Analytical Testing for the Dairy Industry

Test crucial parameters in milk, yogurt and cheese processes

hannainst.com

HANNA® instruments

Contents

Spectrophotometer

iris portable spectrophotometer is unlike any of the products we have created in the past. It is different from our photometers as it allows for measurement in the spectrum of all wavelengths of visible light and not just pre-specified wavelengths. Spectrophotometers work by isolating light at specific wavelengths from white light. This compact meter incorporates a number of features that facilitate both fantastic performance and exceptional usability.

- Advanced split beam optical system
- Rechargeable Li-ion battery
- User customizable methods
- Step-by-step method creation
- Capacitive touchpad
- Advanced split-beam optical system
- Intuitive menu design
- Universal cuvette holder

Step-by-step method creation

The HI801 guides you step-by-step through the process of creating your own custom method. The user interface will guide you through naming your method, setting the measurement wavelengths, creating reaction timers, and calibrating the method.

Favorite methods feature

Always have your most frequently used methods readily available.

Pre-programmed methods

85 commonly used methods for chemical analysis are pre-programmed.

User methods

Program up to 100 personal methods that can include up to 10 calibration points, 5 different wavelengths (which can be used simultaneously), and 5 reaction timers.

Data logging and transfer

Store up to 9999 measurements. Data can be transferred as a CSV or PDF file.

Spectral range

The meter features a spectral range of 340nm to 900nm allowing for a wide selection of analytical methods.

Battery operated

The HI801's rechargeable lithium ion battery lasts for approximately 3,000 measurements.


HANNA
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IRON LR
iris

Dairy Analysis

Acetaldehyde	Citric Acid	Lactulose
L-Arabinose	D-Galactose	Protein-Reducing Substances
L-Ascorbic Acid	D-Glucose	pH
Calcium	D-Fructose	Phosphatase (Residual)
Chloride	L-Lactic Acid	D-Sorbitol
Chlorine	Lactose	Urea/Ammonia

In addition to these critical parameters for dairy, iris is pre-programmed with 85 different tests.

General Specifications	HI801 iris
Measurement Mode	transmittance (%), absorbance and concentration
Wavelength Range	340-900 nm
Wavelength Resolution	1 nm
Wavelength Accuracy	±1.5 nm
Photometric Range	0.000-3.000 Abs
Photometric Accuracy	5 mAbs at 0.000-0.500 Abs; 1% at 0.500-3.000 Abs
Wavelength Selection	automatic, based on the selected method (editable for user methods only)
Wavelength Calibration	internal, automatic at power-on with visual feedback
Light Source	tungsten halogen lamp
Optical System	split beam
Stray Light	<0.1 % T at 340 nm with $NaNO_2$
Spectral Bandwidth	5 nm
Number of Methods	150 Factory / 100 User
Sample Cell	10 mm square, 50 mm rectangular, 16 mm round, 22 mm round, 13 mm round (vial)
Data Points Stored	9999 measured values
Export Capability	csv file format, pdf file format
Connectivity	1x USB A (mass storage host); 1x USB B (mass storage device)
Battery Life	3000 measurements or 8 hours
Power Supply	15 VDC power adapter; 10.8 VDC Li-Ion rechargeable battery
Ordering Information	**HI801-01** (115V) and **HI801-02** (230V) is supplied with sample cuvettes and Caps (22 mm, 4 pcs.), cloth for wiping cuvettes, scissors, USB cable, USB flash drive, 15 VDC power adapter, instruction manual and instrument quality certificate.

Hanna Lab App

Available on iOS
and Android

Take pH and temperature measurements using your smart phone or tablet.

Hanna HALO Bluetooth® pH meter is designed to help anyone get high quality pH and temperature results quickly and consistently.

- All of your results, all of the time.
  - Your Hanna pH lab app collects all of your pH and temperature data.
- Highlight your most important results.
  - Push button logging highlights your data of interest and can be noted for future reference and comparison.
- Sort and share your data.
  - Group your data by time or notation. Email it for storage or share it with friends or colleagues.
- One press connect
  - At the press of a button connect to the Hanna Lab App via Bluetooth® wireless technology (10 m range (33')).

FC2022 HALO®

The FC2022 HALO is an innovative, application specific pH electrode with Bluetooth® Smart technology designed for food processing companies that need to monitor the pH of their product for quality and compliance.

- Conic bulb
  - Easy penetration into soft solids and semi-solids
- Low temperature glass
  - Fast and accurate measurement of refrigerated products
- Open junction
  - Resists clogging and provides fast response time
- Gel-filled reference
  - Maintenance free with no fill solutions required
- Built-in temperature sensor
  - High accuracy temperature compensated measurements

Conic Bulb

The conical shaped tip design allows for the easy penetration of the sensor into soft solids and semi-solids such as cheeses, yogurt, meats, and sauces. It doesn't trap foods and is very easy to wipe clean.

Low Temperature Glass

The glass tip is made with Low Temperature (LT) glass formulation that has a lower resistance than standard glass types used with ordinary pH electrodes. This is beneficial since many food products are stored at low temperatures. FC2022 HALO is suitable to be used for measurements between 0 to 10°C (32 to 50°F).

Specifications	FC2022 HALO
Measurement Range	0.00 to 12.00 pH
Reference Cell Type	double, Ag/AgCl
Junction Type	open
Electrolyte	Viscolene
Body Material	PVDF
Temperature Sensor	integrated
Battery Type/Life	CR2032 3V lithium ion / approximately 500 hours
Ordering Information	**FC2022** (HALO) is supplied with storage solution, cleaning solution, pH 7.01 buffer solution, pH 4.01 buffer solution, CR2032 3V Li-ion battery, quality certificate and instruction sheet.

WIRELESS

To be used in conjunction with the Hanna Lab App for compatible smart devices or edge®blu.

Hanna Lab App

Available on iOS and Android

pH	mV	T (°C)	Date
5.52	83.4	23.6	1/16/17, 3:10:01 PM
5.52	83.3	23.6	1/16/17, 3:10:02 PM
5.52	83.4	23.6	1/16/17, 3:10:03 PM
5.52	83.4	23.6	1/16/17, 3:10:04 PM
5.52	83.5	23.6	1/16/17, 3:10:05 PM
5.52	83.5	23.6	1/16/17, 3:10:06 PM
5.52	83.5	23.6	1/16/17, 3:10:07 PM
5.52	83.5	23.6	1/16/17, 3:10:08 PM
5.52	83.5	23.6	1/16/17, 3:10:09 PM
5.52	83.5	23.6	1/16/17, 3:10:10 PM
5.52	83.5	23.6	1/16/17, 3:10:11 PM
5.52	83.5	23.6	1/16/17, 3:10:12 PM
5.52	83.5	23.6	1/16/17, 3:10:13 PM
5.52	83.5	23.6	1/16/17, 3:10:14 PM
5.52	83.5	23.6	1/16/17, 3:10:15 PM
5.52	83.5	23.6	1/16/17, 3:10:16 PM
5.52	83.5	23.6	1/16/17, 3:10:17 PM

- **Measure like a pro**
  - Your smart device is now a professional grade pH meter wherever and whenever you need it.
- **Real-time data**
  - Displays updated pH and temperature every second

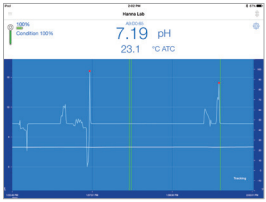
The first app that turns a smart phone or tablet into a full-featured pH meter.

The Hanna Lab App turns a compatible smart phone or tablet into a full-featured pH meter when used with HALO®. Functions include calibration, measurement, data logging, graphing, GLP, and data sharing. Measurement and logging of pH and temperature at one second intervals start as soon as the probe is connected. Measurements can be displayed alone, with tabulated data or as a graph. The graph can be panned and zoomed with pinch-to-zoom technology.

Views

- Just the Essentials
  - Basic view provides measurement information in a clean, straightforward manner.

- All Information on Display
  - Table view is able to display measurement, time and date, annotations, and alarm status in a continuously updated table.



- Fluid, Dynamic Graphing
  - Graph view provides measurement information linearly. Graph axes may be expanded using pinch-to-zoom technology for enhanced viewing

Hanna Lab App Specifications*	
Range**	-2.000 to 16.000 pH; ±800 mV; -20.0 to 120.0°C (-4.0 to 248.0°F)
Resolution	0.1; 0.01; 0.001 pH; 1; 0.1 mV; 0.1°C (0.1°F)
Accuracy (@25°C/77°F)	±0.005 pH; ±0.3 mV; ±0.5°C (±1.0°F)
Calibration Points	up to five-point calibration with seven standard buffers (1.68, 3.00 (HI10482 only) or 4.01, 6.86, 7.01, 9.18, 10.01, 12.45 pH)
Temperature Compensation**	automatic from -5.0 to 100.0 °C – 23.0 to 212.0 °F
Compatibility/System Requirements	see www.hannainst.com for latest compatibility requirements
Download Information	Download on the App Store · ANDROID APP ON Google Play

*HALO™ required for measurement use.
** Limits will be reduced to actual probe/sensor limits.

Laboratory Research Grade Benchtop pH/ mV Meter with 0.001 pH Resolution

The HI5221 is an advanced research grade benchtop pH/mV meter that is completely customizable with a large color LCD, capacitive touch keys, and USB port for computer connectivity. The HI5221 is rich in features including five-point calibration, selectable resolution, data logging, alarm limits, comprehensive GLP, automatic temperature compensation, and much more. This meter retains simplicity with both dedicated keys for routine operation and virtual keys that guide the user through setup options.

- Highly customizable user interface
  - The user interface can display measurements in various modes: basic measurement with or without GLP information, real-time graphing, and logging data.
- Capacitive touch
  - Sensitive capacitive touch buttons ensures the buttons cannot be clogged with sample residue.
- Color graphic LCD
  - The display allows for real-time graphing and the use of virtual keys provide for an intuitive user interface.
- 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.

- GLP data
  - View calibration data and calibration expiration information at the touch of a key. Calibration data include date, time, buffers /standards used for calibration and slope characteristics. The offset is also displayed for pH electrodes.
- 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.
- Data logging
  - Three selectable logging modes are available on the HI5221: 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).

B BNC

HI5221 includes HI1131B pH electrode and is also compatible with all pH electrodes that use BNC connectors.

Specifications		HI5221
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
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
Ordering Information	**HI5221-01** (115V) and **HI5221-02** (230V) are supplied with HI1131B pH electrode, HI7662-T temperature probe, pH 4.01 buffer solution sachet (2), pH 7.01 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.	

* Limits will be reduced to actual sensor limits

edge® pH

edge pH

Innovation dedicated to a single parameter

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

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

Portable field unit

Wall-mount cradle

Electrode holder with built-in cradle

- Capacitive touch keypad
  - edge®pH features sensitive capacitive touch buttons that cannot get clogged with sample residue.
- Rechargeable battery
  - edge pH features a built-in rechargeable battery that can be charged through the micro USB port, benchtop cradle, or wall-mount cradle.

- Two USB ports
  - edge pH includes one standard USB for data export and one micro USB port for data export to your computer as well as for charging when the cradle is not available.

d DIGITAL

HI2002 includes 11310 pH electrode.

- Data logging
  - edge pH allows you to store up to 1000 log records of data. 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.
- CAL Check™
  - CAL Check 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.
- Digital electrodes
  - edge pH measures pH 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.

Specifications		HI2002
pH	Range*	-2.00 to 16.00 pH; -2.000 to 16.000 pH†
	Resolution	0.01 pH; 0.001 pH†
	Accuracy (@25°C/77°F)	±0.01 pH; ±0.002 pH†
	Calibration	automatic, up to three points (five points†) calibration, 5 standard (7 standard†) buffers available (1.68†, 4.01 or 3.00, 6.86, 7.01, 9.18, 10.01, 12.45†) and two custom buffers†
mV pH	Range	±1000 mV
	Resolution	0.1 mV
	Accuracy (@25°C/77°F)	±0.2 mV
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
Ordering Information	**HI2002-01** (115V) and **HI2002-02** (230V) pH kit includes: HI11310 glass body, refillable pH electrode with temperature sensor, pH 4 buffer solution sachets (4), pH 7 buffer solution sachets (2), pH 10 buffer solution sachets (2), and electrode cleaning solution sachets (2), benchtop docking station with electrode holder, wall-mount cradle, USB cable, 5 VDC power adapter, quality certificates and instruction manual.	

* limits will be reduced to actual probe limits
† standard mode only

pH / Temperature Meter for Food

The HI98161 is a rugged, waterproof, portable pH meter that measures pH and temperature using the specialized FC2023 Foodcare pH electrode. This pH meter meets the FDA Food Safety Modernization Act (FSMA) compliance standards.

- Ergonomic, rugged, waterproof (IP67) design
- Backlit, graphic LCD
- CAL Check™ to alert users to problems during calibration including dirty/ broken electrode, contaminated buffer and overall probe condition
- Automatic or manual temperature compensation
- 200 hour battery life with battery level displayed on measurement screen
- Log-on-demand up to 200 samples (100 pH and 100 mV range)
- Auto hold to automatically hold the first stable reading on the display
- Calibration timeout to alert the user at a defined interval when the calibration has expired
- PC connectivity via a sealed opto-isolated micro USB and HI92000 software
- GLP to provide data from previous calibration to ensure Good Laboratory Practices are met
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, PC software and connection cable, instruction manual, quick start guide, and batteries in a rugged, custom carrying case

QUICK DIN

HI98161 includes FC2023 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC2023 pH / temperature probe for food

Food products can provide a number of challenges for the person that needs to measure pH. Food products tend to be solid, semi-solid or as a slurry with a high content of solids. All three types of samples will coat the sensitive glass membrane surface and/or clog the reference junction. The FC2023 that is supplied with the HI98161 is designed specifically for measuring pH in food. From a conic tip shape for easy penetration, open junction that resist clogging, and a Polyvinylidene fluoride (PVDF) food grade plastic body that is resistant to most chemicals and solvents, including sodium hypochlorite. It has high abrasion resistance, mechanical strength and resistance to ultraviolet and nuclear radiation. PVDF is also resistant to fungal growth. The FC2023 is an ideal general-purpose pH electrode for food products that connects to the HI98161 with a quick-connect, waterproof DIN connector, allowing for a secure, non-threaded attachment.

Conical Glass Tip

The conical shaped tip design allows for penetration into solids, semi-solids, and emulsions for the direct measurement of pH in food products including meat, cheese, yogurt, and milk.

PVDF body

Polyvinylidene fluoride (PVDF) is a food grade plastic that is resistant to most chemicals and solvents, including sodium hypochlorite. It has high abrasion resistance, mechanical strength and resistance to ultraviolet and nuclear radiation. PVDF is also resistant to fungal growth.

Specifications		HI98161
pH*	Range	-2.0 to 20.0 pH; -2.00 to 20.00 pH; -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
	Calibration	up to five-point calibration, seven standard buffers available (1.68, 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)
mV	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	±0.2 mV
	Relative mV Offset Range	±2000 mV
Temperature*	Range	-20.0 to 120.0 °C (-4.0 to 248.0°F)
	Resolution	0.1°C (0.1°F)
	Accuracy	±0.4°C (±0.8°F) (excluding probe error)
Ordering Information	**HI98161** is supplied with FC2023 pH electrode, HI7004M pH 4.01 buffer solution (230 mL), HI7007M pH 7.01 buffer solution (230 mL), HI700641 electrode cleaning solution sachet for dairy deposits (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 a rugged carrying case with custom insert.	

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

pH in Milk

The measurement of pH in milk is important in testing for impurities, spoilage, and signs of mastitis infection. While there are a number of factors that affect the composition of milk, pH measurements can help producers understand what might be causing certain compositional changes. pH measurement is commonly performed at various points in a milk processing plant.

Fresh milk has a pH value of 6.7. When the pH value of the milk falls below pH 6.7, it typically indicates spoilage by bacterial degradation. Bacteria from the family of Lactobacillaceae are lactic acid bacteria (LAB) responsible for the breakdown of the lactose in milk to form lactic acid. Eventually when the milk reaches an acidic enough pH, coagulation or curdling will occur along with the characteristic smell and taste of "sour" milk.

Milk with pH values higher than pH 6.7 potentially indicate that the milk may have come from cows with a mastitis infection. Mastitis is an ever-present challenge with dairy milking cows. When infected, the cow's immune system releases histamine and other compounds in response to the infection. There is a resulting increase in permeability of endothelial and epithelial cell layers, allowing blood components to pass through a paracellular pathway. Since blood plasma is slightly alkaline, the resulting pH of milk will be higher than normal. Typically milk producers can perform a somatic cell count to detect a mastitis infection, but a pH measurement offers a quick way to screen for infection.

Understanding the pH of raw milk can also help producers optimize their processing techniques. For example, in operations that use Ultra High Temperature (UHT) processing, even small variations from pH 6.7 can affect the time required for pasteurization and the stability of the milk after treatment.

Measuring the pH of milk can provide a number of challenges. Milk products tend to have a high solids content that will coat the sensitive glass membrane surface and/or clog the reference junction. The FC1013 supplied with the HI98162 is specifically designed for measuring pH in milk. The Polyvinylidene fluoride (PVDF) body is a food grade plastic that is resistant to most chemicals and solvents, including sodium hypochlorite. It has high abrasion resistance, mechanical strength and resistance to ultraviolet and nuclear radiation. PVDF is also resistant to fungal growth. The FC1013 is an ideal general-purpose pH electrode for milk products that connects to the HI98162 with a quick-connect, waterproof DIN connector, allowing for a secure, non-threaded attachment.

pH / Temperature Meter for Milk

The HI98162 is a rugged, waterproof, Foodcare portable pH meter that measures pH and temperature using the specialized FC1013 probe for milk products. This pH meter meets the FDA Food Safety Modernization Act (FSMA) compliance standards.

- Ergonomic, rugged, waterproof (IP67) design
- Backlit, graphic LCD
- CAL Check™ to alert users to problems during calibration including dirty/ broken electrode, contaminated buffer and overall probe condition
- Automatic or manual temperature compensation
- 200 hour battery life with battery level displayed on measurement screen
- Log-on-demand up to 200 samples (100 pH and 100 mV range)
- Auto hold to automatically hold the first stable reading on the display
- Calibration timeout to alert the user at a defined interval when the calibration has expired
- PC connectivity via a sealed opto-isolated micro USB and HI92000 software
- GLP to provide data from previous calibration to ensure Good Laboratory Practices are met
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, PC software and connection cable, instruction manual, quick start guide, and batteries in a rugged, custom carrying case

QUICK DIN

HI98162 includes FC1013 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC1013 pH / temperature probe for milk

The HI98162 uses the FC1013 amplified pH electrode with PVDF body. This specialized electrode offers numerous features that improve pH testing for milk producers. An integrated temperature sensor allows for temperature compensated pH measurements without the need for a separate temperature probe. The contact between the bulb's large surface area and the milk sample ensures a stable calibration and measurement.

An integral part of any pH electrode is the reference junction. The reference junction is a part of the electrode that allows for the flow of ions located in the reference cell into the sample being tested. It is vital that this flow occurs in order to complete an electrical circuit, which ultimately determines the pH value. Any clogging of the junction will prevent completion of the circuit, resulting in readings that are erratic or constantly drifting.

This probe utilizes a secondary reference chamber with ceramic outer junction allowing aqueous silver free electrolyte to flow slowly through the porous ceramic frit providing accurate readings for aqueous samples.

PVDF body

The durable PVDF body of the FC1013 ensures pH measurements can be safely taken on the dairy farm or production floor. The components of the electrode are also able to withstand a wider range of temperatures to allow for accuracy during stages such as pasteurization, which requires heating to temperatures near 72°C (161°F).

Specifications		HI98162
pH*	Range	-2.0 to 20.0 pH; -2.00 to 20.00 pH; -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
	Calibration	up to five-point calibration, seven standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) and five custom buffers
mV	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	±0.2 mV
	Relative mV Offset Range	±2000 mV
Temperature*	Range	-20.0 to 120.0 °C (-4.0 to 248.0°F)
	Resolution	0.1°C (0.1°F)
	Accuracy	±0.4°C (±0.8°F) (excluding probe error)
Ordering Information	**HI98162** is supplied with FC1013 pH electrode, HI7004M pH 4.01 buffer solution (230 mL), HI7007M pH 7.01 buffer solution (230 mL), HI700640 electrode cleaning solution sachet for milk deposits (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 a rugged carrying case with custom insert.	

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

pH / Temperature Meter for Milk

The Hanna Instruments HI99162 is a durable, waterproof, and portable Foodcare pH and temperature meter designed specifically for milk analysis.

- Ergonomic, rugged, waterproof (IP67) design
- Quick Connect probe
- Multi-level LCD display with probe condition indicator
- Automatic Temperature Compensation (ATC)
- Automatic one or two-point pH calibration
- Calibration tags displayed on-screen
- Stability indicator for accurate data recording
- 1400 hour battery life
- Battery life indication and low battery detection
- Adjustable auto-off
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, instruction manual, and batteries in a rugged, custom carrying case

QUICK DIN

HI99162 includes FC1013 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC101D pH / temperature probe for milk

The HI99162 uses the FC1013 amplified pH electrode with PVDF body. This specialized electrode offers numerous features that improve pH testing for milk producers. An integrated temperature sensor allows for temperature compensated pH measurements without the need for a separate temperature probe. The contact between the bulb's large surface area and the milk sample ensures a stable calibration and measurement.

An integral part of any pH electrode is the reference junction. The reference junction is a part of the electrode that allows for the flow of ions located in the reference cell into the sample being tested. It is vital that this flow occurs in order to complete an electrical circuit, which ultimately determines the pH value. Any clogging of the junction will prevent completion of the circuit, resulting in readings that are erratic or constantly drifting.

The FC1013 probe utilizes a secondary reference chamber with ceramic outer junction allowing aqueous silver free electrolyte to flow slowly through the porous ceramic frit providing accurate readings for aqueous samples.

PVDF body

The durable PVDF body of the FC1013 ensures pH measurements can be safely taken on the dairy farm or production floor. The components of the electrode are also able to withstand a wider range of temperatures to allow for accuracy during stages such as pasteurization, which requires heating to temperatures near 72°C (161°F).

Spheric glass tip

A large surface area provides optimal contact between the sensing bulb and aqueous milk sample.

Specifications		HI99162
pH*	Range	-2.0 to 16.0 pH; -2.00 to 16.00 pH
	Resolution	0.1 pH; 0.01 pH
	Accuracy	±0.1 pH; ±0.02 pH
	Calibration	automatic, one or two-point calibration with two sets of standard buffers (standard pH 4.01, 7.01, 10.01 or NIST pH 4.01, 6.86, 9.18)
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 (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
Ordering Information	**HI99162** is supplied with FC1013 pH probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700640 electrode cleaning solution sachets (2), 1.5V AAA batteries (3), instruction manual, and rugged carrying case.	

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

pH in Yogurt

Monitoring pH is crucial in producing consistent, quality yogurt. Yogurt is made by the fermentation of milk with live bacterial cultures. Most yogurts are inoculated with a starter culture consisting of Lactobacillus bulgaricus and Streptococcus thermophilus. Once the live culture is added, the mixture of milk and bacteria is incubated, allowing for fermentation of lactose to lactic acid. The pH of the mixture drops and becomes more acidic due to the lactic acid production; it is this reduction in pH causes the casein protein in milk to coagulate and precipitate, resulting in a yogurt-like texture.

Yogurt producers cease incubation once a specific pH level is reached. Most producers have a desired point between pH 4.0 and 4.6 in which fermentation is stopped by rapid cooling. Within this range of pH there is an ideal amount of lactic acid present for yogurt, giving it the characteristic tartness, aiding in thickening, and acting as a preservative against undesirable strains of bacteria.

By verifying that fermentation continues to a predetermined pH endpoint, yogurt producers can ensure their products remain consistent in terms of flavor, aroma, and texture. A deviation from the predetermined pH can lead to a reduced shelf life of yogurt or create a product that is too bitter or tart. Syneresis can also occur if fermentation is stopped too early or too late, resulting in yogurt that is respectively too alkaline or too acidic. Syneresis is the separation of liquid, in this case whey, from the milk solids. Consumers expect yogurt to remain texturally consistent, so ensuring fermentation is stopped at the appropriate pH is vital to consumer perception.

Yogurt can provide a number of challenges for the person that needs to measure pH. Yogurt is a semi-solid to slurry that has a very high solids content. This type of sample will coat the sensitive glass membrane surface and/or clog the reference junction. The FC2133 that is supplied with the HI98164 is designed specifically for measuring pH in yogurt. From a conic tip shape for easy penetration to an open junction that resist clogging; the FC2133 is an ideal general-purpose pH electrode for yogurt products. The FC2133 connects to the HI98164 with a quick-connect, waterproof DIN connector, allowing for a secure, non-threaded attachment.

pH / Temperature Meter for Yogurt

The HI98164 is a rugged, waterproof, Foodcare portable pH meter that measures pH and temperature using the specialized FC2133 yogurt pH electrode. This pH meter meets the FDA Food Safety Modernization Act (FSMA) compliance standards.

- Ergonomic, rugged, waterproof (IP67) design
- Backlit, graphic LCD
- CAL Check™ to alert users to problems during calibration including dirty/ broken electrode, contaminated buffer and overall probe condition
- Automatic or manual temperature compensation
- 200 hour battery life with battery level displayed on measurement screen
- Log-on-demand up to 200 samples (100 pH and 100 mV range)
- Auto hold to automatically hold the first stable reading on the display
- Calibration timeout to alert the user at a defined interval when the calibration has expired
- PC connectivity via a sealed opto-isolated micro USB and HI92000 software
- GLP to provide data from previous calibration to ensure Good Laboratory Practices are met
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, PC software and connection cable, instruction manual, quick start guide, and batteries in a rugged, custom carrying case

QUICK DIN

HI98164 includes F2133 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC2133 pH / temperature probe for yogurt

The FC2133 amplified pH electrode is a specialized probe that offers numerous features that improve pH testing for yogurt producers. An integrated temperature sensor allows for temperature compensated pH measurements without the need for a separate temperature probe. The probe's conical sensing bulb ensures stable calibration and measurement in semi-solids and emulsions like yogurt.

An integral part of any pH electrode is the reference junction. The reference junction is a part of the electrode that allows for the flow of ions located in the reference cell into the sample being tested. It is vital that this flow occurs in order to complete an electrical circuit, which ultimately determines the pH value. Any clogging of the junction will prevent completion of the circuit, resulting in readings that are erratic or constantly drifting.

Clogging of the reference junction is a common challenge faced by yogurt producers as the milk solids and proteins can easily build up on the electrode. The open junction design of the FC2133 utilizes a viscolene reference electrolyte that comes into direct contact with the yogurt sample. Without a physical junction, the electrode resists clogging and continues to provide accurate, stable readings.

Glass body

The glass body of the FC2133 is chemically resistant and quick to reach thermal equilibrium, allowing for a faster, more stable response when taking pH measurements in samples that are not at ambient temperature.

Specifications		HI98164
pH*	Range	-2.0 to 20.0 pH; -2.00 to 20.00 pH; -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
	Calibration	up to five-point calibration, seven standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) and five custom buffers
mV	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	±0.2 mV
	Relative mV Offset Range	±2000 mV
Temperature*	Range	-20.0 to 120.0 °C (-4.0 to 248.0°F)
	Resolution	0.1°C (0.1°F)
	Accuracy	±0.4°C (±0.8°F) (excluding probe error)
Ordering Information	**HI98164** is supplied with FC2133 pH electrode, HI7004M pH 4.01 buffer solution (230 mL), HI7007M pH 7.01 buffer solution (230 mL), HI700643 electrode cleaning and disinfection solution sachet for yogurt products (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 a rugged carrying case with custom insert.	

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

pH / Temperature Meter for Yogurt

The Hanna Instruments HI99164 is a durable, waterproof, and portable Foodcare pH and temperature meter designed specifically for yogurt analysis.

- Ergonomic, rugged, waterproof (IP67) design
- Quick Connect probe
- Multi-level LCD display with probe condition indicator
- Automatic Temperature Compensation (ATC)
- Automatic one or two-point pH calibration
- Calibration tags displayed on-screen
- Stability indicator for accurate data recording
- 1400 hour battery life
- Battery life indication and low battery detection
- Adjustable auto-off
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, instruction manual, and batteries in a rugged, custom carrying case

QUICK DIN

HI99164 includes F2133 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC2133 pH / temperature Probe for yogurt

The HI99164 uses the FC2133 amplified pH electrode with glass body. This specialized electrode offers numerous features that improve pH testing for yogurt producers. An integrated temperature sensor allows for temperature compensated pH measurements without the need for a separate temperature probe. The probe's conical sensing bulb ensures stable calibration and measurement in semi-solids and emulsions like yogurt.

An integral part of any pH electrode is the reference junction. The reference junction is a part of the electrode that allows for the flow of ions located in the reference cell into the sample being tested. It is vital that this flow occurs in order to complete an electrical circuit, which ultimately determines the pH value. Any clogging of the junction will prevent completion of the circuit, resulting in readings that are erratic or constantly drifting.

Clogging of the reference junction is a common challenge faced by yogurt producers as the milk solids and proteins can easily build up on the electrode. The open junction design of the FC2133 utilizes a viscolene reference electrolyte that comes into direct contact with the yogurt sample. Without a physical junction, the electrode resists clogging and continues to provide accurate, stable readings.

Glass body

The glass body of the FC2133 is chemically resistant and quick to reach thermal equilibrium, allowing for a faster, more stable response when taking pH measurements in samples that are not at ambient temperature.

Conical glass tip

The conical shaped tip design allows for penetration into solids, semi-solids, and emulsions for the direct measurement of pH in samples such as yogurt.

Specifications		HI99164
pH*	Range	-2.0 to 16.0 pH; -2.00 to 16.00 pH
	Resolution	0.1 pH; 0.01 pH
	Accuracy	±0.1 pH; ±0.02 pH
	Calibration	automatic, one or two-point calibration with two sets of standard buffers (standard pH 4.01, 7.01, 10.01 or NIST pH 4.01, 6.86, 9.18)
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 (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
Ordering Information	**HI99164** is supplied with FC2133 pH probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700643 electrode cleaning solution sachets (2), 1.5V AAA batteries (3), instruction manual, and rugged carrying case.	

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


2000
2010

pH in Cheese

pH is an essential measurement throughout the entire cheesemaking process. From the initial measurements of incoming milk to the final measurements of ripened cheese, pH is the most important parameter for cheese quality and safety control.

Acidification of milk begins with the addition of bacterial culture and rennet. The bacteria consume lactose and create lactic acid as a byproduct of fermentation. The lactic acid produced will cause the pH of the milk to go down. Once the milk reaches a particular pH, the rennet is added. The enzymes in rennet help to speed up curdling and create a firmer substance. For cheesemakers that dilute their rennet, the pH of the dilution water is also critical; water that is near pH 7 or higher can deactivate the rennet, causing problems with coagulation.

Once the curds are cut, stirred, and cooked, the liquid whey must be drained. The pH of whey at draining directly affects the composition and texture of the final cheese product. Whey that has a relatively high pH contributes to higher levels of calcium and phosphate and results in a stronger curd. Typical pH levels at draining can vary depending on the type of cheese; for example, Swiss cheese is drained between pH 6.3 and 6.5 while Cheddar cheese is drained between pH 6.0 and 6.2.

During brining, the cheese soaks up salt from the brine solution and loses excess moisture. The pH of the brine solution should be close to the pH of the cheese, ensuring equilibrium of ions like calcium and hydrogen. If there is an imbalance during brining, the final product can have rind defects, discoloration, a weakened texture, and a shorter shelf life.

Cheeses must fall within a narrow pH range to provide an optimal environment for microbial and enzymatic processes that occur during ripening. Bacterial cultures used in ripening are responsible for familiar characteristics such as the holes in Swiss cheese, the white mold on Brie rinds, and the aroma of Limburger cheese. A deviation from the ideal pH is not only detrimental to the ecology of the bacteria, but also to the cheese structure. Higher pH levels can result in cheeses that are more elastic while lower pH levels can cause brittleness.

Cheese products can provide a number of challenges for the person that needs to measure pH. Cheese products tend to be solid to semi-solids. Both types of samples will coat the sensitive glass membrane surface and/or clog the reference junction. The FC2423 that is supplied with the HI98165 is designed specifically for measuring pH in cheese. From a conic tip shape in a durable 5 mm diameter stainless steel body for easy penetration into cheese without leaving a large hole to an open junction that resist clogging; the FC2423 is an ideal general-purpose pH electrode for cheese. The FC2423 connects to the HI98165 with a quick-connect, waterproof DIN connector, allowing for a secure, non-threaded attachment.

pH / Temperature Meter for Cheese

The HI98165 is a rugged, waterproof, portable Foodcare pH meter that measures pH and temperature using the specialized FC2423 cheese pH electrode. This pH meter meets the FDA Food Safety Modernization Act (FSMA) compliance standards.

- Ergonomic, rugged, waterproof (IP67) design
- Backlit, graphic LCD
- CAL Check™ to alert users to problems during calibration including dirty/ broken electrode, contaminated buffer and overall probe condition
- Automatic or manual temperature compensation
- 200 hour battery life with battery level displayed on measurement screen
- Log-on-demand up to 200 samples (100 pH and 100 mV range)
- Auto hold to automatically hold the first stable reading on the display
- Calibration timeout to alert the user at a defined interval when the calibration has expired
- PC connectivity via a sealed opto-isolated micro USB and HI92000 software
- GLP to provide data from previous calibration to ensure Good Laboratory Practices are met
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, PC software and connection cable, instruction manual, quick start guide, and batteries in a rugged, custom carrying case

QUICK DIN

HI98165 includes F2423 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC2423 pH / temperature probe for cheese

The HI98165 uses the stainless steel FC2423 amplified pH electrode. This specialized electrode offers numerous features that improve pH testing for cheese producers. The robust stainless steel sheath paired with the conical sensing tip allows for penetration in cheese at various points throughout the production process. An integrated temperature sensor also ensures that all pH measurements are compensated for temperature without the need for a separate temperature probe.

Low temperature glass

The FC2423 electrode uses Low Temperature (LT) glass for the sensing bulb. The LT glass tip is a lower resistance glass formulation. As the temperature of the sensing glass decreases, the resistance of the LT glass will increase approaching that of standard glass at ambient temperatures. The FC2423 is suitable to use with samples that measure from 0 to 50°C.

Stainless steel body

The AISI 316 stainless steel body offers durability in the production facility and can withstand chloride concentrations that cause corrosion in other types of alloys.

Conic glass tip

The conical shaped tip design allows for penetration into solids, semi-solids, and emulsions for the direct measurement of pH in samples such as cheese.

Specifications		HI98165
pH*	Range	-2.0 to 20.0 pH; -2.00 to 20.00 pH; -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
	Calibration	up to five-point calibration, seven standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) and five custom buffers
mV	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	±0.2 mV
	Relative mV Offset Range	±2000 mV
Temperature*	Range	-20.0 to 120.0 °C (-4.0 to 248.0°F)
	Resolution	0.1°C (0.1°F)
	Accuracy	±0.4°C (±0.8°F) (excluding probe error)
Ordering Information	**HI98165** is supplied with FC2423 pH electrode, HI7004M pH 4.01 buffer solution (230 mL), HI7007M pH 7.01 buffer solution (230 mL), HI700642 electrode cleaning solution sachet for cheese residues (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 a rugged carrying case with custom insert.	

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

pH / Temperature Meter for Cheese

The Hanna Instruments HI99165 is a durable, waterproof, and portable Foodcare pH and temperature meter designed specifically for cheese analysis.

- Ergonomic, rugged, waterproof (IP67) design
- Quick Connect probe
- Multi-level LCD display with probe condition indicator
- Automatic Temperature Compensation (ATC)
- Automatic one or two-point pH calibration
- Calibration tags displayed on-screen
- Stability indicator for accurate data recording
- 1400 hour battery life
- Battery life indication and low battery detection
- Adjustable auto-off
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, instruction manual, and batteries in a rugged, custom carrying case

QUICK DIN

HI99165 includes F2423 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC242D pH / temperature probe for cheese

The HI99165 uses the stainless steel FC2423 amplified pH electrode. This specialized electrode offers numerous features that improve pH testing for cheese producers. The robust stainless steel sheath paired with the conical sensing tip allows for penetration in cheese at various points throughout the production process. An integrated temperature sensor also ensures that all pH measurements are compensated for temperature without the need for a separate temperature probe.

Low temperature glass

The FC2423 electrode uses Low Temperature (LT) glass for the sensing bulb. The LT glass tip is a lower resistance glass formulation. As the temperature of the sensing glass decreases, the resistance of the LT glass will increase approaching that of standard glass at ambient temperatures. The FC2423 is suitable to use with samples that measure from 0 to 50°C.

Stainless steel body

The AISI 316 stainless steel body offers durability in the production facility and can withstand chloride concentrations that cause corrosion in other types of alloys.

Conic glass tip

The conical shaped tip design allows for penetration into solids, semi-solids, and emulsions for the direct measurement of pH in samples such as cheese.

Specifications		HI99165
pH*	Range	-2.0 to 16.0 pH; -2.00 to 16.00 pH
	Resolution	0.1 pH; 0.01 pH
	Accuracy	±0.1 pH; ±0.02 pH
	Calibration	automatic, one or two-point calibration with two sets of standard buffers (standard pH 4.01, 7.01, 10.01 or NIST pH 4.01, 6.86, 9.18)
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 (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
Ordering Information	**HI99165** is supplied with FC2423 pH probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700642 electrode cleaning solution sachets (2), 1.5V AAA batteries (3), instruction manual, and rugged carrying case.	

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

General Purpose Portable pH Meter for Food

- Ergonomic, rugged, waterproof (IP67) design
- Quick Connect probe
- Multi-level LCD display with probe condition indicator
- Automatic Temperature Compensation (ATC)
- Automatic one or two-point pH calibration
- Calibration tags displayed on-screen
- Stability indicator for accurate data recording
- 1400 hour battery life
- Battery life indication and low battery detection
- Adjustable auto-off
- Supplied complete
  - Supplied complete with sensor, calibration and cleaning solutions, beakers, instruction manual, and batteries in a rugged, custom carrying case

The HI99161 is a portable pH and temperature meter is designed specifically for yogurt and cheese applications. Monitoring pH in the dairy process is critical to ensure the quality of product is upheld.

QUICK DIN

HI99161 includes F2023 pH probe with a quick connect DIN connector to make attaching and removing the probe simple and easy. Compatible with all pH electrodes that have a quick DIN connector.

FC2023 pH / temperature probe for dairy

This pH meter uses the FC2023 pH electrode. with an easy-to-clean, PVDF body and a conical tip, this electrode is ideal for measurements in semi-solids such as cheeses. A specialized junction prevents clogging in viscous liquids such as milk or condiments.

Open junction reference

The open junction design consists of a solid gel interface (viscolene) between the sample and internal Ag/AgCl reference. This interface not only prevents silver from entering the sample, but also makes it impermeable to clogging, resulting in a fast response and stable reading.

PVDF body

Polyvinylidene fluoride (PVDF) is a food grade plastic that is resistant to most chemicals and solvents, including sodium hypochlorite. It has high abrasion resistance, mechanical strength and resistance to ultraviolet and nuclear radiation. PVDF is also resistant to fungal growth.

Conic glass tip

The conical shaped tip design allows for penetration into solids, semi-solids, and emulsions for the direct measurement of pH in food products including meat, cheese, yogurt, and milk.

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

    HI710028 Orange
    HI710029 Blue

Specifications		HI99161
pH*	Range	-2.0 to 16.0 pH; -2.00 to 16.00 pH
	Resolution	0.1 pH; 0.01 pH
	Accuracy	±0.1 pH; ±0.02 pH
	Calibration	automatic, one or two-point calibration with two sets of standard buffers (standard pH 4.01, 7.01, 10.01 or NIST pH 4.01, 6.86, 9.18)
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 (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
Ordering Information	**HI99161** is supplied with FC2023 pH and temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700642 electrode cleaning solution sachets (2), 1.5V AAA batteries (3), instructions and hard carrying case.	

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

pH Tester for Milk

- High accuracy
  - The HI981034 pH tester for cheese features ±0.2 pH accuracy with 0.01 resolution.
- Large LCD
  - Enhanced LCD that displays reading, stability indicator, low battery indicator, and calibration tags.
- Automatic Calibration
  - This tester is calibrated automatically to one or two points.
- Stability Indicator
  - An hourglass indicator is displayed on the LCD until a stable reading is obtained.
- Automatic Shut-off
  - Can be set to automatically turn off after 8 or 60 minutes.
- Long Battery Life
  - This tester has a long battery life of approximately 1000 hours. When the battery power is running low a battery indicator is displayed.
- Built-in Specialized Probe
  - The specialized pH electrode is rugged and easy to clean with a conical tip. The open junction design consists of a solid gel interface (viscolene) between the sample and internal Ag/AgCl reference. This interface not only prevents silver from entering the sample, but also makes it impermeable to clogging after measurements in semi-solid or viscous samples. This electrode is designed to prevent the typical problems of clogging in viscous liquids, ensuring a fast response and stable reading.

Specifications		HI981034
pH	Range	0.0 to 14.0 pH
	Resolution	0.1 pH
	Accuracy (@25°C/77°F)	±0.2 pH
	Calibration	automatic, one or two-point
Ordering Information	**HI981034** is supplied with pH 4.01 buffer solution sachet (2), pH 7.01 buffer solution sachet (2), electrode cleaning solution sachet (2), CR2032 3V Li-ion battery, quality certificate, and instruction manual..	

pH Tester for Cheese

- High accuracy
  - The HI981032 pH tester for cheese features ±0.2 pH accuracy with 0.01 resolution.
- Large LCD
  - Enhanced LCD that displays reading, stability indicator, low battery indicator, and calibration tags.
- Automatic Calibration
  - This tester is calibrated automatically to one or two points.
- Stability Indicator
  - An hourglass indicator is displayed on the LCD until a stable reading is obtained.
- Automatic Shut-off
  - Can be set to automatically turn off after 8 or 60 minutes.
- Long Battery Life
  - This tester has a long battery life of approximately 1000 hours. When the battery power is running low a battery indicator is displayed.
- Built-in Specialized Probe
  - When measuring pH, cheese products can pose a number of challenges throughout production. Samples can vary in consistency from solid, semi-solid to a slurry with a high content of solids. These sample types can coat the sensitive glass membrane surface and/or clog the reference junction. The HI981032's built-in, specialized pH electrode has a conic tip shape for easy penetration, an open junction to resist clogging, and a PVDF food grade plastic body that can be cleaned with sodium hypochlorite.

Specifications		HI981032
pH	Range	0.0 to 14.0 pH
	Resolution	0.1 pH
	Accuracy (@25°C/77°F)	±0.2 pH
	Calibration	automatic, one or two-point
Ordering Information	**HI981032** is supplied with pH 4.01 buffer solution sachet (2), pH 7.01 buffer solution sachet (2), electrode cleaning solution sachet (2), CR2032 3V Li-ion battery, quality certificate, and instruction manual..	

QUICK DIN
FC2023

DIGITAL
FC2020

BNC
FC200B

Designed for dairy products such as yogurt and cheese, emulsions, cream, or other semi-solid samples.

FC2023, FC2020, FC200B

These PVDF bodied, gel filled pH electrodes feature an open junction design with viscolene gel electrolyte, a sensing bulb made of low temperature glass, and a conical tip shape. Quick Connect Din and Digital models also incorporate an integrated temperature sensor for temperature compensated measurements

QUICK DIN
FC2053

Designed for dairy products, emulsions, cream, or other semi-solid samples.

FC2053

FC2053 is an amplified single junction pH electrode with an integrated temperature sensor. This electrode features a food grade plastic PVDF body with an easy to clean, removable sleeve, an open junction design with replaceable gel electrolyte, a sensing bulb made of low temperature glass, and a conical tip shape.

- Removable sleeve to extend probe life
  - Allows for cleaning of the outer reference area of any solids/ semi-solids that get trapped during measurement
  - Allows for the replacement of gel electrolyte
- Built-in pre-amplifier for noise free measurements
- Food grade PVDF plastic body
  - Resistant to chlorine (bleach) that would be used for disinfection that comes in contact with the sample.

QUICK DIN
FC2423

BNC
FC240B

Designed for cheese, dairy products, and quality control processes.

FC2423, FC240B

These stainless steel, amplified pH electrodes offer numerous features that improve pH testing for cheese producers. The robust stainless steel sheath paired with the conical sensing tip allows for penetration in cheese at various points throughout the production process. FC2423 also features an integrated temperature sensor to ensure that all pH measurements are compensated for temperature without the need for a separate temperature probe.

QUICK DIN FC2133

DIGITAL FC2100

FC2133, FC2100, FC210B

BNC FC210B

These specialized probes were designed to improve pH testing for yogurt producers. These probes feature a conical sensing bulb to ensure stable calibration and measurement in semi-solids and emulsions like yogurt. Quick Connect Din and Digital models also incorporate an integrated temperature sensor for temperature compensated measurements

Clogging of the reference junction is a common challenge faced by yogurt producers as the milk solids and proteins can easily build up on the electrode. The open junction design of these probes utilize a viscolene reference electrolyte that comes into direct contact with the yogurt sample. Without a physical junction, the electrode resists clogging and continues to provide accurate, stable readings.

Designed for milk, yogurt, cheese, and other products in the dairy industry.

QUICK DIN FC1013

FC1013

This amplified pH electrode offers numerous features to improve pH testing for milk producers. An integrated temperature sensor allows for temperature compensated pH measurements without the need for a separate temperature probe. The contact between the bulb's large surface area and the milk sample ensures a stable calibration and measurement.

The durable PVDF body of the FC1013 ensures pH measurements can be safely taken on the dairy farm or production floor. The components of the electrode are also able to withstand a wider range of temperatures to allow for accuracy during stages such as pasteurization, which requires heating to temperatures near 72°C (161°F).

Designed specifically for milk analysis.

BNC FC100B

FC100B

This refillable, single ceramic, double junction pH electrode features a pH indicating probe made of general purpose glass and a food grade, PVDF plastic body.

Designed for sauces, juices, dairy products and other liquid or slurry forms of food.

QUICK DIN HI10533 | DIGITAL HI10530

BNC HI1053B

HI10533, HI10530, HI1053B

These glass body, refillable, double junction pH electrodes feature a triple ceramic junction in the outer junction and the conical pH sensing portion is made with low temperature glass. Quick Connect Din and Digital models also incorporate an integrated temperature sensor for temperature compensated measurements

QUICK DIN HI12303 | DIGITAL HI12300

BNC HI1230B

Designed for field applications as well as general purpose use.

HI12303, HI12300, HI1230B

These plastic body, double junction, gel filled pH electrodes feature a single ceramic junction and the spherical pH sensing portion is made with general purpose glass. Quick Connect Din and Digital models also incorporate an integrated temperature sensor for temperature compensated measurements.

QUICK DIN HI11313 | DIGITAL HI11310

BNC HI1131B

Designed for laboratory samples, beer and other liquid samples, as well as general purpose use.

HI11313, HI11310, HI1131B

These glass body, refillable, double junction pH electrodes have a single ceramic junction in the outer reference cell and the spherical pH sensing portion is made with high temperature glass. Quick Connect Din and Digital models also incorporate an integrated temperature sensor for temperature compensated measurements

pH Buffer Solutions

(±0.01 pH)

Calibrate your instrument to an accuracy of ±0.01 pH with these NIST traceable buffer solutions.

Each bottle label is clearly marked with their respective value and includes a pH/temperature reference chart and a spot to mark when the bottle was opened. A twist off cap and inner foil seal with pull tab allows for easy opening.

- Supplied with Certificate of Analysis
- Accuracy of ±0.01 pH @ 25°C

Bottles

- Air tight bottle with tamper-proof seal of freshness to ensure quality.

pH Value @25°C	Code	Package
4.01	**HI5004**	500 mL
	HI5004-01	1 L
	HI5004-R	500 mL (color coded solution)
	HI5004-R08	1 G (3.78 L), color coded solution (2)
7.01	**HI5007**	500 mL
	HI5007-01	1 L
	HI5007-G	500 mL, color coded solution
	HI5007-G08	1 G (3.78 L), color coded solution (2)
10.01	**HI5010**	500 mL
	HI5010-01	1 L
	HI5010-V	500 mL (color coded solution)
	HI5010-V08	1 G (3.78 L) (2) (color coded solution)

Single-use sachets

For the highest level of calibration accuracy for field instrumentation, technical solutions are available in convenient single use sachets in 25 pack quantities.

- Light block packaging prevents oxidation from UV light that could alter the value. Every sachet is as fresh as the day it was packaged.

pH Value @25°C	Code	Package
4.01	**HI50004-02**	20 mL (25)
7.01	**HI50007-02**	20 mL (25)
10.01	**HI50010-02**	20 mL (25)

Two-point calibration

To obtain precise and valid pH measurements, the pH meter and electrode must be calibrated at a minimum of two different points.

Cleaning Series

- Clean sensors weekly
  - Clean the sensing portion of your electrodes weekly to prevent fouling and to maintain accuracy. Immerse the electrode in the proper cleaning solution for at least 15 to 20 minutes, rehydrate in storage solution and calibrate before use.

Specific Use Electrode Cleaning Solutions

In many applications, electrodes become contaminated from use and produce inaccurate results. Since these contaminants cannot be removed during normal rinsing, special cleaning solutions are needed.

The Cleaning Series ensures maximum efficiency and accuracy of your sensors when used for its designated application. Electrode cleaning is a fast and effective routine that should be performed on a regular basis as a preventative measure against using a dirty electrode and to ensure that the junction is not clogged.

Bottles

Code	Description	Size
HI70640L	cleaning solution for milk deposits	500 mL
HI70641L	cleaning and disinfection solution for dairy products	500 mL
HI70642L	cleaning solution for cheese deposits	500 mL
HI70643L	cleaning and disinfection solution for yogurt products	500 mL
HI70630L	acid cleaning solution for meat, grease and fats	500 mL

Sachets

Code	Description	Size
HI700640P	cleaning solution for milk deposits	20 mL (25)
HI700641P	cleaning and disinfection solution for dairy products	20 mL (25)
HI700642P	cleaning solution for cheese deposits	20 mL (25)
HI700643P	cleaning and disinfection solution for yogurt products	20 mL (25)
HI700630P	acid cleaning solution for meat, grease and fats	20 mL (25)

Electrode Storage and Filling Solutions

Electrode Storage Solutions

Code	Description
HI70300L	electrode storage solution, 500 mL
HI70300M	electrode storage solution, 230 mL

Electrode Filling Solutions

Code	Description
HI7071	3.5M KCl with AgCl reference electrolyte, 30 mL bottle (4)
HI7082	electrolyte solution, 3.5M KCl, 30 mL bottle (4)
HI7082M	electrolyte solution, 3.5M KCl, 230 mL
HI7082L	electrolyte solution, 3.5M KCl, 460 mL

Electrode Filling Accessories

Code	Description
HI740157P	Electrode filling pipettes (20)

Clean Sensors Weekly

Clean the sensing portion of your electrodes weekly to prevent fouling and to maintain accuracy. Immerse the electrode in the proper cleaning solution for at least 15 to 20 minutes, rehydrate in storage solution and calibrate before use.

Keep Bulb and Junctions Moist

To minimize junction clogging and ensure fast response time, always keep the glass bulb and the junction of your pH electrode moist. Store the electrode with a few drops of HI70300 storage solution in the protective cap.

Top-off electrolyte levels if needed

The electrolyte level in refillable electrodes should be checked before performing any measurement. If the level is low, refill with the proper electrolyte solution to ensure correct electrode performance. This simple maintenance helps guarantee adequate head pressure to keep the liquid junction flowing.

Laboratory Research Grade Two-Channel Benchtop pH/mV/ISE Meter

The HI5222 is an advanced research grade dual channel benchtop pH/ISE/mV meter that is completely customizable with a large color LCD, capacitive touch keys, and USB port for computer connectivity. The HI5222 is rich in features including 5 point calibration, selectable resolution, data logging, alarm limits, comprehensive GLP, automatic temperature compensation, and much more. It retains simplicity with both dedicated key for routine operation and virtual keys that guide the user through setup options.

- Highly customizable user interface
  - The user interface can display measurements in various modes: basic measurement with or without GLP information, real-time graphing, and logging data.
- Capacitive touch
  - Sensitive capacitive touch buttons ensures the buttons cannot be clogged with sample residue.
- Color graphic LCD
  - The display allows for real-time graphing and the use of virtual keys provide for an intuitive user interface.
- Two galvanically isolated pH/ORP/ISE channels
  - Each input channel has connectors for BNC probes, reference probes and a temperature sensor.

- Choice of calibration
  - Automatic buffer recognition, semi-automatic, and direct manual entry pH calibration options are available.
- GLP data
  - View calibration data and calibration expiration information.
- CAL Check™
  - CAL Check™ alerts users to potential problems during the calibration of the pH electrode.
- ISE measurement with choice of concentration units
  - Allows for calibration and readings in choice of concentration units which include ppt, g/L, mg/mL, ppm, mg/L, µg/mL, 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.
- Data logging
  - Automatic, manual, and AutoHold logging are available. Automatic and manual logs up to 100 lots with 50,000 records max/lot with up to 100,000 total data points per channel.

B BNC

HI5222 includes HI1131B pH electrode and is also compatible with all pH electrodes that use BNC and ISE electrodes that use BNC connectors.

Specifications		HI5222
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
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
Ordering Information		**HI5222-01** (115V) and **HI5222-02** (230V) are supplied with HI1131B pH electrode, HI7662-T temperature probe, pH 4.01 buffer solution sachet (2), pH 7.01 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.

* limits will be reduced to actual sensor limits

Calcium ISE

B
BNC

HI4104

	HI4104	
Type	polymer membrane; combination	
Measurement Range	1M to 3•10⁻⁶M; 40080 to 0.12 mg/L (ppm)	
Optimum pH Range	4 to 10	
Temperature Range	0 to 40°C	
Approximate Slope	+28	
Body Material	epoxy/PVC	
Ordering Information	**HI4104** combination ISE with 1 m coaxial cable and BNC connector	
Accessories	**HI4004-01**	0.1 M calcium standard, 500 mL
	HI4004-00	ISA for calcium ISEs, 500 mL
	HI7082	silver-free reference electrolyte fill solution, 3.5 M KCl, 30 mL (4)
	HI4004-45	conditioning and storage solution for HI4004 and HI4104 calcium ISEs
	HI4104-51	calcium module for HI4104 combination ISE

Chloride ISE

B
BNC

HI4107

	HI4107	
Type	solid-state; combination	
Measurement Range	1M to 5•10⁻⁵M ; 35500 to 1.8 mg/L (ppm)	
Optimum pH Range	2 to 11	
Temperature Range	0 to 80°C	
Approximate Slope	-56	
Body Material	PEI	
Ordering Information	**HI4107** combination ISE with 1 m coaxial cable and BNC connector	
Accessories	**HI4007-01**	0.1 M chloride standard, 500 mL
	HI4007-02	100 mg/L (ppm) chloride standard, 500 mL
	HI4007-03	1000 mg/L (ppm) chloride standard, 500 mL
	HI4000-00	ISA for halide ISEs, 500 mL
	HI7072	silver-free reference electrolyte fill solution, 1 M KNO_3, 30 mL (4)
	HI4000-70	halide polishing strips (24)

Chloride Portable Photometer

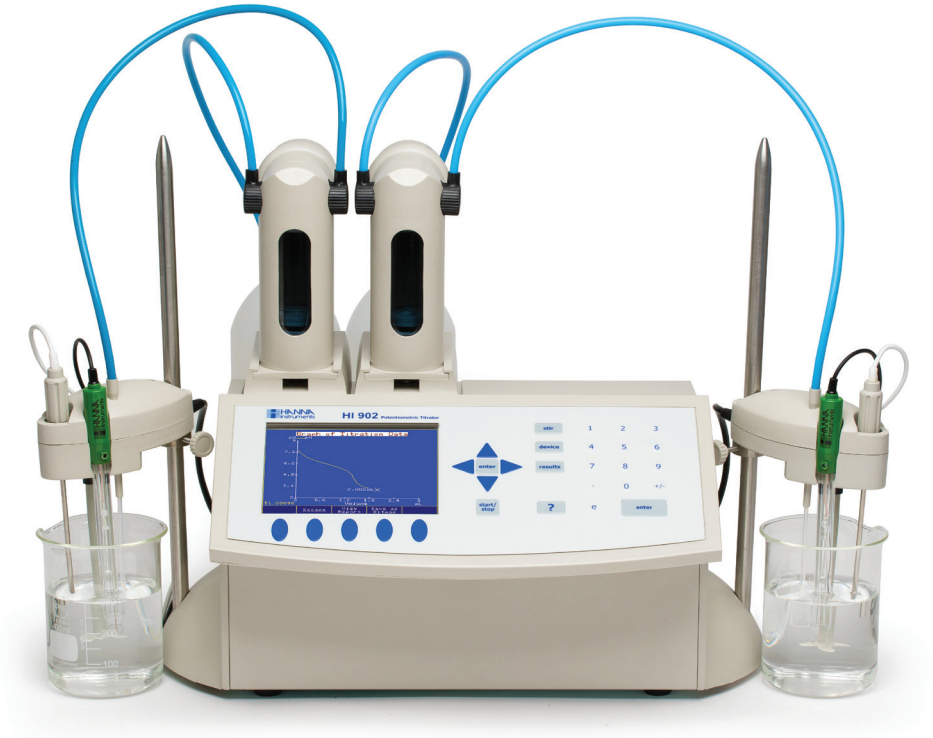
- CAL Check™
  - Allows for performance verification and calibration of the meter using NIST traceable standards

Specifications	HI96753 Chloride	
Range	0.0 to 20.0 mg/L (ppm)	
Resolution	0.1 mg/L	
Accuracy @ 25°C (77°F)	±0.5 mg/L ±6% of reading	
Light Source	light emitting diode	
Light Detector	silicon photocell with narrow band interference filter @ 466 nm	
Method	adaptation of the mercury (II) thiocyanate method	
Ordering Information	**HI96753** is supplied with sample cuvettes (2) with caps, 9V battery, instrument quality certificate and instruction manual. CAL Check™ standards and testing reagents sold separately **HI96753C** includes photometer, CAL Check™ standards, sample cuvettes (2) with caps, 9V battery, cuvette wiping cloth, instrument quality certificate, instruction manual and rigid carrying case. Reagents sold separately	
Reagents and Standards	**HI96753-11**	CAL Check™ standard cuvettes
	HI93753-01	reagents for 100 tests
	HI93753-03	reagents for 300 tests

Chloride Handheld Colorimeter

- Our handheld colorimeter is portable and easily carried anywhere you need.

Specifications	HI753
Range	0.0 to 20.0 ppm
Resolution	0.1 ppm
Accuracy @ 25°C/77°F	± 0.5 ppm ± 6% of reading
Light Source	LED @ 470 nm
Light Detector	silicon photocell
Method	adaptation of the mercury(II) thiocyanate method
Ordering Information	**HI753** Checker®HC is supplied with sample cuvettes with caps (2), chloride reagent starter kit (reagents for 25 tests), syringes with tips (2), 1.5V AAA battery, instructions and quick start guide.
Reagent Set	**HI753-25** (25 tests)
Calibration Set	**HI753-11**



Automatic Potentiometric (pH/mV/ISE) Titration System

The HI902C is an automatic titrator that complements our wide range of products dedicated to efficient and accurate laboratory analysis. The HI902C potentiometric titrator can perform acid/base, redox (ORP), complexometric, precipitation, non-aqueous, argentometric, and ion selective titrations, as well as back titrations and titre determinations. This powerful titrator automatically dispenses the titrant, detects the endpoint, and performs all necessary calculations and graphing. In addition to titration, the HI902C also operates as a fully functional pH, mV/ORP, and ion selective electrode (ISE) meter.

Titrator capabilities

- Dynamic titrant dosing
  - The dynamic dosing feature allows for timely and accurate titration results by relating the titrant volume dosed to the mV response from the titration reaction. This provides for larger doses near the beginning of a titration and smaller, more precise doses near the titration endpoint.
- Equivalence endpoint detection
  - Equivalence endpoint detection is critical in applications where fixed endpoints are not specified in standard methods. This endpoint indicates where the mV response from the titration is greatest with respect to the volume of titrant dosed.

- Signal stability timing
  - The signal stability feature monitors when the mV response of the titration reaction stabilizes before providing the next titrant dose. This ensures reliable measurement values throughout the length of a titration.
- Multiple equivalence point detection
  - The HI902C can detect multiple equivalence points during one titration as specified and required in certain standard methods and applications.
- Method sequencing
  - The HI902C offers users the option of linking two methods. This allows for two analyses to be run on the same sample including direct measurements, single endpoint titrations, multiple equivalence point titrations, and back titrations.
- Multiple titration types
  - Paired with the right electrode from our sensor line, our potentiometric titrator can perform acid/base, redox (ORP), complexometric, precipitation, non-aqueous, argentometric, and ion selective titrations, as well as back titrations and titre determinations.
- Direct measurement functionality
  - The HI902C performs as a high accuracy pH, ORP, and ion selective meter that can link, log, and report direct measurements. Users can easily track and manage data without the hassle of manual record keeping.

Burettes & Dosing System

- Exchangeable burette system
  - With Hanna's Clip-Lock™ burette feature, it only takes a few seconds to exchange titrants and reagents preventing cross-contamination and saving time.
- Multiple burette sizes
  - The HI902C comes standard with a 25 mL burette but may be equipped with a 5 mL, 10 mL, or 50 mL burette. Each burette is constructed with a ground glass syringe and chemically resistant PTFE plunger.
- Precision dosing pump
  - Our unmatched 40,000 step piston driven pump is capable of dosing extremely small and highly accurate volumes of titrant or reagent.
- Automatic reagent addition
  - A second burette may be programmed to volumetrically dispense reagent prior to titration or direct measurement. This helps achieve consistent and accurate results and prevents operator errors such as incorrect volumes or forgetting reagent addition

Interface & display

- Interactive color display
  - A large, color LCD screen clearly shows the chosen titration method along with results, units, titration volume, temperature, and mV or pH values.
- Detailed titration graphs
  - A real-time titration curve can be displayed during each titration; this feature is useful when new methods are tested or when a procedure requires optimization.

Data

- Data storage
  - up to 100 titration and pH/mV/ISE reports. Transfer data via USB.
- Flexible GLP management
  - All necessary GLP (Good Laboratory Practice) information can be recorded with each sample.

Connectivity & functionality

- Multifunctional
  - HI902C functions as a titrator, pH meter, mV/ORP meter, and ISE meter. Valuable laboratory bench space is saved, and multiple analyses can be performed on one sample.
- Multiple connections
  - The titrator offers device support for two analog boards, allowing up to two electrodes, two burettes, and two stirrers to be connected to one unit simultaneously.

Methods of analysis

- Customizable methods
  - The HI902C can store up to 100 user-defined or standard titration and direct measurement methods. Each method may be modified and optimized for performance based on application and user requirements.
- Titration method support
  - Onsite installation, training, and customization is available from one of our Applications or Service experts. Hanna offers continued support for any questions you might have along the way.
- Market specific methods packs
  - Hanna offers titration method packages for various markets including food, beverage, dairy, wine, and more. Ask our Sales Consultants about our library of market specific titration methods.
- Adaptable standard methods
  - Our technical experts can program and optimize standard methods developed by such affiliations as ISO, ASTM, AOAC, AOCS, EPA, and more directly onto your titrator. Ask our Sales Consultants which standard methods are possible with our HI902C system.

- Autosampler connectivity
  - The HI902C works seamlessly with our HI921 Autosampler featuring 16 or 18 sample tray options, automatic tray identification, and automatic beaker detection. Up to three peristaltic pumps for reagent addition and removal can be connected and real-time analysis and sequencing progress is visible on the HI902C display as well as indicated by the LED lights of the Autosampler.

Specifications		HI902C1 / HI902C2
pH	Range	-2.0 to 20.0 pH; -2.00 to 20.00 pH; -2.000 to 20.000 pH
	Resolution	0.1; 0.01; 0.001 pH
	Accuracy (@25°C/77°F)	±0.001 pH
	pH Calibration	up to five-point calibration, eight standard buffers and five custom buffers
mV	Range	-2000.0 to 2000.0 mV
	Resolution	0.1 mV
	Accuracy (@25°C/77°F)	±0.1 mV
	mV Calibration	single point offset
ISE	Range	$1 \cdot 10^{-6}$ to $9.99 \cdot 10^{10}$
	Resolution	1; 0.1; 0.01
	Accuracy (@25°C/77°F)	±0.5% monovalent; ±1% divalent
	ISE Calibration	up to five-point calibration, seven standard solutions and five user-defined standards
Temperature	Range	-5.0 to 105.0°C; 23.0 to 221.0°F; 268.2 to 378.2 K
	Resolution	0.1°C; 0.1°F; 0.1K
	Accuracy (@25°C/77°F)	±0.1°C; ±0.2°F; ±0.1K, excluding probe error
Additional Specifications	Burette Size Capability	5, 10, 25 and 50 mL
	Burette Resolution	1/40000
	Display Resolution	0.001 mL
	Dosing Accuracy	±0.1% of full burette volume
	Display	5.7" (320 x 240 pixel) backlit color LCD
	GLP Conformity	instrumentation data storage and printing capabilities
Ordering Information	**HI902C1-01** (US plug (type A)) and **HI902C1-02** (European plug (type C)): titrator with one analog board, overhead propeller stirrer with stand, 25 mL glass burette, dosing pump drive, temperature sensor, USB cable, USB flash drive and PC software. **HI902C2-01** (US plug (type A)) and **HI902C2-02** (European plug (type C)): titrator with two analog boards, overhead propeller stirrer with stand, 25 mL glass burette, dosing pump, temperature sensor, USB cable, USB flash drive and PC software.	
Accessories	**HI900100**	dosing pump
	HI900150	50 mL burette assembly (includes syringe, aspiration, and dispensing tubes)
	HI900125	25 mL burette assembly (includes syringe, aspiration, and dispensing tubes)
	HI900110	10 mL burette assembly (includes syringe, aspiration, and dispensing tubes)
	HI900105	5 mL burette assembly (includes syringe, aspiration, and dispensing tubes)
	HI4107	Chloride Combination Ion Selective Electrode

Automatic Titration System

The HI901C automatic titrator complements our wide range of products dedicated to efficient and accurate laboratory analysis. The HI901C potentiometric titrator can perform acid/base, redox (ORP), complexometric, precipitation, non-aqueous, argentometric, and ion selective titrations. This powerful titrator dispenses the titrant, detects the endpoint, and performs all necessary calculations and graphs automatically. In addition to titration mode, the HI901C also operates as a fully functional pH, mV/ORP, and ion selective electrode (ISE) meter.

This titrator is supplied with a pack of standard methods or you can create your own. Methods (standard or user) can be easily transferred between titrators via USB flash drive or PC application.

Titrator capabilities

- Dynamic titrant dosing
  - Dynamic dosing allows for timely and accurate titration results by relating the titrant volume dosed to the mV response from the titration reaction. This provides for larger doses near the beginning of a titration and smaller, more precise doses near the titration endpoint.
- Equivalence endpoint detection
  - Equivalence endpoint detection is critical in applications where fixed endpoints are not specified in standard methods. This endpoint indicates where the mV response from the titration is greatest with respect to the volume of titrant dosed.

- Multiple titration types
  - Paired with the right electrode from our sensor line, our potentiometric titrator can perform acid/base, redox (ORP), complexometric, precipitation, non-aqueous, argentometric, and titrations with an ion selective electrode.
- Signal stability timing
  - The signal stability feature monitors when the mV response of the titration reaction stabilizes before providing the next titrant dose. This ensures reliable measurement values throughout the length of a titration.

Methods of analysis

- Customizable methods
  - The HI901C can store up to 100 user-defined or standard titration methods. Each method may be customized and optimized for performance based on application and user requirements.
- Titration method support
  - Onsite installation, training, and customization is available from one of our Applications or Service experts. Hanna offers continued support via phone or webinar for any questions you might have along the way.
- Adaptable standard methods
  - Our technical experts can program and customize standard methods developed by such affiliations as ISO, ASTM, AOAC, AOCS, EPA, and more directly onto your titrator. Ask our Sales Consultants which standard methods are possible with our HI901C system.

Burettes and Dosing System

- Exchangeable burette system
  - With Hanna's Clip-Lock burette, it only takes a few seconds to exchange titrants and reagents, preventing cross-contamination and saving time.
- Multiple burette sizes
  - The HI901C comes standard with a 25 mL burette but may be equipped with a 5 mL, 10 mL, or 50 mL burette.
- Precision dosing pump
  - Our unmatched 40,000 step piston driven pump is capable of dosing extremely small and precise volumes of titrant or reagent.

Data and storage

- Customizable titration reports
  - Each titration report is fully customizable so users can ensure they are storing and filing the appropriate data required for their application and procedures.
- Flexible GLP management
  - All necessary GLP (Good Laboratory Practice) information can be recorded with each sample.
- Effortless data transfer
  - Data can easily be transferred to a USB flash drive or PC with the Hanna HI900PC application software.

Connectivity and Functionality

- Multifunctional with four working modes
  - The HI901C functions as a titrator, pH meter, mV/ORP meter, and ISE meter.
- Multiple connections (HI901C2 only)
  - The titrator offers device support for two analog boards, which allows two electrodes and two stirrers to be simultaneously connected to one unit.
- Multiple peripherals
  - Users can print reports directly from the titrator using a standard parallel printer. An external monitor and keyboard may be attached for added versatility, as well as an analytical balance for automatic sample mass entry for titrations.

Specifications		HI901C1	HI901C2
pH	Range	-2.0 to 20.0 pH; -2.00 to 20.00 pH; -2.000 to 20.000 pH	
	Resolution	0.1; 0.01; 0.001 pH	
	Accuracy (@25°C/77°F)	±0.001 pH	
	pH Calibration	up to five-point calibration, eight standard buffers and five custom buffers	
mV	Range	-2000.0 to 2000.0 mV	
	Resolution	0.1 mV	
	Accuracy (@25°C/77°F)	±0.1 mV	
	mV Calibration	single point offset	
ISE	Range	$1 \cdot 10^{-6}$ to $9.99 \cdot 10^{10}$	
	Resolution	1; 0.1; 0.01	
	Accuracy (@25°C/77°F)	±0.5% monovalent; ±1% divalent	
	ISE Calibration	up to five-point calibration, seven standard solutions and five user-defined standards	
Temperature	Range	-5.0 to 105.0°C; 23.0 to 221.0°F; 268.2 to 378.2 K	
	Resolution	0.1°C; 0.1°F; 0.1K	
	Accuracy (@25°C/77°F)	±0.1°C; ±0.2°F; ±0.1K, excluding probe error	
Additional Specifications	Analog Board(s) Each Analog Board Provides: (1) BNC (pH/mV/ISE) Input, (1) Reference Input, (1)Temperature Input, (1) Stirrer Input	1	2
	Analog Board(s) Capability	1	2
	Dosing Pump Capability	2	2
	Burette Included	1 (25 mL)	1 (25 mL)
	Burette Size Capability	5, 10, 25 and 50 mL	
	Burette Resolution	1/40000	
	Display Resolution	0.001 mL	
	Dosing Accuracy	±0.1% of full burette volume	
	GLP Conformity	instrumentation data storage and printing capabilities	
Ordering Information	**HI901C1-01** and **HI901C1-02** includes titrator with one analog board, overhead propeller stirrer with stand, 25 mL glass burette, dosing pump, temperature sensor, USB cable, 256 MB USB flash drive and PC software. **HI901C2-01** and **HI901C2-02** includes titrator with two analog boards, overhead propeller stirrer with stand, 25 mL glass burette, dosing pump, temperature sensor, USB cable, 256 MB USB flash drive and PC software.		
Accessories	**HI4107**	Chloride Combination Ion Selective Electrode	

Reagents

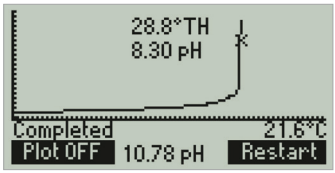
HI70401	potassium hydrogen phthalate, 20 g
HI70402	tartaric acid, 20 g
HI70403	sodium thiosulfate pentahydrate, 20 g
HI70404	potassium iodide powder packets, 100 packets
HI70405	glucose/fructose, 20 g
HI70406	sodium chloride, 20 g
HI70407	potassium iodate, 20 g
HI70408	oxalic acid, 20 g
HI70409	potassium permanganate, 20 g
HI70422	silver nitrate (0.1 M), 1L
HI70423	sodium hydroxide solution (0.11 N), 1 L
HI70424	amino-propanol buffer, 25 mL
HI70425	sulfuric acid solution (16%), 500 mL
HI70426	glyoxal solution (40%), 100 mL
HI70427	nitric acid solution (1.5 M), 500 mL
HI70428	sodium hydroxide solution (0.25N), 1 L
HI70429	silver nitrate solution (0.05 M), 1L
HI70432	hydrogen peroxide solution (3%), 25 mL
HI70433	stabilized iodine solution (0.01 N), 1L
HI70434	phosphoric acid (85%), 500 mL
HI70435	sodium hydroxide solution (5 M), 500 mL
HI70436	deionized water, 1 G
HI70437	potassium Iodide concentrated (30%) solution, 500 mL
HI70438	tris buffer set, 1 L
HI70439	sodium thiosulfate solution (0.1 M), 1 L
HI70440	iodine stabilized solution (0.02 N), 1 L
HI70441	iodine stabilized solution (0.04 N), 1 L
HI70443	sulfuric acid solution (10%), 500 mL
HI70444	sulfuric acid solution (25%), 500 mL
HI70445	nitric acid solution (1 M), 500 mL
HI70446	Fehling solution A, 500 mL
HI70447	Fehling solution B, 500 mL
HI70448	silver nitrate solution (0.02 M), 1 L
HI70449	EDTA solution (0.02 M), 1 L
HI70453	hydrochloric acid solution (0.02 N), 1 L
HI70454	sodium hydroxide solution (0.02 N), 1 L
HI70455	sodium hydroxide solution (0.01 N), 1 L
HI70456	sodium hydroxide solution (0.1 N), 1 L
HI70457	sodium hydroxide solution (1 N), 1 L
HI70458	sulfuric acid solution (0.01 M), 1 L
HI70459	sulfuric acid solution (0.05 M), 1 L
HI70462	hydrochloric acid solution (0.01 N), 1 L
HI70463	hydrochloric acid solution (0.1 N), 1 L
HI70464	hydrochloric acid solution (1 N), 1 L
HI70465	hydrogen peroxide solution (30%), 25 mL
HI70466	phenylarsine oxide (PAO) solution (0.00564N), 500 mL
HI70467	pH 4.18 acetate buffer, 230 mL
HI70468	potassium iodide, 35g
HI70469	iodine solution (0.00188N), 230 mL (4)
HI70471	phenylarsine oxide (PAO) solution (0.000564N), 500 mL
HI70472	pH 7.15 phosphate buffer solution, 230 mL

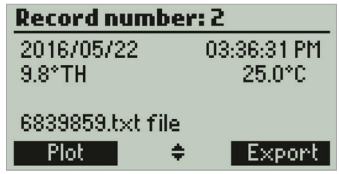
B
BNC

HI84529 includes FC260B glass bodied pH half-cell with BNC connector and HI5315 reference electrode with BNC connector.

Titratable Acidity Mini Titrator and pH Meter

The HI84529 is an easy to use, fast and affordable automatic mini titrator designed for testing titratable acidity levels in dairy products. Based on an acid-base titration method, this mini titrator uses an optimized pre-programmed method of analysis with a powerful algorithm that determines the completion of the titration reaction by the use of a specialized foodcare pH electrode.





- Graphic mode
  - Displays in-depth data during titration, including a real-time graph of the titration curve.
- Log-on-demand
  - The HI84529 allows for data logging of up to 400 samples: 200 titration results and 200 pH/mV readings. Data can be stored and exported to a USB drive or a PC using the USB connection.

Specifications		HI84529
Titrator	Range	Low Range: %l.a.: 0.01 to 0.20; °SH: 0.4 to 8.9; °D: 1.0 to 20.0; °Th: 1.1 to 22.2 High Range: %l.a.: 0.1 to 2.0; °SH: 4.4 to 88.9; °D: 10 to 200; °Th: 11.1 to 222.2
	Resolution	Low Range: %l.a.: 0.01 ; °SH: 0.1; °D: 0.1; °Th: 0.1 High Range: %l.a.: 0.1; °SH: 0.1; °D: 1; °Th: 0.1
	Accuracy (@25°C/77°F)	Low Range: ± 0.01 %l.a. High Range: ± 0.1 %l.a.
	Method	acid-base titration
	Sample Size (LR 20)	20 mL or 20 g
	Sample Size (LR 50)	50 mL or 50 g
	Sample Size (HR 20)	20 mL or 20 g
	Principle	endpoint titration, adjustable (pH 8.0 - 8.7 in 0.1 increments)
	Pump Speed	10 mL/min
	Stirring Speed	800 (Low Range) / 1000 (High Range)
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three-point calibration; four available buffers (pH 4.01, 6.00, 8.30, 10.01)
	Temperature Compensation	manual or automatic
mV Meter	Range	-2000.0 to 2000.0 mV
	Resolution	0.1 mV
	Accuracy	± 1.0 mV
Temperature	Range	-20.0 to 120.0°C; -4.0 to 248.0°F; 253.2 to 393.2 K
	Resolution	0.1°C; 0.1°F; 0.1 K
	Accuracy	±0.4°C; ±0.8°F; ±0.4 K
Ordering Information	**HI84529-01** (115V) and **HI84529-02** (230V) are supplied with HI84529-70 Reagent Kit for titratable acidity in dairy products, FC260B pH electrode, HI5315 reference electrode, HI7662-M temperature probe, HI7072 fill solution (30 mL), HI700640 cleaning solution for milk deposits (2 x 20 mL), capillary dropper pipette, 100 mL beakers (2), dosing pump valve, 5 mL syringe, 1 mL plastic pipette, tube set (aspiration tube with titrant bottle cap and dispensing tube with tip), stir bar, power adapter, instruction manual and quality certificate.	
Reagents	**HI84529-50**	titrant solution for low range 20, 120 mL
	HI84529-51	titrant solution for high range 20, 120 mL
	HI84529-52	titrant solution for low range 50, 120 mL
	HI84529-55	pump calibration standard, 230 mL

Professional Waterproof Meter

EC/TDS/Resistivity/Salinity Meter with USP <645>

HI98192 is a waterproof, portable conductivity meter that has an expanded conductivity range from 0.000 µS/cm to 400 mS/cm, as well as TDS, resistivity and three salinity scales. This meter offers a quick connect four-ring probe and allows the user to adjust the nominal cell constant. HI98192 is also ready to perform all three stages of USP <645> method required for EC measurement of ultrapure water.

Backlit Graphic LCD Display

The HI98192 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.

Quick connect probe

The HI763133 four-ring stainless steel conductivity probe features a quick connect DIN connector to make attaching and removing the probe simple and easy.

Data Logging

The HI98192's allows storage of up to 400 log-on-demand samples or 1000 lot logging samples that can be later transferred to a PC with the supplied HI920015 USB cable and HI92000 software.

GLP

Comprehensive GLP functions are directly accessible by pressing the GLP key. Calibration data, including date, time and calibration values are stored for retrieval at a later time

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 100 hours of battery life.

PC Connectivity

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

Rugged custom carrying case

The HI98192 meter, probe, and all accessories are supplied in a rugged carrying case.

Specifications		HI98192
EC	Range	0 to 400 mS/cm (shows values up to 1000 mS/cm actual conductivity)** 0.001 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 (autoranging)
	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 or 1 digit, whichever is greater)
	Calibration	automatic up to five points with seven memorized standards (0.00 µS/cm, 84.0 µS/cm, 1.413 mS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm)
TDS	Range	0.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 g/L; 10.00 to 99.99 g/L; 100.0 to 400.0 g/L (autoranging)
	Resolution	0.01 ppm; 0.1 ppm; 0.001 g/L; 0.01 g/L; 0.1 g/L
	Accuracy	±1% of reading (±0.05 ppm or 1 digit, whichever is greater)
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* (autoranging)
	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	±1% of reading (±10 Ω or 1 digit, whichever is greater)
Salinity	Range	% NaCl : 0.0 to 400.0%; practical salinity: 0.00 to 42.00 (PSU); seawater scale: 0.00 to 80.00 (ppt)
	Resolution	0.1%; 0.01
	Accuracy	±1% of reading
	Calibration	max. one point only in % NaCl range with HI7037 standard; use conductivity calibration for all other ranges
Temperature †	Range	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	±0.2°C; ±0.4°F (excluding probe error)
	Calibration	one or two points
Ordering Information		**HI98192** is supplied with HI763133 stainless steel, four-ring conductivity/TDS probe, HI7031M 1413 µS/cm calibration solution (230 mL), HI7035M 111.8 mS/cm calibration solution (230 mL), 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 HI720192 rugged carrying case with custom insert.

* The 0.000 µS/cm EC range and 0.1 MΩ•cm resistivity range are not available with the optional 4m cable probe
**Uncompensated temperature reading
(†) Reduced to actual sensor limits

Digital Refractometers

For Sugar Analysis

HI96800

Measures the refractive index in aqueous solutions. Readings can also be displayed with sucrose temperature compensation (nD_{20}) or % Brix.

HI96801

Measures the refractive index to determine the % Brix of sugar in aqueous solutions. The refractive index of the sample is converted to % Brix concentration units.

Specifications		HI96800	HI96801
Sugar Content	Range	1.3300 to 1.5080 nD; 1.3330 to 1.5040 nD_{20}; 0.0 to 85.0% Brix	0 to 85% Brix
	Resolution	0.0001 nD; 0.0001 nD_{20}; 0.1 % Brix	0.1 % Brix
	Accuracy (@25°C/77°F)	±0.0005 nD; ±0.0005 nD_{20}; ±0.2% Brix	±0.2% Brix
Temperature	Range	0.0 to 80.0°C (32.0 to 176.0°F)	0.0 to 80.0°C (32.0 to 176.0°F)
	Resolution	0.1°C (0.1°F)	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	±0.3°C (±0.5°F)	±0.3°C (±0.5°F)
Ordering Information	**HI96800** and **HI96801** is supplied with 9V battery and instruction manual.		
Standard	**HI4020-11** Brix standard 50%, 10 mL		

- Dual-level LCD
  - Displays measurement and temperature readings simultaneously
- Automatic Temperature Compensation
- Easy measurement
  - Place a few drops of the sample in the well and press the READ key
- BEPS
  - Alerts the user of low battery power that could adversely affect readings
- IP65 water protection
  - Built to perform under harsh conditions.
- Quick, accurate results
  - Readings are displayed in approximately 1.5 seconds
- One-point calibration
  - Calibrate with distilled or deionized water
- Small sample size
  - Sample size can be as small as 2 metric drops
- Automatic shut-off
  - After three minutes of non-use
- Stainless steel sample well
  - Easy to clean and corrosion-resistant

For Sodium Chloride Measurement

HI96821

This optical instrument employs the measurement of the refractive index to determine sodium chloride concentration in aqueous solutions used in food preparation.

Specifications		HI96821
g/100 g	Range	0 to 28
	Resolution	0.1
	Accuracy (@25°C/77°F)	±0.2
g/100 mL	Range	0 to 34
	Resolution	0.1
	Accuracy (@25°C/77°F)	±0.2
Specific Gravity (S.G.)	Range	1.000 to 1.216
	Resolution	0.001
	Accuracy (@25°C/77°F)	±0.002
°Baumé	Range	0 to 26
	Resolution	0.1
	Accuracy (@25°C/77°F)	±0.2
Temperature	Range	0 to 80°C (32 to 176°F)
	Resolution	0.1°C (0.1°F)
	Accuracy (@25°C/77°F)	±0.3°C (±0.5°F)
Ordering Information	**HI96821** is supplied with battery and instruction manual.	

Thermistor Thermometer

- EN 13485 compliant
- CAL Check™ feature
- Remaining battery life indication/ low battery detection
- 4500 hour battery life
- Auto-off
- IP65 Waterproof casing

HI710026 blue rubber protective boot available

Interchangeable with FC762 series thermistor probes

Food service, food preparation, packaging, storage and transport of food require temperature to be monitored or controlled. Spot checking temperatures with Hanna food thermometers ensures daily work routines are carried out at the correct temperature.

HI93501 is a thermistor style thermometer that includes a stainless steel replaceable style penetration probe (FC762PW).

Standard features include waterproof casing (rated IP65) and stainless steel penetration probe designed for continuous contact with foodstuffs in accordance with regulation (EC) number 1935/2004. HI93501 also includes features such as CAL Check, low battery detection, auto-off capability, and long battery life.

Specifications	HI93501
Range*	-50.0 to 150.0°C; -58.0 to 302.0°F
Resolution	0.1°C; 0.1°F
Meter Accuracy @ 23.0°C ±5°C	±0.1°C (-50.0 to 150.0°C); ±0.2°F (-58.0 to 302.0°F)
Probe Accuracy (FC762PW)	±0.3°C (-10.0 to 80.0°C); ±0.5°F (-14 to 176°F); ±0.7°C / ±1.3°F remaining range
Probe	FC762PW general purpose penetration probe with 1 m (3.3') white cable and white handle
Certification	EN 13485:2001 suitability: storage and transport; climatic environment: E; accuracy class: 1;
Ordering Information	**HI93501** is supplied with FC762PW temperature probe, 1.5V AAA batteries (3), and instructions.

* The measurement range may be limited by probe type, and applies to the probe shaft.

K-Type Thermocouple Thermometer

- CAL Check™ feature
- Remaining battery life indication/low battery detection
- Auto-off
- 3500 hour battery life
- Waterproof casing

HI710027 blue rubber protective boot available

Food service, food preparation, packaging, storage and transport of food require temperature to be monitored or controlled. Spot checking temperatures with Hanna food thermometers ensures daily work routines are carried out at the correct temperature.

HI935001 is a thermometer that includes a K-type thermocouple stainless steel replaceable style penetration probe (FC766PW).

Standard features include waterproof casing (rated IP65) and stainless steel penetration probe designed for continuous contact with foodstuffs in accordance with regulation (EC) number 1935/2004. HI935001 also includes features such as CAL Check, low battery detection, auto-off capability, and long battery life.

Interchangeable with FC766 series thermocouple probes

Specifications	HI935001
Range*	-50.0 to 199.9°C / 200 to 300°C; -58.0 to 399.9°F / 400 to 572°F
Resolution	0.1°C (-50.0 to 199.9°C) / 1°C (200 to 300°C); 0.1°F (-58.0 to 399.9°F) / 1°F (400 to 572°F)
Meter Accuracy @ 23.0°C ±5°C	±0.4°C (-50.0 to 300°C); ±0.7°F (-58.0 to 572°F)
Probe Accuracy (FC766PW)	±1.6°C (-50.0 to 300°C); ±2.9°F (-58.0 to 572°F)
Probe	FC766PW penetration, K-type thermocouple probe with 1 m (3.3') white cable and white handle
Ordering Information	**HI935001** is supplied with FC766PW temperature probe, 1.5V AAA batteries (3), and instructions.

* The measurement range may be limited by probe type, and applies to the probe shaft.

Checktemp® Digital Thermometer

- ±0.2°C (±0.5°F) - Accuracy
- CAL Check™ calibration verification at startup
- IP 65 water resistant protection
- AISI 316 stainless steel penetration Probe
- 2000 hours of battery life (Continuous use)

Specifications	HI98501
Range	-50.0 to 150.0°C; -58.0 to 302°F
Resolution	0.1°C (-50.0 to 150.0°C); 0.1°F (-58.0 to 199.9°F), 1°F (above 200°F)
Accuracy	±0.2°C (-30 to 120°C), ±0.3°C (outside: -50.0 to -30.0°C, and 120.0 to 150.0°C); ±0.5°F (-22 to 199.9°F), ±1°F (outside: -58.0 to -22.0°F, and 200 to 302°F)
Ordering Information	**HI98501** (Checktemp®) is supplied with penetration probe, protective cap, CR2032 Li-ion battery and instructions.

Checktemp® Dip Digital Thermometer

- ±0.3°C (±0.5°F) Accuracy
- CAL Check™ calibration verification at startup
- 3 m (9.9') silicone cable
- IP 65 water resistant protection
- AISI 316 stainless steel weighted probe

Specifications	HI98539
Range	-20.0 to 80.0°C; -4.0 to 176.0°F
Resolution	0.1°C; 0.1°F
Accuracy	±0.3°C; ±0.5°F
Ordering Information	**HI98539** (Checktemp®Dip) is supplied with stainless steel weighted probe, stand, 1.5V AAA batteries (3) and instructions.

Checkfridge® Remote Sensor Thermometer

The HI147 is a remote temperature sensor ideal for monitoring in foodcare environments and delivers high accuracy measurements over a wide temperature range.

- CAL Check™
  - Allows for an internal calibration of the device with the flick of a switch, thereby alleviating the time preparing an ice bath.
- Magnetic back and food compatible cable

Specifications	HI147-00 Checkfridge® C	HI147-01 Checkfridge® F
Range	-50.0 to 150.0°C	-58.0 to 302.0°F
Resolution	0.1°C	0.1°F (-58.0 to 199.9°F) 1°F (200 to 302°F)
Accuracy	±0.3°C (-20 to 90°C); ±0.5°C (outside)	±0.6°F (-4 to 194°F); ±1°F (outside)
Temperature Probe	stainless steel, general purpose with 1 m (3.3') cable (fixed); 40 x dia 5 mm (1.6 x dia 0.2")	
Ordering Information	**HI147-00** (Checkfridge® C) is supplied with 1.5V AAA battery and instructions. **HI147-01** (Checkfridge® F) is supplied with 1.5V AAA battery and instructions.	

T-Shaped Thermometer

HI145 thermometers were developed for HACCP programs that require high standards of performance with simplicity of use.

- CAL Check™
  - Alerts users of calibration status
- HOLD Feature
  - HOLD button to freeze readings on the display

Specifications	HI145-00	HI145-01
Range	-50.0 to 220°C	-58.0 to 428.0°F
Resolution	0.1°C (-50.0 to 199.9°C); 1°C (200 to 220°C)	0.1°F (-58.0 to 199.9°F); 1°F (200 to 428°F)
Accuracy	±0.3°C (-20 to 90°C); ±0.4% F.S. (outside)	±0.6°F (-4 to 194°F); ±0.4% F.S. (outside)
Probe	AISI 316 stainless steel probe; 125 mm x dia 5 mm (4.9 x dia 0.2")	
Ordering Information	HI145-00 and HI145-01 are supplied complete with battery and instructions.	

T-Logger with Locking Wall Cradle

The HI143 T-Logger temperature dataloggers are housed in a smooth, yet tough watertight casing that is sealed against ingress of dust and water jets. They record the temperature at a given interval to make sure that perishable goods are not left unattended. These dataloggers can provide that extra guarantee that goods never ventured out of limits of public safety.

- IP65 water resistance
- Locking Wall Cradle
- °C/°F Ranges
  - Through the PC application software, the HI143 can be programmed to read in Celsius or Fahrenheit.
- Data Logging
  - The HI143 can store up to 4,000 measurements at selectable intervals from 1 minute to 24 hours. Users can start logging through the PC software, the button on the face of the datalogger, or at a set time.
- PC Connectivity
- Programmable High and Low Alarms
- Enhanced Battery Life
  - The HI143 series uses CR2032 3V lithium ion batteries to achieve a long battery life of about 2 years at 25°C.

Specifications	HI143
Range	-30.0 to 70.0°C/-22.0 to 158.0°F
Resolution	0.1°C/0.1°F
Accuracy	±0.4°C (-20 to 60°C); ±0.6°C (outside); ±0.7°F (-4 to 140°C); ±1.1°F (outside)
Calibration	factory-calibrated
Ordering Information	**HI143** is supplied with CR2032 lithium battery, wall cradle, lock and instructions. **HI143-00** is supplied with HI143 logger, HI143001 RS232 communication cradle, Windows® compatible application software, CR2032 lithium battery, wall cradle, lock and instructions. **HI143-10** is supplied with HI143 logger, HI143002 USB communication cradle, Windows® compatible application software, CR2032 lithium battery, wall cradle, lock and instructions.

Free and Total Chlorine Portable Photometer

- CAL Check™
  - Allows for performance verification and calibration of the meter using NIST traceable standards
- GLP
  - Review of the last calibration date
- Error messages
  - Messages on display alerting to problems including no cap, high zero, and standard too low
- Auto-shut off
- Battery status indicator

Specifications	HI96711 Free and Total Chlorine	
Range	**Chlorine, Free (P1)**	**Chlorine, Total (P2)**
	0.00 to 5.00 mg/L (ppm)	
Resolution	0.01 mg/L from 0.00 to 3.50 mg/L (ppm); 0.10 mg/L above 3.50 mg/L (ppm)	
Accuracy @ 25°C (77°F)	±0.03 mg/L ±3% of reading	
Light Source	tungsten lamp	
Light Detector	silicon photocell with narrow band interference filter @ 525 nm	
Method	adaptation of the USEPA method 330.5 and Standard Method 4500-Cl G	
Ordering Information	**HI96711** is supplied with sample cuvettes (2) with caps, 9V battery, instrument quality certificate and instruction manual. CAL Check™ standards and testing reagents sold separately **HI96711C** includes photometer, CAL Check™ standards, sample cuvettes (2) with caps, 9V battery, scissors, cuvette cleaning cloth, instrument quality certificate, instruction manual and rigid carrying case. Reagents sold separately	
Reagents and Standards	**HI96701-11**	CAL Check™ standard cuvettes (free Cl)
	HI93701-01	reagents for 100 tests (free Cl)
	HI93701-03	reagents for 300 tests (free Cl)
	HI96711-11	CAL Check™ standard cuvettes (total Cl)
	HI93711-01	reagents for 100 tests (total Cl)
	HI93711-03	reagents for 300 tests (total Cl)

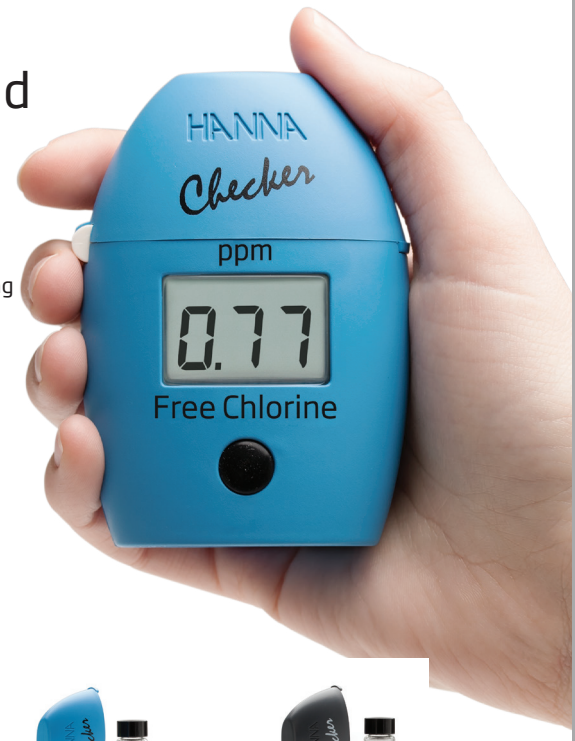
Free Chlorine Ultra High Range Portable Photometer

- Up to 500 ppm chlorine range
- CAL Check™
  - Allows for performance verification and calibration of the meter using NIST traceable standards
- GLP
  - Review of the last calibration date
- Error messages
  - Messages on display alerting to problems including no cap, high zero, and standard too low
- Auto-shut off
- Battery status indicator

Specifications	HI96771 Free Chlorine and Ultra High Range	
Range	**Free Cl (P1)**	**Cl, UHR (P2)**
	0.00 to 5.00 mg/L (ppm)	0 to 500 mg/L (ppm)
Resolution	0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 mg/L above 3.50 mg/L	1 mg/L from 0 to 200 mg/L; 10 mg/L above 200 mg/L
Accuracy @ 25°C (77°F)	±0.03 mg/L ±3% of reading	±3 mg/L ±3% of reading
Light Source	tungsten lamp	
Light Detector	silicon photocell with narrow band interference filter @ 525 nm	
Method	adaptation of Standard Methods for the Examination of Water and Wastewater, 20th edition, 4500-Cl	
Ordering Information	**HI96771** is supplied with sample cuvettes (2) with caps, 9V battery, instrument quality certificate and instruction manual. CAL Check standards and testing reagents sold separately **HI96771C** includes photometer, CAL Check standards, sample cuvettes (2) with caps, 9V battery, scissors, cuvette cleaning cloth, instrument quality certificate, instruction manual and rigid carrying case. Reagents sold separately	
Reagents and Standards	**HI93701-01**	reagents for 100 tests (free Cl)
	HI93701-03	reagents for 300 tests (free Cl)
	HI95771-01	reagents for 100 tests (UHR)
	HI95771-03	reagents for 300 tests (UHR)
	HI96771-11	CAL Check standards

Chlorine Handheld Colorimeters

- Use for quick and accurate on-the-spot analysis
- One-button operation makes getting your chlorine results simple.
- Easy operation and direct results make measurement quick.
- Operated by a single AAA battery



Specifications	HI701 (Free Chlorine)	HI711 (Total Chlorine)	HI771 (UHR Chlorine)
Range	0.00 to 2.50 ppm	0.00 to 3.50 ppm	0 to 500 ppm
Resolution	0.01 ppm	0.01 ppm	1 ppm
Accuracy @ 25°C/77°F	±0.03 ppm ±3% of reading	±0.03 ppm ±3% of reading	±3 ppm ±5% of reading
Light Source	LED @ 525 nm	LED @ 525 nm	LED @ 525 nm
Light Detector	silicon photocell	silicon photocell	silicon photocell
Method	adaptation of USEPA method 330.5, DPD method	adaptation of USEPA method 330.5, DPD method	adaptation of the Standard Methods for Water and Wastewater, 20th Edition 4500-Cl
Ordering Information	**HI701** Checker HC is supplied with sample cuvettes with caps (2), free chlorine reagent starter kit (reagents for 6 tests), 1.5V AAA battery, instructions and quick start guide.	**HI711** Checker HC is supplied with sample cuvettes with caps (2), total chlorine reagent starter kit (reagents for 6 tests), 1.5V AAA battery, instructions and quick start guide.	**HI771** Checker®HC is supplied with sample cuvettes with caps (2), Chlorine UHR reagent starter kit (reagents for 6 tests), battery, instructions and quick start guide.
Reagent Set	**HI701-25** (25 tests)	**HI711-25** (25 tests)	**HI771-25** (25 tests)
Calibration Set	**HI701-11**	**HI711-11**	**HI771-11**

Hypochlorite Test Kit

Specifications	HI3843 Hypochlorite (as Cl_2)
Type	titration
Range	50-150 g/L (ppt)
Smallest Increment	5 g/L (ppt)
Method	iodometric
Number of Tests	100 avg.
Ordering Information	**HI3843** test kit comes with 30 mL potassium iodide solution, 100 packets bleach reagent B, 60 mL bleach reagent C (2), 125 mL glass Erlenmeyer flask and 1 mL plastic pipettes (25).
Reagent	**HI3843-100** hypochlorite (bleach), 100 tests avg.

Hydrogen Peroxide Test Kit

Specifications	HI3844 Hydrogen Peroxide (as H_2O_2)
Type	titration
Range	0.00-2.00 mg/L (ppm) 0.0-10.0 mg/L (ppm)
Smallest Increment	0.25 mg/L (ppm) 1.0 mg/L (ppm)
Method	iodometric
Number of Tests	100 avg.
Ordering Information	**HI3844** test kit comes with 100 mL hydrogen peroxide reagent A, 17 g hydrogen peroxide reagent B, 30 mL hydrogen peroxide reagent C, 25 mL hydrogen peroxide reagent D, graduated plastic test tube with cap, 50 mL calibrated plastic vessel, 3 mL plastic pipette, 1 mL plastic pipette and plastic spoon.
Reagent	**HI3844-100** hydrogen peroxide, 100 tests avg.

Iodine Handheld Colorimeter

- Easier to use and more accurate than chemical test kits
- Dedicated to a single parameter
- Small size, big convenience

Specifications	HI718
Range	0.0 to 12.5 ppm
Resolution	0.1 ppm
Accuracy @ 25°C/77°F	±0.1 ppm ±5% of reading
Light Source	LED @ 525 nm
Light Detector	silicon photocell
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, DPD method
Ordering Information	**HI718** Checker®HC is supplied with sample cuvettes with caps (2), iodine reagent starter kit (reagents for 6 tests), 1.5V AAA battery, instructions and quick start guide.
Reagent Set	**HI718-25** (25 tests)
Calibration Set	**HI718-11**

Iodine Portable Photometer

- CAL Check™
  - Allows for performance verification and calibration of the meter using NIST traceable standards
- GLP
  - Review of the last calibration date
- Error messages
  - Messages on display alerting to problems including no cap, high zero, and standard too low
- Auto-shut off
- Battery status indicator

Significance of Use

The disinfectant properties of iodine have led to its use as an alternative to chlorine and bromine. Unlike chlorinated pools, water treated with iodine decreases eye irritation among swimmers and provides a level of disinfection more stable to adverse conditions. However, its toxic and corrosive properties, along with the difficulties of dissolving it in water, have limited its widespread acceptance. One of the most common applications of iodine is in poultry industry process water.

Specifications	HI96718 Iodine	
Range	0.0 to 12.5 mg/L (ppm)	
Resolution	0.1 mg/L	
Accuracy @ 25°C (77°F)	±0.1 mg/L ±5% of reading	
Light Source	tungsten lamp	
Light Detector	silicon photocell with narrow band interference filter @ 525 nm	
Method	adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, DPD method	
Ordering Information	**HI96718** is supplied with sample cuvettes (2) with caps, 9V battery, instrument quality certificate and instruction manual. CAL Check standards and testing reagents sold separately **HI96718C** includes photometer, CAL Check standards, sample cuvettes (2) with caps, 9V battery, scissors, cuvette wiping cloth, instrument quality certificate, instruction manual and rigid carrying case. Reagents sold separately	
Reagents and Standards	**HI96718-11**	CAL Check standard cuvettes
	HI93718-01	reagents for 100 tests
	HI93718-03	reagents for 300 tests

Total Hardness

Defined as the sum of calcium and magnesium ions, Total Hardness is often expressed as calcium carbonate (CaCO3) equivalents. Other divalent metals ions such as manganese, zinc or iron can also contribute to this number, but are seldom included.

Water high in hardness can affect the quality of product being produced. It also reduces the effectiveness of soaps and detergents used for cleaning and in water treatment hardness is the main contributor to scaling that reduces the ability to transfer heat by a cooling tower.

Areas with a high amount of hardness in the water will treat the water to reduce the levels by the use of a water softener, in which the calcium and magnesium ions are exchanged for sodium or potassium. Hardness can also be reduced by purification by demineralizer, distillation, or reverse osmosis.

Hardness, EPA Portable Photometer

- CAL Check
  - Allows for performance verification and calibration of the meter using NIST traceable standards.
- GLP
  - Review of the last calibration date
- Auto-shut off

Specifications	HI96735 Hardness, Total		
	Hardness LR (P1)	Hardness MR (P2)	Hardness HR (P3)
Range	0 to 250 mg/L (ppm)	200 to 500 mg/L (ppm)	400 to 750 mg/L (ppm)
Resolution	1 mg/L from 0 to 100 mg/L 5 mg/L from 100 to 250 mg/L	1 mg/L from 0-100 mg/L 5 mg/L from 100-500 mg/L	5 mg/L from 400-750 mg/L
Accuracy @ 25°C (77°F)	±5 mg/L ±4% of reading	±7 mg/L ±3% of reading	±10 mg/L ±2% of reading
Light Source	light emitting diode		
Light Detector	silicon photocell with narrow band interference filter @ 466		
Method	adaptation of the EPA recommended method 130.1		
Ordering Information	**HI96735** is supplied with sample cuvettes (2) with caps, 9V battery, instrument quality certificate and instruction manual. CAL Check™ standards and testing reagents sold separately		
Reagents and Standards	**HI96735-11**	CAL Check™ standard cuvettes	
	HI93735-00	reagents for 100 tests (0-250 mg/L)	
	HI93735-01	reagents for 100 tests (200-500 mg/L)	
	HI93735-02	reagents for 100 tests (400-750 mg/L)	
	HI93735-0	reagents for 100 tests (0-750 mg/L)	

Total Hardness Chemical Test Kit

Specifications	HI3812 Total Hardness
Type	titration
Range	0.0 to 30.0 mg/L $CaCO_3$; 0 to 300 mg/L $CaCO_3$
Smallest Increment	0.3 mg/L (0.0 to 30.0 mg/L); 3 mg/L (0 to 300 mg/L)
Method	EDTA
Number of Tests	100 avg.
Ordering Information	**HI3812** test kit comes with 30 mL hardness buffer, 10 mL calmagite indicator, 120 mL EDTA solution, 20 mL plastic beaker with cap, 50 mL plastic beaker with cap and 1 mL syringe with tip.
Reagent	**HI3812-100** total hardness (as $CaCO_3$), 100 tests avg.

- Cuvette Adapter
  - The HI83399 is supplied with a 16 mm cuvette adapter that accepts digestion vials.

d DIGITAL

HI83399 and HI83314 is compatible with compatible Hanna pH digital probes.

Multiparameter Photometers with COD

with Digital pH Electrode Input

HI83399 and HI83314 are compact, multiparameter photometers with COD for measuring key water and wastewater quality parameters. With their digital pH/temperature electrode input, these meters double as a professional pH meter. Now one meter can be used for both photometric and pH measurements.

- Advanced optical system
  - Innovative optical design that utilizes a reference detector and focusing lens to eliminate errors from changes in the light source and from imperfections in the glass cuvette
- Built-in reaction timer for photometric measurements
  - The measurement is taken after the countdown timer expires. This ensures that all readings are taken at the appropriate reaction intervals regardless of user for better consistency in measurements
- Result conversion
  - Automatically convert readings to other chemical forms with the touch of a button

- Absorbance mode
  - Hanna's exclusive CAL Check cuvettes for validation of light source and detector.
  - Allows for the user to plot concentration versus absorbance for a specific wavelength for use with user supplied chemistry or for teaching principles of photometry
- Digital pH electrode input
  - Measure pH and temperature with a single probe
  - Good Laboratory Practice (GLP) to track calibration information including date, time, buffers used, offset and slope for traceability
  - pH CAL Check alerts user to potential problems during the calibration process
- Data logging
  - Log and recall up to 1000 photometric and pH readings via dedicated LOG and RECALL buttons.
  - Sample ID and User ID information can be added to a logged reading
- Connectivity
  - Logged readings can be transferred to a flash drive via USB or to a computer via micro-USB
  - Data is exported as a .CSV file for use
- Rechargeable battery
  - Li-polymer rechargeable battery lasts for 500 measurements or 50 hours of pH measurement
- Battery status indicator
- Backlit 128 x 64 pixel graphic LCD display

General Specifications

Parameters	See table on following pages	
Measurement Channels	5 x optical channels; 1 x digital electrode channel (pH measurement)	
Absorbance	Range	0.000 to 4.000 Abs
	Resolution	0.001 Abs
	Accuracy	±0.003 Abs (at 1.000 Abs)
	Light Source	light-emitting diode
	Bandpass Filter Bandwidth	8 nm
	Bandpass Filter Wavelength Accuracy	± 1.0 nm
pH (from pH digital electrode)	Range	-2.00 to 16.00 pH (±1000 mV)*
	Resolution	0.01 pH (0.1 mV)
	Temperature Compensation	Automatic (-5.0 to 100.0°C; 23.0 to 212.0°F)*
Temperature	Range	-20 to 120°C (-4.0 to 248.0 °F)
	Resolution	0.1 °C (0.1 °F)
Ordering Information	**HI83399-01** (115V) and **HI83399-02** (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter and instruction manual. Reagents sold separately.	
	HI83314-01 (115V) and **HI83314-02** (230V) is supplied with sample cuvettes and caps (4 ea.), cloth for wiping cuvettes, USB to micro USB cable connector, power adapter and instruction manual. Reagents sold separately.	
Standards	**HI83399-11** CAL Check Cuvette Kit for HI83399	
	HI83314-11 CAL Check Cuvette Kit for HI83314	

Parameters

	HI83399	HI83314
Alkalinity	•	
Aluminum	•	
Ammonia Low Range	•	•
Ammonia Low Range (16 mm vial)	•	•
Ammonia Medium Range	•	•
Ammonia High Range	•	•
Ammonia High Range (16 mm vial)	•	•
Bromine	•	
Calcium	•	
Chloride	•	
Chlorine Dioxide	•	
Chlorine, Free	•	•
Chlorine, Free Ultra Low Range	•	
Chlorine, Total	•	•
Chlorine, Total Ultra Low Range	•	
Chlorine, Total Ultra High Range	•	
COD Low Range (16 mm vial)*	•	•
COD Medium Range (16 mm vial)*	•	•
COD HR (16 mm vial)*	•	•
Copper Low Range	•	
Copper High Range	•	
Cyanuric Acid	•	
Hardness, Calcium	•	
Hardness, Magnesium	•	
Hardness, Total Low Range	•	
Hardness, Total Medium Range	•	
Hardness, Total High Range	•	
Hydrazine	•	
Iodine	•	
Iron Low Range	•	
Iron High Range	•	
Magnesium	•	
Manganese Low Range	•	
Manganese High Range	•	

	HI83399	HI83314
Molybdenum	•	
Nitrate	•	
Nitrate (16 mm vial)	•	•
Nitrite Low Range	•	•
Nitrite High Range	•	•
Nitrogen, Total Low Range (16 mm vial)	•	•
Nitrogen, Total High Range (16 mm vial)	•	•
Oxygen, Dissolved	•	
Oxygen Scavengers (Carbohydrazide)	•	
Oxygen Scavengers (DEHA)	•	
Oxygen Scavengers (Hydroquinone)	•	
Oxygen Scavengers (Iso-ascorbic acid)	•	
Ozone	•	
pH (digital probe input)	•	•
Phosphate Low Range	•	
Phosphate High Range	•	
Phosphorus Reactive Low Range (16 mm vial)	•	•
Phosphorus Reactive High Range (16 mm vial)	•	•
Phosphorus Acid Hydrolyzable (16 mm vial)	•	•
Phosphorus, Total Low Range (16 mm vial)	•	•
Phosphorus, Total High Range (16 mm vial)	•	•
Potassium	•	
Silica Low Range	•	
Silica High range	•	
Sulfate	•	
Surfactants, Anionic	•	

***COD Rapid Method available.**

COD Reactor for Digestion Vials

A COD reactor is used to heat the digestion vials. The digestion vials must be heated to a specific temperature for a period time making the HI839800 an important accessory required to have a complete wastewater treatment monitoring system.

COD Certified Standards and Reagents

- Pre-dosed reagents for ease of use
- Supplied with certificate of quality
- Marked with expiration date and lot number for traceability

Reagents (Box of 25 vials)	COD LR: 0 to 150 mg/L	COD MR: 0 to 1500 mg/L	COD HR: 0 to 15000 mg/L
Dichromate EPA*	**HI93754A-25**	**HI93754B-25**	–
Dichromate Mercury Free**	**HI93754D-25**	**HI93754E-25**	–
Dichromate ISO***	**HI93754F-25**	**HI93754G-25**	–
Dichromate	–	–	**HI93754C-25**

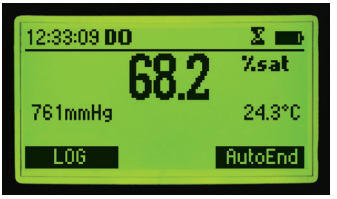
Standards (500 mL bottle)	500 ppm COD standard	14000 ppm COD standard
	HI93754-11	**HI93754-12**

Reagents (Box of 50 vials)	Total Phosphorus LR: 0.00 to 1.15 mg/L (as P)	Total Phosphorus HR: 0.0 to 32.6 mg/L (as P)
Total Phosphorus	**HI94758C-50**	**HI94763B-50**

Notes:
*Method with chromium-sulfuric acid is officially recognized by EPA for wastewater analysis.
**This method is recommended for general purpose analysis with no chloride interference.
*** Method follows the official method ISO 15705. COD MR ISO method is 0-1000 mg/L. Meter can read higher.

Waterproof Portable Dissolved Oxygen and BOD Meter

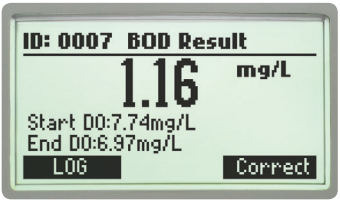
The HI98193 is a rugged, portable dissolved oxygen (DO) meter designed for demanding applications. This professional, waterproof meter complies with IP67 standards and measures DO, barometric pressure, BOD and temperature. The HI98193 is supplied complete with all accessories to perform a DO measurement packaged into a durable carrying case.



- Backlit graphic LCD display
- 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.
- Data logging
  - 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.
- AutoHold
  - Pressing AutoHold during measurement will automatically hold the first stable reading on the display.

QUICK DIN

HI98193 includes HI764073 polarographic DO probe and protective sleeve with a quick connect DIN connector to make attaching and removing the probe simple and easy.



- 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.
- 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.
- GLP
  - Comprehensive GLP functions are directly accessible by pressing the GLP key. Calibration data, including date, time and calibration values are stored for retrieval at a later time.

Specifications		HI98193
DO	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
Ordering Information	**HI98193** is supplied with HI764073 polarographic DO probe with protective sleeve, 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.	

Speedsafe™ speed control

Often in the lab, a sample is removed from a stirrer before reducing the speed. Normally, this would cause the motor to accelerate until it is destroyed. Hanna stirrers incorporate electronic controls that allow the user to regulate the speed with greater precision. In addition to speed control, the Speedsafe mechanism will assure that the maximum speed is never exceeded.

11 colors to choose from

Both models of mini-stirrers are available in eleven colors. The various colors can allow easy sample identification at a distance.

HI181 • HI180

Compact Magnetic Stirrers

Available With and Without Detachable Electrode Holder

- Maximum stirring capacity of 1 liter (0.26 gallons)
- Adjustable speed control
- Chemical resistant housing

Common stirrers are manufactured with steel and aluminum components. These units are often too large and heavy to fit in the limited space of a laboratory. Hanna HI181 and HI180 models are compact, lightweight, and inexpensive.

HI181 ordering information

All models include detachable electrode holder, micro stir bar and instructions.

HI181-1 Black
mini-stirrer (115V)

HI181W-1 Arctic white
mini-stirrer (115V)

HI181F-1 Blue
mini-stirrer (115V)

HI181M-1 Moss green
mini-stirrer (115V)

HI181K-1 Orange
mini-stirrer (115V)

HI181L-1 Lavender
mini-stirrer (115V)

HI181J-1 Charcoal
mini-stirrer (115V)

HI181I-1 Ivory
mini-stirrer (115V)

HI181C-1 Glacier blue
mini-stirrer (115V)

HI181E-1 Green
mini-stirrer (115V)

HI181A-1 Yellow
mini-stirrer (115V)

HI180 ordering information

All models include micro stir bar and instructions.

HI180-1 Black
mini-stirrer (115V)

HI180W-1 Arctic white
mini-stirrer (115V)

HI180F-1 Blue
mini-stirrer (115V)

HI180M-1 Moss green
mini-stirrer (115V)

HI180K-1 Orange
mini-stirrer (115V)

HI180L-1 Lavender
mini-stirrer (115V)

HI180J-1 Charcoal
mini-stirrer (115V)

HI180I-1 Ivory
mini-stirrer (115V)

HI180C-1 Glacier blue
mini-stirrer (115V)

HI180E-1 Green
mini-stirrer (115V)

HI180A-1 Yellow
mini-stirrer (115V)

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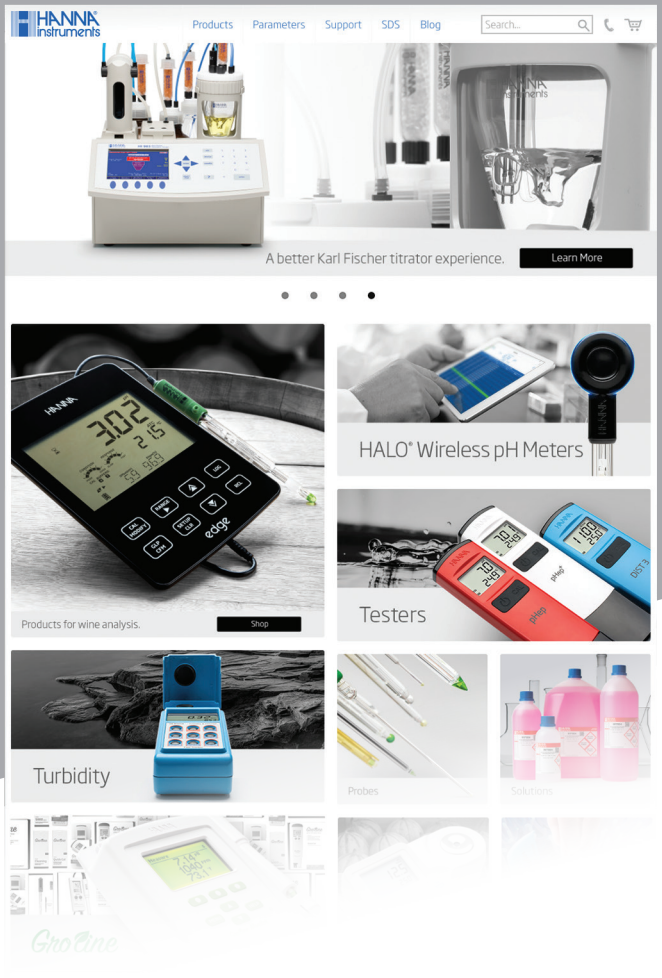

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