INSTRUCTION MANUAL

HI98294 • HI98394

GPS Multiparameter Portable Meters

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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.
Visit 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.

Each meter is delivered in a rugged carrying case and is supplied with:

HI98294	HI98394
• HI7698294/4 Multisensor probe	• HI7698394/4 Autonomously logging multisensor probe
	• HI76983948 Atmospheric pressure box
	• Probe connector protection cover
• 1.5V AA alkaline batteries (4 pcs.)	• 1.5V AA alkaline batteries (8 pcs.)
• HI7698194-1 pH/ORP sensor (pre-installed on the probe) • HI7698594-4 EC/Turbidity sensor (pre-installed on the probe) • HI7698194-2 Galvanic DO sensor (pre-installed on the probe)	
• HI7698296 Long protective probe shield • HI7698293 Long calibration beaker	
• HI9828-20 Quick calibration standard solution (230 mL) • HI9829-16 0 FNU calibration solution (230 mL) • HI9829-17 20 FNU calibration solution (230 mL) • HI9829-18 200 FNU calibration solution (230 mL)	
• HI710036 Protective rubber boot (fitted on meter) • HI920019 USB-C to USB-C cable • Probe maintenance kit includes: DO galvanic membranes, o-rings for DO sensor, o-rings for probe, electrolyte solution for DO sensor, 5 mL syringe, scouring pad, sensor-socket protection*, hex key, small brush, sachet with silicone grease	
• Instrument quality certificate • Sensors and probe quality certificates • Quick reference with QR code for manual download	

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.

* Use when sensor not connected to the probe

2. BATTERY SAFETY

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

⚠ WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if digested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH OF CHILDREN.**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

- 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.

3. GENERAL DESCRIPTION & INTENDED USE

HI98294 and HI98394 are portable logging multiparameter systems (meter and probe) that monitor up to 14 different water quality parameters (7 measured and 7 calculated) such as pH, ORP, turbidity, dissolved oxygen, conductivity, chloride, nitrate, ammonium and temperature. Each parameter is fully configurable.

Both deevices have an internal 12-channel GPS receiver / antenna module that guarantees a position accuracy of 10 m (30 ft). GPS information can be transferred to a PC and can be viewed using GPS mapping software. Clicking on visited locations, using a mapping software, displays the measurement information.

The GPS coordinates are shown on the LCD together with up to 10 measurement parameters, and are recorded with logged data. A 3-bar antenna indicator, in the bottom right corner of the LCD, indicates GPS signal strength.

HI98294 and HI98394 feature a graphic, backlit display that automatically sizes the digits to fit the screen with on-screen graphing capability.

The HI7698294/4 and HI7698394/4 multisensor probes use:

- HI7698194-1 sensor for pH and ORP measurements
- HI7609829-10 (ISE ammonium), HI7609829-11 (ISE chloride), HI7609829-12 (ISE nitrate) can be substituted for pH/ORP sensors
- HI7698194-2 galvanic DO sensor for dissolved oxygen measurements
- HI7698594-4 sensor for turbidity and conductivity (with associated parameters) measurements

The probes have an internal temperature sensor and a removable protective shield.

The HI98X94 system is easy to setup and use.
The built-in tutorial mode guide users step-by-step through sensor preparation, installation, maintenance, and calibration processes.

The meters can log data that can be easily downloaded as a .csv file (or graph) to a type-C, USB flash drive.

HI98294 and HI98394 were designed to withstand harsh environmental conditions and as such are ideal for field measurements. Each meter comes with a protective rubber boot and meets IP67 standard (30 minutes immersion at 1 meter depth). The multisensor probe is totally sealed against water and dust, and meets IP68 standard (continuous immersion in water).

Main Features

- Rugged, water-resistant meter and waterproof probe
- Monitors up to 14 different water quality parameters
- Instantaneous conductivity and turbidity measurements
- Field-replaceable sensors with auto recognition
- Built-in barometer for percent saturation and DO concentration compensation
- Good Laboratory Practice feature, the last 5 calibrations are automatically stored
- Graphical display of logged data on backlit LCD screen
- Log-on-demand and automatic logging on meter for all parameters
- USB-C interface for PC communication

4. SPECIFICATIONS

4.1. SYSTEM SPECIFICATIONS

pH/mV

Range	0.00 to 14.00 pH ±600.0 mV
Resolution	0.01 pH 0.1 mV
Accuracy*	±0.05 pH ±3.0 mV
Calibration	• One point, using HI9828-20 Quick calibration standard solution • Up to three points, using pH 4.01, pH 6.86, pH 7.01, pH 9.18, pH 10.01 standard buffers and one custom buffer

ORP

Range	±2000.0 mV
Resolution	0.1 mV
Accuracy*	±10.0 mV
Calibration	Automatic at one custom point (relative mV)

Dissolved Oxygen (DO)

Range	0.0 to 500.0 % saturation 0.00 to 50.00 ppm (mg/L)
Resolution	0.1 % saturation 0.01 ppm (mg/L)
Accuracy*	• **0.0 to 300.0 %:** ±1.5 % of reading or ±1.0 % whichever is greater; • **300.0 to 500.0 %:** ±3 % of reading; • **0.00 to 30.00 ppm (mg/L):** ±1.5 % of reading or ±0.10 ppm (mg/L) whichever is greater; • **30.00 ppm (mg/L) to 50.00 ppm (mg/L):** ±3 % of reading;
Calibration	• One point, quick calibration in water-saturated air • One or two points, at 100 % and 0 % • One point, using a custom solution (% saturation or mg/L)
Pressure compensation	Automatic 450 to 850 mmHg

* Accuracy is evaluated with a calibrated system at ambient temperature.

Conductivity

Range	0 to 200 mS/cm 0 to 400 mS/cm (absolute)	
Resolution	• **Manual**	1 µS/cm 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm; 1 mS/cm
	• **Automatic**	1 µS/cm from 0 to 9999 µS/cm 0.01 mS/cm from 10.00 to 99.99 mS/cm 0.1 mS/cm from 100.0 to 400.0 mS/cm
	• **Automatic (mS/cm)**	0.001 mS/cm from 0.000 to 9.999 mS/cm 0.01 mS/cm from 10.00 to 99.99 mS/cm 0.1 mS/cm from 100.0 to 400.0 mS/cm
Accuracy**	±1 % of reading or ±1 µS/cm, whichever is greater	
Calibration	• One point, using HI9828-20 Quick calibration standard solution • One point, using 84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm standard solutions or custom point	

Resistivity

Range	0 to 999999 Ω·cm 0 to 1000.0 kΩ·cm 0 to 1.0000 MΩ·cm	depending on resistivity reading
Resolution	1 Ω·cm 0.1 kΩ·cm 0.0001 MΩ·cm	
Calibration	Based on conductivity calibration	

Total Dissolved Solids (TDS)

Range	0 to 400000 ppm (mg/L) Maximum value depends on the TDS factor	
Resolution	• **Manual**	1 ppm (mg/L) 0.001 ppt (g/L); 0.01 ppt (g/L); 0.1 ppt (g/L); 1 ppt (g/L)
	• **Automatic**	1 ppm (mg/L) from 0 to 9999 ppm (mg/L) 0.01 ppt (g/L) from 10.00 to 99.99 ppt (g/L) 0.1 ppt (g/L) from 100.0 to 400.0 ppt (g/L)
	• **Automatic**: ppt (g/L)	0.001 ppt (g/L) from 0.000 to 9.999 ppt (g/L) 0.01 ppt (g/L) from 10.00 to 99.99 ppt (g/L) 0.1 ppt (g/L) from 100.0 to 400.0 ppt (g/L)
Accuracy	±1 % of reading or ±1 ppm (mg/L), whichever is greater	
Calibration	Based on conductivity or salinity calibration	

** Accuracy is evaluated with a calibrated system at ambient temperature.

Salinity

Range	0.00 to 70.00 PSU
Resolution	0.01 PSU
Accuracy	±2% of reading or ±0.01 PSU, whichever is greater
Calibration	One point, using a custom solution

Seawater Sigma

Range	0.0 to 50.0 σ_t, σ_0, σ_{15}
Resolution	0.1 σ_t, σ_0, σ_{15}
Accuracy	±1.0 σ_t, σ_0, σ_{15}
Calibration	Based on conductivity or salinity calibration

Turbidity

Range	0.0 to 99.9 FNU 100 to 1000 FNU
Resolution	0.1 FNU from 0.0 to 99.9 FNU 1 FNU from 100 to 1000 FNU
Accuracy*	±0.3 FNU or ±2 % of reading, whichever is greater
Calibration	Automatic Up to three points, using 0 FNU, 20 FNU, 200 FNU, or custom

Atmospheric Pressure

Range	450.0 to 850.0 mmHg 17.72 to 33.46 inHg 600.0 to 1133.2 mbar	8.702 to 16.436 psi 0.5921 to 1.1184 atm 60.00 to 113.32 kPa
Resolution	0.1 mmHg 0.01 inHg 0.1 mbar	0.001 psi 0.0001 atm 0.01 kPa
Accuracy	±3.0 mmHg within ±15 °C from calibration temperature	
Calibration	Automatic at one custom point	

* Accuracy is evaluated with a calibrated system at ambient temperature.

ISE

Ammonium-Nitrogen	Range	0.02 to 200.0 ppm Am (as NH_4^+-N)
	Resolution	0.01 ppm to 1.00 ppm 0.1 ppm to 200.0 ppm
	Accuracy	±5 % of reading or 2 ppm, whichever is greater
	Calibration	1 or 2 point 10 ppm and 100 ppm
Chloride	Range	0.60 to 200.0 ppm Cl (as Cl^-)
	Resolution	0.01 ppm to 1 ppm 0.1 ppm to 200.0 ppm
	Accuracy	±5 % of reading or 2 ppm, whichever is greater
	Calibration	1 or 2 point 10 ppm and 100 ppm
Nitrate-Nitrogen	Range	0.62 to 200.0 ppm N (as NO_3^--N)
	Resolution	0.01 ppm to 1 ppm 0.1 ppm to 200 ppm
	Accuracy	±5 % of reading or 2 ppm, whichever is greater
	Calibration	1 or 2 point 10 ppm and 100 ppm

Temperature

Range	−5.00 to 55.00 °C 23.00 to 131.00 °F 268.15 to 328.15 K
Resolution	0.01 °C 0.01 °F 0.01 K
Accuracy	±0.15 °C ±0.27 °F ±0.15 K
Calibration	Automatic at one custom point

Meter Specifications

Temperature compensation	Automatic	−5 to 55°C 23 to 131 °F 268.15 to 328.15 K
Logging memory	• Interval logging 50000 total records (meter and probe) • Log-on-demand (all parameters) 15000 total records (meter and probe)	
Logging interval	1 second to 3 hours	
USB-C (host) functions	Mass-storage host	
USB-C (device) functions	Mass-storage device	
Protection rating	IP67	
Environment	0 to 50 °C (32 to 122 °F) RH 100 %	
Battery type	4 × 1.5 V AA alkaline batteries	
Battery life	Meter with no probe, GPS offline Meter with no probe, GPS online Meter with pH/ORP/DO/Turbidity sensors installed, GPS offline Meter with pH/ORP/DO/EC sensors installed, GPS offline Meter with pH/ORP/DO/Turbidity sensors installed, GPS online Meter with pH/ORP/DO/EC sensors installed, GPS online	500 hours 110 hours 100 hours 150 hours 50 hours 70 hours
GPS	12 channel receiver 10 m (30 ft) range	
Dimensions	185 × 93 × 35.2 mm (7.3 × 3.6 × 1.4")	
Weight (with batteries)	435 g (13.3 oz)	

4.2. PROBE SPECIFICATIONS

	HI7698294 Non-logging Probe	HI7698394 Logging Probe
Sensor inputs	pH; pH/ORP EC/Turbidity; EC Dissolved Oxygen	
Sample environment	Fresh, brackish, seawater	
Protection rating	IP68	
Internal battery type	NA	4×1.5V size AA Alkaline batteries
Typical battery life	NA	Interval logging, all channels (no averaging) 1-5 seconds interval » 72 hours 1 minute interval » 22 days 10 minutes interval » 70 days
Memory	NA	Interval logging 50000 records (meter and probe) Log-on-demand (all parameters) 15000 records (meter and probe logs)
Atmospheric pressure box		HI76983948
Operating temperature	−5.0 to 50.0 °C 23.0 to 122.0 °F	
Storage temperature	−20.0 to 70.0 °C −4.0 to 158.0 °F	
Immersion depth	20 m (66')	
Dimensions (without cable)	Length: 342 mm (13.5") Diameter: 46 mm (1.8")	Length: 442 mm (17.4") Diameter: 46 mm (1.8")
Weight (with batteries and sensors)	570 g (20.1 oz.)	775 g (27.3 oz.)
Cable specification	Multistrand-multiconductor shielded cable with internal strength member rated for 90 kg (200 lbs.) intermittent use	
Wetted materials	Body: ABS Threads: Nylon Shield: ABS and 316 stainless steel Temperature probe: 316 stainless steel O-rings: EPDM (ethylene propylene diene monomer)	

SENSOR SPECIFICATIONS

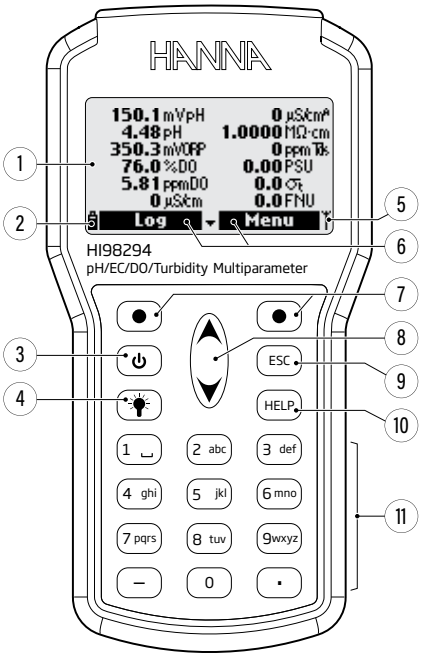
HI7698194-0 pH	Measurement unit	pH mV (pH)
	Measure range	0.00 to 12.00 pH ±600.0 mV (pH)
	Color code	Red
	Operational temperature	−5.0 to 50.0 °C 23.0 to 122.0 °F
	Materials	Tip Glass Junction Wick Body PEI Electrolyte Gel
	Maintenance solution	HI70300 Storage solution
	Reference	Double junction
	Immersion depth	20 m (66')
	Dimensions	Length 118 mm (4.6") Diameter 15 mm (0.6")
HI7698194-1 pH/ORP	Measurement unit	pH mV (pH) mV (ORP)
	Measure range	0.00 to 12.00 pH ±600.0 mV (pH) ±2000.0 mV (ORP)
	Color code	Red
	Operational temperature	−5.0 to 50.0 °C 23.0 to 122.0 °F
	Materials	Tip Glass (pH) and ORP (platinum) Junction Wick Body PEI Electrolyte Gel
	Maintenance solution	HI70300 Storage solution
	Reference	Double junction
	Immersion depth	20 m (66')
	Dimensions	Length 118 mm (4.6") Diameter 15 mm (0.6")

HI7698594-3 EC	Measurement unit	µS/cm, mS/cm
	Measure range	0 to 200.0 mS/cm 0.0 to 400 mS/cm (absolute)
	Color code	Blue
	Operational temperature	−5.0 to 50.0 °C 23.0 to 122.0 °F
	Materials	Electrodes Stainless steel (AISI 316) Body ABS and Epoxy
	Immersion depth	20 m (66’)
	Dimensions	135×35 mm
HI7698594-4 EC/Turbidity	Measurement unit	FNU
	Measure range	0.0 to 1000 FNU
	Color code	Blue
	Operational temperature	−5.0 to 50.0 °C 23.0 to 122.0 °F
	Materials	Electrodes Stainless steel (AISI 316) Body ABS and Epoxy
	Immersion depth	20 m (66’)
	Dimensions	135×35 mm
HI7698194-2 Galvanic Dissolved Oxygen	Measurement unit	% saturation mg/L
	Measure range	0.0 to 500.0 % saturation 0.00 to 50.00 mg/L
	Color code	White
	Operational temperature	−5.0 to 55.0 °C 23.0 to 131.0 °F
	Sensor type	Galvanic
	Materials	Cat/An Ag/Zn Membrane HDPE Body White top ABS CAP
	Immersion depth	20 m (66’)
	Dimensions	Length 99 mm (3.9”) Diameter 17 mm (0.7”)

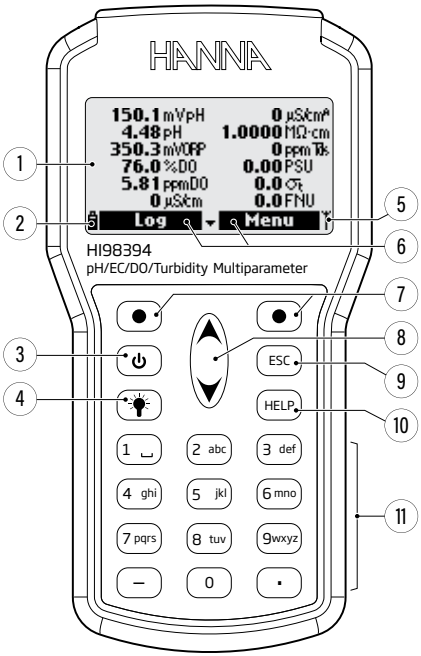
HI7609829-10 **ISE** **Ammonium**	Measurement unit	ppm
	Measure range	0.02 to 200.0 ppm as NH_4^+-N
	Color code	Red
	Operational temperature	0.0 to 40.0 °C 32.0 to 104.0 °F
	Materials	Tip Polymeric liquid membrane Body PEI
	Immersion depth	5 m (16’)
	Dimensions	118×15 mm
HI7609829-11 **ISE** **Chloride**	Measurement unit	ppm
	Measure range	0.60 to 200.0 ppm as Cl^-
	Color code	Red
	Operational temperature	0.0 to 40.0 °C 32.0 to 104.0 °F
	Materials	Tip Solid-state AgCl pellet Body PEI
	Immersion depth	118×15 mm
	Dimensions	5 m (16’)
HI7609829-12 **ISE** **Nitrate**	Measurement unit	ppm
	Measure range	0.60 to 200.0 ppm as NO_3^--N
	Color code	Red
	Operational temperature	0.0 to 40.0 °C 32.0 to 104.0 °F
	Materials	Tip Polymeric liquid membrane Body PEI
	Immersion depth	118×15 mm
	Dimensions	5 m (16’)

5. FUNCTIONAL & KEYPAD DESCRIPTION

HI98294 Front View

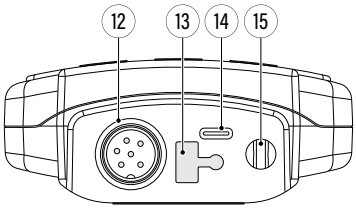


HI98394 Front View



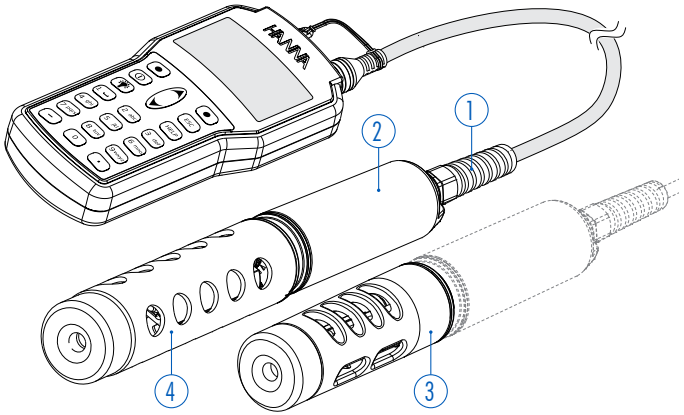
1. Liquid Crystal Display (LCD)
2. Battery level indicator
3. Power (On/Off) key
   Press to turn the meter on or off.
4. Lamp key
   Press to turn the backlight on or off.
5. GPS signal indicator
6. Soft key functions defined on display
7. Functional keys
   Press to perform the function displayed on the screen.
8. Arrow keys, scroll the displayed options and messages
9. ESC key
   Press to return to the previous screen.
10. HELP key
    Press to display the context sensitive help menu.
11. Alphanumeric keypad
    Press to insert alphanumeric codes.

Top View

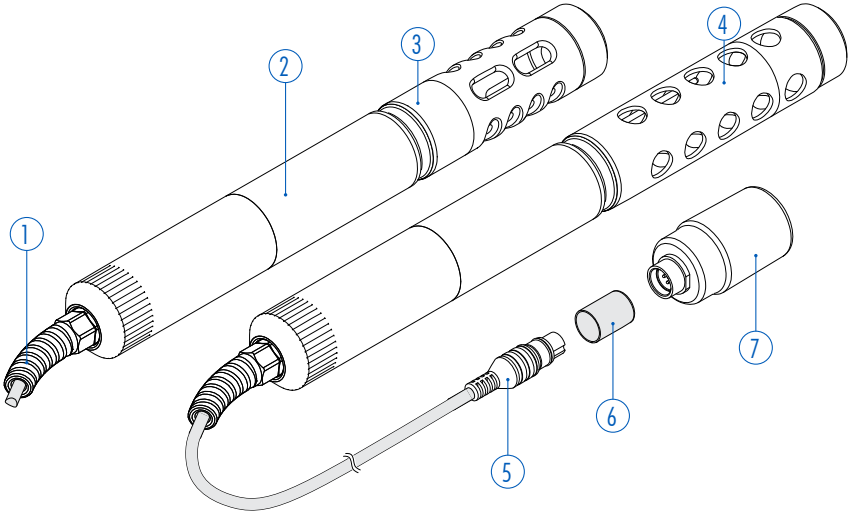


12. Probe connector
13. USB-C protective cap
14. USB-C connector
15. Strap hook

HI7698294/4 Multisensor Probe



HI7698394/4 Multisensor Probe

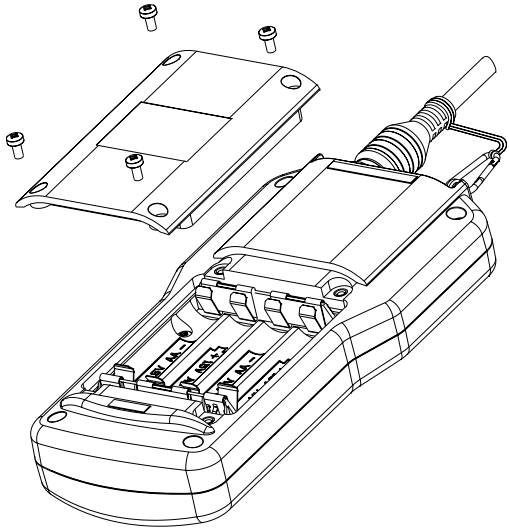


1. Cable strain relief
2. Probe body
3. Short protective shield › HI7698295
   Option when EC/Turbidity sensor is not used.
   Ordered separately.
4. Long protective shield › HI7698296
5. DIN probe connector
6. DIN connector protective cover. Use when the probe is not connected to the instrument or to the pressure box!
7. HI76983948 atmospheric pressure box
   Delivered with HI98394 multisensor probe only.

6. GENERAL OPERATIONS

6.1. METER BATTERY CAPACITY, REPLACEMENT

The meter is supplied with 4 alkaline, 1.5 V AA batteries.
The battery level indicator on the LCD indicates the battery life.
If the battery capacity is less than 10% the indicator is displayed blinking.
If the batteries reach 0%, the symbol is displayed (bottom left corner of the screen). The batteries should be replaced.
The instrument is equipped with the BEPS (Battery Error Prevention System) feature, which automatically turns the instrument off when the batteries reach 0%.



Replacing the batteries:

1. Turn off the instrument.
2. Remove the four screws on the back of the instrument to open the battery compartment.
3. Remove the old batteries.
4. Insert four new 1.5V AA batteries in the battery compartment while paying attention to the correct polarity. Do not mix old and new alkaline batteries.
5. Close the battery compartment using the four screws.

Note: *If the battery capacity is less than 25%, the backlight is no longer available.*

Battery Life

Meter battery life is dependent on connected probe type and sensor configuration.
The table given here estimates meter's battery life connected to a HI7698X94/4 probe.
The logging interval affects meter battery life only when GPS Powersave mode is used (units with GPS).
When HI7698394/4 logging probe is connected, it uses meter's power.

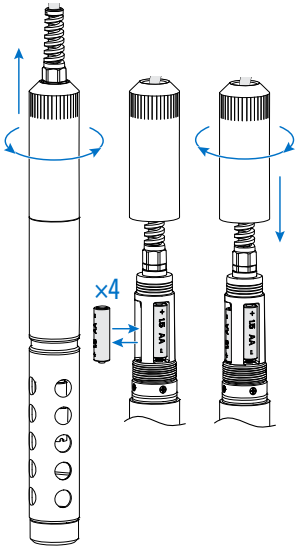
Note: *GPS and backlighting will consume the most power.*

Sensor Configuration	GPS	Battery Life
Meter with no probe	Offline	500 hours
Meter with no probe	Online	110 hours
Meter with pH/ORP/DO/Turbidity sensors installed	Offline	100 hours
Meter with pH/ORP/DO/EC sensors installed	Offline	150 hours
Meter with pH/ORP/DO/Turbidity sensors installed	Online	50 hours
Meter with pH/ORP/DO/EC sensors installed	Online	70 hours

6.2. PROBE BATTERY REPLACEMENT & BATTERY CAPACITY (HI7698394/4 ONLY)

- Turn the probe battery cover counterclockwise to remove.
- Insert four new 1.5V AA batteries in the battery compartment while paying attention to the correct polarity.
- Screw the cover clockwise until flush with the probe body.

Note: *Do not mix old and new batteries.*



Battery Life

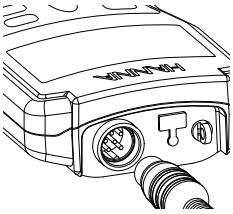
Logging interval	All channels logging (no averaging)	All channels logging (10 sample averaging)
1 - 5 seconds	72 hours	72 hours
1 minute	22 days	11 days
10 minute	70 days	65 days

6.3. CONNECT THE PROBE & GET STARTED

The multiparameter probe is connected to the meter through a waterproof quick connector.
When connected, the probe is automatically detected.

6.3.1. Probe Connection

- With the meter off, connect the probe to the connector on the top of the meter.
- Align the pins and key then push the plug into the socket.
- Wrap attached strap around probe cable and thread through the looped end.



Before taking measurements, complete the following steps:

1. Probe and sensor preparation (See section 6.3.2. Probe and Sensor Preparation)
2. Calibration (See section 8. Calibration)

6.3.2. Probe and Sensor Preparation

Remove the protective shield from the probe and set aside.

pH/ORP Sensor

1. Remove the shipping cap from the pH/ORP sensor.
2. Place the probe with sensors under a stream of water to rinse salt crystals from sensors.
3. Fill calibration beaker partially full of tap water.
   Do not use deionized or distilled water.
4. Screw calibration beaker onto the probe.
5. Support probe in vertical position.
6. Allow the sensors to soak in water for a minimum of 30 minutes (or longer) before attempting calibration.

Ammonium Sensor

- Remove the shipping cap.
- Grip the sensor by the connector and shake down gently to eliminate any trapped air bubbles.
- Soak the sensor in a small amount of HI9829-10 Ammonium standard for at least a ½ hour to condition.

Chloride Sensor

- Remove the shipping cap.
- Grip the sensor by the connector and shake down gently to eliminate any trapped air bubbles.
- Soak the sensor in a small amount of HI9829-12 Chloride calibration standard for at least ½ hour to condition.

Nitrate Sensor

- Remove the shipping cap.
- Grip the sensor by the connector and shake down gently to eliminate any trapped air bubbles.
- Soak the sensor in a small amount of HI9829-14 Nitrate standard for at least a ½ hour to condition.

DO Sensor

The DO probe is shipped dry. To prepare the sensor for use:

- Remove the black and red plastic cap.
  This cap is used for shipping purposes only and can be thrown away.
- Insert the supplied o-ring into the membrane cap.
- Rinse the membrane with some electrolyte solution.
- Refill with clean electrolyte.
  Gently tap the membrane cap to dislodge air bubbles.
  Do not touch the membrane with your fingers or directly tap the membrane.
- With the sensor facing down screw the membrane cap counterclockwise to the end of the threads.
  Some electrolyte will overflow.
- Rinse outside of sensor with deionized water.
- Invert sensor and inspect.
  There should be no bubbles or debris between the membrane and sensor body.

Turbidity and EC Sensor

- Turbidity and EC sensors do not require soaking ahead of time.

6.3.3. Calibration

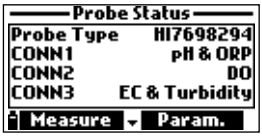
Sensors must be calibrated before taking measurements.

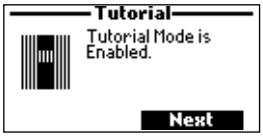
1. Power meter then press **ESC** followed by **Menu**.
2. Select **Calibration**.
3. Use the on board Tutorial and/or Help button to pilot you through the calibration procedures.
   Alternatively, go to section 8. Calibration of this manual for more detailed directions.

6.4. TURN THE METER ON

- Verify the sensors have been installed in the probe.
- Verify the probe has been connected to the meter.
- Press the On/Off key to turn the meter on.
  At start-up the display will show the Hanna Instruments® logo, meter name, and firmware version.

After the initialization has been completed, if the probe is connected, the meter displays the Probe Status or the Tutorial Mode message.
The Probe Status screen identifies the probe and attached sensors.
See section 6.5. Tutorial for information on the Tutorial mode.





- Press **Measure** to view the measurement screen.
- Press **Param.** to open the Parameters menu.
  This screen can also be accessed from the main menu.
- Press the down arrow key to view additional information about the probe i.e. probe ID, probe SN, probe FW.

6.5. TUTORIAL

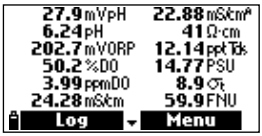
If the tutorial is enabled, after the initialization has been completed, the Tutorial screen is displayed.

- Press **ESC** to view the Probe Status screen and skip the tutorial.
- Press **Next** to start the tutorial.
  The following tutorials are available: Sensor Preparation, Sensor Maintenance, Sensor Installation.

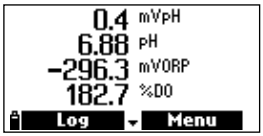
- Press **Select** to view the selected tutorial.

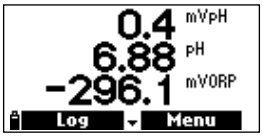
6.6. BASIC OPERATIONS

The main operating modes are setup, measurement, and logging.
The instrument can be configured to display measurement data for all enabled parameters.



- Press the arrow keys to scroll between measured data in all available parameters.
  The display has a feature that automatically sizes the digits to fit the screen.
  With one measurement the digits will be largest.





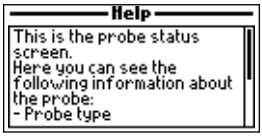
- Press the keys on the alphanumeric keypad (1 - 7) to select number of parameters displayed at one time.

Note: *Pressing 7 will display up to 12 parameters simultaneously. Press down arrow to display any remaining parameters.*

- Press **Measure** for **Log** and **Menu** functional keys to be displayed.
- Press **Log** to view the Log menu.
  Users can log a single measurement of the selected parameter or start an interval log.
  See section 14. Logging for detailed description.
- Press **Menu** to select the measurement parameters.
  See section 7. Parameter Setup for details.
- To calibrate the sensors » see section 8. Calibration.
- To change system settings » see section 10. System Setup.
- To enable or disable GPS and view the meter and probe status, see section 12. Status.

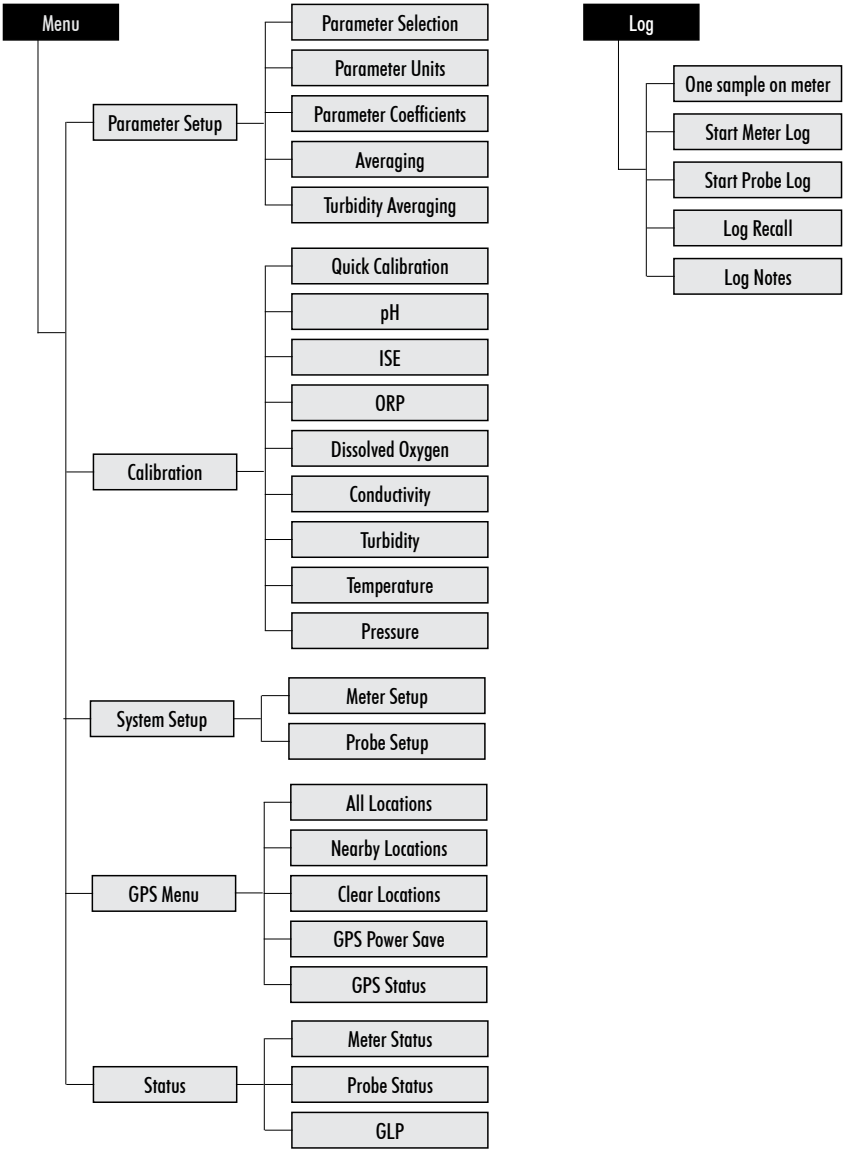
6.7. HELP

- Press the **HELP** key to view the context sensitive help.
- Use the arrow keys to scroll through the text.
- Press the **HELP** or **ESC** key to return to the previous screen.



6.8. METER FUNCTIONAL DIAGRAM

Menu and **Log** functional keys help user navigate through all measurement operations.
The following diagrams present an overview of possible functions.



7. PARAMETER SETUP

- Press **Menu** from the measurement screen.
- Use the arrow keys to highlight "Parameter Setup" then press **Select**.
- Use the arrow keys to highlight the desired option then press **Select**.

Note: *Data saved on the meter will be changed to selected parameter units or coefficients.*

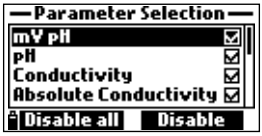
Parameter options and default settings

	Parameter Setup	Options / Range	Default
Parameter Selection	mV pH	Disable or Enable	Disable
	pH	Disable or Enable	Disable
	ORP	Disable or Enable	Disable
	ISE	Disable or Enable	Disable
	% DO saturation	Disable or Enable	Disable
	DO concentration	Disable or Enable	Disable
	Conductivity	Disable or Enable	Disable
	Absolute conductivity	Disable or Enable	Disable
	Resistivity	Disable or Enable	Disable
	TDS	Disable or Enable	Disable
	Salinity	Disable or Enable	Disable
	Seawater	Disable or Enable	Disable
	Turbidity	Disable or Enable	Disable
	Temperature	Disable or Enable	Disable
	Pressure	Disable or Enable	Disable
Parameter Units	Temperature	°C, °F, K	°C
	TDS unit	ppm-ppt, mg/L- g/L	ppm-ppt
	DO concentration unit	ppm DO, mg/L DO	ppm DO
	Pressure unit	psi, mmHg, inHg, mbar, atm, kPa	psi
	Resistivity unit	Ω·cm, KΩ·cm, MΩ·cm	MΩ·cm
	Seawater sigma (σ) unit	σ_t, σ_0, σ_{15}	σ_t
	Distance unit (GPS unit)	m - km, ft - mi	m - km
	EC Res.	Auto, Auto mS/cm, 1 µS/cm, 0.001 mS/cm, 0.01 mS/cm, 0.1 mS/cm, 1 mS/cm	Auto
	Abs. EC Res.	Auto, Auto mS/cm, 1 µS/cm, 0.001 mS/cm, 0.01 mS/cm, 0.1 mS/cm, 1 mS/cm	Auto
	TDS resolution	Auto, Auto ppt, 1 ppm, 0.001 ppt, 0.01 ppt, 0.1 ppt, 1 ppt	Auto
	GPS format	xx°xx'xx.x, xx.xxxxx°, xx°xx.xxx'	xx°xx'xx.x

Parameter Setup		Options / Range	Default
Coefficients	EC Ref. Temp.	25 °C, 20 °C	25 °C
	EC Temp. Coeff.	0.00 to 6.00 %/°C	1.90 %/°C
	TDS Factor	0.00 to 1.00	0.50
Averaging		1 to 20 sample(s)	1 sample
Turbidity Averaging		1 to 20 sample(s)	1 sample

7.1. PARAMETER SELECTION

- Use the arrow keys to scroll through the list of available parameters.
- Press the corresponding functional key to enable or disable selected parameter.
  A checked box indicates that the parameter is enabled.



Note: *When the password protection is enabled, authentication will be required before any parameter modification.*

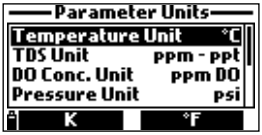
7.2. PARAMETER UNITS

When selected parameters have a single measurement unit, the Parameter Units screen will not be displayed. If a parameter has been disabled the units will not be displayed.

Temperature Unit

Option: °C, °F, K

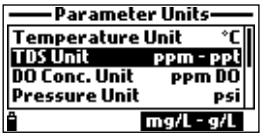
Press the functional key to select the desired temperature unit.



TDS Unit

Option: ppm - ppt or **mg/L - g/L**

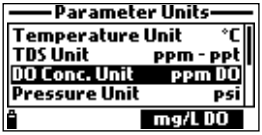
Press the functional key to select the desired TDS unit.



DO Concentration Unit

Option: ppm or **mg/L**

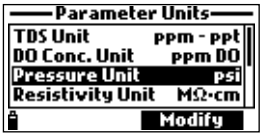
DO concentration is calculated using % saturation, pressure and temperature.
Press the functional key to select the desired DO concentration unit.

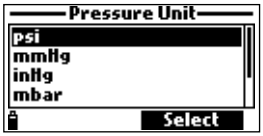


Pressure Unit

Option: psi, mmHg, inHg, mbar, atm, kPa

Press **Modify** and use the arrow keys to select the desired pressure unit.
Press **Select** to confirm or the **ESC** key to return to the previous screen.





Resistivity Unit

Option: Ω·cm, KΩ·cm, MΩ·cm

Resistivity is calculated from the conductivity measurement.
Press the functional key to select the desired resistivity unit.

Seawater Sigma (σ) Unit

Option: σ_t, σ_0, σ_{15}

Seawater sigma is calculated from the conductivity measurement and depends on water pressure, temperature, and salinity.
Press the functional key to select the desired reference temperature (current temperature, 0 °C, or 15 °C).

Distance Unit

Option: m - km (metric) or **ft - mi** (U.S. customary system)
Press the functional key to select a unit for GPS coordinate units.

EC Res. (Resolution)

Option: Auto, Auto mS/cm, 1 µS/cm, 0.001 mS/cm, 0.01 mS/cm, 0.1 mS/cm, 1 mS/cm

Auto

The meter automatically chooses the range (µS/cm or mS/cm) to optimize the measurement.

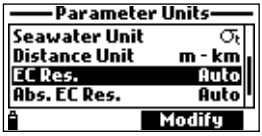
Auto mS/cm

The meter automatically chooses the resolution to optimize the measurement.
Readings are displayed in mS/cm only.
Logged data retains auto units.

Specified numeric resolution

The meter will not autorange.
The measurement will be displayed with the selected measuring unit and decimals.

Press **Modify** and use the arrow keys to select the desired EC resolution.
Press **Select** to confirm or the **ESC** key to return to the previous screen.



Abs. EC Res. (Absolute EC Resolution)

Option: Auto, Auto mS/cm, 1 µS/cm, 0.001 mS/cm, 0.01 mS/cm, 0.1 mS/cm, 1 mS/cm

Auto

The meter automatically chooses the range (µS/cm or mS/cm) to optimize the measurement.

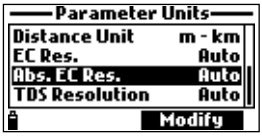
Auto mS/cm

The meter automatically chooses the resolution to optimize the measurement.
Readings are displayed in mS/cm only.
Logged data retains auto units.

Specified numeric resolution

The meter will not autorange.
The measurement will be displayed with selected measuring unit and decimals.

Press **Modify** and use the arrow keys to select the desired absolute EC resolution.
Press **Select** to confirm or the **ESC** key to return to the previous screen.



Note: *A small letter "A" added to the µS/cm or mS/cm unit refers to an absolute conductivity value.*

TDS Resolution

Option: Auto, Auto ppt, 1 ppm, 0.001 ppt, 0.01 ppt, 0.1 ppt, 1 ppt

Auto

The meter automatically chooses the range (ppm or ppt) to optimize the measurement.

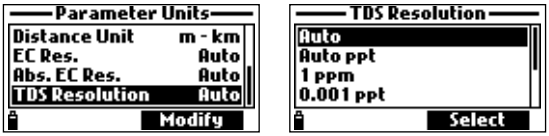
Auto ppt

The meter automatically chooses the resolution to optimize the measurement.
Readings will be in ppt only.

Specified numeric resolution

The meter will not autorange.
The measurement will be displayed with selected measuring unit and decimals.

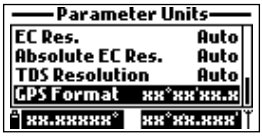
Press **Modify** and use the arrow keys to select the desired TDS resolution.
Press **Select** to confirm or the **ESC** key to return to the previous screen.



GPS Format

Option: xx°xx'xx.x, xx.xxxxx°, xx°xx.xxx'

Press the functional key to select desired format for GPS coordinates.

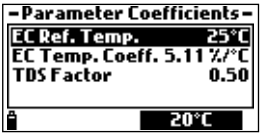


7.3. PARAMETER COEFFICIENTS

EC Ref. Temp. (EC Reference Temperature)

Option: 20 °C or **25 °C**

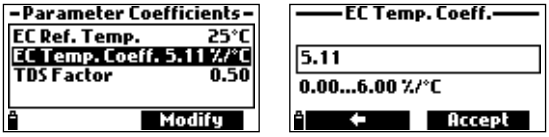
This value is used for temperature compensated conductivity.
All EC measurements will be referenced to the conductivity of a sample at this temperature.
Press the functional key to select the desired EC reference temperature.



EC Temp. Coeff. (EC Temperature Coefficient)

Option: 0.00 to **6.00 %/°C**

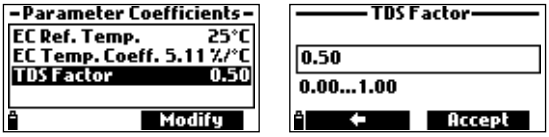
ß is a function of the solution being measured.
For freshwater samples, ß is approximately 1.90 %/°C.
If the actual temperature coefficient of the sample is known, press **Modify** to enter the value.
Press **Accept** to confirm the value or the **ESC** key to return to the previous screen.



TDS Factor

Option: 0.00 to **1.00**

TDS is a calculated value based on the conductivity of the solution (TDS = factor × EC_{25}).
A typical TDS factor for strong ionic solutions is 0.50, while for weak ionic solutions is 0.70 (e.g. fertilizers).
Press **Modify** to enter the value.
Press **Accept** to confirm the value or the **ESC** key to return to the previous screen.



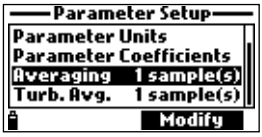
7.4. AVERAGING

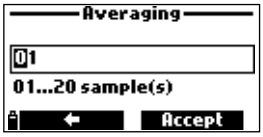
Option: 1 to 20 sample(s)

Averaging is a software filter to minimize measurement noise and provide more stable readings. It is particularly useful to get a representative reading of the "average" value from flowing water. Averaging will affect all measurements.

Note: *If a fast response is needed, this value should be kept low.*

Press **Modify** to select the number of samples to average.
Press **Accept** to confirm the value or the **ESC** key to return to the previous screen.





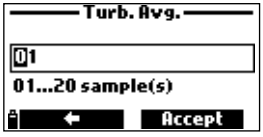
Note: *When logging the first sample using averaging, it will be delayed by a few seconds.*

7.5. TURBIDITY AVERAGING

Option: 1 to 20 sample(s)

Turbidity averaging is software filter to minimize noise and provide more stable turbidity readings. It is particularly useful to get a representative reading of the "average" value from flowing water. Turbidity averaging will not affect other measurements and can be configured separately because the optical turbidity sensor is more strongly affected by bubbles and debris in the water stream than the other sensors.

- Press **Modify** to select the number of samples to average.
- Press **Accept** to confirm the value or the **ESC** key to return to the previous screen.



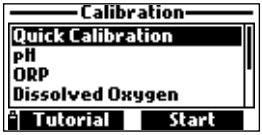
8. CALIBRATION

- Press **Menu** from measurement screen.
- Use the arrow keys to highlight **Calibration** then press **Select**.
- Use the arrow keys to highlight the desired option then press **Select**.

All calibration data is stored in the non volatile probe memory, allowing probes to be connected to different meters without recalibration.

Calibration Options

- **Quick calibration:** A single point pH, conductivity, and/or dissolved oxygen calibration
- **Single parameter calibration:** Allows each parameter to be calibrated individually.



Note: *The password will be required if password protection is enabled.*

Calibration Guidelines

- 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.
- Avoid exposure of sensors to bright sunlight. If possible, calibrate indoors.
- Discard standards after use.
  Do not return the used standards to the bottles of "fresh" solution.
- For measurements across a temperature gradient (when water temperature is drastically different from the standards), allow the sensors to reach thermal equilibrium before conducting calibrations or making measurements.

  Note: *The heat capacity of the probe is much greater than the air and the small beakers of calibration standards.*
- During calibration the temperature probe should also be in the calibration solution.

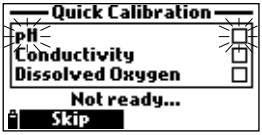
8.1. QUICK CALIBRATION

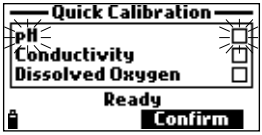
The quick calibration provides a single point calibration for pH, EC, and DO. Users can select to calibrate all sensors or any sensor combination.

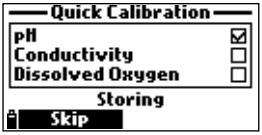
Press **Skip** to escape a sensor calibration and move to next in series.

Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

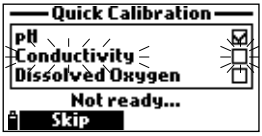
1. Remove the shield from the probe and rinse the probe with purified water.
2. Fill the calibration beaker ⅔ full of HI9828-20 calibration solution.
3. Immerse the sensors in the calibration solution. Raise and lower the probe several times. Discard the solution.
4. Refill the calibration beaker ⅔ full with HI9828-20 calibration solution.
5. Slowly place the sensors in the solution and dislodge bubbles that may adhere to the sensors. Screw the calibration beaker completely onto the probe body. Some solution may overflow!
6. Wait a few minutes for the measurement to stabilize. From the **Calibration** menu select **Quick Calibration** then press **Start**. A three item calibration menu will appear. "pH" will start to blink along with the "Not ready" message.
7. The "Ready" message will appear when the pH reading has stabilized. Press **Confirm** to store the calibration point. The "Storing" message and a check mark will appear in the box next to "pH" to indicate a successful calibration.

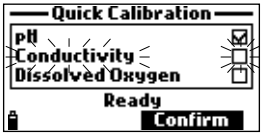


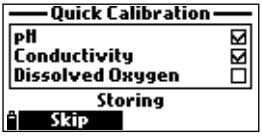




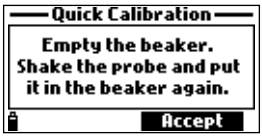
8. "Conductivity" will start to blink along with the "Not ready" message.
9. The "Ready" message will appear when the EC reading has stabilized. Press **Confirm** to store the calibration point. The "Storing" message and a check mark will appear in the box next to "Conductivity" to indicate a successful calibration.



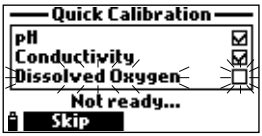


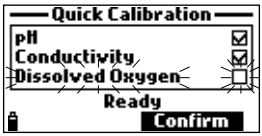


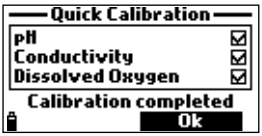
10. The message "Empty the beaker. Shake the probe and put it in the beaker again" will appear. Unscrew the calibration beaker and discard the solution.



11. Shake any remaining solution off the probe. No droplets should remain on the DO sensor membrane.
    Note: *Do not wipe the DO sensor as damage to the membrane may occur.*
12. Screw the empty calibration beaker on the probe body. The beaker should not be dry.
13. Press **Accept**.
    "Dissolved Oxygen" will start to blink along with the "Not ready" message.
14. The "Ready" message will appear when the DO reading has stabilized.
    Press **Confirm** to store the calibration point.
    The "Calibration complete" message and a check mark will appear in the box next to "Dissolved Oxygen" to indicate a successful calibration.



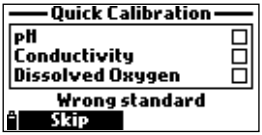




15. Press **Ok** to return to the calibration menu.

Note: *To exit the quick calibration procedure, press ESC key at any time.*

Error Message

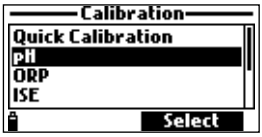


"Wrong standard" is displayed when the input is not within the acceptable range.

8.2. pH CALIBRATION

Calibration Options

Calibrate pH	The user can perform a new calibration using up to 3 buffers. Option to select from pH 4.01, 6.86, 7.01, 9.18, 10.01; or use a custom buffer. For a three-point calibration, new data overwrites existing calibration points. With a single or two-point calibration the meter will also use information from the previous calibration, if available.
Restore Factory Calib.	The user should restore the factory calibration if a new pH sensor is installed. Some messages displayed during calibration are based on previous calibration data. A user calibration should follow immediately.

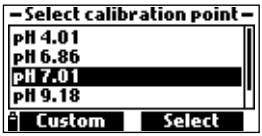


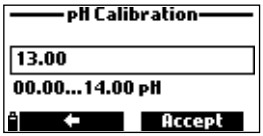
Procedure

Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

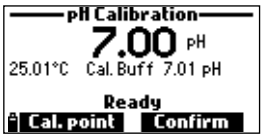
1. Remove the shield from the probe and rinse the probe with purified water.
2. Fill the calibration beaker ⅔ full with the first buffer solution.
3. Immerse the sensors in the buffer solution.
   Raise and lower the probe several times.
   Discard the solution.
4. Fill the calibration beaker ⅔ full with the first buffer solution.
5. Slowly place the sensors in the selected buffer.
   Dislodge bubbles that may adhere to the sensors.
6. Screw the calibration beaker completely onto the probe body.
   Some solution may overflow!
7. Wait a few minutes for the measurement to stabilize.
8. Use the arrow keys to select **Calibrate pH** from the pH Calibration list.
9. Press **Start** to start the calibration.
   The temperature, pH buffer value, and the "Not ready" message are displayed.
10. If necessary, press **Cal. point** to select the correct buffer.
11. To use a custom buffer, press **Custom**.
    A text box window will appear. Use the keypad to enter the value of the buffer (0.00 to 14.00 pH) at the current temperature.

12. Press **Accept** to confirm the buffer value.





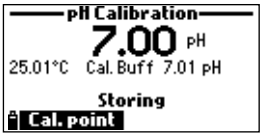
13. Once the reading has stabilized the countdown timer will count down until the display shows the "Ready" message.
    Press **Confirm** to accept the calibration point.



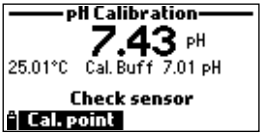
14. After the calibration point is confirmed, to avoid cross-contamination, empty and rinse the calibration beaker.
15. Immerse the sensors in the next calibration buffer rinse solution and stir gently.
16. Repeat the calibration procedure outlined above with the second and third buffers.

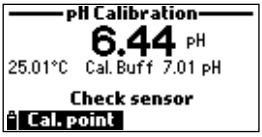
    Note: *To save a one or two-point calibration press the ESC key after the buffer is confirmed. The message "Storing" followed by "Calibration completed" will be displayed.*

17. After the third buffer has been confirmed, the message "Storing" followed by "Calibration completed" will be displayed.
18. Press **Ok** to return to the calibration menu or **Measure** to return to the measurement screen.



Error Messages

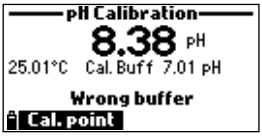




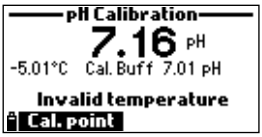
"Check sensor" is displayed when:

- the electrode is broken, very dirty, or the user has attempted to calibrate the same buffer value twice.
- an erroneous slope condition has been detected i.e. the slope difference between the current and previous calibration exceeds the slope window (80% to 110%).

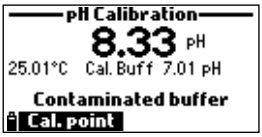
Press **Clear** to cancel the old data and continue the calibration procedure, Alternatively, press **ESC** key to exit the pH calibration mode.



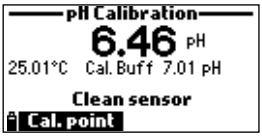
"Wrong buffer" is displayed when the pH reading is too far from the selected buffer value.
This is often seen immediately after a buffer calibration has been completed but before the pH sensor has been moved to the next buffer.
Check if the correct calibration buffer has been selected.



"Invalid temperature" is displayed when the buffer temperature is outside the acceptable range.



"Contaminated buffer" is displayed when the buffer is contaminated, or the sensor is broken or very dirty.



"Clean sensor" is displayed when the electrode is broken or very dirty.

8.3. ORP CALIBRATION

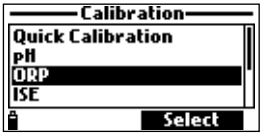
ORP calibration is used to compensate for changes in the potential due to contamination of the sensing surface and drift in the reference electrode.
Calibration is not typically required but it does establish a baseline that can be used for future validations.

Note: *ORP values are not temperature compensated and can change with temperature.*
ORP values should be reported with the reference electrode used and the temperature.
The HI7698194-1 reference is a Ag/AgCl reference with Cl-activity equivalent to 3.5M KCl.

Calibration Options

Custom ORP The user can perform a single point calibration using a custom point.

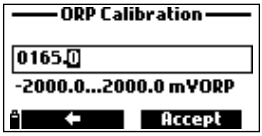
Restore Factory Calib. The user should restore the factory calibration if a new sensor has been installed.



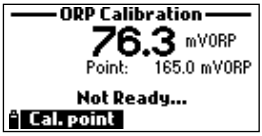
Procedure

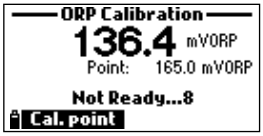
Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

1. Remove the shield from the probe and rinse the probe with purified water.
2. Fill the calibration beaker ⅔ full of the ORP test solution for rinsing.
3. Immerse the sensors in the solution.
   Raise and lower the probe several times.
   Discard this solution.
4. Fill the calibration beaker ⅔ full of the ORP test solution with a known ORP value.
5. Slowly place the sensors in the solution. Dislodge bubbles that may adhere to the sensors.
6. Screw the calibration beaker completely onto the probe body.
   Some solution may overflow!
7. Wait a few minutes for the measurement to stabilize.
8. Use the arrow keys to select **Custom ORP**.
9. Press **Start** to start the calibration.
   A text box window will appear. Use the keypad to enter the value of the solution at the current temperature.
10. Press **Accept** to confirm the calibration point.



11. The stability counter will count down until the display shows the "Ready" message.





12. Press **Confirm** to accept the calibration point.
    The message "Storing" followed by "Calibration completed" will be displayed.

13. Press **Ok** to return to the calibration menu or **Measure** to return to the measurement screen.

Error Message

"Wrong standard" is displayed when the ORP input is not within the acceptable range.

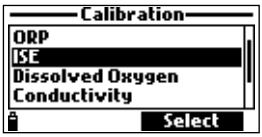
8.4. ISE CALIBRATION

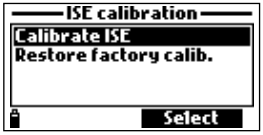
Calibrate ISE

The user can perform a single point calibration (10 ppm) or a two-point calibration (10 ppm and 100 ppm).
For a two-point calibration, new data overwrites existing calibration points.
With a single-point calibration the meter will also use information from the previous calibration, if available.

Restore factory calib.

The user should restore the factory calibration if a new sensor has been installed.





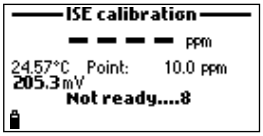
Note: *The ppm tag is displayed blinking when no user calibration.*

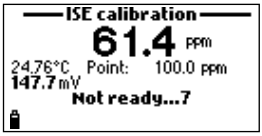
8.4.1. Preparation

Prepackaged ISE calibration standards are available in single-use sachets.
Rinse the ISE sensor with water and shake off excess water.
ISE calibration requires 10 ppm calibration standard first.

8.4.2. Procedure

- Cut open the 10 ppm sachet.
- Pour a small quantity of standard over the ISE tip to rinse the sensor.
  Rinsing should be done over a waste container.
- Immerse the ISE sensor and temperature probe into the standard.
  Position the sachet to ensure sensor membrane and ceramic junction are completely covered with solution.
  Current measurement (or dashes), temperature value, the standard value used for calibration, the "Not ready" message are displayed.





- Once the measure has stabilized, the countdown timer will count down until "Ready" message is on display.
- Press **Confirm** to accept the calibration point.
- Remove sensor from the 10 ppm sachet packet and shake standard off.
  Blot excess with a soft tissue.
- Cut open the 100 ppm sachet.
- Immerse the ISE sensor and temperature probe into the standard.
  Position the sachet to ensure sensor membrane and ceramic junction are completely immersed in solution.
  A value close to 100 ppm and "Not ready..." message are displayed.
- When the reading is stable, the countdown timer will count down until "Ready" message is on display.

- Press **Confirm** to accept the calibration.
  "Storing" message is displayed followed by "Calibration completed".
- Press **OK** to return to the Calibration menu.
- Press **Measure** to return to the measurement screen.

Note: *Press **ESC** key to exit calibration.*

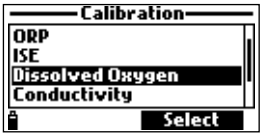
8.5. DISSOLVED OXYGEN CALIBRATION

The accuracy of dissolved oxygen measurement is directly related to the sensing surface cleanliness and calibration technique. Oily coatings and biological contaminations are the primary cause of calibration drift.
A standard solution or a reference DO meter may be used to compare readings during calibration.

Calibration Options

% DO Saturation	The user can perform a one or two-point calibration using 100 % and 0 % saturation or a one-point calibration using a custom solution (50 to 500 % saturation).
DO Concentration	The user can perform a single point calibration using a custom point.
Restore Factory Calib.	The user can restore the factory calibration if a new sensor has been installed.

Note: *When the % DO range is calibrated, the DO concentration range is also calibrated, and vice versa.*



Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

% DO Saturation Calibration

- Remove the shield from the probe and rinse the probe with purified water.
- Shake any remaining solution off the probe.
  No droplets should remain on the DO sensor sensing surface.

Calibration at 100 % Saturation

Note: *Do not calibrate the DO sensor in dry air!*

1. To calibrate at 100 %, fill the calibration beaker with approximately 4 mm (5⁄32") of water and screw it onto the probe. The membrane should not be wet.
   This condition corresponds to air 100 % saturated with oxygen and water vapor.
2. Press **Start** to start the calibration.
   The reading, temperature, calibration point, and the "Not ready" message are displayed.

3. Once the reading has stabilized the countdown timer will count down until the "Ready" message is displayed.
   Press **Confirm** to accept the calibration point.

Calibration at 0 % Saturation

1. Mix the HI7040 bicomponent Zero oxygen solution.
2. Fill the calibration beaker ⅔ full.
3. Slowly place the sensors in the solution.
   Dislodge bubbles that may adhere to the sensors.
4. Screw the calibration beaker completely onto the probe body.
   Some solution may overflow!
5. The stability timer will count down until the display shows the "Ready".
   Press **Confirm** to accept the calibration point.
   The message "Storing" followed by "Calibration completed" will be displayed.
6. Press **Ok** to return to the calibration menu or **Measure** to return to the measurement screen.

Notes: *To save a one calibration press the ESC key after the standard is confirmed.*

Single point Calibration at 100 %, 0 %, or Custom value

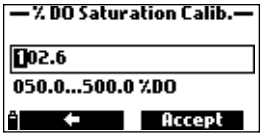
1. Calibrate at 100.0%

- Select **Cal.point** then select 100.0%.
- Follow steps 1–3 from **Calibration at 100% Saturation** section.
- Press **Confirm** when "Ready" message appears.

2. Calibrate at 0.0%

- Select **Cal.point** then select 0.0%.
- Follow steps 1–6 from **Calibration at 0 % Saturation** section.
- Press **Confirm** when "Ready" message appears.

3. Calibrate with Custom value
- Place probe in the water sample needed for calibration.
- Determine the value of the water sample independently.
- Select **Cal.point** then select **Custom**.
- A text box will appear.
  Use the keypad to enter the % Saturated value.
- Press **Accept**.



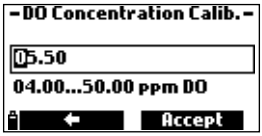
- The following messages will appear: "Storing" and "Calibration completed".
- Press **Ok** to return to the "Calibration" menu.
- Press **ESC** twice to return to the main menu.
- Press **Measure** to return to the measurement screen.

DO Concentration Calibration

1. Remove the shield from the probe and rinse the probe with purified water.
2. Fill the calibration beaker ⅔ full of the test solution.

Note: *The concentration of the solution should be determined independently.*

3. Immerse the sensors in the solution.
   Raise and lower the probe several times then discard this solution.
   Alternately, place probe directly in the water sample needed to calibrate in.
4. Refill the calibration beaker ⅔ full of the test solution.
5. Slowly place the sensors in the solution.
   Dislodge bubbles that may adhere to the sensors.
6. Only engage the calibration beaker one or two threads onto the probe body!
   Some solution may overflow!
7. Wait a few minutes for the measurement to stabilize.
8. Use the arrow keys to select **DO Concentration** from DO Calibration list.
9. Press **Start** to start the calibration.
10. A text box window will appear.
    Use the keypad to enter the value of the standard.
11. Press **Accept** to confirm.



12. The stability timer will count down until the display shows the "Ready" message.

13. Press **Confirm** to accept the value.
    The message "Storing" followed by "Calibration completed" will be displayed.

14. Press **OK** to return to the calibration menu or **Measure** to return to the measurement screen.

Error Messages

"Invalid temperature" is displayed when the temperature input is not within the acceptable range i.e. 0 to 50 °C.

"Wrong standard" is displayed when the DO input is not within the acceptable range.

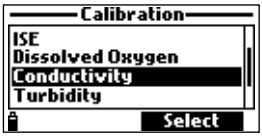
8.6. CONDUCTIVITY CALIBRATION

Conductivity calibrations are used to correct for variations in cell factors.
Oily coatings and biological contaminations can cause changes in the cell geometry.
The EC electrodes are located inside two small channels on the bottom of the sensor. They can be cleaned with the small brush from the maintenance kit. A mild detergent can be used to remove oily coatings. Flush the electrodes with water thoroughly after cleaning.

Calibration Options

Conductivity	The user can perform a one-point calibration using a standard solution. The calibration is temperature compensated. ***Note:*** *for best results select a conductivity standard closest to the water samples being measured.*

Absolute Conductivity	The user can perform a one-point calibration with a known conductivity solution that is not temperature compensated.
Salinity	The user can perform a one-point calibration with a known salinity solution (PSU).
Restore Factory Calib.	The user can restore the factory calibration if a new sensor has been installed.

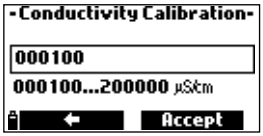


Note: *The probe shield or calibration beaker must be used during calibration.*
When the Conductivity is calibrated, also the Absolute Conductivity and Salinity is calibrated (and vice versa). A Conductivity calibration is recommended.

Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

Conductivity Calibration

1. Remove the shield from the probe and rinse the probe with purified water.
2. Fill the calibration beaker ⅔ full with the conductivity standard solution.
3. Immerse the sensors in the solution.
   Raise and lower the probe several times then discard this solution.
4. Refill the calibration beaker ⅔ full with the conductivity standard solution.
5. Slowly place the sensors in the solution.
   Dislodge bubbles that may adhere to the sensors.
6. Screw the calibration beaker completely onto the probe body.
   Some solution may overflow!
7. Use the arrow keys to select **Conductivity** from the Conductivity Calibration list.
8. Press **Start** to start the calibration.
9. If necessary, press **Cal. point** to select the correct standard.
10. To enter a user-defined standard, press **Custom**.
    A text box window will appear.
    Use the keypad to enter the value of the standard (100 to 200000 µS/cm) at the current temperature.
11. Press **Accept** to confirm the standard value.



12. Once the reading has stabilized, the stability timer will count down until the display shows the "Ready" message.

13. Press **Confirm** to save the calibration.
    The message "Storing" followed by "Calibration completed" will be displayed.
14. Press **Ok** to return to the calibration menu or **Measure** to return to the measurement screen.

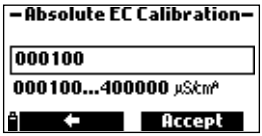
To Calibrate Offset

1. Remove the shield from the probe and rinse the probe with purified water.
2. Shake all water from the probe.
3. Use a tissue to dry off the EC sensor. There should be no moisture in or on the sensor.
4. Suspend the probe in the air (infinite resistance).
5. Press **Start** to initiate the calibration.
6. Press **Cal point** and use the arrow keys to choose 0 μS/cm.
7. Press **Select**.
   Once the reading has stabilized, the stability timer will count down until the display shows the "Ready" message.
8. Press **Confirm**. "Calibration Complete" will be displayed.
9. Press **OK** to return to the calibration menu

Absolute Conductivity (EC) Calibration

1. Remove the shield from the probe and rinse the probe with purified water.
2. Fill the calibration beaker ⅔ full of the test solution with known concentration.
3. Immerse the sensors in the solution. Raise and lower the probe several times then discard this solution.
4. Refill the calibration beaker ⅔ full of the test solution with known concentration.
5. Slowly place the sensors in the solution. Dislodge bubbles that may adhere to the sensors.
6. Screw the calibration beaker completely onto the probe body.
   Some solution may overflow!
7. Wait a few minutes for the measurement to stabilize.
   Use the arrow keys to select **Absolute Conductivity** from the Conductivity Calibration list.
8. Press **Start** to start the calibration.
   A text box window will appear.
   Use the keypad to enter the value of the standard (100 to 200000 μS/cm) at the current temperature.

9. Press **Accept** to confirm the standard value.



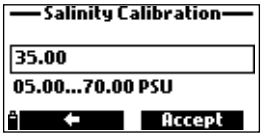
10. The stability counter will count down until the display shows the "Ready" message.

11. Press **Confirm** to save the calibration.
    The message "Storing" followed by "Calibration completed" messages will be displayed.
12. Press **Ok** to return to the calibration menu or **Measure** to return to the measurement screen.

Salinity Calibration

The measurement of salinity is based on the Practical Salinity Scale which uses the EC measurement.
If the user has a standard with known PSU value, it may be used to calibrate the conductivity sensor.

1. Remove the shield from the probe and rinse the probe with purified water.
2. Fill the calibration beaker ⅔ full with salinity standard of a known value.
3. Immerse the sensors in the solution.
   Raise and lower the probe several times then discard this solution.
4. Refill the calibration beaker ⅔ full with the salinity standard.
5. Slowly place the sensors in the solution. Dislodge bubbles that may adhere to the sensors.
6. Screw the calibration beaker completely onto the probe body.
   Some solution may overflow!
7. Wait a few minutes for the measurement to stabilize.
   Use the arrow keys to select **Salinity** from the Conductivity Calibration list.
8. Press **Start** to start the calibration.
   A text box window will appear.
   Use the keypad to enter the value of the standard (5.00 to 70.00 PSU) at the current temperature.
9. Press **Accept** to confirm the standard value.



10. The stability counter will count down until the display shows the "Ready" message.

11. Press **Confirm** to save the calibration. The message "Storing" followed by "Calibration completed" will be displayed.
12. Press **Ok** to return to the calibration menu or **Measure** to return to the measurement screen.

Error Messages

"Invalid temperature" is displayed when the temperature input is not within the acceptable range (0 to 50 °C).

"Wrong standard" is displayed when the conductivity input is not within the acceptable range.

8.7. TURBIDITY CALIBRATION

The HI7698594-4 sensor conforms to ISO 7027 standard.
For best results a three-point calibration (indoors) at 0.0 FNU, 20.0 FNU, and 200.0 FNU is recommended. Hanna Instruments® turbidity standards are StDVB polymer standards that have been specifically formulated for this sensor and meter. The StDVB polymer standards are available in ready-to-use concentrations to ensure accurate turbidity calibrations and measurements.

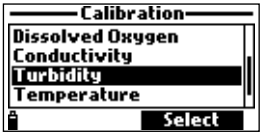
See 16. Accessories for information regarding Hanna Instruments calibration solutions.

Note: *Turbidity standard formulations made with polystyrene beads are instrument-specific and cannot be substituted with standards made for another turbidity sensor.*

Calibration Options

Calibrate Turbidity The user can perform a new calibration in up to three calibration points (0.0, 20.0, 200.0 FNU).

Restore Factory Calib. Clears previous user calibration.

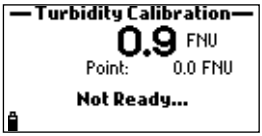


Verify the sensor is clean before calibrating.
Use the HI7698293 calibration beaker for calibration. Calibrate indoors for best results.
Calibrate every time the sensor is replaced and as part of yearly validation routine.

Procedure

Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

1. Remove the shield from the probe. Rinse the probe with purified water.
2. Pour quantities of selected standard solutions into clean beakers for rinse.
3. Fill the HI7698293 calibration beaker 2/3 full of zero standard.
4. Immerse the turbidity sensor into zero rinse beaker and then shake off excess solution.
5. Place the sensor into the calibration beaker. Dislodge bubbles that may adhere to the sensors.
6. Screw the calibration beaker completely onto the probe body.
   Some solution may overflow!
7. Wait a few minutes for the measurement to stabilize.
8. Use the arrow keys to select **Calibrate turbidity** from the Turbidity Calibration list.
9. Press **Start** to start the calibration.
   The turbidity standard value and the "Not ready" message are displayed.
10. Once the reading has stabilized, the display shows the "Ready" message.



11. Press **Confirm** to accept the calibration point.
12. After the calibration point is confirmed, to avoid cross-contamination, immerse the sensors in the next calibration standard rinse solution and stir gently.
13. Repeat the calibration procedure outlined above with 20.0 FNU and 200.0 FNU standards.

Note: *To save a one or two-point calibration, press the ESC key after the standard is confirmed. The message "Storing" followed by "Calibration completed" will be displayed.*

A one-point calibration is only recommended to update the offset of a previous two or three-point calibration. A two-point calibration is only recommended when the expected turbidity readings are below 40.0 FNU.

14. After the third point has been confirmed, the message "Storing" followed by "Calibration completed" will be displayed.
15. Press **OK** to return to the calibration menu or **Measure** to return to the measurement screen.

Error Messages

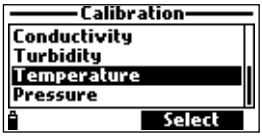
"Wrong standard" is displayed when the turbidity input is not within the acceptable range.

8.8. TEMPERATURE CALIBRATION

Calibration Options

Calibrate Temperature The user can perform a single point calibration.
Note: *Temperature calibration should be made prior to sensor calibration.*

Restore Factory Calib. Clears previous user calibration.

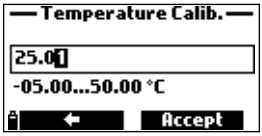


Procedure

Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

1. Remove the shield from the probe. Rinse the probe with purified water.
2. Place the probe in an isothermal bath with a reference instrument.
3. Allow the probe to come to thermal equilibrium.
4. Use the arrow keys to select **Calibrate Temperature** from Temperature Calibration list.
5. Press **Start** to start the calibration.
6. A text box window will appear.
   Use the keypad to enter the calibration temperature (−5 to 50 °C).

7. Press **Accept** to confirm the value.



8. The stability timer will count down until the display shows the "Ready" message.

9. Press **Confirm** to store the calibration point. The message "Storing" followed by "Calibration completed" is displayed.

10. Press **OK** to return to the calibration menu or **Measure** to return to the measurement screen.

Error Message

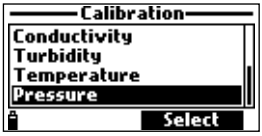
"Wrong standard" is displayed when the temperature input is not within the acceptable range.

8.9. PRESSURE CALIBRATION

Calibration Options

Custom Pressure The user can perform a single point calibration.
Note: *Pressure calibration should be made prior to DO sensor calibration.*

Restore Factory Calib. Clears previous user calibration.

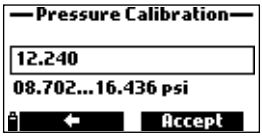


Procedure

Note: *If the tutorial mode is enabled, press Tutorial and follow the messages on the screen.*

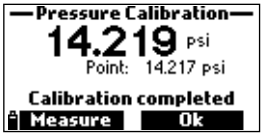
1. Use a reference barometer to obtain the true local barometric pressure reading.
2. Use the arrow keys to select **Custom Pressure** from Pressure Calibration list.

3. Press **Start** to start the calibration.
4. A text box window will appear.
   Use the keypad to enter the calibration pressure in units of psi (8.702 to 16.436 psi).
5. Press **Accept** to confirm the standard value.



6. The stability counter will count down until the display shows the "Ready" message.
7. Press **Confirm** to store the calibration point.

8. After confirmation, the message "Storing" followed by "Calibration completed" will be displayed.



9. Press **OK** to return to the calibration menu or **Measure** to return to the measurement screen.

Error Message

"Wrong standard" is displayed when the atmospheric pressure input is not within the acceptable range.

9. MAINTENANCE

9.1. GENERAL MAINTENANCE

- Inspect all sensor connectors for corrosion. Replace sensors if necessary.
- Inspect sensor o-ring for nicks or other damage. Replace the o-ring if necessary.

⚠ Use only the supplied grease as some lubricants can cause the o-ring to expand.

- After prolonged storage or cleaning, calibrate the sensor.
- After use rinse the probe with tap water and dry it.
- Keep the pH electrode bulb moist.

9.2. SENSOR MAINTENANCE

For correct sensor maintenance:

1. Unscrew to remove the protective shield from the probe body and set aside.
2. Use the calibration beaker for cleaning
3. Use supplied probe maintenance kit. See section 16. Accessories for details.

Note: *If the sensors are removed from the probe body, the body of the sensors must be dried prior to installation to prevent water from entering the sockets.*

9.2.1. pH and pH/ORP

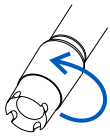
- Remove the sensor protective shield.
- If the bulb and/or junction are dry, soak the electrode in HI70300 Storage solution for at least 30 minutes.
- To ensure a quick response time, the glass bulb and the junction should be kept moist and not allowed to dry. Store the sensor with a few drops of HI70300 Storage solution or pH 4.01 buffer in the protective cap. Tap water may also be used for a very short period (few days).

⚠ Never use distilled or deionized water to store pH sensors.

- Inspect the sensor for scratches or cracks. If any are present, replace the sensor.
- Rinse the sensor in flowing water then clean by soaking it for 1 minute in HI70670 Cleaning solution for mineral deposits or HI70671 Cleaning and disinfection solution for algae, fungi, and bacteria. After cleaning, soak the sensor in HI70300 Storage solution for 30 minutes before calibrating.

9.2.2. Dissolved Oxygen

It is generally recommended to replace the membrane every 2 months and the electrolyte monthly.



- Turn the membrane counterclockwise to unscrew.
- Rinse a spare membrane with some electrolyte while shaking it gently.
- Refill with clean electrolyte.
- Gently tap the cap over a surface to ensure that no air bubbles remain trapped. Avoid touching the membrane.
- With the sensor facing down, screw the membrane cap clockwise. Some electrolyte will overflow.

- If any deposit scales the sensor, gently brush the sensor surface with the supplied brush, while paying attention to not damage the plastic body.
  Do not use the brush on the membrane.

9.2.3. EC

- After every series of measurements, rinse the probe with tap water.
- If a more thorough cleaning is required, clean the sensor with the supplied brush or a non-abrasive detergent.
  Ensure that the two cylindrical holes in the sensor are free of foreign material.

9.2.4. EC/Turbidity

Rinse the probe with tap water after measurements.
If a more thorough cleaning is required:

- Clean the sensor with brush to loosen any debris.
- Use a mild detergent to remove oily coatings.
- Ensure that the cylindrical holes in the sensor are free of foreign material.
- Flush with water after cleaning.

9.2.5. ISE

- Rinse ISE sensor with tap water to remove coatings.
- Shake down the sensor to eliminate trapped air bubbles.
- Soak the electrode in 10 ppm calibration solution for at least ½ hour prior to calibration.
- When not in use, store dry in protective cap.
- Long-term storage:
  Rinse the electrodes with water.
  Shake off the excess water.
  Replace the storage cap to prevent evaporation of the reference electrolyte.

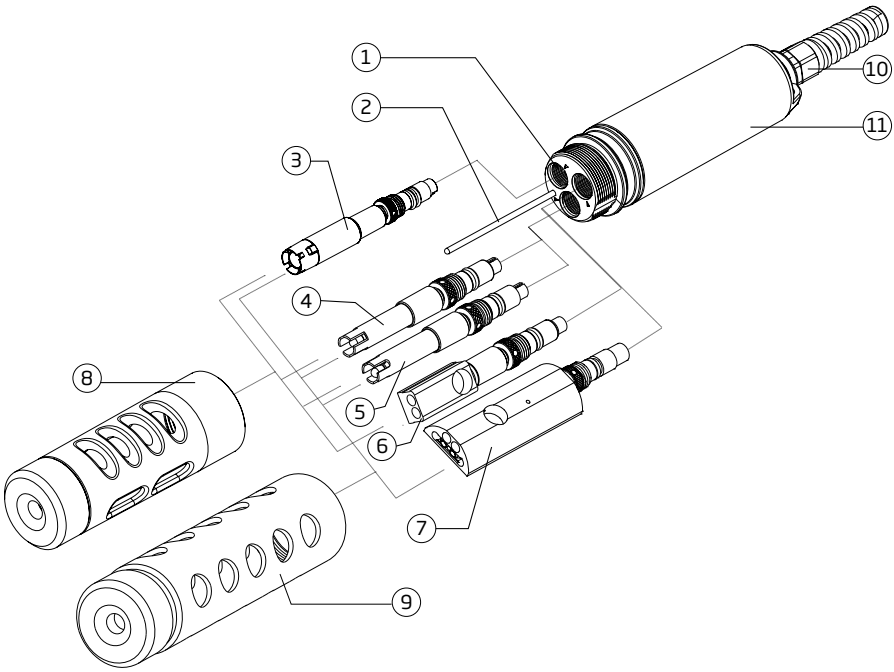
Chloride sensors e.g. HI7609829-11

- If the sensor pellet appears tarnished, use a polishing strip to remove the oxidized surface.
- Cut off approximately 1 inch piece of the strip.
- Wet the frosted side with water and place against damaged surface.
- Place the thumb against the shiny backing and slowly rotate back and forth while applying gentle pressure.
  If dark deposits show on the frosted surface, polish gently.
  Continue polishing until satisfied with the surface.
- Rinse sensor with water.

9.3. SENSOR REPLACEMENT

It is generally recommended to replace the sensors in the following order:

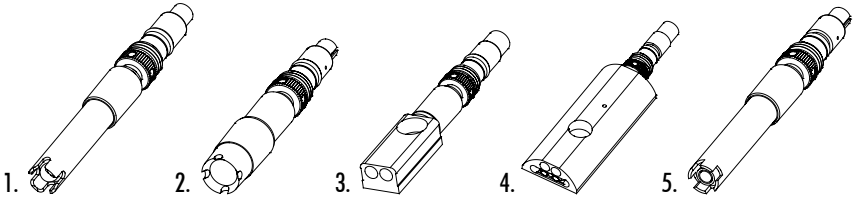
- EC, EC/Turbidity sensor » first
- pH, pH/ORP, ISE sensor » second
- DO sensor » last



1. Sensor sockets
2. Temperature sensor
3. DO sensor
4. pH sensor
   pH/ORP combination sensor
5. ISE sensor
   Ammonium
   Chloride
   Nitrate
6. EC sensor
7. EC/Turbidity sensor
8. Short protective shield
   (ordered separately)
9. Long protective shield
   (supplied with the meter)
10. Strain relief
11. Probe body

Note: *To maintain a waterproof probe, if a sensor is not installed a plug must be inserted.*

9.4. SENSOR TYPES & DESCRIPTIONS



1. HI7698194-0 combination pH sensor
   It features a PEI-body pH sensor with a glass bulb and a silver/silver chloride double junction reference with gelled electrolyte.

   HI7698194-1 combination pH/ORP sensor
   It features a PEI-body pH sensor with a glass bulb, a platinum sensor for redox measurements and a silver/silver chloride double junction reference with gelled KCl electrolyte.

2. HI7698194-2 galvanic dissolved oxygen sensor
   It features a thin, gas-permeable membrane that isolates sensor elements from the testing solution but allows oxygen to pass through.
   The DO sensor conforms to Standard Methods 4500-AG, EPA 360.1.

3. HI7698594-3 four ring-electrode conductivity (EC/TDS/Resistivity/Salinity) sensor
   The sensor is immune to polarization or surface coatings.

4. HI7698594-4 combination EC/Turbidity sensor
   It features a four-electrode conductivity sensor and a turbidity sensor that conforms to ISO 7027 standards.

5. HI7609829-10 ammonium ISE
   It features a polymeric membrane made with ammonium ionophore in a PVC head, and silver/silver chloride double junction gel-filled reference electrode.

   HI7609829-11 chloride ISE

   It features a silver chloride pellet housed in a PEI head and a silver/silver chloride double junction gel filled reference electrode.

   HI7609829-12 nitrate ISE

   It features a polymeric membrane made with nitrate ionophore in a PVC head, and a silver/silver chloride double junction gel-filled reference electrode.

9.5. SENSOR INSTALLATION

General Guidelines

To make installation easier, the probe has three sensor-connector sockets identified with color-coded triangles.

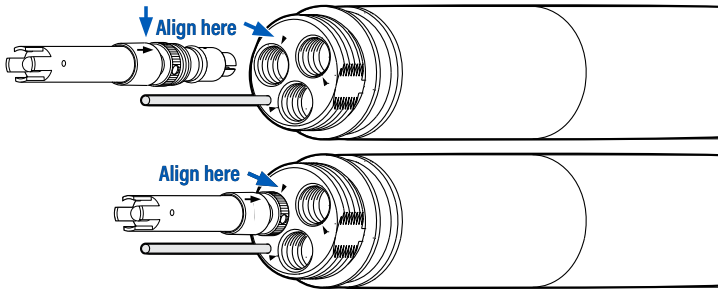
- ▼ connector 1 » HI7698194-1 pH/ORP sensor
  » HI7698194-0 pH sensor
  » HI7609829-10 ammonium, HI7609829-11 chloride, HI7609829-12 nitrate ISE sensor
- ▽ connector 2 » HI7698194-2 galvanic dissolved oxygen sensor
- ▼ connector 3 » HI7698594-4 conductivity and turbidity sensor
  » HI7698594-3 conductivity sensor

It is generally recommended to install the sensors in the following order:

- DO sensor » first
- pH/ORP, ISE sensor » second
- EC/Turbidity sensor » last

To install the sensors follow the steps below:

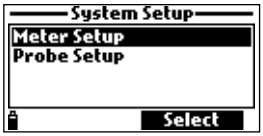
1. Remove the protective shield from the probe and set aside.
2. Cut top off supplied sachet with silicone grease and sparingly lubricate the o-ring with a thin film of the grease. Do not substitute other grease or lubricants as it may cause the o-ring to swell!
3. Identify the "Align here ⇨" signage on the sensor body and correct sensor socket.
4. Align the sensor such that the directional arrow "⇨" points directly to the designated socket.



5. Insert the sensor into the correctly color-coded socket while positioning the connector key toward the center of the probe.
   Make sure the connector is seated correctly (the sensor will no longer move freely) before tightening the locking threads with your fingers.
6. Continue to tighten the locking thread with the small hex key supplied in the maintenance kit until the sensor is secured tightly against the probe body.
7. All sensors have to be conditioned and calibrated before use.
8. Screw the protective shield onto the probe body, to protect the sensors.

10. SYSTEM SETUP

- Press **Menu** from measurement screen.
- Use the arrow keys to highlight **System Setup** then press **Select**.
- Use the arrow keys to highlight the desired option then press **Select**.



Note: *When the password protection is enabled, authentication will be required before any modification.*

10.1. METER SETUP

There are 14 items in the Meter Setup menu.

Pressing the corresponding numerical value brings the user directly to that item's position in the list.

1	Time	**6**	Error Beep	**11**	Meter ID
2	Date	**7**	Decimal Separator	**12**	Language
3	Auto Power Off	**8**	LCD Contrast	**13**	Restore factory settings
4	Tutorial	**9**	LCD Backlight		
5	Key Beep	**10**	Meter Password		

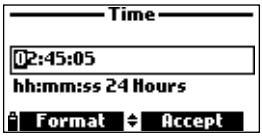
Meter setup items with valid range and factory default settings

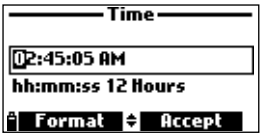
Setup Items	Options / Range	Default
Time	12 or 24 hours	24 hours current time
Date	DD/MM/YYYY, MM/DD/YYYY, YYYY/MM/DD, YYYY-MM-DD, MM-DD-YYYY, DD-MM-YYYY	YYYY/MM/DD current date
Auto Power Off	Disable 5, 10, 15, 20, 30, 60 minutes	Disable
Tutorial	Disable or Enable	Enable
Key Beep	Disable or Enable	Disable
Error Beep	Disable or Enable	Disable
Decimal Separator	Comma (,) or Period (.)	.
LCD Contrast	0 to 15	8
LCD Backlight	0 to 10	5
Meter Password	Disable or Enable	Disable
Meter ID	Up to 14 characters	–
Language	Deutsch, English, Español, Français, Magyar, Italiano, Lietuvių, Nederlands, Polski, Português, Română, Czech, Slovak	English
Restore factory settings	Yes or No	

Time

Option: 12 or 24 hours

- Press **Modify** and set the time using the keypad.
- Press **Format** to change between 12 and 24 hours.
  When the 12 hour format is used, use the down arrow to get to the ante or post meridian abbreviation. The first letter can be changed by pressing any key.
- Press **Accept** to save the option or press **ESC** key to return to the menu.

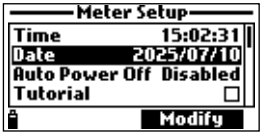


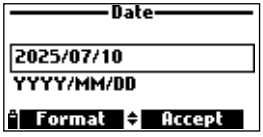


Date

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

- Press **Modify** and set the date using the keypad.
- Press **Format** to change the date format.
- Press **Accept** to save or press **ESC** key to return to the menu.





Auto Power Off

Option: Disabled, 5, 10, 15, 20, 30, 60 minutes

The function is used to save battery life.

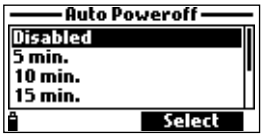
After the set time has elapsed, the meter will:

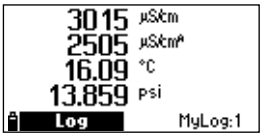
a. Automatically switch off, if in normal measurement mode.

Note: *Press* **On/Off** *key to switch on again.*

b. Enter a sleeping mode, if the continuous logging mode is selected with a minimum logging interval of 30 seconds.
   The "Power save mode" message and the **Wake up** functional key will be displayed on the LCD when it goes into this mode.
   Logging is not stopped.

- Press **Wake up** to reactivate the display.



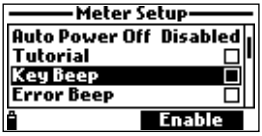


Tutorial

Option: Enabled or Disabled

When enabled, the user will be guided step-by-step through the sensor preparation, sensor maintenance, sensor installation and calibration procedures.

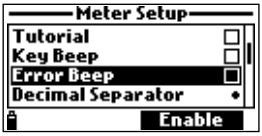
Key Beep



Option: Enabled or Disabled

When enabled, an acoustic signal is heard every time a key is pressed.
Press the functional key to select the desired option.

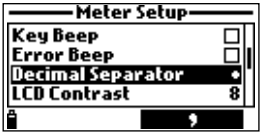
Error Beep



Option: Enabled or Disabled

When enabled, a short beep is heard every time an incorrect 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 select the desired option.

Decimal Separator



Option: Comma (,) or Period (.)

The user can select the type of decimal separator.
Press the functional key to select the desired option.

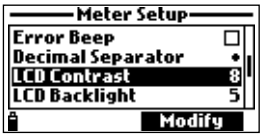
LCD Contrast

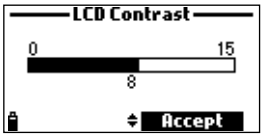
Option: 0 to 15

This function allows the adjustment of the LCD contrast.

- Press **Modify** and use the arrow keys to increase or decrease the contrast.

- Press **Accept** to save or press **ESC** key to return to the menu.



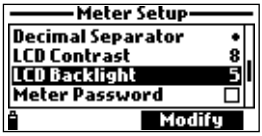


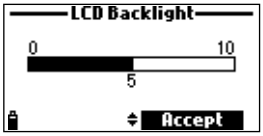
LCD Backlight

Option: 0 to 10

This function allows the adjustment of the LCD backlight intensity.

- Press **Modify** and use the arrow keys to change the backlight intensity.
- Press **Accept** to save or press **ESC** key return to the menu.





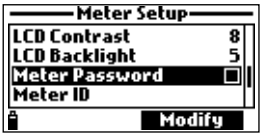
Meter Password

The meter password protects against unauthorized configuration changes and prevents log data from being deleted. When implemented, certain settings and functions require authentication before modifying or viewing.
Once the password is entered, it will not be required until the meter is turned on again.

To enable the password:

1. Select **Meter Password** then press **Modify**.
2. Enter a 6 digit password in the text box.
3. Press **Accept**.

   Note: *While typing, the characters are masked with a "*" (star) symbol.*
4. Reenter the password.
5. Press **Accept** to save or press **ESC** key to return to the menu.
6. The meter returns to the Meter Setup menu and the check mark indicates that the password protection has been enabled.



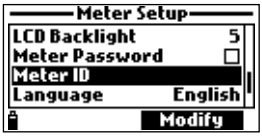
To disable the password protection:

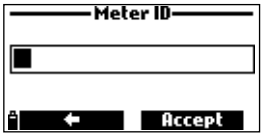
1. Select **Meter Password** then press **Modify**.
2. Enter the password and then press **Disable**.
   "No password" appears in the text box.
3. Press **Accept** to save or press **ESC** key to return to the menu.

Meter ID

Option: Up to 14 characters

- Press **Modify** to enter meter's ID setup screen.
- Use the keypad to set or change the meter's ID.
- Press **Accept** to save or press **ESC** key to return to the menu.



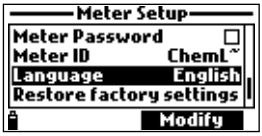


Language

Option: Czech, Deutsch, English, Español, Français, Magyar, Italiano, Lietuvių , Nederlands, Polski, Português, Română , Slovak

Option allows users to change meter's interface language.

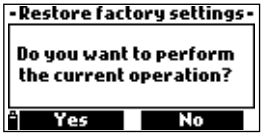
- Press **Modify** and use the arrow keys to change the language.
- Press **Select** to save or press **ESC** key return to the menu.



Restore Factory Settings

This function restores measurement settings to their original factory values. This includes measurement units, coefficients, other measurement configurations, and all logged data. The calibration for the sensor is not affected.

- Highlight **Restore factory** settings then press **Select**.
- Press **Yes** to confirm or press **No** to return to the menu.



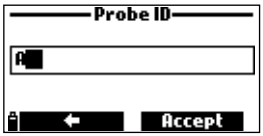
10.2. PROBE SETUP

Probe ID

Option: Up to 14 characters

- Press **Modify** to enter probe ID setup screen.
- Use the keypad to set or change the probe ID.

- Press **Accept** to save or press **ESC** key return to the menu.



10.2.1. Probe Password

When configured, part of the settings and functions cannot be further modified or viewed.
To enable the password follow the steps given here.

- Select "Probe Password" and press **Modify**.
- Type the password in the designated text box.
- Press **Accept**.

Note: *When typing, the characters are masked with "*" symbols.*

- Retype the password to confirm.
- Press **Accept**.
  The meter then returns to the "Probe Setup" menu.

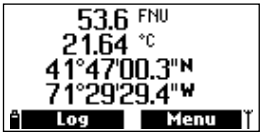
To disable the password follow the steps given here.

- Select "Probe Password" and press **Modify**.
- Enter the password.
- Next, press **Disable**.
  "No password" is displayed in the text box.
- Press **Accept** to confirm.

11. GPS MENU

HI98294 and HI98394 meters feature an internal 12-channel GPS receiver and antenna module that calculates meter position and tracks measurement locations along with measurement data.

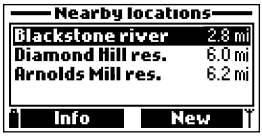
- The GPS has a position accuracy of 10 meters (30 ft).
- The GPS coordinates can be associated with alphanumeric locations, are shown together with up to 10 parameters, and are then assigned to the logged data.
- The GPS signal strength is displayed through a 3-length antenna indicator, seen at the bottom right corner of the LCD.
- If the antenna symbol is blinking, the satellite acquisition is not yet completed or the signal strength is not sufficient.
  Note: *Move outdoors and away from buildings and trees to improve signal strength.*



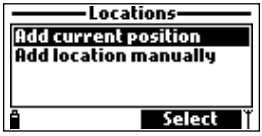
- Press **Menu** from measurement mode and select "GPS Menu".

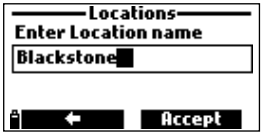
11.2.1. All Locations / Nearby Locations

"All locations" option displays all stored locations.
"Nearby locations" option filters out locations that are further than 100 km (100 mi) from the current location. If a GPS signal has been obtained, the distance from the current position to the nearby locations is also displayed.



- Press **Info** to view the GPS coordinates of the selected location.
- Press **Delete** to erase the selected location.
- Press **New** to add a new location.
  Coordinates for a new location can be entered manually or by using the current GPS coordinates.

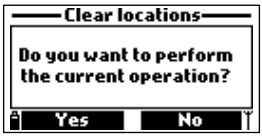




11.2.2. Clear Locations

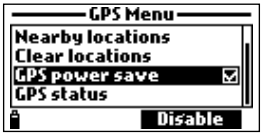
This option deletes all locations.

- The meter asks for confirmation.
  "Do you want to perform the current operation?"message is displayed.
- Press **Yes** to confirm deletion.
- Press **No** to return to the previous screen.



11.2.3. GPS Power Save

This feature saves battery life by automatically switching the GPS off when the meter is continuously logging with a logging interval of at least 4 minutes.
The GPS unit turns off after each measurement and turns on again 3 minutes before the next measurement is taken.
If the GPS unit cannot obtain a position within two minutes, it keeps the GPS on by disabling the power save feature.



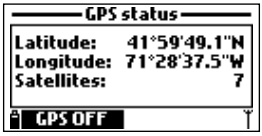
11.2.4. GPS Status

The GPS status screen displays:

» latitude and longitude of the current position
» number of satellites
» time elapsed since last detected position (if GPS signal is not available)

- Press **GPS OFF** to disable the GPS.
- Press **GPS ON** to enable the GPS and show GPS receiver model and version.

Note: *Power consumption of the GPS unit is significant. Turn the GPS off when not needed.*

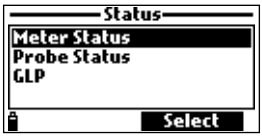


12. STATUS

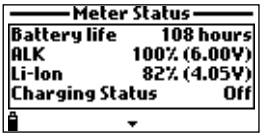
- Press **Menu** from measurement screen.
- Use the arrow keys to highlight "Status" then press **Select**.
- Use the arrow keys to highlight the desired option then press **Select**.

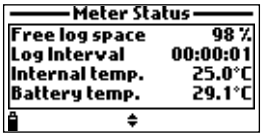
12.1. METER STATUS

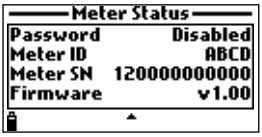
Meter Status displays information related to the batteries, charging status, logging, internal temperature, password, Meter ID, serial number and firmware version.



- Use the arrow keys to navigate through the meter status information.
- Press **ESC** key to return to the menu.

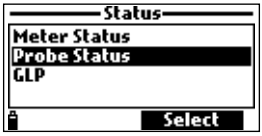




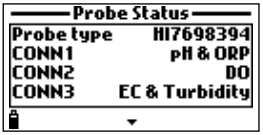


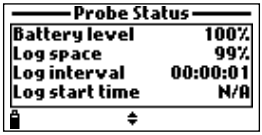
12.2. PROBE STATUS

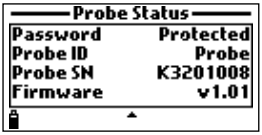
Probe Status displays information related to the probe type, connected sensors, probe ID, serial number and firmware version.



- Use the arrow keys to navigate through the probe status information.
- Press **ESC** key to return to the menu.



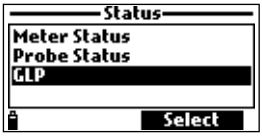


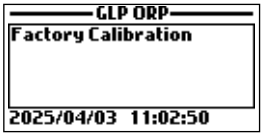


Note: *The probe status screen will automatically be displayed when the probe sensor status has changed.*

12.3. GLP

GLP (Good Laboratory Practice) is a set of functions that allows the user to store or recall data regarding the probe calibration. GLP data stores the last five calibrations.





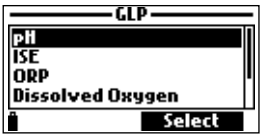
Note: *If no user calibration data is available for the selected parameter, "Factory Calibration" message is displayed.*

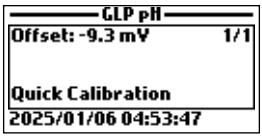
To navigate the GLP screens:

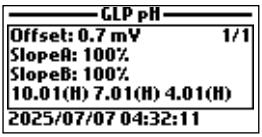
- Use the arrow keys to scroll through the stored data for the last 5 calibrations.
- Press **ESC** key to return to the menu.

pH

pH GLP screen displays: offset, acidic slope, basic slope, buffers used, time and date of the calibration.



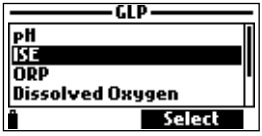


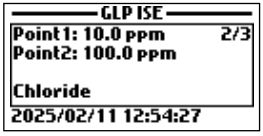


Note: *A "C" label next to the buffer value indicates a custom point, while an "H" indicates a Hanna Instruments® standard buffer value.*
If a quick calibration was performed, the buffer values are replaced with the "Quick Calibration".

ISE

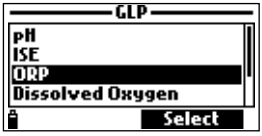
ISE GLP screen displays: standards used, sensor type, time and date of the calibration.

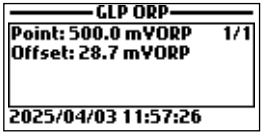




ORP

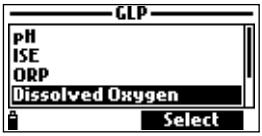
ORP GLP screen displays: calibration point, offset between measured and calibrated value, time, and date.

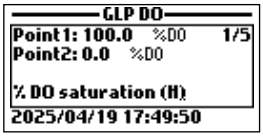




Dissolved Oxygen

DO GLP screen displays: calibration points, calibration type (% saturation or concentration), time and date.



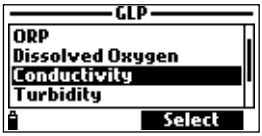


Note: *A "C" label next to the calibration point indicates a custom point, while an "H" indicates a Hanna Instruments standard value.*

If a quick calibration was performed, the calibration points are replaced with the "Quick Calibration".

Conductivity

Conductivity GLP screen displays: calibration point, cell constant value, offset, calibration type (conductivity, absolute conductivity or salinity), time, and date.

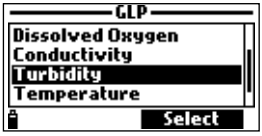


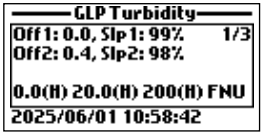
Note: *A "C" label next to the calibration point indicates a custom point, while an "H" indicates a Hanna Instruments® standard value.*

If a quick calibration was performed, the calibration point is replaced with the "Quick Calibration".

Turbidity

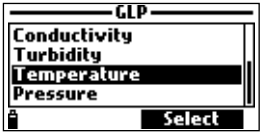
Turbidity GLP screen displays: factory calibration status, calibration time and date.

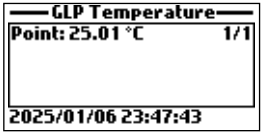




Temperature

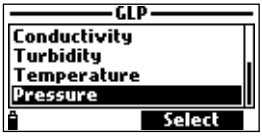
Temperature GLP screen displays: calibrated point, time, and date.

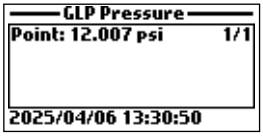




Pressure

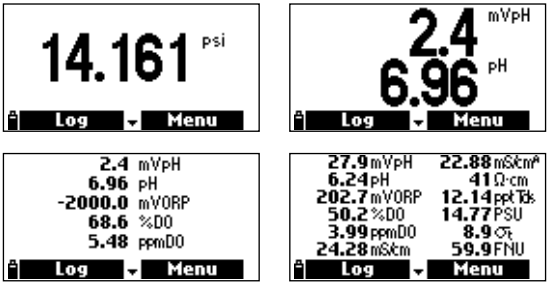
Atmospheric pressure GLP screen displays: calibration point, time, and date.



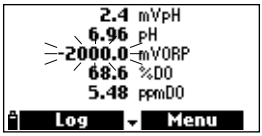


13. MEASUREMENT

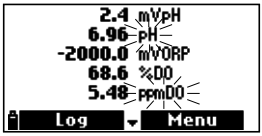
During measurement mode HI98X94 will simultaneously measure data for all enabled parameters.
Use the numbers 1 through 7 on the keypad to select the number of parameters that are shown on the screen at one time. The display will automatically resize the font.



Use the arrow keys to scroll through the enabled parameters if they do not fit on one screen.
A blinking measurement value indicates that the measurement is out of range.



A blinking measurement unit indicates that the user calibration has not been done and is needed for accurate readings.

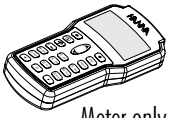


Measurement Guidelines

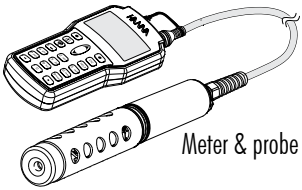
- Operate the probe with protective sleeve installed.
- To prevent the pH/ORP sensor from becoming electrically disconnected, do not position probe horizontally.
- Give the probe a firm shake to dislodge bubbles that may adhere and interfere with the measurements.
- Submerge the probe to ensure the conductivity probe and temperature sensor is in contact with representative sample.
- If measuring in a moving stream, position the probe at a 45° angle and position the sensor surfaces toward the flow.
- Avoid surface measurements in direct sunlight.

14. LOGGING

The HI98X94 and the corresponding probe offer many logging options that can be combined based on user needs. The following figures describe the available logging options.

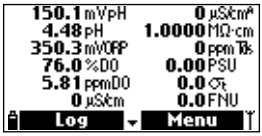


Meter only parameters



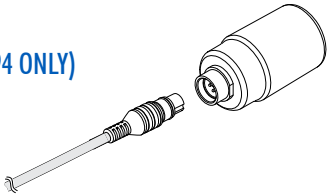
Meter & probe parameters

- From measurement mode, press **Log** to access Log menu.
- The data logged on the meter are organized by lots.
- Up to 50000 complete records can be stored in up to 100 lots.
- Each lot can store log-on-demand records or continuous records with different parameter configurations.



Note: *The values displayed for DO concentration, compensated conductivity, and TDS are dependent on the coefficients defined in Parameter Coefficients in Setup menu (EC Reference Temperature, EC Temperature Coefficient, TDS factor and Salinity).*
If parameter units or coefficients are altered, stored logs will be altered, reflecting these changes.
Save logs to a PC before altering parameters or coefficients! Details are available for the enabled parameters only!

14.1. CONNECT THE ATMOSPHERIC PRESSURE BOX (HI98394 ONLY)



- Connect the probe to the meter.
- Start automatic logging on the meter.
- Next, disconnect the probe.
- Align the pins and key then push the pressure box into the probe connector.

Note: *When not connected to the meter or to the pressure box, probe connector should be kept protected!*

- Continue logging.

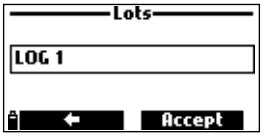
Note: During logging, pressure box should not be submerged.

- When ready, to download the logs:
  - » Disconnect the pressure box.
  - » Connect the probe back to the meter and download the files as .csv.

14.2. ONE SAMPLE ON METER

1. Select **One sample on meter** to add one set of enabled measurement parameters to the meter's memory.

2. If there are existing lots on the meter, select the lot to log the sample in.
3. If no lots have been saved or to create a new lot, press **New**. Use the keypad to enter desired lot name.
4. Press **Accept** to confirm.

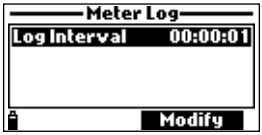


5. Press **OK** to log the sample in the selected lot.
6. The Remarks window will open.
   Press **Yes** to add a remark to the data point or **No** to skip.
7. The meter will return to the measurement screen automatically.

14.3. START METER LOG

1. Select **Start Meter Log** to log the enabled parameters at the set logging interval on the meter.

2. To set the logging interval, press **Options**.
   The log interval time can be set from 1 second to 3 hours.
3. Press **Modify** and use the alphanumeric keys to enter the desired log interval.
4. Press **Accept** to confirm.



5. Press **Select** to start the logs.

Use the keypad to enter desired lot name.

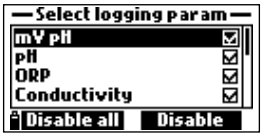
6. Press **Accept** to confirm.
   The Remarks window will open.
7. Press **Yes** to add a remark to the data point or **No** to skip.
   The meter will return to the measurement screen and the log will start.
   - To stop the meter log, press **Log** then select "*Stop Meter Log".
   - To update the remarks, press **Log** then select "Log Notes".

14.4. START PROBE LOG (LOGGING PROBE ONLY)

Select "Start probe log" to start a log with the current settings. Press **Options** to change the log settings.

Probe Log Options

- To edit the lot remark, or tag, see 10. System Setup.
- The log interval time can be set from 1 second to 3 hours. Press **Modify** to change the logging interval. Press **Accept** to confirm.
- "Select logging param." to modify the parameters to be logged.
- To specify the log start time, highlight "Use start time" and press **Enable**. Highlight "Log start time" and press "Select". Enter the desired time and press **Accept** to confirm.
- To specify the log stop time, highlight "Use stop time" and press **Enable**. Highlight "Log stop time" and press **Select**. Enter the desired time and press **Accept** to confirm.

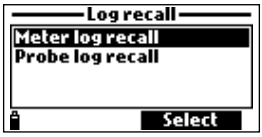


14.5. LOG RECALL

Select "Log Recall" to view stored logs.

14.5.1. Meter Log Recall

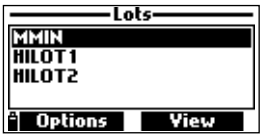
Select "Meter log recall" to view logs that are stored on the meter.

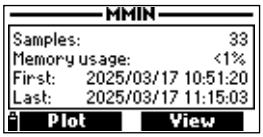


Lots

Select this option to view all continuous log files saved on the meter.

1. Use the arrow keys to select the desired lot and then press **View**.
   The meter displays a summary of all data related to the selected lot: number of samples, used memory space, time and date of the first and last readings.





2. Press **View** to review the log data.
   The sample number is shown on the bottom right corner of the display.
   Use the arrow keys to change the sample number in the selected lot.
3. Press **Info** to see record information for the current sample: time and date, remark or serial number (if available).
4. Press **Data** to return to the previous screen or **Jump** to select a different sample in the same lot.
   When **Jump** is pressed, a text box is displayed.
   Use the keypad to insert the desired sample number.
5. Press **ESC** key to return to the menu.
6. Press **Plot**.
   The meter creates a list with all available parameters that can be plotted.

7. Use the arrow keys to select the parameter to be plotted.
8. Press **Select** to view the graph.
   Use the arrow keys to move the cursor in the graph and highlight a sample.
   The sample data is displayed below the graph.
9. Press **ESC** key to return to the parameter list.

Note: *To Export or Delete an individual Log, press* **Options** *(from the log list screen).*

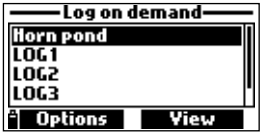
Export selected log data to USB-C Flash Drive:

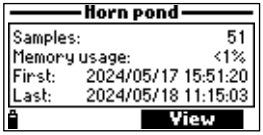
1. Insert a USB-C flash drive (or USB-A with cable adapter) into the USB-C connector located on the top of the meter.
   See section 14.7. PC Connection for details.
2. Select **Export Log**.
   "Connecting" will be displayed followed by the file transfer information.
   When all files have been transfered, "File transfer completed." message will be displayed.

Log On Demand

Select this option to view the log on demand lots and plot selected parameters.

1. Use the arrow keys to select the desired lot and then press **View**.
2. Press **View** to review the log data.

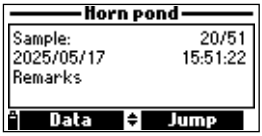


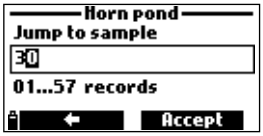


3. Press **Info** to see record information for the current sample: time and date, remark or serial number.

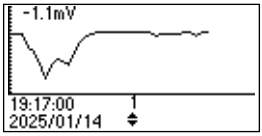
4. Press **Data** to return to the previous screen or **Jump** to select a different sample in the same lot.
   When **Jump** is pressed, a text box is displayed.

Use the keypad to insert the desired sample number.





5. Press **ESC** key to return to the menu.
6. Press **Plot**. The meter creates a list with all available parameters that can be plotted.
7. Use the arrow keys to select the parameter to be plotted.
8. Press **Select** to view the graph.

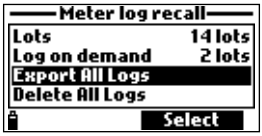


9. Use the arrow keys to move the cursor in the graph and highlight a sample.
   The sample data is displayed below the graph.
10. Press **ESC** key to return to the parameter list.

Note: *The number of lot samples that can be plotted is limited by the display resolution. To view a complete graph download data to PC.*

Export All Logs

Select this option to export all logs to a PC.



Export all logged data to USB-C Flash Drive:

1. Insert a USB-C flash drive (or USB-A with cable adapter) into the USB-C connector located on the top of the meter.
   See section 14.7. PC Connection for details to transfer files to a PC directly.
2. Select **Export All Logs**.
   "Connecting" will be displayed followed by the file transfer information.
   When all files have been transferred, "File transfer completed" message will be displayed.

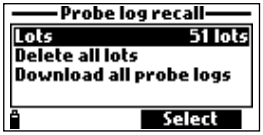
Delete All Logs

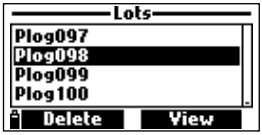
- Select **Delete All Logs** from the Meter log recall list.
- The instrument will ask for confirmation.
- Press **Yes** to delete or **No** to return to the previous screen.

- Press **ESC** key to return to the "Log Recall" menu.

14.5.2. Probe Log Recall (Logging Probe Only)

- Select "Probe log recall" to view and manage lots that are stored on the probe.
- Select "Lots" to display a list of available lots on the probe (logs have a Plog prefix).
- To view basic information about the highlighted lot, press **View**.





- After **View** is pressed, the meter displays all data related to the selected lot: number of samples, memory space used, time and date of the first and the last readings.
- To see all the sample details press **Download**. When the download is completed, the log is now stored on the meter and can be accessed from the "Meter log recall" menu. The data can be viewed as described in 14.5. Log Recall » 14.5.1. Meter Log Recall subsection.

- The downloaded lots are not deleted from the probe and are available for other downloads (e.g. HI929829 PC application).
- If a probe log has been downloaded to the meter, a warning message will be displayed if you try to download it again.

Delete All Lots

- From "Probe log recall", select "Delete all lots" and the meter will display the message "Do you want to perform the current operation?". Press **Yes** to delete or **No** to return to the previous screen.
- To return to the "Log recall" menu, press **ESC**.

Download All Probe Logs

- From "Probe log recall", select "Download all probe logs".
  The meter will download all lots to the meter.

14.6. LOG NOTES

14.6.1. Remarks

The meter can store up to 20 remarks. A remark can be associated with each sample.

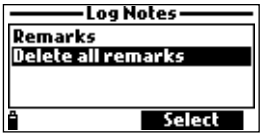
To add a remark:

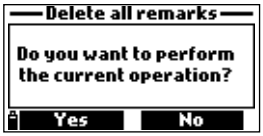
1. Select **Log Notes** from the Log menu then select **Remarks**.
   The display shows a list of stored remarks.

2. Press **New** to create a new remark .
   Use the keypad to enter the new remark in the text box.
3. Press **Delete** to delete the selected remark from the meter.
   If the deleted remark is used in an existing lot, the information will be still available in the lot data.

14.6.2. Delete All Remarks

- Select **Delete all remarks** from the Log Notes menu.
- The instrument will ask for confirmation i.e. "Do you want to perform the current operation?".
- Press **Yes** to delete or **No** to return to the previous screen.





Note:

"!" displayed in log data indicates that the sensor/probe was used out of the operation parameters.

"!!" displayed in log data indicates broken or missing sensor.

14.7. PC CONNECTION

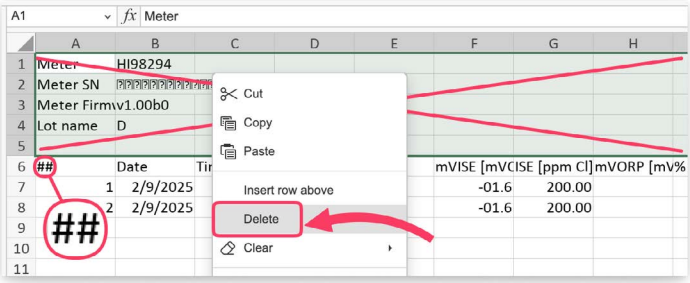
Probe and/or meter logged data can be transferred to a PC.

- When working with HI7698394 autologging probes, first downlod probe logs to the meter.
- Next, use the USB-C to USB-C cable to connect the meter to the PC.
- The meter will appear as a flash drive on the computer.
- Save files to the PC. All logs will be listed as .csv files (comma separated values).

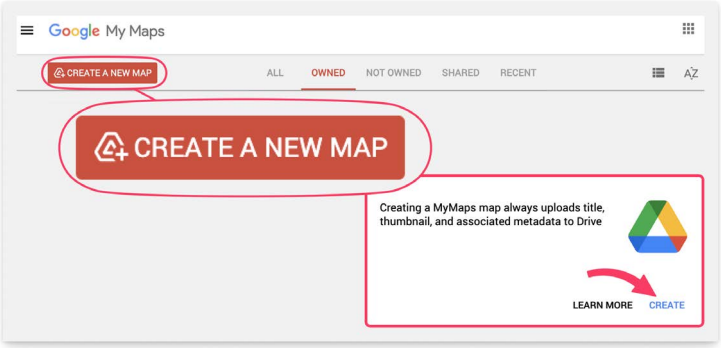
The .csv files may be opened with any text editor or spreadsheet application.
All features of the spreadsheet program can be used to analyze and graph the data.

14.8. VISUALIZE LOGGED DATA USING GOOGLE MY MAPS*

1. Download and save the .csv file to a desktop.
2. Use a spreadsheet program and truncate the .csv file by deleting the top rows.

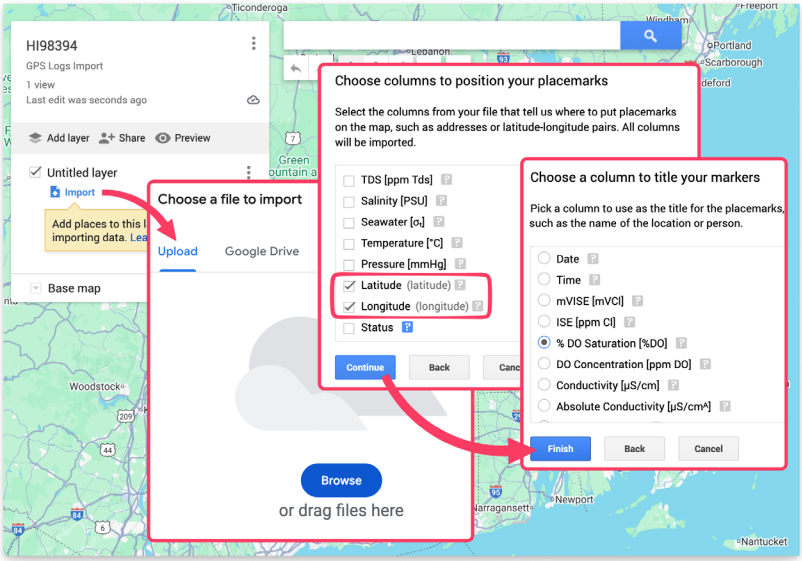


3. Save the truncated file.
4. Log in to your Google account.
5. Go to Google My Maps: https://www.google.com/mymaps
6. In the welcome pop-up, create a new map.



* Google My Maps is a trademark of Google LLC.

7. In the menu, select **Import**.
8. In the pop-up, select **Upload**.
9. Select the .csv from your desktop.
   - The **Latitude** and **Longitude** columns are automatically selected.
   - Pick the column to be used to title your markers i.e. % DO Saturation [%DO] as per example given below.
   - Select **Finish**.



10. Data can now be seen as a layer in the menu and the points plotted on the map.

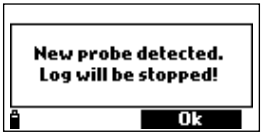
15. TROUBLESHOOTING & ERROR MESSAGES

HI98294 and HI98394 display error messages to aid in troubleshooting.
Warnings are displayed for non-critical issues, while errors are displayed for critical issues.

See section 8. Calibration for warning and error messages during calibration.

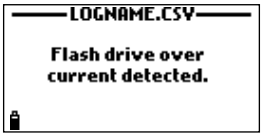
"Log space full" is displayed when the meter memory is full and additional data cannot be logged.

Delete one or more lots from the meter.



"New probe detected. Log will be stopped!" is displayed during interval log when the meter detects a different probe than the one with which the interval log was started.

Reconnecting the initial probe and not pressing OK will not stop the interval log.



"Flash drive over current detected." is displayed when an unusually high current consumption is detected during log file export to an external flash drive.

"Language data not available!" is displayed when powering up the meter if the language file is not loaded.

Restart the meter.
If the problem persists, contact your local Hanna Instruments® office.

''Dead meter battery!'' is displayed if the meter batteries are too low to power the meter. The meter will automatically turn off.

Replace the alkaline batteries to continue.

''User data corrupted!'' is displayed when powering up and the user data stored on meter are corrupted.

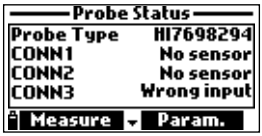
Restart the meter.
If the problem persists, contact your local Hanna Instruments office.

"Incompatible Probe! Remove Probe!" is displayed when the connected probe is not compatible with the meter.

Replace the probe.

"Incompat.sensor!" is displayed in Probe Status screen when the connected sensor is not compatible with probe or meter.

Replace the sensor before continuing.



"Wrong input" is displayed in Probe Status screen when the connected sensor is not compatible with the connector.

Replace the sensor before continuing.

"Warning xxx"

Warnings displayed at power-on are identified using a numeric code. Some features can be accessed but with no guarantee.

- Restart the meter.
- If the problem persists, contact your local Hanna Instruments® office.

"Error x"

Critical errors are identified using a numeric code

- The meter switches off automatically.
- Contact your local Hanna Instruments office.

16. ACCESSORIES

Probes (supplied without sensors or protective shield)

Ordering Information	Product Description
HI7698294/4	Probe with 4 m (13.1') cable
HI7698294/10	Probe with 10 m (33.0') cable
HI7698294/20	Probe with 20 m (65.6') cable
HI7698294/30	Probe with 30 m (98.4') cable
HI7698294/40	Probe with 40 m (131.2') cable
HI7698294/50	Probe with 50 m (164') cable
HI7698394/4	Logging probe with 4 m (13.1') cable
HI7698394/10	Logging probe with 10 m (33.0') cable
HI7698394/20	Logging probe with 20 m (65.6') cable
HI7698394/30	Logging probe with 30 m (98.4') cable
HI7698394/40	Logging probe with 40 m (131.2') cable
HI7698394/50	Logging probe with 50 m (164') cable

Meter with Probe & Sensors (pH / ORP, EC/Turbidity, galvanic DO)

Ordering Information	Product Description
HI98294	HI98294 meter + probe with 4 m (13.1') cable
HI98294/10	HI98294 meter + probe with 10 m (33.0') cable
HI98294/20	HI98294 meter + probe with 20 m (65.6') cable
HI98294/30	HI98294 meter + probe with 30 m (98.4') cable
HI98294/40	HI98294 meter + probe with 40 m (131.2') cable
HI98294/50	HI98294 meter + probe with 50 m (164') cable
HI98394	HI98394 meter + probe with 4 m (13.1') cable
HI98394/10	HI98394 meter + probe with 10 m (33.0') cable
HI98394/20	HI98394 meter + probe with 20 m (65.6') cable
HI98394/30	HI98394 meter + probe with 30 m (98.4') cable
HI98394/40	HI98394 meter + probe with 40 m (131.2') cable
HI98394/50	HI98394 meter + probe with 50 m (164') cable

Sensors

Ordering Information	Product Description
HI7698194-0	pH sensor
HI7698194-1	pH/ORP sensor
HI7698194-2	Galvanic DO sensor
HI7698594-3	EC sensor
HI7698594-4	EC/Turbidity sensor
HI7609829-10	Ammonium ISE
HI7609829-11	Chloride ISE
HI7609829-12	Nitrate ISE

Quick Calibration Solutions

Ordering Information	Product Description
HI9828-20	Quick calibration solution, 230 mL
HI9828-25	Quick calibration solution, 500 mL
HI9828-27	Quick calibration solution, 1 gallon (3.78 Liters)

pH Buffers

Ordering Information	Product Description
HI5004	pH 4.01 buffer solution, 500 mL
HI5068	pH 6.86 buffer solution, 500 mL
HI5007	pH 7.01 buffer solution, 500 mL
HI5091	pH 9.18 buffer solution, 500 mL
HI5010	pH 10.01 buffer solution, 500 mL

ORP Standards

Ordering Information	Product Description
HI7021L	ORP test solution, 240 mV @ 25 °C, 500 mL
HI7022L	ORP test solution, 470 mV @ 25 °C, 500 mL

pH / ORP Maintenance Solutions

Ordering Information	Product Description
HI70670L	pH/ORP cleaning solution for salt deposits, 500 mL
HI70671L	pH/ORP cleaning and disinfecting solution for algae, fungi and bacteria, 500 mL
HI70300L	pH/ORP electrode storage solution, 500 mL

DO Solutions

Ordering Information	Product Description
HI7040L	Zero oxygen solution set, 500 mL + 12 g
HI7042S	Electrolyte solution for DO sensor, 30 mL
HI76409A/P	Spare membrane with O-ring (5 pcs.)

Conductivity Standard Solutions

Ordering Information	Product Description
HI7030L	12880 µS/cm calibration solution, 500 mL
HI7031L	1413 µS/cm calibration solution, 500 mL
HI7033L	84 µS/cm calibration solution, 500 mL
HI7034L	80000 µS/cm calibration solution, 500 mL
HI7035L	111800 µS/cm calibration solution, 500 mL
HI7039L	5000 µS/cm calibration solution, 500 mL

Turbidity Solutions

Ordering Information	Product Description
HI9829-16	0 FNU calibration solution, 230 mL
HI9829-17	20 FNU calibration solution, 230 mL
HI9829-18	200 FNU calibration solution, 230 mL

ISE Solutions

Ordering Information	Product Description
HI9829-10	10 ppm ammonium (as N) standard for HI7609829-10, 25 x 20 mL sachet
HI9829-11	100 ppm ammonium (as N) standard for HI7609829-10, 25 x 20 mL sachet
HI9829-12	10 ppm chloride standard for HI7609829-11, 25 x 20 mL sachet
HI9829-13	100 ppm chloride standard for HI7609829-11, 25 x 20 mL sachet
HI9829-14	10 ppm nitrate (as N) standard for HI7609829-12, 25 x 20 mL sachet
HI9829-15	100 ppm nitrate (as N) standard for HI7609829-12, 25 x 20 mL sachet

Other Accessories

Ordering Information	Product Description
HI740275	Protective cap for HI7698394 probe (5 pcs.)
HI7698290	Short calibration beaker
HI7698293	Long calibration beaker
HI7698295	Short protective shield
HI7698296	Long protective shield
HI7698297	Long, quick release flow cell
HI7698292	Probe maintenance kit with HI7042S (electrolyte solution for DO sensor), small brush, o-rings for DO sensor (5 pcs.), o-rings for probe (5 pcs.), 6 g sachet with silicone grease to lubricate the o-rings, syringe
HI76983948	Atmospheric pressure box for HI98394
HI920019	USB-C to USB-C cable
HI710034	Orange protective rubber boot for meter
HI710035	Blue protective rubber boot for meter
HI710036	Black protective rubber boot for meter

CERTIFICATION

All Hanna® instruments conform to the **CE European Directives.**

CE 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.

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, 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 HI98294 and HI98394 are warranted for two years (sensors and probe for six months) against defects in workmanship and materials when used for their 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.