

HI9126

Portable pH/mV Meter



- **CAL Check™**
 - Alerts users of calibration status
- **Backlight**
 - Backlit, multi-level LCD display
- **Battery Error Prevention System (BEPS)**
 - Automatically shuts off meter when battery is too low to take accurate readings
- **Battery indicator**
 - Battery percentage displayed on startup
- **Help feature**
 - Tutorial messages displayed on LCD

The HI9126 includes Hanna's exclusive CAL Check™ technology. CAL Check™ monitors the pH bulb every time the instrument is calibrated. In the event of a dirty pH electrode, CAL Check™ warns users that maintenance may be needed.

Calibrated buffers are continuously displayed in measurement mode to remind users of the instrument's calibration point. Users can easily determine if readings are taken too far outside the calibration range.

The HI9126 can store and recall a reading at the touch of a button and features a real-time clock.

HI9126 utilizes the HI1230B double junction pH electrode. The double junction design helps to minimize junction contamination for consistently accurate results. The HI9126 can also measure ORP in the mV range using an optional ORP probe.

Specifications	HI9126	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.01 pH
	Calibration	automatic, one or two-point with seven standard buffers available (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) and two custom buffers
	Temperature Compensation	automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F)
mV	Range	±699.9 mV; ±1999 mV
	Resolution	0.1 mV; 1 mV
	Accuracy	±0.2 mV; ±1 mV
Temperature*	Range	-20.0 to 120.0°C; -4.0°F to 248.0°F
	Resolution	0.1°C; 0.1 °F
	Accuracy	±0.4°C; ±0.8°F
Additional Specifications	pH Electrode	HI1230B PEI body pH electrode with BNC connector and 1 m (3.3') cable (included)
	Temperature Probe	HI7662 stainless steel temperature probe with 1 m (3.3') cable (included)
	Slope / Offset Calibration	from 80 to 108% / ±1 pH
	Input Impedance	10 ¹² Ohm
	Battery Type / Life	1.5V (3) AAA / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	after 20 minutes of non-use (can be disabled)
	Environment	0 to 50°C (32 to 122°F); RH max 100%
	Dimensions / Weight	185 x 72 x 36 mm (7.3 x 2.8 x 1.4") / 300 g (10.6 oz.)
Ordering Information	HI9126 is supplied with HI1230B pH electrode, HI7662 temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer sachet, HI700601 electrode cleaning solution sachet, 100 mL plastic beaker, 1.5V AAA batteries (3), instructions and hard carrying case.	

ติดต่อบริษัท เนออนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

* Limits will be reduced to actual sensor limits

HI98190

Professional Waterproof Meter

pH/ORP

- **Waterproof**
 - IP67 rated waterproof, rugged enclosure
- **CAL Check™**
 - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- **Automatic or manual temperature compensation**
 - pH sensors incorporate a built-in temperature sensor
- **Calibration**
 - Up to a five-point calibration with seven standard buffers and five custom buffers available
- **Approximately 200 hour battery life**
 - Powered by (4) 1.5V AA batteries
- **Clear display**
 - Dot matrix display with multifunction virtual keys
- **AutoHold**
 - Automatically holds the first stable reading on the display
- **Calibration timeout**
 - Alerts when calibration is due at a specified interval
- **Connectivity**
 - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
 - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
 - Most of the available options such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
 - Each meter is supplied complete with sensor, calibration solution, beakers, PC software and connection cable, instruction manual, quick start guide and batteries in a rugged, custom carrying case.



Designed for professionals

The HI98190 is a rugged, portable pH meter with the performance and features of a benchtop meter. Exchange out the pH probe for an ORP probe to obtain mV readings in the ± 2000 mV range. This professional, waterproof meter can easily be operated with one hand and complies with IP67 standards. The HI98190 is supplied with all necessary accessories to perform a pH/temperature measurement packaged into a durable carrying case.



Backlit Graphic LCD Display

The HI98190 features a backlit graphic LCD with on-screen help. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

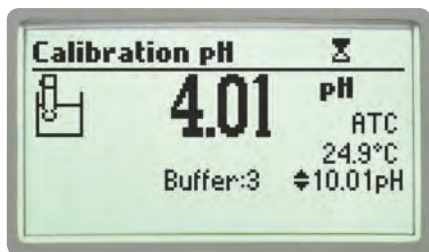
Waterproof Protection

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



Quick Connect Probe

The HI98190 features the HI12963 titanium bodied pH/temperature electrode with a quick connect DIN connector to make attaching and removing the probe simple and easy.



pH Calibration

Choose from seven standard pH buffers and five custom pH buffers to obtain up to five point calibration and achieve high precision readings with a pH accuracy of ± 0.002 and up to ± 0.001 pH resolution.

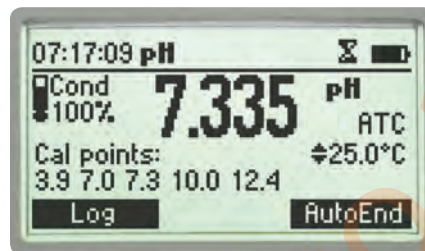
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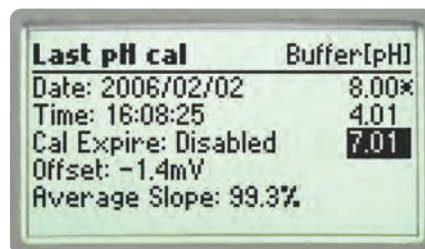
Enhanced Calibration

An "out of calibration range" warning can be engaged to keep the user informed of the current calibration and help to avoid performing measurements that are out of range.



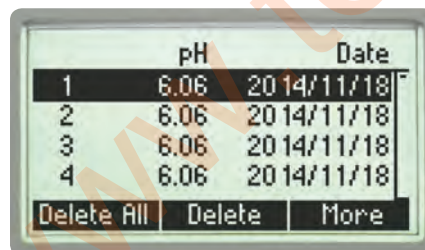
CAL Check™

Hanna's CAL Check maintains a history of past calibrations and monitors the pH electrode and buffers during subsequent calibrations for any signs of wide variances due to a dirty or broken electrode or contaminated pH buffers. During calibration, users are alerted to problems should they occur. After calibration, the electrode's overall condition is displayed as a percentage.



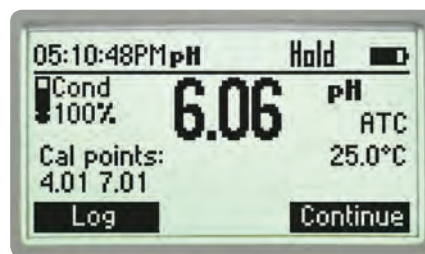
GLP

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.



Data Logging

The log-on-demand feature allows users to store up to 200 samples that can be later 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.

Intuitive Keypad

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



Dedicated Help Key

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

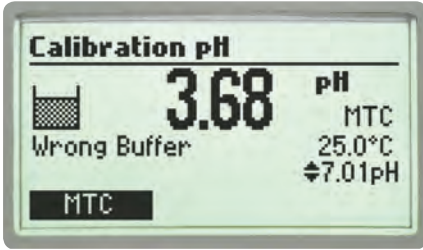


Setup Screen

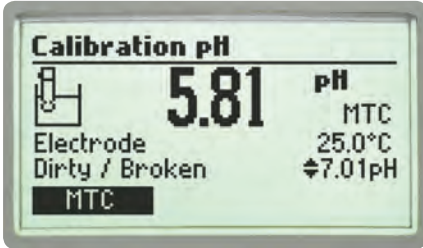
Our extensive setup screen features a host of configurable options such as time, date, temperature units and language for help screens and guides.

Calibration Error Messages

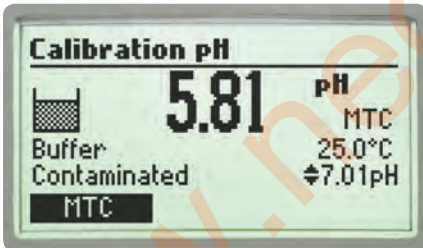
Calibration is successfully performed if the reading is within certain limits.



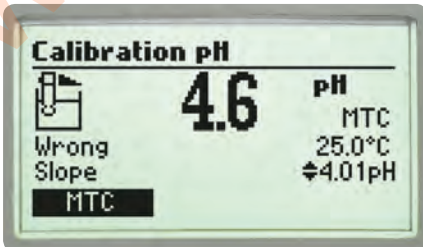
Wrong Buffer – The pH reading is not within range of the selected buffer.



Electrode Dirty/Broken alternatively with



Buffer Contaminated – The offset of the electrode is not in the accepted range. Check if the electrode is broken or clean it following the Cleaning Procedure at the end of this section. Check the quality of the buffer. If necessary, change the buffer.



Wrong or Wrong Old Slope – An inconsistency between new and previous (old) calibration is detected.



PC Connectivity

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



Long Battery Life

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



Supplied Complete in a Rugged Custom Carrying Case

The HI98190 meter, probe, and all accessories are supplied in the HI720190 rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.



HI12963 pH Electrode

- **Titanium body**
 - Titanium construction provides an unbreakable structure and allows the transfer of heat to the internal temperature sensor for rapid temperature compensation.
- **Maintenance free, gel-filled electrode**
 - No fill solution required.

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Calibrate right in the case with custom beaker holders

Our custom carrying case features beaker holders for calibration out in the field.



pH

portable

Specifications	HI98190	
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)
Additional Specifications	pH Probe	HI12963 titanium body, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)
	Slope Calibration	from 80 to 110%
	Log-on-demand	200 samples (100 each pH/mV range)
	PC Connection	opto-isolated USB with HI92000 software and micro USB cable
	Input Impedance	10 ¹² Ω
	Battery Type / Life	1.5V AA batteries (4) / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
Ordering Information	HI98190 is supplied with HI12963 pH electrode, HI7004M pH 4.01 buffer solution (230 mL), HI7007M pH 7.01 buffer solution (230 mL), electrode cleaning solution sachet (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 HI720190 rugged carrying case with custom insert.	

* Limits will be reduced to actual sensor limits

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HI98161

pH / Temperature Meter for Food

HI98161 is a professional portable pH and temperature meter with a probe designed specifically for pH measurement in the Food sector.

- **Waterproof**
 - IP67 rated waterproof, rugged enclosure
- **CAL Check™**
 - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- **Automatic or manual temperature compensation**
 - pH sensors incorporate a built-in temperature sensor
- **Calibration**
 - Up to a five-point calibration with seven standard buffers and five custom buffers
- **Approximately 200 hour battery life**
 - Powered by (4) 1.5V AA batteries
- **Clear display**
 - Dot matrix display with multifunction virtual keys
- **Auto hold**
 - Automatically holds the first stable reading on the display
- **Calibration timeout**
 - Alerts when calibration is due at a specified interval
- **Connectivity**
 - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
 - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
 - Important and often used functions such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
 - Each meter is 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



Foodcare pH Meter

designed for food professionals

Hanna food quality pH meters are rugged and portable with the performance and features of a benchtop. Five models are available in this series to measure food, milk, meat, yogurt and cheese. Each model is supplied with an application specific electrode and cleaning solutions. These waterproof meters comply to IP67 standards and can be easily operated with one hand.



Backlit Graphic LCD Display

These meters feature 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

Each meter features an application specific pH/temperature probe with a quick connect DIN connector to make attaching and removing the probe simple and easy.

Calibration Timeout

Alerts when calibration is due at a specified interval.



pH Calibration

Choose from seven standard pH buffers and five custom values to obtain up to five point calibration and achieve high precision readings with a 0.001 pH resolution and a pH accuracy of ± 0.002 .

Enhanced Calibration

An "out of calibration range" warning can be engaged to keep the user informed of the current calibration and help to avoid performing measurements that are out of the bracketed range.



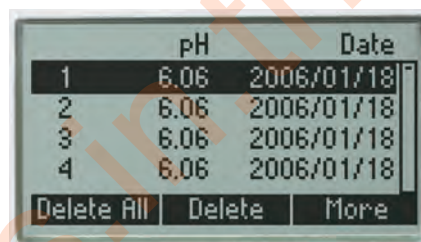
CAL Check™

Hanna's CAL Check™ maintains a history of past calibrations and monitors the pH electrode and buffers during subsequent calibrations for any signs of wide variances due to a dirty or broken electrode or contaminated pH buffers. During calibration, users are alerted to problems should they occur. After calibration, the electrode's overall condition is displayed as a percentage.



GLP

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



Data Logging

The log-on-demand feature allows users to store up to 200 samples that can be later transferred to a PC with the HI920015 USB cable and HI92000 software.

Automatic Temperature Compensation

pH sensors incorporate a built-in temperature sensor in the tip of the electrode for a fast and accurate temperature compensated value.

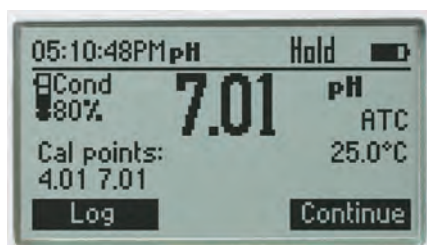
Intuitive Keypad

The fitted rubber keypad has dedicated keys for many important and often used functions. These meters also feature two virtual soft keys that navigate the user through setup and logging of data. The interface is intuitive for any user's level of experience.

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Auto Hold

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



Dedicated Help Key

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



Setup Screen

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



PC Connectivity

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

Long Battery Life

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



Supplied Complete in a Rugged Custom Carrying Case

Each meter is 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. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

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)
Additional Specifications	pH Probe	FC2023 PVDF body, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)
	Slope Calibration	from 80 to 110%
	Log-on-demand	Up to 200 samples (100 pH, 100 mV)
	PC Connection	opto-isolated USB with HI92000 software and micro USB cable
	Input Impedance	10 ¹² Ω
	Battery Type / Life	1.5V AA batteries (4) / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
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 / Temperature Probe for Food

When measuring pH, food products can pose a number of challenges. 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. Designed specifically for measuring pH in food, the FC2023 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. The FC2023 is an ideal general purpose pH electrode for use in food manufacturing.

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.

Low temperature glass

The FC2023 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 FC2023 is suitable to use with samples that measure from 0 to 50°C.

Open junction reference

Clogging of the reference junction is a common challenge faced by food producers that measure pH in slurries and semi-solid products. The solids can easily clog the ceramic junction used with standard laboratory pH electrodes. The open junction design of the FC2023 resists clogging and continues to provide accurate, stable readings.

Viscolene electrolyte

The viscolene electrolyte offers a hard gel interface between the inner electrode components and the sample being measured. The electrolyte is silver-free for use in food products and is maintenance-free.

Conic tip shape

This design allows for penetration into semisolids and emulsions for the direct measurement of pH in a variety of food products including sauces, dough, and other semi-solids.

Built-in temperature sensor

A thermistor temperature sensor is in the tip of the indicating pH electrode. A temperature sensor should be as close as possible to the indicating pH bulb in order to compensate for variations in temperature.

Application Importance

One of the most common measurements of food products is pH because of how it affects food characteristics such as shelf stability, texture, and flavor. Foods are generally broken into two groups based on their pH value. These groups include acid foods which have a naturally low pH of 4.6 or below and low-acid foods that have a finished equilibrium pH value greater than pH 4.6 and a water activity greater than 0.85. The low-acid foods can be pH adjusted with the addition of an acid to lower the final pH and become an acidified food.

In food processing, some products require the measurement of pH to meet industry regulations to ensure the quality and safety of goods. A lower pH will help in preventing unwanted bacteria from growing thus extending the shelf life of a product. While food safety is a crucial consideration, understanding the pH of a food product can also help to achieve consistent flavors and textures. Through fermentation and other biological processes, many foodstuffs only achieve their desired qualities at particular pH values or ranges. pH is an essential parameter that requires close observation throughout food production to provide the best possible product.

Specifications	FC2023
Description	pre-amplified pH/temperature probe
Reference	single, Ag/AgCl
Junction	open
Electrolyte	viscolene
Max Pressure	0.1 bar
Range	pH: 0 to 12
Recommended Operating Temperature	0 to 50°C (32 to 122°F) - LT
Tip /Shape	conic (dia: 6 x 10 mm)
Temperature Sensor	yes
Amplifier	yes
Body Material	PVDF
Cable	coaxial; 1 m (3.3')
Connection	quick connect DIN

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HI98162

pH / Temperature Meter for Milk

HI98162 is a professional portable pH and temperature meter with a probe designed specifically for pH measurement in milk.

- **Waterproof**
 - IP67 rated waterproof, rugged enclosure
- **CAL Check™**
 - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- **Automatic or manual temperature compensation**
 - pH sensors incorporate a built-in temperature sensor
- **Calibration**
 - Up to a five-point calibration with seven standard buffers and five custom buffers
- **Approximately 200 hour battery life**
 - Powered by (4) 1.5V AA batteries
- **Clear display**
 - Dot matrix display with multifunction virtual keys
- **Auto hold**
 - Automatically holds the first stable reading on the display
- **Calibration timeout**
 - Alerts when calibration is due at a specified interval
- **Connectivity**
 - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
 - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
 - Important and often used functions such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
 - Each meter is 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



Milk pH Meter

designed for food professionals

Hanna food quality pH meters are rugged and portable with the performance and features of a benchtop. Five models are available in this series to measure food, milk, meat, yogurt and cheese. Each model is supplied with an application specific electrode and cleaning solutions. These waterproof meters comply to IP67 standards and can be easily operated with one hand.



Backlit Graphic LCD Display

These meters feature 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

Each meter features an application specific pH/temperature probe with a quick connect DIN connector to make attaching and removing the probe simple and easy.

Calibration Timeout

Alerts when calibration is due at a specified interval.

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pH Calibration

Choose from seven standard pH buffers and five custom values to obtain up to five point calibration and achieve high precision readings with a 0.001 pH resolution and a pH accuracy of ± 0.002 .

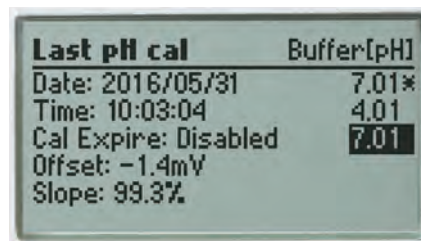
Enhanced Calibration

An "out of calibration range" warning can be engaged to keep the user informed of the current calibration and help to avoid performing measurements that are out of the bracketed range.



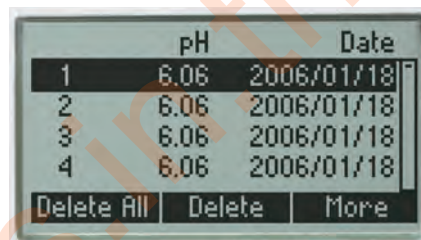
CAL Check™

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GLP

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Data Logging

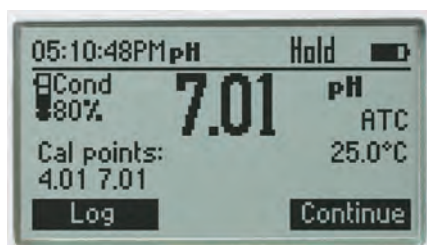
The log-on-demand feature allows users to store up to 200 samples that can be later transferred to a PC with the HI920015 USB cable and HI92000 software.

Automatic Temperature Compensation

pH sensors incorporate a built-in temperature sensor in the tip of the electrode for a fast and accurate temperature compensated value.

Intuitive Keypad

The fitted rubber keypad has dedicated keys for many important and often used functions. These meters also feature two virtual soft keys that navigate the user through setup and logging of data. The interface is intuitive for any user's level of experience.



Auto Hold

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



Dedicated Help Key

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



Setup Screen

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



PC Connectivity

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

Long Battery Life

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



Supplied Complete in a Rugged Custom Carrying Case

Each meter is 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. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

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
	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)
Additional Specifications	pH Probe	FC1013 PVDF body, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)
	Slope Calibration	from 80 to 110%
	Log-on-demand	Up to 200 samples (100 pH, 100 mV)
	PC Connection	opto-isolated USB with HI92000 software and micro USB cable
	Input Impedance	10 ¹² Ω
	Battery Type / Life	1.5V AA batteries (4) / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
	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 Probe for Milk

The FC1013 pH electrode has a built-in temperature sensor for simultaneous temperature compensated pH and temperature readings, and also contains an integral pH sensor preamplifier to provide measurements impervious to noise and electrical interferences.

FC1013 electrode is designed to prevent the typical problems of clogging in viscous and proteinaceous liquids ensuring a fast response and stable reading.

PVDF body

The FC1013 is composed of food grade PVDF plastic. This material is highly durable and chemically resistant.

General purpose glass

The FC1013 uses general purpose (GP) glass. The formulation allows for fast response over a wide range of temperatures. The FC1013 is suitable to use with samples that measure from 0 to 80°C.

Refillable electrolyte

The silver-free electrolyte ensures no silver precipitate can clog the junction. An easy to use fill cap allows for quick refilling of electrolyte solution to maintain adequate head pressure.

Single ceramic junction

A porous ceramic frit allows the silver-free electrolyte to flow slowly into solution, providing accurate readings for aqueous samples.

Spheric tip shape

The shape of the sensing membrane provides a large surface area for contact with milk samples. The highly durable construction provides accurate measurements on the dairy farm as well as the production facility.

Built-in temperature sensor

A thermistor temperature sensor is in the tip of the indicating pH bulb. A temperature sensor should be as close as possible to the indicating pH electrode in order to compensate for variations in temperature.

Specifications	FC1013
Description	pre-amplified pH/temperature probe
Reference	double, Ag/AgCl
Junction	ceramic, single
Electrolyte	KCl 3.5M
Max Pressure	0.1 bar
Range	pH: 0 to 13
Recommended Operating Temperature	0 to 80°C (32 to 176°F) - GP
Tip / Shape	spheric (dia: 7.5 mm)
Temperature Sensor	yes
Amplifier	yes
Body Material	PVDF
Cable	coaxial; 1 m (3.3')
Connection	quick connect DIN

Application Importance

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 measurements are 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 infected with mastitis. 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.



HI98163

pH / Temperature Meter for Meat

HI98163 is a professional portable pH and temperature meter with a probe designed specifically for pH measurement in meat.

- **Waterproof**
 - IP67 rated waterproof, rugged enclosure
- **CAL Check™**
 - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- **Automatic or manual temperature compensation**
 - pH sensors incorporate a built-in temperature sensor
- **Calibration**
 - Up to a five-point calibration with seven standard buffers and five custom buffers
- **Approximately 200 hour battery life**
 - Powered by (4) 1.5V AA batteries
- **Clear display**
 - Dot matrix display with multifunction virtual keys
- **Auto hold**
 - Automatically holds the first stable reading on the display
- **Calibration timeout**
 - Alerts when calibration is due at a specified interval
- **Connectivity**
 - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
 - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
 - Important and often used functions such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
 - Each meter is 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



Meat pH Meter

designed for food professionals

Hanna food quality pH meters are rugged and portable with the performance and features of a benchtop. Five models are available in this series to measure food, milk, meat, yogurt and cheese. Each model is supplied with an application specific electrode and cleaning solutions. These waterproof meters comply to IP67 standards and can be easily operated with one hand.



Backlit Graphic LCD Display

These meters feature 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

Each meter features an application specific pH/temperature probe with a quick connect DIN connector to make attaching and removing the probe simple and easy.

Calibration Timeout

Alerts when calibration is due at a specified interval.



pH Calibration

Choose from seven standard pH buffers and five custom values to obtain up to five point calibration and achieve high precision readings with a 0.001 pH resolution and a pH accuracy of ± 0.002 .

Enhanced Calibration

An "out of calibration range" warning can be engaged to keep the user informed of the current calibration and help to avoid performing measurements that are out of the bracketed range.



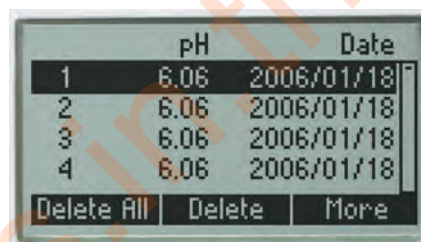
CAL Check™

Hanna's CAL Check™ maintains a history of past calibrations and monitors the pH electrode and buffers during subsequent calibrations for any signs of wide variances due to a dirty or broken electrode or contaminated pH buffers. During calibration, users are alerted to problems should they occur. After calibration, the electrode's overall condition is displayed as a percentage.



GLP

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



Data Logging

The log-on-demand feature allows users to store up to 200 samples that can be later transferred to a PC with the HI920015 USB cable and HI92000 software.

Automatic Temperature Compensation

pH sensors incorporate a built-in temperature sensor in the tip of the electrode for a fast and accurate temperature compensated value.

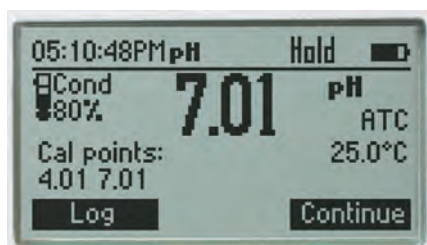
Intuitive Keypad

The fitted rubber keypad has dedicated keys for many important and often used functions. These meters also feature two virtual soft keys that navigate the user through setup and logging of data. The interface is intuitive for any user's level of experience.

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th



Auto Hold

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



Dedicated Help Key

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



Setup Screen

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



PC Connectivity

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

Long Battery Life

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



Supplied Complete in a Rugged Custom Carrying Case

Each meter is 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. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

Specifications	HI98163	
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)
Additional Specifications	pH Probe	FC2323 PVDF body, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)
	Slope Calibration	from 80 to 110%
	Log-on-demand	Up to 200 samples (100 pH, 100 mV)
	PC Connection	opto-isolated USB with HI92000 software and micro USB cable
	Input Impedance	10 ¹² Ω
	Battery Type / Life	1.5V AA batteries (4) / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
Ordering Information	HI98163 is supplied with FC2323 pH electrode, FC099 meat piercing stainless steel blade, HI7004M pH 4.01 buffer solution (230 mL), HI7007M pH 7.01 buffer solution (230 mL), HI700630 electrode acid cleaning solution sachet for meat grease and fat 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 Probe for Meat

The FC2323 probe has been specially designed with a stainless steel blade tip for meat penetration.

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.

Viscolene electrolyte

The viscolene electrolyte offers a hard gel interface between the inner electrode components and the sample being measured. The electrolyte is silver-free for use in food products and is maintenance-free.

Stainless steel piercing blade

The FC099 (35mm; 1.38") stainless steel blade can be attached to the probe for easy meat penetration. Piercing into the meat will allow for the pH glass and reference junction to be in contact with the sample for a direct pH measurement without extensive sample preparation.

Open junction reference

Clogging of the reference junction is a common challenge faced by food producers that measure pH in semi-solid products such as meat. The solids can easily clog the ceramic junction used with standard laboratory pH electrodes. The open junction design of the FC2323 resists clogging and continues to provide accurate, stable readings.

Low temperature glass

The FC2023 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 FC2023 is suitable to use with samples that measure from 0 to 50°C.

Built-in temperature sensor

A thermistor temperature sensor is in the tip of the indicating pH electrode. A temperature sensor should be as close as possible to the indicating pH bulb in order to compensate for variations in temperature.

Conic tip shape

This design along with a piercing blade allows for the easy penetration into semisolids for the direct measurement of pH.



Application Importance

In the meat production industry, the monitoring of pH is considered to be of the utmost importance due to its effect on the meat's quality factors including water binding capacity and shelf life. Upon slaughter, biochemical processes begin to break down the meat. Glycolysis begins post-mortem, converting glycogen to lactic acid, reducing the pH of the carcass. Depending on a number of factors such as type of animal and even breed, this decrease in pH can take anywhere from a single hour to many. It is vital to monitor pH during this phase as once the lowest pH value is reached, the pH will begin to slowly rise, indicating that decomposition has begun.

The pH value of meat influences its' water binding capacity which directly impacts consumer qualities such as tenderness and color. Lower pH values result in a lower water-binding capacity and lighter colors. Factors such as these can be important when considering how to efficiently produce meat products. For example, when producing dry sausages the meat must have a low water binding capacity so that it can dry evenly.

Depending on the type of the final product and the steps required to get there, pH values will vary throughout the meat processing industry. It is imperative, regardless of the final product, that pH be maintained at a low value to prevent bacterial spoilage and comply with food safety regulations. By monitoring pH values throughout the meat production process, you can ensure the creation of consistent and safe meat products.

Specifications	FC2323
Description	pre-amplified pH/temperature probe
Reference	single, Ag/AgCl
Junction	open
Electrolyte	viscolene
Max Pressure	0.1 bar
Range	pH: 0 to 12
Recommended Operating Temperature	0 to 50°C (32 to 122°F) - LT
Tip /Shape	conic (dia: 6 x 10 mm)
Temperature Sensor	yes
Amplifier	yes
Body Material	PVDF
Cable	coaxial; 1 m (3.3')
Connection	quick connect DIN

ติดต่อบริษัท เนโอเนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI98164

pH / Temperature Meter for Yogurt

HI98164 is a professional portable pH and temperature meter with a probe designed specifically for pH measurement in yogurt.

- **Waterproof**
 - IP67 rated waterproof, rugged enclosure
- **CAL Check™**
 - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- **Automatic or manual temperature compensation**
 - pH sensors incorporate a built-in temperature sensor
- **Calibration**
 - Up to a five-point calibration with seven standard buffers and five custom buffers
- **Approximately 200 hour battery life**
 - Powered by (4) 1.5V AA batteries
- **Clear display**
 - Dot matrix display with multifunction virtual keys
- **Auto hold**
 - Automatically holds the first stable reading on the display
- **Calibration timeout**
 - Alerts when calibration is due at a specified interval
- **Connectivity**
 - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
 - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
 - Important and often used functions such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
 - Each meter is 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



Yogurt pH Meter

designed for food professionals

Hanna food quality pH meters are rugged and portable with the performance and features of a benchtop. Five models are available in this series to measure food, milk, meat, yogurt and cheese. Each model is supplied with an application specific electrode and cleaning solutions. These waterproof meters comply to IP67 standards and can be easily operated with one hand.



Backlit Graphic LCD Display

These meters feature 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.

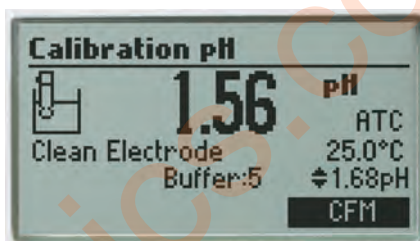


Quick Connect Probe

Each meter features an application specific pH/temperature probe with a quick connect DIN connector to make attaching and removing the probe simple and easy.

Calibration Timeout

Alerts when calibration is due at a specified interval.



pH Calibration

Choose from seven standard pH buffers and five custom values to obtain up to five point calibration and achieve high precision readings with a 0.001 pH resolution and a pH accuracy of ± 0.002 .

Enhanced Calibration

An "out of calibration range" warning can be engaged to keep the user informed of the current calibration and help to avoid performing measurements that are out of the bracketed range.



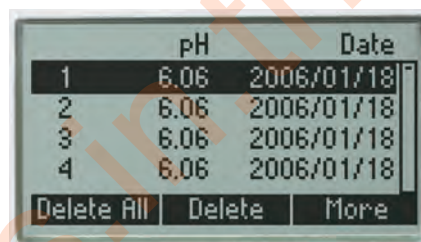
CAL Check™

Hanna's CAL Check™ maintains a history of past calibrations and monitors the pH electrode and buffers during subsequent calibrations for any signs of wide variances due to a dirty or broken electrode or contaminated pH buffers. During calibration, users are alerted to problems should they occur. After calibration, the electrode's overall condition is displayed as a percentage.



GLP

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



Data Logging

The log-on-demand feature allows users to store up to 200 samples that can be later transferred to a PC with the HI920015 USB cable and HI92000 software.

Automatic Temperature Compensation

pH sensors incorporate a built-in temperature sensor in the tip of the electrode for a fast and accurate temperature compensated value.

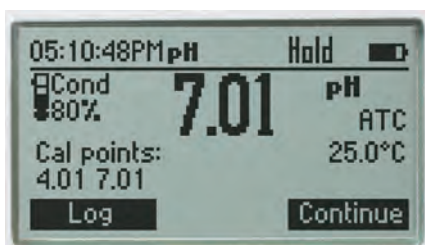
Intuitive Keypad

The fitted rubber keypad has dedicated keys for many important and often used functions. These meters also feature two virtual soft keys that navigate the user through setup and logging of data. The interface is intuitive for any user's level of experience.

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th



Auto Hold

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



Dedicated Help Key

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



Setup Screen

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



PC Connectivity

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

Long Battery Life

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



Supplied Complete in a Rugged Custom Carrying Case

Each meter is 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. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

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
	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)
Additional Specifications	pH Probe	FC2133 glass body, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)
	Slope Calibration	from 80 to 110%
	Log-on-demand	Up to 200 samples (100 pH, 100 mV)
	PC Connection	opto-isolated USB with HI92000 software and micro USB cable
	Input Impedance	10 ¹² Ω
	Battery Type / Life	1.5V AA batteries (4) / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
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 Probe for Yogurt

The FC2133 pH electrode is rugged and easy to clean with a conical tip and built-in temperature sensor. 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. FC2133 electrode is designed to prevent the typical problems of clogging in viscous liquids, ensuring a fast response and stable reading.

Glass body

The glass body of the FC2133 allows standards and samples to more quickly reach thermal equilibrium while also providing chemical resistance.

Low temperature glass

The FC2133 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 FC2133 is suitable to use with samples that measure from 0 to 50°C.

Viscolene electrolyte

The viscolene electrolyte offers a hard gel interface between the inner electrode components and the sample being measured. The electrolyte is silver-free for use in yogurt and is maintenance-free.

Open junction reference

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 resists clogging and continues to provide accurate, stable readings.

Conic tip shape

This design allows for penetration into semisolids and emulsions for the direct measurement of pH in yogurt products.

Built-in temperature sensor

A thermistor temperature sensor is in the tip of the indicating pH electrode. A temperature sensor should be as close as possible to the indicating pH bulb in order to compensate for variations in temperature.

Application Importance

Monitoring pH is crucial in producing consistent, quality yogurt. Yogurt is made by the fermentation of milk with live bacterial cultures. Following pasteurization and compositional adjustment, milk is homogenized for a consistent texture, heated to the desired thickness, and cooled before inoculation. Most yogurt is 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. As lactic acid is produced, there is a correlating drop in pH. Due to the more acidic mixture, the casein protein in milk coagulates and precipitates out, thickening the milk into a yogurt-like texture.

Yogurt producers cease incubation once a specific pH level is reached. Most producers have a set point between pH 4.0 and 4.6 in which fermentation is stopped by rapid cooling. The amount of lactic acid present at this pH level is ideal 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 is the separation of liquid, in this case whey, from the milk solids; this can occur if fermentation is stopped too early or too late, resulting in yogurt that is respectively too alkaline or too acidic. Consumers expect yogurt to remain texturally consistent, so ensuring fermentation is stopped at the appropriate pH is vital to consumer perception.

Specifications	FC2133
Description	pre-amplified pH / temperature probe
Reference	double, Ag/AgCl
Junction	open
Electrolyte	viscolene
Max Pressure	0.1 bar
Range	pH: 0 to 12
Recommended Operating Temperature	0 to 50°C (32 to 122°F)
Tip / Shape	conic
Temperature Sensor	yes
Amplifier	yes
Body Material	glass
Cable	coaxial; 1 m (3.3')
Connection	quick connect DIN

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Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI98165

pH / Temperature Meter for Cheese

HI98165 is a professional portable pH and temperature meter with a probe designed specifically for pH measurement in cheese.

- **Waterproof**
 - IP67 rated waterproof, rugged enclosure
- **CAL Check™**
 - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- **Automatic or manual temperature compensation**
 - pH sensors incorporate a built-in temperature sensor
- **Calibration**
 - Up to a five-point calibration with seven standard buffers and five custom buffers
- **Approximately 200 hour battery life**
 - Powered by (4) 1.5V AA batteries
- **Clear display**
 - Dot matrix display with multifunction virtual keys
- **Auto hold**
 - Automatically holds the first stable reading on the display
- **Calibration timeout**
 - Alerts when calibration is due at a specified interval
- **Connectivity**
 - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
 - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
 - Important and often used functions such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
 - Each meter is 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



ติดต่อบริษัท นีโอนิคส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

Cheese pH Meter

designed for food professionals

Hanna food quality pH meters are rugged and portable with the performance and features of a benchtop. Five models are available in this series to measure food, milk, meat, yogurt and cheese. Each model is supplied with an application specific electrode and cleaning solutions. These waterproof meters comply to IP67 standards and can be easily operated with one hand.



Backlit Graphic LCD Display

These meters feature 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.

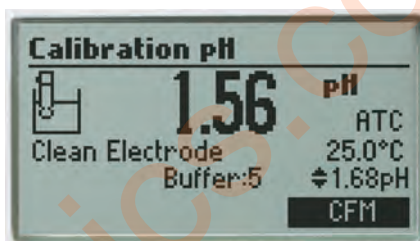


Quick Connect Probe

Each meter features an application specific pH/temperature probe with a quick connect DIN connector to make attaching and removing the probe simple and easy.

Calibration Timeout

Alerts when calibration is due at a specified interval.



pH Calibration

Choose from seven standard pH buffers and five custom values to obtain up to five point calibration and achieve high precision readings with a 0.001 pH resolution and a pH accuracy of ± 0.002 .

Enhanced Calibration

An "out of calibration range" warning can be engaged to keep the user informed of the current calibration and help to avoid performing measurements that are out of the bracketed range.



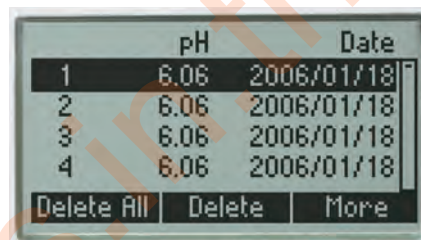
CAL Check™

Hanna's CAL Check™ maintains a history of past calibrations and monitors the pH electrode and buffers during subsequent calibrations for any signs of wide variances due to a dirty or broken electrode or contaminated pH buffers. During calibration, users are alerted to problems should they occur. After calibration, the electrode's overall condition is displayed as a percentage.



GLP

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



Data Logging

The log-on-demand feature allows users to store up to 200 samples that can be later transferred to a PC with the HI920015 USB cable and HI92000 software.

Automatic Temperature Compensation

pH sensors incorporate a built-in temperature sensor in the tip of the electrode for a fast and accurate temperature compensated value.

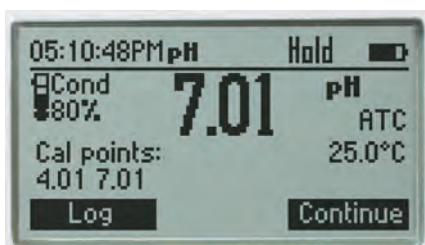
Intuitive Keypad

The fitted rubber keypad has dedicated keys for many important and often used functions. These meters also feature two virtual soft keys that navigate the user through setup and logging of data. The interface is intuitive for any user's level of experience.

ติดต่อบริษัท เนโอเนิกส์ จำกัด

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Auto Hold

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



Dedicated Help Key

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



Setup Screen

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



PC Connectivity

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

Long Battery Life

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



Supplied Complete in a Rugged Custom Carrying Case

Each meter is 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. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

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
	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)
Additional Specifications	pH Probe	FC2423 pre-amplified pH and temperature probe with stainless steel sheath, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)
	Slope Calibration	from 80 to 110%
	Log-on-demand	Up to 200 samples (100 pH, 100 mV)
	PC Connection	opto-isolated USB with HI92000 software and micro USB cable
	Input Impedance	10 ¹² Ω
	Battery Type / Life	1.5V AA batteries (4) / approximately 200 hours of continuous use without backlight (50 hours with backlight)
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions / Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
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 Probe for Cheese

FC2423 electrode has a stainless steel sheath and conical tip to ensure quick, easy measurements and fast response. FC2423 pH electrode features a built-in temperature sensor and is ideal for measurements in semi-solid samples such as cheeses.

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.

AISI 316 stainless steel body

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

Viscolene electrolyte

The viscolene electrolyte offers a hard gel interface between the inner electrode components and the sample being measured. The electrolyte is silver-free for use in cheese products and is maintenance-free.

Built-in temperature sensor

A thermistor temperature sensor is in the tip of the indicating pH electrode. A temperature sensor should be as close as possible to the indicating pH bulb in order to compensate for variations in temperature.

Conic tip shape

This design allows for penetration into solids, semi solids, and emulsions for the direct measurement of pH in cheese products.

Specifications	FC2423
Description	pre-amplified pH / temperature probe
Reference	single, Ag/AgCl
Junction	open
Electrolyte	viscolene
Max Pressure	0.1 bar
Range	pH: 0 to 12
Recommended Operating Temperature	0 to 50°C (32 to 122°F)
Tip / Shape	conic
Temperature Sensor	yes
Amplifier	yes
Body Material	AISI 316 stainless steel
Cable	coaxial; 1 m (3.3')
Connection	quick connect DIN

Application Importance

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, lowering the pH of the milk. 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.

The next stages of milling and salting are affected by pH as well. During milling, curds are cut into smaller pieces to prepare the cheese for salting. Curds with a lower pH at milling result in a harder cheese. A low pH will also result in higher salt absorption during the salting stage.

When curds are pressed into a final, solid form, the pH directly affects how well the curds fuse together. If the pH is too high during pressing, the curds will not bind together as well and the final cheese will have a more open texture.

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 characteristics like 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.



HI9124 · HI9125

Portable pH/mV Meters

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Waterproof casing
- Battery Error Prevention System (BEPS)
 - Automatically shuts off meter when battery is too low to take accurate readings
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

The HI9124 and HI9125 are portable, waterproof pH meters. The HI9125 can utilize ORP (oxidation reduction potential) electrodes and display results in the mV range.

A large dual-level LCD displays both the pH and temperature along with an operational guide. Graphic symbols are displayed to help the users during the calibration process.

The pH calibration procedure is automatic with five memorized pH buffer values.

These meters utilize the HI1230B double junction pH electrode. The double junction helps to minimize junction contamination for accurate, consistent results.



Specifications

	HI9124	HI9125	
pH*	Range	-2.00 to 16.00 pH	-2.00 to 16.00 pH
	Resolution	0.01 pH	0.01 pH
	Accuracy	±0.01 pH	±0.01 pH
	Calibration	one or two-point with five standard buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)	one or two-point with five standard buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)
mV	Temperature Compensation	automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F) without temperature probe	automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F) without temperature probe
	Range	-	±699.9 mV; ±1999 mV
	Resolution	-	0.1 mV; 1 mV
Temperature*	Accuracy	-	±0.2 mV; ±1 mV
	Range	-20.0 to 120.0°C (-4.0°F to 248.0°F)	-20.0 to 120.0°C (-4.0°F to 248.0°F)
	Resolution	0.1°C (0.1°F)	0.1°C (0.1°F)
Additional Specifications Both All Meters	Accuracy	±0.4°C (±0.8°F)	±0.4°C (±0.8°F)
	pH Electrode	HI1230B PEI body pH electrode with BNC connector and 1 m (3.3') cable (included)	
	Temperature Probe	HI7662 stainless steel temperature probe with 1 m (3.3') cable (included)	
	Slope / Offset Calibration	from 80 to 108% / ±1 pH	
	Input Impedance	10 ¹² Ohm	
	Battery Type / Life	1.5V AAA (3) / approximately 200 hours of continuous use.	
	Auto-off	auto-off after 20 minutes of non-use (can be disabled)	
	Environment	0 to 50°C (32 to 122°F); RH max 100%	
	Dimensions / Weight	185 x 72 x 36 mm (7.3 x 2.8 x 1.4") / 300 g (10.6 oz.)	
	Ordering Information	HI9124 and HI9125 are supplied with HI1230B pH electrode, HI7662 temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, 100 mL plastic beaker, batteries, instructions and hard carrying case.	

* Limits will be reduced to actual sensor limits

pH/pH-mV/ORP and Temperature Meters



- **Sensor Check™**
 - (HI991003) Allows users to check the pH electrode status at any time
- **Automatic Temperature Compensation (ATC)**
- **Two-point calibration**
 - Up to two points automatic calibration
- **Battery Error Prevention System (BEPS)**
 - Alerts the user of low battery power that could adversely affect readings
- **Waterproof**
 - Compact, heavy-duty, and waterproof protected casing
- **Battery life indicator**
 - Battery percentage displayed on startup
- **HELP feature**
 - Tutorial messages displayed on LCD

HI991001, HI991002 and HI991003 are ideal for plating baths, wastewater, swimming pool and spa water quality and environmental applications.

HI991003 is a portable pH/pH-mV/ORP and temperature meter with our unique Sensor Check™ feature that allows the user to determine the electrode status at any time. HI991002 measures pH/ORP and temperature while the HI991001 measures pH and temperature.

The HI1296D pH/temperature and HI1297D pH/ORP/temperature probes feature an easy to clean recessed tip that prevents solids in solutions from collecting on the sensor. The titanium body of these probes function as a potential matching pin for increased stability of readings and extended sensor life.



- **Pre-amplified pH electrodes**
 - The HI1297D pH/ORP electrode and HI1296D pH electrode have an internal temperature sensor and also contain a pre-amplifier to render measurements impervious to noise and electrical interferences.

Specifications

	HI991001	HI991002	HI991003
pH*	Range	-2.00 to 16.00 pH	-2.00 to 16.00 pH
	Resolution	0.01 pH	0.01 pH
	Accuracy	±0.02 pH	±0.02 pH
	Calibration	automatic one or two-point calibration with two sets of standard buffers available (standard 4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)	
mV	Range	-	±1999 mV
	Resolution	-	1 mV
	Accuracy	-	±2 mV
pH-mV	Range	-	±825 mV (pH-mV)
	Resolution	-	1 mV
	Accuracy	-	±1 mV
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); ±1.0°F (up to 140°F), ±2.0°F (outside)	
Additional Specifications	pH Electrode (HI991003 & HI991002)	HI1297D pre-amplified pH/ORP probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)	
	pH Electrode (HI991001)	HI1296D pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)	
	Temperature Compensation	automatic, -5.0 to 105.0°C (23.0 to 221.0°F)	
	Battery Type / Life	1.5V (3) AAA / approximately 1200 hours of continuous use.	
	Auto-off	auto-off after eight minutes of non-use	
	Environment	0 to 50°C (32 to 122°F); RH max. 100%	
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)	
Ordering Information	HI991001 is supplied with HI1296D pH/ORP probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700601 electrode cleaning solution sachet (2), batteries, instructions and rugged carrying case.		
	HI991002 and HI991003 are supplied with HI1297D pH/ORP probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700601 electrode cleaning solution sachet (2), batteries, instructions and rugged carrying case.		

* Limits will be reduced to actual sensor limits

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI99121

Direct Soil pH Meter

with Measurement Kit

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

The HI99121 is the perfect portable pH meter for soil testing. With the HI99121 and HI1292D direct soil pre-amplified pH and temperature probe, users can test both the pH of soil directly or after preparation of a soil slurry with deionized water.

The HI1292D features a conical, rugged tip that can be directly inserted in moist or soft soil. For harder soils, the kit includes a plastic auger to perforate the ground.

- Soil preparation solution
 - For higher degrees of accuracy, or for stony ground where the electrode may be damaged, use the included HI7051M soil preparation solution



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

HI710023 Orange
HI710024 Blue



Specifications

HI99121

pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
Temperature*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C; 23.0 to 221.0°F
	Resolution	0.1°C; 0.1°F
Accuracy	Accuracy	±0.5°C (up to 60°C), ±1.0°C (outside); ±1.0°F (up to 140°F), ±2.0°F (outside)
	Electrode	HI1292D glass body, pre-amplified pH electrode for soil measurement with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
Additional Specifications	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
Ordering Information	<p>HI99121 is supplied with HI1292D pH electrode, HI721319 soil auger, HI7051M soil preparation solution, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700663 cleaning solution sachet for inorganic soil deposits, HI700664 cleaning solution sachet for organic soil deposits, 100 mL plastic beaker, batteries, instructions and a hard carrying case.</p>	

* Limits will be reduced to actual sensor limits

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI99131

Portable pH Meter

for Plating Baths

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Battery life indicator
 - Battery percentage displayed on startup
- HELP feature
 - Tutorial messages displayed on LCD

HI99131 is a waterproof, portable pH and temperature meter supplied with a flat tip probe specifically designed for use in plating baths.

The HI62911D pre-amplified, double junction pH probe features a recessed flat tip that is easy to clean and prevents solids in solutions from collecting on the sensor. The titanium body of the HI62911D functions as a potential matching pin for increased stability of readings and extended sensor life.



Specifications

HI99131

pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
Temperature*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C; 23.0 to 221.0°F
	Resolution	0.1°C; 0.1°F
Additional Specifications	Accuracy	±0.5°C (up to 60°C), ±1.0°C (outside); ±1.0°F (up to 140°F), ±2.0°F (outside)
	Electrode	HI62911D titanium body, pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	after 8 minutes of non-use
Ordering Information	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
Ordering Information		HI99131 is supplied with HI62911D pH probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700601 electrode cleaning solution sachets (2), batteries, instructions and hard carrying case.

* Limits will be reduced to actual sensor limits



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

HI710023 Orange
HI710024 Blue

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI99141

Portable pH Meter

for Boiler and Cooling Towers

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

HI99141 is a waterproof, portable pH and temperature meter supplied with a flat tip probe specifically designed for boiler and cooling tower applications.

The HI72911D pre-amplified double junction pH probe features a flat tip sensor that is easy to clean and prevents solids in solutions from collecting on the sensor. The titanium body of the HI72911D functions as a potential matching pin for increased stability of readings and extended sensor life.



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

HI710023 Orange
HI710024 Blue

Specifications

HI99141

pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
Temperature*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C; 23.0 to 221.0°F
	Resolution	0.1°C; 0.1°F
Additional Specifications	Accuracy	±0.5°C (up to 60°C), ±1.0°C (outside); ±1.0°F (up to 140°F), ±2.0°F (outside)
	Electrode	HI72911D titanium body, pre-amplified pH electrode with internal temperature sensor, DIN connector and 1 m (3.3' cable) (included)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
Ordering Information	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
		HI99141 is supplied with HI72911D pH probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700601 electrode cleaning solution sachets (2), batteries, instructions and hard carrying case.

*Limits will be reduced to actual sensor limits

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI99171

Portable pH Meter

for Leather and Paper

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

The HI99171 is a portable, waterproof meter designed for use with leather and paper. It provides fast, accurate, direct pH measurements. The LCD features a multi-level display with on-screen tutorial messages for calibration and set-up. HI99171 utilizes a flat tip probe designed to optimize surface contact with the sample.

pH measurement of papers and cartons is important, not only in the production phase, but also in the packaging phase. The food industry, for example, will perform pH compatibility tests between the product and packaging material.

Specifications

HI99171

pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
Temperature*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C; 23.0 to 221.0°F
	Resolution	0.1°C; 0.1°F
Additional Specifications	Accuracy	±0.5°C (up to 60°C), ±1.0°C (outside); ±1.0°F (up to 140°F), ±2.0°F (outside)
	Electrode	HI1414D glass body, pre-amplified pH electrode with flat tip, internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
Ordering Information	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
	<p>HI99171 is supplied with HI1414D flat tipped pH and temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700680 electrode cleaning solution for cellulose deposits sachets (2), HI70960 conductive electrolyte solution for pH measurement (30 mL), batteries, instructions and hard carrying case.</p>	



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

HI710023 Orange
HI710024 Blue

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI99162

pH / Temperature Meter for Milk

with Application Specific Probe

- Waterproof
- Application specific electrode
- Automatic Temperature Compensation (ATC)
- Automatic one or two-point calibration
- Multi-level LCD display
- On-screen tutorial for calibration and set up
- Stability indicator for accurate data recording
- Battery Error Prevention System
- Battery life displayed on startup
- Supplied as a complete kit

The Hanna Instruments HI99162 is a durable, waterproof, and portable pH and temperature meter designed specifically for milk analysis. Automatic calibration is done at one or two points with two sets of buffers. All calibration and measurement readings are automatically compensated for temperature variations. The split-level LCD displays both pH and temperature readings, along with indicators for reading stability, battery percentage, and calibration instructions.



Calibrate and measure samples right in the case

Our custom carrying case features a beaker holder for calibration on the farm or production floor.



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- Temperature
 - °C and °F measurement modes



- Buffer sets
 - Calibrate to standard (pH 4.01, pH 7.01, pH 10.01) or NIST (pH 4.01, pH 6.86, pH 9.18) buffers



- Calibration prompts
 - On-screen prompts during the calibration process



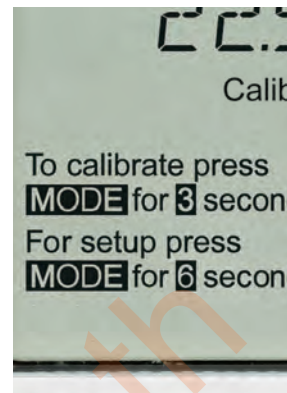
- Stability indicator
 - "Not Stable" tag disappears when the reading is stable for accurate data recording



- Freeze readings
 - Press the SET/HOLD button to hold readings on the display



- Battery percentage
 - Battery percentage is displayed at startup



- On-screen guides
 - On-screen quick guides for entering calibration and set up

Specifications	HI99162	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±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*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C / 23.0 to 221.0°F
	Resolution	0.1°C/0.1°F
Additional Specifications	Accuracy	±0.5°C (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
	Probe (included)	FC101D pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
	Battery Type/Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	auto-off after 8 minutes of non-use
Ordering Information	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz)
<p>HI99162 is supplied with FC101D pH probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700640 electrode cleaning solution sachets (2), batteries, instruction manual, and rugged carrying case.</p>		



Rugged custom carrying case

The HI99162 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

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FC101D

pH / Temperature Probe for Milk

- PVDF body
- Spheric glass tip
- Single ceramic junction
- Double junction
- Built-in temperature sensor

- **PVDF body**
 - The FC101D is composed of food grade PVDF plastic. This material is highly durable and chemically resistant.

- **General purpose glass**
 - The FC101D uses general purpose (GP) glass. The formulation allows for fast response over a wide range of temperatures. The FC101D is suitable to use with samples that measure from 0 to 80°C.

- **Refillable electrolyte**
 - The silver-free electrolyte ensures no precipitate can clog the junction. An easy to use fill cap allows for quick refilling of electrolyte solution to maintain adequate head pressure.

- **Single ceramic junction**
 - A porous ceramic frit allows the silver-free electrolyte to flow slowly into solution, providing accurate readings for aqueous samples.

- **Built-in temperature sensor**
 - A thermistor temperature sensor is in the tip of the indicating pH bulb. A temperature sensor should be as close as possible to the indicating pH electrode in order to compensate for variations in temperature.

- **Spheric tip shape**
 - The shape of the sensing membrane provides a large surface area for contact with milk samples. The highly durable construction provides accurate measurements on the dairy farm as well as the production facility.

Specifications	FC101D
Description	pre-amplified pH/temperature probe
Reference	double, Ag/AgCl
Junction	ceramic, single
Electrolyte	KCl 3.5M
Max Pressure	0.1 bar
Range	pH: 0 to 13
Recommended Operating Temperature	0 to 80°C (32 to 176°F) - GP
Tip /Shape	spheric (dia: 7.5 mm)
Temperature Sensor	yes
Amplifier	yes
Body Material	PVDF
Cable	coaxial; 1 m (3.3')
Connection	DIN

Application Importance

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 measurements are 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 infected with mastitis. 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.

HI99164

pH / Temperature Meter for Yogurt

with Application Specific Probe

- Waterproof
- Application specific electrode
- Automatic Temperature Compensation (ATC)
- Automatic one or two-point calibration
- Multi-level LCD display
- On-screen tutorial for calibration and set up
- Stability indicator for accurate data recording
- Battery Error Prevention System
- Battery life displayed on startup
- Supplied as a complete kit

The Hanna Instruments HI99164 is a durable, waterproof, and portable pH and temperature meter designed specifically for yogurt analysis. Automatic calibration is done at one or two points with two sets of buffers. All calibration and measurement readings are automatically compensated for temperature measurements. The split-level LCD displays both pH and temperature readings, along with indicators for reading stability, battery percentage, and calibration instructions.



Calibrate and measure samples right in the case

Our custom carrying case features a beaker holder for calibration on the production floor.





- Temperature
 - °C and °F measurement modes



- Buffer sets
 - Calibrate to standard (pH 4.01, pH 7.01, pH 10.01) or NIST (pH 4.01, pH 6.86, pH 9.18) buffers



- Calibration prompts
 - On-screen prompts during the calibration process



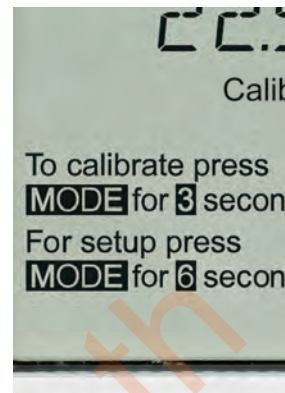
- Stability indicator
 - "Not Stable" tag disappears when the reading is stable for accurate data recording



- Freeze readings
 - Press the SET/HOLD button to hold readings on the display



- Battery percentage
 - Battery percentage is displayed at startup



- On-screen guides
 - On-screen quick guides for entering calibration and set up

Specifications	HI99164	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±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*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C / 23.0 to 221.0°F
	Resolution	0.1°C/0.1°F
Additional Specifications	Accuracy	±0.5°C (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
	Probe (included)	FC213D pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
	Battery Type/Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	auto-off after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
Ordering Information	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz)
		HI99164 is supplied with FC213D pH probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700643 electrode cleaning solution sachets (2), batteries, instruction manual, and rugged carrying case.



Rugged custom carrying case

The HI99164 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

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FC213D

pH / Temperature Probe for Yogurt

- Glass body
- Conic glass tip
- Low temperature glass
- Open Junction reference
- Built-in temperature sensor

- **Glass body**
 - The glass body of the FC213D allows standards and samples to more quickly reach thermal equilibrium while also providing chemical resistance.
- **Low temperature glass**
 - The FC213D 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 FC213D is suitable to use with samples that measure from 0 to 50°C.



- **Viscolene electrolyte**
 - The viscolene electrolyte offers a hard gel interface between the inner electrode components and the sample being measured. The electrolyte is silver-free for use in yogurt and is maintenance-free.
- **Open junction reference**
 - 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 FC213D resists clogging and continues to provide accurate, stable readings.
- **Built-in temperature sensor**
 - A thermistor temperature sensor is in the tip of the indicating pH electrode. A temperature sensor should be as close as possible to the indicating pH bulb in order to compensate for variations in temperature.
- **Conic tip shape**
 - This design allows for penetration into semisolids and emulsions for the direct measurement of pH in yogurt products.

Specifications	FC213D
Description	pre-amplified pH / temperature probe
Reference	double
Junction	open
Electrolyte	viscolene
Max Pressure	0.1 bar
Range	pH: 0 to 12
Recommended Operating Temperature	0 to 50°C (32 to 122°F)
Tip / Shape	conic
Temperature Sensor	yes
Amplifier	yes
Body Material	glass
Cable	coaxial; 1 m (3.3')
Connection	DIN

Application Importance

Monitoring pH is crucial in producing consistent, quality yogurt. Yogurt is made by the fermentation of milk with live bacterial cultures. Following pasteurization and compositional adjustment, milk is homogenized for a consistent texture, heated to the desired thickness, and cooled before inoculation. Most yogurt is 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. As lactic acid is produced, there is a correlating drop in pH. Due to the more acidic mixture, the casein protein in milk coagulates and precipitates out, thickening the milk into a yogurt-like texture.

Yogurt producers cease incubation once a specific pH level is reached. Most producers have a set point between pH 4.0 and 4.6 in which fermentation is stopped by rapid

cooling. The amount of lactic acid present at this pH level is ideal 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 is the separation of liquid, in this case whey, from the milk solids; this can occur if fermentation is stopped too early or too late, resulting in yogurt that is respectively too alkaline or too acidic. Consumers expect yogurt to remain texturally consistent, so ensuring fermentation is stopped at the appropriate pH is vital to consumer perception.



HI99165

pH / Temperature Meter for Cheese

with Application Specific Probe

- Waterproof
- Application specific electrode
- Automatic Temperature Compensation (ATC)
- Automatic one or two-point calibration
- Multi-level LCD display
- On-screen tutorial for calibration and set up
- Stability indicator for accurate data recording
- Battery Error Prevention System
- Battery life displayed on startup
- Supplied as a complete kit

The Hanna Instruments HI99165 is a durable, waterproof, and portable pH and temperature meter designed specifically for cheese analysis. Automatic calibration is done at one or two points with two sets of buffers. All calibration and measurement readings are automatically compensated for temperature measurements. The split-level LCD displays both pH and temperature readings, along with indicators for reading stability, battery percentage, and calibration instructions.

portable



Calibrate samples right in the case

Our custom carrying case features a beaker holder for calibration on the production floor.



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- **Temperature**
 - °C and °F measurement modes



- **Buffer sets**
 - Calibrate to standard (pH 4.01, pH 7.01, pH 10.01) or NIST (pH 4.01, pH 6.86, pH 9.18) buffers



- **Calibration prompts**
 - On-screen prompts during the calibration process



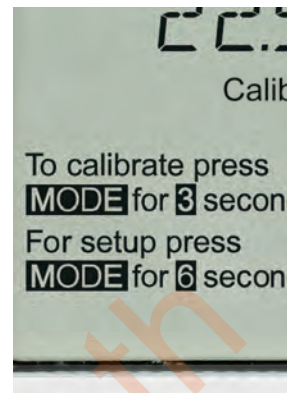
- **Stability indicator**
 - "Not Stable" tag disappears when the reading is stable for accurate data recording



- **Freeze readings**
 - Press the SET/HOLD button to hold readings on the display



- **Battery percentage**
 - Battery percentage is displayed at startup



- **On-screen guides**
 - On-screen quick guides for entering calibration and set up

Specifications	HI99165	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±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*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C / 23.0 to 221.0°F
	Resolution	0.1°C/0.1°F
Additional Specifications	Accuracy	±0.5°C (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
	Probe (included)	FC242D pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
	Battery Type/Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	auto-off after 8 minutes of non-use
Ordering Information	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz)
<p>HI99165 is supplied with FC242D pH probe with internal temperature sensor, HI70004 pH 4.01 buffer sachet, HI70007 pH 7.01 buffer sachet, HI700642 electrode cleaning solution sachets (2), batteries, instruction manual, and rugged carrying case.</p>		



Rugged custom carrying case

The HI99165 meter, probe, and all accessories are supplied in a rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

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* Limits will be reduced to actual sensor limits

pH / Temperature Probe for Cheese

- Stainless steel body
- Conic glass tip
- Low temperature glass
- Built-in temperature sensor

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

- **Low temperature glass**
 - The FC242D 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 FC242D is suitable to use with samples that measure from 0 to 50°C.



- **Viscolene electrolyte**
 - The viscolene electrolyte offers a hard gel interface between the inner electrode components and the sample being measured. The electrolyte is silver-free for use in cheese products and is maintenance-free.

- **Built-in temperature sensor**
 - A thermistor temperature sensor is in the tip of the indicating pH electrode. A temperature sensor should be as close as possible to the indicating pH bulb in order to compensate for variations in temperature.

- **Conic tip shape**
 - This design allows for penetration into solids, semi solids, and emulsions for the direct measurement of pH in cheese products.

Specifications	FC242D
Description	pre-amplified pH / temperature probe
Reference	single
Junction	ceramic
Electrolyte	viscolene
Max Pressure	0.1 bar
Range	pH: 0 to 12
Recommended Operating Temperature	0 to 50°C (32 to 122°F)
Tip /Shape	conic
Temperature Sensor	yes
Amplifier	yes
Body Material	AISI 316 stainless steel
Cable	coaxial; 1 m (3.3')
Connection	DIN

Application Importance

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, lowering the pH of the milk. 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.

The next stages of milling and salting are affected by pH as well. During milling, curds

are cut into smaller pieces to prepare the cheese for salting. Curds with a lower pH at milling result in a harder cheese. A low pH will also result in higher salt absorption during the salting stage.

When curds are pressed into a final, solid form, the pH directly affects how well the curds fuse together. If the pH is too high during pressing, the curds will not bind together as well and the final cheese will have a more open texture.

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 characteristics like 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.

Portable pH Meter

for Food and Dairy

- For HACCP compliant testing
- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

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

The FC202D pH electrode features a rugged, easy to clean PVDF body with a conical tip making it ideal for measurements in semi-solids such as meats and cheeses. The FC202D uses a free diffusion sleeve type reference junction which prevents the typical problems of clogging in viscous liquids such as milk or condiments.

- **Specialized electrode**
 - The FC202D is the ideal electrode to measure the pH of milk, yogurt, meats, cheeses, fruit, sushi, rice, jams, jellies, dough, ice cream, yogurt, beverages and juice



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

HI710023 Orange
HI710024 Blue



Specifications

	HI99161	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
Temperature*	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
	Range	-5.0 to 105.0°C; 23.0 to 221.0°F
	Resolution	0.1°C; 0.1°F
Additional Specifications	Accuracy	±0.5°C (up to 60°C), ±1.0°C (outside); ±1.0°F (up to 140°F), ±2.0°F (outside)
	Electrode	FC202D PVDF body, pre-amplified pH electrode with conical tip, internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
Ordering Information	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
Ordering Information		HI99161 is supplied with FC202D pH and temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700642 electrode cleaning solution sachets (2), batteries, instructions and hard carrying case.

* Limits will be reduced to actual sensor limits

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HI99163

Portable pH Meter

and Sensor for Meat

- For HACCP compliant testing
- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

HI99163 is a portable pH and temperature meter specially designed for the meat processing industry.

The FC232D pre-amplified pH electrode and removable stainless steel blade enables users to perform non-intrusive measurements of meat products inside and out. The free diffusion junction helps to avoid a clogged reference, where the external body material is non-toxic and food compatible.

- Two blade lengths available
 - Use the optional FC098 (20 mm) or the included FC099 (35 mm) stainless steel penetration blades for meat processing applications



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

HI710023 Orange
HI710024 Blue



Specifications

HI99163

pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
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); ±1.0°F (up to 140°F), ±2.0°F (outside)
Additional Specifications	Electrode	FC232D pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3' cable)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
Ordering Information	HI99163 is supplied with FC232D pH and temperature probe with FC099 stainless steel blade tip, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700630 electrode acid cleaning solution sachets for meat, grease and fats (2), batteries, instructions and hard carrying case.	

* Limits will be reduced to actual sensor limits

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HI99192

Portable pH Meter

for Drinking Water

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

The Hanna HI99192 is a waterproof portable pH and temperature meter designed specifically for measuring the pH of drinking water.

The HI99192 measures pH from -2.00 to 16.00 pH and temperature from -5.0 to 105.0 °C (23.0 to 221.0 °F). Automatic calibration is performed at one or two points and all readings are automatically compensated. Indicators for stability, battery percentage, and calibration instructions are viewed on the LCD display. The HI99192 uses three 1.5V AAA batteries for an exceptional battery life of 1200 hours of continuous use.





FC215D Amplified pH Electrode

- Built-in temperature sensor
 - For automatic compensation of temperature variations
- Refillable pH electrode
- Amplified electrode
 - For fast, stable response that is immune to electrical noise due to humidity
- Triple ceramic junction design

The HI99192 drinking water pH meter uses the glass body FC215D amplified pH electrode. The amplified electrode provides a fast stable response that is immune to electrical noise due to humidity. The electrode contains an internal temperature probe to allow for automatic compensation for any variances in temperature. The electrolyte solution in the electrode is refillable.

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 measured. The ions provide for an electrical connection between the reference electrode and the indicating electrode. A standard pH electrode will use a single ceramic junction that allows for 15 to 20 μL /hour of electrolyte to flow. The FC215D has three ceramic junctions providing for 40 to 50 μL /hour of electrolyte to flow. This increased flow provides a greater continuity between the reference electrode and the indicating electrode, making it suitable for water of low ionic strength. To optimize the flow from the electrode, the refill cap should be unscrewed; this allows for positive head pressure to be created, allowing for the electrolyte to flow more easily into the sample.

The pH of Drinking Water

The pH of drinking water is a vital measurement. If the pH is too low, or acidic, the water will be corrosive to the distribution system and water pipes in homes. The pH of water also influences other properties including taste, odor, clarity, and efficiency of disinfection efficiency. In the United States, the pH of water is determined by a pH meter according to EPA method 150.1 and Standard Methods 4500-H.

Most drinking water plants use surface water (lakes, rivers, and streams) or groundwater as their point source. Surface water is typically lower in mineral content, which results in lower EC/TDS readings. Groundwater that has percolated through limestone, dolomite or gypsum will have a relatively higher mineral content. Depending on location, there are sources of groundwater that can be very low in mineral content.

Measuring the pH of water that is low in minerals can be difficult. The lower the mineral content the less conductive the water will be. Low conductivity water presents a challenge since the pH meter is an electrochemical system that relies on the solution being measured to be conductive. The HI99192 uses the FC215D amplified pH electrode. The FC215D has three ceramic junctions in the outer reference cell that allows for pH measurement in low conductivity solutions.

Specifications	HI99192	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	± 0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
Temperature*	Range	-5.0 to 105.0°C; 23.0 to 221.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	$\pm 0.5^\circ\text{C}$ (up to 60°C), $\pm 1.0^\circ\text{C}$ (outside); $\pm 1.0^\circ\text{F}$ (up to 140°F), $\pm 2.0^\circ\text{F}$ (outside)
Additional Specifications	Electrode	FC215D pre-amplified pH electrode with internal temperature sensor, DIN connector, 1 m (3.3') cable (included)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
Ordering Information	HI99192 is supplied with FC215D pH and temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700661 electrode cleaning solution sachets (2), HI7082 3.5 KCl filling solution, batteries, instructions and hard carrying case.	

* Limits will be reduced to actual sensor limits

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI99151

Portable pH Meter

for Beer Analysis

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

The HI99151 is a rugged, waterproof, portable pH and temperature meter designed specifically for the brewing industry. The HI99151 uses the FC214D, a titanium bodied, gel filled pH electrode that features high temperature glass and an extendable cloth junction.

The HI99151 measures pH from -2.00 to 16.00 pH and temperature from -5.0 to 105.0 °C (23.0 to 221.0 °F). Automatic calibration is done at one or two points with two sets of buffers and all readings are automatically compensated for temperature variations. Indicators for stability, battery percentage, and calibration instructions are viewed on the primary display. The HI99151 uses three 1.5V AAA batteries for an exceptional battery life of 1200 hours of continuous use.





The Effects of pH in Brewing

In the brewing process, the enzymes required to convert starch into sugar are pH-sensitive, with an optimal pH of 5.2 to 5.6. Different compounds are used to adjust the pH including phosphoric acid, lactic acid and gypsum.

Wort clarity and break formation are also affected by pH. Protein coagulation occurs during wort boiling, where the optimum pH is around pH 4.9, though a common boil pH is pH 5.2. A pH that is too high will not only inhibit coagulation, but also promote browning due to the interaction of amino acids and reducing sugars.

Hop utilization during the wort boil is also affected by pH; as pH increases, the solubility of hop resins increase. A high pH also increases the release of tannins, resulting in a harsher taste, and tends to favor elevated microbial activity.

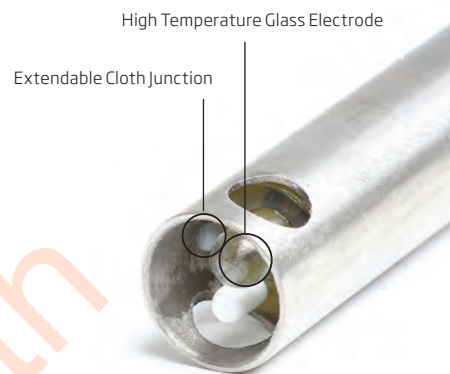
Specifications	HI99151	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
Temperature*	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); ±1.0°F (up to 140°F), ±2.0°F (outside)
Additional Specifications	Electrode	FC214D pre-amplified pH electrode with internal temperature sensor, DIN connector, 1 m (3.3') cable (included)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
Ordering Information	HI99151 is supplied with FC214D pH and temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700661 electrode cleaning solution sachets (2), batteries, instructions and hard carrying case.	

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

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FC214D Amplified pH Electrode

- **Amplified electrode**
 - Provides a fast, stable response that is immune to electrical noise due to static discharge
- **Maintenance free gel filled electrode**
 - No fill solution required
- **Highly durable titanium body**
- **Extendable cloth junction to prevent clogging**
- **High temperature glass**

The HI99151 beer pH meter uses the titanium bodied FC214D amplified pH electrode with built-in temperature sensor. The amplified electrode provides a fast, stable response that is immune to electrical noise due to static discharge. The body of the electrode is made from titanium, which provides an unbreakable structure that allows the transfer of heat to the internal temperature sensor for rapid temperature compensation.

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 measured. It is vital that this flow occurs in order to complete an electrical circuit. Any clogging of the reference junction will prevent the circuit from being completed and will result in readings that are erratic and/or constantly drifting. A typical pH electrode has a junction made of ceramic material. This ceramic material can be easily clogged by samples, such as mash with a high solids content or wort that is viscous. With the cloth junction it is possible to clear the junction by simply extracting 1/8" of the junction from the electrode. This exposes a new portion, resulting in a renewed junction.

HI99111

Portable pH Meter

for Wine Analysis

- Clogging prevention system (CPS™)
- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

The HI99111 is a portable, waterproof pH and temperature meter designed specifically for the wine industry. The HI99111 uses the HI1048D glass bodied pH electrode. Hanna's Clogging Prevention System (CPS™) utilizes the electrodes PTFE sleeve.

HI99111 measures pH from -2.00 to 16.00 and temperature from -5.0 to 105.0 °C (23.0 to 221.0 °F). Automatic calibration is performed at one or two points with two sets of buffers and all readings are automatically temperature compensated. Indicators for stability, battery percentage, and calibration instructions are viewed on the primary display. The HI99111 uses three 1.5V AAA batteries for an exceptional battery life of 1200 hours of continuous use.





The Importance of pH in Wine Making

The pH of wine is important to determine because it will affect the quality of the final product in terms of taste, color, oxidation, chemical stability and other factors. Generally in winemaking, the higher the pH reading, the lower amount of acidity in the wine. Three important factors in determining the pH of wine include the ratio of malic acid to tartaric acid, the amount of potassium, and the total amount of acid present.

Most wines optimally have a pH between 2.9 and 4.0, with values differing based on the type of wine. Values above pH 4.0 indicate that the wine may spoil quickly and be chemically unstable. Lower pH values allow the wine to stay fresher for a longer period and retain its original color and flavor. High pH wine is more likely to breed bacteria and become unsuitable to drink.

For finished white wines, the ideal pH is between pH 3.00 and pH 3.30, while the final pH for red wine is ideally between pH 3.40 and pH 3.50. The optimal pH before the fermentation process is between pH 2.9 and pH 4.0. The pH of wine therefore not only affects the color of wine, but also the oxidation, yeast fermentation, protein stability, and bacterial growth and fermentation.

HI1048D pH electrode

- PTFE sleeve
- Refillable pH electrode
- Clogging prevention system (CPS™)

The HI99111 portable pH meter for wine uses the glass body HI1048D pH electrode with Hanna's unique Clogging Prevention System (CPS™). This electrode provides a fast stable response and resists clogging. The electrolyte solution in the electrode is refillable.

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 measured. The ions provide for an electrical connection between the reference electrode and the indicating electrode. A standard pH electrode will use a single ceramic junction; however, the CPS™ (Clogging Prevention System) is an innovation in electrode technology. Conventional pH electrodes use ceramic junctions that clog quickly when used in wine. When the junction is clogged, the electrode does not function. CPS™ technology utilizes the porousness of ground glass coupled with a PTFE sleeve to prevent clogging of the junction. The ground glass allows proper flow of the liquid, while the PTFE sleeve repels dirt. As a result, pH electrodes with CPS™ stay fresh up to 20 times longer than conventional electrodes.

To optimize the flow from the electrode the refill cap should be unscrewed so that it is open. This allows for positive head pressure to be created allowing for the electrolyte to drain more easily from the reference electrode.

Specifications	HI99111	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (3.00, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
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); ±1.0°F (up to 140°F), ±2.0°F (outside)
Additional Specifications	Electrode	HI1048D pH/temperature probe with CPS™ technology, DIN connector, 1 m (3.3') cable (included)
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
Ordering Information	HI99111 is supplied with HI1048D pH and temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700635 electrode cleaning solution sachet for wine deposits and HI700636 electrode cleaning solution sachet for wine stains, batteries, instructions and hard carrying case.	

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

* Limits will be reduced to actual sensor limits

Portable pH Meter

for Skin

- Automatic Temperature Compensation (ATC)
- Two-point calibration
- Battery Error Prevention System (BEPS)
 - Alerts the user of low battery power that could adversely affect readings
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery life indicator
 - Battery percentage displayed on startup
- Help feature
 - Tutorial messages displayed on LCD

The HI99181 is a pH meter specifically designed for the analysis of skin. Essential for labs researching the biological compatibility of cosmetics and pharmaceuticals, the HI99181 provides quick and simple measurements without compromising precision.

The pre-amplified HI1414D/50 probe has been specially designed with a flat tip for accurate skin pH measurement with maximum surface contact. It is easy to clean and maintain.



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

HI710023 Orange
HI710024 Blue

Specifications

HI99181

pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	one or two-point calibration, two sets of standard buffers available (4.01, 7.01, 10.01 or NIST 4.01, 6.86, 9.18)
	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
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); ±1.0°F (up to 140°F), ±2.0°F (outside)
Additional Specifications	Electrode	HI1414D/50 glass body, pre-amplified pH electrode with flat tip, internal temperature sensor, DIN connector and 1 m (3.3') cable
	Battery Type / Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz.)
	Ordering Information	HI99181 is supplied with HI1414D/50 flat tipped pH/temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700620 electrode cleaning and disinfection solution for skin residuals sachets (2), HI700621 electrode cleaning solution for skin grease and sebum sachets (2), batteries, instructions and hard carrying case.

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ติดต่อบริษัท เนออนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

HI8424

General Purpose pH/mV Meter

- Automatic Temperature Compensation (ATC)
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Two-point calibration
 - Automatic one or two-point calibration
- Hold
 - HOLD function
- Battery indicator
 - Low battery indicator

The HI8424 is a highly accurate, portable pH/mV meter. It is one of the most popular pH meters on the market. This instrument is able to perform pH, mV and temperature measurements with a high degree of accuracy and fast response.

Calibration is automatic at one or two points, with three memorized buffer values (pH 4.01, pH 7.01 and pH 10.01). Once the instrument has been calibrated, the buffer values used during calibration are displayed with tags on the LCD. This feature keeps users informed of the current calibration and helps to avoid taking measurements that are out of range.

Users can exchange the pH probe for an ORP probe to obtain ORP readings in the mV range. The HI8424 also offers measurements in °C and °F and has an auto-off feature to preserve battery life.



Specifications	HI8424	
pH*	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.01 pH
	Calibration	one or two-point, three standard buffers available (4.01, 7.01, 10.01)
	Temperature Compensation	automatic from -20.0 to 120.0°C (-4.0 to 248.0°F) or manual without temperature probe
mV	Range	±699.9 mV; ±1999 mV
	Resolution	0.1 mV; 1 mV
	Accuracy	±0.2 mV; ±1 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
Additional Specifications	pH Electrode	HI1230B PEI body pH electrode with BNC connector and 1 m (3.3') cable (included)
	Temperature Probe	HI7662 stainless steel temperatures probe with 1 m (3.3') cable (included)
	Slope / Offset Calibration	from 75 to 110% / ±1 pH
	Input Impedance	10 ¹² Ohm
	Battery Type / Life	9V / approximately 150 hours of continuous use
	Auto-off	after 20 minutes of non-use (can be disabled)
	Environment	0 to 50°C (32 to 122°F); RH max 100%
	Dimensions / Weight	164 x 76 x 45 mm (6.5 x 3.0 x 1.8") / 180 g (6.3 oz.)
Ordering Information	HI8424 is supplied with HI1230B pH electrode, HI7662 temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700601 electrode cleaning solution sachets (2), battery, protective case and instructions.	

* Limits will be reduced to actual sensor limits

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

Analog pH/mV Meters

- Automatic Temperature Compensation (ATC)
- Two-point Calibration
- Waterproof
 - Compact, heavy-duty, and waterproof protected casing
- Battery indicator
 - Low battery indicator

The HI83141 and HI8314 are portable pH/mV meters designed to be accurate, reliable and easy to use.

The HI8314 uses the HI1217D pre-amplified pH electrode with built-in internal temperature sensor.

The HI83141 uses the HI1230B pH electrode and HI7669AW temperature probe using separate connections.

Manual calibration is performed at one or two points by adjusting the trimmers on the front panel. Capable of measuring pH/mV and °C, these meters are great for field work, providing one meter for multiple uses.

This instrument is ideal for applications that require a custom calibration point. Manual calibration can be extremely useful in order to achieve better accuracy.

These meters can also be used for ORP measurements with the optional probes below:

HI83141: **HI3131B**

HI8314: **HI3618D** or **HI4619D**



Specifications

		HI83141	HI8314
pH*	Range	0.00 to 14.00 pH	0.00 to 14.00 pH
	Resolution	0.01 pH	0.01 pH
	Accuracy	±0.01 pH	±0.01 pH
	Calibration	manual, two-point, via trimmers	
	Temperature Compensation	automatic, 0 to 70°C (32 to 158 °F)	
mV	Range	±1999 mV	±1999 mV
	Resolution	1 mV	1 mV
	Accuracy	±1 mV	±1 mV
Temperature*	Range	0.0 to 100.0°C	0.0 to 100.0°C
	Resolution	0.1°C	0.1°C
	Accuracy	±0.4°C	±0.4°C
Additional Specifications	pH Electrode	HI1230B PEI body pH electrode with BNC connector and 1 m (3.3') cable (included)	HI1217D PEI body, pre-amplified pH electrode with internal temperature sensor, DIN connector and 1 m cable (included)
	Temperature Probe	HI7669AW stainless steel temperature probe, BNC connector (included)	-
	Slope/Offset Calibration	from 80 to 110%/±1 pH	
	Input Impedance	10 ¹² Ohm	
	Battery Type / Life	9V / approximately 100 hours of continuous use	
	Environment	0 to 50°C (32 to 122°F); RH max 100%	
	Dimensions	145 x 80 x 36 mm (5.7 x 3.1 x 1.4")	
	Weight	230 g (8.1 oz.)	

Ordering Information

HI83141 is supplied with HI1230B pH electrode and HI7669AW temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700601 electrode cleaning solution sachets (2), calibration screwdriver, battery, protective case and instructions.

HI8314 is supplied with HI 1217D pH electrode, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700601 electrode cleaning solution sachets (2), calibration screwdriver, battery, protective case and instructions.

* Limits will be reduced to actual sensor limits

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

Educational pH Meters

- Automatic Temperature Compensation (ATC)
- Two-point calibration

Hanna Instruments manufactures meters for all levels of use, from education to research grade. HI8010 and HI8014 are rugged, handheld pH meters specifically designed with ease of use in mind. These affordable meters are ideal for education and field applications.

HI8010 and HI8014 perform pH measurements with manual temperature compensation. HI8014 also performs ORP measurements using the mV range and optional ORP electrode (HI3131B).

Two-point calibration can be performed with trimmers on the front panel. Temperature is manually compensated by using the trimmer.

These rugged, manual pH meters are perfect for teaching students the fundamentals of pH measurement.



Specifications

	HI8010	HI8014	
pH*	Range	0.00 to 14.00 pH	0.00 to 14.00 pH
	Resolution	0.01 pH	0.01 pH
	Accuracy	±0.01pH	±0.01pH
	Calibration	manual, two point, through trimmers (offset ±1 pH; slope: 85 to 105%)	manual, two point, through trimmers (offset ±1 pH; slope: 85 to 105%)
	Temperature Compensation	manual from 0 to 100°C (32 to 212°F)	manual from 0 to 100°C (32 to 212°F)
mV	Range	-	±1999 mV
	Resolution	-	1 mV
	Accuracy	-	±1 mV
Additional Specifications	pH Electrode	HI1230B PEI body pH electrode with BNC connector and 1 m (3.3') cable (included)	
	Slope/Offset Calibration	from 80 to 105%/±1 pH	
	Input Impedance	10 ¹² Ohm	
	Battery Type / Life	9V / approximately 100 hours of continuous use	
	Environment	0 to 50°C (32 to 122°F); RH max 95%	
	Dimensions / Weight	185 x 82 x 53 mm (7.3 x 3.2 x 2.1") / 265 g (9.3 oz.)	
Ordering Information	HI8010 and HI8014 are supplied with HI1230B pH electrode, calibration screwdriver, battery and instructions.		

* Limits will be reduced to actual sensor limits

ติดต่อบริษัท เนโอนิกส์ จำกัด

Tel: 02-077-7602 หรือ 061-8268939

E-mail: sale@neonics.co.th หรือ sale@tools.in.th

pH/mV Precision Simulators

- Simulate pH or ORP sensors to troubleshoot your meter
- Simulate temperature
- Provided with universal BNC connector

HI8427 is designed specifically to simulate pH and ORP electrodes to confirm proper functioning of your meter. Standard pH and mV ranges are selectable with a dial on the front panel and pH can simulate sensor response at temperatures between 0 to 50°C.

Provided with a universal BNC connector, this unit is also a high impedance tester for cable and connector inspection with a leakage sensitivity of 10^9 ohm. This unique tester eliminates the need for very expensive MΩ meters.

Sometimes it is difficult to recognize whether a particular malfunction is due to the meter or the electrode. By simply connecting HI931001 to your meter's input socket and turning the dials, pH readings can be simulated from 0 to 14 pH in 0.01 steps. The output signals all correspond to pH values at 25°C.

For the mV range, HI931001 can simulate output from -1000 to +1000 mV in 1 mV steps.



Specifications

	HI931001	HI8427	
pH*	Range	0.00 to 14.00 pH	0, 2, 4, 7, 10, 12, 14 pH
	Resolution	0.01 pH	-
	Accuracy	±0.01 pH	±0.1 pH
mV	Range	-1000 to 1000 mV	-1900, -350, 350, 1900 mV
	Resolution	1 mV	-
	Accuracy	±1 mV	±5 mV
Additional Specifications	Impedance Test	-	10^9 Ohm
	Temperature Compensation	all output values are simulated at 25°C	manual from 0 to 50°C (32 to 122°F)
	Battery Type / Life	9V / approximately 500 hours of use	9V / approximately 100 hours of use
Weight	320 g (11.3 oz.)	255 g (9.0 oz.)	
Environment	0 to 50°C (32 to 122°F); RH max 95%	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	185 x 82 x 53 mm (7.3 x 3.2 x 2.1")	185 x 82 x 53 mm (7.3 x 3.2 x 2.1")	
Ordering Information	HI8427 and HI931001 are supplied with HI7858/1 BNC/BNC coaxial cable		

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ติดต่อบริษัท เนโอนิกส์ จำกัด

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E-mail: sale@neonics.co.th หรือ sale@tools.in.th