

# Agricultural Catalog

[www.hannainst.com](http://www.hannainst.com)

3rd Edition



 **HANNA**  
instruments  
Agricultural Division

ISO 9001 CERTIFIED



At Hanna, our goal is to provide the user with instruments to grow superior crops effectively using the most economical and environmentally friendly measures.

## Welcome to the Hanna Instruments 3rd Edition Agricultural Catalog

For over two decades, Hanna Instruments has led the world in innovative technology. We know how important testing and controlling chemical properties are for effective management of nutrients, soil and water to prevent environmental contamination.

Our world-wide research and development facilities are constantly working on new and inventive products while working to enhance existing products.

We understand that your measurement and controlling equipment must be well-built and perform with high reliability. All of our products are manufactured to the most stringent standards in state-of-the-art facilities to ensure the highest quality.

We attribute much of our success to maintaining our high standards of surpassing our customers' expectations. Excellence is our only goal, from the quality of our products to the quality of our staff, customer response and customer care.



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# Testers



## pHep® 4 (HI 98127) & pHep® 5 (HI 98128)

### Waterproof pH/Temperature Testers

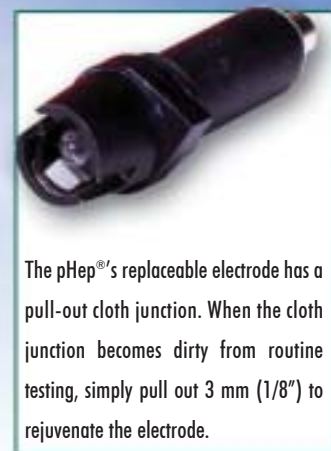
The pHep® 4 & pHep® 5 include features such as a dual-level LCD, battery level indicator, replaceable pH electrode cartridge, the temperature in °C or °F, stability indicator, automatic shut-off and automatic calibration all in a floating, waterproof casing. There is no other value like the pHep® brand of testers!

Specifications	pHep®4	pHep®5
<b>Range</b>	0.0 to 14.0	0.00 to 14.00
<b>Temp.</b>	0.0 to 60.0°C or 32.0 to 140.0°F	
<b>Resolution</b>	0.1	0.01
<b>Temp.</b>	0.1°C or 0.1°F	
<b>Accuracy</b>	±0.1	±0.05
<b>Temp.</b>	±0.5°C or ±1°F	
<b>Temp. Comp.</b>	Automatic	
<b>Battery Life</b>	Approx. 350 hours continuous use	
<b>Dimensions</b>	163 x 40 x 26 mm (6.4 x 1.6 x 1")	
<b>Weight</b>	85 g (3.0 oz.)	



#### Recommended Accessories

- HI 73127** . . . . .pH electrode for HI 98127 & HI 98128
- HI 77400P** . . . . .Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
- HI 77700P** . . . . .Calibration kit (pH 7, 20 mL, 10 pcs)
- HI 770710P** . . . . .Cal. kit (pH 7 & 10, 20 mL, 5 pcs ea.)



The pHep®'s replaceable electrode has a pull-out cloth junction. When the cloth junction becomes dirty from routine testing, simply pull out 3 mm (1/8") to rejuvenate the electrode.

**TIP**

Most pesticides and fungicides perform more effectively when the pH of the tank mix is below 6.5 on the pH scale.

Always check your chemical directions for optimum pH levels.

## pHep® pH Electronic Paper

pHep®, the standard in pH measurement with 0.1 pH accuracy, has 2-point calibration, large LCD, pull-out, replenishable junction and 1700 hours of battery life. The pHep® pH tester features a casing that is more rugged and has been ergonomically enhanced to

- Cloth Renewable Junction
- Large LCD
- 2-Point Calibration
- 0.1 pH Accuracy

better fit your hand. The pHep® comes with a protective cap that can be used as a measurement vessel. The electrode is replaceable by the operator. With the latest innovation of a non-clogging fiber junction, the pHep® lasts much longer.

Specifications	pHep® (HI 98107)
<b>Range</b>	0.0 to 14.0 pH
<b>Resolution</b>	0.1
<b>Accuracy</b>	±0.1
<b>Battery Life</b>	Approx. 1700 hours continuous use
<b>Dimensions</b>	175 x 41 x 23 mm (7.9 x 1.8 x 1")
<b>Weight</b>	78 g (2.7 oz.)



#### Recommended Accessories

- HI 77400P** . . . . .Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
- HI 770710P** . . . . .Cal. kit (pH 7 & 10, 20 mL, 5 pcs ea.)
- HI 7004M** . . . . .Buffer solution pH 4.01, 230 mL
- HI 7007M** . . . . .Buffer solution pH 7.01, 230 mL
- HI 7010M** . . . . .Buffer solution pH 10.01, 230 mL
- HI 70300M** . . . . .Storage solution, 230 mL





## Checker<sup>®</sup>1 (HI 98103) Economical pH Tester

- Replaceable Electrode
- Easy Calibration
- 3000 Hours Battery Life

The Checker<sup>®</sup>1 provides growers with fast and accurate pH readings. The Checker<sup>®</sup>1 is easy to calibrate, uses a replaceable pH electrode and works for 3000 hours before you have to change the batteries!

Specifications	Checker <sup>®</sup> 1 (HI 98103)
<b>Range</b>	0.00 to 14.00 pH
<b>Resolution</b>	0.01 pH
<b>Accuracy</b>	±0.2 pH
<b>Battery Life</b>	Approx. 3000 hours continuous use
<b>Dimensions</b> (meter only)	66 x 50 x 25 mm (2.6 x 2 x 1")
<b>Weight</b> (meter only)	70 g (2.5 oz.)

Recommended Accessories	
HI 77400P	Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
HI 70300L	Storage solution, 460 mL
HI 7061L	Electrode cleaning solution, 460 mL
HI 1270	Replacement electrode

## Checker<sup>®</sup>3 pH Tester with BNC Connector (HI 98105)

- Replaceable Electrode
- Easy Calibration
- 3000 Hours Battery Life

The Checker<sup>®</sup>3 provides growers with fast and accurate pH readings. The Checker<sup>®</sup>3 is easy to calibrate and uses a combination full-size, BNC-type, gel-filled pH electrode and works for 3000 hours before you have to change the batteries!

Specifications	Checker <sup>®</sup> 3 (HI 98105)
<b>Range</b>	0.00 to 14.00 pH
<b>Resolution</b>	0.01 pH
<b>Accuracy</b>	±0.2 pH
<b>Battery Life</b>	Approx. 3000 hours continuous use
<b>Dimensions</b> (meter only)	66 x 50 x 25 mm (2.6 x 2 x 1")
<b>Weight</b> (meter only)	70 g (2.5 oz.)

Recommended Accessories	
HI 77400P	Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
HI 7004M	Buffer solution pH 4.01, 230 mL
HI 7007M	Buffer solution pH 7.01, 230 mL
HI 70300L	Storage solution, 460 mL
HI 7061L	Electrode cleaning solution, 460 mL
HI 1208	Replacement electrode, BNC connector



## pH GRO'CHEK<sup>®</sup> (HI 981408)

### pH Stick Meter with User-replaceable electrode

- Shock-Resistant Casing
- Replaceable Electrode
- Renewable Cloth Junction
- Water-Resistant Housing
- Runs on AA Batteries

The pH Gro'Chek<sup>®</sup> is an ideal meter for use anywhere liquid nutrient feeding is used. The rugged sensor was designed for mixing and incorporates a cloth-renewable junction. The water and shock-resistant casing stands up to even harsh greenhouse environments.

Specifications	pH Gro'Chek <sup>®</sup> (HI 981408)
<b>Range</b>	0.0 to 14.0 pH
<b>Resolution</b>	0.1 pH
<b>Accuracy</b>	±0.2 pH
<b>Battery Life</b>	Approx. 2000 hours continuous use
<b>Dimensions</b> (meter only)	86 x 94 x 33 mm (3.4 x 3.7 x 1.3")
<b>Weight</b> (meter only)	150 g (5.3 oz.)

Recommended Accessories	
HI 77400P	Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
HI 77700P	Cal. kit (pH 7, 20 mL, 10 pcs)
HI 70000P	Rinse solution (25 x 20 mL)
HI 70300L	Storage solution, 460 mL
HI 7061M	Electrode cleaning solution, 230 mL
HI 1219	Double junction pH electrode

## Growers Field Checker<sup>®</sup> Direct Sample pH Tester

- Take Measurements Directly on the Sample
- High Accuracy with 0.01 pH Resolution
- 2-point fast and accurate calibration
- Full 0.00 to 14.00 pH Range
- Lightweight and Pocket Sized

The Growers Field Checker<sup>®</sup> (HI 98103GC) allows the user to determine the pH of fruit and plant tissue in the field with just a few drops of sap or juice. If your sample does not contain sufficient liquid, add an equal portion of deionized water to extract the sample pH. Hanna's Growers Field Checker<sup>®</sup> works with you to obtain superior crops. The Growers Field Checker<sup>®</sup> is supplied with a flat sensor pH probe which allows for minimal liquid sample, soft carrying case, pH 4 and 7



calibration solutions, deionized water sachet, 100 mL sample beaker and screwdriver!

Specifications	Growers Field Checker <sup>®</sup> (HI 98103GC)
<b>Range</b>	0.00 to 14.00 pH
<b>Resolution</b>	0.01 pH
<b>Accuracy</b>	±0.2 pH
<b>Battery Life</b>	Approx. 3000 hours continuous use
<b>Dimensions</b> (meter only)	66 x 50 x 25 mm (2.6 x 2 x 1")
<b>Weight</b> (meter only)	70 g (2.5 oz.)

# Testers



## DiST<sup>®</sup> 5 (HI 98311) & DiST<sup>®</sup> 6 (HI 98312)

### Waterproof EC/TDS/Temperature Testers

Hanna Instruments continues the tradition of innovation with the new DiST<sup>®</sup>5 and DiST<sup>®</sup>6. For this new series, we have included all the features you have asked for such as a replaceable graphite electrode, adjustable TDS ratio, temperature in °C or °F; automatic

temperature compensation with adjustable  $\beta$ , battery level indicator, stability indicator, automatic shut-off, and automatic calibration all in a floating, waterproof casing. These 3-in-1 testers are unmatched in EC/TDS/ Temperature measurement!



Specifications	DiST <sup>®</sup> 5 (HI 98311)	DiST <sup>®</sup> 6 (HI 98312)
<b>Range</b>		
<b>EC</b>	0 to 3999 $\mu$ S/cm	0.00 to 20.00 mS/cm
<b>TDS</b>	0 to 2000 ppm	0.00 to 10.00 ppt
<b>Temp.</b>	0.0 to 60.0°C or 32.0 to 140.0°F	
<b>Resolution</b>		
<b>EC</b>	1 $\mu$ S/cm	0.01 mS/cm
<b>TDS</b>	1 ppm	0.01 ppt
<b>Temp.</b>	0.1°C or 0.1°F	
<b>Accuracy</b>	±2% F.S.	
<b>Temp.</b>	±0.5°C or ±1°F	
<b>Temp. Comp.</b>	Automatic, $\beta$ adj. from 0.0 to 2.4%/°C	
<b>Battery Life</b>	Approx. 100 hours continuous use	
<b>Dimensions</b>	163 x 40 x 26 mm (6.4 x 1.6 x 1")	
<b>Weight</b>	85 g (3.0 oz.)	

Recommended Accessories	
HI 7331	Probe for HI 98311 & HI 98312
HI 70031P	1413 $\mu$ S/cm @ 25°C cal. kit. (25 x 20 mL)
HI 70032P	1382 ppm @ 25°C cal. kit. (25 x 20 mL)
HI 70038P	6.44 ppt @ 25°C cal. kit. (25 x 20 mL)
HI 70030P	12.88 mS/cm @ 25°C cal. kit. (25 x 20 mL)
HI 70442P	1500 ppm @ 25°C cal. kit. (25 x 20 mL)

**TIP**

### What is TDS?

Total Dissolved Solids (TDS) is defined as the amount of solids dissolved in a solution.



## DiST<sup>®</sup>4 Conductivity Tester

The DiST<sup>®</sup>4 conductivity tester incorporates a graphite sensor to eliminate any problems with polarization and adds to the very fast response time of the meter. An external temperature sensor greatly enhances the speed, stability and accuracy of the readings with Automatic Temperature Compensation. The rugged housing facilitates a large LCD and easy-to-access battery compartment.

- Automatic Temperature Compensation
- Fast response and stability
- Graphite sensor
- Models available for TDS (ppm) measurements

Specifications	DiST <sup>®</sup> 4 (HI 98304)
<b>Range</b>	0.00 to 19.99 mS/cm
<b>Resolution</b>	0.01 mS/cm
<b>Accuracy</b>	±2% F.S.
<b>Temp. Comp.</b>	Automatic
<b>Battery Life</b>	Approx. 150 hours continuous use
<b>Dimensions</b>	175 x 41 x 23 mm (7.9 x 1.8 x 1")
<b>Weight</b>	78 g (2.7 oz.)

Recommended Accessories	
HI 70030P	Cal. kit (12.88 mS/cm @ 25°C), 25 x 20 mL
HI 7031M	1413 $\mu$ S/cm @ 25°C cal. sol., 230 mL
HI 70031P	Cal. kit (1413 $\mu$ S/cm @ 25°C), 25 x 20 mL
HI 7039M	5000 $\mu$ S/cm @ 25°C cal. sol., 230 mL
HI 70039P	Cal. kit (5000 $\mu$ S/cm @ 25°C), 25 x 20 mL
HI 73304	Probe for DiST <sup>®</sup> 4

**TIP**

### Extraction to Measure pH & EC 1:2 Dilution Method

1. Mix 3 oz. of soil with 6 oz. of distilled water
2. Let mixture stand 15 to 20 minutes
3. Filter liquid into clean cup



**EC GRO'CHEK®**

## EC, Waterproof, Floating Stick Meter with User-replaceable Electrode

- Water Resistant
- Automatic Calibration
- Automatic Temperature Compensation
- Ideal for Mixing Fertilizer
- ppm Model Available for TDS (HI 981409)

The EC Gro'Chek® is ideal for use anywhere liquid nutrient feeding is used. The rugged sensor was designed for mixing, while the water and shock resistant casing stands up to even harsh greenhouse environments. The EC Gro'Chek® utilizes AA batteries and has an auto shut-off after 5 minutes for long battery life.

Specifications	EC Gro'Chek® (HI 981410)
<b>Range</b>	0.00 to 10.00 mS/cm
<b>Resolution</b>	0.01 mS/cm
<b>Accuracy</b>	±2% F.S.
<b>Temp. Comp.</b>	Automatic from 5 to 50°C (41 to 122°F) with a β of 2% per °C
<b>Battery Life</b>	Approx. 300 hours continuous use
<b>Dimensions</b> (meter only)	86 x 94 x 33 mm (3.4 x 3.7 x 1.3")
<b>Weight</b> (meter only)	150 g (5.8 oz.)

Recommended Accessories	
<b>HI 70039P</b>	...5000 μS/cm @ 25°C cal. kit. (25 x 20 mL)
<b>HI 7061M</b>	...Electrode cleaning solution, 230 mL
<b>HI 70300M</b>	...Electrode storage solution, 230 mL
<b>HI 1220</b>	...Conductivity probe, L: 240 mm, DIN connector



## Combo (HI 98129 & HI 98130)

### Waterproof pH/EC/TDS/Temperature Testers

The new HI 98129 and HI 98130 Combo waterproof testers offer high accuracy pH, EC/TDS and temperature measurements in °C or °F all in a single tester! pH and EC/TDS readings are automatically compensated for the effects of temperature (ATC).

These technologically advanced testers have a replaceable pH electrode cartridge with an extendable cloth junction as well as an EC/TDS graphite electrode that resists contamination by salts and other substances.



The Combo's replaceable electrode has a pull-out cloth junction. When the cloth junction becomes dirty from routine testing, simply pull out 3 mm (1/8") to rejuvenate the electrode.

Specifications	HI 98129	HI 98130
<b>Range</b>	<b>pH</b> 0.00 to 14.00	0.00 to 14.00
	<b>EC</b> 0 to 3999 μS/cm	0.00 to 20.00 mS/cm
	<b>TDS</b> 0 to 2000 ppm	0.00 to 10.00 ppt
	<b>Temp.</b> 0.0 to 60.0°C or 32.0 to 140.0°F	
<b>Resolution</b>	<b>pH</b> 0.01	0.01
	<b>EC</b> 1 μS/cm	0.01 mS/cm
	<b>TDS</b> 1 ppm	0.01 ppt
	<b>Temp.</b> 0.1°C or 0.1°F	
<b>Accuracy</b>	<b>pH</b> ±0.05	
	<b>EC/TDS</b> ±2% F.S.	
	<b>Temp.</b> ±0.5°C or ±1°F	
<b>Temp. Comp.</b>	pH:Automatic; EC: Automatic; β adjustable from 0.0 to 2.4%/°C	
<b>Battery Life</b>	Approx. 100 hours continuous use	
<b>Dimensions</b>	163 x 40 x 26 mm (6.4 x 1.6 x 1")	
<b>Weight</b>	85 g (3.0 oz.)	

Recommended Accessories	
<b>HI 77400P</b>	...Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
<b>HI 77700P</b>	...Calibration kit (pH 7, 20 mL, 10 pcs)
<b>HI 770710P</b>	...Cal. kit (pH 7 & 10, 20 mL, 5 pcs ea.)
<b>HI 7061M</b>	...Electrode cleaning solution, 230 mL
<b>HI 70300M</b>	...Electrode storage solution, 230 mL
<b>HI 73127</b>	...Probe for HI 98129 & HI 98130
<b>HI 70030P</b>	...12.88 mS/cm @ 25°C cal. kit. (25 x 20 mL)
<b>HI 70031P</b>	...1413 μS/cm @ 25°C cal. kit. (25 x 20 mL)
<b>HI 70032P</b>	...1382 ppm @ 25°C cal. kit. (25 x 20 mL)
<b>HI 70038P</b>	...6.44 ppt @ 25°C cal. kit. (25 x 20 mL)
<b>HI 70039P</b>	...5000 μS/cm @ 25°C cal. kit. (25 x 20 mL)
<b>HI 70442P</b>	...1500 ppm @ 25°C cal. kit. (25 x 20 mL)

# Testers

## ORP (HI 98201)

### Oxidation Reduction Potential Portable Tester

- Clog-Resistant Cloth Junction
- Platinum Electrode
- Covers Full ORP Range
- Large LCD & Rugged Housing

In certain applications, ORP is used to determine the effects of soil compaction and the viability of the soil to maintain the proper level of oxygen.



Specifications	ORP (HI 98201)
Range	±999 mV
Resolution	1 mV
Accuracy	±5 mV
Battery Life	Approx. 700 hours continuous use
Dimensions	175 x 41 x 23 mm (7.9 x 1.6 x 0.8")
Weight	78 g (2.7 oz.)

#### Recommended Accessories

- HI 73201 . . . . . Electrode for ORP (HI 98201)
- HI 7020M . . . . . ORP 200/275 mV solution, 230 mL
- HI 7091M . . . . . Reducing solution, 230 mL
- HI 7092M . . . . . Oxidizing solution, 230 mL

**TIP**

### What is ORP?

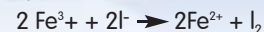
Similar to the manner in which acidic or alkaline solutions are quantified by pH measurements, solutions can also be graded as oxidizing or reducing based on measurements of ORP (REDOX) values.

Oxidation is a process during which a molecule or ion loses electrons.

Oxidation is always coupled with reduction so that as one element or compound gets oxidized, the other is automatically reduced.

**Ex.** The oxidation of iodide by ferric ion (Fe<sup>+++</sup>)

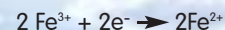
Redox Process :



Oxidation :



Reduction:



#### Recommended Accessories

- HI 73202 . . . . . Electrode for HI 98202
- HI 7080M . . . . . 2.3 g/L Na sol., 230 mL

## pNa (HI 98202)

### Portable Sodium Tester

- Cloth Junction Reference
- Rugged Body
- pNa Determination Graph Included

The pNa tester is the most economical and reliable way to determine sodium levels in soil. Sodium in irrigation water can be caused by underground deposits, road salt leaching or

saline soils. This is a particular problem in Western United States. High levels of sodium can cause poor aeration and decrease the ability of the plant to take up nutrients.



Specifications	pNa (HI 98202)
Range	0.0 TO 3.0 pNa (23 to 0.023 g/L of Na <sup>+</sup> )
Resolution	0.1 pNa
Accuracy	±0.2 pNa
Calibration	Manual one point through trimmer
Battery Life	Approx. 800 hours continuous use
Dimensions	175 x 41 x 23 mm (7.9 x 1.6 x 0.8")
Weight	78 g (2.7 oz.)

## Hygrocheck

### Relative Humidity Tester

- Large LCD
- Pocket Sized
- Common Sense Construction

Now the grower can have accurate readings in a pocket sized tester! The Hygrochecks large LCD can be seen from any

angle. Housed in rugged ABS plastic, the Hygrocheck uses Hanna Instruments Thin Film Polymer Capacitor Sensor.

Specifications	Hygrocheck (HI 98601)
Range	10.0 to 90.0% RH
Resolution	0.1% RH
Accuracy	±3% F.S.
Probe	Thin Film Polymer Capacitor (included)
Battery Life	Approx. 100 hours continuous use
Dimensions	180 x 30 x 15 mm (7.1 x 1.2 x 0.6")
Weight	62 g (2.2 oz.)





## Checktemp® 4 (HI 151) Thermometer with Folding Penetration Thermistor Probe

- Ergonomic and Easy to Carry
- Large LCD
- Cal-Check Feature
- Auto Shut-off
- °C Model Available

The Checktemp® 4 gives you practical solutions to temperature measurement for food service. As you unfold the stainless steel probe, the Checktemp®4

automatically turns ON and immediately performs a calibration test. This unique Hanna feature, Cal-Check, provides you the security of knowing you have accurate measurements. Cal-Check lets you know if your battery level is too low or if your thermometer requires recalibration.

Specifications	Checktemp®4 (HI 151)
<b>Range</b>	-58.0 to 428°F
<b>Resolution</b>	0.1° (-58.0 to 199.9°F), 1°F (200 to 428°F)
<b>Accuracy</b>	±0.8°F / ±1% F.S. (outside)
<b>Probe</b>	Stainless steel, penetration 117 x 3.5 mm (6.75 x .187")
<b>Battery Life</b>	Approx. 25,000 hours continuous use
<b>Dimensions</b>	165 x 50 x 20 mm (6.5 x 2 x 1")
<b>Weight</b>	100 g (3.6 oz.)

A **Factory Calibration Certificate** is available. Ask your sales associate.

## Checktemp® 1 (HI 98510)

### Thermometer with Remote Probe

- 3-foot probe cable
- Calibration Check Feature (Cal-Check)
- Long Battery Life
- °C Model Available

This highly accurate thermometer is equipped with Hanna's unique calibration device which allows the user to ensure that the instrument is calibrated accurately. The 3-foot cable is ideal for checking temperature in hard to reach places.

Specifications	Checktemp®1 (HI 98510)
<b>Range</b>	-58.0 to 302°F
<b>Resolution</b>	0.1°F (-58.0 to 199.9°F), 1°F (200 to 302°F)
<b>Accuracy</b>	±0.5°F (-4 to 194°F), ±1°F (outside)
<b>Probe</b>	Stainless steel with 3-foot cable
<b>Battery Life</b>	Approx. 3000 hours continuous use
<b>Dimensions</b>	106 x 58 x 19 mm (4.2 x 2.2 x 0.7")
<b>Weight</b>	80 g (2.8 oz.)

A **Factory Calibration Certificate** is available. Ask your sales associate.



**TIP**

### Plant Stress

Ideal soil temperature is a constant 70°F for most plants. You should take readings during peak sunlight hours

**TIP**

### Factory Calibration Certificates

Your thermometer will be calibrated against a NIST standard and a certificate will be issued.

**HOT**

### Hanna's Exclusive Cal-Check Feature

How do you know when the reading on any thermometer is correct? You could make an ice point or slurry. Even then there could be several degrees difference in the real and the theoretical or perceived temperatures. With our exclusive **Cal-Check** feature, you do not need to waste time preparing for and making these tests, **Cal-Check** can do it for you. You can check the accuracy and deviation of your thermometer at any time during its life. This way, you are always sure about the accuracy of your readings and if necessary, can manually compensate for any deviation in calibration.

# Testers

## HI 145

### Soil Thermometer

- T-shaped with Easy-to-read Display
- Available with 5" or 12" probe
- °C Model Available
- Cal-Check Feature

The HI 145 series was designed to measure soil temperature quickly and accurately up to depths of 12 inches. Equipped with a calibration check feature, the user can be assured that each reading is accurate. The T-

shaped design and large LCD make the HI 145 easy to spot measure or leave in place.



Specifications	HI 145
<b>Range</b>	-58.0 to 428°F
<b>Resolution</b>	0.1°F (-58.0 to 199.9°F), 1°F (200 to 428°F)
<b>Accuracy</b>	±0.5°F (-4 to 194°F)/±0.4% F.S. (outside)
<b>Probe</b>	5" stainless steel (HI 145-01); 12" stainless steel (HI 145-30)
<b>Battery Life</b>	Approx. 10,000 hours continuous use
<b>Dimensions</b>	HI 145-01: 92 x 165 x 38 mm (3.6 x 6.5 x 1.5") HI 145-30: 92 x 340 x 38 mm (3.6 x 13.4 x 1.5")
<b>Weight</b>	65 g (2.4 oz.)



## Checktemp® (HI 98502) Thermometer with Stainless Steel Probe

- Stainless Steel Probe
- Calibration Check Feature (Cal-Check)
- Long Battery Life
- °C Model Available

This highly accurate thermometer is equipped with Hanna's unique calibration device which allows the user to ensure that the instrument is calibrated

accurately. The Checktemp® offers better accuracy than glass thermometers, features a large LCD and stainless steel 105mm (4.13") probe.

**A Factory Calibration Certificate** is available. Ask your sales associate.

Specifications	HI 98502
<b>Range</b>	-58.0 to 302°F
<b>Resolution</b>	0.1°F (-58.0 to 199.9°F), 1°F (200 to 302°F)
<b>Accuracy</b>	±0.5°F (-4 to 194°F)/±1°F (outside)
<b>Probe</b>	Stainless steel, 105mm (4.13") x 3 mm DIA (0.12")
<b>Battery Life</b>	Approx. 3000 hours continuous use
<b>Dimensions</b>	66 x 50 x 25 mm (2.6 x 2.0 x 1")
<b>Weight</b>	50 g (1.8 oz.)

## Checkfridge (HI 147) Temperature Monitor with Magnetic Backing & Remote Thermistor Sensor on a 1-Meter Cable

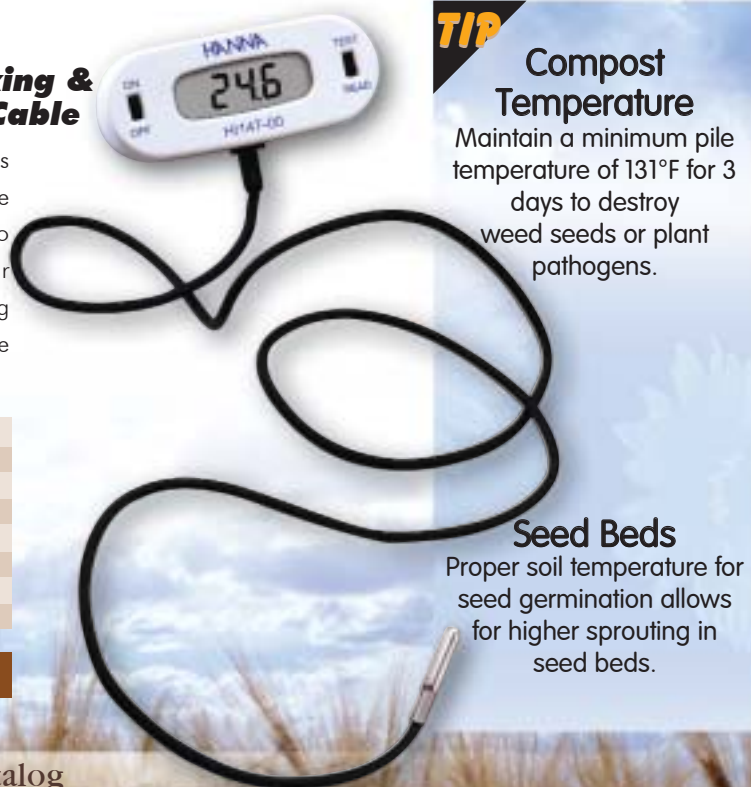
- Magnetic Backing
- Cal-Check Feature
- Large Easy-to-read Display
- °C Model Available

HI 147 is the ideal thermometer when you need accurate, reliable internal temperature monitoring from the outside.

The HI 147 incorporates Hanna's unique Cal-Check feature which allows the user to calibrate the thermometer internally. A low battery warning "ERR" message completes the HI 147's rich features.

Specifications	Checkfridge (HI 147)
<b>Range</b>	-58.0 to 302°F
<b>Resolution</b>	0.1°F (-20.0 to 199.9°F), 1°F (200 to 302°F)
<b>Accuracy</b>	±0.5°F (-4 to 194°F)/ ±1°F (outside)
<b>Probe</b>	Stainless steel, 40 x 5 mm (1.5 x .187"), 1 m silicon cable
<b>Battery Life</b>	Approx. 3 years
<b>Dimensions</b>	92 x 36 x 28 mm (3.625 x 1.25 x 1")
<b>Weight</b>	60 g (2.4 oz.)

**A Factory Calibration Certificate** is available. Ask your sales associate.



**TIP**  
**Compost Temperature**  
Maintain a minimum pile temperature of 131°F for 3 days to destroy weed seeds or plant pathogens.

**Seed Beds**  
Proper soil temperature for seed germination allows for higher sprouting in seed beds.

## Direct Soil Meter (HI 99121) Direct Soil pH and Temperature Meter in Waterproof Casing

- Specialized Electrode
- High Accuracy
- Fast Response
- Automatic Temperature Compensation

The HI 99121 kit has been designed to address the question of correct and rapid measurement of pH directly in soil. Every item in this kit has been made to facilitate measurements in the field without compromising accuracy.

HI 99121 can test the pH of soil directly or after preparation of a diluted sample. In order to measure the pH directly, the kit includes a plastic auger to perforate the ground. The pH and temperature can be directly tested with the 4-in-1 conic shaped electrode with even slightly moist soil. For higher degrees of accuracy or for stony ground where the electrode may be damaged, use the specially made HI 7051 test solution. This solution is included in the pack-

age to help you measure pH more precisely by diluting a sample of the soil in it. The kit naturally includes a pH meter. However, in order to facilitate fast and reliable measurements, the supplied pH meter is a professional grade HI 991001 complete with HI 1292D electrode, pH 4 and 7 calibration sachets, beaker, auger and a practical and rugged carrying case.

HI 991001 is waterproof and sophisticated yet engineered for its simplicity.


The 4-in-1 pH electrode, HI 1292D, has been designed for direct soil measurement. It has a conic, rugged tip and can be directly inserted in moist or soft soil. The electrode incorporates a



temperature sensor near the tip, enabling it to measure and quickly compensate for the temperature effect. It also houses a miniaturized amplifier to provide greater stability in spot measurements. The dual-level LCD shows

the pH value from 0 to 14 in hundredths of units. It also simultaneously displays the temperature. With a menu-driven custom microprocessor, the user is helped with clear prompts during operation and calibration.

Specifications		HI 99121
Range	pH	-2.00 to 16.00
	Temp.	-5.0 to 105.0°C or 23 to 221°F
Resolution	pH	0.01
	Temp.	0.1°C or 0.1°F
Accuracy	pH	±0.02
	Temp.	±0.5°C up to 60°C, ±1°C up to 105°C ±1.0°F up to 140°F, ±2°F up to 221°F
Temp. Comp.		Automatic
Electrode		HI 1292D glass pH/temperature electrode with amplifier, DIN conn. and 1 m (3.3') cable
Battery Life		Approx. 1500 hours continuous use
Dimensions		150 x 80 x 36 mm (5.9 x 3.1 x 1.4")
Weight		245 g (8.6 oz.)

Recommended Accessories	
	HI 77400P . . . . . Cal. kit. (pH 4 & 7, 20 mL, 5 pcs ea.)
	HI 7004L . . . . . Buffer solution pH 4.01, 500 mL
	HI 7007L . . . . . Buffer solution pH 7.01, 500 mL
	HI 7051M . . . . . Soil preparation solution
	HI 721319 . . . . . Ground auger
	HI 710007 . . . . . Blue rubber boot
	HI 710008 . . . . . Orange rubber boot
	HI 721312 . . . . . Rugged carrying case
	HI 1292D . . . . . pH electrode, glass, DIN connector

**TIP**

**Pounds of Aluminum Sulfate to Lower the Soil pH per 10 sq. ft.**

Present pH	Desired pH				
8.0	1.8	2.4	3.3	4.2	4.8
7.5	1.2	2.1	2.7	3.6	4.2
7.0	.06	1.2	2.1	3.0	3.6
6.5		.06	1.5	2.4	2.7
lbs. to add	6.5	6.0	5.5	5.0	4.5

Reduce Rate 1/3 for Sandy Soil

**Pounds of Sulfur to Lower the Soil pH per 10 sq. ft.**

Present pH	Desired pH				
8.0	1.8	2.4	3.3	4.2	4.8
7.5	1.2	2.1	2.7	3.6	4.2
7.0	.06	1.2	2.1	3.0	3.6
6.5		.06	1.5	2.4	2.7
lbs. to add	6.5	6.0	5.5	5.0	4.5

Increase Rate 1/2 for Clay Soil

# Portable Meters

## pH/ORP/°C Meter (HI 9025C) Rugged, Waterproof Microprocessor pH/ORP/°C Meter

- Specialized Electrode
- High Accuracy
- Fast Response
- Automatic Temperature Compensation

The HI 9025C measures pH, °C and ion concentration and ORP in the mV range all in a rugged, waterproof casing. The Auto-Instruction feature guides the user step-by-step through the calibration process with graphic symbols. Unlike conventional microprocessor pH

meters that offer only the standard pH buffer solutions of 4.01, 7.01 and 10.01 for calibration, these meters also allow calibration at the important NBS (NIST) buffers of 6.86 and 9.18. Because the electrode requires a certain amount of time to stabilize between buffers, the meter will display the READY symbol only when the electrode has stabilized. The powerful HI 9025C will allow 1 or 2-point calibration using any of the 5 memorized buffers.



Specifications		HI 9025C
Range	pH	0.00 to 14.00
	mV	±399.9 (ISE); ±1999 (ORP)
	°C	0.0 to 100.0
Resolution	pH	0.01
	mV	0.1 (ISE); 1 (ORP)
	°C	0.1
Accuracy	pH	±0.01
	mV	±0.2 (ISE); ±1 (ORP)
	°C	±0.5
Temp. Comp.	Automatic or manual	
Battery Life	Approx. 400 hours continuous use	
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight	425 g (15 oz.)	

Recommended Accessories	
HI 77400P	Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
HI 7004L	Buffer solution pH 4.01, 500 mL
HI 7006L	Buffer solution pH 6.86, 500 mL
HI 7007L	Buffer solution pH 7.01, 500 mL
HI 7009L	Buffer solution pH 9.18, 500 mL
HI 7010L	Buffer solution pH 10.01, 500 mL
HI 1230B	Combination pH electrode
HI 3230B	ORP electrode
HI 7669/2	Temperature probe
HI 76405	Electrode holder

## pH/mV/°C Meter (HI 8424) pH/mV/°C Meter with ATC and Automatic Buffer Recognition

- Automatic 2-Point Calibration with 3 Memorized Buffers
- Extended mV Range for ORP
- ISE mV Range with 0.1 mV Resolution
- Automatic Temperature Compensation
- Push-Button Calibration

The HI 8424 portable pH meter is one of the most popular pH meters on the market. By utilizing an advanced, custom microprocessor, HI 8424 is able to perform pH, ORP, ISE and temperature measurements with high accuracy and fast response. The mV measurements automatically switch from 0.1 to 1mV resolution when the reading reaches 400mV. Temperature effects are automatically or manually compensated for from 0 to 100°C (32 to 212°F). Calibration is performed at the push of a button.



Specifications		HI 8424
Range	pH	0.00 to 14.00
	mV	±399.9 (ISE); ±400 to ±1999 (ORP)
	°C	0.0 to 100.0
Resolution	pH	0.01
	mV	0.1 (ISE); 1 (ORP)
	°C	0.1
Accuracy	pH	±0.01
	mV	±0.2 (ISE); ±1 (ORP)
	°C	±0.4
Temp. Comp.	Automatic or manual	
Battery Life	Approx. 100 hours continuous use	
Dimensions	185 x 82 x 45 mm (7.3 x 3.2 x 1.8")	
Weight	520 g (1.1 lb)	

Recommended Accessories	
HI 77400P	Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
HI 7004L	Buffer solution pH 4.01, 500 mL
HI 7007L	Buffer solution pH 7.01, 500 mL
HI 7010L	Buffer solution pH 10.01, 500 mL
HI 70300L	Storage solution, 460 mL
HI 710010	Protective rubber boot
HI 1230B	Combination pH electrode
HI 7669/AW	Temperature probe
HI 3230B	ORP electrode
HI 76405	Electrode holder
HI 721312	Rugged carrying case kit

## pH/ORP/°C Meter (HI 98150) Waterproof, pH/ORP/°C Meter with an "Intelligent" Electrode

- Waterproof
- Dual-Level Backlit LCD
- Automatic Temperature Compensation
- Automatic pH & mV Calibration
- Logging Function
- Computer Compatible
- Calibration & Measurement Guide on LCD



The Hanna HI 98150 is an innovative portable pH meter. This instrument features IP 67 waterproof protection, GLP (Good Laboratory Practice) capabilities and uses the latest in electrode technology - Hanna's intelligent electrodes. In addition, the HI 98150 features a dual-level backlit LCD which facilitates operation

in dimly-lit locations. Graphic symbols and messages on the LCD guide the user through calibration and measurement procedures. These advanced meters also allow the operator to set a calibration maximum validity time and will automatically alert the user when recalibration is necessary.

Specifications		HI 98150
Range	pH	-4.00 to 19.99
	mV	±600.0 (ISE); ±2000 (ORP)
	°C	-20 to 120°C
Resolution	pH	0.01
	mV	0.1 mV (±400 mV); 0.2 mV (±600 mV); 1 mV (outside)
	°C	0.1°C from -10 to 120°C, 1°C below -10°C
Accuracy	pH	±0.01
	mV	0.2 mV (±400 mV); 0.4 mV (±600 mV); ±2 mV (outside)
	°C	±0.4°C from 0 to 70°C, ±1°C outside
Temp. Comp.	Automatic from -20 to 120°C	
Battery Life	Approx. 300 hours typical life	
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight	500 g (17.6 oz.)	

## pH Meter & Indicator pH meter with alarm for HACCP control (HI 981400)

- Continuously monitor with 12 VDC adapter
- Set ideal pH level
- 1 or 2-point calibration
- Accepts any pH electrode with a BNC connector



The HI 981400 is a compact, low-cost indicator designed to check the pH of foodstuff. The HI 981400 features a large LCD display and comes with a molded eye to hang in convenient positions such as a QC bench or goods-in area.

Through a trimmer located on the back of the unit, an ideal pH value can be set between 4.0 and 7.5 pH. Should the pH exceed this user-selectable limit, an incorporated LED starts flashing to signal abnormality.

Specifications		HI 981400
Range		0.0 to 14.0 pH
Resolution		0.1 pH
Accuracy		±0.2 pH
Setpoint		Adjustable from 4.0 to 7.5 pH
Power Supply		External VDC adapter (included)
Dimensions		86 x 94 x 33 mm (3.4 x 3.7 x 1.3")
Weight		150 g (5.3 oz.)

### Recommended Accessories

- HI 77400P .....Cal. kit. (pH 4 & 7, 20 mL, 5 pcs ea.)
- HI 7004L .....Buffer solution pH 4.01, 500 mL
- HI 7007L .....Buffer solution pH 7.01, 500 mL

# Portable Meters

## Direct Soil/Liquid EC Meter (HI 993310)

### Dual-Purpose, EC Meter for Direct Measurement in Soil and Liquids

- Direct soil and liquid EC measurement
- Measures EC in soil, irrigation water and fertilizer mixes
- Easy to calibrate and use
- Rapid, accurate measurements
- Automatic Temperature Compensation

Since EC (Electroconductivity) is such an effective indicator of nutrient concentration in soil, irrigation water and fertilizer mixes, the HI 993310 was developed. Now it is possible to use one instrument to accurately and quickly measure EC in many places where the fertilizer

is mixed, such as in the irrigation water and directly in the soil. This meter is easy to operate and gives fast, accurate measurements. Also included in the meter is the ability to measure salt activity. Comes complete with HI 76304 and HI 76305 interchangeable probes.



Specifications	HI 993310
<b>Range</b>	0.00 to 19.99 mS/cm; 0.00 to 1.00 g/L of salt activity
<b>Resolution</b>	0.01 mS/cm; 0.01 g/L of salt activity
<b>Accuracy</b>	±2% F.S. (from 0 - 15.00 mS/cm, excl. probe error)
<b>Temp. Comp.</b>	Automatic
<b>Battery Life</b>	Approx. 100 hours continuous use
<b>Dimensions</b>	185 x 82 x 45 mm (7.3 x 3.2 x 1.8")
<b>Weight</b>	355 g (13 oz.)

#### Recommended Accessories



- HI 7030L** .....12880  $\mu\text{S/cm}$  calibration solution, 460 mL
- HI 7031L** .....1413  $\mu\text{S/cm}$  calibration solution, 460 mL
- HI 710009** .....Blue rubber boot
- HI 710010** .....Orange rubber boot
- HI 721313** .....Rugged carrying case
- HI 710001** .....Soft carrying case (for meter only)
- HI 76305** .....Direct soil probe with 1 m cable, ATC
- HI 76304** .....Liquid probe with 1 m cable, ATC



## EC/TDS/NaCl/°C Meter Waterproof & Auto-ranging with ATC (HI 9835)

- 4 parameters - 1 probe!
- Waterproof
- Automatic or manual temperature compensation
- Auto shut-off (can be disabled)
- Powered by AA batteries or 12 VDC power supply

The HI 9835 combines the more important parameters you need for measuring conductivity. Now you can sample Electroconductivity (EC), Total Dissolved Solids (TDS), sodium chloride (NaCl) and temperature all at once. Hanna's probe design innovation uses 4 rings enhanced with platinum for greater stability while increasing the range of measurable concentrations and temperature. You can choose between automatic and manual

temperature compensation to facilitate your operating requirements. In addition, you can also select a range of TDS factors from 0.40 to 0.80 and a range of temperature coefficients 0.00 to 6.00% for greater consistency and reproducibility. The housing is completely waterproof and built to survive harsh conditions of field use. For extended time studies, this meter can be connected to the available 12 VDC power supply.

## Portable, Logging (HI 933300) EC Meter With Built-in Printer and ATC

- Automatic calibration
- Automatic Temperature Compensation
- Computer compatible
- Powered by AA batteries or 12 VDC power supply

HI 933300 is a powerful and versatile conductivity meter designed to bring lab-grade performance and accuracy anywhere in the plant or field. HI 933300 allows the user to print a permanent, indisputable record of the measurement data at any time for record keeping, trouble shooting or compliance purposes. The printing interval is user-selectable from 1 to 180

minutes. When the logging mode is activated, HI 933300 records the conductivity and the temperature measurements and can be printed directly or at a later date. The stored data (up to 8,000 measurements) can also be downloaded to a PC through the standard RS232 serial connection and Hanna's infrared adapter & Windows® compatible software.



Specifications	HI 933300
<b>Range</b>	0.0 to 150.0 $\mu\text{S}/\text{cm}$ ; 150 to 1500 $\mu\text{S}/\text{cm}$ 1.50 to 15.00 mS/cm; 15.0 to 199.9 mS/cm; 0.0 to 60.0°C
<b>Resolution</b>	0.1 $\mu\text{S}/\text{cm}$ ; 1 $\mu\text{S}/\text{cm}$ ; 0.01 mS/cm; 0.1 mS/cm 0.1°C
<b>Accuracy</b>	$\pm 1\%$ F.S.; $\pm 0.5^\circ\text{C}$ (excluding probe error)
<b>Temp. Comp.</b>	Automatic from 0 to 60°C
<b>Battery Life</b>	Approx. 500 hours continuous use. Power socket for 12 VDC power supply
<b>Dimensions</b>	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
<b>Weight</b>	500 g (18 oz.)

Recommended Accessories	
HI 7030L	.....12880 $\mu\text{S}/\text{cm}$ calibration solution, 460 mL
HI 7031L	.....1413 $\mu\text{S}/\text{cm}$ calibration solution, 460 mL
HI 7033L	.....84 $\mu\text{S}/\text{cm}$ calibration solution, 460 mL
HI 9200/9	.....Infrared Transmitter (9-pin)
HI 92000	.....Windows® compatible software
HI 710034	.....Paper roll (10 pcs)
HI 710035	.....Ink cartridge (1 pcs)
HI 76302W	......4-ring conductivity probe

Specifications	HI 9835
<b>Range</b>	EC: 0.00 to 29.99 $\mu\text{S}/\text{cm}$ ; 30.0 to 299.9 $\mu\text{S}/\text{cm}$ ; 300 to 2999 $\mu\text{S}/\text{cm}$ ; 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm TDS: 0.00 to 14.99 ppm; 15.0 to 149.9 ppm; 150 to 1499 ppm; 1.50 to 14.99 ppt; 15.0 to 100.0 ppt; up to 400.0 ppt NaCl: 0.0 to 400.0% °C: 0.0 to 60.0°C
<b>Resolution</b>	EC: 0.01 $\mu\text{S}/\text{cm}$ (0.00 to 29.99 $\mu\text{S}/\text{cm}$ ); 0.1 $\mu\text{S}/\text{cm}$ (30.0 to 299.9 $\mu\text{S}/\text{cm}$ ); 1 $\mu\text{S}/\text{cm}$ (300 to 2999 $\mu\text{S}/\text{cm}$ ); 0.01 $\mu\text{S}/\text{cm}$ (3.00 to 29.99 mS/cm); 0.1 mS/cm (over 30.0 mS/cm) TDS: 0.01 ppm (0.00 to 14.99 ppm); 0.1 ppm (15.0 to 149.9 ppm); 1 ppm (150 to 1499 ppm); 0.01 ppt (1.50 to 14.99 ppt); 0.1 ppt (over 15.0 ppt) NaCl: 0.1% °C: 0.1°C
<b>Accuracy</b>	EC: $\pm 1\%$ of reading TDS: $\pm 1\%$ of reading NaCl: $\pm 1\%$ of reading °C: $\pm 0.4^\circ\text{C}$
<b>Temperature Compensation</b>	Automatic or manual
<b>Power supply</b>	4 x 1.5V AA or 12VDC adapter
<b>Dimensions</b>	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
<b>Weight</b>	500 g (18 oz.)

Recommended Accessories	
HI 7030L	.....12880 $\mu\text{S}/\text{cm}$ calibration solution, 460 mL
HI 7031L	.....1413 $\mu\text{S}/\text{cm}$ calibration solution, 460 mL
HI 7033L	.....84 $\mu\text{S}/\text{cm}$ calibration solution, 460 mL
HI 7037L	.....NaCl calibration solution, 460 mL
HI 721317	.....Hard carrying case
HI 76309	......4-ring conductivity probe



**TIP**

### Soluble Salts

Measuring soluble salts provides a general indication of nutrient deficiency or excess. Excess soluble salts are very common and generally results from too much fertilizer in relation to the plant's needs, but inadequate watering and leaching or poor drainage are other causes. Sometimes high soluble salt levels occur when root function is impaired by disease or physical damage. Always check the physical condition of the root system when sampling soil for testing.

# Portable Meters

## pH/EC/TDS/°C Meters

**Waterproof pH/EC/TDS/°C Meters for Growers** (HI 9813 series)

- 4 Meters in 1
- Fast Response Probe
- Available with °C display
- Exclusive Cal-Check Feature (HI 9813-6)

These multi-parameter instruments test 4 of the most important factors in the growing environment. HI 9813 is a rugged all around waterproof meter for easy pH/EC/TDS measurements. HI 9813-5 has all the popular features of the HI 9813 and will also display °C with the press of a button. HI 9813-6 has an added Cal-Check feature that can assess the calibration status of the specialized probe in seconds. Accuracy is ensured with ATC and an advanced sensor which completely eliminates polarization and oxidation problems. Comes complete with probe, battery, calibration, cleaning & Cal-Check solutions.

Order the HI 9813 according to your needs:

**HI 9813** is a pH/EC/TDS meter designed for simplicity of use in taking pH, mS/cm, and ppm measurements. Suited for hydroponics, greenhouses, farming, and ground water applications.

**HI 9813-5** offers all of the features if the HI 9813 with the addition of temperature measurement in the °C scale.

**HI 9813-6** is the most complete model in the HI 9813 series. The HI 9813-6 includes all of the features of the previous models and also includes Cal-Check, which allows the user to easily check the probe calibration status at any time.



Specifications	HI 9813	HI 9813-5	HI 9813-6
<b>Range</b>			
pH	0.0 to 14.0	0.0 to 14.0	0.0 to 14.0
EC	0.00 to 4.00 mS/cm	0.00 to 4.00 mS/cm	0.00 to 4.00 mS/cm
TDS	0 to 1999 ppm (mg/L)	0 to 1999 ppm (mg/L)	0 to 1999 ppm (mg/L)
°C	-	0.0 to 60.0	0.0 to 60.0
<b>Resolution</b>			
pH	0.1	0.1	0.1
EC	0.01 mS/cm	0.01 mS/cm	0.01 mS/cm
TDS	1 ppm	1 ppm	1 ppm
°C	-	0.1	0.1
<b>Accuracy</b>			
pH	±0.1	±0.1	±0.1
(@20°C/68°F) EC/TDS	±2% F.S.	±2% F.S.	±2% F.S.
°C	-	±0.5	±0.5
<b>Temp. Comp.</b>	Automatic from 0 to 50°C	Automatic from 0 to 50°C	Automatic from 0 to 50°C
<b>Conversion Factor</b>	variable, 0.56 to 0.72	variable, 0.56 to 0.72	variable, 0.56 to 0.72
<b>Cal-Check</b>	-	-	Yes
<b>Probe</b>	HI 1285-0 pH/EC/TDS probe	HI 1285-5 pH/EC/TDS/°C probe	HI 1285-6 pH/EC/TDS/°C probe with Cal-Check
<b>Battery Life</b>	Approx. 150 hours continuous use	Approx. 150 hours continuous use	Approx. 150 hours continuous use
<b>Dimensions</b>	165 x 75 x 45 mm (6.5 x 3.0 x 1.8")	165 x 75 x 45 mm (6.5 x 3.0 x 1.8")	165 x 75 x 45 mm (6.5 x 3.0 x 1.8")
<b>Weight</b>	250 g (8.8 oz)	250 g (8.8 oz)	250 g (8.8 oz)

**Recommended Accessories**

- HI 77100P . . . . .1413 μS & pH 7 sol., 20 mL, 10 pcs ea.
- HI 77200P . . . . .1500 ppm & pH 7 sol., 20 mL, 10 pcs ea.
- HI 77400P . . . . .pH 4 & 7 solution, 20 mL, 5 pcs ea.
- HI 70300L . . . . .Storage solution, 460 mL
- HI 7061L . . . . .Cleaning solution, 460 mL
- HI 50021P . . . . .Check solution, 20 mL, 25 pcs (for HI 9813-6 only)
- HI 710009 . . . . .Blue rubber boot
- HI 721312 . . . . .Rugged carrying case
- HI 710001 . . . . .Soft carrying case

**TIP** What is pH?

pH is a measure of how acidic or basic a solution is. It is measured on a scale from 0 to 14, with 7 being neutral, 0 the most acidic and 14 the most basic (or alkaline).

Acidic | Basic (Alkaline)

0 | 7 | 14



## pH/EC/TDS/Temperature Megameter (HI 991301) 4-in-1 Meter with Waterproof Casing

This multi-parameter instrument tests for 4 of the most important factors in the growing environment. Calibration is performed at the touch of a button with memorized pH and EC buffers. Accuracy is ensured with Automatic Temperature Compensation and the advanced sensor which

completely eliminates polarization and oxidation problems. Beta factor and TDS ratio are user-selectable as is the ability to read in °C or °F. The HI 991301 complete with probe and carrying case. See recommended solutions below.

Specifications		HI 991301
<b>Range</b>	<b>pH:</b> 0.00 to 14.00; <b>EC:</b> 0.00 to 20.00 mS/cm; <b>TDS:</b> 0.00 to 10.00 ppt; <b>Temp.:</b> 0.0 to 60.0° or 32 to 140°F	
<b>Resolution</b>	<b>pH:</b> 0.01; <b>EC:</b> 0.01 mS/cm; <b>TDS:</b> 0.01 ppt; <b>Temp.:</b> 0.1°C or 0.1°F	
<b>Accuracy</b>	<b>pH:</b> ±0.01; <b>EC/TDS:</b> ±2% F.S.; <b>Temp.:</b> ±0.5°C or ±1.0°F	
<b>Temp. Comp.</b>	<b>pH:</b> Automatic; <b>EC/TDS:</b> Automatic with a BETA factor 0.0-2.4%	
<b>Battery Life</b>	Approx. 500 hours continuous use.	
<b>Dimensions</b>	143 x 80 x 38 mm (5.6 x 3.1 x 1.5")	
<b>Weight</b>	320 g (11.3 oz.)	



Recommended Accessories	
<b>HI 70030P</b>	.....12880 µS/cm cal. sol. (25 x 20 mL)
<b>HI 77100P</b>	.....1413 µS & pH 7 sol. 20 mL, 10 pcs ea.
<b>HI 70038P</b>	.....6.44 ppt cal. sol. (25 x 20 mL)
<b>HI 77200P</b>	.....1500 ppm & pH 7 sol., 20 mL, 10 pcs ea.
<b>HI 77400P</b>	.....pH 4 & 7 solution, 20 mL, 5 pcs ea.
<b>HI 710007</b>	.....Shockproof rubber boot
<b>HI 1288</b>	.....pH/EC/TDS/°C probe



Specifications		HI 9811
<b>Range</b>	<b>pH</b> 0.0 to 14.0 <b>EC</b> 0.00 to 6.00 mS/cm <b>TDS</b> 0.00 to 3.00 g/L (ppt)	
<b>Resolution</b>	<b>pH</b> 0.1 <b>EC</b> 0.01 <b>TDS</b> 0.01 g/L	
<b>Accuracy</b>	<b>pH</b> ±0.2 <b>EC/TDS</b> ±2% F.S.	
<b>Temp. Comp.</b>	Automatic from 0 to 50°C with a β of 2% per °C (conductivity/TDS only)	
<b>Battery Life</b>	Approx. 150 hours continuous use	
<b>Dimensions</b>	185 x 82 x 45 mm (7.3 x 3.2 x 1.8")	
<b>Weight</b>	520 g (1.1 lb)	

## pH/EC/TDS Meter (HI 9811) Versatile & Accurate Field Meter

- Single Probe
- High Versatility
- Automatic Temperature Compensation
- Measures pH & Conductivity or TDS at the same time

HI 9811 is a portable meter for field measurement of pH, conductivity and TDS in agriculture. This meter is ideal for crops with a higher conductivity reading than the HI 9813. The HI 9811 measures pH from 0 to 14 with 0.1 resolution. The HI 9811 measures conductivity from 0.00 to 6.00 mS/cm and TDS from 0.00 to 3.00 g/L both in hundredths of units. The accuracy of your conductivity and TDS measurements will not be in

question as the HI 9811 is equipped with Automatic Temperature Compensation. In addition, the BEPS (Battery Error Prevention System) will alert the user when low batteries could affect the readings. These portable meters use the newly designed replaceable HI 1285 probe. Probe changes are no longer required when switching your measured parameter between pH, conductivity and TDS.

Recommended Accessories	
<b>HI 77100P</b>	.....1413 µS & pH 7 sol. 20 mL, 10 pcs ea.
<b>HI 77300P</b>	.....1382 ppm & pH 7 sol., 20 mL, 10 pcs ea.
<b>HI 77400P</b>	.....pH 4 & 7 solution, 20 mL, 5 pcs ea.
<b>HI 70300L</b>	.....Storage solution, 460 mL
<b>HI 7061L</b>	.....Cleaning solution, 460 mL
<b>HI 710010</b>	.....Orange rubber boot
<b>HI 721312</b>	.....Rugged carrying case
<b>HI 710001</b>	.....Soft carrying case
<b>HI 1285</b>	.....pH/EC/TDS/°C probe

# Portable Meters

## Dissolved Oxygen Meter Waterproof, Extended Range, (HI 9143) D.O. Meter

The HI 9143 is designed for outdoor applications, especially wastewater treatment and fish farming. Simple on-site calibration requires no chemical solutions. Just expose the probe to air and

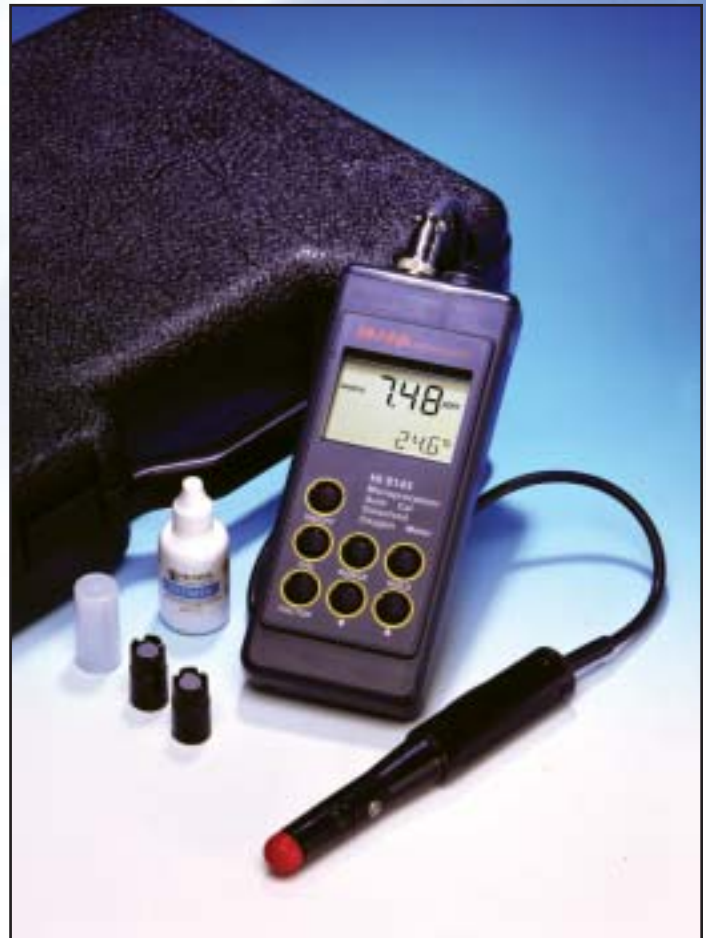
press the CAL button. In a few minutes, the meter is calibrated and ready to use. The HI 9143 measures and displays O<sub>2</sub> from 0 to 300%, 0 to 45 mg/L and temperature from 0 to 50 °C.

Specifications	HI 9143
<b>Range</b>	0.00 to 45.00 mg/L O <sub>2</sub> ; 0.0 to 300.0 % saturation O <sub>2</sub> 0.0 to 50°C
<b>Resolution</b>	0.01 mg/L O <sub>2</sub> ; 0.1 % saturation O <sub>2</sub> ; 0.1°C
<b>Accuracy</b>	±1.5% F.S. mg/L O <sub>2</sub> ; ±1.5% F.S. % saturation O <sub>2</sub> ; ±0.5°C
<b>Calibration</b>	Automatic in air at 100%
<b>Temp. Comp.</b>	Automatic
<b>Altitude Comp.</b>	0 to 1900 m (0 to 6230'), 100 m (328') resolution
<b>Salinity Comp.</b>	0 to 40 g/L; 1 g/L resolution
<b>Battery Life</b>	Approx. 200 hours continuous use. Socket for 12 VDC power supply
<b>Dimensions</b>	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
<b>Weight</b>	425 g (15 oz.)



### Recommended Accessories

- HI 7041S . . . . . Refilling electrolyte solution, 30 mL
- HI 76407/4 . . . . . D.O. probe with 4 m (13') cable
- HI 76407/10 . . . . . D.O. probe with 10 m (33') cable
- HI 76407/20 . . . . . D.O. probe with 20 m (67') cable
- HI 76407A/P . . . . . Pack of 5 replacement membranes
- HI 721317 . . . . . Rugged carrying case



(HI 9142)

Recommended Accessories	
HI 7040L . . . . .	Zero oxygen solution, 500 mL
HI 7041S . . . . .	Refilling electrolyte solution, 30 mL
HI 76407/4 . . . . .	D.O. probe with 4 m (13') cable
HI 76407/10 . . . . .	D.O. probe with 10 m (33') cable
HI 76407/20 . . . . .	D.O. probe with 20 m (67') cable
HI 76407A/P . . . . .	Pack of 5 replacement membranes
HI 721317 . . . . .	Rugged carrying case

## Dissolved Oxygen Meter Waterproof D.O. Meter for Field Use

HI 9142 is a rugged, waterproof meter that solves the common problems of field use. It is very simple to use: calibration is performed with HI 7040 zero oxygen solution while 100% calibration is done in the air. The polarographic probe (HI 76407/4) will take accurate measurements to 0.3 ppm in minutes and is supplied with a 4 m (13') cable

that allows measurements to be taken even in hard to reach places. For applications that require longer probe cables, the HI 76407/10 and HI 76407/20 probes with a 10 m (33') or 20 m (67') cable are available. The conic shape of the probe allows it to be used in BODs measurements making it a truly versatile instrument.

Specifications	HI 9142
<b>Range</b>	0.0 to 19.9 mg/L (ppm)
<b>Resolution</b>	0.1 mg/L
<b>Accuracy</b>	±1.5% F.S.
<b>Calibration</b>	Manual 1 or 2 points (zero & slope)
<b>Temp. Comp.</b>	Automatic
<b>Battery Life</b>	Approx. 500 hours continuous use.
<b>Dimensions</b>	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
<b>Weight</b>	425 g (15 oz.)

## Relative Humidity Meter

Compact, Portable Thermohygrometer

(HI 93640)

- Large LCD
- Dual-Temperature Range
- Low-Battery Indicator

The HI 93640 is a compact, portable and versatile hygrometer with a convenient wrist strap so you can monitor relative humidity anywhere. The built-in thin-film capacitance sensor assures accurate humidity measurements from 5 to 95% RH with a resolution of 0.1%.



Specifications		HI 93640
Range	RH	5.0 to 95.0%
	Temp	0.0 to 60.0°C; 32 to 140°F
Resolution	RH	0.1%
	Temp	0.1°C; 1°F
Accuracy	RH	±2%
	Temp	±0.4°C; ±1°F for one year, excluding probe error
Battery Life	Approx. 100 hours continuous use	
Dimensions	190 x 80 x 38 mm (7.5 x 3.1 x 1.5")	
Weight	320 g (11.3 oz.)	

### Recommended Accessories

HI 7102	.....	.Mini calibration chamber
HI 7111/P	.....	.Spare saturation LiCl salts (6 x 15 g) for low humidity calibration
HI 7121/P	.....	.Spare saturation NaCl salts (6 x 33 g) for high humidity calibration
HI 710007	.....	.Blue shockproof rubber boot
HI 710008	.....	.Orange shockproof rubber boot
HI 710011	.....	.Sintered cap
HI 710001	.....	.Soft carrying case
HI 710031	.....	.Rugged carrying case
HI 740029	.....	.9V battery

## Relative Humidity & Temperature Meter (HI 8564)

- Quick Response Time
- High Accuracy
- 2-Year Warranty
- Displays temperature in °C and °F

The HI 8564 portable, RH/ Temperature meter uses a membrane keypad to switch from RH readings to temperature in °C or °F. The quick response time and reliability of the meter makes it a valuable tool to the greenhouse professional.



Specifications		HI 8564
Range	RH	10.0 to 95.0%
	Temp	0.0 to 60.0°C; 32 to 140°F
Resolution	RH	0.1%
	Temp	0.1°C; 1°F
Accuracy	RH	±2%
	Temp	±0.4°C; ±1°F for one year, excluding probe error
Probe (HI 70601/2)	Thin Film Polymer Capacitor R.H./Temp probe (included)	
Battery Life	Approx. 100 hours continuous use	
Dimensions	185 x 82 x 45 mm (7.3 x 3.2 x 1.8")	
Weight	315 g (11.1 oz.)	

### Recommended Accessories

HI 7101	.....	.Mini calibration chamber
HI 7111/P	.....	.Spare saturation LiCl salts (6 x 15 g) for low humidity calibration
HI 7121/P	.....	.Spare saturation NaCl salts (6 x 33 g) for high humidity calibration
HI 710009	.....	.Blue rubber boot
HI 710010	.....	.Orange rubber boot
HI 710001	.....	.Soft carrying case
HI 710031	.....	.Rugged carrying case
HI 70601/2	.....	.RH probe with 2 m (6.6') cable
HI 70601/5	.....	.RH probe with 5 m (16.5') cable

## Relative Humidity/Temperature Meter

Water Resistant for the Professional Grower

(HI 9065)

- Water-Resistant Casing
- High Accuracy
- 2-Year Warranty
- Hold Key
- Displays Temperature in °C and °F

The waterproof HI 9065 provides the professional grower with high accuracy readings in a rugged casing designed for outstanding performance in harsh

conditions. Relative humidity and temperature are displayed in °C or °F on a large LCD. The hold function will freeze these readings on the display.



Specifications		HI 9065
Range	RH	5.0 to 95.0%
	Temp	0.0 to 60.0°C; 32 to 140°F
Resolution	RH	0.1%
	Temp	0.1°C; 1°F
Accuracy	RH	±2%
	Temp	±0.4°C; ±1°F for one year, excluding probe error
Battery Life	Approx. 500 hours continuous use	
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight	425 g (15 oz.)	

# Portable Meters



## Lux Meter (HI 97500) Portable Lux Meter for Rapid Light Measurements in a Waterproof Case

- Three measurement ranges
- Light sensor attached to 1.5 meter coaxial cable
- Rugged, waterproof case
- Low-Battery Indicator

The New HI 97500 portable Lux Meter from Hanna Instruments has been designed for simplicity of use in taking rapid light measurements.

The HI 97500 is provided with a light sensor connected by a flexible coaxial cable which allows remote, stable and optimum position measurement of light, without any interference of the operator.

The meter makes it possible to choose among three measurement ranges by simply pressing the RANGE key.

The HI 97500 Lux Meter is housed in a rugged waterproof case for trouble-free outdoor measurements.

Specifications	HI 97500
<b>Range (KLux)</b>	0.001 to 1.999; 0.01 to 19.99; 0.1 to 199.9
<b>Resolution (KLux)</b>	0.001; 0.01; 0.1
<b>Accuracy</b>	±6% of reading ±2 digits
<b>Calibration</b>	Factory calibrated
<b>Sensor</b>	Human-Eyes-Response silicon photodiode with 1.5 m fixed Cable
<b>Battery Life</b>	Approx. 200 hours cont. use. Auto-off after 7 min. of non-use
<b>Dimensions</b>	164 x 76 x 45 mm (6.5 x 3 x 1.8")
<b>Weight</b>	170 g with sensor

## Light Intensity

Quality of light is very important in the workplace, schools, greenhouses and public buildings. Too little light (or luminous intensity) affects the quantity and quality of performance of both people and crops. Hanna's light meter uses special optic filters to match the spectral sensitivity of the human eye.

Luminous intensity is measured and reported in foot-candles (ft-c) or in lux (lx). Light meters are commonly referred to as lux meters. One lux is equal to one lumen per square meter and one foot-candle is equal to one lumen per square foot. To convert measurements use the following formulae:

$$\text{foot-candle} = \text{lux} \times 0.0929$$

$$\text{lux} = \text{foot-candle} \times 10.764$$

Hanna's light measuring sensor is a photo diode that converts incident light into an electronic signal that is read and displayed on the meters LCD as Klx which is 1,000 lx. So multiply the reading by 92.9 to get the measurement in foot candles.

### Common examples of light Intensities

Full Moon	.001 Klx	1 lx	.0929 ft-c
Street Lighting	.01 Klx	10 lx	.929 ft-c
Workspace Lighting	.1 - 1 Klx	100 - 1,000 lx	9.29 - 92.9 ft-c
Surgery Lighting	10 Klx	10,000 lx	929 ft-c
Sunshine	100 Klx	100,000 lx	9,290 ft-c

## Plant Light Requirements

Light provides the energy source needed for plants to manufacture food (photosynthesis). The amount of light is commonly measured in foot-candles (ft-c) or lux. Plants differ greatly in their light intensity requirements. Indoor plants are often classified by the amount of light necessary for growth:

- Low (minimum 1.1 Klx, .8 to 2.1 preferred for good growth)
- Medium (minimum 1.1 to 1.6 Klx, 2.1 to 5.4 preferred)
- High (minimum 1.6 to 10.8 Klx, 5.4 to 10.8 preferred)
- Very high (minimum 10.8 Klx, 10.8+ preferred)

About 1.1 Klx for 12 hours per day are necessary simply to maintain plant quality for one year and at least 2.1 Klx for 12 hours per day are necessary for foliage plants to manifest any benefit from fertilization.

While lack of sufficient light results in poor plant growth, too much light can also be harmful. Shade plants cannot tolerate excessively high light levels. When a plant receives too much direct light, the leaves bleach or scald, sometimes dying. This often happens after moving a plant outdoors in direct light. Any changes in light intensity should be gradual.

# Nutrient Management Meters & Kits

## Chemical Test Kits

Hanna Instruments' Chemical Test Kits are economical, easy to use and practical in design. Each test kit comes with thorough instructions and everything necessary to perform quick and easy tests.



Parameter	Method	Range(s)	Chemical Method	# Tests	Weight
<b>Acidity (HI 3820)</b>	Titration	0-100 mg/L 0-500 mg/L	Methyl-orange Phenolphthalein	110 total	32 oz. (910 g.)
<b>Alkalinity (HI 3811)</b>	Titration	0-100 mg/L 0-300 mg/L	Phenolphthalein Bromophenol blue	110 total	16 oz. (460 g.)
<b>Alkalinity, Total (HI 38014)</b>	Titration	0-500 gpg	Bromophenol blue	100	13 oz. (363 g)
<b>Ammonia (HI 3824)</b>	Colorimetric	0-2.5 mg/L	Nessler	25	6.3 oz. (180 g.)
<b>Boron (HI 38074)</b>	Titration	0-5.0 mg/L	Boric Acid	100	27.5 oz. (780 g)
<b>Carbon Dioxide (HI 3818)</b>	Titration	0-10.0 mg/L 0-50.0 mg/L	Phenolphthalein Phenolphthalein	110 total	16 oz. (460 g)
<b>Chloride (HI 3815)</b>	Titration	0-100 mg/L 0-1000 mg/L	Mercuric Nitrate Mercuric Nitrate	110 total	16 oz. (460 g.)
<b>Chloride (HI 38015)</b>	Titration	500-10.000 mg/L	Silver Nitrate	100 total	23.4 oz. (664g)
<b>Gypsum Requirement &amp; Exchangeable Sodium (HI 38083)</b>	Titration	GR: 0-213 metric ton /ha ES: 0-56.4 meq/100g soil	Calcium Sulfate Calcium Sulfate	100 total	31 oz. (883 g)
<b>Hardness (HI 3812)</b>	Titration	0-30 mg/L 0-300 mg/L	EDTA EDTA	100 total	16 oz. (460 g.)
<b>Hardness (HI 3840)</b>	Titration	0-150 mg/L	EDTA	50	4.2 oz. (120 g.)
<b>Hardness (HI 3841)</b>	Titration	40-500 mg/L	EDTA	50	4.2 oz. (120 g.)
<b>Hardness (HI 3842)</b>	Titration	400-3000 mg/L	EDTA	50	4.2 oz. (120 g.)
<b>Iron &amp; Total Hardness (HI 3889)</b>	Colorimetric	Fe: 0-5 mg/L	Phenanthroline	50	
	Titration	40-500 mg/L	EDTA	50	9 oz. (260 g)
<b>Iron (HI 3834)</b>	Colorimetric	0-5 mg/L	Phenanthroline	50	5 oz. (145 g.)
<b>Nitrate (HI 3874)</b>	Colorimetric	0-50 mg/L	Cadmium reduction	100	5.4 oz. (156 g.)
<b>Nitrate, Irrigation Water &amp; Soil (HI 38050)</b>	Checker Disc	IW: 0-50 mg/L Soil: 0-60 mg/L	Cadmium reduction Cadmium reduction	100 total	36 oz. (1026 g)
<b>Nitrite (HI 3873)</b>	Colorimetric	0-1 mg/L	Sulfanilamide	100	5.6 oz. (160 g.)
<b>Oxygen, Dissolved (HI 3810)</b>	Titration	0-10 mg/L 0-5 mg/L	Modified Winkler Modified Winkler	110 total	32 oz. (910 g)
<b>Ozone (38054)</b>	Checker Disc	0-2.3 mg/L	DPD	100	34 oz. (966 g)
<b>pH (HI 38058)</b>	Checker Disc	4.0-10.0 pH	pH indicators	300	7.5 oz. (215 g)
<b>Salinity (HI 3835)</b>	Titration	0-40 g/kg	Mercuric nitrate	110	16 oz. (460 g)
<b>Sodium Absorption Ratio (SAR) (HI 38078)</b>	DiST 4+test kit Calcium+magnesium	> 0 meq/L	Titration	100	27.6 oz. (785 g)
<b>Zinc, HR (HI 38076)</b>	Checker Disc Checker Disc	0-4.0 mg/L 0-20.0 mg/L	Zincon Zincon	100	22.8 oz. (647g)
<b>HI 3895- Agricultural Multiparameter Test Kit</b>					
<b>Nitrogen</b>	Colorimetric	traces, low, med, high	Ned	10	
<b>Phosphorous</b>	Colorimetric	traces, low, med, high	Ascorbic acid	10	
<b>Potassium</b>	Turbidimetric	traces, low, med, high	Tetraphenylborate	10	
<b>pH</b>	Turbidimetric	from 4 to 9 pH	pH indicators (1 pH increments)	10	3.7 oz. (105 g)
<b>HI 3896- Agricultural Multiparameter Test Kit</b>					
<b>Nitrogen</b>	Colorimetric	traces, low, med, high	Ned	25	
<b>Phosphorous</b>	Colorimetric	traces, low, med, high	Ascorbic acid	25	
<b>Potassium</b>	Turbidimetric	traces, low, med, high	Tetraphenylborate	25	
<b>pH</b>	Turbidimetric	from 4 to 9 pH (1 pH increments)	pH indicators	25	23.3 oz. (660 g)

# Nutrient Management Meters & Kits

## pH Bench Meters

Accurate, Affordable Bench Meters

### pH/mV/°C Bench Meter



**pH 213**

- Computer capability through opto-isolated RS232
- Automatic Temperature Compensation
- Automatic calibration
- 0.001 pH resolution

### pH/mV/Ion/°C Bench Meter



**pH 301**

- Computer capability through bi-directional opto-isolated RS232
- Measures direct ion strength concentration in ppm
- Automatic Temperature Compensation
- Automatic calibration
- Meets GLP requirements

### pH/mV/°C Bench Meter With Built-in Printer



**pH 302**

- Computer capability through bi-directional opto-isolated RS232
- Built-in printer
- Automatic Temperature Compensation
- Automatic calibration
- Meets GLP requirements

Specifications	pH 213	pH 301	pH 302
<b>Range</b>	pH -2.00 to 16.00/-2.000 to 16.000 mV ±999.9 (ISE and ORP) ppm - °C 0.0 to 100.0	pH -1.999 to 19.999 mV ±1999.9 ppm 0.001 to 19999 °C -9.9 to 120.0	pH 0.00 to 14.00 mV ±399.9 (ISE); ±1999 (ORP) ppm - °C -9.9 to 120.0
<b>Resolution</b>	pH 0.01/0.001 mV 0.1 (ISE and ORP) ppm - °C 0.1	pH 0.01 or 0.001 mV 0.1 ppm 0.001; 0.01; 0.1; 1 °C 0.1	pH 0.01 mV 0.1 (ISE); 1 (ORP) ppm - °C 0.1
<b>Accuracy</b>	pH ±0.01/±0.002 mV ±0.05% F.S. (ISE and ORP) ppm - °C ±0.5	pH ±0.002 mV ±0.1 (±799.9); ±0.2 (outside) ppm ±0.5% F.S. °C ±0.5	pH ±0.01 mV ±0.3 (ISE); ±1 (ORP) ppm - °C ±0.5
<b>Temperature Comp.</b>	Automatic (with HI 7669/2 probe) or manual from 0 to 100°C (32 to 212°F)	Automatic or manual (for pH only) from -9.9 to 120°C (14 to 248°F)	Automatic or manual from -9.9 to 120°C (14 to 248°F)
<b>pH Calibration</b>	Automatic 1 or 2 points with 5 memorized buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01)	Automatic 1, 2 or 3 points with 6 memorized buffers (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01)	Automatic 1 or 2 points with 3 memorized buffers (4.01, 7.01, 10.01)
<b>Logging Interval</b>	-	1, 15, and 30 seconds; 1, 5, 30, 60, 120, and 180 min.	From 1 minute to 24 hours
<b>Printer</b>	-	-	Built-in
<b>Power Supply</b>	12 VDC adapter	12 VDC adapter	12 VDC adapter
<b>Dimensions</b>	240 x 182 x 74 mm (9.4 x 7.2 x 2.9")	280 x 200 x 75 mm (11 x 7.9 x 3")	280 x 200 x 75 mm (11 x 7.9 x 3")
<b>Weight</b>	1.1 Kg (2.4 lb.)	1.3 Kg (2.9 lb.)	1.3 Kg (2.9 lb.)

### Recommended Accessories

- HI 1331B ..... Combination pH electrode
- HI 1131B ..... Combination, refillable pH electrode
- HI 3131B ..... Combination platinum ORP electrode
- HI 7669/2 ..... Temperature probe
- HI 7004L ..... pH 4.01 buffer solution, 500 mL

- HI 7007L ..... pH 7.01 buffer solution, 500 mL
- HI 7010L ..... pH 10.01 buffer solution, 500 mL
- HI 92000 ..... Windows® compatible software
- HI 920010 ..... .9-pin cable for PC
- HI 710032 ..... 10 spare paper rolls
- HI 710033 ..... - spare ink cartridge

## Magnetic Stirrers

High quality, lightweight stirrers

- Compact Size
- ABS plastic covers for chemical resistance
- Built to last



Specifications	HI 180/U • HI 190M
<b>Maximum Stirring Capacity</b>	1 liter (0.26 gallons)
<b>Speed Range</b>	<b>Min:</b> 100 rpm; <b>Max:</b> 1000 rpm
<b>Power Supply</b>	110/115V, 50/60 Hz
<b>Dimensions</b>	HI 180/U 137 mm (DIA) x 51 mm (h) (5.4 x 2") HI 190M 120 x 120 x 45 mm (4.8 x 4.8 x 1.8")
<b>Weight</b>	640 g (1.4 lb)

\*12 VDC available (HI 190MB)

# Nutrient Management Meters & Kits

## Grow Master (C 215) Nitrogen, Phosphorus, Potassium and Ammonia Meter

- Accurate
- 4 Parameters in 1 Meter
- Three Ranges for Each Parameter
- Easy to use
- Economical Tests

C 215 is a practical instrument made to measure nutrients commonly present in fertilizer-enriched solutions. This convenient photometer measures ammonia, phosphorus, nitrate and potassium in three distinct ranges of low, medium and high concentrations. This way accuracy is maximized for each nutrient and for every concentration.

Thanks to the low cost per test and simplicity of the operations, you no longer need to send off your samples and wait for the results to come back. Using the C 215, you can test the presence and strength of nutrients right on the spot. This can translate itself into a substantial savings and improved yield.



C 215 has been engineered to run on battery power as well as the mains. The C 215 comes complete with a 9-volt battery and a 12 VDC adapter. Add to this the unit's lightweight and you have a bench/portable meter that is just at home in the field as in the horticulturist's lab.

Specifications Test	C 215 Range	Method	Accuracy
Ammonia LR	0.0-10.0 mg/L	Nessler	±0.1 mg/L ±4% of reading
Ammonia MR	0.0-50.0 mg/L	Nessler	± 0.5 mg/L ±4% of reading
Ammonia HR	0-100 mg/L	Nessler	±1 mg/L ±4% of reading
Nitrate LR	0.0-30.0 mg/L	Cadmium Reduction	±1 mg/L ±8% of reading
Nitrate MR	0-150 mg/L	Cadmium Reduction	±5 mg/L ±8% of reading
Nitrate HR	0-300 mg/L	Cadmium Reduction	±10 mg/L ±8% of reading
Phosphorus LR	0.0-10.0 mg/L	Amino Acid	±0.5 mg/L ±4% of reading
Phosphorus MR	0.0-50.0 mg/L	Amino Acid	±2.5 mg/L ±4% of reading
Phosphorus HR	0-100 mg/L	Amino Acid	±5 mg/L ±4% of reading
Potassium LR	0.0-50.0 mg/L	Turbidimetric	±3.0 mg/L ±7% of reading
Potassium MR	10-250 mg/L	Turbidimetric	±15 mg/L ±7% of reading
Potassium HR	20-500 mg/L	Turbidimetric	±30 mg/L ±7% of reading

<b>Light Source</b>	Light Emitting Diode @ 470 nm
<b>Light Detector</b>	Silicon Photocell
<b>Battery Life</b>	Approx 40 hours continuous use
<b>Dimensions</b>	230 x 165 x 70 mm (9.0 x 6.5 x 2.8")
<b>Weight</b>	640 g (22.6 oz)

mg/L = ppm  
LR = Low Range  
MR = Medium Range  
HR = High Range

### Recommended Accessories

- HI 731318** .....Tissue for wiping cuvetts (4 pcs)  
**HI 731321** .....Spare measurement cuvetts (4 pcs)  
**HI 731325** .....Cap for cuvetts(4 pcs)

### Reagents

- HI 93715-01** .....Reagents for Ammonia (100 tests)  
**HI 93728-01** .....Reagents for Nitrate (100 tests)  
**HI 93706-01** .....Reagents for Phosphorus (100 tests)  
**HI 93750-01** .....Reagents for Potassium (100 tests)  
**HI 76407A/P** .....Pack of 5 replacement membranes  
**HI 721317** .....Rugged carrying case

**TIP**

## Plant Nutrition

The three elements that are most needed by plants are nitrogen (N), phosphorous (P) and potassium (K). This is the reason why they are called macronutrients and should be given to plants.

**Nitrogen** is indispensable for the plant's life and is a key factor in fertilization. Nitrogen allows the development of the vegetative activity of the plant, in particular, causes lengthening of trunks and sprouts and increases the production of foliage and fruits. An excess of nitrogen weakens the plants' structure creating an unbalanced relationship between the leaves and the stalks. In addition, the plant becomes less resistant to diseases.

**Phosphorous** is an important element in the composition of DNA and RNA, the regulators of the energetic exchange (ATP & ADP), as well as the reserve substances in seeds and bulbs. It contributes to the formation of buds, roots, blooming, and lignification. A lack of phosphorous results in: stifling of plant, slow growth, a reduction of production, smaller fruits and a lower expansion of the roots.

Even if **Potassium** is not a constituent of important compounds, it plays a remarkable role in many physiological activities like the control of cellular turgor and the accumulation of carbohydrates. It increases the size of fruits, their flavor, as well as yielding a positive effect on the color and fragrance of flowers. Potassium also makes plants more resistant to disease.

# Nutrient Management Meters & Kits

## Single or Dual Parameter Ion Specific Meters

- Lightweight and Portable
- Quick and Simple to Use
- Long Battery Life
- Lab Grade Accuracy
- Economical Tests



### Specifications


Test	Range	Method	Accuracy
Ammonia (HI 93733) (HR)	0.0-50.0 mg/L	Nessler/470 nm	±0.5 mg/L ±5% of reading
Chlorine, Free & Total (HI 93734)	0.00-9.99 mg/L (F. & T.)	DPD	±0.03 mg/L ±3% of reading
Copper (HI 93702) (HR)	0.00-5.00 mg/L	Bicinchoninate/555 nm	±0.02 mg/L ±4% of reading
Iron (HI 93721) (HR)	0.00-5.00 mg/L	Phenantroline/470 nm	±0.04 mg/L ±2% of reading
Manganese (HI 93709) (HR)	0.0-20.0 mg/L	Periodate Oxidation/555 nm	±0.2 mg/L ±3% of reading
Nickel (HI 93740) (LR)	0.000-1.000 mg/L	PAN/555 nm	±0.010 mg/L ±5% of reading
Nitrate (HI 93728)	0.0-30.0 mg/L	Cadmium Reduction/555 nm	±0.5 mg/L ±10% of reading
Nitrite (HI 93708) (HR)	0-150 mg/L	Ferrous Sulfate	±4 mg/L ±4% of reading
Oxygen, Dissolved (HI 93732N)	0.0-10.0 mg/L	Modified Winkler/430 nm	±0.2 mg/L ±3% of reading
Phosphate (HI 93717) (HR)	0.0-30.0 mg/L	Amino Acid/470 nm	±1 mg/L ±4% of reading
Phosphorus (HI 93706)	0.0-15.0 mg/L	Amino Acid/470 nm	±0.3 mg/L ±4% of reading
Potassium (HI 93750)	0.00-50.0 mg/L	Turbidimetric	±1 mg/L ±5% of reading
Sulfate (HI 93751)	0-150 mg/L	Turbidimetric/470 nm	±1 mg/L ±5% of reading
Zinc (HI 93731)	0.00-3.00 mg/L	Zincon	±0.03 mg/L ±3% of reading
Calcium and Magnesium (HI 93752) (HR)	0-150 mg/L Mg 0-400 mg/L Ca	Calmagite Oxalate	±3 mg/L ±3% of reading ±10 mg/L ±5% of reading

### Specifications for dual and single parameter ISMs

Light Source	Light Emitting Diode @ 470 nm
Light Detector	Silicon Photocell
Battery Life	Approx 40 hours continuous use
Dimensions	180 x 83 x 46 mm (7.1 x 3.3 x 1.8")
Weight	290 g (10 oz.)

mg/L = ppm  
 LR = Low Range  
 MR = Medium Range  
 HR = High Range  
 nm = nanometers





**Recommended Accessories**

HI 731318 .....Tissue for wiping cuvetts (4 pcs)

HI 731321 .....Spare measurement cuvetts (4 pcs)

HI 731325 .....Cap for cuvetts(4 pcs)

HI 710009 .....Blue rubber boot

HI 710010 .....Orange rubber boot



Reagents	
HI 93733-01 (HR)	.....Reagents for Ammonia (100 tests)
HI 93734-01	.....Reagents for free & total Chlorine (100 tests)
HI 93702-01 (HR)	.....Reagents for Copper (100 tests)
HI 93721-01 (HR)	.....Reagents for Iron (100 tests)
HI 93709-01 (HR)	.....Reagents for Manganese (100 tests)
HI 93740-01 (LR)	.....Reagents for Nickel (50 tests)
HI 93728-01	.....Reagents for Nitrate (100 tests)
HI 93708-01 (HR)	.....Reagents for Nitrite (100 tests)
HI 93732-01	.....Reagents for Dissolved Oxygen (100 tests)
HI 93717-01 (HR)	.....Reagents for Phosphate (100 tests)
HI 93706-01	.....Reagents for Phosphorus (100 tests)
HI 93750-01	.....Reagents for Potassium (100 tests)
HI 93751-01	.....Reagents for Sulfate (100 tests)
HI 93731-01	.....Reagents for Zinc (100 tests)
HI 93752-01 (HR)	.....Reagent for Magnesium and Calcium (100 tests)



# Digital Maple Meters

## Maple Syrup Grading Bench Meters

(C 219 & C 220)

- Large LCD Display
- PC Interface Compatible
- Auto Shut-off
- Powered by 9V Battery or 12 VDC Adapter

The C 219 & C 220 are high precision USDA (C 219) or Canada Federal and Quebec (C 220) compliant photometers that will bring judging "by eye" to an end. A three-button operation makes these meters extremely easy to use. The C 219 & C 220 read in percent transmittance (grades and equivalents below), and provide a digital readout with a precision of  $\pm 1\%$ . These photometers are supplied with a 12-volt adapter (or can be run off of two 9-volt batteries).

## Maple Syrup Grading Portable Meters

(HI 95759 & HI 95760)

- User Calibration
- Display Codes
- Auto Shut-off
- Rugged Kit Included



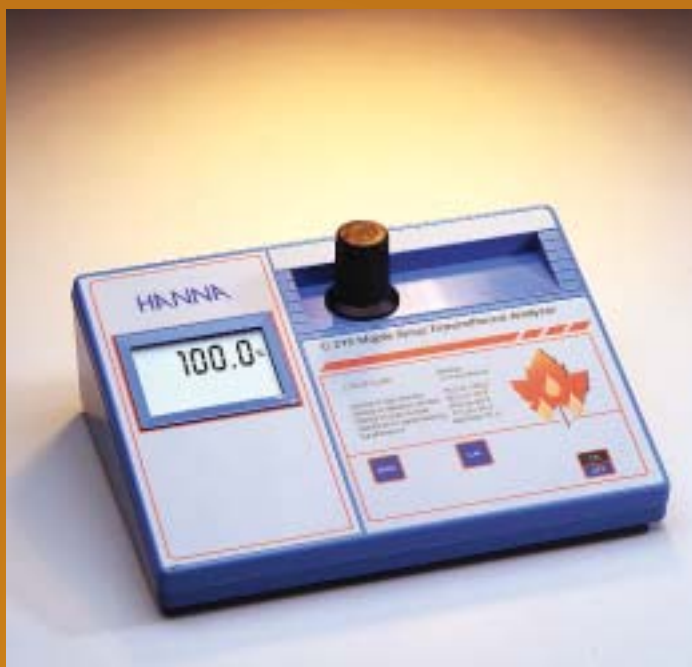
The HI 95759 and HI 95760 handheld, portable maple syrup transmittance analyzers are high precision, USDA (HI 95759) or Canada Federal and Quebec (HI 95760) compliant photometers that bring judging "by eye" to an end. The three-button operation and easy-to-read LCD makes these meters ideal in the field.

Both meters read in percent transmittance (grades and equivalent below) and provide a digital readout with a precision of  $\pm 1\%$ .

Specifications		Hanna Maple Meters
<b>Range</b>		0.0 to 100.0% Transmittance
<b>Resolution</b>		0.1% Transmittance
<b>Precision</b>		$\pm 1\%$ @ 75.0% Transmittance
<b>Light Source</b>		Tungsten lamp with narrow band interference filter @ 560 nm
<b>Dimensions</b>	<b>Bench</b>	230 x 165 x 70 mm (9.0 x 6.5 x 2.8")
	<b>Portable</b>	180 x 83 x 46 mm (7.1 x 3.3 x 1.8)
<b>Weight</b>	<b>Bench</b>	640 g (22.6 oz.)
	<b>Portable</b>	290 g (10 oz.)

### Recommended Accessories

- C 219 or C 220 Kit** . . . . .Kit for maple syrup analysis including 30 mL of glycerol, 82 matched square cuvetts & two 5 mL syringes (75 tests average)
- HI 92000** . . . . .Windows® compatible software
- HI 721310** . . . . .9V battery (10 pcs)
- HI 731318** . . . . .Tissue for wiping cuvetts (4 pcs)



C 219/C220 • HI 95759/HI 95760

# maple

m e t e r s

Our new maple meters measure the percent light transmittance of maple syrup as compared to analytical reagent glycerol. The transmittance value allows identification of syrup quality class. Measurements are performed by using matched square optical cuvetts having a 10 mm light path. Display codes aid the user in routine operations.

### Maple Syrup Grade Designation

Range (% transmittance)	United States USDA	Canada Federal & Quebec
75.0 to 100.0	Grade A Light Amber	No. 1 Extra Light
60.5 to 74.9	Grade A Medium Amber	No. 1 Light Grade A
44.0 to 60.4	Grade A Dark Amber	No. 1 Medium Grade A
27.0 to 43.9	Grade B for reprocessing	No. 2 Amber
less than 27.0	Substandard	No. 3 Dark

# Monitoring Systems




## pH GRO'CHEK® Monitor (HI 991401) pH/Temperature Monitor Featuring a Large, Backlit LCD

- Waterproof
- Dual-level Backlit LCD
- Stability Indicator
- Extra-Large Display
- 12 VDC Power Supply

This new Gro'chek® from Hanna features a dual-level backlit LCD to provide you with instantaneous readings of both pH and temperature. The microprocessor provides automatic calibration, automatic buffer selection and automatic temperature compensation. The HI 991401 incorporates a BNC connector for using a variety of probes.

Specifications		HI 991401
Range	pH	0.00 to 14.00
	Temp.	0.0 to 60.0°C or 32.0 to 140.0°F
Resolution	pH	0.01
	Temp.	0.1°C or 0.1°F
Accuracy	pH	±0.01
	Temp.	±0.5°C or ±1°F
pH Electrode		HI 1293D (included)
Temp. Comp.		Automatic
Power supply		External 12 VDC (included)
Dimensions		160 x 105 x 31 mm (6.2 x 4.1 x 1.2")
Weight		190 g (6.7 oz.)



**Recommended Accessories**

HI 77400P ..... Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)

HI 77700P ..... Calibration kit (pH 7, 20 mL, 10 pcs)

HI 770710P ..... Cal. kit (pH 7 & 10, 20 mL, 5 pcs ea.)

HI 7004M ..... Buffer solution, pH 4.01, 230 mL

HI 7007M ..... Buffer solution, pH 7.01, 230 mL

HI 7010M ..... Buffer solution, pH 10.01, 230 mL

HI 70300M ..... Storage solution, 230 mL


HI 1293D ..... pH electrode with DIN connector

## GRO'CHEK® pH Monitor With Large LCD & Waterproof Casing (HI 981401N)

- Waterproof
- Rugged Housing
- Large LCD
- High Accuracy
- 12 VDC Adapter included

The popular Gro'Chek® pH monitor has been updated with a larger, easy-to-read LCD. Waterproof casing guarantees operation after incidental exposure to water and professional pH electrode provides accurate results every time.

Specifications		HI 981401N
Range		0.0 to 14.0 pH
Resolution		0.1 pH
Accuracy		±0.2 pH
Calibration		Manual 2 point at pH 4 & 7
Electrode		HI 1286 pH electrode with 2 m (6.6') cable (included)
Power supply		External 12 VDC (included)
Dimensions		84 x 94 x 33 mm (3.4 x 3.7 x 1.3")
Weight		150 g (5.3 oz.)



**Recommended Accessories**

HI 7004M ..... Buffer solution, pH 4.01, 230 mL

HI 7007M ..... Buffer solution, pH 7.01, 230 mL

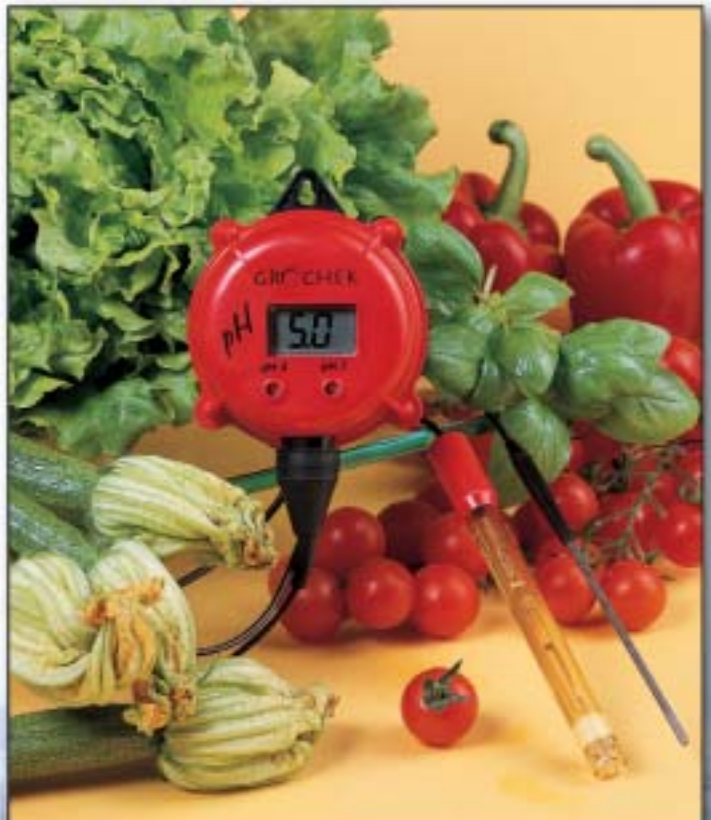
HI 7010M ..... Buffer solution, pH 10.01, 230 mL

HI 70300M ..... Storage solution, 230 mL

HI 70000P ..... Electrode rinse solution, 230 mL

HI 7061M ..... Electrode cleaning solution, 230 mL

HI 1286 ..... pH electrode with 2 m (6.6') cable



## EC TDS GRO'CHEK® Monitor

**EC/TDS/Temperature Monitor With a Large Backlit LCD** (HI 993301 & HI 993302)

- Waterproof
- Dual-Level Backlit LCD
- Adjustable TDS Ratio
- Adjustable  $\beta$
- Extra-Large Display
- 12 VDC adapter

The new EC/TDS Gro'Chek® from Hanna has been designed to meet the grower's need for equipment suited to the aggressive environments found in agricultural and hydroponics applications. The new EC/TDS Gro'chek® features a dual-level

backlit LCD which provides instantaneous readings of both EC/TDS and temperature. The microprocessor provides automatic calibration, automatic buffer selection and automatic temperature compensation.

Specifications	HI 993301	HI 993302
<b>Range</b>	<b>EC</b> 0 to 3999 $\mu\text{S}/\text{cm}$	0.00 to 20.00 $\text{mS}/\text{cm}$
	<b>TDS</b> 0 to 2000 ppm	0.00 to 10.00 ppt
	<b>Temp.</b> 0.0 to 60.0°C or 32.0 to 140.0°F	
<b>Resolution</b>	<b>EC</b> 1 $\mu\text{S}/\text{cm}$	0.01 $\text{mS}/\text{cm}$
	<b>TDS</b> 1 ppm	0.01 ppt
	<b>Temp.</b> 0.1°C or 0.1°F	
<b>Accuracy</b>	<b>EC/TDS</b> $\pm 2\%$ F.S.	
	<b>Temp.</b> $\pm 0.5^\circ\text{C}$ or $\pm 1^\circ\text{F}$	
<b>Temp. Comp.</b>	Automatic, $\beta$ adj. from 0.0 to 2.4%/°C	
<b>Power Supply</b>	12 VDC adapter	
<b>Dimensions</b>	160 x 105 x 31 mm (6.2 x 4.1 x 1.2")	
<b>Weight</b>	190 g (6.7 oz.)	



**Recommended Accessories**

- HI 7031M . . . . .1413  $\mu\text{S}/\text{cm}$  @ 25°C cal. sol., 230 mL
- HI 70031P . . . . .1413  $\mu\text{S}/\text{cm}$  @ 25°C cal. kit. (25 x 20 mL)
- HI 7032M . . . . .1382 ppm @ 25°C cal. sol., 230 mL
- HI 70032P . . . . .1382 ppm @ 25°C cal. kit. (25 x 20 mL)
- HI 70038P . . . . .6.44 ppt @ 25°C cal. kit. (25 x 20 mL)
- HI 7039M . . . . .5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. sol., 230 mL
- HI 70039P . . . . .5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. kit. (25 x 20 mL)

## GRO'CHEK® EC Monitor

**Waterproof and Featuring a Large LCD**

(HI 983302N)



- Waterproof
- Rugged Housing
- Large LCD
- High Accuracy
- TDS Version Available (HI 983301N)

The Gro'Chek® EC monitor has been upgraded with a large, easy-to-read LCD. The HI 983302N's waterproof casing

guarantees operation after accidental water exposure. The professional EC electrode gives accurate results every time.

Specifications	HI 983302N
<b>Range</b>	0.00 to 9.99 EC $\text{mS}/\text{cm}$
<b>Resolution</b>	0.01 EC $\text{mS}/\text{cm}$
<b>Accuracy</b>	$\pm 0.2$ F.S.
<b>Temp. Comp.</b>	Automatic from 5 to 50°C with $\beta = 2\%$
<b>Calibration</b>	Manual with 1 trimmer
<b>Probe</b>	HI 7632 EC probe (included)
<b>Power supply</b>	External 12 VDC (included)
<b>Dimensions</b>	86 x 94 x 33 mm (3.3 x 3.7 x 1.3")
<b>Weight</b>	150 g (5.3 oz.)

**Recommended Accessories**

- HI 7632 . . . . .EC probe with 2 m (6.6') cable
- HI 7632/2 . . . . .EC probe with 2 m (6.6') cable & 1/2" thread for flow-thru mounting
- HI 7632/3 . . . . .EC probe with 2 m (6.6') cable & 3/4" thread for flow-thru mounting
- HI 7032M . . . . .1382 ppm @ 25°C cal. sol., 230 mL
- HI 70032P . . . . .1382 ppm @ 25°C cal. kit. (25 x 20 mL)
- HI 70442P . . . . .1500 ppm cal. kit. (25 x 20 mL)
- HI 7039M . . . . .5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. sol., 230 mL
- HI 70039P . . . . .5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. kit. (25 x 20 mL)

# Monitoring Systems

## Combo GRO'CHEK®

### pH, EC/TDS and Temperature Monitor with Large Backlit LCD (HI 991404 & HI 991405)

- Waterproof
- Dual-level Backlit LCD
- Adjustable, TDS Ratio
- Adjustable  $\beta$
- Stability Indicator
- Extra-Large Display
- 12 VDC Power Supply

The new Combo Gro'Chek® from Hanna continuously monitors the three most important nutrient parameters in greenhouses, hydroponics and horticultural applications. Calibration and temperature compensation is automatic, while the EC/TDS conversion factor and temperature

coefficient ( $\beta$ ) are user adjustable for application specific measurements. The HI 991404 and HI 991405 are supplied with an advanced, non-clogging, double-junction pH electrode and a rugged, conductivity probe that will stand up to the most aggressive environments.



Specifications	HI 991404	HI 991405
<b>Range</b>	<b>pH</b> 0.00 to 14.00	0.00 to 14.00
	<b>EC</b> 0 to 3999 $\mu\text{S}/\text{cm}$	0.00 to 20.00 $\text{mS}/\text{cm}$
	<b>TDS</b> 0 to 2000 ppm	0.00 to 10.00 ppt
	<b>Temp.</b> 0.0 to 60.0°C or 32.0 to 140.0°F	
<b>Resolution</b>	<b>pH</b> 0.01	0.01
	<b>EC</b> 1 $\mu\text{S}/\text{cm}$	0.01 $\text{mS}/\text{cm}$
	<b>TDS</b> 1 ppm	0.01 ppt
	<b>Temp.</b> 0.1°C or 0.1°F	
<b>Accuracy</b>	<b>pH</b> $\pm 0.01$	
	<b>EC/TDS</b> $\pm 2\%$ F.S.	
	<b>Temp.</b> $\pm 0.5^\circ\text{C}$ or $\pm 1^\circ\text{F}$	
<b>Temp. Comp.</b>	pH: Automatic; EC/TDS: Automatic; $\beta$ adjustable from 0.0 to 2.4%/°C	
<b>Electrode/Probe</b>	HI 1293D pH electrode/HI 7630 EC/TDS probe	
<b>Power Supply</b>	External 12 VDC	
<b>Dimensions</b>	160 x 105 x 31 mm (6.2 x 4.1 x 1.2")	
<b>Weight</b>	190 g (6.7 oz.)	

**Recommended Accessories**

- HI 77400P ..... Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
- HI 77700P ..... Calibration kit (pH 7, 20 mL, 10 pcs)
- HI 770710P ..... Cal. kit (pH 7 & 10, 20 mL, 5 pcs ea.)
- HI 7004M ..... Buffer solution, pH 4.01, 230 mL
- HI 7007M ..... Buffer solution, pH 7.01, 230 mL
- HI 7010M ..... Buffer solution, pH 10.01, 230 mL
- HI 7031M ..... 1413  $\mu\text{S}/\text{cm}$  @ 25°C cal. sol., 230 mL
- HI 70031P ..... 1413  $\mu\text{S}/\text{cm}$  @ 25°C cal. kit. (25 x 20 mL)
- HI 7032M ..... 1382 ppm @ 25°C cal. sol., 230 mL
- HI 70032P ..... 1382 ppm @ 25°C cal. kit. (25 x 20 mL)
- HI 70038P ..... 6.44 ppt @ 25°C cal. kit. (25 x 20 mL)
- HI 7039M ..... 5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. sol., 230 mL
- HI 70039P ..... 5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. kit. (25 x 20 mL)
- HI 7061M ..... Electrode cleaning solution, 230 mL
- HI 70300M ..... Storage solution, 230 mL



**Recommended Accessories**

- HI 77400P ..... Cal. kit (pH 4 & 7, 20 mL, 5 pcs ea.)
- HI 70004P ..... pH 4.01 cal. kit. (25 x 20 mL)
- HI 70039P ..... 5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. kit. (25 x 20 mL)
- HI 7061M ..... Electrode cleaning solution, 230 mL
- HI 70300M ..... Storage solution, 230 mL
- HI 1286 ..... pH electrode with BNC conn. & 2 m cable

## GRO'CHEK® pH/EC Monitor Featuring pH and EC Simultaneous Display (HI 981405N)

- Continuous Monitoring
- Displays Both pH and EC
- Adjustable Setpoints

The HI 981405N is ideal for agricultural, horticultural and hydroponics applications where pH and EC levels need to be continuously monitored for optimal plant growth. The HI 981405N features a larger, easy-to-read LCD that displays pH and EC readings simultaneously.

Specifications	HI 981405N	
<b>Range</b>	<b>pH</b>	0.0 to 14.0
	<b>EC</b>	0.00 to 9.99 $\text{mS}/\text{cm}$
<b>Resolution</b>	<b>pH</b>	0.1
	<b>EC</b>	0.01 $\text{mS}/\text{cm}$
<b>Accuracy</b>	<b>pH</b>	$\pm 0.2$
	<b>EC</b>	$\pm 2\%$ F.S.
<b>Temp. Comp.</b>	Automatic	
<b>Power supply</b>	External 12 VDC (included)	
<b>Dimensions</b>	165 x 110 x 35 mm (6.5 x 4.3 x 1.3")	
<b>Weight</b>	300 g (10.6 oz.)	

# Monitoring Systems

## Printing and Logging Hygrometer

(HI 91610F)

- High Resolution and Fast Response
- Computer Compatible
- Accurately Monitors Changing Humidity Conditions
- °C Model Available

This portable thermohygrometer is ideal for spot checking or verifying humidity and temperature levels around the facility. It can also be left logging to store up to 8,000 readings. Logged data includes relative humidity and temperature level, sample #, date, time and printing interval. Data can be printed immediately or can be downloaded later to a PC using HI 9200/9 infrared transmitter and HI 92000 Windows compatible software. Printing and logging intervals are user-selectable at 1, 2, 5, 10, 15, 30, 60, 120 and 180 minutes.



<b>Specifications</b>		<b>HI 91610F</b>
<b>Range</b>	<b>RH</b>	5.0 to 95.0%
	<b>°F</b>	-4.0 to 140°F
<b>Resolution</b>	<b>RH</b>	0.1%
	<b>°F</b>	0.1°F
<b>Accuracy</b>	<b>RH</b>	±2% F.S.
	<b>°F</b>	±1°F
<b>Probe</b>	HI 70604/2 TFPC RH probe with 2 m (7') cable (included) HI 762L/2 temperature probe with 2 m (7') cable (included)	
<b>Battery Life</b>	Approx. 500 hours continuous use	
<b>Dimensions</b>	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
<b>Weight</b>	500 g (18 oz.)	

### Recommended Accessories

- HI 710005 . . . . .110V to 12 VDC Adapter
- HI 762L/2 . . . . .Temperature probe with 6.6' cable
- HI 70604/2 . . . . .RH probe with 6.6' cable
- HI 70604/5 . . . . .RH probe with 16.5' cable
- HI 7111/P . . . . .Spare saturation LiCl salts  
for low humidity calibration
- HI 7121/P . . . . .Spare saturation NaCl salts  
for high humidity calibration
- HI 710034 . . . . .Paper roll (10 rolls)
- HI 710035 . . . . .Ink cartridge (1 pc)
- HI 9200/9 . . . . .Infrared transmitter (9 pin)
- HI 92000 . . . . .Windows® compatible software
- HI 7101 . . . . .Mini calibration chamber



# Monitoring Systems

## Temperature Indicator With Built-in LED Alarm Signal


(HI 148)

- Continuous Ambient Temperature Monitoring
- Visible LED Alarm
- Waterproof
- User-selectable Alarm Set point

The HI 148 is a rapid response continuous monitor thermometer which alerts the user when temperatures are becoming too high for delicate crops. The HI 148 can be mounted anywhere and is powered by 12 VDC.

Specifications		HI 148
Range	HI 148-01	-4.0 to 140°F
	HI 148-00	-20.0 to 60.0°C
Resolution	HI 148-01	0.1°F
	HI 148-00	0.1°C
Accuracy	HI 148-01	±0.9°F
	HI 148-00	±0.5°C
Setpoint	HI 148-01	Selectable from 32.0 to 122.0°F
	HI 148-00	Selectable from 0.0 to 50.0°C
Alarm	LED blinks when measured temperature is higher than the set point	
Sensor	Incorporated, encapsulated stainless steel	
Power Supply	12 VDC external power adapter (included)	
Dimensions	86 x 94 x 33 mm (3.3 x 3.7 x 1.3")	
Weight	150 g (5.2 oz.)	



Recommended Accessories	
	HI 90140 ..... Infrared transmitter
	HI 92140 ..... Windows® compatible software

## Temperature Loggers

(HI 140)

- Waterproof Casing
- Computer compatible
- Record up to 7600 Data Points
- User-selectable Logging Intervals
- LED Alarm
- Long Battery Life

Log the temperature of your greenhouse or perishable material 24 hours per day and download the data to a computer. The HI 140 has programmable high and low alarms, programmable logging interval from 1 minute to 24 hours, logging delay start selectable for 0 to 24

hours, programmable serial and user ID numbers, programmable real-time clock and 4 years of battery life. Data is safe and cannot be overwritten or tampered with. The HI 140 can be reprogrammed by the user to be used over and over.

Specifications		HI 140
Range	-22.0 to 158.0°F (-30.0 to 70.0°C)	
Accuracy	±3°F/±1.5°C	
Maximum Data Points	7600	
Logging Interval	Selectable from 1 minute to 24 hours	
Battery Life	Approx. 4 years of continuous use	

## NTC Thermologgers

(HI 141)

- IP 67 Waterproof Casing
- 1 or 2 Channels
- Logging Interval from 1 Second to 24 Hours
- Programmable High and Low Alarms
- Non-volatile Storage of Logging Parameters and Data in EEPROM

The HI 141 series is a family of temperature data loggers with either one or two channels, internal or external temperature sensors and an optional LCD. External temperature sensor models feature one or two stainless steel sensors on a 1 meter (3.3') cable for direct insertion. HI 141 can store up to 16,000 temperature samples in a protected, non-volatile EEPROM memory. The logging interval can be set from once per second up to every 24 hours and logging delay start can be set anywhere up to 199 hours. The MIN or MAX temperature between logging intervals can also be stored. All of your collected data is tamperproof and stored into serial numbered lots. The user interacts with the logger

setting data acquisition parameters or downloading logged data through an RS232 serial port on a Windows® PC. The HI 141000 Windows® software supports communication between the logger and the PC through the HI 141001 infrared transmitter. The housing is waterproof to IP 67 standards and can include a convenient hanging loop (simply add an "H" to the end of the code). A long-life AA lithium battery provides power. For a typical 1 minute logging interval, your battery will last about 4 years. Hanna's unique Battery Error Protection System, (BEPS), signals when it is time to change the battery. The housing is designed so you can change the battery yourself.



## Checktemp® Dip (HI 98510-01)

With 10 Foot Cable

- Cal-Check Feature
- Weighted Stainless Steel Probe
- 10' Cable on Probe
- Model Available in °C

This highly accurate thermometer is designed for measuring temperatures in tanks where a standard thermometer will not reach. It also incorporates Hanna's one and only calibration check device which allows the user to be sure the thermometer is calibrated properly. Ideal for mixing tanks or reservoirs.



Specifications	HI 98510-01
Range	24.8 to 212°F
Resolution	0.1
Accuracy	±1°F
Probe	Stainless steel weighted probe with 10' cable
Battery Life	Approx. 3000 hours of continuous use
Dimensions	106 x 58 x 19 mm (4.2 x 2.2 x 0.7")
Weight	80 g (2.8 oz.)

### Specifications

Model	LCD	Sensor(s)	Range
HI 141A (H)		1 internal	-40.0 to 80.0°C -40.0 to 175.0°F
HI 141B (H)		1 external	-40.0 to 125.0°C -40.0 to 257.0°F
HI 141C (H)	•	1 internal	-20.0 to 70.0°C -4.0 to 158.0°F
HI 141D (H)	•	1 external	-40.0 to 125.0°C -40.0 to 257.0°F
HI 141E (H)		1 internal	-40.0 to 80.0°C -40.0 to 175.0°F
		1 external	-40.0 to 125.0°C -40.0 to 257.0°F
HI 141F (H)		2 external	-40.0 to 125.0°C -40.0 to 257.0°F
HI 141G (H)	•	1 internal	-20.0 to 70.0°C -4.0 to 158.0°F
		1 external	-40.0 to 125.0°C -40.0 to 257.0°F
HI 141J (H)	•	2 external	-40.0 to 125.0°C -40.0 to 257.0°F

### Specifications for all models

Resolution	0.1°C (-40.0 to 100.0°C); 0.2°C (temp. > 100.0°C) 0.1°F (-40.0 to 190.0°F); 0.3°F (temp. > 190.0°F)
Accuracy	±0.5°C (-40.0 to 0.0 and 70.0 to 100.0°C) ±0.4°C (0.0 to 70.0°C) ±1.0°C (temperature > 100.0°C) ±1.0°F (-40.0 to 32.0 and 158.0 to 212.0°F) ±0.8°F (32.0 to 158.0°F) ±2.0°F (temperature > 212.0°F)
Diameter	86.5 mm (3.4")
Height	35 mm (1.4")
Weight	150 g (5.54 oz.)

### Recommended Accessories

- HI 90140 .....Infrared transmitter
- HI 92140 .....Windows® compatible software

# Thermometers

## Foodcare Thermometer Waterproof with Interchangeable probe

(HI 9061F)

The HI 9061F is a simple-to-operate thermometer that provides excellent accuracy and its waterproof housing is the ultimate in hygiene. This meter is easy to clean and easy to operate. In fact, with only an ON/OFF button, any operator can use them with dexterity. The HI 9061F can operate with a

wide range of interchangeable probes without requiring recalibration. The HI 765 probes have been designed for air, liquid, penetration and between pack measurements. These probes are offered in a variety of colors and cable lengths. A Celsius model is also available.



Specifications	HI 9061F
Range	-58.0 to 302.0°F
Resolution	0.1°F
Accuracy	±0.8°F (for 1 year excl. probe error)
Battery Life	Approx. 2000 hours of continuous use
Dimensions	196 x 80 x 60 mm
Weight	425 g (15 oz.)

A **Factory Calibration Certificate** is available. Just add "/C" to the part number

### Recommended Accessories

HI 765PW	.....	.Penetration probe, white handle
HI 765PBL	.....	.Penetration probe, blue handle
HI 765PG	.....	.Penetration probe, green handle
HI 765PR	.....	.Penetration probe, red handle
HI 765A	.....	.Air/gas probe, white handle
HI 765L	.....	.Liquid probe, white handle
HI 765BL	.....	.Liquid probe, black handle
HI 765W	.....	.Wire probe

### TIP Factory Calibration Certificates

Your thermometer will be calibrated against a NIST standard. And a certificate will be issued.



### TIP Infrared Has The Edge

Hanna Infrared thermometers are ideal for quick and non-intrusive control of equipment, goods on arrival, food on display and in chill units.



## Infrared/Penetration Thermometer (HI 99556-01)

- Ideal for spot checking & Complete Verification of Temperatures
- Fast Response Time
- Rugged Housing
- Models Available in °C

The new dual purpose HI 99556-01 is ideal for checking temperatures everywhere from the greenhouse to the field. Spot check with the infrared probe and get a closer look with the thermistor thermometer. Comes complete with probe and wrist strap.

Specifications	HI 99556-01
Range	IR 14 to 572°F
	Thermistor Probe -40.0 to 302°F
Resolution	IR 1°F
	Thermistor Probe 1°F
Accuracy	IR ±2% of reading or ±3°F
	Thermistor Probe ±1°F
Response Time	1 second
Optic IR Coefficient	3:1 ratio (ratio of distance to DIA of target)
Battery Life	Approx. 300 hours of continuous use
Dimensions	143 x 80 x 38 mm (5.6 x 3.1 x 1.5")
Weight	320 g (11.3 oz.)

### Recommended Accessories

HI 710004	.....	.Soft carrying case
HI 721316	.....	.Hard carrying case
HI 710007	.....	.Blue shockproof rubber boot
HI 731318	.....	.Sensor wipe tissues
HI 765PW	.....	.Temperature probe for HI 99556-01



## Printing Thermometers

### High Precision Printing Thermometers with Backlit LCD (HI 98710 & HI 98740)

- Large Backlit LCD
- 1 and 4 channel models
- Perfect for the food sector
- User-selectable printing intervals
- Selectable auto shut off

For applications requiring documentation and high precision of  $\pm 0.4^{\circ}\text{C}/\pm 0.8^{\circ}\text{F}$ , HI 98710 and HI 98740 are the perfect solution. The advanced Hanna electronics inside the thermometers linearizes measurements taken with the NTC UNI-CURVE<sup>®</sup> thermistor sensor. With a diameter of 0.095" (2.4 mm), these sensors are fast and meet MIL T-23648 standards.

These portable instruments are engineered with large backlit displays to permit use even in dimly lit conditions. The meters incorporate the latest in GLP (Good Laboratory Practice) technology. At the touch of a button, you can retrieve the date and details of the last calibration. A host of default parameters are user-adjustable.

HI 98710 is a single channel unit, while HI 98740 can incorporate up to 4 temperature probes. Printing intervals are user-selectable from 1 to 180 minutes. If more than one probe is in use, the printer will label the data of each probe. The interchangeable HI 762 sensors come preselected with a maximum interchangeability error of  $\pm 0.2^{\circ}\text{C}$ . The probe handles are also color coded to avoid cross contamination of samples - an important plus in the food sector.



Specifications	HI 98710/HI 98740
<b>Range</b>	-50.0 to 150.0°C; -55.0 to 300.0°F
<b>Resolution</b>	0.1°C (-30.0 to 130.0°C); 0.2°C (outside); 0.1°F (-18 to 225°F); 0.2°F (225 to 260°F); 0.3°F (outside)
<b>Accuracy</b>	$\pm 0.4^{\circ}\text{C}$ (-20 to 120°C); $\pm 0.7^{\circ}\text{C}$ (outside); $\pm 0.8^{\circ}\text{F}$ (-4 to 248°F); $\pm 1.3^{\circ}\text{F}$ (outside) for 1 yr excl. probe error
<b>Channels</b>	1 channel (HI 98710); 4 channels (HI 98740)
<b>Battery Life</b>	Approx. 350 hours of continuous use, power socket for 12 VDC supply
<b>Dimensions</b>	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
<b>Weight</b>	500 g (18 oz.)

A Factory Calibration Certificate is available. Just add "/C" to the part number

#### Recommended Accessories

- HI 762-18C . . . . . Calibration test plug -18.0°C  $\pm 0.4^{\circ}\text{C}$
- HI 762000C . . . . . Calibration test plug 0.0°C  $\pm 0.4^{\circ}\text{C}$
- HI 762070C . . . . . Calibration test plug 70.0°C  $\pm 0.4^{\circ}\text{C}$
- HI 762BL . . . . . Temperature probe with black handle
- HI 762L/10 . . . . . Temperature probe with 10 m (33') cable
- HI 710034 . . . . . Paper rolls (10 rolls)
- HI 710035 . . . . . Ink cartridge (1 pcs)
- HI 721317 . . . . . Rugged carrying case

## Temperature Probes for Every Application!

Use our HI 762 series of interchangeable probes to monitor temperatures in air, water, soil, fruits and vegetables. These stainless steel probes feature a precalibrated UNI-CURVE<sup>®</sup> NTC sensor. This allows you to change probes on the fly without having to stop to calibrate the probe to the instrument.

- HI 762PW General purpose/penetration probe with 3.3' cable.
- HI 762PW/10 General purpose/penetration probe with 33' cable.
- HI 762A Air/gas probe with 3.3' cable.
- HI 762A/10 Air/gas probe with 33' cable.
- HI 762PWL Penetration probe for semi solids with 3.3' cable.
- HI 762L General purpose/liquid probe with 3.3' cable.
- HI 762L/2 General purpose/liquid probe with 6.6' cable.
- HI 762L/10 General purpose/liquid probe with 33' cable.
- HI 762W Sensor in a wire without handle for difficult to reach locations with 3.3' cable.
- HI 762W/10 Sensor in a wire without handle for difficult to reach locations with 33' cable.

**TIP**

### Seed Beds

Proper soil temperature for seed germination allows for higher sprouting in seed bed.

# Thermometers



## 1 or 4-Channel Printing and Logging Thermometers (HI 98810 & 98840)

- Computer Compatible
- High Accuracy and Fast Response Time
- Instant Printouts of Time, Date and Temperature
- Log-on-demand

The HI 98840 4-channel printing and logging thermometer is ideal for monitoring temperature levels throughout the greenhouse and outside. Changing temperatures can be tracked in up to four separate locations and printed immediately or downloaded to a PC using HI 9200/9 infrared transmitter and HI 92000 Windows® compatible software. Printing and logging intervals are user-selectable from 1 to 180 minutes and the instrument will store up to 1400 measurements. Current status of any channel can be logged at any time with the log-on-demand feature. Monitored locations can be up to 33' away from the instrument when used with the HI 762W/10 thermistor temperature sensor.

The HI 98810 offers all the features of the 4-channel model. Ideal when it is necessary to monitor a single location at any one time.

Specifications	HI 98810/HI 98840
<b>Range</b>	-50.0 to 150.0°C; -55.0 to 300.0°F
<b>Resolution</b>	0.1°C (-30.0 to 130.0°C); 0.2°C (outside); 0.1°F (-18 to 225°F); 0.2°F (225 to 260°F); 0.3°F (outside)
<b>Accuracy</b>	±0.4°C (-20 to 120°C); ±0.7°C (outside); ±0.8°F (-4 to 248°F); ±1.3°F (outside) for 1 yr excl. probe error
<b>Channels</b>	1 channel (HI 98810); 4 channels (HI 98840)
<b>Battery Life</b>	Approx. 350 hours of continuous use, power socket for 12 VDC supply
<b>Dimensions</b>	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
<b>Weight</b>	500 g (18 oz.)

A **Factory Calibration Certificate** is available. Just add "/C" to the part number

### Recommended Accessories

- HI 76200C** . . . . . Calibration test plug 0.0°C ±0.4°C
- HI 762-18C** . . . . . Calibration test plug -18.0°C ±0.4°C
- HI 762070C** . . . . . Calibration test plug 70.0°C ±0.4°C
- HI 762BL** . . . . . Temperature probe with black handle
- HI 762L/10** . . . . . Temperature probe with 10 m (33') cable
- HI 710034** . . . . . Paper rolls (10 rolls)
- HI 710035** . . . . . Ink cartridge (1 pcs)
- HI 9200/9** . . . . . Infrared transmitter (9-pin)
- HI 92000** . . . . . Windows® compatible software
- HI 721317** . . . . . Rugged carrying case



## **TIP** Compost Temperature

Maintain a minimum pile temperature of 131°F for 3 days to destroy weed seeds or plant pathogens.

## K-Type Thermocouple Thermometer (HI 9063)

### Waterproof and Heavy-duty

- High accuracy and resolution
- Reads Both °C & °F
- Min, Max and Hold Keys
- Large dual-level display

HI 9063 benefits from Hanna's extensive experience in producing instruments that perform to your requirements. The measurement ceiling has been raised, auto-ranging added, and accuracy enhanced. Because it is often necessary to be aware of the highest and lowest temperatures measured during a certain

process, Hanna has incorporated a dual-level LCD that shows the current, minimum, and maximum achieved temperatures. Temperature readings are linearized for increased accuracy and resolution is automatically switched from 0.1° to 1° at 200°C (400°F) and above.

Specifications	HI 9063
<b>Range</b>	-50.0 to 199.9°C & 200 to 1350°C -58.0 to 399.9°F & 400 to 2462°F
<b>Resolution</b>	0.1°C (up to 199.9°C) & 1°C (outside) 0.1°F (up to 399.9°F) & 1°F (outside)
<b>Accuracy</b>	±3°C; ±6°F with HI 766 K-type thermocouple probe
<b>Battery Life</b>	Approx. 2000 hours of continuous use
<b>Dimensions</b>	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
<b>Weight</b>	425 g (15 oz.)



#### Recommended Accessories

- HI 766C** . . . . . Penetration probe with 1 m (3.3') cable
- HI 766E1** . . . . . General use probe with 1 m (3.3') cable
- HI 721317** . . . . . Rugged carrying case

## K-Type Thermocouple Thermometer (HI 9043)

### Microprocessor Thermometer with Min, Max and HOLD

- Memory Functions
- Reads Both °C & °F
- Min, Max and Hold Keys
- High Accuracy

HI 9043 is a hand-held thermometer that uses a K-type probe together with an advanced microprocessor to deliver temperature measurements in the higher ranges.

The meter is housed in a rugged ABS case for maximum protection anywhere. The smooth keypad with membrane keys will wipe clean easily. The powerful microprocessor furnishes this meter also with memory functions. Simply press a button and the meter will recall the highest and lowest temperatures measured in the cycle.

A hold key will guarantee the user plenty of time to record the readings. The °C/°F button makes it possible to switch between the Celsius and Fahrenheit ranges. HI 9043 offers the user 500 hours of battery life, selectable 0.1 or 1°C resolution, Max, Min and Hold features, high accuracy and reliability.

A wide variety of interchangeable probes are available to meet your specific application.

Specifications	HI 9043
<b>Range</b>	-50.0 to 199.9°C & 200 to 1350°C -58.0 to 399.9°F & 400 to 2462°F
<b>Resolution</b>	0.1°C (up to 199.9°C) & 1°C (outside) 0.1°F (up to 399.9°F) & 1°F (outside)
<b>Accuracy</b>	±0.2% F.S., for 1 year excl. probe error
<b>Battery Life</b>	Approx. 500 hours of continuous use
<b>Dimensions</b>	180 x 83 x 40 mm (7.1 x 3.3 x 1.6")
<b>Weight</b>	350 g (12.4 oz.)



#### Recommended Accessories

- HI 766C** . . . . . Penetration probe with 1 m (3.3') cable
- HI 766E1** . . . . . General use probe with 1 m (3.3') cable
- HI 721316** . . . . . Rugged carrying case
- HI 710009** . . . . . Blue rubber boot
- HI 710010** . . . . . Orange rubber boot

# Thermometers

## K-Type Thermocouple Thermometers

**Waterproof, Featuring Min, Max & HOLD**

(HI 935005 & HI 935005N)

- Measures in °C or °F
- 1600 Hours of Battery Life
- Features Min, Max and Hold
- High Range with Auto-ranging
- Auto-calibration and Backlit LCD (HI 935005N only)

The newly redesigned HI 935005 is a hand-held waterproof thermometer that use a K-type sensor together with an advanced microprocessor to deliver accurate temperature measurement with an extraordinary 1600 hour battery life. The new dual-level LCD displays current temperature along with the minimum and maximum extremes achieved during the session. Battery level indication with low battery warning and error prevention furnishes this meter with advanced battery management functions. A HOLD button allows the user to record readings. The °C/°F button instantly switches between Celsius and Fahrenheit ranges. A wide variety of interchangeable probes are available to meet specific applications.

For even greater accuracy and in dimly lit areas, select the HI 935005N. A CAL button allows the operator to remove the combined meter and probe interchange error in an ice bath at 0°C. In addition to the calibration feature, the HI 935005N features a user-activated backlight for low or no light conditions.



Specifications	HI 935005/HI 935005N
<b>Range</b>	-50.0 to 199.9°C & 200 to 1350°C -58.0 to 399.9°F & 400 to 2462°F
<b>Resolution</b>	0.1°C (up to 199.9°C) & 1°C (outside) 0.1°F (up to 399.9°F) & 1°F (outside)
<b>Accuracy</b>	±0.2% F.S., for 1 year excl. probe error
<b>Battery Life</b>	Approx. 1600 hours of continuous use
<b>Dimensions</b>	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")
<b>Weight</b>	235 g (8.3 oz.)



### Recommended Accessories

- HI 766C** . . . . . Penetration probe with 1 m (3.3') cable
- HI 766E1** . . . . . General use probe with 1 m (3.3') cable
- HI 710007** . . . . . Blue shockproof rubber boot

## Direct K-Type Probe Thermometers

**Waterproof Casing for the Food Sector**

(HI 935007 & HI 935007/)



If you would like to order HI 935007 without a fixed probe please add a "/" to the part code.

The HI 935007 enhances the range of portable Hanna thermometers by measuring temperature as high as 1350°C and 2462°F. The HI 935007 is offered at such an attractive price bracket to make it possible for every operator to carry his or her own professional instrument. The fixed HI 766C penetration probe with 1 meter (3.3') of cable is also supplied. Three common AA batteries provide up to 1600 hours of continuous operation. All these features with a wide measurement range and low cost make this meter extremely popular in catering, food preparation, and restaurants.

Specifications	HI 935007 & HI 935007/
<b>Range</b>	-50.0 to 199.9°C & 200 to 1350°C -58.0 to 399.9°F & 400 to 2462°F
<b>Resolution</b>	0.1°C (up to 199.9°C) & 1°C (outside) 0.1°F (up to 399.9°F) & 1°F (outside)
<b>Accuracy</b>	±0.2% F.S., for 1 year excl. probe error
<b>Probe</b>	<b>HI 935007</b> HI 766C (fixed) <b>HI 935007/</b> None
<b>Battery Life</b>	Approx. 1600 hours of continuous use
<b>Dimensions</b>	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")
<b>Weight</b>	235 g (8.3 oz.)



### Recommended Accessories

- HI 766C** . . . . . Penetration probe with 1 m (3.3') cable
- HI 766E1** . . . . . General use probe with 1 m (3.3') cable
- HI 710007** . . . . . Blue shockproof rubber boot

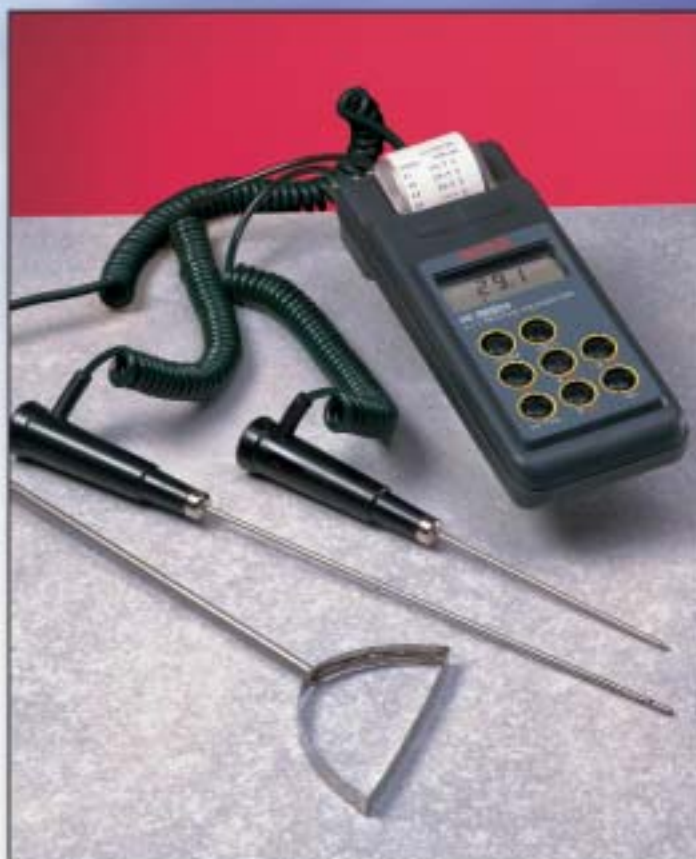
## K, J, T-Type Thermometers Thermocouple, Logging Thermometers with GLP

(HI 98801 & HI 98804)

- Measures in °C or °F
- Dual-level backlit LCD
- Selectable printing and logging intervals
- Computer compatibility
- Factory calibration certificate available

HI 98801 and HI 98804 combine high resolution and extended temperature range with extensive logging capabilities and an infrared data transfer system. In addition to supplying the user with instant printouts of date, time and temperature, they can log the data without supervision at a predetermined interval or simply through the log-on-demand feature. The stored information can later be displayed, downloaded and/or printed. The meters also incorporate GLP (Good Laboratory Practice) features which enable you to retrieve the date and details of the last calibration. With the backlight feature, measurements in poorly lit and even unlit areas

become a reality. HI 98801 accepts one temperature probe while HI 98804 can take up to 4 separate probes. The sophisticated software allocates up to 14000 temperature readings to maximize available space, regardless of the number of channels in use. The LCD shows temperature in large digits with a secondary level of readout displaying logging interval, channel, time and date. Upon request, HI 98801/C and HI 98804/C models are available supplied with a Factory Calibration Certificate against NIST Standard. Recalibration service is available at your nearest Hanna Service Center.



Specifications		HI 98801/HI 98804
<b>Range</b>	<b>K</b>	-200.0 to 999.9°C; 1000 to 1370°C; -300.0 to 999.9°F; 1000 to 2500°F
	<b>J</b>	-200.0 to 760.0°C; -300.0 to 999.9°F; 1000 to 1400°F
	<b>T</b>	-200.0 to 400.0°C; -300.0 to 750.0°F
<b>Resolution</b>	<b>K</b>	0.1°C (-99.9 to 999.9°C); 1°C (1000 to 1370°C); 0.2°C (-200.0 to 100.0°C) 0.2°F (-199.9 to 999.9°F); 1°F (1000 to 2500°F); 0.3°F (-300.0 to -200.0°F)
	<b>J</b>	0.1°C (-149.9 to 760.0°C); 0.2°C (-200.0 to -150.0°C)
	<b>T</b>	0.1°F (32.0 to 999.9°F); 1°F (1000 to 1400°F); 0.2°F (-300.0 to 32.0°F)
		0.1°C (-99.9 to 400.0°C); 0.2°C (-200.0 to -100.0°C)
<b>Accuracy</b>		0.1°F (300.0 to 750.0°F); 0.2°F (-149.9 to 300.0°F); 0.3°F (-300.0 to 150.0°F) ±0.5°C (-200.0 to 999.9°C); ±1°C (outside); ±1°F; for one year excl. probe error
<b>Channels</b>	<b>HI 98801</b>	1 channel
	<b>HI 98804</b>	4 channels
<b>Battery Life</b>		Approx. 350 hours of continuous use
<b>Dimensions</b>		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
<b>Weight</b>		500 g (18 oz.)

### Recommended Accessories

- HI 766C** . . . . . Penetration probe with 1 m (3.3') cable
- HI 766E1** . . . . . General use probe with 1 m (3.3') cable
- HI 710034** . . . . . Paper rolls (10 rolls)
- HI 710035** . . . . . Ink cartridge (1 pcs)
- HI 9200/9** . . . . . Infrared transmitter (9-pin)
- HI 92000** . . . . . Windows® compatible software
- HI 721317** . . . . . Rugged carrying case

**A Factory Calibration Certificate** is available. Just add "/C" to the part number

## THERMISTOR PROBES

### HI 762 Series

**General specifications for HI 762 Series of thermistor probes**

**Range:** -50 to 150°C (-58 to 302°F)

**Sensor According To:** MIL standard T-23648

**Probe Handle:** ABS

**T.C.:** 6 seconds (90% of final value)

**Accuracy:**  $\pm 0.2^{\circ}\text{C}$  ( $\pm 0.4^{\circ}\text{F}$ )

**Probe:** Stainless steel AISI 316

**Interchange Error:**  $\pm 0.2^{\circ}\text{C}$  ( $\pm 0.4^{\circ}\text{F}$ )

**Probes are supplied with a max error of  $\pm 0.2^{\circ}\text{C}$  ( $\pm 0.4^{\circ}\text{F}$ )**

**NOTE:** The HI 762 Series of probes are supplied with a grey cap for identification purposes.

### HI 765 Series

**General specifications for HI 765 Series of precalibrated thermistor probes**

**Range:** -50 to 150°C (-58 to 302°F)

**Probe:** Stainless steel AISI 316

**T.C.:** 8 seconds (90% of final value)

**Accuracy:**  $\pm 0.4^{\circ}\text{C}$  ( $\pm 0.8^{\circ}\text{F}$ )

**Probe Handle:** ABS

**Probes are supplied with a max error of  $\pm 0.4^{\circ}\text{C}$  ( $\pm 0.8^{\circ}\text{F}$ )**

**NOTE:** The HI 765 Series of probes are supplied with a white cap for identification purposes.

### General Purpose/Penetration Probe

NTC thermistor sensor for applications such as liquid, air and penetration of semi-solids.

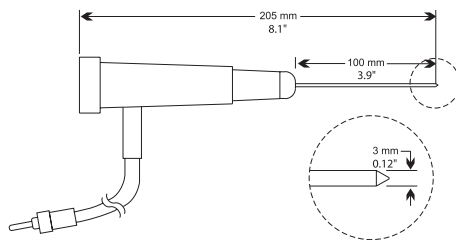
**HI 762PW** with 1 meter (3.3') cable

**HI 762PW/10** with 10 meter (33') cable

PTC thermistor sensor for applications such as liquid, air and penetration of semi-solids.

**HI 765PW** with 1 meter (3.3') cable

**HI 765PW/10** with 10 meter (33') cable



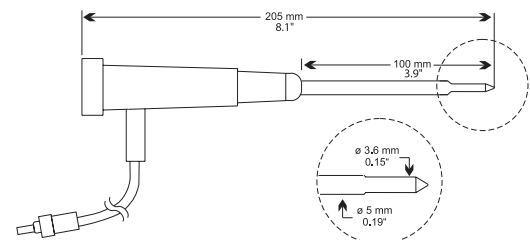
### Penetration Probe

NTC thermistor sensor for measurement of temperature in penetration applications.

**HI 762PWL** with 1 meter (3.3') cable

PTC thermistor sensor for measurement of temperature in penetration applications.

**HI 765PWL** with 1 meter (3.3') cable



### General Purpose/Liquid Probe

NTC thermistor sensor for applications such as liquid and air.

**HI 762L** with 1 meter (3.3') cable

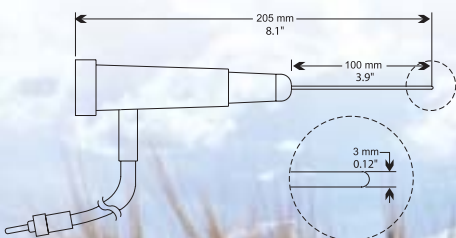
**HI 762L/2** with 2 meter (6.6') cable

**HI 762L/10** with 10 meter (33') cable

PTC thermistor sensor for applications such as liquid and air.

**HI 765L** with 1 meter (3.3') cable

**HI 765L/10** with 10 meter (33') cable



### Wire Probe

NTC thermistor sensor in a wire, designed to access those hard-to-reach places. Probe does not incorporate a handle.

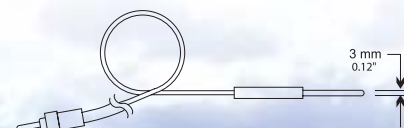
**HI 762W** with 1 meter (3.3') cable

**HI 762W/10** with 10 meter (33') cable

PTC thermistor sensor in a wire, designed to access those hard-to-reach places. Probe does not incorporate a handle.

**HI 765W** with 1 meter (3.3') cable

**HI 765W/10** with 10 meter (33') cable



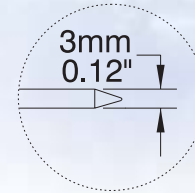
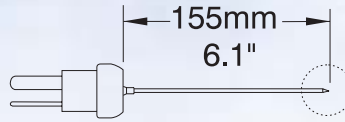
## K-TYPE THERMOCOUPLE PROBES

### HI 766 Series

#### HI 766PC

##### Penetration Probe

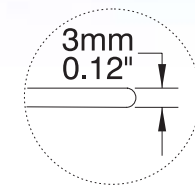
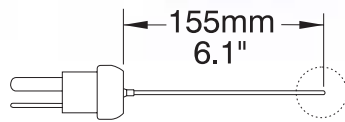
- Use: semi-solids, meat, rubber, etc.
- MAX temperature: 900°C/1650°F
- Response time (90% of final value): 15 sec.
- Probe length: 155 mm (6.1"); DIA 3 mm (0.12")
- Tube in stainless steel



#### HI 766PE1

##### General Purpose Probe

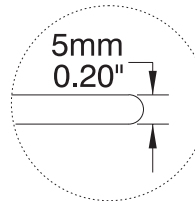
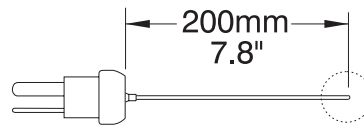
- Use: liquids, gases, etc.
- MAX temperature: 900°C/1650°F
- Response time (90% of final value): 6 sec.
- Probe length: 155 mm (6.1"); DIA 3 mm (0.12")
- Tube in stainless steel



#### HI 766PE2

##### General Purpose Probe

- Use: liquids, gases, etc.
- MAX temperature: 900°C/1650°F
- Response time (90% of final value): 6 sec.
- Probe length: 200 mm (7.8"); DIA 5 mm (0.20")
- Tube in stainless steel



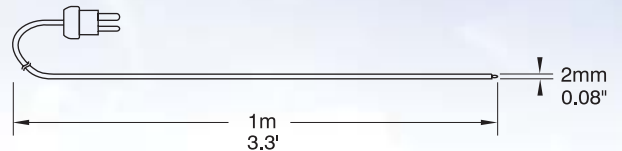
## K-TYPE THERMOCOUPLE PROBES

### HI 766 Surface probes

These probes are constructed for excellent contact with the surface being measured. Response times all refer to 63.2% of measuring range.

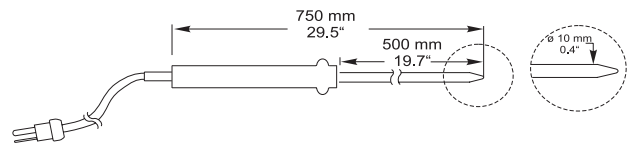
#### HI 766F1 Wire Temperature Probe

- Use: hard to reach places
- MAX temperature: 480°C/900°F
- Response time: 1 sec.
- Wire length: 1000 mm (3.3'); DIA 2 mm (0.08")
- Sensor wires are exposed



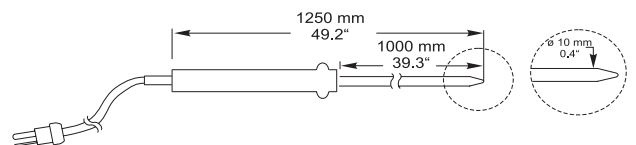
#### HI 766TR1 Penetration Probe

- Use: semi-solids, liquids
- MAX temperature: 250°C/482°F
- Response time (90% of final value): 10 sec.
- Probe length: 500 mm (19.7"); DIA 10 mm (0.4")
- Tube in stainless steel



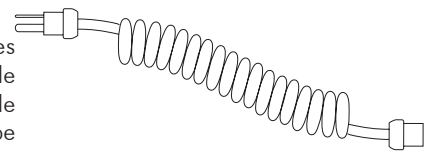
#### HI 766TR2 Penetration Probe

- Use: semi-solids, liquids
- MAX temperature: 250°C/482°F
- Response time (90% of final value): 10 sec.
- Probe length: 1000 mm (39.3"); DIA 10 mm (0.4")
- Tube in stainless steel



#### HI 766EX Extension Cable

This item extends up to 1 m (3.3'), the same length as cables provided with any K-type thermocouple probe. The coiled cable comes with a male thermocouple connector at one end and a female connector at the other. HI 766EX can be used with any K-type thermocouple thermometer.





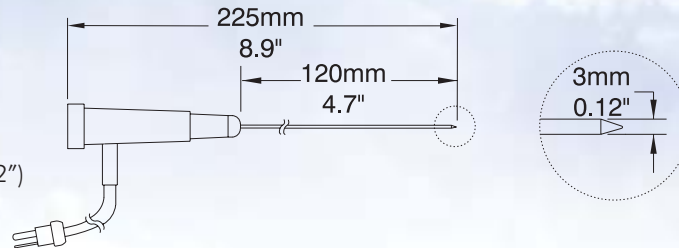
## K-TYPE THERMOCOUPLE PROBES

### HI 766 Series with Integral Handles, 1 Meter Cable and Mini-connector

#### HI 766C

##### Penetration Probe

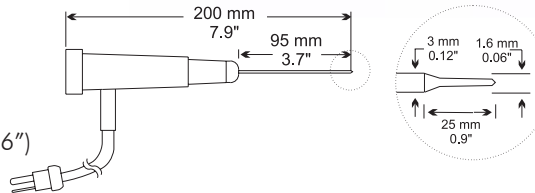
- Use: semi-solids, meat, rubber, etc.
- MAX temperature: 900°C/1650°F
- Response time: (90% of final value): 15 sec.
- Probe length: 120 mm (4.8"); DIA 3 mm (0.12")
- Tube in stainless steel



#### HI 766C1

##### Ultra-fast Penetration Probe

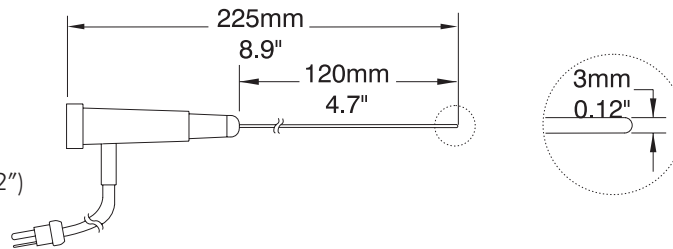
- Use: semi-solids, food
- MAX temperature: 300°C/570°F
- Response time (90% of final value): 4 sec.
- Probe length: 95 mm (3.7"); DIA 1.6 mm (0.06")
- Tube in stainless steel



#### HI 766E1

##### General Purpose Probe

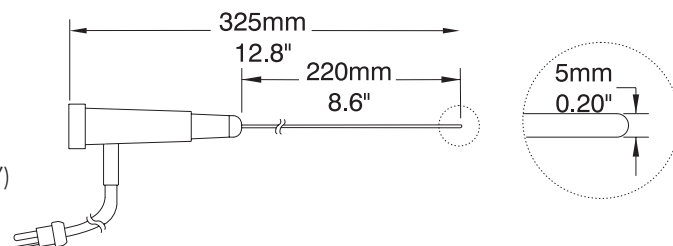
- Use: liquids, gases, etc.
- MAX temperature: 900°C/1650°F
- Response time (90% of final value): 6 sec.
- Probe length: 120 mm (4.7"); DIA 3 mm (0.12")
- Tube in stainless steel



#### HI 766E2

##### General Purpose Probe

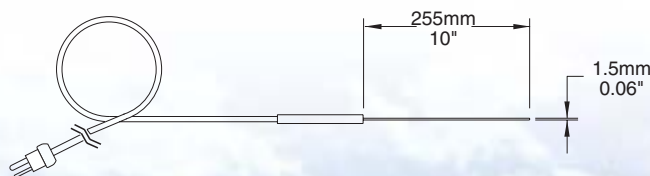
- Use: liquids, gases, etc.
- MAX temperature: 900°C/1650°F
- Response time (90% of final value): 6 sec.
- Probe length: 220 mm (8.5"); DIA 5 mm (0.2")
- Tube in stainless steel



#### HI 766F

##### High Temperature Wire Probe

- Flexible sheath
- MAX temperature: 1100°C/2000°F
- Response time (90% of final value): 4 sec.
- Probe length: 255 mm (10"); DIA 1.5 mm (0.06")
- Tube in AISI 316 stainless steel (no handle)



# Monitoring & Control

## Controller & Monitor with Industrial Enclosure

(HI 1211 & HI 1222)

*Make Your Own Control and Injection Systems*

- LCD Display
- Alarm Contact
- Key Pad Touch Setting
- Calibration and Adjustable Set points
- Multi-ranges for TDS and Conductivity
- Available in 115 V or 12 VDC

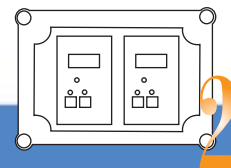
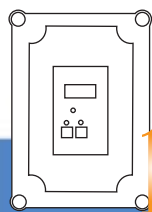
Choose from TDS, Conductivity, pH, Resistivity or ORP. They will allow any system to be cost effectively monitored 24 hours a day.



HI 1211 with single meter capability



**Simple to Install - Just plug in probe, power, and relay meter and you're in business!**



Choose from the single HI 1211 or the dual capability HI 1222



HI 1222 with dual meter capability

**Combine any of Hanna's Mini Controllers into the HI 1222 for versatile monitoring and control.**

## Mini Panel Mount pH Controller

(HI 981411)

- Large LCD
- Compact Size
- Extractable Terminal Modules

HI 981411 is a simple-to-operate pH controller specially designed for hydroponics, swimming pools, or applications where space or cost are a major concern. Thanks to its compact size of only 8 by 5 cm (3 x 2"), HI 981411 can be mounted in confined spaces and right next to tanks or vats. The low cost of the meter will also make it possible for processes that up to

now were manually maintained to be controlled automatically, saving considerable time and money.

Measurements are displayed in large digits on the LCD and LED lights indicate the exact status of the controller even from a distance. HI 981411 also incorporates a bi-directional relay. Through a simple jumper on the

rear of the meter, the operator can select acid dosage, which means the relay is activated with measurements above the set point or alkaline with relay closed when measuring below the set point. In order to adjust the set point from 0 to 14 pH or to calibrate meter at any point on the scale, simply turn the relevant trimmer right on the front panel.



Specifications	HI 981411
<b>Range</b>	0.0 to 14.0 pH
<b>Resolution</b>	0.1 pH
<b>Accuracy</b>	±0.2 pH
<b>Calibration</b>	1 point adjustable with trimmer
<b>Setpoint</b>	Adjustable from 0.0 to 14.0 pH with trimmer
<b>Power Supply</b>	12 VDC adapter (included)
<b>Dimensions</b>	79 x 49 x 95 mm (3.1 x 1.9 x 3.8")
<b>Weight</b>	140 g (4.96 oz.)

Recommended Accessories	
<b>HI 1001</b>	.....Plastic in-line pH electrode
<b>HI 1286</b>	.....pH electrode with 2 m (6.6') cable
<b>HI 77400P</b>	.....Ca. kit pH 4 & 7 sol., 20 mL, 5 pcs ea.
<b>HI 77700P</b>	.....pH 7 buffer solution (10 x 20 mL)
<b>HI 70300L</b>	.....Storage solution, 460 mL
<b>HI 7061L</b>	.....Electrode cleaning solution, 460 mL
<b>HI 70000P</b>	.....Rinse solution (25 x 20 mL)

## Mini Panel Mount pH Controller

(HI 931700)

The HI 931700's small size allows installation close to the monitored equipment, thus adding to its versatility in industry.

Possible applications are almost infinite; from textile (particularly in the monitoring of pH in the wool processing), paper, photographic, plating and aquariums to the process industry. Also small swimming pools and water purification plants can be controlled with HI 931700.

With an affordable cost, HI 931700 can help you monitor your installations that up to now have been controlled with difficulty.

HI 931700 is equipped with a single set point with selection of acid or alkaline dosage. It accepts direct input from any combination pH electrode ending in a BNC connector and provides measurements from 0 to 14 pH with a resolution of 0.01 pH.

The mini pH controller range has now been enhanced with a UL/CSA approved model. HI 931700V is powered by 12VDC and supplied complete with a transformer.



Specifications	HI 931700
<b>Range</b>	0.00 to 14.00 pH
<b>Resolution</b>	0.01 pH
<b>Accuracy</b>	±0.02 pH
<b>Calibration</b>	Offset: ±2 pH by trimmer; slope: 80 to 110% by slope trimmer
<b>1 Setpoint Relay</b>	2 A, Max. 240 V, resistive load, 1,000,000 strokes
<b>Power Supply</b>	12 VDC adapter
<b>Dimensions</b>	79 x 49 x 95 mm (3.1 x 1.9 x 3.8")
<b>Weight</b>	130 g (4.58 oz.)

Recommended Accessories	
<b>HI 1001</b>	.....Plastic in-line pH electrode
<b>HI 1090B/5</b>	.....Glass pH electrode, BNC+5 m (16.5') cable
<b>HI 1090T</b>	.....Glass pH electrode for T connector
<b>HI 7004L</b>	.....pH 4.01 buffer solution, 500 mL
<b>HI 7007L</b>	.....pH 7.01 buffer solution, 500 mL
<b>HI 7010L</b>	.....pH 10.01 buffer solution, 500 mL

# Monitoring & Control



## pH Controllers (pH 502 Series)

### State-of-the-art pH Controllers

The pH 502 series of controllers offer many new features to increase the level of control available in your plant. These powerful instruments can be configured to utilize P, PI or PID controlling. With this advanced feature, the pH 502 takes the place of three instruments that only allow one configuration each. The pH 502 line includes models that incorporate control through analog output to drive any compatible device such as an electrovalve or pump. Models equipped with a Solid State Relay are also available to ensure

maximum life of the switching device. Each model has a differential input for a grounding bar to extend electrode life. Several models come with an RS485 port as well as analog recorder output. The fully programmable microprocessor memory has a 3 month backup power supply. Fail Safe Alarm system protection against power interruption or line failure. 1, 2 or 3-point automatic calibration and manual or Automatic Temperature Compensation complete the features of these state-of-the-art controllers.

#### Order the pH 502 according to your needs:

pH 502123	pH controller with single set point, ON/OFF and PID control, analog & RS485 outputs.
pH 502321	pH controller with single set point, ON/OFF & PID control, SSR & analog output.
pH 502523	pH controller with single set point, PID control, control through analog output, & RS485 output.
pH 502223	pH controller with dual set point, ON/OFF & PID control, analog & RS485 outputs.
pH 502421	pH controller with dual set point, ON/OFF & PID control, SSR & analog output.
pH 502422	pH controller with dual set point, ON/OFF & PID control, SSR & RS485 output.
pH 502423	pH controller with dual set point, ON/OFF & PID control, SSR, analog & RS485 outputs.

Specifications	pH 502
<b>Range</b>	0.00 to 14.00 pH; -9.9 to 120°C
<b>Resolution</b>	0.01 pH; 0.1°C
<b>Accuracy</b>	±0.02 pH; ±0.5°C
<b>Input</b>	High impedance 10 <sup>12</sup> Ohm
<b>Calibration</b>	1, 2, 3 points at pH 4.01, 7.01, and 10.01
<b>Temperature Comp.</b>	Automatic (with PT 100) or manual from -9.9 to 120°C
<b>Outputs</b>	Digital: RS 485 bi-directional opto-isolated or Analog: galvanically isolated 0 to 1 mA, 0 to 20 mA and 4 to 20 mA (max resistive load 1KΩ), 0 to 5 VDC, 1 to 5 VDC and 0 to 10 VDC (min. resistive load 1KΩ)
<b>Setpoint Relay(s)</b>	1 or 2: SPDT NO contact outputs 5A-250 VAC, 5A-30 VDC (resistive load) or 1 or 2: SSR, 1A, 12 VDC to 230 VAC ±10% (resistive and inductive load)
<b>Power Supply</b>	115V ±10% VAC; 60 Hz
<b>Dimensions</b>	1/2 DIN 144 x 144 x 170 mm (5.7 x 5.7 x 6.7")
<b>Weight</b>	1.6 Kg (3.5 lb)

## Advanced Microprocessor pH Controller

(HI 21)

The HI 21 controllers are simple-to-operate, microprocessor-based process meters packed with features. For more flexibility and better resolution for chart recorders, any two points between 0 and 14 pH can be chosen to correspond to the analog output spans. Some HI 21 models are equipped with a bi-directional

RS485 port. Push-button password programming prevents tampering. The microprocessor memory is fully programmable and has 3 months backup power supply. The Fail Safe Alarm system protects the HI 21 against the pitfalls of process control, like power interruption or line failure. With HI 21 quick 1, 2 or 3-point calibration at pH 4.01,

7.01 and 10.01 comes standard. The temperature can be manually or automatically compensated for. Models with RS485 output allow computer compatibility, a necessity for process control instrumentation. You can also choose from ON/OFF, Proportional and PID control to save on chemicals.



#### Order the HI 21 according to your needs:

HI 21111	pH Controller with single set point, ON/OFF control & analog output.
HI 21211	pH Controller with dual set point, ON/OFF control & analog output.
HI 21221	pH Controller with dual set point, proportional & ON/OFF control with analog output.
HI 21222	pH Controller with dual set point, proportional & ON/OFF control with RS485 output.
HI 21523	pH Controller with single set point, control through analog output, PID & ON/OFF control with analog & RS485 output.

Specifications	HI 21
<b>Range</b>	0.00 to 14.00 pH; -9.9 to 120°C
<b>Resolution</b>	0.01 pH; 0.1°C
<b>Accuracy</b>	±0.02 pH; ±0.5°C
<b>Calibration</b>	1, 2, 3 points at pH 4.01, 7.01, and 10.01
<b>Temperature Comp.</b>	Automatic (with PT 100) or manual from -9.9 to 120°C
<b>Outputs</b>	Digital: RS485 bi-directional opto-isolated or Analog: galvanically isolated 0 to 1 mA, 0 to 20 mA and 4 to 20 mA (max resistive load 1KΩ), 0 to 5 VDC, 1 to 5 VDC and 0 to 10 VDC (min. resistive load 1KΩ)
<b>Setpoint Relay(s)</b>	1 or 2: SPDT contact outputs 5A-250 VAC, 5A-30 VDC (resistive load) Fuse protected: 5 A, 250V fast fuse
<b>Alarm Relay</b>	Electromechanical relay SPDT contact output 5A-250 VAC, 5A-30 VDC (resistive load); Fuse protected: 5 A, 250V fast fuse
<b>Power Supply</b>	115V ±10% VAC; 60 Hz
<b>Dimensions</b>	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
<b>Weight</b>	1.4 Kg (3.1 lb)

## pH Controller & Pump (BL 7916)

**Advanced Microprocessor Technology and Built-to-last**

- pH controller and dosing pump in one compact unit.
- $\pm 0.01$  pH accuracy with unbeatable performance.
- Isolated 4 to 20 mA recorder output.
- Proportional dosing slows the pump down when the measured pH level approaches the set value which ensures precise dosage and avoids costly waste of chemicals due to overdosage.
- Alarm contact is activated whenever the pH value varies by more than 2 pH units from the set point.
- Auxiliary contacts allow the user to attach a mixer or priming pump that is activated only when the pump is dosing.
- Kynar®, Viton® and Teflon® materials are used for all parts that come into contact with liquid.



Specifications	BL 7916
<b>Range</b>	0.00 to 14.00 pH
<b>Resolution</b>	0.01 pH
<b>Accuracy</b>	$\pm 0.01$ pH
<b>Flow Rate</b>	See table below
<b>Input</b>	High impedance $10^{12}$ Ohm
<b>Dosage</b>	Proportional: acid or base. User-selectable
<b>Calibration</b>	Offset: $\pm 1$ pH by offset trimmer; Slope: 85 to 115% by slope trimmer
<b>Recorder Output</b>	4 to 20 mA, isolated
<b>Dosing/Alarm Contact</b>	Isolated, 2A, Max. 240V, resistive load, 1,000,000 strokes
<b>Power Supply</b>	100/115V $\pm 15\%$ ; 50/60 Hz (40W)
<b>Dimensions</b>	181H x 221W x 142D mm (7.1H x 8.7W x 5.6D")
<b>Weight</b>	5 Kg (11 lb)



### Recommended Accessories

- HI 1001 ..... Plastic in-line pH electrode
- HI 1090B/5 ..... Glass pH electrode BNC+5 m cable
- HI 1090T ..... Glass pH electrode for T connector
- HI 721101 ..... Pumphead, O-ring and 6 screws
- HI 721102 ..... Spare discharge valve assembly
- HI 721103 ..... Spare suction valve assembly
- HI 721004 ..... Injection valve assembly (required)
- HI 721005 ..... Foot valve assembly (required)
- HI 721008 ..... .4 x ceramic weight
- HI 7004L ..... pH 4.01 buffer solution, 500 mL
- HI 7007L ..... pH 7.01 buffer solution, 500 mL
- HI 7010L ..... pH 10.01 buffer solution, 500 mL

## Mini Panel Mount ORP Controller

(HI 982411)

- Large LCD
- Compact Size
- Simple to operate



HI 982411 is a simple-to-operate ORP controller specially designed where space or costs are a major concern. Thanks to its compact size of 8 by 5 cm (3 x 2"), HI 982411 can be mounted in confined spaces or even right next to the vat or barrel containing the chemicals. The measurements from 0 to 1000 mV are displayed in large digits on the LCD. In addition, LED lights indicate the exact

status of the controller. Both the measurements and the LED's can be seen even from a distance. HI 982411 also incorporates a relay which can be set at any value over the entire range. The relay is activated, whenever the measurement is below the set-point.

### BL 7916 / BL 7917 FLOW/PRESSURE

BAR (PSI)	LPH (GPH)
0.5 (7.4)	13.3 (3.5)
1.0 (14.7)	11.7 (3.0)
2.0 (29.4)	10.1 (2.6)
3.0 (44.1)	9.0 (2.3)
4.0 (58.8)	7.8 (2.0)

Specifications	HI 982411
<b>Range</b>	0 to 1000 mV
<b>Resolution</b>	1 mV
<b>Accuracy</b>	$\pm 5$ mV
<b>Calibration</b>	1-point adjustable with trimmer
<b>Setpoint</b>	Adjustable from 0 to 1000 mV with trimmer
<b>Power Supply</b>	12 VDC adapter (included)
<b>Dimensions</b>	79 x 49 x 95 mm (3.1 x 1.9 x 3.8")
<b>Weight</b>	140 g (4.96 oz.)



### Recommended Accessories

- HI 2001 ..... Plastic in-line ORP electrode
- HI 3214P/2 ..... ORP electrode, Pt, gel, 2 m (6.6') cable
- HI 7020M ..... ORP sol. 200-275 mV, 230 mL
- HI 7092M ..... Pretreatment oxidizing solution, 230 mL

# Monitoring & Control

## Advanced Microprocessor (HI 22) ORP Controller

The HI 22 controllers have been engineered with the same outstanding features as the HI 21 meters. The microprocessor memory is fully programmable and has a 3-month backup power supply. The Fail Safe Alarm system protects these meters against the pitfalls of process control. User-selectable timing capability safeguards against overdosing and saves money while protecting the environment. These instruments have a differential input, extending electrode life by eliminating ground loop current through the reference. Users can choose

between ON/OFF and Proportional control as well as selectable current and voltage outputs. For more flexibility and better resolution for chart recorders, choose any two points between 0 and 2000 mV to correspond to the analog output spans. RS485 capability makes one model PC compatible. Wiring the controllers is simple with extractable terminal modules. A host of self-testing features and user-friendly functions make HI 22 a great value.



Specifications	HI 22
<b>Range</b>	±2000 mV; -9.9 to 120°C
<b>Resolution</b>	1 mV; 0.1°C
<b>Accuracy</b>	±2 mV; ±0.5°C
<b>Calibration</b>	At 0 and 350 or 1900 mV
<b>Temperature Comp.</b>	Automatic (with PT 100) or manual from -9.9 to 120°C
<b>Outputs</b>	Digital: RS485 bi-directional opto-isolated or Analog: galvanically isolated 0 to 1 mA, 0 to 20 mA and 4 to 20 mA (max resistive load 1KΩ), 0 to 5 VDC, 1 to 5 VDC and 0 to 10 VDC (min. resistive load 1KΩ)
<b>Setpoint Relay(s)</b>	1 or 2: SPDT contact outputs 5A-250 VAC, 5A-30 VDC (resistive load) Fuse protected: 5 A, 250V fast fuse
<b>Alarm Relay</b>	Electromechanical relay SPDT contact output 5A-250 VAC, 5A-30 VDC (resistive load); Fuse protected: 5 A, 250V fast fuse
<b>Power Supply</b>	115V ±10% VAC; 60 Hz
<b>Dimensions</b>	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
<b>Weight</b>	1.4 Kg (3.1 lb)

### Order the HI 22 according to your needs:

HI 22111	ORP Controller with single set point, ON/OFF control & analog output.
HI 22122	ORP Controller with single set point, proportional & ON/OFF control & RS485 output.

## ORP Controller & Pump (BL 7917)

- ORP controller and dosing pump in one compact unit.
- ±5 mV accuracy with unbeatable performance.
- Isolated 4 to 20 mA recorder output.
- Proportional dosing slows the pump down when the measured ORP level approaches the set value which avoids over dosage of oxidizing or reducing agents.
- Alarm contact is activated whenever the ORP value varies by more than 200 mV from the set point.
- Auxiliary contacts allow the user to attach a mixer or priming pump that is activated only when the pump is dosing.
- Kynar®, Viton® & Teflon® materials are used for all parts that come in contact with the liquids being pumped.



Specifications	BL 7917
<b>Range</b>	±999mV
<b>Resolution</b>	1 mV
<b>Accuracy</b>	±5 mV
<b>Flow Rate</b>	See table on page 45
<b>Input</b>	High impedance 10 <sup>12</sup> Ohm
<b>Dosage</b>	Proportional: oxidizing or reducing. User-selectable
<b>Recorder Output</b>	4 to 20 mA, isolated
<b>Dosing/Alarm Contact</b>	Isolated, 2A, Max. 240V, resistive load, 1,000,000 strokes
<b>Power Supply</b>	100/115V ±15%; 50/60 Hz (40W)
<b>Dimensions</b>	181H x 221W x 142D mm (7.1H x 8.7W x 5.6D")
<b>Weight</b>	5 Kg (11 lb)



### Recommended Accessories

HI 2001	Plastic in-line ORP electrode
HI 2930B/5	Plastic ORP electrode BNC+5 m cable
HI 2931B/5	Plastic ORP electrode for T connector
HI 3090B/5	Glass ORP electrode for T connector
HI 721101	Pumphead, O-ring and 6 screws
HI 721102	Spare discharge valve assembly
HI 721103	Spare suction valve assembly
HI 721004	Injection valve assembly (required)
HI 721005	Foot valve assembly (required)
HI 721008	.4 x ceramic weight
HI 7020L	ORP testing sol. 200/275 mV (500 mL)
HI 7091L	Reducing solution, 460 mL
HI 7092L	Oxidizing solution, 460 mL

## mV Controller (mV 600)

### Simple & Cost Effective mV Controller

The mV 600 controllers have been engineered with the same outstanding features as the pH 500 meters. The microprocessor memory is fully programmable and has a 3-month backup power supply. The Fail Safe Alarm system protects these meters against the pitfalls of process control. User-selectable timing capability safeguards against overdosing and saves money while protecting the environment. These instruments have a differential input, extending electrode life by eliminating ground loop current

through the reference. Users can choose between ON/OFF and Proportional control as well as selectable current and voltage outputs. For more flexibility and better resolution for chart recorders, choose any two points between 0 and 2000 mV to correspond to the analog output spans. RS232 capability makes two mV 600 models PC compatible. Wiring the controllers is simple with extractable terminal modules. A host of self-testing features and user-friendly functions make mV 600 a great value.



Specifications	mV 600
Range	-2000 to 2000 mV
Resolution	1 mV
Accuracy	±2 mV
Input	High impedance 10 <sup>12</sup> Ohm
Calibration	At 0 and 350 or 1900 mV
Outputs	Digital: RS232 bi-directional opto-isolated or Analog: galvanically isolated 0 to 1 mA, 0 to 20 mA and 4 to 20 mA (max resistive load 1KΩ), 0 to 5 VDC, 1 to 5 VDC and 0 to 10 VDC (min. resistive load 1KΩ)
Setpoint Relay	SPDT NO contact output 5A-250 VAC, 5A-30 VDC (resistive load)
Power Supply	115V ±10% VAC; 60 Hz
Dimensions	1/2 DIN 144 x 144 x 170 mm (5.7 x 5.7 x 6.7")
Weight	1.6 Kg (3.5 lb)

#### Order the mV 600 according to your needs:

mV 600111	mV controller with single set point, ON/OFF control & analog output
mV 600112	mV controller with single set point, ON/OFF control & RS232 output.
mV 600121	mV controller with single set point, proportional control & analog output.
mV 600122	mV controller with single set point, proportional control & RS232 output.

## Advanced Microprocessor mV Controller (mV 602)

The mV 602 line of microprocessor controllers has been engineered to incorporate ease of use with a powerful set of features. These robust instruments can be configured to utilize P, PI or PID controlling. This means you don't need to choose from three separate instruments that only allow one configuration.

The mV 602 line includes models that incorporate control through analog output to drive compatible devices such as electrovalves or pumps. Several models feature bi-directional RS485 to

allow remote operation with a PC as well as analog recorder output. The fully programmable microprocessor memory has a 3-month backup power supply. The Fail Safe Alarm system protects against power interruption or line failure. Use of a Solid State Relay has been included to meet the needs of extreme industrial applications. All models now incorporate a differential input so a grounding bar may be attached, extending the life of the electrodes by eliminating ground loop current problems.



Specifications	mV 602
Range	-2000 to 2000 mV
Resolution	1 mV
Accuracy	±2 mV
Input	High impedance 10 <sup>12</sup> Ohm
Calibration	At 0 and 350 or 1900 mV
Outputs	Digital: RS485 bi-directional opto-isolated or Analog: galvanically isolated 0 to 1 mA, 0 to 20 mA and 4 to 20 mA (max resistive load 1KΩ), 0 to 5 VDC, 1 to 5 VDC and 0 to 10 VDC (min. resistive load 1KΩ)
Setpoint Relay	SPDT NO contact output 5A-250 VAC, 5A-30 VDC (resistive load)
Power Supply	115V ±10% VAC; 60 Hz
Dimensions	1/2 DIN 144 x 144 x 170 mm (5.7 x 5.7 x 6.7")
Weight	1.6 Kg (3.5 lb)

#### Order the mV 602 according to your needs:

mV 602113	mV controller with single set point, ON/OFF control, analog & RS485 outputs.
mV 602123	mV controller with single set point, ON/OFF & PID control, analog & RS485 outputs.
mV 602321	mV controller with single set point, ON/OFF & PID control, SSR & analog output.
mV 602322	mV controller with single set point, ON/OFF & PID control, SSR & RS485 output.
mV 602323	mV controller with single set point, ON/OFF & PID control, SSR, analog & RS485 outputs.
mV 602523	mV controller with single set point, PID control, control through analog output & RS485 output.

# Monitoring & Control

## Mini Panel Mount EC Controller

(HI 983313)

- Simple Installation
- Compact Size
- Extractable Terminal Modules

These Hanna mini controllers have been specially designed for growing and water conditioning applications. They are miniaturized to an 8 by 5 cm (3 x 2") dimension so that they can be mounted on the fertilizing or water softening equipment. Due to their equally compact prices, these meters are ideal for softeners that do not incorporate a controller and

leave the controlling to manual checks. The conductivity values are displayed in large digits on the LCD. There are even LED's to indicate whether the relay is active or not. HI 983313 measures conductivity from 0 to 1999  $\mu\text{S}/\text{cm}$ . The meter is available in two models to best suit your application. You can choose from the 115/220V model or for those who prefer to operate

at low voltage, there is also the 12VDC version with the transformer included in the low cost of the meter.



- 115/220V; 50-60 Hz version available

Specifications	HI 983313
Range	0 to 1999 $\mu\text{S}/\text{cm}$
Resolution	1 $\mu\text{S}/\text{cm}$
Accuracy	$\pm 2\%$ F.S.
Calibration	1 point adjustable with trimmer
Setpoint	Adjustable with trimmer throughout the range
Power Supply	12 VDC adapter (included)
Dimensions	79 x 49 x 95 mm (3.1 x 1.9 x 3.8")
Weight	140 g (4.96 oz.)



### Recommended Accessories

- HI 7632-00 . . . . .Conductivity probe, ATC, with 2 m cable
- HI 7634-00 . . . . .Conductivity probe, ATC, with 2 m cable
- HI 70039P . . . . .5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. kit (25 x 20 mL)
- HI 7039M . . . . .5000  $\mu\text{S}/\text{cm}$  @ 25°C cal. sol., 230 mL



## Mini Panel Mount TDS Controller (HI 983319)

- Large LCD
- Extractable Terminal Modules
- Easy Installation

The HI 983319 is a simple-to-use TDS controller, specially designed for the hydroponics, horticultural and water conditioning applications. Thanks to their compact size of only 8 by 5 cm (3 x 2"), they can be mounted in confined spaces and right next to the fertilizer mixing vats or softening equipment. Due to their incredibly low cost, these

meters are ideal for all those start-up operations that up to now were manually maintained with substantial savings in time and considerable improvement of the yield.

applications. The meter comes with a built-in relay terminal that is activated when the measurements are below the set point. In order to adjust the set point or calibrate the controllers at any point over the full range, simply turn the relevant trimmer positioned on the front panel.

HI 983319 operates with a conversion rate of 0.65 between TDS and conductivity which best fits hydroponics and greenhouse

- 115/220V; 50-60 Hz version available



### Recommended Accessories

- HI 7632-00 . . . . .TDS probe, ATC, with 2 m cable
- HI 7634-00 . . . . .TDS probe, ATC, with 2 m cable
- HI 70032P . . . . .1382 ppm @ 25°C cal. kit (25 x 20 mL)
- HI 7032M . . . . .1382 ppm @ 25°C cal. sol., 230 mL

Specifications	HI 983319
Range	0 to 1999 ppm
Resolution	1 ppm
Accuracy	$\pm 2\%$ F.S.
Calibration	1 point adjustable with trimmer
Setpoint	Adjustable with trimmer throughout the range
Power Supply	12 VDC adapter (included)
Dimensions	79 x 49 x 95 mm (3.1 x 1.9 x 3.8")
Weight	140 g (4.96 oz.)



## Advanced Conductivity (HI 700 & HI 710) and TDS Controllers

- Accurate, Reliable and Simple to Install
- Extensive Range for Both Conductivity and TDS
- Completely Programmable Through Menu-driven Display
- Selectable Isolated Output in mAs and Volts
- On/Off, Proportional, PI and PID Controls
- Automatic or Manual Temperature Compensation
- Parameters Adjustable for Custom Applications
- Two Set points and One Alarm Relay
- Calibration with Backup Memory
- Password Protection Against Tampering
- Fail-safe Protection Against Power Failure
- Status LED on Front Panel
- Self-diagnostics and Troubleshooting Guides



The HI 700 series of regulators offer state-of-the-art specifications for your process control. They can be configured for ON/OFF, Proportional, PI or PID control. Thanks to Hanna's exclusive technology, they can be customized to best fit your application. A menu driven display aids the user throughout the operations with running messages and clear prompts. All relevant parameters can be simply adjusted and will remain memorized until overwritten. Bright LED lights show the current status even from a distance.

With self-diagnostic features and extractable terminals, installation and maintenance are rapid and simple. Password protection guarantees that the calibration and predetermined parameters cannot be altered unnecessarily. The controllers can operate with 4-ring probe or 4-20 mA signal. They accept probes with or without a built-in Pt 100 temperature sensor. HI 700 monitors and controls conductivity. HI 710 monitors and controls both conductivity and TDS.

### Order the HI 700/HI 710 Series according to your needs:

HI 700221/U	EC controller with dual set point, ON/OFF & PID control & analog output, 115V
HI 700222/U	EC controller with dual set point, ON/OFF & PID control & RS485 output, 115V
HI 710221/U	EC/TDS controller with dual set point, ON/OFF & PID control & analog output, 115V
HI 710222/U	EC/TDS controller with dual set point, ON/OFF & PID control & RS485 output, 115V

Specifications	HI 700221/HI 700222	HI 710221/HI 710222
<b>Range</b>	$\mu\text{S}$ 0.0 to 199.9/0 to 1999 $\text{mS}$ 0.00 to 19.99/0.0 to 199.9 $\text{ppm}$ - $\text{ppt}$ - $^{\circ}\text{C}$ -10.0 to 100.0	0.0 to 199.9/0 to 1999 0.00 to 19.99/0.0 to 199.9 0.00 to 100.0/0 to 1000 0.00 to 10.00/0.00 to 100.00 -10.0 to 100.0
<b>Resolution</b>	0.1/1 $\mu\text{S}$ ; 0.01/0.1 $\text{mS}$ ; 0.1 $^{\circ}\text{C}$	0.1/1 $\mu\text{S}$ ; 0.01/0.1 $\text{mS}$ 0.1/1 $\text{ppm}$ ; 0.01 $\text{ppt}$ ; 0.1 $^{\circ}\text{C}$
<b>Accuracy</b>	$\pm 0.5\%$ F.S. (EC & TDS); $\pm 0.5^{\circ}\text{C}$ (0 to 70 $^{\circ}\text{C}$ ); $\pm 1^{\circ}\text{C}$ (outside)	
<b>Calibration</b>	Automatic or manual single point	
<b>Temp. Comp.</b>	Automatic (with Pt 100) or manual from -10 to 100 $^{\circ}\text{C}$ with coeff. from 0.00 to 10.00%/ $^{\circ}\text{C}$	
<b>TDS Ratio</b>	-	Adjustable from 0.00 to 1.00
<b>Output</b>	Analog (for HI 700221 and HI 710221 models): isolated 0 to 1 mA, 0 to 20 mA & 4 to 20 mA (max. resistive load 1K $\Omega$ ), 0 to 5 VDC, 1 to 5 VDC and 0 to 10 VDC (min. resistive load 1K $\Omega$ ); Digital (for HI 700222 and HI 710222 models): RS485, bi-directional opto-isolated 4 to 20 mA	
<b>Analog Input</b>	-	
<b>Set Relay</b>	2 SPDT 5A-250 VAC contact outputs, 5A-30 VDC (resistive load)	
<b>Alarm Relay</b>	SPDT 5A-250 VAC contact outputs, 5A-30 VDC (resistive load)	
<b>Power Supply</b>	115V $\pm 10\%$ ; 50/60 Hz	
<b>Dimensions</b>	1/2 DIN 144 x 144 x 170 mm (5.7 x 5.7 x 6.7")	
<b>Weight</b>	1.6 Kg (3.5 lb)	

# Monitoring & Control



- 2-in-1: pH and TDS
- Economical
- Automatic Temperature Compensation
- Alarm Relay

#### Recommended Accessories

- HI 1002/5 . . . . .Plastic in-line pH electrode+5 m cable
- HI 1090B/5 . . . . .Glass pH elec. BNC+5 m (16.5') cable
- HI 1090T . . . . .Glass pH electrode for T connector
- HI 7638 . . . . .Immersion TDS/°C probe
- HI 3001D . . . . .In-line TDS/°C probe
- HI 6054B . . . . .Electrode holder for in-line applications
- HI 7004L . . . . .pH 4.01 buffer solution (500 mL)
- HI 7007L . . . . .pH 7.01 buffer solution (500 mL)
- HI 70442L . . . . .1500 ppm TDS sol. (460 mL)

## Wall Mount pH/TDS Controller

### pH & TDS Proportional Control for Hydroponics

(HI 9935)

HI 9935 is a 2-in-1 pH and TDS controller engineered for economical dosage of fertilizer solutions in hydroponics. Two separate set points can be user-adjusted from 4 to 7 pH and 900 to 1800 ppm (mg/L). The relays are activated when pH exceeds the set point or TDS falls below the desired value. Two pumps or electro-valves can be wired directly to the

controller and can be powered through the terminals. Independent proportional settings for pH and TDS can be adjusted from 0 to 90 seconds, 0 to 2.0 for pH and 0 to 400 for TDS. A ground probe can be connected to the appropriate terminals to eliminate interference and prolong the pH electrodes' life.

Specifications	HI 9935
<b>Range</b>	0.00 to 14.00 pH; 0 to 1999 ppm (mg/L)
<b>Resolution</b>	0.01 pH; 1 ppm (mg/L)
<b>Accuracy</b>	±0.02 pH; ±2% F.S.
<b>Calibration</b>	2 points for pH and for TDS through "ZERO" and "SLOPE CAL" trimmers
<b>Setpoint</b>	Selectable from 4.00 to 7.00 pH and from 900 to 1800 ppm
<b>Temperature Comp. (TDS)</b>	Automatic from 0 to 50°C with β of 2% per °C
<b>TDS Ratio</b>	0.65 ppm = 1 μS/cm
<b>Dosing Contacts</b>	Two powered terminals for TDS and pH correction (240V) max 2 A, 1,000,000 strokes; Proportional dosage: activated when pH > set point or ppm < set point
<b>Alarm Relay</b>	One, activated when the pH drops below (selectable 0 to 2 pH) the set point or activated when the ppm exceeds (selectable 0 to 400 ppm) from the set point or max. dosage time (1 to 10 minutes) elapses. Isolated, max. 2 A/240V, resistive load, 1,000,000 strokes
<b>Power Supply</b>	110/115V or 220/240V; 50/60Hz
<b>Dimensions</b>	181L x 221W x 142H mm (7.1L x 8.7W x 5.6H")
<b>Weight</b>	1.6 Kg (3.5 lb)



- 2-in-1: pH and Conductivity
- Economical
- Automatic Temperature Compensation
- Alarm Relay

#### Recommended Accessories

- HI 1002/5 . . . . .Plastic in-line pH electrode+5 m cable
- HI 1090B/5 . . . . .Glass pH elec. BNC+5 m (16.5') cable
- HI 1090T . . . . .Glass pH electrode for T connector
- HI 7638 . . . . .Immersion conductivity/°C probe
- HI 3001D . . . . .In-line conductivity/°C probe
- HI 6054B . . . . .Electrode holder for in-line applications
- HI 7004L . . . . .pH 4.01 buffer solution (500 mL)
- HI 7007L . . . . .pH 7.01 buffer solution (500 mL)
- HI 7031L . . . . .1413μS/cm conductivity sol., (460 mL)
- HI 7039L . . . . .5000 μS/cm conductivity sol. (460 mL)

## Wall Mount pH/Conductivity Controller

### pH & Conductivity Proportional Control for Hydroponics

HI 9913 is a 2-in-1 pH and conductivity controller engineered for cost-effective dosage of fertilizer solutions in hydroponics. HI 9913 measures pH from 0.00 to 14.00 and EC from 0.00 to 10.00 mS/cm. Two separate set points can be user-adjusted from 4 to 7 pH and 1.00 to 4.00 EC (mS/cm). The relays are activated when pH exceeds the set point or conductivity falls below the desired value. Two pumps or electro-valves can be wired directly to the

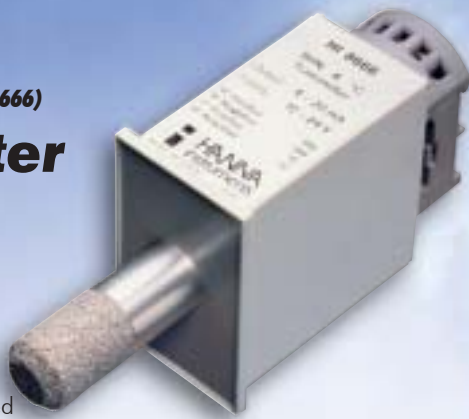
controller and be powered through the terminals. The operator can adjust two independent proportional settings for pH and conductivity. The time cycle is adjustable from 0 to 90 seconds, while the proportional band is 0 to 2.0 for both pH and EC. A ground probe can be connected to the appropriate terminals to eliminate interference and prolong the pH electrodes' life.

Specifications	HI 9913
<b>Range</b>	0.00 to 14.00 pH; 0.00 to 10.00 mS/cm
<b>Resolution</b>	0.01 pH; 0.01 mS/cm
<b>Accuracy</b>	±0.02 pH; ±2% F.S.
<b>Calibration</b>	2 points for pH and for EC through "ZERO" and "SLOPE CAL" trimmers
<b>Setpoint</b>	Selectable from 4.00 to 7.00 pH and from 1.00 to 4.00 mS/cm
<b>Temperature Comp. (EC)</b>	Automatic from 0 to 50°C with β of 2% per °C
<b>Dosing Contacts</b>	Two powered terminals for EC and pH correction (240V) max 2 A, 1,000,000 strokes; Proportional dosage: activated when pH > set point or EC < set point
<b>Alarm Relay</b>	One, activated when the pH drops below (selectable 0 to 2 pH) the set point or activated when the EC exceeds (selectable 0 to 2 mS/cm) from the set point or max. dosage time (1 to 10 minutes) elapses. Isolated, max. 2 A/240V, resistive load, 1,000,000 strokes
<b>Power Supply</b>	110/115V or 220/240V; 50/60Hz
<b>Dimensions</b>	181L x 221W x 142H mm (7.1L x 8.7W x 5.6H")
<b>Weight</b>	1.6 Kg (3.5 lb)

## RH/°C (HI 8666) Transmitter Panel Mounted

- Sintered Metal Cap
- 4-20 mA Output
- Dual-range Transmitter

The highly accurate humidity and temperature transmitter can be mounted anywhere in the greenhouse to relay temperature and humidity values via an analog signal to remote panel meters or controllers.



Specifications		HI 8666
<b>Range</b>	<b>RH:</b>	0% (4mA) to 100% (20 mA)
	<b>°C:</b>	-20 (4mA) to 60 (20 mA)
<b>Resolution</b>	<b>RH:</b>	±0.125%, ±0.02 mA
	<b>°C:</b>	±0.1, ±0.02 mA
<b>Accuracy</b>	<b>RH:</b>	±2% (5% to 80% RH); ±4% (80% to 90% RH)
	<b>°C:</b>	±1% of span
<b>Response Time</b>	6 seconds without sintered filter, 60 seconds with filter	
<b>Power Supply (Required)</b>	12 to 24 VDC for each signal (external not included) needed at undecal connector (not included) i.e. the voltage entry point to HI 8666	
<b>Dimensions</b>	79 x 49 x 140 mm (3.1 x 1.9 x 5.5")	
<b>Weight</b>	200 g (7 oz.)	

## Level (HI 7873) Controller

- High, Low and Over
- Level Indication
- Output Contact
- Compact Design

HI 7873 is ideal for nutrient and acid tank level control over distances of up to 1,000'. This compact controller will prevent one or more of the nutrient tanks from running dry, assuring that the nutrient mix is always correct.

Specifications		HI 7873
<b>Transmission</b>	300 meters (990') max.	
<b>Connection</b>	HI 7164 (11 pin connector)	
<b>Level Adjustment</b>	High, low, and overflow	
<b>Level Indication</b>	High, low, and overflow	
<b>Sensor Bars</b>	4 pieces (min.); HI 731324 pack of 5 pcs (not included)	
<b>Transmitter</b>	HI 7874 (not included)	
<b>Output Contact</b>	2 relays of 2A/max. 240V resistive load 1,000,000 strokes	
<b>Power Supply</b>	110/15V; 50/60 Hz	
<b>Dimensions</b>	79 x 49 x 95 mm (3.1 x 1.9 x 3.8")	
<b>Weight</b>	150 g (5.3 oz.)	

### Required with HI 7873 for system

<b>HI 7874</b>	.....	.Bar holder with amplified circuitry
<b>HI 7164</b>	.....	.Undecal connector
<b>HI 731324</b>	.....	.Threaded measuring bars (5 pcs)



## pH Titration System (HI 3500U)

The HI 3500U is a laboratory grade titration system designed for maximum efficiency, reliability and ease of use. This powerful system comes complete with an adjustable electrode holder with a heavy steel base, ATC pH meter with combination electrode and built-in stirrer, glass reagent container, and precision graduated dosing burette. All this takes up an extremely small amount of bench space.

Specifications		HI 3500U
<b>Range</b>	0.00 to 14.00 pH; 0.0 to 100.0°C	
<b>Resolution</b>	0.01 pH; 0.1°C	
<b>Accuracy</b>	±0.01 pH; 0.1°C	
<b>Calibration</b>	Manual 2 points through knobs	
<b>Temperature Comp.</b>	Automatic from 0 to 70°C (32 to 158°F)	
<b>Setpoint</b>	Adjustable from 2 to 10 pH	
<b>Max. Stirring Capacity</b>	1 liter (0.26 gallons)	
<b>Stirrer Speed</b>	Min: 100 rpm; Max: 800 to 1000 rpm	
<b>Power Supply</b>	110VAC (HI 3050N/U)	
<b>Dimensions</b>	180 x 180 x 70 mm (7.1 x 7.1 x 2.8")	
<b>Weight</b>	1.6 Kg (3.6 lb)	

### Recommended Accessories

<b>HI 70455</b>	.....	.01 N NaOH titration reagent, 1L
<b>HI 70456</b>	.....	.01 N NaOH titration reagent, 1L
<b>HI 70457</b>	.....	.1 N NaOH titration reagent, 1L
<b>HI 70458</b>	.....	.01 M H <sub>2</sub> SO <sub>4</sub> titration reagent, 1L
<b>HI 70459</b>	.....	.05 M H <sub>2</sub> SO <sub>4</sub> titration reagent, 1L
<b>HI 70462</b>	.....	.01 N HCl titration reagent, 1L
<b>HI 70463</b>	.....	.01 N HCl titration reagent, 1L
<b>HI 70464</b>	.....	.1 N HCl titration reagent, 1L
<b>HI 70465</b>	.....	Hydrogen peroxide titration reagent, 30 mL
<b>HI 731319</b>	.....	.Micro stir bar (10 pcs)
<b>HI 731320</b>	.....	.Standard stir bar (10 pcs)



## Panel Mount Irrigation/ Fertilization Controller

(HI 8001)

The F1 Controller is a practical solution to automated irrigation and fertilization control for up to 32 sectors. Ideal for large fields, greenhouses, hydroponic and soil farms, orchards, public gardens and golf courses. The F1 Controller is also capable of mixing, agitation and level control, filter flushing and water pump activation.

Control is performed precisely and automatically, from any distance (requires HI 98143-22), by using both analog and digital signal inputs and outputs, as well as an RS232 output for a PC or network interface with custom software.



### Order the HI 8001 according to your needs:

HI 8001-01	Fertilization/irrigation controller for 8 sectors
HI 8001-02	Fertilization/irrigation controller for 16 sectors
HI 8001-03	Fertilization/irrigation controller for 24 sectors
HI 8001-04	Fertilization/irrigation controller for 32 sectors

### Features

- 16 digital inputs for temporary break, conditional stop, irrigation count, differential pressures and fertilizer, acid, mixing and external tank level controls.
- 6 analog inputs for pH sensors, EC sensors and solar radiation sensors.
- 2 non-consent alarm relays.
- 7 digital outputs for filter back flushing, pH and fertilizer tanks.
- Inputs 24VAC output power supply and 110/220VAC with grounding (internal power).
- PID Control reduces overdosing and large oscillations in the mixing process.
- Logging of executed programs with values of all parameters.

### Information Center - *Splash-proof* polyester membrane cover consisting of:

- 4-level LCD used for programming and data presentation.
- 32 Light Emitting Diodes (LED's) for each sector valve.
- 9 LED's for each of the fertilizer tanks, pH control, mixer and filters.
- 2 Extra-Large LED's for the alarm and pump functions.

## Waterproof Wall Mount Irrigation/ Fertilization Controller

(HI 8002)

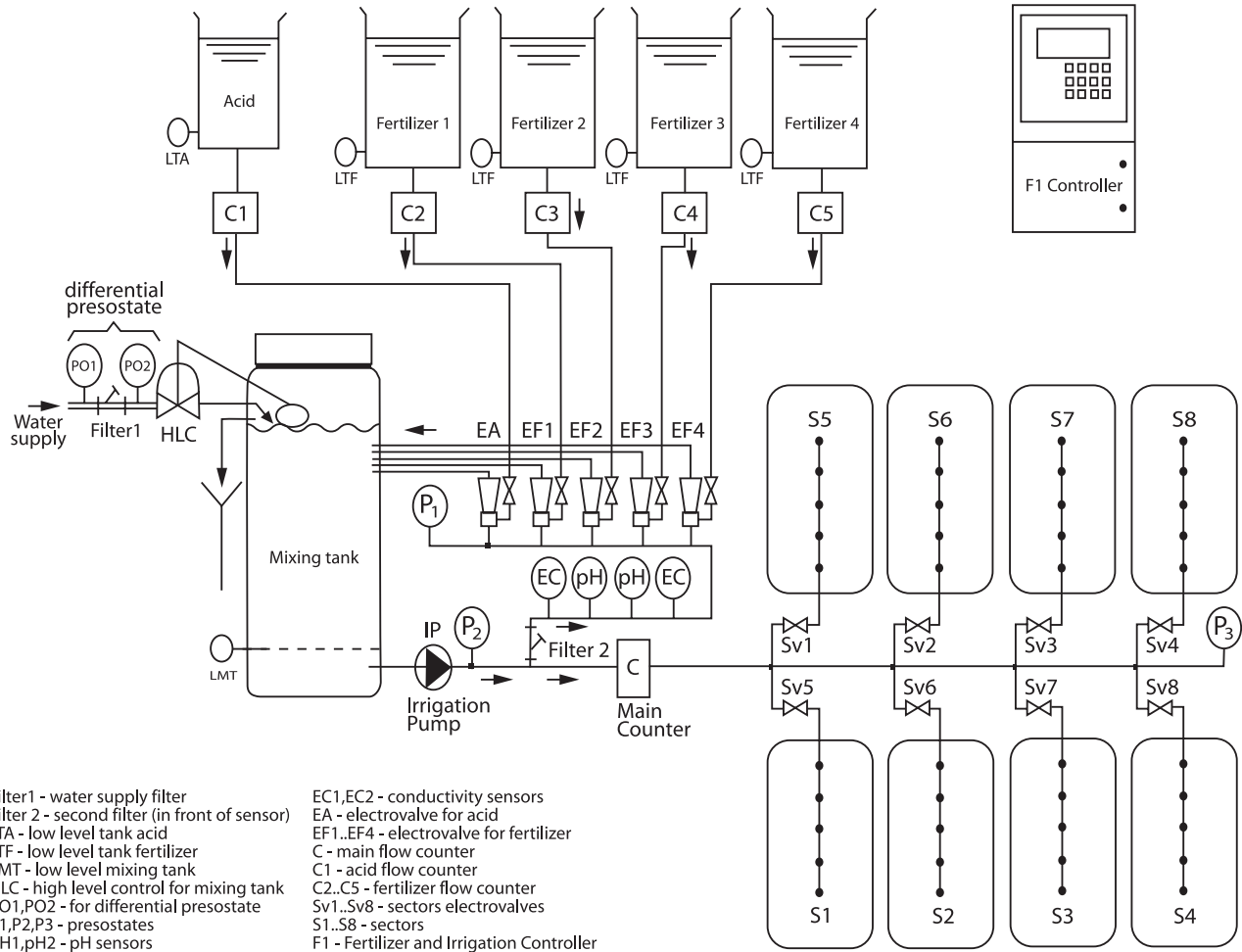
The HI 8002 includes all the features of the HI 8001 but in a Waterproof, NEMA 4X enclosure.



### Order the HI 8002 according to your needs:

HI 8002-01	NEMA 4, waterproof fertilization/irrigation controller for 8 sectors
HI 8002-02	NEMA 4, waterproof fertilization/irrigation controller for 16 sectors
HI 8002-03	NEMA 4, waterproof fertilization/irrigation controller for 24 sectors
HI 8002-04	NEMA 4, waterproof fertilization/irrigation controller for 32 sectors

# Monitoring & Control



Filter1 - water supply filter  
 Filter 2 - second filter (in front of sensor)  
 LTA - low level tank acid  
 LTF - low level tank fertilizer  
 LMT - low level mixing tank  
 HLC - high level control for mixing tank  
 PO1, PO2 - for differential presostate  
 P1, P2, P3 - presostates  
 pH1, pH2 - pH sensors

EC1, EC2 - conductivity sensors  
 EA - electrovalve for acid  
 EF1..EF4 - electrovalve for fertilizer  
 C - main flow counter  
 C1 - acid flow counter  
 C2..C5 - fertilizer flow counter  
 P1..P3 - presostates  
 S1..S8 - sectors  
 F1 - Fertilizer and Irrigation Controller

## Specifications

## HI 8001 & HI 8002 F1 Controllers

<b>Range</b>	<b>pH</b>	0.0 to 14.0
	<b>EC</b>	0.0 to 20.0 mS/cm
	<b>Solar Radiation</b>	0 to 2000 W/m <sup>2</sup>
<b>Resolution</b>		0.1 pH / 0.1 mS/cm / 1 W/m <sup>2</sup>
<b>Accuracy (@20°C/68°F)</b>	<b>pH</b>	±0.0546
	<b>EC</b>	±0.078 mS/cm
	<b>Solar Radiation</b>	±0.78 W/m <sup>2</sup>
<b>Typical Inputs</b>		2 pH electrodes, 3 conductivity probes, solar radiation monitor, 4 fertilizer tanks, 1 acid tank, 5 tank level controls, 1 mixing tank level control, 2 differential pressures, 1 irrigation counter, 1 temporary break, 1 conditional stoppage
<b>Typical Outputs</b>		2 non-consent alarms, up to 32 sector valves, 2 filter flushing, pump, agitator, 4 fertilizer tank electro-valves, 1 pH tank electro-valve
<b>Number of Programs</b>		10
<b>Priority for Programs</b>		5 levels (1 through 5)
<b>Program Method</b>		With keypad or through a PC using proprietary software
<b>Irrigation Capacity</b>		8, 16, 24 and 32 sector valves
<b>Irrigation Control</b>		time/volume control, 1 to 6 different timetables per program, accumulated solar radiation, low tank levels, manually
<b>Readout</b>		20-digit, 4 level LCD with graphic symbols and messages
<b>Power Supply</b>		115V/220V; 50Hz/60Hz
<b>Environment</b>		HI 8001: 0 to 50°C (32 to 122°F); max. 85% RH non-condensing; HI 8002: NEMA 4X specifications
<b>Dimensions</b>		178 x 260 x 115 mm (7.1 x 10.4 x 4.6")
<b>Weight</b>		HI 8001: 3.4 Kg (7.5 lb.); HI 8002: 280 x 330 x 165 mm (11.2 x 13.2 x 6.6")



### Required Accessories

HI 98143-22 . .pH/EC isolated transmitter, non-sourcing current type with 4-20 mA output (2 required)

# Monitoring & Control

## Chemical Metering Pumps

### The Hanna Instruments Blackstone Series

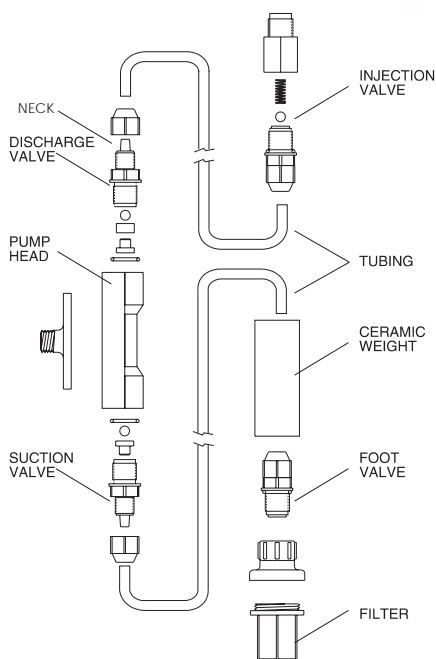
- Design
- Reliable
- High Quality Material
- Ideal for Dosing Nutrients & Acids



These simple and reliable diaphragm pumps are composed of high quality components and incorporate chemical-resistant Teflon and Kynar heads and diaphragms. The Blackstone series of pumps are positive displacement solenoid driven, using a minimum number of moving parts, therefore reducing the chance of mechanical failure.



**Valve/Hose Assembly Diagram**



#### BLACKSTONE PUMPS

A wide range of Blackstone pumps with different dosing capacities are available for your specific dosing needs. Each pump is supplied with discharge and suction valves. Polyethylene tubing, injection fittings, ceramic weights and replacement parts are available from your local dealer.

Part #	Output		Rated Pressure		
	LPH	GPH	BAR	PSI	Strokes/min
<b>With Large Diaphragms</b>					
<b>BL 20</b>	18.3	4.8	0.5	7.3	120
<b>BL 15</b>	15.2	4.0	1	14.5	120
<b>BL 10</b>	10.8	2.9	3	43.5	120
<b>BL 7</b>	7.6	2.0	3	43.5	120
<b>With Small Diaphragms</b>					
<b>BL 5</b>	5.0	1.3	7	101.5	120
<b>BL 3</b>	2.9	0.8	8	116	120
<b>BL 1.5</b>	1.5	0.4	13	188.5	120

Specifications	BL.../U	BL.../D
Maximum Capacity	See chart above	
Pump Casing	Fiber-reinforced polypropylene	
Pumphead	Pumphead in Kynar®, diaphragm and valve seats in Teflon®, glass ball valves and O-Rings in Viton®	
Fittings	Polyethylene 5 x 8 mm tubing, 3/8" gas pipeline injection fitting	
Self-Priming	Max. self-priming height 5 feet (1.5 m)	
Power Supply	110/115V, 50/60 Hz	220/240V, 50/60 Hz
Max. Absorbed Power	Approximately 200 W	
Dimensions	165 x 194 x 121 mm (6.5 x 7.6 x 4.8")	
Weight	6.6 lb. (3 kg.)	

Recommended Accessories		
HI 721004	Injection Valve Assembly	HI 721103 Complete Suction Valve Assembly
HI 721005	Foot Valve Assembly	
HI 721008	Ceramic Weights (4pcs)	HI 720029 10' (3 m) LDPE Hose
HI 721102	Complete Discharge Valve Assembly	HI 720030 .33' (10 m) LDPE Hose
		HI 720031 .165' (50 m) LDPE Hose

Order the dosing pump according to your needs:	
BL1.5/D	220/240V, 1.5 lph (0.4 gph)
BL1.5/U	110/115V, 1.5 lph (0.4 gph)
BL3/D	220/240V, 2.9 lph (0.8 gph)
BL3/U	110/115V, 2.9 lph (0.8 gph)
BL5/D	220/240V, 5.0 lph (1.3 gph)
BL5/U	110/115V, 5.0 lph (1.3 gph)
BL7/D	220/240V, 7.6 lph (2.0 gph)
BL7/U	110/115V, 7.6 lph (2.0 gph)
BL10/D	220/240V, 10.8 lph (2.9 gph)
BL10/U	110/115V, 10.8 lph (2.9 gph)
BL15/D	220/240V, 15.2 lph (4.0 gph)
BL15/U	110/115V, 15.2 lph (4.0 gph)
BL20/D	220/240V, 18.3 lph (4.8 gph)
BL20/U	110/115V, 18.3 lph (4.8 gph)

# Limited Warranty, Return & Exchange Policies

Hanna Instruments products are manufactured in our ISO 9001 facilities meeting the highest quality standards in the industry. Hanna's high standards also apply should a product be returned due to defects in material or workmanship. Our extensive warranty extends up to three years on some products.

Limitations: Warranted products may be returned for repair or replacement only at the discretion of Hanna Instruments. In some circumstances, remedy may constitute refund for the price paid for the product.

The warranty period commences from the original date of sale to the user or a maximum of 18 months from factory ship date. Warranty is valid only when the product is used under normal conditions and in accordance with operating limitations and prescribed maintenance procedures. The express warranty stated previously is the only express warranty given by Hanna to the end-user buyer. Hanna expressly disclaims any warranties implied by law, including but not limited to warranty of merchantability or fitness for a particular purpose. Hanna shall not be liable for any individual or consequential damages of any kind for breach of any warranty, negligence, on the basis of strict liability or otherwise. Hanna's warranty periods are:

<b>3 years</b>	pH 300 Bench Top Meters
<b>2 years</b>	Portable Meters
<b>2 years</b>	Bench Meters
<b>2 years</b>	Printing Meters
<b>2 years</b>	Stirrers & Industrial Meters
<b>1 year</b>	Dosing Pumps
<b>1 year</b>	Waterproof Testers
<b>6 months</b>	Testers & Pocket-size Thermometers
<b>6 months</b>	Electrodes & Probes

## Instrument Service:

Warranty and non-warranty service, replacement, recalibration and repairs are performed by factory trained service technicians at Hanna's Woonsocket, RI Technical Service Center. All items must have a **Return Goods Authorization number (RGA)** that can be obtained by contacting the Hanna Technical Service Department. The RGA number should be clearly marked on the outside of the box and the unit shipped prepaid and insured. Any product not bearing an RGA number will be refused. All products returned for warranty repair or replacement **MUST** be preceded or accompanied with proof of purchase, such as the original invoice or packing slip. Under special circumstances it may be deemed necessary by Hanna Instruments to issue a Return In Advance (RIA). In such cases, the defective materials must be returned to Hanna within 30 days. Materials not returned within 30 days become chargeable. Materials must be packed properly to avoid damage during transport, which would render the warranty null and void. The sender is responsible for expediting any damage claims placed against the carrier.

A flat minimum service charge of \$60.00 (per hour) applies to non-warranty repairs or recalibration. Any materials returned for repair which are considered non-warranty may be serviced at the previously stated hourly cost (excluding parts) following subsequent notification and approval of such.

## Product Return and Exchange

### Returning Merchandise:

Should an instance occur when a product may need to be returned for exchange or credit, or should a discrepancy occur in a packing slip, Hanna Instruments must be contacted to obtain a **Return Goods Authorization Number (RGA)**. Please follow these steps:

1. Within 30 days of receipt of merchandise call Hanna's Technical Service Department to obtain a **Return Goods Authorization Number**.
2. Hanna will issue you a **Return Goods Authorization Number**.
3. The number must be clearly marked on the outside of the package being returned. Shipments not bearing a Return Goods Authorization Number will be refused.
4. Credit returns may be subject to a 25% restocking fee.

### Terms and Conditions

Return shipments must meet the following requirements to be accepted for credit:

1. Products must be returned in the original packaging with labeling not defaced. All items returned will be inspected for credit worthiness. Credit will only be issued for product returned in like-new condition. No credit will be issued for product, which is not received in like-new condition.
2. All freight charges are the responsibility of the customer.
3. All chemicals and reagents being returned must be packaged in accordance with U.S. Department of Transportation regulation. Only unopened chemicals and reagents may be returned.



Authorized Distributor [www.clarksonlab.com](http://www.clarksonlab.com)

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 **HANNA**  
instruments  
Agricultural Division