Dissolved Oxygen Meters

Professional Instruments for a Variety of Applications

Dissolved Oxygen Theory and Measurement

Dissolved oxygen (DO) is a measure of how much oxygen is dissolved in a system. Measurements are usually taken in water using a DO probe and meter. Henry's Law states that the concentration of gas in a solution is directly proportional to the partial pressure of that gas above the solution. Henry's Law constant is a factor of proportionality, and so is specific to the gas in the solvent being measured.

The partial pressure of oxygen is in fact a measurement of the thermodynamic activity of its molecules. The rate at which oxygen dissolves, diffuses, and reacts is not determined by its concentration, but by its partial pressure. The Earth's atmosphere is composed of 20.9% oxygen, and at sea level the atmosphere is 100% saturated with oxygen.

Percent saturation is the amount of DO present per amount of DO possible at a given temperature and pressure. Percent saturation is a common unit for DO measurement since it is based upon the partial pressure of a gas; thus it is correct for determination in any solvent.

Concentration measurements of DO can also use the units of parts per million (ppm) or milligrams per liter (mg/L). In meters that report DO concentration in ppm or mg/L, the solvent is always assumed to be water. In other solvents such as oils or acids, the Henry's Law constant would be different. In those cases, percent saturation should be used as it is incorrect to use ppm or mg/L.

Effects of Temperature and Pressure

As the temperature of a solution increases, the particle movement within that solution increases. With greater particle motion, dissolved gases escape more readily from solution. In warm water, oxygen is less soluble while in cold water, oxygen is more soluble. DO concentration in air saturated waters decreases with increasing temperature.

Atmospheric pressure decreases as altitude increases. Since there is lower partial pressure, oxygen is less soluble at higher altitudes. DO concentration in air saturated waters decreases with increasing elevations.

Applications

Water quality measurements are vital to environmental monitoring. In quiescent lakes and rivers, the decay of organic matter can cause bacteria levels to increase. The aerobic bacteria consume oxygen, triggering a deficiency that can cause a water body "to die," killing aquatic plants and animals.

Aquaculture is the breeding, rearing, and harvesting of plants and animals in all types of water environments. Dissolved oxygen is needed by fish, zooplankton, and plants to survive and reproduce. DO measurements are used to monitor and control the environment required for success.

Wastewater treatment plants rely on bacteria to break down the organic compounds found in water. If the amount of dissolved oxygen in the wastewater is too low, these bacteria will die and septic conditions will occur. The amount of DO must be consistently monitored to ensure proper waste treatment.

Wine and beer are both affected by oxygen at various stages during production and storage. DO is an important parameter to monitor for those who wish to produce consistent, high quality products.

Laboratory Monitoring of BOD, OUR and SOUR

BOD (Biochemical Oxygen Demand) is a measurement that indicates the concentration of biodegradable organic matter present in a water sample. It can be used to determine the general quality of water and its degree of pollution. BOD measures the rate of oxygen uptake by microorganisms in a water sample at a fixed temperature over a given period of time. To ensure that all other conditions are equal, a very small amount of microorganism seed is added to each sample being tested. The samples are kept at 20°C in the dark for five days. The loss of dissolved oxygen during incubation is called the BOD5. BOD is an empirical test that determines the relative oxygen requirements of wastewater, effluent, and polluted waters.

OUR (Oxygen Uptake Rate) is used to determine the biological activity of a system in terms of oxygen consumption or respiration rate. It is defined as the milligrams per liter of oxygen consumed per hour. This measurement indicates the rate of metabolic processes in sludge treatment, helping operators determine the stability of solids after digestion.

SOUR (Specific Oxygen Uptake Rate) also determines the oxygen consumption of a system, but is defined as the milligrams of oxygen consumed per gram of volatile suspended solids (VSS) per hour. This quick measurement has many advantages: rapid measure of influent organic load and biodegradability, indication of the presence of toxic or inhibitory wastes, degree of stability and condition of a sample, and calculation of oxygen demand rates at various points in the aeration basin.

Types of Dissolved Oxygen Probes

Hanna's dissolved oxygen meters utilize one of two common types of sensing probes: polarographic sensors and galvanic sensors.

Polarographic DO probes consist of a working electrode (cathode) and a counter electrode (anode). A polarizing voltage is applied to these electrodes that is specific for the reduction of oxygen. A thin, gas permeable membrane isolates the sensor elements from the water sample but allows oxygen to pass through. The oxygen that passes through the membrane is reduced at the cathode, causing a current from which the oxygen concentration is determined. Two-electrode polarographic probes use the anode as a reference electrode.

Galvanic DO probes consist of a working electrode (cathode) and a counter electrode (anode) that act as a battery to produce a voltage specific for the reduction of oxygen. A thin, gas permeable membrane isolates the sensor elements from the water sample but allows oxygen to pass through. The oxygen that passes through the membrane is reduced at the cathode, causing a current from which the oxygen concentration is determined.

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opdo™

HI98198

Optical Dissolved Oxygen Meter

Professional dissolved oxygen measurement with digital optical probe

The HI98198 opdo™ meter is a rugged, portable dedicated dissolved oxygen (DO) meter designed for fresh and saltwater measurements of dissolved oxygen. This professional, waterproof meter complies with IP67 standards and measures DO, barometric pressure, and temperature. The HI98198 is supplied with a HI764113 digital optical dissolved oxygen probe in a custom thermoformed durable carrying case with accessories. It is compact and ergonomically designed to provide ready access to the materials required for routine sampling.

Comparison Guide

Bench Meters

	Dissolved Oxygen Range	Optical DO Meter	Barometric Pressure	% Saturation O_2	Salinity Compensation	Altitude Compensation	Temperature Range(s)	DO Calibration Points	Barometric Pressure Calibration Points	ATC	Hold Feature	BEPS	PC Connectivity	Logging	Alarm	GLP	Capacitive Touch Buttons	Capacitive Touch Screen	Benchtop, Portable & Wall-Mount	Page
HI6421	•	•	•	•	•		•	2		•	•		•	•	•	•	•	•		6.4
HI6421P	•		•	•			•	2		•	•		•	•	•	•	•	•		6.4
HI5421	•		•	•	•		°C/°F/K	2	1	•	•		•	•	•	•	•			6.14
edge	•				•	•	•	2		•			•	•	•	•	•		•	6.16
edge®DO	•				•	•	•	2		•			•	•	•	•	•		•	6.20

Portable Meters

	Dissolved Oxygen Range	Optical DO Meter	Barometric Pressure	% Saturation O_2	Salinity Compensation	Altitude Compensation	Temperature Range(s)	DO Calibration Points	Barometric Pressure Calibration Points	ATC	Hold Feature	BEPS	PC Connectivity	Logging	Alarm	GLP	Capacitive Touch Buttons	Capacitive Touch Screen	Benchtop, Portable & Wall-Mount	Page
HI98198	•	•	•	•	•		°C/°F	2	1	•	•	•	•	•		•				6.24
HI98193	•		•	•	•		°C/°F	2	1	•	•	•	•	•		•				6.28
HI9147	•		•	•	•	•	°C/°F	1		•	•		•							6.31
HI9146	•		•	•	•	•	°C	2		•	•		•			•				6.32
HI9142	•						°C/°F	2		•	•		•							6.33

Advanced Dissolved Oxygen Meter

with Optical and Polarographic Probe Compatibilty

HI6421 and HI6421P are streamlined benchtop meters with a large touch screen display, comprised of a housing and an integrated module designed for fresh and saltwater measurements of dissolved oxygen.

HI6421 includes Hanna's HI7641133 optical dissolved oxygen probe (opdo®) that is based on the principle of fluorescence quenching. An immobilized Pt-based luminophore is excited by the light of a blue LED and emits a red light. As oxygen interacts with the luminophore it reduces the intensity and lifetime of the luminescence. The lifetime of the luminescence is measured by a photodetector and is used to calculate the dissolved oxygen concentration.

The probe is fitted with easy to use Smart Caps (HI764113-1) which lock in place and contain pre-loaded calibration coefficients that are automatically transmitted to the probe. The Smart Cap features an immobilized O_2 sensitive luminophore with rugged insoluble black oxygen permeable protective layer.

Over time, the sensor's optical components can age but are compensated for by using the reference signal to compensate the measuring path. As a result, the sensor provides accurate DO measurements over long periods of time without the need for frequent calibration.

HI6421P includes the HI764833 polarographic probe. Slim and versatile, this probe covers a wide range of dissolved oxygen and has a built-in thermistor temperature sensor that compensates for temperature variations. The slim design allows for convenient measurement in test tubes and Biological Oxygen Demand (BOD) bottles.

Durable and robust, the probe features a platinum cathode and Ag/AgCl anode assembly. Accurate and with a fast response time, readings are not flow dependent.

The probe is fitted with durable (PTFE), oxygen permeable, screw on membrane caps. Caps are filled with electrolyte and easily installed on the probe.

Concentration measurements are automatically compensated for barometric pressure, temperature, and salinity. Barometric pressure and temperature are automatically measured and compensated. Salinity is automatically compensated by setting manually the salinity concentration of the water being measured.

Additional features include built-in methods and calculations for the measurement of BOD (Biological Oxygen Demand), OUR (Oxygen Uptake Rate), and SOUR (Specific Oxygen Update Rate).

Pressure compensation is done automatically (built-in barometer) or users have the option to manually enter required value. Pressure is displayed in user-configurable units: mmHg, mbar, kPa, inHg, psi, atm.

User interface

- 7-inch capacitive touch screen with multi-touch support

- Capacitive touch back, home and system menu keys

- User-friendly icons and symbols allow users to easily navigate and interpret the instrument functions.

- The user can select between five different views:
  - Basic measurement configuration
  - Simple GLP with calibration information
  - Full GLP with electrode status and calibration point details
  - Live updated, interactive graph
  - Tabulated data with date, time, and notes

Measurement

- Measure %Sat, mg/L, ppm (DO); mg/L, ppm (BOD); mg/L (OUR); ppm, mg/L (SOUR)

- Application-specific profiles allow quick and direct measurement without the need to update the sensor and system settings

- Active log during measurement

- Measurement stability indicator (using the Stability Criteria setting)

- Reading modes: direct and direct/autohold

- Temperature compensation can be Automatic or set manually

- Audible and/or alarm messages for measurements outside of predefined limits

- Galvanic isolation for measurement

Calibration

- One or two points calibration at 0% and/or 100% saturation

- Single point manual calibration in mg/L or % saturation using a reference method

- Non-volatile memory saves data and settings

Logging

- Data log collection of at least 1,000,000 data points (with time and date stamp)

- Logging types: manual, automatic, autohold

- Sample ID for manual and Autohold data

## Connectivity features & services

- Transfer logged data to a USB thumb drive

- Log files that include measurements and calibration data (as .csv file)

- FTP and email for log export via Ethernet and Wi-Fi connection

- USB type A for USB stick, keyboard, and printer

- USB type C for USB stick and PC connection

Help section for meter guidance

- Video support presentation of main functionalities

This system responds to a complex range of measurement and monitoring requirements, providing accuracy, reproducibility, and reliability.
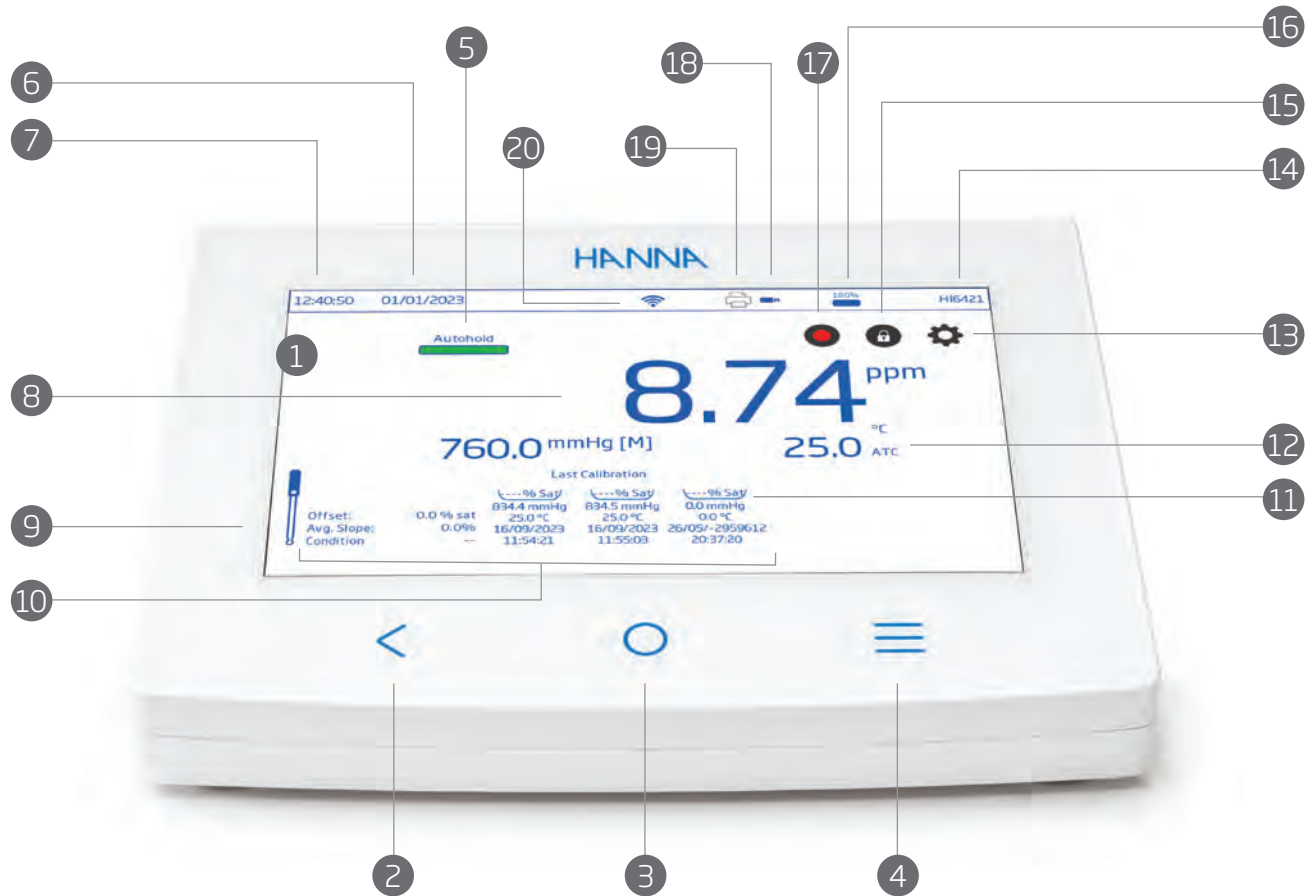
1. Capacitive touch screen with multi-touch support

The benchtop unit has a 7-inch color display with 800 x 480p resolution. The capacitive, multi-touch screen supports video playback and data plotting.

2. Back key

3. Home key

4. System Menu key

This key will enter the system menu where User accounts, System Settings, and Logging can be configured. The Help menu is also accessed on the system menu screen.

5. Stability indicator

6. Current date

7. Current time

8. Main reading

9. Probe icon

10. Calibration information: Electrode condition, Offset, Slope, Date and Time

11. Buffer trays

12. Temp. reading

13. Measurement setup menu

Opens sensor setup parameters.

14. User name (default shown)

15. Direct/Autohold Readings

When Direct/Autohold is selected, measurement reading is held on display when measurement stability is reached. This option removes the subjective nature of stability as a measurement that has not reached equilibrium will not be used.

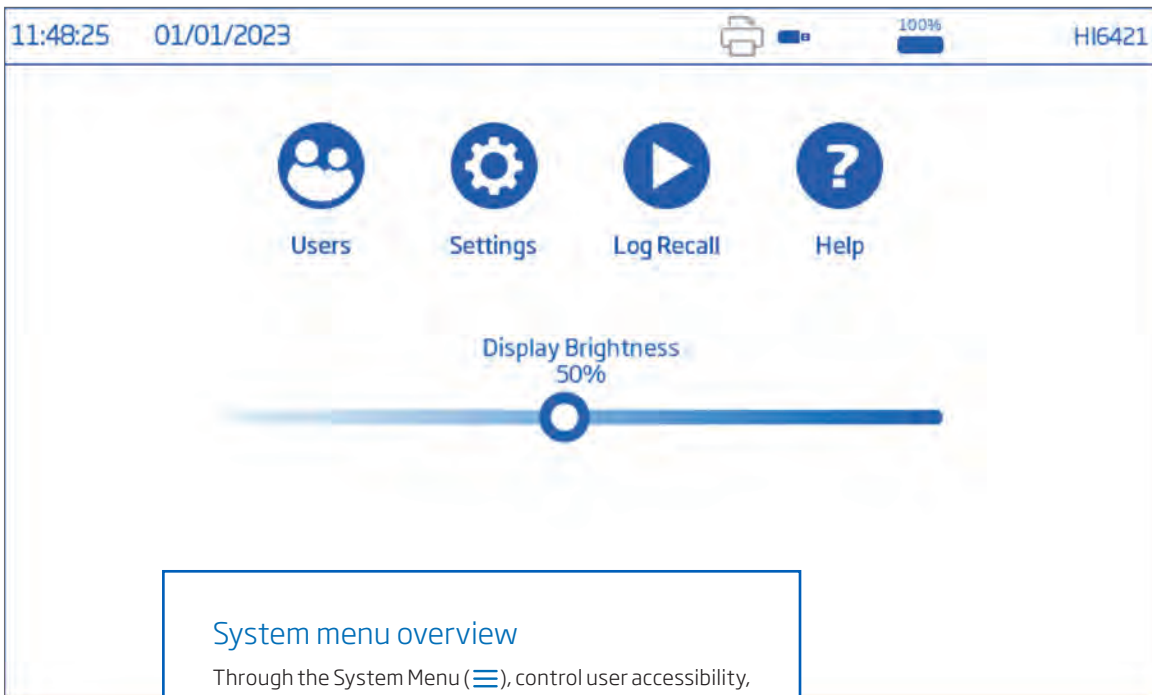When not selected, sample measurements are displayed continuously.

16. Logging space availability

17. Logging start

18. USB connection status

19. Peripheral connection status

20. Wireless network connection status

System Menu

11:48:25   01/01/2023   100%   HI6421

Users   Settings   Log Recall   Help

Display Brightness
50%

System menu overview

Through the System Menu (≡), control user accessibility, system and connectivity configuration, access logged data and video-supported help.

• Add and delete user accounts through Users (😊).

• Access Network Connectivity, System and Info tabs through Settings (⚙)

• Log Recall (▶) recalls stored log sessions (Automatic continuous logging, Manual, or Autohold).
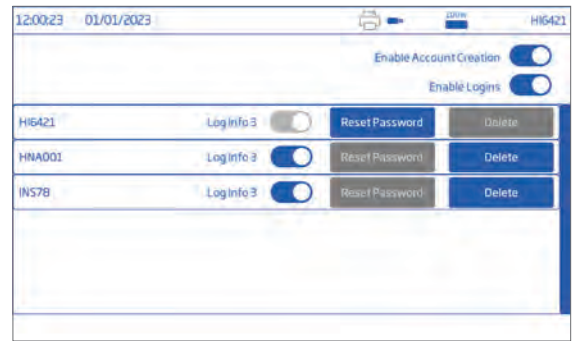
• Help (?) guides users with video-supported help.

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11:48:25   01/01/2023   100%   HI6421

Users   Settings   Log Recall   Help

Display Brightness
50%
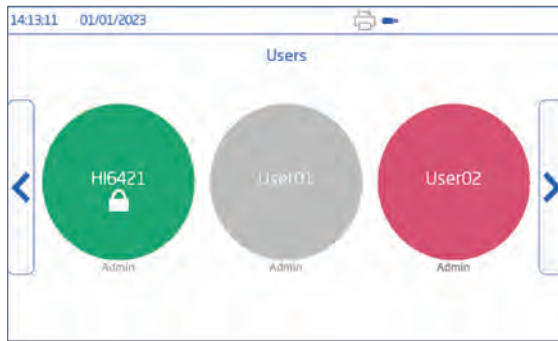
Users

Custom Users

New administrator or standard user accounts can be created. Standard accounts can be configured for specific accessibility.
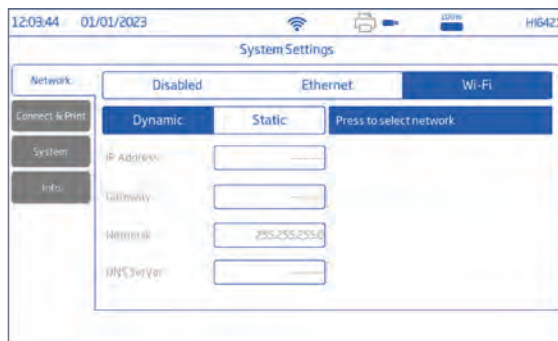
User Account Management

Administrators can create and manage accounts from the Account Management Screen.
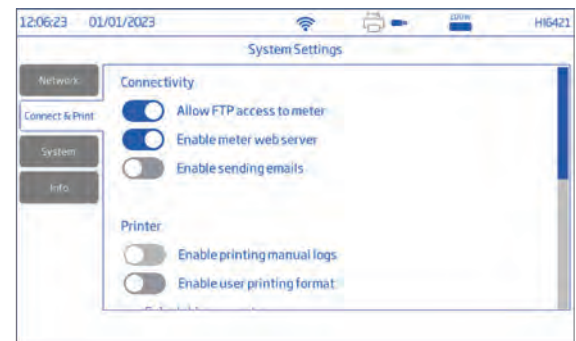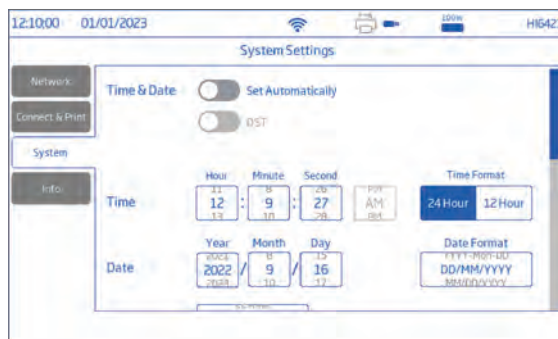
Settings

Network Screen

Determine how measurement logs are shared though network settings. Users can select network to be connected via Ethernet or Wi-Fi, or Disabled.

Connect and Print Screen

Activate connectivity options to allow the meter to connect to other devices.

- FTP access to meter, permits log file transfer to a FTP site and to connect the meter FTP server to a client for log download.
- Meter web server, permits log file download to a web client.
- Sending emails, permits log files to be transferred by email.

System Screen

The system screen enables users to configure options such as: Time, Date, Language, Meter ID, Decimal Separator, Backlight Saver, Audible signals, Startup Tutorial, and Factory Settings restore.
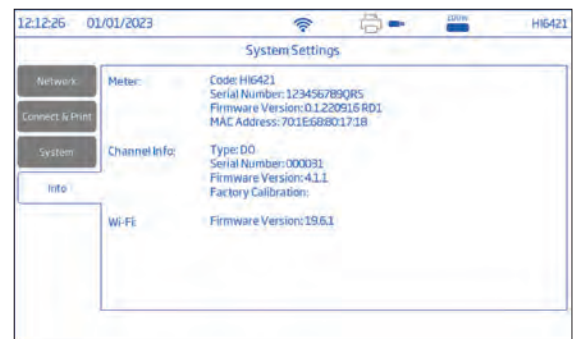
Info Screen

Displays information on meter, channel serial number, and Wi-Fi firmware version.

Log Recall

Log History and Sharing

The item allows users access and management (selection, deletion, and sharing) of measurement data. Only the user who generated the data has access to the logs created by that user.

Data can be viewed tabulated (complete with date, time, and notes), or plotted (as graph).

Log files can be shared via USB, FTP, web server and email.

Table View

Graph View

Log Detail

Tapping the information icon displays log details such as user and profile name, instrument name and serial number, channel, lot information, as well as GLP data.

Help

On-board Help

The HELP menu supports users with a brief overview of the system's main functionalities through text and video tutorials.

Measurement Setup Configuration

Reading

Customize measurement options such as Stability Criteria, Parameter, Units, Pressure Source, Pressure Unit.

Temperature

Customize temperature options such as Automatic or manual temperature Source, °C, °F, or K temperature Unit, Manual Temperature input, or clear last temperature calibration.

Calibration

Customize calibration options such as Last Calibration, Automatic or Manual calibration, and Daily or Periodic Calibration Reminder

Alarm

Alarm configuration allows users to set the high and low threshold limits for the measured parameters. When the parameter is enabled and the the measurement exceeds the high-limit value or drops below the low-limit value, the alarm is triggered and will appear on the message banner along with an audible alarm (if Alarm Beepers is enabled).

Logging

Logging Type (automatic, manual or autohold), Sampling Period (Automatic), Logging Resolution, File Name (with Manual type selected), Log Note and Info, Sample ID (Increment or Manual) can be configured under this option menu.

Profiles

A profile is a sensor setup complete with required measurement unit, temperature unit, display preference, and alarm threshold options.

Once saved the profile can be loaded for applications that require similar configurations.

Views
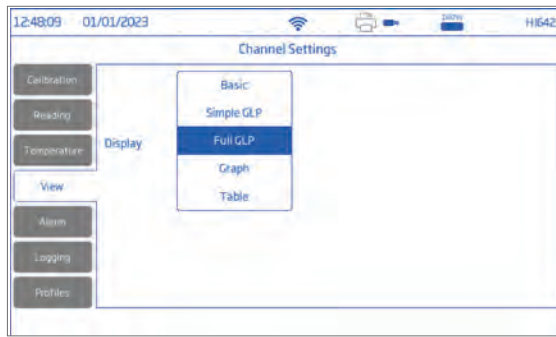
View Configuration

This screen allows users to select the preferred display configuration. Option to select between: Basic, Simple GLP, Full GLP, Graph, Table.

Basic View

Basic screen displays the measured value, measurement unit as well as temperature source.

Simple GLP View

In addition to data displayed when Basic option is selected, screen also displays: last calibration date and time and offset value.
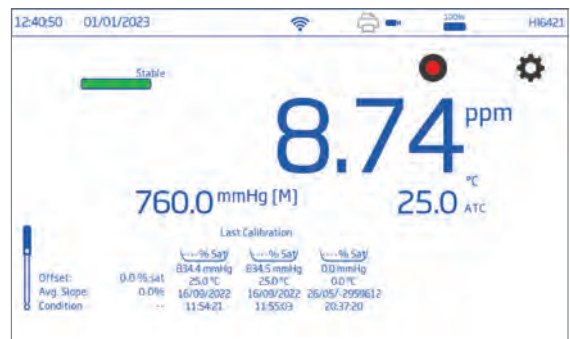
Full GLP View

In addition to data displayed when Simple GLP option is selected, screen also displays: electrode symbol, used buffers trays together with calibration date and time.

Graph View

When Graph is selected, the measured value is plotted as a graph.

Table

When Table is selected, the measured values are displayed tabulated (complete with date, time, and notes made during logging). The newest data is displayed on the top of the table.

Electrode Holder

HI6421 and HI6421P is supplied with an electrode holder featuring a flexible arm. The holder can be mounted on either side quickly and provides secure support for electrodes while taking measurements in sample containers.

Rear Ports

Input for USB-C flash or PC cable

Input for USB-A flash (x2) or keyboard

Power button

Input for power cable

Peripherals port

Ethernet port

Dissolved Oxygen probe connection port
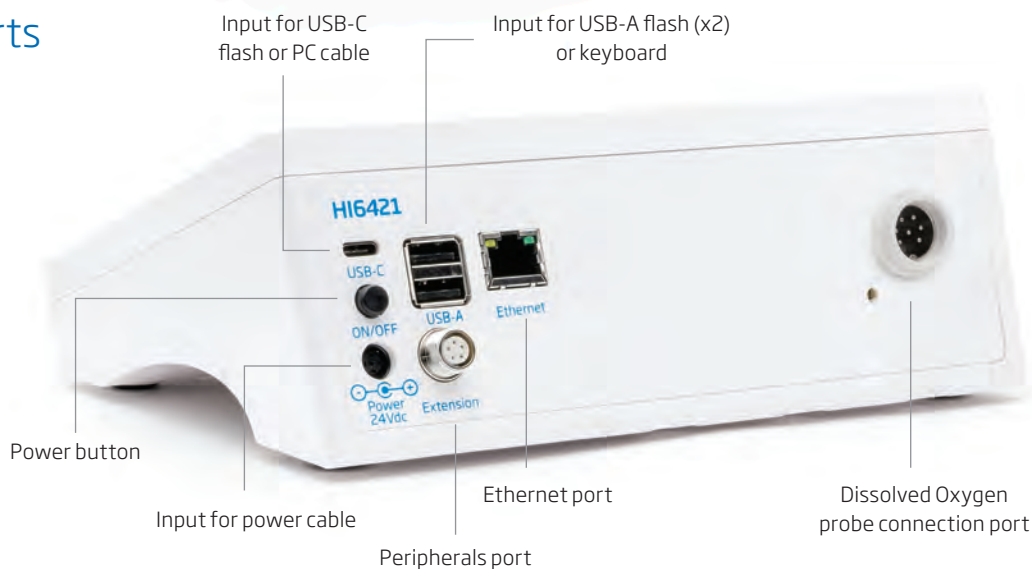
Specifications		HI6421 • HI6421P
DO (HI7641133 Optical probe)	Range	0.00 to 50.00 mg/L (ppm) concentration; 0.0 to 500.0 % saturation
	Resolution	0.01 mg/L (ppm); 0.1 % saturation
	Accuracy	from 0.00 to 20.00 mg/L (ppm) 1.5 % of reading or ± 0.01 mg/L (ppm), whichever is greater from 20.00 to 50.00 mg/L (ppm) ±5 % of reading from 0.0 to 200.0 % saturation ± 1.5 % of reading or ± 0.1 %, whichever is greater from 200.0 to 500.0 % saturation ±5 % of reading
DO (HI764833 Polarographic probe)	Range	0.00 to 90.00 mg/L (ppm) concentration; 0.0 to 600.0 % saturation
	Resolution	0.01 mg/L (ppm); 0.1 % saturation
	Accuracy	±1.5 % of reading ±1, least significant digit

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Barometric Pressure	Range	450 to 850 mmHg; 600 to 1133 mBar; 60 to 133 kPa; 17 to 33 inHg; 8.7 to 16.4 psi; 0.592 to 1.118 atm
	Resolution	1 mmHg; 1 mBar; 1 kPa; 1 inHg; 0.1 psi; 0.001 atm
	Accuracy	±3 mmHg within ±15 % from the calibration point ±3 mmHg ±1 least significant digit
Temperature	Range	−20.0 to 120.0 °C −4.0 to 248.0 °F 253.0 to 393.0 K
	Resolution	0.1 °C; 0.1 °F; 0.1 K
	Accuracy	±0.2 °C; ±0.4 °F; ±0.2 K
DO Calibration	Points	DO optical One or two points automatic calibration at 100% (8.26 mg/L) and 0% (0 mg/L). Single point manual using a value entered by the user in % saturation or mg/L. DO polarographic Automatic-two points / User standard-single point
	Standards	0 and 100% saturation
	Reminder	Disabled Daily: 0 min. to 23 hours and 59 min. Periodic: 1 min. to 500 days, 23 hours and 59 min.
Temperature Compensation		Automatic or Manual
Salinity Compensation (Optical DO only)		Automatic from 0 to 70 PSU (manually set) 0.0 to 70.0 % / 0.0 to 45.0 g/L / 0.0 to 42.0 psu
Reading	Modes	Direct Direct/Autohold
	Stability criteria	Accurate Medium Fast
	Isopotential	7.000 or 4.010
	Sampling rate	1000 ms
DO Views	Basic	Measurement (DO, Temperature) Stability status
	Simple GLP	Basic view information Last calibration date, offset, average slope
	Full GLP	Simple GLP information and calibration point details
	Table	Measurements updated every second are displayed in table
	Graph (Plot)	Measurement versus time graph can be panned or zoomed (pinch-to-zoom technology)
Logging	Type	Automatic, Manual, Autohold
	Number of records	50 000 maximum per file Stores at least 1 000 000 data points per user
	Automatic interval	1, 2, 5, 10, 30 seconds 1, 2, 5, 10, 15, 30, 60, 120, 150, 180 minutes
	Sample ID	Incremental mode
	Export option	.csv file format
Users		Up to 9 users and the default administrator account
Connectivity	USB-A	2 ports for keyboard input or USB thumb drive
	USB-C	1 port for PC connectivity and USB-C type thumb drive
	Wi-Fi & Ethernet	FTP Web server Log transfer and download Email
	RS232	Connecting peripherals
Power supply		DC adapter 100-240AC to 24VDC 2.5A
Environment		0 - 50 °C / 32 - 122 °F / 273 - 323 K maximum 95% RH non-condensing
Dimensions		205 x 160 x 77 mm (8.0 x 6.2 x 3.0 ")
Weight		Approximately 1.2 kg (26.5 lbs.)

Ordering Information

HI6421 is supplied with HI7641133 optical dissolved oxygen probe (opdo®); HI764060 electrode holder; capillary pipette; 24 VDC power adapter; USB-C to USB-A cable; probe quality certificate; quick reference guide with instrument quality certificate.

HI6421P is supplied with HI764833 polarographic probe; HI764060 electrode holder; capillary pipette; 24 VDC power adapter; USB-C to USB-A cable; probe quality certificate; quick reference guide with instrument quality certificate.

HI5421

Research Grade Bench Meter

Dissolved Oxygen and BOD

The HI5421 is an advanced research grade benchtop Dissolved Oxygen and BOD meter that is completely customizable with a large color LCD, capacitive touch keys, and USB port for computer connectivity. The HI5421 is rich in features including data logging, alarm limits, comprehensive GLP, and many more while retaining simplicity in use with both dedicated keys for routine operation and virtual keys that guide the user through setup options.

Customizable User Interface

The user interface of the HI5421 allows the user to show measurements in various modes: basic measurement with or without GLP information, real-time graphing, and logging data. Calibration stability criteria can be adjusted from fast, moderate, and accurate. Programmable alarm limits can be set to inside or outside allowable limits.

Color Graphic LCD

The HI5421 features a color graphic LCD with on-screen help, graphic, and custom color configurations. The display allows for real-time graphing and the use of virtual keys provide for an intuitive user interface.

Capacitive Touch

The HI5421 features sensitive capacitive touch buttons for accurate keystrokes when navigating menus and screens. There are four dedicated keys that are used for routine operations including calibration and switching measurement modes and four virtual keys that change based upon use. The capacitive touch technology ensures the buttons never get clogged with sample residue.

Built in Barometer

Readings are compensated for barometric pressure by a built in pressure transducer located in the meter. Calibration of the barometric pressure is single point with manual entry of current value obtained from local weather service or other device. Barometric pressure is displayed in a multiple choice of units including mmHg, mbar, kPa, mHg, psi, and atm.

Choice of Calibration

Automatic standard recognition is available for two points at 0% and 100% saturation or 0 mg/L and 8.26 mg/L. A user standard option is available for a user defined value.

BOD, OUR and Sour Measurement Modes

An additional three measurement modes are available to measure Biological Oxygen Demand (BOD), Oxygen Uptake Rate (OUR) and Specific Oxygen Uptake Rate (SOUR). Simply enter values and take readings at appropriate times and the meter will automatically calculate the values.

Automatic Salinity Compensation

The HI5421 allows for automatic salinity compensation with a selectable salinity range of 0 to 45 g/L.

GLP Data

View calibration data and calibration expiration information by selecting the Good Laboratory Practice (GLP) display option. Calibration data include date, time, and calibration points.

Data Transfer

Data can be transferred to a PC with USB cable and HI92000 software (both sold separately).

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Data Logging

Three selectable logging modes are available on the HI5421: automatic, manual, and AutoHold logging. Automatic and manual logs up to 100 lots with 50,000 records max/lot, with up to 100,000 total data points. Automatic logging features the option to save data according to sampling period and interval.

Contextual Help

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

DO probe included

The HI5421 is supplied with the HI76483 Clark-Type Polarographic probe. This probe is only 12 mm in diameter and has a built in thermistor temperature sensor that compensates for temperature variations from 0 to 50°C.

On-screen Features

BOD (Biological Oxygen Demand)

OUR (Oxygen Uptake Rate)

SOUR (Specific Oxygen Uptake Rate)

Specifications		HI5421
Dissolved Oxygen	Range	0.00 to 90.00 ppm (mg/L); 0.0 to 600.0 % saturation
	Resolution	0.01 ppm; 0.1% saturation
	Accuracy	±1.5% of reading ±1 LSD
	Calibration	automatic using single or two-point calibration; user calibration single point
Barometric Pressure	Range	450 to 850 mmHg; 600 to 1133 mBar; 60 to 133 KPa; 17 to 33 inHg; 8.7 to 16.4 psi; 0.592 to 1.118 atm
	Resolution	1 mmHg; 1 mBar; 1 kPa; 1 inHg; 0.1 psi; 0.001 atm
	Accuracy	±3 mm Hg + 1 least significant digit
Temperature	Range	-20.0 to 120°C; -4.0 to 248.0°F; 253.15 to 393.15K
	Resolution	0.1°C; 0.1°F; 0.1K
	Accuracy	±0.2°C ; ±0.4°F; ±0.2K (without probe)
Additional Specifications	Measurement Modes	direct DO; BOD (biochemical oxygen demand); OUR (oxygen uptake rate); SOUR (specific oxygen uptake rate)
	Temperature Compensation	0.0 to 50.0°C; 32.0 to 122.0°F; 237.1 to 323.1 K
	Salinity Compensation	0 to 45 ppt
	Barometric Pressure Calibration	single point calibration
	Probe	HI76483 thin body, polarographic dissolved oxygen probe with internal temperature sensor and 1 m (3.3') cable (included)
	Record Samples Logging	Up to 100 lots; 50,000 records max./lot, maximum 100,000 data points; 5000 samples/lot for Manual Logging
	Interval Logging	14 selectable between 1 second and 180 minutes
	Logging Type	manual AutoHOLD, automatic
	Alarm (DO, BOD, OUR, SOUR)	inside and outside limits
	PC Connection	opto-isolated USB
	Display	graphic color LCD with 240x340 pixels
	Power Supply	12 VDC adapter (included)
	Dimensions	160 x 231 x 94 mm (6.3 x 9.1 x 3.7")
	Weight	1.2 kg (2.6 lbs.)
Ordering Information		**HI5421-01** (115V) and **HI5421-02** (230V) is supplied with HI76483 DO probe, HI7041S electrolyte solution (30 mL), DO membrane caps (2), O-rings for DO membrane cap, HI76404W electrode holder, 12 VDC adapter, quality certificates, quick start guide and instruction manual.
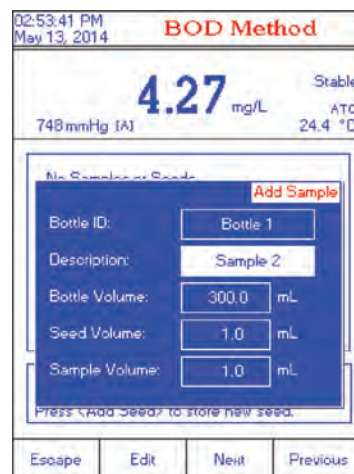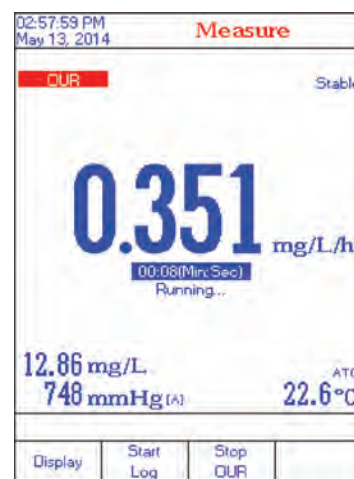
edge®
pH • EC • DO

The world's most innovative pH, EC and DO meter

edge's groundbreaking design is the culmination of Hanna's vision, design capabilities, integrated production and world class R&D. The edge is rich in features to accommodate the needs of a vast amount of customers. For those that prefer very simplistic operation there is a basic mode operation with simplified menu and options while for those who require advanced features there is the full featured standard operating mode. edge is available as a pH, conductivity or dissolved oxygen kit and any edge kit can be upgraded with additional probes to measure pH, conductivity and dissolved oxygen.

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edge® technical features

Rechargeable Battery

edge has a built in rechargeable battery that is charged when the meter is in the plugged in benchtop or wall mount cradle. The battery can also be recharged through the micro USB port with either a USB port from a computer or directly to the power supply.

Two USB ports

edge includes one standard USB for exporting data to a flash drive. edge also includes one micro USB port for exporting files to your computer as well as for charging when the cradle is not available.

Clear, full text readout

edge features clear, full text guides displayed on the bottom of the screen. There is no need to decipher scrambled abbreviations or symbols; these helpful messages guide you through every process quickly and easily.

Data logging

edge allows you to store up to 1000 log records of data. Data sets include readings, GLP data, date and time.

* Using edge compatible pH electrodes

GLP

Data of the last calibration you perform is stored in the sensor including the date, time, and buffers used. When the sensor is connected to edge, GLP data is automatically transferred.

Two Operating Modes

edge can be used in Extended or Basic Operating Modes. Extended Mode enables all edge features while Basic Mode reduces features–ideal for routine measurements by displaying a simplified screen and features.

edge pH Features*

CAL Check™ (pH only)

Hanna's exclusive CAL Check feature analyzes the pH electrode response in the pH buffers during the calibration process to alert the user of potential problems such as a contaminated buffer or dirty electrode. After calibration, indicators for probe condition are displayed on the measurement screen. The probe condition is based on offset and slope characteristics of the pH electrode.

Sensor Check™ (pH only)

When used with Hanna's electrodes equipped with a matching pin, edge constantly checks the impedance of the pH measuring electrode to notify you in real time in the event of glass breakage. During calibration, Sensor Check checks the state of the junction. The reference junction is also evaluated and reported on the display.

ORP Measurement

edge measures ORP with edge compatible ORP probes.

edge design features

Capacitive touch keypad

edge features sensitive capacitive touch buttons for accurate keystrokes when navigating edge's menus and screens. Since they are part of the screen, the buttons can never get clogged with sample residue.

Easy to read LCD

edge features a 5.5" (14 cm) LCD display that you can clearly view from over 5 m (16.4'). The large display, with its wide 150° viewing angle, provides one of the easiest to read LCDs in the industry.

Zero footprint

Using the wall mount cradle (included), edge can be placed on a wall, leaving zero footprint on the benchtop space. The cradle has a built-in connector to power and charge the batteries.

edge®

Hybrid meters that can be used in portable, wall-mount and benchtop configurations

The versatile design of edge® enables it to be used as a portable, wall-mount or benchtop meter. edge simplifies measurement, configuration, calibration, diagnostics, logging and transferring data directly to a computer or USB drive.

Portable field unit

edge is ideal for field use due to its light weight, large screen, and thin design. It can easily be slipped into a backpack or messenger bag. The battery life lasts up to 8 hours when used as a portable device.

Wall–mount cradle

The included wall–mount cradle makes it easy to conserve space on the benchtop while also charging edge with the AC adapter. The cradle is ideal for continuous monitoring applications.

Electrode holder with built-in cradle

The electrode holder features a swivel, adjustable arm with a built-in cradle to hold edge securely in place at the optimum viewing angle.

Digital electrodes

edge® measures pH, conductivity and dissolved oxygen through its unique digital electrodes. These digital electrodes are auto-recognized, providing sensor type, calibration data and a serial number when connected to edge by an easy to plug-in 3.5mm connector.

- Simply connect each probe via the 3.5 mm jack, Digital Smart Electrodes are automatically recognized

- Clark type digital polarographic probe with easy-to-replace membrane cap
  - Covers all ranges from 0.00 to 45.00 mg/L (ppm); 0.0 to 300% saturation
- Accuracy ±1.5% full scale
- One or two-point calibration (HI7040), 0% (solution) and 100% (air)
- Data logging
  - Manual log-on-demand
  - Manual log-on-stability
  - Interval logging
- Automatic Temperature Compensation from 0 to 50 °C
- GLP data
  - Records date, time, calibration standards, altitude value and salinity value

- Altitude compensation from -500 to 4000 meters (-1640 to 13,123')
- Salinity compensation from 0 to 40g/L

Sleek design

Incredibly thin and lightweight, edge measures just 1/2" (12 mm) thick and weighs just 8.8 ounces (250 g).

All edge compatible pH, EC and dissolved oxygen digital probes are interchangeable with edge.

Specifications		HI2040 edge
Dissolved Oxygen	Range	0.00 to 45.00 ppm (mg/L); 0.0 to 300.0 % saturation
	Resolution	0.01 ppm (mg/L); 0.1 % saturation
	Accuracy	± 1.5% of reading ±1 digit
	Calibration	one or two-point at 0% (HI7040 solution) and 100% (in air)
	Temperature Compensation	ATC (0 to 50°C; 32.0 to 122.0°F)*
	Salinity Compensation	0 to 40 g/L (with 1 g/L resolution)
	Altitude Compensation	-500 to 4000 m (-1640 to 13120') (with 100 m (328') resolution)
Temperature	Range*	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	±0.5°C; ±0.9°F
Additional Specifications	Probe (included in DO kit)	HI764080 digital dissolved oxygen electrode with 3.5 mm (1/8") connector and 1 m (3.3') cable
	Logging	up to 1000 records organized in: manual log-on-demand (max. 200 logs), manual log-on-stability (max. 200 logs), interval logging (max. 600 samples; 100 lots)
	Connectivity	1 USB port for storage; 1 micro USB port for charging and PC connectivity
	Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
	Power Supply	5 VDC adapter (included)
	Dimensions / Weight	202 x 140 x 12 mm (7.9" x 5.5" x 0.5") / 250 g (8.82 oz.)
Ordering Information		**HI2040-01** (115V) and **HI2040-02** (230V) DO kit also includes: HI764080 dissolved oxygen electrode, HI7041S refill electrolyte solution, DO membrane caps (2), o-rings (2)
		All edge compatible pH, EC and DO digital probes are interchangeable with HI2040 and can be ordered separately.

* temperature limits will be reduced to actual probe limits

edge® DO

edge DO–Innovation in a Single Parameter

edge DO's groundbreaking design is the culmination of Hanna's vision, design capabilities, integrated production and world class R&D. edge DO is a single meter that can measure pH and ORP and is incredibly easy to use.

Additional feature information

- Clark type digital polarographic probe with easy-to-replace membrane cap
  - Covers all ranges from 0.00 to 45.00 mg/L (ppm); 0.0 to 300% saturation
- Accuracy ±1.5% full scale
- One or two-point calibration (HI7040), 0% (solution) and 100% (air)

- Data logging
  - Manual log-on-demand
  - Manual log-on-stability
  - Interval logging
- Automatic Temperature Compensation from 0 to 50 °C
- GLP data
  - Records date, time, calibration standards, altitude value and salinity value

- Altitude compensation from -500 to 4000 meters (-1640 to 13,123')
- Salinity compensation from 0 to 40g/L

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edge®DO technical features

Rechargeable Battery

edge DO has a built in rechargeable battery that is charged when the meter is in the plugged in benchtop or wall mount cradle. The battery can also be recharged through the micro USB port with either a USB port from a computer or directly to the power supply.

Two USB ports

edge DO includes one standard USB for exporting data to a flash drive. edge also includes one micro USB port for exporting files to your computer as well as for charging when the cradle is not available.

Clear, full text readout

edge DO features clear, full text guides displayed on the bottom of the screen. There is no need to decipher scrambled abbreviations or symbols; these helpful messages guide you through every process quickly and easily.

Data logging

edge DO allows you to store up to 1000 log records of data. Logging data sets include readings, GLP data, date and time.

GLP

Data of the last calibration you perform is stored in the sensor including the date, time, and buffers used. When the sensor is connected to edge DO, GLP data is automatically transferred.

edge DO design features

Capacitive touch keypad

edge DO features sensitive capacitive touch buttons for accurate keystrokes when navigating edge's menus and screens. Since they are part of the screen, the buttons can never get clogged with sample residue.

Easy to read LCD

edge DO features a 5.5" (14 cm) LCD display that you can clearly view from over 5 m (16.4'). The large display, with its wide 150° viewing angle, provides one of the easiest to read LCDs in the industry.

Zero footprint

Using the wall mount cradle (included), edge DO can be placed on a wall, leaving zero footprint on the benchtop space. The cradle has a built-in connector to power and charge the batteries.

3.5 mm probe input

Plugging an electrode in has never been simpler; no alignments or broken pins, simply connect the 3.5 mm plug and begin. Digital electrodes are automatically recognized.

Sleek design

Incredibly thin and lightweight, edge measures just 1/2" (12 mm) thick and weighs just 8.8 ounces (250 g).

Accepts edge DO compatible dissolved oxygen probe

%Sat

91.2

ATC °C

22.4

A hybrid meter that can be used in portable, wall-mount and benchtop configurations

The versatile design of edge DO enables it to be used as a portable, wall-mount or benchtop meter. edge DO simplifies measurement, configuration, calibration, diagnostics, logging and transferring data directly to a computer or USB drive.

Portable field unit

edge DO is ideal for field use due to its light weight, large screen, and thin design. It can easily be slipped into a backpack or messenger bag. The battery life lasts up to 8 hours when used as a portable device.

Wall–mount cradle

The included wall–mount cradle makes it easy to conserve space on the benchtop while also charging edge DO with the AC adapter. The cradle is ideal for continuous monitoring applications.

Electrode holder with built-in cradle

The electrode holder features a swivel, adjustable arm with a built-in cradle to hold edge pH securely in place at the optimum viewing angle.

Digital electrodes

edge®DO performs measurements through its unique digital electrodes. These digital electrodes are auto-recognized, providing sensor type, calibration data and a serial number when connected to edge DO by an easy to plug-in 3.5 mm connector.

Dissolved oxygen electrode

HI764080 (included)

Dissolved oxygen electrode with temperature sensor

Recommended for general purpose

Specifications		HI2004 edge DO
Dissolved Oxygen	Range	0.00 to 45.00 ppm (mg/L); 0.0 to 300.0 % saturation
	Resolution	0.01 ppm (mg/L); 0.1 % saturation
	Accuracy	± 1.5% of reading ±1 digit
	Calibration	one or two-point at 0% (HI7040 solution) and 100% (in air)
	Temperature Compensation	ATC (0 to 50°C; 32.0 to 122.0°F)*
	Salinity Compensation	0 to 40 g/L (with 1 g/L resolution)
	Altitude Compensation	-500 to 4000 m (-1640 to 13120') (with 100 m (328') resolution)
Temperature	Range*	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	±0.5°C; ±0.9°F
Additional Specifications	Probe	HI764080 digital dissolved oxygen electrode with 3.5 mm (1/8") connector and 1 m (3.3') cable (included)
	Logging	up to 1000 records organized in: manual log-on-demand (max. 200 logs), manual log-on-stability (max. 200 logs), interval logging (max. 600 samples; 100 lots)
	Connectivity	1 USB port for storage; 1 micro USB port for charging and PC connectivity
	Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
	Power Supply	5 VDC adapter (included)
	Dimensions	202 x 140 x 12 mm (7.9" x 5.5" x 0.5")
	Weight	250 g (8.82 oz.)
Ordering Information		**HI2004-01** (115V) and **HI2004-02** (230V) edge DO includes: HI764080 dissolved oxygen electrode, HI7041S refill electrolyte solution, DO membrane caps (2), o-rings (2), benchtop docking station with electrode holder, wall-mount cradle, USB cable, 5 VDC power adapter, quality certificates and instruction manual. **HI2004-03** includes the above without electrode.

* temperature limits will be reduced to actual probe limits
** with temperature compensation function disabled
† standard mode only

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HANNA instruments

Optical Dissolved Oxygen Meter

Professional dissolved oxygen measurement with digital optical probe

Design Features

- Digital optical probe with Quick Connect
- IP67 rated waterproof, rugged enclosure
- Clear, dot matrix, back-lit display with multifunction virtual keys
- A dedicated HELP key for assistance anytime.

Technical Features

- Percent saturation or concentration measurements (mg/L)
- One or two-point calibration at 0 or/and 100% saturation (with auto recognition).
- Automatic temperature compensation with one-point temperature calibration
- Salinity compensation
  - Salinity compensation allows for direct determination of dissolved oxygen in saline waters.
  - Users can set the salinity value
- A user selectable "Calibration due" warning.
- Built-in calculations
  - Biochemical Oxygen Demand (BOD), Oxygen Uptake Rate (OUR) and Specific Oxygen Uptake Rate (SOUR) modes
- Built-in barometer
  - Automatic barometric pressure compensation with 1 point calibration
  - Displays pressure in user-selectable units (mmHg, inHg, atm, psi, kPa, mbar)
- Log on demand with 4000 records capability.
- AutoEnd freezes the next stable measurement value on the display.
- GLP
  - A dedicated GLP key that includes at last 5 calibrations with time, date, calibration points as well as barometric pressure, temperature and salinity setting.
- USB-C port for easy data transfer to memory stick, PC or other compatible device
- Displays temperature in °C or °F
- Approximately 200 hours of continuous use using 4 AA batteries

The HI98198 opdo™ meter is a rugged, portable dedicated dissolved oxygen (DO) meter designed for fresh and saltwater measurements of dissolved oxygen. This professional, waterproof meter complies with IP67 standards and measures DO, barometric pressure, and temperature. The HI98198 is supplied with a HI764113 digital optical dissolved oxygen probe in a custom thermoformed durable carrying case with accessories. It is compact and ergonomically designed to provide ready access to the materials required for routine sampling.

The HI98198 opdo meter is only compatible with the Hanna HI764113 digital dissolved oxygen probe.

Concentration measurements are automatically compensated for barometric pressure, temperature and salinity. Barometric pressure and temperature are automatically measured and compensated. Salinity is automatically compensated by setting manually the salinity concentration of the water being measured. The meter also has a built in application to measure and calculate BOD (Biological Oxygen Demand), OUR (Oxygen uptake rate), and SOUR (Specific Oxygen Update Rate).

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Features in Detail

Backlit graphic LCD display

The HI98198 features a backlit graphic LCD with on-screen help and battery life indicator. Dissolved oxygen, barometric pressure, and temperature readings can be displayed in user preferred units. The graphic display allows the use of virtual keys to enhance the intuitive user interface. The meter also displays a text reminder when a scheduled calibration is due.

Waterproof protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1m for up to 30 minutes.

Quick connections to probes

The HI98198 meter is compatible with the HI764113 Optical dissolved oxygen probe. Connections are facilitated by the Quick Connect 7-pin DIN connector which makes attaching and removing the probe quick and easy. The meter automatically detects the connected probe.

Measurement

The HI98198 automatically compensates dissolved oxygen concentrations. Temperature and atmospheric pressure compensations are automatically made. Salinity compensation can be manually entered.
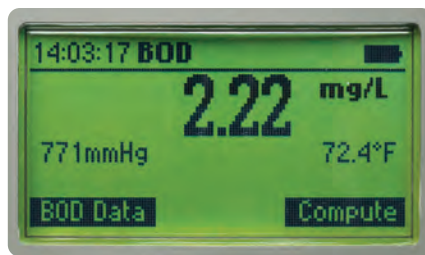
BOD, OUR and SOUR

Dedicated measurement programs are available by using the Mode selection key.

Built-in barometer

With the internal barometer, the HI98198 is able to compensate for changes in barometric pressure so there is no need for charts, altitude information or external barometric pressure information.

Pressure compensation with the meter's built-in barometer can be validated against a reference barometer, and if needed, can be recalibrated in user-selectable units (mmHg, inHg, atm, psi, kPa, mbar).

Data logging

Log on demand with 4000 records capability.

GLP

The last five sets of Calibration data are available by pressing the dedicated GLP key. Calibration values with time and date stamp are captured as well as pressure, salinity and temperature values at the time of calibration. GLP data is available on logged data.

Data transfer

USB Type-C port for easy data transfer to memory stick, PC, or other compatible devices.

Intuitive keypad

The fitted rubber keypad has dedicated keys for power, backlight, up/down arrows and help. The meter also features two virtual soft keys that navigate the user through the configuration, meter setup, and logging of data. The interface is intuitive for any user's level of experience.

Dedicated help key

Access help at any time via the Help button and view content specific information based on the screen that is currently being viewed.

AutoEnd

Press AutoEnd during measurement to hold the first stable reading on the display automatically.

Theory

The Hanna HI764113 optical DO sensing probe is based on the principle of fluorescence quenching. The sensing method features an immobilized Pt based luminophore that is excited by the light of a blue LED and emits a red light. Dissolved oxygen quenches this excitation. When there is no oxygen present, the lifetime of the signal is the greatest; as oxygen hits the sensing surface, the lifetime becomes shorter. The intensity and lifetime are inversely proportional to the amount of oxygen present; as oxygen interacts with the luminophore it reduces the intensity and lifetime of the luminescence. The lifetime of the luminescence is measured by a photodetector, and is used to calculate the dissolved oxygen concentration. This is in turn reported by the meter as a % saturation or mg/L reading of Dissolved Oxygen.

A. 0% O_2 saturation
B. 100% O_2 saturation
C. 500% O_2 saturation

Luminophore emissions of three oxygen measurements after pulsed blue light excitation.

The major components of the probe include a blue LED for excitation, a red LED that is used as a reference light, and a photodetector. The Smart Cap™ is locked in place on the optical probe and includes the immobilized O_2 sensitive luminophore with rugged insoluble black oxygen permeable protective layer.

Over time, the sensor's optical components can age but are compensated for by using the reference signal to compensate the measuring path. As a result, the sensor provides accurate DO measurements over long periods of time without the need for frequent calibration.

Specifications — HI98198

Dissolved Oxygen	Range	0.00 to 50 mg/L (ppm); 0.0 to 500.0% saturation
	Resolution	0.01 mg/L (ppm); 0.1% saturation
	Accuracy (@25°C/77°F)	1.5% of reading ± 0.01mg/L for 0.00-20.00mg/L; 5% of reading for 20.00-50.00mg/L; 1.5% of reading ±0.1% for 00-200.0%; 5% of reading for 200.0-500.0%
	Calibration	one or two points automatic calibration at 100% (8.26 mg/L) and 0% (0 mg/L); Single point manual using a value entered by the user in % saturation or mg/L
Barometric Pressure	Range	420 to 850 mmHg
	Resolution	1 mmHg
	Accuracy (@25°C/77°F)	±3 mmHg within ±15% from the calibration point
	Calibration	single point anywhere within pressure range
Temperature	Range	-5.0 to 50.0°C (23 to 122°F)
	Resolution	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	±0.3°C (±0.4°F)
	Calibration	single point anywhere within temperature range
Additional Specifications	Temperature Compensation	automatic from -5.0 to 50.0°C (23.0 to 122.0°F)
	Pressure Compensation	automatic from 420 to 850 mmHg
	Salinity Compensation	automatic from 0 to 70 PSU (manually set)
	Probe	HI764113 optical DO probe with stainless steel, weighted protective sleeve, internal temperature sensor, 7-pin DIN connector and 4m (13') cable (included)
	Logging	On demand with 4000 records capability
	Battery Type / Life	1.5V (4) AA batteries / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user-selectable: 5, 10, 30, 60 min or disabled
	PC Connectivity	USB Type-C
	Dimensions	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4")
	Weight (with batteries)	450 g (15.9 oz.)
	Case Ingress Protection Rating	IP67
	Environment	0 to 50 °C (32 to 122 °F) max. RH 100%

Ordering Information

HI98198 is supplied with HI764113 Optical DO probe with built-in temperature sensor, protective shield and 4 m (13.1') cable, HI764113-1 Smart Cap™ with o-ring, HI7040 Bicomponent Zero Oxygen Solution, Calibration/storage vessel, 100 mL plastic beaker (2), 1 syringe with silicon grease, 1 lens wipe, 1.5V AA batteries (4), Instruction manual, meter quality certificate, probe quality certificate, cap quality certificate, HI920016 USB Type A to C cable in a rugged carrying case.

HI98198/10 is supplied with HI764113/10 Optical DO probe with built-in temperature sensor, protective shield and 10 m (32.8') cable, HI764113-1 Smart Cap™ with o-ring, HI7040 Bicomponent Zero Oxygen Solution, Calibration/storage vessel, 100 mL plastic beaker (2), 1 syringe with silicon grease, 1 lens wipe, 1.5V AA batteries (4), Instruction manual, meter quality certificate, probe quality certificate, cap quality certificate, HI920016 USB Type A to C cable in a rugged carrying case.

Accessories

HI710034 orange protective rubber boot
HI720198 spare carrying case for HI98198
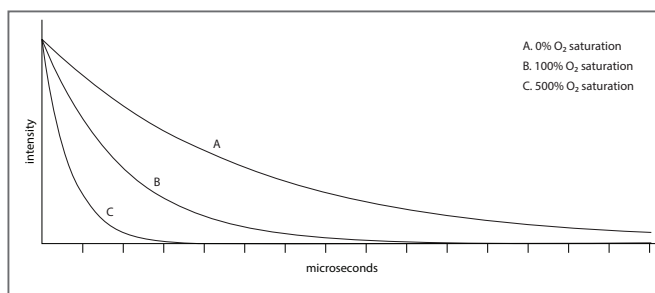
- Optional shockproof silicon rubber boot
  - Specially designed to protect your instrument from damage or impact

HI710034 Orange

Rugged custom carrying case

The HI98198 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

Rugged Optical Dissolved Oxygen Probe for Fresh and Saltwater Applications

- Digital, weighted probe
- No membranes
- No electrolytes
- No oxygen consumption
- No flow dependence or minimum flow rate
- Fast and stable readings
- Not affected by sunlight
- Factory calibrated "Smart Cap"
- Smart Caps last one year
- Minimal maintenance
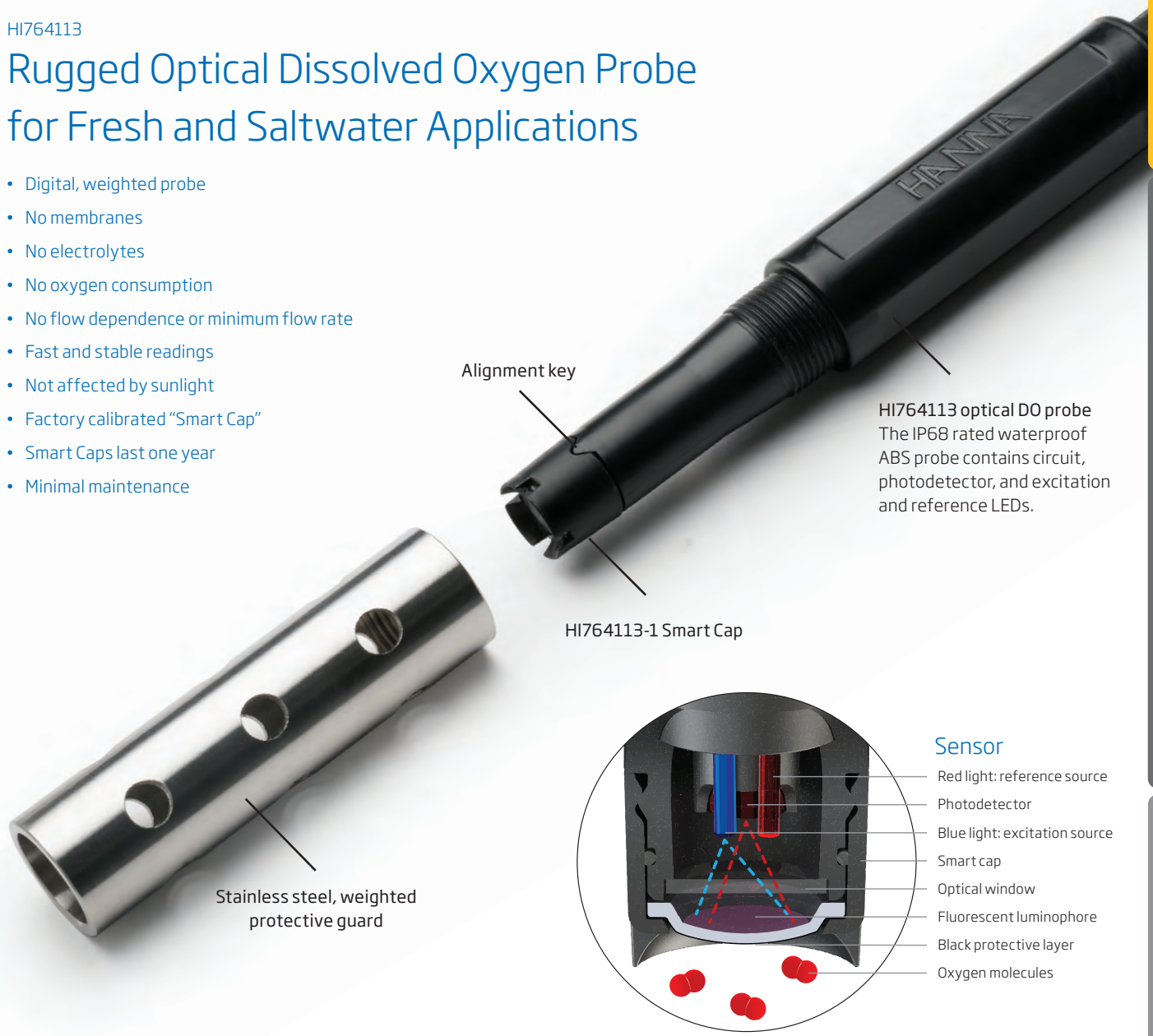
Alignment key

HI764113 optical DO probe
The IP68 rated waterproof ABS probe contains circuit, photodetector, and excitation and reference LEDs.

HI764113-1 Smart Cap

Stainless steel, weighted protective guard
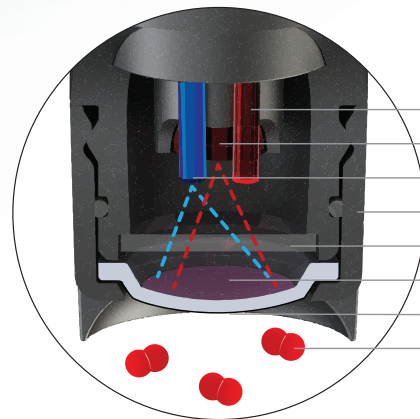
Sensor

Red light: reference source
Photodetector
Blue light: excitation source
Smart cap
Optical window
Fluorescent luminophore
Black protective layer
Oxygen molecules

Specifications	HI764113
Probe body material	ABS
Smart Cap™ material	Polypropylene
Cable jacket material	PVC
Cable length	4 m (13.1 ft.), 10 m (32.8 ft.), and 20 m (65.6 ft.) options
Probe guard	316 Stainless Steel
Temperature Measurement	Thermistor
Pressure	20 m (29 PSI)
Probe Dimensions (with Guard)	174 X 25 mm (6.8 X 1")
Response Time (t95)	45 seconds
Probe Weight (with Guard)	400 g (14.2 oz); 4 m (13.1 ft.) cable length
Probe Ingress Protection Rating	IP68
Sensor type	Optical; Luminescence Quenching

Smart Cap

RFID tag

Smart Cap with RFID communication stores factory calibration coefficients.

The domed surface helps repel surface bubbles and provides increased luminophore surface area for better measurement sensitivity.

HI98193

Professional Waterproof Meters

Dissolved Oxygen and BOD

- Waterproof
  - IP67 rated waterproof, rugged enclosure
- Choice of units
  - Display units in % saturation or mg/L (ppm)
- Salinity compensation
  - Salinity compensation allows for direct determination of dissolved oxygen in saline waters.
  - Users can set the salinity value
- Built-in temperature sensor
  - Automatic temperature compensation with one or two-point temperature calibration
  - Displays temperature in °C or °F
- Built-in barometer
  - Automatic barometric pressure compensation with 1 point calibration
  - Displays pressure in user-selectable units (mmHg, inHg, atm, psi, kPa, mbar)
- Built-in calculations
  - Determination of Biochemical Oxygen Demand (BOD), Oxygen Uptake Rate (OUR) and Specific Oxygen Uptake Rate (SOUR)
- Polarization
  - Automatic polarization of probe at startup
- Membrane caps
  - Ready-to-use preformed PTFE membrane caps
- 200 hour battery life
  - Approximately 200 hours of continuous use
- Clear display
  - Dot matrix display with multifunction virtual keys
- AutoHold
  - Automatically holds the first stable reading on the display
- Calibration timeout
  - Alerts when calibration is due at a specified interval
- PC Connectivity
  - PC connectivity via opto-isolated micro-USB with HI92000 software
- Log-on-demand
  - Store measurement data at the press of a button
- GLP
  - GLP data provides calibration data including date, time, pressure, calibrated value, temperature and salinity value of the last calibration

For Universal Applications

The HI98193 is a portable DO meter with extended ranges of up to 50 ppm and 600% saturation. HI98193 features compensations for pressure, temperature and salinity, which are essential for an accurate dissolved oxygen reading. HI98193 is supplied with the HI764073 polarographic dissolved oxygen probe that utilizes field replaceable PTFE membrane caps.

- Optional shockproof silicon rubber boot
 - Specially designed to protect your instrument from damage or impact

HI710034 Orange
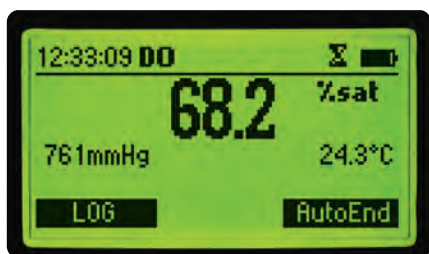
Backlit Graphic LCD Display

The HI98193 features a backlit graphic LCD with on-screen help. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

Waterproof Protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1 m for up to 30 minutes. The probe features an IP68 rating for continuous immersion in water.

Quick connect probe

The HI764073 DO probe features a quick connect DIN connector to make attaching and removing the probe simple and easy.

The HI764073's built-in temperature sensor allows for automatic temperature compensation. The temperature sensor can be calibrated to one or two points. Manual entry of salinity values allows for the salinity compensation of dissolved oxygen readings in saline waters.
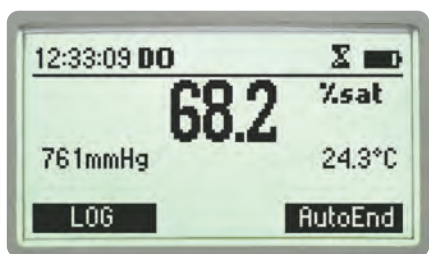
Measurement

The HI98193 has extended ranges of up to 50 ppm and 600% saturation. When measuring dissolved oxygen, compensations for salinity, temperature and pressure are essential to improve the accuracy and precision of readings.

BOD, OUR and SOUR
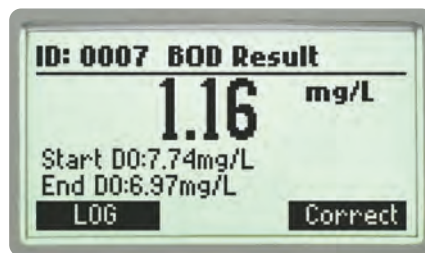
• BOD results
  • BOD is calculated in mg per liter from the difference between the initial and final dissolved oxygen
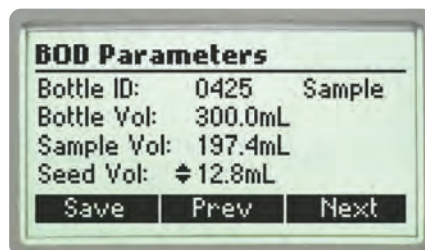
• BOD parameters and records
  • All necessary parameters for BOD testing can be set and displayed at once.
  • A list of all saved BOD data can be easily retrieved and shown on the LCD display.
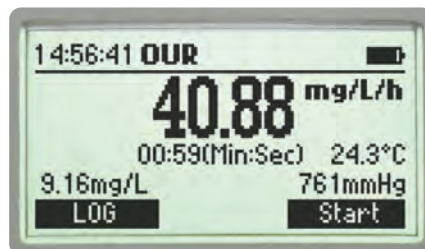
• OUR results
  • Measured in mg of oxygen consumed per L per hour.
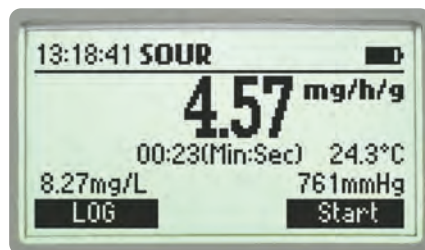
• SOUR results
  • Measured in mg of oxygen consumed per g of volatile suspended solids per hour.

AutoHold

Pressing AutoHold during measurement will automatically hold the first stable reading on the display.

Built-in Barometer

With the internal barometer, the HI98193 is able to compensate for changes in barometric pressure so there is no need for charts, altitude information or external barometric pressure information.

Pressure compensation with the meter's built-in barometer can be validated against a reference barometer, and if needed, can be recalibrated in user-selectable units (mmHg, inHg, atm, psi, kPa, mbar).

Data Logging

The HI98193's log on-demand feature allows users to store up to 400 readings. This data can then be transferred to a PC with the HI920015 USB cable and HI92000 software.

GLP
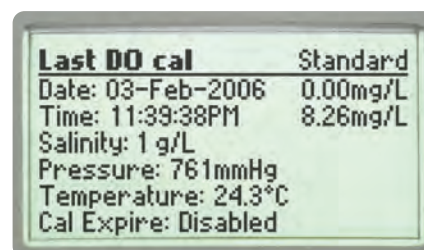
Comprehensive GLP functions are directly accessible by pressing the GLP key. This data includes date, time, pressure, calibrated value, temperature and salinity value of the last calibration.

Intuitive Keypad

The fitted rubber keypad has dedicated keys for power, backlight, up/down arrows, help and alphanumeric characters. The meter also features two virtual soft keys that navigate the user through the configuration of each parameter, meter setup, and logging of data. The interface is intuitive for any user's level of experience.

Dedicated Help Key

Access help at any time at the press of a dedicated button and view content specific information based on the screen that is currently being viewed.
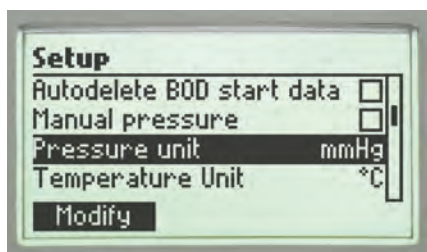
Setup screen

Our extensive setup screen features a host of configurable options such as time, date, temperature units and language for help screens and guides

PC Connectivity

Logged data can be transferred to a Windows compatible PC with the included HI920015 micro USB cable and HI92000 software.

Long Battery Life

The display of the meter has a battery icon indicator to show the remaining power. The meter uses four 1.5V AA batteries that provide up to 200 hours of battery life.

Rugged custom carrying case

The HI98193 meter, probe, and all accessories are supplied in the HI720193 rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

Specifications		HI98193
Dissolved Oxygen	Range	0.00 to 50.00 mg/L (ppm); 0.0 to 600.0% saturation
	Resolution	0.01 mg/L (ppm); 0.1% saturation
	Accuracy (@25°C/77°F)	±1.5% of reading ±1 digit
	Calibration	automatic one or two point at 100 % (8.26 mg/L) and 0 % (0 mg/L).; manual one point using a value entered by the user in % saturation or mg/L
Atmospheric Pressure	Range	450 to 850 mmHg
	Resolution	1 mmHg
	Accuracy (@25°C/77°F)	± 3 mmHg within ±15% from the calibration point
	Calibration	one point at any in range pressure value
Temperature	Range	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy (@25°C/77°F)	±0.2°C; ±0.4°F (excluding probe error)
	Calibration	one or two point at any in range temperature value
Additional Specifications	Measurement Modes	direct DO; BOD (biochemical oxygen demand); OUR (oxygen uptake rate); SOUR (specific oxygen uptake rate)
	Barometric Compensation	automatic from 450 to 850 mmHg
	Salinity Compensation	automatic from 0 to 70 g/L
	Temperature Compensation	automatic from 0.0 to 50.0 °C (32.0 to 122.0 °F)
	Probe	HI764073 polarographic DO probe with protective sleeve, internal temperature sensor, DIN connector and 4m (13') cable (included)
	Logging	log-on-demand up to 400 samples
	PC Connectivity	opto-isolated USB (with HI92000 software)
	Battery Type / Life	1.5V (4) AA batteries / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user-selectable: 5, 10, 30, 60 min or can be disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4")
	Weight	400 g (14.2 oz.)
Ordering Information		All meters are supplied with:
		HI7040 bi-component zero oxygen solution (230 mL + 30 mL), HI7041S electrolyte solution (30 mL), preformed PTFE membrane caps (2), DO protective cap, O-rings (2), 100 mL plastic beaker (2), HI92000 PC software, HI920015 micro USB cable, 1.5V AA batteries (4), quick start guide, quality certificate and instruction manual in an HI720193 rugged carrying case with custom insert.
		HI98193 is supplied with HI764073 polarographic DO probe with protective sleeve and 4m (13') cable.
		HI98193/10 is supplied with HI764073/10 polarographic DO probe with protective sleeve and 10m (33') cable.
Accessories		HI710034 orange protective rubber boot

HI9147

Dissolved Oxygen Meter for Aquaculture

- Automatic Temperature Compensation (ATC)
- Waterpoof
- Backlit LCD

The HI9147 is designed for aquaculture applications. This unit is unique among our family of DO meters as it is supplied with a galvanic probe.

Unlike polarographic probes, galvanic DO probes require no conditioning time. When you need to measure multiple samples in a given period of time, simply turn the meter on and start taking measurements.

The HI9147 is a must have for DO sensitive organisms or high bio-load environments.

DO Levels at 100% Saturation

Temperature	Salinity (ppt)				
	0	10	20	30	40
10°C / 50°F	13.0	12.2	11.4	10.6	9.8
15°C / 59°F	10.3	9.7	9.2	8.6	8.1
20°C / 68°F	9.4	8.8	8.4	7.9	7.4
25°C / 77°F	8.5	8.0	7.6	7.2	6.7
30°C / 86°F	7.8	7.4	7.0	6.6	6.2

Specifications		HI9147
Dissolved Oxygen	Range	0.0 to 50.0 mg/L (ppm); 0 to 600% saturation
	Resolution	0.1 mg/L (ppm); 1% saturation
	Accuracy (@25°C/77°F)	±1% of reading
Temperature	Range	-5.0 to 50.0°C; 23.0 to 122.0°F
	Resolution	0.1°C; 1°F
	Accuracy (@25°C/77°F)	±0.2°C; ±1°F (excluding probe error)
Additional Specifications	Calibration	manual, in saturated air
	Temperature Compensation	automatic, 0° to 50°C (32°F to 122°F)
	Altitude Compensation	0 to 4000 m (resolution 100 m)
	Salinity Compensation	0 to 51 g/L (ppt) (1 g/L resolution)
	Probe	HI76409/4 galvanic DO probe (fixed) with internal temperature sensor, DIN connector and 4 m (13') cable (HI9147-04), 10 m (33') cable (HI9147-10), or 15 m (49') cable (HI9147-15)
	Battery Type / Life	1.5V AAA (3) / approx. 1000 hours of continuous use without backlight
	Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
	Dimensions / Weight	185 x 72 x 36 mm (7.3 x 2.8 x 1.4") / 450 g (15.9 oz.)
Ordering Information		**HI9147-04** is supplied with HI76409/4 probe with 4 m (13') cable, spare membranes (5), electrolyte solution (30 mL), batteries, screwdriver and instructions.
		HI9147-10 is supplied with HI76409/10 probe with 10 m (32.8') cable, spare membranes (5), electrolyte solution (30 mL), batteries, screwdriver and instructions.
		HI9147-15 is supplied with HI76409/15 probe with 15 m (49.2') cable, spare membranes (5), electrolyte solution (30 mL), batteries, screwdriver and instructions.

HI9146

Dissolved Oxygen Meter

Dissolved oxygen is a commonly measured parameter in aquaculture, wastewater treatment, environmental studies, and wine analysis. The HI9146 is a rugged, portable dissolved oxygen (DO) meter designed to provide high accuracy measurements whether in the field or in the lab. The meter features automatic calibration performed at one or two points in saturated air and/or zero oxygen solution.All readings are automatically compensated for temperature variations and can be frozen on the display upon stability using the auto-end feature. Salinity and altitude compensation are user adjustable based on the environmental conditions that are present. The HI9146 features a Battery Error Prevention System (BEPS) that detects when the batteries become too weak to ensure reliable measurements. The HI9146 is supplied complete and ready to use.

- Polarographic Measuring System
- Replaceable Membrane Caps
- Automatic Calibration
- Good Laboratory Practice (GLP)
- Automatic Temperature Compensation
- Altitude Compensation
- Salinity Compensation
- Auto End Point
  - The HI9146 features an auto endpoint mode in which when selected the reading will frozen on the display once a stable measurement is obtained. The auto-end feature allows for consistency among various users by ensuring that stability has been achieved before recording a measurement.
- Backlit LCD
- Battery Error Prevention System (BEPS)
  - The Battery Error Prevention System detects when the batteries become too weak to ensure reliable measurements. The backlight feature is automatically disabled when batteries are getting low and a clear indication is displayed to warn the user of this condition.

Specifications		HI9146
DO	Range	0.00 to 45.00 mg/L (ppm); 0.0 to 300.0% saturation
	Resolution	0.01 mg/L (ppm); 0.1% saturation
	Accuracy (@ 25°C/77°F)	±1.5% F.S. or ±1 digit, whichever is greater
Temperature	Range	0.0 to 50.0°C; 32.0 to 122.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy (@ 25°C/77°F)	±0.2°C ; ±0.4°F (excluding probe error)
Additional Specifications	Dissolved Oxygen Calibration	one or two points at 0% (HI7040 solution) and 100% (in air)
	Temperature Compensation	automatic from 0 to 50°C (32 to 122°F)
	Altitude Compensation	0 to 4000 m (resolution 100 m)
	Salinity Compensation	0 to 80 g/L (ppt) (resolution 1 g/L)
	Probe	HI76407/4F polarographic DO probe, internal temperature sensor, DIN connector and 2 m (6.6') cable (included)
	Battery Type / Life	1.5V AAA (3) /approximately 200 hours of continuous use without backlight (50 hours with backlight on)
	Environment	0 to 50°C (32 to 122°F); RH max 95%
	Dimensions	185 x 72 x 36 mm (7.3 x 2.8 x 1.4")
	Weight	300 g (10.6 oz.)
Ordering Information		**HI9146-04** is supplied complete with HI76407/4F probe with 4 m (13.1') cable, HI76407A membranes (2), HI7041S electrolyte solution (30 mL), batteries, instructions and rugged carrying case. **HI9146-10** is supplied complete with HI76407/10F probe with 10 m (32.8') cable, HI76407A membranes (2), HI7041S electrolyte solution (30 mL), batteries, instructions and rugged carrying case.

HI9142

Manual Calibration Dissolved Oxygen Meter

- Automatic Temperature Compensation (ATC)
- One or two-point calibration
- Waterproof

The ever increasing demand for instant on-site analysis results has created a need for innovative, rugged, portable and waterproof meters.

Field work can subject instrumentation to the inclemency of weather. Cold, rain, snow, dust and humidity can cause condensation to breech the housing. Once the housing has been compromised, the meter is susceptible to diminishing performance and life span. The rugged, waterproof housing of the HI9142 solves many of the problems of field use.

Calibration is performed with HI7040 zero oxygen solution, while 100% calibration is done in air.

The polarographic probe (HI76407/4) is accurate to 0.3 ppm and is supplied with a 4 m (13') cable that allows measurements to be taken even in hard to reach places.

Specifications — HI9142

		HI9142
Dissolved Oxygen	Range	0.0 to 19.9 mg/L (ppm)
	Resolution	0.1 mg/L (ppm)
	Accuracy (@ 25°C/77°F)	±1.5% F.S.
Temperature	Range	-5.0 to 50.0°C (23.0 to 122.0°F)
	Resolution	0.1°C (1°F)
	Accuracy (@ 25°C/77°F)	±0.2°C (±1°F) (excluding probe error)
Additional Specifications	Calibration	automatic in zero oxygen solution; manual in 100% water saturated air
	Temperature Compensation	automatic, 0 to 50°C (32 to 122°F)
	Probe	HI76407/4 polarographic DO probe with internal temperature sensor, DIN connector and 4 m (13') cable
	Battery Type / Life	1.5V AAA (3) / approximately 1,000 hours of continuous use
	Environment	0 to 50°C (32 to 122°F); RH max 100%
	Dimensions	185 x 72 x 36 mm (7.3 x 2.8 x 1.4")
	Weight	300 g (10.6 oz.)

Ordering Information	
HI9142 is supplied with HI 76407/4 probe with 4 m (13') cable, 2 spare membranes, HI7041S electrolyte solution (30 mL), calibration screwdriver, batteries, instructions and rugged carrying case.

HI764113 • HI7641133

Optical DO Probe

- Digital, weighted probe
- No membranes
- No electrolytes
- No oxygen consumption
- No flow dependence or minimum flow rate
- Fast and stable readings
- Not affected by sunlight
- Factory calibrated "Smart Cap"
- Smart Caps last one year
- Minimal maintenance

1 Strain relief

2 ABS Probe body

3 Temperature Sensor

4 O-Ring Seal

5 Optical window

6 Alignment key

7 Smart Cap™

8 RFID Tag

9 Embedded O_2 sensitive luminophore with black protective layer

10 Protective shield*

Probe	Cable Length	Required Meter
HI7641133*	1 m (3.3')	HI6421
HI764113	2 m (6.6')	HI98198
HI764113/10	10 m (33')	
HI764113/20	20 m (33')	

* HI7641133 for the HI6421 does not include a protective shield.

Accessories

HI764113-1	Smart Cap with O-ring
HI764113-2	Calibration/Storage vessel
HI764113-3	Stainless Steel Protective Shield

DETAIL A

DETAIL B
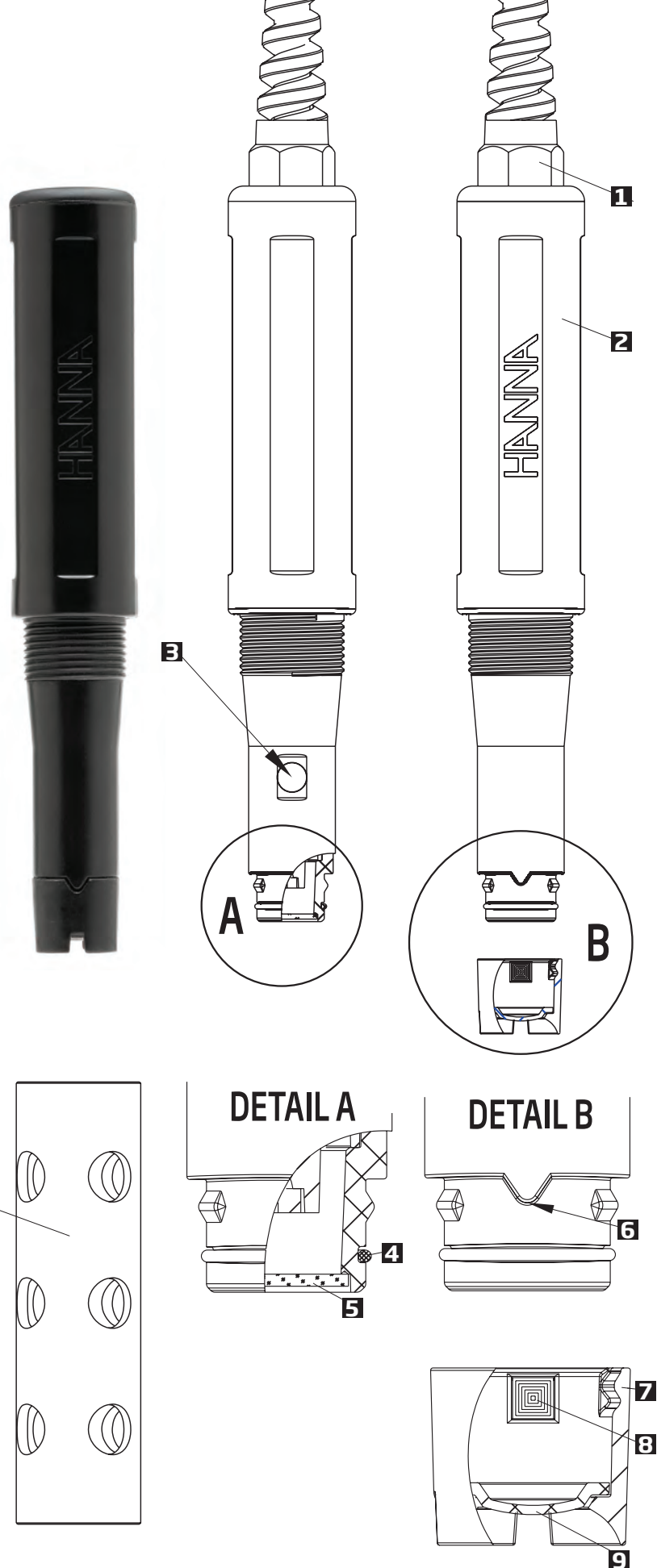
HI764113 with HI764113-3 stainless
steel protective shield attached

HI764113 with HI764113-2 calibration/
storage vessel attached

Smart Cap

RFID tag

Smart Cap with RFID communication stores factory calibration coefficients.

The domed surface helps repel surface bubbles and provides increased luminophore surface area for better measurement sensitivity.

HI764080

edge® Compatible Digital DO Probe

The HI 764080 is a digital dissolved oxygen electrode with built-in temperature sensor. This ultra-thin, Clark-type polarographic electrode is designed for measuring DO in aqueous solutions and contains a built-in microchip that stores sensor type, serial number, and calibration information. The sensor features a platinum cathode with a silver/silver chloride anode, an integrated temperature sensor, and easily replaceable PTFE membrane caps. The HI 764080 is designed for use with Hanna's edge® pH/EC/DO meter.

- Digital Microprocessor
- Ultra-thin design – 12mm body for convenience
- Replaceable membranes – easy screw on for easy maintenance
- Polarographic sensor
- Built-in temperature sensor
- 3.5mm digital plug – easy to plug in, no alignment necessary

1 Strain relief

2 Probe cap

3 PEI probe body

4 Temperature sensor

5 Threads for membrane cap

6 Ag/AgCl anode and reference

7 Glass insulator

8 Platinum cathode

9 Disposable membrane cap

10 Oxygen permeable PTFE membrane

Probe	Cable Length	Compatible edge™ meters
HI764080	1 m (3.3')	HI2020 HI2030 HI2040 HI2004
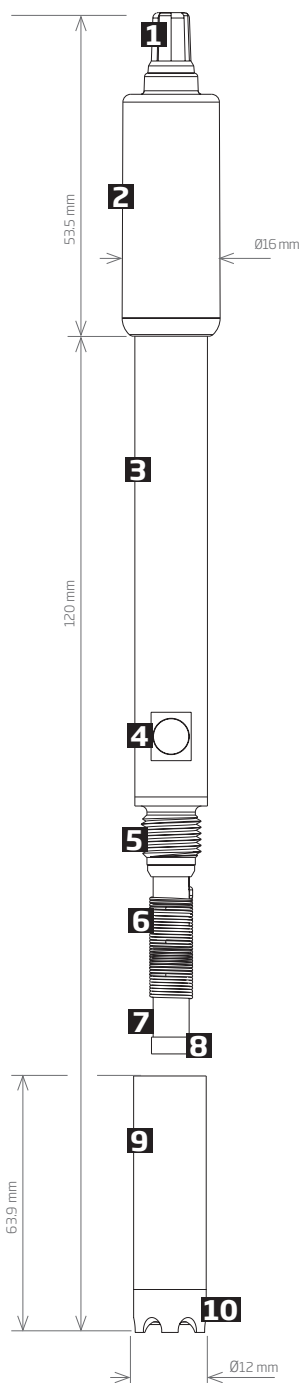
HI764080A/P

Easy, Screw Cap DO Membranes

When the PTFE (polytetrafluoroethylene) membrane of the protective cap wears, it is always good to have a back-up.

HI764080A/P	Contains 5 ready-to-use, replacement membranes

HI7041

Electrolyte Solution

It is crucial to the performance of your DO probe to keep the sensor active with regular maintenance. For this purpose, Hanna has developed HI7041 electrolyte solution to refill the membrane cap.

HI7041S	refilling electrolyte solution (30 mL)
HI7041M	refilling electrolyte solution (250 mL)
HI7041L	refilling electrolyte solution (500 mL)
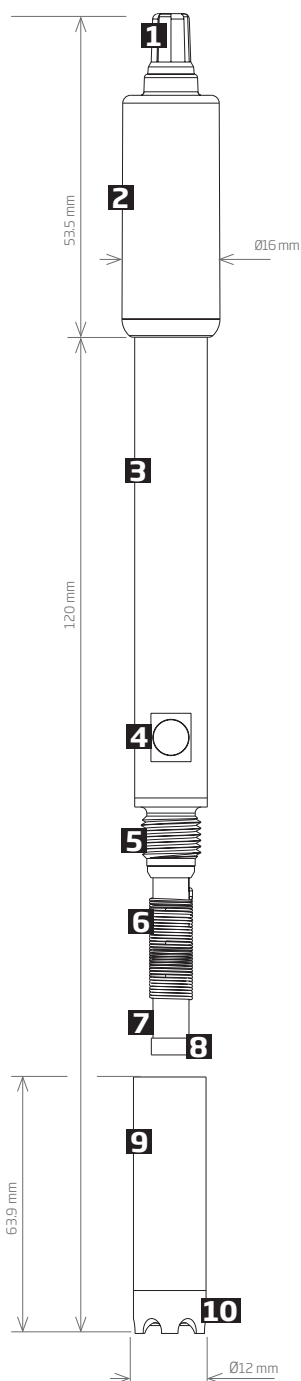
HI76483

Polarographic DO Probe

The HI76483 Clark-Type Polarographic probe measures a wide range of dissolved oxygen from 0.0 to 600% saturation and 0.00 to 90.00 mg/L (ppm). The HI76483 has a slim design measuring only 12 mm in diameter and has a built-in thermistor temperature sensor that compensates for temperature variations from 0 to 50°C. The HI76483 is a spare DO probe for use with the HI5421 Laboratory Research Grade Benchtop Dissolved Oxygen and BOD Meter.

- Polarographic DO probe with analog signal
- 12 mm design that incorporates integral temperature
- Durable PEI (polyetherimide) body and membrane cap has outstanding chemical resistance
- Incorporated 1 m cable and DIN connector

1 Strain relief

2 Probe cap

3 PEI probe body

4 Temperature sensor

5 Threads for membrane cap

6 Ag/AgCl anode and reference

7 Glass insulator

8 Platinum cathode

9 Disposable membrane cap

10 Oxygen permeable PTFE membrane

Probe	Cable Length	Recommended meters
HI764833	1 m (3.3')	HI6421
HI76483	1 m (3.3')	HI5421

Ø16 mm
53.5 mm
120 mm
63.9 mm
Ø12 mm

HI76483A/P

Easy, Screw Cap DO Membranes

When the PTFE (polytetrafluoroethylene) membrane of the protective cap wears, it is always good to have a back-up.

HI76483A/P	Contains 5 ready-to-use, replacement membranes

HI7041

Electrolyte Solution

It is crucial to the performance of your DO probe to keep the sensor active with regular maintenance. For this purpose, Hanna has developed HI7041 electrolyte solution to refill the membrane cap.

HI7041S	refilling electrolyte solution (30 mL)
HI7041M	refilling electrolyte solution (250 mL)
HI7041L	refilling electrolyte solution (500 mL)

DO Probe

with Protective Sleeve

The HI76407/F is a standard Clark-type polarographic dissolved oxygen probe for Hanna's benchtop and portable dissolved oxygen meters. The probe is constructed of durable ABS plastic and contains an integrated temperature sensor for temperature compensated measurements. It is compatible with our HI76407A/P PTFE membrane caps. Each membrane separates the probe's platinum cathode and silver anode from the water sample being measured. Oxygen diffuses across the membrane and interacts with the polarographic system to produce a current proportional to oxygen concentration. Each cap is easily filled with HI7041 electrolyte and screwed on to the probe. The probe's protective sleeve makes it ideal for use in rugged or demanding environments.

1 Shielded, waterproof cable

2 Protective sleeve

3 PEI probe for best field protection

4 Linearized and accurate thermistor temperature sensor protected behind a stainless steel cover

5 Silver wire anode element

6 Glass encapsulated platinum cathode

7 Screw cap membrane that holds potassium chloride electrolyte solution (HI7041S)

8 Thin, permeable PTFE membrane isolates the sensor elements from the testing solution, but allows oxygen to enter (HI76407A/P)

9 Hole for solution cycling

10 Protective sleeve for field applications
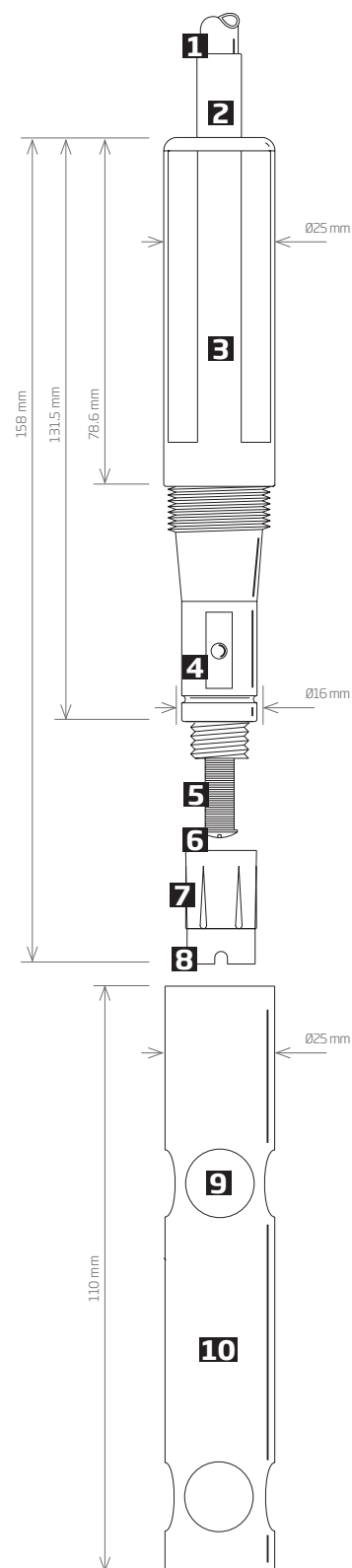
Probe	Cable Length	Recommended Meter
HI76407/4F	4 m (13')	
HI76407/10F	10 m (33')	HI9146
HI76407/20F	20 m (66')	
HI764073	4 m (13')	HI98193
HI764073/10	10 m (33')	

HI76407A/P

Easy, Screw Cap DO Membranes

When the PTFE (polytetrafluoroethylene) membrane of the protective cap wears, it is always good to have a back-up.

HI76407A/P	contains 5 ready-to-use, replacement membranes.

HI7040 • HI7041

DO Solutions

It is crucial to the performance of your DO probe to keep the sensor active with regular maintenance.

HI7040L	zero oxygen solution set, 500 mL + 12g
HI7041S	refilling electrolyte solution (30 mL)
HI7041M	refilling electrolyte solution (250 mL)
HI7041L	refilling electrolyte solution (500 mL)

Ø25 mm

158 mm

131.5 mm

78.6 mm

Ø16 mm

110 mm

Ø25 mm

HI76409

Galvanic DO Probe

with Protective Cap

The HI76409 is a standard galvanic dissolved oxygen probe for use with the HI9147 portable dissolved oxygen meter. Galvanic probes require no conditioning time and therefore allow the ability to measure instantaneously. With extreme portability and a straightforward design, this probe is ideal for both field and lab use.

The D.O. probe is provided with a membrane covering the galvanic sensors and a built-in thermistor for temperature measurement and compensation. The thin permeable membrane isolates the sensor elements from the testing solution but allows oxygen to enter. Oxygen that passes through the membrane causes a current flow, from which the oxygen concentration is determined.

1. Shielded, waterproof cable
2. Flex protect
3. Strain relief for cable
4. Temperature sensors
5. Zinc (Zn) anode
6. Ag^+ cathode (3.5 mm), pure silver
7. Protective cap

Probe	Cable Length	Recommended Meter
HI76409/4	4 m (13')	HI9147 (meter specific, fixed probe)
HI76409/10	10 m (33')	
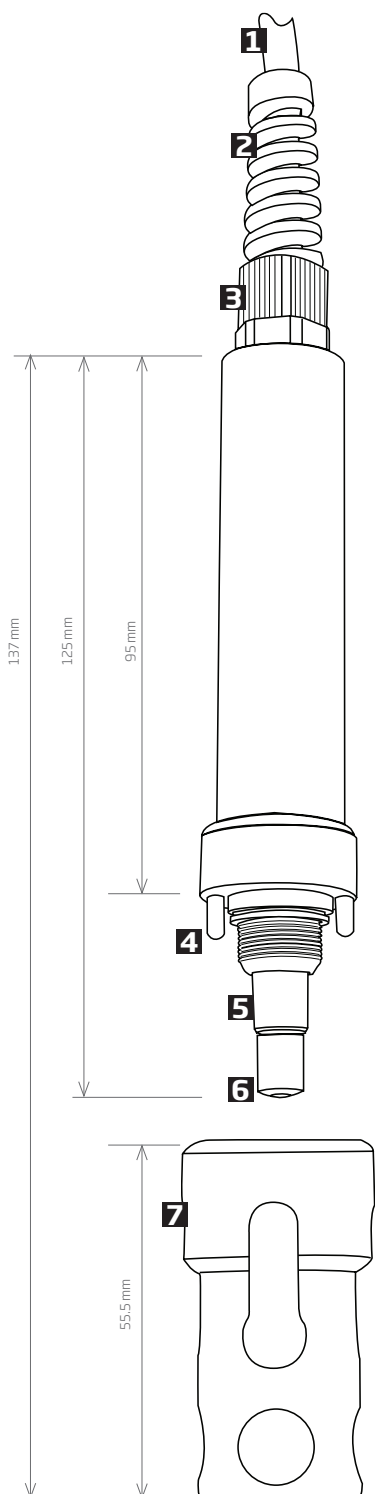
HI76409A/P

Easy, Screw Cap DO Membranes

When the PTFE (polytetrafluoroethylene) membrane of the protective cap wears, it is always good to have a back-up.

| HI76409A/P	Contains 5 ready-to-use, replacement membranes

HI7040 • HI7042

DO Solutions

It is crucial to the performance of your DO probe to keep the sensor active with regular maintenance.

HI7040L	Zero oxygen solution set, 500 mL + 12g
HI7042S	Refilling electrolyte solution (30 mL)

HI76407

Standard DO Probe

The HI76407 is a standard Clark-type polarographic dissolved oxygen probe for Hanna's benchtop and portable dissolved oxygen meters. The probe is constructed of durable ABS plastic and contains an integrated temperature sensor for temperature compensated measurements. It is compatible with our HI76407A/P PTFE membrane caps. Each membrane separates the probe's platinum cathode and silver anode from the water sample being measured. Oxygen diffuses across the membrane and interacts with the polarographic system to produce a current proportional to oxygen concentration. Each cap is easily filled with HI7041 electrolyte and screwed onto the probe. The probe's tapered design makes it ideal for BOD measurements.

1 Shielded, waterproof cable

2 Protective sleeve

3 PEI probe for best field protection

4 Linearized and accurate thermistor temperature sensor protected behind a stainless steel cover

5 Silver wire anode element

6 Glass encapsulated platinum cathode

7 Screw cap membrane that holds potassium chloride electrolyte solution (HI7041S)

8 Thin, permeable PTFE membrane isolates the sensor elements from the testing solution, but allows oxygen to enter (HI76407A/P)
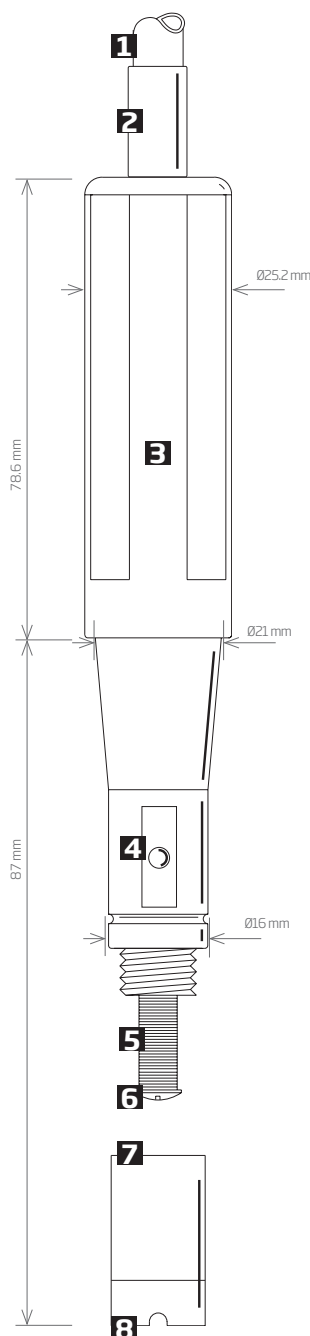
Probe	Cable Length	Recommended Meter
HI76407/2	2 m (6.6')	HI9142
HI76407/4	4 m (13')	
HI76407/10	10 m (33')	
HI76407/20	20 m (66')	

HI76407A/P

Easy, Screw Cap DO Membranes

When the PTFE (polytetrafluoroethylene) membrane of the protective cap wears, it is always good to have a back-up.

HI76407A/P	contains 5 ready-to-use, replacement membranes.

HI7041

Electrolyte Solution

It is crucial to the performance of your DO probe to keep the sensor active with regular maintenance. For this purpose, Hanna has developed HI7041 electrolyte solution to refill the membrane cap.

HI7041S	refilling electrolyte solution (30 mL)
HI7041M	refilling electrolyte solution (250 mL)
HI7041L	refilling electrolyte solution (500 mL)

Product Spotlights

Multiparameter Bluetooth® pH/EC/OPDO® Meter

pH, ORP, EC, TDS, Resistivity, Salinity, Seawater σ, Dissolved Oxygen, Atmospheric Pressure and Temperature

- • Bluetooth connectivity
  - · Retrieve data logs with Hanna Lab app for either sending by e-mail or download to a smart device for review
- • Waterproof
  - · IP67 rated waterproof, rugged enclosure for meter, IP68 for probe
- • Digital probe
  - · Digital probe with built-in temperature sensor and three ports for pH (ORP), EC and optical DO sensors
  - · Color coded, field replaceable sensors
  - · Auto-sensor recognition
  - · Stainless steel, weighted protective guard

Multiparameter Guide

	(B) Benchtop, (P) Portable	pH	ORP	ISE	EC	TDS	Resistivity	Salinity	Temperature	Ammonium	Chloride	Nitrate	Seawater σ	Turbidity	Dissolved Oxygen	Atmospheric Pressure	Bluetooth®	GPS	Fast Tracker™	Logging	Page
HI5522	B	•	•	•	•	•	•	•	•											•	7.4
HI5521	B	•	•		•	•	•	•	•											•	7.10
HI9829	P	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•[1]	•	•	7.14
HI98494	P	•	•		•	•	•	•	•				•		•	•	•			•	7.28
HI98194	P	•	•		•	•	•	•	•				•			•	•			•	7.34
HI98195	P	•	•		•	•	•	•	•				•							•	7.38
HI981954	P	•	•		•	•	•	•	•				•							•	7.42
HI98196	P	•	•						•						•	•				•	7.46
HI991300	P	•			•	•			•												7.50
HI991301	P	•			•	•			•												7.50
HI9814	P	•			•	•			•												7.52
HI9813-51	P	•			•	•			•												7.54
HI9813-61	P	•			•	•			•												7.54
HI9810-61	P	•			•	•			•												7.56
HI9811-51	P	•			•	•			•												7.56
HI9812-51	P	•			•	•			•												7.56

[1] Select Models

Multiparameter

HI9829

GPS Multiparameter Meters

pH/ORP/ISE, EC/TDS/Resistivity/Salinity/Seawater σ, Turbidity, DO, Temperature and Atmospheric Pressure

The HI9829 is a waterproof portable logging multiparameter meter that monitors up to 14 different water quality parameters.

The microprocessor based multi-sensor probe allows for the measurement of key parameters including pH, ORP, conductivity, dissolved oxygen, turbidity, ammonium, chloride, nitrate, and temperature. The probe transmits readings digitally with options to log data while disconnected from the meter. An optional GPS provides location tracking of measurements. The complete system is simple to setup and easy to use. The HI9829 is highly customizable and supplied with all necessary accessories, packaged in a durable carrying case.

Pool Line

HI981954

Multiparameter Waterproof Meter

pH, ORP, EC, TDS, Resistivity, Salinity, Seawater σ and Temperature

The HI981954 is a waterproof portable logging multiparameter meter that monitors up to 9 different water quality parameters. It's multi-sensor probe allows for the measurement of key parameters including pH, ORP, conductivity, and temperature. The probe transmits readings digitally to the meter, where data points can be displayed and logged. The complete system is simple to setup and easy to use.

HI5522

Research Grade Meter

*pH/ORP/ISE and EC/TDS/Resistivity/Salinity
and Temperature*

The HI5522 is an advanced research grade benchtop pH/ORP/ISE and EC/TDS/Salinity/Resistivity meter that is completely customizable with a large color LCD, capacitive touch keys, and USB port for computer connectivity.

The HI5522 is a two-channel meter that allows for simultaneous measure of pH, ORP, or ISE on one channel and EC, TDS, Salinity, or Resistivity on the other. Channel one has a BNC connection for use with the expansive line of pH, ORP, and ISE electrodes that Hanna Instruments offers. The meter is supplied with the HI1131B glass body, double junction, combination pH electrode that operates over a wide temperature range from 0 to 100°C. All readings are automatically compensated for temperature variations with the separate HI7662-T temperature probe or from the built in temperature sensor of the conductivity probe on Channel Two. The HI5522 is supplied with the

HI76312 four-ring conductivity probe that operates over a wide range from 0.000 µS/cm to 1000.0 mS/cm*. The meter can be set to auto-ranging in which the meter chooses the appropriate conductivity range from seven ranges or fixed range in which the meter will only display reading in µS/cm or mS/cm. All readings are automatically compensated for temperature variations with a built in temperature sensor. The temperature correction coefficient is adjustable from 0.00 to 10.00 %/°C.

As a pH meter the HI5522 can be calibrated up to five points with a choice of eight pre-programmed buffers or five custom buffers. The HI5522 features Hanna's exclusive CAL Check™ to alert the user of potential problems during the pH calibration process. Indicators displayed during calibration include "Electrode Dirty/Broken" and "Buffer Contaminated." The overall probe condition based on the offset

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and slope characteristic of the electrode is displayed as a percentage after calibration is complete.

In ISE mode the HI5522 can be calibrated up to five points with a choice of five fixed standards or five user defined in any concentration unit. The calibration data including date, time, standards used and slope can be viewed at any time along with the current measurement by selecting the Good Laboratory Practice (GLP) display option.

As an EC/TDS/Salinity/Resistivity meter the HI5522 can be calibrated up to four points with a choice of six pre-programmed conductivity standards or user defined custom standards. Resistivity, TDS, Practical Salinity (PSU) and Natural Seawater Scale are calibrated through conductivity. The % NaCl is calibrated to single point with the HI7037 salinity standard. The calibration data including date, time, and

standards used, offset and cell factor can be accessed at any time along with the current measurement by selecting the Good Laboratory Practice (GLP) display option.

For the measurement of high purity water used in pharmaceutical manufacturing, the HI5522 is programmed with the three stages of the USP <645> method. Once a stage is met a report is generated and can be saved. Up to 200 reports can be stored and transferred to a Windows® compatible computer using the supplied USB cable and software.

Three selectable logging modes are available: automatic, manual and AutoHold logging. Up to 100,000 data points can be recorded in 100 lots with 50,000 records max/lot on each channel and exported to a computer for data review and storage.

Customizable User Interface

The user interface of the HI5522 allows the user to show measurements in various modes: basic measurement with or without GLP information, real-time graphing, and logging data. Calibration stability criteria can be adjusted from fast, moderate, and accurate. Programmable alarm limits can be set to inside or outside allowable limits.

Color Graphic LCD

The HI5522 features a color graphic LCD with on-screen help, graphic, and custom color configurations. The display allows for real-time graphing and the use of virtual keys provide for an intuitive user interface.

Capacitive Touch

The HI5522 features sensitive capacitive touch buttons for accurate keystrokes when navigating menus and screens. There are four dedicated keys that are used for routine operations including calibration and switching measurement modes and four virtual keys that change based upon use. The capacitive touch technology ensures the buttons never get clogged with sample residue.

Four Ring Conductivity Probe

All readings are performed with the HI76312 four-ring conductivity probe that has a built in temperature sensor for automatic temperature correction. The four rings are made with platinum and the body of the electrode is made of Polyetherimide (PEI) plastic that is resistant to many harsh chemicals. The four-ring design allows for this probe to be used over a wide range of measurements.

Choice of Calibration

Automatic buffer recognition, semiautomatic, and direct manual entry pH calibration options are available for calibrating up to five points, from a selection of eight standard buffers and up to five custom buffers. For the conductivity channel the calibration can be set to automatic standard recognition or user entry along with a choice of single or multi-point. Calibration can be performed up to four points when multi-point is selected.

CAL Check™

CAL Check alerts users to potential problems during the calibration of the pH electrode. Indicators include "Electrode Dirty/Broken," "Buffer Contaminated," electrode response time and the overall probe condition as a percentage that is based on the offset and slope characteristics.

GLP Data

 HI5522 includes a GLP Feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data include date, time, standards used for calibration.

ISE Measurement with Choice of Concentration Units

The HI5522 allows for calibration and readings in choice of concentration units. The choices of concentration units include ppt, g/L, mg/mL, ppm, mg/L, µg/L, ppb, µg/L, mg/mL, M, mol/L, mmol/L, %w/v and a user-defined unit.

ISE Measurement with Incremental Methods

The known addition, known subtraction, analyte addition, and analyte subtraction incremental methods are pre-programmed into the HI5522. Simply follow the on screen guided procedure and the meter will perform the calculation automatically allowing for a higher level of accuracy to be obtained as compared to a direct ISE measurement.

Data Logging

Three selectable logging modes are available on the HI5522: automatic, manual, and AutoHold logging. Automatic and manual logs up to 100 lots with 50,000 records max/lot, with up to 100,000 total data points. Automatic logging features the option to save data according to sampling period and interval.

Data Transfer

Data can be transferred to a PC with USB cable and HI92000 software (both sold separately).

Contextual Help

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

pH and EC Features

pH CAL Check™

Proper calibration of the pH electrode system is critical in order to achieve reliable results. Hanna's exclusive CAL Check system includes several features to help users reach that goal.

- Each time a pH calibration is performed, the instrument compares the new calibration with the previous one. When this comparison indicates a significant difference, the message alerts the user to either clean the electrode, check the buffer or both.
- When measurements are taken too far from the calibration points, the instrument will warn the user with a message on the LCD.
- The condition of the pH electrode after calibration is shown on the display, as well as the date and time.
- To avoid taking readings with old calibrations, the instrument automatically reminds the user when the calibration has expired.

EC USP Mode

Hanna's HI5522 and HI5521 together with EC probes can be used for conductivity measurements required to prepare water for injection (WFI) according to USP <645>.

The instruments give clear instructions on how to perform each stage and automatically check that the temperature, conductivity and stability are within USP limits.

Comprehensive results are shown on a single screen at the end of the test. Up to 200 reports can be saved for future recall.

ISE Features

ISE Incremental Methods

Ion concentration determinations with ISEs can be made faster and easier using the streamlined incremental methods.

Incremental methods involve adding a standard to a sample or sample to a standard and detecting the mV change that occurs due to the addition, and this difference determines the concentration. Historically the user would use mathematical equations to determine the ion concentration of the sample; the HI5522, sample concentrations are calculated automatically and then logged into an ISE method report; up to 200 reports can be saved for future recall. The entire process can be repeated on multiple samples without reentering sets of parameters. Reports can be printed using HI92000 PC software.

Incremental method techniques can reduce errors from variables such as temperature, viscosity, pH or ionic strength. The electrodes remain immersed throughout the process, thus reducing measurement time as well as eliminating sample carry over and its associated errors.

Known Addition, Known Subtraction, Analyte Addition, and Analyte Subtraction methods are standard method choices provided by the HI5522.

First Step

The first step in performing an incremental method analysis is to enter the required parameters including sample, ISA and standard volumes, as well as standard concentration and stoichiometric factor.

When repeating the analysis on another sample, the parameters do not need to be reentered.

Sequence of Readings

Once the variables are entered, the user is guided step-by-step through the measurement process.

The initial mV measurement is made before the addition; next is the addition, followed by the second mV measurement.

Results

The results are automatically calculated and shown together with all the parameters used.

At this time, results can be saved into an ISE Methods Report and printed using the HI92000 PC software.

- Low Profile
  - HI5522 features a low profile with an ideal viewing angle

Additional Features by Screen
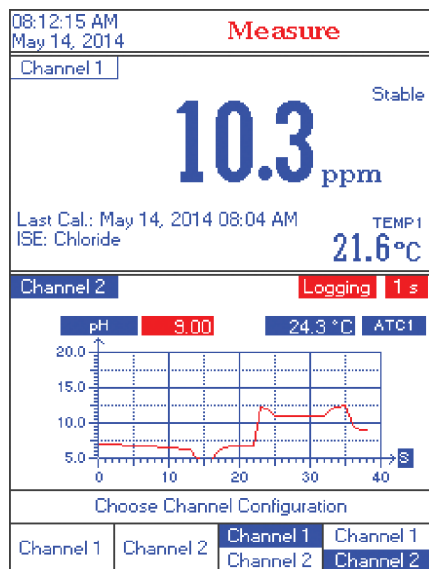
Channel Configuration
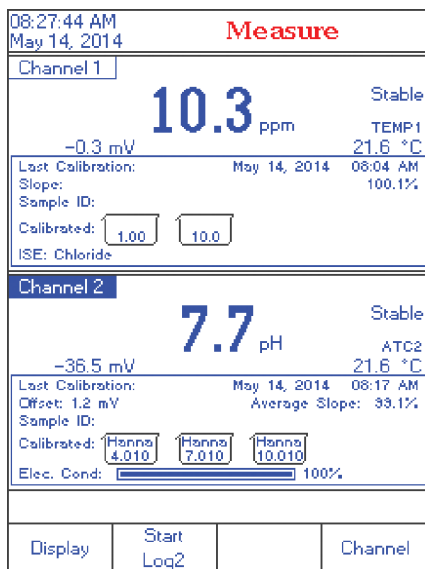
Good Laboratory Practices
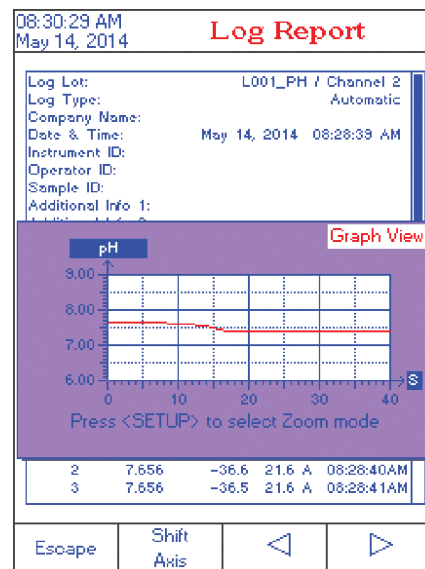
Log Recall
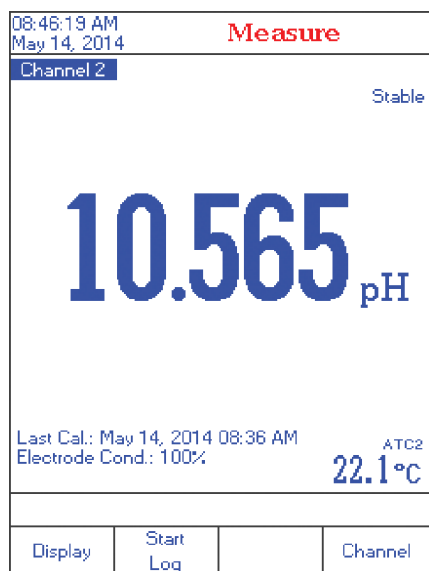
Basic Display
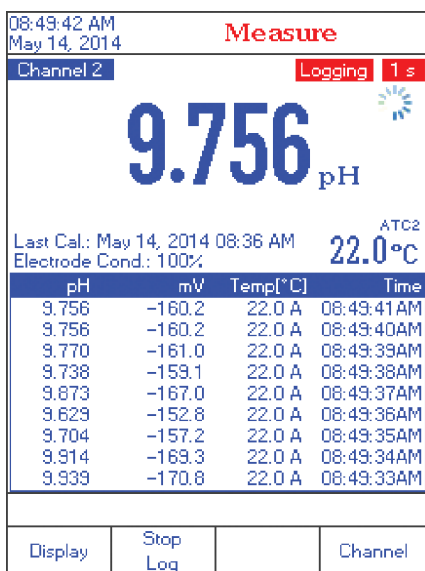
Real-Time Logging
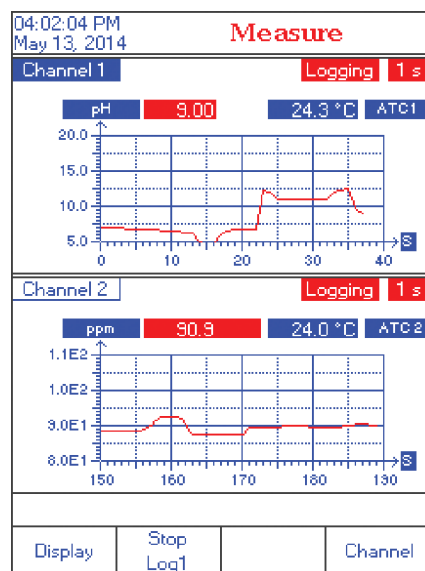
Simultaneous Dual-Channel Graphing

Dual Channels

The two measurement channels of the HI5522 are galvanically isolated to eliminate noise and instability.

In ISE mode, this instrument provides a choice of several incremental methods. Communication is via opto-isolated USB.

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Specifications		HI5522
pH	Range	-2.0 to 20.0 pH; -2.00 to 20.00; -2.000 to 20.000 pH
	Resolution	0.1 pH; 0.01 pH; 0.001 pH
	Accuracy	±0.1 pH; ±0.01 pH; ±0.002 pH ±1 LSD
	Calibration	automatic, up to five-point calibration, eight standard buffers available (1.68, 3.00, 4.01, 6.86, 7.01, 9.18, 10.01,12.45), and five custom buffers
	Temperature Compensation	automatic or manual from -20.0 to 120.0°C/-4.0 to 248.0°F/253.15 to 393.15K
mV	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	±0.2 mV ±1 LSD
ISE	Range	1×10^{-6} to 9.99×10^{10} concentration
	Resolution	1; 0.1; 0.01; 0.001 concentration
	Accuracy	±0.5% (monovalent ions); ±1% (divalent ions)
	Calibration	automatic, up to five-point calibration, seven fixed standard solutions available for each measurement unit, and five user defined standards
Temperature**	Range	-20.0 to 120°C; -4.0 to 248.0°F; 253.15 to 393.15K
	Resolution	0.1°C; 0.1°F; 0.1K
	Accuracy	±0.2°C ; ±0.4°F; ±0.2K (without probe)
EC	Range	0.000 to 9.999 µS/cm; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 1000.0 mS/cm absolute EC*
	Resolution	0.001 µS/cm; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm
	Accuracy	±1% of reading (±0.01 µS/cm)
	Cell Constant	0.0500 to 200.00
	Cell Type	4-pole cell
	Calibration	automatic standard recognition, user standard single point / multi-point calibration
	Calibration Reminder	yes
	Temperature Coefficient	0.00 to 10.00 %/°C
	Temperature Compensation	disabled, linear and non-linear (natural water)
	Reference Temperature	5.0 to 30.0°C
	Profiles	up to 10, 5 each channel
	USP Compliant	yes
TDS	Range	0.000 to 9.999 ppm; 10.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 ppt; 10.00 to 99.99 ppt; 100.0 to 400.0 ppt actual TDS* (with 1.00 factor)
	Resolution	0.001 ppm; 0.01 ppm; 0.1 ppm; 0.001 ppt; 0.01 ppt; 0.1 ppt
	Accuracy	±1% of reading (±0.01 ppm)
Resistivity	Range	1.0 to 99.9 Ω•cm; 100 to 999 Ω•cm; 1.00 to 9.99 kΩ•cm; 10.0 to 99.9 kΩ•cm; 100 to 999 kΩ•cm; 1.00 to 9.99 MΩ•cm; 10.0 to 100.0 MΩ•cm
	Resolution	0.1 Ω•cm; 1 Ω•cm; 0.01 kΩ•cm; 0.1 kΩ•cm; 1 kΩ•cm; 0.01 MΩ•cm; 0.1 MΩ•cm
	Accuracy	±2% of reading (±1 Ω•cm)
Salinity	Range	practical scale: 0.00 to 42.00 psu; natural sea water scale: 0.00 to 80.00 ppt; percent scale: 0.0 to 400.0%
	Resolution	0.01 for practical scale/natural sea water scale; 0.1% for percent scale
	Accuracy	±1% of reading
	Calibration	percent scale–one-point (with HI7037 standard); all others through EC
Additional Specifications	pH Electrode	HI1131B glass body pH electrode with BNC connector and 1 m (3.3') cable (included)
	EC Probe	HI76312 platinum, four-ring EC/TDS probe with and 1 m (3.3') cable (included)
	Temperature Probe	HI7662-W stainless steel temperature probe with 1 m (3.3') cable (included)
	Input Channel(s)	1 pH/ORP/ISE + 1 EC
	GLP	cell constant, reference temperature/coefficient, calibration points, cal time stamp, probe offset for conductivity
	Logging	**record :** Up to 100 lots, 50,000 records max/lot / maximum 100,000 data points/channel; **interval:** 14 selectable between 1 second and 180 minutes; **type:** automatic, manual, AutoHOLD; **additional:** 200 records USP; 200 records incremental methods
	PC Connection	USB
	Power Supply	12 VDC adapter (included)
	Environment	0 to 50°C (32 to 122°F; 273 to 323K) RH max 95% non-condensing
	Dimensions / Weight	160 x 231 x 94 mm (6.3 x 9.1 x 3.7") / 1.2 kg (2.64 lbs.)
Ordering Information		**HI5522-01** (115V) and **HI5522-02** (230V) are supplied with HI1131B pH electrode, HI76312 EC/TDS probe, HI7662-W temperature probe, pH 4.01 buffer solution sachet (2), pH 7.01 buffer solution sachet (2), pH 10.01 buffer solution sachet (2), 1413 µS/cm conductivity standard sachet (2), 12880 µS/cm conductivity standard sachet (2), HI700601 electrode cleaning solution sachet (2), HI7082 3.5M KCl electrolyte solution (30 mL), HI76404W electrode holder, 12 VDC adapter, capillary dropper pipette, quality certificate, quick start guide and instruction manual.

(*) Uncompensated conductivity (or TDS) is the conductivity (or TDS) value without temperature compensation.
(**) Reduced to actual probe limits

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benchtop

HI5521

Research Grade Meter

pH/ORP and EC/TDS/Resistivity/Salinity and Temperature

The HI5521 is an advanced, two channel research grade benchtop pH/ORP and EC/TDS/Salinity/Resistivity meter that is completely customizable with a large color LCD, capacitive touch keys, and USB port for computer connectivity.

The HI5521 allows for simultaneous measure of pH or ORP on one channel and EC or related parameters on the other. Channel one has a BNC connection for use with the expansive line of pH and ORP electrodes that Hanna Instruments offers. The meter is supplied with the HI1131B glass body, double junction, combination pH electrode that operates over a wide temperature range from 0 to 100°C. All readings are automatically compensated for temperature variations with the separate HI7662-T temperature probe or from the built in temperature sensor of the conductivity probe on Channel two. The

HI5521 is supplied with the HI76312 four-ring conductivity probe that operates over a wide range from 0.000 µS/cm to 1000.0 mS/cm*. The meter can be set to auto-ranging in which the meter chooses the appropriate conductivity range from seven ranges or fixed range in which the meter will only display reading in µS/cm or mS/cm. All readings are automatically compensated for temperature variations with a built in temperature sensor. The temperature correction coefficient is adjustable from 0.00 to 10.00 %/°C.

As a pH meter the HI5521 can be calibrated up to five points with a choice of eight pre-programmed buffers or five custom buffers. The HI5521 features Hanna's exclusive CAL Check™ to alert the user of potential problems during the pH calibration process. Indicators displayed during calibration include "Electrode Dirty/Broken" and

"Buffer Contaminated." The overall probe condition based on the offset and slope characteristic of the electrode is displayed as a percentage after calibration is complete. The calibration data including date, time, buffers used, offset and slope can be accessed at any time along with the current measurement by selecting the Good Laboratory Practice (GLP) display option.

As an EC/TDS/Salinity/Resistivity meter the HI5521 can be calibrated up to four points with a choice of six pre-programmed conductivity standards or user defined custom standards. Resistivity, TDS, Practical Salinity (PSU) and Natural Seawater Scale are calibrated through conductivity. The % NaCl is calibrated to single point with the HI7037 salinity standard. The calibration data including date, time, and

standards used, offset and cell factor can be accessed at any time along with the current measurement by selecting the Good Laboratory Practice (GLP) display option.

For the measurement of high purity water used in pharmaceutical manufacturing, the HI5521 is programmed with the three stages of the USP <645> method. Once a stage is met a report is generated and can be saved. Up to 200 reports can be stored and with the USB port be transferred to a Windows® compatible computer.

Three selectable logging modes are available: automatic, manual and AutoHold logging. Up to 100,000 data points can be recorded in 100 lots with 50,000 records max/lot on each channel and exported to a computer for data review and storage.

Customizable User Interface

The user interface of the HI5521 allows the user to show measurements in various modes: basic measurement with or without GLP information, real-time graphing, and logging data. Calibration stability criteria can be adjusted from fast, moderate, and accurate. Programmable alarm limits can be set to inside or outside allowable limits.

Color Graphic LCD

The HI5521 features a color graphic LCD with on-screen help, graphic, and custom color configurations. The display allows for real-time graphing and the use of virtual keys provide for an intuitive user interface.

Capacitive Touch

The HI5521 features sensitive capacitive touch buttons for accurate keystrokes when navigating menus and screens. There are four dedicated keys that are used for routine operations including calibration and switching measurement modes and four virtual keys that change based upon use. The capacitive touch technology ensures the buttons never get clogged with sample residue.

Four Ring Conductivity Probe

All readings are performed with the HI76312 four-ring conductivity probe that has a built in temperature sensor for automatic temperature correction. The four rings are made with platinum and the body of the electrode is made of Polyetherimide (PEI) plastic that is resistant to many harsh chemicals. The four-ring design allows for this probe to be used over a wide range of measurements.

Choice of Calibration

Automatic buffer recognition, semiautomatic, and direct manual entry pH calibration options are available for calibrating up to five points, from a selection of eight standard buffers and up to five custom buffers. For the conductivity channel the calibration can be set to automatic standard recognition or user entry along with a choice of single or multi-point. Calibration can be performed up to four points when multi-point is selected.

CAL Check™

CAL Check alerts users to potential problems during the calibration of the pH electrode. Indicators include "Electrode Dirty/Broken," "Buffer Contaminated," electrode response time and the overall probe condition as a percentage that is based on the offset and slope characteristics.

GLP Data

HI5521 includes a GLP Feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data include date, time, standards used for calibration.

Data Logging

Three selectable logging modes are available on the HI5521: automatic, manual, and AutoHold logging. Automatic and manual logs up to 100 lots with 50,000 records max/lot, with up to 100,000 total data points. Automatic logging features the option to save data according to sampling period and interval.

Data Transfer

Data can be transferred to a PC with USB cable and HI92000 software (both sold separately).

Contextual Help

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

Dual Channels

The two measurement channels of the HI5521 are galvanically isolated to eliminate noise and instability.

Communication is via opto-isolated USB.

pH and EC Features

pH CAL Check™

Proper calibration of the pH electrode system is critical in order to achieve reliable results. Hanna's exclusive CAL Check system includes several features to help users reach that goal.

- Each time a pH calibration is performed, the instrument compares the new calibration with the previous one. When this comparison indicates a significant difference, the message alerts the user to either clean the electrode, check the buffer or both.
- When measurements are taken too far from the calibration points, the instrument will warn the user with a message on the LCD.
- The condition of the pH electrode after calibration is shown on the display, as well as the date and time.
- To avoid taking readings with old calibrations, the instrument automatically reminds the user when the calibration has expired.

EC USP Mode

Hanna's HI5522 and HI5521 together with EC probes can be used for conductivity measurements required to prepare water for injection (WFI) according to USP <645>.

The instruments give clear instructions on how to perform each stage and automatically check that the temperature, conductivity and stability are within USP limits.

Comprehensive results are shown on a single screen at the end of the test. Up to 200 reports can be saved for future recall.

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Specifications		HI5521
pH	Range	-2.0 to 20.0 pH; -2.00 to 20.00; -2.000 to 20.000 pH
	Resolution	0.1 pH; 0.01 pH; 0.001 pH
	Accuracy	±0.1 pH; ±0.01 pH; ±0.002 pH ±1 LSD
	Calibration	automatic, up to five-point calibration, eight standard buffers available (1.68, 3.00, 4.01, 6.86, 7.01, 9.18, 10.01,12.45), and five custom buffers
	Temperature Compensation	automatic or manual from -20.0 to 120.0°C/-4.0 to 248.0°F/253.15 to 393.15K
mV	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	±0.2 mV ±1 LSD
Temperature**	Range	-20.0 to 120°C; -4.0 to 248.0°F; 253.15 to 393.15K
	Resolution	0.1°C; 0.1°F; 0.1K
	Accuracy	±0.2°C ; ±0.4°F; ±0.2K (without probe)
EC	Range	0.000 to 9.999 µS/cm; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 1000.0 mS/cm absolute EC*
	Resolution	0.001 µS/cm; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm
	Accuracy	±1% of reading (±0.01 µS/cm)
	Cell Constant	0.0500 to 200.00
	Cell Type	4-pole cell
	Calibration	automatic standard recognition, user standard single point / multi-point calibration
	Calibration Reminder	yes
	Temperature Coefficient	0.00 to 10.00 %/°C
	Temperature Compensation	disabled, linear and non-linear (natural water)
	Reference Temperature	5.0 to 30.0°C
	Profiles	up to 10, 5 each channel
	USP Compliant	yes
TDS	Range	0.000 to 9.999 ppm; 10.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 ppt; 10.00 to 99.99 ppt; 100.0 to 400.0 ppt actual TDS* (with 1.00 factor)
	Resolution	0.001 ppm; 0.01 ppm; 0.1 ppm; 0.001 ppt; 0.01 ppt; 0.1 ppt
	Accuracy	±1% of reading (±0.01 ppm)
Resistivity	Range	1.0 to 99.9 Ω•cm; 100 to 999 Ω•cm; 1.00 to 9.99 kΩ•cm; 10.0 to 99.9 kΩ•cm; 100 to 999 kΩ•cm; 1.00 to 9.99 MΩ•cm; 10.0 to 100.0 MΩ•cm
	Resolution	0.1 Ω•cm; 1 Ω•cm; 0.01 kΩ•cm; 0.1 kΩ•cm; 1 kΩ•cm; 0.01 MΩ•cm; 0.1 MΩ•cm
	Accuracy	±2% of reading (±1 Ω•cm)
Salinity	Range	practical scale: 0.00 to 42.00 psu; natural sea water scale: 0.00 to 80.00 ppt; percent scale: 0.0 to 400.0%
	Resolution	0.01 for practical scale/natural sea water scale; 0.1% for percent scale
	Accuracy	±1% of reading
	Calibration	percent scale−one-point (with HI7037 standard); all others through EC
Additional Specifications	pH Electrode	HI1131B glass body pH electrode with BNC connector and 1 m (3.3') cable (included)
	EC Probe	HI76312 platinum, four-ring EC/TDS probe with and 1 m (3.3') cable (included)
	Temperature Probe	HI7662-W stainless steel temperature probe with 1 m (3.3') cable (included)
	Input Channel(s)	1 pH/ORP + 1 EC
	GLP	cell constant, reference temperature/coefficient, calibration points, cal time stamp, probe offset for conductivity
	Logging	**record :** Up to 100 lots, 50,000 records max/lot / maximum 100,000 data points/channel; **interval:** 14 selectable between 1 second and 180 minutes; **type:** automatic, manual, AutoHOLD;
	PC Connection	USB
	Power Supply	12 VDC adapter (included)
	Environment	0 to 50°C (32 to 122°F; 273 to 323K) RH max 95% non-condensing
	Dimensions / Weight	160 x 231 x 94 mm (6.3 x 9.1 x 3.7") / 1.2 kg (2.64 lbs.)
Ordering Information		**HI5521-01** (115V) and **HI5521-02** (230V) are supplied with HI1131B pH electrode, HI76312 EC/TDS probe, HI7662-W temperature probe, pH 4.01 buffer solution sachet (2), pH 7.01 buffer solution sachet (4), pH 10.01 buffer solution sachet (2), HI700601 electrode cleaning solution sachet (2), HI7082 3.5M KCl electrolyte solution (30 mL), HI76404W electrode holder, 12 VDC adapter, capillary dropper pipette, quality certificate, quick start guide and instruction manual.

(*) Absolute conductivity (or TDS) is the conductivity (or TDS) value without temperature compensation.
(**) Reduced to actual probe limits

HANNA instruments

HI9829

GPS Multiparameter Meters

pH/ORP/ISE, EC/TDS/Resistivity/Salinity/Seawater σ, Turbidity, DO, Temperature and Atmospheric Pressure

- Logging
  - Logging from probe or meter

- Fast Tracker
  - Tag Identification System

- Sensor Check™
  - Auto-recognition of all sensors

- GLP features
  - Meets Good Laboratory Practices

- Connectivity
  - PC compatible via USB

- Help feature
  - On-screen user guides

- Backlight
  - Backlit, graphic LCD display

- Waterpoof
  - Waterproof casing

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Waterproof Protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1 m for up to 30 minutes. The probe features an IP68 rating for continuous immersion in water.
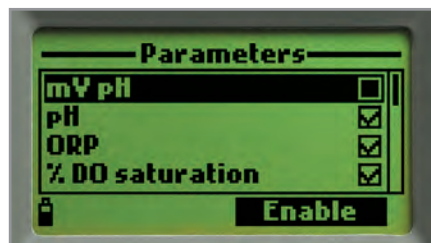
Backlit Dot Matrix LCD Display

The HI9829 features a backlit graphic LCD with on-screen help and the capability to display up to twelve parameters simultaneously. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

Intuitive Keypad

The fitted rubber keypad has dedicated keys for power, backlight, up/down arrows, help and alphanumeric characters. The meter also features two virtual soft keys that navigate the user through the configuration of each parameter, meter setup, and logging of data. The interface is intuitive for any user's level of experience.

Auto-sensor Recognition

The probe and meter automatically recognize the sensors that are connected. Any ports not used on the probe will not have the parameter displayed or be configurable.

Automatic Temperature Compensation

Integrated temperature sensor allows for automatic temperature compensation of pH, conductivity, and dissolved oxygen measurements.

Automatic Barometric Pressure Compensation

The meter features a built-in barometer with user-selectable units for dissolved oxygen pressure compensation.

Quick Calibration

Quick Calibration provides a speedy, single point calibration for pH, conductivity, and dissolved oxygen. Standard calibration options are available including pH up to three points, conductivity at one point and dissolved oxygen up to two points.

Dedicated Help Key

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

GLP Data

HI9829 includes a GLP feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data includes date, time, buffers/standards used for calibration, and slope characteristics.

Data Logging

The HI9829 allows users to store up to 44,000 continuous or log-on-demand samples with logging intervals from one second to three hours.

Graphing Capability

Trend graphing with sample date and time stamp may be viewed on the display or transferred to a PC.

PC Connectivity

Logged data can be transferred to a Windows compatible PC with the included HI7698291 USB adapter and HI929829 software.

Long Battery Life

The display of the meter has a battery icon indicator to show the remaining power. The meter is supplied with four 1.5V "C " NiMH rechargeable batteries that provide up to 140 hours of battery life*

* Without GPS or turbidity measurements

Rugged Custom Carrying Case

The HI9829 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

HI7698297 Quick Release Flow Cell (optional)

The HI7698297 is an optional quick release flow cell designed for low flow sampling of environmental groundwater. The flow cell features a threaded collar for the HI9829 probe and two quick release fittings for inlet and outlet flow. The HI7698297 includes a wall mount kit for continuous monitoring option.
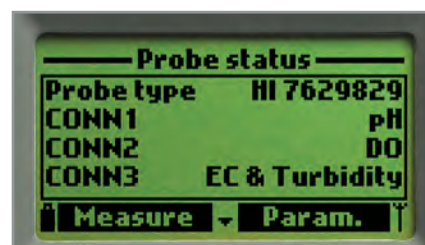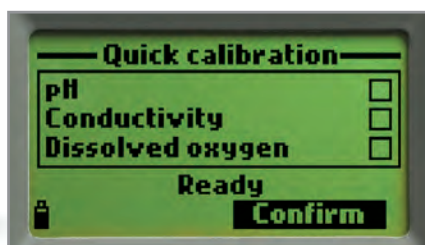
- Field Ready
  - For field calibration, our quick calibration solution allows standardization of pH and conductivity with one calibration solution.

- Quick Calibration
  - Simply screw the calibration beaker filled with HI9828-25 solution onto the probe, select "Quick calibration" from the menu and press OK. Individual calibration may also be performed using multiple calibration points.

- Auto-sensor Recognition
  - In this example, the HI9829 is identifying a pH, dissolved oxygen and EC/turbidity sensor.

Probes

The use of Hanna's microprocessor-based multiparameter intelligent probes with HI9829 will provide reliable data collection that can lead to an improved scientific understanding of the interconnections between natural, chemical and geological processes and manmade pollution to effectively evaluate applications for waste discharge permits, remediate contaminated sites and to protect or restore biological resources.

Reliable temperature measurements are a critical parameter of aquatic system monitoring. Temperature and temperature changes due to water releases can affect the ability of water to hold oxygen as well as the ability of organisms to resist certain pollutants. The intelligent probes incorporate an accurate thermistor that changes predictably with temperature changes. Accurate temperature reading in degrees Celsius, Fahrenheit and kelvin are displayed and utilized by other detectors for temperature correction.

The HI76x9829 probes utilize field replaceable sensors with auto-recognition. The sensors are housed with the probe electronics in a rugged housing and a water-tight cable connection. The HI76909829 probe allows conductivity, pH/ORP (or an ISE), and dissolved oxygen measurement. Other probe models allow turbidity and logging.

Probes with the logging function have a logging memory that allows storage of up to 140,000 individual samples or 35,000 complete sample data sets with date and time stamp thus permitting up to a 70 day deployment with all channels logging at 10 minute intervals. The probe incorporates a temperature sensor for temperature compensation of all parameters.

The probes are available with a choice of cable lengths such as 4m, 10 m and 20 m (13', 33', 65') that utilize a DIN connection to interface with the meters. Logging probes can be connected directly to a PC with the HI76982910 USB adapter cable, and HI929829 PC application software to download log files directly from the probes.

Sensors

Hanna offers a selection of seven sensors to be used on the intelligent probes. Sensor replacement is quick and easy with screw type connectors and are color coded for easy identification. The HI9829 automatically recognizes sensor presence.

The HI7609829-4 EC/turbidity sensor is field replaceable and offers readings from both parameters at the same time.

All potentiometric sensors feature a double junction design and are gel filled to increase resistance to contamination. One of the ISE sensors can be used in place of the pH sensor and is automatically recognized. pH in mV readings are also displayed –which is useful for troubleshooting.

HI7609829
for pH/ORP, Dissolved
Oxygen, EC

HI7629829
for pH/ORP, Dissolved
Oxygen, EC, Logging
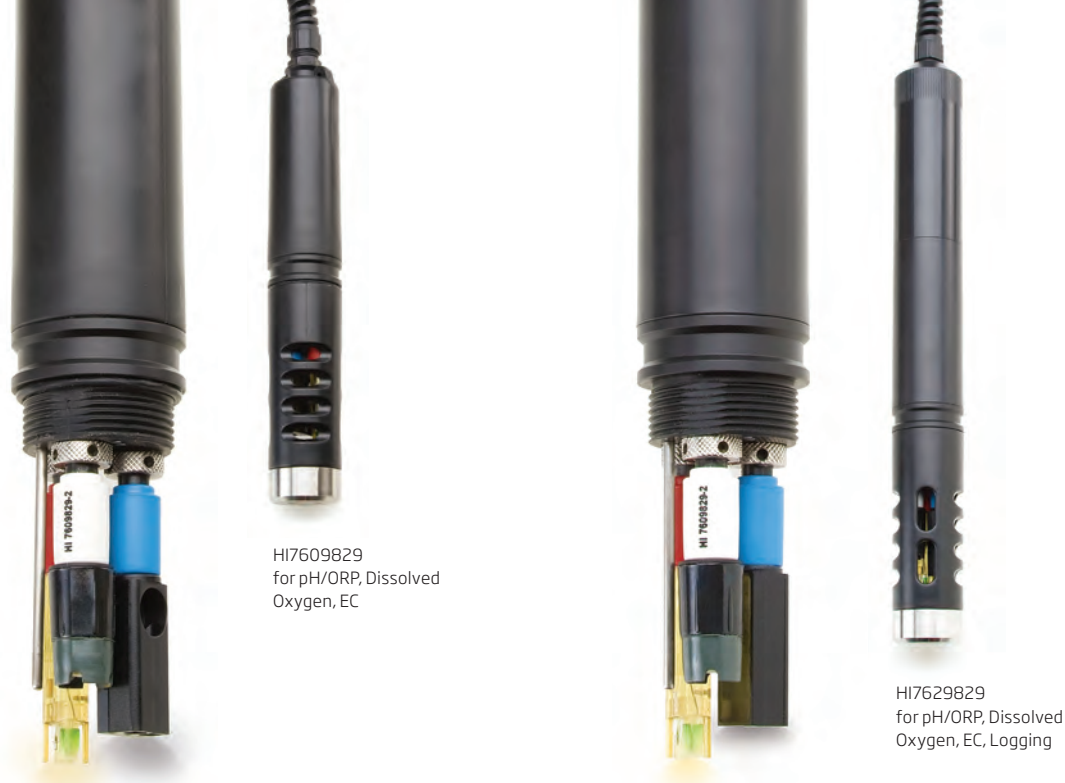
With two probes to choose from, these digital probes provide stable, noise-free sensor signal management without the need for pre-amplified pH sensors.

Specifications		HI7609829	HI7629829
Supported Configuration	Connector 1	pH, pH/ORP, ammonium ISE, chloride ISE, nitrate ISE	pH, pH/ORP, ammonium ISE, chloride ISE, nitrate ISE
	Connector 2	dissolved oxygen	dissolved oxygen
	Connector 3	EC	EC
Temperature sensor		built-in	built-in
Autonomous Logging		–	yes
Logging Interval		–	1 second to 3 hours
Computer Interface		–	USB (HI76982910)
Memory		–	140,000 measurements (single parameter logged); 35,000 measurements (all parameters logged)
Operating Temperature		-5 to 55°C*	-5 to 55°C*
Maximum Depth		20 m (66')*	20 m (66')*
Cable Specification		multistrand-multiconductor shielded cable with internal strength member rated for 68 kg (150 lb.) intermittent use	
Wetted Materials		body: ABS; threads: nylon; shield: ABS/316 SS; temperature probe: 316 SS; O-rings: EPDM	
Logging Probe Internal Battery Type		–	1.5V (4) AA alkaline
Logging Probe Battery Life Note: Log space must be available for continuous logging		–	Interval / all channels logging (no averaging) 1-5 seconds / 72 hours 1 minute / 22 days 10 minutes / 70 days
Sample Environment		fresh, brackish, seawater	fresh, brackish, seawater
Waterproof Protection		IP68	IP68
Dimensions (without cable)		342 mm (13.5"), dia=46 mm (1.8")	442 mm (17.4"), dia 46 mm (1.8")
Weight (with batteries and sensors)		570 g (20.1 oz.)	775 g (27.3 oz.)

* Reduced for ISE sensors

Sensor Configurations

Both probes can accommodate a multitude of sensor configurations. The long sensor cap fits all configurations while the short sensor cap fits configurations not requiring the turbidity/EC sensor.

or

Dissolved Oxygen

HI7609829-2 DO

pH

HI7609829-0 pH
HI7609829-1 pH/ORP

ISE

HI7609829-10 Ammonium ISE
HI7609829-11 Chloride ISE
HI7609829-12 Nitrate ISE

The dissolved oxygen in lakes, rivers, and oceans is crucial for the organisms and creatures living in it. If dissolved oxygen concentrations drop below normal levels in water bodies, the water quality degrades and the organisms begin to die off. The HI7609829-2 galvanic DO sensor does not require long polarization times so is ready for measurement at a moment's notice. This sensor also utilizes a replaceable cap design for ease of maintenance and a safe, non-toxic electrolyte. DO readings are compensated for the effects of temperature (using the probe's built-in temperature sensor) and atmospheric pressure (using the HI 9829's internal atmospheric pressure sensor). The DO measurement complies with standard methods 4500-O G and EPA article 360.1.

The HI7609829-0 and -1 feature a double junction design and are gel filled to increase resistance to contamination. These pH or pH/ORP sensors incorporate the technology that has made Hanna so successful as a pH manufacturer. Reliable pH measurements are one of the most important indicators of water chemistry indicating the relative amount of free hydrogen and hydroxyl ions in the water. Hanna's pH sensors utilize a resilient PEI body to protect them from solid particulates found in water samples. Consistency and quality are the hallmarks of these sensors. Our differential measurement system further enhances the measurement reliability, providing temperature corrected pH.

A choice of three ion selective electrodes (ISE) is available for constant reporting of common surface water contaminants. Nitrate, ammonium and chloride ISEs are available. Each ISE is a combination electrode incorporating an extremely constant reference spiral; all potentionmetric probes feature a double junction and solid gel reference design. The HI9829 displays measurements of ion activity as ppm ammonium-nitrogen, ppm chloride, and ppm nitrate-nitrogen.
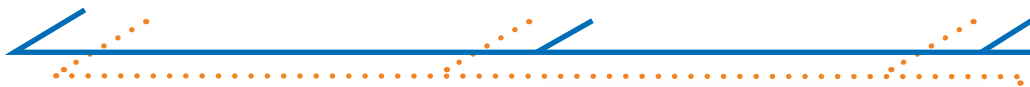
HI7698295

Short cap for probes without EC/turbidity sensor
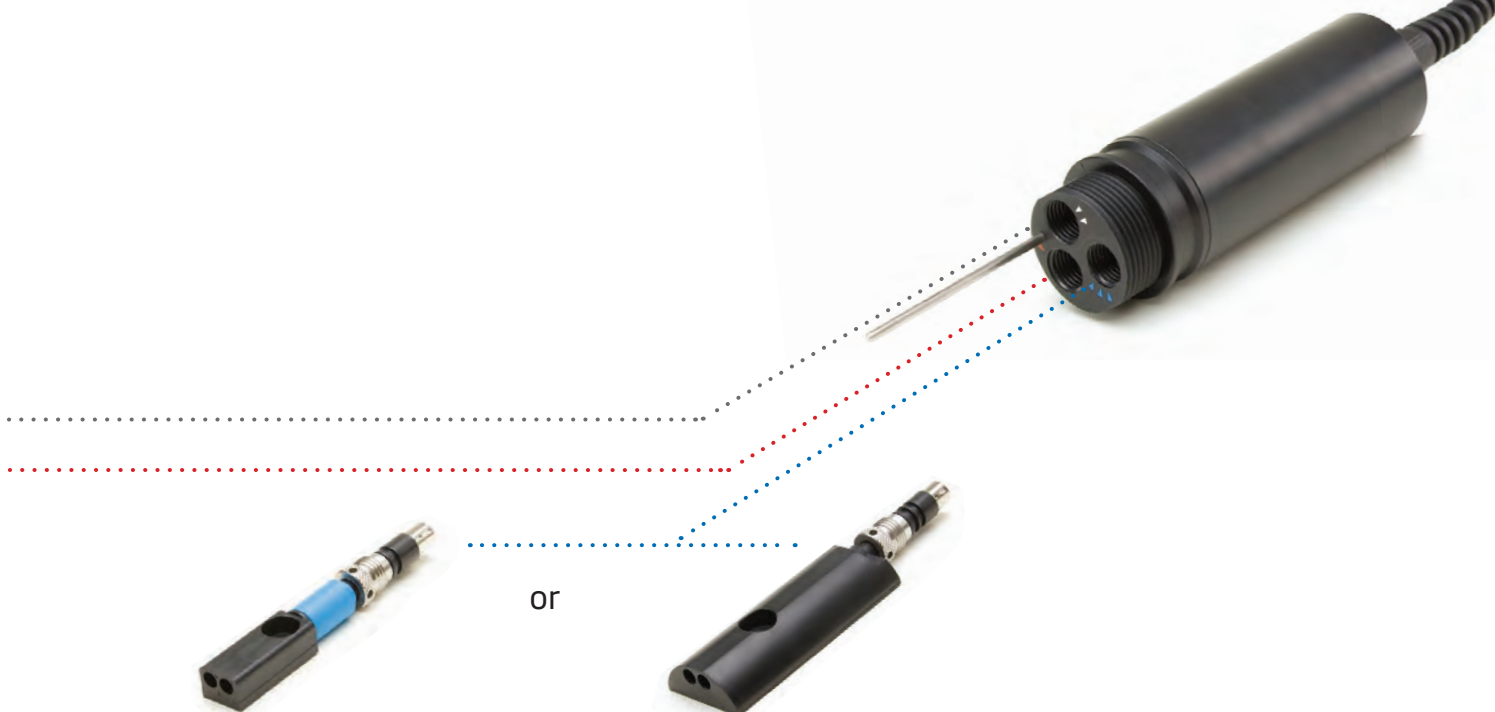
Conductivity

HI7609829-3 EC

Conductivity and Turbidity

HI7609829-4 EC/Turbidity

The HI7609829-3 4-electrode conductivity sensor using the polarographic measurement principal ensures stable conductivity readings. Electrolytic conductivity measures the ability of water to conduct an electrical current. It is highly dependent on the amount of dissolved solids (such as salt) in the water. Absolute conductivity, temperature-corrected conductivity, salinity. Seawater and water hardness (TDS) determinations are possible with measurements from this sensor.

The HI7609829-4 combined EC/turbidity sensor is a replaceable design for instantaneous conductivity and turbidity measurements that conform to ISO 7027 standards. It provides measurements from 0.0 to 1000 FNU. Turbidity is the amount of particulate matter that is suspended in water. Turbidity measures the scattering effect that suspended solids have on light: the higher the intensity of scattered light, the higher the turbidity. Material that causes water to be turbid include: clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, plankton and microscopic organisms. Conductivity measurement is the same as in the HI7609829-3.

or

HI7698296

Long cap for probes with EC/turbidity sensor

Monitoring and Tracking

The HI9829 with GPS module can track measurement locations with detailed coordinate information. All models of the HI9829 are equipped with the Fast Tracker™ TAG ID system which is an invaluable tool for associating measurements with their locations. The HI9829 also incorporates a real-time clock which stamps all logged data with a time and date in addition to location information.

GPS (Global Positioning System)

The HI9829 with GPS features an internal 12 channel GPS receiver and antenna that calculates its position to track locations along with measurement data. The GPS tracks your location using satellites to within 30 ft (10 m) so you can be sure that you return to the same location for repeated measurements. The GPS coordinates can be shown on the LCD together with up to 10 measurement parameters and are recorded with logged data. Users can connect to GPS tracking software such as Google™ Maps* to view locations where samples have been taken. Measurement information is shown right on the map.

Features
- Basic GPS Features
  - GPS coordinates shown on the LCD with up to 10 measurement parameters
  - GPS signal strength shown on LCD
  - Logged data is embedded with GPS coordinates
  - GPS status screen

- Advanced GPS Features
  - Users can associate GPS coordinates with alphanumeric locations
  - Distances between current location and predefined locations are displayed arranged by distance
  - Memorizes last location and time should signal be lost

- HI929829 PC Application Software
  - Manages logged data from the HI9829
  - Displays GPS coordinates with logged data
  - Automatically maps samples on your PC (internet connection required)
  - Shows location points on map with measurement data

FastTracker™
location traceability

Fast Tracker™–Tag Identification System

HANNA's Fast Tracker™–Tag Identification System simplifies test logging. iButton®s with a unique ID can be installed at various sampling sites. When the matching connector on the meter contacts the location button, measurements are logged and labeled with the alphanumeric user-entered location ID. Location, date, time and measurements are logged into the meter which can be transferred to a PC. The Fast Tracker™ system complements the GPS for ultimate tracking.

iButton® Tags are Easy to Install

Install the optional TAGs near your sampling points for quick and easy iButton® readings. Each TAG contains a computer chip with a unique identification code encased in stainless steel. You can install a practically unlimited amount of TAGs. Additional TAGs can be ordered for all of your traceability requirements.

*Google™ is a registered trademark of Google™, inc. HANNA Instruments® has no affiliation with Google™.

Missippi River (15 m)
3/2/2011 6:02:46 PM   #40
29°55'55.3"N   90°03'19.6"W
Remarks: Perry St Warf
44.55 °F   7.97 pH
230.9 ORP 7.56 DO ppm
369 µS/cm 185 TDS ppm
1018.4 mbar

6:50:09 PM 6/8/2011   #49
41.9634496   -71.322368
29.32 Temp [°C]   8.10 pH
20.0 ORP[mV]   315 EC[µS·cm]
0.158 TDS [ppt]   14.543 Press [psi]
101.9 D.O.[%]   41.9634496 GPS Lat.
-71.3223680 GPS Long.

Locations

Add current position
Add location manually

Select

- GPS data can be customized to meet specific requirement

Nearby locations

Blackstone river	2.8 mi
Diamond Hill res.	6.0 mi
Arnolds Mill res.	6.2 mi

Info   New

- Displays distances between current and predefined locations

141.5 mVCl
113.2 ppmCl
16.09 °C
41°54'39.1" N
71°24'13.1" W

Log   Menu
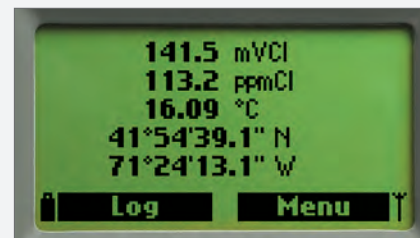
- Display current readings along with GPS coordinates

GPS diagnostics

Latitude:	46°47'03.9"N
Longitude:	23°32'46.3"E
Satellites:	3

GPS OFF

- Shows current position and number of satellites

Measurement log data - LOG005.LOG

Type: HI 9829   Fw. Version v1.00b05.6

	Date	Time	Temp.[°C]	pH	ORP[mV]
1	2011/06/08	18:42:17	24.84	6.27	45.4
2	2011/06/08	18:42:22	24.84	6.27	45.4
3	2011/06/08	18:42:27	24.78	6.29	46.2
4	2011/06/08	18:42:32	24.73	6.25	43.6
5	2011/06/08	18:42:37	28.93	7.36	12.9
6	2011/06/08	18:42:42	29.66	7.38	12.3
7	2011/06/08	18:42:47	29.71	7.41	12.2
8	2011/06/08	18:42:52	29.73	7.45	13.1
9	2011/06/08	18:42:57	29.78	7.49	13.4
10	2011/06/08	18:43:02	29.54	7.45	17.3
11	2011/06/08	18:43:07	29.73	7.58	14.4
12	2011/06/08	18:43:12	29.76	7.60	14.6
13	2011/06/08	18:43:17	29.76	7.62	14.7
14	2011/06/08	18:43:22	29.75	7.63	15.0
15	2011/06/08	18:43:27	29.73	7.63	15.8
16	2011/06/08	18:43:32	29.74	7.64	16.1
17	2011/06/08	18:43:37	29.74	7.65	16.2
18	2011/06/08	18:43:42	29.73	7.66	16.4
19	2011/06/08	18:43:47	29.70	7.66	17.3
20	2011/06/08	18:43:52	29.72	7.67	17.0
21	2011/06/08	18:43:57	29.73	7.68	17.0
22	2011/06/08	18:44:02	29.71	7.68	17.2
23	2011/06/08	18:47:35	26.52	6.52	47.7

Export
Print
Graphic Log
Close
Help
Map

Lot Info   Log data - 1

Multiparameter

portable

Specifications	HI9829	HI9829 with GPS
Temperature Compensation	automatic from -5 to 55°C (23 to 131°F)	automatic from -5 to 55°C (23 to 131°F)
GPS	–	12 channel receiver, 10 m (30 ft) range
Logging Memory from Meter	44,000 records	44,000 records
Logging Interval	1 second to 3 hours	1 second to 3 hours
Computer Interface	USB (with HI 929829 software)	USB (with HI929829 software)
FastTracker™ TAG ID	Yes	Yes
Waterproof Protection	IP67	IP67
Environment	0 to 50°C (32 to 122°F); RH 100%	0 to 50°C (32 to 122°F); RH 100%
Power Supply	1.5V alkaline C cells (4) / 1.2V NiMH rechargeable C cells (4), USB, 12V power adapter	1.5V alkaline C cells (4) / 1.2V NiMH rechargeable C cells (4), USB, 12V power adapter
Dimensions	221 x 115 x 55 mm (8.7 x 4.5 x 2.2")	221 x 115 x 55 mm (8.7 x 4.5 x 2.2")
Weight	750g (26.5 oz.)	750g (26.5 oz.)

HI9829 Parameter Specifications

	pH / mV of pH input	ORP mV	Ammonium-Nitrogen	Chloride	Nitrate-Nitrogen
Range	0.00 to 14.00 pH / ±600.0 mV	±2000.0 mV	0.02 to 200 ppm (as N)	0.6 to 200 ppm	0.62 to 200 ppm (as N)
Resolution	0.01 pH / 0.1 mV	0.1 mV	0.01 ppm to 1 ppm; 0.1 ppm to 200 ppm		
Accuracy	±0.02 pH / ±0.5 mV	±1.0 mV	±5% of reading or 2 ppm, whichever is greater		
Calibration	automatic one, two, or three points with five memorized standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or one custom buffer	automatic at one custom point	1 or 2 point, 10 ppm and 100 ppm		

	Conductivity	TDS	Resistivity	Salinity	Seawater σ
Range	0 to 200 mS/cm (absolute EC up to 400 mS/cm)	0 to 400000 mg/L or ppm (the maximum value depends on the TDS factor)	0 to 999999 Ω•cm; 0 to 1000.0 kΩ•cm; 0 to 1.0000 MΩ•cm	0.00 to 70.00 PSU	0 to 50.0 σt, σ0, σ15
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	manual: 1 mg/L (ppm); 0.001 g/L (ppt); 0.01g/L (ppt); 0.1 g/L (ppt); 1 g/L (ppt); automatic: 1 mg/L (ppm) from 0 to 9999 mg/L (ppm); 0.01 g/L (ppt) from 10.00 to 99.99 g/L (ppt); 0.1 g/L (ppt) from 100.0 to 400.0 g/L (ppt); autorange g/L (ppt) scales: 0.001 g/L (ppt) from 0.000 to 9.999 g/L (ppt); 0.01 g/L (ppt) from 10.00 to 99.99 g/L (ppt); 0.1 g/L (ppt) from 100.0 to 400.0 g/L (ppt)	dependent on resistivity reading	0.01 PSU	0.1 σt, σ0, σ15
Accuracy	±1% of reading or ±1 µS/cm, whichever is greater	±1% of reading or ±1 mg/L, whichever is greater	–	±2% of reading or ±0.01 PSU, whichever is greater	±1 σt, σ0, σ15
Calibration	automatic one point with six memorized standards (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm) or custom point	based on conductivity or salinity calibration		one custom point	based on conductivity or salinity calibration

	Turbidity	Dissolved Oxygen	Atm. Pressure	Temperature
Range	0.0 to 99.9 FNU; 100 to 1000 FNU	0.0 to 500.0%; 0.00 to 50.00 ppm	450 to 850 mm Hg; 17.72 to 33.46 in Hg; 600.0 to 1133.2 mbar; 8.702 to 16.436 psi; 0.5921 to 1.1184 atm; 60.00 to 113.32 kPa	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K
Resolution	0.1 FNU from 0.0 to 99.9 FNU; 1 FNU from 100 to 1000 FNU	0.1%; 0.01 ppm	0.1 mm Hg; 0.01 in Hg; 0.1 mbar; 0.001 psi; 0.0001 atm; 0.01 kPa	0.01°C; 0.01°F; 0.01K
Accuracy	±0.3 FNU or ±2% of reading, whichever is greater	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: ±1.5% of reading or 0.10 ppm, whichever is greater; 30.00 ppm to 50.00 ppm: ±3% of reading	±3 mm Hg within ±15°C from the temperature during calibration	±0.15°C; ±0.27°F; ±0.15K
Calibration	Automatic 1, 2 or 3 points at 0, 20 and 200 FNU, or custom	automatic one or two points at 0, 100% or one custom point	automatic at one custom point	Automatic at one custom point

Ordering Information

Meter and Probe with Rugged Carrying Case

HI9829 – [w] [x] [y] [z]

w=	0	Basic meter, no GPS
	1	Meter with GPS
x=	0	No turbidity basic probe
	1	Turbidity basic probe
	2	Autonomously logging probe, no turbidity
	3	Autonomously logging probe with turbidity
y=	04	4 meter cable length
	10	10 meter cable length
	20	20 meter cable length
z=	1	115V
	2	230V

z=1 is supplied with 115V AC to 12V DC Adapter
z=2 is supplied with 230V AC to 12V DC Adapter

All HI9829 Kits Include:

HI9829 or HI 98290 (GPS Model)
HI710140 Hard carrying case
HI710005/8 (115V) or HI710006/8 (230V)
Mulitiparameter Probe (see table)
HI7698292 Probe Maintenance Kit
HI929829 Application Software
HI7698291 USB cable (PC to meter)
HI710045 Power supply cable
HI710046 Cigarette lighter cable
HI7609829-1 pH/ORP sensor
HI7609829-2 Galvanic DO Sensor
HI920005 iButton® with holder (5 pcs)
HI9828-25 Calibration solution
Instruction Manual

Optional Kit Components:

HI7609829-12 Nitrate sensor
HI7609829-11 Chloride ISE sensor
HI7609829-10 Ammonium ISE sensor
HI7698297 Long quick release flow cell
Spare Solution (see below)

Spare Solution

HI9829-10	25 sachets 10ppm ammonia-nitrogen calibration solution
HI9829-10/11	10 sachets each of 10ppm and 100ppm ammonia-nitrogen calibration solution
HI9829-11	25 sachets 100ppm ammonia-nitrogen calibration solution
HI9829-12	25 sachets 10ppm chloride calibration solution
HI9829-12/13	10 sachets each of 10ppm and 100ppm chloride calibration solution
HI9829-13	25 sachets 100ppm chloride calibration solution
HI9829-14	25 sachets 10ppm nitrate-nitrogen calibration solution
HI9829-14/15	10 sachets each of 10ppm and 100ppm nitrate-nitrogen calibration solution
HI9829-15	25 sachets 100ppm nitrate-nitrogen calibration solution

Kit Specific Components:

Kit Number	Probe	HI7609829-3 EC Sensor	HI7698290 Short calibration beaker	HI7609829-4 EC/Turbidity Sensor	HI7698293 Long calibration beaker	HI9829-16 0 FNU calibration solution	HI9829-17 20 FNU calibration solution	HI9829-18 200 FNU calibration solution	HI6982910 USB cable (PC to Probe)	HI7698295 Short protective sleeve	HI7698296 long protective sleeve
HI9829-0004Z	HI7609829/4	•	•							•	
HI9829-0010Z	HI7609829/10	•	•							•	
HI9829-0020Z	HI7609829/20	•	•							•	
HI9829-0104Z	HI7609829/4			•	•	•	•	•			•
HI9829-0110Z	HI7609829/10			•	•	•	•	•			•
HI9829-0120Z	HI7609829/20			•	•	•	•	•			•
HI9829-0204Z	HI7629829/4	•	•						•	•	
HI9829-0210Z	HI7629829/10	•	•						•	•	
HI9829-0220Z	HI7629829/20	•	•						•	•	
HI9829-0304Z	HI7629829/4			•	•	•	•	•	•		•
HI9829-0310Z	HI7629829/10			•	•	•	•	•	•		•
HI9829-0320Z	HI7629829/20			•	•	•	•	•	•		•
HI9829-1004Z	HI7609829/4	•	•							•	
HI9829-1010Z	HI7609829/10	•	•							•	
HI9829-1020Z	HI7609829/20	•	•							•	
HI9829-1104Z	HI7609829/4			•	•	•	•	•			•
HI9829-1110Z	HI7609829/10			•	•	•	•	•			•
HI9829-1120Z	HI7609829/20			•	•	•	•	•			•
HI9829-1204Z	HI7629829/4	•	•						•	•	
HI9829-1210Z	HI7629829/10	•	•						•	•	
HI9829-1220Z	HI7629829/20	•	•						•	•	
HI9829-1304Z	HI7629829/4			•	•	•	•	•	•		•
HI9829-1310Z	HI7629829/10			•	•	•	•	•	•		•
HI9829-1320Z	HI7629829/20			•	•	•	•	•	•		•

Meter with Probe Ordering Information

Choose Your Configuration Below

Multiparameter

portable

Meter and Probe with Rugged Carrying Case

Basic	**HI9829-00041** (115V) **HI9829-00042** (230V)	HI9829 meter, HI7609829/4 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-00101 (115V) **HI9829-00102** (230V)	HI9829 meter, HI7609829/10 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-00201 (115V) **HI9829-00202** (230V)	HI9829 meter, HI7609829/20 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
GPS	**HI9829-10041** (115V) **HI9829-10042** (230V)	HI9829 meter with GPS, HI7609829/4 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-10101 (115V) **HI9829-10102** (230V)	HI9829 meter with GPS, HI7609829/10 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-10201 (115V) **HI9829-10202** (230V)	HI9829 meter with GPS, HI7609829/20 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
Basic & Turbidity	**HI9829-01041** (115V) **HI9829-01042** (230V)	HI9829 meter, HI7609829/4 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-01101 (115V) **HI9829-01102** (230V)	HI9829 meter, HI7609829/10 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable,HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-01201 (115V) **HI9829-01202** (230V)	HI9829 meter, HI7609829/20 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable,HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
GPS & Turbidity	**HI9829-11041** (115V) **HI9829-11042** (230V)	HI9829 meter with GPS, HI7609829/4 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-11101 (115V) **HI9829-11102** (230V)	HI9829 meter with GPS, HI7609829/10 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-11201 (115V) **HI9829-11202** (230V)	HI9829 meter with GPS, HI7609829/20 probe, HI7698291 USB cable (PC to meter), HI920005 iButton® with holder (5 pcs), HI929829 PC application software, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.

Mulitiparameter Probe (Cable length: 4m, 10m, 20m)

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Meter with Probe Ordering Information

Choose Your Configuration Below

Meter and Logging Probe with Rugged Carrying Case

Basic with Autonomously Logging Probe	**HI9829-02041** (115V) **HI9829-02042** (230V)	HI9829 meter, HI7629829/4 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-02101 (115V) **HI9829-02102** (230V)	HI9829 meter, HI7629829/10 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-02201 (115V) **HI9829-02202** (230V)	HI9829 meter, HI7629829/20 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
GPS with Autonomously Logging Probe	**HI9829-12041** (115V) **HI9829-12042** (230V)	HI9829 meter with GPS, HI7629829/4 probe, HI76982910 USB cable, (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-12101 (115V) **HI9829-12102** (230V)	HI9829 meter with GPS, HI7629829/10 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-12201 (115V) **HI9829-12202** (230V)	HI9829 meter with GPS, HI7629829/20 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-3 EC sensor, HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI710045 power supply cable, HI7698290 short calibration beaker, HI9828-25 calibration solution (500 mL), HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
Basic with Autonomously Logging Probe & Turbidity	**HI9829-03041** (115V) **HI9829-03042** (230V)	HI9829 meter, HI7629829/4 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-03101 (115V) **HI9829-03102** (230V)	HI9829 meter, HI7629829/10 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-03201 (115V) **HI9829-03202** (230V)	HI9829 meter, HI7629829/20 probe, HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/98(230V), instruction manual.
GPS with Autonomously Logging Probe & Turbidity	**HI9829-13041** (115V) **HI9829-13042** (230V)	HI9829 meter with GPS, HI7629829/4 probe,HI76982910 USB cable, (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.
	HI9829-13101 (115V) **HI9829-13102** (230V)	HI9829 meter with GPS, HI7629829/10 probe,HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable,HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V),instruction manual.
	HI9829-13201 (115V) **HI9829-13202** (230V)	HI9829 meter with GPS, HI7629829/20 probe,HI76982910 USB cable (PC to Probe), HI7698291 USB cable (PC to meter), HI929829 PC application software, HI920005 iButton® with holder (5 pcs), HI7609829-2 DO sensor, HI7609829-1 pH/ORP sensor, HI7609829-4 EC/Turbidity sensor, HI710045 power supply cable, HI7698292 probe maintenance kit, HI9829-16 0 FNU calibration solution (230 mL), HI9829-17 20 FNU calibration solution (230 mL), HI9829-18 200 FNU calibration solution (230 mL), HI7698293 long calibration beaker, HI9828-25 calibration solution (500 mL), HI710046 cigarette lighter cable, HI710005/8 (115V) or HI710006/8 (230V), instruction manual.

Meter Only

Basic	**HI9829-01** (115V) **HI9829-02** (230V)	HI9829 meter only
GPS	**HI98290-01** (115V) **HI98290-02** (230V)	HI9829 meter with GPS only

HI9828-27
Quick calibration solution,
1 gallon

Probe Only, No Sensors

HI7609829/4	Probe for pH/pH+ORP/ISE, DO, EC, temperature with HI7698295 short protective shield and 4 m (13.1') cable
HI7609829/10	Probe for pH/pH+ORP/ISE, DO, EC, temperature with HI7698295 short protective shield and 10 m (33') cable
HI7609829/20	Probe for pH/pH+ORP/ISE, DO, EC, temperature with HI7698295 short protective shield and 20 m (65.6') cable
HI7629829/4	Logging probe for pH/pH+ORP/ISE, DO, EC, temperature with HI7698295 short protective shield and 4 m (13.1') cable
HI7629829/10	Logging probe for pH/pH+ORP/ISE, DO, EC, temperature with HI7698295 short protective shield and 10 m (33') cable
HI7629829/20	Logging probe for pH/pH+ORP/ISE, DO, EC, temperature with HI7698295 short protective shield and 20 m (65.6') cable

Sensors with O-Ring

HI7609829-1	pH/ORP
HI7609829-2	Dissolved Oxygen
HI7609829-3	EC
HI7609829-4	EC/Turbidity
HI7609829-10	Ammonium ISE
HI7609829-11	Chloride ISE
HI7609829-12	Nitrate ISE

Quick Calibration Solutions

HI9828-25	Quick calibration solution, 500 mL
HI9828-27	Quick calibration solution, 1 gal

pH Calibration Solutions

HI7004L	pH 4.01 buffer solution, 500 mL
HI7007L	pH 7.01 buffer solution, 500 mL
HI7010L	pH 10.01 buffer solution, 500 mL

ORP Calibration Solutions

HI7021L	ORP test solution @240 mV, 500 mL
HI7022L	ORP test solution @470 mV, 500 mL

EC Calibration Solutions

HI7030L	12880 µS/cm cal. sol., 500 mL
HI7031L	1413 µS/cm cal. sol., 500 mL
HI7033L	84 µS/cm cal. sol., 500 mL
HI7034L	80000 µS/cm cal. sol., 500 mL
HI7035L	111800 µS/cm cal. sol., 500 mL
HI7039L	5000 µS/cm cal. sol., 500 mL

Dissolved Oxygen Solutions

HI7040L	Zero oxygen solution, 500 mL
HI7042S	Electrolyte solution, 30 mL

Turbidity Calibration Solutions

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 Standards

HI9829-10/11	Kit containing 10 sachets each of 10 ppm and 100 ppm standard for HI7609829-10 ammonium ISE
HI9829-10	10 ppm standard sachet for HI7609829-10 ammonium ISE, 20 mL (25)
HI9829-11	100 ppm standard sachet for HI7609829-10 ammonium ISE, 20 mL (25)
HI9829-12/13	Kit containing 10 sachets each of 10 ppm and 100 ppm standard for HI7609829-11 chloride ISE
HI9829-12	10 ppm standard sachet for HI7609829-11 chloride ISE, 20 mL (25)
HI9829-13	100 ppm standard sachet for HI7609829-11 chloride ISE, 20 mL (25)
HI9829-14/15	Kit containing 10 sachets each of 10 ppm and 100 ppm standard for HI7609829-12 nitrate ISE
HI9829-14	10 ppm standard sachet for HI7609829-12 nitrate ISE, 20 mL (25)
HI9829-15	100 ppm standard sachet for HI7609829-12 nitrate ISE, 20 mL (25)

Probe Maintenance Kit

HI7698292	Probe maintenance kit consisting of HI7042S (electrolyte solution for DO sensor), O-rings for DO sensor (5), small brush, O-rings for probe (5), and syringe with grease to lubricate the O-rings.

pH/ORP Cleaning and Storage Solutions

HI70300L	pH/ORP electrode storage sol., 500 mL
HI7061L	pH/ORP electrode cleaning sol., 500 mL

Accessories

HI929829	PC application software
HI7698291	USB cable, PC to meter
HI76982910	USB cable, PC to probe
HI710046	Car accessory port cable
HI7698290	Short calibration beaker
HI7698293	Long calibration beaker
HI7698297	Quick Release Flow Cell
HI7698294	Short flow cell
HI7698297	Long, quick release flow cell
HI7698295	Short protective shield
HI7698296	Long protective shield
HI920005	iButton® with holder (5 pcs)
HI710140	Hard carrying case
HI710045	Power supply cable

HI76982910
USB cable, PC to probe

HI710046
Car accessory port cable

HI7698292
Probe maintenance kit

HI7698297
Long, quick release flow cell

Multiparameter

portable

HI98494

Multiparameter Bluetooth® pH/EC/OPDO® Meter

pH, ORP, EC, TDS, Resistivity, Salinity, Seawater σ, Dissolved Oxygen, Atmospheric Pressure and Temperature

- Bluetooth connectivity
  - Retrieve data logs with Hanna Lab app for either sending by e-mail or download to a smart device for review
- Waterproof
  - IP67 rated waterproof, rugged enclosure for meter, IP68 for probe
- Digital probe
  - Digital probe with built-in temperature sensor and three ports for pH (ORP), EC and optical DO sensors
  - Color coded, field replaceable sensors
  - Auto-sensor recognition
  - Stainless steel, weighted protective guard
- Quick calibration feature
- Automatic barometric pressure compensation
- Automatic temperature compensation
- Logging
  - Automatic interval logging of up to 45,000 samples
  - Log-on-demand to store measurement data
- GLP
  - GLP data provides data from previous five calibrations to ensure Good Laboratory Practices are met
- Dedicated help key
  - On-screen context specific help is readily available at the press of a button
- Backlit LCD display with multifunction virtual keys
- Intuitive keypad
  - Dedicated and virtual soft keys
- USB type-C
  - Computer connectivity for transferring logged data as .CSV file
  - Port used for recharging built-in lithium-ion battery
- Dual power source
  - Meter operates on built-in lithium-ion battery
  - Meter automatically switches to common alkaline batteries as backup power source

Stainless steel, weighted protective guard

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Feature Overview


Bluetooth® 5.0 Connectivity

HI98494 offers the ability to connect wirelessly to a smart device running the Hanna Lap App. Using the app, log lots can be e-mailed or downloaded for review.

Measurements

HI98494 can display from 1 to 12 parameters on the high contrast backlit LCD. The pH, EC and DO measurements are automatically compensated for temperature variations. Dissolved oxygen measurements are automatically compensated for barometric pressure and salinity.
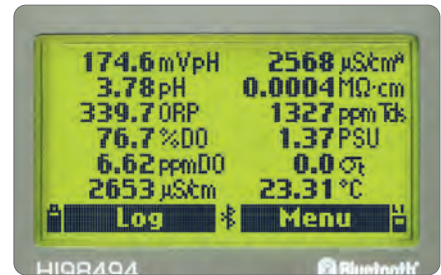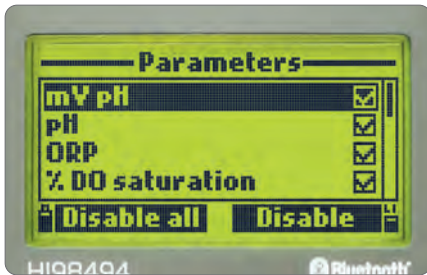
Data Logging

HI98494 can be used to log one data point or do interval logging for continuous logging at a specified interval. All logs have the option to store data into a named lot and the ability to add remarks. Both help to provide for meaningful data including notes on local environmental conditions.
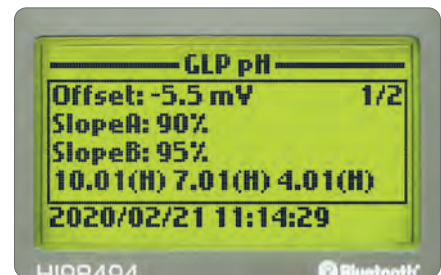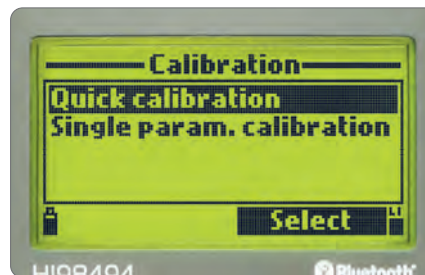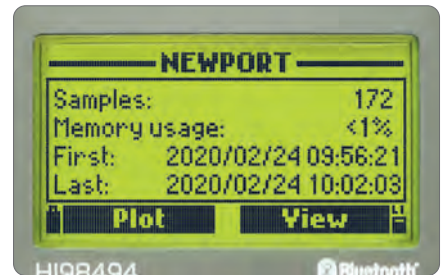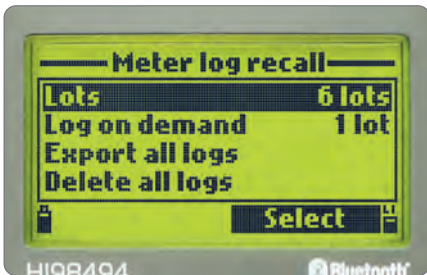
Dual Power Source

The meter operates on a built-in lithium-ion battery. When the rechargeable battery is low the meter will automatically switch to the 1.5 AA alkaline batteries.

Quick-Calibration

Quick Calibration provides a speedy, single point calibration for pH, conductivity, and dissolved oxygen. Standard calibration options are available including pH up to three points, conductivity at one point and dissolved oxygen up to two points.

GLP Data

Calibration information is captured along with time and date stamp. Information includes calibration values along with other values that have an impact on the measurement. GLP data is stored with logged data.

Bluetooth® and Hanna Lab App Compatibility

Using the Bluetooth connection the data can be transferred to a smart device for review or shared as an e-mail.
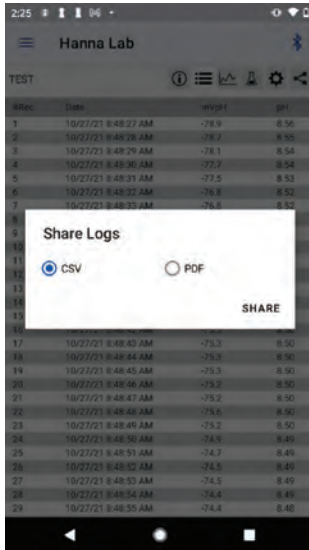
Share

Logs can be shared as a .CSV or .PDF file when being e-mailed.

GLP

Comprehensive GLP data can be reviewed for all parameters when the logged data is downloaded to a smart device.

Unit Selection

When reviewing data on a smart device there is an option to select the measurement units to be displayed independently of the meter settings.
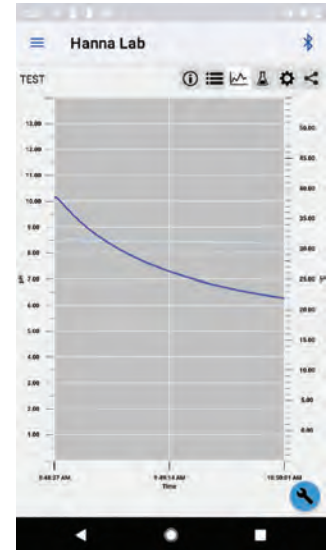
Data Graphing

For trend analysis the Hanna Lab App offers the option to graph logged data.

Multiparameter Probe and Sensors

Multi-function Sensor

- Quick sensor replacement
  - Sensor replacement is quick and easy with field replaceable, screw type connectors and are color coded for easy identification. These meters automatically recognize sensors.

Easy sensor removal with hex key

Probe Specifications	HI7698494
Sensor Inputs	three (pH or pH/ORP, DO, EC)
Sample Environment	fresh, brackish, seawater
Waterproof Protection	IP68
Operating Temperature	-5 to 55°C
Storage Temperature	-20 to 70°C
Maximum Depth	20 m (66')
Dimensions (without cable)	342 mm (13.5"); 46 mm (1.8") dia
Weight (without sensors)	570 g (20.1 oz.)
Cable Specification	multistrand-multiconductor shielded cable with internal strength member rated for 68 kg (150 lb.) intermittent use
Wetted Materials	Body	ABS
	Threads	Nylon
	Shield	ABS / 316 SS
	Temperature Probe	316 SS
	O-rings	EPDM

Optical Dissolved Oxygen Smart Caps

The optical dissolved oxygen sensor uses a smart cap that has an RFID tag that stores calibration coefficients unique to each cap. The RFID keeps track of the age of the cap and alerts the user when it should be replaced.

RFID tag

Sensor Specifications		HI7698194-0	HI7698194-1	HI7698194-3	HI7698494-5
Description		pH sensor	pH/ORP sensor	EC sensor	optical; luminescence quenching DO sensor
Measurement Type		pH, mV (pH)	pH, mV (pH), ORP	EC	DO (% saturation and concentration)
Measurement Range		0.00 to 13.00 pH; ±600.0 mV	0.00 to 13.00 pH; ±600.0 mV; ±2000.0 mV	0.0 to 200.0 mS/cm; 0.0 to 400 mS/cm (absolute)	0.0 to 500.0 %; 0.00 to 50.00 mg/L
Temperature Range		-5 to 55°C	-5 to 55°C	-5 to 55°C	-5 to 55°C
Color Code		red	red	blue	green
Materials	Tip	glass (pH)	glass (pH); Pt (ORP)	stainless steel electrodes AISI 316	polypropylene
	Glass Type	LT (low temperature)	LT (low temperature)	–	–
	Junction	ceramic	ceramic	–	–
	Body	PEI	PEI	ABS/epoxy	ABS
	Electrolyte	gel	gel	–	–
	Reference	double	double	–	–
Maintenance Solution		HI70300 (storage solution)	HI70300 (storage solution)	none	none
Dimensions		118 x 15 mm	118 x 15 mm	111 x 17 mm	99 x 17 mm
Depth		20 m (65')	20 m (65')	20 m (65')	20 m (65')

Data Transfer & Charging

The USB Type-C port provides for easy data transfer to memory stick, PC, or other compatible devices and is used to charge internal lithium-ion battery.

Waterproof Probe Connection and USB Type-C

Waterproof Quick Connect DIN Connector

The meter connects to the multiparameter probe through a single waterproof connector and makes attaching and removing the probe quick and easy. The meter automatically detects the probe when connected.

Specifications		HI98494
pH / mV	Range	0.00 to 14.00 pH / ±600.0 mV
	Resolution	0.01 pH / 0.1 mV
	Accuracy	±0.02 pH / ±0.5 mV
	Calibration	automatic one-point Quick Calibration using HI9828-25; automatic one, two, or three points with automatic recognition of five standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or one custom buffer
ORP	Range	±2000.0 mV
	Resolution	0.1 mV
	Accuracy	±1.0 mV
	Calibration	manual at one custom point (relative mV)

EC	Range	0 to 200 mS/cm (absolute EC up to 400 mS/cm)
	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	automatic one-point Quick Calibration using HI9828-25 ; automatic single point, with six standard solutions (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm) or custom point
TDS	Range	0.0 to 400.0 ppt (g/L) (the 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 calibration
Resistivity	Range	0 to 999999 Ω•cm; 0 to 1000.0 kΩ•cm; 0 to 1.0000 MΩ•cm
	Resolution	dependent on resistivity reading
	Calibration	based on conductivity calibration
Salinity	Range	0.00 to 70.00 PSU
	Resolution	0.01 PSU
	Accuracy	±2% of reading or ±0.01 PSU whichever is greater
	Calibration	based on conductivity calibration
	Compensation	used for DO salinity compensation
Seawater σ	Range	0.0 to 50.0 σ_t, σ_0, σ_{15}
	Resolution	0.1 σ_t, σ_0, σ_{15}
	Accuracy	±1 σ_t, σ_0, σ_{15}
	Calibration	based on conductivity calibration
Dissolved Oxygen	Range	0.0 to 500.0%; 0.00 to 50.00 ppm (mg/L)
	Resolution	0.1%; 0.01 ppm (mg/L)
	Accuracy	±1.5% of reading ± 0.01mg/L for 0.00-20.00mg/L; ±5% of reading for 20.00-50.00mg/L; ±1.5% of reading ±0.1% for 0.0-200.0%; ±5% of reading for 200.0-500.0%
	Calibration	automatic Quick Calibration in water saturated air; one or two-point automatic calibration at 100% and 0%; manual single point using a value entered by the user in % saturation or mg/L
Atmospheric Pressure	Range	450 to 850 mm Hg; 17.72 to 33.46 in Hg; 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 mm Hg; 0.01 in Hg; 0.1 mbar; 0.001 psi; 0.0001 atm; 0.01 kPa
	Accuracy	±3 mm Hg within ±15°C from calibration temperature
	Calibration	automatic at one custom point
Temperature	Range	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K
	Resolution	0.01°C; 0.01°F; 0.01K
	Accuracy	±0.15°C; ±0.27°F; ±0.15K
	Calibration	automatic at one custom point
Additional Specifications	Temperature Compensation	automatic from -5 to 55°C (23 to 131°F)
	Logging Memory	45,000 records interval logging or 25,000 records log-on-demand of all parameters
	Logging Interval	one second to three hours
	Connectivity	Bluetooth® using Hanna Lab App; USB-C: Host – save logs to USB stick device – appears as .MSD on computer
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Battery Type / Life	1.5V AA batteries (4); built-in Li-ion battery (1) / minimum 200 hours (AA, without backlighting and BLE) minimum 50 hours (Li-ion battery, without backlighting and BLE)
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
Ordering Information		all models are supplied with: HI7698194-1 pH/ORP sensor, HI7698194-3 EC sensor, HI7698295 short protective probe shield, HI7698494-5 optical DO sensor, HI9828-20 quick calibration solution, zero oxygen solution, HI76984942 probe maintenance kit, HI920016 USB type-C cable, HI7698290 calibration beaker, batteries (4), quality certificate, and instruction manual in a rugged carrying case with custom insert. **HI98494** is supplied with HI7698494 multiparameter probe with 4m (13') cable **HI98494/10** is supplied with HI7698494/10 multiparameter probe with 10m (33') cable **HI98494/20** is supplied with HI7698494/20 multiparameter probe with 20m (66') cable **HI98494/30** is supplied with HI7698494/20 multiparameter probe with 20m (66') cable **HI98494/40** is supplied with HI7698494/40 multiparameter probe with 40m (131') cable **HI98494/50** is supplied with HI7698494/40 multiparameter probe with 40m (131') cable
Accessories		**HI710034** orange protective rubber boot
		HI740246 ISE and HI7698494 pH Sensor Storage cap (5 pcs.)

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HI98194

Multiparameter Waterproof Meter

pH, ORP, EC, TDS, Resistivity, Salinity, Seawater σ, Dissolved Oxygen, Atmospheric Pressure and Temperature

pH Features

- Calibration
  - Up to a three-point calibration with five standard buffers and one custom buffer available

- pH in mV option
  - Useful for diagnostics

- GLP data
  - Offset, slope, date, time and buffers used

- Automatically temperature compensated readings

- pH or pH/ORP field replaceable sensors
  - Gel filled and maintenance free
  - Double junction for reduced contamination of reference cell

Dissolved Oxygen Features

- Choice of units
  - Display units in % saturation or ppm (mg/L)

- Salinity compensation for saline waters
  - Manual entry of salinity values
  - Readings compensated for salinity effects

- Built-in barometer
  - Automatic compensation for changes in atmospheric pressure
  - User selectable units

- Temperature compensation

- Polarization
  - Automatic polarization of probe at startup

- Membrane caps
  - Ready-to-use HDPE pre-tensioned membrane caps are easy to replace

EC/TDS/Resistivity Features

- Calibration
  - Single-point calibration from six standards

- Temperature compensation
  - Automatic Temperature Compensation
  - Configurable temperature coefficient range from 0.00 to 6.00%/°C
  - Choice of reference temperatures at 20 or 25°C
  - Absolute conductivity can be displayed along with the temperature compensated value

- Auto-ranging

- Salinity readings
  - Practical Salinity Scale (PSU) based on conductivity calibration

The HI98194 is a waterproof portable logging multiparameter meter that monitors up to 12 different water quality parameters. It's multi-sensor probe allows for the measurement of key parameters including pH, ORP, conductivity, dissolved oxygen, and temperature. The probe transmits readings digitally to the meter, where data points can be displayed and logged. The complete system is simple to setup and easy to use.

Backlit Graphic LCD Display

The HI98194 features a backlit graphic LCD with on-screen help and the capability to display up to twelve parameters simultaneously. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

Waterproof Protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1 m for up to 30 minutes. The probe features an IP68 rating for continuous immersion in water.
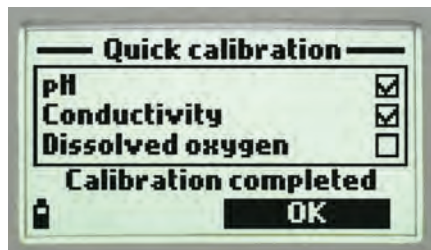

Quick Connect Digital Probe

The HI7698194 probe features a Quick Connect DIN connector that makes a waterproof connection with the meter.

Color Coded, Field Replaceable Sensors

Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor port identification.

Standard or Quick Calibration

Quick Calibration provides a speedy, single-point calibration for pH, conductivity, and dissolved oxygen. Standard pH calibration options are available for calibrating up to three points from a selection of five standard buffers and one custom buffer. Conductivity calibration is a single point from six standard selections or one custom standard. Dissolved oxygen calibration is up to two standard points or a single custom point.

Auto-sensor Recognition

The probe and meter automatically recognize the sensors that are connected. Any ports not used on the probe will not have the parameter displayed or be configurable.

Automatic Temperature Compensation

Integrated temperature sensor allows for automatic temperature compensation of pH, conductivity, and dissolved oxygen measurements.

Automatic Barometric Pressure Compensation

The meter features a built-in barometer with user-selectable units for dissolved oxygen pressure compensation.
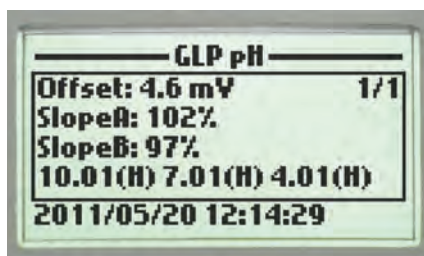
GLP Data

HI98194 includes a GLP feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data includes date, time, buffers/standards used for calibration, and slope characteristics.
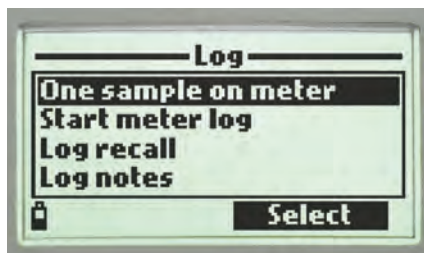
Data Logging

The HI98194 allows users to store up to 45,000 continuous or log-on-demand samples with logging intervals from one second to three hours.

Intuitive Keypad

The fitted rubber keypad has dedicated keys for power, backlight, up/down arrows, help and alphanumeric characters. The meter also features two virtual soft keys that navigate the user through the configuration of each parameter, meter setup, and logging of data. The interface is intuitive for any user's level of experience.

Dedicated Help Key

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

PC Connectivity

Logged data can be transferred to a Window's compatible PC with the included HI920015 micro USB cable and HI9298194 software.

Long Battery Life

The display of the meter has a battery icon indicator to show the remaining power. The meter uses four 1.5V AA batteries that provide up to 360 hours of battery life.

Rugged Custom Carrying Case

The HI98194 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

Probe and Sensors

The HI7698194 is a multiparameter pH/EC/DO/Temperature probe for use with the HI98194 portable meter. It features a Quick Connect DIN that makes a waterproof connection with the meter. Sensors are automatically recognized by the probe and meter when connected. Any ports not used on the probe will not have the parameter displayed on the meter. Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor identification. The probe features a multistrand-multiconductor shielded cable with 4m, 10m, 20m, and 40m lengths available. It's rugged, waterproof design makes it ideal for field use.

Probe Specifications	HI7698194	
Sensor Inputs	three (pH or pH/ORP, DO, EC)	
Sample Environment	fresh, brackish, seawater	
Waterproof Protection	IP68	
Operating Temperature	-5 to 55°C	
Storage Temperature	-20 to 70°C	
Maximum Depth	20 m (66')	
Dimensions (without cable)	342 mm (13.5"); 46 mm (1.8") dia	
Weight (without sensors)	570 g (20.1 oz.)	
Cable Specification	multistrand-multiconductor shielded cable with internal strength member rated for 68 kg (150 lb.) intermittent use	
Wetted Materials	Body	ABS
	Threads	Nylon
	Shield	ABS / 316 SS
	Temperature Probe	316 SS
	O-rings	EPDM

Multi-function Sensor

- Quick sensor replacement
  - Sensor replacement is quick and easy with field replaceable, screw type connectors and are color coded for easy identification. These meters automatically recognize sensors.

- Optional shockproof silicon rubber boot
  - Specially designed to protect your instrument from damage or impact

  HI710034 Orange

HI9828-25
Quick Calibration solution

or

Sensor Specifications	HI7698194-0	HI7698194-1	HI7698194-3	HI7698194-2
Description	pH sensor	pH/ORP sensor	EC sensor	DO sensor
Measurement Type	pH, mV (pH)	pH, mV (pH), ORP	EC	DO (% saturation and concentration)
Measurement Range	0.00 to 13.00 pH ; ±600.0 mV	0.00 to 13.00 pH; ±600.0 mV; ±2000.0 mV	0.0 to 200.0 mS/cm; 0.0 to 400 mS/cm (absolute)	0.0 to 500.0 %; 0.00 to 50.00 mg/L
Temperature Range	-5 to 55°C	-5 to 55°C	-5 to 55°C	-5 to 55°C
Color Code	red	red	blue	white
Materials	Tip	glass (pH)	glass (pH); Pt (ORP)	stainless steel electrodes AISI 316	cat/an: Ag/Zn
	Glass Type	LT (low temperature)	LT (low temperature)	–	–
	Junction	ceramic	ceramic	–	membrane: HDPE
	Body	PEI	PEI	ABS/epoxy	white top ABS
	Electrolyte	gel	gel	–	–
	Reference	double	double	–	–
Maintenance Solution	HI70300 (storage solution)	HI70300 (storage solution)	none	HI7042S (DO electrolyte)
Dimensions	118 x 15 mm	118 x 15 mm	111 x 17 mm	99 x 17 mm
Depth	20 m (65')	20 m (65')	20 m (65')	20 m (65')

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Specifications		HI98194
pH / mV	Range	0.00 to 14.00 pH / ±600.0 mV
	Resolution	0.01 pH / 0.1 mV
	Accuracy	±0.02 pH / ±0.5 mV
	Calibration	automatic one, two, or three points with automatic recognition of five standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or one custom buffer
ORP	Range	±2000.0 mV
	Resolution	0.1 mV
	Accuracy	±1.0 mV
	Calibration	automatic at one custom point (relative mV)
EC	Range	0 to 200 mS/cm (absolute EC up to 400 mS/cm)
	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	automatic single point, with six standard solutions (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm) or custom point
TDS	Range	0.0 to 400.0 ppt (g/L) (the 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 calibration
Resistivity	Range	0 to 999999 Ω•cm; 0 to 1000.0 kΩ•cm; 0 to 1.0000 MΩ•cm
	Resolution	dependent on resistivity reading
	Calibration	based on conductivity calibration
Salinity	Range	0.00 to 70.00 PSU
	Resolution	0.01 PSU
	Accuracy	±2% of reading or ±0.01 PSU whichever is greater
	Calibration	based on conductivity calibration
Seawater σ	Range	0.0 to 50.0 σ_t, σ_0, σ_{15}
	Resolution	0.1 σ_t, σ_0, σ_{15}
	Accuracy	±1 σ_t, σ_0, σ_{15}
	Calibration	based on conductivity calibration
Dissolved Oxygen	Range	0.0 to 500.0%; 0.00 to 50.00 ppm (mg/L)
	Resolution	0.1%; 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	automatic one or two points at 0, 100% or one custom point
Atmospheric Pressure	Range	450 to 850 mm Hg; 17.72 to 33.46 in Hg; 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 mm Hg; 0.01 in Hg; 0.1 mbar; 0.001 psi; 0.0001 atm; 0.01 kPa
	Accuracy	±3 mm Hg within ±15°C from the temperature during calibration
	Calibration	automatic at one custom point
Temperature	Range	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K
	Resolution	0.01°C; 0.01°F; 0.01K
	Accuracy	±0.15°C; ±0.27°F; ±0.15K
	Calibration	automatic at one custom point
Additional Specifications	Temperature Compensation	automatic from -5 to 55°C (23 to 131°F)
	Logging Memory	45,000 records (continuous logging or log-on-demand of all parameters)
	Logging Interval	one second to three hours
	PC Connectivity	via USB (with Hanna PC software)
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Battery Type / Life	1.5V AA batteries (4) / approximately 360 hours of continuous use without backlight (50 hours with backlight)
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
Ordering Information	All models are supplied with: HI7698194-1 pH/ORP sensor, HI7698194-3 EC sensor, HI7698295 short protective probe shield, HI7698194-2 DO sensor, HI9828-20 quick calibration solution, HI76981942 probe maintenance kit, HI7698290 calibration beaker, HI9298194 PC software, HI920015 micro USB cable, batteries (4), quality certificate, and instruction manual in a rugged carrying case with custom insert. **HI98194** is supplied with HI7698194 multiparameter probe with 4m (13') cable **HI98194/10** is supplied with HI7698194/10 multiparameter probe with 10m (33') cable **HI98194/20** is supplied with HI7698194/20 multiparameter probe with 20m (66') cable **HI98194/40** is supplied with HI7698194/40 multiparameter probe with 40m (131') cable	
Accessories	**HI710034** orange protective rubber boot	
	HI720194 spare thermoformed carrying case for HI98194, HI98195, and HI98196	

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HI98195

Multiparameter Waterproof Meter

pH, ORP, EC, TDS, Resistivity, Salinity, Seawater σ and Temperature

pH Features

- Calibration
  - Up to a three-point calibration with five standard buffers and one custom buffer available

- pH in mV option
  - Useful for diagnostics

- GLP data
  - Offset, slope, date, time and buffers used

- Automatically temperature compensated readings

- pH or pH/ORP field replaceable sensors
  - Gel filled and maintenance free
  - Double junction for reduced contamination of reference cell

EC/TDS/Resistivity Features

- Calibration
  - Single-point calibration from six standards

- Temperature compensation
  - Automatic Temperature Compensation
  - Configurable temperature coefficient range from 0.00 to 6.00%/°C
  - Choice of reference temperatures at 20 or 25°C
  - Absolute conductivity can be displayed along with the temperature compensated value

- Auto-ranging

- Salinity readings
  - Practical Salinity Scale (PSU) based on conductivity calibration

The HI98195 is a waterproof portable logging multiparameter meter that monitors up to 9 different water quality parameters. It's multi-sensor probe allows for the measurement of key parameters including pH, ORP, conductivity, and temperature. The probe transmits readings digitally to the meter, where data points can be displayed and logged. The complete system is simple to setup and easy to use.

- Optional shockproof silicon rubber boot
  - Specially designed to protect your instrument from damage or impact

  HI710034 Orange

Backlit Graphic LCD Display

The HI98195 features a backlit graphic LCD with on-screen help and the capability to display up to nine parameters simultaneously. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

Waterproof Protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1 m for up to 30 minutes. The probe features an IP68 rating for continuous immersion in water.
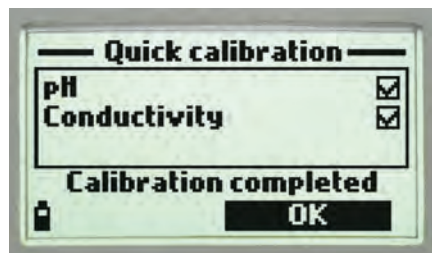
Quick Connect Digital Probe

The HI7698195 probe features a Quick Connect DIN connector that makes a waterproof connection with the meter.

Color Coded, Field Replaceable Sensors

Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor port identification.
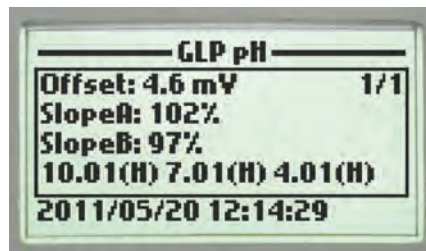
Standard or Quick Calibration

Quick Calibration provides a speedy, single point calibration for pH and conductivity. Standard pH calibration options are available for calibrating up to three points from a selection of five standard buffers and one custom buffer. Conductivity calibration is a single point from six standard selections or one custom standard.

Auto-sensor Recognition

The probe and meter automatically recognize the sensors that are connected. Any ports not used on the probe will not have the parameter displayed or be configurable.

Automatic Temperature Compensation

Integrated temperature sensor allows for automatic temperature compensation of pH and conductivity measurements.

GLP Data

HI98195 includes a GLP feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data includes date, time, buffers/standards used for calibration, and slope characteristics.
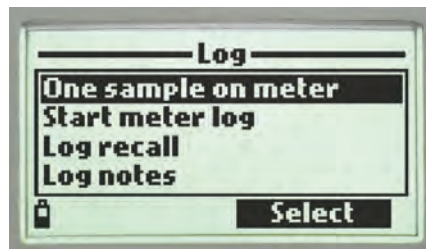
Data Logging

The HI98195 allows users to store up to 45,000 continuous or log-on-demand samples with logging intervals from one second to three hours.

Intuitive Keypad

The fitted rubber keypad has dedicated keys for power, backlight, up/down arrows, help and alphanumeric characters. The meter also features two virtual soft keys that navigate the user through the configuration of each parameter, meter setup, and logging of data. The interface is intuitive for any user's level of experience.

Dedicated Help Key

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

PC Connectivity

Logged data can be transferred to a Window's compatible PC with the included HI920015 micro USB cable and HI9298194 software.

Long Battery Life

The display of the meter has a battery icon indicator to show the remaining power. The meter uses four 1.5V AA batteries that provide up to 360 hours of battery life.

Rugged Custom Carrying Case

The HI98195 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

Probe and Sensors

The HI7698195 is a multiparameter pH/EC/Temperature probe for use with the HI98195 portable meter. It features a Quick Connect DIN that makes a waterproof connection with the meter. Sensors are automatically recognized by the probe and meter when connected. Any ports not used on the probe will not have the parameter displayed on the meter. Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor identification. The probe features a multistrand-multiconductor shielded cable with 4m, 10m, 20m, and 40m lengths available. It's rugged, waterproof design makes it ideal for field use.

Specifications	HI7698195	
Sensor Inputs	two (pH or pH/ORP, EC)	
Sample Environment	fresh, brackish, seawater	
Waterproof Protection	IP68	
Operating Temperature	-5 to 55°C	
Storage Temperature	-20 to 70°C	
Maximum Depth	20 m (66')	
Dimensions (without cable)	342 mm (13.5"); 46 mm (1.8") dia	
Weight (without sensors)	570 g (20.1 oz.)	
Cable Specification	multistrand-multiconductor shielded cable with internal strength member rated for 68 kg (150 lb.) intermittent use	
Wetted Materials	Body	ABS
	Threads	Nylon
	Shield	ABS / 316 SS
	Temperature Probe	316 SS
	O-rings	EPDM

Multi-function Sensor

- Quick sensor replacement
  - Sensor replacement is quick and easy with field replaceable, screw type connectors and are color coded for easy identification. These meters automatically recognize sensors

HI9828-25
Quick Calibration
solution

or

Sensor Specifications		HI7698194-0	HI7698194-1	HI7698194-3
Description		pH sensor	pH/ORP sensor	EC sensor
Measurement Type		pH, mV (pH)	pH, mV (pH), ORP	EC
Measurement Range		0.00 to 13.00 pH ; ±600.0 mV	0.00 to 13.00 pH; ±600.0 mV; ±2000.0 mV	0.0 to 200.0 mS/cm; 0.0 to 400 mS/cm (absolute)
Temperature Range		-5 to 55°C	-5 to 55°C	-5 to 55°C
Color Code		red	red	blue
Materials	Tip	glass (pH)	glass (pH); Pt (ORP)	stainless steel electrodes AISI 316
	Glass Type	LT (low temperature)	LT (low temperature)	–
	Junction	ceramic	ceramic	–
	Body	PEI	PEI	ABS/epoxy
	Electrolyte	gel	gel	–
	Reference	double	double	–
Maintenance Solution		HI70300 (storage solution)	HI70300 (storage solution)	none
Dimensions		118 x 15 mm	118 x 15 mm	111 x 17 mm
Depth		20 m (65')	20 m (65')	20 m (65')

Specifications		HI98195
pH / mV	Range	0.00 to 14.00 pH / ±600.0 mV
	Resolution	0.01 pH / 0.1 mV
	Accuracy	±0.02 pH / ±0.5 mV
	Calibration	automatic one, two, or three points with automatic recognition of five standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or one custom buffer
ORP	Range	±2000.0 mV
	Resolution	0.1 mV
	Accuracy	±1.0 mV
	Calibration	automatic at one custom point (relative mV)
EC	Range	0 to 200 mS/cm (absolute EC up to 400 mS/cm)
	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	automatic single point, with six standard solutions (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm) or custom point
TDS	Range	0.0 to 400.0 ppt (g/L) (the 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
Resistivity	Range	0 to 999999 Ω•cm; 0 to 1000.0 kΩ•cm; 0 to 1.0000 MΩ•cm
	Resolution	dependent on resistivity reading
	Calibration	based on conductivity or salinity calibration
Salinity	Range	0.00 to 70.00 PSU
	Resolution	0.01 PSU
	Accuracy	±2% of reading or ±0.01 PSU whichever is greater
	Calibration	based on conductivity calibration
Seawater σ	Range	0.0 to 50.0 σ_t, σ_0, σ_{15}
	Resolution	0.1 σ_t, σ_0, σ_{15}
	Accuracy	±1 σ_t, σ_0, σ_{15}
	Calibration	based on conductivity or salinity calibration
Temperature	Range	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K
	Resolution	0.01°C; 0.01°F; 0.01K
	Accuracy	±0.15°C; ±0.27°F; ±0.15K
	Calibration	automatic at one custom point
Additional Specifications	Temperature Compensation	automatic from -5 to 55°C (23 to 131°F)
	Logging Memory	45,000 records (continuous logging or log-on-demand of all parameters)
	Logging Interval	one second to three hours
	PC Connectivity	via USB (with Hanna PC software)
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Battery Type / Life	1.5V AA batteries (4) / approximately 360 hours of continuous use without backlight (50 hours with backlight)
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
Ordering Information	All models are supplied with: HI7698194-1 pH/ORP sensor, HI7698194-3 EC sensor, HI7698295 short protective probe shield, HI9828-20 quick calibration solution, HI76981952 probe maintenance kit, HI7698290 calibration beaker, HI9298194 PC software, HI920015 micro USB cable, batteries (4), quality certificate, and instruction manual in a rugged carrying case with custom insert.	
	HI98195 is supplied with HI7698195 multiparameter probe with 4m (13') cable **HI98195/10** is supplied with HI7698195/10 multiparameter probe with 10m (33') cable **HI98195/20** is supplied with HI7698195/20 multiparameter probe with 20m (66') cable **HI98195/40** is supplied with HI7698195/40 multiparameter probe with 40m (131') cable	
Accessories	**HI710034** orange protective rubber boot	
	HI720194 spare thermoformed carrying case for HI98194, HI98195, and HI98196	

Pool Line

HI981954

Multiparameter Waterproof Meter

pH, ORP, EC, TDS, Resistivity, Salinity, Seawater σ and Temperature

pH Features

- Calibration
  - Up to a three-point calibration with five standard buffers and one custom buffer available
- pH in mV option
  - Useful for diagnostics
- GLP data
  - Offset, slope, date, time and buffers used
- Automatically temperature compensated readings
- pH or pH/ORP field replaceable sensors
  - Gel filled and maintenance free
  - Double junction for reduced contamination of reference cell

EC/TDS/Resistivity Features

- Calibration
  - Single-point calibration from six standards
- Temperature compensation
  - Automatic Temperature Compensation
  - Configurable temperature coefficient range from 0.00 to 6.00%/°C
  - Choice of reference temperatures at 20 or 25°C
  - Absolute conductivity can be displayed along with the temperature compensated value
- Auto-ranging
- Salinity readings
  - Practical Salinity Scale (PSU) based on conductivity calibration

The HI981954 is a waterproof portable logging multiparameter meter that monitors up to 9 different water quality parameters. It's multi-sensor probe allows for the measurement of key parameters including pH, ORP, conductivity, and temperature. The probe transmits readings digitally to the meter, where data points can be displayed and logged. The complete system is simple to setup and easy to use.

- Optional shockproof silicon rubber boot
  - Specially designed to protect your instrument from damage or impact

  HI710034 Orange

Backlit Graphic LCD Display

The HI981954 features a backlit graphic LCD with on-screen help and the capability to display up to nine parameters simultaneously. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

Waterproof Protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1 m for up to 30 minutes. The probe features an IP68 rating for continuous immersion in water.
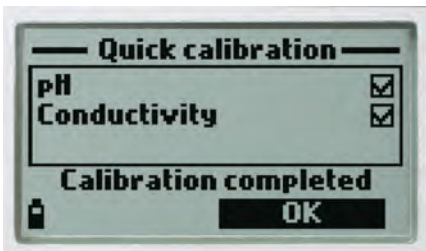
Quick Connect Digital Probe

The HI7698195 probe features a Quick Connect DIN connector that makes a waterproof connection with the meter.

Color Coded, Field Replaceable Sensors

Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor port identification.

Standard or Quick Calibration

Quick Calibration provides a speedy, single point calibration for pH and conductivity. Standard pH calibration options are available for calibrating up to three points from a selection of five standard buffers and one custom buffer. Conductivity calibration is a single point from six standard selections or one custom standard.

Auto-sensor Recognition

The probe and meter automatically recognize the sensors that are connected. Any ports not used on the probe will not have the parameter displayed or be configurable.

Automatic Temperature Compensation

Integrated temperature sensor allows for automatic temperature compensation of pH and conductivity measurements.

GLP Data

HI981954 includes a GLP feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data includes date, time, buffers/standards used for calibration, and slope characteristics.
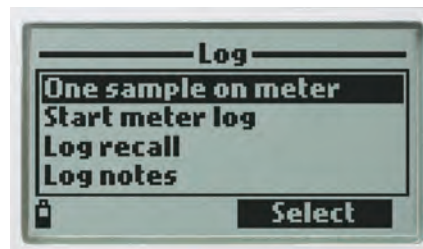
Data Logging

The HI981954 allows users to store up to 45,000 continuous or log-on-demand samples with logging intervals from one second to three hours.

Intuitive Keypad

The fitted rubber keypad has dedicated keys for power, backlight, up/down arrows, help and alphanumeric characters. The meter also features two virtual soft keys that navigate the user through the configuration of each parameter, meter setup, and logging of data. The interface is intuitive for any user's level of experience.

Dedicated Help Key

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

PC Connectivity

Logged data can be transferred to a Window's compatible PC with the included HI920015 micro USB cable and HI9298194 software.

Long Battery Life

The display of the meter has a battery icon indicator to show the remaining power. The meter uses four 1.5V AA batteries that provide up to 360 hours of battery life.

Rugged Custom Carrying Case

The HI981954 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

Probe and Sensors

The HI7698195 is a multiparameter pH/EC/Temperature probe for use with the HI981954 portable meter. It features a Quick Connect DIN that makes a waterproof connection with the meter. Sensors are automatically recognized by the probe and meter when connected. Any ports not used on the probe will not have the parameter displayed on the meter. Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor identification. The probe features a multistrand-multiconductor shielded cable with 4m, 10m, 20m, and 40m lengths available. It's rugged, waterproof design makes it ideal for field use.

Specifications	HI7698195	
Sensor Inputs	two (pH or pH/ORP, EC)	
Sample Environment	fresh, brackish, seawater	
Waterproof Protection	IP68	
Operating Temperature	-5 to 55°C	
Storage Temperature	-20 to 70°C	
Maximum Depth	20 m (66')	
Dimensions (without cable)	342 mm (13.5"); 46 mm (1.8") dia	
Weight (without sensors)	570 g (20.1 oz.)	
Cable Specification	multistrand-multiconductor shielded cable with internal strength member rated for 68 kg (150 lb.) intermittent use	
Wetted Materials	Body	ABS
	Threads	Nylon
	Shield	ABS / 316 SS
	Temperature Probe	316 SS
	O-rings	EPDM

Multi-function Sensor

- Quick sensor replacement
  - Sensor replacement is quick and easy with field replaceable, screw type connectors and are color coded for easy identification. These meters automatically recognize sensors

HI9828-25 Quick Calibration solution

or

Sensor Specifications		HI7698194-0	HI7698194-1	HI7698194-3
Description		pH sensor	pH/ORP sensor	EC sensor
Measurement Type		pH, mV (pH)	pH, mV (pH), ORP	EC
Measurement Range		0.00 to 13.00 pH ; ±600.0 mV	0.00 to 13.00 pH; ±600.0 mV; ±2000.0 mV	0.0 to 200.0 mS/cm; 0.0 to 400 mS/cm (absolute)
Temperature Range		-5 to 55°C	-5 to 55°C	-5 to 55°C
Color Code		red	red	blue
Materials	Tip	glass (pH)	glass (pH); Pt (ORP)	stainless steel electrodes AISI 316
	Glass Type	LT (low temperature)	LT (low temperature)	–
	Junction	ceramic	ceramic	–
	Body	PEI	PEI	ABS/epoxy
	Electrolyte	gel	gel	–
	Reference	double	double	–
Maintenance Solution		HI70300 (storage solution)	HI70300 (storage solution)	none
Dimensions		118 x 15 mm	118 x 15 mm	111 x 17 mm
Depth		20 m (65')	20 m (65')	20 m (65')

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Multiparameter

portable

Specifications		HI981954
pH / mV	Range	0.00 to 14.00 pH / ±600.0 mV
	Resolution	0.01 pH / 0.1 mV
	Accuracy	±0.02 pH / ±0.5 mV
	Calibration	automatic one, two, or three points with automatic recognition of five standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or one custom buffer
ORP	Range	±2000.0 mV
	Resolution	0.1 mV
	Accuracy	±1.0 mV
	Calibration	automatic at one custom point (relative mV)
EC	Range	0 to 200 mS/cm (absolute EC up to 400 mS/cm)
	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	automatic single point, with six standard solutions (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm) or custom point
TDS	Range	0.0 to 400.0 ppt (g/L) (the 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
Resistivity	Range	0 to 999999 Ω•cm; 0 to 1000.0 kΩ•cm; 0 to 1.0000 MΩ•cm
	Resolution	dependent on resistivity reading
	Calibration	based on conductivity or salinity calibration
Salinity	Range	0.00 to 70.00 PSU
	Resolution	0.01 PSU
	Accuracy	±2% of reading or ±0.01 PSU whichever is greater
	Calibration	based on conductivity calibration
Seawater σ	Range	0.0 to 50.0 σ_t, σ_0, σ_{15}
	Resolution	0.1 σ_t, σ_0, σ_{15}
	Accuracy	±1 σ_t, σ_0, σ_{15}
	Calibration	based on conductivity or salinity calibration
Temperature	Range	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K
	Resolution	0.01°C; 0.01°F; 0.01K
	Accuracy	±0.15°C; ±0.27°F; ±0.15K
	Calibration	automatic at one custom point
Additional Specifications	Temperature Compensation	automatic from -5 to 55°C (23 to 131°F)
	Logging Memory	45,000 records (continuous logging or log-on-demand of all parameters)
	Logging Interval	one second to three hours
	PC Connectivity	via USB (with Hanna PC software)
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Battery Type / Life	1.5V AA batteries (4) / approximately 360 hours of continuous use without backlight (50 hours with backlight)
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
Ordering Information		**HI981954** is supplied with HI7698195 multiparameter probe with 4m (13') cable, HI7698194-1 pH/ORP sensor, HI7698194-3 EC sensor, HI7698295 short protective probe shield, HI9828-20 quick calibration solution, HI76981952 probe maintenance kit, HI7698290 calibration beaker, HI9298194 PC software, HI920015 micro USB cable, batteries (4), quality certificate, and instruction manual in a rugged carrying case with custom insert.
Accessories		**HI710034** orange protective rubber boot

Multiparameter Waterproof Meter

pH, ORP, Dissolved Oxygen, Atmospheric Pressure and Temperature

pH Features

- Calibration
  - Up to a three-point calibration with five standard buffers and one custom buffer available

- pH in mV option
  - Useful for diagnostics

- GLP data
  - Offset, slope, date, time and buffers used

- Automatically temperature compensated readings

- pH or pH/ORP field replaceable sensors
  - Gel filled and maintenance free
  - Double junction for reduced contamination of reference cell

Dissolved Oxygen Features

- Choice of units
  - Display units in % saturation or ppm (mg/L)

- Salinity compensation for saline waters
  - Manual entry of salinity values
  - Readings compensated for salinity effects

- Built-in barometer
  - Automatic compensation for changes in atmospheric pressure
  - User selectable units

- Temperature compensation

- Polarization
  - Automatic polarization of probe at startup

- Membrane caps
  - Ready-to-use HDPE pre-tensioned membrane caps are easy to replace

The HI98196 is a waterproof portable logging multiparameter meter that monitors up to 6 different water quality parameters. It's multi-sensor probe allows for the measurement of key parameters including pH, ORP, conductivity, dissolved oxygen, and temperature. The probe transmits readings digitally to the meter, where data points can be displayed and logged. The complete system is simple to setup and easy to use.

- Optional shockproof silicon rubber boot
  - Specially designed to protect your instrument from damage or impact
  - **HI710034** Orange

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Backlit Graphic LCD Display

The HI98196 features a backlit graphic LCD with on-screen help and the capability to display up to twelve parameters simultaneously. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

Waterproof Protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1 m for up to 30 minutes. The probe features an IP68 rating for continuous immersion in water.

Quick Connect Digital Probe

The HI7698196 probe features a Quick Connect DIN connector that makes a waterproof connection with the meter.

Color Coded, Field Replaceable Sensors

Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor port identification.

Standard Calibration

Standard pH calibration options are available for calibrating up to three points from a selection of five standard buffers and one custom buffer. Dissolved oxygen calibration is up to two standard points or a single custom point.

Auto-sensor Recognition

The probe and meter automatically recognize the sensors that are connected. Any ports not used on the probe will not have the parameter displayed or be configurable.

Automatic Temperature Compensation

Integrated temperature sensor allows for automatic temperature compensation of pH and dissolved oxygen measurements.

Automatic Barometric Pressure Compensation

The meter features a built-in barometer with user-selectable units for dissolved oxygen pressure compensation.
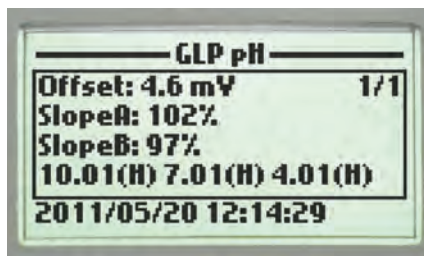
GLP Data

HI98196 includes a GLP feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data includes date, time, buffers/standards used for calibration, and slope characteristics.
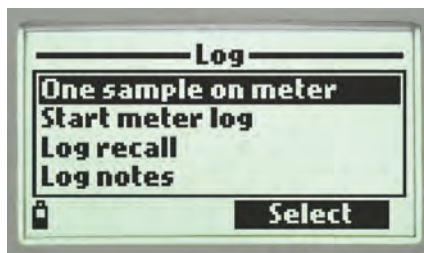
Data Logging

The HI98196 allows users to store up to 45,000 continuous or log-on-demand samples with logging intervals from one second to three hours.

Intuitive Keypad

The fitted rubber keypad has dedicated keys for power, backlight, up/down arrows, help and alphanumeric characters. The meter also features two virtual soft keys that navigate the user through the configuration of each parameter, meter setup, and logging of data. The interface is intuitive for any user's level of experience.
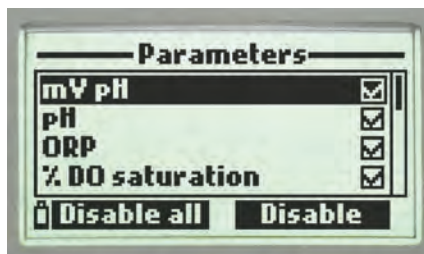
Setup

Extensive setup screen features
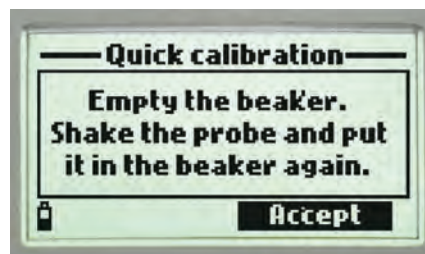
Dedicated Help Key

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

PC Connectivity

Logged data can be transferred to a Window's compatible PC with the included HI920015 micro USB cable and HI9298194 software.

Long Battery Life

The display of the meter has a battery icon indicator to show the remaining power. The meter uses four 1.5V AA batteries that provide up to 360 hours of battery life.

Rugged custom carrying case

The HI98196 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

Probe and Sensors

The HI7698196 is a multiparameter pH/DO/Temperature probe for use with the HI98196 portable meter. It features a Quick Connect DIN that makes a waterproof connection with the meter. Sensors are automatically recognized by the probe and meter when connected. Any ports not used on the probe will not have the parameter displayed on the meter. Sensor replacement is quick and easy with field replaceable, screw type connectors that are color coded for easy sensor identification. The probe features a multistrand-multiconductor shielded cable with 4m, 10m, 20m, and 40m lengths available. It's rugged, waterproof design makes it ideal for field use.

Specifications	HI7698196		
Sensor Inputs	two (pH or pH/ORP, DO)		
Sample Environment	fresh, brackish, seawater		
Waterproof Protection	IP68		
Operating Temperature	-5 to 55°C		
Storage Temperature	-20 to 70°C		
Maximum Depth	20 m (66')		
Dimensions (without cable)	342 mm (13.5"); 46 mm (1.8") dia		
Weight (without sensors)	570 g (20.1 oz.)		
Cable Specification	multistrand-multiconductor shielded cable with internal strength member rated for 68 kg (150 lb.) intermittent use		
Wetted Materials	Body	ABS	
	Threads	Nylon	
	Shield	ABS / 316 SS	
	Temperature Probe	316 SS	
	O-rings	EPDM	

Multi-function Sensor

- Quick sensor replacement
  - Sensor replacement is quick and easy with field replaceable, screw type connectors and are color coded for easy identification. These meters automatically recognize sensors

or

Sensor Specifications	HI7698194-0	HI7698194-1	HI7698194-2
Description	pH sensor	pH/ORP sensor	DO sensor
Measurement Type	pH, mV (pH)	pH, mV (pH), ORP	DO (% saturation and concentration)
Measurement Range	0.00 to 13.00 pH ; ±600.0 mV	0.00 to 13.00 pH; ±600.0 mV; ±2000.0 mV	0.0 to 500.0 %; 0.00 to 50.00 mg/L
Temperature Range	-5 to 55°C	-5 to 55°C	-5 to 55°C
Color Code	red	red	white
Materials — Tip	glass (pH)	glass (pH); Pt (ORP)	cat/an: Ag/Zn
Materials — Glass Type	LT (low temperature)	LT (low temperature)	–
Materials — Junction	ceramic	ceramic	membrane: HDPE
Materials — Body	PEI	PEI	white top ABS
Materials — Electrolyte	gel	gel	–
Materials — Reference	double	double	–
Maintenance Solution	HI70300 (storage solution)	HI70300 (storage solution)	HI7042S (DO electrolyte)
Dimensions	118 x 15 mm	118 x 15 mm	99 x 17 mm
Depth	20 m (65')	20 m (65')	20 m (65')

Specifications		HI98196
pH / mV	Range	0.00 to 14.00 pH / ±600.0 mV
	Resolution	0.01 pH / 0.1 mV
	Accuracy	±0.02 pH / ±0.5 mV
	Calibration	automatic up to three points with automatic recognition of five standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or one custom buffer
ORP	Range	±2000.0 mV
	Resolution	0.1 mV
	Accuracy	±1.0 mV
	Calibration	automatic at one custom point (relative mV)
Dissolved Oxygen	Range	0.0 to 500.0%; 0.00 to 50.00 ppm (mg/L)
	Resolution	0.1%; 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	automatic one or two points at 0, 100% or one custom point
Atmospheric Pressure	Range	450 to 850 mm Hg; 17.72 to 33.46 in Hg; 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 mm Hg; 0.01 in Hg; 0.1 mbar; 0.001 psi; 0.0001 atm; 0.01 kPa
	Accuracy	±3 mm Hg within ±15°C from the temperature during calibration
	Calibration	automatic at one custom point
Temperature	Range	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K
	Resolution	0.01°C; 0.01°F; 0.01K
	Accuracy	±0.15°C; ±0.27°F; ±0.15K
	Calibration	automatic at one custom point
Additional Specifications	Temperature Compensation	automatic from -5 to 55°C (23 to 131°F)
	Logging Memory	45,000 records (continuous logging or log-on-demand of all parameters)
	Logging Interval	one second to three hours
	PC Connectivity	via USB (with Hanna PC software)
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Battery Type / Life	1.5V AA batteries (4) / approximately 360 hours of continuous use without backlight (50 hours with backlight)
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
Ordering Information	All models are supplied with: HI7698194-1 pH/ORP sensor, HI7698194-2 DO sensor, HI7698295 short protective probe shield, HI9828-20 quick calibration solution, HI76981942 probe maintenance kit, HI7698290 calibration beaker, HI9298194 PC software, HI920015 micro USB cable, batteries (4), quality certificate, and instruction manual in a rugged carrying case with custom insert.	
	HI98196 is supplied with HI7698196 multiparameter probe with 4m (13') cable HI98196/10 is supplied with HI7698196/10 multiparameter probe with 10m (33') cable HI98196/20 is supplied with HI7698196/20 multiparameter probe with 20m (66') cable HI98196/40 is supplied with HI7698196/40 multiparameter probe with 40m (131') cable	
Accessories	HI710034 orange protective rubber boot	
	HI720194 spare thermoformed carrying case for HI98194, HI98195, and HI98196	

7

pH/EC/TDS/ Temperature Meters

- Simultaneous, pH, EC/TDS and temperature measurements on a large three-line LCD display;

- User-friendly Design
  - With only two buttons, meter operation could not be simpler. Two buttons allow you to quickly adjust settings, select the measurement range, and choose calibration buffer sets.

- Watertight Connection
  - A Quick Connect DIN connector makes attaching and removing the probe simple and easy. The rubber coating protects the cable and creates a sealed connection for added reliability.

- Probe Condition
  - An on-screen indicator provides visual confirmation that your probe is working at its best.

- Large LCD
  - A multilevel display provides at-a-glance readings of your most important numbers from any angle.

- Durable IP67 waterproofcCasing
  - Designed to withstand the knocks, drops, and spills of real life, the new IP67 body ensures top performance in any environment. These meters are totally protected against dust and water intrusion from any direction.

- On-screen calibration tags

- mV of pH measurement for electrode check

- Selectable temperature unit (°C or °F)

- Battery life indication and low battery detection

- Optional shockproof silicon rubber boot
  - Specially designed to protect your instrument from damage or impact

  HI710028 Orange
  HI710029 Blue

The HI991300 and HI991301 are light weight, portable pH, conductivity (or total dissolved solids) and temperature meters for portable applications requiring both a pH and conductivity (or TDS) measurement. Applications include measurements for greenhouses irrigation, hydroponics and groundwater monitoring from agriculture nutrient pollution.

The HI991300 and HI991301 meters feature 2 button operation and are simple to use. All operations and settings, including calibration buffers and temperature scale selections, are made through these 2 buttons. They have a waterproof and compact casing rated for IP67 conditions and a large Tri-line display. The meters have automatic pH calibration at one or two points and a single conductivity calibration. Other user selectable features include different TDS factors from 0.45 to 1.00, and a range of temperature coefficients (β) from 0.0 to 2.4% for better conductivity or TDS solution temperature compensation. These meters are supplied with a multi-parameter probe specifically designed for these meters. To increase conductivity accuracy, two meter models are available, with different conductivity ranges, for applications from purified to brackish waters.

The HI12883 multi-parameter probe, incorporates a domed shaped pH bulb rated from 0-13 pH, a single junction Ag/AgCl reference electrode with gelled electrolyte and a retractable cloth wick junction, a graphite EC/TDS cell, and a temperature sensor in one convenient, rugged polypropylene body. In addition, to ensure against interference from transient electrical noise to pH, a solidstate preamplifier is integrated into the probe. The probe is rated from 0 to 50°C.

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HI1288 amplified pH electrode

- 3 sensors in a single probe
- Pre-amplified pH electrode for resistance to electrical noise
- Extractable cloth junction to clear any clogging
- Graphite EC/TDS sensor

The HI991301 and HI991300 are supplied with an amplified polypropylene body pH/EC/TDS/temperature probe. The built in amplifier will reduce the effects of electrical noise on the high impedance pH measurement. Examples of sources of electrical noise include rectifiers, motors and ballasts.

The HI1288 pH electrode also features an extractable cloth junction. Every pH electrode has a junction. Many use a single ceramic frit which acts as a barrier between the inside reference cell to the outside sample. This barrier allows for a diffusion electrolyte that is necessary for the pH measurement. Any clogging of the junction will result in a reduced diffusion and as a result the readings will become erratic. Most probes will have to have this junction cleaned and if not possible then the probe has to be replaced. The extractable cloth junction of the HI1288 allows for the renewing of the junction. Simply extract ⅛" of the junction by pulling on the junction will expose a new portion. Any clogging that was present will be cleared and the response time will be back to normal extending the life of the pH electrode.

The EC/TDS sensor is made of graphite. A common problem with amperometric sensors is a polarization effect. With amperometric sensors there are two poles in which a voltage is alternated. The positive and negative ions in the solution migrate to one of the negative or positive poles. When the charges build up on one of these poles a polarization effect occurs. Having a conductivity sensor made of graphite reduces the polarization effect.

Specifications		HI991300	HI991301
pH	Range*	-2.00 to 16.00 pH / -2.0 to 16.0 pH	-2.00 to 16.00 pH / -2.0 to 16.0 pH
	Resolution	0.01 pH / 0.1 pH	0.01 pH / 0.1 pH
	Accuracy (@25°C/77°F)	±0.02 pH / ±0.1 pH	±0.02 pH / ±0.1 pH
	Calibration	automatic, 1 or 2 points choose between 2 sets of buffers (standard: 4.01; 7.01; 10.01 or NIST: 4.01; 6.86; 9.18)	automatic, 1 or 2 points choose between 2 sets of buffers (standard: 4.01; 7.01; 10.01 or NIST: 4.01; 6.86; 9.18)
pH-mV	Range	±825 mV	±825 mV
	Resolution	1 mV	1 mV
	Accuracy (@25°C/77°F)	±1 mV	±1 mV
EC	Range	0 to 3999 µS/cm**	0.00 to 20.00 mS/cm**
	Resolution	1 µS/cm	0.01 mS/cm
	Accuracy (@25°C/77°F)	±2% F.S.	±2% F.S.
TDS	Range	0 to 2000 ppm (mg/L)	0.00 to 10.00 ppt (g/L)
	Resolution	1 ppm (mg/L)	0.01 ppt (g/L)
	Accuracy (@25°C/77°F)	±2% F.S.	±2% F.S.
Temperature	Range*	-5.0 to 105.0°C / 23.0 to 221.0°F	-5.0 to 105.0°C / 23.0 to 221.0°F
	Resolution	0.1°C/0.1°F	0.1°C/0.1°F
	Accuracy (@25°C/77°F)	±0.5°C / ±1.0°F	±0.5°C / ±1.0°F
	EC/TDS Calibration	automatic, one point at: 1413 µS/cm or 1382 ppm (CONV=0.5) or 1500 ppm(CONV=0.7)	automatic, one point at: 12880 µS/cm or 6.44 ppt (CONV=0.5) or 9.02 ppt (CONV=0.7)
	pH Temp. Compensaiton	automatic	automatic
	EC/TDS Temperature Compenation	automatic with β selectable from 0.0-2.4%/°C with 0.1 increments	
	TDS Conversion Factor	selectable from 0.45 to 1.00 with 0.01 increments	
	Probe (included)	HI12883 pH/EC/TDS/temperature sensor, DIN connector and 1 m (3.3') cable	
	Battery Type/Life	1.5V AAA (3) /approx. 600 hours of continuous use	
	Auto-off	user selectable: after 8 min, 60 min or disabled	
	Environment	0 to 50°C (32 to 122°F); RH max. 100%	
	Meter Dimensions	154 x 63 x 30 mm (6.1 x 2.5 x 1.2")	
	Meter Mass (with batteries)	196 g (6.91 oz.)	
	Casing Ingress Protection Rating	IP67	
Ordering Information		**HI991300** is supplied with HI12883 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable, pH 4.01 and 7.01 buffer sachets, HI70031 1413 µS/cm and HI70032 1382 ppm calibration solution sachets, HI700601 Electrode cleaning solution sachets (2), 100 mL beaker, 1.5V AAA batteries (3), calibration certificate of meter, calibration certificate of probe, instruction manual and HI710142 rugged carrying case.	
		HI991301 is supplied with HI12883 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable, pH 4.01 and 7.01 buffer sachets, HI70030 12880 µS/cm and HI70038 6.44 ppt calibration solution sachets, HI700601 electrode cleaning solution sachets (2), 100 mL beaker, 1.5V AAA batteries (3), calibration certificate of meter, calibration certificate of probe, instruction manual and HI710142 rugged carrying case.	

* the pH range is limited from 0 to 13 pH and the temperature range from 0 to 50°C (32 to 122°F) using HI12883 probe
** displays µS for µS/cm
** displays mS for mS/cm

pH solutions begin on page 2.174; EC and TDS solutions begin on page 5.36;
See page7.58 for probe specifications

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GroLine®

HI9814

pH / EC / TDS / Temperature Meter

with Multiparameter Probe

- Simultaneous, pH, EC/TDS and temperature measurements on a large three-line LCD display;

- User-friendly Design
  - With only two buttons, meter operation could not be simpler. Two buttons allow you to quickly adjust settings, select the measurement range, and choose calibration buffer sets.

- Watertight Connection
  - A Quick Connect DIN connector makes attaching and removing the probe simple and easy. The rubber coating protects the cable and creates a sealed connection for added reliability.

- Probe Condition
  - An on-screen indicator provides visual confirmation that your probe is working at its best.

- Large LCD
  - A multilevel display provides at-a-glance readings of your most important numbers from any angle.

- Durable IP67 waterproof Casing
  - Designed to withstand the knocks, drops, and spills of real life, the new IP67 body ensures top performance in any environment. These meters are totally protected against dust and water intrusion from any direction.

- On-screen calibration tags

- mV of pH measurement for electrode check

- Selectable temperature unit (°C or °F)

- Battery life indication and low battery detection

HI9814 is a durable, portable pH, conductivity, total dissolved solids and temperature meter for most measurements encountered in hydroponics, aquaponics or general agriculture applications. All operations and settings, are made through only two buttons and the housing is waterproof and rated for IP67 conditions. User-selectable features include selectable TDS factors of 0.5 and 0.7 as well as auto-off after 8 minutes or 60 minutes to prolong battery life.

The supplied HI1285-7 multiparameter probe measures pH, EC/TDS, and temperature in one convenient, rugged probe.

- Calibrate pH and EC with one solution
  - The HI9814 offers a quick calibration feature that allows for calibration of both parameters with a single solution. Simply enter calibration mode and the meter will automatically detect and calibrate pH and EC sensors. EC calibration is automatically applied to TDS readings.

- Optional shockproof silicon rubber boot
  - Specially designed to protect your instrument from damage or impact

  HI710030 Green

HI1285-7 Multiparameter Probe

- 3 sensors in a single probe
- Gel filled maintenance free pH electrode
- Amplified pH electrode
- Polypropylene body
  - The polypropylene body houses all the sensors in a single body design and is durable. The probe is gel filled for maintenance free operation. It does not have to be refilled periodically.

The specially engineered HI1285-7 pH/EC/TDS/temperature probe utilizes a fiber junction and gel electrolyte which provides a fast response and reduced potential for contamination. These features make this probe ideal for use in fertilizer solutions.

A solid-state preamplifier is integrated into the probe to protect the pH measurement from transient electrical noise. Sources of electrical noise include ballasts used in lighting and pumps to circulate water and nutrient solutions.

The H1285-7 probe features a Quick Connect DIN connector that makes a waterproof connection with the meter.

Specifications		HI9814
pH	Range*	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	automatic, one or two-point calibration (using pH 4.01, 7.01, 10.01 buffers); one-point calibration using quick calibration solution
	Temperature Compensation	automatic
pH-mV	Range	±825 mV
	Resolution	1 mV
	Accuracy	±1 mV
EC	Range	0.00 to 6.00 mS/cm**
	Resolution	0.01 mS/cm
	Accuracy	±2% F.S.
	Calibration	automatic, one-point at 1.41 mS/cm or 5.00 mS/cm; one-point calibration using quick calibration solution
	Temperature Compensation	automatic, with β = 1.9%/°C
TDS	Range	0 to 3000 ppm (500 CF); 0 to 3999 ppm (700 CF)
	Resolution	10 ppm (mg/L)
	Accuracy	±2% F.S.
	Conversion Factor (CF)***	0.5 (500 ppm) or 0.7 (700 ppm)
Temperature	Range*	-5.0 to 105.0°C / 23.0 to 221.0°F
	Resolution	0.1°C/0.1°F
	Accuracy	±0.5°C /±1.0°F
Additional Specifications	Probe (included)	HI1285-7 pH/EC/TDS/temperature sensor, DIN connector and 1 m (3.3') cable
	Battery Type/Life	1.5V AAA (3) /approx. 500 hours of continuous use
	Auto-off	user selectable: after 8 min, 60 min or disabled
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Meter Dimensions	154 x 63 x 30 mm (6.1 x 2.5 x 1.2")
	Meter Mass (with batteries)	196 g (6.91 oz.)
	Casing Ingress Protection Rating	IP67
Ordering Information		**HI9814** is supplied with HI1285-7 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable, HI50036 Quick calibration solution sachets (3), HI700661 electrode cleaning solution sachets for agriculture (3), 100 mL beaker, 1.5V AAA batteries (3), calibration certificate of meter, calibration certificate of probe, instruction manual and rugged carrying case.
Accessories		green carrying case

HI12943 pH Electrode

HI9814 is also compatible with the HI12943 pH electrode.

* the pH range is limited from 0 to 13 pH and the temperature range from 0 to 50 °C (32 to 122 °F) using HI1285-7 probe.
** mS/cm is displayed as mS on the display.
*** TDS Conversion Factor: 1000 µS/cm = 500 ppm with 0.5 CF.

pH/EC/TDS/ Temperature Portable Meter

- Waterproof
- CAL Check™ (HI9813-61)
  - Allows the user to easily check the probe calibration status at any time.
- Variable EC to TDS conversion factor
  - Factor automatically adjusts from 0.56 to 0.78 based on actual EC readings
  - Factor based on 442 curve for natural water
- Automatic Temperature Compensation
  - All readings are compensated for variations in temperature
- Low Battery Indicator

The HI9813-61 and HI9813-51 portable meters feature a large LCD which displays either pH, EC, TDS or temperature readings along with tutorial instructions. The pH readings are displayed with a 0.1 resolution and an accuracy of ±0.1 pH while the EC and TDS readings are displayed with a 0.01 mS/cm and 1 ppm (mg/L) resolution and 2% full scale accuracy. The EC range of both meters is from 0.00 to 4.00 mS/cm and TDS is from 0 to 1999 ppm. The temperature correction coefficient (β) is fixed at 2 %/°C and allows for automatic temperature compensated measurements of EC and TDS. These meters are calibrated manually to a single point with the use of two trimmers. pH is calibrated to pH 7.01 while EC/TDS is calibrated to either 1.41 mS/cm (1413 µS/cm) or 1500 ppm. The LCD screen has battery life indicator as well as on-screen tutorial messages.

No probe changes are required when switching your measured parameter between pH, conductivity and TDS. These multiparameter meters reduce the number of instruments required for daily water quality analysis.

The supplied probe on both models feature a polypropylene body, amplified pH electrode with a built-in EC/TDS and temperature sensors. The amplifier for the pH electrode prevents interference from humidity and electrical noise from common sources including from motors, ballasts or pumps. The HI9813-61 and HI9813-51 are versatile meters for the agriculture, greenhouse and hydroponics industries.
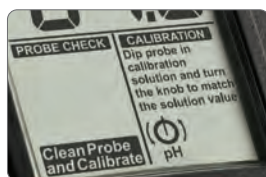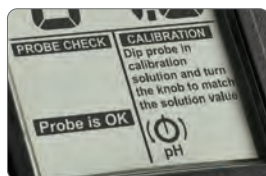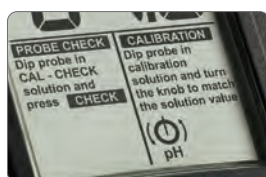
HI9813-61 CAL Check™ Feature

The HI9813-61's CAL Check feature alerts users if there is a problem with the pH electrode. This feature is important for customers that calibrate only to pH 7.0; if there is a fracture on the pH glass of the electrode, the pH meter will always display pH 7.0 regardless of the solution being measured. This can be disastrous for the person that calibrates at pH 7.0 and takes readings of samples with an expected pH of 7.0. The user will never be aware that there is a problem. Placing the HI1285-61 pH/EC electrode in HI50021 CAL Check solution and pressing the "Check" button helps users determine if the probe needs to be calibrated, cleaned or replaced. The meter runs CAL Check diagnostics and will display either "Probe is OK" or "Clean Probe and Calibrate". If the reading is around pH 4.0 when the probe is placed in the solution then the probe is broken and needs to be replaced.

HI1285 series probes

These meters are supplied with a polypropylene body pH/EC/TDS/temperature probe. The pH, EC, TDS, and temperature sensor are housed in a single body that connects to the meter with a DIN connector.

- 3 sensors in a single probe
- Amplified pH electrode
  · The pH electrode circuit has a built-in amplifier that will reduce the effects of electrical noise on the high impedance pH measurement. Examples of sources of electrical noise include motors, ballasts, and pumps which are common in greenhouses.
- Amperometric EC/TDS sensor
  · The EC/TDS readings are performed by an amperometric sensor. An alternating voltage is applied to the sensor and the amount of current that passes between the two stainless steel pins is dependent upon the amount of salts (fertilizer) present. A greater amount of salt present results in an increase in conductance.
- Polypropylene body
  · The polypropylene body houses all the sensors in a single body design and is durable. The probe is gel filled for maintenance free operation. It does not have to be refilled periodically.

Specifications		HI9813-51	HI9813-61 (with CAL Check)
pH	Range	0.0 to 14.0 pH	0.0 to 14.0 pH
	Resolution	0.1 pH	0.1 pH
	Accuracy	±0.1 pH	±0.1 pH
EC	Range	0.00 to 4.00 mS/cm	0.00 to 4.00 mS/cm
	Resolution	0.01 mS/cm	0.01 mS/cm
	Accuracy	±2% F.S.	±2% F.S.
TDS	Range	0 to 1999 ppm (mg/L)	0 to 1999 ppm (mg/L)
	Resolution	1 ppm (mg/L)	1 ppm (mg/L)
	Accuracy	±2% F.S.	±2% F.S.
Temperature	Range	0.0 to 60.0°C	0.0 to 60.0°C
	Resolution	0.1°C	0.1°C
	Accuracy	±0.5°C	±0.5°C
Additional Specifications	TDS Conversion Factor	0.56 to 0.78 ppm = 1 µS/cm (according to TDS 442 curve)	0.56 to 0.78 ppm = 1 µS/cm (according to TDS 442 curve)
	pH & EC/TDS Calibration	manual, one point (all parameters except temperature)	manual, one point (all parameters except temperature)
	Temp. Compensation	automatic 0 to 70°C (32 to 158°F) with β=2%/°C (EC/TDS only)	automatic 0 to 70°C (32 to 158°F) with β=2%/°C (EC/TDS only)
	Probe	HI1285-51 polypropylene body, pre-amplified multiparameter probe with internal temperature sensor, 8-pin DIN connector and 1 m (3.3') cable (included)	HI1285-61 polypropylene body, pre-amplified multiparameter probe with CAL Check compatibilty, internal temperature sensor, 8-pin DIN connector and 1 m (3.3') cable (included)
	Battery Type / Life	9V / approximately 450 hours of continuous use	
	Environment	0 to 50°C (32 to 122°F); RH max 100%	
	Dimensions	145 x 80 x 36 mm (5.7 x 3.1 x 1.4")	
	Weight	230 g (8.1 oz.)	
Ordering Information		**HI9813-51** is supplied with HI1285-51 multiparameter probe, HI70007 pH 7.01 calibration solution sachet, HI70442 1500 ppm (mg/L) calibration solution sachet, HI70031 1413 µS/cm calibration solution sachet, HI700661 electrode cleaning solution sachets (2), battery and instructions. **HI9813-61** is supplied with HI1285-61 multiparameter probe, HI70007 pH 7.01 calibration solution sachet, HI70442 1500 ppm (mg/L) calibration solution sachet, HI70031 1413 µS/cm calibration solution sachet, HI50021 calibration check solution sachets (2), HI700661 electrode cleaning solution sachets (2), 9v battery (1), instructions and rugged carrying case.	
Accessories		**HI50021P** CAL Check solution sachets for HI9813-6, 20mL (25)	
		HI710007 blue shockproof rubber boot	
		HI710008 orange shockproof rubber boot	
		HI7209811 spare carrying case for HI981X-X series	

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pH/EC/TDS/ Temperature Portable Meters

- Waterproof
- Automatic Temperature Compensation
  · All readings are compensated for variations in temperature
- Low battery indicator

HI9810-61 is a pH/EC/TDS meter designed to measure pH, µS/cm, mg/L and temperature in hydroponics, greenhouse, farming and ground water applications. HI9810-6 features Cal Check™, which allows the user to easily check the probe calibration status at any time.

The HI9812-51 and HI9811-51 are pH/EC/ TDS meters for agriculture, greenhouse and hydroponics applications.

These meters feature a large LCD which displays either pH, EC, TDS or temperature readings along with tutorial instructions. The pH readings are displayed with a 0.1 resolution and an accuracy of +/-0.1 pH while the EC and TDS readings are displayed with a 10 mS/cm and 10 ppm (mg/L) resolution and 2% full scale accuracy. The temperature correction coefficient (β) is fixed at 2 %/°C and allows for automatic temperature compensated measurements of EC and TDS. These meters are calibrated manually to a single point with the use of two trimmers. pH is calibrated to pH 7.01 while EC/TDS is calibrated to either 1.41 mS/cm (1413 µS/cm) or 1500 ppm. The LCD screen has battery life indicator as well as on-screen tutorial messages.

No probe changes are required when switching your measured parameter between pH, conductivity and TDS. These multiparameter meters reduce the number of instruments required for daily water quality analysis.

The supplied probe on all models feature a polypropylene body, amplified pH electrode with a built-in EC/TDS and temperature sensors. The amplifier for the pH electrode prevents interference from humidity and electrical noise from common sources including from motors, ballasts or pumps.

Multiparameter

portable

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HI1285-51 and HI1285-61 probes

HI9811-51 and HI9812-51 are supplied with the HI1285-51 pH/EC/TDS/temperature probe. The HI9810-61 is supplied with the HI1285-61 pH/EC/TDS/temperature probe with CAL Check. The pH, EC, TDS, and temperature sensor are housed in a single body that connects to the meter with a DIN connector.

- **Amplified pH electrode**
  - The pH electrode circuit has a built in amplifier that will reduce the effects of electrical noise on the high impedance pH measurement. Examples of sources of electrical noise include motors, ballasts, and pumps which are common in greenhouses.

- **Amperometric EC/TDS sensor**
  - The EC/TDS readings are performed by an amperometric sensor. An alternating voltage is applied to the sensor and the amount of current that passes between the two stainless steel pins is dependent upon the amount of salts (fertilizer) present. A greater amount of salt present results in an increase in conductance.

- **Polypropylene body**
  - The polypropylene body houses all the sensors in a single body design and is durable. The probe is gel filled for maintenance free operation. It does not have to be refilled periodically.

- **3 sensors in a single probe**

- **Gel filled maintenance free pH electrode**

Specifications		HI9810-61	HI9811-51	HI9812-51
pH	Range	0.0 to 14.0 pH	0.0 to 14.0 pH	0.0 to 14.0 pH
	Resolution	0.1 pH	0.1 pH	0.1 pH
	Accuracy	±0.1 pH	±0.1 pH	±0.1 pH
EC	Range	0 to 6000 µS/cm	0 to 6000 µS/cm	0 to 1990 µS/cm
	Resolution	10 µS/cm	10 µS/cm	10 µS/cm
	Accuracy	±2% F.S.	±2% F.S.	±2% F.S.
TDS	Range	0 to 3000 ppm (mg/L)	0 to 3000 ppm (mg/L)	0 to 1990 ppm (mg/L)
	Resolution	10 ppm (mg/L)	10 ppm (mg/L)	10 ppm (mg/L)
	Accuracy	±2% F.S.	±2% F.S.	±2% F.S.
Temperature	Range	0 to 70°C	0 to 70°C	0 to 60°C
	Resolution	0.1°C	0.1°C	10°C
	Accuracy	±0.5°C	±0.5°C	±1°C
Additional Specifications	TDS Conversion Factor	0.5 ppm (mg/L) = 1 µS/cm	0.5 ppm (mg/L) = 1 µS/cm	
	pH Calibration	manual, 1-point through offset trimmer		
	EC/TDS Calibration	manual, 1-point through slope trimmer		
	EC/TDS Temperature Compensation	automatic from 0 to 70°C (32 to 158°F) with β = 2% /°C		
	Probe (included)	HI1285-61 polypropylene body, pre-amplified multiparameter probe with CAL Check, internal temperature sensor, 8-pin DIN connector and 1 m (3.3') cable	HI1285-51 polypropylene body, pre-amplified multiparameter probe with internal temperature sensor, 8-pin DIN connector and 1 m (3.3') cable	
	Battery Type / Life	9V / approximately 450 hours of continuous use		
	Environment	0 to 50°C (32 to 122°F); RH max 100%		
	Dimensions	145 x 80 x 36 mm (5.7 x 3.1 x 1.4")		
	Weight	230 g (8.1 oz.)		
Ordering Information		**HI9810-61** is supplied with HI1285-61 multiparameter probe with CAL Check, HI70007 pH 7.01 calibration solution sachet, HI70032 1382 ppm (mg/L) calibration solution sachet, HI70031 1413 µS/cm calibration solution sachet, HI700661 electrode cleaning solution sachets (2), 9v battery (1), instructions and rugged carrying case.		
		HI9811-51 and **HI9812-51** are supplied with HI1285-51 multiparameter probe, HI70007 pH 7.01 calibration solution sachet, HI70032 1382 ppm (mg/L) calibration solution sachet, HI70031 1413 µS/cm calibration solution sachet, HI700661 electrode cleaning solution sachets (2), 9v battery (1), instructions and rugged carrying case.		
Accessories		**HI710007** blue shockproof rubber boot		
		HI710008 orange shockproof rubber boot		
		HI7209811 spare carrying case for HI981X-X series		

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Replacement Probes

Code	HI1285-7	HI1285-61	HI1285-51	HI12883
Description	pre-amplified pH and EC probe	pre-amplified pH and EC probe	pre-amplified pH and EC probe	pre-amplified pH and EC probe
Reference	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl	single, Ag/AgCl
Junction / Flow Rate	cloth	cloth	cloth	cloth
Electrolyte	gel	gel	gel	gel
Max Pressure	0.1 bar	0.1 bar	0.1 bar	1 bar
Range	pH: 0 to 13 / EC T: 0 to 50°C (32 to 122°F) - LT	pH: 0 to 13 / EC T: 0 to 50°C (32 to 122°F) - LT	pH: 0 to 13 / EC T: 0 to 50°C (32 to 122°F) - LT	pH: 0 to 13 / EC T: 0 to 50°C (32 to 122°F) - LT
Tip /Shape	spheric (dia: 8.0 mm)	spheric (dia: 8.0 mm)	spheric (dia: 8.0 mm)	spheric (dia: 8.5 mm)
Glass Type	LT (low temperature)	LT (low temperature)	LT (low temperature)	LT (low temperature)
Temperature Sensor	yes	yes	yes	yes
Amplifier	yes	yes	yes	yes
Body Material	polypropylene	polypropylene	polypropylene	polypropylene
Cable	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	greenhouses, hydroponics	greenhouses, hydroponics, environmental monitoring, water treatment, boilers, cooling towers	greenhouses, hydroponics, environmental monitoring, water treatment, boilers, cooling towers	general purpose, water treatment, agriculture, boilers, cooling towers
Plug	Quick Connect DIN To be used with HI9814	DIN with CAL Check™ To be used with HI9813-61 and HI9810-61	DIN To be used with HI9811-51, HI9812-51 and HI9813-51	Quick Connect DIN To be used with HI991300 and HI991301

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