HANNA instruments®
30 years
Tradition :: Quality :: Value
1978 :: 2008

GENERAL CATALOG

VOLUME 27



HANNA® instruments

www.hannainst.com

PRESIDENT'S MESSAGE

February 2008

Dear Valued Customer:

This year marks the 30th anniversary of HANNA instruments, and I wish to extend a special thank you to each and every one of you for three decades of success.

Today, more than ever, we at HANNA continue to value our customers' requests, suggestions and observations. We constantly strive to provide a fresh solution to your measurement needs.

Times have changed since our beginning in 1978. In this new era of mergers and acquisitions, most companies are driven by financial expectations of shareholders. HANNA proudly maintains its independence and keeps growing the only way we know how—by expanding our markets with more satisfied customers. We realize that the only way to truly grow as a company is to maintain quality products with exceptional service, and pledge to continue to do so.

Over the decades, you have become accustomed to HANNA regularly introducing many exiting new products to the market and this year is one of our biggest. This 27th edition of our general catalog features a complete line of research grade bench top instruments and ISE's for laboratory applications, an extensive range of food analysis products, new turbidity, COD and single parameter meters (ISMs), a new series of in-line conductivity controllers, a new series of fertilizer management instrumentation, as well as numerous single and multiparameter portable instruments.

As you read this catalog and find the right instrument for your application, you can be sure that HANNA is already working on the next solution to your application's needs.

On behalf of HANNA worldwide, thank you for your continued support.



President, HANNA instruments

Warranty

Limited Warranty/Product Return and Exchange

Limited Warranty

HANNA products are manufactured in our ISO 9001:2000 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 five years on some products.

> Limitations: Warranted products may be returned for repair or replacement only at the discretion of HANNA. 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 of 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 differ across our range of instrumentation, please visit us on the web at: www.hannainst.com or contact your local HANNA representative for specific warranty information.

Instrument Service:

Warranty and non-warranty service, replacement, recalibration and repairs are performed by factory trained service technicians at one of HANNA's Technical Service Centers worldwide. All items must have a Return Goods Authorization (RGA) number 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 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.

In most cases, a flat minimum service charge applies to non-warranty repairs or recalibration. Please contact your local HANNA Technical Service Department for current rates. Any materials returned for repair which are considered non-warranty may be serviced at 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 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 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 the laws and regulations of the governing country. Only unopened chemicals and reagents may be returned.

Guide to Symbols Used Throughout This Catalog



pH Condition
Verify the pH/ORP electrode condition



Check Electrode
Verify the pH/ORP electrode status



Validation
Verification and calibration system for photometers



Fast Tracker
Features HANNA's T.I.S. — Tag Identification System



Custom Buffer
Enter custom buffers for calibration



2 Points
Calibration can be performed at 1 or 2 points



3 Points
Calibration can be performed at 1 to 3 points



4 Points
Calibration can be performed at 2 to 4 points



5 Points
Calibration can be performed at 1 to 5 points



Hold
Freeze reading on the display



Audible
Acoustic signal



Backlight
Backlit display



Replaceable
Tester with replaceable probe



Min/Max
Store and continuously display min and max readings



CAL 0°C
Calibration check at 0°C (32°F)



PC Compatible via USB
PC compatible via USB port with optional HANNA software



PC Compatible
PC compatible with optional HANNA software



Battery
Remaining battery life indication



BEPS (Battery Error Prevention System)
Automatically turns the meter off to avoid erroneous readings due to low battery level

HANNA instruments® reserves the right to change or modify the design of its products at any time without advance notice.



HANNA® instruments

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GENERAL CATALOG

VOLUME 27

CHEMICAL TEST KITS

CHEMICAL OXYGEN DEMAND

CONDUCTIVITY

DISSOLVED OXYGEN

ISE/pH

TITRATION

MAGNETIC STIRRERS

MULTIPARAMETER

PHOTOMETERS

RELATIVE HUMIDITY

TEMPERATURE

TURBIDITY

FOOD AND BEVERAGE

MINI CONTROLLERS

PROCESS INSTRUMENTATION

REAGENTS

ACCESSORIES

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4 **DISSOLVED OXYGEN**
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NEW PRODUCTS

2 Chemical Oxygen Demand (COD)



HI 83224

COD Meter with Bar Code Recognition of Sample Vials

The HI 83224 measures 15 parameters and features a powerful interactive user support menu system that assists you throughout analysis.

This advanced meter scans each vial inserted into it's chamber and automatically identifies the sample and range. HI 83224 also features USB PC connectivity, a backlit LCD and extensive data management.

Starting on page 2.4

2 Chemical Oxygen Demand (COD)



HI 839800

Thermo-Reactor with LCD Display

HANNA The HI 839800 thermo-reactor is constructed of durable materials with a vial capacity to perform up to 25 digestions simultaneously. The reactor is equipped with 6 predifined and 2 user defined temperature profiles. In addition, HI 839800 features power and heating LED indicators.

See Page 2.13

3 Conductivity



HI 4321 • HI 4521

Research Grade Bench Meters

Our new conductivity graphic display bench meters measure EC, resistivity, TDS and 3 salinity ranges. These advanced meters also incorporate an extended range from 0.001 µS/cm to 1 S/cm and can be used to perform all 3 stages of United States Pharmacopeia testing requirements for water quality (USP <645>).

Starting on page 3.4

3 Conductivity



HI 216

EC and Resistivity Bench Meter

HI 216 is a combination bench meter that can read conductivity in 4 different ranges and resistivity. The HI 216 features a 4-ring, platinum EC probe and an easy to clean reistivity probe.

See Page 3.10

Conductivity 3

HI 98188

EC/Resistivity/TDS/NaCl Meter

HI 98188 waterproof, portable conductivity meter has an expanded conductivity range from 0.001 µS/cm to 400 mS/cm as well as resistivity and 3 salinity scales. Data may be captured by either the log-on-demand option (400 samples) and by interval logging (from 5 sec to 1 minute). HI 98188 is also USP <645> compliant with stages 1, 2 and 3. When batteries run low, this meter can be charged via HANNA's inductive recharger.

Starting on page 3.12



Conductivity 3

HI 87314

EC and Resistivity Meter

HI 87314 is a combination, waterproof portable meter that can read conductivity in 4 different ranges, and resistivity. Compatible with our Inductive Chargers.

See Page 3.19



Conductivity 3

HI 8730 • HI 8731 • HI 8732

EC, TDS and Temperature Meters

Designed for QC and production environments, HI 8730, HI 8731 and HI 8732 are complete, versatile and watertight conductivity meters that are lightweight easy to maintain.

See Page 3.20



Conductivity 3

HI 86301-HI 86304

EC, TDS and Temperature Meters

These EC and TDS portable meters have been designed for simplicity of use, and provide accurate measurements. The housing has been completely sealed against humidity, for use in any type of environment. The probe is easy to clean and requires little maintenance.

See Page 3.21





3 Conductivity

HI 98331 Soil Test

Direct Soil Conductivity and Temperature Tester

This lightweight, portable meter features a removable penetration probe with built-in temperature sensor. The Soil Test is an excellent meter to carry around the field or greenhouse.

See Page 3.28



3 Conductivity

HI 98331 Aqua Dip™

EC/TDS/temperature tester

HI 983311 Aqua Dip provides simple and fast measurements for EC/TDS/Temperature in places with high relative humidity. The Aqua Dip™ features a dual-level LCD which displays the current measurement along with temperature. The units HOLD button freezes the display for manual recording and the probe is durable enough to be used as a stirrer.

See Page 3.29



4 Dissolved Oxygen

HI 4421

Research Grade Bench Meters

HI 4421 features DO, BOD, OUR and SOUR measurement modes in a compact versatile instrument. The color 240 x 320 dot matrix LCD is capable of displaying graphs, soft key menus, help screens and calibration reminders. HI 4421 also features USB PC connectivity and data-logging.

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4 Dissolved Oxygen

HI 98186

Dissolved Oxygen and BOD Meter

HI 98186 waterproof, portable DO and BOD Meter features extended range up to 50 ppm and 600% saturation as well as barometric pressure measurement and calibration with a user selectable unit and salinity, pressure and temperature compensation. Data may be captured by either the log-on-demand option (400 samples) and by interval logging. When batteries run low, this meter can be charged via HANNA's inductive recharger.

See Page 4.7

Dissolved Oxygen 4



HI 9147 Oxy-Check™

Dissolved Oxygen Meter with Galvanic Probe

Specifically designed for aquaculture, the Oxy-Check™ features a backlit LCD and comes with a rubber boot! An inductive charger cradle is available for an easy battery charge.

Starting on page 4.14

ISE/pH 5



HI 4000 series

Research Grade Bench Meters

Our new graphic display bench meters feature backlit, dual-level, color LCDs and Calibration Check™ electrode diagnostics.

Starting on page 5.4

ISE/pH 5



HI 3220 • HI 3221 • HI 3222

Laboratory pH Bench Meters

HANNA's HI 322x series of professional bench meters are designed to provide laboratory results under harsh industrial conditions.

An on-screen calibration guide and HANNA's Calibration Check™ diagnostics system are just a fraction of the features offered. HI 3220 and HI 3221 offers one input channel while HI 3222 is equipped with 2 input channels for simultaneous measurements.

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ISE/pH 5



HI 2210 • HI 2211

pH Meters

HANNA's HI 2210 and HI 2211 are microprocessor-based pH and Temperature bench meters.

These instruments are equipped with a large easy-to-read LCD which shows the pH (or mV) and temperature simultaneously, together with graphic symbols.

HI 2211 can also measure ion concentration (ISE) and Oxidation Reduction Potential (ORP) in the mV range.

Starting on page 5.20



5 ISE/pH

HI 98180-HI 98185

Graphic Display pH Meters

These pH and pH/ISE portable meters feature CAL CHECK™ electrode disgnostics, backlit LCD display USB PC connectivity, rugged casing and soft-key functionality. When batteries run low, these meters can be charged via HANNA's inductive recharger. HI 98185 and HI 98184 utilize HANNA's Ion Specific Electrodes.

Starting on page 5.30



5 ISE/pH

HI 98170 • HI 98171 • HI 98172

pH/ORP/ISE Meters

HI 9817x series are state-of-the-art, heavy-duty portable pH meters with temperature sensors. Housed in a waterproof casing, these units are specifically designed to provide laboratory results and accuracy under demanding industrial and field conditions. When batteries run low, these meters can be charged via HANNA's inductive recharger. HI 98172 utilizes HANNA's Ion Specific Electrodes

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5 ISE/pH

HI 9126

Calibration Check™ Portable pH Meter

The HI 9126 is the next generation in professional, accurate, easy-to-use pH meters. These meters are designed to provide laboratory results in a sleek, simple design.

An extended dual-level LCD displays pH and temperature readings simultaneously while also displaying the electrode status. The HI 9126 also guides users through the calibration process with clear on-screen guides. The meter is provided with a series of diagnostic features to improve measurement consistency reliability.

Starting on page 5.38



5 ISE/pH

HI 9124 • HI 9125

Auto-Instruction Portable pH Meters

The HI 9124 and HI 9125 heavy-duty waterproof pH meters have been designed with the latest microprocessor technology to provide laboratory results and accuracy under harsh industrial conditions.

A large dual-level LCD displays the pH and temperature simultaneously. Graphic symbols are provided for helping the user during the calibration process.

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ISE/pH 5



Ion Selective Measurement

Ion Selective Electrodes

A wide selection of liquid, membrane and gas construction electrodes in half-cell or combination form.

Starting on page 5.114

ISE/pH 5



ISE

ISE Standards, Solutions and Accessories

Our wide selection of HANNA ISE Standards are made and bottled in our state-of-the-art solutions facility. HANNA replacement parts and accessories keep your measurements fast and accurate.

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Titration 6



HI 84430

Total Titratable Acidity Titrator

The HI 84430 is specifically designed to determine Total Titratable Acidity of water. Acidity in water is its capacity to react with a strong base.

See Page 6.9

Titration 6



HI 84431

Total Titratable Acidity Titrator

The HI 84431 is specifically designed to determine Total Titratable Alkalinity of water. Alkalinity in water is its acid neutralizing ability.

See page 6.10

8 Multiparameter



HI 4522 • HI 4521

Research Grade Bench Meters

HI 4522 and HI 4521 are USP compliant research-grade laboratory pH/EC and pH/ISE/EC bench meters with a backlit, color screen and millesimal measuring resolution. HI 4521 is dual-channel, while HI 4522 adds ISE and is single channel. Our exclusive Calibration Check™ diagnostics system keeps the user informed about the quality and condition of the electrode and buffer groups for calibration.

Starting on page 8.4

8 Multiparameter



HI 9828

Multiparameter Meter

HANNA 's HI 9828 monitors up to 13 water quality parameters (6 measured, 7 calculated). The meter features a backlit LCD that can display 12 parameters at once. With HANNA 's exclusive Fast Tracker™, iButton®s with unique ID numbers can be installed at any number of sampling sites to be used to record specific location information when logging. For field calibration, HANNA's Quick Calibration allows users to standardize pH, conductivity and oxygen with one solution.

Starting on page 8.8

8 Multiparameter



HI 981504

pH/TDS/temperature Monitor

3 backlit LCD's simultaneouly display pH, TDS and °C or °F. Simply install the HI 981504 above the sample to be tested, plug the instrument to the mains and immerse the probes.

Page 8.19

9 Photometers



HI 83200 *2008 Series*

Multiparameter Photometer

HI 83200 *2008 Series* is a multiparameter bench colorimeter dedicated for Laboratory analysis. It can measure up to 45 parameters using specific liquid or powder reagents. The amount of reagent is precisely dosed to ensure maximum repeatability.

HI 83200 *2008 Series* bench colorimeter can be connected to a PC via a USB cable. Its software companion is HI 92000 HANNA Windows® compatible software that helps users manage all the results. This meter also features a light blocking cuvet cover, logging at a push of a button and can be powered by 12 VDC or rechargeable batteries.

Starting on page 9.2

Photometers 9



HI 83225

Grow Master Photometer for Nutrient Analysis

This Grow Master photometer for hydroponics and greenhouses measures ammonia, nitrate, phosphorus, potassium, calcium, magnesium and sulfate for accurate nutrient analysis. The HI 83225 is lightweight for field analysis and computer compatible.

Starting on page 9.12

Photometers 9



HI 96 series

Waterproof Photometers

These single parameter water resistant photometers feature HANNA's exclusive CAL CHECK™ technology.

Starting on page 9.30

Photometers 9



HI 83900

Suction Lysimeter

The HI 83900 series lysimeter is an ideal tool for collecting soil solution samples and then perform quantitative chemical analysis. In this way the operator can easily monitor the level of nutrients, such as ammonia, nitrate, phosphorous and potassium, sulphate, calcium, magnesium.

The HI 83900 compliments our HI 83225 and HI 83215 multiparameter photometers for fertilizer nutrients.

See Page 9.15

Temperature 11



HI 143

Temperature T-Logger

HI 143 is a temperature data logger with internal NTC sensor. Communication and control is made between the logger and the pc through a transmitter (connected by RS 232 or USB). The supplied wall cradle makes it easy to lock the meter in place to prevent tampering and the application software supports security passwords.

Starting on page 11.52

12 Turbidity



HI 83414

Precision Turbidity and Free/Total Chlorine Bench Meter

The HI 83414 combines turbidity and colorimetric measurements to monitor the most important parameters of drinking water: turbidity and free/total chlorine. The meter is especially designed for water quality measurements, providing reliable and accurate readings on low turbidity and chlorine values. The 83414 features CAL CHECK™, logging, GLP and meets USEPA requirements.

Starting on page 12.4

12 Turbidity



HI 88703

Precision Turbidity Bench Meter

The HI 88703 is especially designed for water quality measurements, providing reliable and accurate readings on low turbidity. The HI 88703 meets and exceeds the requirements of USEPA and Standard Methods. The 88703 features CAL CHECK™, logging, GLP and meets USEPA requirements.

Starting on page 12.4

12 Turbidity



HI 88713

ISO Turbidity Bench Meter

The HI 88713 Turbidity bench meter is a high accuracy meter that meets and exceeds the requirements of ISO 7027 standard.

See Page 12.8

12 Turbidity



HI 93414

Turbidity and Free/Total Chlorine Meter

Designed for water quality measurements, HI 93414 provides reliable and accurate readings on low turbidity and chlorine values. HI 93414 is EPA compliant and features HANNA's exclusive Fast Tracker™ Tag Identification System for simple, organized data management as well as chlorine CAL CHECK™ calibration validation.

Starting on page 12.10

Turbidity 12



HI 98703

EPA Compliant Turbidity Meter

The HI 98703 meets and exceeds the requirements of the USEPA Method 180.1 for wastewater and Standard Method 2130 B for drinking water.
HI 98703 is EPA compliant and features HANNA's exclusive Fast Tracker™ Tag Identification System for simple, organized data management.

See Page 12.12

Turbidity 12



HI 98713

ISO Turbidity Meter

The optical system—The Infrared Method (ISO 7027), consists of a infrared LED and two detectors (scattered and transmitted light), that assures long term stability and minimizes stray light and color interferences. HI 98713 features HANNA's exclusive Fast Tracker™ Tag Identification System for simple, organized data management.

See Page 12.13

Food and Beverage 13



HI 9143W • HI 9142W

Dissolved Oxygen Meters with Wine Bottle Probe

HANNA offers two meters that are ideal for dissolved oxygen spot checks. HI9143W Dissolved Oxygen meter can measure DO in bottled wine as well as in the storage tanks. HI9142W is an easy to use and accurate dissolved oxygen meter. Both meters are supplied with a specific DO probe that fits into the neck of wine bottles.

See Page 13.41

Food and Beverage 13



HI 84100

Sulfur Dioxide Mini Titrator

HI 84100 is a titrator, magnetic stirrer, electrode holder & reagent holder all in one compact unit. Simple to operate, achieve results in minutes. This instrument is supplied with a preprogrammed analysis method designed for free and total sulfur dioxide measurements of wine samples.

See Page 13.26

HANNA INSTRUMENTS®

HANNA instruments® is headquartered in Woonsocket, Rhode Island and is headed by Pamela and Martino Nardo, the daughter and son of the founders. The company was originally founded in Padova, Italy in 1978 by Anna and Oscar Nardo. Today, in Italy HANNA still has a Sales and Technical Service Office with 7 subsidiaries located throughout the Country and also maintains a Research and Development team. The following is a chronology of the history of the company since 1978:



1978 HANNA opens in Italy

1986 Opened R&D/Sales& Technical Service Office in USA

Opened Manufacturing Plant/ Sales & Technical Service Office in Singapore

1987 Opened Sales & Technical Service Offices in Australia, Belgium and UK

1988 Opened Manufacturing Plant in Mauritius

Opened Sales & Technical Service Offices in France, Germany, Japan and Malaysia

1989 Opened Sales & Technical Service Office in South Korea

1990 Opened Sales & Technical Service Office in Taiwan

1991 Opened Sales & Technical Service Offices in Spain and South Africa

1992 Opened Sales & Technical Service Office in Canada

1994 Opened Sales & Technical Service Office in Argentina

1996 Opened Sales & Technical Service Office in Indonesia

1997 Opened Sales & Technical Service Office in Chile

1999 Opened Manufacturing Plant/Sales & Technical Service Office in Romania

Opened Sales & Technical Service Offices in Holland, Mexico, Poland, Portugal and Thailand

2000 Opened Manufacturing Plant/Sales & Technical Service Office in Hungary

Opened Sales & Technical Service Office in China

2001 Opened Sales & Technical Service Office in Greece

2002 Opened Sales & Technical Service Office in Egypt

2004 Opened Sales & Technical Service Office in Vietnam

2005 Opened Sales & Technical Service Office in Brazil

2006 Opened Sales & Technical Service Office in India

2007 Opened Sales & Technical Service Office in Morocco

PHILOSOPHY

Through the years, the philosophy of the Nardo family has always been to be able to supply customers around the world with practical affordable solutions for their testing needs.

When HANNA introduced the pHep® (pH Electronic Paper) in 1986 it literally revolutionized the world of testing by allowing millions of people in various industries to test for pH in a simple, accurate and affordable way. This winning philosophy is still strongly embedded in HANNA. In 2005, when we introduced the world's first single parameter series of automatic titrators dedicated to food analysis, we put thousands of users around the world in the position to perform their own analytical tests in house, and to improve the quality of their product.

The driving philosophy that has been a trademark of HANNA has translated into a top class world wide organization with over 1,000 employees, including Sales and Technical Support, Research & Development and Manufacturing centers in 31 different countries.



13 Food and Beverage

HI 84102

Titratable Total Acidity Mini Titrator

HI 84102 is a titrator, magnetic stirrer, electrode holder & reagent holder all in one compact unit. Simple to operate, achieve results in minutes. This instrument is supplied with a preprogrammed analysis method designed for Total Titratable Acidity measurements in wine.

See Page 13.27



13 Food and Beverage

Wine Line™ Photometers

Photometers Designed Specifically for Wine Analysis

6 new photometers have been added to HANNA's WINE LINE™: Color and Total Phenols, Copper, Iron, Concentration of Reducing Sugars (RS), Tartaric Acid and Turbidity and Bentonite. These easy-to-use instruments aid in staying within parameter, helping to improve the quality of your wine production.

Starting on page 13.35



13 Food and Beverage

HI 84181, HI 84184, HI 84185

ISE Ammonia Nitrogen, Fluoride and Potassium Meters Designed for Wine Analysis

These compact units designed specifically for wine analysis feature logging capabilities, a twist-on electrode holder and built-in, 500 rpm magnetic stirrer.

Starting on page 13.32



13 Food and Beverage

HI 83540

Alcohol in Wine Meter

The HI 83540 is a low cost, easy to use, alcohol meter that employs a new method to measure the alcohol content in wines that is both simple and quick. This meter features USB PC connectivity, GLP, data logging and recall and a backlit LCD with user-friendly interface.

Starting on page 13.42

Food and Beverage 13



HI 847491, HI 847492, HI 847493

Haze Meters for Beer Analysis

The HI 847491, HI 847492, and HI 847493 are auto diagnostic haze in beer meters.

HI 847491 is specially designed for haze in beer measurements. HI 847492 is specially designed, according with the ASBC (American Society of Brewing Chemist) standard requirements for haze in beer measurements. HI 847493 is specially designed, according with the MEBAK (Central European Brewing Commission) standard requirements, for haze in beer measurements.

Starting on page 13.44

Food and Beverage 13



HI 84429

Titratable Acids Mini Titrator and pH Meter

Designed for the dairy industry, the HI 84229 allows users to perform a complete analysis with one meter!

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Mini Controllers 14



HI 1211 • HI 1222

Controller and Monitors in an Industrial Enclosure

Single or dual capacity industrial enclosures protectively house our mini controllers for 24/7 monitoring!

See Bottom of Pages 14.6 and 14.7

Process Instrumentation 15



HI 10,000 Series

Fertigation Systems

HANNA, the world's leader in EC and pH control technology has worked with leading growers to develop advanced system solutions for crops of any type. The HANNA Fertigation System provides precise control of pH and fertilizer injection. Unlike flow driven systems of the past, the HANNA Fertigation System constantly measures the actual EC and pH the water, allowing the system to add the precise concentration of fertilizer directly to the irrigation supply.

Starting on page 15.2



15 Process Instrumentation

HI 720

Conductivity Process Digital Controller

HI 720 offers measurement and control of conductivity or concentration. The HI 720 features auto-ranging, Conductivity probe check, Digital transmitter input, Pt100 or Pt1000 temperature sensor with automatic recognition and damage test, Calibration time-out, Logging of the last 100 error, configuration, and cleaning events, in-line cleaning, diagnostic features, password protection, SMS messages sending.

Starting on page 15.20



15 Process Instrumentation

HI 7650

Inductive Condutivity Probe

Designed to compliment the HI 720, the HI 7650 inductiove conductivity probe features a Pt100 or Pt 1000 (depending on model).

Starting on page 15.20



15 Process Instrumentation

HI 84, HI 85, HI 87, HI 89 Series

Panel Mounted Controllers

HANNA panel mounted pH, ORP, conductivity controllers have been updated and are designed to meet your most demanding process control requirements.

In addtion, we have added dissolved oxygen measurement to our updated panel mounted controller line.

Starting on page 15.33



15 Process Instrumentation

HI 86, HI 89 Series

Analog Transmitters

Our analog transmitter line for pH, ORP and conductivity has been updated. This advanced line features water resistance, industrial enclosures and are available with and without LCD.

Starting on page 15.69



"HANNA instruments® is our best option for portable and bench meters for laboratory and field. We use HANNA instruments® because they are easy to use and the quality of the instruments provides us with the best measurement results in our Wastewater Treatment Plant. Their durability and quick response is one of our favorite aspects. We also choose HANNA instruments® because of the service—they are always available for the customer."

ROSA MARIA HERNANDEZ BAEZ
CHEMICAL ENGINEER
Centro Mexicano de Capacitación en Agua y Saneamiento (CEMCAS)
Texcoco, Estado de México, México









"HANNA instruments® is the best option for our educational laboratory. Accurate and economical tests are made with HANNA instruments®. Students prefer HANNA instruments® products because their easy to handle, compact design allows them to take measurements in small places.

IRAIS JUDITH LOREDO
Laboratory Technical
Instituto de Educatión Media Superior Del D.F. (College of México City)
México City, México

RESEARCH AND DEVELOPMENT

For three decades HANNA has prided itself in being one of the world's leaders in innovation of analytical instrumentation. Headed by our team in Woonsocket, Rhode Island, HANNA's Research & Development teams constantly challenge themselves to improve on existing technology and to invent new testing techniques with the common goal to simplify analytical testing. This applies not only to instrumentation, but also to sensors development, reagents and chemicals. In 1985, HANNA was first to introduce to a pH electrode with a built in temperature sensor (HI 1217S) which became world wide and commonly used throughout the market. The idea of waterproof portable instruments to be used in harsh environments also was launched by HANNA in 1990 (HI 9025). The concept of giving users the possibility to check the accuracy of their digital thermometer (Checktemp®) was introduced to the market by HANNA in 1995 and is still unique today. Another exclusive technology to HANNA is simultaneous testing for pH and EC with a single instrument which was first introduced in 2000 (HI 98129). The following is a comprehensive list of HANNA innovation through the last few decades:



1980 World's first single-probe portable conductivity meter

1982 World's first pH controlled chemical dosing pump

1984 World's first microprocessor-based hand held pH meter

1985 World's first pH electrode with built-in temperature sensor

1986 World's first electronic pocket-sized pH tester

1988 World's first pre-amplified pH electrode

1990 World's first waterproof portable pH meter

1991 World's first replaceable electrode pH pocket tester

1992 World's first portable pH meter with plain-paper printing

1995 World's first pocket thermometer with cal-check feature

1997 World's first pH tester with double junction electrode

1999 World's first pH/temperature tester with dual level LCD

2000 World's first multi-parameter (pH/conductivity/temperature) pocket tester

2002 World's first colorimeter with CAL CHECK™ feature

2003 World's first pH meter with calibration check™ feature

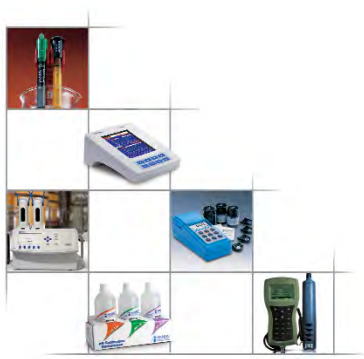
2004 World's first process pH meter with integrated cellular communication

2005 World's first single parameter line of auto titrators for wine testing

2006 World's first single parameter automatic mini titrator

2007 World's first conductimetric known addition alcohol analyzer for beverages

MANUFACTURING



We believe in controlling the quality of our products from their inception to delivery. For this reason, we manufacture all the products we bring to the market including, meters, electrodes, chemical reagents and buffer solutions. To ensure stability and greater quality, each of our five manufacturing facilities are specialized in a product family. To achieve higher standards at all times, we continuously invest in new manufacturing technology equipment as well as new manufacturing techniques. As a vertically integrated manufacturer, HANNA does not subcontract any part of the manufacturing process, from plastic molding, to glass blowing and chemical bottling, to PCB and electronic assemblies.

All HANNA products are in compliance with CE directives and our production facilities are ISO 9001 certified.

S E R V I C E W O R L D W I D E

worldwide offices

With over 50 offices spanning more than 30 countries, HANNA has positioned itself as a worldwide leader in laboratory instrumentation. Offering research grade quality at competitive prices, we strive to work with our customers to develop a HANNA solution tailored to their needs —on their budget.

24/7 access

HANNA's full catalog of instrumentation is available online at www.hannainst.com. Search for products, look up local office contacts, download instruction manuals and print brochures any time of day, wherever you are.

local customer support

After you have made your investment, you should never feel uncertain about the support or technical service you will receive. Over the past 30 years, HANNA has developed relationships with its customers built on quality products with personal service and support.

contact us

It is our philosophy that the best way to support our customers is to be closer to them. HANNA has over 30 offices around the world to provide our customers with dedicated service that is "just around the corner".



ISO 9001:2000 certified

T H E H A N N A D I F F E R E N C E

Technical department

It is our goal to provide each customer with easy access to one on one technical advice for operational and application specific assistance.

Extensive warranty

All HANNA products are covered by a parts and labor warranty, ranging from six months to five years.

Reliable products

Over two decades of manufacturing to ISO 9001:2000 standards is reflected in every aspect of your instrument.

Attractive pricing

By developing and manufacturing every product in-house, HANNA pricing is a major source of envy for our competitors. We are reputed to offer the best value on the market.

Continuous innovation

By listening closely to our customers, we are able to provide instruments that offer innovative features with exceptional reliability.

Ready-to-use

All HANNA products are supplied with electrode(s) and solutions so they can be used right out of the box. Several models also come with carrying cases, temperature probes, calibration solutions and electrode holders.

Complete range

In addition to an extensive range of pH and conductivity meters, we also manufacture electrodes and calibration and maintenance solutions, dissolved oxygen meters, thermometers, COD analyzers, single and multiparameter photometers and reagents.

Certification

HANNA instruments® is an ISO 9001:2000 certified company

HANNA online

To view Hanna's complete line of products and applications, visit our web page at www.hannainst.com.



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CONTENTS

CHEMICAL TEST KITS

NAVIGATION

Introduction..... **1.2**
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Iodine, Iron, Manganese

Chemical Test Kits

Iodine

Iodine is used as an alternative to chlorine and bromine in drinking water and swimming pools. Pool water treated with iodine does not irritate the human eye.



HI 3832 — Iodine

Iron

Iron concentration in natural water is typically below 1 mg/L (ppm), but the level can be much higher due to industrial discharges. Water containing iron is not dangerous to health, but it has a strong taste and can stain.

HANNA test kits allow you to determine the total concentration of iron in both Fe^{+2} and Fe^{+3} oxidation states.



HI 3834 — Iron

Manganese

Manganese is not present in natural waters but it is found in various salts and minerals, frequently associated with iron compounds.

Manganese salts are used as fertilizer additives, in ferroalloys (in steel manufacturing) and in non-ferrous alloys as it improves corrosion resistance and hardness.

Manganese is not considered to be toxic and it is present as a trace nutrient, both in food and water. Nonetheless manganese has been limited in drinking water since it causes stains to laundry and alters taste.

Manganese is commonly found in domestic wastewater and industrial effluents.



HI 38042 — Manganese

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Iodine (as I_2)	HI 3832	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	DPD	approx. 50	180 g
	HI 3879	Colorimetric	0-5 mg/L	1 mg/L	DPD	100	143 g
Iron (Fe^{+2} & Fe^{+3})	HI 3834	Colorimetric	0-5 mg/L	1 mg/L	Phenanthroline	50	142.5 g
	HI 38039	Checker disc	0.00-1.00 mg/L	0.02 mg/L	Phenanthroline	100	436 g
	HI 38040	Checker disc	0.0-5.0 mg/L	0.1 mg/L	Phenanthroline	100	427 g
	HI 38041	Checker disc	0.0-10.0 mg/L	0.2 mg/L	Phenanthroline	100	980 g
Iron and Total Hardness	HI 3889	Colorimetric Titration	Fe: 0-5 mg/L 40-500 mg/L	Fe: 1 mg/L 20 mg/L	Phenanthroline EDTA	50 approx. 50	260 g
Manganese	HI 38042	Checker disc	0.0-3.0 mg/L	0.2 mg/L	Sodium Periodate	100	560 g
	HI 38072	Checker disc	0.0-10.0 mg/L	0.5 mg/L	Sodium Periodate	100	1100 g

* 1 mg/L = 1 ppm

Nitrogen: Ammonia, Nitrate, Nitrite

Chemical Test Kits

Nitrogen, Ammonia

Concentrations of ammonia in rivers and drinking water reservoirs indicate the presence of agricultural or urban pollution. When the concentration of ammonia is high, it can alter the smell and taste of water. In industrial applications, high concentrations of ammonia can cause corrosion in pipes.

Ammonia is also monitored in aquariums and fish farming applications because of its toxicity to fish. HANNA kits allow you to test ammonia in fresh and salt water using the Nessler method.

Nitrogen, Nitrate

Nitrate is an essential nutrient for plants but must be monitored in order to maintain proper health. Excessive levels are detrimental and can even be toxic—effectively "burning" the plants.

Nitrate can be found in natural surface water, as well as in underground water. In drinking water, the nitrate level must be monitored because of its toxic nature. Domestic water supplies should not contain nitrate in excess of 45 mg/L.

Nitrogen, Nitrite

Nitrite is considered the most prevalent chemical pollutant. It is produced during ammonia oxidation or it originates from agricultural, urban and industrial waste. In fresh water aquaculture and aquariums, nitrite is highly toxic and effectively suffocates fish by starving the blood of oxygen.

Nitrite should be kept at very low concentrations (below 0.1 mg/L), since it is a carcinogenic and dangerous to humans and animals. At the same time, in applications such as cooling towers, it is kept at high concentrations, because of its capacity to prevent corrosion.



HI 3874 — Nitrate Colorimetric Test Kit



HI 3824 and HI 3826 — Ammonia

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Ammonia (as NH_3-N) Fresh water	HI 3824	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	Nessler	approx. 25	180 g
Ammonia (as NH_3-N) Fresh water	HI 38049	Checker Disc	0.0-3.0 mg/L	0.1 mg/L	Nessler	100	248 g
Ammonia (as NH_3-N) Salt water	HI 3826	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	Nessler	approx. 25	180 g
Nitrate (as NO_3-N)	HI 3874	Colorimetric	0-50 mg/L	10 mg/L	Cadmium reduction	100	156 g
Nitrate (as NO_3-N) irrigation water and soil	HI 38050	Checker disc	water: 0-50 mg/L soil: 0-60 mg/L	water: 1 mg/L soil: 2 mg/L	Cadmium reduction Cadmium reduction	100 100	1026 g
Nitrite (as NO_2^--N)	HI 3873	Colorimetric	0.0-1.0 mg/L	0.2 mg/L	Chromotropic acid	100	169 g
	HI 38051	Checker disc	0.00-0.50 mg/L	0.01 mg/L	Chromotropic acid	100	446 g

* 1 mg/L = 1 ppm

Dissolved Oxygen, Ozone, Phenols

Chemical Test Kits

Oxygen, Dissolved

Properly dissolved oxygen levels are essential for aquatic ecosystems. A dissolved oxygen level of 5 mg/L or greater will support healthy growth of most fish species. Other applications include monitoring in wastewater treatment and heating plants.

HANNA HI 3810 test kit uses an adaptation of the Winkler method to determine dissolved oxygen levels.



HI 3810 — Dissolved Oxygen

Ozone

Ozone is utilized as an oxidizing agent and a germicide. When employed as a disinfectant in drinking water, ozone oxidizes organic matter and effectively reduces color and odor impurities. Ozone is being used more and more as an oxidizing agent because of its efficiency. As a result of its oxidizing potential, ozone has the advantage of reducing the time normally required for sterilization.

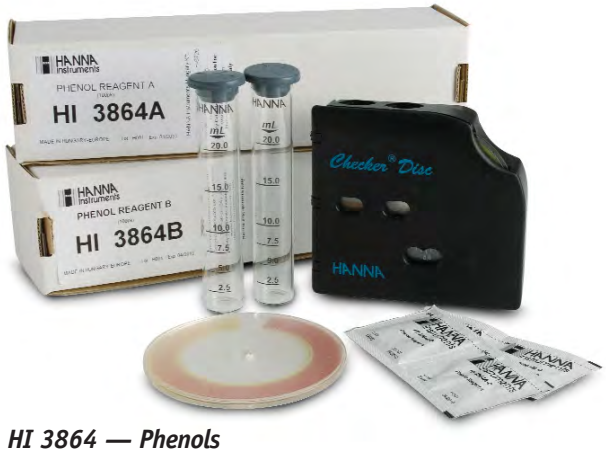
Ozone can be dangerous for human health (depending on concentration and exposure). Sterilizing processes such as those in swimming pools, bottled water and drinking water normally have to apply a process of de-ozonization after treatment. Ozone is also used in reverse-osmosis.



HI 38054 — Ozone

Phenols

Phenols are important starting materials in chemical and pharmaceutical industries. They are widely used as coloring agents, indicators and disinfectants. Phenols can be found both in industrial discharges and in natural waters. The presence of phenols in water, even in very low concentrations, can cause an unpleasant odor.



HI 3864 — Phenols

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Oxygen, dissolved	HI 3810	Titration	0.0-10.0 mg/L	0.1 mg/L	Modified Winkler	approx. 110	910 g
Ozone	HI 38054	Checker disc	0.0-2.3 mg/L	0.1 mg/L	DPD	100	966 g
Phenols	HI 3864	Checker disc	0.00-1.00 mg/L 0.5-5.0 mg/L	0.02 mg/L 0.1 mg/L	Aminoantipyrine	100	573 g

* 1 mg/L = 1 ppm

HANNA instruments®

With Great Products, Come Great Results™

Phosphate, Phosphorus, pH

Chemical Test Kits

Phosphate

Phosphate is utilized in water treatment, heating systems and cooling systems as a corrosion inhibitor. It is also an essential nutrient in agriculture and horticulture.

High concentrations of phosphate facilitate the growth of algae, increase corrosion and can cause environmental pollution.

Phosphorus

Phosphorus belongs to the primary macronutrients group. Together with nitrogen and potassium, it is an essential element to plant growth and is needed in large amounts.

Phosphorus is absorbed by plant roots and stimulates the production of flowers and fruit.

The HI 38073 test kit measures the amount of phosphorus in soil, i.e. the phosphorus actually available to plants.

This kit is supplied complete with the Mehlich extraction kit, which allows the user to correctly extract phosphorus from a soil sample.

pH

The pH value of water can be affected by an array of dissolved substances and is often a good indicator of the quality.

In applications where water is chemically treated, the pH value should be monitored continuously. The contaminents present in wastewater precipitate when the water is neutralized chemically.

Throughout this process, the pH must be monitored since a solution that is too acidic or alkaline may inhibit the precipitation of solids and influence the efficiency of the process.

HANNA line of chemical test kits covers the pH range between 3 and 10.

The colorimetric pH kits are also available with an additional reagent to reduce chlorine interference. To order these simply add "/0" to the end of the part number.



HI 3833 - Phosphate



HI 38077 - Phosphate



HI 38058 — pH



HI 3882 — pH Checker Disc®

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	# OF TESTS	WT
Phosphate (as ortho-phosphate, PO_4^{3-})	HI 3833	Colorimetric	0-5 mg/L	1 mg/L	Ascorbic acid	50	160 g
	HI 38077	Checker disc	0.0-5.0 mg/L	0.1 mg/L	Ascorbic acid	100	429 g
	HI 38061	Checker disc	0.00-1.00 mg/L 0.0-5.0 mg/L 0-50 mg/L	0.02 mg/L 0.1 mg/L 1 mg/L	Ascorbic acid	100	1010 g
Phosphorus (soil)	HI 38073	Checker disc	0.0-130.0 mg/L	3.3 mg/L	Ascorbic acid	100	435.5 g
pH	HI 3882	Checker disc	3.0-5.0 pH	0.1 pH	pH indicator	200	215 g
	HI 3880	Colorimetric	4.0-6.5 pH	0.5 pH	pH indicator	100	110 g
	HI 3880/0	Colorimetric	4.0-6.5 pH	0.5 pH	pH indicator	100	150 g
	HI 3881-5	Color card	4.0-8.0 pH	/	pH indicator	200	37 g
	HI 3881	Colorimetric	6.0-8.5 pH	0.5 pH	pH indicator	100	110 g
	HI 3881/0	Colorimetric	6.0-8.5 pH	0.5 pH	pH indicator	100	150 g
	HI 3886	Colorimetric	7.5-10.0 pH	0.5 pH	pH indicator	100	110 g
	HI 3886/0	Colorimetric	7.5-10.0 pH	0.5 pH	pH indicator	100	150 g
	HI 38058	Checker disc	4.0-10.0 pH	0.5 pH	pH indicator	300	215 g

* 1 mg/L = 1 ppm

Potassium, Salinity

Chemical Test Kits

Potassium

Potassium is present in the tissues responsible for the growth and vigor of plants, in particular, primary and secondary meristems.

This essential nutrient plays an important role in how much water is absorbed by the roots and in the regulation of cellular activity. In addition, Potassium makes plants more resistant to disease and positively effects the color and fragrance in flowers.

This kit is supplied with the Mehlich extraction kit, which allows the user to correctly extract potassium from a soil sample.

Salinity

Salinity is a measure of the concentration of total dissolved salts in a sample of water.

Salinity is ecologically important in that it influences the type of organism that can live in the water. Since the optimal concentration of salinity varies from species to species, it is crucial to the health of an ecosystem that this parameter is monitored.

Applications are found in a variety of fields, from water in fish farming and aquariums to food processing and cheese production.

Salinity is expressed in g/kg or ppt (parts per thousand), as well as Practical Salinity Units (psu).



HI 3835 — Water Salinity Chemical Test Kit



"I really like these instruments because they are very simple, easy to use and they provide solid results."

IMRE MÁCSAI
INDEPENDENT AGRICULTURAL CONSULTANT
Hungary

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Potassium (soil)	HI 38082	Turbidimetric	0-50 mg/L 50-250 mg/L	5 mg/L 25 mg/L	Turbidimetric	100	889 g
Salinity	HI 3835	Titration	0.0-40.0 g/kg	0.4 g/kg	Mercuric nitrate	approx. 110	460 g

* 1 mg/L = 1 ppm; 1 g/Kg = 1 ppt

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SAR
(Sodium Absorption Ratio)

Sodium is closely monitored and regulated because of its toxic effects to soil and crops. High sodium concentrations disperse the soil's colloidal particles, rendering the soil hard and resistant to water penetration.

The build-up of osmotic pressure in soil, due to high sodium concentration, is characterized by poor tilth and hindered water absorption by plant roots. Sodium absorption ratio (SAR) along with pH are used to characterize salt-affected areas. High sodium content can be mitigated by distribution of gypsum directly on the soil.

The HANNA test kit determines Sodium Hazard in irrigation water by calculation of the SAR in relation to Sodium, Calcium and Magnesium concentrations.

To quickly determine the conductivity of irrigation water the kit is supplied with our DiST® 4 Conductivity Tester. The kit's manual supplies information about practical solutions to common problems.



HI 38078 — SAR

Silica

Silicon is most commonly found as Silica Oxide (SiO_2) in crystalline form. When it combines with other oxides and metals it forms a variety of useful silicates such as alumina silicates found in clay and clay borne products.

Silicates are the most abundant minerals of the Earth's mantle and crust. Silica is the major constituent of sand beds on coastal areas and is a significant constituent in most soils.

Silica is hard, resistant to corrosion and is only slightly soluble in water. The solubility and form of Silica in water depends on the pH and the mineral bed in contact with the water.

In industry, heating plants and reverse osmosis processes need to accurately monitor Silica concentrations in water because of scale formation.



HI 38067 — Silica

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	# OF TESTS	WT
SAR	HI 38078	DiST®4 + test kit	> 0.0 meq/L	0.2 meq/L	Titration	approx. 100	785 g
Silica	HI 38066	Checker disc	0.00-1.00 mg/L	0.02 mg/L	Colorimetric	100	580 g
	HI 38067	Checker disc	0-40 mg/L 0-800 mg/L	1 mg/L 40 mg/L	Colorimetric	100	712,5 g

* 1 mg/L = 1 ppm

Sodium, Sulfate

Chemical Test Kits

Exchangeable Sodium and Gypsum Requirement

Alkaline soils are characterized by a low electrical conductivity (EC), high exchangeable sodium percentage (ESP) and the presence of carbonate and bicarbonate sodium salts.

Highly alkaline conditions hinder plant growth since it reduces solubilization of necessary nutrients such as Iron, Copper and Manganese.

Chlorosis, for instance, is a typical disease affecting leaves due to Iron and Manganese deficiencies. It is possible to correct soil alkalinity by adding proper conditioners (generally gypsum) to reduce Sodium's adverse effects and return the pH to an acceptable range.

The exact quantity of gypsum needed for the correction can be calculated with the HANNA kit.



HI 38083 — Exchangeable Sodium and Gypsum Requirement

Sulfate

Sulfate is widely present in natural waters. It is non-toxic but has to be kept below a certain threshold because it adds an unpleasant taste to the water.

Higher sulfate concentrations are found close to mines and their run-off waters. Sulfate is also widely used as a nutrient in agriculture. The HANNA s kit covers an extensive range for measuring sulfate concentrations.



HI 38001 — Sulfate



HI 38000 — Sulfate

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Exchangeable Sodium (ES) and Gypsum Requirement (GR)	HI 38083	Titration	ES: 0.00-56.40 meq GR: 0.0-213.0 metric ton/ha	1.95 meq/100 g soil GR: 3.8 metric ton/ha	Calcium sulfate	100	883 g
Sulfate (as SO_4^{2-})	HI 38000	Turbidimetric	20-100 mg/L	5 mg/L	Barium chloride	100	290 g
	HI 38001	Titration	100-1000 mg/L 1000-10000 mg/L	10 mg/L 100 mg/L	Barium chloride	200	640 g

* 1 mg/L = 1 ppm

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Sulfite

Sulfite is rarely found in natural waters because it oxidizes quickly to sulfate, However, sulfite is commonly used in industry. In the food sector, sulfite is used for its preservative properties. Sulfite is also utilized in water heating systems as a reducing agent. High concentrations of sulfite lower the pH of a solution, hence facilitating corrosion.

Sulfite is also monitored in environmental analysis as it is toxic to aquatic life. Its ability to eliminate oxygen from water disrupts the ecologic equilibrium of rivers, ponds and lakes.

Zinc

Even though zinc is non-toxic to humans, concentrations higher than 5 mg/L (ppm) can give water a bitter, astringent taste.

Zinc can also result in a milky color in alkaline water and can irritate the human digestion system in concentrations higher than 5 mg/L (ppm). Zinc in low quantities however, is a beneficial and necessary element for body growth.

Zinc is normally introduced into drinking water through industrial effluents. In addition to drinking water, zinc is measured in surface finishing and water conditioning.



HI 3822 — Sulfite



HI 3854 — Zinc



HI 38076 — Zinc

PARAMETER	*CODE*	*METHOD*	*RANGE**	*SMALLEST INCREMENT*	*CHEMICAL METHOD*	*NUMBER OF TESTS*	*WEIGHT*
Sulfite (as Na_2SO_3)	HI 3822	Titration	0.0-20.0 mg/L 0-200 mg/L	0.2 mg/L 2 mg/L	Iodometric	approx. 110	910 g
Zinc (as Zn^{+2})	HI 3854	Colorimetric	0.0-3.0 mg/L	0.6 mg/L	Zincon	100	250 g
	HI 38076	Checker disc	0.0-4.0 mg/L 0.0-20.0 mg/L	0.1 mg/L 0.4 mg/L	Zincon	100	647 g

* 1 mg/L = 1 ppm

HI 3897

Olive Oil Acidity Test Kit



Now there is an easy, affordable and accurate way to determine the quality, classification and freshness of your Olive Oil.

Acidity (expressed as percent oleic acid) is the most fundamental measurement of olive oil. It is the primary indicator of olive oil purity and freshness.

The quality of olive oil is directly related to the degree of breakdown of the fatty acids in the oil. As the bound fatty acids break down, free fatty acids are formed which increase the acidity of the % oil. Acidity, expressed as oleic acid, is a measure of the free fatty acid present in the oil, which is directly related to its purity.

The quality of olive oil can be adversely affected during maturation or by environmental conditions. Mishandling, processing and bruising during harvesting can also contribute to a breakdown of fatty acids and an increase in free acidity. Improper and/or long term storage can cause olive oil to breakdown and become rancid. Regular acidity testing is the best way to ensure and maintain quality and freshness.

Normally, testing acidity is a complicated process requiring the use of various chemicals in a laboratory environment. HANNA has simplified this process in an easy to understand test kit that can be used by almost anyone to produce quick and accurate results.

Studies have shown that the quality of olive oil has a direct impact on its health benefits. *Extra Virgin Olive Oil* contains higher levels of antioxidants, particularly Phenols and vitamin E (because it is less processed). Antioxidants can help prevent oxidation damage to body tissue caused by free radicals. Studies have also shown that the oxidation of LDL (bad) cholesterol is associated with the hardening of arteries that can lead to heart disease.

With the HI 3897 test kit, it is possible to easily and accurately test the quality of olive oil at various stages of processing and storage to monitor and maintain the highest quality.

Acidity, defined as percent oleic acid, is a parameter that indicates olive oil freshness. A high acidity value indicates the oil quality has diminished and is at risk of becoming rancid.

Acidity is used to discriminate an extra virgin olive oil from all other olive oils. According to the CEE 2568/91 regulation, olive oil is considered extra virgin when its acidity level is below 1%. A low acidity value also indicates a natural extraction process occured soon after olive harvesting.

The HI 3897 kit utilizes a titration method where the end-point is visually determined when the color changes from yellow-green to pink.



CHEMICAL PARAMETERS

Olive storage period (between harvesting and extraction)	within 48 hours	2 to 4 days	over 4 days
Acidity (as oleic acid %)	0.3	0.4	0.5

The HI 180 is a compact and lightweight magnetic stirrer which incorporates electronic controls that allow the user to regulate the speed with precision. In addition to speed control, HANNA's Speedsafe™ system will assure that the maximum speed is never exceeded.

In accordance with the European Community (EC) reg. CEE2568/91 quality classification of Olive Oil based on acidity (expressed as percent oleic acid) is as follows:

Extra Virgin Olive Oil: **Acidity ≤ 1%**
"Perfect flavor and odor", with a maximum acidity, expressed as Oleic acid, of 1g/100g

Virgin Olive Oil: **Acidity 1 - 2%**
"Perfect flavor and odor", with a maximum acidity, expressed as oleic acid, of 2g/100g

Ordinary Virgin Olive Oil: **Acidity 2 - 3.3% (tolerance of 10%)**
"Good flavor and odor", with a maximum acidity, expressed as Oleic acid, of 3.3g/100g

Virgin Lampante Olive Oil: **+ 3.3%. Not fit for human consumption**
"Off flavor and odor", with a maximum acidity, expressed as Oleic acid, > 3.3g/100g

Sensory Quality of Olive Oil

The sensory analysis of virgin olive oil is based on a panel test, developed by the International Olive Oil Council. The rating is awarded on the basis of a scale of points running from 0, which indicates that the oil has extreme defects to 9, which indicates that the oil has no defects at all. See the following chart for sensory ratings of each grade of Olive Oil.

Extra Virgin Oil	***>6.5***
Virgin	***>5.5***
Ordinary Virgin	***>3.5***
Virgin Lampante	***<3.5***

Additional Technical Information:

Olive oil is a complex compound made of fatty acids, vitamins, volatile components, water soluble components and microscopic bits of olive. The 3 primary fatty acids (triglycerides) are oleic, linoleic, and linolenic.

SPECIFICATIONS	***HI 3897***
Range	0.00 - 1.00 % acidity
Smallest Increment	0.01 mL = 0.01%
Method	titration
Sample Size	4.6 mL (4 g)
Number of Tests	6
Dimensions (kit)	112 x 390 x 318 mm (4.4 x 15.4 x 12.5")
Weight (kit)	3 kg (6.6 lb.)

SPECIFICATIONS	***HI 180 MAGNETIC STIRRER (INCL.)***
Maximum Stirring Capacity	1 L (0.26 g)
Speed Range	100 rpm min.; 1000 rpm Max
Installation Category	II
Cover Material	ABS plastic
Environment	0 to 50°C (32 to 122°F) 95% RH max
Dimensions	dia. 137 mm x 51 mm (h) (5.39 x 2")
Weight	640 g (1.4 lbs.)



Oleic Acid (18:1) = 55 ~ 85% olive oil composition
Linoleic Acid (18:2) = 3.5 ~ 21.00% olive oil composition
Linolenic Acid (18:3) = 0.0 ~ 1.5% olive oil composition

Oleic acid makes up 55-85% of olive oil. Oleic acid is the most abundant fatty acid found in nature.

Studies show that high concentrations of oleic acid can lower blood levels of total and LDL (bad) cholesterol, reducing the long term risk of heart disease.

Olive Oil Acid Composition

Palmitic Acid (16:0) = 7.5 - 20%
Palmitoleic Acid (16:1) = 0.3 - 3.5%
Stearic Acid (18:0) = 0.5 - 5.0%
Oleic Acid (18:1) = 55.0 - 83.0 %
Linoleic Acid (18:2) = 3.5 - 21.0%
Linolenic Acid (18:3) = 0.0 ~ 1.5%
Others = 1.5 - 3.2%

ORDERING INFORMATION

HI 3897 is supplied with 6 ready-to-use bottles of organic solvent, HI 180MB magnetic stirrer, calibrated syringe for oil dosing, calibrated syringe for titrant dosing, titrant (30 mL bottle), rugged carrying case and instructions.

ACCESSORIES

HI 3897-010	Spare kit for 10 test
HI 740226	5 mL calibrated syringe
HI 740142	1 mL calibrated syringe
HI 740143	1 mL calibrated syringe (6)
HI 740144	tip for 1 mL calibrated syringe (6)
HI 740053	100 mL graduated glass bottle (10)
HI 731319	Magnetic stir bar for HI 180 (10)
HI 180MB	Magnetic stirrer w/Speedsafe™ technology

HANNA Chemical Test Kits



With their ease of use and rugged carrying case, HANNA kits are ideal for field testing.

Choose from a wide range of single and multi-parameter test kits for specific applications.

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Single Parameter Test Kits

Simple and Economical Analysis

HANNA instruments®' test kits are the simplest way to perform an accurate chemical analysis. The wide variety of kits presented in this section include single parameter test kits with different measuring ranges as well as combination test kits including all the necessary reagents for a specific application. Each HANNA chemical test kit comes complete with a hard carrying case and comprehensive instruction manuals.

Quality and Safety

HANNA test kits are supplied ready-to-use, complete with all the necessary accessories. They are designed to help you to work better, faster and safer.

All HANNA chemical test kits use color coded dropper bottles which are easy to recognize during analysis. Dropper bottles make titration extremely quick and easy without compromising accuracy.

Each plastic beaker is provided with a ported cap to prevent spills and waste. Every kit is manufactured according to the highest quality standards.

A Material Safety Data Sheet is available for each product.

Comprehensive Instruction Manuals

Every chemical test kit is supplied with a comprehensive, easy to understand instruction manual. The manuals guide you through the analysis step-by-step, making it easy for even non-technical personnel to perform tests.

Colorimetric Chemical Test Kits

Quick and easy to use, HANNA colorimetric chemical test kits are the ideal solution for water analysis of many chemical parameters. The kits are equipped with a transparent container which has the color scale right next to the sample being tested. This makes the color comparison process simple and error free. The reagents are either liquid or powder depending on the parameter to be measured.

Test Kits with Checker® disc

HANNA Checker® disc test kits use the technology of colorimetric kits to provide greater accuracy and resolution. The Checker® disc is a color comparison wheel shaded from dark to light in proportion to the concentration of the chemical parameter being tested. All the user needs to do is put both the blank and the reacted cuvets inside the Checker® disc. By turning the wheel, the user can then visually find the concentration that best equals the reacted sample. This technique enhances resolution and accuracy.

Titration Test Kits

These precise kits provide ease of use without any loss of resolution and accuracy. To determine the concentration of the chemical parameter, these kits utilize a titration technique which consists of counting the number of drops of titrant necessary to cause a color change in the sample. The end point can be determined with enhanced accuracy and simplicity.

HI 3819

Acid Mining Test Kit

Easy, Organized Tests

The acid mining industry produces wastewater which can be acidic or alkaline, depending on the metal type. The discharge water can also contain metals such as iron. Since the run-off water will eventually find its way to lakes and rivers, it is important to test it to make sure it does not pollute the environment and water reservoirs.

HANNA's HI 3819 combination test kit includes all the necessary tests for alkalinity, acidity, pH and iron. The reagent bottles are in easy-to-recognize ascending numbers which allow your tests to be less time consuming.

Testing procedures are clearly shown in the step-by-step instruction manual so that anyone can carry out analyses. For pH measurements, use our pHep® electronic tester to get faster and more accurate results than conventional litmus paper.

The HI 3819 has all the necessary equipment to perform over 100 tests of acidity or alkalinity plus 50 tests of iron.



You can conveniently replace reagents separately as they run out (see Reagents section). The number of pH tests has no limitations other than the life of the instrument itself.

HI 3819 — Combination Test Kit for Acid Mining

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Acidity (as $CaCO_3$)	Titration	0-100 mg/L 0-500 mg/L	1 mg/L 5 mg/L	Methyl-orange/ Phenolphthalein	approx. 110
Alkalinity (as $CaCO_3$)	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110
Iron (as Fe^{2+} and Fe^{3+})	Colorimetric	0-5 mg/L	1 mg/L	Phenanthroline	50
pH	Electronic pH tester	0.0-14.0 pH	0.1 pH	—	life of the meter

OTHER INFORMATION	
Dimensions	370 x 270 x 80 mm (14.6 x 10.6 x 3.1")
Weight	1.6 kg (3.5 lb.)

* 1 mg/L = 1 ppm



HI 3813

Alkalinity and Acidity Test Kit

The ideal solution for combined testing

This practical and versatile test kit comes in a rugged portable carrying case, ideal for field use. It's convenient, saves time and keeps your test materials organized and orderly.

The HI 3813 includes: (2) indicators, (2) pre-standardized titration solutions, graduated cylinders for 20 and 100 mL volume, and a graduated syringe to perform the titrations. The kit also provides (2) plastic pipettes (one for each parameter) in order to avoid cross contamination of your sample during testing.

The reagent bottles are clearly labeled to avoid confusion and can be purchased separately when they run out (see Reagents section). Over 100 tests of acidity and alkalinity can be performed with this kit.

HI 3813 — Acidity/Alkalinity Combination Test Kit

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Acidity (as $CaCO_3$)	Titration	0-100 mg/L 0-500 mg/L	1 mg/L 5 mg/L	Methyl-orange/ Phenolphthalein	approx. 110
Alkalinity	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110

OTHER INFORMATION	
Dimensions	370 x 270 x 80 mm (14.6 x 10.6 x 3.1")
Weight	1.0 kg (2.2 lbs.)

* 1 mg/L = 1 ppm

HANNA instruments®

With Great Products, Come Great Results™

Test 4 crucial soil parameters

In agricultural applications, monitoring the quality of the soil is extremely important for the health and growth of crops. The pH level is an excellent guide as to which plants may thrive in a particular terrain, as well as indicating which conditioners and fertilizers to use. HANNA combination test kits allow you to test not only for pH, but for nitrogen, phosphorous and potassium which are all important for the quality of soil as well.

HI 3895 and HI 3896 are very easy to use: A soil sample is diluted in water and combined with one of the chemical reagents supplied with the kit. The result is a colored solution which is compared to the chart provided to determine the concentration of the element being tested. The concentration is given in easily-understood ranges of low, medium and high.

The professional HI 3896 kit is supplied with an extraction solution which facilitates the precipitation of suspended solids so that measurements can be taken immediately.

HI 3895 is supplied with all the necessary components for 10 tests. HI 3896 provides components for 25 tests and includes a useful guide to measurement.



HI 3896 — Agricultural Test Kit

HI 3895 — Agriculture Test Kit, Basic

PARAMETER	METHOD	RANGE	CHEMICAL METHOD	# OF TESTS
Nitrogen	Colorimetric	traces, low, medium, high	Ned	10
Phosphorus	Colorimetric	traces, low, medium, high	Ascorbic acid	10
pH	Colorimetric	4 to 9 pH (1 pH increments)	pH indicator	10
Potassium	Turbidimetric	traces, low, medium, high	Tetraphenylborate	10

OTHER INFORMATION	
Dimensions	113 x 113 x 62 mm (4.4 x 4.4 x 2.4")
Weight	105 g (3.7 oz.)

HI 3896 — Agriculture Test Kit, Pro

PARAMETER	METHOD	RANGE	CHEMICAL METHOD	# OF TESTS
Nitrogen	Colorimetric	traces, low, medium, high	Ned	25
Phosphorus	Colorimetric	traces, low, medium, high	Ascorbic acid	25
pH	Colorimetric	4 to 9 pH (1 pH increments)	pH indicator	25
Potassium	Turbidimetric	traces, low, medium, high	Tetraphenylborate	25

OTHER INFORMATION	
Dimensions	235 x 176 x 117 mm (9.2 x 6.9 x 4.6")
Weight	710 g (1.6 lbs.)

HI 3823
Aquaculture Test Kit



HI 3823 provides users with the most important test parameters for aquaculture applications: alkalinity, carbon dioxide, dissolved oxygen, hardness, pH and salinity.

Each of these parameters plays a critical role in the delicate balance of the aquatic environment. Alkalinity acts as a stabilizer for pH. Carbon dioxide must be monitored because of its toxicity to fish (every species can tolerate different levels of CO^2). Oxygen levels affect fish respiration and incorrect concentrations can slow down their growth rate. Hardness is monitored because it diminishes the toxicity level of ammonia and pH is measured to determine the toxicity level of the water. Salinity is important because of its relation to dissolved oxygen.

HI 3823 — Combination Test Kit for Aquaculture

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Alkalinity (as $CaCO_3$)	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110
Carbon Dioxide (as CO_2)	Titration	0.0-10.0 mg/L 0.0-50.0 mg/L 0-100 mg/L	0.1 mg/L 0.5 mg/L 1 mg/L	Phenolphthalein	approx. 110
Hardness (as $CaCO_3$)	Titration	0.0-30.0 mg/L 0-300 mg/L	0.3 mg/L 3 mg/L	EDTA	approx. 100
Oxygen, Dissolved	Titration	0.0-10.0 mg/L	0.1 mg/L	Modified Winkler	approx. 110
pH	Electronic pH tester	0.0-14.0 pH	0.1 pH	—	life of the meter
Salinity	Titration	0-40 g/Kg	0.4 g/Kg	Mercuric Nitrate	approx. 110

Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")
Weight	2.3 kg (5.1 lbs.)

* 1 mg/L = 1 ppm; 1 g/Kg = 1 ppt



HI 3893
Aquarium Test Kit

Chemical Test Kits

Many parameters affect the well being and growth of fish in aquaculture and aquariums. HI 3893 is part of HANNA's goal in addressing the needs of operators in these fields.

HI 3893 combines, in one package, 4 different tests—ammonia, nitrate, nitrite and pH. It is an ideal kit for crab and lobster aquariums and saltwater holding tanks at wholesalers as well as at retail shops.

The kit provides 50 tests each of pH, nitrite, nitrate and ammonia. It includes the necessary equipment to perform all appropriate tests. The simplicity of the kit and its affordable price make it suitable for specialists and hobbyists whether technically oriented or not.

HI 3893 — Aquarium Test Kit

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Ammonia (as NH_3-N)	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	Nessler	50
Nitrate (as NO_3^--N)	Colorimetric	0-50 mg/L	10 mg/L	Cadmium reduction	50
Nitrite (as NO_2-N)	Colorimetric	0.0-1.0 mg/L	0.2 mg/L	Chromothropic acid	50
pH	Colorimetric	6.0-8.5 pH	0.5 pH	pH indicator	50

OTHER INFORMATION

Dimensions	370 x 270 x 80 mm (14.6 x 10.6 x 3.1")
Weight	840 g (1.9 lbs.)

* 1 mg/L = 1 ppm

Boiler and Feedwater Test Kits

4 Kits to Choose From!

For boiler and feedwater industries, choose the kit that best fits your application among any of our 4 combinations:

HI 3816: kit for alkalinity, chloride and hardness

HI 3827: kit for alkalinity, chloride, hardness, pH, phosphate and sulfite

HI 3828: kit for alkalinity, chloride, hardness, iron and pH

HI 3837: kit for pH, phosphate and sulfite

All the tests are performed with a titration method except for the pH test. pH is obtained with HANNA's pHep®, pH electronic tester, which guarantees greater accuracy and longer life than traditional litmus paper.

Every kit is equipped with all the necessary reagents and equipment to perform over 100 tests (50 for iron and phosphate). All the reagents can be purchased individually as they run out (please see our Reagents section). All tests are easy to perform with step-by-step instructions.

Every kit is supplied with a rugged portable carrying case for easy, orderly transportation.



HI 3816



HI 3827



HI 3828



HI 3837

HI 3816, HI 3827, HI 3828, HI 3837 — Boiler Test Kits

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Alkalinity (as $CaCO_3$)	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110
Chloride (as Cl^-)	Titration	0-100 mg/L 0-1000 mg/L	1 mg/L 10 mg/L	Mercuric Nitrate	approx. 110
Hardness (as $CaCO_3$)	Titration	0.0-30.0 mg/L 0-300 mg/L	0.3 mg/L 3 mg/L	EDTA	approx. 100
Iron	Colorimetric	0-5 mg/L	1 mg/L	Phenanthroline	50
Phosphate (as PO_4^{-3})	Colorimetric	0-5 mg/L	1 mg/L	Ascorbic acid	50
pH	Electronic pH tester	0.0-14.0 pH	0.1 pH	—	life of the meter
Sulfite (as Na_2SO_3)	Titration	0.0-20.0 mg/L 0-200 mg/L	0.2 mg/L 2 mg/L	Iodometric	approx. 110

OTHER INFORMATION	
Dimensions	HI 3816 and HI 3837: 370 x 270 x 80 mm; HI 3827 and HI 3828: 440 x 330 x 100 mm
Weight	HI 3816: 1.2 kg (2.6 lbs.); HI 3827: 2.2 kg (4.9 lbs.); HI 3828: 2 kg (4.4 lbs.); HI 3837: 1.5 kg (3.3 lbs.)

* 1 mg/L = 1 ppm

HI 3821

Cooling and Boiler Test Kit

Achieve Maximum Efficiency

Heating systems and cooling towers require constant monitoring in order to function efficiently.

The correct equilibrium of the most important chemical parameters such as alkalinity, chloride, dissolved oxygen, hardness, phosphate and sulfite must be maintained.

This guarantees the maximum efficiency of the system and prevents costly damage that can occur as a result of corrosion to metal parts

HANNA's HI 3821 combination test kit includes all the necessary reagents to test these parameters. The kit allows you to perform over 100 tests for each parameter (50 for phosphate). All reagent bottles are numerically labeled for ease of operation and will allow you to avoid mistakes.



HI 3821 — Cooling and Boiler Combination Test Kit

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Alkalinity (as $CaCO_3$)	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110
Chloride (as Cl^-)	Titration	0-100 mg/L 0-1000 mg/L	1 mg/L 10 mg/L	Mercuric Nitrate	approx. 110
Hardness (as $CaCO_3$)	Titration	0.0-30.0 mg/L 0-300 mg/L	0.3 mg/L 3 mg/L	EDTA	approx. 100
Phosphate (as PO_4^{-3})	Colorimetric	0-5 mg/L	1 mg/L	Ascorbic acid	approx. 50
Oxygen, Dissolved	Titration	0.0-10.0 mg/L	0.1 mg/L	Modified Winkler	approx. 110
Sulfite (as Na_2SO_3)	Titration	0.0-20.0 mg/L 0-200 mg/L	0.2 mg/L 2 mg/L	Iodometric	approx. 110

OTHER INFORMATION	
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")
Weight	2.5 kg (5.5 lb.)

* 1 mg/L = 1 ppm

HANNA instruments

With Great Products, Come Great Results™

Ideal for Professionals and Students

The six most important parameters monitored in environmental applications are covered with this combination chemical test kit. They include: acidity, alkalinity, carbon dioxide, dissolved oxygen, hardness and pH.

This kit is ideal not only for professionals, but also for students of Environmental Sciences since it offers great performance and ease of use.

HI 3814 is equipped with all the accessories and reagents to perform over 100 tests for each parameter.

The pHep®, our popular pH electronic tester, is included for your convenience. This small and easy to use pH meter will provide more accurate and reliable pH readings than conventional litmus paper. The pHep® also has the added benefit of introducing students to the use of a pH meter.

The kit is supplied complete with a step-by-step instruction manual and a hard carrying case which makes it easy to perform tests in the field.

Reagents are replenished by purchasing the parameters measured individually as they are run out (Please see our Reagents section).



HI 3814 — Environmental Monitoring Test Kit

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Acidity (as $CaCO_3$)	Titration	0-100 mg/L 0-500 mg/L	1 mg/L 5 mg/L	Methyl-orange/ Phenolphthalein	approx. 110
Alkalinity (as $CaCO_3$)	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110
Carbon Dioxide (as CO_2)	Titration	0.0-10.0 mg/L 0.0-50.0 mg/L 0-100 mg/L	0.1 mg/L 0.5 mg/L 1 mg/L	Phenolphthalein	approx. 110
Hardness (as $CaCO_3$)	Titration	0.0-30.0 mg/L 0-300 mg/L	0.3 mg/L 3 mg/L	EDTA	approx. 100
Oxygen, Dissolved	Titration	0.0-10.0 mg/L	0.1 mg/L	Modified Winkler	approx. 110
pH	Electronic pH tester	0.0-14.0 pH	0.1 pH	—	life of the meter

OTHER INFORMATION	
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")
Weight	2.3 kg (5.1 lb.)

* 1 mg/L = 1 ppm

HI 3825 • HI 3887 • HI 3888

Swimming Pool Test Kits

Organized for Daily Tests

Swimming pool water requires daily tests for alkalinity, bromine, chlorine and pH.

Chlorine and bromine, which kill micro-organisms, are commonly used in swimming pool water because of their disinfectant properties.

Alkalinity and pH are monitored because their concentration in pool water affects the proper activity of the disinfecting agents.

Bromine and chlorine tests are colorimetric (color comparison), while alkalinity tests are a titration. pH tests are performed with HANNA's pHep® pH tester. The pHep® offers greater accuracy and a wider range than litmus paper.

HANNA's Quick-check test kits combine two basic parameters in swimming pool monitoring. These inexpensive kits are ideal for performing routine pH and chlorine testing.

HI 3825: Kit for alkalinity, bromine, chlorine and pH

HI 3887: Quick-check test kit for free chlorine and pH

HI 3888: Quick-check test kit for total chlorine and pH



HI 3825 - Combination

HI 3825 — Combination Swimming Pool Test Kit

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Alkalinity (as $CaCO_3$)	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110
Bromine (as Br_2)	Colorimetric	0.0-3.0 mg/L	0.6 mg/L	DPD	approx. 60
Chlorine (as Cl_2)	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	DPD	approx. 50
pH	Electronic pH tester	0.0-14.0 pH	0.1 pH	—	life of the meter

OTHER INFORMATION	
Dimensions	370 x 270 x 80 mm (14.6 x 10.6 x 3.1")
Weight	1.1 kg (2.4 lb.)

HI 3887, HI 3888 — Quick-check Swimming Pool Test Kits

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Free Chlorine	Colorimetric	0-2.5 mg/L	0.5 mg/L	DPD	approx. 50
Total Chlorine	Colorimetric	0-2.5 mg/L	0.5 mg/L	DPD	approx. 50
pH	Colorimetric	6.0-8.5 pH	0.5 pH	pH indicator	approx. 100

OTHER INFORMATION	
Weight	HI 3887: 170 g (6.0 oz.); HI 3888: 190 g (6.7 oz)

* 1 mg/L = 1 ppm

HANNA instruments
With Great Products, Come Great Results™

Accurate and Reliable Water Quality Tests

Monitor the most important chemical parameters in water: alkalinity, chloride, hardness, iron, pH and sulfite with this combination test kit.

The kit has all the reagents needed to perform over 100 tests for each parameter (50 tests for iron). Reagents may also be purchased individually as they run out. Please see our reagent section for a complete listing.

pH measurements are performed with our electronic pHep® pH tester which guarantees more accurate and repeatable readings than litmus paper.

The chemical reagents to perform each test are provided in numerically labeled bottles and are easy to identify. All titration reagents are standardized, and do not require chemical handling to perform the analysis.

The kit is supplied with a convenient hard carrying case, designed with field applications in mind. It will also keep your test kit neat and organized.

The HANNA HI 3817 combination test kit offers you all the necessary equipment for accurate and reliable water quality testing.



HI 3817 — Water Quality Test Kit

PARAMETER	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS
Alkalinity (as $CaCO_3$)	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110
Chloride (as Cl^-)	Titration	0-100 mg/L 0-1000 mg/L	1 mg/L 10 mg/L	Mercuric Nitrate	approx. 110
Hardness (as $CaCO_3$)	Titration	0.0-30.0 mg/L 0-300 mg/L	0.3 mg/L 3 mg/L	EDTA	approx. 100
Iron	Colorimetric	0-5 mg/L	1 mg/L	Phenanthroline	50
pH	Electronic pH tester	0.0-14.0 pH	0.1 pH	—	life of the meter
Sulfite (as Na_2SO_3)	Titration	0.0-20.0 mg/L 0-200 mg/L	0.2 mg/L 2 mg/L	Iodometric	approx. 110

OTHER INFORMATION	
Dimensions	440 x 330 x 100 mm (17.3 x 13.0 x 3.9")
Weight	2.1 kg (4.6 lb.)

* 1 mg/L = 1 ppm

HI 3817BP

Backpack Lab™ Water Quality Educational Test Kit



Test kits can be replaced individually

Backpack Lab™ Water Quality Educational Test Kit Includes:

- *110 tests each for acidity and alkalinity, 100 tests for carbon dioxide, dissolved oxygen, hardness, nitrate and phosphate*
- *pHep®4: waterproof pH/temperature tester by HANNA*
- *DiST®5: waterproof conductivity and TDS tester by HANNA*
- *Secchi disc for turbidity*
- *Backpack-style carrying case which holds all the components of the kit*
- *Extensive teachers manual with a curriculum that meets the National Science Teachers Association Standard*
- *Overhead transparencies with summaries of each parameter*
- *Laminated instruction cards with step-by-step field test procedures*
- *Lab activity worksheets with instructions, goals, hypothesis, testing procedure results and comments*
- *A glossary of key terms for classroom display*

Learn About Environmental Water Parameters at the Source!

HANNA is now offering a series of test kits specifically designed for Educators and Environmental Science students. These portable kits contain well constructed lessons and activities, and will allow the teacher to get the most out of their classroom time.

Backpack Lab™ is designed with all the necessary components in one place, reducing the chance of misplacing an item. Ideal for transporting, take this durable backpack to the field for on-site measurements.

The lesson plan and components are tied together by a comprehensive teachers manual that includes information about each parameter, classroom activities designed to introduce students to each parameter, and detailed field testing procedures. HANNA parameter test kits and pocket testers provide teachers with a valuable tool in helping students assess the water quality of streams, rivers and lakes.

The HANNA Backpack Lab™ is an example of our evolving innovation and desire to respond to the growing needs of students, teachers and the environment.



www.backpacklab.com

Backpack Lab™ Soil Quality Educational Test Kit

Backpack Lab™ Soil Quality Educational Test Kit Includes:

- *Agriculture combination test kit for testing nitrogen, phosphorous, potassium and pH, with enough materials for 50 tests for each parameter*
- *pHep®4: waterproof pH/temperature tester by HANNA*
- *DiST®5: waterproof conductivity and TDS tester by HANNA*
- *HANNA's HI 145 digital thermometer*
- *Backpack-style carrying case which holds all the components of the kit*
- *Extensive teachers manual with a curriculum that meets the National Science Teachers Association Standard*
- *Overhead transparencies with summaries of each parameter*
- *Laminated instruction cards with step-by-step field test procedures*
- *Lab activity worksheets with instructions, goals, hypothesis, testing procedure results and comments*
- *A glossary of key terms for classroom display*



Test kits can be replaced individually

A Complete, Portable Learning Experience

HANNA introduces a second kit specifically assembled for the Educator and Environmental Science student. Using the popular HANNA Agricultural Combination Test Kit (HI 3895 and HI 3896) as its foundation, the Soil Quality Education Test Kit is designed to provide a complete lesson plan for teachers. Teachers are able to introduce students to important chemical tests for evaluating soil quality and fertility, and relate these measurements to the principles of plant metabolism. Tied together by an extensive Teacher's Guide, this kit includes in-depth background information about each parameter, classroom activities designed to introduce students to each parameter and detailed field-testing procedures.

HANNA Agricultural Combination Test Kit addresses important issues related to soil quality and modern agriculture practices. Real-world examples help students understand the relevance of macronutrients and other parameters in everyday life. This kit introduces the student to all major soil quality topics, and is presented in an easy-to-use format that makes lessons accessible, understandable and memorable.

www.backpacklab.com



Applications

HANNA combination chemical test kits described in this section are tailor made for the following applications:

- *Olive Oil Acidity*
- *Acid Mining*
- *Agriculture*
- *Alkalinity – Acidity*
- *Aquaculture and Aquariums*
- *Boiler Feedwater*
- *Boiler and Cooling Systems*
- *Education*
- *Environmental Testing*
- *Swimming Pools*
- *Water Quality*

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Multiparameter Test Kits



Tailor made for your application

HANNA multiparameter test kits include all the necessary reagents and accessories for a specific application.

Ideal for field measurements

These multiparameter test kits from HANNA are equipped with step-by-step, easy to understand instruction manuals. A hard carrying case helps to keep your equipment neat, organized and easy to carry around in the field. Our carrying cases are rugged, built to last, and easily refilled with replacement reagents as needed.

One more advantage: HANNA's exclusive pHep® for pH measurements

In those kits that offer pH measurements, HANNA has included the exclusive pHep® electronic tester so that your pH analysis will always be quick and reliable. Traditional pH test strips have limited accuracy and do not cover the entire pH range. Due to the pHep's long life, high accuracy and extended range, these problems are avoided.

Specifications

HI 3817BP — Backpack lab Water Quality Educational Test Kit

BACKPACK LAB™ PARAMETER	CODE	METHOD	RANGE	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Acidity ($CaCO_3$)	HI 3820	Titration	0-100 mg/L 0-500 mg/L	1 mg/L 5 mg/L	Methyl-orange Phenolphthalein	110	910 g
Alkalinity ($CaCO_3$) P & Total	HI 3811	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	110	460 g
Carbon Dioxide (CO_2)	HI 3818	Titration	0.0-10.0 mg/L 0.0-50.0 mg/L	0.1 mg/L 0.5 mg/L	Phenolphthalein	110	460 g
Oxygen, Dissolved	HI 3810	Titration	0.0-10.0 mg/L	0.1 mg/L	Modified Winkler	110	910 g
Hardness ($CaCO_3$)	HI 3812	Titration	0.0-30.0 mg/L 0-300 mg/L	0.3 mg/L 3 mg/L	EDTA	approx. 100	460 g
Nitrate (NO_3^-N)	HI 3874	Colorimetric	0-50 mg/L	10 mg/L	Cadmium reduction	100	156 g
Phosphate (Ortophosphate PO_4^{-3})	HI 3833	Colorimetric	0-5 mg/L	1 mg/L	Ascorbic acid	50	160 g

PHEP®4 PARAMETER	CODE	RANGE	RESOLUTION	ACCURACY	CALIBRATION	BATTERY LIFE	WEIGHT
pH	HI 98127	-2.0 to 16.0 pH	0.1 pH	±0.1	Automatic	approx. 300 hours	85 g
Temperature		-5.0 to 60.0°C	0.1°C	±0.5°C			

DIST®5 PARAMETER	CODE	RANGE	RESOLUTION	ACCURACY	CALIBRATION	BATTERY LIFE	WEIGHT
EC	HI 98311	0 to 3999 µS/cm	1 µS/cm	±2% F.S.	Automatic	approx. 100 hours	85 g
TDS		0 to 2000 ppm	1 ppm	±2% F.S.			
Temperature		0.0 to 60.0°C	0.1°C	±0.5°C			

HI 3896BP — Backpack lab Soil Quality Educational Test Kit

BACKPACK LAB™ PARAMETER	CODE	METHOD	RANGE	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Nitrogen	HI 3896	Colorimetric	Traces, low, medium, high	Ned	50	1320 g
Phosphorus		Colorimetric	Traces, low, medium, high	Ascorbic acid	50	
Potassium		Turbidimetric	Traces, low, medium, high	Tetraphenylborate	50	
pH		Colorimetric	4 to 9 pH (1 pH increments)	pH indicators	50	

HI 145-00 SPECIFICATIONS		RANGE	RESOLUTION	ACCURACY	PROBE	BATTERY LIFE	WEIGHT
Temperature		-50.0 to 220°C	0.1°C (-50.0 to 199.9°C) 1°C (200 to 220°C)	±0.3°C (-20 to 90°C) ±0.4 F.S. (outside)	Stainless steel, 125 x 5mm (5 x 0.2")	approx. 10000 hours	65 g

PHEP®4 PARAMETER	CODE	RANGE	RESOLUTION	ACCURACY	CALIBRATION	BATTERY LIFE	WEIGHT
pH	HI 98127	-2.0 to 16.0 pH	0.1	±0.1	Automatic	approx. 300 hours	85 g
Temperature		-5.0 to 60.0°C	0.1°C	±0.5°C			

DIST®5 PARAMETER	CODE	RANGE	RESOLUTION	ACCURACY	CALIBRATION	BATTERY LIFE	WEIGHT
EC	HI 98311	0 to 3999 µS/cm	1 µS/cm	±2% F.S.	Automatic	approx. 100 hours	85 g
TDS		0 to 2000 ppm	1 ppm	±2% F.S.			
Temperature		0.0 to 60.0°C	0.1°C	±0.5°C			

Acidity, Alkalinity, Ascorbic Acid

Chemical Test Kits

Acidity

Acidity can be caused by mineral or organic acids, or by carbon dioxide as carbonic acid. Acidity of aqueous solutions contributes to corrosiveness and influences the rate of biological processes. For these reasons, acidity is monitored in fish farming, soil testing, environmental testing, treated wastewater discharge and in lakes and rivers.

The Total Exchangeable Acidity (TEA) measures the total amount of soil acidifiers (hydrogen, aluminum, iron and manganese) in meq/100g unit, equivalent to 1000 parts per 100g of soil. A high value of total exchangeable acidity means a low soil pH level. Soil with high acidity can damage some crops.

Alkalinity

Testing alkalinity is important in the treatment of drinking water, wastewater, pools, heating and cooling, food and beverage cleaning systems and environmental testing. Alkalinity is also important to measure in agriculture and aquaculture applications.

Ascorbic Acid

Ascorbic Acid—vitamin C—is used in the food and beverage industry as a supplement in fruit juice, and for its flavor and preservative qualities.

HI 3850 has been specifically designed for analysis of beverages and can be used in drinks with a high content of color, such as fruit juices. The kit uses a titration method. Common interferences in this test include reducing agents present in the beverage.



HI 3820 — Acidity



HI 3811 — Alkalinity



HI 3850 — Ascorbic Acid

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Acidity (as $CaCO_3$)	HI 3820	Titration	0-100 mg/L 0-500 mg/L	1 mg/L 5 mg/L	Methyl-orange/ Phenolphthalein	approx. 110	910 g
Acidity Total Exchangeable	HI 38084	Titration	0.0-2.5 meq/100 g	0.1 meq/100 g	Potassium Chloride	100	1027 g
Alkalinity (as $CaCO_3$) Phenolphthalein and Total	HI 3811	Titration	0-100 mg/L 0-300 mg/L	1 mg/L 3 mg/L	Phenolphthalein/ Bromphenol blue	approx. 110	460 g
Total	HI 38014	Titration	0-500 gpg	5 gpg	Bromphenol blue	100	363 g
Phenolphthalein and Total	HI 38013	Titration	0.0-10.0 gpg 0.0-20.0 gpg	0.1 gpg 0.2 gpg	Phenolphthalein/ Bromphenol blue	200	865 g
Ascorbic Acid	HI 3850	Titration	10-200 mg/L	10 mg/L	Iodometric	approx. 100	519 g

* 1 mg/L = 1 ppm; 1 gpg = 17 ppm $CaCO_3$

HANNA instruments®

With Great Products, Come Great Results™

Boron, Bromine, Carbon Dioxide

Chemical Test Kits

Boron

Boron is one of the micronutrients essential for plant growth. It may be present in natural water or in industrial waste effluents.

Boron, in excess of 2.0 mg/L in irrigation water, is detrimental to many plants, but some plants may even be affected adversely by concentrations lower than 1.0 mg/L. Our kit, having an operational range from 0 to 5 mg/L, with a resolution of 0.2 mg/L, is particularly suitable for this application.

Since the pH level is very important for a correct measurement of the amount of Boron, the kit is equipped with our Checker® pocket-sized pH meter, for an accurate measurement.



HI 3830 — Bromine

Bromine

Bromine, because it is stable and less volatile than chlorine, is utilized as a disinfectant in swimming pools, spas and hot tubs. As with chlorine, excessive quantities of bromine in water can be dangerous to health and can cause eye irritation.

Daily monitoring of bromine concentration prevents damage to equipment and contributes to the optimization and efficiency of the process while providing for increased user safety.



HI 3818 — Carbon Dioxide

Carbon Dioxide

In nature, lakes and rivers contain carbon dioxide in concentrations smaller than 10 mg/L (or ppm). However, stagnant or contaminated water can contain higher concentrations because of organic decomposition. This creates a problem for fish farming applications.

Carbon dioxide is added to drinking water during the final phases of the purification process. In water softening processes, carbon dioxide must be kept at a certain level in order to prevent corrosion.



HI 38074 — Boron

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Boron	HI 38074	Titration	0.0-5.0 mg/L	0.2 mg/L	Boric Acid	100	780 g
Bromine (as Br_2)	HI 3830	Colorimetric	0.0-3.0 mg/L	0.6 mg/L	DPD	approx. 60	370 g
Carbon Dioxide (as CO_2)	HI 3818	Titration	0.0-10.0 mg/L 0.0-50.0 mg/L 0-100 mg/L	0.1 mg/L 0.5 mg/L 1 mg/L	Phenolphthalein	approx. 110	460 g

* 1 mg/L = 1 ppm

Chloride, Chlorine, Chromium

Chemical Test Kits

Chloride

Chloride is one of the most common ions present in water. In drinking water, its level must be kept low because it can adversely alter the taste. In other applications, chloride levels must be monitored to prevent scaling and corrosion. In high concentrations, chloride can even corrode stainless steel and is detrimental to vegetation.

HI 3898 allows the user to determine high concentrations of chloride in wastewater, which can interfere with official COD analysis methods. This test done in accordance to the ISO 15705:2002 method, indicates chloride interference in seconds.

The chloride concentration is considered too high if greater than 1000 ppm (for COD test according to ISO directives) or higher than 2000 ppm (for COD test according to the USEPA, APHA, AWWA and WEF methods). If a high concentration of chloride is found, the sample must be diluted.

Chlorine

Chlorine is the most commonly used water disinfectant in applications that vary from treatment of drinking water and wastewater, pools and spas sanitization, to food processing and sterilization.

Chlorine present in water binds with bacteria, leaving only part of the original quantity (free chlorine) to continue its disinfecting action. If the free chlorine level is improper with respect to the pH, water will have an unpleasant taste and odor and the disinfecting potential of chlorine will be diminished.

Free chlorine reacts with ammonium ions and organic compounds to form chlorine compounds with diminished disinfecting capabilities compared with free chlorine. Combined chlorine and free chlorine together result in total chlorine content.

Chromium

Chromium salts are widely used in industrial processes, galvanic plants, tanneries and chemical manufacturing plants. Chromium can therefore be found in industrial discharges and must be monitored because of its toxic nature.



HI 38020 — Free & Total Chlorine



HI 3815 — Chloride



HI 3831F and 3831T — Chlorine



HI 3846 — Chromium

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	# OF TESTS	WT
Chloride (as Cl^-)	HI 3815	Titration	0-100 mg/L 0-1000 mg/L	1 mg/L 10 mg/L	Mercuric Nitrate	approx. 110	460 g
	HI 38015	Titration	500-10000 mg/L 5000-100000 mg/L	100 mg/L 1000 mg/L	Silver Nitrate	100	664 g
	HI 3898	Visual	1000 mg/L (ISO) 2000 mg/L (EPA)	-	Silver Nitrate	100	200 g
Chlorine (as Cl_2) Free	HI 3831F	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	DPD	approx.50	176 g
	HI 3875	Checker disc	0.0-3.5 mg/L	0.1 mg/L	DPD	100	984 g
	HI 38018	Checker disc	0.00-0.70 mg/L 0.0-3.5 mg/L	0.02 mg/L 0.1 mg/L	DPD	200	647 g
Chlorine (as Cl_2) Free & pH	HI 3887	Colorimetric	Cl_2: 0.0-2.5 mg/L pH: 6.0-8.5 pH	Cl_2: 0.5 mg/L pH: 0.5 pH	DPD pH indicator	approx.50 100	280 g
Chlorine (as Cl_2) Total	HI 3831T	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	DPD	50	205 g
	HI 38016	Checker disc	0.0-3.5 mg/L	0.1 mg/L	DPD	100	977 g
	HI 38019	Checker disc	0.00-0.70 mg/L 0.0-3.5 mg/L	0.02 mg/L 0.1 mg/L	DPD	200	678 g
	HI 38022	Titration	0.0-4.0 mg/L 0.0-20.0 mg/L	0.2 mg/L 1.0 mg/L	Iodometric	100	561 g
	HI 38023	Titration	10-200 mg/L	10 mg/L	Iodometric	100	547 g
Chlorine (as Cl_2) Total & pH	HI 3888	Colorimetric	Cl_2: 0.0-2.5 mg/L pH: 6.0-8.5 pH	Cl_2: 0.5 mg/L pH: 0.5 pH	DPD pH indicator	50 100	310 g
Chlorine (as Cl_2) Free & Total	HI 38017	Checker disc	0.00-0.70 mg/L 0.0-3.5 mg/L	0.02 mg/L 0.1 mg/L	DPD	200	696 g
	HI 38020	Checker disc	0.00-0.70 mg/L 0.0-3.5 mg/L 0.0-10.0 mg/L	0.02 mg/L 0.1 mg/L 0.5 mg/L	DPD	200	688 g
Chromium (as Cr^{6+})	HI 3845	Titration	0-100 mg/L 100-1000 mg/L	5 mg/L 50 mg/L	Iodometric	approx. 100	416 g
	HI 3846	Colorimetric	0.0-1.0 mg/L	0.2 mg/L	Diphenylcarb-ohydrazide	approx. 100	160 g

* 1 mg/L = 1 ppm

HANNA instruments

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Copper, Cyanide, Cyanuric Acid, Detergents

Chemical Test Kits

Copper

Copper is an important element in the metabolism of plants and animals and is also used to monitor the bacteriological growth in potable water tanks. Corrosion of pipes contributes to high quantities of copper in water.

Cyanide

Cyanide is a pollutant that originates mostly from metallurgic, galvanic and other industrial processes, such as gold and silver extraction. Because it is poisonous to the human nervous system, it is imperative to monitor and control cyanide levels in potable water. When in contact with acids, HCN (hydrogen cyanide) is freed as a poisonous gas.

The Environmental Protection Agency (EPA) has established that the maximum level of cyanide in water is not to exceed 0.2 mg/L (ppm).

Cyanuric acid

Cyanuric acid is used in swimming pools as a stabilizer to slow down the decomposition of chlorine. With a correct dose, it can save up to 80% of normal chlorine consumption during peak sunny months. Cyanuric acid is also used in chlorinated bleaches and selective herbicides.

Detergents (anionic)

Detergents are found in water from industrial and public wastewater discharges. The most commonly used are linear-alkyl-sulfonates (LAS) and alkylbenzene-sulfonates (ABS). LAS's are biodegradable and quickly destroyed by microorganisms.

The total concentration of LAS/ABS anionic detergents in natural water should be kept below 0.1 mg/L and in public wastewater discharge it should be between 1 and 20 mg/L.



HI 3855 — Cyanide Checker Disc®



HI 3847 — Copper



HI 3851 — Cyanuric Acid

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	NUMBER OF TESTS	WEIGHT
Copper	HI 3847	Colorimetric	0.0-2.5 mg/L	0.5 mg/L	Bicinchonic acid	100	150 g
	HI 3856	Colorimetric	0.00-0.25 mg/L	0.05 mg/L	Bicinchonic acid	100	180 g
	HI 38075	Colorimetric	0.00-0.25 mg/L 0.0-6.0 mg/L	0.05 mg/L 1.2 mg/L	Bicinchonic acid	100	555 g
Cyanide (as CN^-)	HI 3855	Checker disc	0.00-0.30 mg/L	0.01 mg/L	Pyridine-pyrazolone	100	580 g
Cyanuric Acid	HI 3851	Turbidimetric	10-100 mg/L	5 mg/L	Turbidimetric	100	195 g
Detergents	HI 3857	Checker disc	0.00-1.30 mg/L	0.02 mg/L	Methylene blue	35	1245 g

* 1 mg/L = 1 ppm

Formaldehyde, Glycol, Hardness

Chemical Test Kits

Formaldehyde

Formaldehyde is used in many industrial processes, such as maintenance of reverse osmosis plants. It is also used as a preservative and disinfectant.

Each application requires a specific quantity of formaldehyde, which must be monitored for process optimization.

Formaldehyde is carcinogenic and flammable.

Glycol

Glycol is largely used in cooling systems and as an antifreeze. Its presence in motor oil indicates a contamination from the cooling system.

HANNA's HI 3859 can be used for aqueous, as well as oily solutions, and determines the presence of glycol.

Hardness

Hardness in water is mainly due to the presence of Calcium and Magnesium ions. Calcium and Magnesium also contribute to the amount of total hardness. Monitoring and controlling hardness is fundamental in order to prevent scaling and corrosion.

Water is categorized as very soft (0-70 mg/L), soft (70-150 mg/L), slightly hard (150-250 mg/L), moderately hard (250-320 mg/L), hard (320-420 mg/L) and very hard (420 mg/L and above), according to the hardness scale. HANNA kits cover all of these ranges.

HANNA offers the **HI 3840-S**, **HI 3841-S** and **HI 3842-S** chemical test kits packed in sachets offering a low cost alternative.



HI 3840 — Total Hardness



HI 3812 — Total Hardness



HI 38033 — Total Hardness

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	# OF TESTS	WT
Formaldehyde (as CH_2O)	HI 3838	Titration	0.00-1.00% 0.0-10.0%	0.01% 0.1%	Sodium Sulfite/ Hydrochloric Acid	approx. 110	910 g
Glycol	HI 3859	Visual	Present/Absent	—	Oxidation of glycolic group	25	380 g
Hardness (as $CaCO_3$) Total	HI 3812	Titration	0.0-30.0 mg/L 0-300 mg/L	0.3 mg/L 3 mg/L	EDTA	100	460 g
	HI 3840	Titration	0-150 mg/L	5 mg/L	EDTA	approx. 50	120 g
	HI 3841	Titration	40-500 mg/L	20 mg/L	EDTA	approx. 50	120 g
	HI 3842	Titration	400-3000 mg/L	100 mg/L	EDTA	approx. 50	120 g
	HI 38033	Titration	0-30 gpg	1 gpg	EDTA	100	457 g
	HI 38034	Titration	0.0-20.0 gpg 0.0-20.0 mg/L	0.2 gpg 0.2 mg/L	EDTA EDTA	100	567 g
Hardness (as $CaCO_3$) Total & Calcium	HI 38035	Titration	Total: 0.0-20.0 gpg Ca: 0.0-20.0 gpg	0.2 gpg 0.2 gpg	EDTA EDTA	100	960 g
Calcium (Ca) (irrigation water)	HI 38086	Turbidi-metric	0-125 mg/L 0-250 mg/L	1 mg/L 2 mg/L	Turbidimetric	100	950 g
Magnesium (Mg) (irrigation water)	HI 38079	Titration	0.0-240.0 mg/L 0.0-725.0 mg/L	2.4 mg/L 7.3 mg/L	EDTA	approx. 100	873 g
Ca & Mg (irrigation water)	HI 38081	Titration	>0.0 meq/l	0.2 meq/l	EDTA	approx. 100	671 g
Ca & Mg (soil)	HI 38080	Titration	>0.0 meq/100 g	1.5 meq/100 g	EDTA	approx. 100	336 g

* 1 mg/L = 1 ppm; 1 gpg = 17 ppm $CaCO_3$

HANNA instruments

With Great Products, Come Great Results™

Hydrazine, Hydrogen Proxide, Hydroxide, Hypochlorite

Chemical Test Kits

Hydrazine

Hydrazine is a liquid chemical substance used in high pressure heating plants because of its property as an oxygen inhibitor. It reacts with dissolved oxygen and has the advantage over sulfite treatments in that it does not produce solid waste in the process. Hydrazine is added to avoid scaling and corrosion and to control the growth of bacteria. High concentrations react with ammonia and result in damage to metals. Hydrazine is also known to be toxic.

Hydrogen Peroxide

As a disinfectant or a bleaching agent, hydrogen peroxide finds applications in water treatment, textile, pulp and paper industries.

HI 3844 determines hydrogen peroxide concentrations in water up to 10 mg/L (ppm) and is unaffected by the presence of stabilizing substances.

Hydroxide

Hydroxide ions found in natural waters may indicate artificial contamination. Hydroxide ions may also be a measure of the corrosiveness of water on materials. In copper electrolysis plating, hydroxide ions react with formaldehyde to reduce copper.

Hypochlorite

Sodium hypochlorite is used as a bleaching agent in paper and textile industries and as a disinfectant in drinking water and swimming pools.

The most commonly used solution contains 10-15% chlorine (100-150 g/L) but it is very volatile and is affected by temperature, light, pH and heavy metals.



HI 3839 — Hydroxide



HI 3844 — Hydrogen

PARAMETER	CODE	METHOD	RANGE*	SMALLEST INCREMENT	CHEMICAL METHOD	# OF TESTS	WT
Hydrazine (as N_2H_4)	HI 3849	Checker disc	0.00-1.00 mg/L	0.02 mg/L	p-Dimethylamino-benzaldehyde	100	860 g
Hydrogen Peroxide (as H_2O_2)	HI 3844	Titration	0.00-2.00 mg/L 0.0-10.0 mg/L	0.25 mg/L 1.0 mg/L	Iodometric	approx. 100	450 g
Hydroxide (as OH^-)	HI 3839	Titration	0.00-1.00 g/L 0.0-10.0 g/L	0.01 g/L 0.1 g/L	Phenolphthalein	approx. 110	460 g
Hypochlorite (as Cl_2)	HI 3843	Titration	50-150 g/L	5 g/L (0.5%)	Iodometric	approx. 100	485 g

* 1 mg/L = 1 ppm

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RELATIVE HUMIDITY

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Hygrometers: Relative Humidity Measurement

An Introduction to Relative Humidity and HANNA Hygrometers

Definition

The hygrometer is an instrument used to measure relative humidity (RH), that is, the quantity of water vapor present in the air. Hygrometers are often available in versions that also measure temperature—these are normally called thermo-hygrometers.

Relative humidity is expressed as the ratio of the quantity of water vapor present in the air to the quantity at which the air would reach saturation (100%) at a given temperature.

Accurate and Efficient RH Measurement

HANNA is one of the few manufacturers offering a wide range of relative humidity (RH) meters. Calibration is performed at the factory using state-of-the-art humidity chambers and tuned at 3 different points (14%, 50%, 80%) traceable against a NIST standard. Each model has been designed around certain field applications and environments.

HI 8064, for example, is a portable, easy-to-use thermo-hygrometer particularly suited for **education**.

HI 93640 is a hand-held meter with a built-in sensor that has a sintered cap for protection against **dusty or harsh environments**. This product is ideally suited to the **HVAC field**.

HI 9064 and HI 9065 with their water-resistant housing, remote probe and HOLD feature are the perfect meters for **libraries, museums, computer rooms and printing facilities.**

HI 9161 is a relative humidity and temperature meter that can provide **measurement printouts on the spot**. Printouts can be obtained at user selectable intervals that contain information such as sample #, interval, R.H. and temperature reading. The meter can operate at 60 minute intervals over an entire weekend. If necessary, it can also be plugged into a 12 Vdc adapter for extended periods of printing.

It is often necessary to **transfer data to a computer**. This would normally require a serial port and long cables for the connection. HANNA has incorporated a unique system into the **data logging** HI 91610 meter. Infrared lights at the bottom of the meter allow instant transmission of data into the HI 9200 infrared transmitter without cables. The HI 9200 comes complete with an RS232 connector and cable to be connected to a computer.

Besides these models with a capacitive sensor, HANNA presents the new HI 9564 and HI 9565 with resistive sensor. These new hygrometers are ideal for **greenhouse and nursery applications** where temperature ranges are not high and the relative humidity range is narrow. In addition, the probe stores the calibration data and is interchangeable with other hygrometers. HI 9565 also **measures the dew point**.

The HI 8666 compact transmitter can transmit both relative humidity and temperature signals.

HANNA Service

Relative humidity calibration is a very delicate process that requires special equipment and trained personnel. HANNA now offers service contracts for all relative humidity meters. This supplies the user with the confidence that the meter is operating at 100% all of the time.

Ask your dealer or the nearest HANNA office for more details.

Principle of Operation

The measurement system is made up of a meter connected to a probe. The probe measures capacitance, a capacitor with a polymer or plastic dielectric material with a fixed dielectrical constant from 2 to 15. Increased humidity causes the dielectric to dilate, hence distancing the plates with consequent variation of the capacitor's geometry and reduction of its capacitance. These capacitance variations in turn cause a frequency change in the instrument's electronics, resulting in a frequency modulation which is a function of relative humidity. The frequency is then converted into voltage, which is converted into a relative humidity value displayed on the LCD.

The hygrometers precision essentially depends on how insusceptible it is to the following three factors: the first is the "linearity error" caused by the typical non-linearity of RH sensors. HANNA hygrometers compensate for the effects of this error. It is advisable, however, to calibrate the meter periodically to reduce the probability of this error reoccurring.

The second factor is the "temperature error" caused by the variation of the hygroscopic properties of the sensor's dielectric material as a function of temperature. In fact, the ratio between the quantity of water vapor present in the dielectric and the relative humidity is not directly proportional, but varies with temperature.

The third factor is the "calibration error" caused by an incorrect calibration procedure.

There are many "do-it-yourself" calibration kits on the market. Most are made of a receptacle containing two sealed chambers and two different types of salt. It is possible to simulate a particular RH value by filling each chamber with the correct distilled water and salt solution.

Calibration

The RH probe is first immersed in the low RH chamber and allowed to stabilize. The meter is then calibrated at the RH value of the chamber being used. The procedure is repeated with the high RH chamber. Since RH is dramatically affected by temperature changes, kits do not provide accurate calibration due to the practical difficulties in performing the calibration at a constant temperature. Climatic chambers that simulate different humidity levels are the ideal solution to calibrate hygrometers accurately. Hygrometers are also calibrated using two different levels of relative humidity in this calibration procedure, and then the accuracy is checked by simulating other RH values in the chamber.

HANNA service centers are equipped with state-of-the-art calibration chambers to provide for the highest accuracy.

Dew Point

The dew point is defined as the temperature to which air must be cooled in order for condensation (saturation) to occur. The dew point is dependent on the concentration of water vapor present, and therefore, the relative humidity. HI 9565 not only measures relative humidity, but automatically measures and displays the dew point as well.

Printing and Logging Thermo-Hygrometers

Store up to 8,000 Readings

Print and Log Right in the Field

HI 9161 and HI 91610 are advanced portable, printing, thermo-hygrometers. These unique, rugged meters give instant printouts of sample #, date and time of readings, printing interval, relative humidity and temperature at user-selectable intervals. R.H. and temperature measurements have a 0.1 resolution.

HI 91610 combines the high accuracy and portability of HI 9161 with extensive printing and logging features and an infrared RS232 data transfer system.

In addition to supplying the user with R.H. and temperature at the touch of a button, the HI 91610 data logging capabilities store information for transfer to a PC or for retrieval and/or printing at a later date. Sophisticated software allows up to 8,000 readings to maximize available space, regardless of logging interval. The HI 9200 infrared transmitter is available as an optional accessory.

HI 70604/5, RH probe with a 5m (16.5') cable is also available for special applications.

Both models are available in two versions, for °C or °F readings.

- *HI 9200 optional infrared PC transmitter available*
- *Store up to 8,000 readings*
- *Rugged housing*



SPECIFICATIONS		HI 9161C	HI 9161F	HI 91610C	HI 91610F
Range	RH	5.0 to 95.0%	5.0 to 95.0%	5.0 to 95.0%	5.0 to 95.0%
	Temperature	-20.0 to 60.0°C	-4.0 to 140.0°F	-20.0 to 60.0°C	-4.0 to 140.0°F
Resolution		0.1% RH / 0.1°C	0.1% RH. / 0.1°F	0.1% RH / 0.1°C	0.1% RH / 0.1°F
Precision		±2% RH / ±0.4°C	±2% RH. / ±1°F	±2% RH / ±0.4°C	±2% RH / ±1°F
Probes		HI 70604/2 RH probe with 2 m (6.6') cable (included) and HI 762L/2 temperature probe with 2 m (6.6') cable (included)			
RH Calibration		manual, 2-point, through trimmer on the RH probe			
Built-in Printer		low-consumption, plain paper 38 mm (1.5") large (HI 710034)			
Printing Interval		selectable at 1, 2, 5, 10, 15, 30, 60, 120 and 180 minutes			
Logging Interval		—		1, 2, 5, 10, 15, 30, 60, 120, 180 minutes	
PC Connection		—		through serial port RS232 with HI 9200 IR interface	
Power Supply		(4) 1.5V AA batteries/ approx. 500 hours of use (with 60 minutes printing interval); auto-off after 5 minutes of non-use; or 12 Vdc input			
Environment		0 to 50°C (32 to 122°F); RH max 98% non-condensing			
Dimensions		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")			
Weight		550 g (1.2 lbs.)			



Food Industry

Where certain food manufacturing and preservation processes have to be at a specific humidity level.

ORDERING INFORMATION

HI 9161C and **HI 91610C**, RH % and °C readings, are supplied with HI 70604/2 RH probe with 2 m (6.6') cable, HI 762L/2 temperature probe with 2 m (6.6') cable, batteries, paper rolls (5), rugged carrying case and instructions

HI 9161F and **HI 91610F**, RH % and °F readings, are supplied with HI 70604/2 RH probe with 2 m (6.6') cable, HI 762L/2 temperature probe with 2 m (6.6') cable, batteries, paper rolls (5), rugged carrying case and instructions.

ELECTRODES

HI 70604/2 RH probe, 2 m (6.6') cable
HI 70604/5 RH probe, 5 m (16.5') cable
HI 70606/2 RH probe with sintered cap and 2 m (6.6') cable
HI 70606/5 RH probe with sintered cap and 5 m (16.5') cable
HI 762L/2 Temperature probe, 2 m (6.6') cable

ACCESSORIES

HI 7101 Calibration chamber for probes without sintered cap
HI 7102 Calibration chamber for probes with sintered cap
HI 7111/P LiCl RH calibration salts for low humidity calibration, 15 g (6)
HI 7121/P NaCl RH calibration salts for high humidity calibration, 33 g (6)
HI 9200/9 IR interface for PC connection
HI 92000 Windows® compatible software
HI 710034 Paper roll (10)
HI 710035 Ink cartridge (1)
HI 721317 Rugged carrying case

HI 9064 • HI 9065

Rugged Hygrometer

with Water Resistance



Horticulture & Floriculture

Where the growth rate in greenhouses is highly dependent on humidity levels.

Heavy-duty Field Meters

HI 9064 and HI 9065 are heavy-duty hygrometers specifically designed for field applications such as greenhouse management and HVAC systems.

They are housed in a rugged water-resistant case to provide maximum protection in the field.

The relative humidity probe contains a thin-film polymer sensor, which quickly performs all RH readings to 98% accuracy.

The "HOLD" button will instantly freeze the reading on the LCD.

HI 9065 can also measure temperature with an internal sensor in the RH probe from 0 to 60°C as well as 32 to 140°F scales.

You can also connect a separate temperature probe for gas and liquid measurements (HI 765 series).

- *Standard 2 m (6.6') cable allows monitoring in hard to reach areas*
- *"HOLD" key to freeze readings on the display*
- *Rugged housing*
- *Built-in temperature sensor*

SPECIFICATIONS		HI 9064	HI 9065
Range	RH	5.0 to 95.0%	
	Temperature	—	0.0 to 60.0°C (32 to 140°F) up to 150°C (302°F) with HI 765 temperature probe
Resolution	RH	0.1%	
	Temperature	—	0.1°C (1°F)
Accuracy	RH	±2%	
	Temperature	—	±0.4°C (±1°F) (excluding probe error)
RH Calibration		manual, 2-point, through trimmer on the RH probe	
Probe		HI 70608/2, with 2 m (6.6') cable (included)	HI 70605/2, with built-in temperature sensor & 2 m (6.6') cable (included)
Battery Type / Life		(4) 1.5V AA / approx. 500 hours of continuous use	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight		500 g (1.1 lbs.)	

ORDERING INFORMATION

HI 9064 is supplied for HI70608/2 RH probe, 1.5V AA batteries (4) and rugged carrying case.

HI 9065 is supplied with HI70605/2 RH probe, 1.5V AA batteries (4) and rugged carrying case.

ELECTRODES

HI 70608/2 RH probe, 2 m (6.6') cable

HI 70608/5 RH probe, 5 m (16.4') cable

HI 70605/2 RH probe with internal temperature sensor and 2 m (6.6') cable

HI 70605/5 RH probe with internal temperature sensor and 5 m (16.5') cable

HI 7111/P LiCl RH calibration salts for low humidity calibration, 15 g (6)

HI 7121/P NaCl RH calibration salts for high humidity calibration, 33 g (6)

HI 765A Temperature probe for air measurement

ACCESSORIES

HI 7101 Calibration chamber for probes without sintered cap

HI 721317 Rugged carrying case



HI 7101 — Calibration Chamber



HI 7111/P — LiCl Salts

HANNA instruments
With Great Products, Come Great Results™

Data-logging Thermo-Hygrometers

with Dew Point

RH, Temperature and Dew Point on Backlit Display

HI 9564 and HI 9565 are two new portable thermo-hygrometers designed to provide excellent performance in harsh environments and poorly lit areas.

In addition to RH and temperature, HI 9565 will display the dew point with the press of a button. The dew point indicates the presence of water vapor in the air at a given temperature. With this feature HI 9565 permits useful and rapid environmental monitoring where a controlled microclimate is necessary, like greenhouses, museums, clean rooms and laboratories.

HI 7062 RH probe features a built-in microchip that can store calibration data. When the probe is connected to another hygrometer, the microchip transfers the stored calibration data and eliminates the need to recalibrate the instrument.

Both instruments feature auto-off after 20 minutes of inactivity, temperature readings in Celsius and Fahrenheit, and on-line help to indicate anomalies and direct procedures.

- *"HOLD" key to freeze readings on the display*
- *Backlit LCD*
- *Auto shut-off*
- *Built-in temperature sensor*



SPECIFICATIONS		HI 9564	HI 9565
Range	RH	20.0 to 95.0%	20.0 to 95.0%
	Temperature	0.0 to 60.0°C / 32 to 140.0°F	0.0 to 60.0°C / 32 to 140.0°F
	Dew Point	—	-20.0 to 60.0°C / -4.0 to 140.0°F
Resolution	RH	0.1% RH	0.1% RH
	Temperature	0.1°C / 0.1°F	0.1°C / 0.1°F
	Dew Point	—	0.1°C / 0.1°F
Accuracy	RH	±3 % RH (50 to 85 % RH & 15 to 40°C); ±5% RH (outside)	±3 % RH (50 to 85 % RH & 15 to 40°C); ±5% RH (outside)
	Temperature	±0.5°C / ±1°F	±0.5°C / ±1°F
	Dew Point	—	±2°C /±4°F (50 to 85 % RH & 15 to 40°C); ±4.5°C /±9°F (outside)
Probe		HI 70602 RH combined probe with built in temperature sensor and microchip, 1 m cable (included)	
Battery Type / Life		(1) 9V / approx. 250 hours of use; auto-off after 20 minutes of non-use.	
Environment		0 to 60°C (32 to 140°F); RH max 98% non-condensing	
Dimensions		164 x 76 x 45 mm (6.5 x 3 x 1.8")	
Weight		340 g (12 oz.)	



Libraries & Museums

Where the monitoring of humidity levels is essential to guarantee the preservation of works of art.

ORDERING INFORMATION

HI 9564 and **HI 9565** are supplied with HI 70602 RH probe, battery, instruction manual and blue protective case.

ELECTRODES

HI 70602 RH probe with temperature sensor, 1 m (3.3')

HI 93640
Compact Thermo-Hygrometer
with Built-in Sensor



Shown with HANNA's optional protective rubber boot (HI 710008)

One Hand Operation

HI 93640 is a compact, portable and versatile hygrometer that monitors relative humidity, anywhere. This simple-to-use meter is ideal for the HVAC field

The built-in thin-film capacitance sensor assures accurate humidity measurements from 5 to 95% RH with a resolution of 0.1%.

The rubber keypad protects the keyboard from dust and accidental splashes.

A sintered cap can be placed on the sensor shaft for protection in dusty environments. If faster response is desired, the cap can be removed.

Designed to be operated with just one hand, the compact housing fits easily in your palm.

For better instrument protection, use HANNA's optional shockproof rubber boot (shown).

- *Portability and simplicity*
- *Low battery indicator*
- *Dual temperature range*

SPECIFICATIONS		HI 93640
Ranges	RH	5.0 to 95.0%
	Temperature	0.0 to 60.0°C ; 32 to 140°F
Resolution	RH	0.1%
	Temperature	0.1°C; 1°F
Accuracy	RH	±2%
	Temperature	±0.4°C; ±1°F (excluding probe error)
Battery Type / Life		(1) 9V / approx. 100 hours of continuous use
Environment		0 to 50°C; RH max 98% non-condensing
Dimensions		190 x 80 x 38 mm (7.5 x 3.1 x 1.5")
Weight		200 g (7.1 oz.)

ORDERING INFORMATION

HI 93640 is supplied with 9V battery

ACCESSORIES

HI 710011	Probe sintered cap
HI 7102	Calibration chamber for probes with sintered cap
HI 7111/P	LiCl RH calibration salts for low humidity calibration, 15 g (6)
HI 7121/P	NaCl RH calibration salts for high humidity calibration, 33 g (6)
HI 710007	Blue Shockproof rubber boot
HI 710008	Orange Shockproof rubber boot
HI 710031	Rugged carrying case



Heating & Air-Conditioning

In the construction and maintenance of heating and air-conditioning plants.

HANNA instruments

With Great Products, Come Great Results™

Compact and can be used with or without filter

This solid-state transmitter plugs into its wall-mounted receptacle for on-site, continuous monitoring of relative humidity and temperature in critical or controlled environments.

The HI 8666 has an excellent accuracy of ±2% RH and ±1% °C. Each 4-20 mA analog signal can be sent to remote panel meters, controllers or data acquisition systems. The signals are to be powered by separate external voltage sources.

Equipped with a removable sintered cap, the HI 8666 sensor is well protected for the long run against the ingress of dust or unclean environments.

With the sintered cap installed, the life of the sensor and the instrument is prolonged and less maintenance is required. This is ideal in some applications, such as food and industry where reliability rather than response time is the primary objective.

With the sintered cap removed, the sensor's response time is faster but it is no longer protected from dust or debris.

- *Removable sintered metal cap*
- *Dual-range transmitter*
- *Can be quickly removed for maintenance with minimal downtime*





HI 7102 — Calibration Chamber



HI 7111/P — LiCl Salts

SPECIFICATIONS		HI 8666
Range	RH	0% (4 mA) to 100% (20 mA)
	temperature	-20°C (4 mA) to 60°C (20 mA)
Precision	RH	±2% (5% to 95% RH)
	temperature	±1% F.S.
Response Time		6 seconds without sintered cap; 60 seconds with sintered cap
Power Supply		10-30 Vdc
Environment		0 to 60°C
Panel Cutout		73 x 42 mm (2.9 x 1.6")
Dimensions		79 x 49 x 150 mm (3.1 x 1.9 x 5.9")
Weight		150 g (5.3 oz.)

ORDERING INFORMATION

HI 8666 is supplied with sensor protective cap, mounting brackets and instructions

ACCESSORIES

HI 710011 Probe sintered cap

HI 7102 Calibration chamber for probes with sintered cap

HI 7111/P LiCl RH calibration salts for low humidity calibration, 15 g (6)

HI 7121/P NaCl RH calibration salts for high humidity calibration, 33 g (6)

Accessories

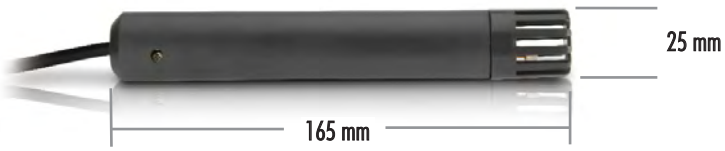
for Relative Humidity

Relative Humidity Probe

HANNA humidity probes utilize a high-tech Thin-Film Polymer Capacitance (TFPC) humidity sensor. This sensor enables rapid response and high accuracy. Several different versions are available for your specific needs.

For rapid response, HANNA recommends a probe with a perforated cap. For industrial environments with dust and powders, HANNA recommends a probe with a sintered cap.



Configuration	Description	
A	ABS body with perforated cap	
B	ABS body with sintered cap	
C	ABS body with perforated cap	

PROBE	CONFIG.	CABLE LENGTH	PROBE LENGTH	CONNECTOR	SENSORS	USED WITH
HI 70601/2	A	2 m (6.6')	165 mm (6.5")	DIN	RH (TFPC) & °C	HI 8064, HI 8564 (included)
HI 70601/5	A	5 m (16.5')	165 mm (6.5")	DIN	RH (TFPC) & °C	HI 8064, HI 8564 (optional)
HI 70602	C	1 m (3.3')	170 mm (6.5")	DIN	RH (resistive) & °C	HI 9564, HI 9565 (included)
HI 70604/2	A	2 m (6.6')	165 mm (6.5")	screw-type	RH (TFPC)	HI 9161, HI 91610 (included)
HI 70604/5	A	5 m (16.5')	165 mm (6.5")	screw-type	RH (TFPC)	HI 9161, HI 91610 (optional)
HI 70605/2	A	2 m (6.6')	165 mm (6.5")	screw-type	RH (TFPC) & °C	HI 9065 (included)
HI 70605/5	A	5 m (16.5')	165 mm (6.5")	screw-type	RH (TFPC) & °C	HI 9065 (optional)
HI 70606/2	B	2 m (6.6')	178 mm (7.0")	screw-type	RH (TFPC)	HI 9161, HI 91610 (optional)
HI 70606/5	B	5 m (16.5')	178 mm (7.0")	screw-type	RH (TFPC)	HI 9161, HI 91610 (optional)
HI 70607/2	B	2 m (6.6')	178 mm (7.0")	screw-type	RH (TFPC) & °C	HI 9065 (optional)
HI 70607/5	B	5 m (16.5')	178 mm (7.0")	screw-type	RH (TFPC) & °C	HI 9065 (optional)
HI 70608/2	A	2 m (6.6')	165 mm (6.5")	screw-type	RH (TFPC)	HI 9064 (included)
HI 70608/5	A	5 m (16.5')	165 mm (6.5")	screw-type	RH (TFPC)	HI 9064 (optional)

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HI 93532 • HI 93532N • HI 93532R

K-Type Thermocouple Thermometers

Dual-Input, Waterproof K-Type

min/max | cal 0°C | audible | backlight | lcd display | B.E.P.S. | hold





HI 710008 Shockproof Rubber Boot

K-type thermocouple probes should be ordered separately to meet your specific application.

Measure 2 Samples at the Same Time

Engineering tests often require two samples to be measured simultaneously. For this reason, HI 93532 has two built-in K-type probe connectors. This advanced meter has a dual-level LCD that shows the current reading along with the high and low temperatures in either channel. You can also see the difference between the two channels simultaneously with the high and low of the difference. Any reading can be frozen on the display for easy recording with the HOLD button.

HI 93532 reads with a resolution of 0.1°C in the range of -149.9 to 999.9°C. This resolution was once only possible in advanced research labs.

For even greater accuracy, the HI 93532N offers all the features of the HI 93532 plus a CAL button allowing simple calibration of the meter and probe with an ice bath at 0°C. HI 93532N also features a backlight for low light conditions.

In addition, the HI 93532R model allows users to send the displayed measurements to a PC or printer through RS232 serial port (once every 2 seconds).

- *Dual ranges*
- *High accuracy + 0.2% Full Scale, excluding probe error*
- *Waterproof casing with ergonomic design*
- *Tactile rubber keys to prevent the ingress of substances*
- *Large dual level LCD displays high and low readings along with current temperature*
- *HOLD button freezes readings on the display*
- *Battery level indicator at startup*
- *Low battery warning with BEPS*
- *Battery life of 500 hours*
- *Backlit Display (HI 93532N and HI 93532R)*
- *Calibration feature (HI 93532N and HI 93532R)*
- *PC and printer compatible (HI 93532R)*

SPECIFICATIONS	HI 93532	HI 93532N	HI 93532R
Range	-200.0 to 999.9°C; 1000 to 1371°C; -328.0 to 999.9°F; 1000 to 2500°F		
Resolution	0.1°C (-149.9 to 999.9°C); 0.2°C (-200.0 to -150.0°C); 1°C (outside) 0.1°F (-24.9 to 999.9°F); 0.2°F (-249.9 to -25.0°F); 0.3°F (-328.0 to -250.0°F); 1°F (outside)		
Accuracy	±0.5°C (-100.0 to 999.9°C); ±1°C (outside); ±1°F (-148.0 to 999.9°F); ±1.5°F (outside) (for 1 year, excluding probe error)		
Probe	K-thermocouple type, HI 766 series (not included)		
CAL Button	N/A	Yes	Yes
Backlit LCD	N/A	Yes	Yes
RS232	N/A	N/A	Yes
Battery Type / Life	(3) 1.5V AA / approx. 500 hours of continuous use (with backlight off); auto-off after 60 minutes of non-use (can be disabled)		
Environment	-10 to 50°C (14 to 122°F); RH max 100%		
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")		
Weight	235 g (8.3 oz.)		

ORDERING INFORMATION

HI 93532, **HI 93532N** and **HI 93532R** are supplied with 1.5V AA alkaline batteries (3) and instruction manual

PROBES

HI 766C Penetration K-type temperature probe with 1 m cable

HI 766D Air K-type temperature probe with 1 m cable

HI 766E1 General purpose K-type temperature probe with 1 m cable

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 710018 Spare protective case

HI 92000 Windows® compatible software

HI 920011 Serial cable for PC connection

HANNA instruments

With Great Products, Come Great Results™

hold | B.E.P.S. | lcd display | backlight | audible | cal 0°C

HI 93530 • HI 93530N

K-Type Thermocouple Thermometers

Waterproof, 0.1° up to 999.9°C/°F

High Accuracy and Resolution Temperature Measurement

HI 93530 and HI 93530N are waterproof thermometers that use a powerful microprocessor to linearize the response of the thermocouple in order to achieve high accuracy and resolution.

These instruments can read with a resolution of 0.1 in the -149.9 to 999.9°C and -24.9 to 999.9°F ranges. These meters are equipped with a HOLD function that freezes the current reading on the LCD. The °C/°F button will change between the Celsius and Fahrenheit ranges; an important feature where measurements are necessary in degrees Celsius as well as Fahrenheit.

HI 93530N has a CAL button to allow the operator to calibrate the meter and probe in an ice bath at 0°C. This will assure the removal of the combined meter and probe interchange error.

In addition to the calibration feature, HI 93530N features a user-activated backlight for low light conditions. Remaining battery power is displayed at startup and a low battery warning and error prevention provides advanced power management to both instruments.

A wide range of thermocouple probes are available for applications such as liquid, air and semisolids.

- *High resolution and accuracy*
- *HOLD button freezes readings on the display*
- *Easily switch between °C and °F*
- *Battery Error Prevention System (BEPS) enabled*



SPECIFICATIONS	HI 93530	HI 93530N
Range	-200.0 to 999.9°C; 1000 to 1371°C; -328.0 to 999.9°F; 1000 to 2500°F	
Resolution	0.1°C (-149.9 to 999.9°C); 0.2°C (-200.0 to -150.0°C); 1°C (outside) 0.1°F (-24.9 to 999.9°F); 0.2°F (-249.9 to -25.0°F); 0.3°F (-328.0 to -250.0°F); 1°F (outside)	
Accuracy	±0.5°C (-100.0 to 999.9°C); ±1°C (outside); ±1°F (-148.0 to 999.9°F); ±1.5°F (outside) (for 1 year, excluding probe error)	
Probe	K-thermocouple type, HI 766 series (not included)	
CAL Button	N/A	Yes
Backlit LCD	N/A	Yes
Battery Type / Life	(3) 1.5V AA / approx. 500 hours of continuous use (with backlight off); auto-off after 60 minutes of non-use (can be disabled)	
Environment	-10 to 50°C (14 to 122°F); RH max 100%	
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")	
Weight	235 g (8.3 oz.)	



HI 710007 Shockproof Rubber Boot

ORDERING INFORMATION

HI 93530 and **HI 93530N** are supplied with 1.5V AA alkaline batteries (3) and iInstruction manual

PROBES

HI 766C Penetration K-type temperature probe with 1 m cable

HI 766D Air K-type temperature probe with 1 m cable

HI 766E1 General purpose K-type temperature probe with 1 m cable

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 710018 Spare protective case

HI 9063

K-Type Thermocouple Thermometer

Waterproof, Heavy-Duty



Designed for Heavy-Duty Applications

Instrumentation used in the field or industry is subject to environmental extremes. Due to this problem, HANNA has developed the HI 9063 to satisfy all of your heavy-duty application needs.

This upgraded version of HI 9063 benefits from HANNA extensive experience in producing instruments that surpass the competition. The measurement ceiling has been raised, auto-ranging added and accuracy enhanced.

Because it is often necessary to know 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.

- *HOLD button freezes readings on the display*
- *View High, Low and Current Readings Simultaneously*
- *Autoranging*
- *Enhanced accuracy*

SPECIFICATIONS	HI 9063 • HI 9063C
Range	-50.0 to 199.9°C; 200 to 1350°C -58.0 to 399.9°F; 400 to 2462°F
Resolution	0.1°C (-50.0 to 199.9°C); 1°C (outside) 0.1°F (-58.0 to 399.9°F); 1°F (outside)
Accuracy	±0.2% F.S. (for 1 year, excluding probe error)
Probe	K-thermocouple type, HI 766 series
Battery Type / Life	(4) 1.5V AA / approx. 2000 hours of continuous use
Environment	-10 to 50°C (14 to 122°F); RH max 100%
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	500 g (1.1 lbs.)

ORDERING INFORMATION

HI 9063 is supplied with batteries (4) and instruction manual.

HI 9063C is supplied with HI 766HD probe handle, HI 766PE1, HI 766PB, HI 766PD probes, batteries, rugged carrying case and instructions.

PROBES

HI 766C	Penetration, K-thermocouple probe with 1 m cable
HI 766E1	General purpose, K-thermocouple probe with 1 m cable

ACCESSORIES

HI 710021	Spare protective case
HI 721317	Rugged carrying case



HI 721317 Rugged Carrying Case

HANNA instruments

With Great Products, Come Great Results™

K-Type Thermocouple Thermometers

Featuring a Wide Measurement Range

Economical Instruments with Advanced Features

HI 9043 is a hand-held thermometer that uses a K-type probe together with an advanced microprocessor to deliver temperature measurements in a wide range. The meter is housed in a rugged ABS case for maximum protection anywhere. The smooth keypad with membrane button will easily wipe clean.

In addition to an extended range and better accuracy, a dual-level LCD will display the highest and lowest temperatures measured in the cycle, while also displaying the current temperature. The HOLD button will guarantee the user as much time as necessary to record the readings. The °C/°F button allows the user to easily switch between the Celsius and Fahrenheit ranges.

At startup, HI 9043 performs a self-check and displays remaining battery life.

A wide variety of interchangeable probes are available for the HI 9043 to meet each specific application.

HI 9044 offers all the features and benefits of HI 9043. The only difference is that a fixed liquid probe is included with this popular thermocouple thermometer.

- *HOLD button freezes readings on the display*
- *View Hi, Low and Current Reading Simultaneously*
- *Switch between °C and °F at the touch of a button*
- *Battery life on display*



SPECIFICATIONS	HI 9043	HI 9044
Range	-50.0 to 1350°C -58.0 to 2462°F	-50.0 to 900°C -58.0 to 1650°F
Resolution	0.1°C (-50.0 to 199.9°C); 1°C (outside) 0.1°F (-58.0 to 399.9°F); 1°F (outside)	
Accuracy	±0.2% F.S. (for 1 year, excluding probe error)	
Probe	K-thermocouple type, HI 766 series (not included)	HI 766E2 (fixed)
Battery Type / Life	(1) 9V / approx. 500 hours of continuous use	
Environment	-10 to 50°C (14 to 122°F); RH max 95%	
Dimensions	180 x 83 x 40 mm (7.1 x 3.3 x 1.6")	
Weight	226 g (8.0 oz.)	



HI 721316 Rugged Carrying Case

ORDERING INFORMATION

HI 9043 is supplied with 9V battery and instruction manual

HI 9044 is supplied with HI 766E2 fixed probe, 9V battery and instruction manual

PROBES

HI 766C	Penetration, K-thermocouple probe with 1 m cable
HI 766E1	General purpose, K-thermocouple probe with 1 m cable

ACCESSORIES

HI 710009	Shockproof rubber boot, blue
HI 710010	Shockproof rubber boot, orange
HI 710020	Spare protective case
HI 721316	Rugged carrying case

HI 8757 • HI 8758

K-Type Thermocouple Thermometers

for Education



Ideal Teaching Tool for Teachers and Students

K-type thermocouple probes are among the most widely used probes for high range temperature measurements. With advancements in technology, we have increased the performance and added features to these popular educational thermometers.

HI 8757 and HI 8758 utilize K-type thermocouple probes to provide temperature measurements in an extended range from -50 to 1350°C or -58 to 2462°F.

Startup battery level indication, 500 hours of battery life and ease of use lend these thermometers perfect for temperature experiments in classrooms. These meters also feature a Battery Error Prevention System (BEPS), durable ABS housings and rugged stainless steel probes making them long lasting, even when used for repeated experiments.

HANNA instruments® offers a wide range of interchangeable K-type thermocouple temperature probes to serve your individual needs.

- *Designed for Educators and Students*
- *Economical and Rugged*
- *Wide range of probes available*
- *Easy to use*

SPECIFICATIONS	HI 8757	HI 8758
Range	-50.0 to 1350°C	-58.0 to 2462°F
Resolution	0.1°C (-50.0 to 199.9°C) 1°C (200 to 1350°C)	0.1°F (-58.0 to 399.9°F) 1°F (400 to 2462°F)
Accuracy	±0.5% F.S. (for 1 year, excluding probe error)	
Probe	K-thermocouple type, HI 766 series (not included)	
Battery Type / Life	(1) 9V / approx. 500 hours of continuous use	
Environment	-10 to 50°C (14 to 122°F); RH max 95%	
Dimensions	180 x 83 x 40 mm (7.1 x 3.3 x 1.6")	
Weight	226 g (8.0 oz)	

ORDERING INFORMATION

HI 8757 and **HI 8758** are supplied with 9V battery and instruction manual

PROBES

HI 766C	Penetration, K-thermocouple probe with 1 m cable
HI 766E1	General purpose, K-thermocouple probe with 1 m cable

ACCESSORIES

HI 710009	Shockproof rubber boot, blue
HI 710010	Shockproof rubber boot, orange
HI 710002	Soft carrying case
HI 721316	Rugged carrying case



HI 721316 Rugged Carrying Case

HANNA instruments®

With Great Products, Come Great Results™

hold | B.E.P.S. | lcd display | backlight | audible | cal 0°C

HI 93551 • HI 93551N • HI 93551R

Waterproof K, J, T-Type Thermocouple Thermometers

Switch Between K-J-T-Types with One Meter

It is often necessary to take temperature measurements with different types of thermocouples (K-J-T). Equipped with a button that switches between K-type, J-type or T-type thermocouples, these meters offer the exact versatility and reliablility needed in the field. These instruments can read with a resolution of 0.1 in an extended range of -149.9 to 999.9°C or -24.9 to 999.9°F. These meters are also equipped with a dual-level LCD that shows measured high and low temperatures along with the current reading. To freeze the display for easy recording, simply press the HOLD button. A °C/°F button will toggle between Celsius and Fahrenheit. These instruments have a low battery warning feature and a Battery Error Prevention System (BEPS).

For even greater accuracy, HI 93551N features a CAL button to allow you to calibrate the meter and probe in an ice bath at 0°C. This will assure the removal of the combined meter and probe interchange error.

HI 92551R also features RS232 output for transferring measurements (once every second) to devices with RS232 input (PC or printer).

- *Will accept K, J, T thermocouples and linearize each of the different ranges*
- *High accuracy*
- *Waterproof casing*
- *Tactile rubber keys*
- *Large dual level LCD displays high and low readings along with current temperature*
- *Battery level indicator at startup*
- *HOLD button to freeze display*
- *Low battery warning with BEPS*
- *Long battery life of 500 hours*
- *Optional rubber boots available*
- *Backlit Display (HI 93551N and HI 93551R)*
- *Calibration feature (HI 93551N and HI 93551R)*
- *PC and printer compatible (HI 93551R)*



SPECIFICATIONS		HI 93551	HI 93551N	HI 93551R
Range	K	-200.0 to 999.9°C and 1000 to 1371°C; -328.0 to 999.9°F and 1000 to 2500°F		
	J	-200.0 to 999.9°C; -328.0 to 999.9°F and 1000 to 1832°F		
	T	-200.0 to 400.0°C; -328.0 to 752.0°F		
Resolution	K	0.1°C (-149.9 to 999.9°C); 0.2°C (-200.0 to -150.0°C); 1°C (1000 to 1371°C); 0.1°F (-24.9 to 999.9°F); 0.2°F (-249.9 to -25.0°F); 0.3°F (-328.0 to -250.0°F); 1°F (1000 to 2500°F)		
	J	0.1°C (-200.0 to 999.9°C); 0.1°F (-149.9 to 999.9°F); 0.2°F (-328.0 to -150.0°F); 1°F (1000 to 1832°F)		
	T	0.1°C (-149.9 to 400.0°C); 0.2°C (-200.0 to -150.0°C); 0.1°F (0.0 to 752.0°F); 0.2°F(-270.0 to -0.1°F); 0.3°F (-328.0 to -270.1°F)		
Accuracy		±0.5°C (-100.0 to 999.9°C); ±1°C (outside); ±1°F (-148.0 to 999.9°F); ±1.5°F (outside) (for 1 year, excluding probe error)		
Probe		K-thermocouple type, HI 766 series (not included)		
CAL Button		N/A	Yes	Yes
Backlit LCD		N/A	Yes	Yes
RS232		N/A	N/A	Yes
Battery Type / Life		(3) 1.5V AA / approx. 500 hours of continuous use (with backlight off); auto-off after 60 minutes of non-use (can be disabled)		
Environment		-10 to 50°C (14 to 122°F); RH max 100%		
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 235 g (8.3 oz.)		

ORDERING INFORMATION

HI 93551 is supplied with 9V battery and instruction manual

HI 93551N is supplied complete with batteries, protective case and instructions

HI 93551R is supplied complete with batteries, protective case and instructions

PROBES

HI 766C Penetration K-type temperature probe with 1 m cable

HI 766D Air K-type temperature probe with 1 m cable

HI 766E1 General purpose K-type temperature probe with 1 m cable

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 710018 Spare protective case

HI 92000 Windows® compatible software

HI 920011 Serial cable for PC connection

HI 93542 • HI 93552 • HI 93552R

K, J, T-Type Thermocouple Thermometers

Dual-Channel, Waterproof

average | min/max | cal 0°C | audible | backlight | lcd display | B.E.P.S. | hold



SPECIFICATIONS		HI 93542	HI 93552	HI 93552R
Range	K	-200.0 to 999.9°C and 1000 to 1371°C; -328.0 to 999.9°F and 1000 to 2500°F		
	J	-200.0 to 999.9°C; -328.0 to 999.9°F and 1000 to 1832°F		
	T	-200.0 to 400.0°C; -328.0 to 752.0°F		
Resolution	K	0.1°C (-149.9 to 999.9°C); 0.2°C (-200.0 to -150.0°C); 1°C (1000 to 1371°C); 0.1°F (-24.9 to 999.9°F); 0.2°F (-249.9 to -25.0°F); 0.3°F (-328.0 to -250.0°F); 1°F (1000 to 2500°F)		
	J	0.1°C (-200.0 to 999.9°C); 0.1°F (-149.9 to 999.9°F); 0.2°F (-328.0 to -150.0°F); 1°F (1000 to 1832°F)		
	T	0.1°C (-149.9 to 400.0°C); 0.2°C (-200.0 to -150.0°C); 0.1°F (0.0 to 752.0°F); 0.2°F(-270.0 to -0.1°F); 0.3°F (-328.0 to -270.1°F)		
Accuracy		±0.5°C (-100.0 to 999.9°C); ±1°C (outside); ±1°F (-148.0 to 999.9°F); ±1.5°F (outside) (for 1 year, excluding probe error)		
Probe		K-thermocouple type, HI 766 series (not included)		
CAL Button		N/A	Yes	Yes
Backlit LCD		N/A	Yes	Yes
RS232		N/A	N/A	Yes
Battery Type / Life		(3) 1.5V AA / approx. 500 approx. 500 hours of continuous use (with backlight off); auto-off: after 60 minutes of non-use (HI 93542); selectable after 8 or 60 minutes of non-use (HI 93552) (can be disabled for all models)		
Environment		-10 to 50°C (14 to 122°F); RH max 100%		
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 235 g (8.3 oz.)		

ORDERING INFORMATION

HI 93542 is supplied with batteries, protective case and instructions

HI 93552 is supplied with batteries, protective case and instructions

HI 93552R is supplied with batteries, protective case and instructions

PROBES

HI 766C Penetration K-type temperature probe with 1 m cable

HI 766D Air K-type temperature probe with 1 m cable

HI 766E1 General purpose K-type temperature probe with 1 m cable

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 710018 Spare protective case

HI 92000 Windows® compatible software

HI 920011 Serial cable for PC connection

Professional Grade K, J, T Thermometers

HI 93542 and HI 93552 are dual-channel, waterproof K, J and T-type thermocouple professional grade thermometers that will switch between thermocouple types and linearize the readings taken with each.

These thermometers offer a resolution of 0.1° from -149.9 to 999.9°C and from -24.9 to 999.9°F. At any time, you can switch views to see all, continuously updated information on either channel. Current temperature can be shown along with the high, low or average values. The current or average differences between channels is displayed with the temperature at both probes or the high/low of the difference. A HOLD button freezes the display for easy recording. Users can set a relative temperature at each channel and then see the variance from that reference point.

HI 93552 allows auto-calibration at 0°C in a simple ice bath. HI 93552 can also store a reading, has selectable auto-off and a backlight for low light conditions. All features are performed with a single handed operation.

In addition, the HI 93552R model allows users to send the displayed measurement to a PC or printer through an RS232 serial port (once every 2 seconds).

- *Will accept K, J, T thermocouples and linearize each of the different ranges*
- *High accuracy*
- *Waterproof casing*
- *Tactile rubber keys*
- *Large dual level LCD displays high and low readings along with current temperature*
- *Battery level indicator at startup*
- *HOLD button to freeze display*
- *Low battery warning with BEPS*
- *Long battery life of 500 hours*
- *Optional rubber boots available*
- *Backlit Display (HI 93552N and HI 93552R)*
- *Calibration feature (HI 93552N and HI 93552R)*
- *PC and printer compatible (HI 93552R)*

K, J, T-Type Printing and Logging Thermocouple Thermometers

Printing and Logging Thermometers with Computer Connection

Featuring Log-on-demand and Supports up to 4 Probes at Once

HI 98801 and HI 98804 thermometers combine on the spot printing with high accuracy and fast response time. An extensive logging feature and infrared computer transfer system are utilized for later storage, recall and study.

These meters support K, J or T-thermocouple probes, one for HI 98801 and up to 4 for HI 98804.

All stored measurements include date, time, sample and probe number. Measurements can be stored automatically at defined intervals (user-selectable from 1 to 180 minutes), or the current reading can be printed or logged-on-demand by just pressing a button.

The backlit LCD allows operations even in poorly lit areas.

PC connection is made through the HI 9200 infrared interface and serial port via HI 92000 application software to transfer all logged data.

Both models can be powered with batteries or 12 Vdc input.

HANNA produces a wide range of K-type thermocouple probes that can be used with this thermometer (HI 766 series).

- *Print an indisputable record of your measurements*
- *Selectable printing and logging intervals*
- *Connect 4 separate probes simultaneously (HI 98804)*
- *Optional computer compatibility with HANNA's HI 92000 Windows® compatible software and HI 9200/9 infrared interface cradle*



HI 710034 Paper Rolls



SPECIFICATIONS		HI 98801	HI 98804
Range	K	-200.0 to 999.9°C; 1000 to 1370°C; -300.0 to 999.9°F; 1000 to 2500°F	
	J	-200.0 to 760.0°C; -300.0 to 999.9°F; 1000 to 1400°F	
	T	-200.0 to 400.0°C; -300.0 to 750.0°F	
Resolution	K	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)	
	J	0.1°C (-149.9 to 760.0°C); 0.2°C (-200.0 to -150.0°C); 0.1°F (32.0 to 999.9°F); 1°F (1000 to 1400°F); 0.2°F (-300.0 to 32.0°F)	
	T	0.1°C (-99.9 to 400.0°C); 0.2°C (-200.0 to -100.0°C); 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)	
Accuracy		±0.5°C (-200.0 to 999.9°C); ±1°C (outside); ±1°F (for 1 year, excluding probe error)	
Channels		1	4
Probe		K, J, T-type thermocouple (not included)	
Cold Junction		NTC 10 K; 0.1°C resolution; ±0.3°C accuracy	
Printer		low power impact, 14 characters per line, using 38 mm plain paper (HI 710034)	
Printing/Logging Interval		selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes	
PC Connection		HI 9200 interface through RS232 serial port and using HI 92000 software (not included)	
Power Supply		(4) 1.5V AA battery / approx. 350 hours (without printing and backlight); auto-off selectable after 5, 10, 15, 30, 45 or 60 minutes of non-use; 12 Vdc input	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight		550 g (1.2 lbs.)	

ORDERING INFORMATION

HI 98801 and **HI 98804** are supplied with AA size alkaline batteries (4), instruction manual, paper rolls (5) and rugged carrying case

PROBES

HI 766C	Penetration, K-type temperature probe with 1 m cable
HI 766E1	General purpose, K-type temperature probe with 1 m cable

ACCESSORIES

HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 710034	Paper roll (10)
HI 710035	Ink cartridge (1)
HI 9200/9	Serial interface for PC connection
HI 92000	Windows® compatible software
HI 721317	Rugged carrying case

HI 98701 • HI 98704

K, J, T-Type Printing Thermocouple Thermometers

Printing Thermometers



GLP capabilty and Backlit LCD

It is often desirable to measure high temperature ranges without compromising resolution and accuracy. For this purpose, HANNA has developed the HI 98701 single channel and the HI 98704 four channel, K, J, T-type thermocouple, printing thermometers.

A built-in printer makes it possible to obtain a hard copy of your temperature measurements taken on 1, 2, 3, or even 4 channels, at selectable intervals. This means you can leave the meter unsupervised to record your readings and not have to worry about human errors in repeated, prolonged testing.

The meters incorporate the latest in GLP (Good Laboratory Practice) technology. At the touch of a button, you can retrieve the date and the details of the last calibration.

A host of default parameters are user-adjustable. For example, you can set a prompt for recalibration, or vary the auto-off settings. The low-power printer uses plain, non-fading printer paper that is widely available. For extended time measurements, the meters can be powered with 12 Vdc. The large backlit LCD allows readings from nearly any angle and in dimly lit conditions.

HANNA offers a wide range of K-thermocouple probes to meet your specific application (HI 766 series).

- *Print an indisputable record of your measurements*
- *Selectable printing intervals*
- *Connect 4 separate probes simultaneously (HI 98704)*

SPECIFICATIONS		HI 98701	HI 98704
Range	K	-200.0 to 999.9°C; 1000 to 1370°C; -300.0 to 999.9°F; 1000 to 2500°F	
	J	-200.0 to 760.0°C; -300.0 to 999.9°F; 1000 to 1400°F	
	T	-200.0 to 400.0°C; -300.0 to 750.0°F	
Resolution	K	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)	
	J	0.1°C (-149.9 to 760.0°C); 0.2°C (-200.0 to -150.0°C); 0.1°F (32.0 to 999.9°F); 1°F (1000 to 1400°F); 0.2°F (-300.0 to 32.0°F)	
	T	0.1°C (-99.9 to 400.0°C); 0.2°C (-200.0 to -100.0°C); 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)	
Accuracy		±0.5°C (-200.0 to 999.9°C); ±1°C (outside); ±1°F (for 1 year, excluding probe error)	
Channels		1	4
Probe		K, J, T-type thermocouple (not included)	
Cold Junction		NTC 10 K; 0.1°C resolution; ±0.3°C accuracy	
Printer		low power impact, 14 characters per line, using 38 mm plain paper (HI 710034)	
Printing Interval		selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes	
Power Supply		(4) 1.5V AA battery / approx. 350 hours (without printing and backlight); auto-off selectable after 5, 10, 15, 30, 45 or 60 minutes of non-use; or 12 Vdc input	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight		550 g (1.2 lbs.)	

ORDERING INFORMATION

HI 98701 and **HI 98704** are supplied with AA size alkaline batteries (4), instruction manual, paper rolls (5) and rugged carrying case

PROBES

HI 766C Penetration, K-type temperature probe with 1 m cable

HI 766D Air, K-type temperature probe with 1 m cable

HI 766E1 General purpose, K-type temperature probe with 1 m cable

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 710034 Paper roll (10)

HI 710035 Ink cartridge (1)

HI 710031 Rugged carrying case



HI 710031 Rugged Carrying Case

HANNA instruments

With Great Products, Come Great Results™

HI 766Px Series, Probes with Detachable Handle

HI 766Px series are K-type thermocouple temperature probes to be used with thermocouple thermometers. These probes are ideal for measuring samples at very high temperatures, such as in industrial applications.

All probes are made with stainless steel for long life and easy cleaning. The HI 766Px series includes a wide range of probes for measurement of liquids, air, gas, penetration in semisolids, as well as curved, planed or hard-to-reach surfaces. In addition, models are available with interchangeable or fixed handles for maximum versatility.



HI 766HD, Probe Interchangeable Handle

A rugged, PVC handle with a 1 meter (3.3') cable. It is provided with a female connector, which allows the connection of any HI 766Px probe.

HI 766EX, Extension Cable

Coiled cable which extends by 1 meter (3.3') the probe cable, with two connectors at the two ends (1 male and 1 female).

HI 766PA, Roller Surface Probe

This probe is designed to measure the temperature of convex surfaces.

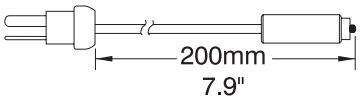


HI 766PA

Application	convex surfaces, moving rollers
Max Temperature	320°C (600°F)
Response Time (90% of final value)	7 seconds
Probe Length	280 mm (11')
Probe	stainless steel

HI 766PB, Surface Probe

Temperature probe for measurements on surfaces.





HI 766PB

Application	hot solids, furnaces, molds
Max Temperature	650°C (1200°F)
Response Time (90% of final value)	8 seconds
Probe Dimensions	L 200 mm x dia 16 mm (7.9 x 0.6")
Probe	stainless steel

Thermometers

An introduction to HANNA Thermometers

Temperature Measurement

About Thermometers

Precise process control is one of the most important factors in maintaining high quality in production, just as precision and accuracy are the key to research. Temperature is one of the most important variables today, in research, as well as in production. Up to a few decades ago, thermometers had remained virtually unchanged. They were mainly either glass or dial/metal type.

Glass and metal thermometers use thermal expansion to measure temperature. This method uses a physical law which gives a false sense of reliability. One assumes the measurement is "true" because he or she can see how it works. This system is no longer suitable for many reasons. Their accuracy and range are very limited. The glass construction is fragile and can be dangerous to a persons health, as well as to the environment. For these reasons, an alternative way of measuring temperature has become necessary.

Electronic thermometers have provided the versatility reqyuested by operators in all areas of temperature measurement. Speed is important when reactions being monitored are changing rapidly. Small compact sensors are preferable for tightly arranged areas, such as electronics and other miniature applications. Electronic thermometers allow users to monitor maximum, minimum and even average temperatures. Mechanical stress is no longer a worry with an electronic thermometer. Field measurements can be very harsh. Rain, cold, dust and other natural obstacles are overcome with our rugged instruments.

In order to meet all the requirements users request, special care is needed. Dedicated research teams, precision process control, integrated production facilities and an overall team effort is required. HANNA has all the prerequisites necessary to accomplish this sush as local sales offices with customer assistance that respond to the customer's needs immediately and products ranging from waterproof to logging in multiple channels. HANNA's extensive professional thermometer line constitute's the true dedication HANNA commits to thermometer design and production.





Measurement Unit

Temperature is one of the most common physical properties in our everyday life. It is defined as the property of a body that determines the transfer of heat to or from other bodies. Physically, temperature affects variations in the macroscopic parameters of a body such as volume and pressure, among others.

The fundamental temperature scale is the absolute, thermodynamic or Kelvin scale. The Kelvin (K) is defined as the fraction 1/273.15 of the thermodynamic temperature of the triple point of water. The triple point of water is a standard fixed point at which ice, liquid water, and water vapor are in equilibrium.

Two empirical temperature scales are in common use: the Celsius and the Fahrenheit scales. These scales are based on two fixed points.

The Celsius (formally Centigrade) temperature scale uses the Celsius (°C) units, defined as 1/100th fraction of the difference between the temperature of boiling (100 °C) and freezing points (0 °C) of water. The relationship between the Kelvin and Celsius scales is given by:

$$K = °C + 273.15$$

The Fahrenheit scale uses Fahrenheit (°F) units, where the temperature of boiling water is taken of 212 °F, and the temperature of the freezing point at 32 °F. The scale originally used the temperature of a mixture of ice and common salt as 0 °F, and the inventor's body temperature as 96 °F. The relationship between the Fahrenheit and Celsius scales is calculated by:

$$°F = 9/5\ °C + 32$$

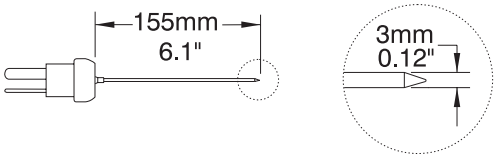
HI 766

HI 766 K-Type Thermocouple Probes



HI 766PC, Penetration Probe

K-type thermocouple probe with sharp tip for penetration of semi solid samples.

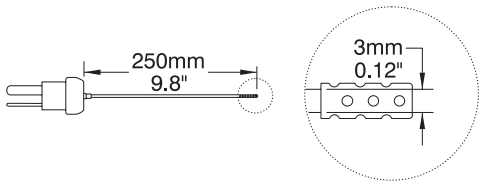


SPECIFICATIONS	HI 766PC
Application	semi solids, meat, rubber
Max Temperature	900°C (1650°F)
Response Time (90% of final value)	15 seconds
Probe Dimensions	L 155 mm x dia 3 mm (6.1 x 0.12")
Probe	stainless steel



HI 766PD, Probe for Air and Gas

K-type thermocouple probe for measuring the temperature of air and gases.

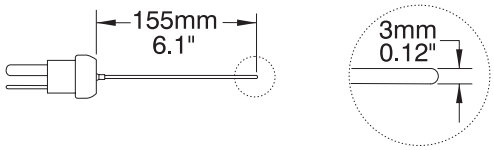


SPECIFICATIONS	HI 766PD
Application	air, gases
Max Temperature	300°C (570°F)
Response Time (90% of final value)	20 seconds
Probe Dimensions	L 250 mm x dia 3 mm (9.8 x 0.12")
Probe	stainless steel



HI 766PE1, General Purpose Probe

General purpose, penetration probe.

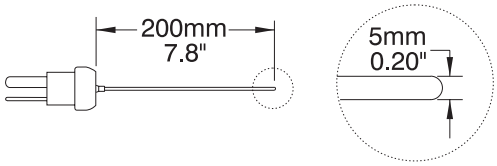


SPECIFICATIONS	HI 766PE1
Application	liquids, air, gases
Max Temperature	900°C (1650°F)
Response Time (90% of final value)	6 seconds
Probe Dimensions	L 155 mm x dia 3 mm (6.1 x 0.12")
Probe	stainless steel



HI 766PE2, General Purpose Probe

General purpose, penetration probe.



SPECIFICATIONS	HI 766PE2
Application	liquids, air, gases
Max Temperature	900°C (1650°F)
Response Time (90% of final value)	6 seconds
Probe Dimensions	L 200 mm x dia 5 mm (7.8 x 0.2")
Probe	stainless steel

HI 766 K-Type Thermocouple Probes

with Integral Handle, 1 Meter (3.3') Cable and Mini-connector

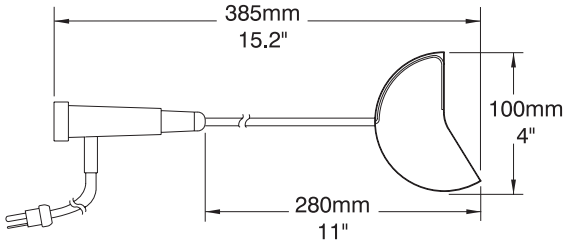


The HI 766 stainless steel probes with fixed handle, are available with different shapes to facilitate temperature measurements of various surfaces and materials.

In these pages, the whole range is presented, as well as the specific field of application of each model.

HI 766A, Roller Surface Probe

This probe is designed to measure the temperature of convex surfaces.

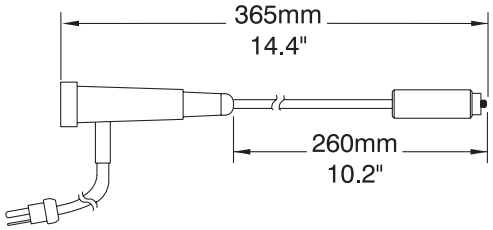




SPECIFICATIONS	HI 766A
Application	convex surfaces, moving rollers
Max Temperature	320°C (600°F)
Response Time (90% of final value)	7 seconds
Probe Length	280 mm (11')
Probe	stainless steel

HI 766B, Surface Probe

Temperature probe for measurements on surfaces.





SPECIFICATIONS	HI 766B
Application	hot solids, furnaces, molds
Max Temperature	650°C (1200°F)
Response Time (90% of final value)	8 seconds
Probe Dimensions	L 200 mm x dia 16 mm (7.9 x 0.6")
Probe	stainless steel

HI 766

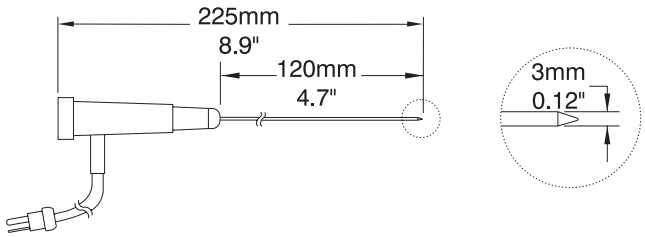
HI 766 K-Type Thermocouple Probes

with Integral Handle, 1 Meter (3.3') Cable and Mini-connector



HI 766C, Penetration Probe

K-type thermocouple probe with sharp tip for penetration of semi solid samples.

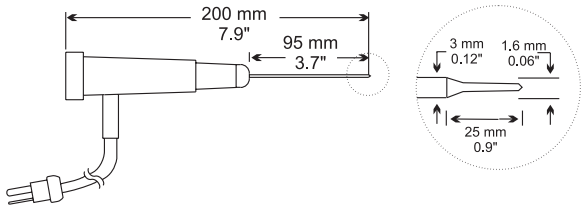


SPECIFICATIONS	HI 766C
Application	semi solids, meat, rubber
Max Temperature	900°C (1650°F)
Response Time (90% of final value)	15 seconds
Probe Dimensions	L 155 mm x dia 3 mm (6.1 x 0.12")
Probe	stainless steel



HI 766C1, Ultra-Fast Penetration Probe

Penetration probe with fast response time

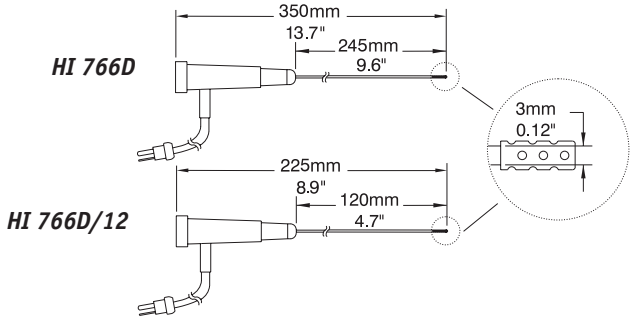


SPECIFICATIONS	HI 766C1
Application	semi solids, food
Max Temperature	300°C (570°F)
Response Time (90% of final value)	4 seconds
Probe Dimensions	L 95 mm x dia 1.6 mm (3.7 x 0.06")
Probe	stainless steel



HI 766D and HI 766D/12, Probes for Air and Gas

K-type thermocouple probe for measuring the temperature of air and gases.



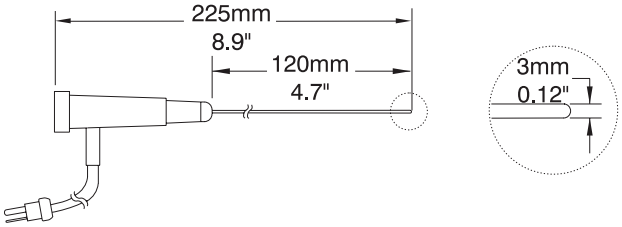
SPECIFICATIONS	HI 766D	HI 766D/12
Application	air, gases	
Max Temperature	300°C (570°F)	
Response Time (90% of final value)	20 seconds	
Dimensions	L 245 mm x dia 3 mm (9.6 x 0.12")	L 120 mm x dia 3 mm (4.7 x 0.12")
Probe	stainless steel	

HI 766 K-Type Thermocouple Probes

with Integral Handle, 1 Meter (3.3') Cable and Mini-connector

HI 766E1, General Purpose Probe

General purpose, penetration probe.

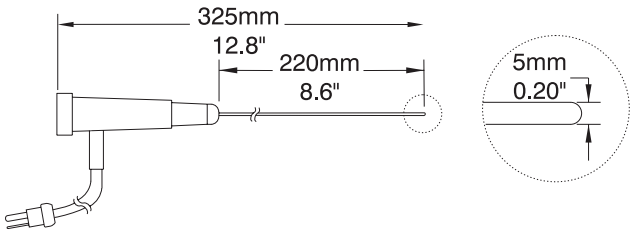




SPECIFICATIONS	HI 766E1
Application	liquids, air, gases
Max Temperature	900°C (1650°F)
Response Time (90% of final value)	6 seconds
Probe Dimensions	L 120 mm x dia 3 mm (4.7 x 0.12")
Probe	stainless steel

HI 766E2, General Purpose Probe

General purpose, penetration probe

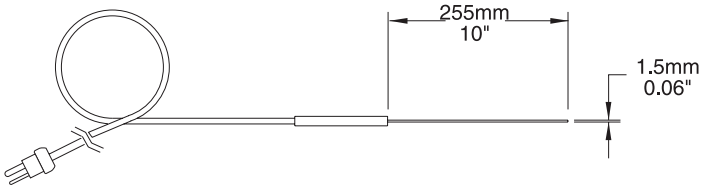




SPECIFICATIONS	HI 766E2
Application	liquids, air, gases
Max Temperature	900°C (1650°F)
Response Time (90% of final value)	6 seconds
Probe Dimensions	L 220 mm x dia 5 mm (8.5 x 0.2")
Probe	stainless steel

HI 766F, High Temperature Probe

Probe with flexible sheath without handle, designed to measure high temepratures.





SPECIFICATIONS	HI 766F
Application	high temperature
Max Temperature	1100°C (2000°F)
Response Time (90% of final value)	4 seconds
Probe Dimensions	L 255 mm x dia 1.5 mm (10 x 0.06")
Probe	stainless steel AISI 316

HI 766

HI 766 K-Type Thermocouple Probes

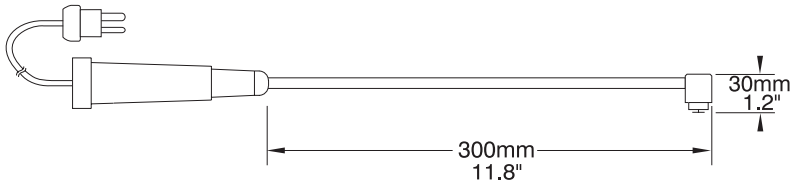
for Specific Applications

These probes are designed to ensure optimal contact with surfaces of different shapes and dimensions.

When using these probes, the handle temperature must never exceed 150°C (302°F), to avoid possible damage to the probe.

HI 766B1, 90° Angle Surface Probe

Probe for measuring the temperature of 90° angle surfaces.

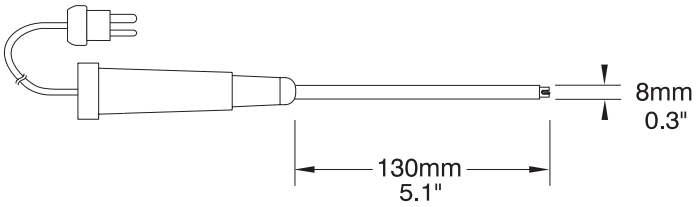




SPECIFICATIONS	HI 766B1
Application	hard-to-reach surfaces
Max Temperature	450°C (840°F)
Response Time (63.2% F.S.)	8 seconds
Probe Length	300 mm (11.8")
Probe	stainless steel
Sensor	spring-loaded

HI 766B2, Surface Probe

Probe for measuring the temperature of round surfaces.





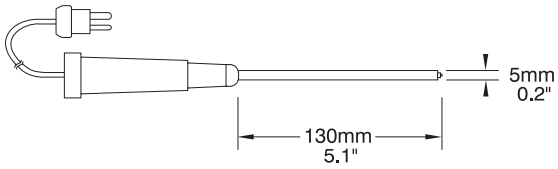
SPECIFICATIONS	HI 766B2
Application	solids, furnaces, molds
Max Temperature	900°C (1650°F)
Response Time (63.2% F.S.)	3 seconds
Probe Dimensions	L 130 mm x dia 8 mm (5.1 x 0.3")
Probe	stainless steel
Sensor	spring-loaded

HI 766 K-Type Thermocouple Probes

for Specific Applications

HI 766B3, Small Surface Probe

Probe for measuring the temperature of small surfaces.

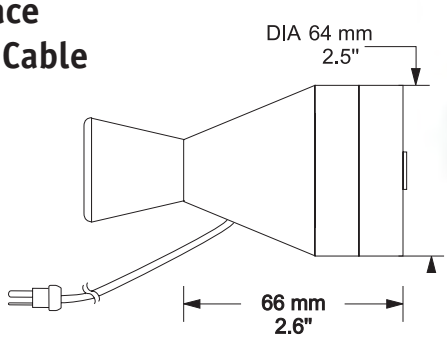




SPECIFICATIONS	HI 766B3
Application	small surfaces
Max Temperature	200°C (390°F)
Response Time (63.2% F.S.)	6 seconds
Probe Dimensions	L 130 mm x dia 5 mm (5.1 x 0.2")
Probe	stainless steel, insulated tube
Sensor	spring-loaded

HI 766B4, Grill Surface Probe with Jacketed Cable

Probe for measuring the temperature of hot grill surfaces.



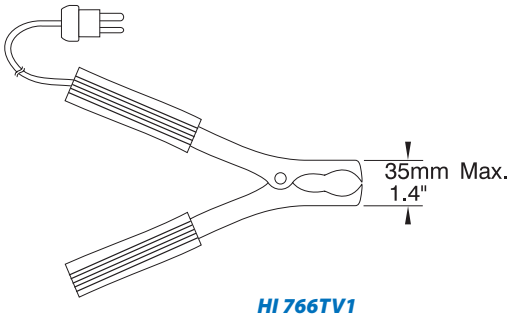


SPECIFICATIONS	HI 766B4
Application	hot grills for food cooking
Max Temperature	250°C (482°F)
Response Time (63.2% F.S.)	6 seconds
Probe Dimensions	L 66 mm x dia 64 mm (2.6 x 2.5")
Sensor	Teflon® contact surface with replaceable stainless steel sensor (HI 7664B4S)
Cable	70 cm (27.6") length, protected with stainless steel jacket



HI 766TV1, Pipe Clamp Probe

Probe for measuring the temperature of pipes and tubes.





SPECIFICATIONS	HI 766TV1
Application	pipes, tubes
Max Temperature	200°C (390°F)
Response Time (63.2% F.S.)	8 seconds
Clamp Opening Diameter	max 35 mm (1.4")
Sensor	housed inside the clamp

HI 766

HI 766 K-Type Thermocouple Probes

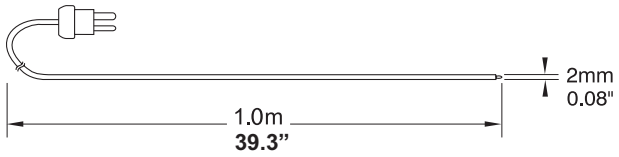
for Specific Applications

HI 766F1, Wire Temperature Probe

Wire probe, designed to access hard-to-reach places.

Probe does not incorporate a handle.



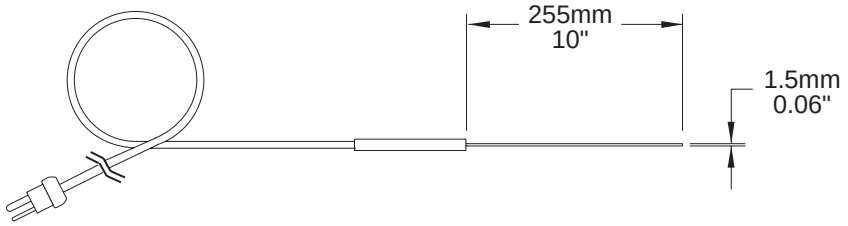


SPECIFICATIONS	HI 766F1
Application	hard to reach areas
Max Temperature	480°C (900°F)
Response Time (63.2% F.S.)	1 second
Wire Length	1 m (3.3’)
Probe Dimensions	dia 2 mm (0.08”)
Sensor	exposed wires

HI 766Z, Wire Temperature Probe

Wire probe, designed to measure temperature inside ovens.



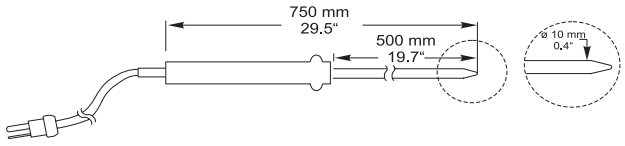


SPECIFICATIONS	HI 766Z
Application	ovens
Max Temperature	1100°C (2000°F)
Response Time (90% of final value)	4 seconds
Wire Length	1.7 m (5.6’)
Probe Dimensions	L 255 mm x dia 1.5 mm (10 x 0.06”)
Sensor	stainless steel

HI 766TR1, Penetration Probe

K-type thermocouple probe with sharp tip for penetration of semi solid samples.





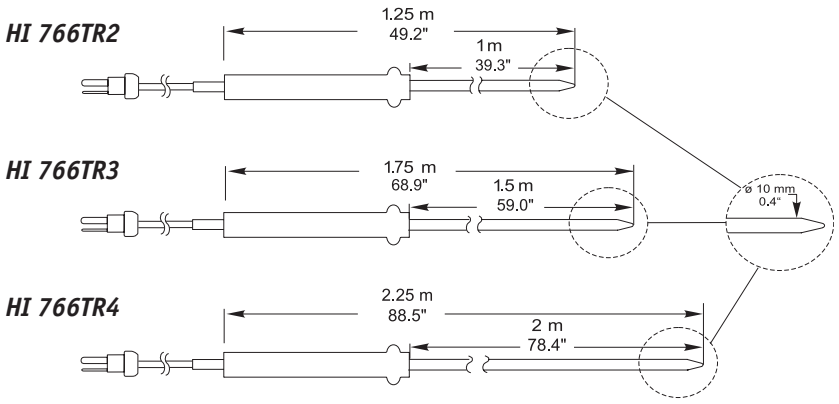
SPECIFICATIONS	HI 766TR1
Application	semi solids, liquids
Max Temperature	250°C (482°F)
Response Time (90% of final value)	10 seconds
Probe Dimensions	L 500 mm x dia 10 mm (19.7 x 0.4”)
Sensor	stainless steel

HI 766 K-Type Thermocouple Probes

for Specific Applications

HI 766TR2, HI 766TR3, HI 766TR4, Penetration Probes

K-type thermocouple probes with sharp tip for penetration of semi solid samples.





HI 766TR2, HI 766TR3, HI 766TR4

Application	semisolids, liquids
Max Temperature	250°C (482°F)
Response Time (90% of final value)	10 seconds
Probe Length	HI 766TR2: 1 m / HI 766TR3: 1.5 m / HI 766TR4: 2 m
Probe	stainless steel



HI 766 Series of K-Type Temperature Probes

HI 766A	Roller surface probe with integral handle and 1 m (3.3') cable
HI 766B	Surface probe with integral handle and 1 m (3.3') cable
HI 766B1	90° angle surface probe with integral handle and 1 m (3.3') cable
HI 766B2	Surface probe with integral handle and 1 m (3.3') cable
HI 766B3	Small surface probe with integral handle and 1 m (3.3') cable
HI 766B4	Grill surface probe with 1 m (3.3') cable
HI 766C	Penetration probe with integral handle and 1 m (3.3') cable
HI 766C1	Ultra-fast penetration probe with integral handle and 1 m (3.3') cable
HI 766D	Air/gas probe with integral handle and 1 m (3.3') cable; probe length of 24.5 cm
HI 766D/12	Air/gas probe with integral handle and 1 m (3.3') cable; probe length of 12 cm
HI 766E1	General purpose probe with integral handle and 1 m (3.3') cable; length of 12 cm
HI 766E2	General purpose probe with integral handle and 1 m (3.3') cable; length of 22 cm
HI 766EX	Coiled extension cable to add 1 m length to the probe cable; provided with thermocouple connectors (a male at one end and a female at the other). Can be used with any K-type thermocouple thermometer.
HI 766F	High temperature probe with flexible sheath
HI 766F1	Wire probe, 1 m (3.3')
HI 766PA	Roller surface probe without handle
HI 766PB	Surface probe without handle
HI 766PC	Penetration probe without handle
HI 766PD	Air/gas probe without handle
HI 766PE1	General purpose probe without handle; probe length of 15.5 cm
HI 766PE2	General purpose probe without handle; probe length of 20 cm
HI 766TR1	Penetration probe with integral handle; probe length of 0.50 m
HI 766TR2	Penetration probe with integral handle; probe length of 1 m
HI 766TR3	Penetration probe with integral handle; probe length of 1.5 m
HI 766TR4	Penetration probe with integral handle; probe length of 2 m
HI 766TV1	Pipe clamp probe with 1 m (3.3') cable
HI 766Z	Wire probe for ovens



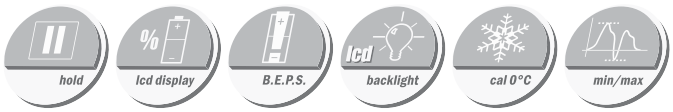




HI 93510 • HI 93510N

Thermistor Thermometers

Waterproof with Interchangeable Probes





HI 762 Test Keys

SPECIFICATIONS	HI 93510	HI 93510N
Range	-50.0 to 150.0°C; -58.0 to 302.0°F	
Resolution	0.1°C; 0.1°F (-58.0 to 230.0°F) and 0.2°F (outside)	
Accuracy	±0.4°C; ±0.8°F (for 1 year, excluding probe error)	
Probe	I 762BL stainless steel probe with 1 m (3.3') cable (included)	
CAL Button	N/A	Yes
Backlit LCD	N/A	Yes
Battery Type / Life	(3) 1.5V AA / approx. 2000 hours of continuous use (with backlight off); HI 93510 only: auto-off selectable after 8 or 60 minutes of non-use (can be disabled)	
Environment	-10 to 50°C (14 to 122°F); RH max 100%	
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")	
Weight	235 g (8.3 oz.)	

ORDERING INFORMATION

HI 93510 and **HI 93510N** are supplied with temperature probe, alkaline batteries (3) and instruction manual.

PROBES

HI 762BL General purpose/liquid temperature probe with 1 m cable

HI 762L/10 General purpose/liquid temperature probe with 10 m cable

ACCESSORIES

HI 762-18C Test key at -18.0°C
HI 762000C Test key at 0.0°C
HI 762070C Test key at 70.0°C
HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange
HI 710019 Spare protective case

Ideal for Lab and Field Use

HI 93510 is a high performance, waterproof thermometer tailor-made for lab and field use. This precision instrument features new electronics to provide the user with unsurpassed accuracy and repeatability across the entire measuring range.

HI 93510 is designed for ease of operation. The dual-level LCD displays the highest and lowest readings in the cycle along with the current temperature. To freeze the reading for easy recording, simply press the HOLD button. Celsius or Fahrenheit range can be selected at the touch of a button. Battery level is shown at startup and a low battery warning with BEPS (Battery Error Prevention System) assures long periods of trouble free use.

For extreme accuracy or dimly lit areas, select the HI 93510N. This meter offers all the features of HI 93510 plus a CAL button to allow the operator to calibrate the meter and probe in an ice bath at 0°C. This will assure the removal of the combined meter and probe interchange error. In addition to calibration capabilities, HI 93510N features a user-activated backlight for low or no light conditions.

A wide range of HI 762 probes is available for specific applications.

- *Waterproof casing with ergonomic design*
- *Tactile rubber keys*
- *High accuracy + 0.4°C/ + 0.8°F*
- *Large dual level LCD displays high and low readings along with current temperature*
- *Battery level indicator at startup*
- *Low battery warning with BEPS*
- *Exceptionally long battery life of 2000 hours*
- *Supplied with HI 762BL general purpose probe*
- *Optional rubber boots available*
- *Calibration test plugs available*
- *Backlit Display (HI 93510N)*
- *Calibration feature (HI 93510N)*

Thermistor Thermometers

Waterproof with 2-Channels

Monitor 2 Samples at the Same Time

HI 93512 is a waterproof two-channel thermometer, ideal for monitoring two samples at once. This easy-to-use thermometer displays the high and low readings together with temperature.

HI 93512 allows the user to view the differences between each channel (along with the high and low difference values or current temperature at each probe), as well as the variance from a reference temperature. The HOLD button allows users to freeze a reading. This powerful instrument enables you to switch views to see all continuously updating information on either channel. HI 93512 can be configured to read °C or °F. Battery level is shown at startup and low battery warning with Battery Error Prevention System (BEPS) assure long periods of trouble free use.

HI 93522 is an advanced instrument offering all the features of HI 93512 and much more. For even greater accuracy, a CAL button allows the operator to remove the combined meter and probe interchange error in an ice bath at 0°C.

HI 93522 can also store and recall a reading, allows the user to set the auto-off time period and activate the backlight for low light conditions.

- *Waterproof casing with ergonomic design*
- *Tactile rubber keys*
- *High accuracy + 0.4°C/ + 0.8°F*
- *Large dual level LCD displays high and low readings along with current temperature*
- *Battery level indicator at startup*
- *Low battery warning with BEPS*
- *Exceptionally long battery life of 2000 hours*
- *Supplied with HI 762BL general purpose probe*
- *Optional rubber boots available*
- *Calibration test plugs available*
- *Backlit Display (HI 93522)*
- *Calibration feature (HI 93522)*



HI 762 Test Keys

SPECIFICATIONS	HI 93512	HI 93522
Range	-50.0 to 150.0°C; -58.0 to 302.0°F	
Resolution	0.1°C; 0.1°F (-58.0 to 230.0°F) and 0.2°F (outside)	
Accuracy	±0.4°C; ±0.8°F (for 1 year, excluding probe error)	
Probe	HI 762BL, precalibrated, stainless steel, with 1 m (3.3') cable (included)	
CAL Button	N/A	Yes
Backlit LCD	N/A	Yes
Battery Type / Life	(3) 1.5V AA / approx. 2000 hours of continuous use (with backlight off); HI 93522 only: auto-off selectable after 8 or 60 minutes of non-use (can be disabled)	
Environment	-10 to 50°C (14 to 122°F); RH max 100%	
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")	
Weight	235 g (8.3 oz.)	

ORDERING INFORMATION

HI 93512 and **HI 93522** are supplied with temperature probe, 1.5V AA alkaline batteries (3) and instruction manual.

PROBES

HI 762BL	General purpose/liquid temperature probe with 1 m cable
HI 762L/10	General purpose/liquid temperature probe with 10 m cable

ACCESSORIES

HI 762-18C	Test key at -18.0°C
HI 762000C	Test key at 0.0°C
HI 762070C	Test key at 70.0°C
HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 710019	Spare protective case

Thermometers

An introduction to HANNA Thermometers

Thermometer Accuracy

As previously described, modern technology has made it possible to produce, at a reasonable cost, electronic thermometers that use various principles and measurement sensors.

With digital indicators it is easy to show resolutions of 0.1°C. There is no relationship between resolution and accuracy of measurements.

Here is a list of the main causes of errors in temperature measuring systems:

- *Instrument:* The instrument may have an extended scale and 19,000 points of measurement may be obtained. Within these 19,000 points the instrument may perform differently because of internal linearity.
- *Electronic Components:* The internal electronics have a drift that depends on the ambient temperature. For this reason the accuracy of the instrument is stated at a specific temperature of 20 or 25°C, and the drift has to be specified for each degree of variations with respect to the reference temperature.
- *LCD:* Liquid crystals have an operating limitation which is a function of temperature. Their normal range is between 0 and 50°C, but there are components capable of performing between -20°C and +70°C.
- *Batteries:* Instrument battery power supply also has limitations of use.
- *Temperature Sensor:* This is a separate accuracy, which is to be added to the instrument's error.

These examples indicate the various errors (which contribute to define) and therefore guarantee the accuracy of the instrument.

If the probe is supplied connected to the meter, during factory calibration the probe error is eliminated. It will reappear if the probe is replaced.

User Calibration

To calibrate your thermometers you need:

- *for Pt100 thermometers: a resistance simulator*
- *for thermometers with NTC/PTC sensor: at least two thermostatic baths*
- *for thermocouple thermometers: a simulator of the emf (electromotive force) generated by the thermocouple*
- *for infrared thermometers, a heat source (panel) at controlled temperature*

Few users can afford this investment in time and materials for checking their thermometers' accuracy.

Importance of accuracy in temperature readings

Up to a few years ago, accuracy was not a very critical aspect and tolerances of a few °C did not jeopardize a process. From the time that HACCP programs became a necessity, measurement accuracy has become a discriminating factor. Due to health risk factors, now an error of a few tenths of a degree can decide whether food can still be kept or must be discarded. In 1990, HANNA began to produce thermometers for our customer's HACCP programs to comply with new European regulations. Soon after, HANNA became the market leader in Europe as a result of the technological solutions offered to our users in need of accuracy.



CAL CHECK™ Feature

As previously described, the electronic components of an instrument shift with time. HANNA has made it possible for the user, with the simple touch of a button, to verify whether the response of the instrument is within the tolerance limit of ±0.02°C.

The CAL CHECK™ system acts by substituting the sensor with an internal resistor, which corresponds to 0°C, and thus simulating the response that the temperature probe would have at 0°C.

Standardization

HANNA has designed a series of pre-calibrated temperature probes with a maximum error of 2°C for trouble free replacement.

Calibration of Thermocouple Thermometers

Although quite fast, thermocouple thermometers read with a response time much slower than other sensors and other technologies. Unfortunately, the measurement of the thermocouple emf (electromotive force) loses accuracy because of the measuring system itself, based on the emf generated by the temperature difference between cold and hot junctions. The same emf may be generated under different conditions:

- *hot junction at 100°C; cold junction at 20°C; difference: 80°C* or:
- *hot junction at 90°C; cold junction at 10°C; difference: 80°C*

So that a temperature difference of 80°C is obtained with two

HI 98811

Printing and Logging Thermistor Thermometer

with Fast Tracker™—Tag Identification System



- *Lab-grade precision*
- *BEPS—Battery Error Prevention System*
- *Lightweight, rugged housing*

FastTracker™
A new revolution in organized data management

SPECIFICATIONS	HI 98811
Range	-50.0 to 150.0°C; -55.0 to 300.0°F
Resolution	0.1°C (-30.0 to 130°C); 0.2°C (outside); 0.1°F (-18 to 225°F); 0.2°F (225 to 260°F); 0.3°F (outside)
Accuracy	±0.4°C (-20 to 120°C); ±0.7°C (outside); ±0.8°F (-4 to 248°F); 1.3°F (outside) (for 1 year, excluding probe error)
Probe	HI 762BL (included)
Printer	low power impact, 14 characters per line, using 38 mm plain paper (HI 710034)
Printing/Logging Interval	selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes
PC Connection	HI 9200 IR interface through RS232 serial port and using HI 92000 software (not included)
Power Supply	(4) 1.5V AA alkaline type/350 hours typical life (with 2700 mA/h batteries, without printing and backlight). 12 VDC adapter (HI 710005 or HI 710006)
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
Weight	550 g (1.2 lbs.)

ORDERING INFORMATION

HI 98811 is supplied with HI 762BL temperature probe with 1 m cable, paper rolls (5), (4) batteries, rugged carrying case and instructions.

PROBES

HI 762L/10 General purpose/liquid temperature probe with 10 m cable

ACCESSORIES

HI 920005	iButton® with holder (5)
HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 710034	Paper roll (10)
HI 710035	Ink cartridge
HI 9200/9	Serial IR interface for PC connection
HI 92000	Windows® compatible software
HI 710031	Rugged carrying case

Features Fast Tracker™—Tag Identification System

The HANNA portable NTC Fast Tracker™ thermometer with built-in printer enables you to accurately measure and record both temperature and sample identification data. The meter features an easy-to-read LCD with backlight feature for comfortable reading even in dark environments. A user friendly interface provides clear messages regarding errors, functions and more.

The Sample Identification feature eliminates the necessity of manual identification for different measurement results to reduce human errors. An alarm time-out is available to alert the user if more than one year has elapsed since the last calibration and that recalibration may be required.

GLP features guarantee data consistency and provides GLP settings through a password protection method.

HI 98811 has the capability to store the measurements in memory at a user selectable interval from 1 to 180 minutes. This information can be retrieved at a later time and can also be printed.

Each measurement/lot can be uniquely identified by assigning a sample ID code obtained by reading from a Dallas iButton® tag (DS1990A, etc) placed in the field.

HI 98811 also allows the transfer of stored data to a computer via the HI9200/9 infrared transmitter connected to the computer RS232 port.

Each meter can also be uniquely identified by the user by assigning an instrument ID code.



HANNA instruments

With Great Products, Come Great Results™

Printing and Logging Thermistor Thermometers

Printing and Logging Thermometers with Log-on-demand

HI 98810 and HI 98840 combine high accuracy and fast response time with an extensive logging feature and an infrared computer transfer system. All stored measurements are correlated with time, date, sample and probe number.

The log-on-demand function is activated by simply pressing one button. When logging automatically, the user can select a time interval from 1 to 180 minutes.

All logged data can be transferred to a PC via HANNA's HI 9200/9 infrared interface cradle connected to the computer serial port. The connection is handled with the HI 92000 Windows® compatible software designed by HANNA.

The large backlit LCD allows readings in dimly lit conditions. These instruments can be powered with batteries or with a 12 Vdc supply.

HI 98810 accepts one temperature probe while HI 98840 can be connected to 4 separate probes at the same time.

HI 98810 is supplied with an HI 762BL temperature probe (for general purpose liquid measurements). Both models use the HI 762 series of thermistor probes by HANNA.

- *Print an indisputable record of your measurements*
- *Selectable printing and logging intervals*
- *Connect 4 separate probes simultaneously (HI 98840)*
- *Optional computer compatibility with HANNA's HI 92000 compatible Windows® software and HI 9200 infrared interface cradle*



SPECIFICATIONS	HI 98810	HI 98840
Range	-50.0 to 150.0°C; -55.0 to 300.0°F	
Resolution	0.1°C (-30.0 to 130°C); 0.2°C (outside); 0.1°F (-18 to 225°F); 0.2°F (225 to 260°F); 0.3°F (outside)	
Accuracy	±0.4°C (-20 to 120°C); ±0.7°C (outside); ±0.8°F (-4 to 248°F); 1.3°F (outside) (for 1 year, excluding probe error)	
Channels	1	4
Probe	HI 762BL (included)	HI 762 series (not included)
Printer	low power impact, 14 characters per line, using 38 mm plain paper (HI 710034)	
Printing/Logging Interval	selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes	
PC Connection	HI 9200 interface through RS232 serial port and using HI 92000 software (not included)	
Power Supply	(4) 1.5V AA battery / approx. 350 hours (without printing and backlight); auto-off selectable after 5, 10, 15, 30, 45 or 60 minutes of non-use; or 12 Vdc input	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight	550 g (1.2 lbs.)	

ORDERING INFORMATION

HI 98810 and **HI 98840** are supplied with HI762BL temperature probe (one channel version only), batteries (4), instruction manual, paper rolls (5) and rugged carrying case.

PROBES

HI 762BL	General purpose/liquid temperature probe with 1 m cable
HI 762L/10	General purpose/liquid temperature probe with 10 m cable

ACCESSORIES

HI 762-18C	Test key at -18.0°C
HI 762000C	Test key at 0.0°C
HI 762070C	Test key at 70.0°C
HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 710034	Paper roll (10)
HI 710035	Ink cartridge
HI 9200/9	Serial IR interface for PC connection
HI 92000	Windows® compatible software
HI 710031	Rugged carrying case



HI 710035 Ink Cartridge

Windows® is registered Trademark of "Microsoft Co."

HI 98710 • HI 98740

Printing Thermistor Thermometers

with 1 or 4 Channels



Economical Printing Thermometers with Backlit LCD

For applications requiring documentation and high precision, HI 98710 and HI 98740 are the perfect solution. The advanced HANNA electronics inside these thermometers linearizes measurements taken with the NTC thermistor sensor.

These portable instruments are supported with large backlit displays to permit use 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 the 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 pre-selected with a maximum inter-changeability error of ±0.2°C. The probe handles are color coded also to avoid cross contamination of samples, an important plus in the food sector.

Both models can be powered with batteries or through the 12 Vdc input.

- *Print an indisputable record of your measurements*
- *Selectable printing intervals*
- *Connect 4 separate probes simultaneously (HI 98740)*

SPECIFICATIONS	HI 98710	HI 98740
Range	-50.0 to 150.0°C; -55.0 to 300.0°F	
Resolution	0.1°C (-30.0 to 130°C); 0.2°C (outside); 0.1°F (-18 to 225°F); 0.2°F (225 to 260°F); 0.3°F (outside)	
Accuracy	±0.4°C (-20 to 120°C); ±0.7°C (outside); ±0.8°F (-4 to 248°F); ±1.3°F (outside) (for 1 year, excluding probe error)	
Channels	1	4
Probe	HI 762BL (included)	HI 762 series (not included)
Printer	low power impact, 14 characters per line, using 38 mm plain paper (HI 710034)	
Printing Interval	selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes	
Power Supply	(4) 1.5V AA battery / approx. 350 hours (without printing and backlight); auto-off selectable after 5, 10, 15, 30, 45 or 60 minutes of non-use; or 12 Vdc input	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight	550 g (1.2 lbs.)	

ORDERING INFORMATION

HI 98710 and **HI 98740** are supplied with HI762BL temperature probe (one channel version only), AA size alkaline batteries (4), instruction manual, paper rolls (5) and rugged carrying case.

PROBES

HI 762BL General purpose/liquid temperature probe with 1 m cable

HI 762L/10 General purpose/liquid temperature probe with 10 m cable

ACCESSORIES

HI 762-18C Test key at -18.0°C

HI 762000C Test key at 0.0°C

HI 762070C Test key at 70.0°C

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 710034 Paper roll (10)

HI 710035 Ink cartridge (1)

HI 721317 Rugged carrying case



HI 710034 Paper Rolls

HANNA instruments

With Great Products, Come Great Results™

hold | lcd display | B.E.P.S. | min/max

HI 9060

Thermistor Thermometer

Waterproof and Rugged

Ideal for Wet and Humid Environments

The waterproof HI 9060 thermistor thermometer is ideal for use in wet and humid environments. This popular instrument is configured with a dual-level LCD that shows the current temperature simultaneously with the high and low session extremes. A HOLD button allows easy recording of the current information on display.

The waterproof HI 9060 uses a thermistor sensor for measuring the temperature in a range from -50 to 150°C and -58 to 302°F.

Toggle between degrees Celsius and degrees Fahrenheit, simply by pushing the °C/°F button.

This rugged instrument offers a new level of portability with an increase in battery life to 3000 hours! That means the instrument will work up to 8 hours a day, seven days a week for over a year. At startup, the thermometer performs a self test and displays the remaining battery power.

HANNA produces a complete range of interchangeable HI 765 probes to meet all of your application needs.

- *HOLD button freezes readings on the display*
- *Switch between °C and °F at the touch of a button*
- *Battery life on display*
- *3000 hour battery life*



SPECIFICATIONS	HI 9060
Range	-50.0 to 150.0°C; -58.0 to 302.0°F
Resolution	0.1°C; 0.1°F
Accuracy	±0.4°C; ±0.8°F (for 1 year, excluding probe error)
Probe	HI 765BL, stainless steel, with 1 m (3.3') cable (included)
Battery Type / Life	(4) 1.5V AA / approx. 3000 hours of continuous use
Environment	-10 to 50°C (14 to 122°F); RH max 100%
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	500 g (1.1 lbs.)



HI 765 Test Keys

ORDERING INFORMATION

HI 9060 is supplied with HI 765BL temperature probe, batteries (4) and instruction manual.

PROBES

HI 765BL General purpose/liquid temperature probe with 1 m cable

HI 765L/10 General purpose/liquid temperature probe with 10 m cable

ACCESSORIES

HI 765-18C Test key at -18.0°C

HI 765000C Test key at 0.0°C

HI 765070C Test key at 70.0°C

HI 710021 Spare protective case

HI 721317 Rugged carrying case

HI 9040

Thermistor Thermometer

High Accuracy, Fast Response Thermometer



Rugged Thermistor Thermometer

HI 9040 is a hand-held thermometer that uses a thermistor sensor to deliver fast response and high accuracy.

The meter is housed in a rugged ABS casing for maximum protection. The smooth keypad with membrane buttons will easily wipe clean. The dual-level LCD allows the display of current temperature simultaneously with the highest and lowest temperature measured in the cycle.

The °C/°F button switches between the Celsius and Fahrenheit ranges instantly and a HOLD button will guarantee the user plenty of time to record the readings.

During startup, this meter performs a self check and displays the current battery level.

HI 9040 is supplied with an HI 765BL thermistor probe.

A wide variety of HI 765 probes for applications such as air, liquid and penetration are available.

- *HOLD button freezes readings on the display*
- *View Hi, Low and Current Reading Simultaneously*
- *Switch between °C and °F at the touch of a button*
- *Battery life on display*

SPECIFICATIONS	HI 9040
Range	-50.0 to 150.0°C; -58.0 to 302.0°F
Resolution	0.1°C; 0.1°F
Accuracy	±0.4°C; ±0.8°F (for 1 year, excluding probe error)
Probe	HI 765BL, precalibrated, stainless steel, with 1 m (3.3') cable (included)
Battery Type / Life	(1) 9V / approx. 700 hours of continuous use
Environment	-10 to 50°C (14 to 122°F); RH max 95%
Dimensions	180 x 83 x 40 mm (7.1 x 3.3 x 1.6")
Weight	226 g (8.0 oz.)

ORDERING INFORMATION

HI 9040 is supplied with HI 765BL thermistor probe, 9V battery and instruction manual.

PROBES

HI 765BL	General purpose/liquid temperature probe with 1 m cable
HI 765L/10	General purpose/liquid temperature probe with 10 m cable
HI 765PW	Penetration temperature probe with 1 m cable

ACCESSORIES

HI 765-18C	Test key at -18.0°C
HI 765000C	Test key at 0.0°C
HI 765070C	Test key at 70.0°C
HI 710009	Shockproof rubber boot, blue
HI 710010	Shockproof rubber boot, orange
HI 710020	Spare protective case
HI 721316	Rugged carrying case



HI 721316 Rugged Carrying Case

HANNA instruments

With Great Products, Come Great Results™

Digital Thermometers

for Education

Ideal for Classrooms or out in the Field

Temperature measurements in the low ranges (-40 to 150°C or -58 to 338°F) are usually performed with thermometers that use the physical expansion of liquids such as in glass and dial thermometers. In terms of accuracy, these thermometers usually read within ±1 to ±5°C (±2 to ±9°F) of the actual temperature. In order to achieve higher accuracy, the range must be reduced or the length of the thermometer must be increased. The HI 8751, HI 8752 and HI 8753 electronic thermistor thermometers resolve these problems.

These thermometers use a miniature silicon sensor and are pre-calibrated at the factory to measure a wide temperature range without the need to change probes. This type of sensor is highly accurate with a very fast response time. The sensor is housed in a rugged, stainless steel probe. This probe can be replaced without requiring recalibration.

A wide variety of interchangeable temperature probes (HI 765 series) for measurements in liquid, air and semi-solids are available.

- *Simple to operate*
- *Wide range of probes available*
- *3 Models to choose from*



SPECIFICATIONS	HI 8751	HI 8752	HI 8753
Range	-40.0 to 150.0°C	-58 to 338°F	-40.0 to 150.0°C; -58 to 338°F
Resolution	0.1°C	1°F	0.1°C; 1°F
Accuracy	±0.5% F.S. (for 1 year, excluding probe error)		
Probe	HI 765PW	HI 765BL	HI 765BL
	precalibrated, stainless steel, with 1 m (3.3') cable (included)		
Battery Type / Life	(1) 9V / approx. 300 hours of continuous use		
Environment	0 to 50°C (32 to 122°F); RH max 95%		
Dimensions	180 x 83 x 40 mm (7.1 x 3.3 x 1.6")		
Weight	265 g (9.3 oz.)		



HI 765 Test Keys



HI 710002 Soft Carrying Case

ORDERING INFORMATION

HI 8751, **HI 8752** and **HI 8753** are supplied with precalibrated and interchangeable HI 765BL temperature probe, 9V battery and instruction manual.

PROBES

HI 765BL General purpose/liquid temperature probe with 1 m cable

HI 765L/10 General purpose/liquid temperature probe with 10 m cable

HI 765PW Penetration temperature probe with 1 m cable

ACCESSORIES

HI 765-18C Test key at -18.0°C

HI 765000C Test key at 0.0°C

HI 765070C Test key at 70.0°C

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 710002 Soft carrying case

HI 721316 Rugged carrying case

HI 762

HI 762 Thermistor Probes









The HI 762 temperature probes can be identified by the grey cap on the top of the handle and have the following specifications:

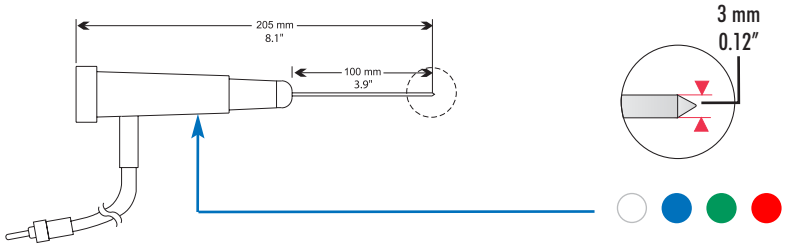
Range	-50 to 150°C (-58 to 302°F)
Sensor	NTC thermistor
Accuracy	±0.2°C (±0.4°F)
Probe Handle	ABS
Interchange Error	±0.2°C (±0.4°F)
Probe	stainless steel AISI 316
Response Time (90% of final value)	6 seconds

The HI 762 series with NTC thermistor sensor offers a wide range of probes for measuring liquids, air and gases, and for penetration in semisolids.

Models are available with a 1, 2 or 10 meter cable, and colored handles to be identified more easily when measuring different samples.

HI 762P

General purpose, penetration probe with colored handle.

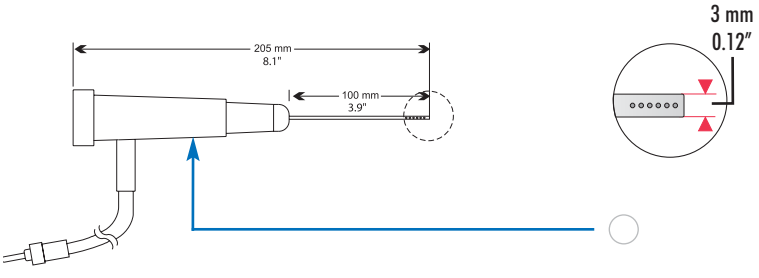


1 M (3.3') CABLE	2 M (6.6') CABLE	10 M (33') CABLE	HANDLE COLOR
HI 762PW	—	HI 762PW/10	White
HI 762PBL	—	HI 762PBL/10	Blue
HI 762PG	—	HI 762PG/10	Green
HI 762PR	—	HI 762PR/10	Red

HI 762A

Thermistor probe for measuring the temperature of air and gases.

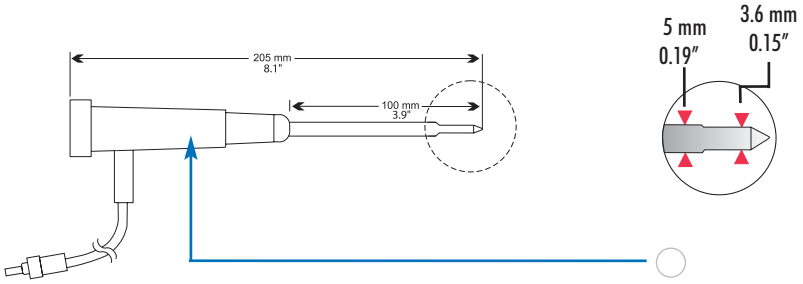




1 M (3.3') CABLE	2 M (6.6') CABLE	10 M (33') CABLE	HANDLE COLOR
HI 762A	—	HI 762A/10	White

HI 762PWL

Thermistor probe with sharp tip for penetration of semi solid samples.

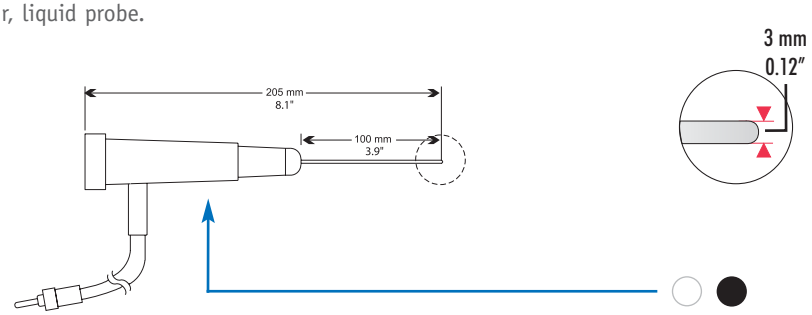




1 M (3.3') CABLE	2 M (6.6') CABLE	10 M (33') CABLE	HANDLE COLOR
HI 762PWL	—	—	White

HI 762L

Air, liquid probe.



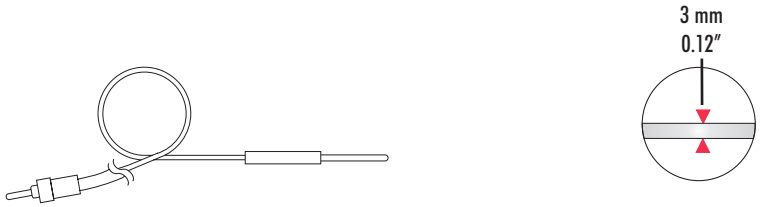


1 M (3.3') CABLE	2 M (6.6') CABLE	10 M (33') CABLE	HANDLE COLOR
HI 762L	HI 762L/2	HI 762L/10	White
HI 762BL	—	—	Black

HI 762W

Wire probe, designed to access hard-to-reach places.

Probe does not incorporate a handle.





1 M (3.3') CABLE	2 M (6.6') CABLE	10 M (33') CABLE
HI 762W	—	HI 762W/10

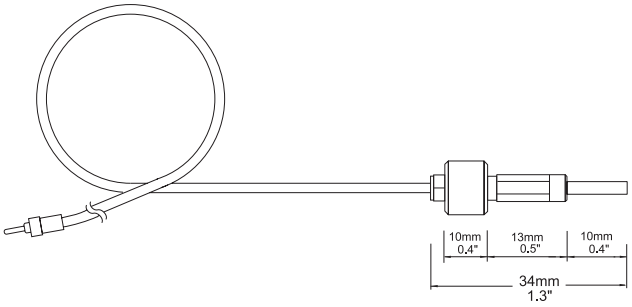
HI 762

HI 762 Thermistor Probes



HI 762DIP

Weighted probe without handle, designed to measure the temperature in tanks.



1 M (3.3') CABLE

HI 762DIP



HI 762BP

Thermistor probe without handle, designed to measure the temperature of stacked goods.



1 M (3.3') CABLE

HI 762BP

Calibration Test Keys

for Thermistor Thermometers

For measurements that are always reliable, thermometers must be calibrated periodically.

HANNA test keys offer a fast and simple way of checking the accuracy of your instruments.

Connect the key to the probe input. If the reading on the display differs more than 0.4°C (0.8°F) from the key rated value, your thermometer should be re-calibrated at our technical service center.



Test Keys for Thermometers Using HI 762 Probes

HI 762-18C	Test key at -18°C	**HI 762070C**	Test key at 70°C	**HI 762032F**	Test key at 32°F
HI 762000C	Test key at 0°C	**HI 762-004F**	Test key at -0.4°F	**HI 762158F**	Test key at 158°F

For periodic verification of your thermometer's calibration, it is recommended to check at least two points. Choose the test keys with the nominal values closest to the temperature usually measured.

HI 765 Thermistor Probes

The HI 765 temperature probes are provided with a PTC thermistor sensor, and have the following specifications:

Range	-50 to 150°C (-58 to 302°F)
Accuracy	±0.2°C (±0.4°F)
Sensor	PTC thermistor
Probe Handle	ABS
Interchange Error	±0.2°C (±0.4°F)
Probe	stainless steel AISI 316;
Response Time (90% of final value)	8 seconds



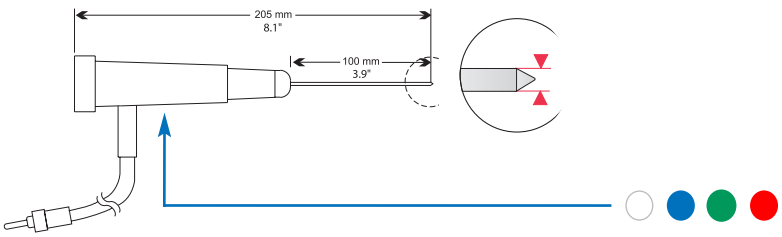
All probes are pre-calibrated with a maximum error of ±0.2°C (±0.4°F).

The HI 765 series can be identified by the white cap on the top of the handle. This series offers a wide range of probes for measuring liquids, air and gases, and for penetration in semisolids.

Models are available with a 1 or 10 meter cable, and colored handles for easy identification during measurements of different samples.

HI 765P

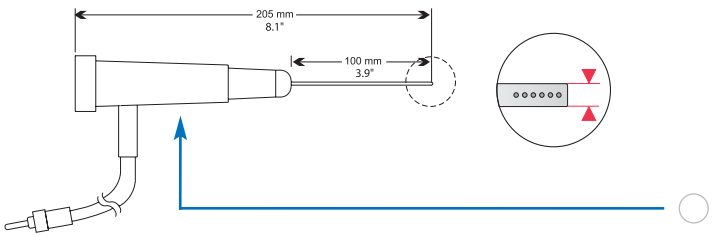
General purpose, penetration probe with colored handle.



1 M (3.3') CABLE	10 M (3.3') CABLE	HANDLE COLOR
HI 765PW	HI 765PW/10	White
HI 765PBL	HI 765PBL/10	Blue
HI 765PG	HI 765PG/10	Green
HI 765PR	HI 765PR/10	Red

HI 765A

Thermistor probe for measuring the temperature of air and gases.





1 M (3.3') CABLE	10 M (3.3') CABLE	HANDLE COLOR
HI 765A	HI 765A/10	White

Thermometers

An introduction to HANNA Thermometers

different temperatures of the sample. It is, therefore, very important to determine the cold junction temperature very precisely. The ability to do this has a large effect on the accuracy of the measuring system. A thermocouple thermometer is made of two thermometers, one that measures the cold junction, and one for measuring the emf generated by the thermocouple. The cold junction is usually measured with an NTC type sensor, which has response times different from those of the thermocouple. Another crucial point is measuring the actual value of the cold junction, without any environmental influence and dispersions.

To partially solve this problem, HANNA has devised the calibration of the instrument-thermocouple system, by dipping the probe in melting ice, and thus allowing the user to calibrate the measuring system at 0°C.

Thanks to this solution, it is now possible to use thermocouple thermometers for HACCP controls with an accuracy of ±0.3°C, which is the same performance of our Pt100 or NTC thermometers, but with a higher response time.



Calibration Test Keys

To check the calibration status of the instrument, calibrated keys have been prepared in the range from -18°C to 70°C. These keys reproduce the value of the sensor at different temperatures. Simply disconnect the measuring probe, replace it with the key and make sure that the instrument reads the simulated value.

HANNA calibrates all thermometers with a standard probe. All NTC temperature probes are inspected and calibrated with standard instruments. During quality inspection our technicians make sure that the reading errors are within the stated accuracies.

In addition, HANNA provides you with the necessary tools to verify that your thermometers read accurate values.

In case of unacceptable readings, please return the instrument to the nearest HANNA technical service center.

Our complete line of electronic thermometers provides fast and precise measurements down to a tenth of a degree Celsius.

HANNA thermometers may be divided into four main categories: thermistor thermometers, thermocouple thermometers, Pt100 thermometers and infrared thermometers.

Thermistor Thermometers

The thermistor is a semi-conductor device whose resistivity (r) varies as a function of temperature (T)

r = ro (1+ aT)

where

ro = characteristic resistivity of material

a = temperature resistance coefficient of material



The temperature resistance coefficient is the parameter that determines if the resistivity variation is positive (as with the Positive Temperature Coefficient sensors) or negative (as with the Negative Temperature Coefficient thermistors). It is possible to determine the temperature by applying a potential difference and measuring the resistance.

Thermistor sensors are suitable for a temperature range of -50 to 150°C (-58 to 302°F). Higher temperatures may damage the semiconductor sensor. Accurate temperature measurements are possible (tenths of degree) due to the high sensitivity of the sensor.

Thermocouple Thermometers

The thermocouple consists of the junction of two wires of different metals. At a given temperature, a potential difference results at the opposite extremes of the two wires (Seebeck effect), with the respective variations linearly related within small intervals. It is therefore possible to determine the temperature given the potential difference and characteristics of the two metals. The measurement end of the thermocouple probe is called the hot junction, while the connection of the thermocouple to the meter is the cold junction. An error is introduced as the cold junction is exposed to the ambient temperature. This error can be eliminated by physically putting the cold junction into an ice bath and forcing a reference temperature of 0°C, or by electronically compensating for the cold junction temperature effect. There are various types of thermocouples, identified by an ANSI code using a letter of the alphabet. The K type is the most commonly used.



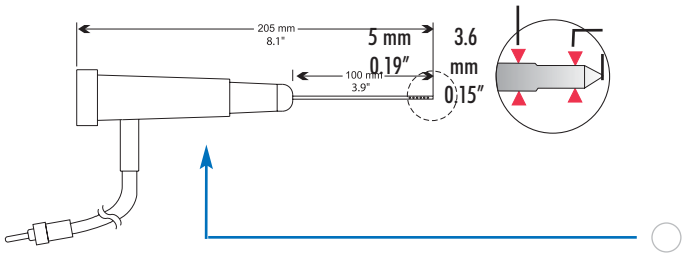
HI 765

HI 765 Thermistor Probes

HI 765PWL

Thermistor probe with sharp tip for penetration of semi solid samples.



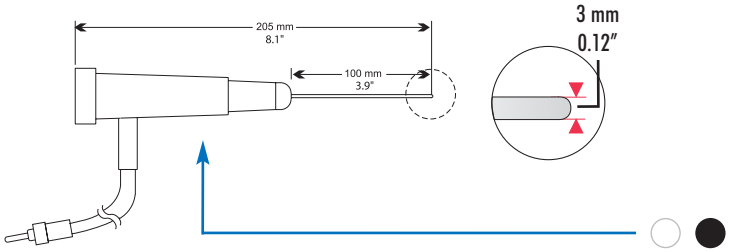


1 M (3.3') CABLE	10 M (3.3') CABLE	HANDLE COLOR
HI 765PWL	—	White

HI 765L

Air, liquid probe.





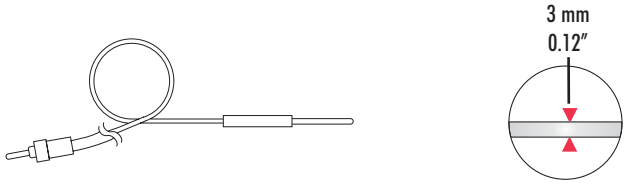
1 M (3.3') CABLE	10 M (3.3') CABLE	HANDLE COLOR
HI 765L	HI 765L/10	White
HI 765BL	—	Black

HI 765W

Wire probe, designed to access hard-to-reach places.

Probe does not incorporate a handle.





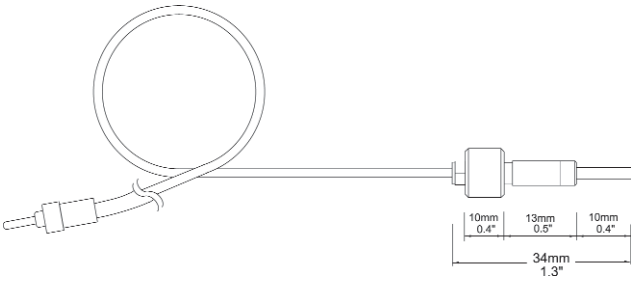
1 M (3.3') CABLE	10 M (33') CABLE
HI 765W	HI 765W/10

HANNA instruments

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HI 765DIP

Weighted probe without handle, designed to measure the temperature in tanks.

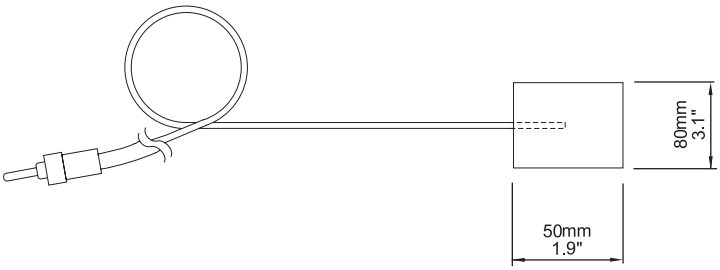




1 M (3.3') CABLE	3 M (9.9') CABLE	5 M (16.4') CABLE	10 M (33') CABLE
HI 765DIP	HI 765DIP/3	HI 765DIP/5	HI 765DIP/10

HI 765BP

Thermistor probe without handle, designed to measure the temperature of stacked goods.





1 M (3.3') CABLE
HI 765BP

Calibration Test Keys

for Thermistor Thermometers

For measurements that are always reliable, thermometers must be calibrated periodically.

HANNA test keys offer a fast and simple way of checking the accuracy of your instruments.

Connect the key to the probe input. If the reading on the display differs more than 0.4°C (0.8°F) from the key rated value, your thermometer should be re-calibrated at our technical service center.



Test Keys for Thermometers Using HI 765 Probes

HI 765-18C	Test key at -18°C	**HI 765070C**	Test key at 70°C	**HI 765032F**	Test key at 32°F
HI 765000C	Test key at 0°C	**HI 765-004F**	Test key at -0.4°F	**HI 765158F**	Test key at 158°F

For periodic verification of your thermometer's calibration, it is recommended to check at least two points. Choose the test keys with the nominal values closest to the temperature usually measured.

HI 955301 • HI 955302

Pt100 Thermometers

Printing and Logging with 1 or 2-Channels



Extensive Logging Capabilities

HI 955301 and HI 955302 combine high resolution and extended temperature 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 also store data to be transferred to a PC or printer.

HI 955301 accepts one temperature probe while HI 955302 can take 2 separate Pt100 probes. The sophisticated software allocates up to 16000 temperature readings to maximize available space, regardless of the number of channels in use. Large easy-to-read digits display readings, with a secondary readout level displaying logging interval, channel, time and date. Due to extensive use of advanced electronics, all of these features can be housed in a package weighing just 500 grams.

These meters are calibrated against a certified standard. Recalibration service is available upon request.

HANNA offers a variety of optional 4-wire Pt100 HI 768 series temperature probes to fit your application needs.

- *Print an indisputable record of your measurements*
- *Selectable printing and logging intervals*
- *Connect 2 separate probes simultaneously (HI 955302)*
- *Optional computer compatibility with HANNA's HI 92000 compatible Windows software and HI 9200/9 infrared interface cradle*

SPECIFICATIONS	HI 955301	HI 955302
Range	-200.0 to 850.0°C	
Resolution	0.1°C or 1°C, selectable	
Accuracy	±0.1°C ±0.1% of reading (for 1 year, excluding probe error)	
Channels	1	2
Probe	HI 768 series, 4-wire Pt100 probe (not included)	
Printer	low power impact, 14 characters per line, using 38 mm plain paper (HI 710034)	
Printing Interval	selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes	
PC Connection	HI 9200 interface through RS232 serial port and using HI 92000 software (not included)	
Power Supply	(4) 1.5V AA battery / approx. 500 hours (with 60' printing interval); auto-off after 5 minutes of non-use; or 12 Vdc input	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight	550 g (1.2 lbs.)	

ORDERING INFORMATION

HI 955301 and **HI 955302** are supplied with paper rolls (5), batteries (4) and rugged carrying case.

PROBES

HI 768A	Air/gas Pt100 temperature probe with 1 m cable
HI 768L	General purpose/liquid Pt100 probe with 1 m cable
HI 768P	Penetration Pt100 temperature probe with 1 m cable

ACCESSORIES

HI 721317	Rugged carrying case
HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 710034	Paper roll (10 pcs.)
HI 710035	Ink cartridge (1 pc.)
HI 9200/9	Serial interface for PC connection
HI 92000	Windows® compatible software



HI 710034 Paper Rolls

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Pt100 Printing Thermometer

with up to 2 Probes

High Range, High Resolution

It is often desirable to print and measure temperature in the higher ranges without having to compromise high resolution. For this purpose HANNA has developed the HI 955201 single channel and the HI 955202 dual-channel, 4-wire Pt100 printing thermometers.

These thermometers have a resolution of 0.1°C in the range of -200.0 to 850.0°C. A built-in printer makes it possible to obtain a hard-copy of your measurements taken on 1 or 2 channels, instantly or at determinable intervals. This means you can leave the meter without supervision to record your readings and not have to worry about human error in repeated or prolonged testing. The low-consumption printer uses widely available plain paper that will not fade over time.

For extended time measurements, the meters can be powered with 12 Vdc. The meter is calibrated against a certified standard.

Choose from a wide variety of optional Pt100 HI 768 series temperature probes from HANNA instruments.®

- *Print an indisputable record of your measurements*
- *Selectable printing intervals*
- *Connect 2 separate probes simultaneously (HI 955202)*





HI 710035 Ink Cartridge



HI 721317 Rugged Carrying Case

SPECIFICATIONS	HI 955201	HI 955202
Range	-200.0 to 850.0°C	
Resolution	0.1°C or 1°C, selectable	
Accuracy	±0.1°C ±0.1% of reading (for 1 year, excluding probe error)	
Channels	1	2
Probe	HI 768 series, 4-wire Pt100 probe (not included)	
Printer	low power impact, 14 characters per line, using 38 mm plain paper (HI 710034)	
Printing Interval	selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes	
Power Supply	(4) 1.5V AA battery / approx. 500 hours (with 60' printing interval); auto-off after 5 minutes of non-use; or 12 Vdc input	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight	550 g (1.2 lbs.)	

ORDERING INFORMATION

HI 955201 and **HI 955202** are supplied with paper rolls (5), batteries (4) and rugged carrying case.

ELECTRODES

HI 768A	Air/gas Pt100 temperature probe with 1 m cable
HI 768L	General purpose/liquid Pt100 probe with 1 m cable
HI 768P	Penetration Pt100 temperature probe with 1 m cable

ACCESSORIES

HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 710034	Paper roll (10 pcs.)
HI 710035	Ink cartridge (1 pc.)
HI 721317	Rugged carrying case

HI 955501 • HI 955502

4-wire Pt100 Thermometers

from -199.9 to 850°C



Shown with optional HI 710007 protective rubber boot

For Supreme Accuracy in Temperature Measurements

Pt100 models are widely recognized as the most accurate with the best stability, repeatability and linearity among thermometers. Add to this the 4-wire system that is practically impervious to lead-wire length error and you have a powerful tool to measure temperature accurately. We have designed two affordable models for you to choose from: HI 955501 with the interchangeable HI 768 Pt100 probes and HI 955502 with the fixed general-purpose probe and 1m (3.3') lead.

Both models measure temperatures with 0.1°C resolution in the -199.9 to 199.9°C range and then automatically switch to 1°C from 200 to 850°C. Press RANGE and the resolution switches to 1°C at any time. A compact, ergonomic design and a wrist-strap make it easy to carry them anywhere in the lab or plant.

To protect the meter during field measurements, a HANNA shockproof boot is recommended.

- *Available with interchangeable or fixed probe*
- *Economical*
- *Optional Protective Boot Recommended*

SPECIFICATIONS	HI 955501	HI 955502
Range	-199.9 to 199.9°C; 200 to 850°C	
Resolution	0.1°C (-199.9 to +199.9°C); 1°C (200 to 850°C)	
Accuracy	±0.2°C and ±1 digit (-120.0 to 199.9°C); ±1°C and ±1 digit (-170 to 450°C); ±1% F.S. and ±1 digit (outside) (for 1 year, excluding probe error)	
Probe	HI 768 series, Pt100, stainless steel, with 1 m (3.3') cable (not included)	Pt100, stainless steel, with 1 m (3.3') cable (fixed)
Battery Type / Life	(1) 9V / approx. 150 hours of continuous use	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	143 x 80 x 38 mm (5.6 x 3.2 x 1.5")	
Weight	320 g (11.3 oz.)	

ORDERING INFORMATION

HI 955501 is supplied with 9V battery and instruction manual.

HI 955502 is supplied with 9V battery, general purpose temperature probe and instruction manual.

PROBES

HI 768A Air/gas temperature probe with 1 m (3.3') cable

HI 768L General purpose/liquid temperature probe, 1 m cable

HI 768P Penetration temperature probe with 1 m (3.3') cable

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 710004 Soft carrying case



HI 710004 Soft Carrying Case

HANNA instruments

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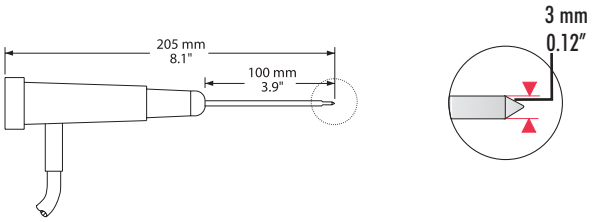
The HI 768 series of temperature probes is provided with a Pt100 sensor and features the following specifications:

Range	-30 to 350°C (-22 to 622°F)
Sensor	Pt100
Accuracy	±0.25°C (±0.5°F) ±3% of reading
Probe Handle	Carilon®
Interchange Error	±0.2°C (±0.4°F)
Probe	stainless steel AISI 316
Response Time	30 seconds

The three HI 768 probes have been designed for liquid, air/gas and penetration measurements, respectively. The HI 768L model is available with a 1, 3 or 5 meter (3.3', 9.9' or 16.4') cable.

HI 768P, General Purpose/Penetration Probe

Pt100 probe for applications, such as air measurement and penetration of semisolids.

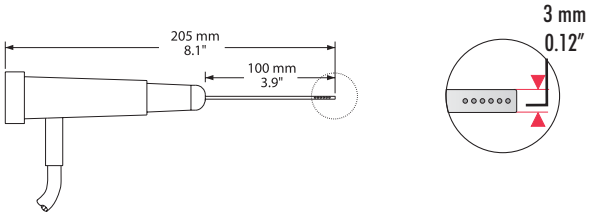




1 M (3.3') CABLE
HI 768P

HI 768A

Pt100 probe for measuring the temperature of air and gases.

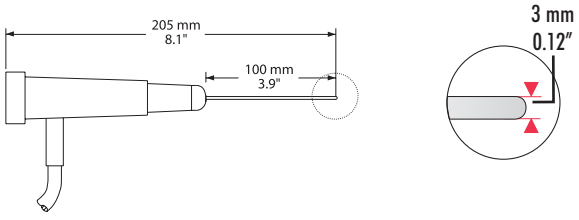




1 M (3.3') CABLE
HI 768A

HI 768L

Pt100 probe for applications, such as liquid and air.





1 M (3.3') CABLE	*3 M (9.9') CABLE*	*5 M (16.4') CABLE*
HI 768L	HI 768L/3	HI 768L/5

HI 99551 • HI 99556

Infrared Thermometers

for Food Applications



Non-invasive Temperature Measurement for the Food Industry

The HANNA HI 99551 and HI 99556 thermometers employ infrared technology to measure the surface temperature. Infrared measurements are extremely practical with a fast response time, typically around 1 second.

A crucial advantage of these meters is the non-intrusive nature of the measurements. This feature is particularly attractive in the food industry since it translates practicality into substantial savings by leaving products intact, especially those sealed or pre-wrapped.

In order to measure the temperature, simply point to the product or target and hold down the measurement key. Readings are immediately displayed on the LCD. This type of non-intrusive measurement is also useful when the surface temperature is too high to approach, for difficult-to-reach places or for hygiene requirements.

These HANNA meters are particularly attractive for food distribution, retailing and supermarkets.

Both HI 99551 and HI 99556 run on a common 9V battery with a low battery indication on the display. An optional HANNA rubber boot makes the meter truly shockproof.

If you must check the core temperature in addition to surface measurement, the HI 99556 is the ideal solution for you. Simply attach an optional external probe to the meter and you have a 2-in-1 infrared-thermistor thermometer.

- *Measure temperature through sealed items*
- *Optional external probe can also be used (HI 99556)*

SPECIFICATIONS		HI 99551 / HI 99556
Range	IR	-10 to 300°C ("-00" models); 14 to 572°F ("-01" models); -20.0 to 199.9°C ("-10" models)
	Probe	-40 to 150°C (HI 99556 only)
Resolution	IR	1°C ("-00" models); 1°F ("-01" models); 0.1°C ("-10" models)
	Probe	0.1°C (HI 99556 only)
Accuracy	IR	±2% of reading or ±2°C (-00 and -10 models); ±2% of reading or ±3°F (-01 models)
	Probe	±0.5°C (-20 to 120°C) /±1°F (0 to 250°F); ±0.5°C / ±1°F +1% reading (outside) (HI 99556 only)
IR Sensor Response Time		1 second
IR Sensor Optic Coefficient		3:1 (ratio of distance to target diameter)
Minimum Distance		30 mm (1.2")
Probe		HI 765PW (included) (HI 99556 only)
Battery Type / Life		(1) 9V / approx. 150 hours of continuous use
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions		143 x 80 x 38 mm (5.6 x 3.2 x 1.5")
Weight		320 g (11.3 oz.)

ORDERING INFORMATION

00= IR range from -10 to 300°C
01= IR range from 14 to 572°F
10= IR range from -20 to 199.9°C

1= meter with IR sensor
6= meter with IR sensor and HI 765W probe with 40 to 150°C range

HI 9955 -

PROBES

HI 765PW Temperature probe for HI 99556
HI 731318 Sensor cleaning tissue (4)

ACCESSORIES

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange
HI 710004 Soft carrying case
HI 721316 Rugged carrying case



HI 721316 Rugged Carrying Case

HANNA instruments

With Great Products, Come Great Results™

Infrared Thermometers

Non-Contact Temperature Measurement

Quick, Non-intrusive Temperature Measurements

Infrared radiation emitted from an object depends on its temperature. The HANNA HI 99550 infrared thermometer employs this technology to measure surface temperature. Infrared thermometers provide non-invasive measurements with instantaneous response times. This can translate into substantial savings particularly in industries where products are sealed or pre-wrapped.

In order to measure the temperature, simply point to the product or the target spot and hold down the measurement key. The measured value will be immediately displayed on the LCD.

This type of non-intrusive measurement is also useful when the surface temperature is high, for difficult-to-reach places or due to hygiene requirements.

HANNA HI 99550 is designed with a wrist-strap and ergonomic shape for greater ease of use.

The fast response time and the HOLD function make HI 99550 infrared thermometer particularly attractive for repetitive tests in the factory or on the production line.

- *Measure temperature in difficult to reach places*
- *HOLD function freezes measurements on LCD display*
- *Ideal for industrial facilities*



SPECIFICATIONS	HI 99550-00	HI 99550-01
Range	-10 to 300°C	14 to 572°F
Resolution	1°C	1°F
Accuracy	±2% of reading or ±2°C	±2% of reading or ±3°F
Emissivity	0.95	
Typical Response Time	1 second	
Optic Coefficient	3:1 (ratio of distance to target diameter); minimum distance 30 mm (1.2")	
Battery Type / Life	(1) 9V / approx. 150 hours of continuous use	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	143 x 80 x 38 mm (5.6 x 3.2 x 1.5")	
Weight	320 g (11.3 oz.)	



HI 710004 Soft Carrying Case

ORDERING INFORMATION

HI 99550-00 is supplied with battery and instructions.

HI 99550-01 is supplied with battery and instructions.

ACCESSORIES

HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 710004	Soft carrying case
HI 721316	Rugged carrying case

HI 141
Temperature Dataloggers

with 1 or 2 channels, internal or external sensor, with or without LCD

min/max | upgraded | B.E.P.S. | PC compatible

At a glance, you can assess the current temperature, channel and status of the logging sequence according to your programmed instructions:



Number of samples taken



Countdown until the start of logging



Number of samples which have exceeded the HIGH/LOW alarms



HIGH and LOW temperature values



HIGH and LOW alarm settings



SPECIFICATIONS MODEL	DISPLAY	SENSOR(S)	RANGE
HI 141A(H)		1 internal	-40.0 to 80.0°C / -40.0 to 176.0°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 / -40.0 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 1 external	-40.0 to 80.0°C / -40.0 to 176.0°F -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 1 external	-20.0 to 70.0°C / -40.0 to 158.0°F -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

SPECIFICATION FOR ALL MODELS

Resolution	0.1°C (-40.0 to 100.0°C); 0.2°C (> 100.0°C) 0.1°F (-40.0 to 190.0°F); 0.3°F (> 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 (> 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 (> 212.0°F)
Environment	RH 100%
Diameter	86.5 mm (3.4")
Height	35 mm (1.4")
Weight	150 g (5.5 oz.)

ORDERING INFORMATION

All **HI 141** models are supplied with 3.6V Lithium AA battery, magnetic key and instructions.

ACCESSORIES

HI 141000 Windows® application software (Required)

HI 141001 Infrared transmitter (Required)

HI 740033 3.6 V AA lithium battery

HI 740221 Key for HI 141 magnetic start

Available in Multiple Configurations

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 1m (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 to once per 24 hour period, and logging delay 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 tamper-proof and stored into serial numbered lots.

The user interacts with the logger, setting data acquisition parameters or down-loading logged data through an RS232 serial port on a Windows® PC. The HI 141000 Windows® compatible software supports communication between the logger and the PC through the HI 141001 infrared transmitter.

The housing is waterproof and can include a convenient hanging hook (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.

Models with a longer cable for external sensors are available upon request.

- *1 or 2 channels* with internal or external sensor
- *16,000 samples/channel* (for 1-channel models) *or 8,000* samples/channel (for 2-channel models)
- *Logging interval* from 1 second to 24 hours
- *Logging delay* start up to 199 hours and magnetic start
- *Programmable high and low alarms*
- *Non-volatile storage* of logging parameters and data in EEPROM
- *IP67 waterproof casing*

* Models with different cable lengths are available upon request. Contact your nearest HANNA dealer.

HANNA instruments

With Great Products, Come Great Results™

Temperature Datalogger

with Remote Control from PC and ±0.3°C Accuracy

Compact Dataloggers with PC Connectivity

HI 140 loggers weigh merely 150 grams each and are not much larger than your PC mouse. They are housed in a smooth, yet tough ABS casing that is sealed against ingress of dust and water.

HI 140 models are tailor-made with different temperature ranges to make them more accurate for your specific needs. They are also very simple-to-use with no keys or buttons to press or hold. A Green LED on the front of the meter will notify you of the logging status, while a Red LED serves as an alarm indication when undesired temperatures have been encountered.

HI 140 series can monitor and store up to 7600 temperatures in non-volatile memory for downloading and analysis. Users can then transfer the logged data to the PC by simply placing the instrument on the HI 90140 interface and running the HI 92140 software. Users need just one interface connected to your PC to handle all HANNA dataloggers, each identified by a unique ID code.

Each model of the HI 140 series is available with molded eye for easy mounting.

- *Store up to 7600 Temperatures*
- *Available in a wide range of temperatures*
- *Economical*





SPECIFICATIONS
HI 140 WITHOUT HOOK

MODEL	RANGE	RESOLUTION	ACCURACY
HI 140A	-30.0 to 70.0°C / -22.0 to 158.0°F	0.5°C / 0.5°F	±1.5°C / ±3°F
HI 140B	-10.0 to 30.0°C / 14 to 86°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 140C	-30.0 to 10.0°C / -22 to 50°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 140D	20.0 to 60.0°C / 68 to 140°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 140E	-30.0 to -10.0°C / -22 to 14°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 140F	20.0 to 40.0°C / 68 to 104°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 140G	-5.0 to 15.0°C / 23 to 59°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 140H	10 to 120°C / 50 to 248°F	1°C /.2°F	±2°C / ±4°F

HI 140 WITH HOOK (MOLDED EYE)

MODEL	RANGE	RESOLUTION	ACCURACY
HI 140AH	-30.0 to 70.0°C / -22.0 to 158.0°F	0.5°C / 0.5°F	±1.5°C / ±3°F
HI 140BH	-10.0 to 30.0°C / 14 to 86°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 140CH	-30.0 to 10.0°C / -22 to 50°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 140DH	20.0 to 60.0°C / 68 to 140°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 140EH	-30.0 to -10.0°C / -22 to 14°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 140FH	20.0 to 40.0°C / 68 to 104°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 140GH	-5.0 to 15.0°C / 23 to 59°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 140HH	10 to 120°C / 50 to 248°F	1°C /.2°F	±2°C / ±4°F

All loggers have the following features: programmable high and low alarm thresholds; programmable logging interval from 1 min. to 23 hours and 59 min; logging delay start selectable from 0 min. to 23 hours and 59 min; programmable ID number; infrared communication with serial interface; programmable real time clock; 3 x 1.5V AA batteries (included) with approx. life of 4 years at 25°C; dimensions: dia 86.5 mm x h 35 mm; / weight: 150 g

ORDERING INFORMATION

All **HI 140** models are supplied with AA 1.5V batteries (3)

ACCESSORIES

HI 90140	Infrared interface for PC connection
HI 92140	Windows® compatible software

www.hannainst.com

Pt100 Thermometers



The operating principle of resistance thermometers is based on the increase of electric resistance of metal conductors (RDT: Resistance Temperature Detectors) with temperature.

This physical phenomenon was discovered by Sir Humphry Davy in 1821. In 1871, Sir William Siemens described the application of this property using platinum, thereby introducing an innovation in the manufacturing of temperature sensors. Platinum resistance thermometers have been used as international standard for measuring temperatures between hydrogen triple point at 13.81 K and the freezing point of antimony at 630.75°C (1167.26°F).

Among the various metals to be used in the construction of resistance thermometers, platinum, a noble metal, is the one that can measure temperatures throughout a wide range, from -251 (-419.8°F) to 899°C (1650.2°F), with a linear behavior.

Platinum RTD thermometers were common in the seventies but now they have been replaced with thermistor sensors because of their smaller dimensions (weight) and faster response to temperature changes. The most common RTD sensor, using platinum, is the Pt100, which means a resistance of 100W at 0°C with a temperature coefficient of 0.00385W per degree Celsius. For a higher price one can buy platinum sensors with 250, 500 or 1000W (Pt1000).

The main disadvantage of RTD probes is the resistance of the connection cable.

This resistance prevents the use of standard two-wire cables for lengths over a few meters, since it affects the accuracy of the reading. For this reason, to obtain high levels of accuracy in industrial and laboratory applications, the use of a three or four-wire system is recommended.

For all its Pt100 thermometers and probes, HANNA has chosen the multiple-wire technology for higher accuracy.



Infrared Thermometers

All objects emit a radiant energy in the infrared (IR) spectrum that falls between visible light and radio waves.

The origins of IR measurements can be traced back to Sir Isaac Newton's prism and the separation of sunlight into colors and electro-magnetic energy. In 1800, the relative energy of each color was measured but it was not until early 20th century that IR energy was quantified. It was then discovered that this energy is proportional to the 4th power of the object's temperature.

IR instrumentation using this formula has been around for over 50 years. They almost exclusively use an optic device that detects the heat energy generated by the object that the sensor is aimed at. This is then amplified, linearized and converted into an electronic signal which in turn shows the surface temperature in Celsius or Fahrenheit degrees.



Infrared measurements are particularly suitable for areas where it is difficult or undesirable to take surface measurements using conventional contact sensors. Applications for IR meters include non-destructive testing of foodstuffs, moving machinery, high temperature surfaces and hazardous areas, such as high voltage wires.

An ideal surface for IR measurements is a black body or radiator with an emissivity of 1.0. Emissivity is the ratio of the energy radiated by an object at a certain temperature to that emitted by a perfect radiator at the same temperature.

The shinier or more polished the surface, the less accurate the measurements. For example, the emissivity of most organic material and rough or painted surfaces is in the 0.95 region and hence, suitable for IR measurements.

On the other hand, surfaces of highly polished or shiny material, such as mirrors or aluminum, may not be appropriate for this application without using some form of filtration. This is due to other factors, namely, reflectivity and transmissivity. The former is a measure of an object's ability to reflect infrared energy while the latter is its ability to transmit it.

HI 142 • HI 504903

Temperature Monitoring System

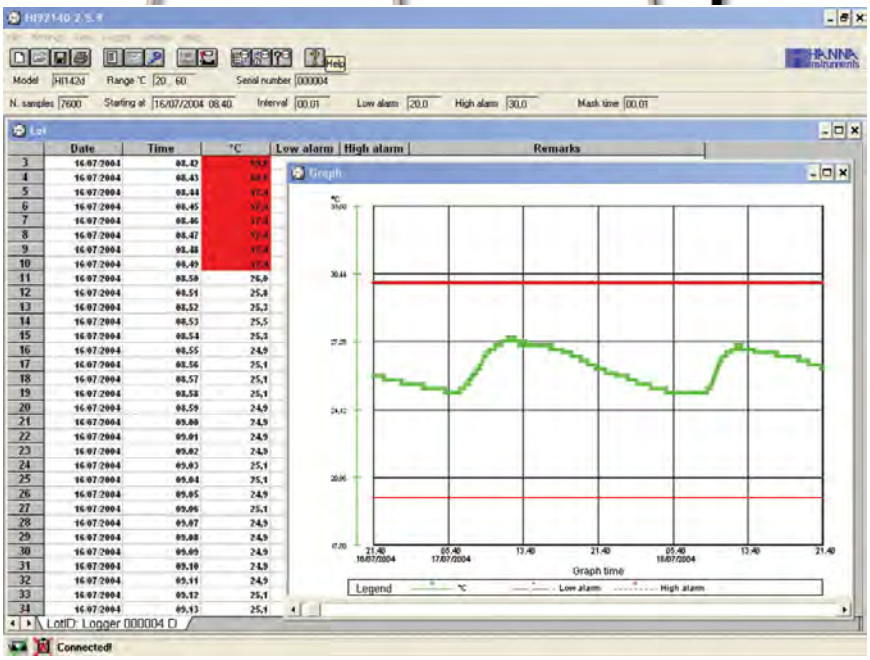
for Temperature Monitoring from PC, Cellular Phone and Modem

GSM · B.E.P.S. · PC compatible

• *Cable length connection is determined by the user*







Direct or Modem connection between your Loggers and the PC

Required temperature monitoring and control is becoming more prevalent in the food industry, catering and supermarkets.

Several regulations also dictate a hard copy of the measured temperatures from production to the consumer.

For this reason many instruments have been produced for continuous temperature monitoring, but they usually have to be removed from their location for data downloading.

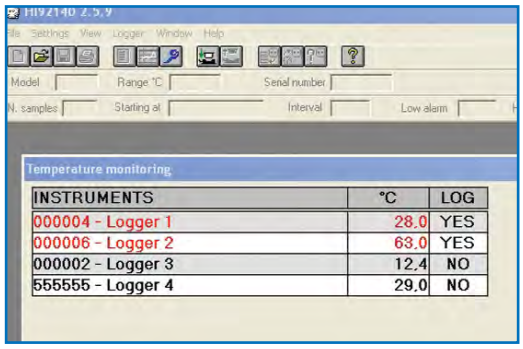
Now, with the advanced technology of our HI 142 this is no longer a problem. HI 142, available in 8 models with different temperature ranges, allows for data transfer directly to a PC or through the HI 504903 GSM supervisor.

You can interact with the loggers directly from your PC, perform set-up, check the status of the instruments and download the data when the logging is complete.

You can choose between two connection types: a direct connection between the

Temperature Monitoring System

for Temperature Monitoring from PC, Cellular Phone and Modem



- *Dataloggers have the ability to be either directly connected to a PC or through the use of the HI 504903 GSM supervisor*



HI 142 and a PC or to the HI 142/HI 504903 system. The HI 142/HI 504903 system allows a remote modem connection for supervision of the loggers where a direct connection is not available.

It is possible to build a control network with up to 31 loggers.

If an error occurs in one or more loggers such as, the measured temperature is outside the set limit or in case of a power failure, HI 504903 will advise the user by sending an SMS to the programmed phone number(s). The message will contain the logger ID and the error. If HI 504903 does not receive any confirmation of received SMS, it will continue to send the message and call the user.

The operator can also check the system status by calling the HI 504903 GSM supervisor, that will answer with an SMS for each logger. The message will include the operating status (stand-by-logging), any recorded error and the current temperature.

SPECIFICATIONS MODEL	RANGE	RESOLUTION	ACCURACY
HI 142A(H)	-30.0 to 70.0°C / -22.0 to 158.0°F	0.5°C / 0.5°F	±1.5°C / ±3°F
HI 142B(H)	-10.0 to 30.0°C / 14 to 86°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 142C(H)	-30.0 to 10.0°C / -22 to 50°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 142D(H)	20.0 to 60.0°C / 68 to 140°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 142E(H)	-30.0 to -10.0°C / -22 to 14°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 142F(H)	20.0 to 40.0°C / 68 to 104°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 142G(H)	-5.0 to 15.0°C / 23 to 59°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 142H(H)	10 to 120°C / 50 to 248°F	1°C / 2°F	±2°C / ±4°F

SPECIFICATIONS FOR ALL MODELS	
Data Logging	up to 7600 samples
Environment	0 to 50°C (32 to 122°F); RH max 95%
Power Supply	10-20 Vdc
Probe	fixed, with 1.5 m cable of non-toxic material
Dimensions / Weight	dia 86.5 x h 35 mm (dia 3.4 x h 1.4") / 150 g (5.5 oz.)

ORDERING INFORMATION

HI 142 is supplied with instructions

HI 504903 is supplied with configuration software, line termination key, HI 920010 serial cable for PC connection, 12 Vdc power adapter and instructions.

ACCESSORIES

HI 504903-1 GSM supervisor (dual-band 900/1900 MHz with 115 Vac/12 Vdc power adapter)

HI 504903-2 GSM supervisor (dual-band 900/1800 MHz with 230 Vac/12 Vdc power adapter)

HI 92140 Windows® compatible software

HI 143

T-Logger

with locking wall cradle



Secure Temperature Logger

HI 143 is a temperature data logger with internal NTC sensor. The HI 143 is controlled via USB on a PC with HANNA's Windows® compatible application software. Communication is made between the logger and the PC through the HI 143001 transmitter with RS232 or HI 143002 with USB connector. The supplied wall cradle makes it easy to lock the meter in place to prevent tampering and the application software supports security passwords.

- *Logging start through PC* by pressing a button or at a set time
- *Selectable sampling interval* from 1 minute to 24 hours
- *Up to 4,000 logged samples*
- *Selectable measurement unit,* °C or °F
- *Min/Max* measured values are stored and displayed
- *Programmable high and low alarms*
- *Non-volatile storage* of logging parameters and data
- *Battery level indicator on display*
- *Security password*
- *IP 65 protection*





HANNA instruments

With Great Products, Come Great Results™

HI 143

T-Logger

with locking wall cradle



SPECIFICATIONS	HI 143
Range	-30. to 70.0°C/-22.0 to 158.0°F
Resolution	0.1°C/0.1°F
Accuracy	±0.4°C (-20 to 60°C); ±0.6°C (outside) ±0.7°F (-4 to 140°C); ±1.1°F (outside)
Calibration	Factory calibrated
Datalogging	Up to 4,000 samples
Logging interval	User selectable, from 1 minute to 24 hours
Battery Type / Life	(1) CR2032 3V lithium ion/approx. 2 years
Protection	IP 65 (water-resistant)
Dimensions	60 x 37 x 17 mm (2.4 x 1.5 x 0.7")

ORDERING INFORMATION

HI 143 is supplied with CR2032 lithium battery, wall cradle, lock and instructions.

HI 143-00 is supplied with HI 143002 USB communication cradle, Windows® compatible application software, CR2032 lithium battery, wall cradle, lock and instructions.

HI 143-10 is supplied with HI 143001 RS232 communication cradle, Windows® compatible application software, CR2032 lithium battery, wall cradle, lock and instructions.

ACCESSORIES

HI 143002 USB communication cradle.

HI 143001 RS232 communication cradle.

HI 98501 • HI 98502 • HI 98505 • HI 98506

Checktemp® Electronic Digital Thermometer

with ±0.3°C Accuracy and CAL CHECK™



Quick and Accurate Temperature Measurement

Did you ever wish that your temperature measurements could be made a little easier? The Checktemp® offers better accuracy over a wider range without worrying about breakage or condensation. Checktemp® might just be what you have been looking for!

The Checktemp® offers NO breakage, NO waste, NO injuries, NO difficulty in reading; not even a parallax error by taking a wrong measurement due to the angle of view!

Checktemp® is provided with the unique calibration check function: simply activate a switch and the instrument will simulate an ice bath of 0.0°C (32.0°F) signal that is displayed on the LCD within a range of ±0.3°C (±0.5°F). This system guarantees the accuracy of your measurement every time!

The sharp-tip probe of the Checktemp® easily penetrates semisolid products, making routine controls simple and quick for both incoming and outgoing goods. Checktemp® is the ideal instrument for measuring temperature according to HACCP requirements.

Checktemp® L models feature a round tip probe for liquid measurements and safety.

- *CAL CHECK™*
- *Ideal for Spot Checks*
- *Fast and Accurate Results*

SPECIFICATIONS	HI 98501 (Checktemp® C)	HI 98502 (Checktemp® F)	HI 98505 (Checktemp® LC)	HI 98506 (Checktemp® LF)
Range	-50.0 to 150.0°C	-58.0 to 302.0°F	-50.0 to 150.0°C	-58.0 to 302.0°F
Resolution	0.1°C	0.1°F (58.0 to 199.9°F); 1°F (200 to 302°F)	0.1°C	0.1°F (58.0 to 199.9°F); 1°F (200 to 302°F)
Accuracy	±0.3°C (-20 to 90°C) ±0.5°C (outside)	±0.5°F (-4 to 194°F) ±1°F (outside)	±0.3°C (-20 to 90°C) ±0.5°C (outside)	±0.5°F (-4 to 194°F) ±1°F (outside)
Probe	fixed, stainless steel 105 x dia 3 mm (4.1 x dia 0.1") (penetration)	fixed, stainless steel 105 x dia 3 mm (penetration)	fixed, stainless steel 105 x dia 3 mm (liquid)	fixed, stainless steel 105 x dia 3 mm (liquid)
Battery Type / Life	(1) 1.5V / approx. 3000 hours of continuous use			
Environment	0 to 50°C (32 to 122°F); RH max 95%			
Dimensions / Weight	66 x 50 x 25 mm (2.6 x 2.0 x 1.0") / 50 g (1.8 oz.) - meter only			

ORDERING INFORMATION

HI 98501 (Checktemp®C) is supplied with penetration probe, protective cap, battery and instructions

HI 98505 (Checktemp®LC) is supplied with probe for liquid measurement, protective cap, battery and instructions

HI 98502 (Checktemp®F) is supplied with penetration probe, protective cap, battery and instructions

HI 98506 (Checktemp®LF) is supplied with probe for liquid measurement, protective cap, battery and instructions

Pocket Thermometers

with -50 to 150°C Range and ±1°C Accuracy

Compact Testers for a Variety of Applications

HI 98501-1 and HI 98509-1 are two models with the same technical characteristics, but designed for different applications.

HI 98501-1 is a compact meter with direct probe that is suitable for temperature measurements in semisolid samples and liquid testing.

HI 98509-1 is provided with a probe and a 1 meter (3.3') cable, that allows easy measurements in hard-to-reach locations. Moreover, the large LCD immediately displays the temperature value, making routine monitoring simple and fast.

These thermometers are the closest, digital alternative to traditional glass thermometers.



SPECIFICATIONS	HI 98501-1	HI 98509-1
Range	-50.0 to 150.0°C	
Resolution	0.1°C	
Accuracy	±1°C	
Probe	stainless steel 105 mm x dia 3 mm (4.1 x dia 0.1")	stainless steel with 1 m (3.3') cable 160 mm x dia 3 mm (6.3 x dia 0.1")
Battery Type / Life	(1) 1.5V / approx. 3000 hours of use	(1) 1.5V AAA / approx. 3 years of use
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	66 x 50 x 25 mm (2.6 x 2.0 x 1.0")	106 x 58 x 19 mm (4.2 x 2.3 x 0.7")
Weight	50 g (1.8 oz.) - meter only	80 g (2.8 oz.) - meter only

ORDERING INFORMATION

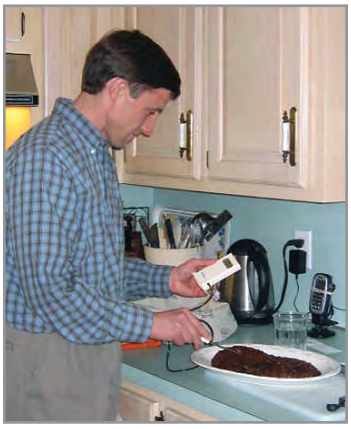
HI 98501-1 is supplied with battery and instructions
HI 98509-1 is supplied with battery and instructions

HI 98509 • HI 98510

Pocket Thermometer

with Stainless Steel Probe with 1 m (3.3') Cable, ±0.3°C Accuracy and CAL CHECK™





The Checktemp®1 is ideal to check the temperature of meat

1 m flexible cable for Easy Measurement Readings

High Precision Thermometer Checktemp®1 is a high accuracy thermometer with a 1m (3.3') flexible cable between the meter and the stainless steel probe. This penetration probe is perfect for fast response in liquids, air, frozen and semisolid materials. These thermometers utilize a high-tech NTC thermistor sensor to measure the temperature. Thermistors make it possible to obtain extremely high accuracy in a very short period of time.

A CAL Check™ features has been incorporated into the Checktemp®1. Activate the "test" switch and this device will simulate an ice bath of 0.0°C (32.0°F) signal that is displayed on the LCD within a range of ±0.3°C (±0.5°F). This assures the user that the reading is reliable and accurate, every time.

The sharp-tip probe easily penetrates semisolid products such as fruits, vegetables and cheeses. Checktemp®1 makes routine controls are fast and simple for both incoming and outgoing goods. Constructed of AISI 316 stainless steel material, this probe is in compliance with food regulations.

Checktemp®1 is an ideal instrument for measuring temperature according to HACCP requirements.

Checktemp® Dip is also available with a weighted probe and flexible 3m cable, ideal for measurements in tanks.

- *Stainless steel probe with sharp tip for semi-solids*
- *Incorporated calibration test*
- *Ideal for HACCP requirements*

SPECIFICATIONS	HI 98509 Checktemp®1C	HI 98510 Checktemp®1F
Range	-50.0 to 150.0°C	-58.0 to 302.0°F
Resolution	0.1°C	0.1°F
Accuracy	±0.3°C (-20 to 90°C) / ±0.5°C (outside)	±0.5°F (-4 to 194°F) / ±1°F (outside)
Probe	stainless steel, 160 x dia 3 mm (6.3 x dia 0.1"), with 1 m (3.3') cable	
Battery Type / Life	(1) 1.5V AAA / approx. 3 years of use	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	106 x 58 x 19 mm (4.2 x 2.3 x 0.7")	
Weight	80 g (2.8 oz.) - meter only	

ORDERING INFORMATION

HI 98509 (Checktemp®1 C) is supplied with battery and instructions

HI 98509-01 (Checktemp® Dip C) is supplied complete with weighted probe with 3 m (10') cable, battery and instructions

HI 98510 (Checktemp®1 F) is supplied complete with battery and instructions.

HI 98510-01 (Checktemp® Dip F) is supplied complete with weighted probe with 3 m (10') cable, battery and instructions.

ACCESSORIES

HI 740024 Base for Checktemp® 1



HI 740024 Base for Checktemp®1

HANNA instruments

With Great Products, Come Great Results™

Pocket Thermometer

with Folding Probe ±0.3°C Accuracy and CAL CHECK™

Pocket Thermometer with Folding Probe— Ideal for Spot Checks

Checktemp® 4 provides practical solutions to temperature measurement for food service.

Special attention was given to the ergonomic form of Checktemp® 4. This thermometer fits comfortably and securely in your hand. An oversized LCD, on the side of the handle is easy to see and read. The fast responding, fold-away probe is made of high quality, stainless steel and can penetrate semi-frozen and semi-solid foods like meats, ice cream and cheeses. When you are finished using your Checktemp® 4, wipe the probe clean and fold it away. Checktemp® 4 automatically turns OFF so you can safely carry it in your pocket.



CAL CHECK™

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 the security of knowing you have accurate measurements. CAL CHECK™ also lets you know if your battery level is low or if your thermometer requires recalibration.

- *High accuracy*
- *Enables measurment at different angles*
- *Stainless steel folding probe with penetration tip*
- *Ergonomic*
- *Incorporated calibration test*
- *Auto shut-off*

SPECIFICATIONS	HI 151-00 (Checktemp® 4C)	HI 151-01 (Checktemp® 4F)
Range	-50.0 to 220°C	-58.0 to 428°F
Resolution	0.1°C (-50.0 to 199.9°C); 1°C (200 to 220°C)	0.1°F (-58.0 to 199.9°F); 1°F (200 to 428°F)
Accuracy	±0.3°C ±1 digit (-20.0 to 90.0°C); ±1% F.S. ±1 digit (outside)	±0.5°F ±1 digit (-4.0 to 194.0°F); ±1% F.S. ±1 digit (outside)
Calibration Check	automatic, at start-up	
Probe	stainless steel, with penetration tip, 117 x dia 3.5 mm (4.6 x dia 0.14")	
Battery Type / Life	(1) 1.5V AA / approx. 25000 hours; auto-off after 8 minutes of non-use	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	165 x 50 x 20 mm (6.5 x 2.0 x 0.8")	
Weight	100 g (3.5 oz.)	

ORDERING INFORMATION

HI 151-00 (Checktemp®4 C) is supplied complete with battery and instructions

HI 151-01 (Checktemp®4 F) is supplied complete with battery and instructions

HI 145

Pocket Thermometers

Designed for HACCP Control with Cal-Check™ and ±0.3°C Accuracy



HI 145-20 (°C) — HI 145-30 (°F):
Stainless steel probe
300 x dia 5 mm

HI 145-00 (°C) — HI 145-01 (°F):
Stainless steel probe
125 x dia 5 mm



SPECIFICATIONS	HI 145-00	HI 145-01	HI 145-20	HI 145-30
Range	-50.0 to 220°C	-58.0 to 428.0°F	-50.0 to 220°C	-58.0 to 428.0°F
Resolution	0.1°C (-50.0 to 199.9°C); 1°C (200 to 220°C)	0.1°F (-58.0 to 199.9°F); 1°F (200 to 428°F)	0.1°C (-50.0 to 199.9°C); 1°C (200 to 220°C)	0.1°F (-58.0 to 199.9°F); 1°F (200 to 428°F)
Accuracy	±0.3°C (-20 to 90°C); ±0.4% F.S. (outside)	±0.6°F (-4 to 194°F); ±0.4% F.S. (outside)	±0.3°C (-20 to 90°C) ±0.4% F.S. (outside)	±0.6°F (-4 to 194°F); ±0.4% F.S. (outside)
Probe	stainless steel 125 mm x dia 5 mm (4.9 x dia 0.2")		stainless steel 300 mm x dia 5 mm (11.8 x dia 0.2")	
Battery Type / Life	1 x 1.5V AAA / approx. 10000 hours of continuous use; auto-off after 8 minutes of non-use			
Environment	-10 to 50°C (14 to 122°F); RH max 95%			
Dimensions	92 x 165 x 38 mm		92 x 340 x 38 mm	
Weight	65 g (2.3 oz.)		80 g (2.8 oz.)	

T-shaped HACCP Thermometer

HI 145 thermometers were developed for HACCP programs that need high standards of performance with simplicity-of-use. The durable T-shaped handle fits comfortably in hand and is ideal for applications where applied force is necessary for insertion, such as with incoming meat inspection and semi-frozen foods. The LCD positioned on top of the meter allows for easy reading in cooking applications.

The HI 145 thermometer is idealy suited for monitoring incoming merchandise and food storage, as well as applications in food preparation, and during cooking.

HI 145-00 and **HI 145-01** are equipped with a 5" (125mm) long AISI 316 stainless steel probe. The sharp conical tip provides fast response and improved accuracy over the entire range.

HI 145-20 and **HI 145-30** are supplied with a 12" (300mm) long stainless steel probe; ideal for monitoring hot liquids, such as deep frying and soup preparation.

With an automatic CAL CHECK™ feature, the HI 145 series performs a self check of its calibration status and displays it on the LCD. With this feature, accuracy is assured and you can have confidence in your readings.

- *T-shaped body for easy LCD reading*
- *2 probe lengths available*
- *CAL CHECK™ equipped*
- *Ideal for semi-solids, deep fryers and soup preparation*
- *Exceptionally long battery life of over a year*

ORDERING INFORMATION

All models of the HI 145 series are supplied complete with battery and instructions
HI 145-00 with 125 mm probe
HI 145-01 with 125 mm probe
HI 145-20 with 300 mm probe
HI 145-30 with 300 mm probe

HANNA instruments

With Great Products, Come Great Results™

Checkfridge™ Pocket Thermometer

with Magnetic Backing, Remote Thermistor Sensor, ±0.3°C Accuracy and CAL CHECK™

Monitor Temperature Inside, Read Results Outside

Few manufacturers have given any thought to providing the user a convenient means to monitor internal temperature conditions of a refrigerator or freezer from the outside. When contents of freezer and refrigeration units need to be monitored to ensure safety and preservation, you need a thermometer that is as accurate and easy to read.

The HI 147 is the ideal choice when you need accurate and reliable temperature monitoring.

How do you know when the reading on the thermometer is correct? You could make an ice point or slurry. Even then there could be several degrees difference in the real vs theoretical temperatures. With HI 147, you do not need to waste time preparing and ice bath for making these tests. Its unique CAL CHECK™ feature can do it for you. Conveniently located on the face of the thermometer is a TEST switch. Engage the switch and the HI 147 performs an internal calibration check. In only a few seconds, you see the results on the large LCD. Return the switch to the READ position and the HI 147 returns to its normal measuring status.

- *Magnetic backing*
- *Perfect for refrigerator and freezer monitoring*
- *Food grade stainless steel thermistor probe on 1m (3.3') cable*
- *Fast Response*
- *CAL CHECK™ verification*
- *Low battery warning*
- *Small and lightweight*





SPECIFICATIONS	HI 147-00 Checkfridge™ C	HI 147-01 Checkfridge™ F
Range	-50.0 to 150.0°C	-58.0 to 302.0°F
Resolution	0.1°C	0.1°F (-58.0 to 199.9°F) 1°F (200 to 302°F)
Accuracy	±0.3°C (-20 to 90°C); ±0.5°C (outside)	±0.6°F (-4 to 194°F); ±1°F (outside)
Calibration Check	manual, through switch	
Probe	stainless steel, general purpose; 40 x dia 5 mm (1.6 x dia 0.2"); 1 m (3.3') cable	
Battery Type / Life	(1) 1.5V AAA / approx. 3 years of use	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions (meter only)	93 x 39 x 31 mm (3.7 x 1.5 x 1.2")	
Weight	60 g (2.1 oz.)	

ORDERING INFORMATION

HI 147-00 (Checkfridge™ C) is supplied complete with battery and instructions
HI 147-01 (Checkfridge™ F) is supplied complete with battery and instructions

Thermometers

An introduction to HANNA Thermometers

Another important and practical concern is the field of view. Infrared meters measure the average temperature of all objects in their field of view. To obtain an accurate result, it is important that the object completely fills the instrument's field of view and there are no obstacles between the meter and the object. The distance-to-target ratio, or the optic coefficient, is therefore an important consideration.

Reference Temperatures

In 1990, NIST established 17 fixed points of the International Temperature Scale (ITS-90) related to reproducible physical phenomena in nature. The ITS-90 Fixed Points are shown in the chart below:

Equilibrium state	K	°C
Vapor pressure point of helium	3 to 5	-270.15 to -268.19
Triple point of hydrogen	13.8033*	-259.346*
Boiling point of hydrogen at a pressure of 33.330.6 Pa	17.042*	-256.108*
Boiling point of equilibrium hydrogen	20.28*	-252.87*
Triple point of neon	27.102	-246.048
Triple point of oxygen	54.361	-218.789
Triple point of argon	83.8058	-189.3442
Triple point of mercury	234.3156	-38.8344
Triple point of water	273.16	0.01
Triple point of gallium	302.9146	29.7646
Melting point of indium	429.7485	156.5985
Melting point of tin	505.078	231.928
Melting point of zinc	692.677	419.527
Melting point of aluminum	933.473	660.323
Melting point of silver	1234.93	961.78
Melting point of gold	1337.33	1064.18
Melting point of copper	1357.77	1084.62

* Given for e-H2 , which is hydrogen at the equilibrium concentration of the ort and para molecular forms.







HI 98517 KEY® °C • HI 98518 KEY® °F

KEY® Pocket Thermometer

From -40 to 550°C in a Pocket Thermocouple Thermometer



Thermocouple Thermometer with Interchangeable Probe

The KEY® is a K-type thermocouple thermometer with an interchangeable probe for quick spot measurements. With a response time of less than 20 seconds in water, KEY is ideal for quality control and routine industrial temperature monitoring.

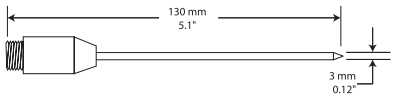
There are 5 interchangeable temperature probes available to meet your specific requirements.

In the HVAC field, gas and air can be monitored with the HI 98517-11 probe. The HI 98517-13 probe is for penetration and is included with the meter. It also provides a fast response typical of a thermocouple probe. HI 98517-15 and HI 98517-30 probes are for general liquid monitoring. The HI 98517-12 being a surface probe is made for machine shops, molding facilities and welding surfaces.

The casing of the meter is designed redesigned with an ergonomic and appealing shape. Each probe is constructed out of rugged AISI 316 stainless steel, that resists the harmful effects of chemicals and humid conditions.

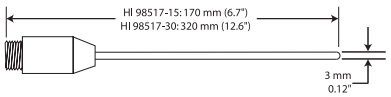
HI 98517 (KEY®°C) provides temperature measurements in degrees Celsius, while the HI 98518 (KEY®°F) model reads in degrees Fahrenheit.

- *Ideal for spot measurements*
- *5 interchangeable stainless steel probes available*



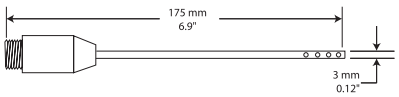
HI 98517-13 penetration/general purpose

K-type thermocouple probe supplied with KEY®. Application: liquid, air/gas, penetration of semisolids.



HI 98517-15 and HI 98517-30 liquid/general purpose

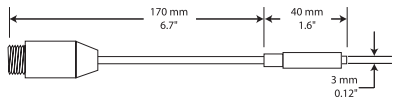
K-type thermocouple probe for KEY®. Application: liquids, air/gas.



HI 98517-11, air/gas

K-type thermocouple probe for KEY®.

Application: air/gas.



HI 98517-12, surface

K-type thermocouple probe for KEY®.

Application: solids, plates, furnaces, molds.

SPECIFICATIONS	HI 98517 (KEY®C)	HI 98518 (KEY®F)
Range	-40 to 550°C	-40 to 999°F
Resolution	1°C	1°F
Accuracy	±2°C	±4°F
Response Time	approx. 20 seconds in water (with HI 98517-13 probe, included)	
Battery Type / Life	4 x 1.5V / approx. 700 hours of continuous use	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions (meter only)	175 x 41 x 23 mm (6.2 x 1.4 x 0.8")	
Weight	78 g (3.0 oz.)	

ORDERING INFORMATION

HI 98517 (KEY®C) and **HI 98518** (KEY®F) are supplied with HI 98517-13 probe, batteries and instructions

PROBES

HI 98517-11 K-thermocouple probe for air/ gas
HI 98517-12 K-thermocouple probe for surfaces
HI 98517-13 K-thermocouple probe for penetration
HI 98517-15 K-thermocouple probe for liquid/general purpose, length 170 mm (6.7")
HI 98517-30 K-thermocouple probe for liquid/general purpose, length 320 mm (12.6")

Mount Right Over the Samples!

HI 146-00, HI 146-01 and the new waterproof HI 146-99 are high accuracy thermometers with a professional-grade probe and a flexible 2 m (6.6') cable. The CAL CHECK™ feature is incorporated into its function to allow you to confirm the accuracy of the meter any time.

You can monitor the exact temperature of any product continuously and easily observe it on the large LCD display.

With their compact and simplified design featuring with a fixed stainless steel probe and an optional probe holder, these thermometers ideal for monitoring the temperatures of liquids, semisolids and refrigerated food.

HI 146-00, HI 146-01 and HI 146-99 can be easily carried from station to station or installed in a fixed position utilizing the molded eye along and wall mount probe holder.

- *CAL CHECK®*
- *Hang above the samples or spot check*
- *Stainless steel temperature probe*
- *Waterproof (HI 146-99)*



Accurate Measurements with CAL CHECK®

In order to make sure that the meter is reporting the correct temperature, HI 146 has been designed with HANNA's exclusive CAL CHECK™ switch. By simply setting the switch from "READ" to "TEST" and without requiring any external equipment, users can ensure the accuracy of the meter. In the "TEST" mode, HI 146 shows 0.0 °C (or 32.0°F) ±0.3°C (±0.5°F) which is the accuracy of the meter. With this HANNA innovation, the accuracy can be checked throughout the life of the thermometer without requiring any accessories or additional investments.

ORDERING INFORMATION

HI 146-00, **HI 146-01** and **HI 146-99** are supplied with probe, battery and instructions

ACCESSORIES

HI 750146 Wall-mounted probe holder



HI 750146 Wall-Mounted Probe Holder

SPECIFICATIONS	HI 146-00	HI 146-01	HI 146-99
Range	-50.0 to 150.0°C	-58.0 to 302.0°F	-50.0 to 150.0°C
Resolution	0.1°C	0.1°F (-58.0 to 199.9 °F) 1°F (200 to 302 °F)	0.1°C
Accuracy	±0.3°C (-20 to 90°C) ±0.5°C (outside)	±0.5°F (4 to 194°C) ±1°F (outside)	±0.3°C (-20 to 90°C) ±0.5°C (outside)
Probe (fixed)	stainless steel, 160 x dia 3 mm (6.3 x dia 0.1"), 2 m (6.6') cable		
Battery type/life	1 x 1.5V AA / approx. 5 years		
Environment	0 to 50°C (32 to 122°F); RH max 95%		0 to 50°C; RH max 100%
Dimensions	86 x 110 x 43 mm (3.4 x 4.3 x 1.7")		
Weight	150 g (5.3 oz.)		

HI 97500

Portable Lux Meter

or Rapid Light Measurements in a Waterproof Case



Easily Perform Light Measurements

HI 97500 is a portable lux meter designed to perform light measurements with ease. The instrument is provided with a light sensor connected to the meter through a coaxial cable, allowing measurements from a distance, without any interference from the operator.

By simply pressing the RANGE key, it is possible to switch among three ranges and choose the best resolution according to the environment being tested. The HI 97500 lux meter has a rugged and water-resistant body for outdoor use without any problems.

The 9V battery and automatic shut-off feature guarantee about 200 hours of operation.

- *Three measurement ranges*
- *Light sensor attached to 1.5 meter coaxial cable*
- *Rugged, waterproof case*
- *Low-battery indicator*

SPECIFICATIONS	HI 97500
Range	0.001 to 1.999 Klux 0.01 to 19.99 Klux 0.1 to 199.9 Klux
Resolution	0.001 Klux 0.01 Klux 0.1 Klux
Accuracy	±6% of reading ±2 digits
Sensor	human-eye-response silicon photodiode with 1.5 m coaxial cable (fixed)
Battery Type / Life	1 x 9V alkaline / approx. 200 hours of continuous use; auto-off after 7 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH 100%
Dimensions	164 x 76 x 45 mm (6.5 x 3.0 x 1.8")
Weight	180 g (6.3 oz.)

ORDERING INFORMATION

HI 97500 is supplied with battery, protective case and instructions

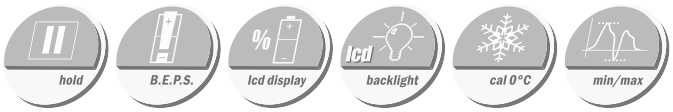
The Quality of Light

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 formula:

foot-candle = lux x 0.0929

lux = foot-candle x 10.764



HI 935005 • HI 935005N

K-Type Thermocouple Thermometers

Waterproof with Dual-level LCD

Thermometers with Extended battery Life

HI 935005 is a hand-held waterproof thermometer that uses a K-type sensor together with an advanced micro-processor to deliver accurate temperature measurement with an extraordinary 1600 hour battery life. Battery level indication with low battery warning and error prevention furnishes this meter with advanced battery management functions.

This unit displays current temperature along with the minimum and maximum extremes achieved during the session on a dual-level LCD. A HOLD button provides the user time to record readings. The °C/°F button instantly switches between the Celsius and Fahrenheit ranges.

For dimly lit areas, HI 935005N is your choice. HI 935005N features a user-activated backlight for low or no light conditions. The CAL button allows the operator to remove the combined meter and probe interchange error in an ice bath at 0°C, for added accuracy and reliability.

Select from a wide variety of interchangeable probes to meet your specific needs.

The HANNA exclusive shockproof rubber boots, HI 710007 and HI 710008 offer maximum impact protection.

- *Dual ranges*
- *High accuracy + 0.2% Full Scale, excluding probe error*
- *Waterproof casing with ergonomic design*
- *Tactile rubber keys to prevent the ingress of substances*
- *Large dual level LCD displays high and low readings along with current temperature*
- *HOLD button freezes readings on the display*
- *Battery level indicator at startup*
- *Low battery warning with BEPS*
- *Long battery life of 1600 hours*
- *Optional HI 710007 (blue) or HI 710008 (orange) rubber boot available*
- *Backlit Display (HI 935005N)*
- *Calibration feature (HI 935005N)*



HI 710007 Shockproof Rubber Boot

SPECIFICATIONS	HI 935005	HI 935005N
Range	-50.0 to 199.9°C and 200 to 1350°C; -58.0 to 399.9°F and 400 to 2462°F	
Resolution	0.1°C (-50.0 to 199.9°C) and 1°C (outside); 0.1°F (-58.0 to 399.9°F) and 1°F (outside)	
Accuracy	±0.2% F.S. (for 1 year, excluding probe error)	
Probe	K-thermocouple type, HI 766 series (not included)	
CAL Button	N/A	Yes
Backlit LCD	N/A	Yes
Battery Type / Life	(3) 1.5V AA / approx. 1600 hours of continuous use (with backlight off); HI 935005 only: auto-off selectable after 8 or 60 minutes of non-use (can be disabled)	
Environment	-10 to 50°C (14 to 122°F); RH max 100%	
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")	
Weight	235 g (8.3 oz.)	

ORDERING INFORMATION

HI 935005 is supplied with batteries, protective case and instructions

HI 935005N is supplied with batteries, protective case and instructions

PROBES

HI 766C	Penetration K-type temperature probe with 1 m cable
HI 766D	Air K-type temperature probe with 1 m cable
HI 766E1	General purpose K-type temperature probe with 1 m cable

ACCESSORIES

HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 710018	Spare protective case

HI 935002 • HI 935009

K-Type Thermocouple Thermometers

Waterproof, 2-Channel Meters



HI 710008 Shockproof Rubber Boot

K-type thermocouple probes should be ordered separately to meet your specific application.

SPECIFICATIONS	HI 935002	HI 935009
Range	-50.0 to 199.9°C and 200 to 1350°C; -58.0 to 399.9°F and 400 to 2462°F	
Resolution	0.1°C (-50.0 to 199.9°C) and 1°C (outside); 0.1°F (-58.0 to 399.9°F) and 1°F (outside)	
Accuracy	±0.2% F.S. (for 1 year, excluding probe error)	
Probe	K-thermocouple type, HI 766 series (not included)	
CAL Button	N/A	Yes
Backlit LCD	N/A	Yes
Battery Type / Life	(3) 1.5V AA / approx. 1600 hours of continuous use (with backlight off); HI 935009only: auto-off selectable after 8 or 60 minutes of non-use (can be disabled)	
Environment	-10 to 50°C (14 to 122°F); RH max 100%	
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")	
Weight	235 g (8.3 oz.)	

ORDERING INFORMATION

HI 935002 and **HI 935009** are supplied with 1.5V AA alkaline batteries (3) and instruction manual.

PROBES

HI 766C Penetration K-type temperature probe with 1 m cable

HI 766D Air K-type temperature probe with 1 m cable

HI 766E1 General purpose K-type temperature probe with 1 m cable

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 710018 Spare protective case

2-Channel Thermometers

HI 935002 and HI 935009 are waterproof 2-channel thermometers offering a wide temperature range and an extraordinary 1600 hours of battery life-ideal for extended lab and field use.

A dual-level LCD shows the current temperature and the high and low values for each channel. The difference between each channel can also be shown along with the current temperature at each probe or the high and low values of their differences. A relative value can be set on each channel and variances around that value can then be monitored.

These instruments enable you to see all continuously updating information on either channel. A HOLD button gives the user time to record the reading and HI 935009 will store that reading for later retrieval.

Both instruments read in °C and °F and if required, HI 935009 features a user calibration feature.

Remaining battery power is displayed at startup and is managed with a low battery warning signal and error prevention (BEPS).

HI 935009 has a selectable auto-off interval and a button activated backlight for low light conditions.

- *Dual ranges*
- *High accuracy + 0.2% Full Scale, excluding probe error*
- *Waterproof casing with ergonomic design*
- *Tactile rubber keys to prevent the ingress of substances*
- *Large dual level LCD displays high and low readings along with current temperature*
- *HOLD button freezes readings on the display*
- *Battery level indicator at startup*
- *Low battery warning with BEPS*
- *Long battery life of 1600 hours*
- *Optional HI 710007 (blue) or HI 710008 (orange) rubber boot available*
- *Backlit Display (HI 935009)*
- *Calibration feature (HI 935009)*

HANNA instruments

With Great Products, Come Great Results™

hold | B.E.P.S. | lcd display | backlight | audible | cal 0°C | min/max

HI 93531 • HI 93531N • HI 93531R

K-Type Thermocouple Thermometers

Waterproof with Min/Max and 0.1° Resolution

Monitor the Highest and Lowest Temperatures

These advanced waterproof thermometers are ideal when it's necessary to know the highest and lowest temperatures measured during a certain process.

HANNA has incorporated a dual-level LCD into these portable instruments. Along with the current reading, the highest and lowest temperature in the series can be assessed at a glance.

These thermometers can read with a resolution of 0.1 in the range of -149.9 to 999.9°C or -24.9 to 999.9°F. The meters are equipped with a HOLD function that freezes the current reading on the display. The °C/°F button will change between Celsius and Fahrenheit modes. Battery level is shown at startup and low battery warning with Battery Error Prevention System (BEPS) assure long periods of trouble-free use between battery changes.

HI 93531N also features a backlit LCD and can be calibrated at one point with a simple ice bath by pressing the CAL button.

HI 93531R features RS232 output for transferring measurements (once every 2 seconds) to devices provided with RS232 input (PC or printer).

- *Dual ranges*
- *High accuracy + 0.2% Full Scale, excluding probe error*
- *Waterproof casing with ergonomic design*
- *Tactile rubber keys to prevent the ingress of substances*
- *Large dual level LCD displays high and low readings along with current temperature*
- *HOLD button freezes readings on the display*
- *Battery level indicator at startup*
- *Low battery warning with BEPS*
- *Battery life of 500 hours*
- *Backlit Display (HI 93531N and HI 93531R)*
- *Calibration feature (HI 93531N and HI 93531R)*
- *PC and printer compatible (HI 93531R)*



HI 710007 Shockproof Rubber Boot



K-type thermocouple probes should be ordered separately to meet your specific application.

SPECIFICATIONS	HI 93531	HI 93531N	HI 93531R
Range	-200.0 to 999.9°C; 1000 to 1371°C -328.0 to 999.9°F; 1000 to 2500°F		
Resolution	0.1°C (-149.9 to 999.9°C); 0.2°C (-200.0 to -150.0°C); 1°C (outside) 0.1°F (-24.9 to 999.9°F); 0.2°F (-249.9 to -25.0°F); 0.3°F (-328.0 to -250.0°F); 1°F (outside)		
Accuracy	±0.5°C (-100.0 to 999.9°C); ±1°C (outside); ±1°F (-148.0 to 999.9°F); ±1.5°F (outside) (for 1 year, excluding probe error)		
Probe	K-thermocouple type, HI 766 series (not included)		
CAL Button	N/A	Yes	Yes
Backlit LCD	N/A	Yes	Yes
RS232	N/A	N/A	Yes
Battery Type / Life	(3) 1.5V AA / approx. 500 hours of continuous use (with backlight off); auto-off after 60 minutes of non-use (can be disabled)		
Environment	-10 to 50°C (14 to 122°F); RH max 100%		
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")		
Weight	235 g (8.3 oz.)		

ORDERING INFORMATION

HI 93531, **HI 93531N** and, **HI 93531R** are supplied with 1.5V AA alkaline batteries (3) and instruction manual

PROBES

HI 766C	Penetration K-type temperature probe with 1 m cable
HI 766D	Air K-type temperature probe with 1 m cable
HI 766E1	General purpose K-type temperature probe with 1 m cable

ACCESSORIES

HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 710018	Spare protective case
HI 92000	Windows® compatible software
HI 920011	Serial cable for PC connection

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HI 93414

Turbidity and Free/Total Chlorine Meter

EPA Compliant Meter that Features HANNA's Exclusive Fast Tracker™ (T.I.S.) and CAL CHECK™





FastTracker™
A new revolution in organized data management

Features

- *Tungsten light source—EPA compliant turbidity measurement*
- *High accuracy at low ranges*
- *Exclusive chlorine Cal Check™ calibration validation*
- *Exclusive Fast Tracker™ system*
- *User replaceable light source*
- *2, 3 or 4 point turbidity calibration*
- *USB and RS232 PC connectivity*
- *Backlit LCD*
- *GLP capability*
- *User friendly display with guidance codes*
- *Auto shut-off*
- *Battery percentage on display*
- *Continuous current time on display*

A Truly Advanced Meter

The HI 93414 combines turbidity and colorimetric measurements to measure the most important parameters of drinking water: turbidity and free/total chlorine. Designed for water quality measurements, HI 93414 provides reliable and accurate readings on low turbidity and chlorine values. The HI 93414 meets and exceeds the requirements of USEPA and Standard Methods both for turbidity and colorimetric measurements.

This instrument incorporates a state-of-the-art optical system which guarantees accurate results. The optical system, consisting of a tungsten filament lamp, three detectors (scattered, transmitted for turbidimeter range and one for colorimeter range), and a narrow band interference filter @ 525 nm assures long term stability and minimizes stray light and color interferences. It also compensates for variations in intensity of the lamp, making no need for frequent calibration. The 25 mm round cuvets made from special optical glass guarantee the repeatability and consistency of the measurements.

Turbidity measurements can be made in the 0.00 to 1000 NTU (Nephelometric Turbidity Units) range. The instrument has an EPA compliance reading mode which rounds the reading to meet EPA reporting requirements.

Depending on the measured sample and needed accuracy, normal measurement, continuous measurement or signal averaging measurement can be selected. Free or Total Chlorine measurements can be made in the 0.00 to 5.00 mg/L (ppm) range.



iButton® Tags are Easy to Install

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

With the powerful CAL CHECK™ function, performance of the instrument can be validated at any time by using the exclusive HANNA ready-made NIST traceable standards. Calibration can be performed at any time for turbidity and colorimetric range. For turbidity, a two, three or four-point calibration is available using supplied (<0.1, 15, 100 and 750 NTU adjustable calibration points) or user prepared standards. For colorimetermeasurements, a one-point calibration can be performed.

HI 93414 has complete G.L.P. (Good Laboratory Practice) functions that allow traceability of the calibration conditions. The last calibration points, time and date can be checked by a single key touch. HI 93414 has a user-friendly interface with an easy to read, large Liquid Cristal Display. Displayed codes guide the user step by step with routine operation and through calibration. Confirmation and error acoustic signals aid the user during instrument operation.

With it's logging function, up to 200 measurements can be stored in internal memory and consulted at any time. Data can be further stored and analyzed by transferring it to a PC via RS232 or USB interface and HANNA software (optional).

For advanced field applications, the HI 93414 is equipped with Fast Tracker™—Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever.

Turbidity and Free/Total Chlorine Meter

EPA Compliant Meter that Features HANNA's Exclusive Fast Tracker™ (T.I.S.) and CAL CHECK™



Peace of mind.

CAL CHECK™ Calibration Validation

With HANNA's exclusive CAL CHECK™ validation function users are able to verify the performance of the instrument at any time. Taking just a few short steps, the validation procedure is user friendly and ensures that the meter is properly calibrated. Just use the exclusive HANNA ready-made, NiST traceable standards to verify the performance of the instrument and recalibrate if necessary. All instruments are factory calibrated and the electronic and optical design minimizes the need for frequent calibration.

TURBIDITY

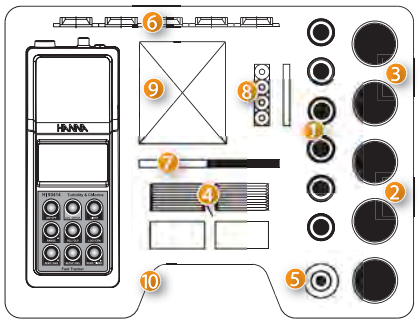
Range	0.00 to 9.99; 10.0 to 99.9 and 100 to 1000 NTU
Range Selection	Automatic
Resolution	0.01 NTU from 0.00 to 9.99 NTU; 0.1 NTU from 10.0 to 99.9 NTU; 1 NTU from 100 to 1000 NTU
Accuracy	±2% of reading plus 0.02 NTU
Repeatability	±1% of reading or 0.02 NTU, whichever is greater
Stray Light	< 0.02 NTU
Typical EMC Deviation	±0.05 NTU
Light Detector	Silicon Photocell
Method	Ratio Nephelometric Method (90°), ratio of scattered and transmitted light; Adaptation of the USEPA Method 180.1 and Standard Method 2130 B.
Measuring mode	Normal, Average, Continuous
Turbidity Standards	<0.1, 15, 100 and 750 NTU
Calibration	Two, three or four-point calibration

FREE AND TOTAL CHLORINE

Range	Free Cl_2 0.00 to 5.00 mg/L; Total Cl_2 0.00 to 5.00 mg/L
Resolution	0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 above 3.50 mg/L
Accuracy	±0.02 mg/L @ 1.00 mg/L
Typical EMC Deviation	±0.02 mg/L
Detector	Silicon photocell with 525 nm narrow band interference filter
Method	Adaptation of the USEPA Method 330.5 and Standard Method 4500-Cl G. The reaction between chlorine and DPD reagent causes a pink tint in the sample.
Standards	1 mg/L free chlorine, 1 mg/L total chlorine
Calibration	One-point calibration

GENERAL SPECIFICATIONS

Light Source	Tungsten filament lamp
Lamp life	Greater than 100,000 readings
LOG Memory	200 records
Serial Interface	USB or RS 232
Environment	Up to 50°C (122°F); max 95% RH non-condensing
Power Supply	(4) 1.5V AA alkaline batteries or AC adapter; Auto-off after 15 minutes of non-use
Dimensions / Weight	224 x 87 x 77 mm (8.8 x 3.4 x 3.0") / 512 g (18 oz.)



1. Five sample cuvets and caps
2. Three calibration cuvets for turbidimeter
3. Two calibration cuvets for colorimeter*
4. Reagent powder packets for F & T chlorine
5. Silicone oil
6. Five tag holders with tags (HI 920005)
7. Scissors
8. Batteries (4)
9. AC adapter
10. Rugged carrying case

Instruction manual

Quick reference guide

Instrument quality certificate

ORDERING INFORMATION

HI 93414-01 (115V) and **HI 93414-02** (230V) are supplied with sample cuvets and caps (5), calibration cuvets for turbidimeter, calibration cuvets for colorimeter, silicone oil, cuvet wiping tissue, scissors, batteries (4), AC adapter, instruction manual and rugged carrying case.

SOLUTIONS

HI 93414-11 CAL CHECK™ Calibration set for Free & Total Chlorine
HI 93701-01 Reagents for 100 Free Chlorine tests
HI 93701-03 Reagents for 300 Free Chlorine tests
HI 93711-01 Reagents for 100 Total Chlorine tests
HI 93711-03 Reagents for 300 Total Chlorine tests
HI 98703-11 Turbidity standards kit
HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 920005 Tag holders with tags (5)
HI 98703-58 Silicone oil (15 mL)
HI 93703-60 Caps for cuvets (4)
HI 731318 Tissue for wiping cuvets (4)
HI 731331 Glass cuvets (4)
HI 92000 Windows® compatible software
HI 920011 5 to 9 pin RS232 connection cable
HI 920013 USB cable for PC connection

HI 98703

EPA Compliant Turbidity Meter

Features HANNA's Exclusive Fast Tracker™ (T.I.S.)





FastTracker™
A new revolution in organized data management

SPECIFICATIONS	HI 98703
Range	0.00 to 9.99; 10.0 to 99.9 and 100 to 1000 NTU
Range Selection	Automatic
Resolution	0.01 NTU from 0.00 to 9.99 NTU; 0.1 NTU from 10.0 to 99.9 NTU; 1 NTU from 100 to 1000 NTU
Accuracy	±2% of reading plus 0.02 NTU
Repeatability	±1% of reading or 0.02 NTU, whichever is greater
Stray Light	< 0.02 NTU
Typical EMC Deviation	±0.05 NTU
Light Detector	Silicon Photocell
Light Source	Tungsten filament lamp
Lamp life	Greater than 100,000 readings
Method	Ratio Nephelometric Method (90°), ratio of scattered and transmitted light; Adaptation of the USEPA Method 180.1 and Standard Method 2130 B.
Measuring mode	Normal, Average, Continuous
Turbidity Standards	<0.1, 15, 100 and 750 NTU
Calibration	Two, three or four-point calibration
LOG Memory	200 records
Serial Interface	USB or RS 232
Environment	Up to 50°C (122°F); max 95% RH non-condensing
Power Supply	(4) 1.5V AA alkaline batteries or AC adapter; Auto-off after 15 minutes of non-use
Dimensions / Weight	224 x 87 x 77 mm (8.8 x 3.4 x 3.0") / 512 g (18 oz.)

ORDERING INFORMATION

HI 98703-01 (115V) and **HI 98703-02** (230V) are supplied with (5) sample cuvets and caps, HI 98703-11 calibration cuvets, HI 93703-58 silicone oil, cuvet wiping tissue, (4) batteries, AC adapter, instruction manual and rugged carrying case.

SOLUTIONS

HI 98703-11 Turbidity standards kit
HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 920005 Tag holders with tags (5)
HI 98703-58 Silicone oil (15 mL)
HI 93703-60 Caps for cuvets (4)
HI 731318 Tissue for wiping cuvets (4)
HI 731331 Glass cuvets (4)
HI 92000 Windows® compatible software
HI 920011 5 to 9 pin RS232 connection cable
HI 920013 USB cable for PC connection

EPA Compliant Turbidity Measurement

The HI 98703 meets and exceeds the requirements of the USEPA Method 180.1 for wastewater and Standard Method 2130 B for drinking water.

The HI 98703 measures the turbidity of a sample in the 0.00 to 1000 NTU (Nephelometric Turbidity Units) range. An effective algorithm calculates and converts the readings in NTU. The instrument has an EPA compliance reading mode which rounds the reading to meet EPA reporting requirements. Depending on the measured probe and needed accuracy, normal, continuous, or signal averaging measurement can be selected.

HI 98703 has GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. The last calibration points, time and date can be checked at any time by a single touch.

HI 98703 has a user-friendly interface with a backlit, easy to read, large LCD (Liquid Crystal Display). The display codes guide the user step by step with routine operation and through calibration.

With it's logging function, up to 200 measurements can be stored in the internal memory and consulted at any time. In order to further store and analyze, the data can be downloaded to a PC using by either RS232 or USB.

For advanced field applications, the HI 98703 turbidimeter is equipped with Fast Tracker™—Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever.

- *Tungsten light source—EPA compliant turbidity measurement*
- *High accuracy at low ranges (below 0.05 NTU)*
- *Exclusive Fast Tracker™*
- *2, 3 or 4 point calibration*
- *USB and RS232 PC connectivity*
- *Backlit LCD*
- *GLP capability*
- *User friendly display with guidance codes*
- *Battery percentage on display*
- *Continuous current time on display*

HANNA instruments

With Great Products, Come Great Results™

HI 98713

ISO Turbidity Meter

Features HANNA's Exclusive Fast Tracker™ (T.I.S.)

Designed for Low Turbidity Water Quality Measurements

The HI 98713 measures the turbidity of a sample in the 0.00 to 1000 FNU range. An effective algorithm calculates and converts the detectors output in FNU. Depending on the needed accuracy, normal measurement, continuous measurement, or signal averaging measurement can be selected.

The optical system—The Infrared Method (ISO 7027), consists of a infrared LED and two detectors (scattered and transmitted light), that assures long term stability and minimizes stray light and color interferences. It also compensates for variations in intensity of the LED, minimizing the need for frequent calibration.

The 25 mm round cuvets made from special optical glass guarantee the repeatability and consistency of the measurements.

HI 98713 has complete GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. Last calibration points, time and date can be checked at any time by a single touch.

HI 98713 has a very user-friendly interface, with a backlit, easy to read, large LCD (Liquid Crystal Display). The display codes guide the user step by step with routine operation and calibration.

With the HI 98713's logging function, up to 200 measurements can be stored in the internal memory and consulted at any time. Data can be downloaded to a PC for storing or further analysis through one of the two available ports: RS232 or USB.

For advanced field applications, the HI 98713 turbidimeter is equipped with Fast Tracker™—Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever.



HI 920005 iButton® Tags



- *Exclusive Fast Tracker™*
- *2, 3 or 4 point calibration*
- *USB and RS 232 PC connectivity*
- *Backlit LCD*
- *GLP capability*
- *User friendly display with guidance codes*
- *Battery percentage on display*
- *Continuous current time on display*

FastTracker™
A new revolution in organized data management

SPECIFICATIONS

Range	0.00 to 9.99; 10.0 to 99.9 and 100 to 1000 FNU
Range Selection	Automatic
Resolution	0.01 FNU from 0.00 to 9.99 FNU; 0.1 FNU from 10.0 to 99.9 FNU; 1 FNU from 100 to 1000 FNU
Accuracy	±2% of reading plus 0.1 FNU
Repeatability	±1% of reading or 0.1 FNU, whichever is greater
Stray Light	< 0.1 FNU
Typical EMC Deviation	±0.05 FNU
IR Detector	Silicon Photocell
Light Source	860 nm infrared LED
Lamp life	Greater than 100,000 readings
Method	Adaptation of ISO 7027, ratio method with 90° and 180° detector.
Turbidity Standards	<0.1, 15, 100 and 750 FNU
Calibration	Two, three or four-point calibration
LOG Memory	200 records
Serial Interface	USB or RS 232
Environment	Up to 50°C (122°F); max 95% RH non-condensing
Power Supply	(4) 1.5V AA alkaline batteries or AC adapter; Auto-off after 15 minutes of non-use
Dimensions / Weight	224 x 87 x 77 mm (8.8 x 3.4 x 3.0") / 512 g (18 oz.)

ORDERING INFORMATION

HI 98713-01 (115V) and **HI 98713-02** (230V) are supplied with (5) sample cuvets and caps, HI 98713-11 calibration cuvets, HI 93703-58 silicone oil, cuvet wiping tissue, (4) batteries, AC adapter, instruction manual and rugged carrying case.

SOLUTIONS

HI 98703-11 Turbidity standards kit
HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 920005 Tag holders with tags (5)
HI 98703-58 Silicone oil (15 mL)
HI 93703-60 Caps for cuvets (4)
HI 731318 Tissue for wiping cuvets (4)
HI 731331 Glass cuvets (4)
HI 92000 Windows® compatible software
HI 920011 5 to 9 pin RS232 connection cable
HI 920013 USB cable for PC connection

HI 93114

Logging Turbidity & Chlorine Meter

with GLP Capabilities



Benchtop Sophistication in a Handheld

With the hand-held HI 93114, three important parameters in water quality analysis are at your fingertips. Free and total chlorine measurements and USEPA compliant turbidity measurements are performed quickly and reliably with this lab-grade microprocessor-based field instrument. HI 93114 is particularly useful for potable water measurements and municipalities.

The rugged HI 93114 will log data for up to 25 measurements along with time and date information for retrieval at a later date. This instrument also offers Good Laboratory Practice (GLP) features which allow the user to verify the calibration status of the meter.

With HI 93114 measurements can be performed using either concentration or relative absorbance of the sample depending on the requirements of the application.

HI 93114 can be calibrated using the factory preprogrammed calibration points or can be custom calibrated when in colorimetric mode.

This rugged instrument has been engineered to offer all the sophistication and reliability of bench top laboratory instrumentation in the size of a hand-held meter.

SPECIFICATIONS		HI 93114
Range	Turbidity	0.00 to 9.99 FTU* 10.0 to 50.0 FTU*
	Free Chlorine	0.00 to 2.50 mg/L
	Total Chlorine	0.00 to 3.50 mg/L
Resolution	Turbidity	0.01 FTU (0.00 to 9.99 FTU) 0.1 FTU (10.0 to 50.0 FTU)
	Chlorine	0.01 mg/L
Accuracy	Turbidity	±0.5 FTU or ±5% of reading (whichever is greater)
	Chlorine	±0.03 mg/L; ±3% of reading (whichever is greater)
Calibration		2 points; selectable between 0.00 - 50.0 FTU (0.00 and 20.0 FTU recommended)
Light Source		green LED
Light Source life		life of the instrument
Light Detector		2 silicon photocells
Battery Type / Life		(4) 1.5V AA / approx. 60 hours of continuous use or 1000 measurements; automatic shut-off selectable after 10, 20, 30, 40, 50 or 60 minutes
Environment		0 to 50°C (32 to 122°F); RH max 95% (non condensing)
Dimensions		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
Weight		510 g (1.1 lb.)

* 1 FTU (Formazine Turbidity Unit) =1 NTU (Nephelometric Turbidity Unit)

ORDERING INFORMATION

HI 93114 is supplied complete with glass cuvet, batteries and instructions.

REAGENTS

HI 93701-01 Reagent kit for 100 free Cl_2 tests

HI 93701-03 Reagent kit for 300 free Cl_2 tests

HI 93711-01 Reagent kit for 100 total Cl_2 tests

HI 93711-03 Reagent kit for 300 total Cl_2 tests

SOLUTIONS

HI 93102-0 AMCO-AEPA-1 calibration solution @ 0 NTU, 30 mL

HI 93102-20 AMCO-AEPA-1 calibration solution @ 20 NTU, 30 mL

ACCESSORIES

HI 731318 Tissue for wiping cuvets (4)

HI 731321 Spare glass cuvets (4)

HI 731327 Maintenance kit: rugged carrying case including HI 93102-0 and HI 93102-20 calibration solutions, HI 93703-50 cuvet cleaning solution, 1 tissue for wiping cuvets and 2 cuvets

HANNA instruments

With Great Products, Come Great Results™

PC compatible · 3 points · upgraded

HI 93703 • HI 93703-11

Logging Turbidity Meters

(ISO 7027)

Ideal for Accurate Field Turbidity Measurements

HI 93703 series are microprocessor based turbidity meters that provide laboratory precision for field turbidity measurements.

HANNA HI 93703 is designed to provide you with a simple yet accurate way to test turbidity on-site.

These meters have two operating ranges; 0.00 to 50.00 FTUs, and 50 to 1000 FTUs that can accommodate the most turbid condition you may encounter.

The HI 93703 is easy to calibrate (with 3 point calibration) using AMCO-EPA standards and is ISO 7027 compliant.

The HI 93703-11 enhanced version features a real-time clock and internal logging for up to 199 measurements.

Collected data can be downloaded to your management system using the Windows® compatible HI 92000 software.

Both versions meet the requirements of GLP (Good Laboratory Practice) protocols for last calibration data storage.



ORDERING INFORMATION

HI 93703 is supplied complete with glass cuvet, batteries and instructions.

HI 93703-11 is supplied with 1.5V AA Size Batteries (4), Glass Cuvet and Cap.

HI 93703C, kit including HI 93703 and HI 731313 maintenance kit.

SOLUTIONS

HI 93703-0	AMCO-AEPA-1@ 0 FTU calibration solution, 30 mL
HI 93703-05	AMCO-AEPA-1 @ 500 FTU calibration solution, 30 mL
HI 93703-10	AMCO-AEPA-1 @ 10 FTU calibration solution, 30 mL

ACCESSORIES

HI 731318	Tissues for wiping cuvets (4)
HI 731321	Spare glass cuvets (4)
HI 731313	Maintenance kit: rugged carrying case including HI 93102-0 and HI 93102-20 calibration solutions, HI 93703-50 cuvet cleaning solution, 1 tissue for wiping cuvets and 2 cuvets
HI 92000	Windows® compatible application software
HI 920011	Serial cable (5 to 9 pin) for PC connection

SPECIFICATIONS

SPECIFICATIONS	HI 93703
Range	0.00 to 50.00 FTU* 50 to 1000 FTU*
Resolution	0.01 FTU (0.00 to 50.00 FTU) 1 FTU (50 to 1000 FTU)
Accuracy	±0.5 FTU or ±5% of reading (whichever is greater)
Calibration	3-points (0 FTU, 10 FTU and 500 FTU)
Light Source	infrared LED
Light Source Life	life of the instrument
Ligh Detector	silicon photocell
Battery Type / Life	(4) 1.5V AA /approx. 60 hours of continuous use or 900 measurements; auto-off after 5 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% (non condensing)
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
Weight	510 g (1.1 lb.)
	HI 93703-11 **Same as HI 93703 with additional features:**
Data Logging	199 measurements, on-demand
PC Connection	through serial port and HI 92000 Windows® compatible software (not included)
Real Time Clock	yes

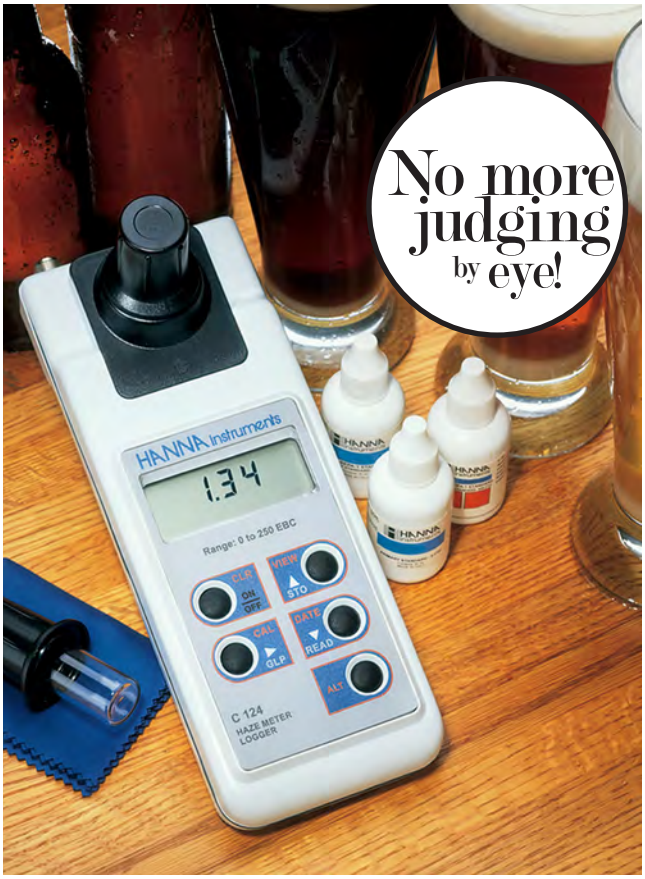
* FTU (Formazine Turbidity Unit) = 1 FNU (Formazine Nephelometric Unit)

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HI 93124

Haze Meter

for Beer Quality



Now there is an accurate and affordable way to determine beer haze.

Since the presence of haze in beer is usually associated with inferior quality, beer clarity is an important factor influencing consumer acceptance. Haze in beer is a natural phenomenon that can be observed after storage for one to three weeks.

The two most important causes for haze formation are proteins and tannins. Proper treatment is required to prevent or delay its formation.

A common way to determine beer haze is by visual comparison. This method however is subjective and inefficient.

HANNA's HI 93124 is a professional haze meter using the nephelometric method (measurement at 90° angle) combined with an infrared light source (890 nm) to reduce color interference.

In addition, since haze is normally measured after chilling at 0°C (32°F), the HI 93124 is supplied complete with HANNA's high accuracy Checktemp® digital thermometer.

- *Simple 3 step calibration*
- *Last calibration date recall*
- *Automatically selects measuring range*
- *Log and recall up to 200 tests*
- *PC compatible*

SPECIFICATIONS	HI 93124
Range	0.00 to 10.00 EBC/10 to 250 EBC
Resolution	0.01/1 EBC
Accuracy	±0.2 EBC or ±5% of reading (whichever is greater)
Typical EMC Dev.	±1% F.S.
Light Source	IR LED @ 890 nm
Light Source Life	Life of the instrument
Light Detector	Silicon Photocell
Battery Type/ Life	4 x 1.5V AA batteries / 60 hours of continuous use or Auto-off after 5 min.
Environment	0 to 50°C (32 to 122°F); 95% RH
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
Weight	510 g (18 oz.)

ORDERING INFORMATION

HI 93124 is supplied with measurement cuvets and caps (2), 1.5V AA batteries and instruction manual

SOLUTIONS

HI 93124-0 Calibration solution, 0 EBC, 30 mL
HI 93124-1 Calibration solution, 2.5 EBC, 30 mL
HI 93124-2 Calibration solution, 125 EBC, 30 mL
HI 93124-3 EBC haze calibration set (C 124-0, C 124-1, C 124-2)
HI 93703-50 Cleaning solution, 250 mL

ACCESSORIES

HI 731321 Measurement cuvets (4)
HI 731318 Tissue for wiping cuvets (4)
HI 92000 Windows® compatible software
HI 920011 5 to 9-pin RS232 connection cable

Water is the Key to Great Beer

Water

Water composes more than 90% of beer. The chemical characteristics of water and the minerals it contains influence mashing, boiling and fermentation.

Beer Haze and Turbidity
EBC = European Brewery Convention
ASBC = American Society of Brewing Chemists
FNU = Formazine Nephelometric Unit

1 EBC	1 FNU (1 NTU)	1 ASBC	
1	0.25	0.014	EBC
4	1	0.057	FNU/NTU
69	17.5	1	ASBC

BEER HAZE TABLE		
GRADE	EBC	ASBC
Brilliant	0.0 to 0.5	0.0 to 34.5
Almost brilliant	0.5 to 1.0	34.5 to 69
Very slightly Hazy	1.0 to 2.0	69 to 138
Slightly Hazy	2.0 to 4.0	138 to 276
Hazy	4.0 to 8.0	276 to 552
Very hazy	> 8.0	> 552

HANNA Turbidity Meters

An Introduction to HANNA Turbidity Instruments

Turbidity Measurement

Introduction to Turbidity

The cloudy appearance of water (called Turbidity) is caused by suspended material. The unit of measure adopted by the ISO Standard is the FNU (Formazine Nephelometric Unit) and by EPA is NTU (Nephelometric Turbidity Unit). The other two methods used to test for turbidity and their measurement units are the JTU (Jackson Turbidity Unit) and the Silica unit (mg/L SiO_2). See the conversion table of these methods and their units for your reference.

	JTU	FTU (NTU/FNU)	SiO_2 (mg/l)
JTU	1	19	2.5
FTU (NTU/FNU)	0.053	1	0.13
SiO_2 (mg/l)	0.4	7.5	1

Purification of Drinking Water

Turbidity is one of the most important parameters used to determine the quality of drinking water. Public water suppliers are required to treat their water to remove turbidity. Adequately treated surface water does not usually present a turbidity problem. The World Health Organization indicates 5 FTU as the reference turbidity value of water for trade. This value has been established based on the aesthetic characteristics of water. From a hygienic point of view, 1 FTU is the recommended value. Turbidity is an indicator and will not give results for a specific pollutant. It will, however, provide information on the degree of overall contamination. The flow chart below for the water treatment process of drinking water shows the turbidity reference values for each phase.





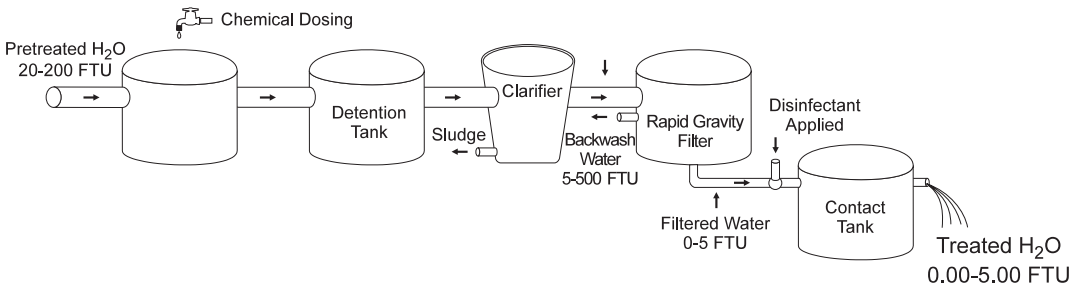
Monitoring for Natural Water Supplies

In natural water, turbidity measurements are taken to gauge general water quality and its compatibility in applications where there are aquatic organisms. It has been found that there is a strong correlation between the turbidity level and the BOD value. Moreover, by definition, turbidity obstructs light, thus reducing the growth of marine plants, eggs and larvae, which are usually found in the lower levels of an aquatic ecosystem.



Wastewater Treatment and Turbidity

Historically, turbidity is one of the main parameters monitored in wastewater. In fact, the monitoring and treatment process was once solely based on the control of turbidity. Currently, the measurement of turbidity at the end of the wastewater treatment process is necessary to verify that the values are within regulatory standards. Generally speaking, the turbidity value has to be between 0 and 50 FTU, with an accuracy of ±3 FTU, depending on the phase of the wastewater treatment process. By monitoring the turbidity level, it can be determined if the different stages of the process, particularly in the filtration and purification stages, have been completed correctly.



HANNA instruments

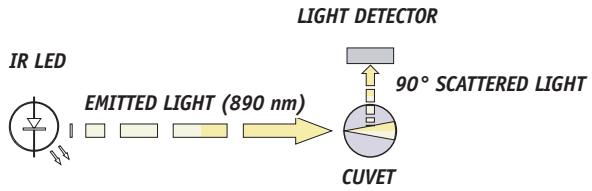
With Great Products, Come Great Results™

The HANNA instruments® Solution

There are two different standards to comply with: the USEPA and Standard Methods recommend a particular wavelength in the visible range of the spectrum and the European system requiring an infrared light source (ISO 7027). In order to satisfy these different requirements, HANNA has developed products that meet both standards.

The Infrared Method (ISO 7027)

HI 98713, HI 93703, LP 2000, HI 93124 and HI 93125 operate by passing a beam of infrared light through a vial containing the sample to be tested. The light source is a High Emission Infrared LED. A sensor, positioned at 90° with respect to the direction of the light, detects the amount of light scattered by the undissolved particles present in the sample. A microprocessor converts these readings into FTU (FNU) values.



The USEPA (Environmental Protection Agency) Approved Method

Instruments featuring EPA approved methods are designed to meet or exceed the criteria specified by the USEPA Method 180.1 and Standard Method 2130 B.

HANNA instruments® Calibration Method

10 FTU has been chosen as a calibration point because it is the value that best fits the water turbidity measurements in different applications. Calibration solutions of primary standard AMCO-AEPA-1 at 0 FTU, 10 FTU, 20 FTU and 500 FTU are supplied with the appropriate maintenance kit for each meter. This standard is generally preferred over the formazine standard, because it is much more stable and nontoxic. The HANNA meters can also be used with the formazine standard. HI 93102 and HI 93114, on the other hand, offer user-selectable calibration points in the 0.00 to 50.0 FTU range.



HI 83414 and HI 88703 Principal of Operation

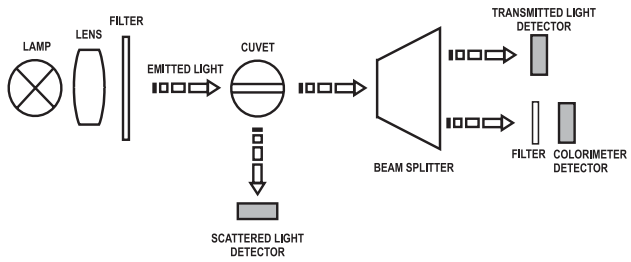
Turbidity is the optical property that causes light to be scattered and absorbed, rather than transmitted. The scattering of the light that passes through a liquid is primarily caused by the suspended solids. The higher the turbidity, the greater the amount of scattered light. Because even the molecules in a very pure fluid scatter light to a certain degree, no solution will have zero turbidity.

The USEPA Method 180.1 specify the key parameters for the optical system to measure turbidity for drinking, saline and surface water in a 0 to 40 NTU range, using the nephelometric method.

Both the HI 83414 and HI 88703 instrument, are designed to meet or exceed the criteria specified by the USEPA Method 180.1 and Standard Method 2130 B.

The light beam that passes through the sample is scattered in all directions. The intensity and pattern of the scattered light is affected by many variables like wavelength of the incident light, particle size and shape, refractive index and color.

The optical system includes a tungsten filament lamp, a scattered light detector (900) and a transmitted light detector (1800).



HI 83414 • HI 88703

Precision Turbidity and Free/Total Chlorine Meters



High Accuracy Turbidity Measurement

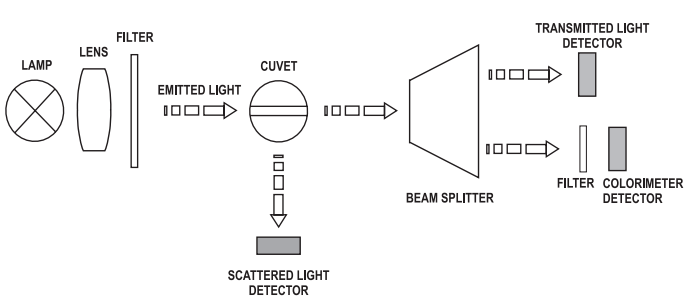
Turbidity is the optical property that causes light to be scattered and absorbed, rather than transmitted. The scattering of the light that passes through a liquid is primarily caused by the suspended solids. The higher the turbidity, the greater the amount of scattered light. Since molecules in a very pure liquid scatter light to a certain degree, no solution will have zero turbidity. The USEPA Method 180.1 specify the key parameters for the optical system to measure turbidity for drinking, saline and surface water, in a 0 to 40 NTU range, using the nephelometric method.

HI 83414 and HI 88703 are designed to meet or exceed the criteria specified by the USEPA Method 180.1 and Standard Method 2130 B. The light beam that passes through the sample is scattered in all directions. The intensity and pattern of the scattered light is affected by many variables, such as wavelength of the incident light, particle size and shape, refractive index and color. The optical system includes a tungsten filament lamp, a scattered light detector (90°) and a transmitted light detector (180°).

In the ratio turbidimeter range, the microprocessor of the instrument calculates the NTU value from the signals that reach the two detectors by using an effective algorithm. This algorithm corrects and compensates for interferences of color, making the HI 83414 and HI 88703 color-compensated. The optical system and measuring technique also compensate for the lamp intensity fluctuations—minimizing the need of frequent calibration.

In the non ratio turbidimeter range, the NTU value is calculated from the signal on the scattered light detector (90°). This method offers a high linearity on the low range but is more sensitive to lamp intensity fluctuations.

The lower detection limit of a turbidimeter is determined by stray light. Stray light is the light detected by the sensors that is not caused by light scattering from suspended particles. The optical system of HI 83414 and HI 88703 is designed to have very low stray light, providing accurate results for low turbidity samples.



With Great Products, Come Great Results™

Ideal for Drinking Water Applications

HI 83414 is a highly accurate dual parameter instrument that benefits from HANNA's years of experience. The HI 83414 successfully combines turbidity and colorimetric measurements to test the most important parameters of drinking water: turbidity and free/total chlorine. The meter is especially designed for water quality measurements, providing reliable and accurate readings on low turbidity and chlorine values. The HI 83414 meets and exceeds the requirements of USEPA and Standard Methods both for turbidity and colorimetric measurements.

With the powerful CAL CHECK™ function, reliable performance can be validated at any moment by using the exclusive HANNA ready-made, NIST traceable standards. A one-point calibration can be performed using the same CAL CHECK™ standard.

The HI 88703 measures turbidity only and is especially designed for water quality measurements, providing reliable and accurate readings on low turbidity ranges. The HI 88703 also meets and exceeds the requirements of USEPA and Standard Methods.

These instruments feature a state-of-the-art optical system to guarantee accurate results, assure long term stability and minimize stray light and color interferences. They also compensate for variations in intensity of the lamp for less frequent calibration. The 525 nm interference filter of the colorimeter assures precise and repeatable results. Repeatability of the measurements are ensured with 25 mm round cuvets made from special optical glass.

Turbidity measurements can be made in the 0.00 to 4000 NTU (Nephelometric Turbidity Units) range when ratiometric measurements are used and in the 0.00 to 40.0 NTU range when non ratio method is used. These instruments have an EPA compliance reading mode which rounds the reading to meet EPA reporting requirements. Alternative EBC and Nephelos measuring units are available. Depending on the measured sample and needed accuracy, normal measurement, continuous measurement or signal averaging measurement can be selected.

A two, three, four or five-point calibration can be performed by using the supplied (<0.1, 15, 100, 750 and 2000 NTU) standards. If user prepared standards are used, the calibration points can be modified. Free or Total Chlorine measurements can be made in the 0.00 to 5.00 mg/L (ppm) range.

HI 83414 and HI 88703 have complete G.L.P. (Good Laboratory Practice) functions that allow traceability of the calibration conditions. The last calibration points, time and date can be checked.

Both meters incorporate a user-friendly interface with an easy to understand, graphic LCD. All messages are in plain text making them easy to read and understand. Comprehensive contextual help is available at the press of a button. All messages and help screens are available in several languages. Confirmation and error acoustic signals help the user during instrument operation. Furthermore, a tutorial mode of operation guides the user step by step through the analysis process.

The instrument's logging function offers complete information for the measurement. Up to 200 measurements can be stored in the internal memory and consulted at any time. For further storage or analysis options, data can be downloaded to a PC using the USB port.



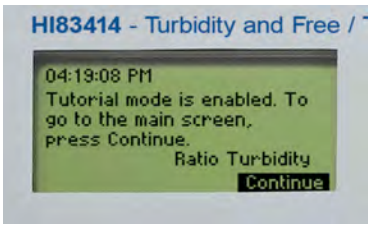
Features

- *HI 83414 features 4 measuring ranges:*
  Ratio Turbidity; Non-Ratio Turbidity;
  Free Chlorine; Total Chlorine
- *HI 88703 features 2 measuring ranges:*
  Ratio Turbidity; Non-Ratio Turbidity
- *Meets USEPA requirements*
- *Exclusive chlorine CAL CHECK™ calibration validation for HI 83414*
- *Good Laboratory Practice capabilities*
- *2, 3, 4 or 5 point turbidity calibration*
- *USB PC connectivity*
- *Backlit LCD*
- *On-screen tutorial modes*
- *Log and recall up to 200 measurements*
- *Contextual help menus*
- *Auto shut-off*

HI 83414 • HI 88703

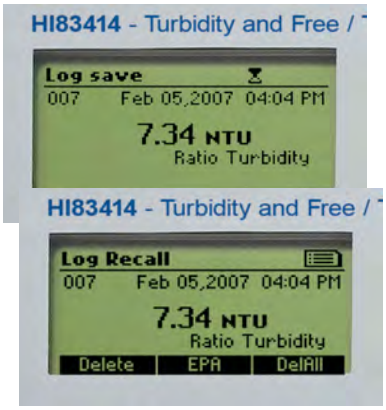
Precision Turbidity and Free/Total Chlorine Meters

Display Examples



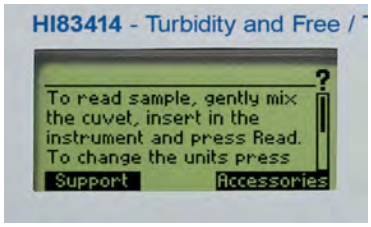
Tutorial Mode

The HI 83414 and HI 88703 have a unique Tutorial Mode that provides additional information to help the inexperienced user during measurements. The instruments display a screen with explanations and confirmation button each time when a preparation or other operation has to be performed by the user. The instrument resumes the measuring sequence when the user confirms that the requested operation was done.



Log and Recall

The HI 83414 has a powerful log function that can store up to 200 records.



Help Mode

Both meters offer an interactive contextual help mode that assists the user at any moment.

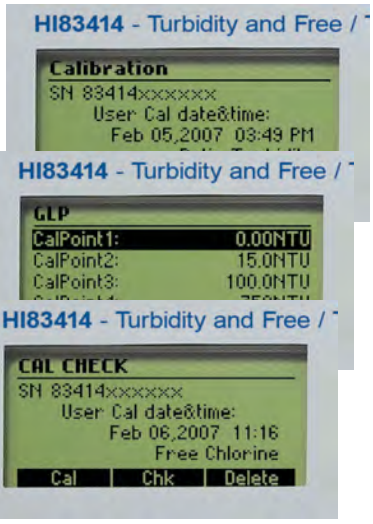


Calibration Error Messages

If the value of the standard read during the calibration is too far from the set value, the instrument will display a standard low or a standard high message.

Check if the correct standard is used or prepare a fresh standard, if formazine is used, and repeat the reading of the standard.

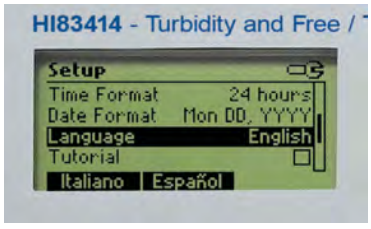
If the calculated calibration coefficients are outside a certain range a calibration error message is displayed.



GLP

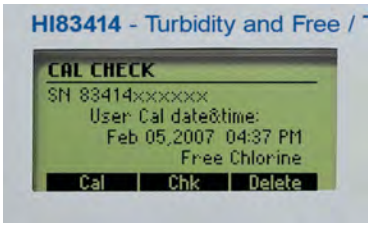
The HI 83414 has built in complete GLP information. The calibration date and the calibration points are displayed in a comprehensive mode for each range.

To display the GLP information, simply press CAL CHECK key. A screen with instrument serial number and with information about the calibration is displayed. For further information, press the "GLP" functional key.



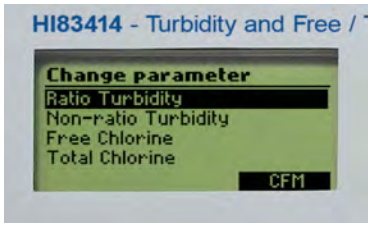
Language

Press the corresponding function key to change the option. If the new selected language cannot be loaded, the previously selected language will be reloaded.



CAL CHECK™

The HI 83414 free and total chlorine colorimeter has a powerful CAL CHECK™ function that allows the user to check the instrument calibration against a NIST traceable standard before making a set of measurements. With the same standard, the instrument could be re-calibrated if necessary.



Ranges

The HI 83414 instrument has four measuring ranges: Ratio Turbidity, Non-Ratio Turbidity, Free Chlorine, Total Chlorine. The HI 88703 instrument has two measuring ranges: Ratio Turbidity, Non Ratio Turbidity.

Precision Turbidity and Free/Total Chlorine Meters

TURBIDITY SPECIFICATIONS

Range—Non Ratio Mode	0.00 to 9.99; 10.0 to 40.0 NTU; 0.0 to 99.9; 100 to 268 Nephelos 0.00 to 9.80 EBC
Resolution—Non Ratio Mode	0.01; 0.1 NTU 0.1; 1 Nephelos 0.01 EBC
Range—Ratio Mode	0.00 to 9.99; 10.0 to 99.9; 100 to 4000 NTU 0.0 to 99.9; 100 to 26800 Nephelos 0.00 to 9.99; 10.0 to 99.9; 100 to 980 EBC
Resolution—Ratio Mode	0.01; 0.1; 1 NTU 0.1; 1 Nephelos 0.01; 0.1, 1 EBC
Range Selection	Automatic
Accuracy	±2% of reading plus 0.02 NTU (0.15 Nephelos; 0.01 EBC) ±5% of reading above 1000 NTU (6700 Nephelos; 245 EBC)
Repeatability	±1% of reading or 0.02 NTU (0.15 Nephelos; 0.01 EBC) whichever is greater
Stray Light	< 0.02 NTU (0.15 Nephelos; 0.01 EBC)
Light Detector	Silicon Photocell
Method	Nephelometric method (90°) or Ratio Nephelometric Method (90° & 180°), Adaptation of the USEPA Method 108.1 and Standard Method 2130 B.
Measuring Mode	Normal, Average, Continuous
Turbidity Standards	<0.1, 15, 100, 750 and 2000 NTU
Calibration	Two, three, four or five-point calibration

FREE AND TOTAL CHLORINE SPECIFICATIONS – HI 83414 ONLY

Range	Free Cl_2: 0.00 to 5.00 mg/L Total Cl_2: 0.00 to 5.00 mg/L
Resolution	0.01 mg/L from 0.00 to 3.50 mg/L; 0.10 above 3.50 mg/L
Accuracy	±0.02 mg/L @ 1.00 mg/L
Detector	Silicon photocell with 525 nm narrow band interference filters
Method	Adaptation of the USEPA Method 330.5 and Standard Method 4500-Cl G.
Standards	1 mg/L free chlorine, 1 mg/L total chlorine
Calibration	One-point calibration

GENERAL SPECIFICATIONS

Light Source/ Life	Tungsten filament lamp / Greater than 100,000 readings
Display	40 x 70 mm graphic LCD (64 x 28 pixels) with backlight
LOG Memory	200 records
PC Interface	USB
Auto Shut-off	After 15 minutes of non-use
Environment	0°C (32°F) to 50°C (122°F); max 95% RH non-condensing
Power Supply	230 V/50 Hz or 115 V/60 Hz 20 W
Dimensions / Weight	230 x 200 x 145 mm (9 x 7.9 x 5.7") L x W x H / 2.5 Kg (88 oz.)

ORDERING INFORMATION

HI 88703-01 (115 V) and **HI 88703-02** (230 V) are supplied with (5) sample cuvets and caps, calibration cuvets, silicone oil (HI 93703-58), tissue for wiping cuvets, power cord and instruction manual.

HI 83414-01 (115 V) and **HI 83414-02** (230 V) are supplied with (5) sample cuvets and caps, calibration cuvets for turbidimeter and colorimeter (HI 83414-11), silicone oil (HI 93703-58), tissue for wiping cuvets, scissors, power cord and instruction manual.

SOLUTIONS

HI 93414-11 CAL CHECK™ Calibration set for Free & Total Chlorine
HI 93701-01 Reagents for 100 Free Chlorine tests
HI 93701-03 Reagents for 300 Free Chlorine tests
HI 93711-01 Reagents for 100 Total Chlorine tests
HI 93711-03 Reagents for 300 Total Chlorine tests
HI 88703-11 Calibration set for turbidimeter (<0.1, 15, 100 750 and 2000 NTU)
HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 93703-58 Silicone oil (15 mL)
HI 731318 Tissue for wiping cuvets (4)
HI 731331 Glass cuvets (4)
HI 731335N Caps for cuvets (4)
HI 740234 Replacement lamp for EPA turbidimeter
HI 92000 Windows® compatible software
HI 920013 USB cable for PC connection

HI 88713

ISO Turbidity Meter



- *Graphic Display, Backlit LCD*
- *2, 3 or 4 point calibration*
- *Backlit LCD*
- *GLP capability*
- *Log up to 200 records*
- *User friendly display with guidance codes*
- *USB PC connectivity*

SPECIFICATIONS

Range	FNU Mode	0.00 to 9.99; 10.0 to 99.9; 100 to 1000 FNU
	FAU Mode	10.0 to 99.9; 100 to 4000 FAU
	NTU Ratio Mode	0.00 to 9.99; 10.0 to 99.9; 100 to 4000 NTU 0.00 to 9.99; 10.0 to 99.9; 100 to 980 EBC
	NTU Non-Ration Mode	0.00 to 9.99; 10.0 to 99.9; 100 to 1000 NTU 0.00 to 9.99; 10.0 to 99.9; 100 to 245 EBC
Range Selection		Automatic
Resolution	FNU Mode	0.01; 0.1; 1 FNU
	FAU Mode	0.1; 1 FAU
	NTU Ratio Mode	0.01; 0.1; 1 NTU / 0.01; 0.1; 1 EBC
	NTU Non-Ration Mode	0.01; 0.1; 1 NTU / 0.01; 0.1; 1 EBC
Accuracy	FNU Mode	±2% of reading plus straylight
	FAU Mode	±10% of reading
	NTU Ratio Mode	±2% of reading plus straylight / ±5% of reading above 1000 NTU
	NTU Non-Ration Mode	±2% of reading plus straylight
Repeatability		±1% of reading or straylight, whichever is greater
Stray Light		< 0.1 NTU (0.05 EBC)
Light Detector		Silicon Photocell
Light Source		IR LED
Lamp life		Instrument life
Method		ISO 7027 Method
Measuring Mode		Normal, Average, Continuous.
Turbidity Standards		<0.1, 15, 100, 750 FNU and 2000 NTU
Calibration		Two, three, four or five-point calibration
LOG Memory		200 records
Serial Interface		USB
Environment		0°C (32°F) to 50°C (122°F); max 95% RH non-condensing
Power Supply		12 Vdc power input
Dimensions / Weight		230 x 200 x 145 mm (9 x 7.9 x 5.7") / 2.5 Kg (88 oz.)

ORDERING INFORMATION

HI 88713-01 (115V) and **HI 88713-02** (230V) are supplied with (6) sample cuvets and caps, calibration cuvets, silicone oil, tissue for wiping cuvets, power adapter and instruction manual.

SOLUTIONS

HI 88713-11 Calibration set for turbidimeter (<0.1, 15, 100 750 FNU and 2000 NTU)

HI 93703-50 Cuvets cleaning solution (230 mL)

ACCESSORIES

HI 98703-58 Silicone oil (15 mL)
HI 731318 Tissue for wiping cuvets (4)
HI 731331 Glass cuvets (4)
HI 731335N Caps for cuvets (4)
HI 92000 Windows® compatible software
HI 920013 USB cable for PC connection

Designed for Low Turbidity Water Quality Measurements

The HI 88713 Turbidity bench meter is a high accuracy meter that meets and exceeds the requirements of ISO 7027 standard.

The instrument is based on a state-of-the-art optical system which guarantees accurate results, long term stability and minimizes stray light and color interferences. It also compensates for variations in intensity of the LED, limiting the need for frequent calibration.

The 25 mm round cuvets made from special optical glass guarantee measurement repeatability and consistency. Turbidity measurements can be made in four modes: 0.00 to 1000 FNU (Formazin Nephelometric Units) in FNU mode, 10 to 4000 FAU (Formazin Attenuation Units) in FAU mode, 0.00 to 4000 NTU (Nephelometric Turbidity Units) in NTU ratio mode and 0.00 to 1000 NTU in NTU non-ratio mode. Alternative EBC measuring units are available in NTU modes.

Depending on the measured sample and needed accuracy, normal measurement, continuous measurement or signal averaging measurement can be selected.

A two, three, four or five-point calibration can be performed by using the supplied (<0.1, 15, 100, 750 FNU and 2000 NTU) standards. Calibration points can be modified when user prepared standards are used.

The HI 88713 Turbidity bench meter has complete G.L.P. (Good Laboratory Practice) functions that allow traceability of the calibration conditions.

The HI 88713 Turbidity bench meter has a user-friendly interface with an easy to understand, graphical LCD. Comprehensive contextual help is available at a simple key press. Furthermore, a tutorial mode of operation guides the user step by step through the analysis process.

The instrument's logging function offers complete information for the measurement. Up to 200 measurements can be stored in the internal memory and consulted at any time. In order to further store or analyse, the data can be downloaded to a PC using the USB port and the HI 92000 HANNA Windows® compatible software.

HANNA instruments

With Great Products, Come Great Results™

EPA Compliant Turbidity Meters

EPA Compliant Portables that Feature HANNA's Exclusive Fast Tracker™ (T.I.S.) Technology

Fast Tracker™ *Tag Identification System (T.I.S.)*

HANNA's exclusive Fast Tracker™ — Tag Identification System simplifies test logging while retaining the management versatility users need to search, filter and export data. The system, designed for scientific and industrial applications, helps verify that samples have truly been taken at pre-established locations during safety audits and inspections.

Fast Tracker™ is easy to install and operate. Just place the iButton® tags near your sampling sites that need to be regularly checked. These meters identify and authenticate logged data by storing the iButton® serial number, time and date stamp by simply touching the iButton® with the matching connector on the instruments. The number of tags that can be installed is unlimited and each tag has a unique identification code.

With our HI 92000 Windows® compatible application software, users can sort or filter all collected test data using different criteria such as specific sampling location, parameter, date and time intervals or fixed range to filter measured values. The data can be plotted in a graph, exported to other common Windows® applications or printed for reporting purposes. It is easy to add new tags later on to increase an already existing database.

The HANNA Fast Tracker™ system is a new revolution in simple and organized data management.



FastTracker™
A new revolution in organized data management

HI 93414, HI 98703 and HI 98713 Turbidity Meters: *Principal of Operation*

Turbidity of the water is an optical property that causes light to be scattered and absorbed, rather than transmitted. The scattering of the light that passes through a liquid is primarily caused by the suspended solids. The higher the turbidity, the greater the amount of scattered light. Because even the molecules in a very pure fluid scatter light to a certain degree, no solution will have zero turbidity.

The USEPA Method 180.1 specifies the key parameters for the optical system to measure turbidity for drinking, saline and surface water in a 0 to 40 NTU range, using the nephelometric method. The HI 93414 and HI 98703 Portable Turbidimeter is designed to meet or exceed the criteria specified by the USEPA Method 180.1 and Standard Method 2130 B.

The ISO 7027 standard specifies the key parameters for the optical system to measure turbidity for drinking and surface water, using the formazin based metric method. The HI 98713 Portable Turbidimeter is designed to meet or exceed the criteria specified by the ISO 7027 standard.

The light beam that passes through the sample is scattered in all directions. The intensity and pattern of the scattered light is affected by many variables like wavelength of the incident light, particle size, shape, refractive index and color.

The HANNA's HI 98703, HI 93414 and HI 98713 are based on a state-of-the-art optical system that guarantee both high performance and reliable results.

HI 93414 and HI 98703's optical system includes a tungsten filament lamp, a scattered light detector (90°) and a transmitted light detector (180°). For the colorimeter range the optical system is based on the turbidimeter tungsten lamp and a separate detector with a narrow band interference filter @ 525 nm to guarantee both high performance and reliable results for colorimetric measurements.

HI 98713's optical system includes an infrared LED, a scattered light detector (90°) and a transmitted light detector (180°). By using an effective algorithm, the instrument's microprocessor calculates the FTU value from the signals that reach the two detectors. This algorithm corrects and compensates for interferences of color, making the HI 98713 turbidimeter color-compensated.

The optical system and measuring technique allow the compensation of lamp intensity (HI 98703, HI 93414) or LED intensity (HI 98713) fluctuations, minimizing the need of frequent calibration.

The lower detection limit of a turbidimeter is determined by the so called "stray light". Stray light is the light detected by the sensors that is not caused by light scattering from suspended particles.

The optical system of HI 98713 turbidimeter is designed to have very low stray light, providing accurate results for low turbidity samples when special care is taken.

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FOOD & BEVERAGE

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Maple 13.56



HI 93503

Waterproof Thermometer

with Pre-calibrated Interchangeable Probe



SPECIFICATIONS	HI 93503
Range	-50.0 to 150.0°C
Resolution	0.1°C
Accuracy	±0.4°C for 1 year, excluding probe error
Probe	HI 765PWL (included)
Battery	(3) 1.5V AA / approx. 2000 hours of use;
Type / Life	auto-off selectable after 8 or 60 minutes of inactivity (can be disabled)
Environment	-10 to 50°C (14 to 122°F); RH max 100%
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")
Weight	235 g (8.3 oz.)

ORDERING INFORMATION

HI 93503 is supplied with Temperature probe, 1.5V Alkaline batteries AA (3) and Instruction manual.

PROBES

HI 765PWL	For penetration, white handle
HI 765PBL	For penetration, blue handle
HI 765PG	For penetration, green handle
HI 765PR	For penetration, red handle
HI 765A	For air/gas, white handle
HI 765L	For liquids, white handle
HI 765BL	For liquids, black handle
HI 765W	Wire probe

ACCESSORIES

HI 710004	Soft carrying case
HI 721316	Rugged carrying case
HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 765-18C	Test key at -18.0°C
HI 765000C	Test key at 0.0°C
HI 765070C	Test key at +70.0°C

A probe for every application!

We manufacture a vast range of temperature probes, designed to obtain the best results in diverse applications. The HANNA thermistor probes can be changed without requiring calibration. There is also a range of color-coded probe handles to eliminate likelihood of cross-contamination when dealing with different types of food.

All probes are supplied with a 1 meter (3.3') cable and connector. For longer leads, see our Temperature Probes section.

Easily Change Probes for Versatile Temperature Measurement

HI 93503 measures a wide range of temperatures from -50.0°C to 150.0°C with exceptional accuracy. The casing is ergonomic, waterproof and compact. This meter is simple to operate and supplied complete with the user-replaceable HI 765PWL penetration probe.

Exchange the probe with any other model in the HI 765 series without requiring recalibration. This amounts to tremendous savings in time and money.

The HANNA exclusive BEPS system displays remaining power at startup then continuously checks the battery voltage and alerts the user when necessary. With its 2000 hours of battery life, one can be lulled into thinking that the meter will run forever! If you fail to change the battery the meter will shut itself down to prevent reading errors.

The range of accessories includes shockproof boots, practical field cases and calibration keys. With calibration keys, you can check your meter's accuracy at any time. Simply plug in the key and if the display value does not match those of the key, the meter is due for recalibration.

- *Pre-calibrated Thermistor Probe*



Waterproof Thermometer

with Direct K-type Probe

Professional and Affordable with a Fixed Probe

HI 935007 extends the range of portable HANNA thermometers by measuring temperatures as high as 1350°C and 2462°F. The resolution remains 0.1 up to 199.9°C and 399.9°F and automatically changes to 1.0 above.

HI 935007's attractive price point makes it possible for every operator to carry his or her own professional instrument.

The fixed HI 766C penetration probe with 1m (3.3') flexible cable is also supplied with the instrument. Three common AA batteries provide up to 1600 hours of continuous operation. Advanced battery management features include a display of remaining battery power at startup, low battery warning and an error prevention system. Add these to the HANNA two year parts and labor warranty and you have got yourself years of trouble-free operation.

With the optional HANNA rubber boot, you can use HI 935007 anywhere with maximum impact protection. These features together with a wide measurement range and low price make HI 93007 extremely popular in catering, food preparation and restaurants.



SPECIFICATIONS	HI 935007
Range	-50.0 to 199.9°C; 200 to 1350°C or 58.0 to 399.9°F; 400 to 2462°F
Resolution	0.1°C; 1°C; 0.2°F; 1°F
Accuracy	±0.2% F.S. (for 1 year, excluding probe error)
Probe	HI 766C (fixed)
Battery	(3) 1.5V AA / approx. 1600 hours of use;
Type / Life	auto-off selectable after 8 or 60 minutes of inactivity (can be disabled)
Environment	-10 to 50°C (14 to 122°F); RH max 100%
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")
Weight	235 g (8.3 oz.)

ORDERING INFORMATION

HI 935007 is supplied with 1.5V Alkaline batteries AA (3) and Instruction manual

ACCESSORIES

HI 710004	Soft carrying case
HI 710031	Rugged carrying case
HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange



HI 710004 Soft Carrying Case



HI 710031 Rugged Carrying Case



HI 710008 Shockproof Rubber Boot

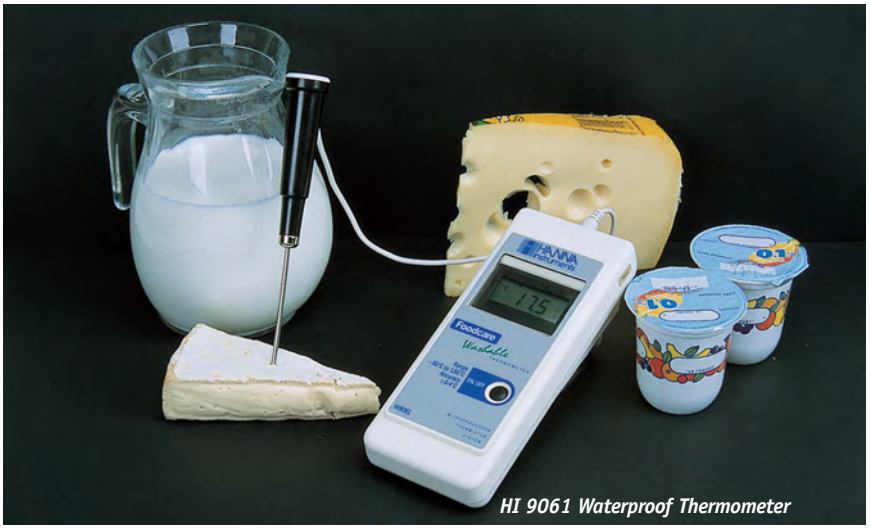
HI 9041 and HI 9061

One-Button Operation Thermometers

with Interchangeable Probe



HI 9041 Water-Resistant Thermometer



HI 9061 Waterproof Thermometer

Rugged, Easy to Use Thermometers

HI 9041 and HI 9061 are rugged, accurate and reliable thermometers, measuring temperature from -50.0 to 150.0°C or -58.0 to 302.0°F. In addition to a wider range, these instruments also offer greater accuracy at ±0.4°C (±0.8°F) across the entire range. They are easy-to-clean and easy-to-operate. In fact with only an ON/OFF button, any operator can use them with dexterity.

HI 9061 adds a waterproof housing making it the ultimate in hygiene.

SPECIFICATIONS	HI 9041C (HI 9041F)	HI 9061C (HI 9041F)
Range	-50.0 to 150.0°C (-58.0 to 302.0°F)	
Resolution	0.1°C (0.1°F)	
Precision	±0.4°C for 1 year, excluding probe error (±0.8°F)	
Probe	HI 765 series (not included)	
Battery Type / Life	(1) 9V / 700 hours approx.	(4) 1.5V AA / 2000 hours
Environment	-10 to 50°C (14 to 122°F); RH max 95%	-10 to 50°C (14 to 122°F); RH max 100%
Dimensions	180 x 83 x 40 mm (7.1 x 3.3 x 1.6")	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	226 g (8 oz.)	425 g (15 oz.)

ORDERING INFORMATION

HI 9041C, °C readings and **HI 9041F**, °F readings are supplied with 9V alkaline batteries (1) and instruction manual

HI 9061C, °C readings and **HI 9061F**, °F readings are supplied with 1.5V AA alkaline batteries (4) and instruction manual

PROBES

HI 765PWL	For penetration, white handle
HI 765PBL	For penetration, blue handle
HI 765PG	For penetration, green handle
HI 765PR	For penetration, red handle
HI 765A	For air/gas, white handle
HI 765L	For liquids, white handle
HI 765BL	For liquids, black handle
HI 765W	Wire probe



Extensive Choice of Probes

HI 9041 and HI 9061 can operate with a wide range of interchangeable HI 765 probes without requiring recalibration. The HI 765 probes have been designed for air, liquid, penetration and between pack measurements. You can order them with different handle colors to prevent the probe from cross-contaminating food. Longer probe cables are also available.

Non-Intrusive Temperature Measurement

The HANNA HI 99551 and HI 99556 thermometers employ infrared technology to measure the surface temperature. Infrared measurements are extremely practical with a fast response time, typically around 1 second.

The advantage is the non-intrusive nature of the measurements. This latter feature is particularly attractive in the food industry. By leaving products intact, especially those sealed or pre-wrapped, users can save time, prevent waste and save on costs.

In order to measure the temperature, simply point to the product or target and hold down the measurement key. Readings are immediately displayed on the LCD. This type of non-intrusive measurement is also useful when the surface temperature is too high to approach, for difficult-to-reach places or due to hygiene requirements.

With a 3 to 1 emissivity ratio, these HANNA meters are particularly attractive for food distribution, retailing and supermarkets.

Both HI 99551 and HI 99556 run on a common 9V battery with low battery indication on the display. The optional HANNA rubber boot makes these meters truly shockproof.

If in addition to the surface measurement, you must check the core temperature too, then HI 99556 is the ideal solution for you. Simply attach an optional external probe to the meter and you have a 2-in-1 infrared-thermistor thermometer.



2-in-1 IR + Probe

SPECIFICATIONS		HI 99551 • HI 99556
Range	IR	10 to 300°C ('-00' models); -20 to 199.9°C ('-10' models)
	Probe	-40 to 150°C (HI 99556 only)
Resolution	IR	1°C ('-00'models); 0.1°C ('-10'models)
	Probe	0.1°C
Accuracy	IR	±2% o ±2°C
	Probe	±0.5°C (-20 to 120°C); ±0.5°C+1% (outside)
IR Response Time		1 second
Optic IR Coefficient		3:1 (ratio of distance to diameter of target)
Min. Distance		30 mm
Probe		HI 765PW (included) (HI 99556 only)
Battery		(1) 9V
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions		143 x 80 x 38 mm (5.6 x 3.1 x 1.5")
Weight		320 g (11.3 oz.)

ORDERING INFORMATION

All the models are supplied complete with battery and instruction manuals.

HI 99551-00, °C readings, IR sensor, -10 to300°C

HI 99551-01, °F readings, IR sensor, - 14 to 572°F

HI 99551-10, °C readings, IR sensor, -20.0 to 199.9°C

HI 99556-00, °C readings, IR sensor, thermistor input, IR range -10 to 300°C, stainless steel probe HI 765PW

HI 99556-01, °F readings, IR sensor, thermistor input, IR range 14 to 572°F, supplied complete with stainless steel probe HI 765PW

HI 99556-10, °C readings, IR sensor, thermistor input, IR range -20.0 to 199.9°C, supplied complete with stainless steel probe HI 765PW

ACCESSORIES

HI 710004	Soft carrying case
HI 721316	Rugged carrying case
HI 731318	Sensor wipe cloth (4)
HI 765PW	Temperature probe for HI 99556


HI 731318 Sensor Wipe Cloth

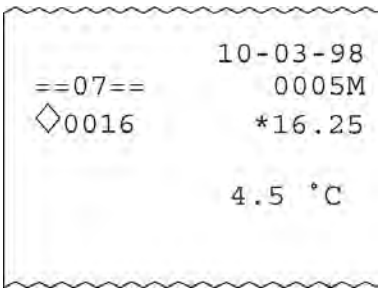
HI 98810 • HI 98811 • HI 98840

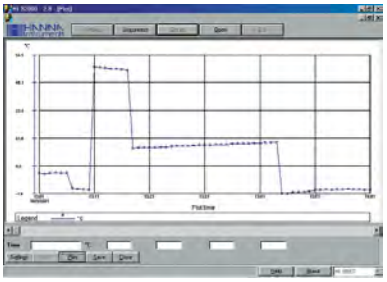
Portable Thermometers

with Built-in Printer & Logging Capability

PC compatible







with HI 98810, HI 98811 and HI 98840 you can print the measurements or transfer them to a PC

Designed for the Food Sector

HI 98810, HI 98811 and HI 98840 have been developed for the HACCP and food safety applications where documentation and/or recording of data is needed.

The Key Design Initiative

Simplicity-of-operation was the key initiative in their design. In fact most functions are menu-driven and user selectable. You can log measurements at a given interval from 1 minute to 3 hours without any supervision whatsoever. Also, by simply pressing LOG you can store, print and later retrieve a specific measurement. With GLP (Good Laboratory Practice) capability, you will know when the meter was last calibrated and when it is due for recalibration. In addition, by employing the built-in password protection, you can limit access to the calibration data and GLP settings.

Useful Features

Do you have to take measurements in dimly-lit areas? Not to worry! HI 98810, HI 98811 and HI 98840 are equipped with a backlit LCD. Each meter will switch itself off after a period of inactivity selectable by the operator. A low battery indication will provide a warning beforehand and the HANNA exclusive BEPS system will ensure that no bad measurements are taken due to low voltage. For operators needing continuous printing and logging, there is also a 12 Vdc power inlet. The internal nonvolatile memory can store up to 14000 individual data. These can be transferred to a PC through the infrared cradle (HI 9200).

The new HI 98811 is particularly suitable to monitor warehouses and cold storage. In fact, thanks to the i-Button® feature, the sample can be immediately identified.

HI 98810 and HI 98811 are single channel and are supplied with a general-purpose HI 762BL thermistor probe. HI 98840, on the other hand, will take up to 4 probes and measures temperature simultaneously on 4 different channels. All 3 meters measure temperature from -50°C to 150°C (-55.0 to 302.0°F) in tenths of degrees. In the setup function, you can also select Fahrenheit measurements over the same range.

With all the features, these thermometers represent the very apex of technology.

HI 98811 Features Fast Tracker™—Tag Identification System

HI 98811 is a new thermistor thermometer designed for temperature monitoring in warehouses and stores. Using the i-Button® located on the rear of the meter and the optional TAGs, it is possible to immediately identify the sample or lot location being measured.

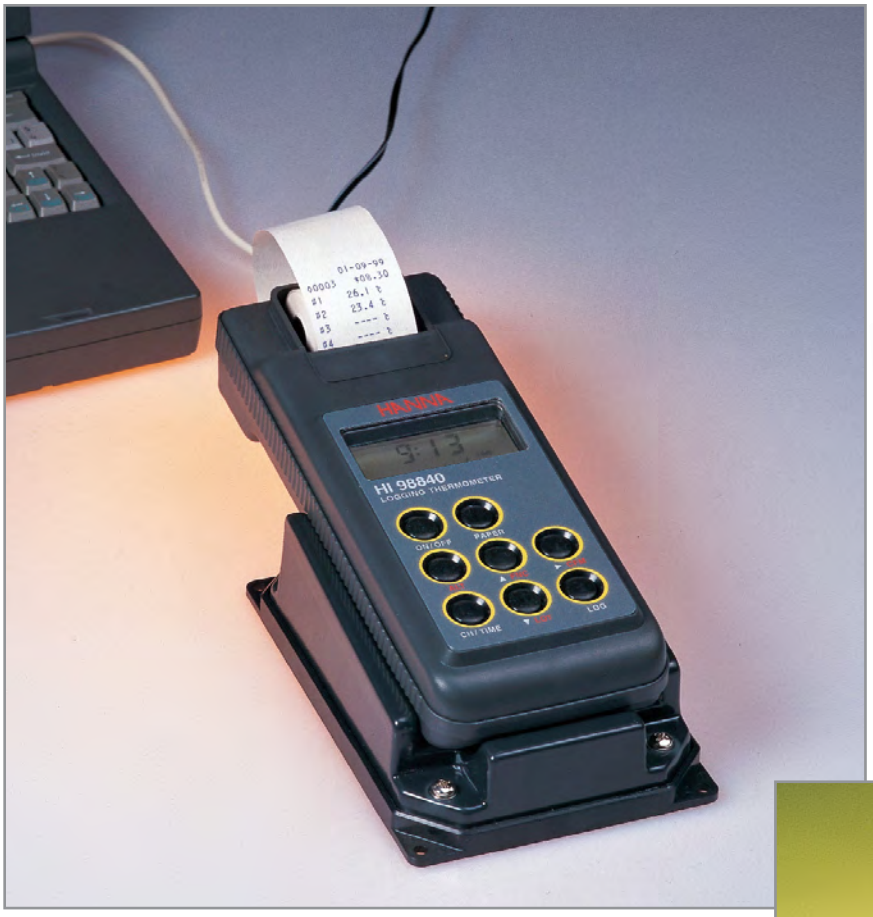


HANNA instruments

With Great Products, Come Great Results™

Portable Thermometers

with Built-in Printer & Logging Capability



Extensive Choice for Probes

HANNA produces a vast range of probes for just as wide a range of applications. The HI 762 probes can be replaced without requiring recalibration. They are supplied with a standard 1 meter (3.3') cable, however, there is also a choice of longer probe cables.





Download through an infrared cradle and customize the data with our Windows® based software

ORDERING INFORMATION

HI 98810 single channel thermometer, is supplied with HI762BL temperature probe, AA size alkaline batteries (4), instruction manual, paper rolls (5) and rugged carrying case.

HI 98811 single channel thermometer with Fast Tracker™ technology, is supplied with HI 762BL temperature probe, paper rolls (5), batteries, rugged carrying case and instructions.

HI 98840 4 channel thermometer, is supplied with paper rolls (5), batteries, rugged carrying case and instructions.

PROBES

HI 762PW	Penetration probe with white handle
HI 762PBL	Penetration probe, blue handle
HI 762PG	Penetration probe with green handle
HI 762PR	Penetration probe, red handle
HI 762A	Probe for air/gas probe with white handle
HI 762L	Probe for liquids, white handle
HI 762BL	Probe for liquids, black handle
HI 762W	Wire probe

ACCESSORIES

HI 710005	115 Vac/12 Vdc Power adapter (US plug)
HI 710006	230 Vac/12 Vdc Power adapter (European plug)
HI 710034	Paper roll (10)
HI 710035	Ink cartridge (1)
HI 9200/9	Infrared transmitter (9 pin)
HI 92000	Windows® compatible Software
HI 710031	Rugged carrying case
HI 920005	i-Button® with holder (5)

All 3 meters measure temperature from -50°C to 150°C (-55.0 to 302.0°F) in tenths of degrees.

For complete specifications, please refer to our temperature section.

HI 142 • HI 504903

Temperature Dataloggers

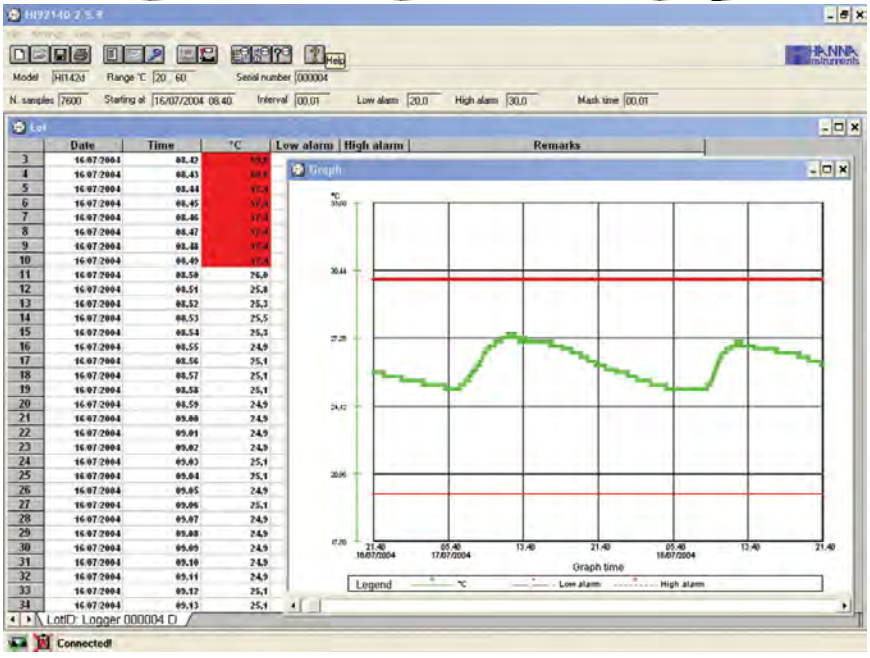
A Complete System for Temperature Monitoring

GSM · B.E.P.S. · PC compatible

• *Cable length connection is determined by the user*







HI 142 and HI 504903

In food industry applications, such as catering and supermarkets, temperature monitoring, recording accountability and control are becoming more and more crucial. Several regulations require hard copies of all temperature data - from production all the way through to the consumer.

For this reason many instruments have been produced for continuous temperature monitoring, but all of them have to be removed from their location for data downloading. Now, thanks to advanced technology from HANNA HI 142 and HI 504903, this is no longer a problem.

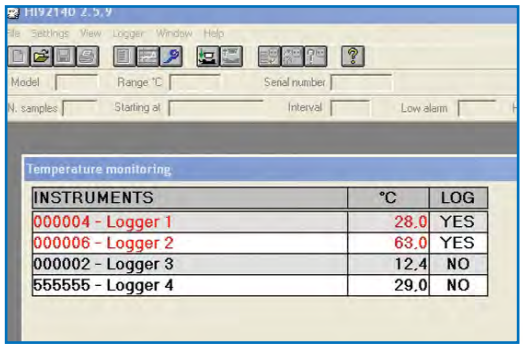
HI 142 (available in 8 models with different temperature ranges) allows data downloading directly on the PC.

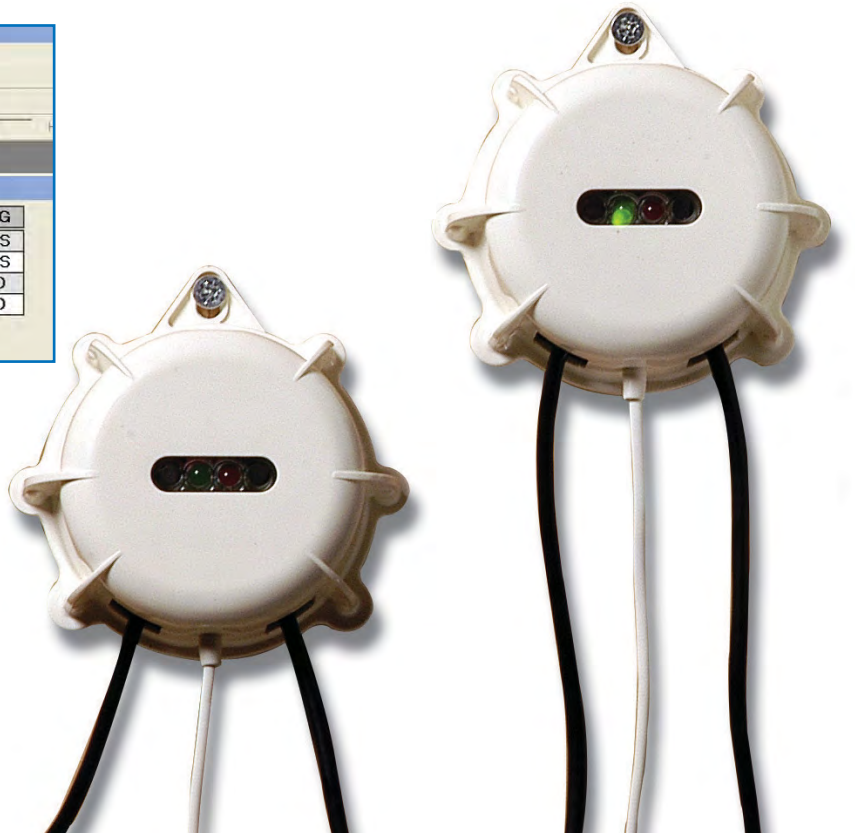
You can interact with the loggers directly from your PC, perform set-up, check instrument status and download the data when the logging is complete.

You can choose between two connection types: a direct connection between the HI 142 and a PC or to the HI 142/HI

Temperature Dataloggers

A Complete System for Temperature Monitoring





- *Dataloggers have the ability to be either directly connected to a PC or through the use of the HI 504903 GSM supervisor*

504903 system. The HI 142/HI 504903 system allows a remote modem connection for supervision of the loggers where a direct connection is not available.

It is possible to build a control network with up to 31 loggers, each one can log up to 7600 data or work in a cyclical fashion.

If an error occurs in one or more loggers, e.g. measured temperature is outside the set limit or in case of power failure, HI 504903 will advise the user by sending an SMS to the programmed phone number(s). The message will contain the logger ID and the occurred error, then the user will be also advised with a phone call.

If the HI 504903 does not receive any confirmation of received SMS, it will continue to send messages and call the user.

The operator can also check the system status by calling the HI 504903 GSM supervisor, that will answer with an SMS for each logger. The message will include the operating status (stand-by, logging), any occurred error and the current measured temperature.

SPECIFICATIONS MODEL*	RANGE	RESOLUTION	ACCURACY
HI 142A(H)	-30.0 to 70.0°C / -22.0 to 158.0°F	0.5°C / 0.5°F	±1.5°C / ±3°F
HI 142B(H)	-10.0 to 30.0°C / 14 to 86°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 142C(H)	-30.0 to 10.0°C / -22 to 50°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 142D(H)	20.0 to 60.0°C / 68 to 140°F	0.2°C / 0.4°F	±0.5°C / ±1°F
HI 142E(H)	-30.0 to -10.0°C / -22 to 14°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 142F(H)	20.0 to 40.0°C / 68 to 104°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 142G(H)	-5.0 to 15.0°C / 23 to 59°F	0.1°C / 0.2°F	±0.3°C / ±0.6°F
HI 142H(H)	10 to 120°C / 50 to 248°F	1°C /.2°F	±2°C / ±4°F

SPECIFICATIONS FOR ALL MODELS	
Data Logging	up to 7600 samples
Environment	0 to 50°C (32 to 122°F); RH max 95%
Power Supply	10-20 Vdc
Probe	fixed, with 1.5 m cable of non-toxic material
Dimensions / Weight	dia 86.5 x h 35 mm (dia 3.4 x h 1.4") / 150 g (5.5 oz.)

ORDERING INFORMATION

HI 142 is supplied with instructions

HI 504903 is supplied with configuration software, line termination key, HI 920010 serial cable for PC connection, 12 Vdc power adapter and instructions

*add an "H" to the end of the part number to add a hook for wall mounting (e.g. HI 142AH)

ACCESSORIES

HI 504903-1 GSM supervisor (dual-band 900/1900 MHz with 115 Vac/12 Vdc power adapter)

HI 504903-2 GSM supervisor (dual-band 900/1800 MHz with 230 Vac/12 Vdc power adapter)

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EURO)

HI 92140 Windows® compatible sofware

HI 141

Temperature Dataloggers

Continuously Monitor Temperature with 1 or 2 Channels

min/max B.E.P.S. PC compatible

At a glance, you can assess the current temperature, channel and status of the logging sequence according to your programmed instructions:



Number of samples taken



Countdown until the start of logging



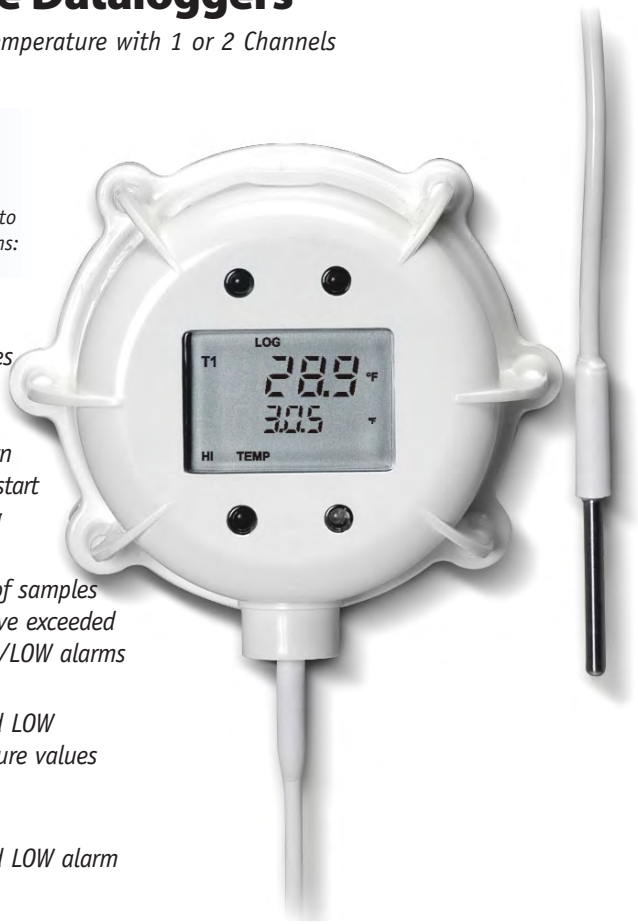
Number of samples which have exceeded the HIGH/LOW alarms



HIGH and LOW temperature values



HIGH and LOW alarm settings



Easy to Read Results

The HI 141 thermologgers feature a LCD display showing a wide variety of information while simultaneously storing it. From the LCD, you can immediately tell the current temperature, channel and status of the logging sequence according to your programmed instructions

- *1 or 2 channels* with internal or external sensor
- *16,000 samples/channel* (for 1-channel models) *or 8,000* samples/channel (for 2-channel models)
- *Logging interval* from 1 second to 24 hours
- *Logging delay* start up to 199 hours and magnetic start
- *Programmable high and low alarms*
- *Non-volatile storage* of logging parameters and data in EEPROM
- *IP67 waterproof casing*

*ORDERING INFORMATION***

Code	Sensor/s	Range
HI 141A(H)	1 internal	-40.0 to 80.0°C
HI 141B(H)	1 external	-40.0 to 125.0°C
HI 141C(H)*	1 internal	-20.0 to 70.0°C
HI 141D(H)*	1 external	-40.0 to 125.0°C
HI 141E(H)	1 internal	-40.0 to 80.0°C
	1 external	-40.0 to 125.0°C
HI 141F(H)	2 external	-40.0 to 125.0°C
HI 141G(H)*	1 internal	-20.0 to 70.0°C
	1 external	-40.0 to 125.0°C
HI 141J(H)*	2 external	-40.0 to 125.0°C

* Model with LCD display

** add an "H" to the end of the part number to add a hook for wall mounting (e.g. HI 141AH)

ACCESSORIES

HI 141000	Windows® application software (Required)
HI 141001	Infrared transmitter (Required)
HI 740033	3.6 V AA battery
HI 740221	Key for magnetic start

Through HI 141000 application software (optional), all models can be programmed to read °C or °F

HI 141

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 1m (3.3') cable for direct insertion. HI 141 can store up to 16,000 temperature readings in a protected, non-volatile EEPROM memory. The logging interval can be set from once per second to once per 24 hour period, and logging delay 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 tamper-proof and stored into serial numbered lots.

The user interacts with the logger, setting data acquisition parameters or down-loading logged data through an RS232 serial port on a Windows® PC. The HI 141000 Windows® compatible software supports communication between the logger and the PC through the HI 141001 infrared transmitter.

The housing is waterproof and can include a convenient hanging hook (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.

Models with a longer cable for external sensors are available upon request.



HI 140

The HI 140 dataloggers represent the most economical and secure way of monitoring temperature continuously over long periods of time. They can be placed with goods on the move, on supermarket shelves and in warehouses to act as your eyes and ears. They record the temperature at a given interval to make sure that perishable goods are not left unattended on a loading dock on the other side of the world! They can testify if fresh fish remained at unacceptable temperatures and for how long! They can provide that extra guarantee that goods never ventured out of limits that public safety imposes or you regard as reasonable. HI 140 can store up to 7600 measurements at selectable intervals from 1 minute to 24 hours. All parameters can be set through our Windows® compatible software. An infrared cradle eliminates the need to put a connector on the meter - an undesirable dirt-trap in the food market and source of problems due to wear and tear over time.

Thanks to the HI 92140 software, you can import the data into Excel® and show it in clear graphic format. You can also set min. and max. levels, delayed start time, as well as a password. Should the registered temperature exceed your desired limits, a red LED on the meter will start flashing and remains so until the meter is reset by authorized personnel. This way, no one can tamper with the data. A green LED will light up the moment the HI 140 starts recording so that the operator can visibly see that the unit is working. For transport companies with several trucks, or supermarkets with multiple critical points, one can also assign a different identity number to each logger. HI 140 runs on inexpensive and readily available AA type batteries. It is completely waterproof and does not require calibration. Several types are offered so that you may choose the model with the range and accuracy most suitable for your application.



ORDERING INFORMATION*

All the models are supplied complete with batteries and instructions.

HI 140A(H)	-30.0 to 70.0°C ±1.5°C
HI 140B(H)	-10.0 to 30.0°C ±0.5°C
HI 140C(H)	-30.0 to 10.0°C ±0.5°C
HI 140D(H)	20.0 to 60.0°C ±0.5°C
HI 140E(H)	-30.0 to -10.0°C ±0.3°C
HI 140F(H)	20.0 to 40.0°C ±0.3°C
HI 140G(H)	-5.0 to 15.0°C ±0.3°C

*For models with an eye hook, add an "H" to the part number, (e.g. HI 140AH)

The HI 140 logger is an excellent way to conform with HACCP requirements and guarantee safety throughout the food chain

Through HI 141000 application software (optional), all models can be programmed to read °C or °F

REQUIRED ACCESSORIES

HI 90140	Infrared cradle (transmitter)
HI 92140	Windows® compatibile software

Completely user friendly - set the parameters to best fit your application



HACCP & Food Quality Testing

Professional Instrumentation from HANNA

A Complete Range of Products for the Food Sector

Operators in the food sector need an extensive range of products in order to guarantee the quality of food supplied to the public. Legislation has made such controls obligatory for anyone preparing, manufacturing, distributing or serving food. In order to satisfy this need, we have manufactured an equally vast range of products with the necessary accuracy and reliability to check the quality of food in all phases of preparation and distribution. For example, to satisfy the needs of HACCP (Hazard Analysis and Critical Control Points), we have produced a complete range of thermometers and pH meters to check food from production to transport and from catering to storage.

Some HANNA portable and pocket thermometers have become synonymous with temperature control in restaurants and catering facilities. The already extensive range has been now further enhanced. You can choose from pocket meters with the range most appropriate for your application. There is also a vast selection of shapes and configurations to best fit your needs. For example, some of our thermometers are available with interchangeable or fixed probes, as well as meters with a hinged, folding, or even ones with a reinforced handle for frozen samples. The more professional portable meters offer just as wide a range of measurement scales, fixed or replaceable probes and additional features.

For the adverse measurement conditions found in food production areas, typically with high humidity and condensation problems, we have manufactured a substantial array of waterproof meters.

For those operators who prefer extra rugged instrumentation, we have added the shockproof series. Documentation is a must in certain production cycles and important for HACCP programs, you can choose from a range of printing and/or logging meters. These are stand-alone meters that can measure, print and log the parameters without any supervision.





As far as pH is concerned, legislation is making pH control just as important as temperature. For example, the European Community's Directive sets the pH level as the most crucial factor together with water activity and temperature for safe storage of perishable food. To satisfy these demands, we offer specifically-designed portable and bench pH meters. The range covers all the basic needs of operators in the food sector, from accuracy to ruggedness and specially-made electrodes for meat and milk to the latest in GLP microprocessor technology.



HI 143

T-Logger

with locking wall cradle



Secure Temperature Logger

HI 143 is a temperature data logger with internal NTC sensor. The HI 143 is controlled via USB or RS232 on a PC with HANNA's Windows® compatible application software. Communication is made between the logger and the PC through the HI 143001 transmitter with RS232 or HI 143002 with USB connector. The supplied wall cradle makes it easy to lock the meter in place to prevent tampering and the application software supports security passwords.

- *Logging start through PC*
  by pressing a button or at a set time
- *Selectable sampling interval*
  from 1 minute to 24 hours
- *Up to 4,000 logged samples*
- *Selectable measurement unit,*
  °C or °F
- *Min/Max* measured values are stored and displayed
- *Programmable high and low alarms*
- *Non-volatile storage*
  of logging parameters and data
- *Battery level indicator on display*
- *Security password*
- *IP 65 protection*

SPECIFICATIONS	HI 143
Range	-30. to 70.0°C/-22.0 to 158.0°F
Resolution	0.1°C/0.1°F
Accuracy	±0.4°C (-20 to 60°C); ±0.6°C (outside) ±0.7°F (-4 to 140°C); ±1.1°F (outside)
Calibration	Factory calibrated
Datalogging	Up to 4,000 samples
Logging interval	User selectable, from 1 minute to 24 hours
Battery Type / Life	(1) CR2032 3V lithium ion/approx. 2 years
Protection	IP 65 (water-resistant)
Dimensions	60 x 37 x 17 mm (2.4 x 1.5 x 0.7")

ORDERING INFORMATION

HI 143 is supplied with CR2032 lithium battery, wall cradle, lock and instructions.

HI 143-00 is supplied with HI 143002 USB communication cradle, Windows® compatible application software, CR2032 lithium battery, wall cradle, lock and instructions.

HI 143-10 is supplied with HI 143001 RS232 communication cradle, Windows® compatible application software, CR2032 lithium battery, wall cradle, lock and instructions.

ACCESSORIES

HI 143002 USB communication cradle.

HI 143001 RS232 communication cradle.

Automatic Titration Systems

with Clip Lock™ Exchangeable Burette System and Automatic Burette Recognition



Designed to measure pH • Free and Total SO_2 • Reducing Sugars • Total Acidity • Volatile Acidity • General Alcohol • Ammonium • Potassium • Fluoride • Nitrogen

HI 901 and HI 902 Automatic Titrators Feature:

- *320 x 240 pixel LCD w/backlight*
- *Precise dosing system (accuracy under 0.1% of burette volume)*
- *Supports up to 10,000 titration methods (standard and user defined)*
- *Clip Lock™ — change burettes quickly with auto burette recognition*
- *Dynamic/Linear dosing feature*
- *Fixed end point potential or pH*
- *Equivalence point detection (first derivative and second derivative)*
- *The results are displayed directly in the selected units*
- *Titration graph can be displayed on-screen and saved*
- *User customized reports can be printed, saved on floppy disk or transferred to PC via RS232 interface*
- *Reminders for titrant age and standardization expiration*
- *Self diagnostic features for peripheral devices including pump, valve, burette and stirrer*

HI 901 • HI 902

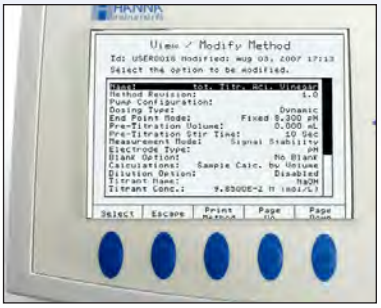
Automatic Titration Systems

with Clip Lock™ Exchangeable Burette System and Automatic Burette Recognition

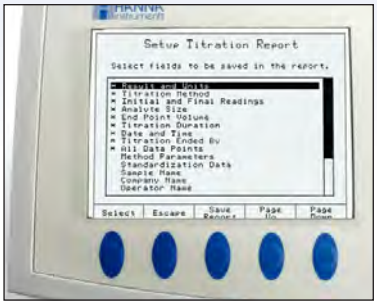
Keep an accurate record of analyses!

HANNA's 900 Series titration systems are easily incorporated into any existing GLP data management program:

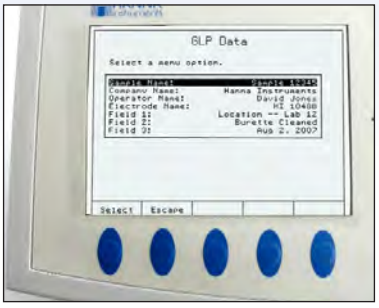
- *Users can easily record all necessary GLP information with every sample including sample identification, company and operator name, date, time, electrode ID codes and calibration information.*
- *Data can also be transferred using the integral floppy disk drive for communication with a PC or even other titration systems. Special memory cards are not required.*
- *All test results can be transferred directly to a PC.*
- *Users can print reports of analyses directly from the titrator using a standard parallel printer.*
- *An external monitor and keyboard can be attached for added versatility.*
- *RS485 port for future expansion.*



Custom methods



Record up to 100 reports



Incorporate HANNA 900 series titrators into any GLP data management program

View Store Print

with HANNA PC Connectivity

A Complete Analysis

These instruments perform a complete analysis comprising of sample preparation, dispensing of titrant solution, stirring, measuring and waiting times, recognition of the end point and storing the results. All the parameters that a titration requires are grouped into a method.

The titrators are already supplied with a set of standard methods or you can create your own. Using a floppy disk or connecting the titrator to the HI 900 PC application, methods (standard and user) can be upgraded, stored or deleted.



PC Connectivity

The HI 900 series titrators can be connected to a computer in conjunction with HANNA software.



VGA Display Connectivity

The information shown on the titrator display can be viewed on a standard VGA display via a 15-pin socket.



Printer Connectivity

The HI 900 series titrators accept a variety of parallel printers for printing of data.



PC Keyboard Connectivity

An external PC compatible keyboard can be connected.

Automatic Titration Systems

with Clip Lock™ Exchangeable Burette System and Automatic Burette Recognition

Clip-Lock™ Exchangeable Burette System



With Clip-Lock™, it only takes a couple of seconds to exchange the reagent burettes to perform a different titration.

With conventional titrators, there is the risk of cross contamination of titrants when exchanging reagents. Reconfiguring the titrator for different sample methods consumes time and reagents. Each method may need different reagents and care must be used when purging and cleaning the burette. To avoid these problems, HANNA introduces the Clip-Lock™ exchangeable burette system to prevent cross contamination while reducing loss of time and reagents. Burettes simply slide out for quick exchanges without having to detach the aspiration and dispensing tubes from the titrant bottles.

Having several prepared burettes on hand will make the HANNA 900 series the fastest and most versatile titration systems available. Interrupting an important cycle of analysis due to a malfunctioning burette is a thing of the past. With the HANNA Clip-Lock™ system you can simply substitute the burette and complete all your tests with the same titrant!

HANNA's burettes feature a threaded screw connection to prevent leakage problems. Burettes are available in 5 mL, 10 mL & 25 mL sizes and are made of chemically resistant material to ensure many years of trouble-free operation.



A. Aspiration Tube (Titrant Inlet)
B. Dispensing Tube (Titrant Outlet)
C. Burette Assembly
D. Light Shield (in closed state)
E. Burette Support
F. Support Bar
G. Sliding Positioning Collar
H. Dispensing Tip
I. Temperature Sensor
J. pH Electrode
K. Stirrer Propeller
L. Stirrer Stand
M. Numeric Keys
N. Function Keys
O. Help Key
P. Arrow Keys
Q. Option Keys
R. 320 x 240 Pixel Graphic LCD

HI 901 • HI 902

Automatic Titration Systems

with Clip Lock™ Exchangeable Burette System and Automatic Burette Recognition

SPECIFICATIONS	mV	pH	Temperature
Range	-2000.0 to 2000.0 mV	-2.000 to 20.000 pH	-5.0 to 105.0°C/23 to 221°F/268.2 to 378.2 K
Resolution	0.1 mV	0.1/0.01/0.001 pH	0.1°C/0.1°F/0.1K
Accuracy	±0.1 mV (@25°C/77°F)	±0.001 pH (@25°C/77°F)	±0.1°C/±0.2°F/±0.1K (excluding probe error)
Burette Sizes	5, 10, and 25 mL		
Burette Resolution	1/40000		
Display Resolution	0.001 mL		
Dosing Accuracy	±0.1% of full burette volume		
Display	Graphic LCD, 320 x 240 pixel LCD		
Languages	English, Italian, Portuguese, Spanish		
Methods	Up to 10,000 methods (standard and user-defined)		
Burette Auto-Detection	Burette size is automatically recognized when inserted into the unit		
Programmable Stirrer	Propeller type, 100-2500 RPM, automatically held within 10% of the set value, resolution 100 rpm		
Flow Rate	User-selectable from 0.1 mL/min to 2 x burette volumes/min		
pH/mV Measurement	Titrators can also perform direct pH and mV measurements		
Temperature Compensation	Manual or automatic (ATC)		
pH Calibration	Manual or automatic at 1-5 points with 4 buffer sets or custom buffers		
Potentiometric Titrations	Acid-Base (pH or mV-Mode), Redox, Precipitation, Complexometric, Non-Aqueous, Ion-Selective, Argentometric (in mV-mode only)		
HI 901 Titration Methods	Fixed mV or pH end-point detection & first equivalency point detection (with the 1st or 2nd derivatives)		
HI 902 Titration Methods	Fixed mV or pH end-point detection & multiple equivalency point detection (with the 1st or 2nd derivatives); back titration		
Measurement Units	User specified expression of concentration units to suit specific calculation requirements		
Real Time & Stored Graphs	mV-Volume or pH-Volume titration curve, 1st derivative curve or 2nd derivative curve, in pH-mode or mV-mode; pH/mV values versus time-datalogging results		
Data Storage:	Up to 100 complete titration and pH/mV logging complete reports		
Disk Drive:	Built-in 3.5" floppy disk drive allows storage and transfer of configurations, preprogrammed methods, custom methods, titration reports and bitmap graph files		
Peripherals	Connections for VGA display, PC-keyboard, parallel printer, RS 232 input, interface for future expansion		
GLP Conformity	Instrumentation data storage and printing capabilities		
Operating Environment	10 to 40°C (50 to 104°F), up to 95% RH		
Storage Environment	-20 to 70°C (-4 to 158°F), up to 95% RH		
Power	110V/220 Vac; 50-60Hz		
Dimensions	Width x Depth x Height = 390 x 350 x 380 mm (15.3 x 13.8 x 14.9 in)		
Weight	approx. 10 kg (22 lbs.) with one pump and stirrer assembly		

ORDERING INFORMATION

HI 901-01 (115V) and **HI 901-02** (230V) is supplied with (1) 25 mL glass burette, (1) burette driver assembly, power adapter and instructions.

HI 902-01 (115V) and **HI 902-02** (230V) back titration and multiple end-point titrators are supplied with (1) 25 mL glass burette, (1) burette driver assembly, power adapter and instructions.

ISE's for Wine Analysis

Ion Selective Electrodes that Compliment our ISE Meters



PARAMETER	AMMONIA	BROMIDE		FLUORIDE		POTASSIUM	
Code	**HI 4101**	**HI 4002**	**HI 4102**	**HI 4010**	**HI 4110**	**HI 4014**	**HI 4114**
Type	Gas-Sensing; Combination	Solid-state; Half-cell	Solid-state; Combination	Solid-state; Half-cell	Solid-state; Combination	Polymer Membrane; Half-cell	Polymer Membrane; Combination
Measurement Range	1M to 1X 10^{-6}M 17000 to 0.02 ppm	1M to 1X 10^{-6}M 79910 to 0.08 ppm	1M to 1X 10^{-6}M 79910 to 0.08 ppm	1M to 1X 10^{-6}M Sat to 0.02 ppm	1M to 1X 10^{-6}M Sat to 0.02 ppm	1M to 1X 10^{-6}M 39100 to .039 ppm	1M to 1X 10^{-6}M 39100 to .039 ppm
Optimum pH Range	>11	2 to 12.5	2 to 12.5	5 to 8	5 to 8	1.5 to 12.0	1.5 to 12.0
Temperature Range	0 to 40°C	0 to 80°C	0 to 80°C	0 to 80°C	0 to 80°C	0 to 40°C	0 to 40°C
Approximate Slope	-56	-56	-56	-56	-56	+56	+56
Body Material	Delrin	Epoxy	PEI	PVC	PEI	PVC	PEI/PVC
Cable	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial
Connector	BNC	BNC	BNC	BNC	BNC	BNC	BNC
Possible Applications	Determination of ammonium, ammonia in wine, beer, water, waste water and soil	Determination of free bromide ions in wine, emulsified food products, beverages, plants, soils and as an indicator for titration		Determination of free fluoride in wine, potable water, soft drinks, plants, emulsified food products, plating and pickling acids		Determination of potassium ions in wine, waters, soils and biological samples.	

HI 84100

Sulfur Dioxide Mini Titrator

For the Determination of Sulfur Dioxide for Wine Analysis



- *Titrator, magnetic stirrer, electrode & reagent holder in one compact unit*
- *Results in minutes*
- *Simple to operate*

SPECIFICATIONS	HI 84100 mini Titrator
Range	0 to 400 ppm of SO_2
Resolution	1 ppm
Accuracy	5% of reading
Method	Ripper titrimetric method
Principle	Equivelance point redox titration
Sample Volume	50 mL
ORP Electrode	HI 3148B/50 (included)
Pump Dosing	0.5 mL/min
Stirring Speed	1500 rpm
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	115V/230 Vac; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

ORDERING INFORMATION

HI 84100-01 (115V) and **HI 84100-02** (230V) is supplied with reagent set for 20 titrations, 50 mL beakers (2), 20 mL beakers (2), scissors, tube set with cap, ORP electrode, stir bar, power cable, 30 mL bottle of electrode refill solution, 1 mL syringe, wine deposits cleaning solution sachets (2), wine stain cleaning solution sachets (2) and instructions.

PROBES

HI 3148B/50 ORP Probe with shorter cable

SOLUTIONS

HI 70300L Electrode storage solution, (500 mL)

HI 70635 Cleaning solution for wine deposits (500 mL)

HI 70636 Cleaning solution for wine stains (500 mL)

HI 7082 Electrode filling solution, 30 mL (4)

REAGENTS

HI 84100-50 Titrant solution (110 mL)

HI 84100-51 Alkaline reagent (500 mL)

HI 84100-52 Acid reagent for total SO_2 determination (500 mL)

HI 84100-53 Acid reagent for free SO_2 determination (500 mL)

HI 84100-54 Stabilizer reagent (25)

HI 84100-55 Calibration standard (500 mL)

ACCESSORIES

HI 70483T Tube set with cap for titrant bottle and tip

HI 731316 Stir bar (5)

HI 740036P Beaker 50 mL (10)

HI 740037P Beaker 20 mL (10)

Free and Total Sulfur Dioxide

An important reason for adding SO_2 is to avoid oxidation. When there is oxygen around, SO_2 itself becomes oxidized before phenol compounds in the wine, and so acts as an oxygen scavenger. Also, SO_2 suppresses the activity of enzymes that cause browning and other problems.

What is really protecting your wine is molecular SO_2. When you add SO_2, depending of circumstances, some of it immediately becomes bound. The relationship between the amount of SO_2 and amount of SO_2 remaining free is complex. It is clear, however, that is largely governed by the total SO_2 content of the wine. The rate of binding decreases as the free SO_2 concentration increases. The exact relationship between free and bound (total-free) SO_2 will vary from wine to wine.

Below 30-60 ppm, 33% to 50% of SO_2 addition becomes bounded. What remains is called "free" and it is divided in two parts. The larger, and relatively ineffective free part is "bisulphite" (HSO^3). The smaller part of the free is the active molecular. The amount of molecular SO_2 in your wine depends both on the level of free SO_2 present as well as pH. For instance, at pH 3.2, the amount of the free SO_2 for 0.8 ppm molecular SO_2 is 22 ppm. At pH 3.5, you will need 43 ppm free - essentially double.

In most situations, 0.8 pp, molecular SO_2 during bulk storage and at bottling will provide you with adequate protection from oxidation and bacterial action. This includes prevention of malolactic bacteria as well.

It is important to remember that the amount of free SO_2 in the wine depends on three things: how much is added, how much was present before the addition and how much of your addition promptly becomes bound.

The level at which molecular SO_2 can be detected by the human senses is about 2.0 ppm. This is also the level which is needed for maximum protection of your wine. This is particularly true in the case of sweet, and most notably, botrytised wines.

The HANNA HI 84100 offers the possibility to test free or total SO_2 in all the wines including the red ones, that are difficult to test with manual methods because the color changes are hardly seen.

HI 84102

Titratable Total Acidity Mini Titrator

For the Determination of Titratable Total Acidity for Wine Analysis

Titratable Total Acidity

Acids occur naturally during the growing of grapes as as part of the fermentation process wines show lower levels of acid when there are hot growing seasons or when the grapes come from hotter regions. In the proper proportion, acids are a desirable trait and give the wine character.

The three predominant acids in wine are tartaric, malic, and citric, all of which are intrinsic to the grape. Tartaric acid is the principal acid in grapes and is a component that promotes a crisp flavor and graceful again in wine. A moderate amount of a wine's acid comes from malic acid, which contributes to fruitiness, and a small amount comes from citric acid. Wine also contains trace amounts of other acids. The least desirable acid in wine is acetic acid, which, when preset in more than a nominal amount, give swine a sour vinegary aspect.

Total acidity, also called, titratable acidity, is the sum of the fixed and volatile acids. in the United States the total acidity is usually expressed in terms of tartaric acid, even though the other acids are measured.

Total acidity directly effects the color and flavor of wine and, depending on the style of the wine, is sought in a perfect balance with the sweet and bitter sensations of other components. Too much acidity makes wine tart and sharp; too little makes wines flat, flabby and uninteresting. Proper acidity in wine is what makes it refreshing and an ideal accompaniment to food.

The proper acid level of a wine varies, with sweeter wines generally requiring somewhat higher levels to retain the proper balance. For dry table wine the acceptable range is usually 0.60 to 0.75%; for sweet wine it's 0.70 to 0.85%.



- *Titrator, magnetic stirrer, electrode & reagent holder in one compact unit*
- *Results in minutes*
- *Simple to operate*

SPECIFICATIONS	HI 84102 mini Titrator
Range	0.0 to 25.0 g/L of tartaric acid
Resolution	0.1 g/L
Accuracy	5% of reading
Method	Acid-base titration method
Principle	End-point titration
pH Calibration	1 point in selected end-point: 7.00 pH or 8.20 pH
Sample Volume	2 mL
Temperature Compensation	Automatic from 0.0 to 100.0°C
pH Electrode	HI 1048B (included)
Temperature Probe	HI 7662-T (included)
Pump Dosing	0.5 mL/min
Stirring Speed	1500 rpm
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	115V/230 Vac; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

ORDERING INFORMATION

HI 84102-01 (115V) and **HI 84102-02** (230V) is supplied with reagent set for 20 titrations, 2000 µL automatic pipette, plastic tips for 2000 µL automatic pipette (2), 50 mL beakers (2), tube set with cap, pH electrode, temperature probe, stir bar, power cable, 30 mL bottle of refill solution, mL syringe (1), wine deposits cleaning solution sachets (2), wine stain cleaning solution sachets (2) and instruction manual.

ELECTRODES

HI 1048B pH Electrode

HI 7662-T Temperature Probe

SOLUTIONS

HI 70300L Electrode storage solution, 500 mL

HI 70635 Cleaning solution for wine deposits, 500 mL

HI 70636 Cleaning solution for wine stains, 500 mL

HI 7082 Electrode filling solution, 30 mL (4)

HI 84102-50 Titrant solution, 110 mL

HI 84102-55 Calibration standard, 100 mL

HI 84102-60 Buffer solution 1, pH 7.00, 500 mL

HI 84102-61 Buffer solution 2, pH 8.20, 500 mL

ACCESSORIES

HI 70483T Tube set with cap for titrant bottle and tip

HI 731316 Stir bar (5)

HI 731342 Automatic pipette 2000 µL

HI 731352 Tips for 2000 µL automatic pipette (4)

HI 740036P Beaker 50 mL (10)

HI 7662-T Temperature probe

HI 222

Professional pH Meter

for Wine Analysis

audible · hold · 2 points · check electrode · electrode condition · PC compatible



KEY FEATURES

- *Designed specifically for wine analysis*
- *Calibration Check™ Electrode diagnostics*
- *Electrode condition is shown on display*
- *Logging up to 500 samples*
- *Last calibration date and data*
- *Calibration alarm timeout*
- *Instrument ID Number*
- *Real Time Clock*
- *Clog-resistant electrode*
- *RS232 PC Interface*

WINE line

Recognizing dirty pH electrodes

In the process of wine making, most pH measurements are made in the must. A pH electrode gets dirty rapidly when measuring the pH of must because sediments deposit on the pH measuring bulb and on the pH electrode junction. This becomes a big problem during the actual pH measurement, and even after, if the electrode has not been properly cleaned. Simply, a dirty pH electrode can give results that are up to 0.5 pH inaccurate — even after a pH calibration has just been performed.

Knowing when to clean pH electrodes

Conventional pH meters do not warn the user when the pH electrode is dirty. A common example of this occurs just after calibrating the instrument — the pH electrode is immersed into the pH 7 buffer and the reading is lower than expected (pH 6.8 or 6.9 instead of 7.0). HI 222 uses HANNA 's unique technology to detect when the electrode is dirty and gives a warning during calibration.

Cleaning pH electrodes

It is of the utmost importance to properly clean the pH electrode prior to use. A proper cleaning of the electrode must be done with appropriate cleaning solutions in order to remove all the deposits on the sensitive bulb and junction. HI 70635 (wine deposits removal) and HI 70636 (wine stain removal) are tailored made cleaning solutions that remove all deposits from your pH electrode and will guarantee your measurements are always accurate and your pH electrode will last a long time. HANNA is the only manufacturer to offer tailor made cleaning solutions for winemaking.

pH 3.00 Buffer: Tailor Made Calibration for Wine Analysis

Since most wine measurments are taken at a pH of less than 4, these meters have been pre-programmed at a custom calibration point of 3.00 pH.

Using the pH 3.00 buffer will minimize any measurement error due to calibration.



Professional pH Meter

for Wine Analysis

Calibration Check™ Indications



Optimal condition



Clogged junction



Clogged junction, dirty electrode



Aged/dirty electrode



Electrode failure

SPECIFICATIONS

		HI 222
Range	pH	-2.00 to 16.00
	mV	±699.9 mV; ±2000 mV
	Temperature	-20.0 to 120.0°C
Resolution	pH	0.01
	mV	0.1 (±699.9 mV); 1 (±2000 mV)
	Temperature	0.1°C
Accuracy	pH	±0.01
	mV	±0.2 (±699.9 mV); ±1 (±2000 mV)
	Temperature	±0.5°C
Calibration Check		status of electrode condition and response time, status of the buffer solutions during calibration
pH Calibration		automatic, 1 or 2 point with 7 memorized buffer values (pH 1.68, 3.00, 6.86, 7.01, 9.18, 10.01, 12.45)
Temperature Compensation		manual or automatic, -20.0 to 120.0°C (-4 to 248°F)
pH Electrode for Wine Analysis		HI 1048P glass body, BNC + pin (included)
Temperature Probe		HI 7669/2W stainless steel probe (included)
PC Connection		S232 opto-isolated serial port
Data Logging		100 samples
Input Impedance		10^{12} Ohm
Power Supply		12 Vdc adapter (included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions		240 x 182 x 74 mm (9.4 x 7.2 x 2.9")
Weight		1.1 kg (2.4 lb)



HI 1048P

pH Wine Electrode with CPS™ Technology

ORDERING INFORMATION

HI 222-01 (115V) and **HI 222-02** (230V) are supplied with HI 1048P pH electrode, HI 7669/2W stainless steel temperature probe, HI 76404 electrode holder, pH 3 and pH 7 buffer sachets, cleaning solutions for removing wine stains and wine deposits, electrode refilling solution, 5 mL graduated syringe, 12 Vdc power adaptor and instruction manual.

ELECTRODES

HI 1048P Refillable pH electrode with glass body and 1 m (3.3') cable

HI 7669/2W Temperature probe

SOLUTIONS

HI 5003 pH 3.00 buffer solution, 500 mL bottle

HI 7007L pH 7.01 buffer solution, 500 mL bottle

HI 7010L pH 10.01 buffer solution, 500 mL

HI 7001L pH 1.68 Buffer Solution in FDA approved bottle, 500 mL

HI 8006L pH 6.86 Buffer Solution in FDA approved bottle, 500 mL

HI 8007L pH 7.01 Buffer Solution in FDA approved bottle, 500 mL

HI 8009L pH 9.18 Buffer Solution in FDA approved bottle, 500 mL

HI 8010L pH 10.01 Buffer Solution in FDA approved bottle, 500 mL

HI 70635L Cleaning solution for wine deposits, 500 mL bottle

HI 700635P Cleaning Solution for wine deposits, (25) 20mL sachets

HI 70636L Cleaning solution for wine stains, 500 mL bottle

HI 700636P Cleaning Solution for wine stains, (25) 20 mL sachets

HI 7061L General Cleaning solution, 500 mL

HI 70300L Electrode storage solution, 500 mL bottle

HI 7082 3.5M KCl Electrolyte, (4) 30 mL, for double junction electrodes

ACCESSORIES

HI 92000 Windows® compatible software

HI 920010 Serial cable for PC connection

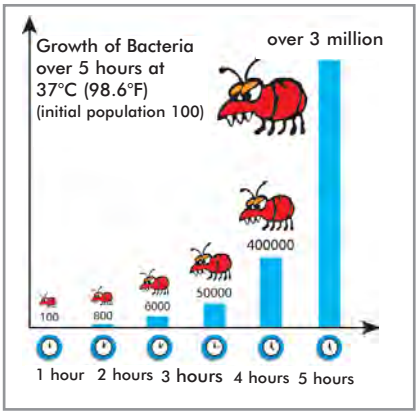
Checktemp®C Pocket thermometer, range: -50.0 to 120.0°C



HI 70635 Wine Deposit Cleaning Solution



HI 70636 Wine Stain Cleaning Solution



If temperature is not properly controlled, bacteria can grow to dangerous levels in just a few hours

Temperature

Temperature of food is constantly monitored to keep growth of pathogens and micro-organisms under control. Temperature is important in production to ensure that the food is not spoiled and the quality is not compromised therefore enhancing it's value. Food needs to be kept at the correct temperature while stored, displayed and on the move. The table (below left) lists recommended temperatures for different products. It is vital to monitor and document the temperature to which food has been exposed.

Meat

The temperature of meat at slaughterhouses needs to be checked as an important quality control test. Fresh meat should be stored at about 2°C (35.6°F).



For deep freeze meat in storage, it should have an internal temperature around -22°C (-7.6°F) with the surface temperature reaching -35°C (-31°F). In order to thaw the meat properly, the surrounding temperature should be 7°C (44.6°F).

PRODUCT	RECOMMENDED TEMPERATURE
Chunks of Meat	≤ 7°C
Minced Meat	≤ 4°C
Innards	≤ 3°C
Frozen Chicken	≤ -12°C
Deep-freeze Chicken	≤ -18°C
Fresh Fish	≤ 2°C
Smoked Fish	≤ 7°C
Frozen Food	≤ -18°C
Milk	≤ 7°C
Fruit and Vegetables	≤ 10°C
Eggs	≤ 8°C
Dried Fruit	≤ 25°C

Temperature plays an important role in the processing and preparation of edible products containing meat



Ham and Sausages

The temperature of salted meat stored for several months is around 2°C (35.6°F). Afterwards, the product is rinsed and dried at around 25°C (77°F) prior to maturing at a preset temperature for a particular product. For sausages, the mixed ingredients are cooked at a certain temperature and then cooled at around 5 to 15°C (41 to 59°F).

Beverages

Temperature of spring or deep well waters extracted for making drinks must be continuously monitored to ensure purity. During the production of soft drinks, syrup is pasteurized before being added, to prevent bacteriological problems during this procees the temperature is monitored.

In order to prepare fruit juices, fruit pulp is heated to just below boiling point for a few seconds to reduce the presence of micro-organisms.



Temperature control also plays a crucial role in beer production. For example, malt has to be heated to 75°C (167°F) during the mash process. Once the mash is cooled, the vessel is heated above boiling point to prepare the mash for a strainer and later the mash is heated to up to 120°C (248°F) for a few seconds to pasteurize it. The type of yeast then used for the fermentation process is also temperature-dependent. By controlling the fermentation temperature, one can determine the time needed for the product to fully develop. Temperature is controlled during filtration which is needed in order to remove particles and improve the taste and longevity of beer. In order to remove protein, beer is cooled down to almost 0°C (32°F). As with many other products in the market, beer is pasteurized at around 60°C (140°F) after it has been bottled to eliminate the presence of micro-organisms.

HI 9026V

pH and Temperature Meter

for Wine Analysis



HI 1048B

pH Wine Electrode with CPS™ Technology

Calibration Check™ System

Clean Electrode



Each time pH calibration is performed, the meter internally compares the new calibration with the one previously stored. When this comparison indicates a significant difference, the clean message blinks on the LCD to advise the user that the pH electrode may need to be cleaned and another calibration will need to be performed.

Expired Calibration



The instrument is provided with a real time clock (RTC) in order to monitor the time elapsed since the last pH calibration. The RTC is reset every time the meter detects a calibration time-out. The CAL tag will start blinking to warn the user that the meter should be calibrated.

- *Electrode monitoring*
- *7 memorized buffers*
  for calibration
- *Custom calibration*
  with two custom buffers
- *Display hold and memory storage*
- *Real time clock*
  for accurate calibration monitoring
- *User-selectable calibration reminder*
- *Extended pH and temperature ranges*
- *Measures in °C or °F*
- *Backlit, dual-level LCD*
- *Heavy-duty waterproof casing*
- *Supplied ready to use*
  in a hard carrying case

SPECIFICATIONS	HI 9026V
Range	pH: -2.00 to 16.00; ORP: ±699.9 mV; ±1999 mV; Temperature: -20.0 to 120.0°C/-4.0°F to 248.0°F
Resolution	pH: 0.01; ORP: 0.1 mV, 1 mV; Temperature: 0.1°C/±0.1°F
Accuracy (@20°C)	pH: ±0.01; ORP: ±0.2 mV; ±1 mV; Temperature: ±0.4°C; ±0.8°F (excluding probe error)
Calibration Check	Check of the electrode status during calibration
pH Calibration	Automatic, 1 or 2 points with 7 memorized buffer values (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 2 custom buffers
Offset Calibration	±1 pH
Slope Calibration	From 80 to 108%
Temp. Compensation	Automatic, from -20.0 to 120.0°C (-4 to 248°F) or manual, without temperature probe
pH electrode	HI 1048B glass-body combination, BNC with CPS™ (included)
Temperature probe	HI 7662 stainless steel probe with 1 m (3.3') cable (included)
Input impedance	10^{12} ohm
Battery Type/Life	(4) 1.5V AA/approx. 500 hours of continuous use (without backlight); Auto-off after 20 min. of non-use (can be disabled)
Environment	0 to 50°C (32 to 122°F); 100% RH
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	500 g (1.1 lb.)

ORDERING INFORMATION

HI 9026V is supplied with HI 1048B CPS™pH electrode, HI 7662 temperature probe, pH 3 & pH 7 buffer sachets (20 mL ea.), wine stains and deposits cleaning solution sachets (20 mL ea.), 100 mL plastic beaker, batteries, rugged carrying case and instructions.

SOLUTIONS

HI 5003	pH 3.00 Buffer Solution @ 25°C, 500 mL (1 pint)
HI 7007L	pH 7.01 Buffer Solution @ 25°C, 500 mL (1 pint)
HI 70300L	Storage Solution, 500 mL (1 pint)
HI 70635L	Cleaning solution for wine deposits, 500 mL (1 pint)
HI 70636L	Cleaning solution for wine stains, 500 mL (1 pint)
HI 7082	3.5M KCl Electrolyte, 30 mL (4), for double junction electrodes

pH Electrodes for Wine Analysis

with CPS™ (Clogging Prevention System) Technology

An Electrode Specifically Designed for Wine Analysis

HI 1048 series is ideal for use with HANNA's Wine Line pH instruments such as HI 222 benchtop pH meter and HI 9026W portable pH meter

CPS™ (Clogging Prevention System)

CPS (Clogging Prevention System) is HANNA's latest innovation in pH electrode technology.

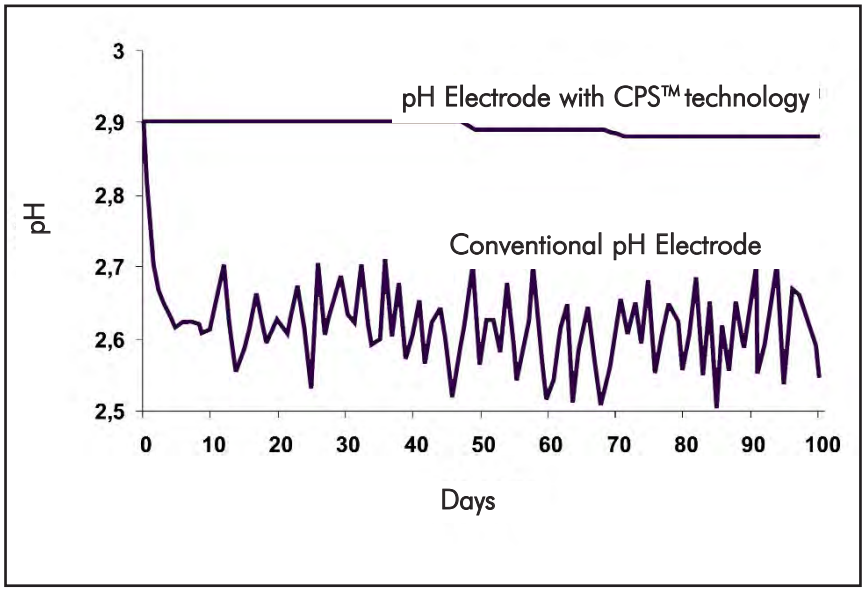
Conventional pH electrodes use ceramic junctions that clog quickly when used with wine. When the junction is clogged, the electrode does not function.

CPS™ technology utilizes the porousness of ground glass coupled with a PTFE sleeve to prevent clogging of the junction. The ground glass allows proper flow of the liquid, while the PTFE sleeve repels dirt.

As a result of HANNA's new CPS™ technology, pH electrodes stay fresh for up to 20 times longer than conventional electrodes.



Effects of dirty pH electrode junctions (conventional pH electrode) vs. CPS™ pH electrode.



After a few days conventional electrodes are already contaminated, while the CPS™ pH electrode remains clean for over 100 days.



"HANNA meters are the best for wine producers, because they are portable and give very quick results."

NICOLA FROZZA
Wine Specialist—Cantina Montelliana
Italia

ORDERING INFORMATION

HI 1048P (for HI 222) Food Industry pH electrode with open, CPS™ junction, BNC connector and 1 m (3.3') cable, recommended for wine & must applications.

HI 1048B (for HI 9026V) Food Industry pH electrode with open, CPS™ junction, BNC connector and 1 m (3.3') cable, recommended for wine & must applications.

HI 84185

ISE Ammonia Nitrogen Meter

with Electrode Holder and Built-in Stirrer



- *Compact unit designed for wine analysis*
- *Log up to 50 Samples*
- *Twist-on electrode holder and built-in 500 rpm stirrer*

Compact, Dedicated Wine Meter with a built-in Stirrer

The HI 84185 is a low cost, easy to use, ammonia nitrogen (N-NH3) ISE instrument that performs automatic analysis with all the necessary calculations assuring to the user a simple and effective interface.

The instrument comes with a powerful and effective built-in algorithm to analyse the shape of the ISE electrode response and to determine the reaction completion.

By simply pressing the Start key, the instrument performs automatic analysis, all the necessary calculations and verifications. The result is immediately displayed in convenient units, then the instrument is ready for another measurement.

Significance of Use

The nitrogenous compounds of must and wine are deriving from grapes and play important role in fermentation, clarification, and potential microbial instability of wines. They are profoundly modified during the alcoholic fermentation by the physiologic activity of yeast. Thus, yeast assimilates 60-70% of the must nitrogen, ammonium ion completely disappearing during the fermentation and the total nitrogen being slightly reduced.

Ammonia is present in grapes as ammonium ions. In a few milligrams amount it serves as the primary form of available nitrogen for yeast metabolism. So, the content of ammonium ion can drastically decrease during the alcoholic fermentation, increasing again, especially in red wines, at the end of the malolactic fermentation because the lactic bacteria release ammonia nitrogen in wine.

The amount of ammonium ion in must influences the rapidity of fermentation start and evolution. The ammonia concentration ranges from 24 to 209 mg/L (ppm) in grapes and from a few mg/L (ppm) to about 50 mg/L (ppm) in wine.

The HI 84185 ISE Ammonia Nitrogen meter measures the ammonia nitrogen ($N\text{-}NH_3$) content in wine using an ion selective electrode. The used method is double standard addition, a simple and rapid method of analysis, and the result is readily displayed in ammonia nitrogen ($N\text{-}NH_3$) mg/L (ppm).

SPECIFICATIONS	HI 84185
Range	0 to 50 mg/L (ppm) $N\text{-}NH_3$
Resolution	1 mg/L (ppm) $N\text{-}NH_3$
Accuracy (@20°C)	±5% of reading
Sample Volume	50 mL
Temp. Compensation	Automatic from 0 to 80 °C
Electrode	HI 61101 Ammonia combination ISE
Temperature Probe	HI 7662-T (included)
Log Feature	50 samples
Stirring Speed	500 rpm
Power	115V/230 Vac; 50-60Hz; 10VA
Environment	0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

ORDERING INFORMATION

HI 84185-01 (115V) and **HI 84185-02** (230V) is supplied with reagent set for 20 tests, 1000 µL automatic pipette, plastic tips for 1000 µL automatic pipette (6), 50 mL beakers (2), HI 61101 ammonia electrode, HI 7662-T temperature probe, Stir bars (2), Power cable, HI 4001-40 refilling solution, 30 mL (4), HI 4001-51 replacement membranes (10), HI 4000-47-4 and HI 4000-47-7 pH 4 & 7 powder packets (1 ea.), 1 mL syringe, 1 mL pipette, tweezers, instruction sheet, power cable and instruction manual.

ELECTRODES

HI 61101 Ammonia electrode
HI 7662-T Temperature probe

SOLUTIONS and REAGENTS

HI 4001-40 Ammonia filling solution
HI 4001-45 Ammonia conditioning and storage solution
HI 4000-47 Buffer replacement kit
HI 84185-20 Reagent set (20 tests)
HI 84185-0 ISA for Ammonia electrode, 500 mL
HI 84185-1 Standard No. 1 for Ammonia electrode, 500 mL
HI 85185-2 Standard No. 2 for Ammonia electrode, 500 mL

ACCESSORIES

HI 61001-51 Membrane (20)
HI 731316 Stir bar (5)
HI 731341 Automatic pipette 1000 µL
HI 731351 Tips for 1000 µL automatic pipette (25)
HI 731355P Capillary pipette (20)
HI 740036P Plastic beaker 50 mL (10)
HI 740143 Syringe 1mL (6)
HI 740144 Syringe tip (6)

HI 84184

ISE Fluoride Meter

with Electrode Holder and Built-in Stirrer

Compact, Dedicated Wine Meter with a built-in Stirrer

The HI 84184 is a low cost, easy to use, fluoride ISE instrument that performs automatic analysis with all the necessary calculations assuring to the user a simple and effective interface.

The instrument comes with a powerful and effective built-in algorithm to analyze the shape of the ISE electrode response and to determine the reaction completion.

By simply pressing the Start key, the instrument performs automatic analysis, all the necessary calculations and verifications. The result is immediately displayed in convenient units and then the instrument is ready for another measurement.

Significance of Use

Fluoride ion (F^-) comes from grapes used for wine and its usual concentration value varies between 0.1 and 2 mg/L. Higher levels of fluoride content in wine can derive from cryolite used by farmers as an insecticide in the vine.

The HI 84184 ISE Fluoride meter measures the fluoride content in wine using an ion selective electrode.

The method used is double standard addition, and the result is readily displayed in F^- mg/L (ppm).

- *Compact unit designed for wine analysis*
- *Log up to 50 Samples*
- *Twist-on electrode holder and built-in 500 rpm stirrer*



SPECIFICATIONS	HI 84184
Range	0.0 to 5.0 mg/L (ppm) F^-
Resolution	0.1 mg/L (ppm) F^-
Accuracy (@20°C)	±5% of reading
Sample Volume	50 mL
Temp. Compensation	Automatic from 0 to 80 °C
Electrode	HI 61010 Fluoride half cell HI 5315 Reference half cell
Temperature Probe	HI 7662-T (included)
Log Feature	50 samples
Stirring Speed	500 rpm
Power	115V/230 Vac; 50-60Hz; 10VA
Environment	0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

Note: Above 3 mg/L the instrument process information about the approximate fluoride content.

ORDERING INFORMATION

HI 84184-01 (115V) and **HI 84184-02** (230V) is supplied with reagent set for 20 tests, 1000 µL automatic pipette, plastic tips for 1000 µL automatic pipette (4), 50 mL beakers (2), 20 mL beakers (2), HI 61010 fluoride half cell, HI 5315 reference half cell, HI 7662-T temperature probe, Stir bars (2), HI 7075 refilling solution, 30 mL (4), 1 mL syringe, 1 mL pipette, instruction sheet, power cable and instruction manual.

ELECTRODES

HI 61010	Fluoride half cell
HI 5315	Reference half cell
HI 7662-T	Temperature probe

SOLUTIONS and REAGENTS

HI 7075	Electrode filling solution
HI 84184-20	Reagent set (20 tests)
HI 84184-0	TISAB W/5 for Flouride electrode, 100 mL (5)
HI 84184-1	Standard No. 1 for Fluoride electrode, 500 mL
HI 84184-2	Standard No. 2 for Fluoride electrode, 500 mL

ACCESSORIES

HI 731316	Stir bar (5 pcs.)
HI 731341	Automatic pipette, 1000 µL
HI 731351	Tips for 1000 µL automatic pipette (25)
HI 731355P	Capillary pipettes (20)
HI 740036P	50 mL plastic beakers (10)
HI 740037P	20 mL plastic beakers (10)
HI 740143	Syringe, 1mL (6)
HI 740144	Syringe tip (6)

HI 84181

ISE Potassium Meter

with Electrode Holder and Built-in Stirrer



Compact, Dedicated Wine Meter with a built-in Stirrer

The HI 84181 is a low cost, easy to use, potassium ISE instrument that performs automatic analysis with all the necessary calculations to assure the user simple and effective operation.

The instrument comes with a powerful built-in algorithm to analyze the shape of the ISE electrode response and to determine the reaction completion.

By simply pressing the Start key, the instrument performs automatic analysis, all the necessary calculations and verifications. The result is immediately displayed in convenient units, then the instrument is ready for another measurement.

Significance of Use

Potassium ion (K^+) is absorbed by the vine from soil. Unlike other essential nutrients potassium remains in ionic form and passes to the grapes.

Potassium ion is by far the most important ion that can be found in wine with concentrations between 0.7-2 g/L (ppt) and is mostly deriving from grapes.

Potassium ion greatly influences the taste of wine. With its absence wine will have a sour taste.

The alcohol content and low temperatures can cause potassium to precipitate as potassium bitartrate. Red wines have an increased content of potassium compared to white wines because the phenols found in red wine inhibit the precipitation of potassium bitartrate.

The HI 84181 ISE Potassium meter measures the potassium content in wine using an ion selective electrode. The method used is the double standard addition which is a simple and rapid method of analysis. The result is readily displayed in g/L K^+ (ppt).

- *Compact unit designed for wine analysis*
- *Log up to 50 Samples*
- *Twist-on electrode holder and built-in 500 rpm stirrer*

SPECIFICATIONS	HI 84181
Range	0.0 to 5.0 g/L (ppt) K^+
Resolution	0.1 g/L (ppt) K^+
Accuracy (@20°C)	±5% of reading
Sample Volume	50 mL
Temp. Compensation	Automatic from 0 to 80 °C
Electrode	HI 61014 Potassium half cell ; HI 5315 Reference half cell
Temperature Probe	HI 7662-T (included)
Log Feature	50 samples
Stirring Speed	500 rpm
Power	115V/230 Vac; 50-60Hz; 10VA
Environment	0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

Note: Above 2.5 g/L the instrument provides information about the approximate potassium content.

ORDERING INFORMATION

HI 84181-01 (115V) and **HI 84181-02** (230V) is supplied with reagent set for 20 tests, 2000 µL automatic pipette, plastic tips for 2000 µL automatic pipette (6), 50 mL beakers (2), HI 61014 Potassium half cell, HI 5315 Reference half cell, HI 7662-T temperature probe, Stir bars (2), HI 7076 refilling solution, 30 mL (4), 1 mL syringe, 1 mL pipette, instruction sheet, power cable and instruction manual.

ELECTRODES

HI 61014 Potassium half cell
HI 5315 Reference half cell
HI 7662-T Temperature probe

SOLUTIONS and REAGENTS

HI 7076 Electrode filling solution
HI 84181-20 Reagent set (20 tests)
HI 84181-0 ISA for Potassium electrode (500 mL)
HI 84181-1 Standard No. 1 for Potassium electrode (500 mL)
HI 84181-2 Standard No. 2 for Potassium electrode (500 mL)

ACCESSORIES

HI 731316 Stir bars (5)
HI 731342 Automatic pipette 2000 µL
HI 731352 Tips for 2000 µL automatic pipette (25)
HI 740036P Beakers, 50 mL (10 pcs.)
HI 740143 Syringe, 1mL (6 pcs.)
HI 740144 Syringe tips (6 pcs.)
HI 741355P Capillary pipette

Color determination of wine

Analytical techniques have become a valuable tool of modern wine makers. The definition and the processing techniques to obtain the desired wine color are of key importance. The right decisions taken during maturation of the grapes, processing, aging and blending, all strongly influence the final resulting wine color.

The color of wine is always read after removal of suspended matter. There are mainly two color components present, yellow and red but also a blue or green hue may appear. The color hue is the ratio between the yellow color concentrations over the red one, and is an indication about the degree of evolution.

	Color Density (I.C.)	Total Phenols (g/L)
White Wines	0.05 to 0.15	0.4 to 1.2
Red Wines	4 to 6	2 to 5

TINT	STATE	VALUE (O.D420./O.D.525)
Purple-Red	Young wine	less than 0.44
Red	Mature wine	0.44 to 1
Red-Yellow	Very mature wine	greater than 1

The yellow color in wine comes from the presence of tannins (polymers of flavonoid-procyanidins type, and non-flavonoid phenols) and can be read without dilution. The increase of the yellow-brown color in older wines is due to aging or oxidation.

The red colors of wines are caused by free anthocyanins, copigments of anthocyanins, and polymerized phenolic compounds. The color of these pigments is pH dependent and can be intensely dark. It is therefore necessary to dilute the wine sample taking care not to change the original wine pH. HANNA recommends using it's special wine solvent to minimize possible errors due to dilution.

Phenol determination of wine

Phenolic compounds are important for several reasons since they (i) affect the color of the wine, (ii) have an astringent taste, (iii) may cause pungent odor, (iv) are a source of oxygen reduction, and (v) are sources of browning substances.

Wine can contain a large variety of phenolic compounds and with traditional analytical techniques it is difficult to distinguish between total phenols and specific phenols. Although some progress has been made with HPLC, the most common analyses for total phenols remain the reaction of phenolic substances with the Folin-Ciocalteu reagent. Other methods like the direct spectrophotometric determinations are less accurate, because of difference in specific molar absorptivity, and color present of non phenolic substances.



SPECIFICATIONS	HI 83742 Phenol and Color Photometer		
		WHITE WINE	RED WINE
Range	Color Density (I.C.)	0.000 to 1.000	0.00 to 15.00
	Tint (O.D.420/O.D.525)	0.00 to 9.99	0.00 to 9.99
	Total Phenols (g/L)	0.000 to 0.750	0.00 to 5.00
Resolution	Color Density (I.C.)	0.001	0.01
	Tint (O.D.420/O.D.525)	0.01	0.01
	Total Phenols (g/L)	0.001	0.01
Precision	Color Density (I.C.)	±0.010 @ 0.200	±0.20 @ 5.00
	Tint (O.D.420/O.D.525)	±0.03 @ 0.75	±0.03 @ 0.75
	Total Phenols (g/L)	±0.015 @ 0.350	±0.10 @ 2.00
Light Source	Tungsten lamp with narrow band interference filter @ 420 nm, 520 nm and 610 nm		
Sensor	Silicon photocell		
Method	Colorimetric		
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing		
Battery Type	(4) 1.5V AA batteries/12 VDC adapter		
Auto Shut-off	After 15 minutes of non-use		
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")		
Weight	500 g (17.6 oz.)		

ORDERING INFORMATION

HI 83742-01 (115V) and **HI 83742-02** (230V) is supplied with sample cuvets (2) and caps, reagents for 5 tests (HI 83742-O, HI 83742A-O, HI 83742B-O, HI 83742C-O), 200 µL automatic pipette with (2) tips and instruction sheet, 2000 µL automatic pipette with tips (2), 5 mL syringe with tip, 1 mL plastic pipette, 3 mL plastic pipette, 12 VDC adapter, 1.5V AA batteries (4), tissue for wiping cuvets and instructions in a rigid carrying case.

REAGENT SETS

HI 83742-20 Phenols reagent set (20 tests)
HI 83742-25 Color reagent set for wine (20 tests) containing HI 83742-0 Wine Solvent 1
HI 83742-27 Color reagent set for wine (20 tests) containing HI 83742-3 Wine Solvent 3

ACCESSORIES

DEMI-10 Bottle to prepare 10 liters of demineralized water
HI 731318 Tissue for wiping cuvets (4)
HI 731321 Glass cuvets (4)
HI 731325W Caps for cuvets (4)
HI 93703-50 Cuvet cleaning solution (250 mL)
HI 740226 5 mL graduated syringe
HI 731340 200 µL automatic pipette
HI 731350 Plastic tips for 200 µL automatic pipette (25)
HI 731342 2000 µL automatic pipette
HI 731352 Plastic tips for 2000 µL automatic pipette (25)
HI 740157 Plastic refilling pipette (20)

HI 83740

Photometer

for the Determination of Copper in Wine



TABLE 1: FACTORS FAVORING COPPER CASSE

CONDITIONS FOR COPPER CASSE FORMATION	PREVENTIVE MEASURES
Strong reducing conditions	Maintain copper levels at less then 0.3 mg/L
Low ion concentrations	Limit SO_2 addition
High protein levels	Cold-stabilize and bentonite fine to reduce proteins in white wine
Light and heat	

TABLE 2: COPPER ELIMINATION WITH POTASSIUM FERROCYANIDE TREATMENT

WINE BEFORE TREATMENT		WINE AFTER $FE(CN)_6K_4$ TREATMENT (BLUE FINING)
IRON (MG/L)	COPPER (MG/L)	COPPER (MG/L)
20	5	0.2
10	5	0.5
5	5	1.0
2.5	5	1.5
1	5	2.0
Small traces	5	3.0

SPECIFICATIONS	HI 83740 COPPER PHOTOMETER
Range	0.00 to 1.50 mg/L
Resolution	0.05 m/L
Precision	SD ±0.05 mg/L @ 0.50 mg/L
Light Source	Tungsten lamp with narrow band interference filter @ 560 nm
Sensor	Silicon photocell
Method	Extraction method 2.2 bichinoline
Environment	0 to 50°C; max 95% RH non-condensing
Battery Type	(4) 1.5V AA batteries/12 VDC adapter
Auto Shut-off	After 15 minutes of non-use
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")
Weight	500 g (17.6 oz.)

Why it is important to monitor Copper in wine

Instability, which is initially manifested as a white haze (white wines) and later as a reddish-brow precipitate, could result from storage of bottled wine containing levels of copper above 0.5 mg/L. The precipitated casse (see table 1) develops only in the strong reducing conditions found in bottled wine. Instability can damage the quality of wine irreparably. Excessive levels of copper are toxic. Excessive levels of copper in wine may be removed or reduced by treatment of potassium ferrocyanide (blue fining, see table 2).

Significance of Use

Grapes accumulate normally only a small amount of copper by natural translocation from roots. Unless exposed to significant airborne borne pollution or vineyard sprays, increased concentrations in wine result from contamination during post fermentation processing, like contact with non stainless steel equipment and as impurities in fining agents and filter media.

The copper concentration in wine is normally low, less that 0.10 to 0.30mg/L, because excess copper is precipitated during fermentation due to adsorption onto the yeast cells. This adsorption and precipitation can reduce the initial copper concentration with 40 to 89%. At higher concentration copper plays an important role in catalyzing oxidation reactions of wine phenols.

It is important to check the copper content both in must and in wine, because at levels about 9 mg/L copper becomes a metabolic toxin that inhibits or delays alcoholic fermentation, and concentrations exceeding 1mg/L may be sensorial detected and should be avoided.

Other copper related problems can be manifested as formation of white haze (in white wines) and later as a reddish brown amorphous precipitate. This precipitated "casse" develops only under the strongly reducing conditions found in bottles wines. It has been found that this casse is a mixture of copper compounds and proteins.

HANNA's HI 83740 is an invaluable instrument to monitor this crucial parameter in the winemaking process.

ORDERING INFORMATION

HI 83740-01 (115V) and **HI 83740-02** (230V) is supplied with sample cuvets and caps (2), reagents for 5 tests (HI 83740A-O, HI 83740B-O, HI 83740C-O, HI 83740D-O), 20 mL glass vials with caps (2), 1 mL plastic pipette (2), 3 mL plastic pipette (2), spoons (2), 12 VDC adapter, 1.5V AA batteries (4), cuvet cleaning cloth and instruction manual in a rugged carrying case.

REAGENT SETS

HI 83740-20 Copper reagent set for wine (20 tests)
HI 83742-25 Color Reagent Set for wine (Wine Solvent-1)

ACCESSORIES

HI 740027P 1.5V AA batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Glass cuvets (4)
HI 731325W Caps for cuvets (4)
HI 93703-50 Cuvet cleaning solution (250 mL)
HI 740231 20 mL glass cylinder with caps (2)

Iron Concentration and Casse

HANNA HI 83741 measures the iron concentrations of both white and red wines. HI 83741 makes it possible to quickly and easily determine the state of your wine, and to act on it in case it may be necessary.

Significance of Use

Trace iron concentrations in wine are beneficial for enzyme activity, as a stabilizer, and as a functional component for proteins.

At higher concentrations it alters the redox potential, in favoring oxidation, affecting sensory characteristics and participating in the formation of complexes with tannin and phosphates resulting in instabilities (casse). The most common iron case is "white casse" (iron phosphate), it is initially seen as milky white cloud and later as a precipitate. The "blue casse" (ferric tannate) that occurs less often can be observed in white wines, for example, after tannic acid additions.

Most of the iron present in wine is present in the ferrous Fe(II) state. The ratio of the Fe(II)/Fe(III) depends on the oxidation state of wine. If Fe (III) is formed, it can bind with phosphates that are normally present in wine.

Since iron strongly binds with several organic acids, some wine makers add citric acid to the wine to complex free iron in wine is contact with iron in wine is contact with iron containing alloys during processing. During fermentation a part of the iron is absorbed by yeast and thus removed from the wine during filtration.

Iron Concentration & Casse

Wine containing less than 8 mg/L of iron: there is no risk of casse

Wine containing more than 8 mg/L of iron: it is necessary to check the stability since there may be the possibility for casse to occur

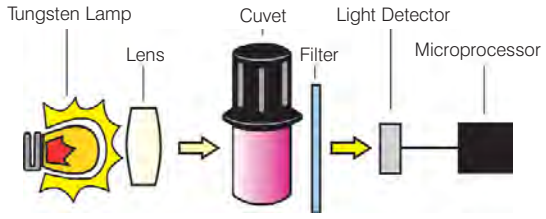
Wine containing 8 to 15 mg/L of iron: wine is subject to casse and needs treatment with SO_2, citric acid or ascorbic acid

Wine containing over 15 mg/L of iron: wine is highly subject to casse and needs treatment with potassium ferricyanide.

HANNA's HI 83741 is an invaluable instrument for monitoring this crucial parameter in the process of wine making. With a few simple steps wine makers can quickly and accurately measure iron content in wine directly in mg/L.

Optical system of HANNA wine photometers

HANNA wine photometers use a tungsten light source and narrow band filter





SPECIFICATIONS	HI 83741 Iron Photometer
Range	0.0 to 15.0 mg/L
Resolution	0.1 mg/L
Precision	SD ±0.4 mg/L @ 4.0 mg/L
Light Source	Tungsten lamp with narrow band interference filter @ 560 nm
Sensor	Silicon photocell
Method	The reaction between iron and the reagents causes a purple tint in the sample
Environment	0 to 50°C; max 95% RH non-condensing
Battery Type	(4) 1.5V AA batteries/12 VDC adapter
Auto Shut-off	After 15 minutes of non-use
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")
Weight	500 g (17.6 oz.)

ORDERING INFORMATION

HI 83741-01 (115V) and **HI 83741-02** (230V) is supplied with sample cuvets and caps (2), reagents for 5 tests (HI 83741A-O, HI 83741B-O, HI 83742-O), scissors, 1000 µL automatic pipette with Instruction Sheet, plastic tips for 1000 µL automatic pipette (2), 1 mL plastic pipette (1), 12 VDC adapter, 1.5V AA batteries (4), cuvet cleaning cloth and instruction manual in a rugged carrying case.

REAGENT SETS

HI 83741-20 Iron reagents set for wine (20 tests)

OTHER ACCESSORIES

HI 740027P 1.5V AA batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Glass cuvets (4)
HI 731325W Caps for cuvets (4)
HI 93703-50 Cuvet cleaning solution (250 mL)
HI 731341 1000 µL automatic pipette
HI 731351 Plastic tips for 1000 µL automatic pipette (25)

HI 83746

Photometer

for the Determination of Concentration of Reducing Sugars



"HANNA meters are the best for wine producers because they are portable and give very quick results."

NICOLA FROZZA
Wine Specialist—Cantina Montelliana
Italia

The Determination of Concentration of Reducing Sugars (RS)

The determination of concentration of reducing sugars (RS) is one of the most important parameters that need to be measured during the wine making process. Following the increase of RS during maturation of grapes can help decide when to start harvest. Having the highest possible sugar content is important because this is the main parameter that defines the commercial value of grapes. During the alcoholic fermentation instead, the decrease of sugars can be followed to decide when fermentation is completed, or allows making corrective actions if the content of RS is too low to obtain the desired alcohol degree or sweetness.

The predominant RS in grape products are glucose and fructose (hexoses). After reaction with excess alkaline cupric tartrate (Fehling reagents), the RS content can be determined colorimetrically. The Fehling method is not an exact determination but an index of the reducing sugar concentration, because the reaction depends upon the amount and kind of RS present. When the reducing sugar content is known at the beginning of fermentation, the potential alcohol degree can be estimated multiplying the sugar concentration (in g/L) by 0.06. Phenols interfere in the Fehling reaction and therefore red wine must be colorized prior to analysis. Wine also contains non-fermentable reducing sugars like pentose which will also be analyzed by this method.

SPECIFICATIONS	HI 83746 Reducing Sugars Photometer
Range	0.00 to 50.00 mg/L
Precision	±0.50 @ 10.00 g/L
Resolution	0.25 g/L
Light Source	Tungsten lamp with narrow band interference filter @ 610 nm
Sensor	Silicon photocell
Method	Fehling
Environment	0 to 50°C; max 95% RH non-condensing
Battery Type	(4) 1.5V AA batteries/12 VDC adapter
Auto Shut-off	After 15 minutes of non-use
Dimensions	224 x 87 x 77 mm (8.7 x 3.3 x 3.1")
Weight	512 g (17.6 oz.)

ORDERING INFORMATION

HI 83746-01 (115V) and **HI 83746-02** (230V) is supplied with glass cuvets and caps (4), reagents for about 20 tests (HI 83746A-0 and HI 83746B-0), HI 93703-59 Charcoal, 200 µL Automatic Pipette with two plastic tips, 1000 µL Automatic Pipette with plastic tips (2), instruction Sheet for Automatic Pipette, Spoon, Funnel, Filter paper (25), 12 VDC Adapter, 1.5V AA batteries, (4), cuvet cleaning cloth and instruction manual in a rugged carrying case.

OPTIONAL REAGENTS

HI 83746-20 RS reagent set (20 tests)
HI 93703-59 Charcoal for decoloration of Red Wine (about 100 tests)

ACCESSORIES

HI 731318	Cuvet cleaning cloth (4)
HI 731331	Large 10 mL cuvet (4)
HI 731340	200 µl pipette
HI 731350	200 µl pipette tips (25)
HI 731341	1000 µl pipette
HI 731351	1000 µl pipette tips (25)
HI 740142P	1 ml graduated syringe
HI 740144P	2 mL graduated syringe tips (10)
HI 740216	Tube rack for glass vials
HI 740217	Safety shield
HI 740232	Filter paper type 1 (100)
HI 839800	Thermoreactor
HI 740027P	1.5V AA batteries (10)

TYPICAL CONTENT OF REDUCING SUGARS IN MUST AND WINE

MUST		
Sweet Must	20-25 %	200-250 g/L
Normal	10-20 %	100-200 g/L
In fermentation	4-12.5 %	40-125 g/L
WINE		
Sweet	2.5-12.5 %	25-125 g/L
Semi Sweet	0.8-2.5 %	8-25 g/L
Almost Dry	0.2-0.8 %	2-8 g/L
Dry	0-0.2 %	0-2 g/L

Tartaric Acid: Wine Acidity.

Tartaric acid and tartrate are playing an important role in the stability of wines. They can be present in wine and juice in various forms, like tartaric acid (H_2T), potassium bi-tartrate (KHT) or calcium tartrate (CaT). The ratio of these depends mainly on the pH of the wine. The percent of tartrate present as bitartrate (HT^-) is maximum at pH 3.7.

The formation of crystalline deposits (tatrate casse) is a phenomenon of wine aging but does not meet customer acceptance. It is therefore important to test for, and to reduce potential of bottle precipitation; for example by adjusting the pH of the wine that significantly influences the potential of casse formation.

Potassium concentrations in wine can range from 600 to 2500 ppm in certain red wines. Although the potassium bi-tartrate is soluble in water, alcohol and low temperatures decrease its solubility. Especially during the alcoholic fermentation potassium bi-tartrate becomes increasingly insoluble resulting in super-saturation and precipitation. The KHT stability can be restored by chilling (with or without seeding). Wines with initial pH values below 3.65 can show a reduction in pH during cold stabilization because of generation of one free proton for each KHT precipitated. The pH may drop as much as 0.2 pH unites. For wines at higher pH than 3.7, the pH shifts to a higher pH.

Calcium concentrations can range from 6 to 165 ppm and may complex with tartrate or oxalate to form crystalline precipitates. Calcium tartrate instabilities occur normally from 4 to 7 months after fermentation and are temperature independent.

Sulphates, proteins, gum and poly-phenols can form stable complexes with tartrate thus inhibiting case formation. the complexes are mainly between poly-phenols and tartaric acid in red, and proteins in white wine. This explains why, as pigment polymerization occurs, the holding capacity of tartaric acid diminishes, resulting in delayed casse. the sulfate instead does not complex with potassium from 50% in white wines up to 100% in red ones.

Tartaric acid concentrations in wine range normally from 1.5 to 4.0 g/L. This acid concentration may not be confused with total or titratable acidity of wines that are often expressed in tartaric acid content too. Although it is the tartaric acid that is the predominantly present acid (up to 60% of the total acidity), others like malic, citric and several volatile acids do give a significant contribution total acidity.

HANNA's HI 83748 is an invaluable instrument to monitoring this crucial parameter in the process of wine making.



"HANNA wine photometers are very small. It is very important in a laboratory like this because space is always limited."

GONZALO CELAYETA
Winery—Bodega Cooperativa de San Martín de Unx, Navarra, Spain

SPECIFICATIONS	HI 83748 Tartaric Acid Photometer
Range	0.0 to 5.0 g/L
Resolution	0.1 g/L
Precision	SD ±0.1 g/L @ 2.0 g/L
Light Source	Tungsten lamp with narrow band interference filter @ 525 nm
Sensor	Silicon photocell
Method	The reaction between Tartaric Acid and the reagents causes a yellow/orange red tint in the sample.
Environment	0 to 50°C; max 95% RH non-condensing
Battery Type	(4) 1.5V AA batteries/12 VDC adapter
Auto Shut-off	After 15 minutes of non-use
Dimensions	225 x 85 x 80 mm (8.7 x 3.3 x 3.1")
Weight	500 g (17.6 oz.)

ORDERING INFORMATION

HI 83748-01 (115V) and **HI 83748-02** (230V) is supplied with sample cuvets and caps (2), reagents for 5 tests (HI 83748A-O, HI 83748B-O), 200 µL automatic pipette with Instruction Sheet, plastic tips for 200 µL automatic pipette (2), 5 mL syringe with tip, 12 VDC adapter, 1.5V AA batteries (4), cuvet cleaning cloth and instruction manual in a rugged carrying case

REAGENT SETS

HI 83748-20 Tartaric Acid reagents set for wine (20 tests)

OTHER ACCESSORIES

HI 740027P 1.5V AA batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Glass cuvets (4)
HI 731325W Caps for cuvets (4)
HI 93703-50 Cuvet cleaning solution (250 mL)
HI 740226 5 mL graduated syringe
HI 731340 200 µL automatic pipette
HI 731350 Plastic tips for 200 µL automatic pipette (25)

HACCP & Food Quality Testing

Professional Instrumentation from HANNA









Milk and Dairy Products

Milk is checked for impurities and infections upon collection. During storage, the temperature of stored milk is normally kept below 5°C (41°F). In order to slow down cream formation, milk is homogenized at about 60°C (140°F).

Pasteurization of milk results in the reduction of micro-organisms by a 95% and it is attained by raising the temperature to over 72°C (161.6°F). For UHT (Ultra Heat Treated), milk is heated to 135/150°C (275/302°F) in a pressurized vessel for a few seconds. If the process is repeated for several minutes, all micro-organisms, including spores, are destroyed and the sterilized milk will have a 12 month shelf life. For cheese, temperature needs to be adjusted before and during various processes, for example, when rennet is added.

Temperature in the maturation chamber also determines the period of maturation needed. Likewise, temperature is important in the production of butter. For example, skimmed milk is separated from cream at around 55°C (131°F) and the cream is then cooled to about 8°C (46.4°F). The temperature of incoming milk is raised to 45°C (113°F) before the addition of a culture for yogurt manufacturing. In order to denature the whey proteins, milk is raised to very high temperatures. The incubation temperature is maintained for a few hours prior to its cooling to about 10°C (50°F).

Chocolate

By increasing the temperature to about 50°C (122°F), the fermentation of cocoa beans is started. At different stages of chocolate manufacturing such as crystallization, accurate temperature measurement is a must. Once the chocolate is ready, the storage temperature should be monitored to ensure that it stays in the 15°C (59°F) range.

Coffee

In order to invoke an aroma, coffee beans are heated up to 200°C (392°F). During roasting, the temperature is closely monitored. In order to provide a long shelf life, the finished product is frozen at -40°C (-40°F) prior to drying. To produce a good coffee, it is important to ensure that the temperature of coffee machines do not exceed 80°C (176°F).

Bread and Pasta

The temperature of stored grain in silos is controlled to ensure that premature fermentation does not occur. During pasta production, water at about 25°C (77°F) is added to wheat flour and during fermentation of dough for bread making the temperature is kept at around 30°C (86°F). The oven temperature for baking should be around 260°C (500°F) and once baked, bread is cooled to room temperature. For semi-finished products that can be flash-baked, the dough has to be stored at very low temperatures.

Sanitization of Machinery

The temperature of cleansing agents, together with their concentration, have a significant bearing on how effectively the machinery is sanitized. The temperature for fermentation vessels can range from room to 40°C (104°F). For milk and yogurt, tanks may reach 70°C (158°F) and as high as 150°C (302°F) for steam sterilizers. In addition, regulatory bodies recommend a certain minimum temperature for cleaning agents to be effective that varies from 24°C (75.2°F) for iodine and ammonia to 49°C (120.2°F) for chlorine.

HI 83749

Photometer

for Turbidity and Bentonite Monitoring



Turbidity, Bentonite and HI 83749

The prevention of protein haze or deposit in bottled white wines is a universal concern and often a wine needs to be stabilized before bottling. One commonly used stabilization agent is bentonite. Bentonite is a volcanic clay earth type filling agent (like kaolin). It improves the clarity and stability of wine but also has negative aspects because of the volume of lees formed, reduction of tannin and color. Since there are different types and qualities of bentonite with different capacity of protein removal, it is important to make laboratory trials with the same lot and wetting degree of the bentonite as that will be used in the cellar.

Protein stabilization is normally not a problem in bottled red wines because of the relatively high concentration of phenols that bind with and precipitate the instable proteins before bottling. Often bentonite is added to red wines at a level of about 12 g/hL (1lb/1000 gal), reducing colloidal suspended particles thus improving membrane filterability.

Wines with low phenol contents, such as rosé, light reds and whites should be checked for protein stability before bottling. HANNA is offering a rapid test to verify the risk of future protein haze formation. If protein instability is detected, a subsequent test can help define the right amount of bentonite to be added for improving protein stability. It is important not to overdose bentonite to avoid stripping wine flavor, body, and significant loss of color, especially in young red wines. Moreover, adding only the necessary amount of bentonite to obtain the desired protein stability also saves costs.

The meter measures turbidity of samples from 0.00 to 1200 NTU (Nephelometric Turbidity Units) and is USEPA compliant. In the USEPA measurement mode the instrument rounds the readings to meet USEPA reporting requirements. It has a continuous measurement mode to verify the settling rate of suspended matter, and a signal average (AVG) mode to accumulate multiple readings giving a final average value. The AVG routine is particularly useful to measure samples with suspended particles with different dimensions.

The meter has all necessary GLP (Good Laboratory Practice) functions to allow maximum traceability of data like a real time clock, log-on-demand (up to 200 measurements), and T.I.S. -Tag Identification System to give all recorded data a location, time and date stamp.

The HI 83749 has a user-friendly interface, with a large backlit LCD (Liquid Crystal Display). Acoustic signals and displayed codes to guide the user step by step through routine operations.

SPECIFICATIONS — *HI 83749 Turbidity and Bentonite Photometer*

Range	0.00 to 9.99 NTU; 10.0 to 99.9 NTU; 100 to 1200 NTU Automatic range selection
Resolution	0.01 NTU from 0.00 to 9.99 NTU; 0.1 NTU from 10.0 to 99.9 NTU; 1 NTU from 100 to 1200 NTU
Accuracy	±2% of reading plus 0.05 NTU
Repeatability	±1% of reading plus 0.05 NTU
Stray Light	< 0.05 NTU
Light Source	Tungsten filament lamp
Light Detector	Silicon photocell
Method	Ratio Nephelometric
Display	60 x 90 mm backlit LCD
Calibration	2, 3 or 4 points
LOG Memory	200 records
Serial Interface	RS 232 or USB 1.1
Environment	0 to 50°C; max 95% RH non-condensing
Battery Type	(4) 1.5V AA batteries/12 VDC adapter
Auto Shut-off	After 15 minutes of non-use
Dimensions	224 x 87 x 77 mm (8.7 x 3.3 x 3.1")
Weight	512 g (17.6 oz.)

ORDERING INFORMATION

HI 83749-01 (115V) and **HI 83749-02** (230V) is supplied with sample cuvets and caps (6), calibration cuvets (HI 83749-11) (4), bentocheck reagent (HI 83749-0) and silicone oil (HI 93703-58), 1000 µL automatic pipette with two tips and instructions sheet, 25 mL glass vials with caps (4), 1 mL syringe with two tips, funnel, filter paper (25), tag holders with tags (HI 920005) (5), cuvet cleaning cloth, 1.5V AA batteries (4), 12 VDC adapter and instruction manual in a rugged carrying case.

ACCESSORIES

HI 83749-20	Bentocheck (100 mL)
HI 93703-58	Silicone oil (15 mL)
HI 83749-11	Calibration cuvets kit
HI 731331	Glass cuvets (4)
HI 731335N	Caps for cuvets (4)
HI 93703-50	Cuvet cleaning solution (250 mL)
HI 731318	Cuvet cleaning cloth (4)
HI 740220	25 mL glass vial with cap (2)
HI 731341	Automatic pipette 1000 µL
HI 731351	Tips fo automatic pipette 1000 µL (25)
HI 740233	Filter paper type II (100)
HI 740142P	1 mL graduated syringe (10)
HI 740144P	Tips for 1 mL syringe (10)
HI 740234	Replacement lamp for EPA turbidimeter (1)
HI 92000	Windows® compatible software
HI 920011	RS232 connection cable
HI 920005	iButton tag holders with tags (5)
HI 740027P	1.5V AA battery (12)

Dissolved Oxygen in Wine

Dissolved Oxygen (DO) is a term commonly used for the measurement of the amount of free molecular oxygen (O_2) dissolved in a unit volume of a solution usually expressed in milligrams per liter (mg/L), parts per million (ppm), or percent saturation.

Why measure for Dissolved Oxygen in wine? There are several stages where it is important to measure for Dissolved Oxygen:

1. Test for the level of oxygen during racking and tank movements. Whether its reduced or alternatively oxidized, the taste of wine can be dramatically effected by oxygen.

2. Test for oxygen pickup during pad, DE, and crossflow filtrations. DO monitoring insures consistent process control and operation of equipment.

3. Monitor micro O_2 treatment during maturation process. Plotting the dissolved oxygen present during treatment aids in timely and effective micro O_2 implementations.

4. Test the tank for the amount of oxygen after processing and before bottling. The concentration of molecular oxygen should be measured in the wine before bottling and should be less than 0.5 mg/L. If the concentration of oxygen is greater than 0.5 mg/L, it can generally be lowered by sparging with nitrogen gas (see Zoecklein et al., 1995).

5. Test oxygen in bottled wine – During bottling, oxygen must be monitored regularly to insure minimal impact on wine quality during final filtration and filler/corker operations.





The HI 9142W and HI 9143W can be calibrated with no chemical solutions

WINE line

HI9143W Dissolved Oxygen meter can measure DO in bottled wine as well as in the storage tanks. This meter has automatic compensation capabilities for effects such as temperature, altitude, humidity and salinity. These conditions can all impact the accuracy of your reading and must be accounted for. This meter also comes with a probe that allows for bottle testing.

HI9142W is an easy to use and accurate dissolved oxygen meter. It comes with a specific DO probe that will allow the user to conduct measurements inside the bottled wine.

Ideal for Spot Checks

SPECIFICATIONS	*HI 9143W*	*HI 9142W*
Range	O_2: 0.00 to 45.00 mg/L; % Saturation O_2: 0.0 to 300.0%; °C: 0.0 to 50.0°C	0.0 to 19.9 mg/L
Resolution	O_2: 0.01 mg/L; % Saturation O_2: 0.1% F.S.; Temperature: 0.1°C	0.1 mg/L
Accuracy (@20°C/68°F)	O_2: ±1.5% F.S.; % Saturation O_2: 1.5% F.S.; Temperature: ±0.5°C	±1.5% F.S.
Calibration	Automatic, in air, at 100%	Manual, 1 or 2 points (zero and slope)
Temp. Compensation	Automatic, 0 to 50°C (32°F to 122°F)	Automatic, 0 to 30°C
Altitude Compensation	0 to 1900 m, 100 m (328') resolution	—
Salinity Compensation	0 to 40 g/L, 1 g/L resolution	—
Probe	HI 76408 wine spot check probe with 1 m (3.3') cable (included)	
Battery Type/Life	(4) 1.5V AA/approx. 200 hours of continuous use; auto-off after 4 hours of non-use/12 VDC power adapter	(4) 1.5V AA/approx. 500 hours of continuous use
Environment	0 to 50°C (32 to 122°F); 100% max RH	
Dimensions/Weight	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")/500 g (1.1 lb.)	

ORDERING INFORMATION

HI 9143W is supplied with HI 76408 wine spot check D.O. probe with 1 m (3.3') cable, 2 spare membranes, HI 7041S electrolyte solution (30 mL), batteries, rugged carrying case and instructions

HI 9142W is supplied with HI 76408 wine spot check D.O. probe with 1 m (3.3') cable, 2 spare membranes, HI 7041S electrolyte solution (30 mL), batteries, calibration screwdriver, rugged carrying case and instructions

ACCESSORIES

HI 76408	Spot check D.O. probe for wine with 1 m (3.3') cable
HI 7040L	Zero oxygen solution (500 mL)
HI 7041S	Refilling electrolyte solution (30 mL)
HI 76407A/P	Replacement membrane (5)

HI 83540

Alcohol

for Measurement of Alcohol in Wine



Measurements are quick and easy

Step 1



Fill the beaker with the wine sample

Step 2



Add HI 83540-50 standard solution

Step 3



Read the results

About the Instrument

- *Backlit LCD with user-friendly interface*
- *Log and recall data*
- *USB connection - PC compatible*
- *Good Laboratory Practice (GLP)*
- *Calibration data reminders*
- *Built-in Magnetic Stirrer*
- *Twist-on electrode holder*
- *Choice of automatic (ATC), manual (MTC) or no temperature compensation (NoTC)*

About the Measurement

- *Exclusive HANNA patent pending conductimetric known addition procedure*
- *Quick results: tests takes less than 5 minutes*
- *No sample preparation required*
- *Low cost*
- *Better than 1.0% accuracy*
- *Can be operated by inexperienced personnel: not dangerous, no need for toxic reagents*
- *Automatic sugar compensation: Fixed, by Wine Type, and by sugar concentration*
- *Not dependent on barometric pressure*

Alcohol determination made simple

Until now, the determination of alcohol in wine required wine makers to invest in expensive gas chromatography or HPLC equipment, or to use alternate methods such as ebulliometry or hydrometry which are time consuming. HANNA's new HI 83540 alcohol determination analyzer uses a patent pending conductimetric known addition procedure that allows wine makers to accurately determine alcohol concentration in minutes. The basis for this invention is that the change of electric conductivity (EC) of a wine after the addition depends on the amount of alcohol. The complex software of the instrument performs all the necessary calculations and adjustments, providing the user with a direct readout of alcohol in % volume on the graphic LCD.

Significance of Use

The alcohol content is a critical parameter in the analysis of wine, representing the first and most important criteria for classifying the wine into quality classes.

From a qualitative point of view, alcohol concentration has an important role in the conservation of a wine over time.

From a sensory point of view, alcohol content influences the power, warmth and sweetness of a wine. Lower alcoholic concentrations tend to taste sweeter.

The alcohol content is also used to classify wines for taxation: Regional governments' regulations use alcohol % as a criteria to classify the wine as table wine or alcoholic beverage.

The HI 83540 meter measures the alcohol content in wine simply and accurately, displaying the results directly in % v/v units.



HI 76315
Alcohol Probe

With Great Products, Come Great Results™

Alcohol

for Measurement of Alcohol in Wine

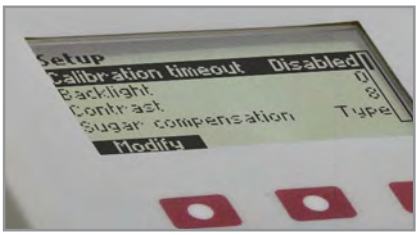
LCD Display Examples



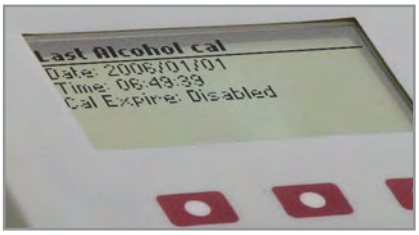
Fast, Easy Measurements



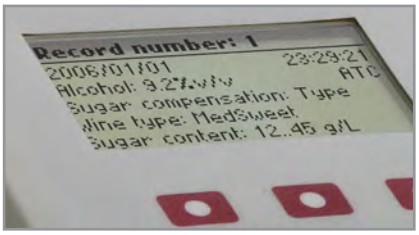
Sample Preparation



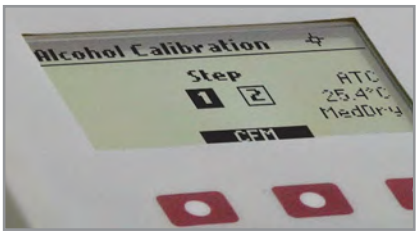
Setup



GLP



Recall



Alcohol Calibration

Alcohol in Wine Measurement with the HI 83540

The alcohol determination is made using a new, state of the art method. The wine sample is measured before and after the HANNA reagent is added. The difference between measurements is used to calculate the alcohol content.

In addtion to the HI 83540's logging, storage and recall features, readings can be transferred to a PC for further analysis and storage via USB.



HI 83540 rear

Sugar content:

sugar has a direct effect on the concentration of alcohol in wine. For this reason, HI 83540 features a built-in algorithm for sugar content compensation. There are three types of sugar content compensation: Fixed Sugar Compensation (the same compensation for all wine types); Specific Wine Type Sugar Compensation and Sugar Content Compensation (compensation made when the sugar content of a wine is known).

SPECIFICATIONS		HI 83540 ALCOHOL METER
Range		0.0 to 25.0 %v/v
Resolution		0.1 %v/v
Accuracy	Fixed Sugar Compensation	0.7 %v/v for dry and medium-dry wines (less than 12 g/L sugar)
	Type Sugar Compensation	Dry range: 0.4 %v/v (less than 4 g/L sugar) Medium-dry range: 0.4 %v/v (4 g/L..12 g/L sugar) Medium-sweet range: 0.8 %v/v (12 g/L..45 g/L sugar) Sweet range: 0.8 %v/v (45 g/L..180 g/L sugar)
	Sugar Content Compensation	Dry range: 0.2 %v/v (less than 4 g/L sugar) Medium-dry range: 0.2 %v/v (4 g/L..12 g/L sugar) Medium-sweet range: 0.4 %v/v (12 g/L..45 g/L sugar) Sweet range: 0.4 %v/v (45 g/L..180 g/L sugar)
Sample volume		50 mL
Temperature Compensation		5-35 °C (41 to 95 °F)
Electrode		HI 76315 Alcohol probe
Stirring speed		1500 rpm
Environment		0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power supply		12 Vdc adapter (included)
Dimensions		208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight		2200 g (77.6 oz.)

ORDERING INFORMATION

HI 83540-01 (115V) and **HI 83540-02** (230V) is supplied with reagents set for 50 tests, 60 mL plastic syringe, 30 mL plastic syringe, 100 mL beaker, HI 76315 Alcohol probe, stir bar, power adapter and Instruction manual.

PROBE

HI 76315 Alcohol probe

ACCESSORIES

HI 83540-50 Standard solution, (3) 500 mL
HI 83540-51 Electrode cleaning solution (230 mL)
HI 83540-55 Calibration solution, 230 mL
HI 731316 Stir bar (5 pcs.)
HI 740035 Beaker 100 mL (10 pcs.)
HI 740225 60 mL syringe
HI 740235 30 mL syringe bar
HI 92000 Windows compatible software

HI 847491 • HI 847492 • HI 847493

Haze Meters

for Beer Quality Analysis



- *Utilizes Fast Tracker—Tag Identification System*
- *LED optical system*
- *PC Compatible via USB*
- *Good Laboratory Practice (GLP)*
- *Log-on-demand*
- *Large, backlit LCD*

Professional Quality Analysis of Haze in Beer

The HI 847491, HI 847492, and HI 847493 are auto diagnostic haze in beer meters. Each instrument features a different measuring unit or light source to comply with different standard requirements.

HI 847491 is specially designed according to the ISO standard for haze in beer measurements.

HI 847492 is specially designed, according to the ASBC (American Society of Brewing Chemist) standard for haze in beer measurements.

HI 847493 is specially designed, according with the MEBAK (Central European Brewing Commission) standard requirements, for haze in beer measurements.

These instruments compensate a beer color to guarantee accurate readings during the brewering process. The optical system consists of an LED and multiple detectors. A two, three or four point calibration can be easily performed at any time using the supplied or user prepared standards.

These meters have all the necessary GLP (Good Laboratory Practice) features to allow maximum traceability of data. Features include a real time clock, log-on-demand (up to 200 measurements), and Fast Tracker™—Tag Identification System.

It has a continuous measurement mode to measure the settling rate of suspended matter, and a signal average (AVG) mode to accumulate multiple readings giving a final average value. The average mode is particularly useful to measure samples with suspended particles with different dimensions.

All 3 meters feature a user-friendly interface, with a large backlit LCD (Liquid Crystal Display). Acoustic signals and displayed codes to guide the user step by step through routine operations.

This splash proof portable turbidity meter is supplied in a rigid carrying case that offers protection for harsh environments.

Why this instrument is so important

Beer haze

Beer haze may be defined as an insoluble or semisoluble particulate matter which is small enough to form a colloidal suspension in beer. These particles scatter transmitted light and are observed as a degradation in the transparency of the beer.

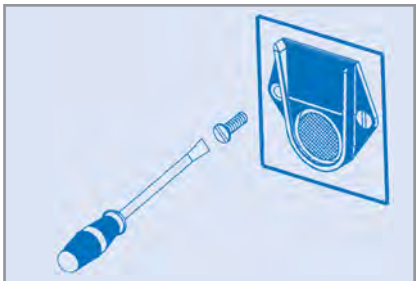
The beer clarity is a parameter constantly controlled in brewery, and to assure a consistent product quality, the brewmaster needs more than visual inspection.

Several substances can cause haze in beer, but the most frequently encountered problem is due to a cross-linking of polyphenol and protein.

A range of stabilization treatments are available for avoiding haze problems. The products have to be controlled on several steps during brewing process, in particular after filtration and before the beer enters the single tanks.

FastTracker™
A new revolution in organized data management





iButton® Tags are Easy to Install

Install TAGs near your sampling points for quick and easy iButton® readings. Each TAG contains a computer chip with a unique identification code encased in stainless steel. You can install a practically unlimited amount of TAGs. These tags do not use batteries to operate. Additional TAGs can be ordered for all of your traceability requirements.

Fast Tracker—Tag Identification System

HANNA is the first manufacturer of portable turbidity meters that have the unique Fast Tracker™—Tag Identification System. The Fast Tracker™ system is designed to meet users' needs for traceability and data management.

The system has been created for both scientific and industrial applications. Using the Fast Tracker™ system provides a way to prove that samples have been truly taken at pre-established locations—making them ideal for safety audits or routine inspections.

The system is as easy to install and operate. Just fix the iButton® tags near the sampling site. Each tag has a unique identification code making the number of tags than can be installed practically unlimited.

Immediately after installation of the tags you can start collecting data. The tag contains an embedded computer chip and is designed to withstand the harsh indoor and outdoor environments. Use the meter to take measurements and store test results by pressing the LOG key. Next, the instrument will ask for the tag identification. Simply touch the iButton® with the instruments connector to identify and authenticate logging. The meter will store all the necessary information. Transfer all test data to your PC using our HI 92000 Windows® compatible software for further data management. Data can then be exported for use in popular spreadsheet programs.

It is also possible to add new tags later on to increase an already existing database. Each time the PC software recognizes an unregistered tag, it will ask for a description of the new sampling location.

Methods

Many methods were used to measure turbidity over the years. The Jackson Candle Turbidimeter was used to measure turbidity as Jackson turbidity units (JTU). The method is visual and are not considered very accurate. To obtain more accurate readings a nephelometer should be used as a turbidity reading instrument.

The HI 847491 reports the measurements in FNU (Formazin Nephelometric Units), HI 847492 reports the measurements in FTU (Formazin Turbidity Units). FTU units are equal to NTU units (Nephelometeric Turbidity Units). The HI 847493 reports the measurements in EBC (European Brewery Convention). The conversion table between these measurement units is shown below:

	NTU/FNU/FTU	EBC	ASBC	HELM
1 NTU 1 FNU 1 FTU	1	0.25	17.5	0.1
1 EBC	4	1	69	40
1 ASBC	0.057	0.014	1	0.579
1 HELM	10	0.025	1.725	1



HI 847491 • HI 847492 • HI 847493

Haze Meters

for Beer Quality Analysis

SPECIFICATIONS	HI 847491	HI 847492	HI 847493
Range	0.00 to 9.99 FNU 10.0 to 99.9 FNU 100 to 1000 FNU	0.00 to 9.99 FTU 10.0 to 99.9 FTU 100 to 1000 FTU	0.00 to 9.99 EBC 10.0 to 99.9 EBC 100 to 250 EBC
Range Selection	Automatic		
Resolution	0.01 FTU from 0.00 to 9.99 FNU 0.1 FTU from 10.0 to 99.9 FNU 1 FTU from 100 to 1000 FNU	0.01 FTU from 0.00 to 9.99 FTU 0.1 FTU from 10.0 to 99.9 FTU 1 FTU from 100 to 1000 FTU	0.01 EBC from 0.00 to 9.99 EBC 0.1 EBC from 10.0 to 99.9 EBC 1 EBC from 100 to 250 EBC
Accuracy	±2% of reading plus 0.05 FNU	±2% of reading plus 0.05 FTU	±2% of reading plus 0.02 EBC
Repeatability	±1% of reading or 0.02 FNU, whichever is greater	±1% of reading or 0.02 FTU, whichever is greater	±1% of reading 0.01 EBC, whichever is greater
Stray Light	< 0.1 FNU	< 0.1 FTU	< 0.03 EBC
Light Source	IR LED @ 890nm	LED @ 580nm	LED @ 650nm
Light Detector	Silicon Photocell		
Method	Ratio Nephelometric Method.		
Display	60 x 90mm backlit LCD		
Calibration	Two, three or four point calibration		
LOG Memory	200 records		
Serial Interface	RS232 or USB		
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing		
Power Supply	4 x 1.5V AA alkaline batteries or AC adapter		
Auto Shut-off	After 15 minutes of non-use		
Dimensions	224 x 87 x 77 mm (8.8 x 3.4 x 3.0")		
Weight	512 g (18 oz.)		



HI 847492



HI 920005 Tag holders with tags



HI 731318 Cuvet Cleaning Cloth



HI 731331 Measuring Cuvets

ORDERING INFORMATION

HI 847491-01 (115V) and **HI 847491-02** (230V) are supplied with HI 98501-1 Checktemp® thermometer, Checktemp® instruction manual, (6) sample cuvets and caps, (4) calibration cuvets (HI 847491-11), (4) 25 mL glass vials with caps, tissue for wiping the cuvets, (4) 1.5V AA batteries, power adapter, instrument quality certificate, rigid carrying case and instruction manual.

HI 847492-01 (115V) and **HI 847492-02** (230V) are supplied with HI 98501-1 Checktemp® thermometer, Checktemp® instruction manual, (6) sample cuvets and caps, (4) calibration cuvets (HI 847492-11), (4) 25 mL glass vials with caps, tissue for wiping the cuvets, (4) 1.5V AA batteries, power adapter, instrument quality certificate, rigid carrying case and instruction manual.

HI 847493-01 (115V) and **HI 847493-02** (230V) are supplied with (6) sample cuvets and caps, (4) calibration cuvets (HI 847493-11), (4) 25 mL glass vials with caps, tissue for wiping the cuvets, (4) 1.5V AA batteries, power adapter, instrument quality certificate, rigid carrying case and instruction manual.

ACCESSORIES

HI 93703-58 Silicone oil (15 mL)
HI 847491-11 Calibration cuvet kit (HI 847491)
HI 847492-11 Calibration cuvet kit (HI 847492)
HI 847493-11 Calibration cuvet kit (HI 847493)
HI 731331 Glass cuvets (4 pcs)
HI 731335N Caps for cuvets (4 pcs)
HI 93703-50 Cuvets cleaning solution (230 mL)
HI 731318 Cloth for wiping cuvets (4 pcs)
HI 740220 25 mL glass vial with cap (2 pcs)
HI 740231 Replacement LED for haze turbidimeter (HI 847491)
HI 740232 Replacement LED for haze turbidimeter (HI 847492)
HI 740233 Replacement LED for haze turbidimeter (HI 847493)
HI 92000 Windows® compatible software
HI 920011 RS232 connection cable
HI 920005 5 tag holders with tags
HI 740027P 1.5V AA battery (12 pcs)
HI 710005 Voltage adapter, 115V to 12 VDC (US)
HI 710006 Voltage adapter, 230V to 12 VDC (EU)

Now there is an accurate and affordable way to determine beer haze.

Since the presence of haze in beer is usually associated with inferior quality, beer clarity is an important factor influencing consumer acceptance. Haze in beer is a natural phenomenon that can be observed after storage for one to three weeks.

The two most important causes for haze formation are proteins and tannins. Proper treatment is required to prevent or delay its formation.

A common way to determine beer haze is by visual comparison. This method however is subjective and inefficient.

HANNA's HI 93124 is a professional haze meter using the nephelometric method (measurement at 90° angle) combined with an infrared light source (890 nm) to reduce color interference.

In addition, since haze is normally measured after chilling at 0°C (32°F), the HI 93124 is supplied complete with HANNA's high accuracy Checktemp® digital thermometer.

- *Simple 3 step calibration*
- *Last calibration date recall*
- *Automatically selects measuring range*
- *Log and recall up to 200 tests*
- *PC compatible*



Water is the Key to Great Beer

Water

Water composes more than 90% of beer. The chemical characteristics of water and the minerals it contains influence mashing, boiling and fermentation.

Beer Haze and Turbidity
EBC = European Brewery Convention
ASBC = American Society of Brewing Chemists
FNU = Formazine Nephelometric Unit

1 EBC	1 FNU (1 NTU)	1 ASBC	
1	0.25	0.014	EBC
4	1	0.057	FNU/NTU
69	17.5	1	ASBC

BEER HAZE TABLE		
GRADE	**EBC**	**ASBC**
Brilliant	0.0 to 0.5	0.0 to 34.5
Almost brilliant	0.5 to 1.0	34.5 to 69
Very slightly Hazy	1.0 to 2.0	69 to 138
Slightly Hazy	2.0 to 4.0	138 to 276
Hazy	4.0 to 8.0	276 to 552
Very hazy	> 8.0	> 552

SPECIFICATIONS	HI 93124
Range	0.00 to 10.00 EBC/10 to 250 EBC
Resolution	0.01/1 EBC
Accuracy	±0.20 EBC ±3% of reading (0.00 to 10.00 EBC) ±1 EBC ±5% of reading (outside)
Typical EMC Dev.	±1% F.S.
Light Source	IR LED @ 890 nm
Light Source Life	Life of the instrument
Light Detector	Silicon Photocell
Battery Type/ Life	(4) 1.5V AA batteries / 60 hours of continuous use or Auto-off after 5 min.
Environment	0 to 50°C (32 to 122°F); 95% RH
Dimensions	220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
Weight	510 g (18 oz.)

ORDERING INFORMATION

HI 93124 is supplied with measurement cuvets and caps (2), 1.5V AA batteries and instruction manual

SOLUTIONS

HI 93124-0 Calibration solution, 0 EBC, 30 mL
HI 93124-1 Calibration solution, 2.5 EBC, 30 mL
HI 93124-2 Calibration solution, 125 EBC, 30 mL
HI 93124-3 EBC haze calibration set (C 124-0, C 124-1, C 124-2)
HI 93703-50 Cleaning solution, 250 mL

ACCESSORIES

HI 731321 Measurement cuvets (4)
HI 731318 Tissue for wiping cuvets (4)
HI 92000 Windows® compatible software
HI 920011 5 to 9-pin RS232 connection cable

HI 84429

Titratable Acids Mini Titrator and pH Meter

Low cost, easy to use meter that provides professional results quickly and accurately



A Better Product for Quality Production

HI 84429 is a low cost, easy to use, microprocessor-based automatic titrator and pH meter that benefits from HANNA's years of experience as a manufacturer of analytical instruments. HI 84429 performs automatic analysis with all the necessary calculations through a clear and simple interface.

This advanced automatic titrator and pH meter has a powerful and effective built-in algorithm to analyze the shape of the pH electrode response and determines the reaction completion. By pressing the START key, the instrument automatically conducts an end point titration and result is immediately displayed. The HI 84429 has a simple and reliable peristaltic pump to ensure accuracy in dosing and repeatability in measurement.

The HI 84429 comes with a pre-programmed analysis method designed for Total Titratable Acidity measurements on milk as well as a pH electrode, temperature probe, solutions and tubing.

The determination of total acids in dairy products is made according to a neutralization reaction; that is the reaction between the acids found in dairy products and a base. This type of reaction forms the basis of titration methods of analyzing acids.

Titratable acidity is measured on a degassed sample at the end point of 8.30 pH. The results are expressed in °SH, °Thm °D or % l.a.





HANNA instruments

With Great Products, Come Great Results™

HI 84429

Titratable Acids Mini Titrator and pH Meter

Low cost, easy to use meter that provides professional results quickly and accurately

Why this instrument is so important





About acidity measurement and its significance in the dairy industry

There are two fundamentally different conventions for expressing acidity in dairy products: titratable acidity and pH. The pH is a measurment of hydrogen ion concentration while titratable acidity is the neutralizing capacity by a base.

Acidity affects taste, thus this parameter is tested to determine the quality of the milk product. As milk acidity increases over time, measuring this parameter is also a means of monitoring storage conditions. Acidity is determined by an end-point titration using sodium hydroxide (a base) and is defined as the consumption of base necessary to shift the pH value from 6.6 (corresponding to fresh milk) to a pre-determined basic pH value. While pH 7.0 is the actual point of neutralization, phenolphthalein is commonly employed as a color indicator to determine the end-point of reaction and with it, color change occurs at pH 8.3. Titratable acidity is expressed as one of a variety of units, the use of which reflects the titration method and strength of base employed during titration.

°SH — Soxlet Henkel degrees: obtained by titrating 100 mL of milk with 0.25N NaOH, using phenolphthalein as the indicator. This method is common in Central Europe.

°Th — Thorner degrees: obtained by titrating 100 mL of milk thinned with 2 parts distilled water, with 0.1 N NaOH, using phenolphthalein as an indicator; Used mostly in Sweden and the CIS.

°D — Dornic degrees: obtained by titrating 100 mL of milk thinned with two parts distilled water, with 0.9N NaOH, using phenolphthalein as an indicator. Used mostly in the Netherlands and France.

% l.a. — percent lactic acid: obtained as °D divided by 100. Frequently used in the UK, USA, Canada, Australia and New Zealand.

Note: Taking into account the concentration of sodium hydroxide, the results expressed in one value can be easily converted into any other unit value by consulting the chart below.

The HI 84429 mini Titrator makes measuring both pH and acidity of dairy products possible within one compact unit. The titration method is a potentiometric end-point determination using a pre-determined pH value. HI 84429 mini Titrator eliminates the subjective end-point color-change detection determined by the human eye, and instead employs the sensitivity and accuracy of a pH sensor, virtually eliminating human error.

Acidity of dairy products can be expressed in any one of the units described earlier, simply by selecting the desired unit value. After performing a pump calibration with the supplied standard, you can then make titrations, expressed in the desired unit, using the same titrant. This eliminates the inconvenience of changing tubes, purging the titrant for tube cleaning and being sure that you have the right titrant concentration – thus eliminating wasted time and titrant. The quantity of sample needed is much smaller in comparison with the classical method, where 100 mL of product is used.

	°SH	°Th	°D	% l.a.
NaOH concentration (N)	0.25	0.1	0.111	0.111
	1	2.5	2.25	0.0225
	0.4	1	0.9	0.009
	4/9	10/9	1	0.01

Pocket Thermometers

Simple and Precise with a Direct Probe

HANNA Pocket Testers Are Ideal for

- Fresh Markets
- Grocery Stores
- Goods-In Areas
- Commercial Shipping
- Food processing
- Food Storage
- Restaurants

and anywhere you need to spot check and monitor temperature accurately and quickly.

Perform Fast, On the Spot Checks with Clear Digital Readouts

From HACCP applications to catering and from restaurants to manufacturing, HANNA's vast range of pocket thermometers are ideal for quick measurement of food temperature.

The HANNA pocket thermometers are incomparable with conventional measurement types or cheap inaccurate models. Designed and manufactured to the same strict standards of the professional series, they offer exceptional accuracy and reliability in a compact, rugged housing.

Outstanding features include HANNA exclusive CAL CHECK® that allows the operator to check the accuracy of the meter at any time.

They also provide exceptionally long battery life that make it possible to work with the meters for thousands of hours without worrying about battery changes. You can choose the most appropriate thermometer for your application based on range, probe type and characteristics.

Ideal for Display Case Monitoring

Checktemp® is a rugged thermometer with a direct stainless steel probe. The measurement range stretches all the way from -50 to 150°C (-58 to 302°F) with 0.1° resolution. With an exceptional accuracy of ±0.3°C (±0.5°F), Checktemp® thermometer is in a league of its own among pocket meters.

You can choose from the original Checktemp® model with a sharp penetration probe, or the Checktemp® L with a rounded-tip for liquid measurements. Models with factory calibration certificate against NIST standards are also available.





Electronic thermometers show a clear superiority over the outdated mercury and alcohol glass thermometers

SPECIFICATIONS	HI 98501 (Checktemp®C)	HI 98502 (Checktemp®F)	HI 98505 (Checktemp®LC)	HI 98506 (Checktemp®LF)
Range	-50.0 to 150.0°C	-58.0 to 302.0°F	-50.0 to 150.0°C	-58.0 to 302.0°F

FEATURE	ELECTRONIC TESTERS	GLASS/MERCURY
Durability	rugged ABS housing	fragile
Ease of Transport	no protection required	must be protected
Response Time	20 seconds approx.	2 to 5 minutes
Easy to Read	LDC legible at any angle	difficult to read
Hazardous Waste	none	leaded glass, mercury or alcohol
Applications	liquid, air, semisolids, frozen material	liquid, air

ORDERING INFORMATION

HI 98501 (Checktemp®C) is supplied with penetration probe, protective cap, battery and instructions

HI 98505 (Checktemp®LC) is supplied with liquid measurement probe, cap, battery and instructions

HI 98502 (Checktemp®F) is supplied with penetration probe, protective cap, battery and instructions

HI 98506 (Checktemp®LF) is supplied with liquid measurement probe, cap, battery and instructions

HI 84429

Titratable Acids Mini Titrator and pH Meter

Low cost, easy to use meter that provides professional results quickly and accurately



DAIRY line

SPECIFICATIONS FOR HI 84429 TITRATOR

	°SH	°Th	°D	% l.a.
Titratable Acidity Range	0.0 to 15.0 °SH	0 to 40 °Th	0 to 30 °D	0.00 to 0.35 % l.a.
Titratable Acidity HR (High Range)	10 to 75 °SH	20 to 200 °Th	20 to 175 °D	0.0 to 2.0 % l.a.
Titratable Acidity Resolution	0.1 °SH	1 °Th	1 °D	0.1% l.a.
Titratable Acidity HR Resolution	0.5 °SH	1 °Th	1 °D	0.1% l.a.
Accuracy	5% of reading			
Titration Methods	Acid-base titration			
Principle	End point titration, 8.30 pH			
Pump Dosing	0.5 mL/min			
Stirring Speed	1500 rpm			
Log Data	up to 50 samples			

SPECIFICATIONS FOR HI 84429 PH AND TEMPERATURE METER

Range	pH	-2.0 to 16.0 pH; -2.00 to 16.00 pH
	Temperature	-20.0 to 120.0 °C (-4 to 248°F)
Resolution	pH	0.1 pH; 0.01 pH
	Temperature	0.1°C
Accuracy	pH	±0.01 pH
	Temperature	±0 to 4°C (excluding probe error)
pH Calibration	1, 2 or 3 point calibration (4.01, 6.00, 8.30)	
Electrodes	FC 260 B (included), HI 5315 reference probe (included)	
Temperature Probe	HI 7662-T (included)	

ORDERING INFORMATION

HI 84429-01 (115V) and **HI 84429-02** (230V) is supplied with a reagent set for 20 titrations, 50 mL beakers (2), 20 mL beakers (2), tube set with cap, pH electrode, temperature probe, stir bar, 1 mL syringe, milk deposit cleaning solution sachets (2), pH 7.01 buffer sachets (2), pH 4.01 buffer sachets (2), power cable and instructions.

GENERAL SPECIFICATIONS FOR HI 84429

Environment	0 to 50°C (32 to 122°F); max 95% non-condensing
Power Supply	115V/230 Vac; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") with beaker
Weight	2200 g (77 oz.)

SOLUTIONS

HI 84429-50 Titrant solution, 100 ml
HI 84429-55 Pump Calibration Standard, 500 mL
HI 84429-65 pH 4.01 Buffer Solution, 230 mL (6)
HI 84429-70 pH 6.00 Buffer Solution, 230 mL (6)
HI 84429-60 pH 8.30 Buffer Solution, 230 mL (6)
HI 70640L Cleaning solution for remaining milk deposits (500 mL)
HI 70641L Cleaning and desinfecting for dairy products (500 mL)
HI 70642L Cleaning solution for remaining cheese deposits (500 mL)
HI 7072 Reference electrode filling solution

ACCESSORIES

HI 70483T Tube set with cap for titrant bottle and tip
HI 731316 Stir bar 12x5 mm (5 pcs)
HI 731319 Stir bar 25x7 mm (10 pcs)
HI 740036P 50 mL plastic beaker (10 pcs)
HI 740037P 20 mL plastic beaker (10 pcs)
HI 740143 Syringe 1 mL (6 pcs)
HI 740144 Pipette tip 1 mL (6 pcs)

2 points | hold | lcd display | COMPLIANT HACCP | B.E.P.S.

HI 99161

Food and Dairy pH Meter

Waterproof for Dairy Products

Milk and Dairy Products

pH of milk is around 6.8 and it is tested for impurities and signs of infection upon collection, as well as at point of delivery. In processes such as sterilization, pH is checked, since a lower value helps to speed up the process. However, lower pH levels can indicate that the cattle carried leukocyte infections such as mamites.

Milk used for cheese manufacturing must be of excellent quality and its pH value contributes to whether the cheese will be soft or hard. pH is also checked during cheese preparation, souring of milk and cream maturation. Pathogen multiplication of the fresh and soft variety, is slowed down considerably by ensuring that the pH stays in the 4.1 to 5.3 region.

Controlling the pH value is very important in butter manufacturing processes. For example, cream is cooled after pasteurization at a very strict pH value of 6.70 to 6.85 to generate sweet butter. In order to manufacture sour butter, citric acid extracts are added to acidify the cream to 4.6-5.0 pH. With butter having a high diacetyl content, a starter is added to bring the pH value to around 5. As with other products, a lower pH value enhances the shelf life of the product.

Specific Food Industry pH Electrode for HI 99161

FC 202D is built with a non toxic material, open junction and conic tip for easy penetration even in semisolid samples.



HI 710007 — Shockproof Boot



Specifically Designed for the Food Sector

HI 99161's waterproof casing provides excellent protection from the water and humidity typically present in the food industry.

HI 99161 is supplied with the FC 202D pH electrode with built-in temperature sensor, specially designed for use in the food sector. This electrode features a rugged, easy to clean, PVDF body that tapers to a strong conical tip ideal for semisolid applications such as meats and cheeses. The electrode has a free diffusion sleeve type reference junction which prevents the typical problems of clogging in viscous liquids or samples with high solid content such as milk or condiments.

The electrolyte used in the FC 202D electrode is free from poisonous silver chloride, which prevents contamination of the sample.

HI 99161 allows automatic calibration at either NIST or standard buffer sets with auto recognition and a stability indicator.

- *pH Probe with built-in temperature sensor*
- *Easy to clean probe resists clogging*
- *Dual level LCD displays pH and temperature at the same time*
- *1000 hour battery life with low battery warning(approx.)*

SPECIFICATIONS	HI 99161
Range	0.00 to 14.00 pH 0.0 to 60.0°C; 32.0 to 140.0°F
Resolution	0.01 pH; 0.1°C; 0.1°F
Accuracy	±0.01 pH; ±0.1°C; ±0.2°F
pH Calibration	automatic, 1 or 2 point with 2 sets of standard pH buffers (pH 4.01/7.01/10.01 or 4.01/6.86/9.18)
Temperature Compensation	automatic, 0 to 60°C (32 to 140°F)
pH Electrode	FC 202D, with DIN connector and 1 m (3.3') cable (included)
Battery Type / Life	(4) 1.5V AAA / approx. 1000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight	150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99161 is supplied with a FC 202D specially-made food electrode for direct measurement of pH in semi-solid products, pH 4.01 buffer (20 mL), pH 7.01 buffer (20 mL), batteries and instruction manual in a rugged carrying case.

ELECTRODES

FC 202D pH electrode with DIN connector and 1 m (3.3') cable

SOLUTIONS

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 700641P Cleaning & disinfection sol. for dairy products, 20 mL sachets (25)
HI 700642P Cleaning solution for cheese deposits, 20 mL sachets (25)

ACCESSORIES

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange
HI 721312 Rugged carrying case

HI 99163

Meat pH Meter

with a pH Probe and Stainless Steel Penetration Blade



Internal and Surface Measurements

HI 99163 is a specific instrument for the pH analysis of meat products. The specially designed electrode FC 232D incorporates many essential features to perform reliably without damaging the sample. This probe has a built-in temperature sensor that provides automatic temperature compensation, an open junction to avoid a clogged reference and its external body material is non-toxic and food compatible.

The probe body has an external thread to securely screw on the stainless steel penetration blade included with the kit. The replaceable penetration blade allows the user to measure not only the surface, but also the internal pH of meat.

- *Stainless Steel penetration blade for probe included*
- *Dual level LCD displays pH and temperature at the same time*

SPECIFICATIONS		HI 99163
Range	pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C (up to 60°C), ±1°C (outside); ±1.0°F (up to 140°F), ±2°F (outside)
pH Calibration		automatic, 1 or 2 point with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)
pH Electrode		FC 232D, amplified, food compatible body material, built-in temperature sensor, thread for blade insertion (included)
Battery Type / Life		(3) 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99163 is supplied with FC 232D amplified pH/temperature probe with FC 099 stainless steel blade tip, DIN connector and 1 m (3.3') cable, pH 4.01 buffer (20 mL), pH 7.01 buffer (20 mL), (2) Acid cleaning solution for meat grease and fats (20 mL), 1.5V AA alkaline batteries (3) and instructions in a rugged carrying case.

ELECTRODES

FC 232D	Pre-amplified pH electrode with food compatible body, built-in temperature sensor and thread for blade insertion
FC 098	20 mm stainless steel blade for FC 232D electrode
FC 099	35 mm stainless steel blade for FC 232D electrode

Meat

pH of carcasses constitutes an important initial test to determine condition of the animal prior to slaughter, quality of the breeding and any signs of stress during slaughter. The typical pH value, ranging from 5.4 to 7.0, can also provide an indication of whether fresh meat was properly stored as well as presence of lactic acid.

During aging, the pH value drops by 1 or more pH units. Furthermore, by simply checking the pH, carcasses can be divided into tenderness groups. The acidification process varies in different parts of the animal based on the muscular mass, for example, the loin has a lower pH value. Too high a pH value induces a loss of aroma and a visibly darker meat resulting in a lower market value.

In addition to meat, ingredients used in the production of ham and sausages are often refrigerated. By simply checking the pH at the liquefier's intake and drainage points, one can determine if any ammonia has possibly contaminated the product.

Food Industry Specific Meat Electrode

FC 232D is a special electrode, built with a non toxic material, open junction and thread for stainless steel blade for easy penetration in semi-frozen samples.

SOLUTIONS

HI 70004P	pH 4.01 buffer solution, 20 mL sachet (25)
HI 70006P	pH 6.86 buffer solution, 20 mL sachet (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachet (25)
HI 70300L	Storage solution, 500 mL
HI 700630P	Acid cleaning solution for meat grease and fats, 20 mL sachet (25)
HI 70630L	Acid cleaning solution for meat grease and fats, 500 mL
HI 70631L	Alkaline cleaning sol. for meat grease and fats, 500 mL
HI 70632L	Cleaning & disinfection solution for blood products, 500 mL

ACCESSORIES

HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 721312	Rugged carrying case

Now there is an easy, affordable and accurate way to determine the quality, classification and freshness of your Olive Oil.



Acidity (expressed as percent oleic acid) is the most fundamental measurement of olive oil. It is the primary indicator of olive oil purity and freshness.

The quality of olive oil is directly related to the degree of breakdown of the fatty acids in the oil. As the bound fatty acids break down, free fatty acids are formed which increases the % acidity of the oil. Acidity, expressed as oleic acid, is a measure of the free fatty acid present in the oil, which is directly related to its purity.

The quality of olive oil can be adversely affected during maturation or by environmental conditions. Mishandling, processing and bruising during harvesting can also contribute to a breakdown of fatty acids and an increase in free acidity. Improper and/or long term storage can cause olive oil to breakdown and become rancid. Regular acidity testing is the best way to ensure and maintain quality and freshness.

Normally, testing acidity is a complicated process requiring the use of various chemicals in a laboratory environment. HANNA has simplified this process in an easy to understand test kit that can be used almost anywhere to produce quick and accurate results.

Studies have shown that the quality of olive oil has a direct impact on its health benefits. *Extra Virgin Olive Oil* contains higher levels of antioxidants, particularly Phenols and vitamin E (because it is less processed). Antioxidants can help prevent oxidation damage to body tissue caused by free radicals. Studies have also shown that the oxidation of LDL (bad) cholesterol is associated with the hardening of arteries that can lead to heart disease.

With the HI 3897 test kit, it is possible to easily and accurately test the quality of olive oil at various stages of processing and storage to monitor and maintain the highest quality classification.

Acidity, defined as percent oleic acid, is a parameter that indicates olive oil freshness. A high acidity value indicates the oil quality has diminished and is at risk of becoming rancid.

Acidity is used to discriminate an extra virgin olive oil from other olive oils. According to the CEE 2568/91 regulation, olive oil is considered extra virgin when its acidity level is below 1%. A low acidity value also indicates a natural extraction process occured soon after olive harvesting.

The HI 3897 kit utilizes a titration method where the end-point is visually determined when the color changes from yellow-green to pink.



CHEMICAL PARAMETERS

Olive storage period (between harvesting and extraction)	within 48 hours	2 to 4 days	over 4 days
Acidity (as oleic acid %)	0.3	0.4	0.5

The HI 180 is a compact and lightweight magnetic stirrer which incorporates electronic controls that allow the user to regulate the speed with precision. In addition to speed control, HANNA's Speedsafe™ system will assure that the maximum speed is never exceeded.



In accordance with the European Community (EC) reg. CEE2568/91 quality classification of Olive Oil based on acidity (expressed as percent oleic acid) is as follows:

Extra Virgin Olive Oil: **Acidity ≤ 1%**
"Perfect flavor and odor", with a maximum acidity, expressed as Oleic acid, of 1g/100g

Virgin Olive Oil: **Acidity 1 - 2%**
"Perfect flavor and odor", with a maximum acidity, expressed as oleic acid, of 2g/100g

Ordinary Virgin Olive Oil: **Acidity 2 - 3.3% (tolerance of 10%)**
"Good flavor and odor", with a maximum acidity, expressed as Oleic acid, of 3.3g/100g

SPECIFICATIONS	HI 3897
Range	0.00 - 1.00 % acidity
Smallest Increment	0.01 mL = 0.01%
Method	titration
Sample Size	4.6 mL (4 g)
Number of Tests	6
Dimensions (kit)	112 x 390 x 318 mm (4.4 x 15.4 x 12.5")
Weight (kit)	3 kg (6.6 lb.)

SPECIFICATIONS	HI 180 Magnetic Stirrer (included)
Maximum Stirring Capacity	1 L (0.26 g)
Speed Range	100 rpm min.; 1000 rpm Max
Installation Category	II
Cover Material	ABS plastic
Environment	0 to 50°C (32 to 122°F) 95% RH max
Dimensions	dia. 137 mm x 51 mm (h) (5.39 x 2")
Weight	640 g (1.4 lbs.)

Virgin Lampante Olive Oil: **+ 3.3%. Not fit for human consumption**
"Off flavor and odor", with a maximum acidity, expressed as Oleic acid, > 3.3g/100g

Sensory Quality of Olive Oil

The sensory analysis of virgin olive oil is based on a panel test, developed by the International Olive Oil Council. The rating is awarded on the basis of a scale of points running from 0, which indicates that the oil has extreme defects to 9, which indicates that the oil has no defects at all. See the following chart for sensory ratings of each grade of Olive Oil.

Extra Virgin Oil	***>6.5***
Virgin	***>5.5***
Ordinary Virgin	***>3.5***
Virgin Lampante	***<3.5***

Additional Technical Information:

Olive oil is a complex compound made of fatty acids, vitamins, volatile components, water soluble components and microscopic bits of olive. The 3 primary fatty acids (triglycerides) are oleic, linoleic, and linolenic.

Oleic Acid (18:1) = 55 ~ 85% olive oil composition
Linoleic Acid (18:2) = 3.5 ~ 21.00% olive oil composition
Linolenic Acid (18:3) = 0.0 ~ 1.5% olive oil composition

Oleic acid makes up 55-85% of olive oil. Oleic acid is the most abundant fatty acid found in nature.

Studies show that high concentrations of oleic acid can lower blood levels of total and LDL (bad) cholesterol, reducing the long term risk of heart disease.

Olive Oil Acid Composition

Palmitic Acid (16:0) = 7.5 - 20%
Palmitoleic Acid (16:1) = 0.3 - 3.5%
Stearic Acid (18:0) = 0.5 - 5.0%
Oleic Acid (18:1) = 55.0 - 83.0 %
Linoleic Acid (18:2) = 3.5 - 21.0%
Linolenic Acid (18:3) = 0.0 ~ 1.5%
Others = 1.5 - 3.2%

ORDERING INFORMATION

HI 3897 is supplied with 6 ready-to-use bottles of organic solvent, HI 180MB magnetic stirrer, calibrated syringe for oil dosing, calibrated syringe for titrant dosing, titrant (30 mL bottle), rugged carrying case and instructions.

ACCESSORIES

HI 3897-010	Spare kit for 10 test
HI 740226	5 mL calibrated syringe
HI 740142	1 mL calibrated syringe
HI 740143	1 mL calibrated syringe (6)
HI 740144	tip for 1 mL calibrated syringe (6)
HI 740053	100 mL graduated glass bottle (10)
HI 731319	Magnetic stir bar for HI 180 (10)
HI 180IMB	Magnetic stirrer w/Speedsafe™ technology

No More Judging By Eye!

HI 83221 is a complete and ready-to-use kit for the analysis of the color of honey. It is made up of a professional photometer with direct readings in mm Pfund, 5 measurement cuvets and analytical-grade glycerin for accurate calibration.

No more guessing: with HI 83221 you can easily and quickly obtain immediate and precise readings. In addition, the ease of use allows it to work in the laboratory or in the field.

- *Immediate Results*
- *Digital Readout*
- *No More Judging by Eye*





Why this instrument is so important

HI 93703-56



The natural color of honey presents many tonalities: from straw yellow to amber, from dark amber to almost black with a hint of red. The color of untreated honey originates from the botanical varieties used by the bees: for this reason, its coloration allows one to commercially identify the original floral type.

USDA COLOR STANDARDS DESIGNATIONS	COLOR RANGE PFUND SCALES (MM)
Water White	≤ 8 or less
Extra White	> 8 - ≤ 17
White	> 17 - ≤ 34
Extra Light Amber	> 34 - ≤ 50
Light Amber	> 50 - ≤ 85
Amber	> 85 - ≤ 114
Dark Amber	> 114

In addition, the color of honey tends to darken with age or change according to the method of conservation or production used by beekeepers, (for example: the use of old beehives, contact with metals, the temperature of conservation, exposure to light, etc.). The classes of color are expressed in millimeters (mm) on the Pfund scale, compared to an analytical standard scale of reference on the graduation of glycerin.

ORDERING INFORMATION

HI 83221-01 (115V) and **HI 83221-02** (230V) is supplied with cuvets (5), 9V batteries (2), cuvet holder, protective cap, 12 Vdc adapter, 30 mL glycerine and instruction manual.

HI 83221C-01 (115V) and **HI 83221C-02** (230V) consists of HI 83221 (listed above) and C22190 honey refractometer.

ACCESSORIES

HI 93703-56 Consists of 82 matched square cuvets, 30 mL of glycerol and (2) 5 mL syringes (75 tests average)
C 22190 Honey Refractometer

SPECIFICATIONS	HI 83221
Light Source	2 tungsten lamps with narrow band interference filter
Light Detector	2 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230 x 165 x 70 mm (9 x 6.5 x 2.8")
Weight	640 g (22.6 oz.)

TEST	RANGE	METHOD
Honey Color	0 to 150 mm Pfund	Direct measure

HI 96759 • HI 96760

Maple Syrup Photometers

Water Resistant

Application Designed Photometers

validation

B.E.P.S.



Stay Consistant and Improve the Quality of Your Maple Syrup Production!

The HI 96759 and HI 96760 handheld, portable maple syrup transmittance analyzers are high precision, USDA (HI 96759) or Canada Federal and Quebec (HI 96760) compliant photometers that bring judging "by eye" to an end.

HANNA maple syrup transmittance analyzers measure the percent light transmittance of maple syrup as compared to analytical standard glycerol. The transmittance value allows identification of syrup quality class.

Measurements are performed by using matched square optical cuvets having a 10 mm light path.

When the syrup color is very light, that can be compared to minimum standards of light transmittance, the quality level is very high, while when the color is very dark, the classification level is low. High quality syrup, must not have suspensions, bad odors and must have a minimum density of 66.0 Brix (20°C).

All instruments are water resistant and the lamp and filter units are protected from dust or dirt by a cover. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

MAPLE SYRUP GRADE DESIGNATIONS

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

SPECIFICATIONS	HI 96759 (USA) • HI 96760 (CAN)
Range	0.0 to100.0% trasmittance
Resolution	0.1% trasmittance
Precision	±1% to 75% trasmittance
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter 560 nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 min of non-use
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)

ORDERING INFORMATION

HI 95759 is supplied with square, sample cuvets (5), 9V battery, light shield cap (1), 5 mL syringes (2), rigid carrying case and 30 mL glycerol (1) and instruction manual.

HI 96760 is supplied with square, sample cuvets (5), 9V battery, light shield cap (1), 5 mL syringes (2), rigid carrying case and 30 mL glycerol (1) and instruction manual.

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

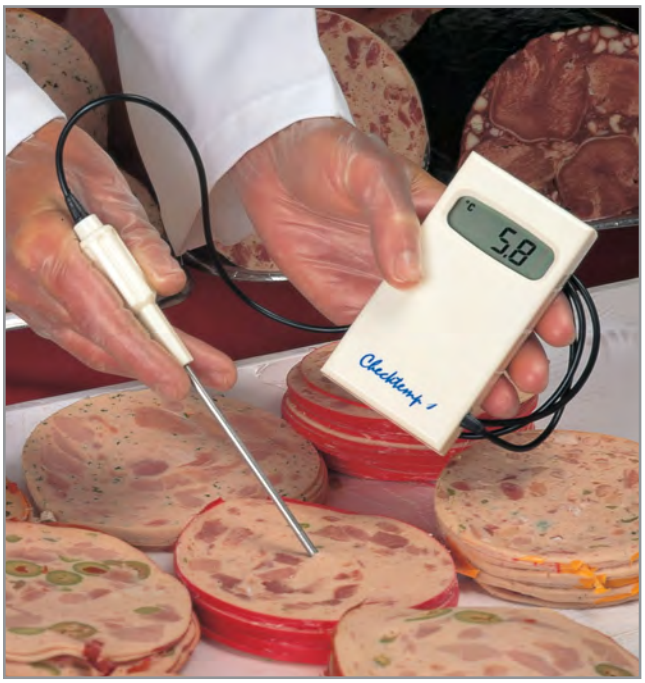
HI 93703-56 Consists of 82 matched square cuvets, 30 mL of glycerol and (2) 5 mL syringes (75 tests average)
HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)

HI 93703-56



HANNA instruments

With Great Products, Come Great Results™



ORDERING INFORMATION

HI 98509 (Checktemp® 1 C), °C readings, is supplied complete with battery and instructions

HI 98510 (Checktemp® 1 F), °F readings, is supplied complete with battery and instructions

Checktemp® 1
Pocket Thermometer

Remote Stainless Steel Probe with 1m (3.3') Cable, ±0.3°C Accuracy and CAL CHECK™

Checktemp® 1 is a high precision thermometer with a 1m (3.3') flexible cable between the meter and the stainless steel probe. This penetration probe is perfect for fast response in liquids, air, frozen and semisolid materials. It utilizes a high-tech NTC thermistor sensor to measure the temperature. Thermistors make it possible to obtain extremely high accuracy in a very short period of time.

A calibration test device has been incorporated into the meter. Activate the "test" switch and this device will simulate an ice bath of 0.0°C (32°F). The LCD should display readings within the accuracy statement of ±0.3°C (±0.5°F). This assures the user that the reading is reliable and accurate, every time.

The sharp-tip probe easily penetrates semisolid products such as fruits, vegetables and cheese. Routine controls are fast and simple for both incoming and outgoing goods. Constructed of AISI 316 stainless steel material, this probe is in compliance with food regulations.

Checktemp® 1 (left) is an ideal instrument for measuring temperature according to HACCP requirements.

Checktemp® Dip (below) is also available with a weighted probe and flexible 3m cable, ideal for measurements in tanks.

COMMON CHECKTEMP® SPECIFICATIONS	°C MODELS	°F MODELS
Range	-50.0 to 150.0°C	-58.0 to 302.0°F
Resolution	0.1°C	0.1°F
Accuracy	±0.3°C (-20 to 90°C) / ±0.5°C (outside)	±0.5°F (-4 to 194°F) / ±1°F (outside)
Environment	0 to 50°C (32 to 122°F); RH max 95%	



ORDERING INFORMATION

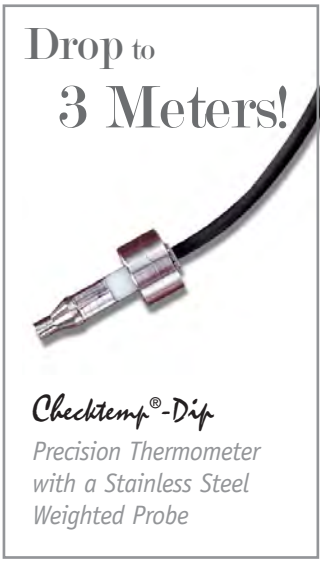
HI 98509-01 (Checktemp® Dip C), °C readings, is supplied with weighted probe with 3 m (9.9') cable, battery and instructions

HI 98510-01 (Checktemp® Dip F), °F readings, is supplied with weighted probe with 3 m (9.9') cable, battery and instructions

Checktemp®-Dip
Precision Thermometer

with a Stainless Steel Weighted Probe

Checktemp® Dip is an accurate instrument measuring temperature from -20 to 100°C (-4 to 212°F). The stainless steel probe with a flexible 3 meter (9.9') cable is weighted so that it can be dipped into any vat or tank and measure the temperature at different depths. Due to its hygienic stainless steel probe, it is ideal for food applications, especially to check the temperature inside wine casks and milk tanks.



Due to its rugged construction and long cable, you no longer have to bend down or get into awkward positions to measure the temperature. Simply drop the probe from a comfortable position and read the temperature on the large LCD.

Checktemp® Dip can also be used for applications such as fish farms, water reservoirs and pools where the operator can simply stand on the edge of the water and throw the probe over.

In addition, you can check to make sure that your thermometer is measuring the right temperature with HANNA exclusive CAL CHECK™ technology. The battery life is a remarkable 3 years with a normal AAA battery.



HI 145

Rugged Thermometers

with T-shaped Handle Designed for HACCP Control with ±0.3°C Accuracy and Cal-Check®

HI 145 thermometers have been developed for HACCP programs and offer high standards of performance together with maximum simplicity-of-use. The durable T-shaped handle fits comfortably in hand and is ideal for applications where applied force is necessary for insertion, such as with incoming meat inspection and semi-frozen foods. The HI 145 thermometer is idealy suited for monitoring incoming merchandise and food storage, as well as applications in food preparation, and during cooking. The positioned on top of the meter allows for easy reading in cooking applications.

HI 145-00 and HI 145-01 are equipped with a 5" (125mm) long AISI 316 stainless steel probe. The sharp conical tip provides fast response and improved accuracy over the entire range. HI 145-20 and HI 145-30 are supplied with a 12" (300mm) long stainless steel probe; ideal for monitoring hot liquids, such as deep frying and soup preparation.

Automatic Calibration Check

The HI 145 series is equipped with the exclusive Cal-Check feature. When the instrument is turned on, it performs a self check of its calibration status and displays it on the LCD. Accuracy is assured and your measurements are reliable.

ORDERING INFORMATION

HI 145-00, °C readings, 125 mm probe

HI 145-01, °F readings, 125 mm probe

HI 145-20, °C readings, 300 mm probe

HI 145-30, °F readings, 300 mm probe

All HI 145 models are supplied with batteries and instructions.

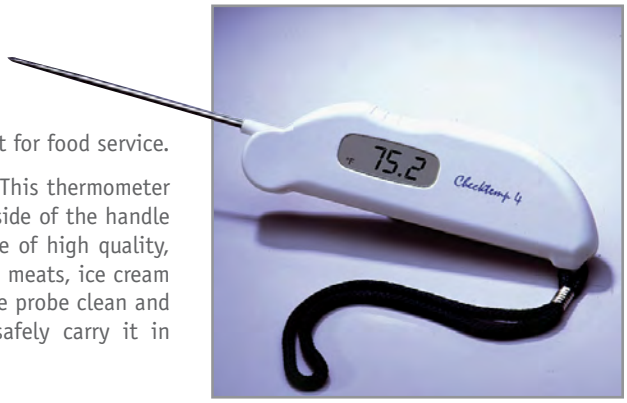
Checktemp® 4

Pocket Thermometer

with Folding Probe, ±0.3°C Accuracy and CAL CHECK™

Checktemp® 4 provides practical solutions to temperature measurement for food service.

Special attention was given to the ergonomic form of Checktemp® 4. This thermometer fits comfortably and securely in your hand. An oversized LCD, on the side of the handle is easy to see and read. The fast responding, fold-away probe is made of high quality, stainless steel and can penetrate semi-frozen and semi-solid foods like meats, ice cream and cheeses. When you are finished using your Checktemp® 4, wipe the probe clean and fold it away. Checktemp® 4 automatically turns OFF so you can safely carry it in your pocket.



Calibration Check

As you unfold the stainless steel probe, the Checktemp® 4 automatically turns ON and immediately performs a calibration test. CAL CHECK™, provides the security of knowing you have accurate measurements. Cal-Check also lets you know if your battery level is low or if your thermometer requires re-calibration.

ORDERING INFORMATION

HI 151-00 (Checktemp® 4 C), °C readings, is supplied with battery and instructions

HI 151-01 (Checktemp® 4 F), °F readings, is supplied with battery and instructions

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Checkfridge

Checkfridge Thermometer

with Magnetic Backing, Remote Thermistor Sensor, ±0.3°C Accuracy and CAL CHECK™

Few manufacturers have given any thought to providing the user convenient means to monitor internal temperature conditions from the outside. When the contents of the freezer and refrigeration units must be monitored to ensure their safely and preservation, you need a thermometer just as sophisticated and efficient.

The HI 147 is the ideal choice when you need accurate and reliable temperature monitoring.

How do you know when the reading on a thermometer is correct? You could make an ice bath or slurry. Even then there could be several degrees difference in the real and theoretical, or perceived, temperatures. With HI 147, you do not need to waste time preparing for and making these tests. Its unique CAL CHECK™ feature can do it for you. Conveniently located on the face of the thermometer is a TEST switch. Engage the switch and the HI 147 performs an internal CAL CHECK™. In only a few seconds, you see the results on the large LCD. Return the switch to the READ position and the HI 147 returns to its normal measuring status.

ORDERING INFORMATION

HI 147-00 (*Checkfridge*™ C) is supplied complete with battery and instructions

HI 147-01 (*Checkfridge*™ F) is supplied complete with battery and instructions



HI 146

Wall-mounting Precision Thermometer

with CAL CHECK™

HI 146-00, HI 146-01 and the new waterproof HI 146-99 are high accuracy thermometers with a professional-grade probe and a flexible 2 m (6.6') cable. The exclusive CAL CHECK™ feature is incorporated into its function and allows you to confirm the accuracy of the meter at any time.

The compact design and the simplified characteristics of this meter with a fixed stainless steel probe and an optional probe holder make these thermometers ideal for monitoring the temperatures of liquids, semisolids and refrigerated foodstuffs. The HI 146 can be installed easily in a fixed position utilizing the molded eye along with the probe holder, or it can be hung with a lanyard right where it is needed. You can monitor the exact temperature of any product continuously and easily observe it on the large LCD display.

ORDERING INFORMATION

HI 146-00, -50.0 to 150°C, is supplied with batteries and instructions

HI 146-01, -58.0 to 302.0°F, is supplied with batteries and instructions

HI 146-99, Waterproof, -50.0 to 150°C, is supplied with batteries and instructions

ACCESSORIES

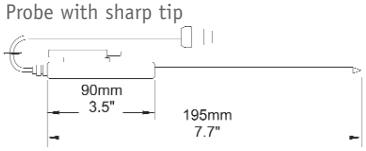
HI 750146 Wall-mounting probe holder for HI 146



Probes for HI 149

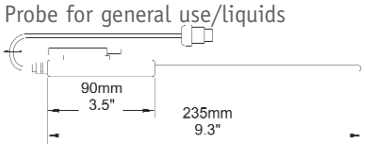
PROBE EPW

Probe with sharp tip



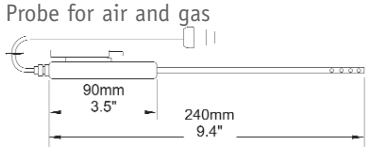
PROBE ELW

Probe for general use/liquids



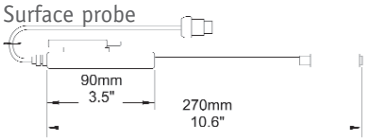
PROBE ECW

Probe for air and gas



PROBE EMW

Surface probe



SPECIFICATIONS	HI 149-00 (HI 149-01)
Range	-40 to 300°C (-40 to 572°F)
Resolution	1°C (1°F)
Accuracy	±2°C (±4 °F)
Probe	interchangeable, stainless steel, 1 m cable
Battery Type	(3) 1.5V
Life	approx. 700 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	106 x 68 x 21 mm (4.2 x 2.7 x 0.8)
Weight	80 g (2.8 oz.)

HI 149

High Temperature Thermometer

with Interchangeable Probes

HI 149 is a pocket thermometer for routine checks in the food industry. It provides an extensive measurement range from -40°C to 300°C (-40 to 572°F). With a user-replaceable probe, it can be employed in an equally wide range of applications. You have a choice of four probes, specifically manufactured to measure the temperature of liquids, air, surface, solids and semi-solids. This way you can match the meter to your application as well as changing the probes without requiring calibration.

ORDERING INFORMATION

HI 149-00, °C readings, is supplied with batteries and instructions

HI 149-01, °F readings, is supplied with batteries and instructions

PROBES

PROBE EPW Penetration probe

PROBE ELW General purpose/liquid probe

PROBE ECW Air/gas probe

PROBE EMW Surface probe

HANNA instruments

With Great Products, Come Great Results™

B.E.P.S.

HI 93501

Thermistor Thermometer

Accurate, Fast, Reliable

Waterproof Thermometers

The following professional thermometers are manufactured to offer high precision at prices accessible to all. They feature long battery life and ergonomic waterproof casings. Particular attention has been paid in making the instruments simple so that they can be operated by technical and non-technical personnel.

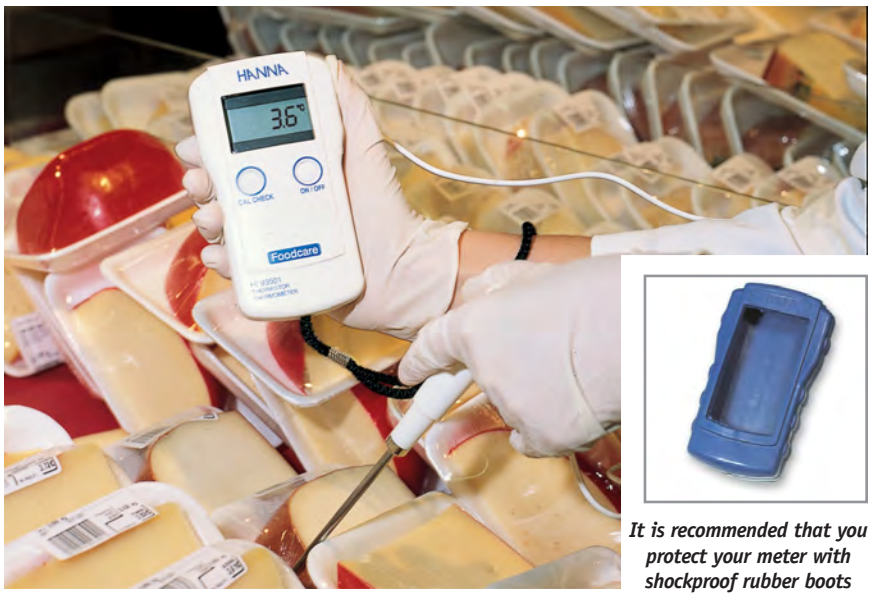
Designed to be used on a daily basis in industrial kitchens and catering, the meters are rugged, ergonomic and compact. An optional rubber boot renders them completely shockproof and much easier to grip.

There is also a range of calibration test keys with which you can test the accuracy of the thermometers. Simply insert the key into the thermometer and it should measure and display the range specified on the key. If not, it is time to recalibrate the thermometer.

All models are also available with factory calibration certificate against NIST standards.



HANNA *calibration test keys assure accurate measurements*



It is recommended that you protect your meter with shockproof rubber boots

Simple, Professional Temperature Measurement

HI 93501 is a waterproof thermometer designed for those who need a precision instrumentation without complications.

With just one ON/OFF key, measurements are simple and straightforward. At a truly attractive price, HI 93501 delivers a ±0.4°C accuracy and a range of -50.0 to 150.0°C.

The HI 762PWL rugged penetration probe is supplied with the meter. The thermometers probe is replaceable with a vast assortment of HI 762 probes at your disposal for specific applications. Among an array of accessories, you can choose from shockproof boots as well as soft and hard carrying cases. The electronic display indicates the remaining battery power at startup then continuously checks the battery level and warns the user with ample time to change the battery. When low battery power may affect your results, the meter will shut down and ensure that accuracy is not compromised (BEPS).

SPECIFICATIONS	HI 93501
Range	-50.0 to 150.0°C
Resolution	0.1°C
Precision	±0.4°C for 1 year, excluding probe error
Probe	HI 762PWL (included)
Battery Type	(3) 1.5V AA / approx. 2000 hours of use;
Battery Life	auto-off selectable after 8 or 60 minutes of inactivity (can be disabled)
Environment	-10 to 50°C (14 to 122°F); RH max 100%
Dimensions	150 x 80 x 36 mm (5.9 x 3.1 x 1.4")
Weight	235 g (8.3 oz.)

ORDERING INFORMATION

HI 93501 is supplied with temperature probe, and Instruction manual.

PROBES

HI 762PWL	For penetration, white handle
HI 762PBL	For penetration, blue handle
HI 762PG	For penetration, green handle
HI 762PR	For penetration, red handle
HI 762A	For air/gas, white handle
HI 762L	For liquids, white handle
HI 762BL	For liquids, black handle
HI 762W	Wire probe

ACCESSORIES

HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 710004	Soft carrying case
HI 721316	Rugged carrying case
HI 762-18C	Test key at -18.0°C
HI 762000C	Test key at 0.0°C
HI 762070C	Test key at +70.0°C

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MINI CONTROLLERS

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BL 983317 • BL 983327

Conductivity Mini Controllers

Measuring in mS/cm



Effective Process Control

BL 983317 and BL 983327 are panel mounted mini controllers with an output relay that have been designed for easy, affordable installation in tight spaces—ideal for simple yet effective process control.

They are provided with automatic compensation for variations in temperature. The probe is easy-to-clean and requires very little maintenance. The calibration is performed at 1 point, through a trimmer.

All wiring and connections to external devices are done through the terminals on the rear panel. The multicolor LED continuously indicates if the controller is in measurement, dosing or alarm mode.

You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need. The overtime control system advises you when the relay is active too long, helping to prevent overdosing.

Several models are available:

"-0" Models powered at 12 Vdc

"-1" Models powered at 115 or 230 Vac

SPECIFICATIONS	BL 983317	BL 983327
Range	0.00 to 10.00 mS/cm	
Resolution	0.01 mS/cm	
Accuracy (@20°C/68°F)	±2% f.s.	
Probe (not included)	HI 7632-00	
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with ß=2%/°C	
Calibration	manual, with CAL trimmer	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc	
	contact closed when reading falls below setpoint value	contact closed when reading exceeds setpoint value
Setpoint	adjustable from 0 to 10 mS/cm	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Power Supply	models "-0": 12 Vdc adapter (included) models "-1": 115/230 Vac ±10%; 50/60Hz	
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	models "-0": 200 g (7.1 oz.) / models "-1": 300 g (10.6 oz.)	

ORDERING INFORMATION

BL 983317-0 (12 Vdc) and **BL 983317-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

BL 983327-0 (12 Vdc) and **BL 983327-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 7632-00 EC/TDS probe with internal temperature sensor and 2 m cable

SOLUTIONS

HI 7031L 1.41 mS/cm calibration solution, 500 mL bottle

HI 7039L 5.00 mS/cm calibration solution, 500 mL bottle

HI 7061L Cleaning solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 740146 Mounting brackets

HI 1211 Controller and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



optional

These controllers will allow any system to be cost effectively monitored 24 hours a day.

HANNA instruments

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TDS (Total Dissolved Solids) Mini Controllers

Ideal for Hydroponics, Horticulture and Water Conditioning

These instruments have been designed for TDS control in hydroponics, horticulture and water conditioning. Compact in size, they can be mounted in confined spaces or even right next to the vat or barrel containing the chemicals. These meters permit automatic control of installations previously checked manually.

Readings are shown on the large display and the multicolored LED continuously indicates if the mini-controller is in measurement, dosing or alarm mode.

BL 983315 can control TDS from 0.0 to 199.9 ppm, BL 983319 from 0 to 1999 ppm, BL 983321 from 0.00 to 19.99 ppm and BL 983329 from 0 to 999 ppm.

You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need.

The overtime control system advises you when the relay is active too long, helping to prevent over dosage.

Several models are available:

"-0" Models powered at 12 Vdc

"-1" Models powered at 115 or 230 Vac

HI 1222 Controllers and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



optional

Combine any of HANNA's mini controllers into the HI 1222 for versatile monitoring and control



SPECIFICATIONS	BL 983315	BL 983319	BL 983321	BL 983329
Range	0.0 to 199.9 ppm	0 to 1999 ppm	0.00 to 19.99 ppm	0 to 999 ppm
Resolution	0.1 ppm	1 ppm	0.01 ppm	1 ppm
Accuracy (@20°C/68°F)	±2% f.s.			
TDS Conversion Factor	0.5	0.65	0.5	0.5
Probe (not included)	HI 7634-00			
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with ß=2%/°C			
Calibration	manual, with CAL trimmer			
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc contact close when reading			
	exceeds setpoint	falls below setpoint	exceeds setpoint	exceeds setpoint
Setpoint	adjustable from 0 to 199.9 ppm	adjustable from 0 to 1999 ppm	adjustable from 0 to 19.99 ppm	adjustable from 0 to 999 ppm
Overtime	adjustable, typically from 5 to approx. 30 minutes			
Power Supply	models "-0": 12 Vdc adapter (included) models "-1": 115/230 Vac ±10%; 50/60Hz			
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")			
Weight	models "-0": 200 g (7.1 oz.) / models "-1": 300 g (10.6 oz.)			

ORDERING INFORMATION

BL 983315-0 (12 Vdc) and **BL 983315-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

BL 983319-0 12 Vdc) and **BL 983319-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

BL 983321-0 12 Vdc) and **BL 983321-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

BL 983329-0 12 Vdc) and **BL 983329-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 7634-00	EC/TDS probe with internal temperature sensor and 2 m cable

SOLUTIONS

HI 7033L	84 µS/cm (42ppm) calibration solution, 500 mL
HI 7032L	1382 ppm calibration sol., 500 mL
HI 70442L	1500 ppm calibration sol., 500 mL
HI 7061L	Cleaning solution, 500 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 740146	Mounting brackets

BL 983318

TDS (Total Dissolved Solids) Mini Controllers

Measuring up to 10,000 ppm



Easy, Affordable Installation

BL 983318 is a mini controller that has been designed for easy, affordable installation in tight spaces, ideal for simple yet effective process control.

BL 983318 features ATC (Automatic Temperature Compensation) and simple one point calibration is performed through trimmer.

The multicolored LED continuously indicates if the controller is in measurement, dosing or alarm mode.

Wiring and external device connections are extremely simple to perform through the terminals on the rear of the instrument.

You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need.

The overtime control system advises you when the relay is active too long, helping to prevent over-dosage.

Two models are available, with power supply input at 115/230 Vac or 12 Vdc.

Two models are available:

BL 983318-0 powered at 12 Vdc

BL 983318-1 powered at 115 or 230 Vac

SPECIFICATIONS	BL 983318-0	BL 983318-1
Range	0.00 to 10.00 ppt (0 to 10,000 ppm)	
Resolution	0.01 ppt (10 ppm)	
Accuracy (@20°C/68°F)	±2% f.s.	
TDS Conversion Factor	0.5	
Probe (not included)	HI 7632-00	
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with ß=2%/°C	
Calibration	manual, with CAL trimmer	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc contact closed when reading exceeds setpoint value	
Setpoint	adjustable from 0 to 10 ppt (10,000 ppm)	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Power Supply	12 Vdc adapter (included)	115/230 Vac ±10%; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	200 g (7.1 oz.)	300 g (10.6 oz.)

ORDERING INFORMATION

BL 983318-0 (12 Vdc) and **BL 983318-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 7632-00 EC/TDS probe with internal temperature sensor and 2 m cable

SOLUTIONS

HI 7038L 6.44 ppt (6440 ppm) calibration solution, 500 mL

HI 7061L Cleaning solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 740146 Mounting brackets

HI 1211 Controller and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



These controllers will allow any system to be cost effectively monitored 24 hours a day.

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TDS (Total Dissolved Solids) Mini Controllers

Measuring up to 49.9 ppm

Compact and Easy to Install

BL 983324 is a panel mounted TDS controller, designed for easy installation, configuration and maintenance.

The meter is provided with a dosing relay, activated when the TDS reading exceeds the setpoint value.

Measurements are compensated for temperature variations and shown on the large display automatically.

A multicolored LED on the front panel continuously indicates if the mini controller is in measurement, dosing or alarm mode.

Wiring and external device connections are extremely simple to perform through the terminals on the rear of the instrument.

You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need.

The overtime control system advises you when the relay is active too long, helping to prevent over dosage.

Two models are available:

BL 983324-0 powered at 12 Vdc

BL 983324-1 powered at 115 or 230 Vac



HI 1222 Controllers and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



Combine any of HANNA's mini controllers into the HI 1222 for versatile monitoring and control

SPECIFICATIONS	BL 983324-0	BL 983324-1
Range	0.0 to 49.9 ppm	
Resolution	0.1 ppm	
Accuracy (@20°C/68°F)	±2% f.s.	
TDS Conversion Factor	0.5	
Probe (not included)	HI 7634-00	
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with ß=2%/°C	
Calibration	manual, with CAL trimmer	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 contact closed when reading exceeds setpoint value	
Setpoint	adjustable from 0 to 49.9 ppm	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Power Supply	12 Vdc adapter (included)	115/230 Vac ±10%; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	200 g (7.1 oz.)	300 g (10.6 oz.)

ORDERING INFORMATION

BL 983324-0 (12 Vdc) and **BL 983324-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 7634-00 EC/TDS probe with internal temperature sensor and 2 m cable

SOLUTIONS

HI 7061L Cleaning solution, 500 mL

HI 7033L 84 µS/cm (42ppm) calibration solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 740146 Mounting brackets

BL 983314

Resistivity Mini Controllers



Designed for Ultra Pure Water, R.O. and Water Conditioning Applications

BL 983314 is a simple-to-operate resistivity controller designed for ultra pure water, R.O., and water conditioning applications. The BL 983314 resistivity controller is also ideal for continuous monitoring of process solutions. Setpoint and calibration are manually adjusted with a trimmer and the alarm relay allows for simple control.

Readings are automatically temperature compensated, with three different coefficients (β=2.4, 3.5 or 4.5 %/°C). The alarm contact can be used for connection to an alarm, pump, solenoid or dosing system.

The relay contact is open when readings are higher than the setpoint, while for measurements lower than setpoint, the relay contact is closed. The Hysteresis is typically 0.20 MΩ/cm from the setpoint.

Measurements are displayed on the large LCD and the multicolored LED continuously indicates if the controller is in measurement, dosing or alarm mode. You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need.

The overtime control system advises you when the relay is active for too long, helping to prevent over-dosage.

Two models are available:

BL 983314-0 powered at 12 Vdc

BL 983314-1 powered at 115 or 230 Vac

SPECIFICATIONS	BL 983314-0	BL 983314-1
Range	0.00 to 19.90 MΩ/cm	
Resolution	0.10 MΩ/cm	
Accuracy (@20°C/68°F)	±2% f.s.	
Probe (included)	HI 3314	
Temperature Compensation	automatic and linear, 5 to 50°C (41 to 122°F)	
Temperature Coefficient	β=2.4 ; 3.5 ; 4.5 %/°C selectable through jumper on the rear panel	
Calibration	factory calibrated	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc contact closed when reading falls below setpoint value	
Setpoint	adjustable from 0 to 19.90 MΩ/cm	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Power Supply	12 Vdc adapter (included)	115/230 Vac ±10%; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	200 g (7.1 oz.)	300 g (10.6 oz.)

ORDERING INFORMATION

BL 983314-0 (12 Vdc) and **BL 983314-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 3314 Resistivity probe

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter
HI 710006 230 Vac/12 Vdc power adapter
HI 740146 Mounting brackets

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Liquid Level Control

HI 7871 and HI 7873 mini level controllers are ideal for liquid level control over distances of up to 100 meters (330 feet). The are highly compact and will fit in tight spaces.

These easy-to-use controllers are ideal for nearly any liquid level application, such as industrial and municipal water treatment, nutrient tank control in farming, hydroponics, aquaculture applications and plating rinse baths.

HI 7871 features high and low level control, while HI 7873 includes an overflow alarm. Both instruments are connected to a 2-wire transmitter (HI 7874), which is ideal for level monitoring in remote applications.

A complete liquid level measuring system requires:

A controller (HI 7871 or HI 7873)

A bar holder with amplifier circuitry (HI 7874)

A package of measuring bars (HI 731324)

An undecal connector (HI 7164)

HI 7871 requires 3 bars, one each for low and high levels and the third as a consent sensor.

HI 7873 requires 4 bars with the additional bar used for overflow measurement.



HI 7874 Level Transmitter with HI 731324 Stainless Steel Measuring Bars



SPECIFICATIONS	HI 7871	HI 7873
Transmission	max 100 meters (330 feet)	
Electrical Connection	HI 7164 undecal connector (not included)	
Level Adjustment	high and low	high, low and overflow
Level Indication	high and low	high, low and overflow
Sensor Bars	3 (not included)	4 (not included)
	(HI 731324 pack of 5)	
Transmitter	HI 7874 (not included)	
Output Contact	1 relay (2A/250 Vac, 30 Vdc)	2 relays (2A/250V, 30 Vdc)
Power Supply	models "/115": 110/115 Vac ±10%; 50/60Hz models "/220": 220/240 Vac ±10%; 50/60Hz	
Environment	0 to 50°C (32 to 122°F); RH max 85% non condensing	
Dimensions	83 x 53 x 95 mm (3.1 x 1.9 x 3.8")	
Weight	250 g (8.8 oz	

ORDERING INFORMATION

HI 7871/115 (115 Vac) is supplied with mounting brackets and instructions.

HI 7871/220 (220 Vac) is supplied with mounting brackets and instructions.

HI 7873/115 (115 Vac) is supplied with mounting brackets and instructions.

HI 7873/220 (220 Vac) is supplied with mounting brackets and instructions.

ACCESSORIES

HI 7874	Level transmitter with internal amplifier
HI 7164	Undecal connector
HI 731324	Stainless steel threaded measuring bars (5)

HI 7874

Level Transmitter



Quick and Easy Installation

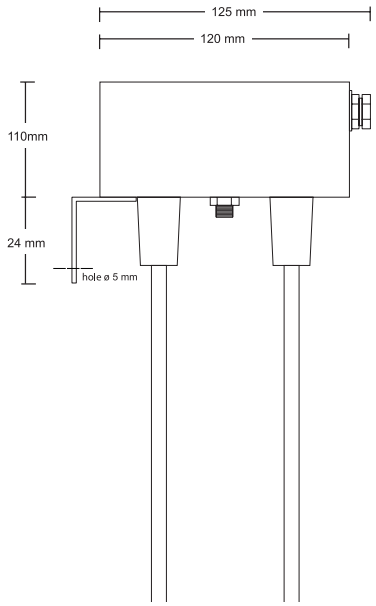
Accurate level control is critical to many industrial applications, especially for process adjustments using aggressive chemicals. Our sensor bars are built with stainless steel for long life even in harsh conditions. They are easy to install and ideal for monitoring tanks and water conditioning plants.

The HI 7874 transmitter has been designed to be combined with the HI 7871 and HI 7873 level controllers. The transmitter is housed in a durable and waterproof ABS body, and allows the user to easily adjust the length of the sensor bars according to the specific need.

HI 7874 is supplied with a sturdy mounting bracket for quick and easy installation.



HI 7874 Level Transmitter with HI 731324 Stainless Steel Measuring Bars



SPECIFICATIONS	HI 7874
Transmission	max 100 meters (330 feet)
Electrical Connection	2-wire terminal
Level Adjustment	high, low and overflow
Sensor Bars	3 or 4 (not included) (HI 731324 pack of 5)
Power Supply	from level controller
Environment	0 to 50°C (32 to 122°F); RH max 100%
Weight	550 g (1.2 lbs.)

ORDERING INFORMATION

HI 7874 is supplied with mounting bracket and instructions.

ACCESSORIES

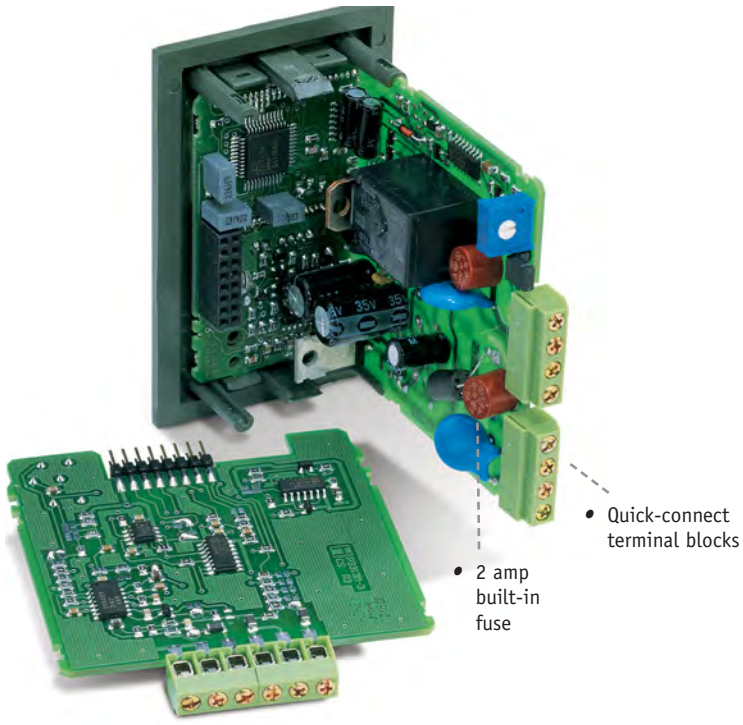
HI 731324 Stainless steel threaded measuring bars (5)

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HANNA Mini Controllers

BL Series





- Quick-connect terminal blocks
- 2 amp built-in fuse
- Removable modules for easy maintenance

Accurate and Simple to Install

Traditionally, process monitoring has required considerable investment in system design, equipment, maintenance and training. With our mini controllers, we are able to offer a solution for industries that have to monitor a process economically. HANNA mini controllers are easy-to-use and allow accurate continuous monitoring and control of pH, ORP, TDS, EC, Resistivity and Level. These compact, in-line instruments are designed to consistently perform in most environments and conditions.

Our line of simple-to-operate controllers have been specially designed for hydroponics, swimming pools or applications where space or cost are a major concern. Thanks to their compact size, they can be mounted in confined spaces and right next to tanks or vats. The low cost of these meters will make it possible for processes that were manually maintained to be controlled automatically, saving considerable time and money.

Our redesigned mini controller series features a larger LCD for easy reading, manual output control for simple maintenance, an overtime control system and a multicolored LED to indicate meter condition (measurement, dosing or alarm mode).

Finally, the BL 931700 and BL 932700 models are provided with 4-20 mA analog output and input for remote control disabling.

- *Fire retardant casing*
- *Larger LCD*
- *Selectable overdose protection system*
- *External disable feature*
- *Selectable control override*
- *Matching pin connection*
- *4-20 mA analog output*

HANNA instruments

With Great Products, Come Great Results™

HANNA Mini Controllers

BL Series

Any System Can be
Cost Effectively
Monitored
24 Hours A Day!



BlackStone mini controllers are the perfect solution for water analysis and control

pH Mini Controllers

Monitoring and controlling pH in water conditioning and industrial applications is essential for water quality and maintaining infrastructure (piping and equipment). In the case of industrial effluent, neutralization of acidic waste is vital for environmental safety and public health. In industrial applications such as boiler feed water conditioning, a higher pH of 8.5 is necessary to prevent scaling and corrosion of critical components. Maintaining a pH of 7.4 is fundamental for proper and efficient sanitization in swimming pools and spas. The effectiveness of sanitizers such as chlorine is dependent on a controlled pH value.

ORP Mini Controllers

ORP (Oxidation Reduction Potential) is the most dependable and consistent indicator of the sanitizing effectiveness of your pool, spa or treatment water. As oxidizers such as chlorine, peroxide and ozone are added to water for the purpose of sanitization, the ORP value increases, providing a clear indication of the cleansing power of the water. Typically, an ORP value of 650 to 700 mV at a pH of 7.2 indicates that your water is properly treated and all harmful bacteria are killed in less than 1 second. ORP is also essential in chemical processing where reducing agents are used and a negative ORP value is an indicator of proper neutralization.

Conductivity Mini Controllers

In water, an increase in conductivity indicates an increase in water hardness and a decrease in purity. Conductivity monitoring and control is essential in reducing water hardness and maintaining water quality. For instance, water with a conductivity value in the range of 0-140 µS is considered "very soft" where as water with a range of 640-840 µS is considered "hard" water. An increase in conductivity indicates an increase in the amount of damaging dissolved solids (salts) present in water. Conductivity monitoring and control is essential in industrial applications such as feed water control, blow down activation in cooling towers and water management. In these applications, high conductivity will cause scaling and corrosion of piping and damage to critical components.

TDS Mini Controllers

TDS measurement is an important indicator of water quality. An increase in the TDS reading indicates an increase in the amount of dissolved solids (salts) present in the water. TDS monitoring and control is imperative in industrial applications such as feed water control, blow down activation in cooling towers and water management, in these applications high TDS will cause scaling and corrosion of piping and damage to critical components.

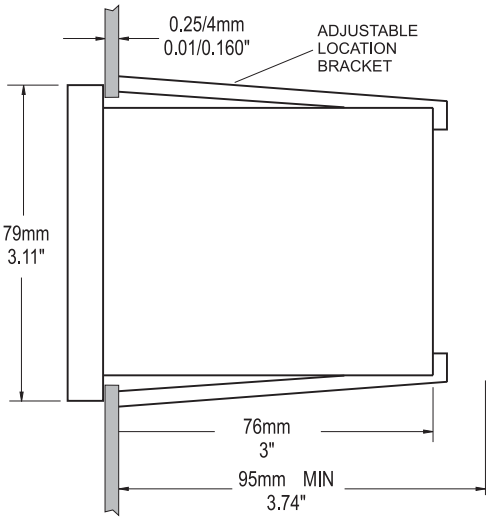
TDS measurement is also an important indicator of the effectiveness of water conditioning since an increase in TDS indicates an increase in water hardness and a decrease in purity. This will affect the quality of drinking water, feed water and rinse water. TDS monitoring and control is crucial in reducing water hardness and maintaining water quality and usability.

Resistivity Mini Controller

Resistivity, measured in MΩ (Ohm's), is the optimal way to measure the quality of water produced by high purity systems such as R.O systems and water conditioning equipment. As filter systems become less effective, the resistivity value will decrease indicating a need for maintenance and/or replacement of filters and critical components. Properly functioning RO and water conditioning systems will consistently produce water with resistivity readings in the range of 16 to 18MΩ.

HANNA Mini Controllers

BL Series Mechanical Dimensions



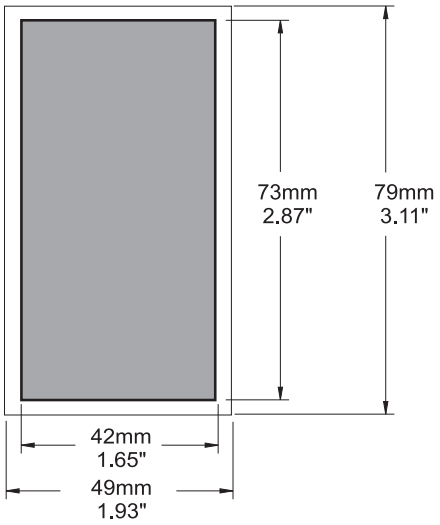


Side View

Side view of panel-mounted controllers.

Adjustable location brackets allow the controller to slide into the cutout and will hold the unit securely in place.

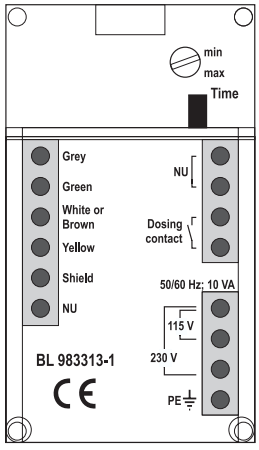
130 or 87 mm (depending on model) is the minimum amount of room required to install the meter with all wiring.



Front View

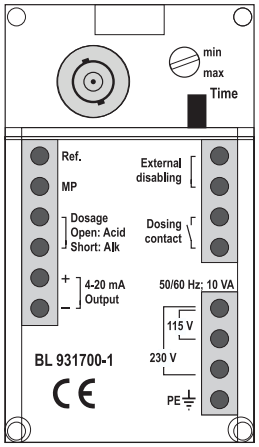
Front view of the panel-mounted units.

Dimensions show the cutout size for installation and also the outside dimensions of the panel.



Rear View

Rear view of the BL 983313-1 with electrical connections.



Rear View

Rear view of the BL 931700-1 with electrical connections.

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Compact pH Controller

BL 981411 pH controller has been designed for easy, affordable installation in tight spaces, ideal for simple and effective process control. The unit is provided with high inpedance pH input and can be used with any pH electrode with standard BNC connector. Measurements are clearly displayed on the large LCD, while the status LED indicates operating mode.

BL 981411 is also provided with a dosing relay. Selecting acid dosing, will cause the relay to activate when the measurement is higher than the setpoint. If the basic dosing is selected, the relay is activated when the reading falls below the setpoint.

Setpoint adjustment (from 0 to 14 pH) and calibration procedures are easily performed with trimmers on the front panel. You can also choose from automatic or manual dosing modes with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need. An overtime control system advises you when the relay is active too long, to help prevent overdosing.

Two models are available:

BL 981411-0 powered at 12 Vdc

BL 981411-1 powered at 115 or 230 Vac



SPECIFICATIONS	BL 981411-0	BL 981411-1
Range	0.0 to 14.0 pH	
Resolution	0.1 pH	
Accuracy (@20°C/68°F)	±0.1 pH	
Calibration	manual, with offset trimmer	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc	
Dosing Selection	acid or alkaline contact open=acid dosage; activated when reading exceeds setpoint value contact closed=alkaline dosage; activated when reading falls below setpoint value	
Setpoint	adjustable from 0.0 to 14.0 pH	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Input Impedance	10^{12} Ohm	
Power Supply	12 Vdc adapter (included)	115/230 Vac ±10%; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	200 g (7.1 oz.)	300 g (10.6 oz.)

ORDERING INFORMATION

BL 981411-0 (12 Vdc) and **BL 981411-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 1001	pH electrode for continuous flow-thru monitoring

SOLUTIONS

HI 7004L	pH 4.01 calibration solution, 500 mL
HI 7007L	pH 7.01 calibration solution, 500 mL
HI 7010L	pH 10.01 calibration solution, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 740146	Mounting brackets

HI 1222 Controllers and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



Combine any of HANNA's mini controllers into the HI 1222 for versatile monitoring and control

BL 931700

pH Mini Controller

with 4-20 mA Recorder Output



SPECIFICATIONS	BL 931700-0	BL 931700-1
Range	0.00 to 14.00 pH	
Resolution	0.01 pH	
Accuracy (@20°C/68°F)	±0.02 pH	
Calibration	manual, 2 point, with offset and slope trimmers	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc	
Dosing Selection	acid or alkaline contact open=acid dosage; activated when reading exceeds setpoint value contact closed=alkaline dosage; activated when reading falls below setpoint value	
Setpoint	adjustable from 0.00 to 14.00 pH	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Recorder Output	4-20 mA, accuracy ±0.20 mA, 500 Ohm max load	
Input Impedance	10^{12} Ohm	
Power Supply	12 Vdc adapter (included)	115/230 Vac ±10%; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	200 g (7.1 oz.)	300 g (10.6 oz.)

ORDERING INFORMATION

BL 931700-0 (12 Vdc) and **BL 931700-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 1001 pH electrode for continuous flow-thru monitoring

SOLUTIONS

HI 7004L pH 4.01 calibration solution, 500 mL

HI 7007L pH 7.01 calibration solution, 500 mL

HI 7010L pH 10.01 calibration solution, 500 mL

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 740146 Mounting brackets

Easy installation

BL 931700 mini pH controller has been designed for easy, affordable installation in tight spaces to perform simple yet effective process control. Thanks to its compact size, BL 931700 can be installed right next to tanks or vats.

This versatile controller is ideal for a wide variety of applications, such as textiles, papers, photographic solutions, plating baths, chemicals and water treatment.

BL 931700 is provided with a selectable setpoint for acid or basic dosage.

Measurements are directly aquired from a pH electrode in the range from 0 to 14 with a 0.01 pH resolution.

Accuracy is ensured by the 2 point calibration, performed manually through trimmers on the front panel.

You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need. The overtime control system advises you when the relay is active for too long, helping to prevent overdosing.

In addition, this model features a 4-20 mA analog output for recorder connection.

Two models are available:

BL 931700-0 powered at 12 Vdc

BL 931700-1 powered at 115 or 230 Vac

HI 1211 Controller and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



These controllers will allow any system to be cost effectively monitored 24 hours a day.

HANNA instruments

With Great Products, Come Great Results™

Ideal for Swimming Pools and Spas

BL 982411 is an ORP mini controller for panel mounting, specially designed for swimming pools and spas. Thanks to its compact size, BL 982411 can be installed in small spaces. BL 982411 is the ideal solution for those who have always checked ORP manually. With it's automatic dosing, this mini controller will significantly reduce maintenance time.

BL 982411 can be used with any ORP electrode with standard BNC connector. The instrument measures ORP in the 0 to 1000 mV range and shows the readings on the large display. The status LED continuously indicates if the controller is in measurement, dosing or alarm mode.

BL 982411 is also provided with a relay for selecting the dosing direction, oxidizing or reducing.

You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need. The overtime control system advises you when the relay is active for too long, helping to prevent over-dosage.

Two models are available:

BL 982411-0 powered at 12 Vdc

BL 982411-1 powered at 115 or 230 Vac



SPECIFICATIONS	BL 982411-0	BL 982411-1
Range	0 to1000 mV	
Resolution	1 mV	
Accuracy (@20°C/68°F)	±5 mV	
Calibration	manual, with CAL trimmer	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc	
Dosing Selection	reducing or oxidizing contact open=reducing dosage; activated when reading exceeds setpoint value contact closed=oxidizing dosage; activated when reading falls below setpoint value	
Setpoint	adjustable from 0 to 1000 mV	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Input Impedance	10^{12} Ohm	
Power Supply	12 Vdc adapter (included)	115/230 Vac ±10%; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	200 g (7.1 oz.)	300 g (10.6 oz.)

HI 1222 Controllers and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



optional

Combine any of HANNA's mini controllers into the HI 1222 for versatile monitoring and control.

ORDERING INFORMATION

BL 982411-0 (12 Vdc) and **BL 982411-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 2001	ORP electrode for continuous flow-thru monitoring

SOLUTIONS

HI 7020L	200-275 mV test solution, 500 mL
HI 7022L	470 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 740146	Mounting brackets

BL 932700

ORP Mini Controller

with 4-20 mA Recorder Output



SPECIFICATIONS	BL 932700-0	BL 932700-1
Range	±1000 mV	
Resolution	1 mV	
Accuracy (@20°C/68°F)	±5 mV	
Calibration	manual, with CAL trimmer	
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc	
Dosing Selection	reducing or oxidizing contact open=reducing dosage; activated when reading exceeds setpoint value contact closed=oxidizing dosage; activated when reading falls below setpoint value	
Setpoint	adjustable from -1000 to 1000 mV	
Overtime	adjustable, typically from 5 to approx. 30 minutes	
Recorder Output	4-20 mA, accuracy ±0.20 mA, 500 Ohm max load	
Input Impedance	10^{12} Ohm	
Power Supply	12 Vdc adapter (included)	115/230 Vac ±10%; 50/60Hz
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")	
Weight	200 g (7.1 oz.)	300 g (10.6 oz.)

ORDERING INFORMATION

BL 932700-0 (12 Vdc) and **BL 932700-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

PROBES

HI 2001 ORP electrode for continuous flow-thru monitoring

SOLUTIONS

HI 7020L 200-275 mV test solution, 500 mL

HI 7022L 470 mV test solution, 500 mL

HI 7091L Reducing solution, 500 mL

HI 7092L Oxidizing solution, 500 mL

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 740146 Mounting brackets

Versatile ORP Controller

BL 932700 is an ORP mini controller that has been designed for easy, affordable installation in tight spaces, ideal for simple yet effective process control. As a result of its compact size, BL 932700 can be installed right next to tanks or vats.

This versatile controller is ideal for many applications, such as ORP monitoring bleaching processes, waste water treatment and swimming pools. BL 932700 permits automatic control of installations previously checked manually.

The instrument can be set for reducing or oxidizing dosage. It measures in the ±1000 mV range, with 1 mV resolution. Setpoint adjustment and calibration are simply performed through trimmers on the front panel. You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need.

The overtime control system advises you when the relay is active too long, helping to prevent over dosage. In addition, this model features a 4-20 mA analog output for recorder connection.

Two models are available, with power supply input at 115/230 Vac or 12 Vdc.

Two models are available:

BL 932700-0 powered at 12 Vdc

BL 932700-1 powered at 115 or 230 Vac

HI 1211 Controller and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



optional

These controllers will allow any system to be cost effectively monitored 24 hours a day.

HANNA instruments

With Great Products, Come Great Results™

Conductivity Mini Controllers

Measuring in µS/cm

Specially Designed for Agriculture and Water Conditioning

These HANNA mini controllers have been specially designed for water conditioning and growing applications. Compact in size, they can be mounted in confined spaces or even right next to the vat or barrel containing the chemicals. These meters permit automatic control of installations previously checked manually.

EC measurements are shown on the large display and the multicolored LED continuously indicates if the mini controller is in measurement, dosing or alarm mode. BL 983313 measures in the 0 to 1999 µS/cm range, BL 983320 measures from 0.0 to 199.9 µS/cm and BL 983322 from 0.00 to 19.99 µS/cm.

You can also choose automatic or manual dosing mode with a switch on the front panel. Manual control is particularly useful during maintenance operations, because it permits you to enable or disable the dosing relay according to your need. The overtime control system advices you when the relay is active for too long, helping to prevent over dosage.

Several models are available:

"-0" Models powered at 12 Vdc

"-1" Models powered at 115 or 230 Vac



SPECIFICATIONS	BL 983313	BL 983320	BL 983322
Range	0 to 1999 µS/cm	0.0 to 199.9 µS/cm	0.00 to 19.99 µS/cm
Resolution	1 µS/cm	0.1 µS/cm	0.01 µS/cm
Accuracy (@20°C/68°F)	±2% f.s.		
Probe (not included)	HI 7634-00		
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with ß=2%/°C		
Calibration	manual, with CAL trimmer		
Dosing Relay	1, max 2A (fuse protected), 250 Vac, 30 Vdc contact closed when reading exceeds setpoint value		
Setpoint	adjustable from 0 to 1999 µS/cm	adjustable from 0 to 199.9 µS/cm	adjustable from 0 to 19.99 µS/cm
Overtime	adjustable, typically from 5 to approx. 30 minutes		
Power Supply	models "-0": 12 Vdc adapter (included) models "-1": 115/230 Vac ±10%; 50/60Hz		
Dimensions	83 x 53 x 99 mm (3.3 x 2.1 x 3.9")		
Weight	models "-0": 200 g (7.1 oz.) / models "-1": 300 g (10.6 oz.)		

HI 1222 Controllers and Monitor in an Industrial Enclosure

- *NEMA protection*
- *Simple to install*



Combine any of HANNA's mini controllers into the HI 1222 for versatile monitoring and control

ORDERING INFORMATION

BL 983313-0 (12 Vdc) and **BL 983313-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

BL 983320-0 (12 Vdc) and **BL 983320-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

BL 983322-0 (12 Vdc) and **BL 983322-1** (115/230 Vac) are supplied with mounting brackets, transparent cover and instruction manual.

ELECTRODES

HI 7634-00 EC/TDS probe with internal temperature sensor and 2 m cable

SOLUTIONS

HI 7031L 1413 µS/cm calibration solution, 500 mL bottle

HI 7033L 84 µS/cm calibration solution, 500 mL bottle

HI 7061L Cleaning solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter

HI 710006 230 Vac/12 Vdc power adapter

HI 740146 Mounting brackets

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PCA 310 • PCA 320 • PCA 330

Chlorine, pH, ORP and Temperature Analyzers

SPECIFICATIONS		PCA 310	PCA 320	PCA 330
Range	Free & Total Chlorine	0.00 to 5.00 mg/L	0.00 to 5.00 mg/L	0.00 to 5.00 mg/L
	pH	-	0.00 to 14.00 pH	0.00 to 14.00 pH
	Temperature	-	5.0 to 75.0°C	5.0 to 75.0°C
	ORP	-	-	0 to 2000 mV
Resolution	Free & Total Chlorine	0.01 mg/L	0.01 mg/L	0.01 mg/L
	pH	-	0.01 pH	0.01 pH
	Temperature	-	0.1 °C	0.1 °C
	ORP	-	-	1 mV
Accuracy	Free & Total Chlorine	±8% ±0.05 mg/L	±8% ±0.05 mg/L	± 8% ± 0.05 mg/L
	pH	-	± 0.05 pH	± 0.05 pH
	Temperature	-	±0.5°C	±0.5°C
	ORP	-	-	±1 mV
Minimum Detectable Level	Free & Total Chlorine	0.05 mg/L		
Input Impedance		10^{12} Ohm		
Calibration	Free & Total Chlorine	1 point		
	pH	1 or 2 point		
Sampling	Free & Total Chlorine	adjustable from 3 to 90 minutes		
Rate	pH	adjustable from 3 to 120 seconds		
Dosage	Free & Total Chlorine	proportional		
	pH	ON/OFF or proportional		
Delta	Free & Total Chlorine	selectable from 0.1 to 5 mg/L		
	pH	selectable from 0.1 to 2 pH (hysteresis adjustable from 0.05 to 2 pH)		
Recorder Output		0-10 mV, 0-100 mV, 0-1 V, 4-20 mA or 0-20 mA		
Serial Communication		RS485 port, galvanically isolated		
Baud Rate		1200, 2400, 4800, 9600 bps		
Data Logging		up to 3500 data points		
GSM Communication		2 programmable cellular phone numbers, alarm & information SMS using the HI 504900 module (optional)		
Alarm Relay		SPDT contact with 5A, 230 V resistive load		
Dosing Relay		SPDT contact with 5A, 230 V resistive load		
System Error		SPDT contact with 5A, 230 V resistive load		
Inlet Pressure		0.07 to 4 bar with no external pressure regulator (for pressure exceeding 4 bar an external pressure regulator is required)		
Sample Flow		100 to 300 mL/min		
Sample Temperature		5 to 40°C (41 to 104°F)		
Sample Inlet Connection		12 mm (1/2") tubing diameter		
Drain Connection		10 mm (3/8") bar fitting		
Power Supply		115 Vac ±10% or 230 Vac ±10%; 50/60 Hz; 20 VA		
Enclosure		NEMA-4X standard, molded fiberglass polyester with transparent Lexan window		
Dimensions / Weight		318 x 267 x 159 mm (12.5 x 10.5 x 6.25") / 5 kg (11 lb.) without reagents		

ORDERING INFORMATION

Each PCA model is supplied with (2) reagent bottles, (2) reagent caps, 1 DPD compound powder, tubing and instructions.

PCA 310-1 Free & Total Chlorine Analyzer, 115 Vac power supply

PCA 310-2 Free & Total Chlorine Analyzer, 230 Vac power supply

PCA 320-1 Free & Total Chlorine, pH and Temperature Analyzer, 115 Vac power supply

PCA 320-2 Free & Total Chlorine, pH and Temperature Analyzer, 230 Vac power supply

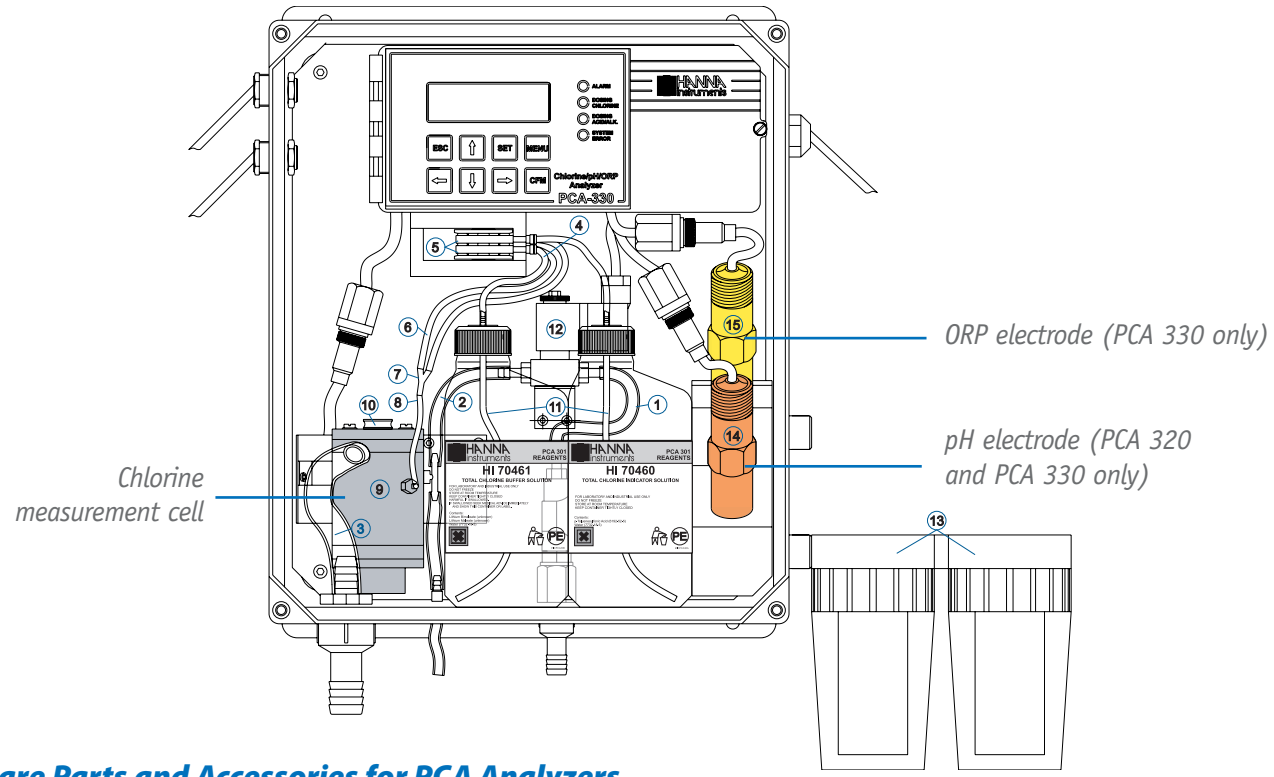
PCA 330-1 Free & Total Chlorine, pH, ORP and Temperature Analyzer, 115 Vac power supply

PCA 330-2 Free & Total Chlorine, pH, ORP and Temperature Analyzer, 230 Vac power supply

ACCESSORIES

HI 504900 GSM module

For a complete list of available spare parts, see the following page.



Spare Parts and Accessories for PCA Analyzers

PARTS

HI 70473 PCA tubing kit, pressure regulator to drain (2 pcs). Each kit includes: transparent Tygon tubes 86L x 3.2ID mm (3.4 x 0.1") (Length x Internal Diameter) (1, 2) and 105 x 9.5 mm 4.1 x 0.4") (3)

HI 70474 PCA peristaltic pump tubing kit (6 pcs). Each kit includes: non-transparent C-flex tubes 55L x 0.8ID mm (2.1 x 0.03") (5)

HI 70475 PCA peristaltic pump tubing kit (2 pcs). Each kit includes: non-transparent C-flex tubes 55L x 0.8ID mm (2.1 x 0.03") (5)

HI 70476 PCA reagent bottle tubing kit (6 pcs). Each kit includes: non-transparent C-flex tubes 155L x 0.8ID mm (6.1 x 0.03") (11)

HI 70477 PCA tubing set for measuring cell (2 pcs). Each set includes: non-transparent C-flex tube 50L x 0.8ID mm (2.0 x 0.03") (8) and Y strainer (7)

HI 70478 PCA tubing kit, bottle to pump (6 pcs). Each kit includes: non-transparent C-flex tube 150L x 0.8ID mm (5.9 x 0.03") (4)

HI 70479 PCA tubing kit, pump to Y strainer (6 pcs). Each kit includes: non-transparent C-flex tube 150L x 0.8ID mm (5.9 x 0.03") (6)

HI 70482 PCA filters. The kit includes 0.5 µm and 50 µm filters (13)

HI 70483 PCA complete tubing kit. The kit includes: non-transparent C-flex tubes (4, 6) 150L x 0.8ID (5.9 x 0.03") (4 pcs), non-transparent C-flex tubes (5) 55L x 0.8ID (2.1 x 0.03") (2 pcs), non-transparent C-flex tubes (8) 50L x 0.8ID (2.0 x 0.03") and Y strainer (7)

HI 70484 PCA complete tubing kit (3 pcs). Each kit includes: non-transparent C-flex tubes (4, 6) 150L x 0.8ID (5.9 x 0.03") (4 pcs), non-transparent C-flex tubes (5) 55L x 0.8ID (2.1 x 0.03") (2 pcs), non-transparent C-flex tubes (8) 50L x 0.8ID (2.0 x 0.03"), Y strainer (7)

HI 70485 PCA stirrer motor

HI 70486 PCA stirring bar (2 pcs)

HI 70487/N Measuring cell (9)

HI 70488 Electrovalve, 24VAC/60Hz (12)

HI 70489 Electrovalve, 24VAC/50Hz (12)

HI 70494 PCA calibration port cap (10)

HI 704731 Complete set of tubes from pressure regulator to drain (PCA 310)

HI 70492 Electrode holder (PCA 330)

HI 704732 Complete set of tubes from electrode holder to drain (PCA 320/PCA 330)

HI 70493 Closing cap for electrode holder

ELECTRODES

HI 1005 Amplified pH electrode with Matching Pin and Pt100 (14) (PCA 320/330 only)

HI 2008 Amplified ORP electrode with Matching Pin (15) (PCA 330 only)

REAGENTS

HI 70480 PCA free chlorine reagent kit (for fresh water). The kit includes buffer solution, indicator and DPD powder.

HI 70481 PCA total chlorine reagent kit (for fresh water). The kit includes buffer solution, indicator and DPD powder reagent.

SOLUTIONS

HI 7004M	pH 4.01 buffer solution, 250 mL
HI 7004L	pH 4.01 buffer solution, 500 mL
HI 7006M	pH 6.86 buffer solution, 250 mL
HI 7006L	pH 6.86 buffer solution, 500 mL
HI 7007M	pH 7.01 buffer solution, 250 mL
HI 7007L	pH 7.01 buffer solution, 500 mL
HI 7009M	pH 9.18 buffer solution, 250 mL
HI 7009L	pH 9.18 buffer solution, 500 mL
HI 7010M	pH 10.01 buffer solution, 250 mL
HI 7010L	pH 10.01 buffer solution, 500 mL
HI 7020M	200-275 mV buffer solution, 250 mL
HI 7020L	200-275 mV buffer solution, 500 mL
HI 7091M	Pretreatment reducing solution, 250 mL
HI 7091L	Pretreatment reducing sol., 460 mL
HI 7092M	Pretreatment oxidizing solution, 230 mL
HI 7092L	Pretreatment oxidizing sol., 460 mL
HI 70300M	Storage solution, 230 mL
HI 70300L	Storage solution, 460 mL
HI 7082	3.5M KCL electrolyte, 50 mL (4)
HI 7061M	Electrode cleaning solution, 230 mL
HI 7061L	Electrode cleaning solution, 460 mL

GSM

HI 504900 Hanna GSM module

SOFTWARE

HI 92500 Windows® compatible software

Process Instrumentation

Professional, Industrial Instrumentation



Panel Mount or Wall Mount Instruments

Most process instruments for measuring and controlling pH, ORP and conductivity are designed for installation in panel enclosures. Panel configurations are necessary when installing a variety of control devices in a confined space. These devices may include switches, power relays for driving dosing pumps, solenoid valves, mixer drives, etc.

Quite often users need to design a simple and remote solution close to the measurement point. To solve this problem, HANNA has designed a series of wall mounted instruments which do not require enclosures and housing for a multitude of connections and wiring. Almost the entire range of HANNA panel mount instrumentation is available in stand alone wall mountable versions for quick and easy "plug and play" installation.

HANNA'S wide range of wall mount instrumentation also includes combination controllers for pH/ORP, or pH/conductivity applications.

HANNA wall mounted controllers can be found in a variety of industries and applications, such as municipal, boiler and cooling towers, agriculture, greenhouses, electro-plating, etc.

Remote Monitoring and Control

It has become a common practice to assign specially trained operators to the tasks of plant maintenance. The plant managers and producers tend to concentrate all attention to controlling the actual process, leaving maintenance and support of the automated systems to the specialists.

When an installation does not perform properly, process instruments will usually alert the specialist with a visual or audible signal. If a specialist or operator is not available on the premises to correct the problem, the process may run or shut down improperly, possibly causing costly damage to product and/or equipment. Quite often the specialist can be contacted and informed that an alarm has been triggered. However, the operator could be hundreds of miles from the premises at the time and, quite often, production has to be interrupted while waiting for instruction or hands on intervention.

HANNA has provided a solution by designing process systems that can send alarm messages automatically to a cellular phone. As soon as the message is received, the specialist not only knows the source of the alarm, but can also connect and interact with the instrument via remote PC connection to determine the cause of the malfunction. This allows the specialist or operator the possibility to correct the malfunction or if necessary shut down the process. Over 100 diagnostic messages can be sent directly to the user.

The HI 504900-1 module is programmed to be used in the United States; the HI 504900-2 is programmed to be used in Europe.

Calibration of a Process pH Meter

In industrial applications, the calibration of a pH meter often poses difficulties due to the distance between the electrode and the instrument. In addition, accessing the electrode for calibration may prove to be a challenge if it is installed in a pressurized line or large tank in a continuous process.

Stopping a process frequently for the purposes of regular calibration may prove inconvenient and costly. In laboratory applications, the task of calibration is significantly different because the electrode and the instrument are close together and easily manageable. To provide the same level of manageability in a process application, HANNA has devised a remote calibration method, which allows the maintenance technician or operator the capability to calibrate the process controller without having direct access to it or without removing the electrode from the installation.



TELE-CONTROL™ TECHNOLOGY | YOU DON'T HAVE TO BE THERE TO BE AWARE.



HANNA® HI 504920

Using the HI 504920 portable pH meter with electrode, a maintenance technician or operator can simply take a sample measurement at or near the location of the sensor and automatically load it into memory. This is done without the need to remove the process electrode (sensor) from the line or tank.

Once the reading is taken and stored into memory, it is sent to a transmitter via an infrared connection. The transmitter automatically adjusts the pH value of the process instrument, possibly located hundreds of meters away.

The LCD of the portable pH meter will display an indication when the remote instrument has been calibrated and the process is complete.

pH Dependent ORP Control

ORP (Oxidation Reduction Potential) is predominately pH dependent. A change of one pH unit can shift the ORP of a solution by as much as 60 mV. ORP measurement and control is utilized in industrial processes for water treatment, cyanide oxidation and chromate reduction. Many instruments for controlling pH and ORP do not interact and normally operate independently. In this case it is possible that overdosing of an oxidant or reducing agent may occur if, for example, the pH is not controlled properly prior to obtaining the desired ORP.

An example of a worst case scenario would be at process start up with a pH level at 7.0 instead of the required 10.5 or 3. If at this point the ORP instrument activates a dosing pump before the pH controller has corrected the pH level, a disastrous reaction and contamination of the process will occur.

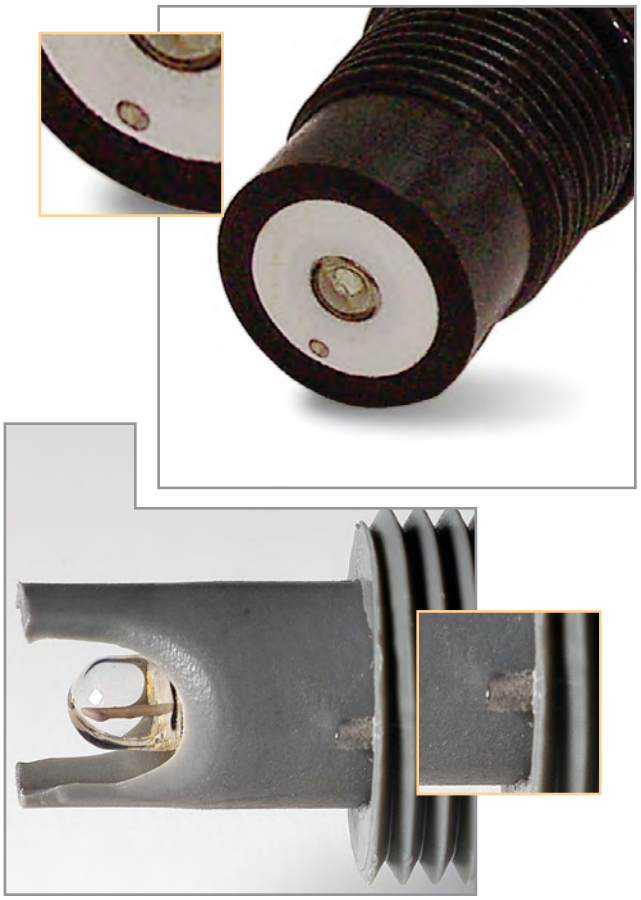
HANNA has devised a control system which prevents the ORP controller from dosing (i.e. sodium bisulfide and sodium hypochloride) whenever the pH value is not in the correct operating range, preventing a potentially dangerous and costly reaction.

The Solution to Ground Loop Effect; the Matching Pin

In process applications utilizing controllers and electrodes installed in-line or in tank, the potential matching pin is considered the "earth ground" connection used to prevent ground loop effects from causing erratic readings and damage to the system. In fact, it is a grounding device with a pin made of a material inert to chemical attack, usually stainless steel or titanium.

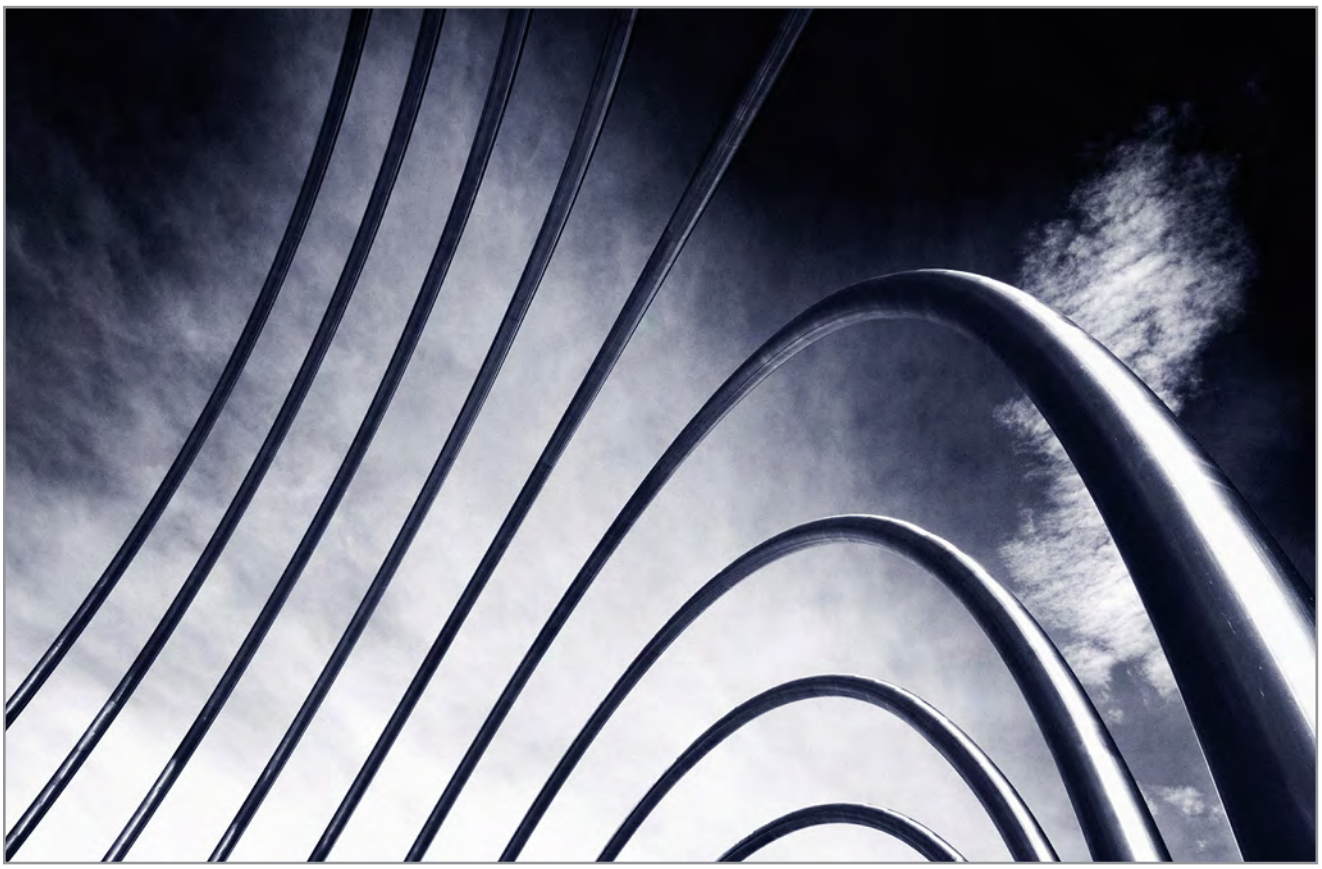
The matching pin is necessary when a process stream containing an electrode, whether in a pipe or tank, has a potential difference (voltage) with respect to "earth ground" which creates flow of electrical current. The matching pin essentially redirects the current from the reference cell of the process electrode (i.e. pH or ORP sensor). This prevents erratic readings and permanent damage to the reference cell of the electrode which significantly reduces its life span.

Potentials and transient current flow can also be caused by "leakage" of improperly insulated electrical equipment (pumps and stirrers), in addition to electrostatic charges introduced by the motion of mixer blades, or the existence of electric fields (electrolysis) present in plating baths.



Process Instrumentation

Professional, Industrial Instrumentation



The Effects of Ground Loop Current on Process pH and ORP Electrodes

An electrochemical (combination) cell, such as a pH or ORP electrode, is comprised of 2 half cells; the measuring cell and the reference. Both are essential for the cell to function and each has a specific purpose.

The entire cell is considered galvanic in that no external power is supplied to the solution. In many respects, the electrochemical cell is very much like a "wet cell" battery. In order for the measuring half cell to produce a readable measurement of a test solution it must be compared to a stable reference potential.

It is absolutely crucial that the potential produced by the reference half cell is consistent and stable (approx. 210 mV) regardless of the properties of the test solution and the working conditions. The only changing potential, as a result of the solution under test, is produced by the glass bulb of the measuring cell. The reference electrode must also make contact with the test solution to complete an electrochemical connection. Unlike the measuring cell which is hermetically separated by means of a glass bulb, the reference cell contains a permeable membrane (reference junction) which allows electrolyte to leach out into the solution. This creates an ionic connection between the internal silver reference and test solution completing the circuit. Hence the reference is now electrochemically connected to the solution which makes it vulnerable to transient electrical currents that may be present in the process. Unlike with a portable battery powered pH meter and electrode, the process system is not isolated from potential difference and the resulting current flow.

It is possible, given that unwanted potentials exists in the process, that the silver/silver chloride wire of the reference is exposed to current flow thousands of times higher than normal. In theory, this should not happen since most process instruments are powered at low voltage and the transformer inside the instrument will galvanically isolate the two potentials between the "process" and ground of the electrical system. All depends, therefore, on the quality of the instrument's input transformer. Even with the best isolation, capacitance may be generated between the instrument and the process stream. In this case the reference electrode is influenced by the resulting EMF, can no longer function properly and as a result the pH reading is lost.

By introducing the matching pin, which acts as a ground connection, the EMF is rerouted through the pin and galvanically isolated from the internal mass of the instrument. The instrument must be equipped electrically to perform this function. Hence, the matching pin can only be used with controllers provided with a differential input and circuit.

Few electrode and instrumentation manufacturers have paid the necessary attention to the matching pin and as a result it has been up to the user to devise makeshift ground connections that may or may not work correctly.

HANNA has responded to this problem by designing a complete series of process electrodes, each equipped with an integrated potential matching pin.



Sensor Check

A pH control system consists of a pH electrode in contact with a test solution, a connection cable, and a meter for measurements and adjustments. The instrument is typically set to control acid or alkaline dosage for the purpose of maintaining a desired pH value. Many efforts have been devoted to such functions as dosage in pipes or tanks, on/off or proportional control, automatic temperature compensation, the use of amplifiers for distances exceeding 15 meters, panel- or wall-mounted models, etc. However, little effort has been applied to determining when and what occurs when an electrode fails.

For example, let's assume a process electrode is installed in a tank of wastewater containing hexavalent chromium. The set point pH value is 3.0 and, every time this value rises, pumps or solenoid valves are activated to dose sulfuric acid to maintain the set point. Let's also assume that the process electrode becomes damaged and the pH bulb is broken. Under normal conditions, the electrode will produce a potential equal to the difference between the buffer inside the glass bulb (pH 7.0) and the liquid being tested (pH 3.0), i.e. pH (7.0-3.0) x approx. 58.17 mV = 232.68 mV (value not compensated for temperature variations).

Once the glass bulb is broken, a short circuit occurs between the reference wire of the glass electrode (bulb) and the reference electrode; as a result the complete electrode potential is 0 mV. When the instrument receives a 0 mV signal, it will read approximately pH 7.0 and will immediately start to dose sulfuric acid in order to lower the pH level of the tank. If the controller does not posses a timed override function to shut down automatically, the system will keep dosing in an attempt to reach the 3.0 pH set point. This will continue until the acid container becomes empty by which time the process stream will be dangerously contaminated. Even if a timed override is programmed into the controller, this will only limit the contamination. If the electrode fails near to the set point, the controller could dose for several minutes before the override shuts down the system.

This is just one of many possible examples of overdosing and contamination as a result of undetectable electrode failure.

In any given application, costly damage can be avoided by automatically and continually monitoring the condition of the process sensors. HANNA has devised such a system. The "Sensor Check™" system automatically checks the condition of the process electrode every 5 seconds to ensure proper function.

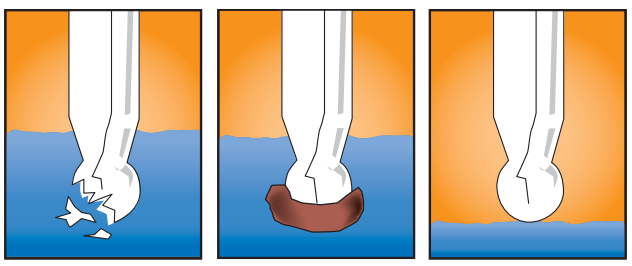
A pH glass electrode is a high impedance device (tens of MΩ at high temperatures, and up to 1,000 MΩ for temperatures close to zero). The Sensor Check™ system repeatedly checks the impedance of the cable and electrode to ensure it does not fall below the average value of the system (at least 10 MΩ). If a lower value is detected, indicating electrode failure, the instrument stops all dosage and activates an alarm that alerts the operator. By doing so, the Sensor Check™ system makes over dosage and contamination as a result of electrode failure a thing of the past.

Additionally, the Sensor Check™ system monitors the condition of the reference electrode. The pH measuring half-cell may be intact and work normally, but problems may occur related specifically to the reference portion of the electrode. The purpose of the reference half cell portion of the electrode is to supply a consistent and stable potential that is independent of the liquid being tested. This stable potential is the reference value by which the measuring portion of the electrode is compared. As a result the potential difference between the measuring half cell and the reference is the value used by the instrument to produce the pH reading. The reference electrode must make contact with the test solution to complete an electrochemical connection. Unlike the measuring cell which is hermetically separated by means of a glass bulb, the reference cell contains a permeable membrane (reference junction) which allows electrolyte to diffuse into the solution. This creates an ionic connection between the internal silver reference and test solution, completing the circuit. As with any electrochemical connection, contamination is always a concern and possibility. When contamination occurs, the potential of the reference electrode changes and the pH reading is no longer reliable. In addition, exposure to dirt and particles in the process stream may clog the porous reference junction, isolating the reference from the test liquid. If this occurs the electrochemical connection is broken and the electrode is essentially "unplugged" from the test solution making a correct pH reading impossible. This is why regular cleaning of the electrode system is a necessity. As with the pH bulb, the reference junction produces a measurable resistance value which under normal conditions is approximately 1,000Ω.

The HANNA Sensor Check™ system monitors the reference junction every 5 seconds to ensure that the proper resistance is maintained. The user can program a maximum value for the resistance similar to setting the pH set point. When the resistance of the clogged junction exceeds the set value, the instrument can stop dosage, trigger an alarm or automatic cleaning cycle.

These features are present in the HANNA HI 504 series of process pH/ORP controllers.

PROBLEMS DETECTED BY THE SENSOR CHECK™ SYSTEM



Broken electrode ***Dirty electrode*** ***Electrode not immersed***

HI 504

pH/ORP Digital Controller

with Tele-Control™ and Sensor Check™





- *Sensor check™ pH/ORP electrode diagnostic system*
- *RS 485 interface*
- *Digital transmitter input*
- *Programmable auto-cleaning cycle*
- *Fail safe alarm system*
- *Automatic temperature compensation*
- *Programmable hold system*

pH/ORP Controller with Tele-Control™ and Sensor Check™

HI 504 introduces an innovative concept in pH and ORP control that enhances the entire line of process controllers engineered by HANNA. 30 years of experience in the production of industrial controllers have enabled us to develop this series of high performance instruments with our new Tele-control™ technology. This technology supplies the means to control, from whatever distance and in real time, one or more installations, allowing the user to optimize operations such as maintenance cycles. With two-way communication supplied by the RS485 output and Windows® compatible software, users can control the complete regulation process from the PC or through SMS via cellular phone.

Measurement reliability is guaranteed by many self-diagnostic and troubleshooting functions, such as our Sensor Check™ feature which is the result of advanced research and application know-how.

The use of a universal BNC connector allows the use of any type of industrial probe to be chosen for a specific application, while rendering probe replacement a simple and time saving operation.

The HI 504 family offers a wide range of models, designed to fit your individual needs, and is able to satisfy whatever application of monitoring and regulation you require.



Digital Transmitter Input

Many industrial applications require greater distances from the regulation system to the probe than industrial probes can provide (typically around 15 meters). For these situations, the use of a transmitter is necessary.

All HI 504 models are supplied with a digital transmitter input. Compared to a traditional analog transmitter, which has a maximum transmission length of 300 meters, our new digital transmitter, HI 504910 permits the connection with the controller at distances up to 1.2 km (.74 mi). The data transmitted can be pH, mV and temperature.

This digital transmitter is compatible with the Sensor Check™ function and therefore guarantees excellent precision with continuous probe inspection.

GSM Cellular Module

The optimization of an industrial process plant means the reduction of costly unscheduled shutdown time. With this in mind, HANNA has developed the HI 504900 GSM cellular module* (optional). The HI 504900 is used for sending SMS alarm messages* and can also receive live updates on actual process conditions from authorized personnel.

The GMS cellular module can be programmed with one or two mobile phone numbers, where alarm messages can be sent whenever a malfunction is revealed. The SMS message immediately reports the nature of the alarm, and can include: Damaged pH probe, Damaged temperature probe or High setpoint exceeded.

* Compatible phones, plans & SIM cards must be purchased separately from an outside provider and is not in any way covered by HANNA



Direct Wire Connection or Tele-Control through an RS485 Port

The RS485 output is a versatile interface that can be used for connecting the HI 504 controller to many other devices. The simplest configuration is a direct wire connection to a PC (with distances up to 1.2 km (.74 mi), or it is possible to use either a traditional or GSM modem.

The remote control can be managed with the HI 92500 Windows® compatible software. Once connected, the user can interact with the system, view parameters in real time, download process data relative to the last 100 events that have occurred and, if necessary, modify or reconfigure program settings (setpoints, alarms, cleaning cycles, stand-by times, etc.). When a connection is kept active, it is possible to continuously download and automatically store the process data in Excel® format. This data, once saved, can be easily organized into tables and graphs, used for creating records and supervising process progression.

RS485 Network

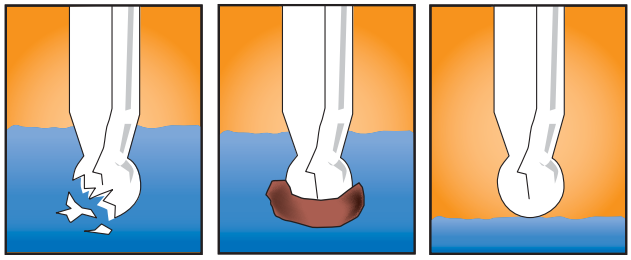
The RS485 output allows users to create a network composed up to 32 instruments using a simple double-wire cable. The communication speed (up to 19200 bps) allows the user to establish an RS485 network covering an area of up to 1.2 km (.74 mi) between the two instruments at both extremities of the network.

The network can be created with HI 504 units or any other HANNA industrial controllers with RS485 output (pH 502, mV 602, etc.). The entire network can be managed by our HI 92500 software, using a simple wire connection to a PC, with the HI 504902 traditional modem or a GSM module (HI 504900 or HI 504901).

Receive electrode status & diagnostic messages on the LCD display or via your mobile-phone!*

Sensor Check™ pH/ORP

As part of the powerful self-diagnostic functions of this instrument series, the Sensor Check™ system provides continuous inspection of probe status. The test is not limited to a simple signal that indicates an error in progress, but it reports the nature of the breakdown with a specific error code. With the use of the HI 504900 GSM module, errors or alarms can be sent directly to the operator's mobile phone as SMS message.



Broken electrode ***Dirty electrode*** ***Electrode not immersed***

Here are the types of breakdowns shown by sensor check:

> *pH electrode broken*
> *Reference electrode dirty*
> *Reference electrode or matching pin not immersed*
> *Electrode junction dirty or clogged*
> *Short-circuit between cables of pH and reference electrodes*
> *Signal problems from the cable or connector due to humid or dirty environments*

The internal circuit of the instrument executes two independent tests, one for the probe and one for the reference chamber, measuring the respective impedance values every 5 seconds. These tests last for a very short period to avoid electrolysis and polarization, which can be caused by a prolonged exposure to an electric current.

Programmable Cleaning Cycles

Heavy-duty applications often require almost continuous probe maintenance. Elements such as suspended solids, fat, oils, pigments and microorganisms can quickly deposit and soil the glass bulb of a pH probe, the sensor of an ORP probe or the reference junction. To solve these problems the HI 504 series has been equipped with an automatic cleaning system (simple or advanced, depending on model) with programmable cycles.

The cleaning cycle is a simple wash with either water or detergent, programmed by setting the rinse time and the pause length. The Advanced Cleaning uses both water and detergent, and allows the user to program three stages, with the possibility to vary the sequence, the time, and the number of cycles. The advanced mode can also be triggered at any time from a remote control or through the isolated digital input on the rear panel, which can be connected to an external switch. The controllers can also automatically activate both cleaning modes whenever the sensor check reveals a soiled probe. It is possible to set a delay time before restarting the reading after a cleaning cycle has taken place; this allows the probe to adjust to the new operating conditions.

HI 504

pH/ORP Digital Controller

with Tele-Control™ and Sensor Check

Programmable Hold System

The hold function allows the user to stop the regulating action of the controller for programmable time periods. It is possible to activate the hold periods in correspondence to programmed operations, such as plant maintenance, cleaning procedures and instrument calibration.

Fail-Safe Alarm System

HANNA exclusive Fail-safe Alarm System protects against problems caused by power supply failure or signal interruption, which are typical risks in industrial environments. The system acts both on a hardware and a software level. The alarm relay functions in a normally closed condition, and is tripped when there is a power failure if, for example, the power cable is accidentally cut. This function is very important in industrial plants where alarms are usually not activated if there is a power supply interruption, which can cause serious damage due to a loss of control of the process plant. At the software level, the fail safe function activates an alarm in case of abnormal circumstances, for example if the dosing contacts remain closed for an excessive period. The alarm condition is also signaled by a red LED, located directly on the front panel of the controller.

Logging of the Last 100 Events

With the HI 504 series, it is possible to recall the sequence of the last 100 occurred events at any time: errors, calibrations performed, set parameter changes and cleaning cycles. Every code shown on the display corresponds to a certain type of event, error or operation. Errors that are still active are indicated by a flashing code, while operations and alarms recorded or already concluded appear with a fixed code on the display.

Analog Output: Data Logging or PID Dosage Control

Models are available with one or two analog outputs. These outputs can be connected to a recorder for the cataloging of process data (pH/mV and temperature), or can be used for controlling dosing systems (pumps or electrovalves) using PID control.

Built-in Data Logger

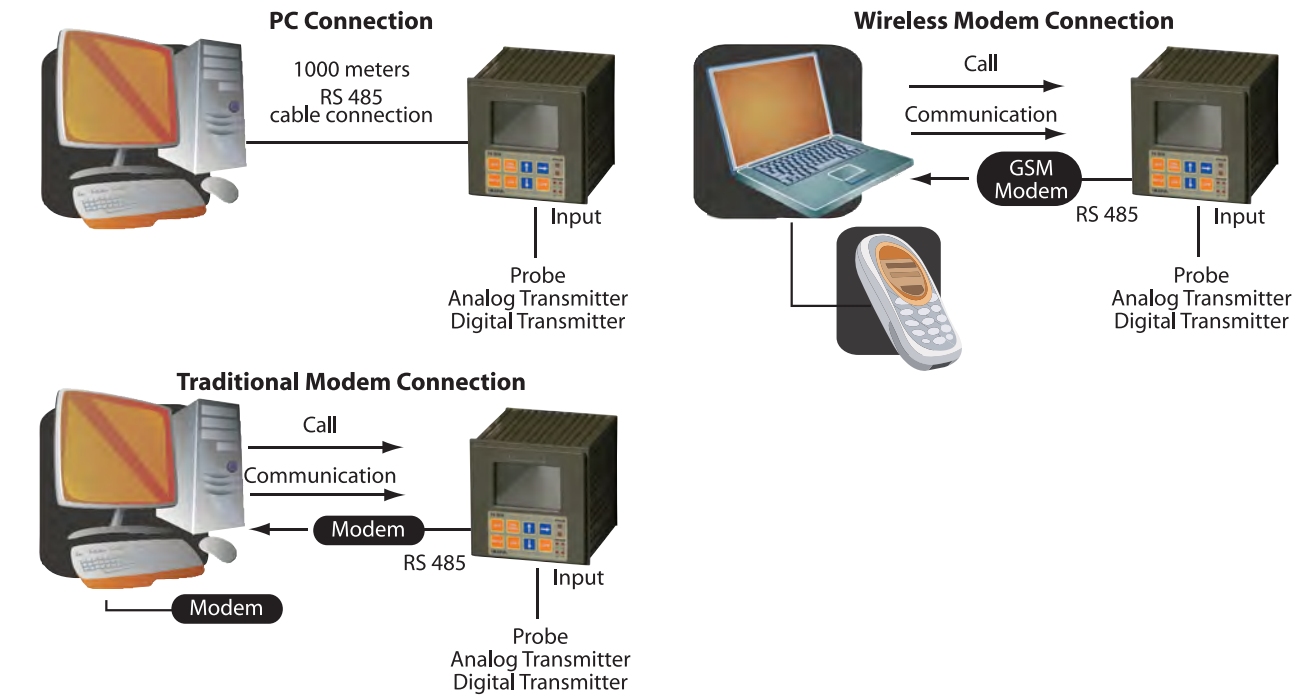
HI 504 can store date, time, pH or ORP and temerature measurements that can be transferred to a PC. The powerful HI 92000 software has graphing capabilities and can print graphs directly or save as a bitmap. Data can be exported in common spreadsheet formats.

UL Certification

The HI 504 process controller series complies with the production standards required by the Underwriters Laboratories (UL), one of the most important international authorities for device safety, and has obtained the following UL certification:

c UL us
LISTED
PROCESS CONTROL EQUIPMENT
42BA

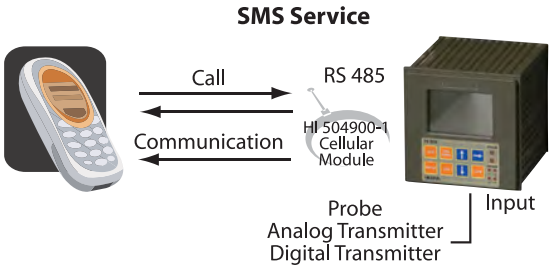
TELE-CONTROL™ TECHNOLOGY | YOU DON'T HAVE TO BE THERE TO BE AWARE.



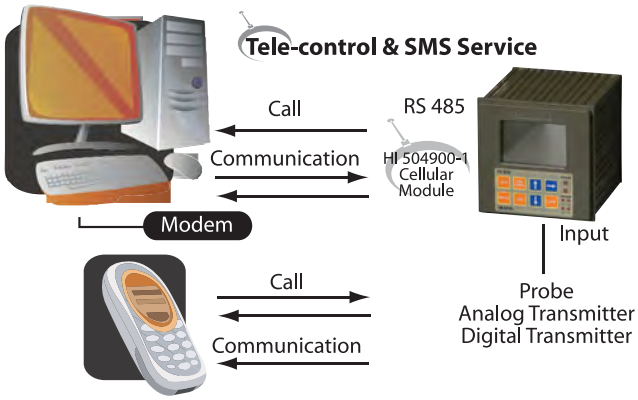
HI 504

pH/ORP Digital Controller

with Tele-Control™ and Sensor Check







SPECIFICATIONS	HI 504
Range	-2.00 to 16.00 pH; -2000 to 2000 mV; -30 to 130.0°C
Resolution	0.01 pH; 1 mV; 0.1°C (above -10 °C); 1°C (below -10°C)
Accuracy (@20°C/68°F)	±0.02 pH; ±2 mV; ±0.5°C (-9.9 to 130.0°C); ±1°C (-30 to -10°C)
Input Impedance	10^{12} Ohm
Digital Output	isolated output; contact closed upon Hold mode
Analog Output	1 or 2 independent outputs (configuring as 0-20 mA or 4-20 mA)
Dosing and Alarm Relay	electromechanical relay SPDT contact output ; 5A - 250 Vac, 5A - 30 Vdc (resistive load) fuse protected: 5A, 250V "Quick Blow" fuse
Temperature Compensation	automatic or manual, -30 to 130°C
Temperature Probe	Pt100/Pt1000 sensor (with automatic recognition and damage test)
Power Supply (depending on model)	24 Vdc/ac, 115 Vac ±10%, 230 Vac ±10% or 100 Vac ±10%; 50/60 Hz
Environment	0 to 50°C (32 to 122°F); RH max 85% non-condensing
Casing	IP54 (front panel)
Dimensions / Weight	panel cutout:140 x 140 mm, instrument: 144 x 144 x 170 mm / 1.6 kg (3.5 lb.)

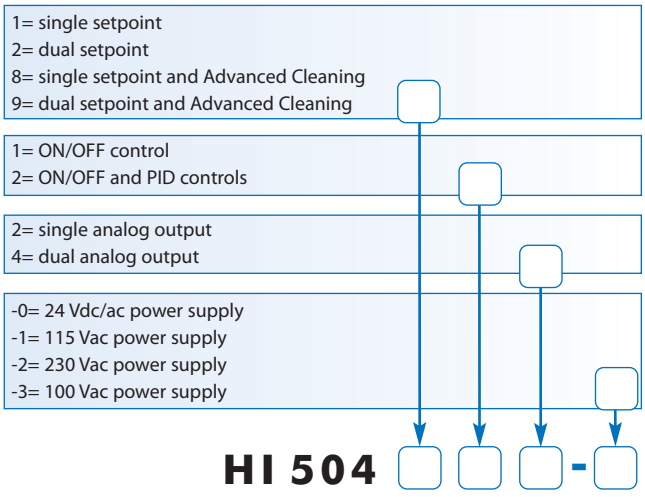
ORDERING INFORMATION

Each **HI 504** model is supplied complete with mounting brackets and instructions.

Example:

HI 504922-2

pH/ORP controller with dual setpoint, Advanced Cleaning, ON/OFF and PID controls, single analog output and 230 Vac power supply.



PROBES

HI 7610	Stainless steel temperature probe with Pt100 sensor and 5 m cable
HI 7611	Stainless steel temperature probe with Pt1000 sensor and 5 m cable

SOLUTIONS

HI 7004/1L	pH 4.01 buffer solution, 1 L
HI 7006/1L	pH 6.86 buffer solution, 1 L
HI 7007/1L	pH 7.01 buffer solution, 1 L
HI 7009/1L	pH 9.18 buffer solution, 1 L
HI 7010/1L	pH 10.01 buffer solution, 1 L
HI 7020L	200-275 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL

ACCESSORIES

HI 504900	GSM module
HI 504901	GSM supervisor
HI 504902	RS485 modem (PSTN)
HI 504910	Digital transmitter
HI 92500	Windows® compatible software

HI 10,000 Series

Fertigation Systems

Irrigation, Fertilization, pH and EC Control

HI 10,000 Series Overview



HANNA instruments

With Great Products, Come Great Results™

HI 720

Conductivity Process Digital Controller

with Inductive Probe



HANNA HI 720

- *Measurement and control of conductivity or concentration*
- *Concentration can be measured as TDS (fixed ratio) or through custom conductivity/temperature concentration curves*
- *Customizing temperature coefficient table and NaCl temperature compensation according to IEC 746-3, in addition to the standard linear compensation*
- *Auto-ranging*
- *Display reading offset adjustment for temperature*
- *Temperature level alarm*
- *Cleaning in place activated through two cleaning commands, or triggered by a variety of events*
- *Hold management, including a digital input to enter the hold mode through an external trigger*
- *Conductivity probe check*
- *Digital transmitter input*
- *Pt100 or Pt1000 temperature sensor with automatic recognition and damage test*
- *Calibration time-out*
- *Logging of the last 100 error, configuration and cleaning events*
- *Alarm configuration can be customized: different errors can lead different actions (alarm relay activation, fault current, hold mode, automatic cleaning, SMS message)*
- *Alarm fault current (3.6 mA or 22 mA)*
- *SMS messages sending*
- *RS485 communication with additional capabilities, such as error log file downloading and cleaning commands*
- *Daily programmable control timing*
- *Diagnostic features*
- *Password protection*

In-Line Cleaning

The cleaning feature allows an automatic cleaning action of the probe. To perform cleaning, the controller activates an external device (pump). Cleaning actions never take place if no relay is configured for cleaning.

Cleaning can be of two types:

- Simple cleaning: with water only, it can be triggered only by a timer (periodical cleaning) or by an error for which a cleaning action can be configured.

- Advanced cleaning (optional): with water and detergent, it can be triggered by the following events:
  - > Timer
  - > Digital input or RS485 command (external trigger)
  - > Timer and digital input or RS485 command (external trigger)
  - > Timer masked by the digital input (i.e. disabled when the digital
  - > input is on)
  - > Error for which a cleaning action can be configured



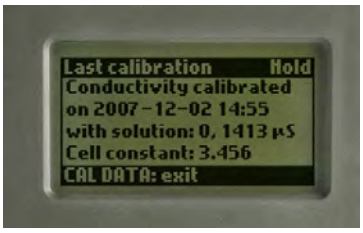
Inductive Probe

HANNA instruments

With Great Products, Come Great Results™

Calibration Mode

The controller is factory calibrated for temperature as well as for the analog outputs. The user should periodically calibrate the instrument for the conductivity range.



Last Calibration Data Viewing Mode

The following data about the last calibration is stored in the EEPROM:

- Date & time of last conductivity calibration
- Calibration point(s)
- Cell constant or installation factor value

Control Mode

The control mode is the normal operational mode for this meter. During control mode HI 720 fulfills the following main tasks:

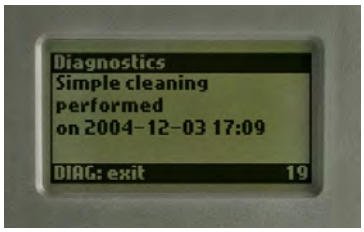
- Convert information from conductivity and temperature inputs to digital values, and show them on the display
- Control relays and generate the analog outputs as determined by the setup configuration
- Display alarm condition
- Perform cleaning actions according to the relay configuration
- Start & stop hold mode according to the programmed control timing
- RS485 management

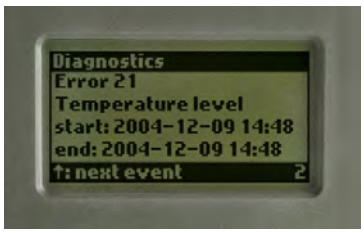
In addition, the meter can log working data. This data includes:

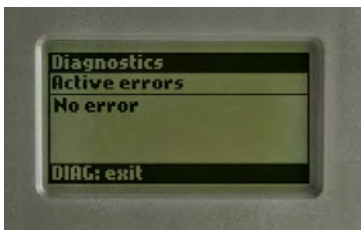
- Conductivity and temperature measured values
- Last calibration data
- Setup configuration
- Event data

Diagnostic Mode

The diagnostic mode allows the user to check if some errors are still active on the controller, or view the event log file.



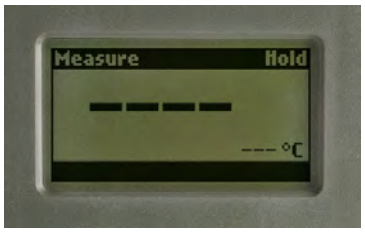




Hold Mode

This function is started by:

- Calibration
- Setup
- Cleaning in place
- Hold digital insulated input (there are two digital insulated inputs: one for hold mode and one for the advanced cleaning) when it is on; normally the signal level is polled at least every 4 seconds
- Proper key combination (CFM and up arrow keys together) for service; the same key combination is used both to start and stop the hold mode (the key combination acts in the same way as the hold digital input)
- Daily programmable control timing
- An error event
- The hold start/stop RS485 command



Communication

For remote interaction with your controller, enter the setup mode, confirm the "Communication" menu, and select the "Connection type" from among 4 options:

- PC
- HI 504900 GSM module
- HI 504901 GSM supervisor
- HI 504902 Modem



PC Communication

Choose the "PC" connection type to communicate with the controller from your PC, through an RS485 network and the HI 92500 Windows® compatible software. RS485 standard is a digital transmission method that allows long lines connections. Its current-loop system makes this standard suitable for data transmission in noisy environments.

Short Messaging Service (SMS)

It is possible to connect the controller to a GSM cellular engine (HI 504900 or HI 504901). This connection enables the instrument to send SMS to one (or two) cellular phone(s) and through this feature the device can be monitored at any moment. Moreover, if an error occurs on the HI 720, it is possible to receive an alarm SMS which immediately advises about the problem.

Modem Connection

A modem connection can be established between HI 720 and a remote computer over telephone line. Two different types of remote connection are possible:

- Over the GSM network, connecting the HI 504900 cellular module to the RS485 port of HI 720.

Note A SIM card able to receive data calls must be used.

- Over a standard analog telephone line, connecting the HI 504902 modem module to the HI 720 RS485 port.

HI 720

Conductivity Process Digital Controller

with Inductive Probe

Theory of Operation

This instrument allows conductivity measurements without any electrical contact between electrodes and process fluid. The measurement is based on inductive coupling of two toroidal transformers by the liquid.

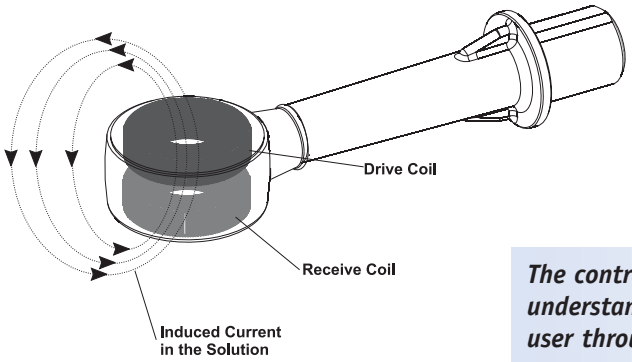
The instrument supplies a high frequency, reference voltage to the "Drive Coil", and a strong magnetic field is generated in the toroid.

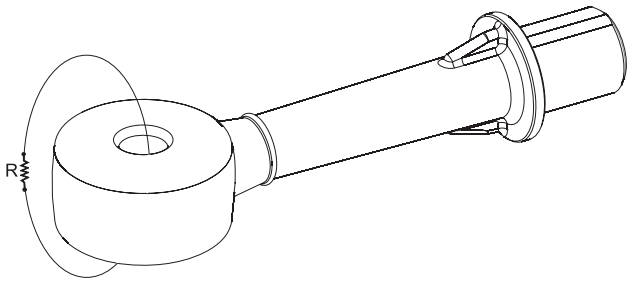
The liquid passes through the hole in the toroid and can be considered as one turn secondary winding. The magnetic field induces a voltage in this liquid winding, the current induced in the flow is proportional to this voltage, and the conductance of the liquid one-turn winding is in accordance to Ohm's law.

The conductance is proportional to the specific conductivity and a constant factor determined by the sensor geometry and installation.

The liquid also passes through the second toroid and therefore the liquid turn can be considered as a primary winding of the second toroidal transformer. The current in the liquid will create a magnetic field in the second toroid, and the induced current can be measured as an output.

The output current of this "Receive Coil" is therefore proportional to the specific conductivity of process liquid.





For an inductive cell, the cell constant is defined as the measured conductivity, obtained by making a loop through the sensor with a resistor R, multiplied by that R value.

The cell constant depends only on the sensor geometry. However, when the probe is immersed in a liquid, the induced current in the solution is affected by the piping or any other container where the probe is inserted. This effect is negligible when there is an area of at least 3 cm of liquid around the cell.

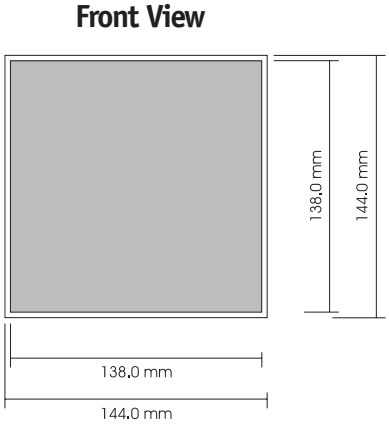
Otherwise, it is necessary to multiply measurements by the installation factor: Conductivity = (cell constant)(installation factor)/(measured resistance). The installation factor is < 1 for conductive piping/containers, and > 1 for nonconductive piping/containers.

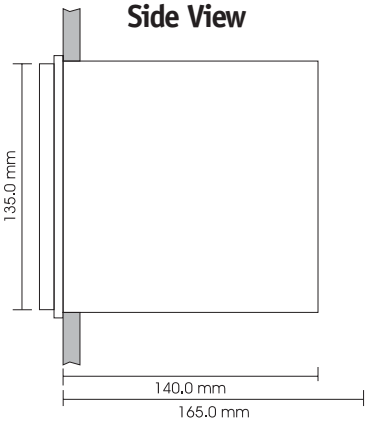
Since this type of sensor has no electrodes, common problems such as polarization and contamination are eliminated and will not affect the performance of the electrodeless sensor.

The controllers are equipped with a graphic display that is understandable and straightforward. Simple messages guide the user through all operations and parameter settings.

Mechanical Dimensions







HANNA instruments

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HI 720

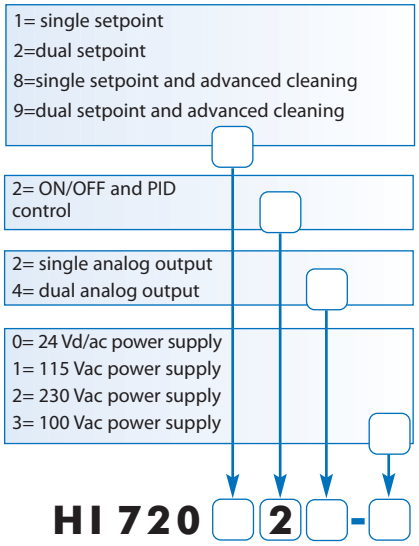
Conductivity Process Digital Controller

with Inductive Probe

SPECIFICATIONS	HI 720
Range	0 to 2000 mS/cm (auto-ranging); -30 to 130°C / -22 to 266°F
Resolution	1 µS/cm (0 to 1999 µS/cm); 0.01 mS/cm (2.00 to 19.99 mS/cm); 0.1 mS/cm (20.0 to 199.9 mS/cm); 1 mS/cm (200 to 2000 mS/cm); 0.1°C / 0.2°F
Accuracy (@20°C/68°F)	±2% f.s. (conductivity) / ±0.5°C / ±1°F
Temperature Compensation	Automatic or manual, -30 to 130°C
Temperature Probe	3-wire or 2-wire Pt100 or Pt1000 sensor with automatic recognition and damage test
Digital Input	Digital Transmitter, Hold & Advanced Cleaning inputs
Digital Output	1 digital insulated contact closed upon Hold mode
Analog Output	1 or 2 independent outputs; 0-22 mA (configuring as 0-20 mA or 4-20 mA)
Digital Serial Output	RS485
Dosing Relay	1, 2, 3 or 4 electromechanical relays SPDT; 5A-250 Vac, 5A-30 Vdc (resistive load); fuse protected: 5A, 250 V fuse
Alarm Relay	1 electromechanical relay SPDT; 5A-250 Vac, 5A-30 Vdc (resistive load); fuse protected: 5A, 250 V fuse
Installation Category	II
Power supply (depending on model)	24 Vdc/ac, or 115 Vac or 230 Vac or 100 Vac ±10%, 50/60 Hz; fuse protected: 400 mA, 250 V fast fuse
Power Consumption	10 VA
Max Oscillation Frequency	8 MHz
Environment	0 to 50°C (32 to 122°F); RH max 85% non-condensing
Enclosure	Single case 1/2 DIN
Weight	Approx. 1.6 kg (3.5 lb.)

ORDERING INFORMATION for HI 720

Each **HI 720** model is supplied complete with mounting brackets and instructions.



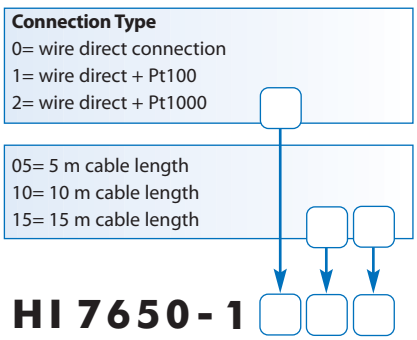
Example:

HI 720124-1

EC controller with single setpoint, ON/OFF and PID control, dual analog output and 115 Vac power supply.



ORDERING INFORMATION for HI 7650



SPECIFICATIONS	HI 7650 Inductive Conductivity Probe
Measuring Range	0 to 2000 mS/cm
Accuracy	±2% f.s.
Cell Constant	approx. 2.4 cm^{-1}
Protection Class	IP67
Temperature Sensor	Pt100 to Pt1000 (depending on model)
Temperature Response	90% of the final value, approx 10 minutes
Required Pipe Diameter	>80 mm (consider installation factor for pipe with diameter < 125 mm)
Dimensions (probe only)	40 x 190 x 55 mm (1.57 x 7.48 x 2.16") ; Head: 32 x OD 55 mm (1.25" x OD 2.16"n)
Weight (probe only)	approx. 330 g (11.64 oz.)

PROBES

HI 7610	Stainless steel Pt100 probe with 5 m (16.5') cable
HI 7611	Glass Pt100 probe with 5 m (16.5') cable
HI 7620	Stainless steel Pt1000 probe with 5 m (16.5') cable
HI 7621	Glass Pt1000 probe with 5 m (16.5') cable

CONDUCTIVITY CALIBRATION SOLUTIONS

HI 7030L	12880 µS/cm, 500 mL
HI 7031L	1413 µS/cm, 500 mL
HI 7034L	80000 µS/cm, 500 mL
HI 7035L	111800 µS/cm, 500 mL
HI 7039L	5000 µS/cm, 500 mL
HI 8039L	5000 µS/cm, 500 mL

PROBE CLEANING SOLUTIONS

HI 7061M	General cleaning solution, 250 mL
HI 7061L	General cleaning solution, 500 mL

ACCESSORIES

HI 504900	Hanna GSM module
HI 504901	Hanna GSM supervisor
HI 504902	Hanna RS485 modem
BL Pumps	Dosing pumps with flow rate from 1.5 to 18.3 LPH
HI 92500	Windows® compatible software
HI 931002	4-20 mA Simulator
HI 98501	ChecktempC temperature tester (range -50 to 150°C)
HI 98502	ChecktempF temperature tester (range -58 to 302°F)

pH 500, mV 600 and HI 700 Series

High Performance pH, ORP, Conductivity and TDS Panel-Mount Digital Controllers



Recalls calibration data to ensure accuracy and compliance with procedures

Displays various parameters and returns to normal operation mode

A 4-digit password protects the setup parameters to prevent tampering

The primary display shows measurements, visible from a distance

The secondary display shows temperature reading or calibration data

LED indicators allow a constant assesment of the operating status of the meter and relay contacts, even from a distance

Simple automatic calibration and temperature compensation with visual prompts

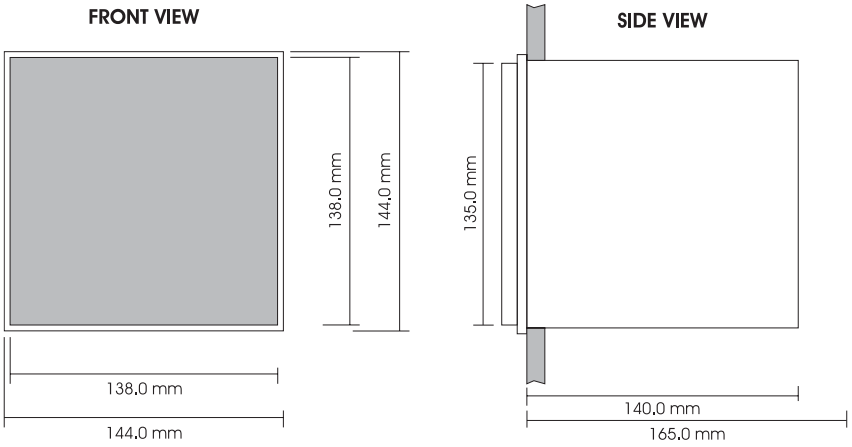
The advanced technology of the internal microprocessor allows fine tuning of process parameters for enhanced efficiency

CFM key confirms set parameter values

Additional Keyboard Functions

- *Two ID numbers to identify a specific process in a particular factory*
- *High and low setpoints can be djusted with 0.01 pH, 1 mV, 0.1 µS and 0.01 ppm resolution*
- *The hysteresis bands in ON/OFF controls can be regulated with 0.01 pH, 1 mV, 0.1 µS and 0.01 ppm resolution*
- *The span in proportional controls can be fine tuned in all measurement ranges*
- *Setting of the reset and rate times for models with PID control*
- *Two independent alarm bands for high and low setpoints to guarantee a timely warning*
- *Choose the max. time the relay contacts may remain closed before the alarm is triggered*
- *Setting of the analog output range (mA or Vdc) and corresponding measurement ranges (pH, mV, EC and TDS)*

Mechanical Dimensions



pH 500, mV 600 and HI 700 Series

High Performance pH, ORP, Conductivity and TDS Panel-Mount Digital Controllers

Industrial Digital Controllers for Demanding Applications

The HANNA line of industrial digital controllers offer a multitude of features such as single and dual setpoints, ON/OFF, proportional and PID control, relay outputs, user-selectable zoom, bidirectional isolated RS232, RS485 port, isolated recorder outputs in mAmps and Volts, and much more.



Simple to Use

The large, dual-level LCD shows both pH (or mV) or EC (or TDS) and temperature and guides operators through calibration and programming with step-by-step prompts. The choice of ON/OFF, proportional and PID control provides extra versatility and makes it possible to pick the process controller that best fits your application. Keeping track of multiple controllers in different plants is made easy. These advanced controllers can be identified with both a factory and a process ID.

Fail-Safe Protection

The Fail-Safe alarms protect processes against critical errors arising from power interruptions, surges and human errors. The sophisticated yet easy-to-use system resolves these problems on two fronts: hardware and software. To eliminate blackout and line failure problems, the alarm function operates in a "Normally Closed" state and goes off if the wires are accidentally tripped, or when the power is down. This is an important feature since with most meters the alarm terminals close in abnormal situations, but no alarm is sounded with a line interruption, causing extensive damage. With our controllers, software is employed to set off the alarm in abnormal circumstances, for example, if the dosing terminals are closed too long. in any case, the alarm message is also displayed on the LCD.

Password Protection

HANNA password protection feature keeps these controllers safe from tampering. Only users with the proper password can change the settings of these hi-tech controllers.

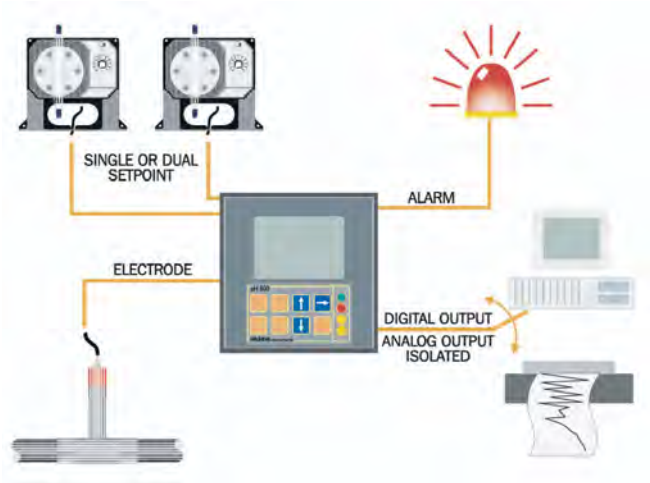
Save Money with Custom Programs

These series of controllers put a host of parameters at your disposal to prevent overdosing or costly system failures. You can set your high and low set point hysteresis bands independently to fine tune dosing processes with the ON/OFF controllers. Similarly, the proportional band and time period are user-programmable to save on slow reacting chemicals, which are commonly overdosed.

Moreover, the pH 502 and mV 602 series includes models with PID (Proportional Integrative Derivative) control. All models offer an adjustable timer from 10 minutes to 7 days as the maximum time that the relay contacts may remain closed. An important feature in case of sudden chemical depletion. In addition, a contact for level control ensures proper functioning of the process.

Galvanically Isolated Outputs with Zoom

Some models incorporate hardware selectable isolated current or voltage output. These can drive auxiliary devices, chart recorders and provide remote monitoring. Users can also zoom on to any 2 points from the full measurement scale. These lines of industrial controllers include models that provide control through analog output. Now any compatible device such as electrovalves or pumps may be driven with these advanced controllers.



pH 502

pH Digital Controllers

with Matching Pin and PID Control



SPECIFICATIONS	pH 502
Range	0.00 to 14.00 pH; -9.9 to 120°C
Resolution	0.01 pH; 0.1°C
Accuracy (@20°C/68°F)	±0.02 pH; ±0.5°C
Input Impedance	1012 Ohm
pH Calibration	automatic, 1, 2 or 3 point, at pH 4.01, 7.01, 10.01
Temperature Compensation	automatic (with Pt100 probe) or manual from -9.9 to 120°C
Outputs	digital: RS485 bi-directional opto-isolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay	1 or 2 contact outputs SPDT 5A-250 Vac, 5A-30 Vdc (resistive load) or 1 or 2 Solid State Relay (SSR), 1A, 250 Vac (resistive and inductive load)
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	panel cutout:140 x 140 mm, instrument: 144 x 144 x 170 mm
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

Each **pH 502** model is supplied complete with mounting brackets and instructions.

1= single setpoint
2= dual setpoint
3= single setpoint with SSR relay
4= dual setpoint with SSR relay
5= control through analog output

1= ON/OFF control
(only for models with X=1, 2)
2= ON/OFF e& PID controls

1= analog output
(only for models with X=3, 4)
2= RS485 output
(only for models with X=3, 4)
3= analog and RS485 outputs

1= 115 Vac power supply
2= 230 Vac power supply

pH 502 X - -

Example:

pH 502123-2

pH controller with single setpoint, ON/OFF &PID controls, analog & RS485 outputs, and 230 Vac power supply.

Panel-Mount Controller

The pH 502 series of controllers offer many features to increase the level of control available in your plant. These instruments can be configured to utilize P, PI, PID controlling. With this 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 this state-of-the-art controllers.

- *Single or dual setpoint*
- *SSR relay available*
- *Control through analog output*
- *PID control*
- *Fully programmable*
- *Microprocessor memory*
- *mA & VDC recorder output or RS485*
- *Differential input for ground loop protection*
- *Automatic 3 point calibration*
- *Last calibration data*
- *Automatic temperature compensation*
- *Simple wiring with removable terminal modules*

SOLUTIONS

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

ACCESSORIES

HI 8427	pH/ORP electrode simulator
HI 931001	pH/ORP electrode simulator with display

mV 602

ORP Digital Controller

with Matching Pin and PID Control

ORP Panel-Mount Controller

The mV 602 line of microprocessor controllers have 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 electro-valves 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 Solid State Relay has been included to meet the needs of extreme industrial applications.

All models incorporate a differential input so a grounding bar may be attached, extending the life of the electrodes by eliminating ground loop current problems.

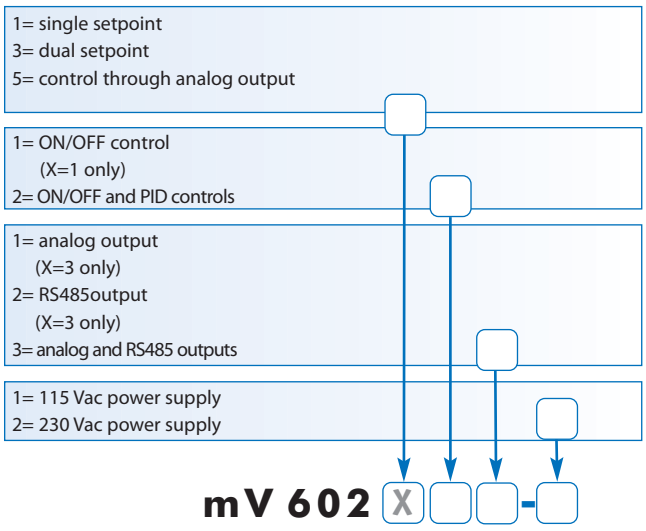
- *Control through analog output (single setpoint)*
- *Fully programmable microprocessor memory*
- *RS485 interface*
- *Differential input for ground loop protection*
- *Automatic 2 point calibration*
- *Last calibration data*
- *Automatic temperature compensation*
- *Simple wiring with removable terminal modules*



SPECIFICATIONS	mV 602
Range	-2000 to 2000 mV; -9.9 to 120°C
Resolution	1 mV; 0.1°C
Accuracy (@20°C/68°F)	±2 mV; ±0.5°C
Input Impedance	1012 Ohm
ORP Calibration	automatic, at 0 and 350 or 1900 mV
Outputs	digital: RS485 bi-directional opto-isolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay	SPDT contact output, 5A-250 Vac, 5A-30 Vdc (resistive load) or Solid State Relay (SSR), 1A, 250 Vac (resistive and inductive load)
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	panel cutout:140 x 140 mm, instrument: 144 x 144 x 170 mm
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

Each **mV 602** model is supplied complete with mounting brackets and instructions.



Example:

mV 602113-1

ORP controller with single setpoint, ON/OFF control, analog and RS485 output and 115 VAC power supply.

SOLUTIONS

HI 7020L	200-275 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL

ACCESSORIES

HI 8427	pH/ORP electrode simulator
HI 931001	pH/ORP electrode simulator with display

pH 500

pH Digital Controllers

with Matching Pin



Panel-Mount Controller

pH 500 series of 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. Several pH 500 models are equipped with a bi-directional RS232 port. Push button password programming prevents tampering. The microprocessor memory is fully programmable and has a 3 month backup power supply.

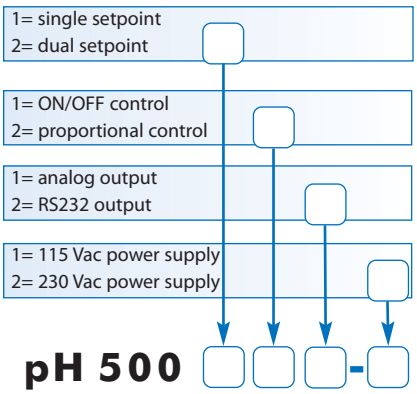
The Fail Safe Alarm system protects the pH 500 against the pitfalls of process control, like power interruption or line failure. With pH 500 quick 1, 2 or 3 point calibration at pH 4.01, 7.01 and 10.01 comes standard. The temperature can be manually or automatically compensated for. Models with RS232 output allow computer compatibility, a necessity for process control instrumentation. You can also choose from ON/OFF or Proportional Dosage to save on chemicals.

- *Single or dual setpoint*
- *Fully programmable*
- *Microprocessor memory*
- *mA & VDC recorder output or RS232*
- *Differential input for ground loop protection*
- *Automatic 3 point calibration*
- *Last calibration data*
- *Automatic temperature compensation*
- *Simple wiring with removable terminal modules*

SPECIFICATIONS	pH 500
Range	0.00 to 14.00 pH; -9.9 to 120°C
Resolution	0.01 pH; 0.1°C
Accuracy (@20°C/68°F)	±0.02 pH; ±0.5°C
Input Impedance	1012 Ohm
pH Calibration	automatic, 1, 2 or 3 point, at pH 4.01, 7.01, 10.01
Temperature Compensation	automatic (with Pt100 probe) or manual from -9.9 to 120°C
Outputs	digital: RS232 bi-directional optoisolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay	1 or 2 contact outputs SPDT 5A-250 Vac, 5A-30 Vdc (resistive load)
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	panel cutout:140 x 140 mm, instrument: 144 x 144 x 170 mm
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

Each **pH 500** model is supplied complete with mounting brackets and instructions.



Example:

pH 500221-2

pH controller with dual setpoint, proportional control, analog output and 230 Vac power supply.

SOLUTIONS

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

ACCESSORIES

HI 8427	pH/ORP electrode simulator
HI 931001	pH/ORP electrode simulator with display



HI 931001 pH/ORP electrode simulator

HANNA instruments

With Great Products, Come Great Results™

ORP Panel-Mount 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.

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 output. 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.

- *Fully programmable microprocessor memory*
- *mA & VDC recorder output or RS232*
- *Differential input for ground loop protection*
- *Automatic 2 point calibration*
- *Last calibration data*
- *Automatic temperature compensation*
- *Simple wiring with removable terminal modules*



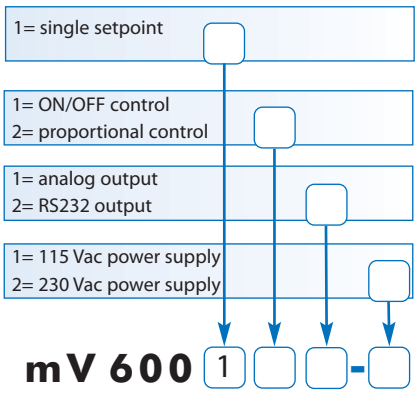
HI 8427 pH/ORP electrode simulator



SPECIFICATIONS	mV 600
Range	-2000 to 2000 mV; -9.9 to 120°C
Resolution	1 mV; 0.1°C
Accuracy (@20°C/68°F)	±2 mV; ±0.5°C
Input Impedance	1012 Ohm
ORP Calibration	automatic, at 0 and 350 or 1900 mV
Outputs	digital: RS232 bi-directional optoisolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay	contact output SPDT 5A-250 Vac, 5A-30 Vdc (resistive load)
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	panel cutout:140 x 140 mm, instrument: 144 x 144 x 170 mm
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

Each **mV 600** model is supplied complete with mounting brackets and instructions.



Example:

mV 600121-2

ORP controller with single setpoint, proportional control, analog output and 230 Vac power supply.

SOLUTIONS

HI 7020L	200-275 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL

ACCESSORIES

HI 8427	pH/ORP electrode simulator
HI 931001	pH/ORP electrode simulator with display

Complete Greenhouse Fertigation Control

HANNA, the world's leader in EC and pH control technology has worked with leading growers to develop advanced system solutions for crops of any type. The HANNA Fertigation System provides precise control of pH and fertilizer injection. Unlike flow driven systems of the past, the HANNA Fertigation System constantly measures the actual EC and pH of the water, allowing the system to add the precise concentration of fertilizer directly to the irrigation supply. The HANNA System is a bypass system which does not limit line flow or pressure. This allows the user to accurately inject fertilizer from 5GPM up to 300 GPM.

The HI 8000 series controller included with the system has 10 programs that allow the user to set various EC and pH values for a variety of plants. Each system allows the injection and mixing of up to 4 fertilizers. If preferred, each fertilizer injector can be set to a specific percent, allowing the user to mix combination fertilizers from basic N - P - K elements, providing a considerable cost savings. The HANNA Fertigation System also controls up to 32 irrigation valves for complete automation of the fertigation process.









Quality and Service

The HANNA systems are above all reliable, durable and require little to no maintenance and each unit is backed by impeccable training and support ...just ask our clients!

HI 700 • HI 710

Conductivity and TDS Digital Controllers

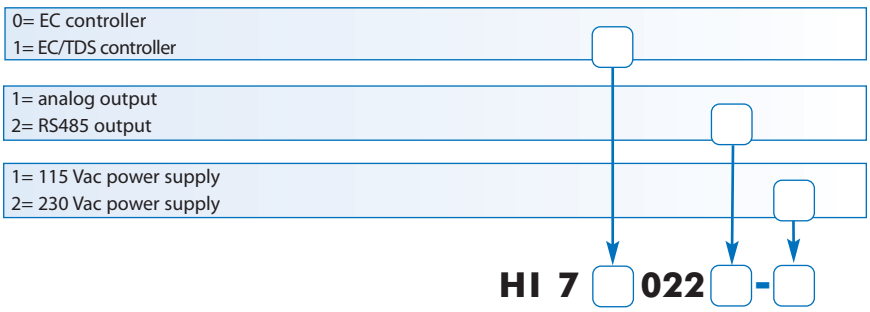
with 4-ring Potentiometric Probe



SPECIFICATIONS		HI 700	HI 710
Range	EC	0.0 to 199.9 µS/cm; 0 to 1999 µS/cm 0.00 to 19.99 mS/cm; 0.0 to 199.9 mS/cm	
	TDS	—	0.0 to 100.0 ppm; 0 to 1000 ppm 0.00 to 10.00 ppt; 0.0 to 100.0 ppt
	Temperature	-10.0 to 100.0°C	
Resolution		0.1 µS; 1 µS; 0.01 mS; 0.1 mS; 0.1 °C	
		—	0.1 ppm; 1 ppm; 0.01 ppt; 0.1 ppt
Accuracy (@20°C/68°F)		±0.5% F.S. (EC / TDS); ±0.5°C (0 to 70°C); ±1°C (outside)	
EC Calibration		automatic or manual at 1 point	
Temperature Compensation		automatic (with Pt100 probe) or manual from -10 to 100°C with ß = 0.00 to 10.00%/°C	
TDS Conversion Factor		—	adjustable from 0.00 to 1.00
Outputs		analog: isolated 0-1 mA, 0-20 mA and 4-20 mA; 0-5 Vdc, 1-5 Vdc and 0-10 Vdc or digital: RS485 bi-directional opto-isolated	
Analog Input		4-20 mA	
Setpoint Relay		2 contact outputs SPDT 5A-250 Vac, 5A-30 Vdc (resistive load)	
Alarm Relay		contact output SPDT 5A-250 Vac, 5A-30 Vdc (resistive load)	
Power Supply		115 Vac ±10% or 230 Vac ±10%; 50/60 Hz	
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Dimensions		panel cutout:140 x 140 mm, instrument: 144 x 144 x 170 mm	
Weight		1.6 kg (3.5 lb.)	

ORDERING INFORMATION

Each model is provided with dual setpoint, ON/OFF and PID controls and is supplied with mounting brackets and instructions.



EC & TDS Controllers

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 our exclusive technology, they can be customized to best fit your application. Bright LED's show the current status even from a distance. 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.

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 Pt100 temperature sensor. HI 710 monitors and controls both conductivity and TDS.

- *Fully programmable microprocessor memory*
- *Dual setpoints*
- *mA & VDC recorder output*
- *Differential input for ground loop protection*
- *Automatic 1 or 2 point calibration*
- *Last calibration data*
- *Manual or automatic temperature compensation*
- *Extensive range for both conductivity and TDS*

Example:

HI 710221-2

EC/TDS controller with dual setpoint, ON/OFF and PID controls, analog output and 230 Vac power supply.

SOLUTIONS

HI 7030L	12880 µS/cm calibration sol., 500 mL
HI 7031L	1413 µS/cm calibration sol., 500 mL
HI 7033L	84 µS/cm calibration sol., 500 mL
HI 7034L	80000 µS/cm calibration sol.,500 mL

ACCESSORIES

HI 504901	GSM supervisor

HANNA instruments®

With Great Products, Come Great Results™

Analog Process Controllers

for Demanding Process Control Environments



Panel Mounted Controllers

HANNA panel mounted pH, ORP and conductivity controllers are designed to meet your most demanding process control requirements. Our controllers come equipped with a relay operating at a maximum of 2 A (240V). Where a direct electrode input is not suitable, the controller is available with a 4-20 mA input from a transmitter. This feature greatly improves the safety of your instrumentation and plant. Accurate measurements are displayed on a large LCD, enabling the operator to check the controller readings easily. These units have sophisticated, built-in self-diagnostic functions that allow the operator to check whether a malfunction has originated in the instrument itself, or in the outside connection (electrode, transmitter or cables). This saves valuable time and money, particularly in the monitoring of critical processes. In the event of a malfunction, the operator can determine the origin and rectify the situation before any costly errors occur. This Self-Diagnostic Error Prevention System makes the HANNA process meters superior to conventional controllers.

Alarm Feature

HANNA controllers incorporate an alarm warning system. When the measured value of the meter is out of the user-specified range, the alarm is activated. When activated, the alarm contacts close, triggering the mechanism of your choice, whether a buzzer, light or any other electrical connection. The alarm feature is a necessity when the installation is in a remote location and corrective action must be taken immediately in the event of an out-of-range condition.

Recorder Output

The ability to record data from the process you are monitoring greatly enhances process troubleshooting. By simply connecting a recorder to the controller's output terminals (choose between 0 to 20 mA or 4 to 20 mA according to your needs), you are able to acquire a hard copy for demonstrative or analytical purposes.

Low or High Impedance Input and Analog Inputs

HANNA pH and ORP controllers come in two different models to meet all requirements. These models, have a high impedance 10^{12} Ohm direct input from an electrode, ideal for connections with a distance of up to 10 meters (33 feet). However, if the distance is greater than 10 m (33') then a 4 to 20 mA transmitter should be used. The greater the distance between the controller and the sample, the greater the chance you have of line noise causing erroneous readings. Using a transmitter greatly enhances the input signal, thus allowing high accuracy at distances of up to 300 m (1000').

Consent Feature

The consent contact allows you to be sure that the ORP dosing occurs only when the pH value is correct. This assures that the pH is within a specified range before any dosing of oxidizing or reducing agents occurs. This will prevent any overdosing of chemicals, a very important cost-effective feature in many applications, especially in pools, spas and hot tubs.

Quality Construction

The controllers are housed in sturdy aluminum casings with ABS plastic front panels. The mounting brackets that are supplied with the meter, can be installed securely and quickly. When in operation, and with the transparent protective cover installed, the units comply with IP42 standards (see chart in section W for IP codes). The use of this design protects the unit from the conditions associated with industrial environments, ensuring long and trouble-free operation.

LED Indicators

The LEDs on the front panel light up to indicate the correct operational mode. The LEDs also blink at different rates to indicate multiple modes occurring simultaneously. This feature allows the user to evaluate the controller from a distance and clearly read which mode it is in.



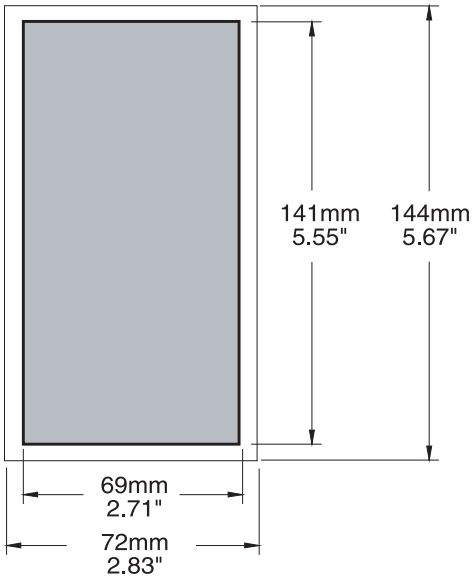
Mechanical Dimensions

for Panel Mounting



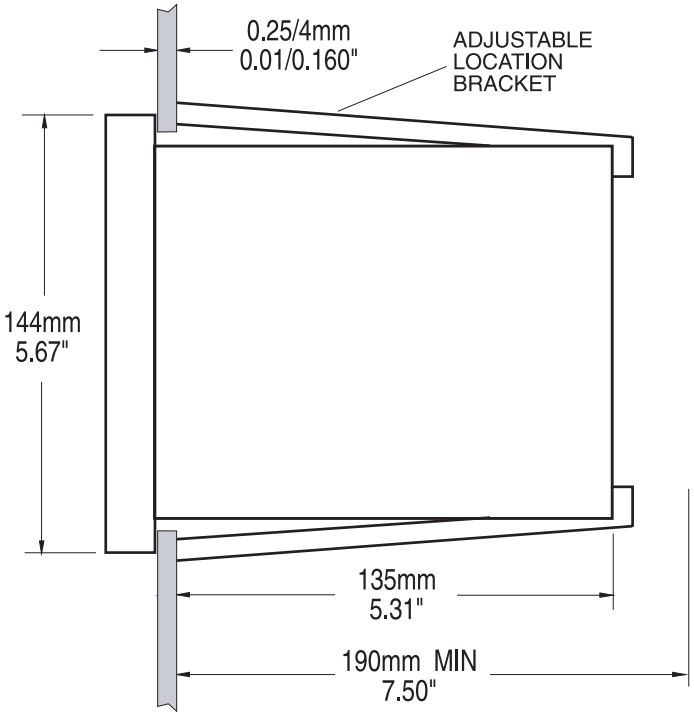
Analog Indicators & Controllers

HI 8510E / HI 8510T / HI 8512E / HI 8512T / HI 8710E / HI 8710T / HI 8711E HI 8711T / HI 8720E / HI 8720T / HI 8931A / HI 8931B / HI 8931C / HI 8931D / HI 943500



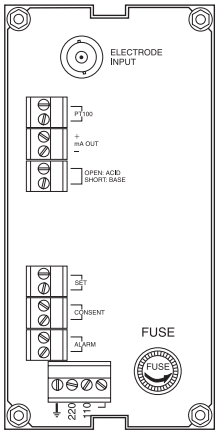
Side View

Adjustable location brackets allow the instrument to slide into the cutout and will hold the unit securely in place. 190 mm (7.50") is the minimum amount of room required to install the indicator with the cables connected.



Front View

Dimensions show the cutout size for installation and also the outside dimensions of the instrument panel.



Rear View

Rear view of the HI 8710E shows the typical electrical connections.

HI 8510

Panel Mounted pH Analog Indicator

with Self-diagnostic Test

Designed for Process Control Monitoring

HI 8510 has been redesigned with extended pH and temperature compensation ranges as well as BNC, amplified probe input and input from transmitter all in one instrument.

These instrumens are ideal for monitoring pH in process control. They can provide accurate pH measurements and display values on the easy-to-read LCD.

Designed for easy and fast installation, the HI 8510 is provided with membrane keypads on the front panel, large display and autodiagnostic functions to check pH electrode and instrument status. These instruments also provide ±5V power output and input terminals for amplified electrodes.

The front panel is protected behind a transparent splash-proof cover.

Inputs allowed:

1) *BNC Connector*
2) *Direct wire connection with amplified probe (supports HI 1006 series probes)*
3) *4-20 mA from a transmitter*

- *Broader pH range: -2.00 to 16.00 pH*
- *Extended temperature compensation range: -20 to 100°C*
- *Supports potential matching pin connection*
- *Both 4-20 and 0-20 mA output*
- *±5V outputs for amplified electrodes*
- *Backlit LCD*
- *Auto-diagnostic tests for pH electrode and instrument status*
- *Operational mode LED indicators*
- *Designed for easy installation*
- *Transparent splash-proof cover included*



SPECIFICATIONS	HI 8510
Range	-2.00 to 16.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.02 pH (0 to 100 °C) ±0.05 pH (-20 to 0 °C) ±0.5% (input transmitter)
Input	High impedance 10^{12} Ohm; Reference and Matching pin inputs are available; 4-20 mA
Power Output	±5 Vcc; 150 mA max load for amplified electrodes
Calibration	Offset: ±2 pH with OFFSET trimmer; Slope: 80 to 110% with SLOPE trimmer
Temperature Compensation	fixed or automatic with Pt100, from -20 to 100°C (-4 to 212°F)
Recorder Output	0-20 mA or 4-20 mA (isolated)
Backlight	Continuous ON
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Enclosure	Black anodized aluminium body; front panel with flame retardant ABS; transparent splash-proof front cover
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Panel Cutout	141 x 69 mm (5.6 x 2.7")
Weight	1 kg (2.2 lb.)

ORDERING INFORMATION

The **HI 8510** is supplied complete with mounting brackets and instructions.

SOLUTIONS

HI 7004/1L pH 4.01 buffer solution, 1 L
HI 7007/1L pH 7.01 buffer solution, 1 L
HI 7010/1L pH 10.01 buffer solution, 1 L

ACCESSORIES

HI 8427 pH / ORP electrode simulator
HI 931001 pH / ORP electrode simulatorwith display HI 8510T only
HI 8614-01 pH transmitter
HI 8614L-01 pH transmitter with display

HI 8710

Panel Mounted pH Analog Controller

with Self-diagnostic Test



Backlit LCD

Auto-diagnostic tests for pH electrode and instrument status

Operational mode LED indicators

Fail Safe function–the alarm relay is activated at power down

Transparent splash-proof cover

Inputs allowed:

1) *BNC Connector*
2) *Direct wire connection with amplified probe (supports HI 1006 series probes)*
3) *4-20 mA from a transmitter*

SPECIFICATIONS	HI 8710
Range	-2.00 to 16.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.02 pH (0 to 100 °C) ±0.05 pH (-20 to 0 °C) ±0.5% (input from transmitter)
Input	High impedance 10^{12} Ohm; Reference and Matching pin inputs are available 4-20 mA
Power Output	±5 Vcc; 150 mA max load for amplified electrodes
Calibration	Offset: ±2 pH with OFFSET trimmer; Slope: 80 to 110% with SLOPE trimmer
Temperature Compensation	fixed or automatic with Pt100, from -20 to 100°C (-4 to 212°F)
Recorder Output	0-20 mA or 4-20 mA (isolated)
Setpoint Relay	1, isolated, 2 A, Max 240 V, resistive load, 1000000 strokes (not fuse protected)
Setpoint Range	-2.00 to 16.00 pH
Alarm Relay	1, isolated, 2 A, Max 240 V, resistive load, 1000000 strokes (not fuse protected)
ΔAlarm Range	0.2 to 3.00 pH
Consent Relay	1, isolated, 2 A, Max 240 V, resistive load, 1000000 strokes (not fuse protected)
Dosing Control	OFF/AUTO/ON with selection switch
Over Dosing Control	Adjustable, from 5 min to 60 min with knob or Disable by wire strap - on rear panel
Backlight	Continuous ON
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Enclosure	Black anodized aluminium body; front panel with flame retardant ABS; transparent splash-proof front cover
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Panel Cutout	141 x 69 mm (5.6 x 2.7")
Weight	1 kg (2.2 lb.)

ORDERING INFORMATION

The **HI 8710** is supplied complete with mounting brackets and instructions.

SOLUTIONS

HI 7004/1L pH 4.01 buffer solution, 1 L
HI 7007/1L pH 7.01 buffer solution, 1 L
HI 7010/1L pH 10.01 buffer solution, 1 L

ACCESSORIES

HI 8427 pH / ORP electrode simulator
HI 931001 pH / ORP electrode simulator with display

ACCESSORIES

HI 8614-01 pH transmitter
HI 8614L-01 pH transmitter with display

Reliable pH Control

The HI 8710 is a panel mounted pH Controller with self diagnostic and test. The user can set: the setpoint for acid or alkaline dosage, the tolerance of the setpoint before an Alarm is activated, the Dosage mode: Automatic, Continuous On or OFF and the Over dosage control by setting the Overtime dosage knob

When used in conjunction with the HI 8720 ORP controller, the ODCD* function will ensure that the ORP dosage will start only when the pH level is correct.

The controller is also provided with a unique self-diagnostic test to check the pH electrode and instrument status.

"Over time dosage" function with selection knob and jumper for disable on the rear panel. If the dosing relay remains continuously activated for more than selected dosing time the alarm relay is activated, the alarm LED is blinking and the dosing relay is deactivated.

"Automatic/OFF/Manual" dosing selection switch and LED on the front panel.

In Automatic mode all the relays are controlled based on the measurement set point and alarm values. In OFF mode the dosing and alarm relays are always deactivated. The dosing LED is OFF (as relay status) and the ALARM LED is in accordance with the instrument setpoint, input reading and ΔALARM.

In ON (Manual) mode the dosing relay is always ON, the alarm relay is still enabled. If an alarm occurs the dosing relay is not deactivated. If the over dosage time expires during Manual mode, the alarm relay remains activated

The front panel is protected behind a transparent splash-proof cover.

* ORP Dosing Consent Device

- *Broader pH range*
- *Extended temperature compensation range: -0 to 100°C*
- *Supports potential matching pin connection*
- *Both 4-20 and 0-20 mA output*
- *±5V outputs for amplified electrodes*

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HI 8711

Panel Mounted pH Analog Controller

with Dual Output and Self-diagnostic Test

Dual Output Versatility

This instrument allow the selection of two setpoints with two independent outputs for acid and alkaline dosages.

HI 8711 pH controllers are ideal for process control monitoring in a wide range of industrial applications.

These instruments have been edesigned with extended pH and temperature compensation ranges as well as BNC, amplified input and input from transmitter all in one instrument.

Each model accepts either a direct input from a pH or ORP electrode or from a transmitter through 4-20 mA input. The instrument also provides ±5V power output and input terminals for amplified electrodes.

Moreover, you can choose the output configuration for connecting a recorder or a PLC, between 0-20 or 4-20 mA.

The HI 8711 incorporates adjustable overtime dosing protection from 5 to 60 minutes. If dosing exceeds selected time, the alarm will be triggered and the dosing contact will deactivate. This feature can be activated or deactivated via a shorting connection on the rear panel.

The front panel is protected behind a transparent splash-proof cover.

- *Dual setpoint with two independent dosing outputs*
- *Broader pH range: -2.00 to 16.00 pH*
- *Extended temperature compensation range: -0 to 100°C*
- *Supports potential matching pin connection*
- *Both 4-20 and 0-20 mA output*
- *±5V outputs for amplified electrodes*
- *Fail Safe function–the alarm relay is activated at power down*
- *Operational mode LED indicators*
- *Backlit LCD*
- *Transparent splash-proof cover included*



Auto-diagnostics to verify offset and slope calibration and electrode contamination/deterioration

Selectable manual ON, OFF and Automatic Dosing Control for alkaline, acid and REDOX dosing with indicator

Inputs allowed:

1) *BNC Connector*
2) *Direct wire connection with amplified probe (supports HI 1006 series probes)*
3) *4-20 mA from a transmitter*

SPECIFICATIONS	HI 8711
Range	-2.00 to 16.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.02 pH (0 to 100 °C) ±0.05 pH (-20 to 0 °C) ±0.5% (input from transmitter)
Input	High impedance 10^{12} Ohm; Reference and Matching pin inputs are available; 4-20 mA
Power Output	±5 Vcc; 150 mA max load for amplified electrodes
Calibration	Offset: ±2 pH with OFFSET trimmer; Slope: 80 to 110% with SLOPE trimmer
Temperature Compensation	fixed or automatic with Pt100, from -20 to 100°C (-4 to 212°F)
Recorder Output	0-20 mA or 4-20 mA (isolated)
Setpoint Relay	2, isolated, 2 A, Max 240 V, resistive load, 1000000 strokes (not fuse protected)
Setpoint Range	ALK. SET: from -2.00 to 16.00 pH; ACID SET: from -2.00 to 16.00 pH
Alarm Relay	1, isolated, 2 A, Max 240 V, resistive load, 1000000 strokes (not fuse protected)
ΔAlarm Range	0.2 to 3.00 pH
Dosing Control	OFF/AUTO/ON with selection switch
Over Dosing Control	Adjustable, from 5 min to 60 min with knob or Disable by wire strap - on rear panel
Backlight	Continuous ON
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Enclosure	Black anodized aluminium body; front panel with flame retardant ABS; transparent splash-proof front cover
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Panel Cutout	141 x 69 mm (5.6 x 2.7")
Weight	1 kg (2.2 lb.)

ORDERING INFORMATION

The **HI 8711** is supplied complete with mounting brackets and instructions.

Solutions

HI 7004/1L	pH 4.01 buffer solution, 1 L
HI 7007/1L	pH 7.01 buffer solution, 1 L
HI 7010/1L	pH 10.01 buffer solution, 1 L

ACCESSORIES

HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulator with display

ACCESSORIES

HI 8614-01	pH transmitter
HI 8614L-01	pH transmitter with display

HI 8512

Panel Mounted ORP Analog Indicator

with Self-diagnostic Test



±1999 mV Range

HI 8512 ORP panel-mounted controllers are ideal for process control monitoring in a wide range of industrial applications.

These instruments have been designed for easy and fast installation, and are provided with membrane keypads on the front panel, large display and autodiagnostic functions.

Each model accepts either a direct input from an ORP electrode or from a transmitter through 4-20 mA input. The instrument also provides ±5V power output and input terminals for amplified electrodes.

Moreover, you can choose the output configuration for connecting a recorder or a PLC, between 0-20 or 4-20 mA.

The front panel is protected behind a transparent splash-proof cover.

Inputs allowed:

1) BNC Connector

2) Direct wire connection with amplified probe (supports HI 1006 series probes)

3) 4-20 mA from a transmitter

- *ORP range extension: ± 1999 mV*
- *BNC, amplified input and input from transmitter all in one instrument*
- *Supports potential matching pin connection*
- *Recorder output 0-20mA or 4-20mA user selectable*
- *±5V outputs for amplified electrodes*
- *Backlit LCD*
- *Auto-diagnostic tests for electrode and instrument status*
- *Operational mode LED indicators*
- *Designed for easy installation*
- *Transparent splash-proof cover included*

SPECIFICATIONS	HI 8512
Range	±1999 mV
Resolution	1 mV
Accuracy (@20°C/68°F)	±5 mV ±0.5% (input form transmitter)
Input	High impedance 10^{12} Ohm; Reference and Matching pin inputs are available; 4-20 mA
Power Output	±5 Vcc; 150 mA max load for amplified electrodes
Calibration	Offset: ±200 mV with CAL trimmer
Recorder Output	0-20 mA or 4-20 mA (isolated)
Backlight	Continuous ON
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Enclosure	black anodized aluminum body; front panel with flame retardant ABS; transparent splash-proof front cover
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Panel Cutout	141 x 69 mm (5.6 x 2.7")
Weight	1 kg (2.2 lb.)

ORDERING INFORMATION

The **HI 8512** is supplied complete with mounting brackets and instructions.

SOLUTIONS

HI 7020L	200-275 mV test solution, 500 mL bottle
HI 7091L	Reducing solution, 500 mL bottle
HI 7092L	Oxidizing solution, 500 mL bottle

ACCESSORIES

HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulator with display HI 8512T only
HI 8615-01	ORP transmitter
HI 8615L-01	ORP transmitter with display

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HI 8720

Panel Mounted ORP Analog Controller

with Self-diagnostic Test

ORP Controller

This instrument allows the selection of a setpoint for oxidizing or reducing dosage. It is provided with self-diagnostic feature to control the calibration at 0 and 500 mV. The user can also set the tolerance of the setpoint (10 to 200 mV), before an alarm is activated.

When used in conjunction with the HI 8710 pH controller, the ODCD* function (featured by the HI 8710) will ensure that the ORP dosage will start only when the pH level is correct.

These instruments have been designed for easy and fast installation, and are provided with membrane keypads on the front panel, large display and autodiagnostic functions.

All connections are made through screw terminals on the rear panel.

Each model accepts either a direct input from an ORP electrode or from a transmitter through 4-20 mA input. The instrument also provides ±5V power output and input terminals for amplified electrodes.

The HI 8720 incorporates adjustable overtime dosing protection from 5 to 60 minutes. If dosing exceeds selected time, the alarm will be triggered and the dosing contact will deactivate. This feature can be activated or deactivated via a shorting connection on the rear panel.

Moreover, you can choose the output configuration for connecting a recorder or a PLC, between 0-20 or 4-20 mA.

The front panel is protected behind a transparent splash-proof cover.

* ORP Dosing Consent Device

- *Supports potential matching pin connection*
- *Both 4-20 and 0-20 mA output*
- *±5V outputs for amplified electrodes*
- *Backlit LCD*
- *Transparent splash-proof cover included*



Selectable manual ON, OFF and Automatic Dosing Control for alkaline, acid and REDOX dosing with indicator

Auto-diagnostic test for instrument status troubleshooting

Operational mode LED indicators

Inputs allowed:

1) *BNC Connector*
2) *Direct wire connection with amplified probe (supports HI 1006 series probes)*
3) *4-20 mA from a transmitter*

SPECIFICATIONS	HI 8720
Range	±1999 mV
Resolution	1 mV
Accuracy (@20°C/68°F)	±5 mV ±0.5% (input from transmitter)
Input	High impedance 10^{12} Ohm; Reference and Matching Pin inputs are available; 4-20 mA
Power Output	±5 Vcc; 150 mA max load for amplified electrodes
Calibration	Offset: ±200 mV with CAL trimmer;
Recorder Output	0-20 mA or 4-20 mA (isolated)
Setpoint Relay	1, isolated, 2 A, Max 240 V, resistive load, 1000000 strokes (not fuse protected)
Setpoint Range	±1999 mV
Alarm Relay	1, isolated, 2 A, Max 240 V, resistive load, 1000000 strokes (not fuse protected)
ΔAlarm Range	10 to 300 mV
Dosing Control	OFF/AUTO/ON with selection switch
Over Dosing Control	Adjustable, from 5 min to 60 min with knob or Disable by wire strap - on rear panel
Backlight	Continuous ON
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Enclosure	Black anodized aluminium body; front panel with flame retardant ABS; transparent splash-proof front cover
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Panel Cutout	141 x 69 mm (5.6 x 2.7")
Weight	1 kg (2.2 lb.)

ORDERING INFORMATION

The **HI 8720** is supplied complete with mounting brackets and instructions.

SOLUTIONS

HI 7020L	200-275 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL

ACCESSORIES

HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulatorwith display HI 8720T only
HI 8615-01	ORP transmitter
HI 8615L-01	ORP transmitter with display

HI 8931A • HI 8931B • HI 8931C • HI 8931D

Conductivity Analog Controller

with Input from Probe or Transmitter



Using HI 8931 series in conjunction with our HI 8936 transmitters assures strong, interference-free signals up to 1000'

4 Models to Choose From

HI 8931 is a panel-mounted conductivity controller designed for simplicity of use in a wide range of industrial process applications.

The instruments are designed with a standard DIN panel mount with membrane keypads and large LCD with backlight on the front, and provide a series of auto-diagnostic functions.

Probes, power supply, contacts and recorders are connected on the rear panel through screw terminals.

Using HI 8931 in conjunction with a 4-20 mA output transmitter (HI 8936 or HI 8936L series) will assure you of a strong, interference free signal at distances up to 300 meters (1000').

For in-line applications use the HI 7635 probe, while for tanks the HI 7638 with external threads is recommended. These probes are provided with a built-in NTC sensor for temperature compensated conductivity measurements. The probe cable length is 3 meters (10').

HI 8931 also features a direct connection up to 20 m (67'), without intermediate amplifiers to the conductivity probe. HI 7638 conductivity probe features a DIN connector and automatic temperature compensation.

- *Both electrode and transmitter compatible*
- *Selectable manual ON, OFF and Automatic Dosing Control with indicator*
- *Built-in auto-diagnostic function for offset and slope*
- *Both 4-20 and 0-20 mA output user selectable, all in one instrument*
- *Backlit LCD*
- *Operational mode LED indicators*
- *Transparent splash-proof cover included*

SPECIFICATIONS	HI 8931A	HI 8931B	HI 8931C	HI 8931D
Range	0.0 to 199.9 mS/cm	0.00 to 19.99 mS/cm	0 to 1999 µS/cm	0.0 to 199.9 µS/cm
Resolution	0.1 mS/cm	0.01 mS/cm	1 µS/cm	0.1 µS/cm
Accuracy (@20°C/68°F)	±2% F.S. (excluding probe error)			
Input from Transmitter	HI 8936A / AL	HI 8936B / BL	HI 8936C / CL	HI 8936D / DL
Temperature Compensation	Automatic, 0 to 60°C with β=2%/°C; See also transmitter HI 8936			
Inputs	DIN (probe) or 4-20 mA (transmitter)			
Conductivity Probe	HI 7635 for in-line applications or HI 7638 for tank (not included)			
Calibration	Manual, 2 point, through offset and slope trimmers			
Recorder Output	0 to 20 mA or 4 to 20 mA (isolated)			
Setpoint and Alarm Relay	1, Isolated, 2A, Max. 240V, resistive load, 1,000,000 strokes			
Set point Range	0.0 to 199.9 mS/cm	0.00 to 19.99 mS/cm	0 to 1999 µS/cm	0.0 to 199.9 µS/cm
Alarm Range	0.0 mS and 100.0 mS	0.00 mS and 10.00 mS	0 µS and 1000 µS	0.0 µS and 100.0 µS
Dosing Control	OFF/AUTO/ON with selection switch			
Over Dosing Control	Adjustable, from 5 min to 60 min with knob or Disable by wire strap - on rear panel			
Backlight	Continuous ON			
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz			
Enclosure	Black anodized aluminum body; front panel with flame retardant ABS; transparent splash-proof front cover			
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing			
Panel Cutout	141 x 69 mm (5.6 x 2.7")			
Weight	1 kg (2.2 lbs.)			

ORDERING INFORMATION

The **HI 8931** series is supplied complete with mounting brackets and instructions.

SOLUTIONS

HI 7033L	84 µS/cm cal. solution, 500 mL
HI 7031L	1413 µS/cm cal. solution, 500 mL
HI 7030L	12880 µS/cm cal. solution, 500 mL
HI 7034L	80000 µS/cm cal. solution, 500 mL
HI 7035L	111800 µS/cm cal. solution, 500 mL
HI 7039L	5000 µS/cm cal. solution, 500 mL

PROBES

HI 3001D	Conductivity probe for in-line or submersion mounting

Other probes available upon request

ACCESSORIES

HI 731326	Calibration screwdrivers (20 pcs)
HI 779/P	6-wire cable (100 m/330' roll)
HI 8733	Portable conductivity meter with ATC



HI 731326

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HI 943500

Conductivity Analog Controller

with Direct Input from Potentiometric Probe

4 Models to Choose From

These controllers allow direct connection of a potentiometric conductivity probe (HI 7638) with a cable up to 20 meters long, without using any transmitter.

Four different models are available with different measurement ranges, to satisfy any application requirements.

The output configuration for connecting a recorder or a PLC can be chosen between 0-20 or 4-20 mA.

The LED on the front panel indicates the operating status of the controller.

The automatic temperature compensation (ATC) is performed directly by the HI 7638 probe with built-in temperature sensor.

The front panel is protected behind a transparent splash-proof cover.

- *Direct connection of up to 66' without the need for intermediate amplifiers to the HI 7638 probe*
- *Automatic diagnostic controls*
- *Available in four models, each with a different measurement range*
- *Operational mode LED indicators*
- *Automatic temperature compensation with HI 7638 potentiometric conductivity probe*
- *Transparent splash-proof cover included*



SPECIFICATIONS	HI 943500A	HI 943500B	HI 943500C	HI 943500D
Range	0.0 to 199.9 mS/cm	0.00 to 19.99 mS/cm	0 to 1999 µS/cm	0.0 to 199.9 µS/cm
Resolution	0.1 mS/cm	0.01 mS/cm	1 µS/cm	0.1 µS/cm
Accuracy (@20°C/68°F)	±2% F.S.			
Temperature Compensation	automatic, 0 to 60°C (32 to 140°F), with b=2%/°C			
Recorder Output	4-20 mA (isolated)			
Setpoint Relay	1, isolated, 2A, Max. 240 V, resistive load, 1,000,000 strokes			
Alarm Relay	1, isolated, 2A, Max. 240 V, resistive load, 1,000,000 strokes			
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz			
Enclosure	black anodized aluminum body; front panel with flame retardant ABS; transparent splash-proof front cover			
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing			
Panel Cutout	141 x 69 mm (5.6 x 2.7")			
Weight	1 kg (2.2 lb.)			

ORDERING INFORMATION

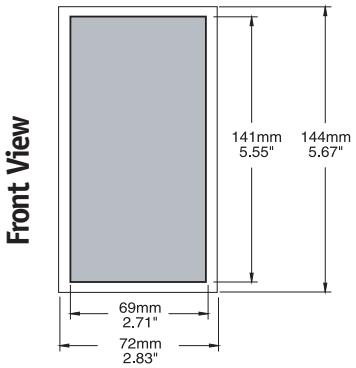
The **HI 943500** series is supplied complete with mounting brackets and instructions.

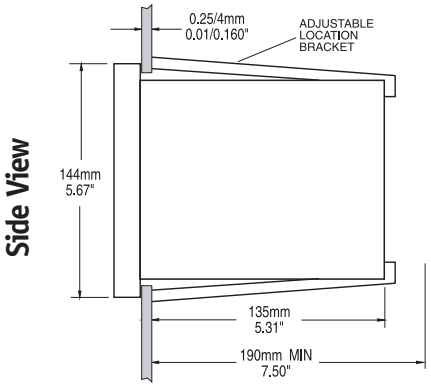
PROBES

HI 7638	Conductivity probe for immersion
HI 3001	Conductivity probe for in-line or submersion mounting
HI 3002	Conductivity probe for submersion mounting

SOLUTIONS

HI 7033L	84 µS/cm solution, 500 mL
HI 7031L	1413 µS/cm solution, 500 mL
HI 7030L	12880 µS/cm solution, 500 mL
HI 7034L	80000 µS/cm solution, 500 mL





Front View

Dimensions show the cutout size for installation and also the outside dimensions of the instrument panel.

Side View

Adjustable location brackets allow the instrument to slide into the cutout and will hold the unit securely in place. 190 mm (7.50") is the minimum amount of room required to install the indicator with the cables connected.

HI 10,000 Series

Fertigation Systems

Irrigation, Fertilization, pH and EC Control



Pro's Choice

HANNA's Fertigation and pH Control Systems can be found in a number of notable greenhouses throughout the USA: Van Wingerden Greenhouses NJ, Gro-Rite NJ, Van Vugt NJ, Michael's Greenhouse CT. Additional installations include such greenhouse leaders such as OVW Greenhouse NJ, and De Groot Greenhouse NJ, Van Wingerden Greenhouses WA.

"We replaced our manual injectors with the HANNA system and are now adding supplemental fertilizers to optimize the nutrients to the plants.

The result is healthier plants and longer shelf life when delivered to our customers".

MARK KELLY
GROWER
Grower Direct Farms
CT USA

"Best mums ever since integrating the HANNA system".

MIKE VANDEVREDE
GROWER
Gro Rite
Lincoln Park, NJ USA

Powerful Features

- ***Precise control*** *via continuous EC and pH monitoring*
- ***8 to 300 GPM*** *flow rate range*
- ***65 to 75 PSI*** *operating range*
- ***Bypass system*** *— unit does not interfere with main line flow*
- ***3 fertilizer injectors*** *and 1 minor or (mild) acid*
- ***Make your own combination fertilizer*** *— Each fertilizer can be set to a specific percent. Ex: Injector #1 (N = 20%), Injector #2 (P = 10%), Injector #3 (K = 20%)*
- ***10 programs*** *for various EC and pH set-points and fertilizer percentages*
- ***Save money*** *on fertilizer usage*
- ***Optimize*** *the nutrients to your plants*
- ***Control over 32 valves*** *— Valves can be controlled sequentially, or x 2, x 3 ...up to x 8 at once*
- ***Programs can be triggered*** *by time, external switching, and/or flow*
- ***Flow activated*** *to allow for spot watering — timer adjustable*
- ***Control agitators*** *and filter cleaning*
- ***Alarm Control*** *and Redundant Monitoring*
- ***GSM compatible*** *for remote monitoring and control from PC*

HI 8410

Panel Mounted Dissolved Oxygen Controller

with Extended Range and Analog Output



SPECIFICATIONS	HI 8410
Range	0.0 to 50.0 mg/L (ppm) O_2 0 to 600 % O_2 -5.0 to 50.0 °C
Resolution	0.1 mg/L or 1% (O_2) / 0.1 °C
Accuracy (@20°C/68°F)	±1% of reading (O_2) / ±0.2 °C
Input	High impedance 10^{12} Ohm; Reference and Matching pin inputs are available; 4-20 mA
Calibration	Manual, one point, in saturated air
Temperature Compensation	Automatic, from -5 to 50°C (23 to 122 °F)
Salinity Compensation	0 to 51 g/L (resolution 1 g/L)
Probe (not included)	HI 76409/4 with 4 m cable or HI 76409/10 with 10 m cable
Recorder Output	0 to 20 mA or 4 to 20 mA (isolated)
Setpoint and Alarm Relay	1, Isolated, 2A, Max. 240V, resistive load, 1,000,000 strokes
Setpoint Range	1 to 600 % O_2; 0.1to 50.0 mg/L (ppm) O_2
Alarm Range	1.0 to 5.0 mg/L (ppm) O_2
Hysteresis Range	0.1 to 1.0 mg/L (ppm) O_2
Dosing Control	OFF/AUTO/ON with selection switch
Over Dosing Control	Adjustable, from 5 min to 60 min with knob or Disable by wire strap - on rear panel
Backlight	Continuous ON
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz
Enclosure	black anodized aluminum body; front panel with flame retardant ABS; transparent splash-proof front cover
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Panel Cutout	141 x 69 mm (5.6 x 2.7")
Weight	1 kg (2.2 lb.)

ORDERING INFORMATION

The **HI 8410** is supplied complete with mounting brackets and instructions.

Reliable DO Control

The HI 8410 is an extended range panel mounted Dissolved Oxygen (DO) controller that is used to maintain and monitor the concentration of DO in a wide range of applications from wastewater treatment to aquaculture. The HI 8410 uses a Galvanic probe and typically requires less maintenance than a Polarographic style making it ideal for long term monitoring of aeration basins, ponds, and lakes. The set point for controlling the activation of a relay is adjusted manually by the user. An alarm relay is also manually adjustable and is based upon a tolerance from the programmed set point. Calibration is single set point and can be done in zero oxygen solution.

The dosage mode: Automatic, Continuous ON or OFF and over dosage control by setting the Overtime dosage trimmer. If the dosing relay remains continuously activated for more than the selected dosing time, the alarm relay is activated, the alarm LED will start blinking and the dosing relay will be deactivated. A jumper found on the rear panel can disable the "Over time dosage" function.

"Automatic/Off/Manual" dosing selection switch and LED on the front panel.

In Automatic mode all the relays are controlled based on the measurement set point and alarm values. In OFF mode the dosing and alarm relays are always deactivated. The dosing LED is OFF (as relay status) and the ALARM LED is in accordance with the instrument setpoint, input reading, and ΔALARM.

In ON (Manual) mode the dosing relay is always on. The alarm relay is still enabled. If an alarm occurs the dosing relay remains activated. If the over dosage time exceeds the setting during manual mode, the alarm relay remains activated.

The front panel is protected behind a transparent splash-proof cover.

- *Extended DO range to 50 mg/L (ppm)*
- *Manual single point calibration*
- *Selectable 0-20 or 4-20 mA output*
- *Low maintenance Galvanic probe*
- *Backlit LCD*
- *Operational mode LED indicators*

HANNA instruments
With Great Products, Come Great Results™

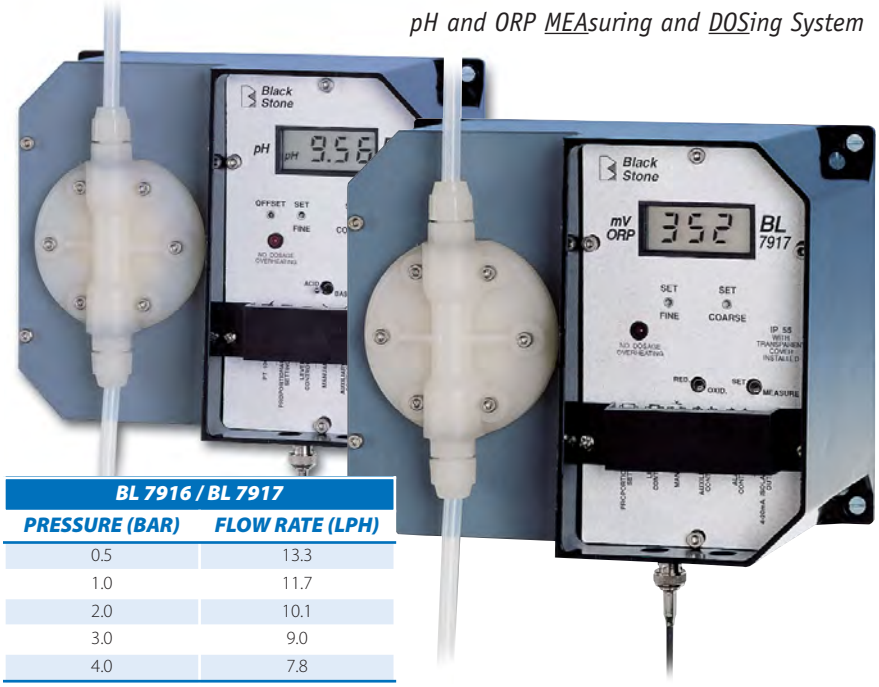
Black Stone by HANNA

MEADOS

pH and ORP MEAsuring and DOSing System

Two Advanced Instruments in One

MEADOS pumps combine the powerful Blackstone dosing pumps with the state-of-the-art controllers that HANNA is famous for. These unique products were developed by our Blackstone division for measuring and controlling pH or ORP. This latest innovation eliminates the need for multiple units by combining a pH controller and chemical feed pump into one. No more complicated installations, wiring, and compatibility problems. This compact unit features accurate regulation, proportional dosing, alarm and recorder signals and much more all in one meter.



BL 7916 / BL 7917	
PRESSURE (BAR)	**FLOW RATE (LPH)**
0.5	13.3
1.0	11.7
2.0	10.1
3.0	9.0
4.0	7.8

Easy Installation

Designed with mounting holes in the rugged base, Blackstone pump/controllers are simple to install. They use a standard pH probe with a BNC connector and there is no need for any additional hardware. All of the controls and pump assemblies are conveniently located on the front of the unit. If the operator must access the pump head or control panel for any reason, there is no need to uninstall the unit.

Rugged Construction

Blackstone pump/controllers are housed in rugged, fiber-reinforced polypropylene casings. They are IP55 rated, preventing ingress of liquids. The material used for the housing resists corrosion caused by most chemicals, protecting the unit from hazardous spills and splashes.

Superior Materials

Blackstone pumps use PVDF, FPM/FKM and PTFE materials for all components in contact with the chemicals being dosed. These materials have properties which enable them to resist even the most corrosive chemicals in the industry. Blackstone's choice of material makes the pump more versatile, allowing it to handle a wider variety of reagents. The chemical resistance chart on page T1.56 shows how well PVDF, FPM/FKM and PTFE resist the harmful effects of different products.

Simple Pump Action

A positive displacement solenoid with few moving parts makes Blackstone pumps more reliable than motor driven pumps. With no rotating parts, gears or cams, part wear and oiling associated with motor driven pumps is eliminated, drastically reducing any chance of mechanical failure.

Proportional Dosing

The Blackstone controller/pump strokes at full capacity when the measured value deviates by more than 1.5 pH or 150 mV from the set value. A proportional control slows down the stroke rate as the measured value approaches the user-selectable setpoints, avoiding overdosage of chemicals. This feature makes the pump's dosing more accurate, saves chemicals and eliminates unnecessary and costly corrections to your process, especially with slow reacting chemicals.

Isolated Recorder Output

To enhance troubleshooting and provide the user with the ability to record data while monitoring, the Blackstone controller/pumps provide a recorder output. By simply attaching a recording device to the instrument's 4 to 20 mA output contacts, conveniently located on the front panel, you can obtain a hard copy of the results on demand.

Alarm Output

When monitoring and controlling pH and ORP levels in a process, it is very important that any potential problem does not go unattended. The HANNA MEADOS units incorporate an alarm system that will alert the user if the reaction is not within certain guidelines. The alarm of the BL 7916 will be activated if the measured pH value is 2 pH units lower than the set point (if dosing acid, this indicates overdosage, a common symptom of siphoning). The alarm will also activate if the value is 2 pH higher than the set point (if dosing acid, this is an indication of insufficient dosage, a common symptom of the lack of chemicals). The BL 7917's alarm will activate if the mV value is 200 mV lower than the set point (if dosing reducing chemicals, this indicates overdosage). The alarm will also activate if the value is 200 mV higher than the set point (if dosing reducing chemicals, this is an indication of lack of chemicals).

Auxiliary Dosing Contacts

The auxiliary dosing contacts of the MEADOS units are closed whenever the pump is dosing. This solution offers considerable advantages, especially for small plants, where these pumps need to be the only equipment left running. This will spare other equipment such as mixers, priming pumps etc. With this feature activated, a mixer can be automatically started, when the pump is dosing.

BL 7916

pH Controller and Pump

Black Stone



Accurate pH Control, Precise Dosing

- *pH controller and dosing pump in one compact unit.*
- *±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 valve which ensures precise dosage and avoids costly waste of chemicals due to over dosage.*
- *Alarm contact is activated whenever the pH value varies 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.*
- *PVDF, FPM/FKM and PTFE materials are used for all parts that come into contact with liquid.*

SPECIFICATIONS	BL 7916-1	BL 7916-2
Range	0.00 to 14.00 pH	
Resolution	0.01 pH	
Accuracy (@20°C/68°F)	±0.01 pH	
Flow Rate	see table on page T1.50	
Input Impedance	10^{12} Ohm	
Dosage	proportional, acid or base, user selectable	
Calibration	offset: ±1 pH with trimmer; slope: 85 to 115% with trimmer	
Recorder Output	4-20 mA (isolated)	
Dosing Contact	1 isolated contact, 2A, Max. 240V, resistive load, 1,000,000 strokes	
Alarm Contact	1 isolated contact, 2A, Max. 240V, resistive load, 1,000,000 strokes	
Power Supply	110/115V ±15%; 50/60Hz (40W)	220/240V ±15%; 50/60Hz (40W)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Dimensions	181 x 221 x 142 mm (7.1 x 8.7 x 5.6")	
Weight	5 kg (11 lb.)	

ORDERING INFORMATION

BL 7916-1 is supplied with discharge and suction valves, polyethylene tubing, 110/115V power cable and instructions

BL 7916-2 is supplied with discharge and suction valves, polyethylene tubing, 220/240V power cable and instructions

SOLUTIONS

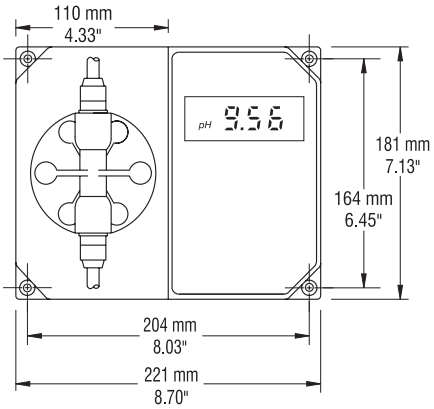
HI 7004L	pH 4.01 buffer solution, 500 mL
HI 7007L	pH 7.011 buffer solution, 500 mL
HI 7010L	pH 10.011 buffer solution, 500 mL

ACCESSORIES

HI 721101	Pumphead, O-ring and screws
HI 721102	Discharge valve assemby
HI 721103	Suction valve assemby
HI 721004	Injection valve assemby (required)
HI 721005	Foot valve assemby (required)
HI 721008	Ceramic weight (4 pcs.)
HI 767/P	Power plug (5 pcs.)
HI 7671/P	Output plug (5 pcs.)
HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulator with display

Front View

This series of instruments will mount easily in your plant using a minimum of wall space. The controls and pump head are located in the front to allow easy access.



HANNA instruments

With Great Products, Come Great Results™

Accurate ORP Control, Precise Dosing

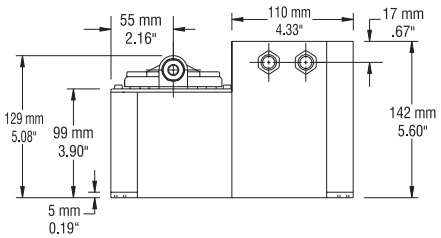
- *ORP controller and dosing pumps in one compact unit.*
- *±5 mV accuracy with unbeatable performance.*
- *Isolated 4 to 20 mA recorder output.*
- *Proportional dosing slows the pump down when the measured ORP level approaches the set value which avoids over dosage of oxidizing or reducing agents.*
- *Alarm contact is activated whenever the ORP reading varies 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*
- *PVDF, FPM/FKM and PTFE materials are used for all parts that come into contact with liquid.*



SPECIFICATIONS	BL 7917-1	BL 7917-2
Range	-999 mV to +999 mV	
Resolution	1 mV	
Accuracy (@20°C/68°F)	±5 mV	
Flow Rate	see table on page T1.50	
Input Impedance	10^{12} Ohm	
Dosage	proportional, oxidizing or reducing, user selectable	
Recorder Output	4-20 mA (isolated)	
Dosing Contact	1 isolated contact, 2A, Max. 240V, resistive load, 1,000,000 strokes	
Alarm Contact	1 isolated contact, 2A, Max. 240V, resistive load, 1,000,000 strokes	
Power Supply	110/115V ±15%; 50/60Hz (40W)	220/240V ±15%; 50/60Hz (40W)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Dimensions	181 x 221 x 142 mm (7.1 x 8.7 x 5.6")	
Weight	5 kg (11 lb.)	

Bottom View

The Controller/Pump series of instruments are enclosed in a modular housing for maximum protection. These illustrations show the layout of the Controller/Pumps and how they utilize the one-piece polypropylene, injection-molded housing. Since there are no joints or screws holding different sections of the housing together, the case is extremely rugged and sturdy.



ORDERING INFORMATION

BL 7917-1 is supplied with discharge and suction valves, polyethylene tubing, 110/115V power cable and instructions

BL 7917-2 is supplied with discharge and suction valves, polyethylene tubing, 220/240V power cable and instructions

SOLUTIONS

HI 7020L	200/275 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL
HI 767/P	Power plug (5 pcs.)

ACCESSORIES

HI 721101	Pumphead, O-ring and screws
HI 721102	Discharge valve assemby
HI 721103	Suction valve assemby
HI 721004	Injection valve assemby (required)
HI 721005	Foot valve assemby (required)
HI 721008	Ceramic weight (4 pcs.)
HI 7671/P	Output plug (5 pcs.)
HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulator with display

Wall-Mounted Process Controllers

for Demanding Process Control Environments



Reliable, High Performance Wall Mounted Controllers

HANNA instruments® wall mounted pH, ORP, and conductivity controllers are specifically designed to meet your process control requirements. The controllers come equipped with power relays operating at a maximum of 2A (240V). Electrodes can be installed quickly and easily. Simply plug the universal BNC or DIN connector over the socket and twist it into a secured position. This feature greatly improves the reliability of your instrumentation by assuring a positive connection. Accurate measurements are displayed on a large LCD, enabling the operator to check the controller readings easily.



Alarm Feature

The HANNA instruments® wall mounted series of controllers incorporate a triple contact alarm system that allows the user to select whether the alarm contacts will be in a normally open or normally closed position. When the measured value of the meter is out of range, the alarm is activated. The alarm will also be activated if the unit loses power. When activated, the alarm contacts will open or close, triggering the mechanism of your choice, whether a buzzer, light or any other electrical device. The alarm is a necessity when the installation is in a remote location and corrective action must be taken immediately in the event of an out-of-range condition.

Isolated Recorder Output

The ability to record the data from the process you are monitoring greatly enhances process troubleshooting. By simply connecting a recorder to the controller's output terminals you are able to acquire a hard copy of the readings for demonstrative or analytical purposes. The recorder output terminals are isolated from the controller circuitry to avoid any interference and are user-switchable between 0 to 20 mA or 4 to 20 mA.

High Impedance Input

The pH and ORP controllers come with high impedance 10^{12} Ω direct input from the electrode, ideal for applications with a distance of up to 10 meters (33 feet). The greater the distance between the controller and the sample, the greater the chance that line noise will occur, causing faulty readings. Use an AmpHel® pH electrode (available also with external battery) to greatly enhance the input signal allowing high accuracy at distances of up to 50 meters (165 feet).

Quality Construction

These controllers are housed in a rugged, modular, fiber-reinforced polypropylene housing. Polypropylene has properties that will resist the harmful effects of most chemicals. When in operation, and with the transparent protective cover installed, the units comply with the IP55 standards (see chart in section W). The modular design isolates the controller circuitry from all contacts, assuring that there is no noise interference. The use of this rugged design protects the unit from the tough conditions associated with industrial environments, ensuring long periods of trouble-free operation.

Advanced Controllers

HI 2X Advanced Microprocessor Controllers

This line of industrial microprocessor controllers offers a wide range of features and functions such as single and dual setpoints, ON/OFF, proportional and PID control, relay outputs, bi-directional isolated RS485, isolated recorder outputs in mAmps and volts, differential input, control through analog output and Fail-Safe Features.

Wall-Mounted Process Controllers

for Demanding Process Control Environments



Simple to Use

The large, dual-level LCD shows both primary measurement and temperature and guides operators through calibration and programming with step-by-step prompts. The choice of ON/OFF, proportional and PID control provides extra versatility and makes it possible to pick the process controller that best fits your application. Keeping track of multiple controllers in different plants is made easy. These advanced controllers can be identified with both a factory and a process ID.

Save Money with Custom Programs

HI 2X help to prevent overdosing or costly system failures. You can set your high and low setpoint hysteresis bands independently to fine tune dosing processes with the ON/OFF controllers. Similarly, the proportional band and time period are user-programmable to save on slow reacting chemicals which are commonly overdosed.

All models offer an adjustable timer from 10 minutes to 7 days as the maximum time that the relay contacts may remain closed. An important feature in case of sudden chemical depletion, truncated intake or discharge tubing and other calamities. With these silicon guardians, users can rest assured that processes are operating efficiently and safely.

Fail-Safe Protection

The Fail-Safe alarms protect processes against critical errors arising from power interruptions, surges and human errors. The sophisticated yet easy-to-use system resolves these problems on two fronts: hardware and software. To eliminate blackout and line failure problems, the alarm function operates in a “Normally Closed” state and goes off if the wires are accidentally tripped, or when the power is down. This is an important feature since with most meters the alarm terminals close in abnormal situations, but no alarm is sounded with a line interruption, causing extensive damage. With our controllers, software is employed to set off the alarm in abnormal circumstances, for example, if the dosing terminals are closed too long a red LED will provide a visual warning signal.

Differential Input (Matching Pin)

All HANNA instruments® controllers in this family come with a differential input to prevent problems due to ground loop current. With this new feature the life of the electrodes will be greatly extended.

Password Protection

HANNA instruments® password protection feature keeps these controllers safe from tampering. Only users with the proper password can change the settings of these hi-tech controllers.

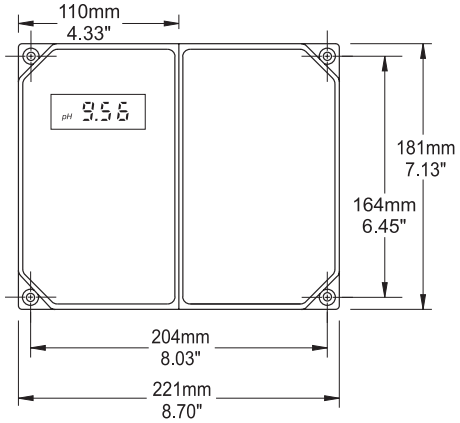
Simple Installation

The wall mounted controllers have mounting holes molded into the housing to assure simple, quick and secure installation without the need for additional hardware. Once all electrical connections are made, the protective cover can be installed over the front panel, making it possible to perform all adjustments without disassembling any part of the unit. Temperature probes can also be installed. Pumps to be used in conjunction with the controller simply plug into the controller's input and will be powered up through the unit's internal power supply.

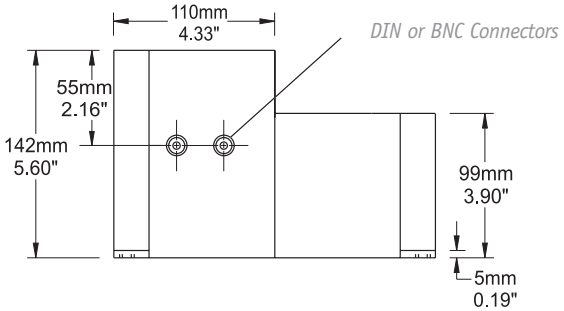
Mechanical Dimensions

The modular design isolates electrical connections in a closed compartment, while the control settings are accessible and can be made through the adjacent compartment.

Front View



Bottom View



HI 21

Industrial Grade pH Digital Controllers

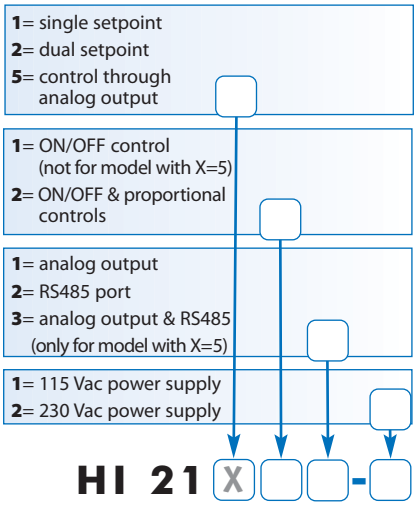
Wall Mounted with Matching Pin



SPECIFICATIONS	HI 21
Range	0.00 to 14.00 pH; -9.9 to 120°C
Resolution	0.01 pH; 0.1°C
Accuracy (@20°C/68°F)	±0.02 pH; ±0.5°C
Input Impedance	1012 Ohm
pH Calibration	automatic, 1, 2 or 3 point, at pH 4.01, 7.01, 10.01
Temperature Compensation	automatic (with Pt100 probe) or manual from -9.9 to 120°C
Outputs	digital: RS485 bi-directional opto-isolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay	1 or 2 contact outputs SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Alarm Relay	contact output SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz; fuse: 400 mA, 250 V
Power Consumption	15 VA
Environment	0 to 50°C (32 to 122°F); RH max. 85% non-condensing
Protection	IP 54
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.4 kg (3.1 lb.)

ORDERING INFORMATION

Each **HI 21** model is supplied complete with instructions.



Example:

HI 21212-1

pH controller with dual setpoint, ON/OFF control, RS485 output and 115 Vac power supply.

SOLUTIONS

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

ACCESSORIES

HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulator with display

Advanced pH Process Controller

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, which allows remote control of the instrument from a PC.

Password protection prevents tampering. The microprocessor memory is fully programmable and has a 3 month 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. You can also choose from ON/OFF, Proportional and PID control to save on chemicals.

- *Control through analog output (single setpoint)*
- *Fully programmable microprocessor memory*
- *RS485 interface*
- *Differential input for ground loop protection*
- *Automatic 3 point calibration*
- *Last calibration data*
- *Automatic temperature compensation*

HANNA instruments

With Great Products, Come Great Results™

Industrial Grade ORP Digital Controllers

Wall Mounted with Matching Pin

Advanced ORP Process Controllers

The HI 22 controllers have been engineered with the same outstanding quality and 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 pitfall 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 this 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.

- *Fully programmable microprocessor memory*
- *RS485 interface*
- *Differential input for ground loop protection*
- *Automatic 2 point calibration*
- *Last calibration data*



SPECIFICATIONS	HI 22
Range	2000 to 2000 mV; -9.9 to 120°C
Resolution	1 mV; 0.1°C
Accuracy (@20°C/68°F)	±2 mV; ±0.5°C
Input Impedance	10^{12} Ohm
ORP Calibration	automatic, at 0 and 350 or 1900 mV
Outputs	digital: RS485 bi-directional opto-isolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay	contact output SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Alarm Relay	contact output SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Power Supply	115 Vac ±10% or 230 Vac ±10%; 50/60 Hz; fuse: 400 mA, 250 V
Power Consumption	15 VA
Environment	0 to 50°C (32 to 122°F); RH max. 85% non-condensing
Protection	IP 54
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.4 kg (3.1 lb.)

ORDERING INFORMATION

Each **HI 22** model is supplied complete with instructions.

111= single setpoint, ON/OFF control and analog output
122= single setpoint, ON/OFF & proportional controls, RS485 port

1= 115 Vac power supply
2= 230 Vac power supply

HI 22 □ □ □ - □

Example:

HI 22111-1

ORP controller with single setpoint, ON/OFF control, analog output and 115 Vac power supply.

SOLUTIONS

HI 7020L	200-275 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL

ACCESSORIES

HI 8427	pH/ORP electrode simulator
HI 931001	pH/ORP electrode simulator with display

HI 23

Industrial Grade EC Digital Controllers

Wall Mounted with 4-ring Potentiometric Probe



Advanced EC Process Controller

HI 23 is a new series of wall-mounted, microprocessor conductivity controllers. These meters can provide very accurate measurements due to the 4-ring EC probe and Automatic Temperature Compensation (ATC) feature.

You can choose among models featuring ON/OFF or PID control, analog input and output, double setpoint. The relay contacts can drive external devices such as pumps or electro-valves.

The input signal can come from a probe or a 4-20 mA transmitter.

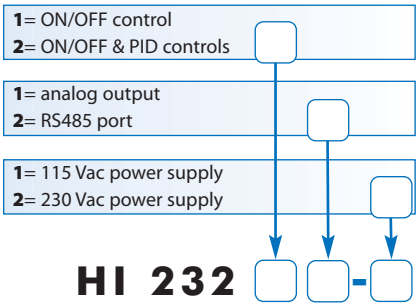
Models with RS485 output are also available. This option allows the user to insert the controller into a 2-wire RS485 network.

- *Works with 4-ring potentiometric probe*
- *Drives external devices*
- *Automatic EC calibration*
- *Automatic temperature compensation*

SPECIFICATIONS		HI 23
Range	EC	0.0 to 199.9 µS/cm; 0 to 1999 µS/cm; 0.00 to 19.99 mS/cm; 0.0 to 199.9 mS/cm
	Temperature	-10.0 to 100.0°C
Resolution	EC	0.1 µS/cm, 1 µS/cm; 0.01 mS/cm, 0.1 mS/cm
	Temperature	0.1 °C
Accuracy (@20°C/68°F)		0.5% F.S. (EC); ±0.5 °C (0 to 70°C); ±1 °C (outside)
Calibration		automatic, 1 point
Temperature Compensation		automatic or manual from -10 to 100°C with Pt100; ß adjustable from 0.00 to 10.00%/°C
Outputs		digital: RS485 bi-directional opto-isolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay		2 contact outputs SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Alarm Relay		contact output SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Power Supply		115 Vac ±10% or 230 Vac ±10%; 50/60 Hz; fuse: 400 mA, 250 V
Power Consumption		15 VA
Environment		0 to 50°C (32 to 122°F); RH max. 85% non-condensing
Protection		IP 54
Dimensions		221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight		1.6 kg (3.5 lb.)

ORDERING INFORMATION

Each **HI 23** model is provided with dual setpoint and is supplied complete with instructions.



Example:

HI 23222-2

EC controller with ON/OFF and PID controls, RS485 output and 230 Vac power supply.

PROBES

HI 7639	Conductivity probe for high temperature in-line applications

SOLUTIONS

HI 7030L	12880 µS/cm cal. sol., 500 mL
HI 7031L	1413 µS/cm cal. sol., 500 mL
HI 7033L	84 µS/cm cal. sol., 500 mL
HI 7034L	80000 µS/cm cal. sol., 500 mL

Industrial Grade EC/TDS Digital Controllers

Wall Mounted with 4-ring Potentiometric Probe

Advanced EC/TDS Process Controller

HI 24 is a new series of wall-mounted, microprocessor-based EC and TDS controllers. Due to the 4-ring probe and automatic temperature compensation feature, these meters can provide very accurate EC and TDS measurements.

You can choose among models featuring ON/OFF or PID control, analog input and output and double setpoint. The relay contacts can drive external devices as, such as pumps or electro-valves.

The input signal can come from a probe or a 4-20 mA transmitter.

Models with RS485 output are also available. This option allows the user to insert the controller into a 2-wire RS485 network.

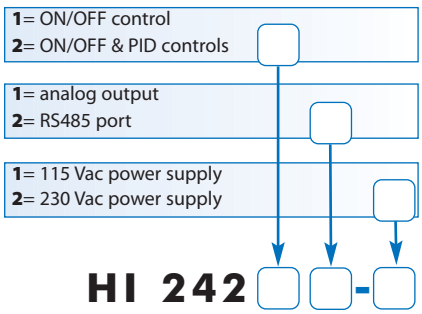
- *Works with 4-ring potentiometric probe*
- *Drives external devices*
- *Automatic EC calibration*
- *Automatic temperature compensation*



SPECIFICATIONS		HI 24
Range	EC	0.0 to 199.9 µS/cm, 0 to 1999 µS/cm; 00 to 19.99 mS/cm, 0.0 to 199.9 mS/cm
	TDS	0.0 to 100.0 ppm, 0 to 1000 ppm; 0.00 to 10.00 ppt, 0.0 to 100.0 ppt
	Temperature	-10.0 to 100.0°C
Resolution	EC	0.1 µS/cm, 1 µS/cm; 0.01 mS/cm, 0.1 mS/cm
	TDS	0.1 ppm, 1 ppm; 0.01 ppt, 0.1 ppt
	Temperature	0.1 °C
Accuracy (@20°C/68°F)		0.5% F.S. (EC / TDS); ±0.5°C (0 to 70°C), ±1°C (outside)
EC Calibration		automatic, 1 point
Temperature Compensation		automatic or manual from -10 to 100°C with Pt100; ß adjustable from 0.00 to 10.00%/°C
TDS Conversion Factor		adjustable from 0.00 to 1.00
Outputs		digital: RS485 bi-directional opto-isolated; or analog, galvanically isolated: 0-1 mA, 0-20 mA and 4-20 mA, 0-5 Vdc, 1-5 Vdc and 0-10 Vdc
Setpoint Relay		2 contact outputs SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Alarm Relay		contact output SPDT 5A-250 Vac, 5A-30 Vdc (resistive load); fuse: 5A, 250V
Power Supply		115 Vac ±10% or 230 Vac ±10%; 50/60 Hz; fuse: 400 mA, 250 V
Power Consumption		15 VA
Environment		0 to 50°C (32 to 122°F); RH max. 85% non-condensing
Protection		IP 54
Dimensions		221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight		1.6 kg (3.5 lb.)

ORDERING INFORMATION

Each **HI 24** model is provided with dual setpoint and is supplied complete with instructions.



Example:

HI 2412-1

EC/TDS controller with ON/OFF control, RS485 output and 115 Vac power supply.

PROBES

HI 7639	Conductivity probe for high temperature in-line applications

SOLUTIONS

HI 7030L	12880 µS/cm cal. solution, 500 mL
HI 7031L	1413 µS/cm cal. solution, 500 mL
HI 7033L	84 µS/cm cal. solution, 500 mL
HI 7034L	80000 µS/cm cal. solution, 500 mL

Fertigation Systems

Irrigation, Fertilization, pH and EC Control

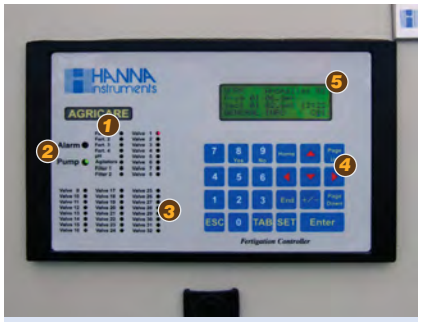


"The main reason I buy HANNA instruments® *is the existence of* HANNA *all around the world. I work with foreign customers and if they need some pieces to replace, they can go and search these pieces in their home country.* HANNA instruments® *is always developing and improving their equipment to fulfill market necessities."*

JOSÉ BARATA
ENGINEER, CEO
UPV—Comercial Norte, Lda.
Portugal



Control Panel



1. **Fertilizer and acid injection indicators (LEDs)**
2. **Main pump and alarm indicators (LEDs)**
3. **Multiple zone valve indicators (LEDs)**
4. **Touch Keypad**
5. **Backlit LCD**

SPECIFICATIONS	HI 10,000 controller (head unit)
Range	pH : 0.0 to 14.0; EC: 0.0 to 10.0 mS/cm
Resolution	0.1 pH / 0.1 mS/cm
Accuracy (@20°C/68°F)	pH: ±0.0546; EC: ±0.078 mS/cm
Typical Inputs	2 pH electrodes, 3 conductivity probes, 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
Typical Outputs	2 non-consent alarms, up to 32 zone valves, 2 filter flushing, pump, agitator, 4 fertilizer tank electro-valves, 1 pH tank electro-valve
Number of Programs	10
Program Method	With keypad or through a PC using proprietary software
Irrigation Capacity	1, 4, 8 and 32 zone valves
Irrigation Control	time/volume control, 1 to 6 different timetables per program,
Readout	20-digit, 4 level LCD with graphic symbols and messages
Power Supply	115V/220V ±10%; 50Hz/60Hz
Environment	HI 8002: NEMA 4X specifications
Dimensions	Wall mounted: 280 x 330 x 165 mm (11.2 x 13.2 x 6.6"); Panel mounted: 178 x 260 x 115 mm (7.1 x 10.4 x 4.6")
Weight	Wall mounted: 4.95 Kg (11 lb.); Panel mounted: 3.4 Kg (7.5 lb.);

ORDERING INFORMATION

Please contact your nearest HANNA instruments® for more information on how the HI 10,000 can benefit your greenhouse.

HI 9912

Industrial Grade pH & ORP Digital Controller

2-in1 Versatility



Specially Designed for Pools

HI 9912 is a 2-in-1 pH and ORP controller specially designed for pool sanitization. Two separate setpoints can be user-adjusted from 6 to 8 pH and 500 to 900 mV. The relays are activated when the pH exceeds or the mV falls below the relevant setpoint. HI 9912 accepts any pH and ORP electrode ending in a universal BNC connector. Two independent terminals provide for pH and ORP ground probes to eliminate interference and prolong the electrodes' lives.

HANNA's proportional control allows considerable savings by minimizing the use of chemicals. The settings are made through independent time cycles adjustable from 0 to 90 seconds and two proportional bands from 0 to 200 mV and 0 to 2 pH. Two pumps or electro-valves can be wired directly to the controller and be powered through the terminal.

HI 9912 alarm is activated when measurements exceed the operator-adjustable thresholds of 50 to 250 mV or 0.5 to 2.5 pH. Should the two max dosing periods of 1 to 10 minutes be exceeded an alarm is activated to signal the abnormality. The alarm is alterable in a normally-closed or a normally-open state and can be turned off during maintenance. The pools status can be ascertained from a distance through dosage and alarm LED's. HI 9912 comes with extractable terminal modules for quicker and safer wiring. The wiring compartment is protected behind a fire-retardant ABS removable panel.

SPECIFICATIONS	HI 9912
Range	0.00 to 14.00 pH; 0 to 1000 mV
Resolution	0.01 pH; 1 mV
Accuracy (@20°C/68°F)	±0.02 pH; ±5 mV
Input Impedance	10^{12} Ohm
Calibration	manual, 2 point for pH and 1 point for ORP, through trimmers on the front panel
Setpoint	2, selectable from 6.00 to 8.00 pH and from 500 to 900 mV
Proportional Control	adjustable from 0 to 2 pH and from 0 to 200 mV, time cycles from 0 to 90 seconds
Dosing Contact	powered terminals for pH and ORP corrections (240V) Max. 2A, 1,000,000 strokes pH dosage: activated when pH > setpoint; ORP dosage: activated when mV < setpoint
Alarm Relay	activated when pH varies more than a selectable value (0.5 to 2.5 pH) from setpoint or when max dosage time for pH (adjustable from 1 to 10 minutes) elapses; or activated when mV reading varies more than a selectable value (50 to 250 mV) from setpoint or when max dosage time for ORP (adjustable from 1 to 10 minutes) elapses
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9912 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9912 - ☐

SOLUTIONS

HI 7004/1L	pH 4.01 buffer solution, 1 L
HI 7007/1L	pH 7.01 buffer solution, 1 L
HI 7010/1L	pH 10.01 buffer solution, 1 L
HI 7020L	200-275 mV test solution, 500 mL
HI 7021L	240 mV test solution, 500 mL
HI 7022L	475 mV test solution, 500 mL

ACCESSORIES

HI 8427	pH/ORP electrode simulator
HI 931001	pH/ORP electrode simulator with display

With Great Products, Come Great Results™

HI 9913

Industrial Grade pH & Conductivity Digital Controller

with Proportional Control for Fertigation

2-in-1 Process Controller

HI 9913 is a 2-in-1 pH and conductivity controller engineered for dosage of fertilizer solutions in hydroponics.

HI 9913 measures pH from 0 to 14 and EC from 0 to 10 mS/cm. Two separate setpoints can be user-adjusted from 4 to 7 pH and 0 to 6 mS/cm. The relays are activated when pH exceeds the setpoint or conductivity falls below the desired value. Two pumps or electro-valves can be wired directly to the controller and be powered through the terminal. 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 for both pH and EC. A ground probe can be connected to the appropriate terminals to eliminate interference and prolong the pH electrode's life.

HI 9913 provides for an alarm relay which is activated in several circumstances. These include when the pH is below the setpoint by the operator-adjustable threshold of 0.5 to 2.5 pH, or EC exceeds the setpoint by a value in the 0.5 to 2.5 mS/cm range. The alarm goes off if the pH and/or conductivity are not corrected within the operator-determined time frame of 1 to 10 minutes. The alarm can be turned off during maintenance. The fertilization status can be ascertained from a distance through dosage and alarm LED's.

HI 9913 accepts pH electrodes with a BNC and a conductivity probe with a DIN connector. HI 9913 compensates for the temperature effect on conductivity measurements automatically.



SPECIFICATIONS	HI 9913
Range	0.00 to 14.00 pH; 0.00 to 10.00 mS/cm
Resolution	0.01 pH; 0.01 mS/cm
Accuracy (@20°C/68°F)	±0.02 pH; ±2% F.S.
Input Impedance	1012 Ohm
Calibration	manual, 2 point for pH and 2 point for EC, through trimmers on the front panel
Setpoint	2, selectable from 4.00 to 7.00 pH and from 0.00 to 6.00 mS/cm
Temperature Compensation (EC)	automatic, 0 to 50°C (32 to 1226F) with ß=2%/°C
Proportional Control	adjustable from 0.00 to 2.00 pH and from 0.00 to 2.00 mS/cm, time cycles from 0 to 90 seconds
Dosing Contact	powered terminals for pH and EC dosages (240V) Max. 2A, 1,000,000 strokes activated whe pH > setpoint and when mS reading < setpoint, respectively
Alarm Relay	activated when pH varies more than a selectable value (0.5 to 2.5 pH) from setpoint or when max dosage time for pH (adjustable from 1 to 10 minutes) elapses; or when conductivity varies more than a selectable value (0.5 to 2.5 mS/cm) from setpoint or when max dosage time for EC (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, resistive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions / Weight	221 x 181 x 86 mm (8.7 x 7.1 x 3.4") / 1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9913 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9913 - ☐

PROBES

HI 3001D Conductivity probe for in-line or submersion applications

SOLUTIONS

HI 7004/1L pH 4.01 buffer solution, 1 L
HI 7007/1L pH 7.01 buffer solution, 1 L
HI 7031L 1413 µS/cm calibration solution, 500 mL
HI 7039L 5000 µS/cm calibration solution, 500 mL

ACCESSORIES

HI 8427 pH/ORP electrode simulator
HI 931001 pH/ORP electrode simulator with display

HI 9923

Industrial Grade pH & Conductivity Digital Controller

Wall Mounted for Boilers and Cooling Towers



The Ideal Boiler and Cooling Tower Process Controller

HI 9923 is a 2-in-1 pH and conductivity controller engineered for the monitoring of industrial boilers and cooling towers. Two separate setpoints can be adjusted from 5 to 10 pH and 1 to 6 mS/cm to activate independent relays. Two pumps or electro-valves can be wired directly to the controller and be powered through the terminals. For optimum control, the operator can set the Dead Band (hysteresis) from 0 to 0.5 mS/cm. Trimmers for the pH and conductivity are positioned on the front panel make for easy calibration. A ground probe can be connected to the appropriate terminals to prolong the pH electrode's life.

HI 9923 provides for an alarm relay which is activated when the pH falls below the setpoint by the operator-adjustable threshold of 0.5 to 2.5 pH, or conductivity exceeds the setpoint by a value in the 0.5 to 2.5 mS/cm range. The alarm is also activated if the pH and/or conductivity are not corrected within the operator-determined time frame of 1 to 90 minutes.

The boiler and cooling towers' status can be ascertained from a distance with dosage and alarm LEDs. This 2-in-1 controller accepts pH electrodes with a BNC connector and a conductivity probe with a DIN connector incorporating a temperature sensor.

The HI 9923 compensates for the temperature effect of conductivity measurements automatically.

SPECIFICATIONS	HI 9923
Range	0.00 to 14.00 pH; 0.00 to 10.00 mS/cm
Resolution	0.01 pH; 0.01 mS/cm
Accuracy (@20°C/68°F)	±0.02 pH; ±2% F.S.
Input Impedance	10^{12} Ohm
Calibration	manual, 2 point for pH and 2 point for conductivity, with trimmers on the front panel
Hysteresis (EC)	adjustable from 0 to 0.5 mS/cm
Setpoint	2, selectable from 5.00 to 10.0 pH and from 1.00 to 6.00 mS/cm
Temperature Compensation (EC)	automatic, 0 to 50°C (32 to 1226F) with ß=2%/°C
Dosing Contact	powered terminals for pH (alkaline dosage) and EC corrections (240 V, Max. 2A, 1,000,000 strokes)
Alarm Relay	activated when pH falls below the setpoint more than a selectable value (0.5 to 2.5 pH) or when max dosage time for pH (adjustable from 1 to 10 minutes) elapses; or when EC reading exceeds the setpoint more than a selectable value (0.5 to 2.5 mS/cm) or when max dosage time for EC (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, resistive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions / Weight	221 x 181 x 86 mm (8.7 x 7.1 x 3.4") / 1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9923 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9923 - ☐

PROBES

HI 3001D Conductivity probe for in-line or submersion applications

SOLUTIONS

HI 7004/1L pH 4.01 buffer solution, 1 L
HI 7007/1L pH 7.01 buffer solution, 1 L
HI 7031L 1413 µS/cm calibration solution, 500 mL
HI 7039L 5000 µS/cm calibration solution, 500 mL

ACCESSORIES

HI 8427 pH/ORP electrode simulator
HI 931001 pH/ORP electrode simulator with display

HANNA instruments

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2 points upgraded

HI 9935

Industrial Grade pH & TDS Digital Controller

with Proportional Control for Fertigation

Ideal for Hydroponics

HI 9935 is a 2-in-1 pH and TDS controller engineered for dosage of fertilizer solutions in hydroponics.

HI 9935 measures pH from 0 to 14 and TDS from 0 to 1999 ppm. Two separate setpoints can be user-adjusted from 4 to 7 pH and 900 to 1800 ppm (mg/L). The relays are activated when the pH exceeds the setpoint or TDS falls below the desired value. Two pumps or electro-valves can be wired directly to the controller and 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 ppm for TDS. A ground probe can be connected to the appropriate terminals to eliminate interference and prolong the electrode's life.

HI 9935 provides for an alarm relay which is activated in several circumstances. These include when the pH is below the setpoints in the operator-adjustable threshold of 0.5 to 2.5 pH, or similarly, TDS exceeding the setpoint by a value in the 50 to 450 ppm range. The alarm also goes off if the pH and/or TDS are not corrected within the operator-determined time frame of 1 to 10 minutes. Moreover, the alarm configuration is switchable from a normally-closed to a normally-open state or turned off during maintenance. The fertilization status can be ascertained from a distance through dosage and alarm LED's

HI 9935 automatically compensates for the temperature effect on TDS. It accepts pH electrodes with a BNC connector and a TDS probe with a DIN connector incorporating a temperature sensor.



SPECIFICATIONS	HI 9935
Range	0.00 to 14.00 pH; 0 to 1999 ppm (mg/L)
Resolution	0.01 pH; 1 ppm (mg/L)
Accuracy (@20°C/68°F)	±0.02 pH; ±2% F.S.
Input Impedance	10^{12} Ohm
Calibration	manual, 2 point for pH and 2 point for TDS, with trimmers on the front panel
Setpoint	2, selectable from 4.00 to 7.00 pH and from 900 to 1800 ppm
TDS Conversion Factor	0.65 ppm = 1 µS/cm
Temperature Compensation (TDS)	automatic, 0 to 50°C (32 to 122°F) with ß = 2%/°C
Proportional Control	adjustable from 0.00 to 2.00 pH and from 0 to 400 ppm, time cycles from 0 to 90 seconds
Dosing Contact	powered terminals for pH and TDS corrections (240 V) Max. 2A, 1,000,000 strokes activated when pH > setpoint and TDS reading < setpoint, respectively
Alarm Relay	activated when pH varies more than a selectable value (0.5 to 2.5 pH) from setpoint or when max dosage time for pH (adjustable from 1 to 10 minutes) elapses; or when TDS differs more than a selectable value (50 to 450 ppm) from setpoint or when max dosage time for TDS (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, resistive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9935 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9935 -

PROBES

HI 3001D Conductivity probe for in-line or submersion applications

SOLUTIONS

HI 7004/1L pH 4.01 buffer solution, 1 L
HI 7007/1L pH 7.01 buffer solution, 1 L
HI 70442L 1500 ppm calibration solution, 500 mL

ACCESSORIES

HI 8427 pH / ORP electrode simulator
HI 931001 pH / ORP electrode simulator with display

HI 9914

Industrial Grade Fertigation Digital Controller

for Process Control Requirements in Agriculture



SPECIFICATIONS	HI 9914
Range	0.00 to 10.00 mS/cm; 0.00 to 14.00 pH
Resolution	0.01 mS/cm; 0.01 pH
Accuracy (@20°C/68°F)	±5% F.S.; ±0.02 pH
Calibration	manual, 1 point for EC with slope trimmer; 2 point for pH with offset and slope trimmers
Setpoint	2, selectable from 0.50 to 10 mS/cm and from 0.5 to 14.0 pH
Analog Output	0-5V±5% (0.5V/mS); 0-7 V±5% (0.5 V/pH)
Timer	adjustable from 1 to 10 minutes
Feed OK Output	12V, 15 mA
Humidity Sensor	activated if resistivity is below 220 KOhm
Water Nozzle Output	2A, 220V relay
Circulation Pump Output	2A, 220V relay
Feeding Pump Output	2A, 220V relay
Alarm output	2A, 220V relay
Water Level Inputs	contact type water level sensors
User Input	contact type switch
External FILL Button	contact type push-button
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 90 mm (8.7 x 7.1 x 3.5")
Weight	1.75 kg (3.9 lb.)

ORDERING INFORMATION

HI 9914 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9914 - ☐

PROBES

HI 3001D	Conductivity probe for in-line or submersion applications

SOLUTIONS

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 7031L	1.41 mS/cm cal. solution, 500 mL
HI 7039L	5.00 mS/cm calibration solution, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning sol., 500 mL

2-in-1 Process Controller

HI 9914 is a wall mounted fertigation controller, designed to meet specific process control requirements in agricultural, horticultural and hydroponics applications. The controller is provided with two measuring channels, one for pH and one for conductivity. The readings are displayed simultaneously on two independent LCDs with backlight.

The conductivity probe is designed with a built-in temperature sensor which allows the controller to automatically compensate for the temperature effect. The differential input and the use of a Matching Pin prevent grounding problems and thus ensure longer life to the pH electrode.

The controller includes two regulators for pH and conductivity, that can be adjusted from the front panel by setting two independent thresholds. The conductivity and pH controls are time separated and a timed operation mode to avoid overdosing of fertilizer or acid. The controller status is indicated by LEDs on the front panel. Moreover, the equipment is provided with a three-level sensor, to control the water level, the alarm condition and irrigation sequences.

The instrument also features an alarm system, which is activated when an unusual working condition occurs. A humidity detector can be used to stop the controller if any leakage is detected. Water nozzle, circulation pump, feeding pump and alarm are equipped with relays.

HANNA instruments
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2 points upgraded

HI 9910

Industrial Grade pH Digital Controller

Wall Mounted with Single Setpoint and Proportional Dosage

Reliable and Built to last

HI 9910 is a pH controller with a single setpoint for proportional dosage of acid or alkaline solutions. Any pH electrode ending in a BNC connector can be directly attached to the controller. The proportional control can be fine tuned through two dials on the front panel. The time cycle is adjustable from 0 to 90 seconds and the proportional band from 0.0 to 2.0 pH. Coarse and fine as well as offset and slope trimmers make accurate setting and calibration easy and convenient. A pump or electro-valve can be wired directly to the controller and be powered through the terminals.

The HI 9910 also provides for an alarm relay. The alarm is activated when the measurements stray away from the setpoint by a predetermined value in the 0.5 to 2.5 pH range. A max. dosing time from 1 to 10 minutes can also be set, after which the alarm is activated to warn of an abnormality. The alarm can be configured in either normally-closed or normally-opened state. HI 9910 also provides an isolated output signal which is user selectable between 0-20 or 4-20 mA. A dial on the front panel renders manual temperature compensation fast and easy.

For automatic compensation, hook up a 3 wire Pt100 to the controller. To speed up wiring, the HI 9910 comes with extractable terminal modules. Once wired up, the compartment containing the connections is protected behind a fire-retardant ABS panel. Several LED's show whether the setpoint or alarm relays are activated from a distance.



SPECIFICATIONS	HI 9910
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.02 pH
Input Impedance	10^{12} Ohm
Calibration	manual, 2 point, through trimmers on the front panel
Temperature Compensation	automatic from 0 to 50°C with Pt100 probe or manual from -10 to 80°C
Setpoint	selectable from 0.00 to 14.00 pH
Recorder Output	selectable at 0-20 mA or 4-20 mA (isolated)
Proportional Control	adjustable from 0.0 to 2.0 pH and time cycle from 0 to 90 seconds
Dosing Contact	powered terminal for pH correction (115 or 240 V) Max. 2A, 1,000,000 strokes; activated when pH > setpoint for acid dosage or when pH < setpoint for alkaline dosage
Alarm Relay	activated when pH varies more than a selectable value (0.5 to 2.5 pH) from setpoint or when max dosage time (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, resistive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9910 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9910 -

SOLUTIONS

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

ACCESSORIES

HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulator with display

HI 9911

Industrial Grade pH Digital Controller

Wall Mounted with Dual Setpoint and Proportional Dosage



Heavy-duty pH Controller

HI 9911 is a pH controller with two setpoints for proportional dosage of acidic and alkaline solutions. Through two sets of coarse and fine trimmers, the setpoints can be accurately fine tuned to any value in the 0.00 to 14.00 range. Likewise, two trimmers on the front panel allow for easy calibration. HI 9911 accepts any pH electrode ending in a BNC connector. The proportional control can be adjusted to match your application through the time cycle from 0 to 90 seconds and the proportional band of 0 to 2 pH. Two pumps or valves can be wired directly to the controller and be powered through the terminals.

HI 9911 provides for two types of alarms. The alarm relay is activated when the measurements are away from the setpoints by more than a predetermined value in the 0.5 to 2.5 pH range. Or alternatively, when one of the two independently adjustable maximum dosing times is exceeded. The alarm can be configured in either normally-open or normally-closed state and turned off during maintenance. HI 9911 also provides for a user-selectable 0-20 or 4-20 mA isolated recorder output.

You can choose from manual or automatic temperature compensation with an optional 3-wire Pt100 probe. HI 9911 comes with extractable terminal modules. Once wired, the compartment containing the connections is closed behind a fire-retardant ABS removable panel. As with HI 9910, a ground probe can be hooked up to the controller to eliminate interference.

SPECIFICATIONS	HI 9911
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.02 pH
Input Impedance	10^{12} Ohm
Calibration	manual, 2 point, through trimmers on the front panel
Temperature Compensation	automatic from 0 to 50°C with Pt100 probe or manual from -10 to 80°C
Setpoint	2, selectable from 0.00 to 14.00 pH
Recorder Output	selectable at 0-20 mA or 4-20 mA (isolated)
Proportional Control	adjustable from 0.0 to 2.0 pH and time cycle from 0 to 90 seconds
Dosing Contact	powered terminals for pH correction (115 or 240 V) Max. 2A, 1,000,000 strokes; acid dosage activated when pH > setpoint; alkaline dosage activated when pH < setpoint
Alarm Relay	activated when pH varies more than a selectable value (0.5 to 2.5 pH) from setpoint or when max dosage time (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, resistive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9911 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9911 - ☐

SOLUTIONS

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

ACCESSORIES

HI 8427	pH / ORP electrode simulator
HI 931001	pH / ORP electrode simulator with display

HANNA instruments

With Great Products, Come Great Results™

HI 9920

Industrial Grade ORP Digital Controller

Wall Mounted with Proportional Dosage

Withstands Extreme Environments

HI 9920 is an ORP controller with a single setpoint for user-selectable dosage of reducing or oxidizing solutions. Any ORP electrode ending in a BNC connector can be directly attached to the controller. With proportional control, you can fine tune your treatment plant and minimize the use of chemicals. The proportional setting can be adjusted through the time cycle from 0 to 90 seconds and the band from 0 to 200 mV. The setpoint can be accurately adjusted through coarse and fine trimmers. A pump or electro-valve can be wired directly to the controller and be powered through the terminal.

In addition to the setpoint relay, HI 9920 also provides for an alarm relay. The alarm is activated when the measurements exceed the operator-adjustable threshold of 50 to 250 mV from setpoint. For extra security, a maximum dosing time from 1 to 10 minutes can also be set, after which the alarm is activated to signal an abnormality. The alarm configuration is alterable in a normally-closed or normally-open state to accommodate fail-safe installations.

Any recorder accepting a 0-20 or 4-20 mA output can also be hooked up to the controller. One can see the controller's status, even from a distance, by observing the dosage or alarm LED's. To speed up wiring, HI 9920 comes with extractable terminal modules. Once wired up, the compartment containing the connections is protected behind a fire-retardant ABS removable panel.

HI 9920 also provides for a ground probe to eliminate interference and prolong the electrode's life.



SPECIFICATIONS	HI 9920
Range	-500 to +1500 mV
Resolution	1 mV
Accuracy (@20°C/686F)	±5 mV
Input Impedance	10^{12} Ohm
Calibration	manual, 1 point, through trimmer on the front panel
Recorder Output	selectable at 0-20 mA or 4-20 mA (isolated)
Setpoint	selectable from -500 to +1500 mV
Proportional Control	adjustable from 0 to 200 mV and time cycle from 0 to 90 seconds
Dosing Contact	powered terminal for ORP correction (115 or 240 V) Max. 2A, 1,000,000 strokes; activated when mV reading > setpoint for reducing dosage or when mV reading < setpoint for oxidizing dosage
Alarm Relay	activated when mV reading varies more than a selectable value (50 to 250 mV) from setpoint or when max dosage time (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, resistive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9920 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9920 - ☐

SOLUTIONS

HI 7020L	200-275 mV test solution, 500 mL
HI 7021L	240 mV test solution, 500 mL
HI 7022L	475 mV test solution, 500 mL
HI 7091L	Reducing solution, 500 mL
HI 7092L	Oxidizing solution, 500 mL

ACCESSORIES

HI 8427	pH/ORP electrode simulator
HI 931001	pH/ORP electrode simulator with display

HI 9931

Industrial Grade EC Digital Controller

Proportional Function for Hydroponics and Fertigation

upgraded

2 points



Designed for Hydroponics and Fertigation

HI 9931 is a wall mounted meter that measures and controls conductivity in the 0 to 10 mS/cm range. A single setpoint allows for proportional dosage of fertilizer solutions. The proportional settings can be fine tuned through two conveniently positioned dials on the front panel. The time cycle is adjustable from 0 to 90 seconds and the proportional band from 0 to 1.6 mS/cm. Calibration and setpoints have a coarse and fine tuning trimmers. A pump or electro-valve can be wired directly to the controller and be powered through the terminals.

HI 9931 also provides for an alarm relay which is activated when the measurements exceed the setpoint by a user-selectable margin from 0.5 to 2.5 mS/cm. The alarm also goes off due to a malfunction, the continuous dosing time exceeds the operator adjustable period of 1 to 10 minutes. The alarm can be configured in either normally closed or open position and turned off during maintenance. HI 9931 also provides an isolated output signal which is user selectable between 0-20 or 4-20 mA.

HANNA 4-ring conductivity probes ending in a DIN connector can be quickly attached to the controller. Readings are automatically compensated for temperature variations in the 0 to 50°C (32 to 122°F) range. For quick and easy wiring, HI 9931 comes with extractable terminal modules. Several LED's show whether the setpoint or alarm relays have been activated.

SPECIFICATIONS	HI 9931
Range	0.00 to 10.00 mS/cm
Resolution	0.01 mS/cm
Accuracy (@20°C/68°F)	±2% F.S.
Calibration	manual, 2 point, with zero and slope trimmers on the front panel
Setpoint	selectable from 0.00 to 10.00 mS/cm
Temperature Compensation	automatic, 0 to 50°C (32 to 122°F) with ß = 2%/°C
Recorder Output	selectable at 0-20 mA or 4-20 mA (isolated)
Proportional Control	adjustable from 0.0 to 1.6 mS/cm, time cycle from 0 to 90 seconds
Dosing Contact	powered terminal for EC correction (240 V, Max. 2A, 1,000,000 strokes) activated when reading < setpoint
Alarm Relay	activated when EC differs more than a selectable value (0.5 to 2.5 mS/cm) from setpoint or when max dosage time (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, res--istive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9931 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9931 - ☐

PROBES

HI 3001D Conductivity probe for in-line or submersion applications

SOLUTIONS

HI 7031L 1413 µS/cm calibration solution, 500 mL

HI 7039L 5000 µS/cm calibration solution, 500 mL

HANNA instruments

With Great Products, Come Great Results™

HI 9934

Industrial Grade TDS Digital Controller

Proportional Function for Hydroponics and Fertigation

Designed for Hydroponics and Fertigation

This wall mounted meter controls TDS in the 0 to 1999 ppm (mg/L) range through a single setpoint for dosage of fertilizers. The proportional control can be fine tuned through the time cycle between 0 to 90 seconds and the proportional band from 0 to 400 ppm. Coarse and fine as well as a slope trimmer make for an accurate setting and calibration. A pump or electro-valve can be powered through the terminal. In addition to the setpoint relay, HI 9934 also provides for an alarm relay. The alarm is activated when the measurements exceed the setpoint by a user-selectable margin in the 50 to 450 ppm range. The alarm also goes off due to a malfunction, the continuous dosing time exceeds the operator adjustable period of 1 to 10 minutes. The alarm can be configured in either normally-closed or normally-open position and turned off during maintenance.

HI 9934 also provides an isolated output signal which is user selectable between 0-20 or 4-20 mA.

HANNA instruments 4-ring TDS probes with incorporated temperature sensor and DIN connector can be quickly attached to the controller. Readings are automatically compensated for temperature variations in the 0 to 50°C (32 to 122°F) range.

The extractable terminal wiring is through the side of the meter with washers and grommets. The compartment containing the connections is closed behind a fire-retardant ABS panel.



SPECIFICATIONS	HI 9934
Range	0 to 1999 ppm (mg/L)
Resolution	1 ppm (mg/L)
Accuracy (@20°C/68°F)	±2% F.S.
Calibration	manual, 2 point, with zero and slope trimmers on the front panel
Setpoint	selectable from 0 to 1999 ppm (mg/L)
TDS Conversion factor	0.65 ppm = 1 µS/cm
Temperature Compensation	automatic, 0 to 50°C (32 to 122°F) with ß = 2%/°C
Recorder Output	selectable at 0-20 mA or 4-20 mA (isolated)
Proportional Control	adjustable from 0 to 400 ppm, time cycle from 0 to 90 seconds
Dosing Contact	powered terminal for TDS correction (240 V, Max. 2A, 1,000,000 strokes) activated when reading < setpoint
Alarm Relay	activated when TDS exceeds the setpoint more than a selectable value (50 to 450 ppm) or when max dosage time (adjustable from 1 to 10 minutes) elapses (isolated, Max 2A-240 V, resistive load, 1,000,000 strokes)
Power Supply	110/115 Vac ±10% or 220/240 Vac ±10%; 50/60 Hz
Environment	-10 to 50°C (14 to 122°F); RH max 95% non-condensing
Dimensions	221 x 181 x 86 mm (8.7 x 7.1 x 3.4")
Weight	1.6 kg (3.5 lb.)

ORDERING INFORMATION

HI 9934 is supplied complete with instructions.

1= 115 Vac power supply
2= 230 Vac power supply

HI 9934 -

PROBES

HI 3001D TDS probe for in-line or submersion applications

SOLUTIONS

HI 70442L 1500 ppm calibration solution, 500 mL



"I Buy HANNA products because of the good and fast service provided. I have been using HANNA products over the past few years and the quality and accuracy during measurements keeps me satisfied."

"I decided to install a fertilizer controller after discussions I had with other growers. As the other growers have been satisfied with the usage of the fertilizer controller, I decided to install one in my greenhouse."

MR. KAROFILLAKIS NIKOS
Growet
Greece

Transmitters

Digital and Analog Transmitters for pH, ORP and Conductivity

Two-Wire pH & ORP Transmitters

Two-wire transmitters are widely used for process control in industry. These instruments are particularly useful in industrial conditions where electrical interference is an important factor. By galvanically isolating the signals, any interference created is prevented from reaching the transmitter. One usually associates industrial environments with corrosive conditions, therefore any instrumentation used must be resistant to liquids and corrosion. HANNA transmitters meet all of these criteria and they only use two wires which reduces costs and eliminates the need for expensive coaxial cable. Two-wire transmitters are ideal when used in remote applications that do not have AC power available.



As technology advances it is becoming more important to monitor certain processes closely, particularly from remote locations. Computers are commonly used to receive signals from transducers that have travelled a great distance (up to 300 meters, 1000'). When transmitting signals over such a distance, it is likely that a substantial portion of the signal will be absorbed by the resistance of the lines. Considerable differences in ground potentials and between the signal source and load, are inherent to long lines.

Powering the system with an AC supply is beneficial in eliminating this problem. One of the two wires is power ground return, while the other is the power supply. The power supply line acts in a dual manner, as a power supply, and as a signal carrier. This allows the transmitter to operate with 2 wires.

The signal current from the process controller is normally 4 to 20 mA. When the load is connected with the power supply return line, the signal current will be proportional in the range of 4 to 20 mA.

The ability to use a thinner gauge of wire greatly reduces the costs associated with the wiring of remote transmitters. Typically, a heavy gauge of shielded cable is required in order to minimize the ambient electrical noise from AC power sources, interference from electrical equipment or various other sources of noise.

Thin wire will also provide better operation when the transmitter current output is a 4 to 20 mA signal. All of these features and many more, give HANNA transmitters the versatility to be used over long distances in almost any process control application.

Conductivity, 4-Ring Technology

HANNA conductivity transmitters use 4-ring Potentiometric probes. As opposed to the more widely used 2-electrode Amperometric method, the 4-ring Potentiometric method provides the highest accuracy and repeatability attainable. When measuring liquids that have a high conductivity, the 2-electrode system is susceptible to polarization. This condition makes it exceptionally difficult to obtain measurements with any accuracy. The polarization is directly related to the electrode's current load, and will cause a considerable, nonlinear drop in the voltage. As a result, the solution around the electrode simulates a low conductivity condition.

4-ring electrodes eliminate the polarization effect by splitting the four rings into 2 current and 2 voltage electrodes. When placed in a conductive liquid, the 2 current electrodes take the alternating voltage and create a current. This alternating current produces a Buffer Field from which polarization is absent. The voltage is then measured in this field assuring no altered readings.

Advanced Digital Technology

HI 504910 can acquire and transmit pH, ORP and °C measurements in a digital format to the HI 504 controller, or a computer workstation.

The digital link allows the user to send additional information, regarding the pH, ORP and temperature probes. Moreover, this transmitter is provided with the sensor check feature for pH and ORP electrodes, and can be connected to a Pt100 or Pt1000 temperature sensor (with automatic recognition and damage test).

The HI 504910 transmitter can store up to 6000 samples, pH/°C or ORP, complete with information about last calibration data (date and time, pH offset and slope, number and values of the used buffers). All stored data can be downloaded through the RS485 communication port using our HI 92500 software.

Advanced Digital Transmitter

HI 504910 can acquire and transmit pH, ORP and °C measurements in a digital format to the HI 504 controller, or a computer workstation.

The digital link allows the user to send additional information, regarding the pH, ORP and temperature probes. Moreover, this transmitter is provided with the Sensor Check™ feature for pH and ORP electrodes, and can be connected to a Pt100 or Pt1000 temperature sensor (with automatic recognition and damage test).

The general setting and measurement parameters of the instrument can be independantly set by the user for pH and ORP configurations.

The pH range can be calibrated through a normal 2-point procedure or through the HI 504920 using the innovative one-point system.

The temperature compensation mode can be automatic or manual (automatically selected when a temperature input error occurs).

This advanced digital transmitter can store up to 6000 samples, pH/°C or ORP, complete with information about last calibration data (date and time, pH offset and slope, number and values of the used buffers). Through an RS485 communication port, all stored data can be transferred using our HI 92500 software.

- *Uses HI 1006 series probes with direct wire connection*



ORDERING INFORMATION

HI 504910 is supplied with instructions

ELECTRODES

HI 7920	HI 504910/HI 504920 interface cable
HI 7610	Stainless steel Pt100 probe
HI 7611	Stainless steel Pt1000 probe

SOLUTIONS

HI 92500	Windows® compatible software
HI 7004/1L	pH 4.01 buffer solution, 1 L
HI 7007/1L	pH 7.01 buffer solution, 1 L
HI 7010/1L	pH 10.01 buffer solution, 1 L
HI 7020L	200-275 mV test solution, 500 mL

ACCESSORIES

HI 504900	GSM module
HI 504901	GSM supervisor
HI 504920	Remote user interface pH meter & calibrator

SPECIFICATIONS		HI 504910
Range	pH	-2.00 to 16.00 pH
	mV	-2000 to +2000 mV
	Temperature	-30 to 130.0°C
Resolution	pH	0.01 pH
	mV	1 mV
	Temperature	0.1°C
Accuracy (@20°C)	pH	±0.02 pH
	mV	±2 mV
	Temperature	±0.5°C
Installation Category		II
pH Calibration		automatic, 1 or 2 point with 5 memorized buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)
Temperature Compensation		automatic or manual, -30 to 130°C (-22 to 266°F)
Temperature Probe		with 2 or 3-wire Pt100 or Pt1000 sensor (with automatic recognition and damage test)
Power Supply		24 Vac/dc ± 20%
Power Consumption		5 VA
Over Current Protection		400 mA, 250 V fast fuse
Infrared Optical Interface towards HI 504920		RS232, baud rate fixed to 2400
Data Logging		6000 pH/°C or ORP samples
Environment		0 to 50°C (32 to 122°F); RH max 85% non-condensing
Enclosure		fiberglass NEMA case 4X type
Dimensions		216 x 165 x 108 mm (8.5 x 6.5 x 4.25") - excluding mounting feet
Weight		1.5 kg (3.3 lb.)

HI 504901

GSM Supervisor

For complete remote control or set up of the fertigation unit.



The Intelligent Interface

HI504901 GSM supervisor is an intelligent interface between HANNA meters with RS232 and RS485 port and an industrial GSM cellular phone. This interface is ideal for sending SMS messages or connecting through a local or a remote computer with HI92500 HANNA application software.

HI504901 can acquire information about active alarms, errors, current status and real time values with following HANNA meters:

- HI8001 and HI8002 towards RS232 channel #1 and RS232 channel #2 serial port;
- HI23 and HI24 series, towards RS485 serial port;
- HI700 and HI710 series, towards RS485 serial port;
- HI504 series, towards RS485 serial port;
- HI504910, towards RS485 serial port.

HI 504901 GSM supervisor is also provided with one digital input (typically an alarm relay) from "non-intelligent" instruments (instruments with only an alarm relay contact or another digital output signal).

HI504901 can be configured for all its parameters and features through the HI504901SW Windows® compatible application software provided.

Two models are available:

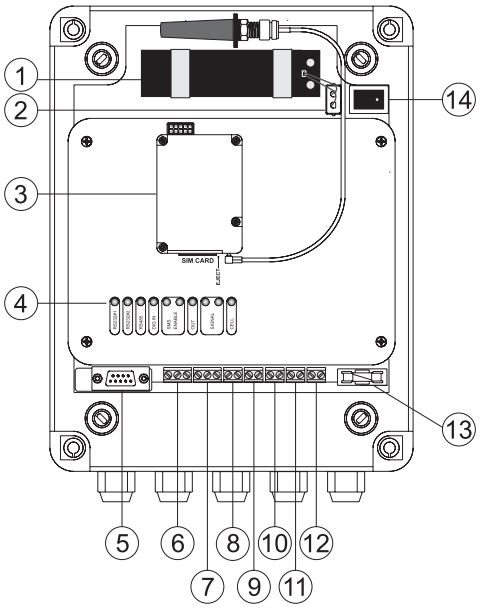
HI504901-1: Dual-band 900/1900 MHz GSM Power supply: 115VAC to 12VDC power adapter (HI710005).

HI504901-2: Dual-band 900/1800 MHz GSM Power supply: 230VAC to 12VDC power adapter (HI710006).

Front View



Inside View



1. Backup battery
2. On-board connector
3. GSM module
4. LED indicators
5. RS232 comm port (local PC comm. only)
6. RS232 ch. #1 serial comm. terminal
7. RS232 ch. #2 serial comm. terminal
8. Digital input terminal to aquire ext. info
9. Digital input terminal to disable SMS sending
10. Digital output terminal
11. RS485 serial comm. port
12. Power supply input (12 Vdc)
13. Fuse (1 A)
14. Power ON/OFF switch

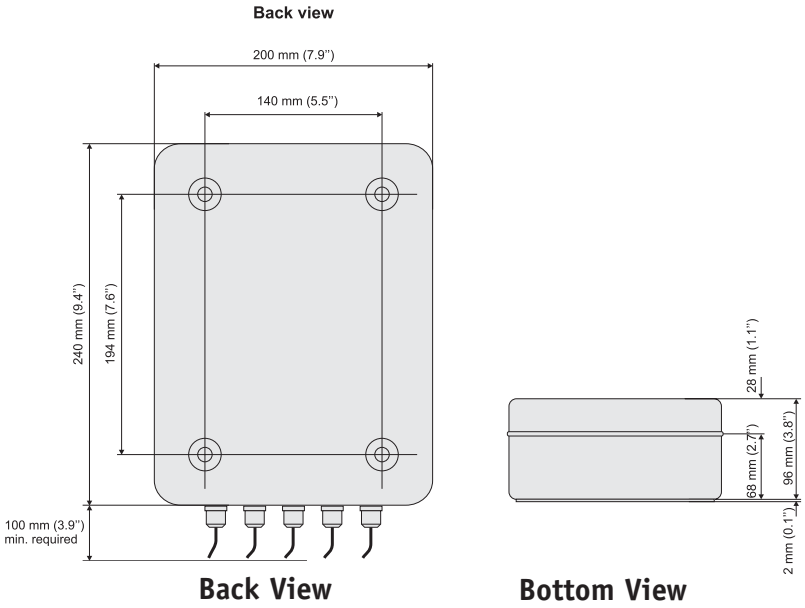
GSM Supervisor

For complete remote control or set up of the fertigation unit.

Feature List

- *GSM phone inside for Short Messaging Service (SMS) sending.*
- *Possibility of a wireless remote interface configuration or connection to a computer workstation (equipped with a modem) through the cellular phone inside.*
- *RS232 ports (channel #1 and #2) for communication towards HANNA meters with RS232 port.*
- *RS485 port for communication towards HANNA meters with RS485 port, allowing connection of up to 32 instruments on the same wire.*
- *Digital input port (typically connected to an alarm relay) to acquire information from "non-intelligent" instruments.*
- *Digital output port, for which it is possible to change the status (open/closed) through an appropriate SMS sent to the interface.*
- *SMS enabling/disabling option through a dedicated port.*
- *LED indicators:* four red LED's are provided for signaling error conditions or active alarms in the devices connected to the interface through RS232 ports (#1 and #2), RS485 port or digital input, depending on interface configuration; one green LED and one red LED are provided to give indication about SMS sending enable current status; two green LED's indicate the cellular phone signal quality; one yellow LED is dedicated to the current status of digital output contact, and another yellow LED to the operating status of the cellular phone terminal.
- *Real time clock.*
- *Diagnostic features.*
- *Internal backup battery which provides power supply in case of mains power failure.*

Mechanical Dimensions



Back View **Bottom View**

SPECIFICATIONS	HI 504901
Max Output Power	2 W for EGSM900; 1 W for GSM1800/1900
SIM Interface	3V type SIM card
Antenna	dual band (900/1800/1900 MHz)
Digital Input Channel	supporting mechanical relays or open-collector outputs
Digital Output Channel	open-collector output, 5 mA/30V max.
RS485 Channel Towards Instruments	for connection of an instrument with RS485 in the same bus; baud rate up to 9600
RS232 Channel Towards Instruments	for connection of an instrument with RS232; baud rate up to 9600 (limited by the instrument)
RS232 Auxiliary Port Towards PC	D-Sub female connector, baud rate up to 9600
Installation Category	I
Power Supply	12 VDC adapter & internal rechargeable battery (12V / 0.8 Ah) for backing up
Power Consumption	6 VA Max.
Environment	0 to 50ºC; RH max 85% non-condensing
Enclosure	ABS case, IP54
Dimensions / Weight	240 x 200 x 98 mm (9.4 x 7.9 x 3.9") / approx. 1.4 kg (3.1 lbs.)

ORDERING INFORMATION

HI 504901-1 (900/1900 MHz GSM supervisor) is supplied complete with 115 Vac/12 Vdc power adapter, HI 504901SW configuration software and instructions.

HI 504901-2 (900/1800 MHz GSM supervisor) is supplied complete with 230 Vac/12 Vdc power adapter, HI 504901SW configuration software and instructions.

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 710012	230 Vac/12 Vdc pwr adapter (UK)
HI 710013	230 Vac/12 Vdc pwr adapter (S.A.)
HI 710014	230 Vac/12 Vdc pwr adapter (Aus)
HI 920010	9 to 9-pin RS232 connection cable
HI 92500	Windows® Compatible Application Software

HI 504903

GSM Supervisor

for HI 142 Series



Connect and Monitor up to 31 Dataloggers with 1 Unit!

HI504903 instrument is an intelligent interface between HI142 temperature dataloggers connected through RS485 port and an industrial GSM cellular phone for sending SMS messages or connecting through a local or a remote computer with HI92140 Hanna application software.

HI504903 can acquire from HI142 information about active alarms, errors, current status and real time temperature values on datalogger.

HI504903 device is also provided with one digital input (typically an alarm relay) from "non-intelligent" instruments, with only an alarm relay contact or another digital output signal. HI504903 can be configured for all its parameters and features through the HI504903SW Windows® compatible application software provided with the instrument.

Two models are available:

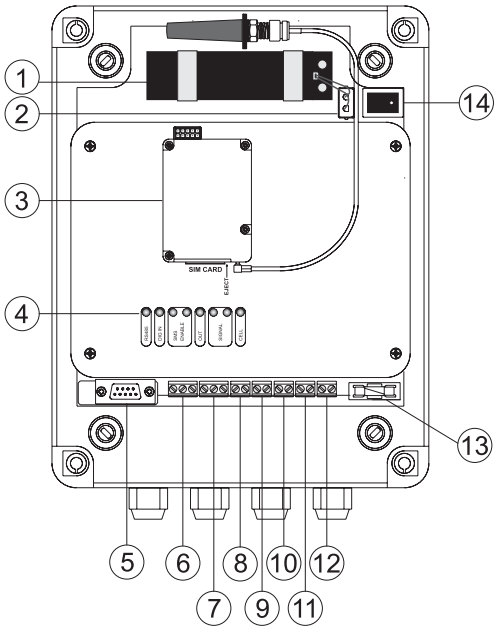
HI504903-1: Dual-band 900/1900 MHz GSM Power supply: 115VAC to 12VDC power adapter (HI710005)

HI504903-2: Dual-band 900/1800 MHz GSM Power supply: 230VAC to 12VDC power adapter (HI710006)

Front View



Inside View

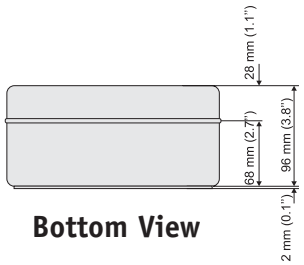


1. Backup battery
2. On-board connector
3. GSM module
4. LED indicators
5. RS232 comm port (local PC comm. only)
6. Not used
7. Not used
8. Digital input terminal to aquire ext. info
9. Digital input terminal to disable SMS sending
10. Digital output terminal
11. RS485 serial comm. port
12. Power supply input (12 Vdc)
13. Fuse (1 A)
14. Power ON/OFF switch

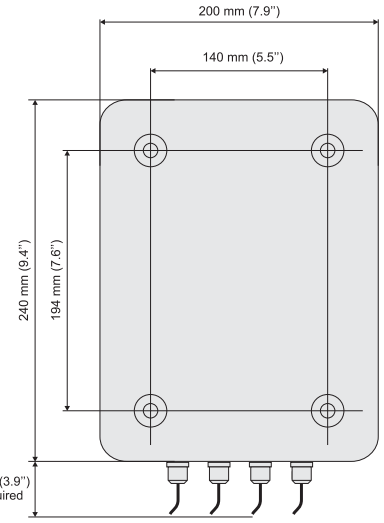
Feature List

- *GSM phone inside for Short Messaging Service (SMS) sending.*
- *Possibility of a wireless remote interface configuration or connection to a computer workstation (equipped with a modem) through the cellular phone inside.*
- *RS232 auxiliary port (PC config) for configuration or connection purpose with a local computer connected through HI920010 cable.*
- *RS485 port, allowing connection of up to 31 HI142 temperature dataloggers on the same wire.*
- *Digital input port (typically connected to an alarm relay) to acquire information from "non-intelligent" instruments.*
- *Digital output port, for which it is possible to change the status (open/closed) through an appropriate SMS sent to the interface.*
- *SMS enabling/disabling option through a dedicated port.*
- *LED indicators:* two red LED's are provided for signaling error conditions or active alarms in the devices connected to the interface through RS485 port or digital input, depending on interface configuration; one green LED and one red LED are provided to give indication about SMS sending enable current status; two green LED's indicate the cellular phone signal quality; one yellow LED is dedicated to the current status of digital output contact, and another yellow LED to the operating status of the cellular phone terminal.
- *Real time clock.*
- *Diagnostic features.*
- *Internal backup battery which provides power supply in case of mains power failure.*

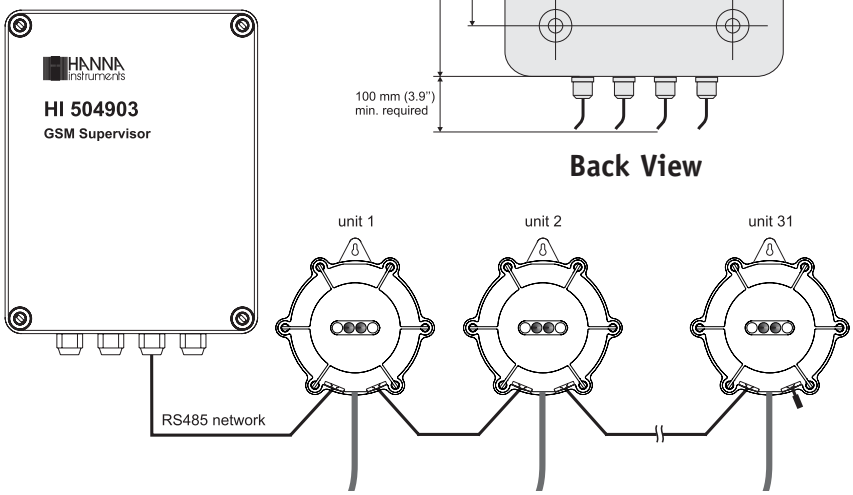
Mechanical Dimensions



Bottom View



Back View



SPECIFICATIONS	HI 504903
Max Output Power	2 W for EGSM900; 1 W for GSM1800/1900
SIM Interface	3V type SIM card
Antenna	Dual-band antenna (900/1800/1900 MHz)
Digital Input Channel	supporting mechanical relays or open-collector outputs
Digital Output Channel	open-collector output, 5 mA/30V max.
RS485 Channel Towards Instruments	For connection of up to 31 HI142 temperature dataloggers on the same wire; baud rate fixed to 1200 bps (limited by the HI142 dataloggers)
RS232 Auxiliary Port	D-Sub female connector, baud rate up to 9600
Installation Category	I
Power Supply	12 VDC adapter & internal rechargeable battery (12V / 0.8 Ah) for backing up
Power Consumption	6 VA max.
Environment	0 to 50ºC (32 to 122°F); RH max 85% non-condensing
Enclosure	ABS case, IP54
Dimensions / Weight	240 x 200 x 98 mm (9.4 x 7.9 x 3.9") / approx. 1.4 kg (3.1 lbs.)

ORDERING INFORMATION

HI 504903-1 (900/1900 MHz GSM supervisor) is supplied complete with 115 Vac/12 Vdc power adapter, HI 504903SW configuration software and instructions.

HI 504903-2 (900/1800 MHz GSM supervisor) is supplied complete with 230 Vac/12 Vdc power adapter, HI 504903SW configuration software and instructions.

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 710012	230 Vac/12 Vdc pwr adapter (UK)
HI 710013	230 Vac/12 Vdc pwr adapter (S.A.)
HI 710014	230 Vac/12 Vdc pwr adapter (Aus)
HI 920010	9 to 9-pin RS232 connection cable
HI 92500	Windows® Compatible Application Software

HI 504900
GSM Module



The Essential Link

The optimization of an industrial process plant means the reduction of costly unscheduled shutdown time. With this in mind, HANNA has developed the HI 504900 GSM cellular module*. The HI 504900 is used for sending SMS alarm messages* and also can receive live updates on actual process conditions from authorized personnel.

HI 504900 is a GSM module to be used for connecting advanced HANNA controllers that incorporate an RS485 port directly to the user's cellular phone through a GSM network.

The module will send an alarm SMS when errors occur on instruments included on the RS485 network, and also process status SMS's upon request.

The GSM module allows users to store two cellular phone numbers, to be used for sending SMS alarms. The text message is simple and easy to understand.

In addition, HI 504900 can download data and perform a complete remote control of all instruments connected to the RS485 network by using the HANNA HI 92500 software and modem connection.

The GSM module is also provided with an LED indicator, which gives information about the module operating status.

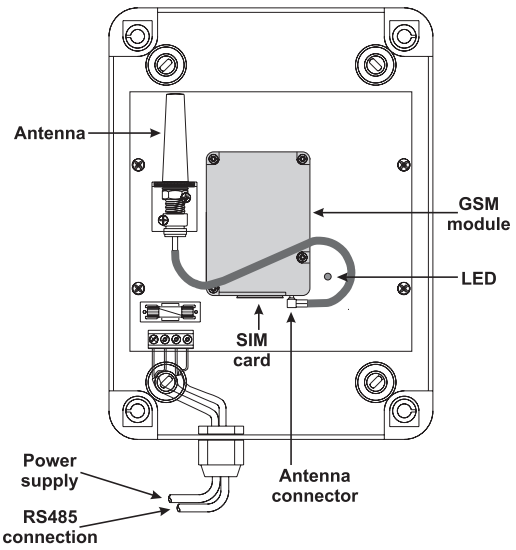
Two models are available:

HI 504900-1: Dual-band 900/1900 MHz GSM Power supply: 12VDC to 115VAC power adapter

HI 504900-2: Dual-band 900/1800 MHz GSM Power supply: 12VDC to 230VAC power adapter

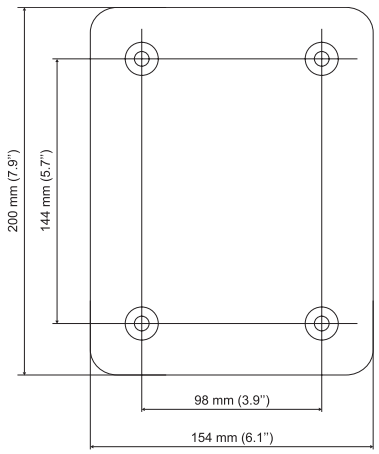
- *Remote control by AT commands (according to GSM 07.07 and 07.05)*
- *Dual-band antenna (900/1800/1900 MHz)*

Inside View



*Compatible phones, plans & SIM cards must be purchased separately by an outside provider and is not in any way covered by HANNA instruments®.

Mechanical Dimensions



SPECIFICATIONS	HI 504900
Max Output Power	2 W for EGSM900; 1 W for GSM1800/1900
SIM Interface	3 V type SIM card
Antenna	dual band (900/1800/1900 MHz)
Installation Category	I
Power Supply	12 Vdc adapter (included)
RS485 Channel	for connection of all instruments with RS485 in the same bus; baud rate up to 19200
Environment	0 to 50ºC (32 to 122°F); RH max 85% non-condensing
Enclosure	fiberglass NEMA case 4X type
Dimensions / Weight	240 x 154 x 79 mm (7.9 x 6.1 x 3.1") / 800 g (1.8 lb.)

ORDERING INFORMATION

HI 504900-1 (900/1900 MHz GSM module) is supplied complete with 115 Vac/12 Vdc power adapter and instructions

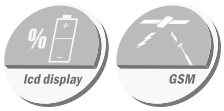
HI 504900-2 (900/1800 MHz GSM module) is supplied complete with 230 Vac/12 Vdc power adapter and instructions

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 710012	230 Vac/12 Vdc pwr adapter (UK)
HI 710013	230 Vac/12 Vdc pwr adapter (S.A.)
HI 710014	230 Vac/12 Vdc pwr adapter (Aus)
HI 92500	Windows® compatible software



HI 504902
RS485 Modem



For Remote Controlling

HI 504902 is a standard modem provided with an RS485 port. It allows the remote control of HANNA meters with an RS485 port. Meters can be remotely controlled from a PC, using the HI 92500 software through a standard telephone line.

The modem is included in an RS485 network and connected to an analog telephone line. This way, HI 504902 allows the user to receive and transmit data to the instruments in the RS485 network through a simple telephone connection.

The modem is provided with LEDs that indicate if the device is ON and its operating status (data receiving or transmitting).

SPECIFICATIONS	HI 504902
Telecom Certifications	Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Liechtenstein, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, Russia, Singapore, Slovak Republic, South Africa, Spain, Sweden, Switzerland, Taiwan, Turkey, United Kingdom, United States
Functions	data service; remote control by AT commands
Power Supply	12 Vdc adapter (included)
Dimensions	165 x 110 x 35 mm (6.5 x 4.3 x 1.4")
Weight	approx. 250 g (0.55 lb

ORDERING INFORMATION

HI 504902 is supplied complete with 12 Vdc power adapter and instructions.

ACCESSORIES

HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter
HI 920010	Serial cable for PC connection
HI 92500	Windows® compatible software

HI 98143

pH and EC Transmitter

with Isolated Output

2 points



Accepts 2 Signals Simultaneously

The HI 98143 series is designed to accept signals directly from a pH electrode and a conductivity probe at the same time.

Direct connection of the probes to the transmitter assure a positive electrical connection with no signal loss. This transmitter is most useful in remote process control applications.

Four models are available, transmitting a 0-1 V, 0-4 V or 4-20 mA signal. The output signals are proportional to the input signals but independent of changes in load or cable capacitance. Compensation for the effects of temperature for EC measurements are performed by the transmitter's ATC circuitry.

The transmitter can be connected to any pH or conductivity controller, recorder, computer or any data monitoring device that accepts 0 to 1 V, 0 to 4 V or 4 to 20 mA input. HI 98143 is an ideal tool for applications that require the monitoring of both pH and conductivity at the same time.

The HI 98143-22 model has been specifically designed to be used with the HI 8000 fertigation controllers.

- *Accepts pH electrode and EC probe signals simultaneously*
- *Direct probe connection assures a positive electrical connection eliminating signal loss*
- *Automatic temperature compensation (EC only)*

SPECIFICATIONS	HI 98143-01	HI 98143-04	HI 98143-20	HI 98143-22
Range	0 to 14 pH; 0 to 10 mS/cm			
Accuracy (@20°C/68°F)	pH: ±0.5% F.S.; EC: ±2% F.S.			
Input Impedance	10^{12} Ohm			
Calibration	manual; with offset (pH4/10) and slope (pH7) trimmers for pH; at 0 and 5 mS/cm for EC			
Temperature Compensation (EC)	automatic, 0 to 60°C (32 to 132°F) with ß=2%/°C			
Output (isolated)	0-1 V	0-4 V	4-20 mA	4-20 mA
Protection	IP 54			
Power Supply	12-24 Vdc			
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing			
Dimensions	160 x 105 x 31 mm (6.3 x 4.1 x 1.2")			
Weight	280 g (9.9 oz.)			

ORDERING INFORMATION

All **HI 98143** models are supplied complete with instructions.

HI 98143-01 with 0-1 V isolated output

HI 98143-04 with 0-4 V isolated output

HI 98143-20 with 4-20 mA isolated output

HI 98143-22 with 4-20 mA isolated output (specific for the HI 8000 controllers)

PROBES

HI 3001 Conductivity probe for in-line or submersion applications

ACCESSORIES

HI 7004/1L pH 4.01 buffer solution, 1 L

HI 7007/1L pH 7.01buffer solution, 1 L bottle

HI 7010/1L pH 10.01buffer solution, 1 L bottle

HI 7039L 5000 µS/cm calibration solution, 500 mL

HI 7855/1 1 m (3.3') connection cable with BNC and screw connectors

pH Transmitters

with 4-20 mA Galvanically Isolated Output

Water Resistance

The HI 8614 is a water-resistant pH transmitter is designed to be used with a standard high impedance pH probe with BNC connector. The signal is then processed by a special high-impedance amplifier, which transmits an output current directly proportional to the input signal but independent of changes in load or cable capacitance. Calibration is performed by adjustment of two independent trimmers—slope and offset.

Temperature compensation is performed by the transmitter's ATC circuitry when measurements are taken with a temperature probe attached; if ATC is not required, it is also possible to substitute a fixed resistor for the temperature probe. The transmitter can be connected to HANNA controller HI 8510, HI 8710 or HI 8711, recorders, computers or any data monitoring device that accepts 4 to 20 mA input.

Four versions are available, HI 8614 without an LCD, and the LCD version, HI 8614"L". HI 8614L allows easy verification and monitoring of measured values, and is easier to calibrate and maintain.

The HI 8614-01 and HI 8614L-01 are the same as HI 8614 and HI8614L respectively, but with a range extension in order to be connected to the new design of HI 8510, HI 8710 and HI 8711 controllers.

- *Water resistant*
- *Loop Powered*
- *ATC*
- *Available with or without LCD*



HI 8614 without LCD



"-01" models feature an extended range in order to be connected to the new design of our HI 8510, HI 8710 and HI 8711 controllers.

SPECIFICATIONS	HI 8614	HI 8614L	HI 8614-01	HI 8614L-01
Range	0.00 to 14.00 pH; 4–20 mA		-2.00 to 16.00 pH; 4–20 mA	
Resolution (for "L" models)	0.01 pH			
Accuracy (@20°C/68°F)	±0.02 pH; ±0.02 mA			
Calibration	offset: ±2 pH; ±2.2 mA; slope: 86 to 116%; ±0.5 mA			
Temperature Compensation	fixed or automatic from 0 to 100°C (32 to 212°F) with HI 76608 probe		fixed or automatic from -20 to 100°C (-4 to 212°F) with HI 76608 probe	
Input Impedance	10^{12} Ohm			
Recorder Output	4-20 mA (isolated)			
Protection	IP 65			
Power Supply	18-30 Vdc	20-36 Vdc	18-30 Vdc	20-36 Vdc
Load	max 500 Ohm			
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing			
Dimensions	165 x 110 x 90 mm (6.5 x 4.3 x 3.5")			
Weight	1 kg (2.2 lb.)			

ORDERING INFORMATION

HI 8614 and **HI 8614-01** is supplied with instructions.

HI 8614L and **HI 8614L-01** (with display) is supplied complete with instructions

ELECTRODES

HI 76608	Temperature probe with 3 m (9.9') cable

SOLUTIONS

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

ACCESSORIES

HI 6054B	Electrode holder for in-line applications
HI 931002	4-20 mA simulator
HI 931001	pH / ORP electrode simulator with display

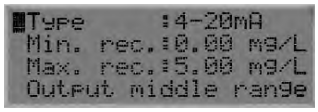
Chlorine, pH, ORP and Temperature Analyzers



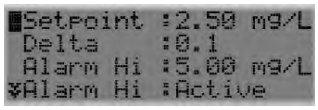
- *pH regulation with both ON/OFF and proportional controls*
- *Separate alarms can be set for pH and chlorine controls*
- *DPD colorimetric method*
- *NEMA enclosure*
- *Parameters can be sent through SMS*
- *Large graphical display with backlight*
- *User-friendly interface*
- *Can store up to 3500 data points that can be displayed or downloaded to a PC*



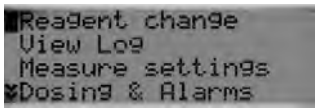
Large graphic display with backlight



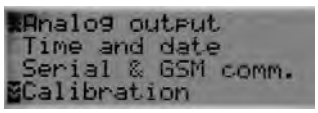
Recorder output selectable at 0-10 mV, 0-10 mV, 0-1 V, 4-20 mA or 0-20 mA



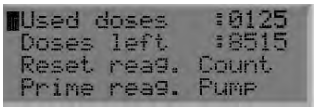
Adjustable setpoint, proportional dosing and high and low alarms



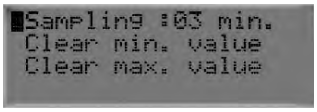
User-friendly interface simplifies setup and maintenance.



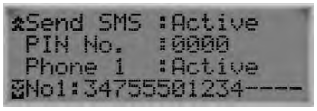
Analog output for proportional chlorine or acid/alkali dosing pump control



Minimum required maintenance, thanks to the pre-mixed reagents that can last for weeks



Sampling interval selectable from 3 to 90 minutes for chlorine and from 3 to 120 minutes for pH



SMS message sending through the external optional HI 504900 GSM module



Up to 3500 data series can be stored and then downloaded to a PC...



... or shown on the display

HI 8615

ORP Transmitters

with 4-20 mA Galvanically Isolated Output



HI 8615L with LCD

"-01" models feature range extension in order to be connected to the new design of our HI 8512 and HI 8720 controllers.

Ideal for Aggressive Environments

The HI 8615 has been designed for transmitting ORP measurements from remote locations in industrial environments.

This improved transmitter features two controls (one for 4 mA and one for 20 mA) to compensate for electronic drift and ambient temperature.

The HI 8615 uses a universal BNC socket for quick and secure connection of any ORP electrode with a BNC connector.

An IP65 rating and a rugged ABS casing provide optimum protection even in harsh environments making this instrument ideal for chromium hexavalent reductions and water sanitation. The transmitter can be connected to HANNA meters HI 8512, HI 8720 or any recorders, computers or data monitor that accepts 4 to 20 mA input.

Four versions are available, HI 8615 without an LCD, and the LCD version, HI 8615"L". HI 8615"L" allows easy verification and monitoring of measured values, and is easier to calibrate and maintain.

The HI 8615-01 and HI 8615L-01 are the same as HI 8615 and HI8615L respectively, but with a range extension in order to be connected to the new design of HI 8512 and HI 8720 controllers.

- *Universal BNC connector for quick connections*
- *Rugged ABS casing*
- *Loop Powered*
- *Available with or without LCD*

SPECIFICATIONS	HI 8615	HI 8615L	HI 8615-01	HI 8615L-01
Range	±1000 mV; 4–20 mA		±1999 mV; 4–20 mA	
Resolution	1 mV			
Accuracy (@20°C/68°F)	±5 mV; ±0.2 mA			
Calibration	offset: ±100 mV; ±0.8 mA slope: 90 to 110%; ±0.8 mA			
Input Impedance	10^{12} Ohm			
Recorder Output	4-20 mA (isolated)			
Protection	IP 65			
Power Supply	18-30 Vdc	20-36 Vdc	18-30 Vdc	20-36 Vdc
Load	max 500 Ohm			
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing			
Dimensions	165 x 110 x 90 mm (6.5 x 4.3 x 3.5")			
Weight	1 kg (2.2 lb.)			

ORDERING INFORMATION

HI 8615 and **HI 8615-01** is supplied complete with instructions

HI 8615L and **HI 8615L-01** (with display) is supplied complete with instructions

SOLUTIONS

HI 7020L 200-275 mV ORP test solution, 500 mL

HI 7091L Pretreatment Reducing solution, 500 mL

HI 7092L Pretreatment Oxidizing solution, 500 mL

ACCESSORIES

HI 6054B Electrode holder for in-line applications

HI 8427 pH / ORP electrode simulator

HI 931001 pH / ORP electrode simulator with display



HI 8615 without LCD

HANNA instruments

With Great Products, Come Great Results™

Peak Performance

HI 8936 is our redesigned conductivity transmitter that utilizes a 4-ring potentiometric probe. This probe is virtually immune to contamination by unclean solutions. This allows the transmitter to operate at peak performance at all times.

Temperature effects are compensated for by utilizing both the built-in temperature sensor on the probe and the transmitter's ATC circuitry with a β of 2%/°C.

Direct connection of the probe to the transmitter assures a positive electrical connection with no signal loss over long distances.

Two versions are available, HI 8936 without an LCD, and the LCD version, HI 8936"L". HI 8936"L" allows easy verification and monitoring of measured values, and is easier to calibrate and maintain.

The HI 8936 series should be used in conjunction with the HI 7635 in-line probe or HI 7638 platinum probe (see Process Electrodes and Probes).

The HI 8936 series requires external power to the 4-20 mA current loop.

- *Utilizes HANNA's potentiometric 4-ring conductivity probe*
- *4-ring probe*
- *Automatic temperature compensation*
- *Direct probe connection eliminates signal loss*
- *Available with or without LCD*
- *Use in conjunction with HI 7638 or HI 3001 platinum conductivity probes*



A, B, C, and D without LCD



AL, BL, CL, and DL with LCD

SPECIFICATIONS	HI 8936A HI 8936AL	HI 8936B HI 8936BL	HI 8936C HI 8936CL	HI 8936D HI 8936DL
Range	0.0 to 199.9 mS/cm	0.00 to 19.99 mS/cm	0 to 1999 µS/cm	0.0 to 199.9 µS/cm
Resolution	0.1 mS/cm	0.01 mS/cm	1 µS/cm	0.1 µS/cm
Accuracy (@20°C/68°F)	±2% F.S. (excluding probe error)			
Calibration	manual, 2 point, with offset and slope trimmers			
Temperature Compensation	fixed or automatic from 0 to 50°C (32 to 122°F) with β=2%/°C			
Conductivity Probe	HI 7635 for in-line applications or HI 7638 for tank (not included)			
Calibration	Manual, 2 point, through offset and slope trimmers			
Recorder Output	4-20 mA, not isolated, max 500 Ohm			
Protection	IP 65			
Power Supply	without LCD: 12-30 Vdc; with LCD: 17-36 Vdc			
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing			
Dimensions	165 x 110 x 90 mm (6.5 x 4.3 x 3.5")			
Weight	1 kg (2.2 lb.)			

ORDERING INFORMATION

All **HI 8936** models are supplied complete with instructions.

SOLUTIONS

HI 7030L	12880 µS/cm solution, 500 mL
HI 7031L	1413 µS/cm solution, 500 mL
HI 7033L	84 µS/cm solution, 500 mL
HI 7034L	80000 µS/cm solution, 500 mL
HI 7035L	111800 µS/cm olution, 500mL
HI 7039L	5000 µS/cm solution, 500 mL

ACCESSORIES

HI 731326	Calibration screwdrivers (20 pcs)
HI 779/P	6-wire cable (100 m/330' roll)
HI 8733	Portable conductivity meter with ATC

HI 504920

Portable pH Meter & Calibrator

for Digital Transmitters



Calibrate Transmitters Easily

The digital calibrator is an absolute necessity for calibrating field transmitters. Calibration of process instrumentation over long distances is now made quick and simple with the introduction of the HI 504920

The HI 504920 is a handheld portable instrument for the measurement of pH/ORP and temperature and it functions as a reference pH meter by which to calibrate the new HI 504910 transmitter.

Quick, single-point calibration is performed in three simple steps:

1. Connect the calibrator to the transmitter by means of the special cable, HI 7290
2. Immerse the calibrator electrode in a sample of the process solution taken as close as possible to the installed process electrode. Wait for the signal o stabilize.
3. Press a button to transfer the data to the transmitter, and wait for confirmation on the display.

The operator can now store the reading on the portable meter and later connect the calibrator to the transmitter in order to calibrate the system.

SPECIFICATIONS		HI 504920
Range	pH	-4.00 to 19.99 pH
	mV	±600.0 mV; ±2000 mV
	Temperature	-20 to 120.0°C
Resolution	pH	0.01 pH
	mV	0.1 mV (within ±400.0 mV); 0.2 mV (±400 to ±600 mV)
	Temperature	±0.1°C (-10°C to 120°C); 1°C (below -10°C)
Accuracy (@20°C)	pH	±0.01 pH
	mV	±0.2 mV (within ±400.0 mV); ±0.4 mV (±400 to ±600 mV); ±2 mV (outside)
	Temperature	± 0.4°C (0 to 70°C); ±1°C (outside)
Calibration	pH	automatic, 1 or 2 point, with 5 memorized buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)
	mV	automatic, 2 point (0, 350 mV) or 3 point (0, 350, 1900 mV)
pH Electrode		HI 62920 amplified electrode with internal temperature sensor, Matching Pin and DIN connector (included)
Temperature Compensation		automatic, -20 to 120°C (-4 to 248°F)
Input Impedance		1012 Ohm
Power Supply		(4) 1.5V AA batteries (approx. 300 hours of continuous use) or 12 Vdc input
Infrared Interface		through HI 7920 cable (included)
Environment		0 to 50°C (32 to 122°F); RH 100%
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight		500 g (1.1 lb.)

ORDERING INFORMATION

HI 504920 is supplied with HI 62920 amplified pH electrode with built-in temperature sensor, DIN connector and 2 m cable, Hanna HI 504910 interface cable (HI 7920), pH 4.01 buffer 20 mL (1), pH 7.01 buffer 20 (1), instruction manual, 1.5V AA size alkaline batteries (4), 12 VDC power adapter and rugged carrying case

ELECTRODES

HI 62920	Amplified pH electrode with internal temperature sensor and titanium cage
HI 7920	HI 504910/HI 504920 interface cable

SOLUTIONS

HI 7004/1L	pH 4.01 buffer solution, 1 L
HI 7007/1L	pH 7.01 buffer solution, 1 L
HI 7010/1L	pH 10.01 buffer solution, 1 L

HANNA instruments

With Great Products, Come Great Results™

4-20 mA Amperometer, Simulator and Calibrator

Portable, Handheld Simulator

HI 931002 is a portable instrument designed by the plant Repair and Maintenance Operator for the MRO! This portable simulator can monitor and regulate 4-20 mA from practically any process meter with or without a voltage generator. The communication bus from process instrumentation can be simulated in any of the following modes:

Passive Drive/Calibrator Mode:

HI 931002 can set the 4-20 mA current values and the user can then adjust the process meter accordingly.

Active Drive/Simulator Mode:

HI 931002 simulates the correct current values as above in addition to providing power to the bus communication. Power is provided through an external adapter (included) which is connected to the simulator. This mode is ideal to calibrate chart recorders, pressure transducer or current indicators.

Passive Measurement/Tester Mode:

HI 931002 practically becomes an Amperometer. It measures and displays the mA (or pH) values transmitted by the process meter.

Active Measurement/Tester Mode:

Same as above in addition to providing voltage to the 4-20 mA bus.

HI 931002 can measure incoming current, provide power and simulate 4-20 mA output to calibrate your process meter. A large LCD shows values on the display. You can select between drive and measurement modes through a switch on the front panel and two dials allow for quick adjustment of the current.



SPECIFICATIONS	HI 931002
Range	2.00 to 19.99 mA and -1.50 to 14.00 pH (active and passive drive mode); 0.00 to 19.99 mA and -3.50 to 14.00 pH (active and passive measuring mode)
Resolution	0.01 mA; 0.01 pH
Accuracy (@20°C/68°F)	±0.01 mA; ±0.01 pH
Input Resistance	20 W
Power Supply	(1) 9V battery; approx. 1600 hours of continuous use; or 12 Vdc power adapter (included)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	180 x 83 x 40 mm (7.1 x 3.3 x 1.6")
Weight	320 g (11.3 oz.)

ORDERING INFORMATION

HI 931002 is supplied complete with 1 m connection cable, battery, 12 Vdc power adapter and instructions.

ACCESSORIES

HI 7862/1	1 m (3.3') connection cable
HI 710005	115 Vac/12 Vdc power adapter
HI 710006	230 Vac/12 Vdc power adapter

Dosing Pumps

BlackStone Chemical Dosing Pumps

Chemical Resistance Guide*

CHEMICAL RESISTANCE GUIDE*	PVC	PP	Hypalon	FPM/FKM	PVDF	PTFE
Acetic Acid, 80%	D	B	A	E	A	A
Bleach	A	B	A	A	A	B
Citric Acid	A	A	A	A	A	A
Copper Cyanide	A	A	X	B	A	A
Copper Sulfate	A	A	B	B	A	A
Ferric Chloride	A	A	B	B	A	A
Ferric Sulfate	A	A	B	B	A	A
Hydrazine	X	X	B	B	A	A
Hydrochloric Acid (concentrated)	A	A	B	B	A	A
Hydrochloric Acid (diluted)	A	A	B	B	A	A
Hydrofluoric Acid (diluted)	D	B	D	A	A	A
Hydrogen Sulfide	C	A	B	B	A	A
Magnesium Nitrate	A	A	A	A	A	A
Magnesium Sulfate	A	A	A	A	A	A
Nitric Acid, 50%	A	C	E	A	A	A
Phosphoric Acid	B	B	A	B	A	A
Plating Baths	A	A	C	A	A	A
Potassium Cyanide	A	A	B	B	A	A
Potassium Nitrate	A	A	B	B	A	A
Propyl Alcohol	C	X	B	B	A	A
Soaps	A	A	B	B	A	A
Sodium Bicarbonate	A	A	A	A	A	A
Sodium Bisulfite	A	A	A	A	A	A
Sodium Hydroxide, 50%	A	A	B	E	A	A
Sodium Hypochlorite, 18%	A	A	A	D	A	A
Sulfuric Acid (concentrated)	A	A	B	A	A	A
Tanning Reagents	A	A	A	X	A	A
Trichloretane	E	C	E	A	A	A

Symbol Key

A - Excellent B - Good C - Fair D - Acceptable (limited use)
E - Not recommended X - Unknown

* PARTIAL LISTING

BL Series Dosing Pumps

PART NUMBER	MAX OUTPUT LPH	RATED PRESSURE BAR	DOSING FREQUENCY STROKES/MIN
WITH LARGE DIAPHRAGM			
BL 20	18.3	0.5	120
BL 15	15.2	1	120
BL 10	10.8	3	120
BL 7	7.6	3	120
WITH SMALL DIAPHRAGM			
BL 5	5.0	7	120
BL 3	2.9	8	120
BL 1.5	1.5	13	120

Black Stone

Versatility

Blackstone pumps have been designed to meet the ever changing needs of industry. With their broad, flat base and mounting holes for tank, shelf or floor mounting (horizontal), the pumps can be easily mounted anywhere in your plant. The rear of the pump housing also provides mounting holes to facilitate vertical mounting: wall, tank or machine. With the pump valve assembly and unit controls both located on the front of the pump, there is never a problem with installation or flow adjustments.

Simple Operation

Blackstone pumps are equipped with a single control for pump output. The external Flow Rate Control (potentiometer) on the face of the pump allows you to adjust the percentage of flow from 0 to 100% of the pump's rated capacity. This feature eliminates the need to worry about stroke lengths and power settings. An LED indicator lights up each time a stroke begins. This allows the user to assess the stroke rate from a distance.

High Quality Materials

Blackstone pumps have been manufactured with the highest level of mechanical precision, from materials chosen for their inherent ability to resist the effects of aggressive chemicals. When you select a Blackstone pump, you are eliminating the time consuming effort involved in picking the right material for your application. Blackstone pumps are supplied with the highest quality material as standard equipment—not optional. The diaphragm utilizes one-piece construction of PTFE, which unlike conventional laminated diaphragms will stand up to the test of time and wear. Ball valves are constructed in glass.

The pumphead and O-rings are made of PVDF, PTFE and FPM/FKM which offer unsurpassed resistance. The chemical resistance chart shows how well PVDF and PTFE stand up to some of the most aggressive chemicals.

Dosing Pumps

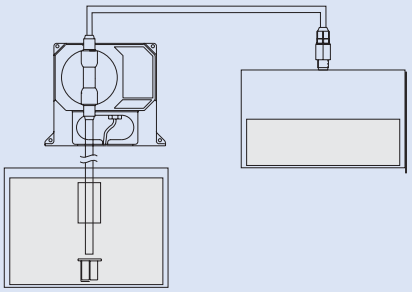
BlackStone Chemical Dosing Pumps

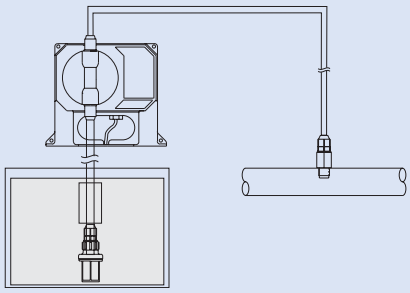


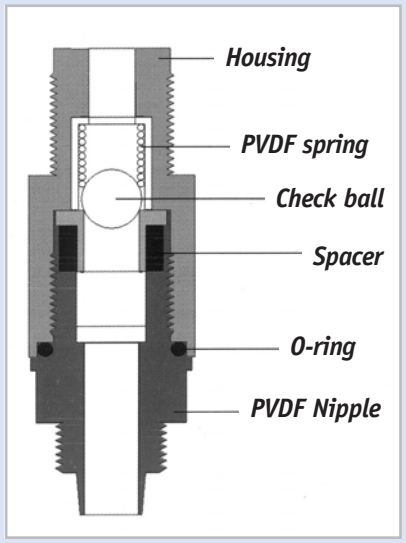
Rugged Design

Blackstone pumps are completely sealed during assembly and offer IP65 protection against splashes and spills providing excellent protection even in hostile environments. The fiber-reinforced polypropylene housing stands up to aggressive chemicals while offering superior strength under tough industrial conditions.

Typical Installations







Blackstone's positive displacement solenoid driven pumps use a minimum number of moving parts, therefore reducing the chance of mechanical failure. Part wear and oiling associated with motor driven pumps (ball-bearings, gear drives and cams) are not a concern with these pumps. Blackstone pumps are more accurate than standard pumps due to the positive displacement design ensuring each stroke is identical to the strokes before and after it, thus keeping the flow rate consistent.

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.

HANNA also produces polyethylene tubing, injection fittings, ceramic weights and replacement parts.

SPECIFICATIONS	BL Series
Max Output	see table on previous page
Pump Casing	fiber-reinforced polypropylene
Materials	pumphead in PVDF, diaphragm in PTFE, glass ball valves and O-rings in FPM/FKM polyethylene 5 x 8 mm tubing and 3/8" injection fitting
Self-priming	max height: 1.5 m (5 feet)
Power Supply	110/115 Vac or 220/240 Vac, 50/60Hz
Max Power Consumption	approx. 200 W
Protection	IP65
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	165 x 194 x 121 mm (6.5 x 7.6 x 4.8")
Weight	approx. 3 kg (6.6 lb.)

ORDERING INFORMATION*

BL 1.5-1	1.5 LPH flow rate
BL 1.5-2	1.5 LPH flow rate
BL 3-1	2.9 LPH flow rate
BL 3-2	2.9 LPH flow rate
BL 5-1	5.0 LPH flow rate
BL 5-2	5.0 LPH flow rate
BL 7-1	7.6 LPH flow rate
BL 7-2	7.6 LPH flow rate
BL 10-1	10.8 LPH flow rate
BL 10-2	10.8 LPH flow rate
BL 15-1	15.2 LPH flow rate
BL 15-2	15.2 LPH flow rate
BL 20-1	18.3 LPH flow rate
BL 20-2	18.3 LPH flow rate

ACCESSORIES

HI 721101	Pumphead, O-ring and acrews
HI 721102	Discharge valve assembly
HI 721103	Suction valve assembly
HI 721004**	Injection valve assembly
HI 721005**	Foot valve assembly
HI 721008	Ceramic weight (4 pcs.)

** Required for operation

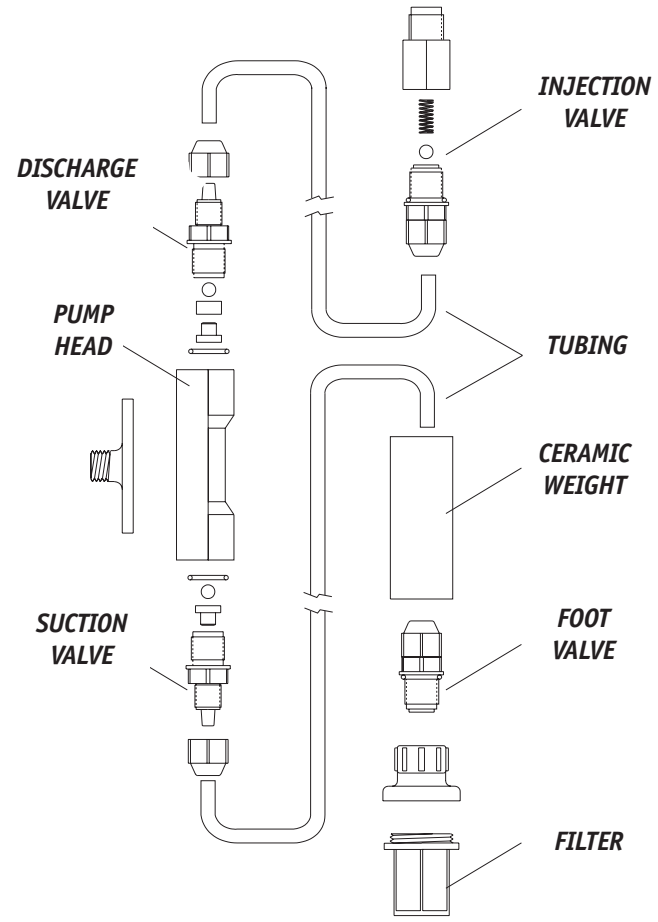
* **-1** = 110/115 Vac power supply
-2 = 220/2400 Vac power supply

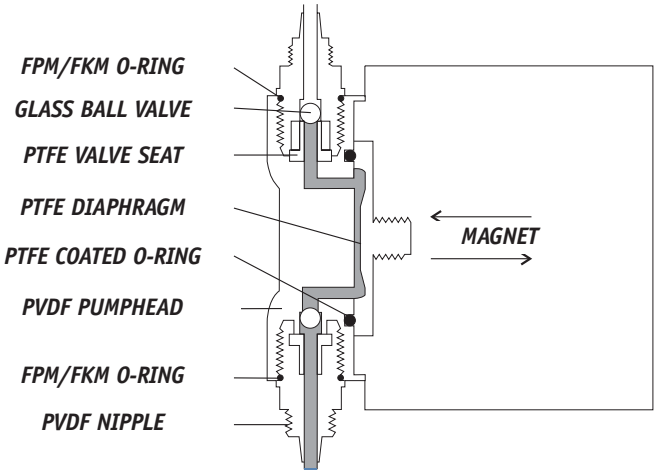
Replacement Parts

BlackStone Chemical Dosing Pumps

Blackstone Pump Replacement Parts

Assembly Diagram

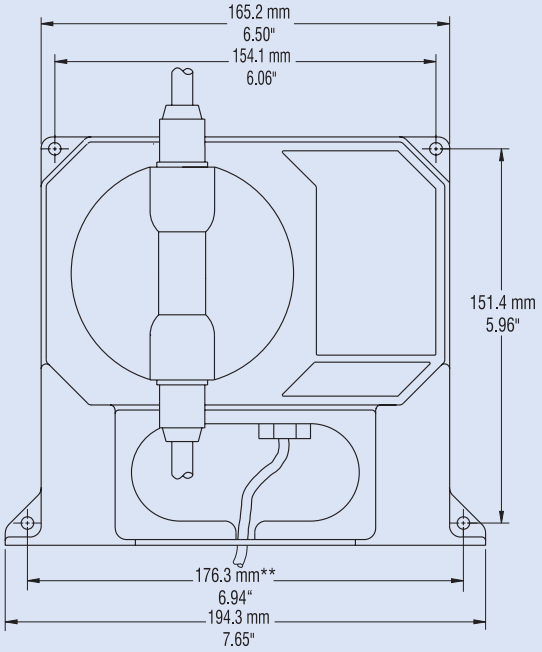




Mechanical Dimensions

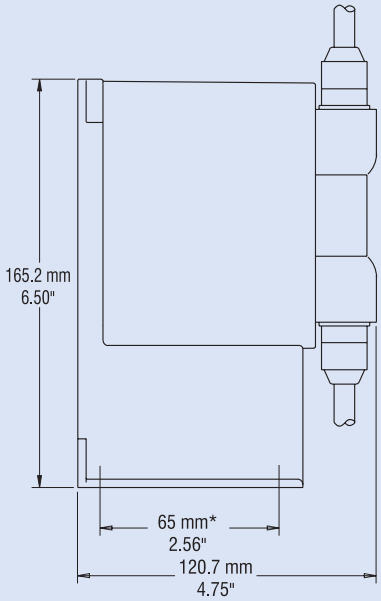
BlackStone Chemical Dosing Pumps

Front View



** Dimensions for floor and wall mounting

Side View



* Dimensions for floor mounting

HANNA instruments
With Great Products, Come Great Results™

PCA 310 • PCA 320 • PCA 330

Chlorine, pH, ORP and Temperature Analyzers



Continuous chlorine monitoring is essential.

The PCA series of analyzers check chlorine levels in applications such as pools and spas, drinking water and influent and effluent discharge of water to ensure public safety, prevent waste and protect the environment by reducing overdosage.

Chlorine Monitoring

Chlorine is the most commonly used water disinfectant in applications that vary from treatment of drinking and waste water to pool and spa sanitization. The monitoring of the chlorine level has an important bearing on public health in applications such as drinking water and return on investment and efficiency for heating systems and industry. Too much chlorine will generate unpleasant odor and taste, or can even be harmful, while too little can prove ineffective. The chlorine present in the water binds itself with bacteria, leaving only a part of the original quantity (free chlorine) to continue its disinfecting action.

HANNA presents its industrial range of Chlorine Meters in the PCA series of Chlorine Analyzers & Controllers. These microprocessor-based process instruments can continuously monitor a sample stream

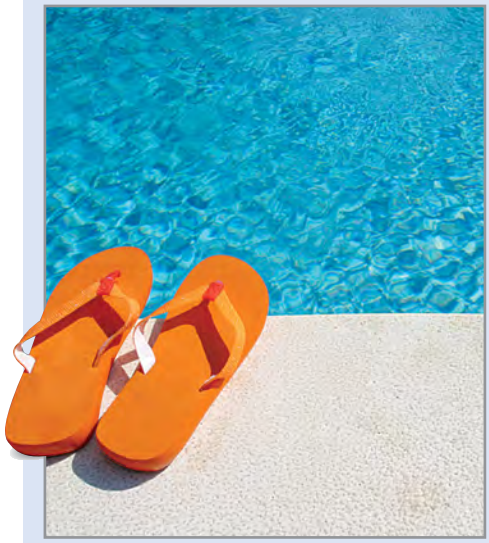
for Free Chlorine or Total Chlorine content in the 0 to 5 mg/L range with a 0.01 resolution. The principle of operation is based on an adaptation of the EPA recommended DPD 330.5 method.

Indicator and buffer reagent bottles are placed directly into the instrument case. Using a sampling period of 10 minutes, reagents need not be replenished for a month. The reagent bottles are also visible through the transparent window.

The operator can select a chlorine dosing set point which will be activated when the measurement is below the set point. The alarm can be also selected above or below the set point. The set point controls a relay which can perform proportional dosage with a user-selectable delta from 0.1 to 5.0 mg/L.

Since chlorine effectiveness is closely tied with pH levels, HANNA has designed our new chlorine analyzers PCA 320 & PCA 330 respectively with pH/temperature and pH/ORP/temperature control. These two new models also allow pH regulation through acid or alkaline dosage with both ON/OFF and proportional modes. All measured parameters can be sent through SMS to a cellular phone using the optional GSM module.

The external enclosure of the instruments meet the NEMA 4X standards: molded fiberglass polyester giving outstanding chemical and temperature resistance.



Method of Analysis

In the DPD Colorimetric method, N, N-Diethyl-p-phenylene-Diamine indicator and a buffer are mixed with the sample. Free available chlorine oxidizes the DPD indicator reagent at a pH between 6.3 and 6.6 to form a magenta colored compound. The intensity of the resulting color is proportional to the concentration of chlorine in the sample. The purpose of the buffer solution is to maintain the proper pH.

In total chlorine measurement (free available chlorine plus combined chloramines), potassium iodide is added. The chloramines in the sample cause the iodide ions to become iodine which reacts with free chlorine to oxidize the DPD indicator. A pH of 5.1 is required for this reaction. Thus total chlorine measurements require a different buffer solution containing potassium iodide. Once the chemical reaction is completed, the optical signal at 555 nm is compared to the signal measured through the sample before the reagents were added. From these measurements chlorine concentration is calculated and shown on the display.





"We use HANNA instruments® because it is a valuable world wide brand. Their high performance and technology provides us with good water quality monitoring."

RACIEL PAREDES
FACILITIES SERVICIES
Eli Lilly y Compañía de México
México City, México

Replacement Parts

BlackStone Chemical Dosing Pumps

ORDERING INFORMATION

HI 721101

This kit contains the PVDF pumphead, PTFE coated O-ring, 6 screws and washers.

HI 721102

This kit contains all the necessary replacement parts for your discharge valve assembly. Complete with a FPM/FKM O-ring, glass valve ball, the valve spacer and seat, head nipple and the tube nut to secure the assembled parts.

HI 721103

Suction valve assembly, complete with a FPM/FKM O-ring, glass valve ball, the valve spacer and seat, head nipple and the tube nut to secure the assembled parts.

HI 721004

Complete with an injection nipple, PTFE coated spring, glass valve ball and a valve assembly.

HI 721005

This kit contains a filter with a filter holder and a valve assembly.

HI 721003

This kit contains 10 glass balls and 10 valve O-rings.

HI 721006

This kit contains 4 PVDF springs.

HI 720029

LDPE hose, 3 m (9.9').
Inside diamater 4.71 mm
Outside diameter 7.87 mm

HI 720030

LDPE hose, 10 m (33').
Inside diamater 4.71 mm
Outside diameter 7.87 mm

HI 720031

LDPE hose, 50 m (165').
Inside diamater 4.71 mm
Outside diameter 7.87 mm

HI 720032

LPDE hose, 100 m (333').
Inside diamater 4.71 mm
Outside diameter 7.87 mm

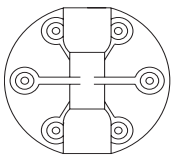
HI 721008

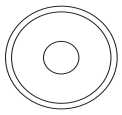
This kit contains 4 ceramic weights.

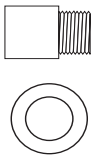
HI 740156

This kit contains 3 valve seats.

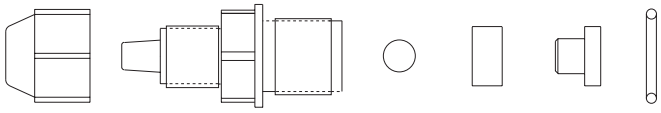
HI 721101


PUMPHEAD

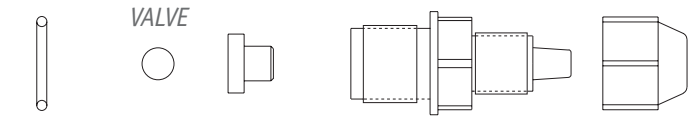

PTFE COATED O-RING


6 SCREWS & WASHERS

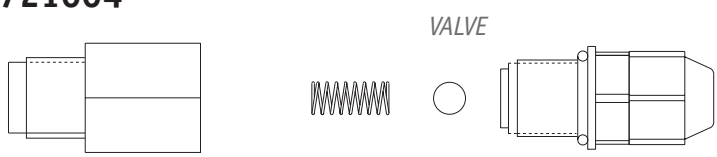
HI 721102



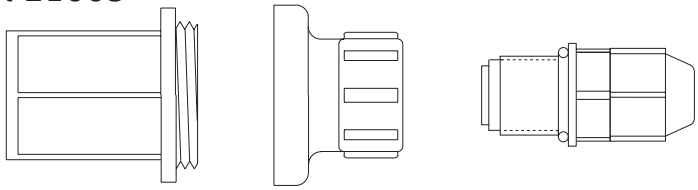
HI 721103



HI 721004



HI 721005



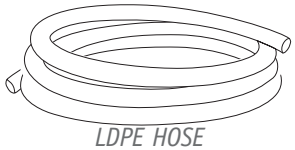
HI 721003



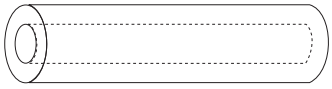
HI 721006


PVDF SPRING

HI 720032


LDPE HOSE

HI 721008


CERAMIC WEIGHT

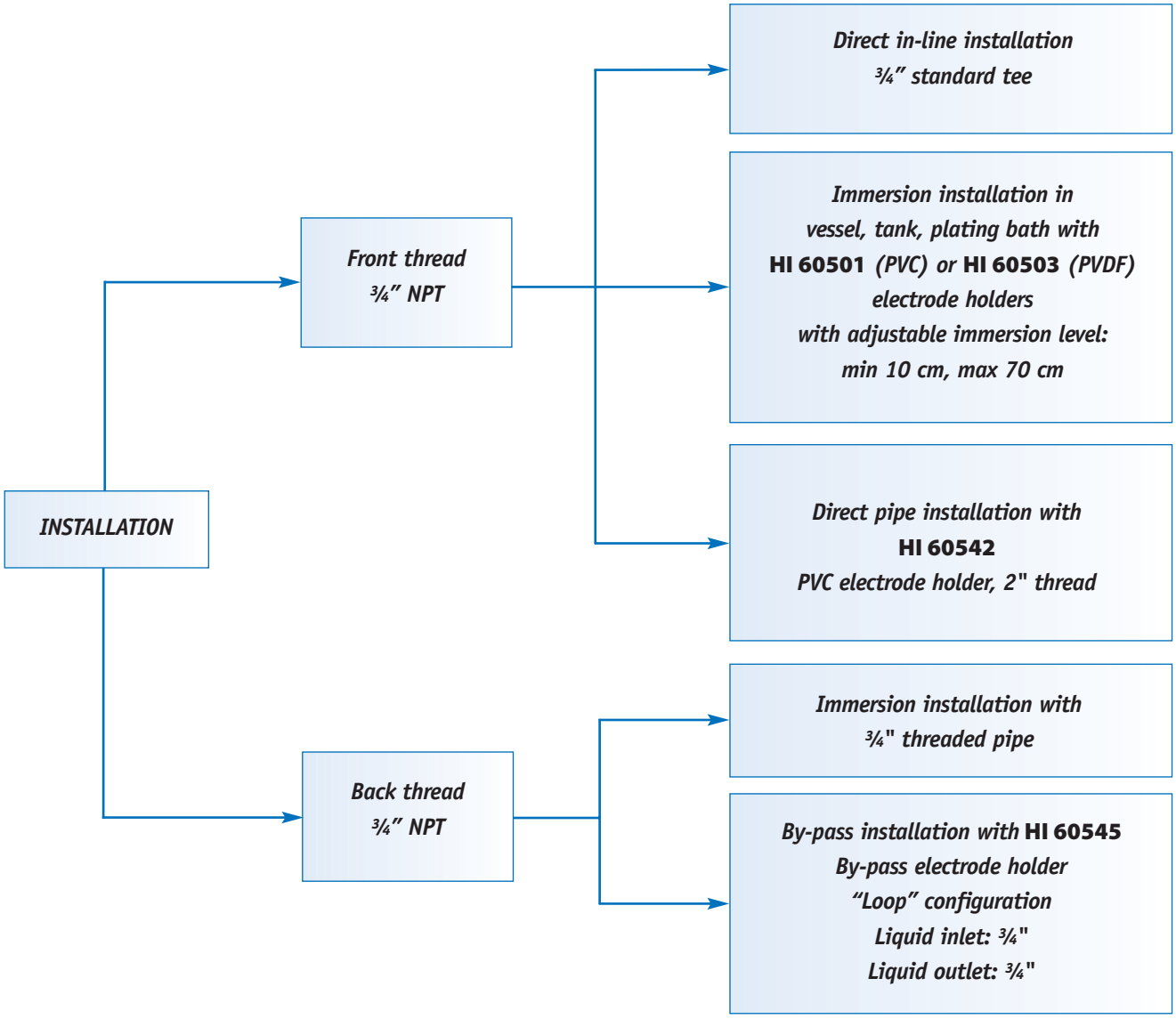
Flat Tip Industrial Electrodes

More Than 300 Models, More Than 300 Applications

Installation

These electrodes have been designed with ¾" external thread on both ends for easy installation.

HANNA also provides a series of probe holders for in-line, tank or by-pass installations for these electrodes, as shown below.

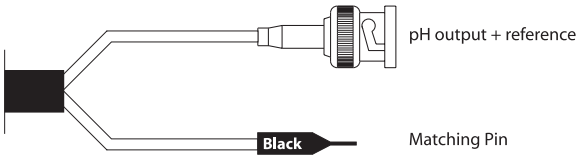


Flat Tip Industrial Electrodes

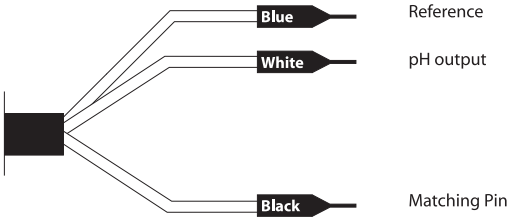
More Than 300 Models, More Than 300 Applications

Electrical Connections

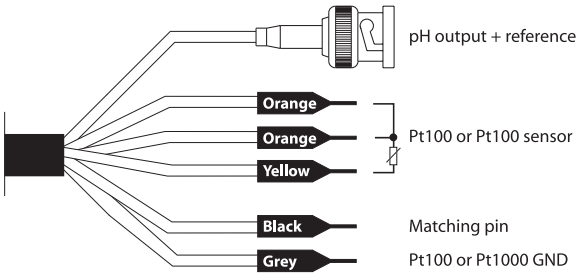
pH & ORP electrodes with BNC connector



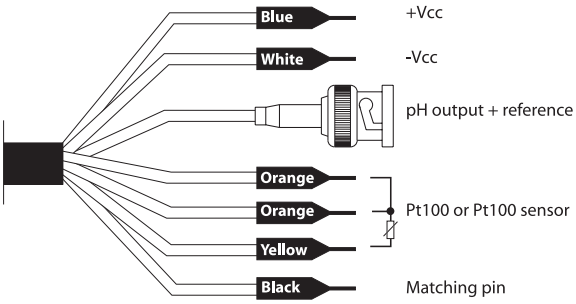
pH & ORP electrodes with direct wire connection



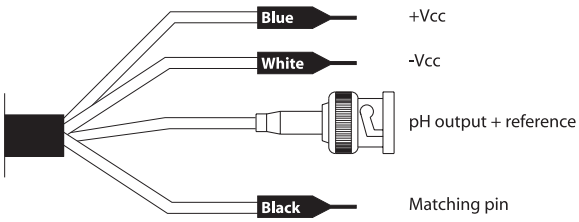
pH electrodes with BNC connector & Pt or Pt1000 temperature sensor



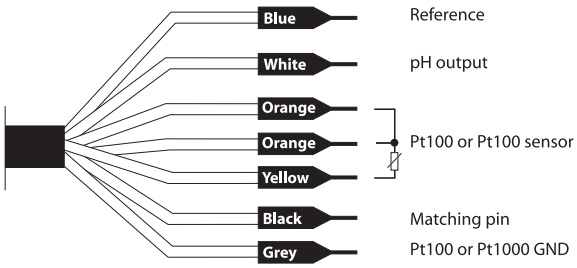
pH electrodes with BNC connector & Pt 100 temperature sensor, amplified



pH & ORP electrodes with BNC connector, amplified



pH electrodes with direct wire connection & Pt or Pt1000 temperature sensor



Amplified pH and ORP AmpHel® Electrodes

a Breakthrough in Technology





With the new AmpHel® replaceable battery model, it is no longer necessary to throw away an electrode when the battery is exhausted.

HANNA instruments® Glass Sensors for Process Electrodes

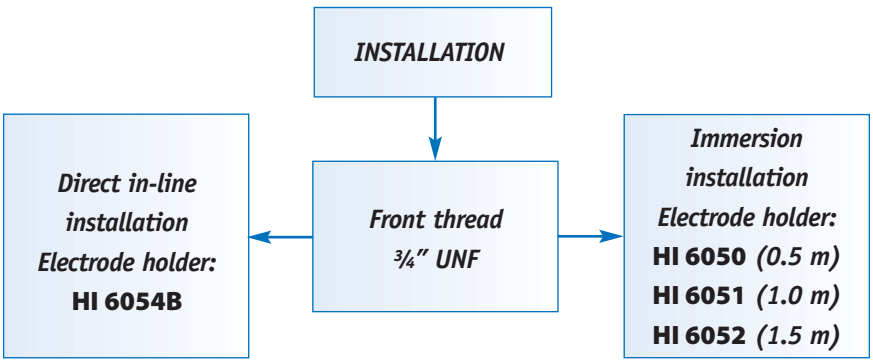
GLASS TYPE	APPLICATION RANGE	PH RANGE	TEMPERATURE
LT	Low Temperature	0 to 12	-10 to 80°C
HT	High Temperature	0 to 14	0 to 100°C
HF	Acid Samples with F– (*)	0 to 10	-5 to 60°C

Installation

Easy installation of these electrodes is possible thanks to the ¾" UNF external thread.

Models with glass body and PTFE junctions are recommended for in-line installations.

Models with an PEI body and cloth junction are suitable for tank monitoring or for use with portable meters, where the electrode can be easily accessed for maintenance.



A Stable Signal Over a Long Range

Due to the high resistance of the glass membrane, conventional electrodes require a high impedance measurement system. Inadequate insulation of the connectors and cables result in erroneous readings due to leakage or noise. For conventional electrodes, the lead is therefore limited to typically less than 15-20 meters. HANNA AmpHel® electrodes incorporate a miniaturized amplifier which resolves most of the problems associated with high impedance signals. The amplifier circuitry is located right on top of the electrode and is completely sealed. As a result, a strong, low impedance signal is emitted and ordinary connectors with long unshielded cables can be used. This breakthrough technology provides a stable signal for industrial monitoring as well as a major saving in low noise coaxial cable costs. In some cases, the need for a transmitter is also eliminated, resulting in further cost reductions.

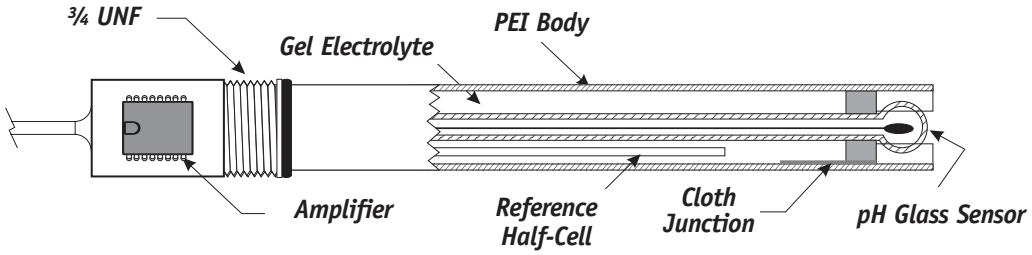
For those applications that have proven particularly hostile to electrodes, HANNA has developed four types of specialized glass. First is an extremely durable sensor glass for general purpose, industrial use. This glass can withstand the stress of daily use. The remaining types of electrode glass allow continuous monitoring in highly acidic solutions containing fluoride ions, as well as high or low temperature process streams, without significantly reducing the useful life of the electrode.

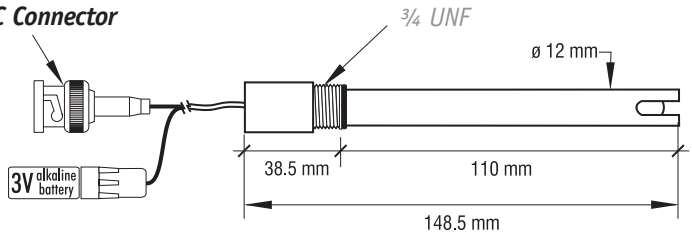
Electrode body material is glass or PEI, while the junction is cloth or PTFE.

- *Strong signal up to 75 meters (246 feet)*
- *Low noise coaxial cables are no longer required*
- *Measurements in unclean samples and high humidity conditions*
- *Models with external replaceable battery, for longer electrode life*
- *Glass sensor for specific applications*

Amplified pH and ORP AmpHel® Electrodes

a Breakthrough in Technology





AmpHel® pH Electrodes with Replaceable Battery

GENERAL PURPOSE PH ELECTRODES								
CODE	**BODY**	**JUNCTION**	**ELECTROLYTE**	**GLASS TYPE**	**TEMPERATURE**	**MAX PRESSURE**	**CONNECTOR**	**CABLE**
HI 6291005	PEI	cloth	gel	GP	-5 to 80 ° C	3 bar	BNC	5 m
LOW TEMPERATURE PH ELECTRODES								
CODE	**BODY**	**JUNCTION**	**ELECTROLYTE**	**GLASS TYPE**	**TEMPERATURE**	**MAX PRESSURE**	**CONNECTOR**	**CABLE**
HI 5291005	PEI	cloth	gel	LT	-10 to 80 °C	3 bar	BNC	5 m
HIGH TEMPERATURE PH ELECTRODES								
CODE	**BODY**	**JUNCTION**	**ELECTROLYTE**	**GLASS TYPE**	**TEMPERATURE**	**MAX PRESSURE**	**CONNECTOR**	**CABLE**
HI 8299505	glass	PTFE	polymer	HT	0 to 100 °C	3 bar	BNC	5 m
PH ELECTRODES FOR ACID SAMPLES WITH FLUORIDE IONS (F– MAX 2 G/L, TEMPERATURE MAX 60 °C, pH >2)								
CODE	**BODY**	**JUNCTION**	**ELECTROLYTE**	**GLASS TYPE**	**TEMPERATURE**	**MAX PRESSURE**	**CONNECTOR**	**CABLE**
HI 7291005	PEI	cloth	gel	HF	-5 to 60 °C	3 bar	BNC	5 m
HI 7299505	glass	PTFE	polymer	HF	-5 to 60 °C	3 bar	BNC	5 m

AmpHel® pH Electrodes with Internal Battery

CODE	BODY	JUNCTION	ELECTROLYTE	GLASS TYPE	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 2910B/5	PEI	cloth	gel	GP	-5 to 80 °C	3 bar	BNC	5 m
HI 2911B/5	PEI	PTFE	polymer	GP	-5 to 80 °C	3 bar	BNC	5 m

AmpHel® ORP Electrodes with Replaceable Battery

CODE	BODY	JUNCTION	ELECTROLYTE	GLASS TYPE	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 6293005	PEI	cloth	gel	platinum	-5 to 80 °C	3 bar	BNC	5 m
HI 6493005	PEI	cloth	gel	gold	-5 to 80 °C	3 bar	BNC	5 m

AmpHel® ORP Electrodes with Internal Battery

CODE	BODY	JUNCTION	ELECTROLYTE	GLASS TYPE	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 2930B/5	PEI	cloth	gel	platinum	-5 to 80 °C	3 bar	BNC	5 m
HI 2931B/5	PEI	PTFE	gel	platinum	-5 to 80 °C	3 bar	BNC	5 m

Accessories

HI 740031 Spare replaceable battery for AmpHel® electrodes

HI 1000 and HI 2000 Series

pH and ORP Electrodes

for Continuous Flow-thru Monitoring

Specifically Built for Industry

In order to reduce normal contamination coming from industrial use, these electrodes combine a polymer reference and double-junction technology: no refilling is required, and the electrode can be used in samples such as organic compounds, proteins and heavy metals. In addition, the pH electrodes use a unique annular PTFE junction that minimizes clogging.

These industrial probes have a glass body electrode for use in aggressive chemicals and are easy to clean. A PEI protective sleeve gives the electrodes resistance against mechanical stress. Operating limits are -5 to 80°C (23 to 176°F) and pressure up to 6 bar (87 psi).

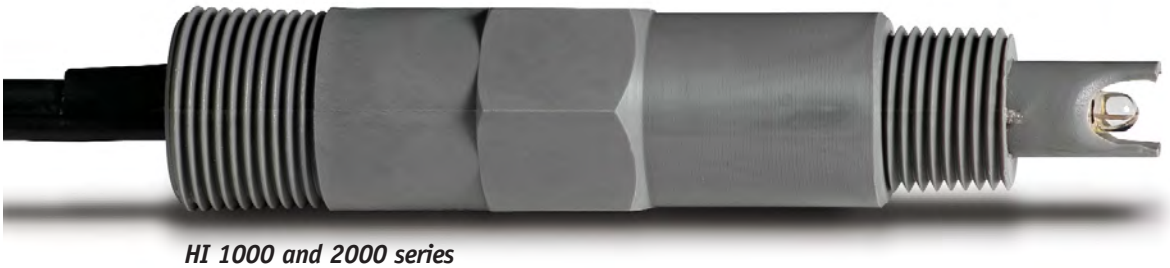
Some models, both pH and ORP, are provided with built-in matching pin. Others also feature a built-in amplifier, which allows measurements far from the location of the instrument without requiring a transmitter.

HI 1000 and HI 2000 series come with BNC connector that makes connection to any pH/ORP meter quick and easy; models with 3 or 5 meters (9.8 or 16 feet) cable are available.

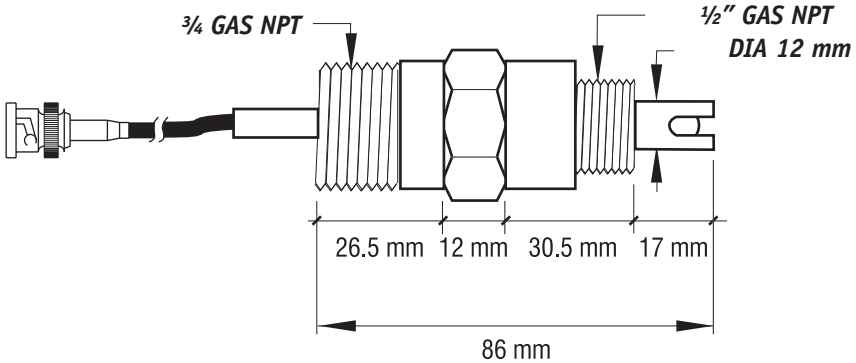


Matching pin with differential input for grounding

- *½" NPT external thread for in-line installation*
- *pH electrode with exclusive PTFE non-clogging membrane*
- *Double-junction technology*
- *PVDF body*
- *Models with built-in matching pin and amplifier*



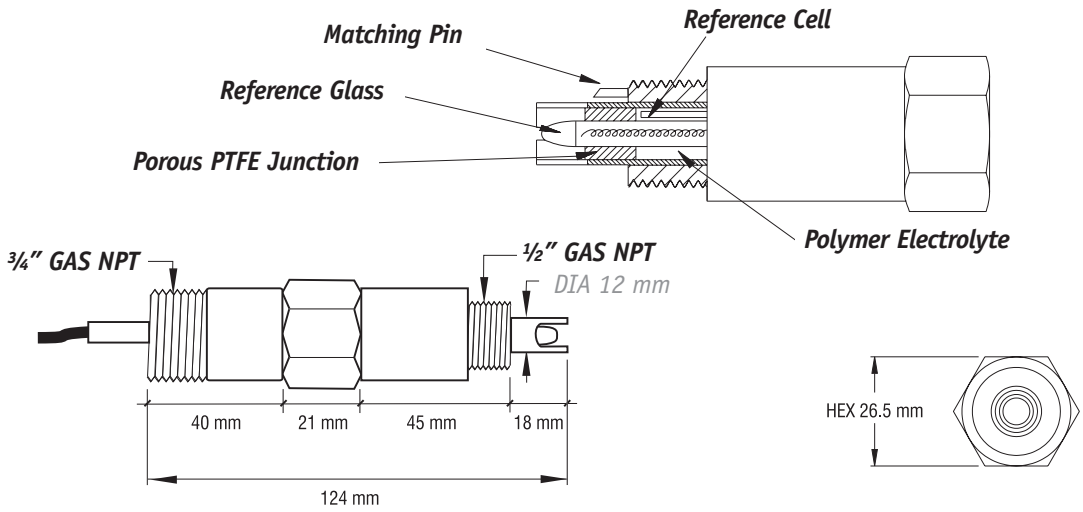
HI 1000 and 2000 series



HI 1001 (pH ELECTRODE) AND HI 2001 (ORP ELECTRODE WITH PT SENSOR)						
CODE	**JUNCTION**	**ELECTROLYTE**	**TEMPERATURE**	**MAX PRESSURE**	**CONNECTOR**	**CABLE**
HI 1001	double, PTFE	polymer	-5 to 80°C	6 bar	BNC	3 m
HI 2001	double, PTFE	polymer	-5 to 80°C	6 bar	BNC	3 m

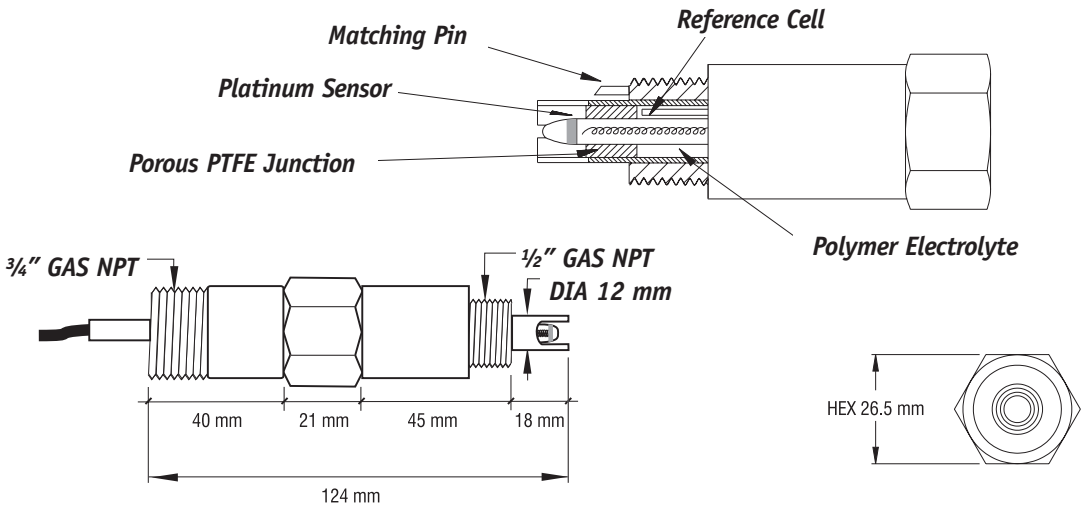
pH and ORP Electrodes

for Continuous Flow-thru Monitoring



HI 1000 SERIES: pH ELECTRODES

CODE	JUNCTION	ELECTROLYTE	MATCHING PIN	AMPLIFIER	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 1002/3	double, PTFE	polymer	—	—	-5 to 80°C	6 bar	BNC	3 m
HI 1002/5	double, PTFE	polymer	—	—	-5 to 80°C	6 bar	BNC	5 m
HI 1003/3	double, PTFE	polymer	yes	—	-5 to 80°C	6 bar	BNC	3 m
HI 1003/5	double, PTFE	polymer	yes	—	-5 to 80°C	6 bar	BNC	5 m
HI 1004/5	double, PTFE	polymer	yes	yes	-5 to 80°C	6 bar	spade lug	5 m



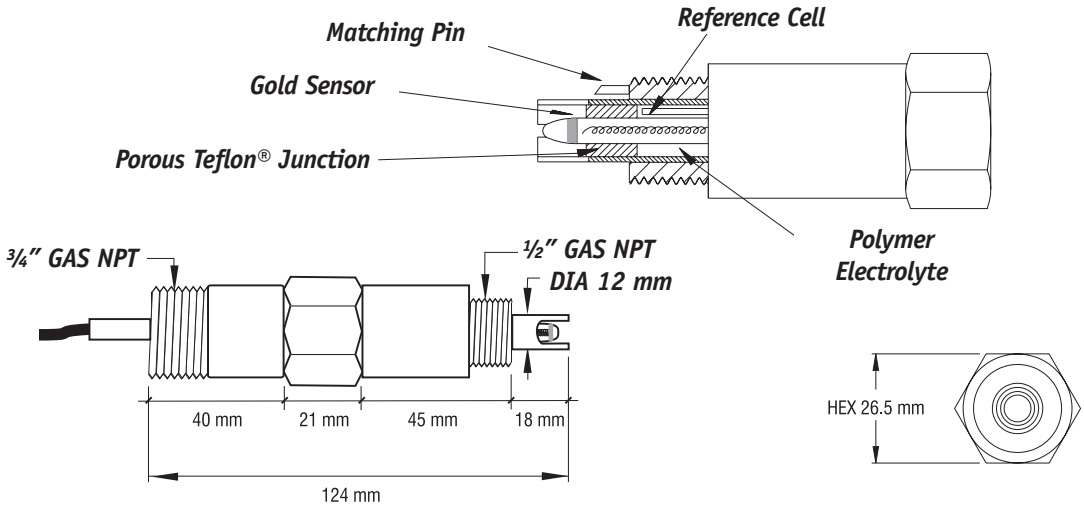
HI 2000 SERIES: ORP ELECTRODES WITH PLATINUM SENSOR

CODE	JUNCTION	ELECTROLYTE	MATCHING PIN	AMPLIFIER	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 2002/3	double, PTFE	polymer	—	—	-5 to 80°C	6 bar	BNC	3 m
HI 2002/5	double, PTFE	polymer	—	—	-5 to 80°C	6 bar	BNC	5 m
HI 2003/3	double, PTFE	polymer	yes	—	-5 to 80°C	6 bar	BNC	3 m
HI 2003/5	double, PTFE	polymer	yes	—	-5 to 80°C	6 bar	BNC	5 m
HI 2004/5	double, PTFE	polymer	yes	yes	-5 to 80°C	6 bar	spade lug	5 m

HI 1000 and HI 2000 Series

pH and ORP Electrodes

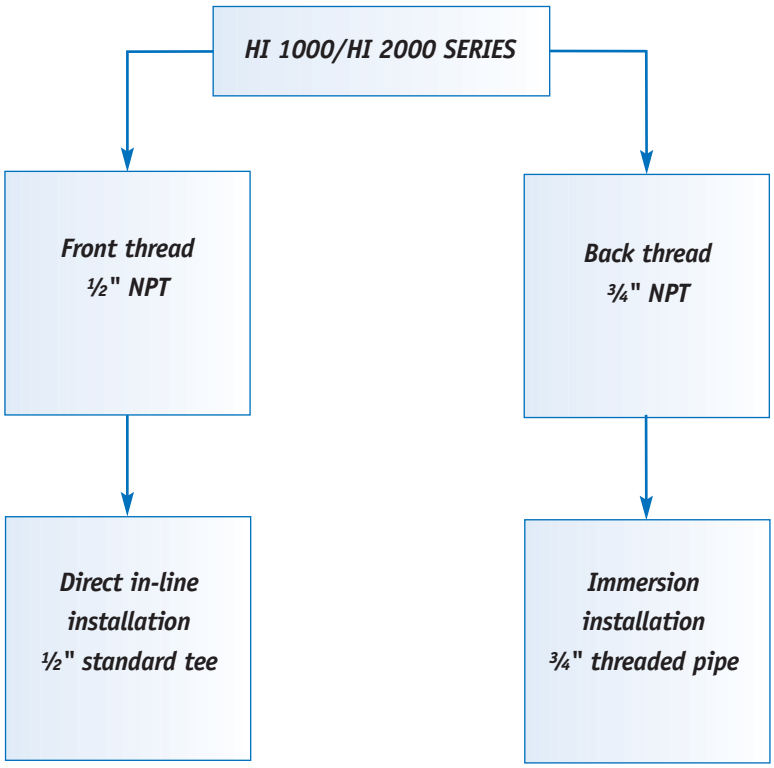
for Continuous Flow-thru Monitoring



HI 2000 SERIES: ORP ELECTRODES WITH GOLD SENSOR								
CODE	JUNCTION	ELECTROLYTE	MATCHING PIN	AMPLIFIER	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 2012/3	double, PTFE	polymer	–	–	-5 to 80°C	6 bar	BNC	3 m
HI 2012/5	double, PTFE	polymer	–	–	-5 to 80°C	6 bar	BNC	5 m
HI 2013/3	double, PTFE	polymer	yes	–	-5 to 80°C	6 bar	BNC	3 m
HI 2013/5	double, PTFE	polymer	yes	–	-5 to 80°C	6 bar	BNC	5 m
HI 2005/5	double, PTFE	polymer	yes	yes	-5 to 80°C	6 bar	spade lug	5 m

Installation

These sensors have a hex-shaped body for easy installation, requiring no special tools. Continuous in-line mounting is possible due to the ½" external thread. No special holders are required: HI 1000 and HI 2000 series can be used with any standard ½" pipe tee available on the market. On the opposite end, these probes are provided with a ¾" thread so that they can be attached to a pipe for dip applications.



HANNA instruments®

With Great Products, Come Great Results™

Easy pH and ORP Electrodes

with Quick and Easy BNC Connection

Easy to Connect and Installs Securely In-line

HANNA offers a wide range of combination pH and ORP electrodes specifically designed for needs of industrial users.

In order to reduce contamination problems, all electrodes are gel or polymer filled and feature double-junction technology.

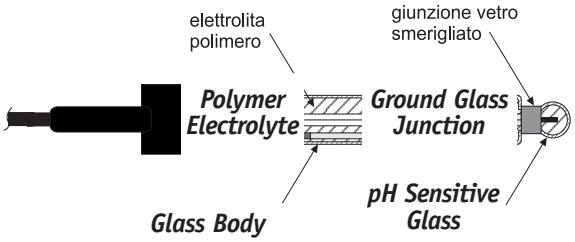
The BNC connector allows quick and easy connection to any pH/ORP meter or transmitter. In addition, all electrodes have a BNC connector and select models offer a ¾" UNF thread for secure in-line installation.

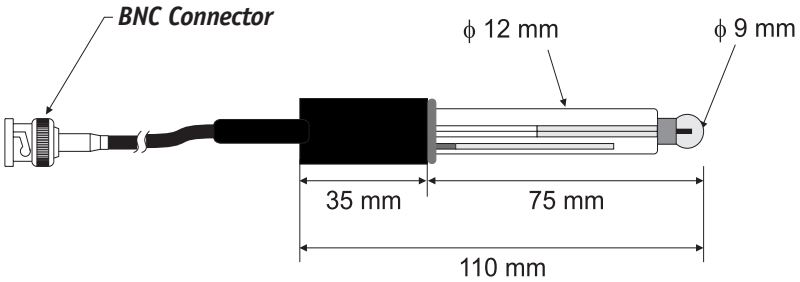
The range includes PEI and glass-body electrodes: the former are rugged and suitable for applications in which the capability to resist stress is needed; the latter are recommended for use in aggressive chemicals and are easier to clean.

All pH and ORP electrodes can be mounted with the HANNA instruments® in-line and submersion assemblies.

- *BNC connector*
- *Submersion and in-line installation capability*
- *PEI and glass body*



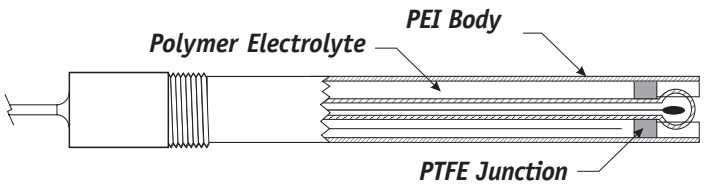


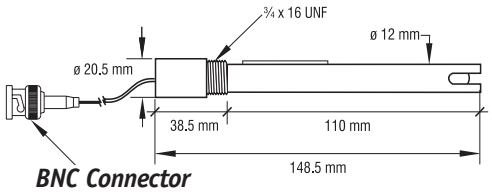


COMBINATION GLASS-BODY pH ELECTRODE						
CODE	JUNCTION	ELECTROLYTE	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 1090B/5	double, ground glass	polymer	-5 to 95°C	3 bar	BNC	5 m

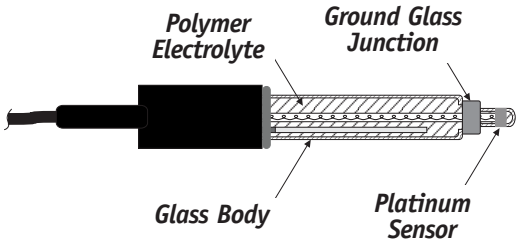
Easy pH and ORP Electrodes

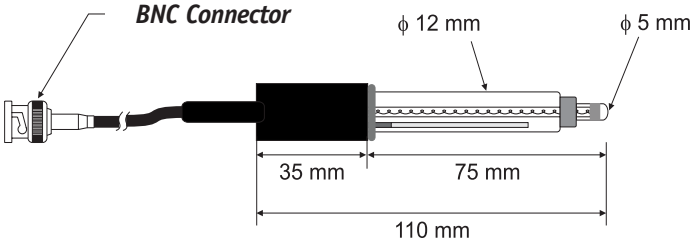
with Quick and Easy BNC Connection



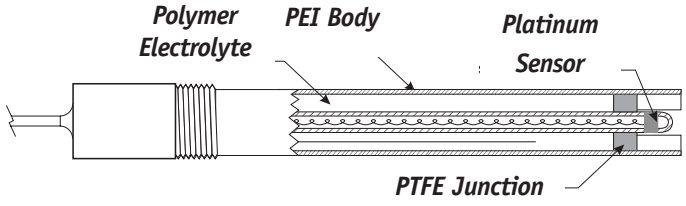


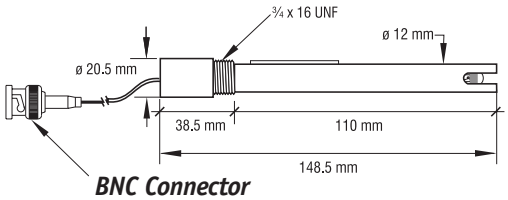
COMBINATION PEI-BODY pH ELECTRODE						
CODE	JUNCTION	ELECTROLYTE	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 1210B/5	double, PTFE	polymer	-5 to 80°C	3 bar	BNC	5 m





COMBINATION GLASS-BODY ORP ELECTRODE WITH PLATINUM SENSOR						
CODE	JUNCTION	ELECTROLYTE	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 3090B/5	double, ground glass	polymer	-5 to 95°C	3 bar	BNC	5 m





COMBINATION GLASS-BODY ORP ELECTRODE WITH PLATINUM SENSOR						
CODE	JUNCTION	ELECTROLYTE	TEMPERATURE	MAX PRESSURE	CONNECTOR	CABLE
HI 3210B/5	double, PTFE	polymer	-5 to 80°C	3 bar	BNC	5 m

Easy pH and ORP Electrodes

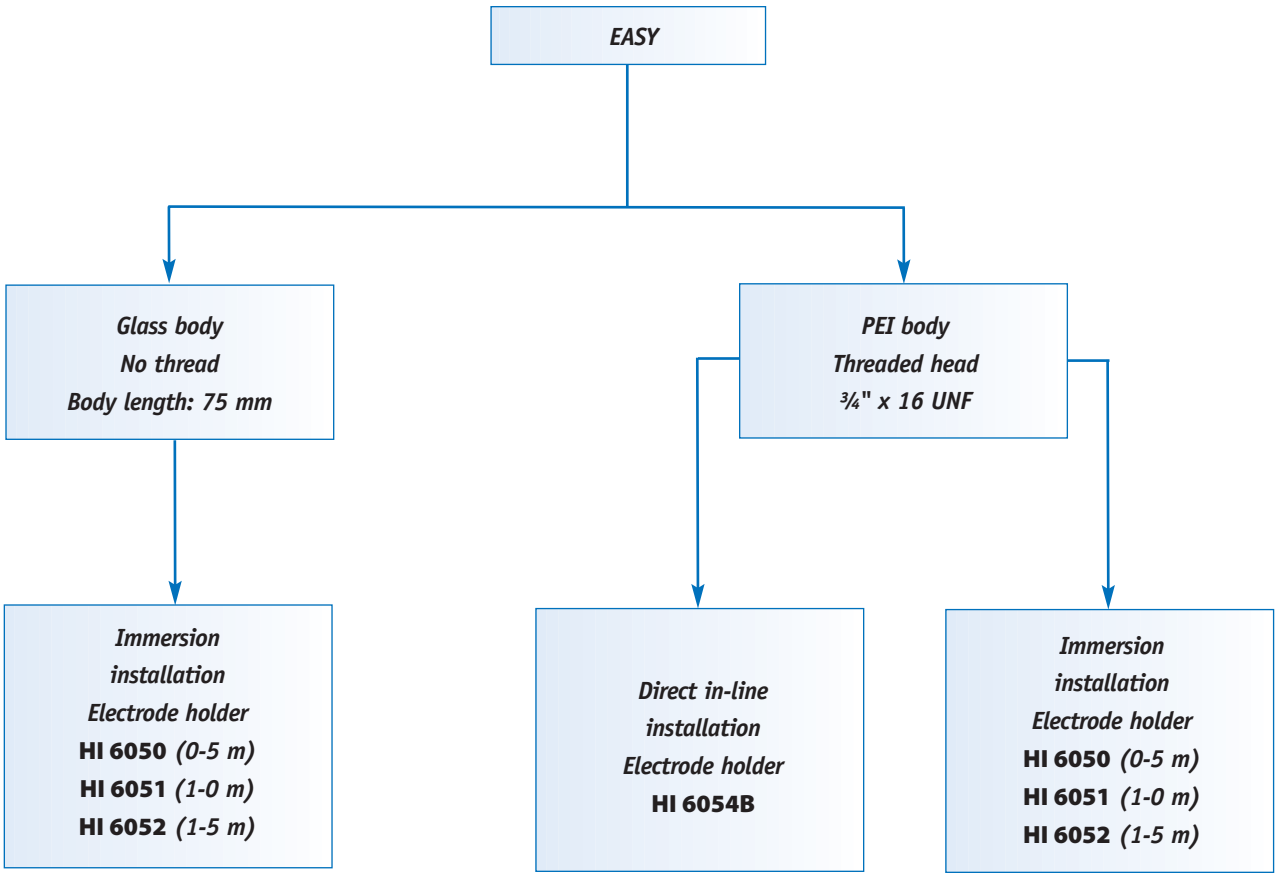
with Quick and Easy BNC Connection

Installation

The installation of these electrodes is very flexible, because you can choose different mounting configurations.

Models with glass body and no external thread can be installed on tanks using the HI 6050 electrode holder with sealing O-ring.

Models with a PEI body and ¾" UNF thread or glass body and no thread can be easily installed directly in-line, using a T shape electrode holder, such as HI 6054B.



Process Electrodes

Electrodes Designed and Manufactured by HANNA

A Worldwide Leader in Electrode Manufacturing

Since the beginning of the 1990's HANNA has been a leader in the research & development of pH and ORP electrodes. Today, HANNA is proud to present the latest family of industrial electrodes, the Flat Tip series, which completes the wide range of HANNA probes for any process application. All HANNA industrial pH and ORP electrodes are combination type, i.e. the reference half-cell and the measurement half-cell are assembled in the same body.

Industrial Electrodes and Probes



Reference Half-Cell

The reference half-cell provides a known and stable reference potential. During the normal electrode life span, this potential can vary, possibly signaling the end of the electrode's life.

The main causes of reference potential variation are:

- *Electrolyte contamination*
- *Dilution*
- *Electrochemical reaction*
- *Junction clogging*

HANNA has found the solutions for all these challenges, thanks to many years of experience and electrode testing in industrial applications.

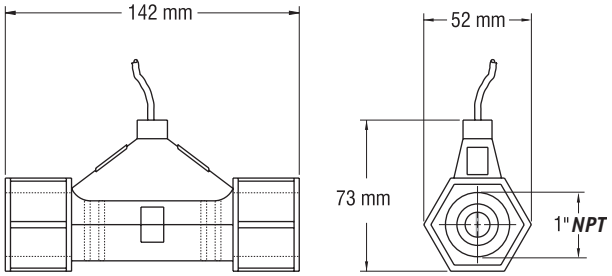


HANNA instruments

With Great Products, Come Great Results™

HI 7635 • HI 7636
In-line Conductivity Probes





Flow-thru Conductivity Probes

The wide range of HANNA conductivity probes includes models for industrial applications. Flow-thru and dip versions are available.

These conductivity probes combine the proven 4-ring potentiometric method of measuring conductivity with platinum sensors. The universally acclaimed 4-ring method provides a more stable measurement over a wider range. The probe does not suffer polarization, nor does it need frequent calibration or cell changes.

In addition, the built-in temperature sensor allows automatic temperature compensation of measurements.

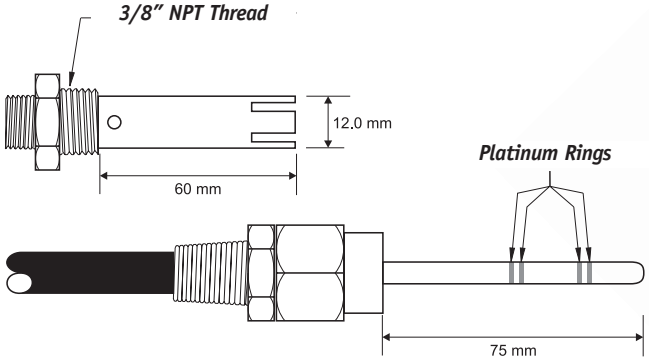
These probes have been designed for easy operation and maintenance.

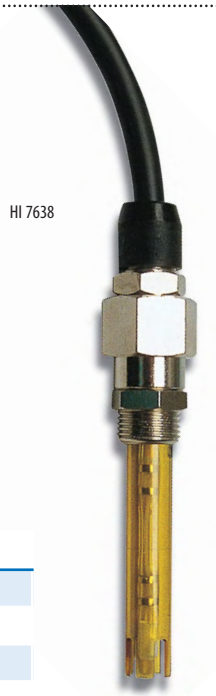
The 4 m cable is provided with color coded wires for easy connection to HI 8936 transmitters.

SPECIFICATIONS	HI 7635	HI 7636
Temperature Compensation	automatic, 0 to 50°C with NTC sensor	—
Body	polypropylene	polypropylene
Operating Temperature	0 to 80°C (32 to 176°F)	0 to 80°C (32 to 176°F)
Max Pressure (@25°C/77°F)	5 bar	5 bar

HI 7638 • HI 7639 • HI 7640
Conductivity Probes

with Platinum Rings



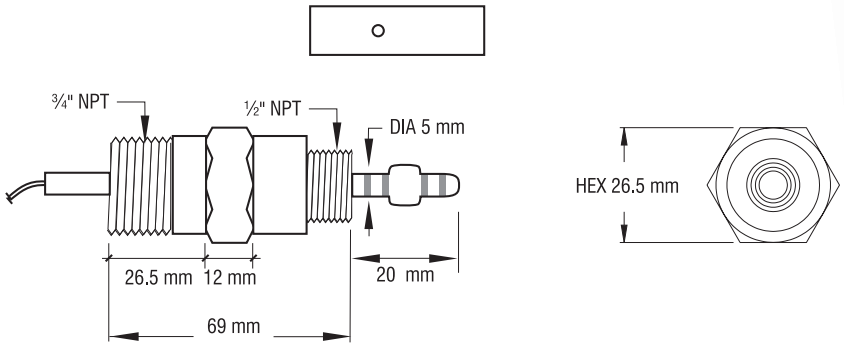


SPECIFICATIONS	HI 7638	HI 7639	HI 7640
Temperature Compensation	automatic, 0 to 50°C with NTC sensor	automatic, 0 to 50°C with Pt100 sensor	—
Body	Ultem® and glass	Ultem® and glass	Ultem® and glass
Operating Temperature	0 to 120°C (32 to 248°F)	0 to 120°C (32 to 248°F)	0 to 120°C
Max Pressure (@25°C/77°F)	5 bar	5 bar	5 bar

4-ring and Platinum Sensors

These 4-ring probes measure conductivity with platinum sensors. They come with standard ½" external thread on the front and for flow-thru mounting and ¾" threads on the back for submersion or pipe mounting. Probes feature 3 m (9.9') of cable. The protective cover is made of PEI and can be removed for quick maintenance. These probes can withstand temperatures up to 80°C (176°F) and 6 bars (87 psi) of pressure.

In addition, HI 3001 houses an NTC sensor for automatic temperature compensation.





SPECIFICATIONS	HI 3001 / HI 3001D	HI 3011
Temperature Compensation	automatic, 0 to 60°C with NTC sensor	–
Body	Ultem® and PVDF	Ultem® and PVDF
Operating Temperature	0 to 80°C (32 to 176°F)	0 to 80°C (32 to 176°F)
Max Pressure (@25°C/77°F)	6 bar	6 bar

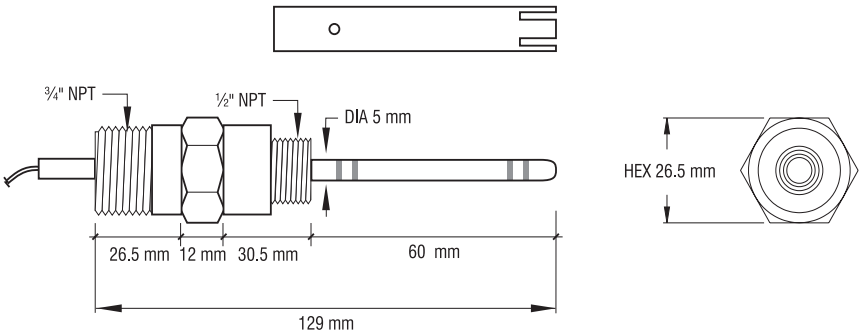
Model HI 3001D with DIN connector is to be used with the HI 99xx series of wall-mounted controllers.

HI 3002 • HI 3012

Submersion Probes

4-ring and Platinum Sensors

The HI 3002 and HI 3012 4-ring probes measure conductivity with platinum sensors. hey come with standard ½" external thread on the front and for flow-thru mounting and ¾" threads on the back for submersion or pipe mounting. Probes feature 3 m (9.9') of cable. The protective cover is made of PEI and can be removed for quick maintenance. The new probes can withstand temperatures up to 80°C (176°F) and 6 bars (87 psi) of pressure. HI 3002 also houses an NTC temperature sensor for automatic temperature compensation.



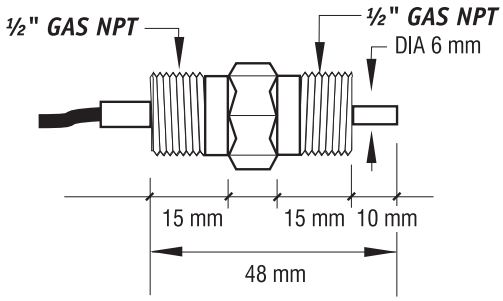


SPECIFICATIONS	HI 3002	HI 3012
Temperature Compensation	automatic, 0 to 60°C with NTC sensor	–
Body	Ultem® and PVDF	Ultem® and PVDF
Operating Temperature	0 to 80°C (32 to 176°F)	0 to 80°C (32 to 176°F)
Max Pressure (@25°C/77°F)	6 bar	6 bar

HI 7610 • HI 7611

Stainless Steel Temperature Probes





Industrial Specific Probes for Aggressive Environments

HANNA presents temperature probes with 3-wire Pt100 or Pt 1000 sensor. These probes provide an accurate and effective way of measuring and compensating for temperature. They can be used with a vast array of industrial pH, ORP and conductivity controllers on the market, as well as our pH 500, mV 600, HI 700 & HI 504 series.

HI 7610 and HI 7611 are constructed of stainless steel for additional ruggedness. They incorporate ½" external threads on both ends to facilitate inline and immersion installations.

HI 7620 and HI 7621 are made with a glass body in order to provide greater resistance against aggressive chemicals. They also come with a standard PG 13.5 external thread so that they may be used with our HI 6054T holder as well as other common probe holders.

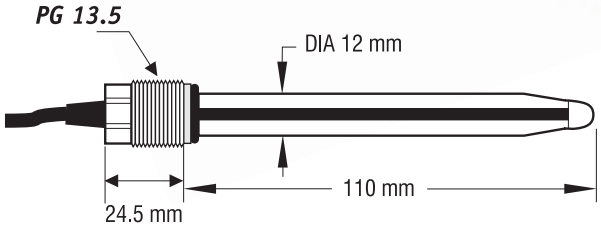
- *Flow-thru and immersion mounting*
- *High accuracy*
- *Stainless steel model with ½" GAS NPT external thread*
- *Glass version with high chemical resistance and PG 13.5 external thread*

HI 7620 • HI 7621

Glass Body Probes

for Greater Chemical Resistance





HI 7610, HI 7611, HI 7620 AND HI 7621 INDUSTRIAL TEMPERATURE PROBES				
CODE	TEMPERATURE SENSOR	BODY	MAX PRESSURE	CABLE LENGTH
HI 7610	Pt 100	Stainless steel	8 bar	5 m (16.4')
HI 7611	Pt 1000	Stainless steel	8 bar	5 m (16.4')
HI 7620	Pt 100	Glass	3 bar	5 m (16.4')
HI 7621	Pt 1000	Glass	3 bar	5 m (16.4')

HI 60542

In-line Electrode Holder

for Direct Pipe Installation

Ideal for Direct Pipe Installations

HI 60542 is a 2 inch NPT in-line PVC electrode holder ideal for direct pipe installation.

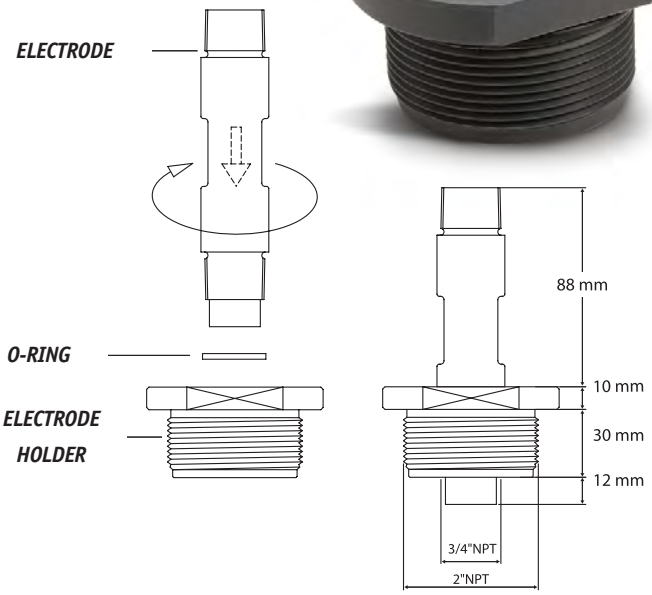
HI 60542 has been designed specifically to be used with HANNA ¾" NPT process electrodes with built-in temperature sensor and matching pin.

SPECIFICATIONS	HI 60542
Electrode Holder Material	PVC
O-ring Material	NBR (Buna N)
Minimum Temperature	-10 °C
Maximum Temperature	+60 °C
Maximum Pressure	8 bar @25°C or 3 bar @50°C

ACCESSORIES

HI 60542-0 1 set of O-rings





HI 60545

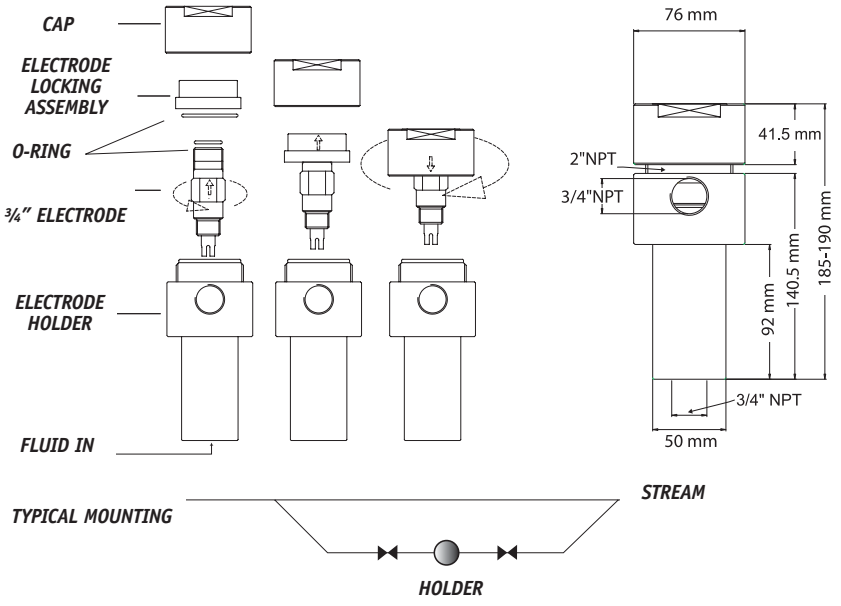
By-pass Loop Electrode Holder

Allows for 0 Downtime

HI 60545 is an electrode holder designed for use in a bypass loop configuration. HI 60545 allows easy maintenance and calibration without shutting down the process. The design of HI 60545 assures that the glass sensor remains wet even when system is not under pressure.

HI 60545 is only for use with HANNA 1006 series probes that have a ¾" NPT fitting.





SPECIFICATIONS	HI 60545
Electrode Holder Material	PVC
O-ring Material	NBR (Buna N)
Minimum Temperature	-10 °C
Maximum Temperature	+60 °C
Maximum Pressure	8 bar @25°C or 3 bar @50°C

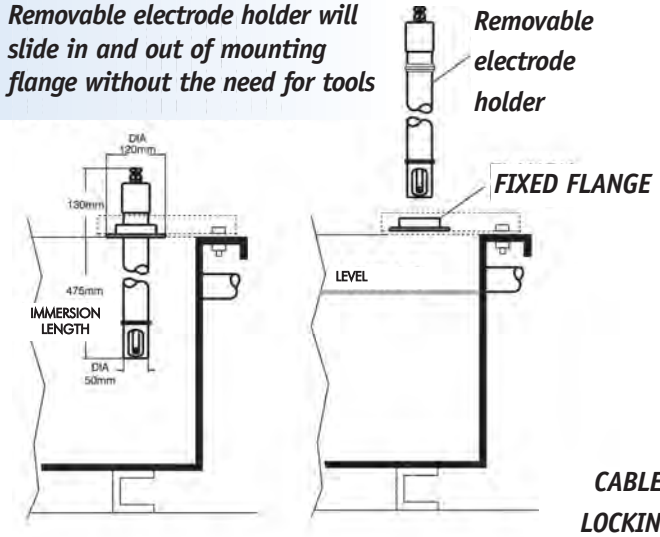
ACCESSORIES

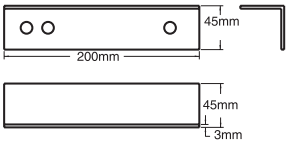
HI 60545-0 1 set of O-rings

HI 6050

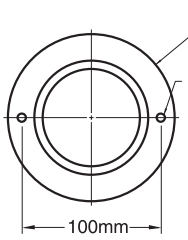
Submersible Electrode Holder

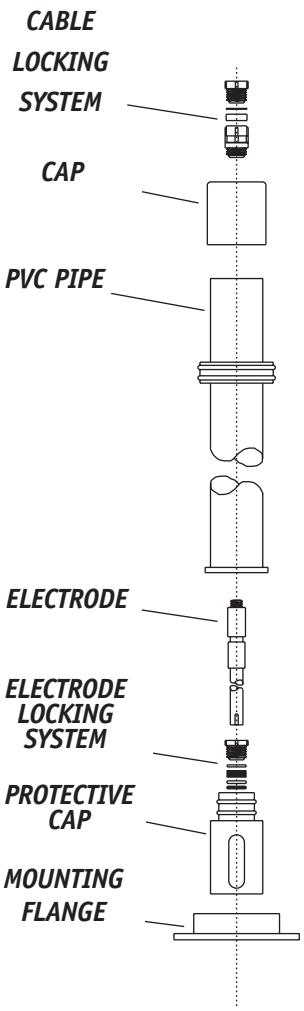
Removable electrode holder will slide in and out of mounting flange without the need for tools





SUGGESTED DIMENSIONS OF STAINLESS STEEL MOUNTING BRACKETS TO MOUNT THE FLANGE ONTO THE TANK





PVC Construction, Requires No Tools For Maintenance

These electrode mounting systems are constructed in rugged PVC and will resist most of the chemicals associated with wastewater treatment.

They are easy to install and require no tools for maintenance, making weekly electrode inspection and meter calibration a quick and easy task.

The mounting flange is a rugged PVC piece that mounts directly to the stainless steel brackets on your tank.

The figure illustrates the suggested bracket dimensions used for mounting. Once mounted to your tank, the electrode holder is a sturdy, protective housing that will extend the life of your electrodes.

The electrode slides into the holder and is hand tightened into place. The cable from the electrode will lead up through the holder and out through the cap on top. The cable is also shielded inside the holder to prevent any damage to the insulation. The protective cap is removable to allow for quick and simple electrode maintenance and replacement.



SPECIFICATIONS	TOTAL LENGTH	WEIGHT	SUBMERSION LENGTH
HI 6050	605 mm (23.8")	0.8 kg (26 oz.)	475 mm (18.7")
HI 6051	1105 mm (43.5")	1.2 kg (44 oz.)	975 mm (38.4")
HI 6052	1605 mm (63.2")	2.0 kg (71 oz.)	1500 mm (59.1")

HANNA instruments
With Great Products, Come Great Results™

Electrode Holders

for In-line Applications

Perform Accurate In-line Readings

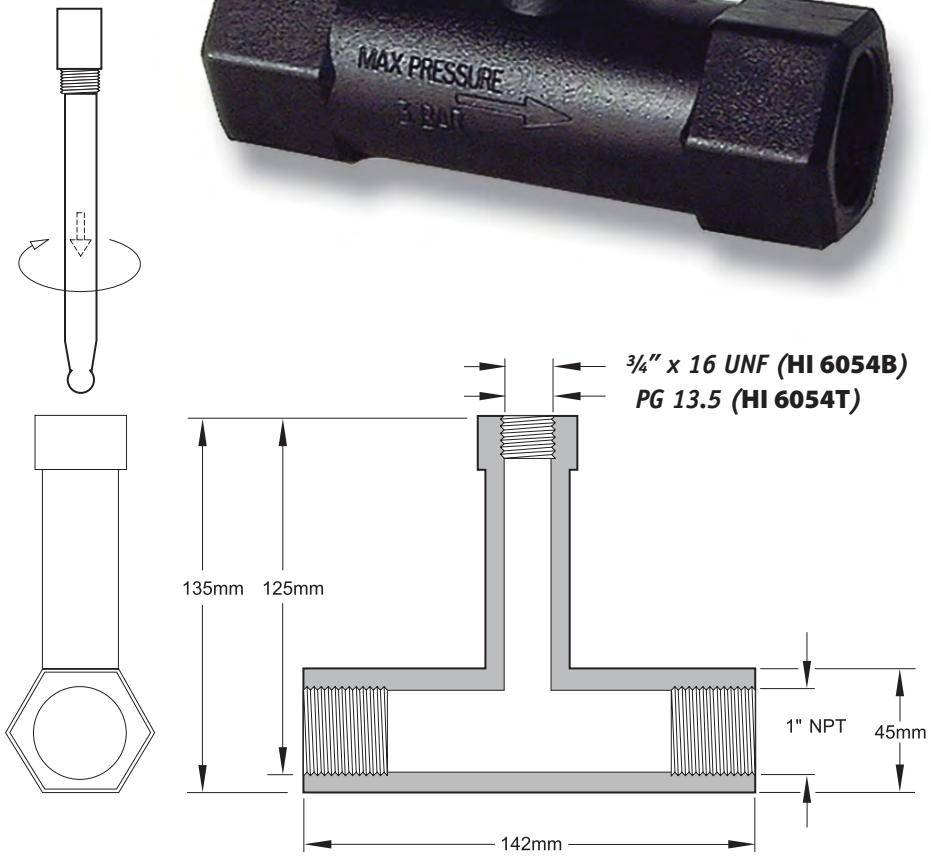
The HI 6054 is a rugged, fiber-reinforced polypropylene in-line electrode holder.

Simply install the holder in the line so that liquid will always be present inside the holder.

Once installed, the electrode will remain in contact with the fluid at all times, allowing the most accurate readings possible.

The HI 6054B and HI 6054T are designed specifically to work with HANNA electrodes with external thread of ¾" x 16 UNF and PG 13.5 respectively.

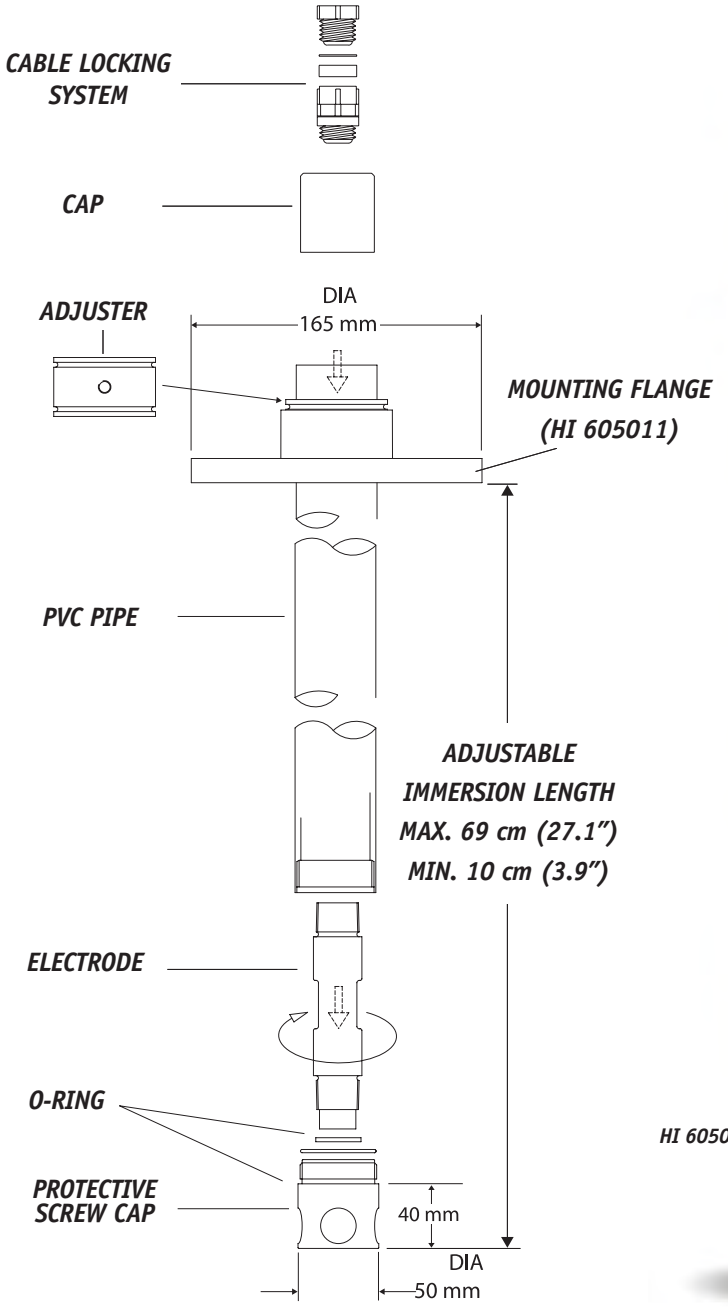




HI 60501 • HI 60503

Immersion Electrode Holders

for Tanks, Vessels, Baths and Open Channels





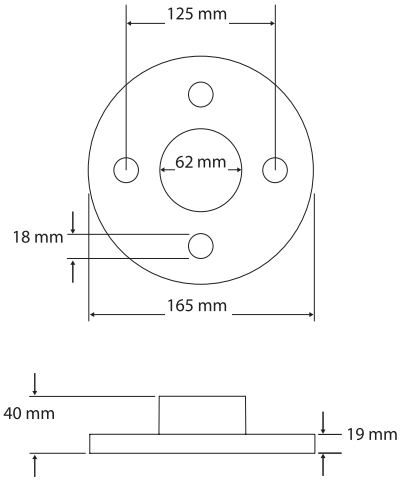
HI 60503

Adjustable Length Electrode Holders

These electrode holders are adjustable length and have been designed for immersion applications. Simply set the flange adjuster and the flange (HI 605011) to your required length and install.

These holders have been designed specifically to be used with HANNA 1006 series probes that have a ¾" NPT fitting.

(HI 605011)
MOUNTING FLANGE



ACCESSORIES

HI 605011 PVC mounting flange
HI 60501-0 1 set of O-rings

SPECIFICATIONS	HI 60501	HI 60503
Electrode Holder Material	PVC	PVDF
O-ring Material	NBR (Buna N)	NBR (Buna N)
Minimum Immersion Level	10 cm (3.9")	10 cm (3.9")
Maximum Immersion Level	69 cm (27.1")	69 cm (27.1")
Minimum Temperature	-10°C (14°F)	-15°C (5°F)
Maximum Temperature	+60°C (140°F)	+100°C (212°F)

HANNA instruments

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Electrolyte Contamination

The contamination of the reference half-cell is linked to the diffusion of external substances into the reference chamber (strong oxidants, reductancts, complexing agents).

The combination of HANNA double junction technology. with a polymer reference electrolyte, reduces the diffusion process rate and keeps the reference potential stable for long periods of time.

Dilution

When a reference cell, containing a very concentrated solution, comes in contact with a water solution sample much less concentrated, a diffusion phenomenon will take place on the electrolyte/sample junction, i.e. the diffusion of the electrolyte (KCl) into the sample solution. This process causes a progressive dilution of the reference electrolyte with a consequent variation of the reference potential.

HANNA double junction technology and the use of a large electrolyte volume (up to three times greater than traditional electrodes) makes the dilution effect negligible.

Electrochemical Reaction

In many industrial applications, it is possible to get a potential difference between the measuring point and the instrument. This inconvenience originates from electrical currents that destroy the Ag/AgCl element of the reference half-cell and also creates non-stable, interfering potentials.

The simple and effective HANNA solution to this challenge is the matching pin built-in to each industrial electrode, a unique characteristic in the market. The matching pin is a stainless steel or titanium element that is connected to the instrument to prevent grounding problems, and thus prolong electrode life.



Junction Clogging

Typical industrial applications require continuous monitoring of pH and ORP. Periodic cleaning and maintenance of the electrode junction ensure a stable and repeatable contact between sample and junction. The frequency of these cleaning procedures depends on the junction shape and material.

HANNA industrial electrodes are provided with different types of junctions. In particular, we want to highlight the porous PTFE junction used for our Flat Tip electrodes, which, thanks to its shape, can provide optimum performance for months without requiring any maintenance.

Measurement Half-Cell

All HANNA industrial pH electrodes include a measurement cell with glass sensor.

Even though it can be difficult to handle, the glass sensor is still the only answer for most industrial requirements. Below is a list of the main causes of shortened glass sensor life, for which HANNA has developed different types of specialized glass:

- High temperature
- Low temperature
- Acid samples containing fluoride

Process Electrodes

Electrodes Designed and Manufactured by HANNA

Built for Everday, Demanding Use

HANNA provides glass sensors that are able to withstand the previously listed industrial environmental challenges.

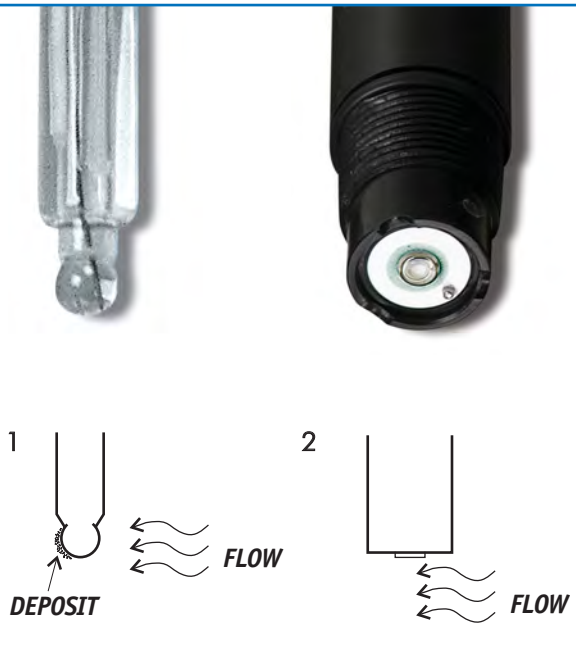
GLASS TYPE	APPLICATION	pH RANGE	TEMPERATURE RANGE
LT	Low Temperature	0 to 12	-10 to 80°C
HT	High Temperature	0 to 14	0 to 100°C
HF	Acid Samples with Fluoride	0 to 10	-5 to 60°C

Mechanical Stress

In a continuous in-line installation, the glass sensor of the pH electrode can be physically damaged by solution streams containing suspended solids.

Our Flat Tip electrodes are the best answer to this problem. The Flat Tip virtually eliminates deposits that can foul the electrode, significantly reducing necessary maintenance.

Flat Tip Advantages



Exposed electrode surface will foul and require frequent cleaning.

The flat shape of the electrode tip nearly eliminates deposits.

Electrode Body Material: Glass, PVDF or PEI



Glass

The glass body electrode can withstand high pressure and high temperature applications. The glass body also offers high resistance to aggressive chemicals (only fluoridic acid and strong alkaline solutions can damage glass).



PVDF

The PVDF body used for the Flat tip series withstands high pressure and high temperature applications, and guarantees a high chemical and mechanical resistance. These characteristics makes the PVDF material the most recommended for many industrial applications. PVDF is also non-toxic and compatible with food applications.



PEI

PEI is a special plastic material used first to produce electrodes by HANNA. PEI electrodes proved to be ideally suited to field applications, as well as industrial environments. An electrode with an PEI body represents a very good combination of chemical, mechanical and thermic resistance, and can be used in non-critical applications (e.g. swimming pools), or with portable meters for routine field monitoring and control, such as wells, lakes and rivers, and discharges of tanks and reservoirs.



AmpHel®: Why and Where to Use It

pH electrode glass sensors have a high impedance of typically 100 Mohm, but can reach 800 Mohm depending on the temperature. This is a very weak signal available for accurate measurements. Impedance this high is difficult to handle especially between the electrode and the instrument. Normally this distance is covered by special cables with very high shielding and electrical insulation. Even with these cables, the distance cannot be longer than 5 meters.

In industrial installations it is not easy to limit to 5 meters the distance between the electrode and the measuring instrument. Quite often, the recording instruments are located in separate areas from where the pH is measured. To avoid this limitation, a pH amplifier can be used.

Amplifiers are usually available with water-tight casings and can be used under the worst conditions. The pH amplifier needs a power supply and usually must also provide for galvanic insulation between the power supply and the amplification circuit. At times it is difficult to have a power supply close to the measuring electrode. In such a case two-wire amplifiers and a 4-20 mA output can solve the problem (see HI 8614 and HI 8614L produced by HANNA).

Such amplifiers need instruments with 4-20 mA input in place of, or in parallel with, the BNC connector (some instruments are not provided with this option).

To overcome the instrument limitation, HANNA, in 1988, produced the AmpHel® electrode (Amplified pH electrode). The AmpHel® electrodes feature an internal, high impedance pH amplifier with the required batteries.

An AmpHel® electrode has a life of approximately 3 years from the day it was produced. Considering an average life for a pH electrode of one year, 3 years from the date of production should not be considered a limitation.

The output is still with 2 wires, as in the case of the typical coaxial cable, but it has a low impedance, and allows connections up to 75 meters long without delays in the measurements.

Cable Leakage

A high impedance coaxial cable, when installed more than 5 meters away from the electrode, could also be subject to current leakage. Quite often the installers place it in underground ducts as done with any other electric cable. During the installation of the cable, the insulation may become scratched by rubbing against the pipes or sharp corners. Underneath the insulation there is a screen connected to the reference electrode.

If the cable is in an underwater duct, it could happen that, sometime during the year, as in a rainy season, the reference electrode (the screen) comes into contact with the humid environment and, thus, with the grounding circuit of the electrical installations. Under these conditions, the pH electrode cannot take reliable measurements and can give erroneous readings. Without any reference to the measurement the actual reading can be many pH units off. This is an additional good reason for avoiding cables longer than 5 meters.



Electrode-Cable Connection

Some German manufacturers have produced pH electrodes with a coaxial connector mounted directly at one end of the electrode, i.e. without cable. The intention was to replace the electrode, without having to replace the connecting cable which remains attached. As time passed, such a solution has proven to be dangerous.

In fact, in many cases, the electrode is placed inside an electrode holder, which protects it from test liquid (tank measurement). Moisture forms inside the holder because of temperature changes from day to night. This moisture reduces the connector insulation, and the signal to the electrode drops.

When an electrode leaks, the generated emf drops and the reading drifts toward the pH 7 value. Therefore, for example, instead of pH 3, the measurement can be pH 3.5 or 4. This reading may result in a dosage that is harmful to the system.

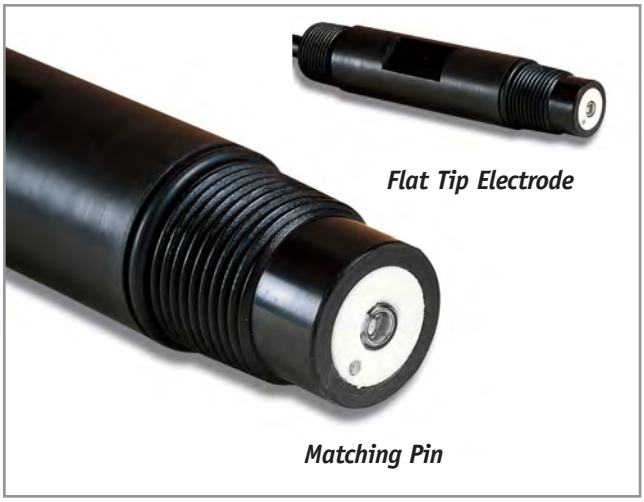
Potential Matching Pin

In many industrial applications, especially in plating baths, grounding loop current is a very common problem.

When a traditional electrode/controller system is used, with the electrode reference connected both to the electrode and to the instrument, a current flow occurs through the reference half-cell, causing fluctuations in reading and serious damage to the Ag/AgCl element.

Process Electrodes

Electrodes Designed and Manufactured by HANNA instruments®



The potential matching pin shields the reference from external electrical fields. Shown above, the matching pin allows the measurement to stabilize and ensures effective process regulation. In order to function properly, the matching pin has to be continuously immersed in the measured solution and for this reason is placed near the electrode junction.

Temperature Effect

The sample temperature is a very important parameter for solutions with a pH different from 7.0. In fact at pH 7.0, temperature compensation is not required.

Thanks to a built-in temperature sensor, the electrode is easy to install. Also due to its proximity to the pH sensor, our flat tip electrode's built-in temperature probe ensures fast, accurately compensated readings even during sudden temperature fluctuations.

A Specific Electrode for Each Application

The table on the next page lists the most common industrial applications with the corresponding, recommended HANNA electrodes.

For each application, several models are available, with different options for the

following characteristics:

- *electrode dimensions*
- *connection type*
- *installation requirement*
- *optional configurations (matching pin, Pt100 or Pt1000 sensor)*

HANNA produces a wide range of industrial electrodes, for any specific application need.

Common Industrial Applications

APPLICATION	pH ELECTRODE SERIES	PART NUMBER
DOMESTIC WASTEWATER SEWAGE, SEPTIC TANK TREATMENT	FLAT TIP	HI 1026-2005
	EASY	HI 1090B/5
INDUSTRIAL WASTEWATER	FLAT TIP	HI 1006-2005
	AmpHel®	HI 5291005
	HI 1000	HI 1003/5
	EASY	HI 1210B/5
FOOD INDUSTRY (Beer, Jam, Diary Products)	FLAT TIP	HI 1006-2005
	AmpHel®	HI 5291005
	EASY	HI 1090B/5
CHEMICAL NEUTRALIZATIONFLAT TIP	HI 1006-2005	
	AmpHel®	HI 5291005
	EASY	HI 1210B/5
POTABLE WATER (>400µS/cm)	FLAT TIP	HI 1006-2005
	AmpHel®	HI 5291005
	HI 1000	HI 1001
	EASY	HI 1210B/5
COOLING TOWERS	FLAT TIP	HI 1006-1005
	AmpHel®	HI 6291005
	HI 1000	HI 1002/5
	EASY	HI 1210B/5
WATER SOFTENING	FLAT TIP	HI 1006-2005
	AmpHel®	HI 6291005
	HI 1000	HI 1001/5, HI 1002/5
	EASY	HI 1210B/5
DEMINERALIZATION	FLAT TIP	HI 1006-2005
	AmpHel®	HI 5291005
	EASY	HI 1090B/5
LOW CONDUCTIVITY SOLUTIONS	FLAT TIP	HI 1006-2005
	AmpHel®	HI 5291005
SWIMMING POOLS	FLAT TIP	HI 1006-2005
	AmpHel®	HI 5291005
SEA WATER	FLAT TIP	HI 1026-2005
	AmpHel®	HI 5291005
	EASY	HI 1090B/5
GALVANIC BATHS	FLAT TIP	HI 1006-3005
	AmpHel®	HI 8299505
	HI 1000	HI 1003/5
	EASY	HI 1210B/5
SUGAR INDUSTRY, PAPER INDUSTRY	FLAT TIP	HI 1006-2005
	AmpHel®	HI 5291005
	EASY	HI 1090B/5
TEXTILE INDUSTRY, TANNERIES	FLAT TIP	HI 1006-3005
	AmpHel®	HI 8299505
ACID SAMPLES WITH FLUORIDE IONS	FLAT TIP	HI 1006-4005
	AmpHel®	HI 7291005, HI 7299505

APPLICATION	ORP ELECTRODE SERIES	PART NUMBER
OXIDATION OF CYANIDE & NITRITE	FLAT TIP	HI 2004-2005
OZONIZATION & OXIDANT PRODUCTS	AmpHel®	HI 6493005
	HI 2000	HI 2013/5
REDUCTANT PRODUCTS (Chromate Reduction)	FLAT TIP	HI 2004-1005
	AmpHel®	HI 6293005
	HI 2000	HI 2003/5
	EASY	HI 3210B/5
SWIMMING POOLS	HI 2000	HI 2001, HI 2003/5
	EASY	HI 3210B/5

Flat Tip Industrial Electrodes

More Than 300 Models, More Than 300 Applications



- *Self-cleaning flat tip sensor*
- *Significantly reduced maintenance requirement*
- *Models especially designed for plating baths*
- *PVDF body*
- *Three junction types: ceramic, PTFE and open junction*
- *Built-in potential matching pin*
- *Four different glass type pH sensors*
- *ORP electrodes with platinum or gold sensor*
- *Models with built-in Pt100 or Pt1000 temp. sensor*
- *Models with internal amplifier powered by the process controller*
- *3/4" NPT external thread on both ends for an easy install*

HANNA presents a new series of combination pH and ORP electrodes, including more than 300 models, incorporating over 20 years of electrode manufacturing experience.

The most advanced feature of this series is the electrode shape with flat tip, virtually eliminating deposits that can foul the electrode, significantly reducing necessary maintenance. This characteristic makes flat tip electrodes ideal for continuous in-line monitoring, and with solutions containing aggressive chemicals.

The PVDF body offers a higher level of mechanical and temperature resistance. Moreover, the PVDF material is non-toxic and compatible with food applications.

Each pH and ORP electrode is provided with an internal matching pin that can avoid typical problems caused by grounding loop current, such as:

- *progressive damage of the electrode*
- *fluctuating measurements*
- *poor process regulation*

Select the flat tip electrode that best fits your process requirements by choosing from the following technical characteristics:

1. Junction

Three junction types are available:

- *Annular non-clogging PTFE junction, for testing solutions with high content of suspended solids or for high pressure installation*
- *Open junction, ideal for wastewater analysis*
- *Ceramic junction*

2a. pH Electrodes

HANNA has developed four types of specialized glass. First is a durable sensor glass for general purpose, industrial use. This glass can withstand the stress of daily use. The remaining types of electrode glass allow continuous monitoring in highly acidic solutions containing fluoride ions, as well as high or low temperature process streams significantly increasing the electrode life.

2b. ORP Electrodes

ORP electrodes are provided with a platinum sensor for most applications, while a gold sensor is required for measurement of cyanide or highly oxidative environments.

3. Temperature Sensor

The pH electrodes with built-in 3-wire Pt100 or Pt1000 temperature sensor allow the temperature compensation of pH readings as well as temperature measurements.

4. Connection Type

Electrodes can be provided with wire for direct connection to a transmitter or process controller, or with the standard BNC connector.

5. Built-in Amplifier

Models with a built-in amplifier are necessary for long distance measurements, where it is not possible to install a transmitter.

The internal amplifier can be powered directly from select HANNA process controllers or a power source that supplies the appropriate voltage.

6. Cable Length

Non-amplified electrodes can be provided with a 5, 10 or 15 m cable (16', 33' or 49'), while the amplified models can be provided with a 15, 25, 50 or 75 m cable (49, 82, 164 or 246').

GLASS TYPE	APPLICATION	pH RANGE	TEMPERATURE RANGE
LT	Low Temperature	0 to 12	-10 to 80°C
HT	High Temperature	0 to 14	0 to 100°C
HF	Acid Samples with F– (*)	0 to 10	-5 to 60°C

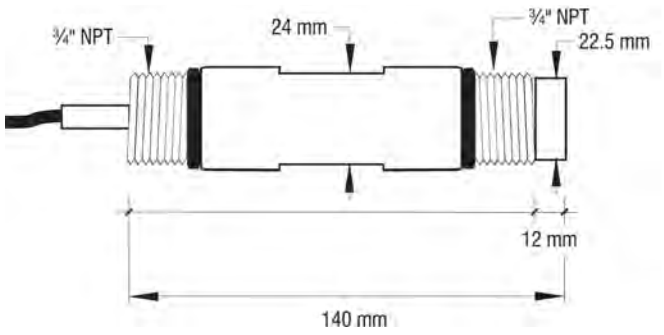
(*) F– max 2 g/L, temperature max 60°C, pH >2

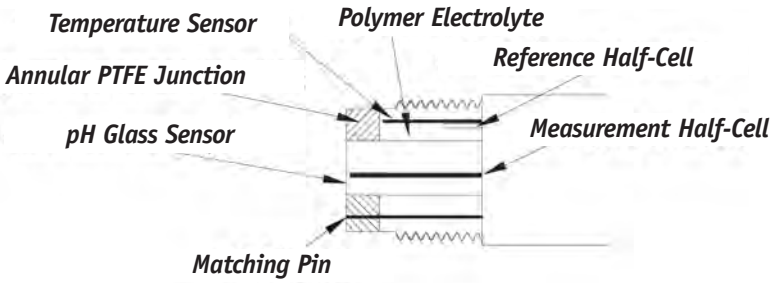
Flat Tip Industrial Electrodes

More Than 300 Models, More Than 300 Applications

Flat Tip pH Electrodes







FLAT TIP pH ELECTRODES: ORDERING INFORMATION

HI	1	0			–		

06: PTFE junction
16: Ceramic junction
26: Open junction*

1: LT (Low Temperature) glass sensor
2: GP (General Purpose) glass sensor
3: HT High Temperature) glass sensor; Titanium Matching Pin
4: HF (Fluoride resistant) glass sensor

0: BNC connector
1: Direct wire connection
2: BNC connector + Pt100
3: Direct wire connection + Pt100
4: BNC connector + Pt1000
5: Direct wire connection + Pt1000
6: Amplified electrode with BNC connector
7: Amplified electrode with BNC connector + Pt100

05, 10, 15: Cable length (meters); for non-amplified electrodes
15, 25, 50, 75: Cable length (meters); for amplified electrodes

* Open junction is available only with GP glass sensor.
Note: The internal amplifier can be powered directly from select HANNA process controllers or a power source that supplies the appropriate voltage.

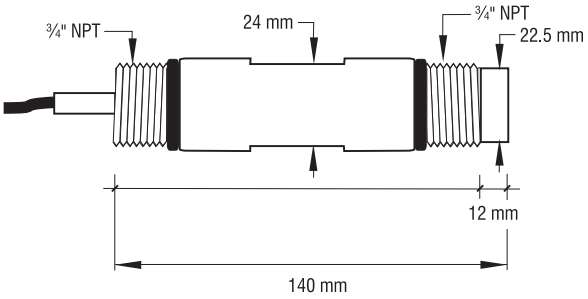
HANNA instruments

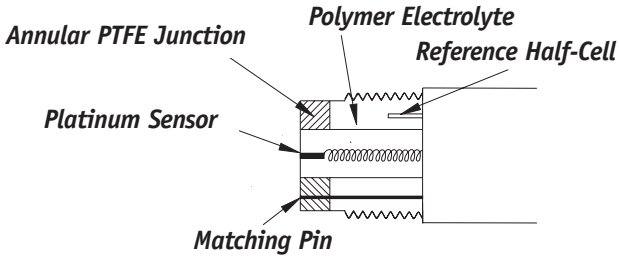
With Great Products, Come Great Results™

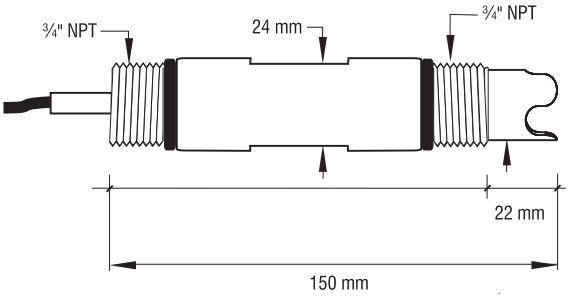
Flat Tip Industrial Electrodes

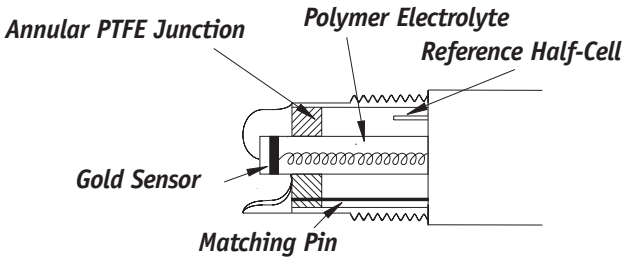
More Than 300 Models, More Than 300 Applications

Flat Tip ORP Electrodes









FLAT TIP ORP ELECTRODES: ORDERING INFORMATION

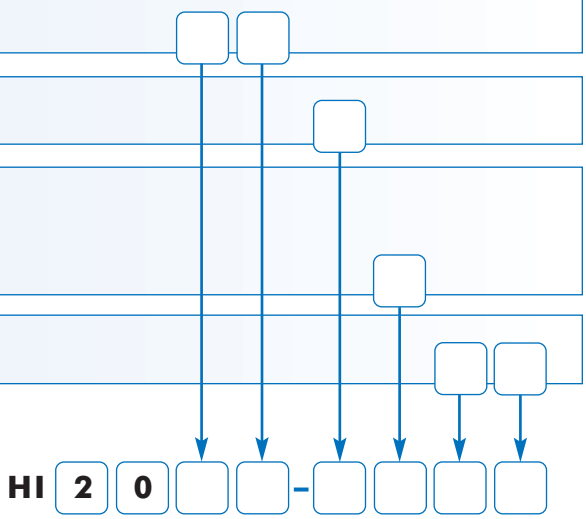
04: PTFE junction
14: Ceramic junction
24: Open junction

1: Platinum sensor
2: Gold sensor

0: BNC connector
1: Direct wire connection
2: BNC connector + Pt100
6: Amplified electrode with BNC connector

05, 10, 15: Cable length (meters); for non-amplified electrodes
15, 25, 50, 75: Cable length (meters); for amplified electrodes

Note: The internal amplifier can be powered directly from select HANNA process controllers or a power source that supplies the appropriate voltage.



CONTENTS

REAGENTS

NAVIGATION

Photometer Reagents **16.2**
CAL CHECK™ Reagents **16.5**
Chemical Test Kit Reagents **16.6**
Turbidity Reagents **16.10**
Accessories for Analysis **16.10**



Reagents for Turbidity Meters

Code		Description
Bromine, method DPD		
Range:		0.00 to 8.00 mg/L
Reagents:	**HI 93716-01**	Reagent kit for 100 tests (Br_2)
	HI 93716-03	Reagent kit for 300 tests (Br_2)
Chlorine, free, DPD method		
Range:		0.00 to 2.50 mg/L
Reagents:	**HI 93701-01**	Powder reagent kit for 100 tests (free Cl_2)
	HI 93701-03	Powder reagent kit for 300 tests (free Cl_2)
	HI 93701-F	Liquid reagent kit for 300 tests (free Cl_2)
Chlorine, total, DPD method		
Range:		0.00 to 3.50 mg/L
Reagents:	**HI 93711-01**	Powder reagent kit for 100 tests (total Cl_2)
	HI 93711-03	Powder reagent kit for 300 tests (total Cl_2)
	HI 93701-T	Liquid reagent kit for 300 tests (total Cl_2)
	HI 93711-D3	DPD3 eeagent for 600 tests (total Cl_2)
Cyanuric Acid, turbidimetric method		
Range:		0 to 80 mg/L
Reagents:	**HI 93722-01**	Reagent kit for 100 tests (cyanuric acid)
	HI 93722-03	Reagent kit for 300 tests (cyanuric acid)
Iodine, method DPD		
Range:		0.0 to 12.5 mg/L
Reagents:	**HI 93718-01**	Reagent kit for 100 tests (I_2)
	HI 93718-03	Reagent kit for 300 tests (I_2)
Iron LR, TPTZ method		
Range:		0.00 to 1.00 mg/L
Reagents:	**HI 93746-01**	Reagent kit for 50 tests (Fe LR)
	HI 93746-03	Reagent kit for 150 tests (Fe LR)
pH, phenol red method		
Range:		5.9 to 8.5 pH
Reagents:	**HI 93710-01**	Reagent kit for 100 tests (pH)
	HI 93710-03	Reagent kit for 300 tests (pH)
Turbidity, ISO 7027 method		
Range:		0.00 to 1000 FTU
Calibration Solutions:	**HI 93703-0**	AMCO-EPA solution @ 0 FTU (30 mL)
	HI 93703-05	AMCO-EPA solution @ 500 FTU (30 mL)
	HI 93703-10	AMCO-EPA solution @ 10 FTU (30 mL)
Turbidity, USEPA 180.1 method		
Range:		0.00 to 50.0 NTU
Calibration Solutions:	**HI 93102-0**	AMCO-EPA solution @ 0 NTU (30 mL)
	HI 93102-20	SAMCO-EPA solution @ 20 NTU (30 mL)
	HI 93124-03	Calibration set @ 0.00, 2.50, 125 EBC (30 mL)
	HI 93124-0	0.00 EBC solution (30 ml)
	HI 93124-1	2.50 EBC solution (30 ml)
	HI 93124-2	125 EBC solution (30 ml)

Accessories for Analysis

HI 3824-99	Ammonia color cube
HI 3830-99	Bromine color cube
HI 3831-99	Chlorine color cube
HI 3832-99	Iodine color cube
HI 3833-99	Phosphate color cube
HI 3834-99	Iron color cube
HI 731340	200 µL automatic pipette
HI 731341	1000 µL automatic pipette
HI 731342	2000 µL automatic pipette
HI 731350	Tip for 200 µL automatic pipette (25)
HI 731351	Tip for 1000 µL automatic pipette (25)
HI 731352	Tip for 2000 µL automatic pipette (25)
HI 740032P	Cap for 20 mL beaker (10)
HI 740034P	Cap for 50 mL beaker (10)
HI 740036P	Plastic Beaker, 50 mL (10)
HI 740037P	Plastic Beaker, 20 mL (10)
HI 740041	60 mL glass BOD bottle
HI 740048P	Plastic bottle, 120 mL (10)
HI 740049P	Cap for 120 mL plastic bottle (10)
HI 740132P	Dosing spoon (10)
HI 740142P	Graduated syringe (10)
HI 740144P	Tip for graduated syringe (10)
HI 740196P	Plastic vials (5)
HI 740220	25 mL glass test tube with cap, (2)
Demi-02	Bottle for 2 L of demineralized water
Demi-05	Bottle for 5 L of demineralized water
Demi-10	Bottle for 10 L of demineralized water



HI 740142P
Graduated syringe



HI 731340 200 µL
Auto Pipette

HI 731342 2000 µL
Auto Pipette

HI 731352 Tips for
2000 µL Auto Pipette



HI 3834-99 Iron
Color Cube



HI 3833-99 Phosphate
Color Cube

HANNA instruments
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Reagents for Photometers

Alkalinity, colorimetric method

	Code	Description
Range:		0 to 500 mg/L
Reagents:	**HI 93755-01**	Reagent kit for 100 tests ($CaCO_3$)
	HI 93755-03	Reagent kit for 300 tests ($CaCO_3$)

Aluminum, aluminon method

	Code	Description
Range:		0.00 to 1.00 mg/L
Reagents:	**HI 93712-01**	Reagent kit for 100 tests (Al)
	HI 93712-03	Reagent kit for 300 tests (Al)

Ammonia HR, Nessler method

	Code	Description
Range:		0 to 100 mg/L
Reagents:	**HI 93764B-25**	Reagent kit for 25 test vials (N-NH_3 HR)
Range:		0.0 to 50.0 mg/L
Reagents:	**HI 93733-01**	Reagent kit for 100 tests (NH_4+ HR
	HI 93733-03	Reagent kit for 300 tests (NH_4+ HR)

Ammonia LR, Nessler method

	Code	Description
Range:		0.00 to 3.00 mg/L
Reagents:	**HI 93700-01**	Reagent kit for 100 tests (NH_3-N LR)
	HI 93700-03	Reagent kit for 300 tests (NH_3-N LR)
	HI 93764A-25	Reagent kit for 25 test vials (NH_3-N LR)

Ammonia MR, Nessler method

	Code	Description
Range:		0.00 to 9.99 mg/L (10.00 mg/L)****
Reagents:	**HI 93715-01**	Reagent kit for 100 tests (NH_3-N MR)
	HI 93715-03	Reagent kit for 300 tests (NH_3-N MR)

Bromine, DPD method

	Code	Description
Range:		0.00 to 8.00 mg/L (10.00 mg/L)****
Reagents:	**HI 93716-01**	Reagent kit for 100 tests (Br_2)
	HI 93716-03	Reagent kit for 300 tests (Br_2)

Calcium and magnesium HR, oxalate (Ca) and calmagite (Mg) methods

	Code	Description
Range:		0 to 400 mg/L (Ca) 0 to 150 mg/L (Mg)
Reagents:	**HI 93752-01**	Reagent kit for 100 tests (50 Ca and 50 Mg)
	HI 93752-03	Reagent kit for 300 tests (150 Ca and 150 Mg)

Chloride, mercury (II) thiocyanate method

	Code	Description
Range:		0.0 to 20.0 mg/L
Reagents:	**HI 93753-01**	Reagent kit for 100 tests (Cl^-)
	HI 93753-03	Reagent kit for 300 tests (Cl^-)

Chlorine Dioxide, chlorophenol red method

	Code	Description
Range:		0.00 to 2.00 mg/L
Reagents:	**HI 93738-01**	Reagent kit for 100 tests (ClO_2)
	HI 93738-03	Reagent kit for 300 tests (ClO_2)

Chlorine, ULR, iodometric method

	Code	Description
Range:		0 to 500 mg/L
Reagents:	**HI 95711-01**	Reagent kit for 100 tests (Cl_2)
	HI 95711-03	Reagent kit for 300 tests (Cl_2)

Chlorine, free and total HR, DPD method

	Code	Description
Range:		0.00 to 10.00 mg/L
Reagents:	**HI 93734-01**	Powder reagent kit for 100 tests (Cl_2 free or total)
	HI 93734-03	Powder reagent kit for 300 tests (Cl_2 free or total)

Chlorine, free, ULR, DPD method

	Code	Description
Range:		0.000 to 0.500 mg/L
Reagents:	**HI 95762-01**	Reagent kit for 100 tests (free Cl_2)
	HI 95762-03	Reagent kit for 300 tests (free Cl_2)

Chlorine, free, DPD method

	Code	Description
Range:		0.00 to 2.50 mg/L (5.00 mg/L)****
Reagents:	**HI 93701-01**	Powder reagent kit for 100 tests (free Cl_2)
	HI 93701-03	Powder reagent kit for 300 tests (free Cl_2)
	HI 93701-F	Liquid reagent Kit for 300 tests (free Cl_2)

Chlorine, total, ULR, DPD method

	Code	Description
Range:		0.000 to 0.500 mg/L
Reagents:	**HI 95761-01**	Reagent kit for 100 tests (total Cl_2)
	HI 95761-03	Reagent kit for 300 tests (total Cl_2)

Chlorine, total, DPD method

	Code	Description
Range:		0.00 to 3.50 mg/L (5.00 mg/L)****
Reagents:	**HI 93711-01**	Powder reagent kit for 100 tests (total Cl_2)
	HI 93711-03	Powder reagent kit for 300 tests (total Cl_2)
	HI 93701-T	Liquid reagent Kit for 300 tests (total Cl_2)
	HI 93711-D3	DPD3 reagent for 600 tests (total Cl_2)

Chromium VI HR, diphenylcarbohydrazide method

	Code	Description
Range:		0 to 1000 µg/L
Reagents:	**HI 93723-01**	Reagent kit for 100 tests (Cr VI HR)
	HI 93723-03	Reagent kit for 300 tests (Cr VI HR)

Chromium VI LR, diphenylcarbohydrazide method

	Code	Description
Range:		0 to 300 µg/L
Reagents:	**HI 93749-01**	Reagent kit for 100 tests (Cr VI LR)
	HI 93749-03	Reagent kit for 300 tests (Cr VI LR)

COD, HR, dichromate method

	Code	Description
Range:		0 to 150 mg/L
Reagents:	**HI 93754C-25**	Reagent kit for 25 test vials (O_2)

* The sulphuric acid method is officially recognized by EPA for wastewater.
** HI 93754F-25 and HI 93754G-25 are compliant to ISO 15705 method.

*** It is a recommended method for generic analysis and if chlorine is absent.
**** Some meters allow the user to extend the range to the value between brackets.

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Code	Description

COD, LR EPA*, dichromate method

Range: 0 to 150 mg/L

Reagents:		
	HI 93754A-25	Reagent kit for 25 test vials (O_2)

COD, LR ISO**, dichromate method

Range: 0 to 150 mg/L

Reagents:		
	HI 93754F-25	Reagent kit for 25 test vials (O_2)

COD, LR, dichromate method mercury free***

Range: 0 to 15000 mg/L

Reagents:		
	HI 93754D-25	Reagent kit for 25 test vials (O_2)

COD, MR, dichromate method mercury free***

Range: 0 to 1500 mg/L

Reagents:		
	HI 93754E-25	Reagent kit for 25 test vials (O_2)

COD, MR EPA*, dichromate method

Range: 0 to 1500 mg/L

Reagents:		
	HI 93754B-25	Reagent kit for 25 test vials (O_2)

COD, MR ISO**, dichromate method

Range: 0 to 1000 mg/L

Reagents:		
	HI 93754G-25	Reagent kit for 25 test vials (O_2)

Copper HR, bicinchoninate acid method

Range: 0.00 to 5.00 mg/L

Reagents:		
	HI 93702-01	Reagent kit for 100 tests (Cu HR)
	HI 93702-03	Reagent kit for 300 tests (Cu HR)
	HI 93702T-01	Reagent kit for total copper 100 tests (Cu HR)
	HI 93702T-03	Reagent kit for total copper 300 tests (Cu HR)

Copper LR, bicinchoninate acid method

Range: 0.000 to 1.500 mg/L

Reagents:		
	HI 95747-01	Reagent kit for 100 tests (Cu LR)
	HI 95747-03	Reagent kit for 300 tests (Cu LR)

Cyanide, pyridine-pyrazalone method

Range: 0.000 to 0.200 mg/L

Reagents:		
	HI 93714-01	Reagent kit for 100 tests (CN-)
	HI 93714-03	Reagent kit for 300 tests (CN-)

Cyanuric Acid, turbidimetric method

Range: 0 to 80 mg/L (200 mg/L)****

Reagents:		
	HI 93722-01	Reagent kit for 100 tests (cyanuric acid)
	HI 93722-03	Reagent kit for 300 tests (cyanuric acid)

Detergents, Anionic, MBAS method

Range: 0.00 to 3.50 mg/L

Reagents:		
	HI 95769-01	Reagent kit for 40 tests (SDBS)

Code	Description

Dissolved Oxygen, Winkler method

Range: 0.0 to 10.0 mg/L

Reagents:		
	HI 93732-01	Reagent kit for 100 tests (O_2)
	HI 93732-03	Reagent kit for 300 tests (O_2)

Fluoride HR, SPADNS method

Range: 0.0 to 20.0 mg/L

Reagents:		
	HI 93739-01	Reagent kit for 100 tests (F- HR)
	HI 93739-03	Reagent kit for 300 tests (F- HR)

Fluoride LR, SPADNS method

Range: 0.00 to 2.00 mg/L

Reagents:		
	HI 93729-01	Reagent kit for 100 tests (F- LR)
	HI 93729-03	Reagent kit for 300 tests (F- LR)
	HI 93703-53	Optional Reagent for chlorine removal

Hardness calcium, calmagite method

Range: 0.00 to 2.70 mg/L

Reagents:		
	HI 93720-01	Reagent kit for 100 tests (Ca hardness, $CaCO_3$)
	HI 93720-03	Reagent kit for 300 tests (Ca hardness, $CaCO_3$)

Hardness calcium, colorimetric method

Range: 0 to 500 mg/L

Reagents:		
	HI 93756-01	Reagent kit for 100 tests (Ca hardness, $CaCO_3$)
	HI 93756-03	Reagent kit for 300 tests (Ca hardness, $CaCO_3$)

Hardness magnesium, EDTA method

Range: 0.00 to 2.00 mg/L

Reagents:		
	HI 93719-01	Reagent kit for 100 tests (Mg hardness, $CaCO_3$)
	HI 93719-03	Reagent kit for 300 tests (Mg hardness, $CaCO_3$)

Hardness, total, colorimetric method

Range: 0 to 750 mg/L

Reagents:		
	HI 93735-0	Reagent kit for 100 tests (0-750 mg/L $CaCO_3$)
	HI 93735-00	Reagent kit for 100 tests (0-250 mg/L $CaCO_3$)
	HI 93735-01	Reagent kit for 100 tests (200-500 mg/L $CaCO_3$)
	HI 93735-02	Reagent kit for 100 tests (400-750 mg/L $CaCO_3$)

Hydrazine, p-dimethylaminobenzaldehyde method

Range: 0 to 400 µg/L

Reagents:		
	HI 93704-01	Reagent kit for 100 tests (N_2H_4)
	HI 93704-03	Reagent kit for 300 tests (N_2H_4)

* The sulphuric acid method is officially recognized by EPA for wastewater.
** HI 93754F-25 and HI 93754G-25 are compliant to ISO 15705 method.

*** It is a recommended method for generic analysis and if chlorine is absent.
**** Some meters allow the user to extend the range to the value between brackets.

Code	Description

Iodine, DPD method

Range: 0.0 to 12.5 mg/L

Reagents:		
	HI 93718-01	Reagent kit for 100 tests (I_2)
	HI 93718-03	Reagent kit for 300 tests (I_2)

Iron HR, phenantroline method

Range: 0.00 to 5.00 mg/L

Reagents:		
	HI 93721-01	Reagent kit for 100 tests (Fe HR)
	HI 93721-03	Reagent kit for 300 tests (Fe HR)

Iron LR, TPTZ method

Range: 0 to 400 µg/L

Reagents:		
	HI 93746-01	Reagent kit for 50 tests (Fe LR)
	HI 93746-03	Reagent kit for 150 tests (Fe LR)

Manganese HR, periodate method

Range: 0.0 to 20.0 mg/L

Reagents:		
	HI 93709-01	Reagent kit for 100 tests (Mn HR)
	HI 93709-03	Reagent kit for 300 tests (Mn HR)

Manganese LR, PAN method

Range: 0 to 300 µg/L

Reagents:		
	HI 93748-01	Reagent kit for 50 tests (Mn LR)
	HI 93748-03	Reagent kit for 150 tests (Mn LR)

Molybdenum, mercaptoacetic acid method

Range: 0.0 to 40.0 mg/L

Reagents:		
	HI 93730-01	Reagent kit for 100 tests (Mo)
	HI 93730-03	Reagent kit for 300 tests (Mo)

Nickel HR, fotometric method

Range: 0.00 to 7.00 mg/L

Reagents:		
	HI 93726-01	Reagent kit for 100 tests (Ni HR)
	HI 93726-03	Reagent kit for 300 tests (Ni HR)

Nickel LR, PAN method

Range: 0.000 to 1.00 0 mg/L

Reagents:		
	HI 93740-01	Reagent kit for 50 tests (Ni LR)
	HI 93740-03	Reagent kit for 150 tests (Ni LR)

Nitrate, cadmium reduction method

Range: 0.0 to 30.0 mg/L

Reagents:		
	HI 93728-01	Reagent kit for 100 tests (NO^{3-}-N)
	HI 93728-03	Reagent kit for 300 tests (NO^{3-}-N)

Nitrate, cromotropic acid method

Range: 0.0 to 30.0 mg/L

Reagents:		
	HI 93766-50	Reagent kit for 50 test vials (NO^{3-}-N)

* The sulphuric acid method is officially recognized by EPA for wastewater.
** HI 93754F-25 and HI 93754G-25 are compliant to ISO 15705 method.

Code	Description

Nitrite HR, ferrous suplhate method

Range: 0 to 150 mg/L

Reagents:		
	HI 93708-01	Reagent kit for 100 tests (NO_2^- HR)
	HI 93708-03	Reagent kit for 300 tests (NO_2^- HR)

Nitrite LR, diazotation method

Range: 0.00 to 0.35 mg/L (1.500 mg/L)****

Reagents:		
	HI 93707-01	Reagent kit for 100 tests (N-NO_2^- LR)
	HI 93707-03	Reagent kit for 300 tests (N-NO_2^- LR)

Nitrogen, total, HR, cromotropic acid method

Range: 10 to 150 mg/L

Reagents:		
	HI 93767B-50	Reagent kit for 50 test vials (N)

Nitrogen, total, LR, cromotropic acid method

Range: 0.0 to 25.0 mg/L

Reagents:		
	HI 93767A-50	Reagent kit for 50 test vials (N)

Ozone, DPD method

Range: 0.00 to 2.00 mg/L

Reagents:		
	HI 93757-01	Reagent kit for 100 tests (O_3)
	HI 93757-03	Reagent kit for 300 tests (O_3)
	HI 93703-52	Optional reagent for 100 tests (glycin)

pH, phenol red method

Range: 5.9(6.5)**** to 8.5 pH

Reagents:		
	HI 93710-01	Reagent kit for 100 tests (pH)
	HI 93710-03	Reagent kit for 300 tests (pH)

Phosphate HR, amino acid method

Range: 0.0 to 30.0 mg/L

Reagents:		
	HI 93717-01	Reagent kit for 100 tests (PO_4^{3-} HR)
	HI 93717-03	Reagent kit for 300 tests (PO_4^{3-} HR)

Phosphate LR, ascorbic acid method

Range: 0.00 to 2.50 mg/L

Reagents:		
	HI 93713-01	Reagent kit for 100 tests (PO_4^{3-} LR)
	HI 93713-03	Reagent kit for 300 tests (PO_4^{3-} LR)

Phosphorus acid-hydrolizable, ascorbic acid method

Range: 0.00 to 5.00 mg/L

Reagents:		
	HI 93758B-50	Reagent kit for 50 test vials (PO_4^{3-})

Phosphorus, amino acid method

Range: 0.0 to 15.0 mg/L

Reagents:		
	HI 93706-01	Reagent kit for 100 tests (P)
	HI 93706-03	Reagent kit for 300 tests (P)

Phosphorus, reactive, ascorbic acid method

Range: 0.00 to 5.00 mg/L

Reagents:		
	HI 93758A-50	Reagent kit for 50 test vials (PO_4^{3-})

*** It is a recommended method for generic analysis and if chlorine is absent.
**** Some meters allow the user to extend the range to the value between brackets.

CAL CHECK™ Standards

for HI 96 and HI 95 Series Photometers

Code		Description
Phosphorus reactive HR, vanadomolibdophosphoric acid method		
Range:		0.0 to 100.0 mg/L
Reagents:	**HI 93763A-50**	Reagent kit for 50 test vials (PO_4^{3-})
Phosphorus total, ascorbic acid method		
Range:		0.00 to 3.50 mg/L
Reagents:	**HI 93758C-50**	Reagent kit for 50 test vials (PO_4^{3-})
Phosphorus total, HR, vanadomolibdophosphoric acid method		
Range:		0.0 to 100.0 mg/L
Reagents:	**HI 93763B-50**	Reagent kit for 50 test vials (PO_4^{3-})
Potassium, turbidimetric method		
Range:		0.0 to 50.0 mg/L
Reagents:	**HI 93750-01**	Reagent kit for 100 tests (K)
	HI 93750-03	Reagent kit for 300 tests (K)
Silica, LR heteropoly blue method		
Range:		0.00 to 2.00 mg/L
Reagents:	**HI 93705-01**	Reagent kit for 100 tests (SiO_2)
	HI 93705-03	Reagent kit for 300 tests (SiO_2)
Silver, PAN method		
Range:		0.000 to 1.000 mg/L
Reagents:	**HI 93737-01**	Reagent kit for 50 tests (Ag)
	HI 93737-03	Reagent kit for 150 tests (Ag)
Sulfate, turbidimetric method		
Range:		0 to 150 mg/L
Reagents:	**HI 93751-01**	Reagent kit for 100 tests (SO_4^{2-})
	HI 93751-03	Reagent kit for 300 tests (SO_4^{2-})
Zinc, zincon method		
Range:		0.00 to 3.00 mg/L
Reagents:	**HI 93731-01**	Reagent kit for 100 tests (Zn)
	HI 93731-03	Reagent kit for 300 tests (Zn)

CAL CHECK™ Standard Solutions: Calibrate and Check HI 96 series!



Code	Description
HI 96701 • HI 95701	
HI 95701-11	CAL CHECK™ standard cuvets
HI 96762 • HI 95762	
HI 95762-11	CAL CHECK™ standard cuvets
HI 96761 • HI 95761	
HI 95761-11	CAL CHECK™ standard cuvets
HI 96711 • HI 96781 • HI 95711	
HI 95701-11	CAL CHECK™ standard cuvets for Free Chlorine
HI 95711-11	CAL CHECK™ standard cuvets for Total Chlorine
HI 96724 • HI 95724	
HI 95724-11	CAL CHECK™ standard cuvets
HI 96734 • HI 95734	
HI 95734-11	CAL CHECK™ standard cuvets
HI 96771 • HI 95771	
HI 95771-11	CAL CHECK™ standard cuvets
HI 96747 • HI 95747	
HI 95747-11	CAL CHECK™ standard cuvets
HI 96769 • HI 95769	
HI 95769-11	CAL CHECK™ standard cuvets
HI 96729 • HI 95729	
HI 95729-11	CAL CHECK™ standard cuvets
HI 96721 • HI 95721	
HI 95721-11	CAL CHECK™ standard cuvets
HI 96715 • HI 95715	
HI 95715-11	CAL CHECK™ standard
HI 96707 • HI 95707	
HI 95707-11	CAL CHECK™ standard cuvets
HI 96706 • HI 95706	
HI 95706-11	CAL CHECK™ standard cuvets
HI 96717 • HI 95717	
HI 95717-11	CAL CHECK™ standard cuvets
HI 96770	
HI 95770-11	CAL CHECK™ standard cuvets

Reagents for Chemical Test Kits

Acidity, methyl orange method

	Code	Description
Range:		0 to 100 mg/L; 0 to 500 mg/L
Reagents:	**HI 3820-100**	Reagent kit for 110 tests ($CaCO_3$)

Acidity, olive oil, titration with hydroxide

	Code	Description
Range:		0.00 to 1.00%
Reagents:	**HI 3897**	Reagent kit for 6 tests
	HI 3897-010	Spare kit for 10 tests

Acidity, total exchangeable, potassium chloride method

	Code	Description
Range:		0.0 to 2.5 meq/100 g
Reagents:	**HI 38084-100**	Reagent kit for 100 tests (total acidity exchangeable)

Alkalinity, acid titration method

	Code	Description
Range:		0 to 100 mg/L 0 to 300 mg/L
Reagents:	**HI 3811-100**	Reagent kit for 110 tests ($CaCO_3$)

Alkalinity, acid titration method

	Code	Description
Range:		0 to 500 gpg
Reagents:	**HI 38014-100**	Reagent kit for 100 tests ($CaCO_3$)

Alkalinity, Phenolphthalein and total, phenolphthalein/bromine phenol blue

	Code	Description
Range:		0.0 to 10.0 gpg0. 0 to 20.0 gpg
Reagents:	**HI 38013-100**	Reagent kit for 200 tests

Ammonia (fresh water), Nessler colorimetric method

	Code	Description
Range:		0.0 to 2.5 mg/L
Reagents:	**HI 3824-025**	Reagent kit for 25 tests (NH_3-N fresh water)

Ammonia (fresh water), Nessler colorimetric method

	Code	Description
Range:		0.0 to 3.0 mg/L
Reagents:	**HI 38049-100**	Reagent kit for 100 tests (NH_3-N fresh water)

Ammonia (sea water), Nessler colorimetric method

	Code	Description
Range:		0.0 to 2.5 mg/L
Reagents:	**HI 3826-025**	Reagent kit for 25 tests (NH_3-N sea water)

Ascorbic Acid, iodometric method

	Code	Description
Range:		10 to 200 mg/L
Reagents:	**HI 3850-100**	Reagent kit for 100 tests (ascorbic acid)

Boron, boric acid method

	Code	Description
Range:		0.0 to 5.0 mg/L
Reagents:	**HI 38074-100**	Reagent kit for 100 tests (B)

Bromine, DPD colorimetric method

	Code	Description
Range:		0.0 to 3.0 mg/L
Reagents:	**HI 3830-060**	Reagent kit for 60 tests (Br2)

Calcium (irrigation water), turbidimetric method

	Code	Description
Range:		0 to 125 mg/L 0 to 250 mg/L
Reagents:	**HI 38086-100**	Reagent kit for 100 tests (Ca)

Calcium and magnesium (irrigation water), EDTA method

	Code	Description
Range:		> 0.0 mg/L
Reagents:	**HI 38081-100**	Reagent kit for 100 tests (Ca and Mg)

Carbon dioxide, base titration method

	Code	Description
Range:		0.0 to 10.0 mg/L 0.0 to 50.0 mg/L 0 to 100 mg/L
Reagents:	**HI 3818-100**	Reagent kit for 110 tests (CO2)

Chloride, absence/presence, silver nitrate tiration method

	Code	Description
Range:		1000 mg/L (ISO) 2000 mg/L (EPA)
Reagents:	**HI 3898**	Test kit for 100 tests (Cl-)

Chloride, extended range, silver nitrate titration method

	Code	Description
Range:		500 to 10.000 mg/L 5.000 to 100.000 mg/L
Reagents:	**HI 38015-100**	Reagent kit for 100 tests (Cl-)

Chloride, mercury nitrate titration method

	Code	Description
Range:		0 to 100 mg/L 0 to 1000 mg/L
Reagents	**HI 3815-100**	Reagent kit for 100 tests (Cl-)

Chlorine, free and total, LR / MR / HR, DPD colorimetric method

	Code	Description
Range:		0.00 to 0.70 mg/L 0.0 to 3.5 mg/L 0.0 to 10.0 mg/L
Reagents	**HI 38020-200**	Reagent kit for 200 tests (free and total chlorine)

Chlorine, free and total, LR / MR, DPD colorimetric method

	Code	Description
Range:		0.00 to 0.70 mg/L 0.0 to 3.5 mg/L
Reagents	**HI 38017-200**	Reagent kit for 200 tests (free and total chlorine)

Code	Description

Chlorine, free, DPD colorimetric method

Range:		0.0 to 2.5 mg/L
Reagents	**HI 3831F-050**	Reagent kit for 50 tests (free chlorine)

Chlorine, free, LR / MR, DPD colorimetric method

Range:		0.00 to 0.70 mg/L
		0.0 to 3.5 mg/L
Reagents	**HI 38018-200**	Reagent kit for 200 tests (free chlorine)

Chlorine, free, MR, DPD colorimetric method

Range:		0.0 to 3.5 mg/L
Reagents	**HI 3875-100**	Reagent kit for 100 tests (free chlorine)

Chlorine, total, DPD colorimetric method

Range:		0 to 2.5 mg/L
Reagents	**HI 3831T-050**	Reagent kit for 50 tests

Chlorine, total, extended range, iodometric method

Range:		10 to 200 mg/L
Reagents	**HI 38023-100**	Reagent kit for 100 tests (total chlorine)

Chlorine, total, HR, iodometric method

Range:		0.0 to 4.0 mg/L
		0.0 to 20.0 mg/L
Reagents	**HI 38022-100**	Reagent kit for 100 tests (total chlorine)

Chlorine, total, LR / MR, DPD colorimetric method

Range:		0.00 to 0.70 mg/L
		0.0 to 3.5 mg/L
Reagents	**HI 38019-200**	Reagent kit for 200 tests (total chlorine)

Chlorine, total, MR, DPD colorimetric method

Range:		0.0 to 3.5 mg/L
Reagents	**HI 38016-100**	Reagent kit for 100 tests (total chlorine)

Chromium VI, diphenylcarbohydrazide method

Range:		0.0 to 1.0 mg/L
Reagents:	**HI 3846-100**	Reagent kit for 100 tests (Cr VI LR)

Chromium VI MR / HR, iodometric method

Range:		0 to 100 mg/L
		100 to 1000 mg/L
Reagents:	**HI 3845-100**	Reagent kit for 100 tests (Cr VI HR)

Copper HR, bicinchoninate method

Range:		0.0 to 2.5 mg/L
Reagents:	**HI 3847-100**	Reagent kit for 100 tests (Cu HR)

Copper LR / HR, bicinchonic acid

Range:		0.00 to 0.25 mg/L
		0.0 to 6.0 mg/L
Reagents:	**HI 38075-100**	Reagent kit for 100 tests (Cu)

Code	Description

Copper ULR, bicinchoninate method

Range:		0.00 to 0.25 mg/L
Reagents:	**HI 3856-100**	Reagent kit for 100 tests (Cu LR)

Cyanide, pyridine-pyrazolone method

Range:		0.00 to 0.30 mg/L
Reagents:	**HI 3855-100**	Reagent kit for 100 tests (CN-)

Cyanuric Acid, turbidimetric method

Range:		10 to 100 mg/L
Reagents:	**HI 3851-100**	Reagent kit for 100 tests (cyanuric acid)

Detergents, metilene blue method

Range:		0.00 to 1.30 mg/L
Reagents:	**HI 3857-035**	Reagent kit for 35 tests (ABS/LAS)

Dissolved Oxygen, Winkler method

Range:		0.0 to 10.0 mg/L
Reagents:	**HI 3810-100**	Reagent kit for 110 tests (O2)

Formaldehyde, acid titration method

Range:		0.00 to 1.00 % CH_2O
		0.0 to 10.0 % CH_2O
Reagents:	**HI 3838-100**	Reagent kit for 110 tests (formaldehyde)

Glycol, oxidation method

Range:		present/absent
Reagents:	**HI 3859-025**	Reagent kit for 25 tests (glycol)

Hardness, total and calcium, EDTA titration method

Range:		0.0 to 20.0 gpg total Hardness ($CaCO_3$)
		0.0 to 20.0 gpg Calcium (Ca)
Reagents:	**HI 38035-200**	Reagent kit for 200 tests

Hardness, total, EDTA titration method

Range:		0.0 to 20.0 gpg
		0.0 to 20.0 mg/L
Reagents	**HI 38034-200**	Reagent kit for 200 tests ($CaCO_3$)

Hardness, total, EDTA titration method

Range:		0.0 to 30.0 mg/L
		0 to 300 mg/L
Reagents:	**HI 3812-100**	Reagent kit for 100 test

Hardness, total, EDTA method

Range:		0 to 30 gpg
Reagents:	**HI 38033-100**	Reagent kit for 100 test

Hardness, total, EDTA method

Range:		0 to 3000 mg/L
Reagents:	**HI 3840**	Test kit for 50 tests (range 0 to 150 mg/L)
	HI 3841	Test kit for 50 tests (range 40 to 500 mg/L)
	HI 3842	Test kit for 50 tests (range 400 to 3000 mg/L)

Reagents for Chemical Test Kits

Code	Description

Hydrazine, p-dimethylaminobenzaldehyde method

Range: 0.00 to 1.00 mg/L (ppm)
Reagents: **HI 3849-100** Reagent kit for 100 tests (N_2H_4)

Hydrogen Peroxide, iodometric method

Range: 0.00 to 2.00 mg/L
0.0 to 10.0 mg/L
Reagents: **HI 3844-100** Reagent kit for 100 tests (H_2O_2)

Hydroxide, acid titration method

Range: 0.00 to 1.00 g/L
0.0 to 10.0 g/L
Reagents: **HI 3839-100** Reagent kit for 110 tests (OH-)

Hypochlorite, iodometric method

Range: 50 to 150 g/L Cl_2
Reagents: **HI 3843-100** Reagent kit for 100 tests (hypochlorite)

Iodine, DPD colorimetric method

Range: 0.0 to 2.5 mg/L
Reagents: **HI 3832-050** Reagent kit for 50 tests (I_2)

Iodine, DPD colorimetric method

Range: 0 to 5 mg/L
Reagents: **HI 3879-100** Reagent kit for 100 tests (I_2)

Iron HR, phenanthroline colorimetric method

Range: 0.0 to 10.0 mg/L
Reagents: **HI 38041-100** Reagent kit for 100 tests (Fe)

Iron LR, phenanthroline colorimetric method

Range: 0.00 to 1.00 mg/L
Reagents: **HI 38039-100** Reagent kit for 100 tests (Fe)

Iron MR, phenanthroline colorimetric method

Range: 0.0 to 5.0 mg/L
Reagents: **HI 38040-100** Reagent kit for 100 tests (Fe)

Iron, phenanthroline colorimetric method

Range: 0 to 5 mg/L
Reagents: **HI 3834-050** Reagent kit for 50 tests (Fe)

Magnesium (irrigation water), EDTA method

Range: 0.0 to 24.0 mg/L
0.0 to 725.0 mg/L
Reagents: **HI 38079-100** Reagent kit for 100 tests (Mg irrigation water)

Magnesium and Calcium (soil), method EDTA

- see Calcium and MagnesiumManganese (irrigation water) HR, sodium periodate method

Range: 0.0 to 10.0 mg/L
Reagents: **HI 38072-100** Reagent kit for 100 tests (Mn HR)

Code	Description

Manganese (LR), method sodium periodate

Range: 0.0 to 3.0 mg/L
Reagents **HI 38042-100** Reagent kit for 100 tests (Mn LR)

Nitrate (soil + irrigation), cadmium reduction method

Range: 0 to 60 mg/L (soil)
0 to 50 mg/L (irrigation water)
Reagents: **HI 38050-200** Reagent kit for 200 tests (NO_3^--N)

Nitrate, cadmium reduction method

Range: 0 to 50 mg/L
Reagents: **HI 3874-100** Reagent kit for 100 tests (NO_3^--N)

Nitrite, chromotropic acid method

Range: 0.00 to 0.50 mg/L
Reagents: **HI 38051-100** Reagent kit for 100 tests (NO_2^--N)

Nitrite, chromotropic acid method

Range: 0.0 to 1.0 mg/L
Reagents: **HI 3873-100** Reagent kit for 100 tests (NO_2^--N)

Ozone, DPD method

Range: 0.0 to 2.3 mg/L
Reagents: **HI 38054-100** Reagent kit for 100 tests (O_3)

pH, pH indicator method

Range: 4.0 to 6.5 pH
Reagents: **HI 3880-010** Reagent kit for 100 tests (4.0-6.5 pH, reag. Cl_2)
HI 3880-100 Reagent kit for 100 tests (4.0-6.5 pH)

pH, pH indicator method

Range: 6.0 to 8.5 pH
Reagents: **HI 3881-010** Reagent kit for 100 tests (6.0-8.5 pH, Cl_2 reag.)
HI 3881-100 Reagent kit for 100 tests (6.0-8.5 pH)

pH, pH indicator method

Range: 3.0 to 5.0 pH
Reagents: **HI 3882-10** Reagent kit for 200 tests (3.0-5.0 pH)

pH, pH indicator method

Range: 7.5 to 10.0 pH
Reagents: **HI 3886-010** Reagent kit for 100 tests (7.5-10.0 pH, Cl_2 reag.)
HI 3886-100 Reagent kit for 100 tests (7.5-10.0 pH)

pH, pH indicator method

Range: 4.0 to 10.0 pH
Reagents: **HI 38058-100** Reagent kit for 300 tests (4.0-10.0 pH)

pH, pH indicator method

Range: 4.0 to 8.0 pH
Reagents: **HI 3881-5** Test kit for 200 tests

Code	Description

Phenol, aminoantipyrine method

Range:		0.00 to 1.00 mg/L
		0.5 to 5.0 mg/L
Reagents:	**HI 3864-100**	Reagent kit for 100 tests (phenol)

Phosphate (irrigation water), ascorbic acid method

Range:		0.0 to 5.0 mg/L
Reagents:	**HI 38077-100**	Reagent kit for 100 tests (PO_4^{3-} orthophosphate)

Phosphate, ascorbic acid method

Range:		0 to 5 mg/L
Reagents:	**HI 3833-050**	Reagent kit for 50 tests (PO_4^{3-} orthophosphate)

Phosphate, ascorbic acid method

Range:		0.00 to 1.00 mg/L
		0.0 to 5.0 mg/L
		0 to 50 mg/L
Reagents:	**HI 38061-100**	Reagent kit for 100 tests (PO_4^{3-} orthophosphate)

Phosphorus (soil), colorimetric method

Range:		0.0 to 130.0 mg/L
Reagents:	**HI 38073-100**	Reagent kit for 100 tests (phosphorus)

Potassium (soil), turbidimetric method

Range:		0 to 50 mg/L
		50 to 250 mg/L
Reagents:	**HI 38082-100**	Reagent kit for 100 tests (potassium)

Salinity, mercuric nitrate titration method

Range:		0.0 to 40.0 g/Kg
Reagents:	**HI 3835-100**	Reagent kit for 110 tests (salinity)

SAR, EDTA titration method

Range:		>0.0 meq/L
Reagents:	**HI 38078-100**	Reagent kit for 100 tests (S.A.R)

Silica HR, Heteropoly Blue method

Range:		0 to 40 mg/L
		0 to 800 mg/L
Reagents:	**HI 38067-100**	Reagent kit for 100 tests (SiO_2)

Silica LR, Heteropoly Blue method

Range:		0.00 to 1.00 mg/L
Reagents:	**HI 38066-100**	Reagent kit for 100 tests (SiO_2)

Sodium, exchangeable (EES) and gypsum requirement (GR), calcium sulfate method

Range:		0.00 to 56.40 meq/100 g soil (EES)
		0.0 to 213.0 metric ton/ha (GR)
Reagents:	**HI 38083-100**	Reagent kit for 100 tests (EES and GR)

Code	Description

Soil analysis, Ned (N), ascorbic acid (P), tetraphenylborate (K), pH indicaators (pH)

Range:		Nitogen (N): trace, low, medium, high
		Phosphorus (P): trace, low, medium, high
		Potassium (K): trace, low, medium, high
		pH: 4 to 9 pH
Reagents	**HI 3895-010**	Reagent kit for 10 tests (N, P, K, pH)
	HI 3896-025	Reagent kit for 25 tests (N, P, K, pH)

Sulfate, barium chloride method

Range:		20 to 100 mg/L
Reagents:	**HI 38000-10**	Reagent kit for 100 tests (SO42-)

Sulfate LR / HR, barium chloride method

Range:		100 to 1000 mg/L
		1000 to 10000 mg/L
Reagents	**HI 38001-10**	Reagent kit for 200 tests (SO_4^{2-})

Sulfite, iodometric titration method

Range:		0 to 20 mg/L
		0 to 200 mg/L
Reagents:	**HI 3822-100**	Reagent kit for 100 tests (Na_2SO_3)

Zinc, extended range, zincon method

Range:		0.0 to 4.0 mg/L
		0.0 to 20.0 mg/L
Reagents:	**HI 38076-100**	Reagent kit for 100 tests (Zn)

Zinc, zincon method

Range:		0.0 to 3.0 mg/L
Reagents	**HI 3854-100**	Reagent kit for 100 tests (Zn)

See Food and Beverage Section for Wine Analysis Reagents

CONTENTS

ACCESSORIES



c
Accessories


HI 710001

Soft carrying case for HI 9040 type thermistor thermometers. 280 x 120 x 50 mm (11 x 4.7 x 2").

HI 710002 Soft carrying case for portable thermistor thermometers


HI 710002

Soft carrying case for HI 9214 stick pH meter and any pocket meters, such as Piccolo and Conmet. 230 x 100 x 50 mm (9.1 x 3.9 x 2").

HI 710003 Soft carrying case for HI 9214

Soft carrying case for HI 93510 and HI 955501 housings. 150 x 90 x 30 mm (5.9 x 3.5 x 1.2").

HI 710004 Soft carrying case for HI 93510 housing


HI 710003

Soft carrying case for HYGROCHECK®.

HI 740203 Soft carrying case for HYGROCHECK®

Case, Protective

Protective case for portable meters.

HI 710018 Protective case for HI 93530N housing
HI 710019 Protective case for HI 93510N housing with probe
HI 710020 Protective case for HI 9040 housing with probe
HI 710021 Protective case for HI 9060 housing
HI 710022 Protective case for HI 8424 housing

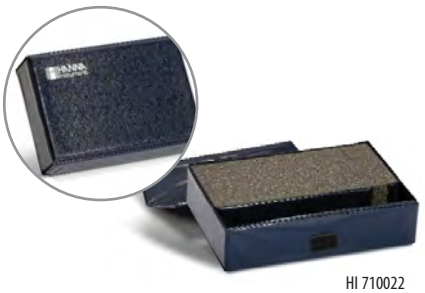

HI 710004

Cell, Colorimetric, for PCA Series

see PCA Spare Parts

Cell, Measurement, for Photometers and Turbidity Meters

see Cuvet


HI 710022

COD Test Tube Adapter

HI 740219P C.O.D. test tube adapter (3 pcs)

Connector

Connectors to repair or customize the probe connection cables.

HI 740116 BNC connector (2 pcs)
HI 740117 DIN connector (2 pcs)
HI 740118 US standard connector (2 pcs)
HI 731323 Phono style plug with 1 m (3.3') cable and wire end for HI 762 and HI 765 series of temperature probes (4 pcs)
HI 76P2-10 Phono style plug with 10 m (33') cable and wire end for HI 762 and HI 765 series of temperature probes (4 pcs)

Connector, Undecal

11-pin connector for all electrical connections of HI 7871, HI 7873 and HI 8666.

HI 7164 Undecal connector


HI 7164

Cover for Battery Compartment

Spare battery covers for portable and pocket meters.

HI 740002P Battery cover for Checker® (10 pcs)
HI 740003P Battery cover for Checktemp® (10 pcs)
HI 740004P Battery cover for Checktemp® 1 (10 pcs)
HI 740005P Battery cover for Checktemp® 2 (10 pcs)
HI 740006 Battery cover for Conmet
HI 740007P Battery cover for HI 9040 casing (10pcs)
HI 740009P Battery cover for HI 9025 casing (10 pcs)
HI 740011P Battery cover for Piccolo+ (10 pcs)
HI 740013P Battery cover for HI 9214 casing (10 pcs)
HI 740014P Battery cover for HI 98810 casing (10 pcs)
HI 740015P Battery cover for HI 99551 casing (10 pcs)
HI 740016P Battery cover for HI 99550 casing (10 pcs)
HI 740017P Battery cover for Hygrocheck® (10 pcs)
HI 740018P Battery cover for portable photometers (10 pcs)
HI 740019P Battery cover for C 200 series (10 pcs)
HI 740020P Battery cover for HI 99104 (10 pcs)
HI 740021P Battery cover for Piccolo (10 pcs)
HI 740022P Battery cover with O-ring for waterproof testers (10 pcs)
HI 740207P Battery cover for HI 93703 (10 pcs)


HI 740022P

Cover for Fuse Holder

Spare cover for fuse holder of process instrumentation.

HI 740119P Cover for fuse holder (10 pcs)

Cover for Housing

Used for housing protection and internal electronics. Transparent covers for front panels of process meters and built-in printers.

HI 740120 Left keyboard cover for HI 120 series
HI 740121 Right plastic cover for wall mounted instruments
HI 740122P Plastic cover for terminals of BL 7916 and BL 7917 (2 pcs)
HI 740124P Rear cover for HI 140 series (2 pcs)
HI 740125P Rear cover for HI 981401 (2 pcs)
HI 740126 Rear cover for HI 8614 housing
HI 740127 Transparent cover for built-in printer of portable meters
HI 740129 Transparent front cover for BL 7916 and BL 7917
HI 740130 Transparent front cover for HI 8710 housing



HI 3834-99



HI 3833-99

Cube, Color for CTK

Spare comparison cubes for colorimetric chemical test kits.

HI 3824-99 Color cube for ammonia test kit
HI 3830-99 Color cube for bromine test kit
HI 3831-99 Color cube for chlorine test kit
HI 3832-99 Color cube for iodine test kit
HI 3833-99 Color cube for phosphate test kit
HI 3834-99 Color cube for iron test kit
HI 3874-99 Color cube for nitrate test kit

Cradle, Docking

Docking cradle for quick and easy placement of your instrument for PC connection.

HI 143001 RS232 communication cradle complete with Windows® compatible software for HI 143 T-logger.

HI 143002 USB communication cradle complete with Windows® compatible software for HI 143 T-logger.


HI 143002


HI 731331

Cuvet

The glass cuvet is the most sensitive part for taking accurate measurements with photometers and turbidity meters. It is important that the cuvet is always clean and without scratches.

HI 731321 Glass cuvet for HI 937xx portable meters & HI 832xx series (4 pcs)
HI 731331 Glass cuvet for HI 95 and 96 series (4 pcs)
HI 731311 Glass vial with cap for HI 93214 (5 pcs)


HI 731318

Cuvet, Cleaning Cloth

These non-abrasive cloths are ideal to wipe measurement cuvets of photometers and tubidity meters, without damaging the cuvet surface.

HI 731318 Cuvet cleaning cloth (4 pcs)


HI 740035

D

Demineralized Water

Demi-02 Bottle to prepare 2 liters of demineralized water
Demi-05 Bottle to prepare 5 liters of demineralized water
Demi-10 Bottle to prepare 10 liters of demineralized water

E


HI 76404

Electrode Holder

Cantilever stand with a large steel base provides greater stability and flexibility, and holds up to 3 electrodes in any position.

HI 76404 Electrode holder for pH 209 type bench meters
HI 76405 Electrode holder with steel base
HI 76405A Cantilever arm
HI 76405C Steel base for HI 76405
HI 740035 Electrode holder and plastic beaker for HI 207 and HI 208


HI 76404N

Industrial by-pass loop electrode holder. Designed for use in a bypass loop configuration.

HI 60545 Electrode holder for by-pass loop configurations


HI 76405

Industrial electrode holder for immersion installation. Made of rugged PVC, this item can withstand most chemicals.

HI 6050 Electrode holder for immersion installation, 0.6 m (23.8")
HI 6051 Electrode holder for immersion installation, 1 m (3.3')
HI 6052 Electrode holder for immersion installation, 1.6 m (5.25')
HI 60501 Electrode holder for immersion installation for tanks, vessels, baths and open channels
HI 60503 Electrode holder for immersion installation for tanks, vessels, baths and open channels

Industrial electrode holder for in-line installation. Two models are available, depending on the electrode thread. Made of fiber-glass reinforced polypropylene, these holders perfectly fit the relevant HANNA pH and ORP electrodes.

HI 6054B Electrode holder for in-line installation, 3/4x16UNF thread
HI 6054T Electrode holder for in-line installation, PG 13.5 thread
HI 60542 Electrode holder for in-line direct pipe installation, PG 13.5 thread

Electrodes for Testers, Spare Parts

HI 73106 Spare electrode for HI 98106 and HI 98107
HI 73108 Spare electrode for HI 98108
HI 73120 Spare electrode for HI 98120
HI 73127 Spare electrode for HI 98121, HI 98127, HI 98128, HI 98129 and HI 98130
HI 73201 Spare electrode for HI 98201
HI 73202 Spare electrode for HI 98202 and HI 98203
HI 1281 Spare electrode for Watercheck and Watercheck 1
HI 1282 Spare electrode for Agritest and Agritest 1


HI 60545

F

Fast Tracker™ (Tag Identification System)

i-Button® tags to be used with Fast Tracker™ compatible meters.

HI 920005 5 tag holders with tags


HI 6050


HI 60503

Filter for Chemical Test Kits

Replacement filter cartridge for HI 3838 formaldehyde test kit.

HI 740135 Filter for HI 3838

Filter for PCA

see PCA Spare Parts

Fuse

HI 70490P 400 mA, 5 x 20 mm fuse (10 pcs)
HI 740136P 1 A, 5 x 20 mm fuse (10 pcs)
HI 740137 1 A, 5 x 20 mm fuse (6 pcs)
HI 740138P 2 A, 5 x 20 mm fuse (10 pcs)
HI 740139 2 A, 5 x 20 mm fuse (6 pcs)
HI 740214 5 A, 5 x 20 mm fuse (1 pcs)
HI 740215 5 A, 5 x 20 mm fuse (6 pcs)


HI 60542

H

Holder for Electrodes

see Electrode Holder


HI 6054T

Holder for HI 146 Probe

HI 750146 Wall mounting probe holder for HI 146

Holder for Level Controller Bars

The HANNA level controllers require measuring bars and this bar holder, which incorporates the amplifier circuitry to operate the controllers.

HI 7874 Bar holder and level transmitter


HI 920005

Hose

LDPE hose to be used with BL dosing pumps. Different lengths are available.

HI 720029 LDPE hose, 3 m (9.9')
HI 720030 LDPE hose, 10 m (33')
HI 720031 LDPE hose, 50 m (165')
HI 720032 LDPE hose, 100 m (333')

Accessories


HI 750146

I

Ink Cartridge for Built-in Printers

Spare ink cartridge for bench meters with built-in printer.

HI 710033 Ink cartridge for bench meters with built-in printer

Spare ink cartridge for portable meters with built-in printer.

HI 710035 Ink cartridge for portable meters with built-in printer


HI 7874

K

Key for HI 141 Magnetic Start

HI 740221 Key for HI 141 magnetic start

Key for Testing Thermometer Calibration

Allows a quick calibration check of the thermistor thermometers. Simply connect the key to the meter and verify that reading is within the key value ±0.4°C (or ±0.8°F). If not, contact the nearest HANNA instruments® Customer Service Center for recalibration.

Test keys for thermometers using an HI 762 series probe.

HI 762-18C Test key at -18°C
HI 762000C Test key at 0°C
HI 762070C Test key at 70°C
HI 762-004F Test key at -0.4°F
HI 762032F Test key at 32°F
HI 762158F Test key at 158°F


HI 710035

Test keys for thermometers using an HI 765 series probe.

HI 765-18C Test key at -18°C
HI 765000C Test key at a 0°C
HI 765070C Test key at 70°C
HI 765-004F Test key at -0.4°F
HI 765032F Test key at 32°F
HI 765158F Test key at 158°F


HI 762

Kit, HI 83215 and HI 83225 Accessories

Complete accessory kit for preparation of samples to be analyzed (nutrients for agriculture) with the HI 83215 photometer.

HI 740223 Plastic beaker (170 mL)
HI 740224 Plastic beaker (170 mL, 12 pcs)
HI 740225 Syringe (60 mL)
HI 740226 Pipette (5 mL)
HI 740227 Filter
HI 740228 Filter (25 pcs)
HI 740229 Polypropylene cylinder (100 mL)
HI 740230 Demineralized bottle (230 mL)
HI 93703-54 Dried resin (100 g)
HI 93703-55 Activated carbon (for 50 tests)
HI 83215K Rugged carrying case containing the following kit for HI 83215: 100 mL and 170 mL beakers, 5 mL and 60 mL syringes, filter holder and 25 filters, 100 mL cylinder, demineralizer bottle, 1.5 mL spoon, 2 pipettes and active carbon for 50 tests


HI 765

Kit, HI 9828 Accessories

Accessories designed for HI 9828 multiparameter portable meter. For a full list, see HI 9828 in our Multiparameter section

HI 769828-0 pH sensor, single junction, non refillable
HI 769828-1 pH/ORP sensor
HI 769828-2 DO/Temperature sensor
HI 769828-3 EC sensor
HI 7698281 USB interface cable
HI 92000 Software application
HI 920005 i-Button® with holder (5 pcs)
HI 7698282 Maintenance probe kit
HI 7698283 Calibration beaker
HI 7698284 Flow cell
HI 710045 Power supply cable
HI 710046 Lighter cigarette cable

HI 769828-1





HI 769828-2

HI 769828-3





HI 7698281

L

Lamp, Turbidimeter

HI 740234 Replacement lamp for EPA turbidimeter

Lysimeter, Suction

Designed to be used with the HANNA HI 83215 and HI 83225, this lysimeter is available in three sizes and is comprised of: sampler tube endinh in a porous tip, capillary rubber tube with rubber cap and finger clamp, cleaning solution starter kit, 30 mL syring and instructions.

HI 83900-30 Suction lysimeter, 30 cm (0.98') tube
HI 83900-60 Suction lysimeter, 60 cm (1.97') tube
HI 83900-90 Suction lysimeter, 90 cm (2.95') tube
HI 83900-25 Cleaning solution replacement kit, 500 mL

HI 7698282





HI 7698284



HI 7698283

M

Membrane for D.O. Probes

HI 76407AP This kit contains 5 ready-to-use, replacement PTFE membranes.

Membrane for HI 84185

HI 61001-51 Spare membrane for HI 84185 (20)

Motor for Magnetic Stirrers

HI 740213 Motor for magnetic stirrers (3 pcs)

Mounting Bracket

see Bracket for Installation of Process Meters

Mounting Kit for Process Instruments

For installation of panel-mounted process instruments with the relevant mounting brackets (supplied with the meter).

HI 740148P Nut, screw and washer to install HI 8710 housing (10 pcs)
HI 740150P Nut, screw and washer to install pH 500 housing (10 pcs)

HI 710045





HI 710046

HI 76407AP




HI 740153

N

Nut

Plastic nuts to tightly seal electrical connections for transmitters to an HI 8614 housing, ensuring IP65 protection rate.

HI 740151P Black plastic nut for HI 8614 housing (10 pcs)
HI 740152 Grey plastic nut for HI 8614 housing

O


HI 710032

O-ring

Spare O-ring to secure the HI 1083 protective cap.

HI 740153P O-ring for HI 1083 (10 pcs)
HI 740154 O-ring for HI 1083 (6 pcs)

P


HI 710032

Paper, for Built-in Printers

Spare paper rolls for HANNA meters with built-in printer. This paper, unlike the thermal paper, allows you to store your recorded measurements in an archive and not worry about the information being lost.

Spare paper rolls for bench meters with built-in printer.

HI 710032 Paper rolls for bench meters (10 pcs)
HI 710034 Paper rolls for portable meters (10 pcs)


HI 70487/N

PCA Spare Parts

Complete list of accessories and spare parts to be used with the PCA series of process analyzers, for measurement and maintenance purposes.

HI 70450 Indicator solution for PCA series
HI 70451 Buffer solution for PCA series
HI 70452 DPD reagents for PCA series
HI 70460 Indicator solution for PCA 310, PCA 320 and PCA 330
HI 70461 Buffer solution for PCA 310, PCA 320 and PCA 330
HI 70473 PCA tubing kit, pressure regulator to drain (2 pcs)
HI 70474 PCA peristaltic pump tubing kit (6 pcs)
HI 70475 PCA peristaltic pump tubing kit (2 pcs)
HI 70476 Reagent bottle tubing kit (6 pcs)
HI 70477 PCA Y strainer and tubing to measuring cell (2 pcs)
HI 70478 PCA tubing kit, bottle to pump (6 pcs)
HI 70479 PCA tubing kit, pump to Y strainer (8 pcs)
HI 70480 Reagents set for PCA series
HI 70481 Reagents set for PCA 310, PCA 320 and PCA 330
HI 70482 5 µm and 50 µm input filters for PCA series
HI 70483 PCA complete tubing kit
HI 70484 PCA complete tubing kit (3 pcs)
HI 70485 Magnetic stirrer motor for PCA series
HI 70486 Magnetic bar for PCA series (2 pcs)
HI 70487/N PCA measuring cell
HI 70488 PCA electrovalve, 60 Hz
HI 70489 PCA electrovalve, 50 Hz
HI 70490 Free chlorine reagent kit


HI 70482

PCA Spare Parts *contined from previous page*

HI 70491 Total chlorine reagent kit
HI 70492 PCA drain tubing kit
HI 70493 PCA drain pressure regulator
HI 70494 PCA calibration port cap
HI 70495 PCA incoming pressure regulator
HI 70496 0.45 µm filter for PCA series
HI 70497 50 µm filter for PCA series


HI 70496

Pipette for Automatic Dosage

HI 731340 200 µL graduated pipette
HI 731341 1000 µL graduated pipette
HI 731342 2000 µL graduated pipette
HI 731350 Tip for 200 µL graduated pipette (25 pcs)
HI 731351 Tip for 1000 µL graduated pipette (25 pcs)
HI 731352 Tip for 2000 µL graduated pipette (4 pcs)


HI 70497

Pipette, Capillary

HI 731355P Capillary pipette (20)


HI 731340

Pipette (Tip) for Dosing Syringes

This tool allows the user to precisely dose the reagent, avoiding any contamination of the titration syringe during measurements with the chemical test kits. Use one tip for each reagent to prevent cross contamination.

HI 740144P Pipet for syringe (10 pcs)


HI 731342

Pipette for Electrode Refilling

Typically used with refillable pH and ORP electrodes for precise dosage of the electrolyte solution. They are also useful for precision liquid transfer in any field or lab application.

HI 740157P Electrode refilling pipette (20 pcs)

Power Adapter

These converters enable HANNA meters to operate at 12 Vdc from a 115 Vac or 230 Vac power outlet and are available with several plugs.

HI 710005 115 Vac to 12 Vdc, US plug
HI 710006 230 Vac to 12 Vdc, European plug
HI 710012 230 Vac to 12 Vdc, UK plug
HI 710013 230 Vac to 12 Vdc, South African plug
HI 710014 230 Vac to 12 Vdc, Australian plug

HI 731352

Power Cord

These cords power all HANNA meters requiring direct 115 Vac or 230 Vac supply.

HI 740198 Power cord with DIN plug
HI 740199 Power cord with US plug

Power Plug

To be used with old wall mounted controllers and external devices (such as pumps or electrovalves) driven by the controllers, and with BL 7916 & BL 7917.

HI 767/P Input plug (5 pcs)
HI 7671/P Output plug (5 pcs)

Pump Spare Parts

List of necessary spare parts for operation and maintenance of dosing pumps.

HI 721003 Glass ball with O-ring (10 pcs each)
HI 721004 Injection valve assembly
HI 721005 Foot valve assembly
HI 721006 Spring (4 pcs)
HI 721008 Ceramic weight (4 pcs)
HI 720029 LDPE hose, 3 m (9.9')
HI 720030 LDPE hose, 10 m (33')
HI 720031 LDPE hose, 50 m (165')
HI 720032 LDPE hose, 100 m (333')
HI 721101 Pumphead, O-ring, screws (6 pcs) and washers (6 pcs)
HI 721102 Discharge valve assembly
HI 721103 Suction valve assembly
HI 721108 PVDF nut (25 pcs)
HI 740156 Valve seat (3 pcs)


HI 770216

R

Rack, Test Tube Cooling

HI 740216 Test tube cooling rack (25 holes)

RH Calibration Chamber

These portable chambers allow you to easily calibrate your hygrometers. They measure 190 x 115 x 110 mm (7.5 x 4.5 x 4.3"), and are supplied complete with O-ring and precalibrated, ready-to-use saturated salts.

The HI 7101 model is designed for use with HI 8564, HI 9064, HI 9065, HI 9161, HI 9261 and HI 91610 instruments, while the HI 7102 is for use with the HI 93640 and HI 8666 hygrometers.


HI 7102

HI 7101 Calibration chamber for RH probes with sintered cap
HI 7102 Calibration chamber for RH probes without sintered cap

RH Calibration Salt

LiCl calibration salt for HI 7101 & HI 7102 calibration chambers (low RH).

HI 7111/P LiCl calibration salt, 15 g bottle (6 pcs)

NaCl calibration salt for HI 7101 & HI 7102 calibration chambers (high RH).

HI 7121/P NaCl calibration salt, 33 g bottle (6 pcs)


HI 731326

S

Screwdriver for Calibration

Calibration screwdriver, length 90 mm (3.5"), to perform manual calibration with trimmers.

HI 731326 Calibration screwdriver (20 pcs)


HI 740217

Shield, Safety

Safety shield that connects to the top of the HI 839800 test tube heater.

HI 740217 Laboratory bench safety shield for HI 839800

Sleeve, Protective, for Conductivity Probes

These sleeves are needed to correctly perform EC and TDS measurements with HANNA probes. In addition, they protect sensors against accidental impact.

HI 740179 Protective PVC sleeve for Conmet
HI 740180 Protective PVC sleeve for HI 76302W
HI 740181 Protective PVC sleeve for HI 1285
HI 740182 Protective PVC sleeve for HI 76303
HI 740189 Protective sleeve for HI 7685,HI 7686 and HI 7687

Sleeve, Protective, for D.O. Probes

Protective sleeve designed HI 76409 series of dissolved oxygen probes.

HI 746409-0 Protective sleeve for HI 76409 series

Software

Use the following Windows® compatible softwares to handle PC connection of the relevant HANNA meters.

HI 92000 Windows® compatible software for logging instruments, photometers and turbidity meters
HI 92140 Windows® compatible software for HI 140 and HI 142 series
HI 92500 Windows® compatible software for microprocessor-based process controllers
HI 800104 Windows® compatible software for HI 8000 controllers
HI 981500 Windows® compatible software for pH Turtle (HI 9815)
HI 141000 Windows® compatible software for HI 141 series



HI 92000

Stir Bars for Magnetic Stirrers

see Bars, Stir Bars for Magnetic Stirrers


HI 731319

Syringe

Graduated syringe for accurately reagent dosing for CTK and photometers.

HI 740225 60 mL graduated syringe
HI 740226 60 mL graduated syringe
C115-00300 5 mL graduated syringe
HI 740142P 1 mL graduated syringe (10 pcs)
HI 740143 1 mL graduated syringe (6 pcs)

Syringe, Tip

HI 7740144 Syringe tip for HI 740143 (6 pcs)

T

Terminals, Extractable, for Process Instruments

These extractable modules have been designed for quick and easy wiring of HANNA process meters. They are available for 2, 3 and 4 inputs.

HI 740191P Extractable terminal, 2 inputs (10 pcs)
HI 740192P Extractable terminal, 3 inputs (10 pcs)
HI 740193P Extractable terminal, 4 inputs (10 pcs)
HI 740204P Large extractable terminal, 2 inputs (10 pcs)
HI 740205P Large extractable terminal, 3 inputs (10 pcs)


HI 740142P

Test Tube

HI 740220 Glass test tube with caps, 25 mL (2 pcs)


HI 721319

A

Adapter for Industrial Electrodes

This adapter allows installation of any electrode in in-line holders. The nipple comes with an O-ring for more secure installation.

HI 6057 3/4" nipple for electrodes

Auger for Ground Penetration

The auger is supplied with HI 99121 and HI 993310 for direct soil measurement.

HI 721319 Ground auger

B

Bar, Grounding

This stainless steel AISI 316 grounding bar can be connected to the differential input of all pH and ORP meters provided with this feature, and prevents the electrode from problems due to ground loop current. The life of the electrode will be much longer.

HI 1283 Grounding bar with 1 m (3.3') cable

Bar, Measuring for Level Controllers

Stainless steel measuring bars for detection of liquid level in tanks, designed to be used with HANNA level controllers and transmitters. Available singly or in packs of 5 pcs. Can be joined for custom lengths. Each bar is 0.5 m (1.7') long.

HI 731324 0.5 m (1.7') measuring bar (5 pcs)

HI 731328 0.5 m (1.7') measuring bar

Bar, Stir Bars for Magnetic Stirring

Micro stir bars specifically designed for HANNA stirrers. The PTFE coating ensures high chemical resistance even with aggressive substances.


HI 731319

HI 731319 Stir bars (L 25 mm x dia 7 mm/ 1x0.3"), specially designed for use with HI 180, and HI 190M, HI 190MB and HI 200M stirrers. The PTFE (PolyTetraFluoro-Ethylene) coating ensures high chemical resistance even with aggressive substances. (10 pcs.)

HI 731320 PTFE (PolyTetraFluoro-Ethylene) coated stir bars (L 50 mm x dia 7 mm/ 2x0.3"), designed for use with the HI 300 stirrer series. (10 pcs.)

HI 731316 Stir bars for mini Titrators and HI 208, (5 pcs.)

HI 70486 Stir bars for PCA series, (2 pcs.)

Base for Checktemp® 1

Handy plastic stand for Checktemp®1


HI 740024

HI 740024 Stand for Checktemp®1

HI 740024P Stand for Checktemp®1 (10 pcs)

HI 740025 Stand for Checktemp®1 (6 pcs)

Base for HI 76405

see Electrode Holder

Battery, 1.5 V

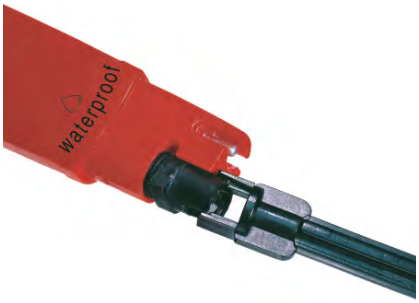
Replacement batteries used in most HANNA testers.


HI 740026P

HI 740026P 1.5 V battery (12 pcs)

HI 721301 1.5 V battery (100 pcs)

Accessories



HI 73128P

Tool for Calibration

To perform manual calibration of the HI 99104 pH tester.

HI 740091P Calibration tool for HI 99104 (20 pcs)

Tool for Replacing Probe

Used for removing the probe cartridge of HI 98120, HI 98121, HI 98127, HI 98128, HI 98129, HI 98130, HI 98311 and HI 98312 testers.

HI 73128P Probe removal tool (10 pcs)

Transformer

see Power Adapter


HI 9200/9

Transmitter, Infrared, for PC Connection

Infrared interfaces to be used with portable meters. Simply place the unit on the cradle and the data will be transmitted to the PC through the RS232 serial port.

HI 9200/9 Infrared transmitter with 9-pin serial connector
HI 9200/25 Infrared transmitter with 25 pin serial connector

Infrared interfaces to be used with temperature dataloggers.

HI 90140 Infrared transmitter for HI 140 series
HI 141001 Infrared transmitter for HI 141 series


HI 90140

V

Vessel for Water Test

Plastic vessel to collect sample being measured with Water Test.

HI 740088 Vessel for Water Test

Vial - see also Cuvet

To be used with HI 3835 salinity test kit, to perform the reaction during titration.

HI 740196P Plastic vial for HI 3835 (20 pcs)


HI 141001

W

Weight, Ceramic, for Pumps

see Pump Spare Parts

Wrist-strap

HI 740123 Spare wrist-strap for ergonomic portable meters (in HI 93510, HI 99550 and HI 151 housing)


HI 740088

Battery, 1.5 V AA

Replacement batteries for all HANNA waterproof and printing/logging portable meters.

HI 740027P 1.5 V AA battery (10 pcs)


HI 740031

Battery, 1.5 V AAA

Replacement batteries available in packs of 10 pieces.

HI 740028P 1.5 V AAA battery (10 pcs)


HI 740033

Battery, 3.6 V AA Lithium

Replacement battery for HI 141 series.

HI 740033 3.6 V AA Lithium battery

Battery, 9 V

Replacement battery for all HANNA portable meters with non-waterproof housing and HI 83200 bench photometers series.

HI 740029P 9 V battery (10 pcs)
HI 721310 9 V battery (100 pcs)


HI 721310

Battery, for AmpHel® Electrodes

Spare battery for amplified pH and ORP industrial electrodes, AmpHel® series.

HI 740031 Spare battery for AmpHel® electrodes

Battery Cover

see Cover for Battery Compartment


HI 710040

Battery, Inductive Chargers

These models have up to 200 hour extended battery life to guarantee long operation in the field. When the batteries are low, you don't have to worry about carrying a spare set with you—the batteries can be recharged with HANNA's inductive recharger. Simply leave the meter on the recharger for a few hours and you're ready to go. The recharger can either be plugged to a standard 115V socket using the included HANNA adapter or into a 12 VDC source such as a car's 12 volt accessory outlet.

HI 710040 Inductive battery recharger with no external contact
HI 710041 Inductive battery recharger for HI 9818x and HI 9817x series.
HI 710044 Inductive battery recharger for HI 9124, HI 9125 and HI 9126


HI 710044

Beaker

Rugged plastic beakers available in several different sizes. For use during testing with HANNA chemical test kits and photometers. Anti-spill ported caps are available separately.

HI 740036P 100 mL plastic beaker (10 pcs.)
HI 740037P 20 mL plastic beaker (10 pcs.)
HI 740223 170 mL plastic beaker
HI 740224 170 mL plastic beaker (6 pcs.)
HI 740032P Cap for 20 mL plastic beaker (10 pcs.)
HI 740034P Cap for 100 mL plastic beaker (10 pcs.)


HI 740223

Blades, for Meat pH Electrodes

These stainless steel blades, in conjunction with FC 230, FC 231 and FC 232 pH electrodes, allow easy meat penetration. Two models are available for different depths.

FC 098 Stainless steel blade for meat pH electrode, 20 mm (0.8")
FC 099 Stainless steel blade for meat pH electrode, 35 mm (1.4")


HI 740223

B
Accessories


HI 710007

Boot, Shockproof

These special boots have been designed to protect your instruments and prevent damage due to accidental impact, particularly in field applications. They can withstand high temperature (up to 200°C / 392°F), ozone and environmental phenomena, and are available in 2 colors.

Boot, Shockproof rubber boot for portable meters with HI 991001 stlye casing.

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange


HI 710008

Boot, Shockproof rubber boot for portable meters with HI 93711 style casing.

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange

Boot, Shockproof silicone boot for portable meters with HI 8424 style casing.

HI 710015 Shockproof silicone boot, blue
HI 710016 Shockproof silicone boot, orange

Bottle for D.O. Analysis

Glass bottle, supplied with the HANNA chemical test kits and photometer for D.O. analysis. The bottle is provided with a glass stopper to ensure an air tight seal. Bottle and stopper can be also ordered separately.

HI 740039 60 mL glass bottle for D.O. analysis
HI 740041 60 mL glass bottle and stopper (6 pcs)
HI 740042 60 mL glass bottle for D.O. analysis (6 pcs)
HI 740043 Glass stopper for 60 mL glass bottle (6 pcs)


HI 710009

Bottle, Glass

HI 740038 60 mL glass bottle and stopper

Bottle, Polyethylene

High density polyethylene bottles, suitable for sampling, mixing and storage. Available in packs of 6 and 10 pcs, and in several capacities, from 30 mL to 1 Gallon (approx. 3.78 L). Polypropylene caps can be ordered separately.

HI 740056P 30 mL bottle (10 pcs)
HI 740058 30 mL bottle (6 pcs)
HI 740059P Cap for 30 mL bottle (10 pcs)
HI 740048P 120 mL bottle (10 pcs)
HI 740050 120 mL bottle (6 pcs)
HI 740049P Cap for 120 mL bottle (10 pcs)
HI 740052P 230 mL bottle (10 pcs)
HI 740054 230 mL bottle (6 pcs)
HI 740055 Cap for 230 mL bottle (6 pcs)
HI 740070P 500 mL bottle (10 pcs)
HI 740072 500 mL bottle (6 pcs)
HI 740073P Cap for 500 mL bottle (10 pcs)
HI 740046P 1 L bottle (10 pcs)
HI 740047P Cap for 1 liter bottle (10 pcs)
HI 740044P 1 Gallon bottle (5 pcs)
HI 740045P Cap for 1 Gallon bottle (10 pcs)


HI 710010

Bottle, Polyethylene, Dropper

Provided with HANNA test kits where one-by-one drop dosing is required. Thanks to the removable plug, bottle refilling is very easy.

HI 740060P 30 mL dropping bottle (10 pcs)
HI 740063 30 mL dropping bottle (6 pcs)
HI 740061P Plug for 30 mL dropping bottle (10 pcs)
HI 740064 Plug for 30 mL dropping bottle (6 pcs)
HI 740065P Cap for 30 mL dropping bottle (10 pcs)


HI 710015

Bottle, Polyethylene, FDA Compliant

These black bottles protect liquids even under direct light. They are available in several capacities, from 30 mL to 1 liter.

HI 740068P 30 mL FDA bottle (10 pcs)
HI 740069P Cap for 30 mL FDA bottle (10 pcs)
HI 740084P 500 mL FDA bottle (10 pcs)
HI 740086 500 mL FDA bottle (6 pcs)
HI 740087P Cap for 500 mL FDA bottle (10 pcs)
HI 740082P 1 L FDA bottle (10 pcs)
HI 740083P Cap for 1 L FDA bottle (10 pcs)


HI 710016

Bottle, Polyethylene, Rectangular

These bottles complete the range of HANNA bottles. They are typically provided as containers for the reagents of the PCA analyzers.

HI 740074P 460 mL rectangular bottle (10 pcs)
HI 740076P 460 mL rectangular bottle (10 pcs)
HI 740077P Cap for 460 mL rectangular bottle (10 pcs)

Bracket for Installation of Process Meters

To be used for installation of panel mounted process meters, such as BL 931700, HI 8710 and pH 500.

HI 740145 Mounting bracket for HI 8710 housing (2 pcs)
HI 740146 Mounting bracket for BL 931700 housing (2 pcs)
HI 740147 Mounting bracket for pH 500 housing (2 pcs)

Burette

Glass burette for liquid dosing, ideal tool for educational and laboratory applications. The reagent can be accurately dosed with a resolution of 0.1 mL. The burette is supplied with a reagent glass container to perform up to 100 tests before requiring refilling.

HI 740195 10 mL glass burette with 500 mL reagent container and pressure bulb
HI 740212 25 mL glass burette with 1 L reagent container and pressure bulb


HI 740038

C

Cable, 6-wire

6-wire cable for 4-ring conductivity probes. Several lengths are available.

HI 779/1 6-wire cable, 1 m (3.3')
HI 779/3 6-wire cable, 3 m (9.9')
HI 779/5 6-wire cable, 5 m (16.5')
HI 779/10 6-wire cable, 10 m (33')
HI 779/15 6-wire cable, 15 m (49.5')


HI 779/5

c
Accessories

Cable, Connection, for Electrodes

Wide range of connection cables for pH and ORP electrodes, available with several options for connectors and cable lengths.

Connection cable without connectors, dia 3 mm (0.12")

HI 7853/1 Cable for electrodes, 1 m (3.3')
HI 7853/3 Cable for electrodes, 3 m (9.9')
HI 7853/5 Cable for electrodes, 5 m (16.5')
HI 7853/10 Cable for electrodes, 10 m (33')
HI 7853/15 Cable for electrodes, 15 m (49.5')


HI 7862-1

Cable, Connection, for HI 931002

To connect pH and ORP process controllers to the HI 931002 simulator and perform all calibration procedures.

HI 7862/1 HI 931002 connection cable, 1 m (3.3')

Cable, Connection, with one screw-cap connector at one end, dia 5 mm (0.2")

HI 778P/1 Cable for electrodes with screw-cap connector, 1 m (3.3')
HI 778P/3 Cable for electrodes with screw-cap connector, 3 m (9.9')
HI 778P/5 Cable for electrodes with screw-cap connector , 5 m (16.5')
HI 778P/10 Cable for electrodes with screw-cap connector , 10 m (33')
HI 778P/15 Cable for electrodes with screw-cap connector , 15 m (49.5')
HI 778P Cable for electrodes with screw-cap connector, 100 m (333')

Cable, Connection, 3 mm (0.12') dia. with a screw-cap connector at one end. The other end can be free or provided with a BNC, DIN or US standard connector.


HI 7856-1

HI 7854/1 Connection cable with screw-cap connector, 1 m (3.3')
HI 7854/3 Connection cable with screw-cap connector, 3 m (9.9')
HI 7854/5 Connection cable with screw-cap connector, 5 m (16.5')
HI 7854/10 Connection cable with screw-cap connector, 10 m (33')
HI 7854/15 Connection cable with screw-cap connector, 15 m (49.5')
HI 7855/1 Connection cable with screw & BNC connectors, 1 m (3.3')
HI 7855/3 Connection cable with screw & BNC connectors, 3 m (9.9')
HI 7855/5 Connection cable with screw & BNC connectors, 5 m (16.5')
HI 7855/10 Connection cable with screw & BNC connectors, 10 m (33')
HI 7855/15 Connection cable with screw & BNC connectors, 15 m (49.5')
HI 7856/1 Connection cable with screw & US connectors, 1 m (3.3')
HI 7856/3 Connection cable with screw & US connectors, 3 m (9.9')
HI 7856/5 Connection cable with screw & US connectors, 5 m (16.5')
HI 7856/10 Connection cable with screw & US connectors, 10 m (33')
HI 7856/15 Connection cable with screw & US connectors, 15 m (49.5')
HI 7857/1 Connection cable with screw & DIN connectors, 1 m (3.3')
HI 7857/3 Connection cable with screw & DIN connectors, 3 m (9.9')
HI 7857/5 Connection cable with screw & DIN connectors, 5 m (16.5')
HI 7857/10 Connection cable with screw & DIN connectors, 10 m (33')
HI 7857/15 Connection cable with screw & DIN connectors, 15 m (49.5')


HI 7858-15

Cable, Connection, 3 mm (0.12') dia. with a BNC connector at one end. The other end can be provided with a BNC, DIN, US standard connector or spade lug.

HI 7858/1 Connection cable with BNC & BNC connectors, 1 m 3.3')
HI 7858/3 Connection cable with BNC & BNC connectors, 3 m (9.9')
HI 7858/5 Connection cable with BNC & BNC connectors, 5 m (16.5')

HI 7858/10 Connection cable with BNC & BNC connectors, 10 m (33')
HI 7858/15 Connection cable with BNC & BNC connectors, 15 m (49.5')
HI 7859/1 Connection cable with BNC & DIN connectors, 1 m (3.3')
HI 7859/3 Connection cable with BNC & DIN connectors, 3 m (9.9')
HI 7859/5 Connection cable with BNC & DIN connectors, 5 m (16.5')
HI 7859/10 Connection cable with BNC & DIN connectors, 10 m (33')
HI 7859/15 Connection cable with BNC & DIN connectors, 15 m (49.5')
HI 7860/1 Connection cable with BNC & US connectors, 1 m (3.3')
HI 7860/3 Connection cable with BNC & US connectors, 3 m (9.9')
HI 7860/5 Connection cable with BNC & US connectors, 5 m (16.5')
HI 7860/10 Connection cable with BNC & US connectors, 10 m (33')
HI 7860/15 Connection cable with BNC & US connectors, 15 m (49.5')
HI 7861/1 Connection cable with BNC conn. & spade lug, 1 m (3.3')
HI 7861/3 Connection cable with BNC conn. & spade lug, 3 m (9.9')
HI 7861/5 Connection cable with BNC conn. & spade lug, 5 m (16.5')
HI 7861/10 Connection cable with BNC conn. & spade lug, 10 m (33')
HI 7861/15 Connection cable with BNC conn. & spade lug, 15 m (49.5')


HI 7861-1

Cable, Extension, for K-Type Thermocouple Probes

This coiled cable can be used to extend the cable of all K-type thermocouple probes. It comes with male and female connectors at the two ends, respectively.

HI 766EX Extension cable for K-type thermocouple probes, 1 m (3.3')


HI 920010

Cable, PC Connection

RS232 serial cables to connect a PC to any HANNA meter provided with RS232 serial port.

Cable, PC Connection, for Bench Meters.

HI 920010 Serial cable for PC connection (9 to 9-pin)

Cable, PC Connection, for Portable Meters.

HI 920011 Serial cable for PC connection (5 to 9-pin)

Cable, USB PC Connection

USB interface cables.

HI 7698281 USB PC connection cable for HI 9828
HI 920013 USB cable for PC connection (excluding HI 9828, use HI 7698281 instead)


HI 920011

Cap, Beaker

see Beaker

Cap, Bottle

see Bottle

Cap, Cuvet

To be used with cuvets for photometers and turbidity meters. They are notched to fit the groove on the meter, thus no light can enter and interfere with measurement.

HI 731325 Cap for cuvet for turbidity meters and HI 937xx series (4 pcs)
HI 731325N Cap for cuvet for HI 832xx series (4 pcs)
HI 731335 Cap for cuvet for HI 95 and HI 96 series (4 pcs)

Cap, Protective

Prevents tester and probe damage due to accidental impacts.

HI 740162P Protective cap for Checktemp® (5 pcs)
HI 740164 Protective cap for HI 1083

c
Accessories

HI 740165 Protective cap for HI 1330
HI 740166 Protective cap for HI 1331
HI 740167 Protective cap for HI 2031
HI 740169 Protective cap for Hygrocheck®
HI 740170 Protective cap with O-ring for top compartment in HI 9033 housing
HI 740172 Protective cap for Piccolo
HI 740173 Protective cap for SkincheckTM electrode
HI 740178 Protective cap for RH probes
HI 740194 Protective cap for pH and ORP electrodes
HI 740208P Protective cap for FC 200 (2 pcs)
HI 740210P Protective cap for HI 98107 housing (2 pcs)
HI 740211 Transparent protective cap for D.O. probes



HI 740218

Cap, Protective, for Photometers

Protects measurement cell of photometers from dust, liquid or any other damaging material, when not in use.

HI 740095 Protective cap for photometer measurement cell (2 pcs)


HI 710031

Cap for Refillable Electrodes

Plastic cap for refilling hole of all pH and ORP electrodes using liquid electrolyte.

HI 740093P Cap for refillable electrodes (20 pcs)

Cap, Sintered, for RH Probes

Sintered cap for protecting the sensors of HANNA instruments® RH probes in harsh environments.

HI 710011 Sintered cap

Cap, Transportation, for D.O. Probes

Protects the membrane of HANNA instruments® D.O. probes during transportation, against accidental impacts.

HI 740094P Transportation cap for D.O. probes (10 pcs)


HI 721311

Carrying Case, Rugged

Rugged carrying case for photometers and turbidity meters with pre-cut sponge to fit instrument, reagents and apparatus. 381 x 311 x 108 mm (15 x 12.2 x 4.2").

HI 740218 Carrying case for portable photometers and turbidity meters
HI 740222 Carrying case for HI 832xx series

Rugged carrying case for general use. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5")

HI 710031 General rugged carrying case

Rugged carrying case with thermoformed tray for HI 8014 and HI 8314 meters, complete with calibration screwdriver and pH 4 & pH 7 buffer solutions. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5")

HI 721311 Kit for HI 8014 and HI 8314


HI 721312

Rugged carrying case with thermoformed tray for HI 931000 and all HANNA pH meters with HI 8424 casing, complete with pH 4 and pH 7 buffer solutions. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5")

HI 721312 Kit for HI 991001 and HI 8424

Rugged carrying case with thermoformed tray for HI 8733 and HI 8633, complete with calibration screwdriver and HI 7030M calibration solution. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5").

HI 721313 Kit for HI 8733 and HI 8633


HI 721313

Rugged carrying case with thermoformed tray for HI 8734, complete with calibration screwdriver and HI 7032M calibration solution. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5").

HI 721314 Kit for HI 8734

Rugged carrying case with thermoformed tray for HI 8424 and HI 93510 casings. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5").

HI 721316 Carrying case for portable meters


HI 721316

Rugged carrying case with thermoformed tray for HI 9025 casing and portable meters with built-in printer. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5").

HI 721317 Carrying case for portable, waterproof and printing meters

Rugged carrying case for HI 93703 turbidity meter, complete with calibration and cleaning solutions, tissues and cuvets. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5")

HI 731313 Maintenance kit for HI 93703

Rugged carrying case for HI 93102 and HI 93114, complete with calibration and cleaning solutions, tissues and cuvets. 340 x 230 x 90 mm (13.4 x 9.1 x 3.5").

HI 731327 Maintenance kit for HI 93102 and HI 93114


HI 731327

Rugged carrying case with thermoformed tray for chemical test kits. The tray allows orderly placement of the reagents in each test kit.

HI 740098 Carrying case for HI 3813
HI 740099 Carrying case for HI 3814
HI 740100 Carrying case for HI 3816
HI 740101 Carrying case for HI 3817
HI 740102 Carrying case for HI 3819
HI 740103 Carrying case for HI 3821
HI 740104 Carrying case for HI 3823
HI 740105 Carrying case for HI 3825
HI 740106 Carrying case for HI 3827
HI 740107 Carrying case for HI 3828
HI 740108 Carrying case for HI 3837
HI 740115 Carrying case for HI 3835
HI 740197 Carrying case for HI 3810
HI 740201 Carrying case for HI 3822

Carrying Case, for Testers

In addition, several rugged carrying cases are available for other HANNA products, such as pocket meters.

HI 740109 Carrying case for Piccolo
HI 740110 Carrying case for HI 98107 housing
HI 740112 Carrying case for Conmet

Carrying Case, Soft

Soft carrying case for HI 8014 and portable photometer housing. 230 x 130 x 50 mm (9.1 x 5.1 x 2").

HI 710001 Soft carrying case for HI 8014 housing

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MSDS information is available on-line for all reagents listed in this catalog.



CE Mark Definition & Compliance



Emission Directives: *Restrict the amplitude of the signals emerging from a device.*



Susceptibility: *Directives which sets standards for the amount of EMI a device can withstand and still operate normally and without incurring any damage.*









All industries make use of electronic instrumentation for their daily operations. The increased use of electronic equipment in many industries means that more instruments are used together and in conjunction with each other, often in a very restricted area.

Proximity of equipment has increased the likelihood of interferences between various instruments, as well as the instruments and the environment surrounding them. Improper operation of the equipment may result from these undesired Electro-Magnetic Interferences (EMI).

Electro-Magnetic Interferences (EMI)

Electro-magnetic interferences are generated by currents which flow into the electronic circuitry of instrumentation. Some Electro-magnetic interferences originate in nature through atomospheric phenomena, such as lightning and static electricity.

Electro-Magnetic Compatibility (EMC) Directives define two categories (illustrated on the right):

Each category is further sub-divided into:

- Conducted EMI propagated by wires (such as power or connection cables)
- Radiated EMI spread through the air

The effects of these Electro-magnetic interferences are the main cause for:

- Incorrect equipment operation and therefore, inaccurate measurements
- Damage to the equipment, itself

International Governing bodies have defined the EMI tolerance limits for electronic instruments. The aim is to limit EMI effects and to reach an Electro-Magnetic Compatibility (EMC) that permits all electronic devices to operate normally, and in proximity with each other, without having an adverse effect on their operation.

Electro-Magnetic Compatibility

Electro-magnetic compatibility of an instrument means that electro-magnetic interferences will not compromise its functionality, and at the same time, the meter itself will not generate interferences which may affect other equipment. In Europe, the CE mark on a product means compliance with the EMC Directives. The products must meet the directives before they can be legally sold. The CE Directive referring the the "Conducted and Radiated Emissions" is designated as EN 50081-1, while EN 50082-1 defines the prerequisites for "Susceptibility to the Conducted and Radiated EMI".

The "Mission Statement" of HANNA's Research and Development is "a complete dedication in designing electroanalytical instruments to monitor and safeguard the environment, in compliance with the CE Directives". The following provides a short list of the significance of CE Norms and how we comply with them.

Radiated Susceptibility

Our instruments are not susceptible to radiation generated by other equipment that in turn can cause improper operation, such as, automatic switching off and/or inaccurate measurements.

Radited Emissions

The HANNA meters do not emit radiation that might cause improper functioning of other equipment in their proximity (such as switching off and/or inaccurate measurements).

Susceptibility to Conducted Interferences

This is caused mainly by power leads or signal/control cables connecting different devices, which could result in malfunctioning or permanent damage. HANNA products come with this protection

Electrostatic Discharges

HANNA equipment is not susceptible to static electricity from users or objects, whether due to direct contact or proximity. This kind of discharge can cause severe damage to other equipment.

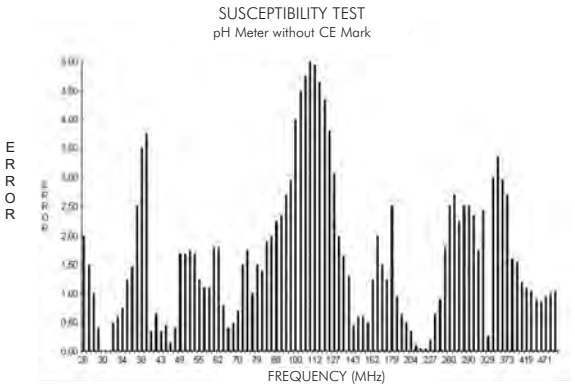
Compliance with the CE Directives, ensures reliability and accuracy for products manufactured by HANNA.

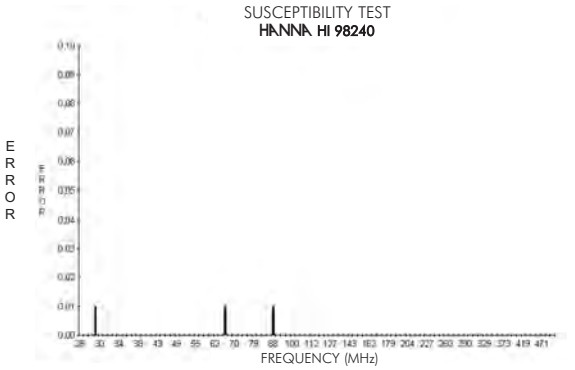
HANNA Meter Vs. Meter without CE

To show how susceptible instruments are to outside interference, we had a pH meter without the CE Mark tested against HI 98240 from HANNA (shown at right). Both meters had a purported 0.01 pH margin of error.

Both meters were subjected to the effects of an external electro-magnetic field, in accordance with the procedures established by the CE Directives. The graphs show the measurements taken at different frequencies.

As you can see from the histograms, at 3 V/meter and 100 MHz frequency, the HANNA meters stayed within the stated tolerance, wheras the non-CE model displayed an erroneous reading of almost 5 pH! The rest of the graph also demonstrates that the readings from the HANNA meter remained practically unvaried throughout the test.







Our commitment to provide quality products for our customers has resulted in instruments manufactured by HANNA, complying with the European Directives

EN 61000-6-1,

EN 61000-6-3 and

EN 61010-1.

ISO 9001:2000 and HANNA Compliance



ISO Standards

ISO 9000 standards were adopted in 1978 by the International Organization of Standards in Geneva, Switzerland, as a uniform standard of excellence for use in the European Economic Community. The standards were an immediate success and have since been adopted in more than 90 countries around the world, including the USA.

HANNA is an ISO 9001:2000 certified company. This means the production system is certified to guarantee our customers a quality-oriented product every time.

In order to obtain an ISO 9001:2000 Certification, each and every one of the following deparments need to comply with the rigorous ISO standards:

1) *Design/Development: HANNA products are designed, developed and engineered under ISO 9001 standards.*
2) *Production: Every instrument undergoes stringent Quality Control tests at different stages of manufacturing.*
3) *Quality Assurance: All meters undergo 100% quality control checks prior to shipment.*
4) *Installation and Servicing: HANNA provides unsurpassed level of customer service, technical support and after sales assistance.*

With HANNA, you receive products manufactured to the most stringent quality standards.

IP 67—Heavy-Duty Construction



IP 67: The Waterproof Edge

HANNA waterproof meters comply with the IP 67 standards that classify them dust-tight and protected against the effect of temporary immersion in water.

This enables the units to operate in the harshest of environments, protected against spills, dust, high humidity and severe weather conditions. This makes them ideal for outdoor measurements and the most severe industrial applications such as mines, food processing, plating, industry, foundries, etc. HANNA waterproof meters are built to last.

IP Codes



This standard describes a system for classifying the degree of protection provided by the enclosure of electrical/electronic equipment. Developed by the European Committee for Electro-Technical Standardization (CENELEC), these standards are designed to numerically rate an electrical product on the level of protection its enclosure provides. By assigning different number codes, the degree of protection of the product can be quickly and easily identified. In the IP 67 code, for example, IP signifies International Protection, the first digit 6 indicates the level of protection from solid objects, and the second digit 7 denotes the level of protection from liquids. See the tables below for the details.

DEGREE OF PROTECTION (FIRST NUMBER IN THE CODE)

FIRST NUMBER	BRIEF DESCRIPTION	DEFINITION
0	Not protected	—
1	Protected against solid foreign objects of 50 mm diameter and greater	An object probe, sphere of 50 mm diam. shall not fully penetrate*
2	Protected against solid foreign objects of 12.5 mm diameter and greater	An object probe, sphere of 12.5 mm diam. shall not fully penetrate*
3	Protected against solid foreign objects of 2.5 mm diameter and greater	An object probe of 2.5 mm diam. shall not penetrate at all
4	Protected against solid foreign objects of 1.0 mm diameter and greater	An object probe of 1.0 mm diam. shall not penetrate at all
5	Dust-Protected	Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety.
6	Dust-tight	No ingress of dust.

DEGREE OF PROTECTION FROM LIQUIDS (SECOND NUMBER IN THE CODE)

SECOND NUMBER	BRIEF DESCRIPTION	DEFINITION
0	Not protected	—
1	Protected against vertically falling water drops	Vertically falling water drops shall have no harmful effects.
2	Protected against vertically falling water drops tilted at any angle up to 15°	Vertically falling water drops have no harmful effects when the enclosure is when enclosures is tilted up to 15° on either side of the vertical.
3	Protected against spraying water	Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effects.
5	Protected against water jets	Water projected in jets against the enclosure from any direction shall have no harmful effects.
6	Protected against powerful water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.
7	Protected against the effects of temporary immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed 1 meter in water under standardized conditions of pressure and time.
8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and the user, but ---are more severe than for number 7.

* The full diameter of the object probe shall not pass through an opening of the enclosure.

Equilibrium Relative Humidity

RELATIVE HUMIDITY IN AIR AS A FUNCTION OF TEMPERATURE OF SOME SATURATED SALT SOLUTIONS					
TEMPERATURE °C	LITHIUM CHLORIDE	POTASSIUM ACETATE	MAGNESIUM CHLORIDE	POTASSIUM CARBONATE	MAGNESIUM NITRATE
0	11.23 ± 0.54		33.66 ± 0.33	43.13 ± 0.66	60.35 ± 0.55
5	11.26 ± 0.47		33.60 ± 0.28	43.13 ± 0.50	58.86 ± 0.43
10	11.29 ± 0.41	23.28 ± 0.53	33.47 ± 0.24	43.14 ± 0.39	57.36 ± 0.33
15	11.30 ± 0.35	23.40 ± 0.32	33.30 ± 0.21	43.15 ± 0.33	55.87 ± 0.27
20	11.31 ± 0.31	23.11 ± 0.25	33.07 ± 0.18	43.16 ± 0.33	54.38 ± 0.23
25	11.30 ± 0.27	22.51 ± 0.32	32.78 ± 0.16	43.16 ± 0.39	52.89 ± 0.22
30	11.28 ± 0.24	21.61 ± 0.53	32.44 ± 0.14	43.17 ± 0.50	51.40 ± 0.24
35	11.25 ± 0.22		32.05 ± 0.13		49.91 ± 0.29
40	11.21 ± 0.21		31.60 ± 0.13		48.42 ± 0.37
45	11.16 ± 0.21		31.10 ± 0.13		46.93 ± 0.47
50	11.10 ± 0.22		30.54 ± 0.13		45.44 ± 0.60
55	11.03 ± 0.23		29.93 ± 0.16		
60	10.95 ± 0.26		29.26 ± 0.18		
65	10.86 ± 0.29		28.54 ± 0.21		
70	10.75 ± 0.33		27.77 ± 0.25		
75	10.64 ± 0.38		26.94 ± 0.29		
80	10.51 ± 0.44		26.05 ± 0.34		
85	10.38 ± 0.51		25.11 ± 0.39		
90	10.23 ± 0.59		24.12 ± 0.46		
95	10.07 ± 0.67		23.07 ± 0.52		
100	9.90 ± 0.77		21.97 ± 0.60		

RELATIVE HUMIDITY IN AIR AS A FUNCTION OF TEMPERATURE OF SOME SATURATED SALT SOLUTIONS				
TEMPERATURE °C	SODIUM CHLORIDE	POTASSIUM CHLORIDE	POTASSIUM NITRATE	POTASSIUM SULFATE
0	75.51 ± 0.34	88.61 ± 0.53	96.33 ± 2.90	98.77 ± 1.10
5	76.65 ± 0.27	87.67 ± 0.45	96.27 ± 2.10	98.48 ± 0.91
10	75.67 ± 0.22	86.77 ± 0.39	95.96 ± 1.40	98.18 ± 0.76
15	75.61 ± 0.18	85.92 ± 0.33	95.41 ± 0.96	97.89 ± 0.63
20	75.47 ± 0.14	85.11 ± 0.29	94.62 ± 0.66	97.59 ± 0.53
25	75.29 ± 0.12	84.34 ± 0.26	93.58 ± 0.55	97.30 ± 0.45
30	75.09 ± 0.11	83.62 ± 0.25	93.21 ± 0.60	97.00 ± 0.40
35	74.87 ±0.12	82.95 ± 0.25	90.79 ± 0.83	96.71 ± 0.38
40	74.68 ± 0.13	82.32 ± 0.25	89.03 ± 1.20	96.41 ± 0.38
45	74.52 ± 0.16	81.74 ± 0.28	87.03 ± 1.80	96.12 ± 0.40
50	74.43 ± 0.19	81.20 ± 0.31	84.78 ± 2.50	95.82 ± 0.45
55	74.41 ± 0.24	80.70 ± 0.35		
60	74.50 ± 0.30	80.25 ± 0.41		
65	74.71 ± 0.37	79.85 ± 0.48		
70	75.06 ± 0.45	79.49 ± 0.57		
75	75.58 ± 0.55	79.17 ± 0.66		
80	76.29 ± 0.65	78.90 ± 0.77		
85		78.68 ± 0.89		
90		78.50 ± 1.00		
95				
100				

Thermocouple Reference Tables

Thermoelectric Voltage in milliVolts

Reference Tables
N.I.S.T Rev. ITS-90

K-TYPE THERMOCOUPLE - TEMPERATURE IN DEGREES "C" WITH REFERENCE JUNCTION AT 0°C

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	°C
-270	-6.458											-270
-260	-6.441	-6.444	-6.446	-6.448	-6.450	-6.452	-6.453	-6.455	-6.456	-6.457	-6.458	-260
-250	-6.404	-6.408	-6.413	-6.417	-6.421	-6.425	-6.429	-6.432	-6.435	-6.438	-6.441	-250
-240	-6.344	-6.351	-6.358	-6.364	-6.370	-6.377	-6.382	-6.388	-6.393	-6.399	-6.404	-240
-230	-6.262	-6.271	-6.280	-6.289	-6.297	-6.306	-6.314	-6.322	-6.329	-6.337	-6.344	-230
-220	-6.158	-6.170	-6.181	-6.192	-6.202	-6.213	-6.223	-6.233	-6.243	-6.252	-6.262	-220
-210	-6.035	-6.048	-6.061	-6.074	-6.087	-6.099	-6.111	-6.123	-6.135	-6.147	-6.158	-210
-200	-5.891	-5.907	-5.922	-5.936	-5.951	-5.965	-5.980	-5.994	-6.007	-6.021	-6.035	-200
-190	-5.730	-5.747	-5.763	-5.780	-5.797	-5.813	-5.829	-5.845	-5.861	-5.876	-5.891	-190
-180	-5.550	-5.569	-5.588	-5.606	-5.624	-5.642	-5.660	-5.678	-5.695	-5.713	-5.730	-180
-170	-5.354	-5.374	-5.395	-5.415	-5.435	-5.454	-5.474	-5.493	-5.512	-5.531	-5.550	-170
-160	-5.141	-5.163	-5.185	-5.207	-5.228	-5.250	-5.271	-5.292	-5.313	-5.333	-5.354	-160
-150	-4.913	-4.936	-4.960	-4.983	-5.006	-5.029	-5.052	-5.074	-5.097	-5.119	-5.141	-150
-140	-4.669	-4.694	-4.719	-4.744	-4.768	-4.793	-4.817	-4.841	-4.865	-4.889	-4.913	-140
-130	-4.411	-4.437	-4.463	-4.490	-4.516	-4.542	-4.567	-4.593	-4.618	-4.644	-4.669	-130
-120	-4.138	-4.166	-4.194	-4.221	-4.249	-4.276	-4.303	-4.330	-4.357	-4.384	-4.411	-120
-110	-3.852	-3.882	-3.911	-3.939	-3.968	-3.997	-4.025	-4.054	-4.082	-4.110	-4.138	-110
-100	-3.554	-3.584	-3.614	-3.645	-3.675	-3.705	-3.734	-3.764	-3.794	-3.823	-3.852	-100
-90	-3.243	-3.274	-3.306	-3.337	-3.368	-3.400	-3.431	-3.462	-3.492	-3.523	-3.554	-90
-80	-2.920	-2.953	-2.986	-3.018	-3.050	-3.083	-3.115	-3.147	-3.179	-3.211	-3.243	-80
-70	-2.587	-2.620	-2.654	-2.688	-2.721	-2.755	-2.788	-2.821	-2.854	-2.887	-2.920	-70
-60	-2.243	-2.278	-2.312	-2.347	-2.382	-2.416	-2.450	-2.485	-2.519	-2.553	-2.587	-60
-50	-1.889	-1.925	-1.961	-1.996	-2.032	-2.067	-2.103	-2.138	-2.173	-2.208	-2.243	-50
-40	-1.527	-1.564	-1.600	-1.637	-1.673	-1.709	-1.745	-1.782	-1.818	-1.854	-1.889	-40
-30	-1.156	-1.194	-1.231	-1.268	-1.305	-1.343	-1.380	-1.417	-1.453	-1.490	-1.527	-30
-20	-0.778	-0.816	-0.854	-0.892	-0.930	-0.968	-1.006	-1.043	-1.081	-1.119	-1.156	-20
-10	-0.392	-0.431	-0.470	-0.508	-0.547	-0.586	-0.624	-0.663	-0.701	-0.739	-0.778	-10
0	0.000	-0.039	-0.079	-0.118	-0.157	-0.197	-0.236	-0.275	-0.314	-0.353	-0.392	0
°C	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**°C**
0	0.000	0.039	0.079	0.119	0.158	0.198	0.238	0.277	0.317	0.357	0.397	0
10	0.397	0.437	0.477	0.517	0.557	0.597	0.637	0.677	0.718	0.758	0.798	10
20	0.798	0.838	0.879	0.919	0.960	1.000	1.041	1.081	1.122	1.163	1.203	20
30	1.203	1.244	1.285	1.326	1.366	1.407	1.448	1.489	1.530	1.571	1.612	30
40	1.612	1.653	1.694	1.735	1.776	1.817	1.858	1.899	1.941	1.982	2.023	40
50	2.023	2.064	2.106	2.147	2.188	2.230	2.271	2.312	2.354	2.395	2.436	50
60	2.436	2.478	2.519	2.561	2.602	2.644	2.685	2.727	2.768	2.810	2.851	60
70	2.851	2.893	2.934	2.976	3.017	3.059	3.100	3.142	3.184	3.225	3.267	70
80	3.267	3.308	3.350	3.391	3.433	3.474	3.516	3.557	3.599	3.640	3.682	80
90	3.682	3.723	3.765	3.806	3.848	3.889	3.931	3.972	4.013	4.055	4.096	90
100	4.096	4.138	4.179	4.220	4.262	4.303	4.344	4.385	4.427	4.468	4.509	100
110	4.509	4.550	4.591	4.633	4.674	4.715	4.756	4.797	4.838	4.879	4.920	110
120	4.920	4.961	5.002	5.043	5.084	5.124	5.165	5.206	5.247	5.288	5.328	120
130	5.328	5.369	5.410	5.450	5.491	5.532	5.572	5.613	5.653	5.694	5.735	130
140	5.735	5.775	5.815	5.856	5.896	5.937	5.977	6.017	6.058	6.098	6.138	140
150	6.138	6.179	6.219	6.259	6.299	6.339	6.380	6.420	6.460	6.500	6.540	150
160	6.540	6.580	6.620	6.660	6.701	6.741	6.781	6.821	6.861	6.901	6.941	160
170	6.941	6.981	7.021	7.060	7.100	7.140	7.180	7.220	7.260	7.300	7.340	170
180	7.340	7.380	7.420	7.460	7.500	7.540	7.579	7.619	7.659	7.699	7.739	180
190	7.739	7.779	7.819	7.859	7.899	7.939	7.979	8.019	8.059	8.099	8.138	190
200	8.138	8.178	8.218	8.258	8.298	8.338	8.378	8.418	8.458	8.499	8.539	200
210	8.539	8.579	8.619	8.659	8.699	8.739	8.779	8.819	8.860	8.900	8.940	210
220	8.940	8.980	9.020	9.061	9.101	9.141	9.181	9.222	9.262	9.302	9.343	220
230	9.343	9.383	9.423	9.464	9.504	9.545	9.585	9.626	9.666	9.707	9.747	230
240	9.747	9.788	9.828	9.869	9.909	9.950	9.991	10.031	10.072	10.113	10.153	240
250	10.153	10.194	10.235	10.276	10.316	10.357	10.398	10.439	10.480	10.520	0.561	250
260	10.561	10.602	10.643	10.684	10.725	10.766	10.807	10.848	10.889	10.930	10.971	260
270	10.971	11.012	11.053	11.094	11.135	11.176	11.217	11.259	11.300	11.341	11.382	270
280	11.382	11.423	11.465	11.506	11.547	11.588	11.630	11.671	11.712	11.753	11.795	280
290	11.795	11.836	11.877	11.919	11.960	12.001	12.043	12.084	12.126	12.167	12.209	290
300	12.209	12.250	12.291	12.333	12.374	12.416	12.457	12.499	12.540	12.582	12.624	300
310	12.624	12.665	12.707	12.748	12.790	12.831	12.873	12.915	12.956	12.998	13.040	310
320	13.040	13.081	13.123	13.165	13.206	13.248	13.290	13.331	13.373	13.415	13.457	320
330	13.457	13.498	13.540	13.582	13.624	13.665	13.707	13.749	13.791	13.833	13.874	330
340	13.874	13.916	13.958	14.000	14.042	14.084	14.126	14.167	14.209	14.251	14.293	340
350	14.293	14.335	14.377	14.419	14.461	14.503	14.545	14.587	14.629	14.671	14.713	350
360	14.713	14.755	14.797	14.839	14.881	14.923	14.965	15.007	15.049	15.091	15.133	360
370	15.133	15.175	15.217	15.259	15.301	15.343	15.385	15.427	15.469	15.511	15.554	370
380	15.554	15.596	15.638	15.680	15.722	15.764	15.806	15.849	15.891	15.933	15.975	380
390	15.975	16.017	16.059	16.102	16.144	16.186	16.228	16.270	16.313	16.355	16.397	390
400	16.397	16.439	16.482	16.524	16.566	16.608	16.651	16.693	16.735	16.778	16.820	400
410	16.820	16.862	16.904	16.947	16.989	17.031	17.074	17.116	17.158	17.201	17.243	410
420	17.243	17.285	17.328	17.370	17.413	17.455	17.497	17.540	17.582	17.624	17.667	420
430	17.667	17.709	17.752	17.794	17.837	17.879	17.921	17.964	18.006	18.049	18.091	430
440	18.091	18.134	18.176	18.218	18.261	18.303	18.346	18.388	18.431	18.473	18.516	440
450	18.516	18.558	18.601	18.643	18.686	18.728	18.771	18.813	18.856	18.898	18.941	450
460	18.941	18.983	19.026	19.068	19.111	19.154	19.196	19.239	19.281	19.324	19.366	460
470	19.366	19.409	19.451	19.494	19.537	19.579	19.622	19.664	19.707	19.750	19.792	470
480	19.792	19.835	19.877	19.920	19.962	20.005	20.048	20.090	20.133	20.175	20.218	480
490	20.218	20.261	20.303	20.346	20.389	20.431	20.474	20.516	20.559	20.602	20.644	490
500	20.644	20.687	20.730	20.772	20.815	20.857	20.900	20.943	20.985	21.028	21.071	500
510	21.071	21.113	21.156	21.199	21.241	21.284	21.326	21.369	21.412	21.454	21.497	510
520	21.497	21.540	21.582	21.625	21.668	21.710	21.753	21.796	21.838	21.881	21.924	520
530	21.924	21.966	22.009	22.052	22.094	22.137	22.179	22.222	22.265	22.307	22.350	530
540	22.350	22.393	22.435	22.478	22.521	22.563	22.606	22.649	22.691	22.734	22.776	540

Thermocouple Reference Tables

Thermoelectric Voltage in milliVolts

K-TYPE THERMOCOUPLE - TEMPERATURE IN DEGREES "C" WITH REFERENCE JUNCTION AT 0°C

°C	0	1	2	3	4	5	6	7	8	9	10	°C
550	22.776	22.819	22.862	22.904	22.947	22.990	23.032	23.075	23.117	23.160	23.203	550
560	23.203	23.245	23.288	23.331	23.373	23.416	23.458	23.501	23.544	23.586	23.629	560
570	23.629	23.671	23.714	23.757	23.799	23.842	23.884	23.927	23.970	24.012	24.055	570
580	24.055	24.097	24.140	24.182	24.225	24.267	24.310	24.353	24.395	24.438	24.480	580
590	24.480	24.523	24.565	24.608	24.650	24.693	24.735	24.778	24.820	24.863	24.905	590
600	24.905	24.948	24.990	25.033	25.075	25.118	25.160	25.203	25.245	25.288	25.330	600
610	25.330	25.373	25.415	25.458	25.500	25.543	25.585	25.627	25.670	25.712	25.755	610
620	25.755	25.797	25.840	25.882	25.924	25.967	26.009	26.052	26.094	26.136	26.179	620
630	26.179	26.221	26.263	26.306	26.348	26.390	26.433	26.475	26.517	26.560	26.602	630
640	26.602	26.644	26.687	26.729	26.771	26.814	26.856	26.898	26.940	26.983	27.025	640
650	27.025	27.067	27.109	27.152	27.194	27.236	27.278	27.320	27.363	27.405	27.447	650
660	27.447	27.489	27.531	27.574	27.616	27.658	27.700	27.742	27.784	27.826	27.869	660
670	27.869	27.911	27.953	27.995	28.037	28.079	28.121	28.163	28.205	28.247	28.289	670
680	28.289	28.332	28.374	28.416	28.458	28.500	28.542	28.584	28.626	28.668	28.710	680
690	28.710	28.752	28.794	28.835	28.877	28.919	28.961	29.003	29.045	29.087	29.129	690
700	29.129	29.171	29.213	29.255	29.297	29.338	29.380	29.422	29.464	29.506	29.548	700
710	29.548	29.589	29.631	29.673	29.715	29.757	29.798	29.840	29.882	29.924	29.965	710
720	29.965	30.007	30.049	30.090	30.132	30.174	30.216	30.257	30.299	30.341	30.382	720
730	30.382	30.424	30.466	30.507	30.549	30.590	30.632	30.674	30.715	30.757	30.798	730
740	30.798	30.840	30.881	30.923	30.964	31.006	31.047	31.089	31.130	31.172	31.213	740
750	31.213	31.255	31.296	31.338	31.379	31.421	31.462	31.504	31.545	31.586	31.628	750
760	31.628	31.669	31.710	31.752	31.793	31.834	31.876	31.917	31.958	32.000	32.041	760
770	32.041	32.082	32.124	32.165	32.206	32.247	32.289	32.330	32.371	32.412	32.453	770
780	32.453	32.495	32.536	32.577	32.618	32.659	32.700	32.742	32.783	32.824	32.865	780
790	32.865	32.906	32.947	32.988	33.029	33.070	33.111	33.152	33.193	33.234	33.275	790
800	33.275	33.316	33.357	33.398	33.439	33.480	33.521	33.562	33.603	33.644	33.685	800
810	33.685	33.726	33.767	33.808	33.848	33.889	33.930	33.971	34.012	34.053	34.093	810
820	34.093	34.134	34.175	34.216	34.257	34.297	34.338	34.379	34.420	34.460	34.501	820
830	34.501	34.542	34.582	34.623	34.664	34.704	34.745	34.786	34.826	34.867	34.908	830
840	34.908	34.948	34.989	35.029	35.070	35.110	35.151	35.192	35.232	35.273	35.313	840
850	35.313	35.354	35.394	35.435	35.475	35.516	35.556	35.596	35.637	35.677	35.718	850
860	35.718	35.758	35.798	35.839	35.879	35.920	35.960	36.000	36.041	36.081	36.121	860
870	36.121	36.162	36.202	36.242	36.282	36.323	36.363	36.403	36.443	36.484	36.524	870
880	36.524	36.564	36.604	36.644	36.685	36.725	36.765	36.805	36.845	36.885	36.925	880
890	36.925	36.965	37.006	37.046	37.086	37.126	37.166	37.206	37.246	37.286	37.326	890
900	37.326	37.366	37.406	37.446	37.486	37.526	37.566	37.606	37.646	37.686	37.725	900
910	37.725	37.765	37.805	37.845	37.885	37.925	37.965	38.005	38.044	38.084	38.124	910
920	38.124	38.164	38.204	38.243	38.283	38.323	38.363	38.402	38.442	38.482	38.522	920
930	38.522	38.561	38.601	38.641	38.680	38.720	38.760	38.799	38.839	38.878	38.918	930
940	38.918	38.958	38.997	39.037	39.076	39.116	39.155	39.195	39.235	39.274	39.314	940
950	39.314	39.353	39.393	39.432	39.471	39.511	39.550	39.590	39.629	39.669	39.708	950
960	39.708	39.747	39.787	39.826	39.866	39.905	39.944	39.984	40.023	40.062	40.101	960
970	40.101	40.141	40.180	40.219	40.259	40.298	40.337	40.376	40.415	40.455	40.494	970
980	40.494	40.533	40.572	40.611	40.651	40.690	40.729	40.768	40.807	40.846	40.885	980
990	40.885	40.924	40.963	41.002	41.042	41.081	41.120	41.159	41.198	41.237	41.276	990
1000	41.276	41.315	41.354	41.393	41.431	41.470	41.509	41.548	41.587	41.626	41.665	1000
1010	41.665	41.704	41.743	41.781	41.820	41.859	41.898	41.937	41.976	42.014	42.053	1010
1020	42.053	42.092	42.131	42.169	42.208	42.247	42.286	42.324	42.363	42.402	42.440	1020
1030	42.440	42.479	42.518	42.556	42.595	42.633	42.672	42.711	42.749	42.788	42.826	1030
1040	42.826	42.865	42.903	42.942	42.980	43.019	43.057	43.096	43.134	43.173	43.211	1040
1050	43.211	43.250	43.288	43.327	43.365	43.403	43.442	43.480	43.518	43.557	43.595	1050
1060	43.595	43.633	43.672	43.710	43.748	43.787	43.825	43.863	43.901	43.940	43.978	1060
1070	43.978	44.016	44.054	44.092	44.130	44.169	44.207	44.245	44.283	44.321	44.359	1070
1080	44.359	44.397	44.435	44.473	44.512	44.550	44.588	44.626	44.664	44.702	44.740	1080
1090	44.740	44.778	44.816	44.853	44.891	44.929	44.967	45.005	45.043	45.081	45.119	1090
1100	45.119	45.157	45.194	45.232	45.270	45.308	45.346	45.383	45.421	45.459	45.497	1100
1110	45.497	45.534	45.572	45.610	45.647	45.685	45.723	45.760	45.798	45.836	45.873	1110
1120	45.873	45.911	45.948	45.986	46.024	46.061	46.099	46.136	46.174	46.211	46.249	1120
1130	46.249	46.286	46.324	46.361	46.398	46.436	46.473	46.511	46.548	46.585	46.623	1130
1140	46.623	46.660	46.697	46.735	46.772	46.809	46.847	46.884	46.921	46.958	46.995	1140
1150	46.995	47.033	47.070	47.107	47.144	47.181	47.218	47.256	47.293	47.330	47.367	1150
1160	47.367	47.404	47.441	47.478	47.515	47.552	47.589	47.626	47.663	47.700	47.737	1160
1170	47.737	47.774	47.811	47.848	47.884	47.921	47.958	47.995	48.032	48.069	48.105	1170
1180	48.105	48.142	48.179	48.216	48.252	48.289	48.326	48.363	48.399	48.436	48.473	1180
1190	48.473	48.509	48.546	48.582	48.619	48.656	48.692	48.729	48.765	48.802	48.838	1190
1200	48.838	48.875	48.911	48.948	48.984	49.021	49.057	49.093	49.130	49.166	49.202	1200
1210	49.202	49.239	49.275	49.311	49.348	49.384	49.420	49.456	49.493	49.529	49.565	1210
1220	49.565	49.601	49.637	49.674	49.710	49.746	49.782	49.818	49.854	49.890	49.926	1220
1230	49.926	49.962	49.998	50.034	50.070	50.106	50.142	50.178	50.214	50.250	50.286	1230
1240	50.286	50.322	50.358	50.393	50.429	50.465	50.501	50.537	50.572	50.608	50.644	1240
1250	50.644	50.680	50.715	50.751	50.787	50.822	50.858	50.894	50.929	50.965	51.000	1250
1260	51.000	51.036	51.071	51.107	51.142	51.178	51.213	51.249	51.284	51.320	51.355	1260
1270	51.355	51.391	51.426	51.461	51.497	51.532	51.567	51.603	51.638	51.673	51.708	1270
1280	51.708	51.744	51.779	51.814	51.849	51.885	51.920	51.955	51.990	52.025	52.060	1280
1290	52.060	52.095	52.130	52.165	52.200	52.235	52.270	52.305	52.340	52.375	52.410	1290
1300	52.410	52.445	52.480	52.515	52.550	52.585	52.620	52.654	52.689	52.724	52.759	1300
1310	52.759	52.794	52.828	52.863	52.898	52.932	52.967	53.002	53.037	53.071	53.106	1310
1320	53.106	53.140	53.175	53.210	53.244	53.279	53.313	53.348	53.382	53.417	53.451	1320
1330	53.451	53.486	53.520	53.555	53.589	53.623	53.658	53.692	53.727	53.761	53.795	1330
1340	53.795	53.830	53.864	53.898	53.932	53.967	54.001	54.035	54.069	54.104	54.138	1340
1350	54.138	54.172	54.206	54.240	54.274	54.308	54.343	54.377	54.411	54.445	54.479	1350
1360	54.479	54.513	54.547	54.581	54.615	54.649	54.683	54.717	54.751	54.785	54.819	1360
1370	54.819	54.852	54.886									1370

Thermocouple Reference Tables

Thermoelectric Voltage in milliVolts

Reference Tables
N.I.S.T Rev. ITS-90

K-TYPE THERMOCOUPLE - TEMPERATURE IN DEGREES "F" WITH REFERENCE JUNCTION AT 32°F

°F	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	°F
-450							-6.458	-6.457	-6.457	-6.456	-6.456	-450
-440	-6.456	-6.455	-6.454	-6.454	-6.453	-6.452	-6.451	-6.450	-6.449	-6.448	-6.446	-440
-430	-6.446	-6.445	-6.444	-6.443	-6.441	-6.440	-6.438	-6.436	-6.435	-6.433	-6.431	-430
-420	-6.431	-6.429	-6.427	-6.425	-6.423	-6.421	-6.419	-6.416	-6.414	-6.411	-6.409	-420
-410	-6.409	-6.406	-6.404	-6.401	-6.398	-6.395	-6.392	-6.389	-6.386	-6.383	-6.380	-410
-400	-6.380	-6.377	-6.373	-6.370	-6.366	-6.363	-6.359	-6.355	-6.352	-6.348	-6.344	-400
-390	-6.344	-6.340	-6.336	-6.332	-6.328	-6.323	-6.319	-6.315	-6.310	-6.306	-6.301	-390
-380	-6.301	-6.296	-6.292	-6.287	-6.282	-6.277	-6.272	-6.267	-6.262	-6.257	-6.251	-380
-370	-6.251	-6.246	-6.241	-6.235	-6.230	-6.224	-6.218	-6.213	-6.207	-6.201	-6.195	-370
-360	-6.195	-6.189	-6.183	-6.177	-6.171	-6.165	-6.158	-6.152	-6.146	-6.139	-6.133	-360
-350	-6.133	-6.126	-6.119	-6.113	-6.106	-6.099	-6.092	-6.085	-6.078	-6.071	-6.064	-350
-340	-6.064	-6.057	-6.049	-6.042	-6.035	-6.027	-6.020	-6.012	-6.004	-5.997	-5.989	-340
-330	-5.989	-5.981	-5.973	-5.965	-5.957	-5.949	-5.941	-5.933	-5.925	-5.917	-5.908	-330
-320	-5.908	-5.900	-5.891	-5.883	-5.874	-5.866	-5.857	-5.848	-5.840	-5.831	-5.822	-320
-310	-5.822	-5.813	-5.804	-5.795	-5.786	-5.776	-5.767	-5.758	-5.749	-5.739	-5.730	-310
-300	-5.730	-5.720	-5.711	-5.701	-5.691	-5.682	-5.672	-5.662	-5.652	-5.642	-5.632	-300
-290	-5.632	-5.622	-5.612	-5.602	-5.592	-5.581	-5.571	-5.561	-5.550	-5.540	-5.529	-290
-280	-5.529	-5.519	-5.508	-5.497	-5.487	-5.476	-5.465	-5.454	-5.443	-5.432	-5.421	-280
-270	-5.421	-5.410	-5.399	-5.388	-5.377	-5.365	-5.354	-5.343	-5.331	-5.320	-5.308	-270
-260	-5.308	-5.296	-5.285	-5.273	-5.261	-5.250	-5.238	-5.226	-5.214	-5.202	-5.190	-260
-250	-5.190	-5.178	-5.166	-5.153	-5.141	-5.129	-5.117	-5.104	-5.092	-5.079	-5.067	-250
-240	-5.067	-5.054	-5.042	-5.029	-5.016	-5.003	-4.991	-4.978	-4.965	-4.952	-4.939	-240
-230	-4.939	-4.926	-4.913	-4.900	-4.886	-4.873	-4.860	-4.847	-4.833	-4.820	-4.806	-230
-220	-4.806	-4.793	-4.779	-4.766	-4.752	-4.738	-4.724	-4.711	-4.697	-4.683	-4.669	-220
-210	-4.669	-4.655	-4.641	-4.627	-4.613	-4.599	-4.584	-4.570	-4.556	-4.542	-4.527	-210
-200	-4.527	-4.513	-4.498	-4.484	-4.469	-4.455	-4.440	-4.425	-4.411	-4.396	-4.381	-200
-190	-4.381	-4.366	-4.351	-4.336	-4.321	-4.306	-4.291	-4.276	-4.261	-4.246	-4.231	-190
-180	-4.231	-4.215	-4.200	-4.185	-4.169	-4.154	-4.138	-4.123	-4.107	-4.091	-4.076	-180
-170	-4.076	-4.060	-4.044	-4.029	-4.013	-3.997	-3.981	-3.965	-3.949	-3.933	-3.917	-170
-160	-3.917	-3.901	-3.885	-3.869	-3.852	-3.836	-3.820	-3.803	-3.787	-3.771	-3.754	-160
-150	-3.754	-3.738	-3.721	-3.705	-3.688	-3.671	-3.655	-3.638	-3.621	-3.604	-3.587	-150
-140	-3.587	-3.571	-3.554	-3.537	-3.520	-3.503	-3.486	-3.468	-3.451	-3.434	-3.417	-140
-130	-3.417	-3.400	-3.382	-3.365	-3.348	-3.330	-3.313	-3.295	-3.278	-3.260	-3.243	-130
-120	-3.243	-3.225	-3.207	-3.190	-3.172	-3.154	-3.136	-3.119	-3.101	-3.083	-3.065	-120
-110	-3.065	-3.047	-3.029	-3.011	-2.993	-2.975	-2.957	-2.938	-2.920	-2.902	-2.884	-110
-100	-2.884	-2.865	-2.847	-2.829	-2.810	-2.792	-2.773	-2.755	-2.736	-2.718	-2.699	-100
-90	-2.699	-2.680	-2.662	-2.643	-2.624	-2.605	-2.587	-2.568	-2.549	-2.530	-2.511	-90
-80	-2.511	-2.492	-2.473	-2.454	-2.435	-2.416	-2.397	-2.378	-2.359	-2.339	-2.320	-80
-70	-2.320	-2.301	-2.282	-2.262	-2.243	-2.223	-2.204	-2.185	-2.165	-2.146	-2.126	-70
-60	-2.126	-2.106	-2.087	-2.067	-2.048	-2.028	-2.008	-1.988	-1.969	-1.949	-1.929	-60
-50	-1.929	-1.909	-1.889	-1.869	-1.850	-1.830	-1.810	-1.790	-1.770	-1.749	-1.729	-50
-40	-1.729	-1.709	-1.689	-1.669	-1.649	-1.628	-1.608	-1.588	-1.568	-1.547	-1.527	-40
-30	-1.527	-1.507	-1.486	-1.466	-1.445	-1.425	-1.404	-1.384	-1.363	-1.343	-1.322	-30
-20	-1.322	-1.301	-1.281	-1.260	-1.239	-1.218	-1.198	-1.177	-1.156	-1.135	-1.114	-20
-10	-1.114	-1.094	-1.073	-1.052	-1.031	-1.010	-0.989	-0.968	-0.947	-0.926	-0.905	-10
0	-0.905	-0.883	-0.862	-0.841	-0.820	-0.799	-0.778	-0.756	-0.735	-0.714	-0.692	0

°F	0	1	2	3	4	5	6	7	8	9	10	°F
0	-0.692	-0.671	-0.650	-0.628	-0.607	-0.586	-0.564	-0.543	-0.521	-0.500	-0.478	0
10	-0.478	-0.457	-0.435	-0.413	-0.392	-0.370	-0.349	-0.327	-0.305	-0.284	-0.262	10
20	-0.262	-0.240	-0.218	-0.197	-0.175	-0.153	-0.131	-0.109	-0.088	-0.066	-0.044	20
30	-0.044	-0.022	0.000	0.022	0.044	0.066	0.088	0.110	0.132	0.154	0.176	30
40	0.176	0.198	0.220	0.242	0.264	0.286	0.308	0.330	0.353	0.375	0.397	40
50	0.397	0.419	0.441	0.463	0.486	0.508	0.530	0.552	0.575	0.597	0.619	50
60	0.619	0.642	0.664	0.686	0.709	0.731	0.753	0.776	0.798	0.821	0.843	60
70	0.843	0.865	0.888	0.910	0.933	0.955	0.978	1.000	1.023	1.045	1.068	70
80	1.068	1.090	1.113	1.136	1.158	1.181	1.203	1.226	1.249	1.271	1.294	80
90	1.294	1.316	1.339	1.362	1.384	1.407	1.430	1.453	1.475	1.498	1.521	90
100	1.521	1.543	1.566	1.589	1.612	1.635	1.657	1.680	1.703	1.726	1.749	100
110	1.749	1.771	1.794	1.817	1.840	1.863	1.886	1.909	1.931	1.954	1.977	110
120	1.977	2.000	2.023	2.046	2.069	2.092	2.115	2.138	2.161	2.184	2.207	120
130	2.207	2.230	2.253	2.276	2.298	2.321	2.344	2.367	2.390	2.413	2.436	130
140	2.436	2.459	2.483	2.506	2.529	2.552	2.575	2.598	2.621	2.644	2.667	140
150	2.667	2.690	2.713	.736	2.759	2.782	2.805	2.828	2.851	2.874	2.897	150
160	2.897	2.920	2.944	2.967	2.990	3.013	3.036	3.059	3.082	3.105	3.128	160
170	3.128	3.151	3.174	3.197	3.220	3.244	3.267	3.290	3.313	3.336	3.359	170
180	3.359	3.382	3.405	3.428	3.451	3.474	3.497	3.520	3.544	3.567	3.590	180
190	3.590	3.613	3.636	3.659	3.682	3.705	3.728	3.751	3.774	3.797	3.820	190
200	3.820	3.843	3.866	3.889	3.912	3.935	3.958	3.981	4.004	4.027	4.050	200
210	4.050	4.073	4.096	4.119	4.142	4.165	4.188	4.211	4.234	4.257	4.280	210
220	4.280	4.303	4.326	4.349	4.372	4.395	4.417	4.440	4.463	4.486	4.509	220
230	4.509	4.532	4.555	4.578	4.601	4.623	4.646	4.669	4.692	4.715	4.738	230
240	4.738	4.760	4.783	4.806	4.829	4.852	4.874	4.897	4.920	4.943	4.965	240
250	4.965	4.988	5.011	5.034	5.056	5.079	5.102	5.124	5.147	5.170	5.192	250
260	5.192	5.215	5.238	5.260	5.283	5.306	5.328	5.351	5.374	5.396	5.419	260
270	5.419	5.441	5.464	5.487	5.509	5.532	5.554	5.577	5.599	5.622	5.644	270
280	5.644	5.667	5.690	5.712	5.735	5.757	5.779	5.802	5.824	5.847	5.869	280
290	5.869	5.892	5.914	5.937	5.959	5.982	6.004	6.026	6.049	6.071	6.094	290
300	6.094	6.116	6.138	6.161	6.183	6.205	6.228	6.250	6.272	6.295	6.317	300
310	6.317	6.339	6.362	6.384	6.406	6.429	6.451	6.473	6.496	6.518	6.540	310
320	6.540	6.562	6.585	6.607	6.629	6.652	6.674	6.696	6.718	6.741	6.763	320
330	6.763	6.785	6.807	6.829	6.852	6.874	6.896	6.918	6.941	6.963	6.985	330
340	6.985	7.007	7.029	7.052	7.074	7.096	7.118	7.140	7.163	7.185	7.207	340

Thermocouple Reference Tables

Thermoelectric Voltage in milliVolts

K-TYPE THERMOCOUPLE - TEMPERATURE IN DEGREES "F" WITH REFERENCE JUNCTION AT 32°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
350	7.207	7.229	7.251	7.273	7.296	7.318	7.340	7.362	7.384	7.407	7.429	350
360	7.429	7.451	7.473	7.495	7.517	7.540	7.562	7.584	7.606	7.628	7.650	360
370	7.650	7.673	7.695	7.717	7.739	7.761	7.783	7.806	7.828	7.850	7.872	370
380	7.872	7.894	7.917	7.939	7.961	7.983	8.005	8.027	8.050	8.072	8.094	380
390	8.094	8.116	8.138	8.161	8.183	8.205	8.227	8.250	8.272	8.294	8.316	390
400	8.316	8.338	8.361	8.383	8.405	8.427	8.450	8.472	8.494	8.516	8.539	400
410	8.539	8.561	8.583	8.605	8.628	8.650	8.672	8.694	8.717	8.739	8.761	410
420	8.761	8.784	8.806	8.828	8.851	8.873	8.895	8.918	8.940	8.962	8.985	420
430	8.985	9.007	9.029	9.052	9.074	9.096	9.119	9.141	9.163	9.186	9.208	430
440	9.208	9.231	9.253	9.275	9.298	9.320	9.343	9.365	9.388	9.410	9.432	440
450	9.432	9.455	9.477	9.500	9.522	9.545	9.567	9.590	9.612	9.635	9.657	450
460	9.657	9.680	9.702	9.725	9.747	9.770	9.792	9.815	9.837	9.860	9.882	460
470	9.882	9.905	9.927	9.950	9.973	9.995	10.018	10.040	10.063	10.086	10.108	470
480	10.108	10.131	10.153	10.176	10.199	10.221	10.244	10.267	10.289	10.312	10.334	480
490	10.334	10.357	10.380	10.402	10.425	10.448	10.471	10.493	10.516	10.539	10.561	490
500	10.561	10.584	10.607	10.629	10.652	10.675	10.698	10.720	10.743	10.766	10.789	500
510	10.789	10.811	10.834	10.857	10.880	10.903	10.925	10.948	10.971	10.994	11.017	510
520	11.017	11.039	11.062	11.085	11.108	11.131	11.154	11.176	11.199	11.222	11.245	520
530	11.245	11.268	11.291	11.313	11.336	11.359	11.382	11.405	11.428	11.451	11.474	530
540	11.474	11.497	11.519	11.542	11.565	11.588	11.611	11.634	11.657	11.680	11.703	540
550	11.703	11.726	11.749	11.772	11.795	11.818	11.841	11.864	11.887	11.910	11.933	550
560	11.933	11.956	11.978	12.001	12.024	12.047	12.070	12.093	12.116	12.140	12.163	560
570	12.163	12.186	12.209	12.232	12.255	12.278	12.301	12.324	12.347	12.370	12.393	570
580	12.393	12.416	12.439	12.462	12.485	12.508	12.531	12.554	12.577	12.600	12.624	580
590	12.624	12.647	12.670	12.693	12.716	12.739	12.762	12.785	12.808	12.831	12.855	590
600	12.855	12.878	12.901	12.924	12.947	12.970	12.993	13.016	13.040	13.063	13.086	600
610	13.086	13.109	13.132	13.155	13.179	13.202	13.225	13.248	13.271	13.294	13.318	610
620	13.318	13.341	13.364	13.387	13.410	13.433	13.457	13.480	13.503	13.526	13.549	620
630	13.549	13.573	13.596	13.619	13.642	13.665	13.689	13.712	13.735	13.758	13.782	630
640	13.782	13.805	13.828	13.851	13.874	13.898	13.921	13.944	13.967	13.991	14.014	640
650	14.014	14.037	14.060	14.084	14.107	14.130	14.154	14.177	14.200	14.223	14.247	650
660	14.247	14.270	14.293	14.316	14.340	14.363	14.386	14.410	14.433	14.456	14.479	660
670	14.479	14.503	14.526	14.549	14.573	14.596	14.619	14.643	14.666	14.689	14.713	670
680	14.713	14.736	14.759	14.783	14.806	14.829	14.853	14.876	14.899	14.923	14.946	680
690	14.946	14.969	14.993	15.016	15.039	15.063	15.086	15.109	15.133	15.156	15.179	690
700	15.179	15.203	15.226	15.250	15.273	15.296	15.320	15.343	15.366	15.390	15.413	700
710	15.413	15.437	15.460	15.483	15.507	15.530	15.554	15.577	15.600	15.624	15.647	710
720	15.647	15.671	15.694	15.717	15.741	15.764	15.788	15.811	15.834	15.858	15.881	720
730	15.881	15.905	15.928	15.952	15.975	15.998	16.022	16.045	16.069	16.092	16.116	730
740	16.116	16.139	16.163	16.186	16.209	16.233	16.256	16.280	16.303	16.327	16.350	740
750	16.350	16.374	16.397	16.421	16.444	16.468	16.491	16.514	16.538	16.561	16.585	750
760	16.585	16.608	16.632	16.655	16.679	16.702	16.726	16.749	16.773	16.796	16.820	760
770	16.820	16.843	16.867	16.890	16.914	16.937	16.961	16.984	17.008	17.031	17.055	770
780	17.055	17.078	17.102	17.125	17.149	17.173	17.196	17.220	17.243	17.267	17.290	780
790	17.290	17.314	17.337	17.361	17.384	17.408	17.431	17.455	17.478	17.502	17.526	790
800	17.526	17.549	17.573	17.596	17.620	17.643	17.667	17.690	17.714	17.738	17.761	800
810	17.761	17.785	17.808	17.832	17.855	17.879	17.902	17.926	17.950	17.973	17.997	810
820	17.997	18.020	18.044	18.068	18.091	18.115	18.138	18.162	18.185	18.209	18.233	820
830	18.233	18.256	18.280	18.303	18.327	18.351	18.374	18.398	18.421	18.445	18.469	830
840	18.469	18.492	18.516	18.539	18.563	18.587	18.610	18.634	18.657	18.681	18.705	840
850	18.705	18.728	18.752	18.776	18.799	18.823	18.846	18.870	18.894	18.917	18.941	850
860	18.941	18.965	18.988	19.012	19.035	19.059	19.083	19.106	19.130	19.154	19.177	860
870	19.177	19.201	19.224	19.248	19.272	19.295	19.319	19.343	19.366	19.390	19.414	870
880	19.414	19.437	19.461	19.485	19.508	19.532	19.556	19.579	19.603	19.626	19.650	880
890	19.650	19.674	19.697	19.721	19.745	19.768	19.792	19.816	19.839	19.863	19.887	890
900	19.887	19.910	19.934	19.958	19.981	20.005	20.029	20.052	20.076	20.100	20.123	900
910	20.123	20.147	20.171	20.194	20.218	20.242	20.265	20.289	20.313	20.336	20.360	910
920	20.360	20.384	20.407	20.431	20.455	20.479	20.502	20.526	20.550	20.573	20.597	920
930	20.597	20.621	20.644	20.668	20.692	20.715	20.739	20.763	20.786	20.810	20.834	930
940	20.834	20.857	20.881	20.905	20.929	20.952	20.976	21.000	21.023	21.047	21.071	940
950	21.071	21.094	21.118	21.142	21.165	21.189	21.213	21.236	21.260	21.284	21.308	950
960	21.308	21.331	21.355	21.379	21.402	21.426	21.450	21.473	21.497	21.521	21.544	960
970	21.544	21.568	21.592	21.616	21.639	21.663	21.687	21.710	21.734	21.758	21.781	970
980	21.781	21.805	21.829	21.852	21.876	21.900	21.924	21.947	21.971	21.995	22.018	980
990	22.018	22.042	22.066	22.089	22.113	22.137	22.160	22.184	22.208	22.232	22.255	990
1000	22.255	22.279	22.303	22.326	22.350	22.374	22.397	22.421	22.445	22.468	22.492	1000
1010	22.492	22.516	22.540	22.563	22.587	22.611	22.634	22.658	22.682	22.705	22.729	1010
1020	22.729	22.753	22.776	22.800	22.824	22.847	22.871	22.895	22.919	22.942	22.966	1020
1030	22.966	22.990	23.013	23.037	23.061	23.084	23.108	23.132	23.155	23.179	23.203	1030
1040	23.203	23.226	23.250	23.274	23.297	23.321	23.345	23.368	23.392	23.416	23.439	1040
1050	23.439	23.463	23.487	23.510	23.534	23.558	23.581	23.605	23.629	23.652	23.676	1050
1060	23.676	23.700	23.723	23.747	23.771	23.794	23.818	23.842	23.865	23.889	23.913	1060
1070	23.913	23.936	23.960	23.984	24.007	24.031	24.055	24.078	24.102	24.126	24.149	1070
1080	24.149	24.173	24.197	24.220	24.244	24.267	24.291	24.315	24.338	24.362	24.386	1080
1090	24.386	24.409	24.433	24.457	24.480	24.504	24.527	24.551	24.575	24.598	24.622	1090
1100	24.622	24.646	24.669	24.693	24.717	24.740	24.764	24.787	24.811	24.835	24.858	1100
1110	24.858	24.882	24.905	24.929	24.953	24.976	25.000	25.024	25.047	25.071	25.094	1110
1120	25.094	25.118	25.142	25.165	25.189	25.212	25.236	25.260	25.283	25.307	25.330	1120
1130	25.330	25.354	25.377	25.401	25.425	25.448	25.472	25.495	25.519	25.543	25.566	1130
1140	25.566	25.590	25.613	25.637	25.660	25.684	25.708	25.731	25.755	25.778	25.802	1140
1150	25.802	25.825	25.849	25.873	25.896	25.920	25.943	25.967	25.990	26.014	26.037	1150
1160	26.037	26.061	26.084	26.108	26.132	26.155	26.179	26.202	26.226	26.249	26.273	1160
1170	26.273	26.296	26.320	26.343	26.367	26.390	26.414	26.437	26.461	26.484	26.508	1170
1180	26.508	26.532	26.555	26.579	26.602	26.626	26.649	26.673	26.696	26.720	26.743	1180
1190	26.743	26.767	26.790	26.814	26.837	26.861	26.884	26.907	26.931	26.954	26.978	1190

Thermocouple Reference Tables

Thermoelectric Voltage in milliVolts

Reference Tables
N.I.S.T Rev. ITS-90

K-TYPE THERMOCOUPLE - TEMPERATURE IN DEGREES "F" WITH REFERENCE JUNCTION AT 32°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
1200	26.978	27.001	27.025	27.048	27.072	27.095	27.119	27.142	27.166	27.189	27.213	1200
1210	27.213	27.236	27.259	27.283	27.306	27.330	27.353	27.377	27.400	27.424	27.447	1210
1220	27.447	27.471	27.494	27.517	27.541	27.564	27.588	27.611	27.635	27.658	27.681	1220
1230	27.681	27.705	27.728	27.752	27.775	27.798	27.822	27.845	27.869	27.892	27.915	1230
1240	27.915	27.939	27.962	27.986	28.009	28.032	28.056	28.079	28.103	28.126	28.149	1240
1250	28.149	28.173	28.196	28.219	28.243	28.266	28.289	28.313	28.336	28.360	28.383	1250
1260	28.383	28.406	28.430	28.453	28.476	28.500	28.523	28.546	28.570	28.593	28.616	1260
1270	28.616	28.640	28.663	28.686	28.710	28.733	28.756	28.780	28.803	28.826	28.849	1270
1280	28.849	28.873	28.896	28.919	28.943	28.966	28.989	29.013	29.036	29.059	29.082	1280
1290	29.082	29.106	29.129	29.152	29.176	29.199	29.222	29.245	29.269	29.292	29.315	1290
1300	29.315	29.338	29.362	29.385	29.408	29.431	29.455	29.478	29.501	29.524	29.548	1300
1310	29.548	29.571	29.594	29.617	29.640	29.664	29.687	29.710	29.733	29.757	29.780	1310
1320	29.780	29.803	29.826	29.849	29.873	29.896	29.919	29.942	29.965	29.989	30.012	1320
1330	30.012	30.035	30.058	30.081	30.104	30.128	30.151	30.174	30.197	30.220	30.243	1330
1340	30.243	30.267	30.290	30.313	30.336	30.359	30.382	30.405	30.429	30.452	30.475	1340
1350	30.475	30.498	30.521	30.544	30.567	30.590	30.613	30.637	30.660	30.683	30.706	1350
1360	30.706	30.729	30.752	30.775	30.798	30.821	30.844	30.868	30.891	30.914	30.937	1360
1370	30.937	30.960	30.983	31.006	31.029	31.052	31.075	31.098	31.121	31.144	31.167	1370
1380	31.167	31.190	31.213	31.236	31.260	31.283	31.306	31.329	31.352	31.375	31.398	1380
1390	31.398	31.421	31.444	31.467	31.490	31.513	31.536	31.559	31.582	31.605	31.628	1390
1400	31.628	31.651	31.674	31.697	31.720	31.743	31.766	31.789	31.812	31.834	31.857	1400
1410	31.857	31.880	31.903	31.926	31.949	31.972	31.995	32.018	32.041	32.064	32.087	1410
1420	32.087	32.110	32.133	32.156	32.179	32.202	32.224	32.247	32.270	32.293	32.316	1420
1430	32.316	32.339	32.362	32.385	32.408	32.431	32.453	32.476	32.499	32.522	32.545	1430
1440	32.545	32.568	32.591	32.614	32.636	32.659	32.682	32.705	32.728	32.751	32.774	1440
1450	32.774	32.796	32.819	32.842	32.865	32.888	32.911	32.933	32.956	32.979	33.002	1450
1460	33.002	33.025	33.047	33.070	33.093	33.116	33.139	33.161	33.184	33.207	33.230	1460
1470	33.230	33.253	33.275	33.298	33.321	33.344	33.366	33.389	33.412	33.435	33.458	1470
1480	33.458	33.480	33.503	33.526	33.548	33.571	33.594	33.617	33.639	33.662	33.685	1480
1490	33.685	33.708	33.730	33.753	33.776	33.798	33.821	33.844	33.867	33.889	33.912	1490
1500	33.912	33.935	33.957	33.980	34.003	34.025	34.048	34.071	34.093	34.116	34.139	1500
1510	34.139	34.161	34.184	34.207	34.229	34.252	34.275	34.297	34.320	34.343	34.365	1510
1520	34.365	34.388	34.410	34.433	34.456	34.478	34.501	34.524	34.546	34.569	34.591	1520
1530	34.591	34.614	34.637	34.659	34.682	34.704	34.727	34.750	34.772	34.795	34.817	1530
1540	34.817	34.840	34.862	34.885	34.908	34.930	34.953	34.975	34.998	35.020	35.043	1540
1550	35.043	35.065	35.088	35.110	35.133	35.156	35.178	35.201	35.223	35.246	35.268	1550
1560	35.268	35.291	35.313	35.336	35.358	35.381	35.403	35.426	35.448	35.471	35.493	1560
1570	35.493	35.516	35.538	35.560	35.583	35.605	35.628	35.650	35.673	35.695	35.718	1570
1580	35.718	35.740	35.763	35.785	35.807	35.830	35.852	35.875	35.897	35.920	35.942	1580
1590	35.942	35.964	35.987	36.009	36.032	36.054	36.076	36.099	36.121	36.144	36.166	1590
1600	36.166	36.188	36.211	36.233	36.256	36.278	36.300	36.323	36.345	36.367	36.390	1600
1610	36.390	36.412	36.434	36.457	36.479	36.501	36.524	36.546	36.568	36.591	36.613	1610
1620	36.613	36.635	36.658	36.680	36.702	36.725	36.747	36.769	36.792	36.814	36.836	1620
1630	36.836	36.859	36.881	36.903	36.925	36.948	36.970	36.992	37.014	37.037	37.059	1630
1640	37.059	37.081	37.104	37.126	37.148	37.170	37.193	37.215	37.237	37.259	37.281	1640
1650	37.281	37.304	37.326	37.348	37.370	37.393	37.415	37.437	37.459	37.481	37.504	1650
1660	37.504	37.526	37.548	37.570	37.592	37.615	37.637	37.659	37.681	37.703	37.725	1660
1670	37.725	37.748	37.770	37.792	37.814	37.836	37.858	37.881	37.903	37.925	37.947	1670
1680	37.947	37.969	37.991	38.013	38.036	38.058	38.080	38.102	38.124	38.146	38.168	1680
1690	38.168	38.190	38.212	38.235	38.257	38.279	38.301	38.323	38.345	38.367	38.389	1690
1700	38.389	38.411	38.433	38.455	38.477	38.499	38.522	38.544	38.566	38.588	38.610	1700
1710	38.610	38.632	38.654	38.676	38.698	38.720	38.742	38.764	38.786	38.808	38.830	1710
1720	38.830	38.852	38.874	38.896	38.918	38.940	38.962	38.984	39.006	39.028	39.050	1720
1730	39.050	39.072	39.094	39.116	39.138	39.160	39.182	39.204	39.226	39.248	39.270	1730
1740	39.270	39.292	39.314	39.335	39.357	39.379	39.401	39.423	39.445	39.467	39.489	1740
1750	39.489	39.511	39.533	39.555	39.577	39.599	39.620	39.642	39.664	39.686	39.708	1750
1760	39.708	39.730	39.752	39.774	39.796	39.817	39.839	39.861	39.883	39.905	39.927	1760
1770	39.927	39.949	39.970	39.992	40.014	40.036	40.058	40.080	40.101	40.123	40.145	1770
1780	40.145	40.167	40.189	40.211	40.232	40.254	40.276	40.298	40.320	40.341	40.363	1780
1790	40.363	40.385	40.407	40.429	40.450	40.472	40.494	40.516	40.537	40.559	40.581	1790
1800	40.581	40.603	40.624	40.646	40.668	40.690	40.711	40.733	40.755	40.777	40.798	1800
1810	40.798	40.820	40.842	40.864	40.885	40.907	40.929	40.950	40.972	40.994	41.015	1810
1820	41.015	41.037	41.059	41.081	41.102	41.124	41.146	41.167	41.189	41.211	41.232	1820
1830	41.232	41.254	41.276	41.297	41.319	41.341	41.362	41.384	41.405	41.427	41.449	1830
1840	41.449	41.470	41.492	41.514	41.535	41.557	41.578	41.600	41.622	41.643	41.665	1840
1850	41.665	41.686	41.708	41.730	41.751	41.773	41.794	41.816	41.838	41.859	41.881	1850
1860	41.881	41.902	41.924	41.945	41.967	41.988	42.010	42.032	42.053	42.075	42.096	1860
1870	42.096	42.118	42.139	42.161	42.182	42.204	42.225	42.247	42.268	42.290	42.311	1870
1880	42.311	42.333	42.354	42.376	42.397	42.419	42.440	42.462	42.483	42.505	42.526	1880
1890	42.526	42.548	42.569	42.591	42.612	42.633	42.655	42.676	42.698	42.719	42.741	1890
1900	42.741	42.762	42.783	42.805	42.826	42.848	42.869	42.891	42.912	42.933	42.955	1900
1910	42.955	42.976	42.998	43.019	43.040	43.062	43.083	43.104	43.126	43.147	43.169	1910
1920	43.169	43.190	43.211	43.233	43.254	43.275	43.297	43.318	43.339	43.361	43.382	1920
1930	43.382	43.403	43.425	43.446	43.467	43.489	43.510	43.531	43.552	43.574	43.595	1930
1940	43.595	43.616	43.638	43.659	43.680	43.701	43.723	43.744	43.765	43.787	43.808	1940
1950	43.808	43.829	43.850	43.872	43.893	43.914	43.935	43.957	43.978	43.999	44.020	1950
1960	44.020	44.041	44.063	44.084	44.105	44.126	44.147	44.169	44.190	44.211	44.232	1960
1970	44.232	44.253	44.275	44.296	44.317	44.338	44.359	44.380	44.402	44.423	44.444	1970
1980	44.444	44.465	44.486	44.507	44.528	44.550	44.571	44.592	44.613	44.634	44.655	1980
1990	44.655	44.676	44.697	44.719	44.740	44.761	44.782	44.803	44.824	44.845	44.866	1990
2000	44.866	44.887	44.908	44.929	44.950	44.971	44.992	45.014	45.035	45.056	45.077	2000
2010	45.077	45.098	45.119	45.140	45.161	45.182	45.203	45.224	45.245	45.266	45.287	2010
2020	45.287	45.308	45.329	45.350	45.371	45.392	45.413	45.434	45.455	45.476	45.497	2020
2030	45.497	45.518	45.539	45.560	45.580	45.601	45.622	45.643	45.664	45.685	45.706	2030
2040	45.706	45.727	45.748	45.769	45.790	45.811	45.832	45.852	45.873	45.894	45.915	2040

Thermocouple Reference Tables

Thermoelectric Voltage in milliVolts

K-TYPE THERMOCOUPLE - TEMPERATURE IN DEGREES "F" WITH REFERENCE JUNCTION AT 32°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
2050	45.915	45.936	45.957	45.978	45.999	46.019	46.040	46.061	46.082	46.103	46.124	2050
2060	46.124	46.145	46.165	46.186	46.207	46.228	46.249	46.269	46.290	46.311	46.332	2060
2070	46.332	46.353	46.373	46.394	46.415	46.436	46.457	46.477	46.498	46.519	46.540	2070
2080	46.540	46.560	46.581	46.602	46.623	46.643	46.664	46.685	46.706	46.726	46.747	2080
2090	46.747	46.768	46.789	46.809	46.830	46.851	46.871	46.892	46.913	46.933	46.954	2090
2100	46.954	46.975	46.995	47.016	47.037	47.057	47.078	47.099	47.119	47.140	47.161	2100
2110	47.161	47.181	47.202	47.223	47.243	47.264	47.284	47.305	47.326	47.346	47.367	2110
2120	47.367	47.387	47.408	47.429	47.449	47.470	47.490	47.511	47.531	47.552	47.573	2120
2130	47.573	47.593	47.614	47.634	47.655	47.675	47.696	47.716	47.737	47.757	47.778	2130
2140	47.778	47.798	47.819	47.839	47.860	47.880	47.901	47.921	47.942	47.962	47.983	2140
2150	47.983	48.003	48.024	48.044	48.065	48.085	48.105	48.126	48.146	48.167	48.187	2150
2160	48.187	48.208	48.228	48.248	48.269	48.289	48.310	48.330	48.350	48.371	48.391	2160
2170	48.391	48.411	48.432	48.452	48.473	48.493	48.513	48.534	48.554	48.574	48.595	2170
2180	48.595	48.615	48.635	48.656	48.676	48.696	48.717	48.737	48.757	48.777	48.798	2180
2190	48.798	48.818	48.838	48.859	48.879	48.899	48.919	48.940	48.960	48.980	49.000	2190
2200	49.000	49.021	49.041	49.061	49.081	49.101	49.122	49.142	49.162	49.182	49.202	2200
2210	49.202	49.223	49.243	49.263	49.283	49.303	49.323	49.344	49.364	49.384	49.404	2210
2220	49.404	49.424	49.444	49.465	49.485	49.505	49.525	49.545	49.565	49.585	49.605	2220
2230	49.605	49.625	49.645	49.666	49.686	49.706	49.726	49.746	49.766	49.786	49.806	2230
2240	49.806	49.826	49.846	49.866	49.886	49.906	49.926	49.946	49.966	49.986	50.006	2240
2250	50.006	50.026	50.046	50.066	50.086	50.106	50.126	50.146	50.166	50.186	50.206	2250
2260	50.206	50.226	50.246	50.266	50.286	50.306	50.326	50.346	50.366	50.385	50.405	2260
2270	50.405	50.425	50.445	50.465	50.485	50.505	50.525	50.545	50.564	50.584	50.604	2270
2280	50.604	50.624	50.644	50.664	50.684	50.703	50.723	50.743	50.763	50.783	50.802	2280
2290	50.802	50.822	50.842	50.862	50.882	50.901	50.921	50.941	50.961	50.981	51.000	2290
2300	51.000	51.020	51.040	51.060	51.079	51.099	51.119	51.139	51.158	51.178	51.198	2300
2310	51.198	51.217	51.237	51.257	51.276	51.296	51.316	51.336	51.355	51.375	51.395	2310
2320	51.395	51.414	51.434	51.453	51.473	51.493	51.512	51.532	51.552	51.571	51.591	2320
2330	51.591	51.611	51.630	51.650	51.669	51.689	51.708	51.728	51.748	51.767	51.787	2330
2340	51.787	51.806	51.826	51.845	51.865	51.885	51.904	51.924	51.943	51.963	51.982	2340
2350	51.982	52.002	52.021	52.041	52.060	52.080	52.099	52.119	52.138	52.158	52.177	2350
2360	52.177	52.197	52.216	52.235	52.255	52.274	52.294	52.313	52.333	52.352	52.371	2360
2370	52.371	52.391	52.410	52.430	52.449	52.468	52.488	52.507	52.527	52.546	52.565	2370
2380	52.565	52.585	52.604	52.623	52.643	52.662	52.681	52.701	52.720	52.739	52.759	2380
2390	52.759	52.778	52.797	52.817	52.836	52.855	52.875	52.894	52.913	52.932	52.952	2390
2400	52.952	52.971	52.990	53.010	53.029	53.048	53.067	53.087	53.106	53.125	53.144	2400
2410	53.144	53.163	53.183	53.202	53.221	53.240	53.260	53.279	53.298	53.317	53.336	2410
2420	53.336	53.355	53.375	53.394	53.413	53.432	53.451	53.470	53.490	53.509	53.528	2420
2430	53.528	53.547	53.566	53.585	53.604	53.623	53.643	53.662	53.681	53.700	53.719	2430
2440	53.719	53.738	53.757	53.776	53.795	53.814	53.833	53.852	53.871	53.890	53.910	2440
2450	53.910	53.929	53.948	53.967	53.986	54.005	54.024	54.043	54.062	54.081	54.100	2450
2460	54.100	54.119	54.138	54.157	54.176	54.195	54.214	54.233	54.252	54.271	54.289	2460
2470	54.289	54.308	54.327	54.346	54.365	54.384	54.403	54.422	54.441	54.460	54.479	2470
2480	54.479	54.498	54.517	54.536	54.554	54.573	54.592	54.611	54.630	54.649	54.668	2480
2490	54.668	54.687	54.705	54.724	54.743	54.762	54.781	54.800	54.819	54.837	54.856	2490
2500	54.856	54.875	54.894									

Resistance Values of HANNA Thermistor Sensors

HI 765 Series

The following table shows various ambient temperatures and the corresponding resistance values of our HI 765 sensor series in the -50.0 to +170.0°C range

AMBIENT TEMPERATURE (°C)	RESISTANCE (ohm)	AMBIENT TEMPERATURE (°C)	RESISTANCE (ohm)
-50.0	537.2	60.0	1275.3
-40.0	588.2	70.0	1361.9
-30.0	641.9	80.0	1450.2
-20.0	699.5	90.0	1542.0
-10.0	760.9	100.0	1637.2
0.0	825.0	110.0	1734.9
10.0	891.9	120.0	1835.9
20.0	962.4	130.0	1939.4
25.0	999.1	140.0	2045.2
30.0	1036.7	150.0	2154.3
40.0	1112.6	160.0	2267.5
50.0	1193.1	170.0	2380.2

HI 762 Series

The following table shows various ambient temperatures and the corresponding resistance values of our HI 762 sensor series in the -50.0 to +140.0°C range

AMBIENT TEMPERATURE (°C)	RESISTANCE (ohm)	AMBIENT TEMPERATURE (°C)	RESISTANCE (ohm)
-50.0	670100	50.0	3603
-40.0	336500	60.0	2488
-30.0	177000	70.0	1752
-20.0	97070	80.0	1258
-10.0	55330	90.0	917.7
0.0	32650	100.0	680.0
10.0	19900	110.0	511.2
20.0	12490	120.0	389.3
25.0	10000	130.0	300.9
30.0	8057	140.0	234.8
40.0	5327		



"The Calibration Check™ option on the HI 9026 is my assurance that measurements are accurate..."

MR. M VAN NOORT
PROCESS ENGINEER
Rijnplant
the Netherlands

Mr. van Noort uses the HI 9026 combined with the FC 200B electrode to take more than 200 measurements each week. They measure directly in soil and 'plugs' by using the FC 200B, only a small hole is necessary, to assure minimal damage.

CONTENTS

COD: CHEMICAL OXYGEN DEMAND

NAVIGATION

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HI 83214

Wastewater COD Meter

Designed for Wastewater Analysis



In the Field ...

An Essential Environmental Tool

The new HI 83214 multi-parameter photometer is a compact instrument featuring different ranges and methods, suitable for a wide range of applications.

HI 83214 is designed and built to perform COD analysis in accordance with EPA 410.4 and ISO 15705:2002 standards.

Ensuring accurate and repeatable results, it is the ideal tool for documenting waste treatment processes.

Besides the fundamental parameter of COD, HI 83214 also measures total ammonia nitrogen and total reactive phosphorus.

The instrument can be connected to a PC through an RS232 serial port and stored measurements can be downloaded using HANNA HI 92000 software.

HI 83214, allows a complete wastewater analysis in a single powerful instrument.

- *Easy COD measurement*

  HI 83214 multi-parameter photometer is pre-calibrated to measure COD levels at three ranges at the touch of a key pad. Simply use the scroll button to select the desired range and begin reading. HI 83214 automatically selects the correct wavelength for the chosen range.

- *Outstanding measurement quality*

  HI 83214 employs an advanced optical system, assuring high accuracy measurements throughout the entire range. The optics combine the power of a miniature light source with the precision of a narrow band interference filter.

- *Save space in your laboratory.*

  The compact size of the HI 83214 photometer allows the user to eliminate the clutter of bulkier and more costly spectrophotometers currently being used. Measuring 23 x 17 x 7 cm and weighing less than 700 grams, HI 83214 can be transported with ease from place to place.

Measurement Procedure

The entire COD measurement process has been designed for ease of use by personnel at any skill level. In addition, all Hanna equipment has been designed for maximum safety during handling and testing with a minimum amount of waste. Even a novice can safely run accurate COD tests in just 3 simple steps:



1. Fill the pre-dosed vial with the sample



2. Place the vial in the HI 839800 reactor (sold separately) and set the timer



3. Place the vial in the HANNA HI 83214 and read the results

HANNA instruments

With Great Products, Come Great Results™

HI 83214

Wastewater COD Meter

Designed for Wastewater Analysis

ORDERING INFORMATION

HI 83214-01 (115V) and **HI 83214-02** (230V) is supplied with 5 glass cuvets, batteries, 12 Vdc adapter and instructions

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

The following accessories and spare parts have been specially designed for COD analysis to make your measurements simpler and safer.

HI 3898 Test kit for fast analysis of chloride concentration
HI 839800-01 HANNA instruments® reactor (115 Vac)
HI 839800-02 HANNA instruments® reactor (230 Vac)
HI 151-00 Thermometer with stainless steel probe
HI 710005 110 Vac / 12 Vdc power adapter
HI 710006 220 Vac / 12 Vdc power adapter
HI 731310 9V battery (10)
HI 731311 Cuvets with caps for HI 83214
HI 731318 Tissue for wiping cuvets (4)
HI 731321 Measurement cuvet (4)
HI 731325N Cuvet cap (4)
HI 731340 200 µL automatic pipette
HI 731341 1000 µL automatic pipette
HI 731342 2000 µL automatic pipette
HI 731350 Tips for 200 µL automatic pipette (25)
HI 731351 Tip for 1000 µL automatic pipette (25)
HI 731352 Tip for 2000 µL automatic pipette (4)
HI 740216 Test tube cooling rack (25 tube capacity)
HI 740217 Laboratory bench safety shield
HI 92000 Windows® compatible application software
HI 920010 Serial cable for PC connection (9 pin)



... or in the lab.

SPECIFICATIONS	HI 83214
Light Source	3 tungsten lamps with narrow-band interference filters at 420/525/610 nm
Light Detector	3 silicon photocells
Power Supply	2 x 9V batteries or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight	230 x 165 x 70 mm (9.1 x 6.5 x 2.6") / 640 g (1.4 lbs.)

PARAMETER	RANGE	METHOD	REAGENT CODE
Ammonia, LR	0.00 to 3.00 mg/L	Nessler	HI 93764A-25
Ammonia, HR	0 to 100 mg/L	Nessler	HI 93764B-25
Chlorine, free	0.00 to 5.00 mg/L	DPD	HI 93701-01, HI 93701-03
Chlorine, total	0.00 to 5.00 mg/L	DPD	HI 93711-01, HI 93711-03
Nitrate	0.0 to 30.0 mg/L	Chromotropic acid	HI 93766-50
Nitrogen, total	0.0 to 25.0 mg/L	Chromotropic acid	HI 93767A-50
Nitrogen, total HR	10 to 150 mg/L	Chromotropic acid	HI 93767B-50
COD LR, EPA*	0 to 150 mg/L	Dichromate	HI 93754A-25
COD MR, EPA*	0 to 1500 mg/L	Dichromate	HI 93754B-25
COD HR	0 to 15000 mg/L	Dichromate	HI 93754C-25
COD LR, Mercury-free†	0 to 150 mg/L	Dichromate, mercury-free	HI 93754D-25
COD MR, Mercury-free†	0 to 1500 mg/L	Dichromate, mercury-free	HI 93754E-25
COD LR, ISO**	0 to 150 mg/L	Dichromate	HI 93754F-25
COD MR, ISO**	0 to 1000 mg/L	Dichromate	HI 93754G-25
Phosphorus, reactive	0.00 to 5.00 mg/L	Ascorbic acid	HI 93758A-50
Phosphorus, acid hydrolyzable	0.00 to 5.00 mg/L	Ascorbic acid	HI 93758B-50
Phosphorus, total	0.00 to 3.50 mg/L	Ascorbic acid	HI 93758C-50
Phosphorus, reactive HR	0.0 to 100.0 mg/L	Vanadomolybdophosphoric acid	HI 93763A-50
Phosphorus, total HR	0.0 to 100.0 mg/L	Vanadomolybdophosphoric acid	HI 93763B-50



HI 731340 200 µL Automatic Pipette

Notes:
* Method with chromium-sulfuric acid is officiallly recognized by EPA for wastewater analysis.
** The HI 93754F-25 and HI 93754G-25 method follows the official method ISO 15705.
† This method is recommended for general purpose analysis with no chloride interference

HI 93754

COD Certified Reagents

in 3 Measurement Ranges



Certified COD Reagents

HANNA COD reagents are available in the following formats:

CODE	METHOD	RANGE
HI 93754A-25	EPA*	0 to 150 mg/L
HI 93754B-25	EPA*	0 to 1500 mg/L
HI 93754C-25		0 to 15000 mg/L
HI 93754D-25	Mercury-free***	0 to 150 mg/L
HI 93754E-25	Mercury-free***	0 to 1500 mg/L
HI 93754F-25	ISO**	0 to 150 mg/L
HI 93754G-25	ISO**	0 to 1000 mg/L

Each box of 25 vials is supplied with a HANNA certificate of quality.

The reagents are traceable to NIST SRM® 930.

HANNA also produces mercury-free reagents to be used for analyzing samples without chloride.



- *Three measurement ranges to satisfy each need*

  As COD levels vary depending on the application and process measuring points, HANNA offers reagents to cover three separate ranges. Simply choose the best range for your application:

  low range: 0 to 150 mg/L O_2

  medium range: 0 to 1500 mg/L or 0 to 1000 mg/L O_2

  high range: 0 to 15000 mg/L O_2

- *Accurate and repeatable measurements*

  HANNA COD reagents have been developed in accordance with Standard Methods 5220D, USEPA 410.4 and ISO15705:2002 methods.

- *Pre-dosed vials*

  HANNA vial contains approx. 3 mL of pre-dosed reagent. The operator just needs to add a small quantity of the sample - 2 mL for LR and MR, and 0.2 mL for HR analysis.

- *Quick and accurate measurements*

  With pre-dosed vials test preparation time is dramatically reduced. There is no time-consuming reagent preparation procedure or glassware cleaning.

- *Safe reagents*

  HANNA COD reagents are safe for operators and the environment. Vials and caps have been designed to avoid accidental reagent spills. Thanks to the pre-dosed reagents, the amount of chemicals is minimized.



HI 740216 Test Tube Cooling Rack

Notes:

* Method with chromium-sulfuric acid is officiallly recognized by EPA for wastewater analysis.

** The HI 93754F-25 and HI 93754G-25 method follows the official method ISO 15705.

*** This method is recommended for general purpose analysis with no chloride interferance.

HI 839800

COD Test Tube Heater

with 25 Vial Capacity

Accuracy and Safety

The HI 839800 COD reactor is constructed of durable materials. The aluminum block incorporates a 25-vial capacity and a well for a reference temperature probe.

The HI 839800 COD reactor is an easy to use test tube heater. Its well-marked user interface provides intuitive operation. The reactor is equipped with two predefined temperature settings: 150° and 105°C. COD and Total Phosphorus digestions are conducted at 150°C, and Total Nitrogen digestions are at the 105°C.

In addition, the HI 839800 has 3 LED's for visual indication. A green LED indicates power, a blinking red LED warns the user of a hot heater block (above 50°C), and a yellow LED indicates heating.

A three-hour countdown timer is also incorporated to control timed digestions. When the countdown timer expires, a beep will sound and the heating element will turn off.

The reactor contains a thermal fuse that prevents overheating by turning off the heating element.

The temperature of the block is continuously displayed on the LCD even when there is no active temperature program running.



Low Temperature: Appears when the block is warming up. It alerts the user that the temperature is below the set value.



High Temperature: Appears when the block is warming up. It alerts the user that the temperature is above the set value.



Countdown Timer: Shows time remaining until the heating element shuts off.



Outer casing stays cool to the touch!

SPECIFICATIONS	HI 839800
Temperature of Reaction	105°C or 150°C (221°F or 302°F)
Temperature Stability	±0.5°C
Temperature Range	-10°C to 160°C
Capacity	25 vials (dia 16 x 100 mm), 1 receptacle for a stainless steel reference thermometer
Accuracy	±2°C (@ 25°C/77°F)
Warm-up Time	10-15 minutes, depending on selected temperature
Operating Mode	timed (0 to 180 minutes) or infinity mode
Block	aluminum
Environment	5 to 50°C (41 to 122°F)
Power Supply (fuse protected)	HI 839800-01: 115 Vac; 60 Hz; 250 W HI 839800-02: 230 Vac; 50 Hz; 250 W
Dimensions	190 x 300 x 95 mm (7.5 x 11.8 x 3.7")
Weight	approx. 4.8 kg (10.6 lb.)



HI 740217 Lab Safety Shield

ORDERING INFORMATION

HI 839800-01 (115 Vac) and **HI 839800-02** (230 Vac) are supplied with power cable and instructions.

ACCESSORIES

HI 740216	Test tube cooling rack (25 tube capacity)
HI 740217	Laboratory bench safety shield
HI 151-00	Electronic thermometer for reactor (°C)
HI 151-01	Electronic thermometer for reactor (°F)

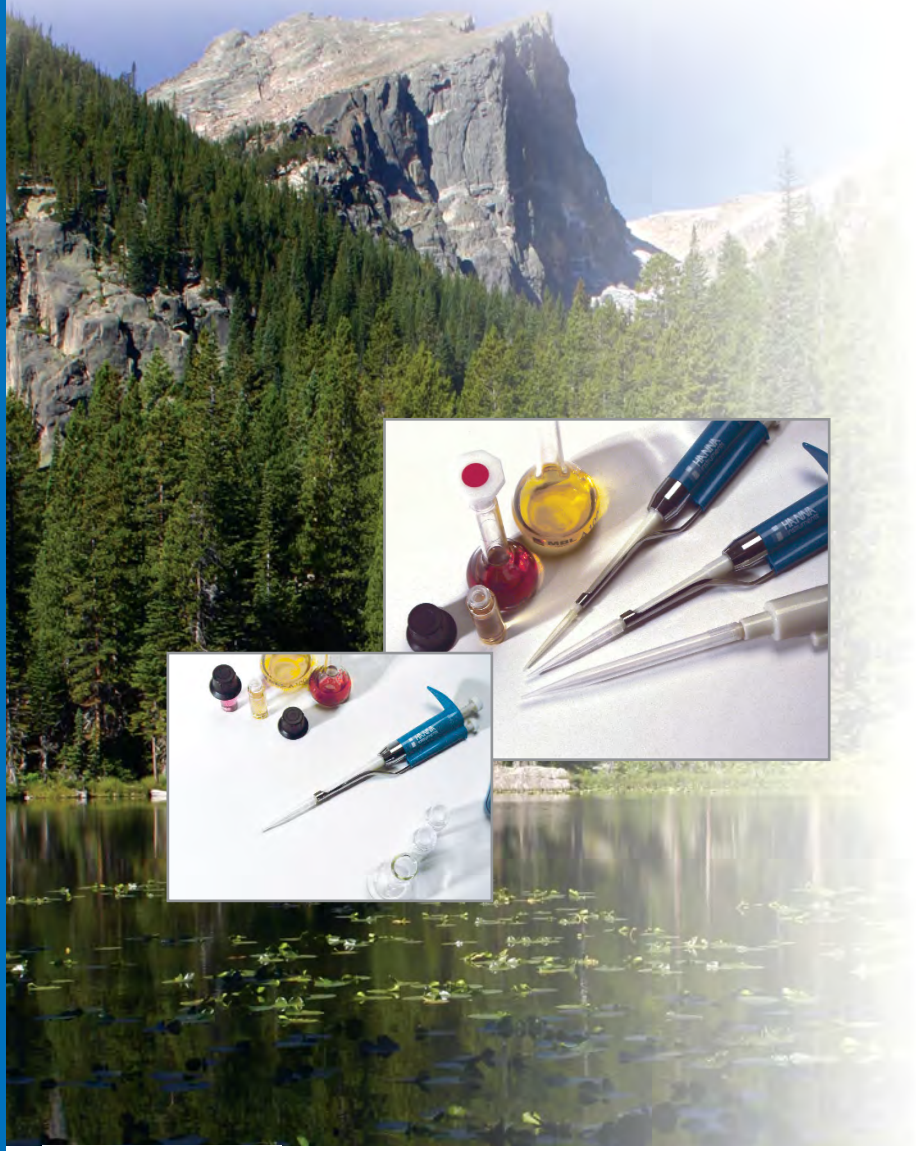
COD Accessories

Specially Designed for our COD Instruments

Tailor-Made Accessories

The following accessories and spare parts have been specially designed for COD analysis to make your measurements simpler and safer.

HI 839800-01	HANNA instruments® reactor (115 Vac)
HI 839800-02	HANNA instruments® reactor (230 Vac)
HI 151-00	Thermometer with stainless steel probe
HI 710005	110 Vac / 12 Vdc power adapter
HI 710006	220 Vac / 12 Vdc power adapter
HI 731310	9V battery (10)
HI 731311	Cuvets with caps for HI 83214
HI 731318	Tissues for wiping cuvets (4)
HI 731321	Measurement cuvets (4)
HI 731325N	Cuvet caps (4)
HI 731340	200 µL automatic pipette
HI 731341	1000 µL automatic pipette
HI 731342	2000 µL automatic pipette
HI 731350	Tips for 200 µL automatic pipette (25)
HI 731351	Tips for 1000 µL automatic pipette (25)
HI 731352	Tips for 2000 µL automatic pipette (4)
HI 740216	Test tube cooling rack (25 tube capacity)
HI 740217	Laboratory bench safety shield
HI 740219	COD test tube adapter for HI 83099
HI 92000	Windows® compatible application software
HI 920010	Serial cable for PC connection (9 pin)
HI 93703-50	Cuvet cleaning solution, 230 mL



HI 3898

Chloride Test Kit

Used in conjunction with COD

Quick Chloride Tests

The HI 3898 test kit, developed according to the ISO 15705:2002 method, determines chloride concentration.

This very important test is recommended by ISO, since an excessive presence of chloride can interfere with the COD analysis.

The test gives a fast YES/NO reply to the question if chloride will interfere with the COD analysis. If chloride concentration is greater than the official maximum level, the solution turns yellow and the sample needs to be diluted before performing the COD test, otherwise if the solution is orange-brown, the sample doesn't need to be diluted.

The maximum level allowed is 1000 ppm of Cl^- following ISO methods, or 2000 ppm of Cl^- for US EPA, APHA, AWWA and WEF methods.



SPECIFICATIONS	HI 3898
Range	1000 ppm Cl^- (ISO) 2000 ppm Cl^- (EPA)
Analysis Method	visual evaluation
Sample Volume	2 mL
Number of Tests	100
Dimensions	120 x 110 x 90 mm (4.7 x 4.3 x 3.5")
Weight	200 g (7.0 oz.)

ORDERING INFORMATION

HI 3898 is supplied with HI 3898-0 Reagent 25 mL (4), Chloride Indicator 7 mL(1), glass cuvet with plastic stopper (1) and calibrated syringes of 1.0 ml with tip (2).

SOLUTIONS

HI 93703-50 Cuvet cleaning solution (250 mL)

ACCESSORIES

HI 731342	2000 µL automatic pipet
HI 731352	Tips for 2000 µL automatic pipet (4)
HI 740142	1 mL graduated syringe
HI 740143	1 mL graduated syringes (6)
HI 740144	Tips for 1 mL graduated syringes (6)
HI 731318	Tissues for wiping cuvets (4)
HI 731331	Large cuvets (4)
HI 731335	Cap for large cuvets (4)

Chemical Oxygen Demand



p 2.4

Product Spotlights

A Complete Laboratory for Wastewater Analysis

The HI 83224 is a multiparameter bench colorimeter that has 15 methods for measurement. It features a powerful interactive user support menu system that assists you before, during and after analysis.

An exciting feature of the HI 83224 is it's automatic recognition of bar coded samples. This advanced meter scans each vial inserted into it's chamber and automatically identifies the sample and range.



p 2.8



p 2.10

A Complete Laboratory at Your Fingertips

This compact photometer operates in three different ranges to cover virtually every COD application: 0-150 mg/L, 0-1500 mg/L and 0-15000 mg/L. The HI 83099 meets the design requirements of USEPA 410.4, guaranteeing high quality measurements suited for reporting purposes.

An Essential Environmental Tool

The HI 83214 multi-parameter photometer is a compact instrument with ranges and methods tailored to the environmental sector.

HI 83214 is designed and built to perform COD analysis in accordance with EPA 410.4 and ISO 15705:2002 standards.



p 2.13



p 2.12

Accuracy and Safety

HANNA The HI 839800 thermo-reactor is constructed of durable materials with a vial capacity to perform up to 25 digestions simultaneously. The reactor is equipped with 6 predifined and 2 user defined temperature profiles. In addition, HI 839800 features power and heat LED indicators and an LCD display.

Certified COD Reagents

HANNA COD reagents are available in boxes of 25 vials and is supplied with a HANNA certificate of quality.



Wastewater needs to be monitored closely to prevent environmental pollution and human illness.

Oxygen Demand and COD

Chemical Oxygen Demand (COD) is defined as the amount of specified oxygen that reacts with a sample under controlled conditions. The quantity of oxygen consumed is expressed in terms of its oxygen equivalent: mg/L of O_2.

The HANNA COD method is based on the well established closed dichromate-reflux colorimetric method.

Moreover the US Environmental Protection Agency (EPA) specifies that the dichromate reflux method is the **only method acceptable for reporting purposes**. The advantage in using this method includes certifiable results as well as high accuracy.

COD Testing Applications

COD is used as a measurement of pollutants. It is normally measured in both municipal and industrial wastewater treatment plants and gives an indication of the efficiency of the treatment process. COD is measured on both influent and effluent water. The efficiency of the treatment process is normally expressed as *COD Removal*, measured as a percentage of the organic matter purified during the cycle. COD has further applications in power plant operations, chemical manufacturing, commercial laundries, pulp and paper mills, agriculture and animal waste runoff, environmental studies and general education. HANNA equipment can be used in the laboratory or for on-site testing. The measurement procedure has been designed for ease of use by personnel at any skill level.

Monitoring examples:

TEST NO	COD INFLUENT	COD EFFLUENT	COD REMOVAL
1	1214	451	62%
2	948	328	63%
3	1341	307	77%

Beyond COD: Nitrogen and Phosphorus

The goal in Wastewater Treatment is not only COD reduction, but also to control Nitrogen and Phosphorus, which are responsible for eutrophication phenomena in natural environments. COD, Nitrogen, and Phosphorus control are performed not only to obey environmental protection laws, but also to optimize plant costs.

Effective monitoring and control of parameters such as ammonia, nitrate, total nitrogen and total reactive phosphorus allow plant managers to profile and improve the health of aquatic ecosystems. By accurately monitoring levels of each specific pollutant, operational parameters can be adjusted to maintain high efficiency of biodegradation treatments while also minimizing costs.

Nitrogen

When a treatment plant uses processes like nitrification and denitrification, it is important to monitor and maintain the equilibrium between Ammonia Nitrogen, Nitrate and Total Nitrogen during the bio-treatment. The nitrogen level is important because it relates to the quantity of oxygen provided in the nitrification area. Ammonia is also controlled because it can become very toxic for the bacteria responsible for denitrification.

Phosphorus

Nitrification

$$NH_4^+ + 3/2\ O_2 \xrightarrow{\text{nitrosomonas}} NO_2^- + 2\ H^+ + H_2O$$

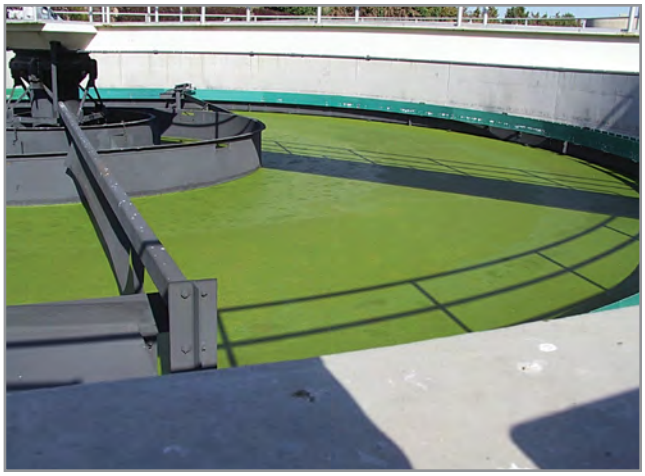
$$NO_2^- + 1/2\ O_2 \xrightarrow{\text{nitrobacteria}} NO_3^-$$

$$NH_4^+ + 2\ O_2 \xrightarrow{\text{nitrobacteria}} NO_3^- + 2\ H^+ + H_2O$$

Denitrification

$$2NO_3^- + \text{carbon} \xrightarrow{\text{denitrobacteria}} N_2 + 3CO_2$$

Phosphorus is measured during both biological and chemical dephosphorization. An excessive amount of phosphate discharged in superficial waters or in bio-treatment tanks causes an increase of algae and system eutrophication



HI 83224

COD Meter and Multiparameter Photometer

With Bar Code Recognition of Sample Vials



- *Measures Ammonia, Chlorine, COD, Nitrate, Nitrogen and Phosphorus*
- *Bar code reader detects the method and range automatically*
- *Three operation modes: Automatic, Semi-automatic and Manual*
- *Bar coded pre-dosed reagent vials*
- *On-screen step-by-step tutorial*
- *Logs up to 200 samples*
- *Context sensitive help screen at a touch of a button*
- *Selection of languages*
- *USB connection*
- *Graphic LCD*

A Complete Lab for Wastewater Analysis

The HI 83224 is a multiparameter bench photometer that has 15 methods for measurement of COD, chlorine, nitrate, nitrogen and phosphorus.

Automatic recognition of bar coded samples is an exciting feature of the HI 83224. This advanced meter scans each vial inserted into the vial holder and automatically identifies the sample method and range. This feature eliminates errors and simplifies the testing process.

The HI 83224 features a powerful interactive user support system that assists you before, during and after analysis. On-screen tutorials guide you through set-up, calibration and measurement while context sensitive help screens are available at a push of a button.

HI 83224 uses a new series of pre-dosed reagent vials for the 15 methods. Each reagent vial is bar coded with specific reagent information at our factory (with the exception of chlorine). This information is automatically scanned by the HI 83224 to assure that the vial and method are the same.

Users have the choice of operating the HI 83224 in automatic mode, semi-automatic mode and manual mode.

HI 83224 can log and recall up to 200 different measurements. Stored data includes parameter, test results, sample number, lot number, instrument id, date and time. HI 83224 bench photometer can be connected to a PC via USB. The HI 92000 Windows® compatible software (optional) aids users in managing data.

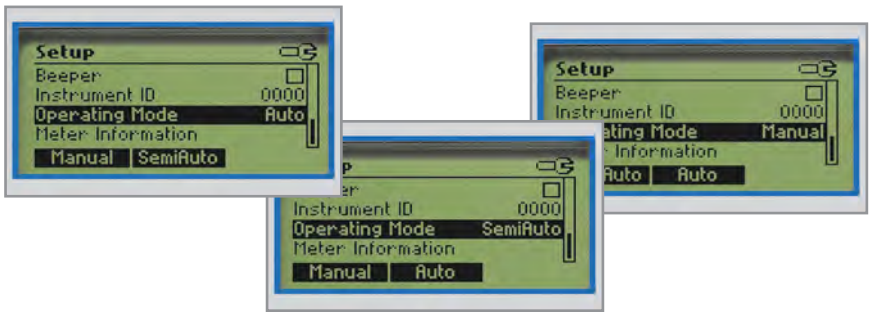
Operating Mode

The instrument has 3 operating modes.

In Automatic mode, no user involvement is required in the method selection.

In Semi-Automatic mode, user involvement is required when a different vial is identified related to the current method.

In Manual mode, the user involvement is required at every level in the method selection.



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Automatic Sample Scanning

Avoid vial confusion and wrong samples with bar code identification

Sample vials inserted into the HI 83224 are identified using bar codes. The bar codes for different methods are shown in the table below. For parameters that don't use a bar coded reagent, the vials supplied with the instrument should be used. The bar code has 4 digits. The first 2 digits are for parameter identification and the second 2 digits are for reagent lot ID.

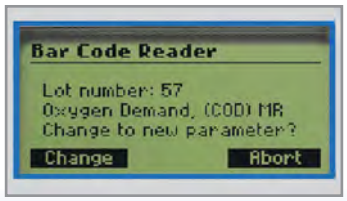
HI 83224 has a powerful interactive help system that assists the user during the analysis process. At a touch of a button, users can get detailed help tailored to the current information on the LCD. A tutorial mode is also available and can be accessed via the setup menu.

Vial Identification

Vials for different methods can be distinguished by a bar code printed on the vial and the cap color.

Part Code	Method	Vial bar code
HI 94764A-25	Ammonia, LR	01xx
HI 94764B-25	Ammonia HR	02xx
HI 93701-01	Chlorine, Free	N/A
HI 93711-01	Chlorine, Total	N/A
HI 94766-50	Nitrate	05xx
HI 94767A-50	Nitrogen, Total LR	16xx 06xx
HI 94767B-50	Nitrogen, Total HR	17xx 07xx
HI 94754A-25	Oxygen Demand, Chemical (COD) LR	12xx
HI 94754B-25	Oxygen Demand, Chemical (COD) MR	13xx
HI 94754C-25	Oxygen Demand, Chemical (COD) HR	24xx
HI 94758A-50	Phosphorus, Reactive	30xx
HI 94758B-50	Phosphorus, Acid Hydrolyzable	31xx
HI 94758C-50	Phosphorus, Total	32xx
HI 94763A-50	Phosphorus, Reactive HR	33xx
HI 94763B-50	Phosphorus, Total HR	34xx

Note: xx represents the reagent lot code.



Identification

Bar coded vials provide automatic recognition of samples and ranges.
Once placed in the holder, the HI 83224 scans the sample and displays the results on-screen.



HI 83224

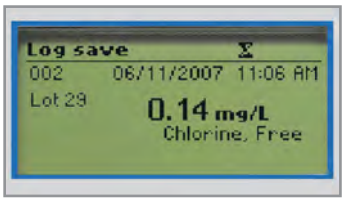
COD Meter and Multiparameter Photometer

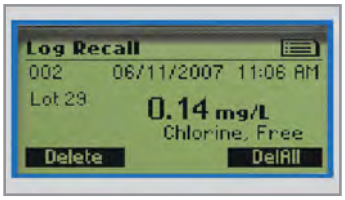
With Bar Code Recognition of Sample Vials

Display Examples

Data Management

Keep track of your data with the HI 83224 quickly and easily. Save and recall up to 200 measurements at any time complete with date and time stamps.





Setup Screen

The HI 83224's extensive setup screen allows users to adjust the screen display as well as date and time formats, language and more!

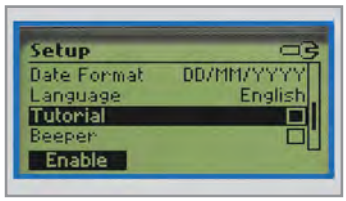


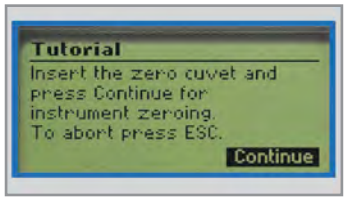


Tutorial

If enabled a short message is displayed on the LCD providing information about the current action.

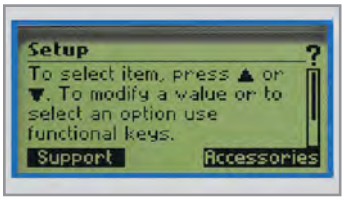
Use the function key to enable/disable the tutorial mode.



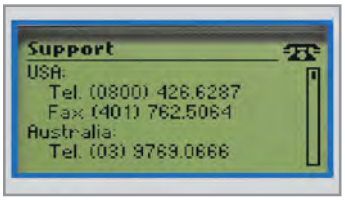


HELP Screens

The HELP key gives users information about the current screen, support numbers and accessories.

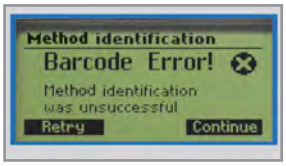






Errors and Warnings

The instrument displays messages if error conditions occur or when measured values are outside the expected range. These messages are described below.



Barcode Error: The instrument cannot identify the vial's bar code or the vial has no code.



Wrong vial: The expected bar code is not found.



No Light: The light source is not functioning properly.



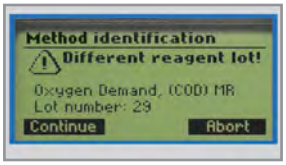
Light Leak: There is too much light entering the cell for accurate measurement.



Inverted vials: The sample and the zero vials are inverted.



Wrong vial: The current method doesn't correspond to the current vial.



Different reagent lot: The reagent lot doesn't correspond to the current lot code.

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HI 83224

COD Meter and Multiparameter Photometer

With Bar Code Recognition of Sample Vials

SPECIFICATIONS	HI 83224
Light source	Tungsten lamps with narrow-band interference filters
Light detector	Silicon photocells
Data Logging	Up to 200 samples
Power supply	230 Vac or 115Vac power adapter
Dimensions	235 x 212 x 143 mm (9.2 x 8.34 x 5.62")
Weight	2.3 kg (5.1 lb)

METHOD	RANGE	RESOLUTION	PRECISION	METHOD	REAGENT CODE
Ammonia LR	0.00 to 3.00 mg/L (as NH_3-N)	0.01 mg/L	±0.03 @ 1.50 mg/L	Nessler	HI 94764A-25 (25 tests)
Ammonia HR	0 to 100 mg/L (as NH_3-N)	1 mg/L	±3 @ 50 mg/L	Nessler	HI 94764B-25 (25 tests)
Chlorine, free ‡	0.00 to 5.00 mg/L	0.01 mg/L from 0.00 to 0.99 mg/L; 0.1 mg/L above 0.99 mg/L	±0.04 @ 1.00 mg/L	DPD	HI 93701-01 (100 tests)
Chlorine, total ‡	0.00 to 5.00 mg/L	0.01 mg/L from 0.00 to 0.99 mg/L; 0.1 mg/L above 0.99 mg/L	±0.04 @ 1.00 mg/L	DPD	HI 93711-01 (100 tests)
Chemical Oxygen Demand LR	0 to 150 mg/L (as COD)	1 mg/L	±4 @ 150 mg/L	Dichromate, Mercuric Sulfate	HI 94754A-25 (25 tests)
Chemical Oxygen Demand MR	0 to 1500 mg/L (as COD)	1 mg/L	±22 @ 1000 mg/L	Dichromate, Mercuric Sulfate	HI 94754B-25 (25 tests)
Chemical Oxygen Demand HR	0 to 15000 mg/L (as COD)	10 mg/L	±220 @ 10000 mg/L	Dichromate, Mercuric Sulfate	HI 94754C-25 (25 tests)
Nitrate	0.0 to 30.0 mg/L (as NO_3-N)	0.1 mg/L	±0.5 @ 25 mg/L	Chromotropic Acid	HI 94766-50 (50 tests)
Nitrogen, Total LR	0.0 to 25.0 mg/L (as N)	0.1 mg/L	±0.5 @ 15 mg/L	Chromotropic Acid	HI 94767A-50 (50 tests)
Nitrogen, Total HR	10 to 150 mg/L (as N)	1 mg/L	±3 @ 75 mg/L	Chromotropic Acid	HI 94767B-50 (50 tests)
Phosphorus, Acid Hydrolyzable	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.02 @ 0.80 mg/L	Ascorbic acid	HI 94758B-50 (50 tests)
Phosphorus, Reactive	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.02 @ 0.80 mg/L	Ascorbic acid	HI 94758A-50 (50 tests)
Phosphorus, Reactive HR	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±1.0 @ 25.0 mg/L	Vanadomolybdophosphoric acid	HI 94763A-50 (50 tests)
Phosphorus, Total	0.00 to 1.15 mg/L (as P)	0.01 mg/L	±0.02 @ 0.80 mg/L	Ascorbic acid	HI 94758C-50 (50 tests)
Phosphorus, Total HR	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±1.0 @ 25.0 mg/L	Vanadomolybdophosphoric acid	HI 94763B-50 (50 tests)

‡ For chlorine analysis, liquid reagents are also available.

Some analytical methods require digestion of the sample. For digestion of the vials, use the HANNA HI 839800 reactor only.
For safety, the optional HI 740217 safety shield and HI 740216 test tube cooling rack for the HI 839800 are strongly recommended.

ORDERING INFORMATION

HI 83224-01 (115V) and **HI 83224-02** (230V) are supplied with sample vials (10), vial cleaning cloths (4), scissors and instruction manual.

SOLUTIONS and REAGENTS

HI 93701-01	100 free chlorine tests
HI 93701-03	300 free chlorine tests
HI 93711-01	100 total chlorine tests
HI 93711-03	300 total chlorine tests
HI 94754A-25	25 COD LR tests
HI 94754B-25	25 COD MR tests
HI 94754C-25	25 COD HR tests
HI 94758A-50	50 reactive phosphorus tests
HI 94758B-50	50 acid hydrolyzable phosphorus tests
HI 94758C-50	50 total phosphorus tests
HI 94763A-50	50 reactive phosphorus HR tests
HI 94763B-50	50 total phosphorus HR tests
HI 94764A-25	25 ammonia LR tests
HI 94764B-25	25 ammonia HR tests
HI 94766-50	50 nitrate tests
HI 94767A-50	50 total nitrogen LR tests
HI 94767B-50	50 total nitrogen HR tests
HI 94703-50	Vial cleaning solution, 250 mL

ACCESSORIES

HI 839800-01	HANNA Reactor (115 Vac)
HI 839800-02	HANNA Reactor (230 Vac)
HI 731318	Cloth for wiping vials (4)
HI 731340	200 µL automatic pipette
HI 731341	1000 µL automatic pipette
HI 731342	2000 µL automatic pipette
HI 731350	Tips for HI 731340 (25)
HI 731351	Tips for HI 731341 (25)
HI 731352	Tips for HI 731342 (4)
HI 740142	1 mL graduated syringe
HI 740143	1 mL graduated syringe (6 pcs)
HI 740144	Pipette tip (6 pcs)
HI 740157	Plastic refilling pipette (20 pcs)
HI 740216	Test tube cooling rack (25 holes)
HI 740217	Laboratory bench safety shield
HI 92000	Windows® Compatible Software



HI 731340 200 µL Automatic Pipette

HI 83099

COD Meter

Measure COD and 36 Additional Parameters



- *Easy COD measurement*

  HI 83099 multi-parameter photometer is pre-calibrated to measure COD levels at three ranges at the touch of a key pad. Simply use the scroll button to select the desired range and begin reading. HI 83099 automatically selects the correct wavelength for the chosen range.

- *Outstanding measurement quality*

  HI 83099 employs an advanced optical system, assuring high accuracy measurements throughout the entire range. The optics combine the power of a miniature light source with the precision of a narrow band interference filter.

- *Save space in your laboratory.*

  The compact size of the HI 83099 photometer allows the user to eliminate the clutter of bulkier and more costly spectrophotometers currently being used. Measuring 23 x 17 x 7 cm and weighing less than 700 grams, HI 83099 can be transported with ease from place to place.

A Complete Laboratory at Your Fingertips

This compact photometer operates in three different ranges to cover virtually every COD application: 0-150 mg/L, 0-1500 mg/L and 0-15000 mg/L. The HI 83099 meets the design requirements of USEPA 410.4, guaranteeing high quality measurements suited for reporting purposes.

The HI 83099 can be operated manually or from a PC via the built-in RS232 port. The collected/logged data can be downloaded for analysis and documented with the HI 92000 application software.

HI 83099 is one of the most versatile photometers on the market. In addition to COD, this meter measures up to 36 of the most important water quality parameters.

HI 83099 runs for hours on two common 9V batteries. In addition, it can operate continuously with a 12 Vdc adapter.

HI 83099 is extremely simple to use. The front mask lists all the parameters in a numerical order and the display shows the same numbers for quick reference during testing.

The meter can be zeroed in seconds and the reagents cost much less than what you may have been paying.

All this and much more at a fraction of the cost of expensive and complex spectrophotometers!

Measurement Procedure

The entire COD measurement process has been designed for ease of use by personnel at any skill level. In addition, all HANNA equipment has been designed for maximum safety during handling and testing with a minimum amount of waste. Even a novice can safely run accurate COD tests in just 3 simple steps:



1. Fill the pre-dosed vial with the sample



2. Place the vial in the HI 839800 reactor (sold separately) and set the timer



3. Place the vial in the HANNA HI 83099 and read the results

HANNA instruments
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HI 83099

COD Meter

for COD and 36 Additional Parameters

SPECIFICATIONS	HI 83099
Light source	4 tungsten lamps with narrow-band interference filters at 420/525/575/610 nm
Light detector	4 silicon photocells
Power supply	(2) 9V batteries or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	230 x 165 x 70 mm (9.1 x 6.5 x 2.6")
Weight	640 g (1.4 lbs.)

PARAMETER	RANGE	METHOD	REAGENT CODE‡
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 9.99 mg/L	Nessler	HI 93715-01
Bromine	0.00 to 8.00 mg/L	DPD	HI 93716-01
Chlorine, free‡	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine, total‡	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chlorine dioxide	0.00 to 2.00 mg/L	Chlorophenol red	HI 93738-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazine	HI 93749-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazine	HI 93723-01
COD LR	0 to 150 mg/L	Dichromate EPA* Dichromate Hg-free† Dichromate ISO**	HI 93754D-25 HI 93754F-25 HI 93754A-25
COD MR	0 to 1500 mg/L 0 to 1000 mg/L	Dichromate EPA* Dichromate Hg-free† Dichromate ISO**	HI 93754B-25 HI 93754E-25 HI 93754G-25
COD HR	0 to 15000 mg/L	Dichromate	HI 93754C-25
Color	0 to 500 PCU	Platinum Cobalt	—
Copper LR	0 to 990 µg/L	Bicinchoninate	HI 95747-01
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Cyanide	0.000 to 0.200 mg/L	Pyridine-Pyrazalone	HI 93714-01
Cyanuric acid	0 to 80 mg/L	Turbidimetric	HI 93722-01
Fluoride	0.00 to 2.00 mg/L	SPADNS	HI 93729-01
Hardness (Calcium)	0.00 to 2.70 mg/L	Calmagite	HI 93720-01
Hardness (Magnesium)	0.00 to 2.00 mg/L	EDTA	HI 93719-01
Hydrazine	0 to 400 µg/L	p-Dimethylaminobenzaldehyde	HI 93704-01
Iodine	0.0 to 12.5 mg/L	DPD	HI 93718-01
Iron LR	0 to 400 µg/L	TPTZ	HI 93746-01
Iron HR	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Manganese HR	0.0 to 20.0 mg/L	Periodate oxidation	HI 93709-01
Manganese LR	0 to 300 µg/L	PAN	HI 93748-01
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nitrate	0.0 to 30.0 mg/L	Cadmium reduction	HI 93728-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotation	HI 93707-01
Nitrite HR	0 to 150 mg/L	Ferrous sulfate	HI 93708-01
Oxygen, dissolved	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol red	HI 93710-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic acid	HI 93713-01
Phosphate HR	0.0 to 30.0 mg/L	Amino acid	HI 93717-01
Phosphorus	0.0 to 15.0 mg/L	Amino acid	HI 93706-01
Silica	0.00 to 2.00 mg/L	Dimolybdate	HI 93705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

ORDERING INFORMATION

HI 83099-01 (115V) and**HI 83099-02** (230V) is supplied with 3 glass cuvets, cell protective cap, batteries, 12 Vdc adapter and instructions

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

The following accessories and spare parts have been specially designed for COD analysis to make your measurements simpler and safer.

HI 3898 Test kit for fast analysis of chloride concentration

HI 839800-01 HANNA instruments® reactor (115 Vac)

HI 839800-02 HANNA instruments® reactor (230 Vac)

HI 151-00 Thermometer with stainless steel probe

HI 710005 115 Vac / 12 Vdc power adapter

HI 710006 230 Vac / 12 Vdc power adapter

HI 731318 Tissue for wiping cuvets (4)

HI 731321 Measurement cuvet (4)

HI 731325N Cuvet cap (4)

HI 731340 200 µL automatic pipette

HI 731341 1000 µL automatic pipette

HI 731342 2000 µL automatic pipette

HI 731350 Tips for 200 µL automatic pipette (25)

HI 731351 Tip for 1000 µL automatic pipette (25)

HI 731352 Tip for 2000 µL automatic pipette (4)

HI 740216 Test tube cooling rack (25 tube capacity)

HI 740217 Laboratory bench safety shield

HI 740219 COD test tube adapter for HI 83099

HI 92000 Windows® compatible application software

HI 920010 Serial cable for PC connection (9 pin)



HI 731340 200 µL Automatic Pipette

Notes:

* Method with chromium-sulfuric acid is officially recognized by EPA for wastewater analysis.

** The HI 93754F-25 and HI 93754G-25 method follows the official method ISO 15705.

† This method is recommended for general purpose analysis with no chloride interference.

‡ For chlorine analysis, liquid reagents are also available.

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HI 216

EC and Resistivity Meter

with 4-ring platinum EC probe and easy to clean resistivity probe



Add Resistivity Versatility

HI 216 is a combination bench meter that can read conductivity in 4 different ranges and resistivity.

For conductivity measurements, the calibration is a simple 1 point procedure using the easy-to-operate front panel knob. The temperature coefficient can be adjusted from 0 to 2.5% by also using a knob on the front panel. The supplied EC probe does not require re-calibration when switching from one range to another. The 4-platinum-ring probe has a built-in temperature sensor that automatically compensates for temperature changes.

For resistivity measurements, the meter is factory calibrated and, if necessary, calibration can be adjusted. The HI 3316D resistivity probe is easy to clean and requires little maintenance. It also features a built-in temperature sensor to automatically compensate for temperature variations. The temperature coefficient is user selectable from 2 to 7%.

Both the EC and resistivity probes use the same DIN plug on the rear panel and the meter automatically recognizes which probe is connected.

- *4 Measurement Ranges*
- *Simple 1 point EC calibration procedure*
- *Both probes feature internal temperature sensors*
- *Low profile and takes little benchspace*

SPECIFICATIONS		HI 216
Range	EC	199.9 µS/cm; 0 to 1999 µS/cm; 19.99 mS/cm; 199.9 mS/cm
	Resistivity	0 to 19.90 MΩ•cm
Resolution	EC	0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm
	Resistivity	0.10 MΩ•cm
Accuracy (@20°C)	EC	±1% FS
	Resistivity	±2% FS
Calibration		Manual, 1 point, for both EC and resistivity
Temperature Compensation		Automatic from 0 to 50°C with ß selectable from 0 to 2.5%/°C for EC and from 2 to 7%/°C for resistivity
Probes (included)		HI 76303 for conductivity measurements; HI 3316D for resistivity measurements
Power Supply		12 Vdc (power adapter included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.1 x 2.9") / 1.0 kg (2.3 lbs.)

ORDERING INFORMATION

HI 216-01 (115V) and **HI 216-02** (230V) are supplied with HI 76303 conductivity probe, HI 3316D resistivity probe,12 Vdc adapter and instruction manual.

PROBES

HI 76303 Platinum 4-ring conductivity probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable.

HI 3316D Resistivity probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable.

SOLUTIONS

HI 7030L 12880 µS/cm calibration solution, 500 mL

HI 7031L 1413 µS/cm calibration solution, 500 mL

HI 7033L 84 µS/cm calibration solution, 500 mL

HI 7034L 80000 µS/cm calibration solution, 500 mL

HI 7035L 111800 µS/cm calibration solution, 500 mL

HI 7039L 5000 µS/cm calibration solution, 500 mL

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EU)

HI 740036 100 mL plastic beaker (6 pcs)

HI 740034 Cap for 100 mL beaker (6 pcs)

HI 76405 Electrode holder



HI 3316D — Resistivity Probe

HANNA instruments

With Great Products, Come Great Results™

Ideal for Labs

EC 214 and EC 215 are bench top multi-range conductivity meters that are ideal for the laboratory. 4 measurement ranges ensure the highest resolution and precision for your measuring requirements.

1-point calibration is performed manually by adjusting a knob on the front of the meter.

With a user selectable temperature coefficient and a temperature sensor incorporated in the probe, temperature compensation is automatic for the EC 215. The temperature compensation for the EC 214 is manual and the temperature value is set with a knob.

Each model features a rugged probe with a 4-ring platinum sensor responds faster than conventional stainless steel probes. These probes can be used for measuring highly acidic or alkaline samples even at high temperatures.

In addition, the EC 215R model offers analog output of 0 to 5V that represents the full conductivity scale across all 4 ranges.

- *4 measurement ranges*
- *4-ring, platinum conductivity probe with internal temperature sensor*
- *Analog output (EC 215R)*



SPECIFICATIONS		EC 214	EC 215	EC 215R
Range		0.0 to 199.9 µS/cm; 0 to 1999 µS/cm; 0.00 to 19.99 mS/cm; 0.0 to 199.9 mS/cm		
Resolution		0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm		
	analog output	—	—	±2.5 mV
Accuracy (@20°C/68°F)		±1% F.S. (excluding probe error)		
	analog output	—	—	0.1% of reading
Calibration		manual, 1 point		
Temperature Compensation		manual, 0 to 50°C (32 to 122°F) with β = 2%/°C	automatic, 0 to 50°C (32 to 122°F)with β adjustable from 0 to 2.5%/°C	
Probe		HI 76300, platinum 4-ring sensor, 1 m (3.3') cable (included)	HI 76303, platinum 4-ring sensor, built-in temperature sensor 1 m (3.3') cable (included)	
Analog Output		—	—	0-5 Vcc
Power Supply		12 Vdc (power adapter included)		
Environment		0 to 50°C (32 to 122°F); RH max 95%		
Dimensions		240 x 182 x 74 mm (9.4 x 7.2 x 2.9")		
Weight		1.0 kg (2.2 lbs.)		



ORDERING INFORMATION

EC 214-01 (115V) and **EC 214-02** (230V) are supplied with conductivity probe HI76300, instruction manual and 12 Vdc adapter (HI710005 or HI710006).

EC 215-01 (115V), **EC 215-02** (230V), **EC 215R-01** (115V) and **EC 215R-02** (230V) are supplied with conductivity probe HI76303, instruction manual and 12 Vdc adapter (HI710005 or HI710006).

ELECTRODES

HI 76300	4-ring conductivity probe for EC 214
HI 76303	4-ring conductivity probe with built-in temperature sensor, for EC 215 and EC 215R

SOLUTIONS

HI 7030L	12880 µS/cm calibration solution, 500 mL
HI 7031L	1413 µS/cm calibration solution, 500 mL
HI 7033L	84 µS/cm calibration solution, 500 mL
HI 7034L	80000 µS/cm calibration solution, 500 mL
HI 7035L	111800 µS/cm calibration solution, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EU)
HI 76404	Probe holder

HI 98188

EC/Resistivity/TDS/NaCl Meter

Waterproof Meter with USP and Backlit Graphic LCD Display



Industrial Grade EC Meter with USP

HI 98188 waterproof, portable conductivity meter has an expanded conductivity range from 0.001 µS/cm to 400 mS/cm, as well as resistivity and 3 salinity scales. This meter automatically recognizes the probe type (2 or 4-ring) and allows the user to adjust the nominal cell constant.

Choose from 7 memorized standards and obtain up to a 5-point calibration. For salinity (% range), HI 7037 standard allows you to make a 1-point calibration. Both linear and natural water temperature compensation are available and the reference temperature is user adjustable. Ten sets of measurement parameters (such as reference temperature, temperature compensation mode, TDS factor, calibration etc.) can be stored as a customized user profile and recalled for later use. HI 98188 is also USP <645> compliant with stages 1, 2 and 3.

Data may be captured by either the log-on-demand option (400 samples) or by interval logging (from 5 sec to 1 minute). Return to the lab and download all data to your PC with the USB connection and HANNA's HI 92000 software. A combination of dedicated and soft keys allows quick, intuitive operation in a choice of languages. Comprehensive GLP data is directly accessible by pressing the GLP key. At the touch of a button access the contextual Help Menu to obtain on-screen information and assistance about each feature.

Designed for field use, this instrument can be easily operated with one hand and is housed in a rugged carrying case. With an extended battery life of up to 100 hours, users are assured long operation time. The inductive charger can either be plugged into a standard 115V or 230V socket with the included adapter.

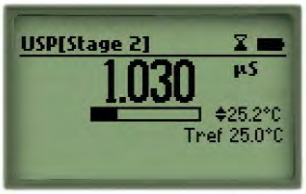
- *USP <645> stages 1, 2 and 3*
- *Autorange from 0.001 uS/cm to 400 mS/cm*
- *2 or 4-ring probe with auto probe recognition*
- *Memorize up to 10 user profiles*
- *Linear and natural water temperature compensation*
- *Three salinity scales*
- *Interval Logging*

Screen Highlights



3 Stage Conformity

This meter can perform all 3 stages of USP <645> water quality testing requirements.



Progress Bar

Meter displays progress towards meeting stage 2 stability requirements.



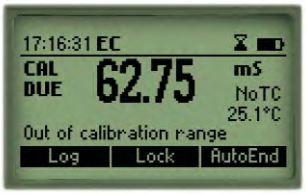
On-screen Guide

Users are provided with on-screen instructions for each USP stage.



User Profiles

10 sets of measurement parameters can be stored in user profiles for later retrieval.



Measurement

Large backlit graphic display shows multiple messages along with the current measurement readings.



Help

Users can consult the on-screen help from any mode by pressing the HELP key. The instrument will then explain the function and options currently available.

HANNA instruments

With Great Products, Come Great Results™

HI 98188

EC/Resistivity/TDS/NaCl Meter

Waterproof Meter with USP and Backlit Graphic LCD Display

Rechargeable batteries with inductive charger

These models have up to 100 hours of extended battery life to guarantee long operation in the field. When the batteries are low, you don't have to worry about carrying a spare set with you—the batteries can be recharged with HANNA's inductive charger. Simply leave the meter on the recharger for a few hours and you're ready to go. The charger can be plugged into a standard 115V or 230V socket using the included HANNA adapter.



SPECIFICATIONS

SPECIFICATIONS		HI 98188
EC	Range	0 to 400mS/cm (actual conductivity 1000 mS/cm) 0.001 to 9.999 µS/cm; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 1000.0 mS/cm (autoranging)
	Resolution	0.001 µS/cm; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm
	Accuracy	±1% of reading (±0.01 µS/cm or 1 digit, whichever is greater)
Resistivity	Range	1 to 999.9 Ohm•cm; 1.000 to 9.999 kOhm•cm; 10.00 to 99.99 kOhm•cm; 100.0 to 999.9 kOhm•cm; 1.0 to 100.0 MOhm•cm (autoranging)
	Resolution	0.1 Ohm•cm; 0.001 kOhm•cm; 0.01 kOhm•cm; 0.1 kOhm•cm; 0.1 MOhm•cm
	Accuracy	±2% of reading (±1 Ohm•cm or 1 digit, whichever is greater)
TDS	Range	0.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 g/L; 10.00 to 99.99 g/L; 100.0 to 400.0 g/L (autoranging)
	Resolution	0.01 ppm; 0.1 ppm; 0.001 g/L; 0.01 g/L; 0.1 g/L
	Accuracy	±1% of reading (±0.05 ppm or 1 digit, whichever is greater)
NaCl	Range	%: 0.0 to 400.0%; seawater scale: 0.00 to 80.00 (PSU); Practical salinity: 0.01 to 42.00
	Resolution	0.1%; 0.01
	Accuracy	±1% of reading
Temperature	Range	-20.0 to 120.0°C
	Resolution	0.1°C
	Accuracy	±0.2°C (excluding probe error)
Calibration	EC	Automatic up to 5 points with 7 memorized standards (0.00 µS/cm, 84.0 µS/cm, 1.413 mS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm)
	NaCl	1 point only in % range (with HI 7037 buffer); Use conductivity calibration for all other ranges
	Temperature	1 or 2 points
Temperature Compensation		-20.0 to 120.0°C
Reference Temperature		15°C, 20°C and 25°C
TDS Factor		0.40 to 1.00
Probe		HI 76310 4-ring EC probe with built-in temperature sensor
Logging	Log-on-demand	400 samples
	Interval	5 seconds to 1 minute
PC Connectivity		Opto-isolated USB (with HI 92000 software)
Battery Type/Life		(4) 1.5V AA rechargeable batteries/approx. 100 hrs continuous use (without backlight)
Recharger		HI 710042 inductive charger (included)
Auto-off		User Selectable: 5, 10, 30, 60 min or can be disabled
Environment		IP67
Dimensions / Weight		226.5 x 95 x 52 mm (8.9 x 3.75 x 2") /525 g

ORDERING INFORMATION

HI 98188-01 (115V) and **HI 98188-02** (230V) are supplied with HI 76310 4-ring conductivity probe with built-in temperature sensor, calibration solution, (4) rechargeable batteries, HI 710042 inductive battery charger with power adapter, rugged carrying case and instructions.

PROBES

HI 76310 4-ring EC probe with built-in temperature sensor

SOLUTIONS

HI 7030L 12880 µS/cm calibration solution, 500 mL
HI 7031L 1413 µS/cm calibration solution, 500 mL
HI 7033L 84 µS/cm calibration solution, 500 mL
HI 7034L 80000 µS/cm calibration solution, 500 mL
HI 7035L 111800 µS/cm calibration solution, 500 mL
HI 7039L 5000 µS/cm calibration solution, 500 mL
HI 7035L 111800 µS/cm calibration solution, 500 mL
HI 70442L 1500 ppm calibration solution, 500 mL
HI 7036L 12.41 ppt (g/L) calibration solution, 500 mL
HI 7037L Salinity solution, 500 mL
HI 70300L Electrode storage solution, 500 mL
HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710042 Inductive charger
HI 76405 Electrode holder
HI 92000 Windows® compatible software
HI 920013 USB cable for PC connection



HI 92000 — PC Software

HI 9835 • HI 98360

EC/TDS/NaCl/°C Meters

Waterproof with 8 EC and TDS Ranges

B.E.P.S. | lcd display | hold | PC compatible



4 Parameters—1 Probe!

HI 9835 and HI 98360 are rugged waterproof conductivity meters that combine versatility, reliability and ease of use.

HANNA's advanced probe design utilizes 4 rings. This design offers greater stability while increasing the range of measurable concentrations and temperature.

The "Auto Endpoint" mode of the HI 98360 makes it the ideal instrument for field measurements. After entering this mode, the instrument will freeze stable readings automatically on the LCD for easy recording of measurements.

- *Autoranging-8 EC and TDS ranges*
- *4-ring, conductivity probe with built-in temperature sensor*
- *ATC*

SPECIFICATIONS		HI 9835	HI 98360
Range	EC	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm; 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm (actual EC)*	
	TDS	0.00 to 14.99 mg/L (ppm); 15.0 to 149.9 mg/L (ppm); 150 to 1499 mg/L (ppm); 1.50 to 14.99 g/L (ppt); 15.0 to 100.0 g/L (ppt); up to 400.0 g/L (actual TDS)*, with 0.80 conversion factor	
	NaCl	0.0 to 400.0%	
	Temperature	0.0 to 60.0°C	-9.9 to 120.0°C**
Resolution	EC	0.01 µS/cm; 0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm	
	TDS	0.01 mg/L; 0.1 mg/L; 1 mg/L; 0.01 g/L; 0.1 g/L	
	NaCl	0.1%	
	Temperature	0.1°C	
Accuracy	EC	±1% of reading ± (0.05 µS/cm or 1 digit)	±0.5% of reading
	TDS	±1% of reading ± (0.03 mg/L or 1 digit)	±0.5% of reading
	NaCl	±1% of reading	±0.5% of reading
	Temperature	±0.4°C (excluding probe error)	±0.4°C (excluding probe error)
Calibration	EC	automatic, 1 point with 6 memorized values (84, 1413, 5000, 12880, 80000, 111800 µS/cm)	
	NaCl	1 point, with HI 7037 calibration solution	
	Temperature	2-point, at 0 and 50°C (32 and 122°F)	
Temperature Compensation		automatic or manual, 0 to 60°C (32 to 140°F); can be disabled for measuring actual EC and TDS	
Temperature Coefficient		selectable from 0.00 to 6.00%/°C (EC and TDS only)	
TDS Conversion Factor		selectable from 0.40 to 0.80 (default value: 0.50)	
Data Logging		—	up to 250 samples
PC interface		—	RS 232
Probe (included)		HI 9835: HI 76309, 4-ring probe with built-in temperature sensor and 1m (3.3') cable HI 98360: HI 76309/1.5 with built-in temperature sensor and 1.5 m (4.9') cable	
Power Supply		(4) 1.5V AA batteries (included) or 12 Vdc input; auto-off after 5 minutes of non-use (can be disabled)	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions/Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4") / 500 g (1.1 lbs.)	

* with temperature compensation function disabled ** using the proper probe

ORDERING INFORMATION

HI 9835 is supplied with HI 76309 4-ring conductivity probe, batteries (4), instruction manual and rugged carrying case.

HI 98360 is supplied with HI 76309/1.5 4-ring conductivity probe with 1.5 m (4.9') cable, batteries, instruction manual and rugged carrying case.

ELECTRODES

HI 76310	Platinum 4-ring conductivity probe with temperature sensor and 1m (3.3') cable.

SOLUTIONS

HI 7030L	12880 µS/cm calibration solution, 500 mL
HI 7031L	1413 µS/cm calibration solution, 500 mL
HI 7033L	84 µS/cm calibration solution, 500 mL
HI 7034L	80000 µS/cm calibration solution, 500 mL
HI 7035L	111800 µS/cm calibration solution, 500 mL
HI 7039L	5000 µS/cm calibration solution, 500 mL
HI 70442L	1500 ppm calibration solution, 500 mL
HI 7036L	12.41 ppt (g/L) calibration solution, 500 mL
HI 7037L	Salinity solution, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EU)
HI 92000	Windows® compatible software
HI 920011	Serial cable for PC connection

HANNA instruments

With Great Products, Come Great Results™

HI 933300 • HI 933301

Portable Logging Conductivity Meters

with Built-in Printer



Print Measurement Records Right in the Field or Workstation

HI 933300 and HI 933301 are versatile conductivity meters designed to bring lab-grade performance and accuracy anywhere in the plant or field.

HI 933300 and HI 933301 allows users to print a permanent, indisputable record of measurement data from the built-in printer. On-the-spot printing is ideal for record keeping, trouble shooting or compliance purposes. Printing intervals are user selectable from 1 to 180 minutes.

HI 933300 offers the benefit of logging and PC connectivity. While in logging mode, HI 933300 records conductivity and temperature measurements and can be printed immediately or at a later date. All stored data (up to 8000 measurements) can be transferred to a PC through the standard RS232 serial connection or through HANNA's infrared adapter and Windows® compatible software.

With the included HI 76302W conductivity probe with 4-ring technology and built-in temperature sensor, HI 933300 and HI 933301 are able to perform advanced measurements with automatic temperature compensation.

- *Plain paper roll printer*
- *PC compatible with optional HI 92000 appication software and HI 9200/9 connection interface (HI 933300)*
- *Supplied with probe, paper rolls, batteries and hard carrying case*



HI 710034 Paper Rolls

SPECIFICATIONS		HI 933300	HI 933301
Range	EC	0.0 to 150.0 µS/cm; 150 to 1500 µS/cm; 1.50 to 15.00 mS/cm; 15.0 to 199.9 mS/cm	
	Temperature	0.0 to 60.0°C	
Resolution	EC	0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm	
	Temperature	0.1°C	
Accuracy (@20°C/68°F)		±1% F.S. (EC) /±0.5°C (excluding probe error)	
Calibration		automatic, 1, 2, 3, 4 or 5 points at 0, 84, 1413, 12880, 80000 µS/cm	
Temperature Compensation		automatic, 0 to 60°C (32 to 140°F) with ß adjustable from 0.0 to 3.0%/°C	
Probe		HI 76302W 4-ring probe with internal temperature sensor, 1 m (3.3') cable (included)	
Printer		low consumption, plain paper 38 mm (1.5") large	
Printing Interval		selectable at 1, 2, 5, 10, 15, 30, 60, 120 and 180 minutes	
Logging Interval		selectable at 1, 2, 5, 10, 15, 30, 60, 120 and 180 minutes	—
PC Connection		through RS232 port, using HI 9200/9 infrared interface	—
Power Supply		(4) 1.5V AA batteries / approx. 500 hour (with 60 minutes printing interval);or 12 Vdc input	
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Dimensions		196 x 80 x 57 mm (7.7 x 3.1 x 2.2")	
Weight		425 g (0.9 lbs.)	

ORDERING INFORMATION

HI 933300 and **HI 933301** are supplied with HI 76302W conductivity probe with 1 m (3.3') screened cable, AA size alkaline batteries (4), paper roll (10) and rugged carrying case.

PROBES

HI 76302W 4-ring conductivity probe

SOLUTIONS

HI 7030L 12880 µS/cm cal. sol., 500 mL
HI 7031L 1413 µS/cm cal. sol., 500 mL
HI 7033L 84 µS/cm calibration solution, 500 mL
HI 7034L 80000 µS/cm calibration solution, 500 mL
HI 7035L 111800 µS/cm cal. solution, 500 mL
HI 7039L 5000 µS/cm calibration solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US)
HI 710006 230 Vac/12 Vdc pwr adapter (EURO)
HI 9200/9 Interface for PC connection
HI 92000 Windows® compatible application software
HI 710034 Paper roll (10)
HI 710035 Ink cartridge (1)
HI 721317 Rugged carrying case

HI 993310
Direct Measurement Kit
for of Soil Activity and Solutions Conductivity



Direct Measurements Right in the Field

HI 993310 is an instrument that has been specifically designed to address the need for correct and rapid conductivity measurements in soil and liquids. It is supplied with two probes: HI 76305 with a stainless steel, conical tip for direct soil measurement, and HI 76304 for fertilizer enriched solutions.

HI 993310 measures both the soil conductivity in EC (mS/cm) as well as salt activity (g/L). The different scales can be selected through two keys on the front panel and two separate LEDs indicate which parameter is being tested. In addition, HI 993310 is equipped with an alarm LED that automatically turns on if the soil is too dry or nutritive substances such as potassium or nitrogen are lacking. Demineralized water can be added to the soil prior to proceeding with further tests.

Direct soil measurement is facilitated by the small diameter, stainless steel, pointed HI 76305 probe. Once inserted into the ground, the user simply waits until the meter displays the value read.

- *Supplied with 2 probes for measurement versatlity*
- *Automatic Temperature Compensation*
- *Equipped with BEPS (Battery Error Prevention System)*

SPECIFICATIONS		HI 993310
Range	EC	0.00 to 19.99 mS/cm
	Salt activity	0.00 to 1.00
Resolution	EC	0.01 mS/cm g/L
	Salt activity	0.01 g/L
Accuracy (@20°C/68°F)		±2% F.S. (0 to 15.00 mS/cm; excluding probe error)
Calibration		manual, 1 point
Temperature Compensation		automatic, 0 to 50°C (32 to 122°F), ß=2%/°C
Probes		HI 76305, for direct soil measurements, with stainless steel body, conic tip, built-in temperature sensor and 1 m (3.3') cable (included) HI 76304, for EC measurements in solution, with plastic body, built-in temperature sensor and 1 m (3.3') cable (included)
Battery Type / Life		(1) 9V / approx. 100 hours of continuous use
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions		185 x 82 x 52 mm (7.3 x 3.2 x 2.0")
Weight		275 g (9.7 oz.)

ORDERING INFORMATION

HI 993310 is supplied with HI 76304 plastic body, conductivity probe with built-in temperature sensor and 1 m (3.3') cable, HI 76305 probe with stainless steel conic tip for direct soil measurements with built-in temperature sensor and 1 m (3.3') cable, one 9V battery, instruction manual and rugged carrying case.

PROBES

HI 76305	Stainless steel probe for direct soil measurement
HI 76304	EC probe for measurement of solution and soil sample

SOLUTIONS

HI 7030L	12880 µS/cm calibration solution, 500 mL
HI 7031L	1413 µS/cm calibration solution, 500 mL
HI 7051M	Soil preparation solution

ACCESSORIES

HI 721319	Ground auger
HI 710009	Shockproof rubber boot, blue
HI 710010	Shockproof rubber boot, orange
HI 710002	Soft carrying case
HI 721313	Rugged carrying case

Why this meter is so important

Conductivity is an important factor in greenhouses and hydroponics and is measured in soil as well as in fertilizer solutions.

Conductivity of soil is an excellent indication for the presence of nutritive salts. Soil conductivity is checked before and after fertilization to establish its effectiveness as well as ensuring that the soil is not too saline or damaging to the plant roots.

Conductivity of the irrigation water and fertilizer mixes is checked to make sure values are within an acceptable range and a correct fertilizer concentration strength is being applied.

EC and TDS Meters

Waterproof, Multi-range with ATC for Field Applications

Professional Meters Designed for Harsh Conditions

HI 9033 and HI 9034 have proven time and again to hold up under extended use in wet, humid and muddy conditions.

HI 9033 utilizes a single probe and performs conductivity readings in four ranges. This meter offers the advantage of measuring samples from deionized water to brine without having to switch or recalibrate the probe.

HI 9034 measures total dissolved solids (TDS) in three ranges and offers the highest accuracy when performing measurements in applications as diverse as HVAC, waste water treatment and reverse osmosis. All three ranges can be activated at the touch of a button without having to change the conductivity probe.

Both meters perform measurements with automatic temperature compensation which adjusts for the effects of temperature on the probe. These portable instruments also feature BEPS (Battery Error Prevention System) technology that switches the meter off when low battery power could affect the readings.

- *Multiple conductivity ranges*
- *Rugged and built to last*
- *Automatic Temperature Compensation*



SPECIFICATIONS	HI 9033	HI 9034
Range	0.0 to 199.9 µS/cm; 0 to 1999 µS/cm; 0.00 to 19.99 mS/cm; 0.0 to 199.9 mS/cm	0.0 to 199.9 mg/L; 0 to 1999 mg/L; 0.00 to 19.99 g/L
Resolution	0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm	0.1 mg/L; 1 mg/L; 0.01 g/L
Accuracy (@20°C/68°F)	±1% F.S. (excluding probe error)	
Calibration	manual, 1 point	
Temperature Compensation	automatic, 10 to 50°C (50 to 122°F) with ß = 2%/°C	
Probe	HI 76302W with internal temperature sensor and 1 m (3.3') cable (included)	
Battery Type / Life	(1) 9V / approx. 100 hours of continuous use	
Environment	0 to 50°C (32 to 122°F); RH max 100%	
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight	425 g (0.9 lbs.)	



HI 721317 — Carrying Case

ORDERING INFORMATION

HI 9033 and **HI 9034** is supplied with HI 76302W conductivity probe with 1 m (3.3') screened cable, 9 V battery and hard carrying case.

ELECTRODES

HI 76302W 4-ring conductivity probe with built-in temperature sensor and 1 m (3.3') cable

SOLUTIONS

HI 7030L 12880 µS/cm calibration solution, 500 mL

HI 7031L 1413 µS/cm calibration solution, 500 mL

HI 7033L 84 µS/cm calibration solution, 500 mL

HI 7034L 80000 µS/cm calibration solution, 500 mL

HI 7035L 111800 µS/cm calibration solution, 500 mL

HI 7032L 1382 ppm (mg/L) calibration solution, 500 mL

HI 7036L 12.41 ppt (g/L) calibration solution, 500 mL

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 721317 Rugged carrying case

HI 8633 • HI 8733

Multi-range Conductivity Meters

Reliable and Waterproof

upgraded



SPECIFICATIONS	HI 8633	HI 8733
Range	0.0 to 199.9 µS/cm 0 to 1999 µS/cm 0.00 to 19.99 mS/cm 0.0 to 199.9 mS/cm	
Resolution	0.1 µS/cm 1 µS/cm 0.01 mS/cm 0.1 mS/cm	
Accuracy (@20°C/68°F)	±1% F.S. (excluding probe error)	
Calibration	manual, 1 point	
Temp. Compensation	manual, 0 to 50°C (32 to 122°F) with β = 2%/°C	automatic, 0 to 50°C (32 to 122°F) with β adjustable from 0 to 2.5%/°C
Probe	HI 76301D with 1 m (3.3') cable (included)	HI 76302W, ATC, with 1 m (3.3') cable (included)
Battery Type / Life	1 x 9V / approx. 100 hours of continuous use	
Environment	0 to 50°C (32 to 122°F); RH max 100%	
Dimensions	164 x 76 x 45 mm (6.4 x 3.0 x 1.8")	
Weight	250 g (8.8 oz.)	

Designed for QC and Production

HI 8633 and HI 8733 have been designed specifically for use in areas of production and quality control. It is often necessary to test samples ranging from deionized water to brine.

Using an amperometric system would require constant recalibration and probe changes, thus making the measurement process time consuming and burdensome. To solve this problem, HANNA has developed the HI 8633, which uses a 4-ring potentiometric probe. The rugged probe is made of PVC, which is ideal for indoor and outdoor measurements.

Using one point calibration, it is now possible to obtain accurate readings across a very wide range, from 0.1 to 199.9 mS/cm.

If the temperature of the solution fluctuates, HI 8733, with a built-in temperature sensor and Automatic Temperature Compensation, is the perfect instrument.

As an accessory, HI 721313 is available. The kit includes a rugged carrying case with a beaker, a calibration screwdriver and standardizing solution of 12880 µS/cm.

- *Rugged probe for indoor/outdoor measurements*
- *Allow for calibration across a wide range*
- *Choose from automatic (HI 8733) or manual (HI 8633) temerature compensation*

ORDERING INFORMATION

HI 8633 is supplied with HI 76301D conductivity probe with 1m (3.3') cable, calibration screwdriver, instruction manual and 9V battery.

HI 8733 is supplied with HI 76302W conductivity probe with internal temperature probe, 1m (3.3') cable, calibration screwdriver, instruction manual and 9V battery.

PROBES

HI 76301D 4-ring conductivity probe for HI 8633

HI 76302W 4-ring conductivity probe with internal temperature sensor, for HI 8733

SOLUTIONS

HI 7030L 12880 µS/cm calibration solution, 500 mL

HI 7031L 1413 µS/cm calibration solution, 500 mL

HI 7033L 84 µS/cm calibration solution, 500 mL

HI 7034L 80000 µS/cm calibration solution, 500 mL

HI 7035L 111800 µS/cm calibration solution, 500 mL

ACCESSORIES

HI 710015 Shockproof rubber boot, blue

HI 710016 Shockproof rubber boot, orange

HI 721313 Rugged carrying case



HI 710015 — Shockproof Boot

HANNA instruments

With Great Products, Come Great Results™

HI 87314

EC and Resistivity Meter

Reliable and Waterproof



EC and Resistivity in a Watertight Enclosure

HI 87314 is a combination, portable meter that can read conductivity in 4 different ranges and resistivity.

For conductivity measurements, the calibration is a simple 1 point procedure via a trimmer located in the battery compartment. The supplied probe does not require recalibration when switching from one range to another. The 4- ring (stainless-steel) probe has a built-in temperature sensor that automatically compensates for temperature changes. The temperature coefficient can be adjusted from 0 to 2.5% using a knob on the front panel.

For resistivity measurements, the meter is factory calibrated and, if necessary, calibration can be adjusted.

The HI 3316D resistivity probe is easy to clean and requires little maintenance. It also features a built-in temperature sensor to automatically compensate for temperature variations. The temperature coefficient is user-selectable from 2 to 7%.

Both probes use the same DIN plug on the top of the instrument, and the meter automatically recognizes which probe is connected.

The instrument can be powered by a 9V rechargeable battery. The HI 87314 utilizes an inductive system for battery recharge, ensuring a watertight seal with no external contacts. The battery can be recharged using the HI 710040 battery charger (optional) without needing to open the meter or remove the battery.

- *Rugged probe for indoor and outdoor measurements*
- *Easy to calibrate*
- *Rechargebale battery can be used with optional HI 710040 inductive charger*



HI 3316D — Resistivity Probe

SPECIFICATIONS		HI 87314
Range	EC	199.9 µS/cm; 1999 µS/cm; 19.99 mS/cm; 199.9 mS/cm
	Resistivity	0 to 19.90 MΩ•cm
Resolution	EC	0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm
	Resistivity	0.10 MΩ•cm
Accuracy (@20°C)	EC	±1% FS
	Resistivity	±2% FS
Calibration		Manual, 1 point, for both EC and resistivity
Temperature Compensation		Automatic from 0 to 50°C with β selectable from 0 to 2.5%/°C for EC and from 2 to 7%/°C for resistivity
Probes		HI 76302W3 for conductivity measurements; HI 3316D for resistivity measurements
Battery Type / Life		(1) 9V / Approx 100 hours of use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		164 x 76 x 45 mm (6.5 x 3.0 x 1.8") / 250 g (8.8 oz.)

ORDERING INFORMATION

HI 87314 is supplied with HI 76302W 4-ring conductivity probe, HI 3316D resistivity probe, 9V battery, calibration screwdriver and instructions.

PROBES

HI 76302W 4-ring conductivity probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable

HI 3316D Resistivity probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable

SOLUTIONS

HI 7030L 12880 µS/cm calibration solution, 500 mL

HI 7031L 1413 µS/cm calibration solution, 500 mL

HI 7033L 84 µS/cm calibration solution, 500 mL

HI 7034L 80000 µS/cm calibration solution, 500 mL

HI 7035L 111800 µS/cm calibration solution, 500 mL

HI 7039L 5000 µS/cm calibration solution, 500 mL

HI 7061L Cleaning solution, 500 mL

ACCESSORIES

HI 710040 No-contact, inductive battery recharger

HI 731326 Calibration screwdriver

HI 76405 Electrode holder

Conductivity/TDS Meters

An Introduction to HANNA EC/TDS Instruments

Product Spotlights

Color Graphic Display Bench Meters

The HI 4321 research grade bench meter with pre-programmed USP method incorporates a large, backlit color LCD.



p 3.4

Color Graphic Display Portable Meters

HANNA's new HI 98188 graphic LCD portable meter with USP measures conductivity, resistivity, TDS, NaCl and temperature. This meter features Log-on-demand, auto-endpoint, Good Laboratory Practice (GLP) functions and PC compatibility via USB. Battery recharging is fast with the included inductive charger.



p 3.12



Spot Check Directly in Soil with this Ultra Portable!

The HI 98331 *Soil Test*™ is a special pocket tester designed to directly measure soil conductivity and temperature with an incorporated sensor in the penetration probe.



p 3.28

Precision Instruments for Lab and Field Applications.

Conductivity is a variable that is monitored in many fields such as the chemical industry and agriculture. Conductivity is a measurement of the amount of dissolved salts in a given liquid and is inversely proportional to resistance.

With conventional meters, conductivity is obtained by applying a voltage across two probes and measuring the conductance of the solution. Solutions with a high conductivity, produce a higher current. In order to keep a low current in a highly conductive solution, you would have to reduce the surface area of the probe or increase the distance between the poles. The dual-sensor method is suitable for solutions with low-medium conductivity. For this reason, different probes must be used for different ranges.

Only the 4-ring method can measure multiple ranges with a single meter and a single probe. The advantages of four-ring potentiometric method over the two-pole (amperometric) method are numerous, including a linear reading over a wide range, no polarization, no need for thorough cleaning, etc. HANNA was the world's first manufacturer to introduce the four-ring or potentiometric method of conductivity measurement with portable and bench meters.

HANNA offers a wide range of Potentiometric (4-ring) and Amperometric (two-pole) meters. You have a choice of multiple meters for TDS, conductivity and pH, as well as specific instruments made for boilers and agriculture.

Conductivity (EC) and Total Dissolved Solids (TDS)

Definition

Electrical conductivity is defined as the ability of a substance to conduct an electrical current and it is the reciprocal of electrical resistivity. The unit of measurement commonly used is the Siemens/cm (S/cm). Listed below are some conductivities found with different types of water.

WATER CONDUCTIVITY	
Pure water	0.055 µS/cm
Distilled water	0.5 µS/cm
Mountain water	1.0 µS/cm
Domestic water	500 to 800 µS/cm
Max. for potable water	10055 µS/cm
Sea water	52 mS/cm

HANNA instruments
With Great Products, Come Great Results™

HI 8730 • HI 8731 • HI 8732

EC, TDS and Temperature Meters

Versatile, Watertight Meters



Designed for QC and Production

HI 8730, HI 8731 and HI 8732 are complete, versatile and watertight conductivity meters that are lightweight and easy to maintain.

HI 8730 measures EC in the 0 to 1990 µS/cm range, TDS from 0 to 1990 ppm, and temperature from 0 to 70°C.

HI 8731 measures EC and TDS with extended ranges (from 0 to 6000 µS/cm and from 0 to 3000 ppm, respectively) and temperature from 0 to 70°C.

HI 8732 measures EC in the 0 to 4 mS/cm range, TDS from 0 to 1999 ppm and temperature from 0 to 70°C.

Each desired measurement mode features its own key for quick selection.

Conductivity measurements are automatically compensated for temperature changes with a fixed coefficient of 2%/°C.

Designed to require little maintenance, the HI 761285 probe features a built-in temperature sensor.

These meters can be calibrated at one point for EC or TDS, while the temperature range is factory calibrated.

- *Automatic Temperature Compensation*
- *Probe is easy to maintain and features a built-in temperature sensor*

SPECIFICATIONS		HI 8730	HI 8731	HI 8732
Range	EC	0 to 1990 µS/cm	0 to 6000 µS/cm	0.00 to 4.00 mS/cm
	TDS	0 to 1990 ppm	0 to 3000 ppm	0 to 1999 ppm
	Temperature	0 to 70.0°C		
Resolution	EC	10 µS/cm	10 µS/cm	0.01 mS/cm
	TDS	10 ppm	10 ppm	1 ppm
	Temperature	1°C	0.1°C	0.1°C
Accuracy (@20°C)	EC/TDS	±2% F.S.		
	Temperature	±1 °C	±0.5 °C	
Calibration		EC/TDS: Manual 1 point through knob; Temp: Factory calibrated		
TDS Factor		0.5	0.5	Variable, 0.56 to 0.72
Probe		HI 761285 (included)		
Temperature Compensation		Automatic, 0 to 50°C (32 to 122 °F) with β=2%/°C		
Environment		0 to 50°C (32 to 122°F); RH max 100%		
Battery Type / Life		(1) 1.9V / approx. 250 hours		
Dimensions		164 x 76 x 45 mm (6.4 x 3.0 x 1.8")		
Weight		205 g (8.8 oz.)		

ORDERING INFORMATION

HI 8730, **HI 8731** and **HI 8732** are supplied with conductivity probe with built-in temperature sensor, calibration solution sachets, battery and instructions.

PROBES

HI 761285 Conductivity probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable

SOLUTIONS

HI 70031P 1413 µS/cm solution, 20 mL sachet (25 pcs)
HI 7031M 1413 µS/cm solution, 250 mL
HI 7031L 1413 µS/cm solution, 500 mL
HI 70032P 1382 ppm solution, 20 mL sachet (25 pcs)
HI 7032M 1382 ppm solution, 250 mL
HI 7032L 1382 ppm solution, 500 mL
HI 70039P 5000 µS/cm solution, 20 mL sachet (25 pcs)
HI 7039M 5000 µS/cm solution, 250 mL
HI 7039L 5000 µS/cm solution, 500 mL
HI 70442P 1500 ppm solution, 20 mL sachet (25 pcs)
HI 70442M 1500 ppm solution, 250 mL
HI 70442L 1500 ppm solution, 500 mL

TDS and EC Meters

Designed for Measurement Simplicity

Choose from Either TDS or EC Specific Instruments

These EC and TDS portable meters have been designed for simplicity of use and provide accurate measurements.

Readings are automatically temperature compensated for and the calibration is manually performed at one point.

The BEPS (Battery Error Prevention System) automatically switches the meter off when the battery level is too low to ensure reliable readings.

The housing has been completely sealed against humidity, for use in any type of environment.

The probe is easy to clean and requires little maintenance.

Choose the model with the measurement range that best fits your application:

HI 86301: TDS from 0 to 1999 ppm (mg/L)

HI 86302: TDS from 0.00 to 10.00 ppt (g/L)

HI 86303: EC from 0 to 1999 µS/cm

HI 86304: EC from 0.00 to 19.99 mS/cm

- *Automatic Temperature Compensation*
- *Probe is easy to maintain and features a built-in temperature sensor*



SPECIFICATIONS	HI 86301	HI 86302	HI 86303	HI 86304
Range	0 to 1999 ppm	0.00 to 10.00 ppt	0 to 1999 µS/cm	0.00 to 19.99 mS/cm
Resolution	1 ppm	0.01 ppt	1 µS/cm	0.01 mS/cm
Accuracy (@20°C/68°F)	±2% F. S.			
Calibration	manual, 1 point, through trimmer			
Calibration Solution	HI 70032	HI 70032	HI 70031	HI 70039
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with β=2%/°C			
Probe	HI 7634D/1	HI 7632D/1	HI 7634D/1	HI 7632D/1
Battery Type / Life	(1) 9V alkaline / Approx 300 hours	(1) 9V alkaline / Approx 150 hours	(1) 9V alkaline / Approx 300 hours	(1) 9V alkaline / Approx 150 hours
Environment	0 to 50°C (32 to 122°F); RH max 100%			
Dimensions	164 x 76 x 45 mm (6.4 x 3.0 x 1.8")			
Weight	250 g (8.8 oz.)			

ORDERING INFORMATION

HI 86301 and **HI 86303** are supplied with HI 7634D/1 conductivity probe with built-in temperature sensor, calibration solution sachets, battery, screwdriver and instructions.

HI 86302 and **HI 86304** are supplied with HI 7632D/1 conductivity probe with built-in temperature sensor, calibration solution sachets, battery, screwdriver and instructions.

PROBES

HI 7632D/1 Conductivity probe, HR, with built-in temperature sensor, DIN connector and 1 m (3.3') cable

HI 7634D/1 Conductivity probe, LR, with built-in temperature sensor, DIN connector and 1 m (3.3') cable

SOLUTIONS

HI 70031P 1413 µS/cm solution, 20 mL sachet (25 pcs)

HI 7031M 1413 µS/cm solution, 250 mL

HI 7031L 1413 µS/cm solution, 500 mL

HI 70032P 1382 ppm solution, 20 mL sachet (25 pcs)

HI 7032M 1382 ppm solution, 250 mL

HI 7032L 1382 ppm solution, 500 mL

HI 70039P 5000 µS/cm solution, 20 mL sachet (25 pcs)

HI 7039M 5000 µS/cm solution, 250 mL

HI 7039L 5000 µS/cm solution, 500 mL

ACCESSORIES

HI 731326 Calibration screwdriver

HI 8734

TDS Meter

Portable, Waterproof with Wide Measurement Range

upgraded



Designed for Water Conditioning

HI 8734 has not only been specifically designed for the water conditioning industry, but particularly in the softening, demineralization, reverse osmosis and drinking water applications.

Three ranges of measurement ensure the highest accuracy possible. All three ranges can be executed at the touch of a button, without having to change the conductivity probe. This makes it very easy to switch applications without having to worry about recalibration.

To add to the meter's accuracy and efficiency, Manual Temperature Compensation is possible using a knob on the front panel.

For the best protection in the field, the 4-ring potentiometric probe is made of rugged PVC. To access difficult areas, the probe is supplied with a 1m (3.3') cable.

The ratio between conductivity and TDS is factory set at 0.5.

- *3 measurement ranges*
- *Rugged probe for field use*
- *Waterproof*

SPECIFICATIONS	HI 8734
Range	0.0 to 199.9 mg/L (ppm); 0 to 1999 mg/L (ppm); 0.00 to 19.99 g/L (ppt)
Resolution	0.1 mg/L (ppm); 1 mg/L (ppm); 0.01 g/L (ppt)
Accuracy (@20°C/68°F)	±1% F.S. (excluding probe error)
Calibration	manual, 1 point
Temperature Compensation	manual, 0 to 50°C (32 to 122°F) with ß = 2%/°C
Probe	HI 76301D with 1 m (3.3') cable (included)
Battery Type / Life	(1) 9V / approx. 100 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions	164 x 76 x 45 mm (6.4 x 3.0 x 1.8")
Weight	250 g (8.8 oz.)

ORDERING INFORMATION

HI 8734 is supplied with conductivity probe with 1m (3.3') cable, calibration screwdriver, 9V battery and instruction manual.

PROBES

HI 76301D 4-ring conductivity probe

SOLUTIONS

HI 7032L 1382 ppm (mg/L) calibration solution, 500 mL

HI 7036L 12.41 ppt (g/L) calibration solution, 500 mL

ACCESSORIES

HI 710015 Shockproof rubber boot, blue

HI 710016 Shockproof rubber boot, orange

HI 710022 Spare protective case



HI 710016 — Shockproof Boot



HI 710022 — Protective Case

HANNA instruments

With Great Products, Come Great Results™

upgraded

HI 8033

µS/mS/TDS Meter

with Potentiometric Technology

Ideal for Education

HI 8033 is a hand-held conductivity meter with the ability to take measurements in 3 different ranges.

The probe uses the 4-ring potentiometric method which measures conductivity with the utmost accuracy and reliability.

The four stainless steel rings are embedded in the resin shaft of the probe create a smooth surface for fast and easy cleaning.

To improve accuracy, temperature compensation can be performed with a knob on the front panel of the meter.

The dial on the front of the HI 8033 easily indicates which range you are working in.

- *3 conductivity ranges and 1 TDS*
- *Accurate and reliable*
- *Easy to clean probe*





HI 710010 — Shockproof Boot



HI 710001 — Soft Carrying Case

SPECIFICATIONS		HI 8033
Range	EC	0.0 to 199.9 µS/cm; 0 to 1999 µS/cm; 0.00 to 19.99 mS/cm
	TDS	0 to 19990 ppm
Resolution	EC	0.1 µS/cm; 1 µS/cm; 0.01 mS/cm
	TDS	10 ppm
Accuracy (@20°C/68°F)		±1% F.S. (excluding probe error)
Calibration		manual, 1 point
Temperature Compensation		manual, 0 to 50°C (32 to 122°F) with ß=2%/°C
Probe		HI 76301W EC/TDS probe with 1 m (3.3') cable (included)
Battery Type / Life		(1) 9V / approx. 100 hours of continuous use
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions		185 x 82 x 47 mm (7.3 x 3.2 x 1.9")
Weight		270 g (9.5 oz.)

ORDERING INFORMATION

HI 8033 is supplied with conductivity probe with 1m (3.3') cable, 9V battery and instruction manual.

PROBES

HI 76301W 4-ring conductivity probe with 1 m (3.3') cable

SOLUTIONS

HI 7030L 12880 µS/cm calibration solution, 500 mL

HI 7031L 1413 µS/cm cal. sol., 500 mL

HI 7032L 1382 ppm calibration solution, 500 mL

HI 7033L 84 µS/cm calibration sol., 500 mL

HI 7039L 5000 µS/cm calibration solution, 500 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 710001 Soft carrying case

HI 721313 Rugged carrying case

HI 99300 • HI 99301

EC/TDS/Temperature Meters

Waterproof with Amperometric Technology



SPECIFICATIONS		HI 99300	HI 99301
Range	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm (mg/L)	0.00 to 10.00 ppt (g/L)
	Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	
Resolution	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm (mg/L)	0.01 ppt (g/L)
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	EC	±2% F.S.	
	TDS	±2% F.S.	
	Temperature	±0.5°C / ±1°F	
TDS Factor (CONV)		adjustable, from 0.45 to 1.00 with 0.01 step (default 0.50)	
Calibration		automatic, 1 point at 1382 ppm (CONV 0.5) or at 1500 ppm (CONV 0.7) or at 1413 µS/cm	automatic, 1 point at 6.44 ppt (CONV 0.5) or at 9.02 ppt (CONV 0.7) or at 12880 µS/cm
Temperature Compensation		automatic, 0 to 60°C (32 to 140°F) with β adjustable from 0.0 to 2.4%/°C with 0.1% step	
Probe		HI 76306, EC/TDS/temperature, with DIN connector and 1 m (3.3') cable (included)	
Battery Type / Life		4 x 1.5V AAA / approx. 500 hours of continuous use	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions		143 x 80 x 38 mm (5.6 x 3.1 x 1.5)	
Weight		210 g (7.4 oz)	

An Affordable Solution for EC/TDS Measurement

HI 99300 and HI 99301 are two innovative meters that are provided with advanced features, designed for quick and easy field operation. The housing is waterproof and rated IP 67.

The multi-functional HI 76306 probe measures EC/TDS and temperature in one rugged unit. EC (or TDS) and temperature readings are displayed simultaneously. In addition, symbols and messages on the LCD indicate the meter status and guide the user through operations.

Calibration is a single point, automatic procedure and measurements are automatically compensated for temperature variations. The temperature compensation coefficient and the EC/TDS conversion factor are user-selectable.

At start-up, the meter shows the remaining battery percentage and when a low battery condition is detected, a battery symbol appears on the LCD to advise the user that only a few hours of working time are left. All settings and calibration data remain in memory when changing batteries. The meters are also provided with BEPS (Battery Error Prevention System), which turns the meter off when the battery level is too low, to ensure reliable readings.

- *Easy to Operate*
- *Waterproof Casing*
- *Battery life shown on LCD display*
- *Equipped with BEPS (Battery Error Prevention System)*

ORDERING INFORMATION

HI 99300 and **HI 99301** are supplied with HI 76306 probe, 1.5V AAA alkaline batteries (4), instructions and rugged carrying case.

PROBES

HI 76306 EC/TDS/temperature probe with 1 m (3.3') cable

SOLUTIONS

HI 70030P 12880 µS/cm calibration solution, 20 mL sachets (25)

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

HI 70038P 6.44 ppt calibration solution, 20 mL sachets (25)

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange



HI 710008 — Shockproof Boot

HANNA instruments

With Great Products, Come Great Results™

hold | replaceable | lcd display | B.E.P.S.

HI 98129 • HI 98130

pH/Conductivity/TDS Testers

Waterproof and Designed to Float

The Ultimate in HANNA Combination Testers!

HI 98129 and HI 98130 are waterproof testers that offer high accuracy pH, EC/TDS and temperature measurements in a single tester! No more switching between meters for your routine measurements. These floating, waterproof testers have a large easy-to-read, dual-level LCD and automatic shut-off. pH and EC/TDS readings are automatically temperature compensated (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. This gives these meters an extended life. Your tester no longer needs to be thrown away when the pH sensor is exhausted.

The EC/TDS conversion factor is user selectable as well as the temperature compensation coefficient (β).

Fast, efficient, accurate and portable, the Combo pH, EC/TDS and temperature tester brings you all the features you've asked for and more!

Replaceable pH electrode cartridge



The Combo features an easy-to-replace pH electrode and has an extendable cloth junction. The sturdy, snap-in connector means there are no pins to bend or break.

High accuracy



The graphite conductivity electrode provides greater accuracy because it cannot be contaminated by salt deposits in the solution. The exposed temperature sensor provides fast response times, and guarantees accurate temperature compensated readings.

On-screen Battery Life

LCD indicates the percentage of battery power remaining upon startup.



Standard or N.I.S.T Buffer Calibration

Auto calibration is performed with 2 sets of memorized buffers for greater accuracy.



Adjustable TDS Ratio

For measurement accuracy, users can choose between different conductivity to TDS conversion factors.





SPECIFICATIONS		HI 98129	HI 98130
Range	pH	0.00 to 14.00 pH	
	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm	0.00 to 10.00 ppt
	Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	
Resolution	pH	0.01 pH	
	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.05 pH	
	EC / TDS	±2% F.S.	
	Temperature	±0.5°C /±1°F	
Temperature Compensation		pH: automatic; EC/TDS: automatic with β adjustable from 0.0 to 2.4% / °C	
Calibration	pH	automatic, 1 or 2 points with 2 sets of standard buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)	
	EC / TDS	automatic, 1 point at 1413 µS/cm or 1382 ppm	automatic, 1 point at 12.88 mS/cm or 6.44 ppt
TDS Conversion Factor		adjustable, from 0.45 to 1.00	
pH Electrode		HI 73127 (replaceable; included)	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Battery Type / Life		(4) 1.5V / approx. 100 hours of continuous use, auto-off after 8 minutes of non-use	
Dimensions/Weight		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")/100 g (3.5 oz.)	

ORDERING INFORMATION

HI 98129 (*Combo*) and **HI 98130** (*Combo*) are supplied with 1.5V batteries (4), HI 73127 pH electrode and HI 73128 electrode removal tool.

ELECTRODES

HI 73127 Spare pH electrode for (*Combo*)

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70006P pH 6.86 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70009P pH 9.18 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 70030P 12.88 mS/cm buffer solution, 20 mL sachets (25)

HI 70031P 1413 µS/cm buffer solution, 20 mL sachets (25)

HI 70032P 1382 ppm buffer solution, 20 mL sachets (25)

HI 70038P 6.44 ppt buffer solution, 20 mL sachets (25)

HI 70442P 1500 ppm buffer solution, 20 mL sachets (25)

HI 70300M Electrode storage solution, 250 mL

HI 7061M Electrode cleaning solution, 250 mL

ACCESSORIES

HI 73128 Electrode removal tool

HI 98305 Conmet® 1 • HI 98306 Conmet® 2 • HI 98307 Conmet® 3

Stick Conductivity Meter

with 4-ring Technology and ATC



HI 98305

Easy to use, easy to clean

The need for an easy, accurate and reliable method to measure conductivity and TDS prompted HANNA to develop Conmet 1, Conmet 2 and Conmet 3. These meters utilize the proven 4-ring potentiometric method of measuring conductivity in liquids.

The 4-ring probe is constructed of a rugged resin shaft that houses 4 stainless steel rings, providing excellent immunity to hostile environments. The 4-ring technology provides a reading that is virtually unaffected by dirt and unclean samples. The smooth probe makes cleaning quick and simple.

All readings are temperature compensated. One-point calibration is performed by turning the trimmer on the instrument body.

Conmet® 1 has a range of 0 to 1999 µS/cm, designed for areas such as: softeners, demineralizers and drinking water.

Conmet® 2 has a range of 0.00 to 19.99 mS/cm and is particularly suitable for: waste water, hydroponics and fertilizer control applications.

Conmet® 3 with a range of 0.00 a 19.99 ppt is perfect for HVAC applications.



HI 98306

SPECIFICATIONS	HI 98305 (CONMET®1)	HI 98306 (CONMET®2)	HI 98307 (CONMET®3)
Range	0 to 1999 µS/cm	0.00 to 19.99 mS/cm	0.00 to 19.99 ppt (g/l)
Resolution	1 µS/cm	0.01 mS/cm	0.01 ppt (g/l)
Accuracy (@20°C/68°F)	±2% F.S.		
Calibration	manual, 1 point		
Temperature Compensation	automatic, 0 to 50°C with b=1.9±0.15 %/°C, with reference temperature 25°C		
Probe	HI 3291 (included)	HI 3292 (included)	HI 3292 (included)
Battery Type / Life	(4) 1.5V AA / approx. 150 hours of continuous use		
Environment	0 to 50°C (32 to 122°F); RH max 95%		
Dimensions	265 x 29 x 15 mm (10.4 x 1.1 x 0.6")		
Weight	400 g (0.88 lbs.) - with carrying case		

ORDERING INFORMATION

HI 98305 (Conmet®1) is supplied with rugged plastic carrying case and a 120 mL HI 7031 calibration solution.

HI 98306 (Conmet®2) is supplied with rugged plastic carrying case and a 120 mL HI 7030 calibration solution.

HI 98307 (Conmet®3) is supplied with rugged plastic carrying case and a 120 mL HI 7036 calibration solution.

ELECTRODES

HI 3291 Spare probe for Conmet®1

HI 3292 Spare probe for Conmet®2 and Conmet®3

ACCESSORIES

HI 70030P 12880 µS/cm calibration solution, 20 mL sachets (25)

HI 7030M 12880 µS/cm cal. sol., 250 mL

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 7031M 1413 µS/cm cal. sol., 250 mL

HI 7036M 12.41 ppt cal. sol., 250 mL

With Great Products, Come Great Results™



HI 98311 DiST® 5 • HI 98312 DiST® 6

EC/TDS/Temperature Testers

Advanced Waterproof Testers that Float!

Small in Size, Big on Features!

The original DiST® (Dissolved Solids Tester) was first introduced in 1986 by HANNA. Since then, Conductivity and Total Dissolved Solids measurements have never been easier. DiST's ease-of-use, in combination with its affordability made it the standard in EC and TDS measurement. HANNA continues the tradition of innovation with the DiST®5 and DiST®6.

Here at HANNA we have always valued the comments and suggestions coming from our customers, so for this series, we have included all the features you have asked for and more! The DiST®5 and DiST®6 include features such as: a replaceable graphite electrode, adjustable TDS ratio, temperature in °C or °F, automatic temperature compensation (ATC) with adjustable β, battery level indicator, stability indicator, automatic shut-off and automatic calibration. All of this in a floating, waterproof casing. This 3-in-1 tester is unmatched in EC/TDS/Temperature measurements.



- *Replaceable graphite electrode*

  An easy-to-replace graphite electrode with a sturdy, snap-in connector means there are no pins to bend or break.
- *High accuracy*

  The graphite conductivity electrode provides greater accuracy because it cannot be contaminated by salt deposits in the solution.
- *Automatic Calibration and Temperature Compensation*

On-screen Battery Life

LCD indicates the percentage of battery power remaining upon startup.



Adjustable Temp. Coefficient

For more precise temperature compensated measurements users can choose between different BETA (β) factors.



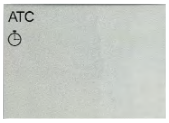
Adjustable TDS Ratio

For measurement accuracy, users can choose between different conductivity to TDS conversion factors.



Instability and ATC Indicators

Ensures reliable EC and TDS measurements. ATC symbol is shown when active.





SPECIFICATIONS		HI 98311 (DIST®5)	HI 98312 (DIST®6)
Range	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm	0.00 to 10.00 ppt
	Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	
Resolution	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	EC	±2% F.S.	
	TDS	±2% F.S.	
	Temperature	±0.5°C / ±1°F	
Calibration		automatic, 1 point at 1413 µS/cm or 1382 ppm	automatic, 1 point at 12.88 mS/cm or 6.44 ppt
TDS Conversion Factor		adjustable from 0.45 to 1.00	
Temperature Compensation		automatic, with ß adjustable from 0.0 to 2.4% / °C	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Battery Type / Life		(4) 1.5V with BEPS / approx. 100 hours of co.ntinuous use, auto-off after 8 minutes of non-use	
Dimensions		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")	
Weight		100 g (3.5 oz.)	

ORDERING INFORMATION

HI 98311 (DiST®5) and **HI 98312** (DiST®6) are supplied with HI 73311 EC/TDS probe, HI 73128 probe removal tool and 1.5V batteries (4).

PROBES

HI 73311 Spare probe for HI 98311 and HI 98312

SOLUTIONS

HI 70030P 12.88 mS/cm calibration solution, 20 mL sachets (25)

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 70038P 6.44 ppt calibration solution, 20 mL sachets (25)

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

ACCESSORIES

HI 73128 Probe removal tool

HI 98331

EC Tester *Soil Test™*

with Penetration Probe for Direct Soil Measurements

replaceable



Spot Check Directly in Soil!

The HI 98331 *Soil Test™* is a special pocket tester designed to directly measure soil conductivity and temperature. With a temperature sensor in the penetration probe, readings are automatically temperature compensated. Conductivity range can be calibrated at one point and is designed to be done in a standardized solution.

- *122 mm (4.5") Penetration probe*
- *Automatic temperature compensation*
- *Lightweight and portable*

SPECIFICATIONS		HI 98331 Soil Test™
Range	EC	0.00 to 4.00 mS/cm (dS/m)
	Temperature	0.0 to 50.0°C
Resolution	EC	0.01 mS/cm
	Temperature	0.1°C
Accuracy (@20°C)	EC	±0.05 mS/cm (0.00 to 2.00 mS/cm), ±0.30 mS/cm (2.00 to 4.00 mS/cm)
	Temperature	±1°C
Calibration		Manual, 1 point
Probe		HI 73331 122 mm (4.5") penetration
Temperature Compensation		automatic, temperature coefficient (β) fixed 2% / °C
Environment		0 to 50°C (32 to 122°F); RH max 100%
Battery Type		(4) 1.5V
Dimensions (without probe)		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")
Weight		100 g (3.5 oz.)

ORDERING INFORMATION

HI 98331 (*Soil Test™*) is supplied with HI 73331 penetration conductivity probe, batteries, calibration screwdriver and instructions.

PROBES

HI 73331 Direct soil conductivity probe

SOLUTIONS

HI 7031L 1413 µS/cm (1.4 mS/cm) calibration solution, 500 mL

HI 7031M 1413 µS/cm (1.4 mS/cm) calibration solution, 250 mL

HI 70031P 1413 µS/cm (1.4 mS/cm) calibration solution, 20 mL sachets (25)

ACCESSORIES

HI 731326 Calibration screwdrivers (20)



HANNA instruments

With Great Products, Come Great Results™

replaceable B.E.P.S.

HI 983311
EC/TDS Tester
with Extra Long Probe

Reach New Lows — Designed for Nutrient Solutions!

HI 983311 EC/TDS Aqua Dip™ provides simple and fast EC/TDS/Temperature measurements in places with high relative humidity. EC/TDS Aqua Dip™ allows immediate and precise response with only two operation buttons. This rugged unit is tough and built to last. The probe is even durable enough to be used as a stirrer. The HOLD button will freeze the display reading for your documentation requirements. Aqua Dip is factory calibrated and offers total protection against humidity, which makes Aqua Dip ideal for field use.

- *Dual level LCD*
- *Probe can be used as a fertilizer solution stirrer*
- *HOLD button to freeze display*
- *Auto shut-off*
- *No calibration needed*



SPECIFICATIONS	HI 983311 AQUA DIP™ EC/TDS
Range	EC: 0 to 3999 µS/cm; TDS : 0 to 2000 ppm; °C: 0.0 to 60.0°C
Resolution	EC: 1 µS/cm; TDS : 1 ppm; °C: 0.1°C
Accuracy (@20°C)	EC/TDS: ±2% F.S.; °C: ±0.5°C
Calibration	factory calibrated
TDS Factor	0.5 or 0.7 (available upon request)
Temperature Compensation	automatic, with ß = 2.1% / °C
Environment	0 to 50°C (32 to 122°F); RH max 100%
Battery Type / Life	(2) 1.5V AAA with BEPS / approx. 180 hours of use
Dimensions	94 x 38 x 440 mm (3.7 x 1.5 x 17.3")
Weight	200 g (7.8 oz.)

ORDERING INFORMATION

HI 983311 (Aqua Dip™) is supplied with batteries and instructions.

Simple and Fast TDS

To perform simple and fast TDS measurements in places with a high percentages of humidity, HANNA offers the Aqua Dip™ TDS. With only two operating buttons, the Aqua Dip™ TDS allows an immediate and precise response. This instrument indicates the TDS measurement in ppm and the temperature in °C. It is very simple to use, one button turns the meter on and the other switches from TDS to temperature measurements, and activates the HOLD function. The hold feature, in particular, is very important for measurements in tanks, where many parameters need to monitored and the values need to be recorded manually. Aqua Dip™ is factory calibrated. Measurements are automatically compensated up to 60°C with a reference temperature of 25°C. Aqua Dip™ uses conventional AAA batteries and is ideally suited for analysis in the field.

hold

HI 983310
TDS Tester
with Extra Long Probe

- *Probe can be used as a fertilizer solution stirrer*
- *HOLD button to freeze display*
- *No calibration needed*



SPECIFICATIONS	HI 983310 AQUA DIP™ TDS
Range	TDS : 0 to 1999 ppm; °C: 0.0 to 60.0°C
Resolution	TDS : 1 ppm; °C: 0.1°C
Accuracy (@20°C)	TDS: ±2% F.S.; °C: ±0.5°C
Calibration	factory calibrated
TDS Factor	0.5
Temperature Compensation	automatic, with ß = 2% / °C
Environment	0 to 50°C (32 to 122°F); RH max 100%
Battery Type / Life	(2) 1.5V AAA batteries / approx. 1000 hours of use
Dimensions	94 x 38 x 440 mm (3.7 x 1.5 x 17.3")
Weight	200 g (7.8 oz.)

ORDERING INFORMATION

HI 983310 (Aqua Dip™TDS) is supplied with batteries and instructions.

Conductivity/TDS Meters

An Introduction to HANNA *EC/TDS Instruments*

In aqueous solutions, conductivity is directly proportional to the concentration of total dissolved solids (TDS) as salts. Therefore the higher the concentrations of solids, the greater the conductivity. The relation between conductivity and dissolved solids is expressed with a good approximation, by:

English Degrees **American Degrees**

1.4 µS/cm = 1 ppm or 2 µS/cm = 1 ppm (parts per million of $CaCO_3$)

where 1 ppm = 1 mg/L is the measuring unit for dissolved solids.

In addition to conductivity meters, there are TDS instruments that automatically convert the conductivity value into ppm, thus providing a direct reading of the dissolved solids concentration.

The conductivity of a solution is determined by molecular motion. Temperature affects molecular motion and it is, therefore, important to compensate for temperature when accurate measurements are necessary. To correct for the effect of temperature, a compensation coefficient is used. In most applications, 2% per degree Celsius is used as a value to compensate for the temperature effect.

Conductivity Measurement

It is possible to differentiate conductivity meters according to the measurement method they use, that is, amperometric or potentiometric. The amperometric system applies a known potential difference (V) to two electrodes and measures the current (I) that passes through them. According to Ohm's law:

$$I = V/R$$

where R is resistance, V is the known voltage and I is the current going from one electrode (probe) to the other.

It follows that the higher the current obtained, the greater the conductivity. The resistance, however, depends on the distance between the two electrodes and their surfaces, which can vary due to deposits of salts or other materials by electrolysis. For this reason an amperometric system is recommended for solutions with low level of dissolved solids, i.e. up to 1 g/L (ppt) (approx. 2000 µS/cm).

The 4-ring potentiometric method is based on the principle of induction and eliminates common problems associated with the amperometric system, such as the effects of polarization. The two outer rings apply an alternating voltage and induce a current loop in the solution. The two inner rings measure the voltage drop induced by the current loop, which is dependent on the conductivity of the solution. A PVC shield maintains the current field restrained and constant. Using the four-ring method, it is possible to measure conductivity with ranges up to 200000 µS/cm and 100 g/L (ppt).

It is possible to obtain the value of the hardness of water with good approximation even in French degrees, using conductivity or TDS meters. The main cause of hard water is the presence of dissolved calcium or magnesium ions. The most common measurement unit of hardness is the French degree (°f), defined as:

$$1°f = 10 \text{ ppm of } CaCO_3$$

Dividing the ppm measurement of the dissolved solids by 10 gives the hardness value of water with an error of 2-3°f. As noted earlier, 1 ppm = 2 µS/cm conductivity, thus:

$$1°f = 20 \text{ µS/cm} = 10 \text{ ppm}$$

Dividing the microSiemens conductivity measurement by 20 gives the French degree hardness of water (with a 2-3°f error).

IMPORTANT: Measurement of water hardness with either conductivity or dissolved solids meters must be performed before any softening treatments. During the water softening processes, calcium and magnesium are substituted by sodium, which does not alter the total concentration of dissolved solids, but diminishes the hardness of the water.

Table of Water Conductivity and Hardness

PPM	µS/CM	°F	HARDNESS
0-70	0-140	0-7	very soft
70-150	140-300	7-15	soft
150-250	300-500	15-25	slightly hard
250-320	500-640	25-32	moderately hard
320-420	640-840	32-42	hard
above 420	above 840	above 42	very hard

AREA OF APPLICATION	APPLICATION
Graphic arts	Calibration baths, film processing
Breweries and yeast factories	Cleaning, filter monitoring, dispensing of common salt in yeast production
Water softening	Characterization of plants incoming water, control of the status of water softening resins, control of osmotic membranes
Fertilizer dosing	Hydroponics and fertigation systems
Chemical industry	Monitoring of heat exchangers for leak proof integrity, acid and alkaline solutions for concentration, alkalies, salts and acids for concentration in manufacturing
Steam generation, power plants	Ion exchanger, boiler feed water for residual salt contents, evaporators and condensers for leak proof integrity
Electrolytic and electro-plating techniques	Forming baths in capacitor manufacturing, etching solutions, electrolytic dieforming, zinc electrolysis, plating baths, rinse water in semiconductor manufacturing
Metallurgical works	Ore preparation, bauxite processing
Food industry	Vegetables preservatives, potato peelings waste lyes, salt brines, dairies, etc.
Paper and textile industry, tanneries, etc.	Water treatment, bleaching, soap and washing baths, mordants
Soap and detergent industry	Removal of uncombined glycerine in soap manufacturing, residual lye, lye concentrations
Cooling towers	Testing of pipe scales and cooling water aggressivity

HI 981409 • HI 981410

EC and TDS Testers

for Fertigation Solutions



Designed Specifically for Agricultural Applications

HI 981409 and HI 981410 TDS and EC meters have been specifically designed to address the needs of operators in hydroponics, greenhouses and nurseries. These meters employ the latest in custom-built, application-specific microchips as well as rugged housing to measure TDS and EC in fertilizer mixes.

Calibration is easy and completely automatic. Simply press and hold the on/off button for a few seconds and the microchip inside the meter requests the appropriate calibration solution. Place the probe in the solution and wait until it is calibrated. No extra buttons to push or dials to turn!

HI 1220 probe measures 25 cm (10") and can be used to mix the fertilizer solution! The custom-built microprocessor switches the meter off after five minutes of inactivity to save battery life. The outer casing also incorporates a molded eye so that the meter can be hung right where it is needed.

- *Lightweight and they float!*
- *Water resistant*
- *Ideal for mixing fertilizer*
- *Automatic calibration*
- *Automatic temperature compensation*

SPECIFICATIONS	HI 981409	HI 981410
Range	0 to 1999 mg/L (ppm)	0.00 to 10.00 mS/cm
Resolution	1 mg/L (ppm)	0.01 mS/cm
Accuracy (@20°C/68°F)	±2% F.S.	
Calibration	automatic, at 1500 ppm	automatic, at 5.00 mS/cm
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with β = 2%/°C	
Probe	HI 1220, replaceable EC/TDS probe, 240 mm (9.4") long, with DIN connector (included)	
Battery Type / Life	(2) 1.5V AA / approx. 3000 hours of continuous use; auto-off after 5 minutes of non-use	
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions (meter only)	86 x 94 x 33 mm (3.4 x 3.7 x 1.3")	
Weight (meter only)	150 g (5.3 oz.)	

ORDERING INFORMATION

HI 981409 is supplied with HI 1220 EC/TDS probe L: 240 mm with DIN connector with protective sheath, 1.5 V AA batteries (2) and 1500 ppm solution sachet (20 mL).

HI 981410 is supplied with HI 1220 EC/TDS probe L: 240 mm with DIN connector with protective sheath, 1.5 V AA batteries (2) and 5.00 mS/cm solution sachet (20 mL).

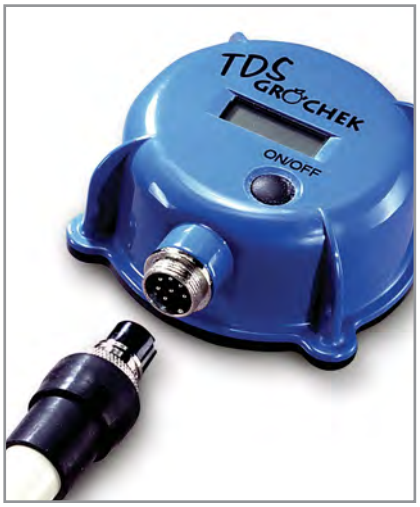
ELECTRODES

HI 1220 Spare probe for HI 981409 and HI 981410

SOLUTIONS

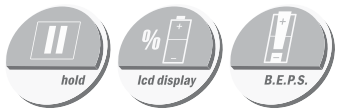
HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

HI 70039P 5.00 mS/cm calibration solution, 20 mL sachets (25)



HANNA instruments

With Great Products, Come Great Results™



HI 98323 DiST® 7 • HI 98324 DiST® 8

EC/TDS Testers

with Sample Cell

Economical Cup Style Instruments

DiST® 7 & DiST® 8 handheld meters from HANNA are designed for quick and easy EC, TDS and temperature measurements with high accuracy. These waterproof instruments feature a dual-level LCD that simultaneously display EC or TDS and temperature in either °C or °F.

These microprocessor meters have been developed in direct response to users' requests in water treatment, boilers, cooling towers, reverse osmosis and agricultural applications.

Rugged and easy-to-use, each feature an on-board sample cell with built-in funnel, digital readout, push button automatic calibration and automatic temperature compensation. The EC/TDS conversion factor and temperature coefficient (β) are user-adjustable for application-specific measurements.

At startup DiST 7 & DiST 8 perform a self-check and then display the battery level to ensure proper working conditions. Each unit has a stability indicator and hold feature to prompt the user when to freeze the display and take a reading for easy and accurate recording.

Choose your model according to the EC/TDS range of your application:

DiST® 7: 0 to 3999 µS/cm (EC); 0 to 2000 ppm (TDS)

DiST® 8: 0.00 to 20.00 mS/cm (EC); 0.00 to 10.00 ppt (TDS)

- *Multiple ranges*
- *Automatic calibration*
- *Automatic Temperature Compensation*
- *HOLD function*





SPECIFICATIONS		HI 98323 (DIST®7)	HI 98324 (DIST®8)
Range	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm	0.00 to 10.00 ppt
	Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	
Resolution	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temperature	0.5°C / 0.1°F	
Accuracy (@20°C)	EC	±2% F.S.	
	TDS	±2% F.S.	
	Temperature	±0.5°C / ±1°F	
Calibration		automatic, 1 point at 1413 µS/cm or 1382 ppm	automatic, 1 point at 12.88 mS/cm or 6.44 ppt
TDS Conversion Factor		adjustable from 0.45 to 1.00	
Temperature Compensation		automatic, with ß adjustable from 0.0 to 2.4% / °C	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Battery Type / Life		(4) 1.5V AA / approx. 2000 hours of continuous use; auto-off after 8 minutes of non-use	
Dimensions		120 x 53 x 81 mm (4.7 x 2.1 x 3.2")	
Weight		205 g (7.2 oz.)	

ORDERING INFORMATION

HI 98323 (DiST®7) is supplied with calibration solution, batteries and instructions.

HI 98324 (DiST®8) is supplied with calibration solution, batteries and instructions.

SOLUTIONS

HI 7030M 12880 µS/cm calibration solution, 250 mL

HI 70030P 12880 µS/cm calibration solution, 20 mL sachets (25)

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 7031M 1413 µS/cm calibration solution, 250 mL

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 7032M 1382 ppm calibration solution, 250 mL

HI 70038P 6.44 ppt calibration solution, 20 mL sachets (25)

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

HI 70442M 1500 ppm calibration solution, 250 mL

DiST®: HI 98300 • HI 98301 • HI 98302 • HI 98303 • HI 98304

EC and TDS Testers



A Smart, Economical Choice for Spot EC and TDS Measurements

DiST® testers are reliable, pocket-sized instruments that will give you quick and accurate readings of conductivity and TDS.

This popular line of Dissolved Solids Testers have been redesigned to offer a host of improvements.

The casing has been modified to provide increased strength, a better fit for holding and a large LCD for easy viewing. The graphite sensors provide better repeatability since they do not oxidize. The casing has been engineered to allow air bubbles to escape. The temperature sensor is exposed to provide faster response time.

HI 98300, HI 98301 (DiST 1) and HI 98302 (DiST® 2) perform TDS measurements, while HI 98303 (DiST 3) and HI 98304 (DiST® 4) provide conductivity readings.

If calibration is necessary, simply submerge the electrode tip into calibration solution and adjust the trimmer on the side of the tester.

SPECIFICATIONS	HI 98300 / HI 98301 (DIST® 1)	HI 98302 (DIST® 2)	HI 98303 (DIST® 3)	HI 98304 (DIST® 4)
Range	1999 ppm (mg/L)	10.00 ppt (g/L)	1999 µS/cm	19.99 mS/cm
Resolution	1 ppm (mg/L)	0.01 ppt (g/L)	1 µS/cm	0.01 mS/cm
Accuracy (@20°C/68°F)	±2% F.S.	±2% F.S.	±2% F.S.	±2% F.S.
TDS Factor	0.65 / 0.5	0.5	-	-
Calibration Solution	HI 70442 / HI 70032	HI 70038	HI 70031	HI 70039 or HI 70030
Calibration	manual, 1 point	manual, 1 point	manual, 1 point	manual, 1 point
Probe	HI 73301	HI 73302	HI 73303	HI 73304
Temperature Compensation	automatic, 0 to 50°C (32 to 122°F)			
Battery Type / Life	(4) 1.5V / approx. 200 hours of continuous use			
Environment	0 to 50°C (32 to 122°F); RH max 95%			
Dimensions	175 x 41 x 23 mm (6.9 x 1.6 x 0.9")			
Weight	95 g (3.4 oz.)			



ORDERING INFORMATION

HI 98300 (DiST®1 with TDS factor = 0.65) is supplied with protective cap, screwdriver, batteries and instructions.

HI 98301 (DiST®1 with TDS factor = 0.5) is supplied with protective cap, screwdriver, batteries and instructions.

HI 98302 (DiST®2 with TDS factor = 0.5) is supplied with protective cap, screwdriver, batteries and instructions.

HI 98303 (DiST®3) is supplied with protective cap, screwdriver, batteries and instructions.

HI 98304 (DiST®4) is supplied with protective cap, screwdriver, batteries and instructions.

ELECTRODES

HI 73301* Spare probe for HI 98300 and HI 98301

HI 73302* Spare probe for HI 98302

HI 73303* Spare probe for HI 98303

HI 73304* Spare probe for HI 98304

SOLUTIONS

HI 70030P 12.88 mS/cm calibration solution, 20 mL sachets (25)

HI 7030M 12.88 mS/cm calibration solution, 250 mL

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 7031M 1413 µS/cm calibration solution, 250 mL

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 7032M 1382 ppm calibration solution, 250 mL

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

HI 70038P 6.44 ppt calibration solution, 20 mL sachets (25)

HI 70039P 5.00 mS/cm calibration solution, 20 mL sachets (25)

HI 7039M 5.00 mS/cm calibration solution, 250 mL

* To be replaced by authorized technical personnel only.

HANNA instruments

With Great Products, Come Great Results™

EC and TDS Testers

with Attached Probe on a 1 m Cable

Reaches Beyond the Average Tester

This series of Primo testers has been designed for those hard-to-reach places where standard testers are not particularly suitable. The specially designed conductivity/TDS probe supplied with the Primo series, has a one meter (3') cable. This helps insertion in inaccessible or low level places without the operator having to maneuver into awkward positions to take a reading.

The automatic calibration together with the convenience of the HANNA 20 mL sachet solutions make frequent calibration easier increases accuracy. Conductivity and TDS readings are temperature sensitive and as a result, the probes contain a temperature sensor. All Primo models automatically compensate for temperature variations.

Primo 1 measures TDS from 0 to 1999 ppm in increments of 1 ppm.

Primo 3 measures both TDS and temperature from 0 to 60.0°C.

Primo 4 measures EC reading from 0 to 10.00 in increments of one hundredths of mS/cm (EC).

- *Probe with 1 m (3.3') cable*
- *Automatic calibration*
- *Automatic Temperature Compensation*





SPECIFICATIONS	PRIMO 1	PRIMO 3	PRIMO 4
Range	0 to 1999 ppm (mg/L)	0 to 1999 ppm (mg/L); 0.0 to 60.0°C	0.00 to 10.00 mS/cm
Resolution	1 ppm (mg/L)	1 ppm (mg/L); 0.1°C	0.01 mS/cm
Accuracy (@20°C/68°F)	±2% F.S.	±2% F.S.; ±0.5°C	±2% F.S.
Calibration Solution	HI 70032P	HI 70032P	HI 70039P
Calibration	automatic, at 1382 ppm	automatic, at 1382 ppm	automatic, at 5.00 mS/cm
Temperature Compensation	automatic, 0 to 60°C (32 to 140°F), ß=2%/°C		
Battery Type / Life	(2) 1.5V / approx. 200 hours; auto-off after 5 minutes of non-use		
Environment	0 to 50°C (32 to 122°F); RH max 95%		
Dimensions (meter only)	66 x 50 x 25 mm (2.6 x 2.0 x 1.0")		
Weight	115 g (4.1 oz.)		

ORDERING INFORMATION

Primo 1 is supplied with batteries and instructions.

Primo 3 is supplied with batteries and instructions.

Primo 4 is supplied with batteries and instructions.

SOLUTIONS

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 7032M 1382 ppm cal. solution, 250 mL

HI 70039P 5.00 mS/cm calibration solution, 20 mL sachets (25)

HI 7039M 5.00 mS/cm cal. solution, 250 mL

Primo • Primo 2 • Primo 5

Conductivity and TDS Testers

with Automatic Temperature Compensation



An Indespensible Tool for Water Quality

The Primo TDS tester provides a fast and dependable way to measure the Total Dissolved Solids in your water samples. It is ideally suited for the rigorous demands of water quality professionals. Professionals appreciate Primo's easy-to-read LCD when demonstrating the before and after results of conditioning and filtration systems. Temperature is compensated automatically to ensure the readings are consistent to the standard or reference temperature.

Operating and routine maintenance has never been easier. Primo TDS uses a single button at the top of the meter. Press it once and the meter is powered and ready for use. Press and hold the button for a few seconds and Primo automatically enters calibration mode. Simply open a sachet of the calibration solution, dip the probe in, and within seconds the meter recognizes the calibration solution and calibrates itself! Maximum battery life is managed by Primo's power micro-processor, which automatically turns it of after 5 minutes of inactivity.

- *Choose from TDS or EC*
- *Automatic calibration*
- *Automatic Temperature Compensation*

SPECIFICATIONS	PRIMO	PRIMO 2	PRIMO 5
Range	0 to 1999 ppm (mg/L)	0 to 1999 ppm (mg/L); 0.0 to 60.0°C	0 to 1999 µS/cm
Resolution	1 ppm (mg/L)	1 ppm (mg/L); 0.1°C	1 µS/cm
Accuracy (@20°C/68°F)	±2% F.S.	±2% F.S.; ±0.5°C	±2% F.S.
Calibration Solution	HI 70032P	HI 70032P	HI 70031P
Calibration	automatic, at 1382 ppm	automatic, at 1382 ppm	automatic, at 1413 µS/cm
Temperature Compensation	automatic, 0 to 60°C (32 to 140°F), ß=2%/°C		
Battery Type / Life	(2) 1.5V / approx. 200 hours; auto-off after 5 minutes of non-use		
Environment	0 to 50°C (32 to 122°F); RH max 95%		
Dimensions	180 x 50 x 25 mm (7.1 x 2.0 x 1.0")		
Weight	50 g (1.8 oz.)		

ORDERING INFORMATION

Primo is supplied with batteries and instructions.

Primo 2 is supplied with batteries and instructions.

Primo 5 is supplied with batteries and instructions.

SOLUTIONS

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 7031M 1413 µS/cm cal. solution, 250 mL

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 7032M 1382 ppm cal. solution, 250 mL



HANNA instruments

With Great Products, Come Great Results™

Accurate, Affordable Readings

DiST® is an affordable pocket tester that ensures precise EC and TDS readings. Simply immerse the tester in the solution and the reading will be displayed.

For many applications, it is crucial to determine the quantity of dissolved salts in a body of water. High concentrations can cause corrosion, deposits in heating systems and can be detrimental to aquatic plant life and animals.

HI 96301 (DiST® 1) and **HI 96302 (DiST® 2)** read in ppm, while **HI 96303 (DiST 3)**and **HI 96304 (DiST 4)** read in µS/cm.

Calibration is very simple to perform: immerse the tester in the calibration solution and adjust the trimmer on the rear of the meter until the correct value is displayed.

Automatic temperature compensation ensures correct readings. The digital display allows the operator to see the readings from every angle.

- *Automatic Temperature Compensation*
- *Rugged casing*



SPECIFICATIONS	HI 96301 (DIST® 1)	HI 96302 (DIST® 2)	HI 96303 (DIST® 3)	HI 96304 (DIST® 4)
Range	1990 ppm	10000 ppm	1990 µS/cm	19900 µS/cm
Resolution	10 ppm	100 ppm	10 µS/cm	100 µS/cm
Accuracy (@20°C/68°F)	±2% F.S.	±2% F.S.	±2% F.S.	±2% F.S.
Calibration	manual, 1 point, through trimmer			
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F)			
Battery Type / Life	(4) 1.5V / approx. 150 hours of continuous use			
Environment	0 to 50°C (32 to 122°F); RH max 95%			
Dimensions	150 x 30 x 21 mm (5.9 x 1.2 x 0.8")			
Weight	70 g (2.5 oz.)			



ORDERING INFORMATION

HI 96301 (DiST®1) is supplied with protective cap, calibration screwdriver, batteries and instructions.

HI 96302 (DiST®2) is supplied with protective cap, calibration screwdriver, batteries and instructions.

HI 96303 (DiST®3) is supplied with protective cap, calibration screwdriver, batteries and instructions.

HI 96304 (DiST®4) is supplied with protective cap, calibration screwdriver, batteries and instructions.

SOLUTIONS

HI 70031P	1413 µS/cm calibration solution, 20 mL sachets (25)
HI 7031M	1413 µS/cm cal. solution, 250 mL
HI 70032P	1382 ppm calibration solution, 20 mL sachets (25)
HI 7032M	1382 ppm cal. solution, 250 mL
HI 70038P	6.44 ppt calibration solution, 20 mL sachets (25)
HI 70039P	5000 µS/cm calibration solution, 20 mL sachets (25)
HI 7039M	5000 µS/cm cal. solution, 250 mL

HI 98204

pH/ORP/EC Meter

with °C Temperature Measurement



- *4 instruments in 1*
- *Long battery life*
- *Lightweight with built in handle*
- *Easy to take measurements*

Water Test—A Portable Water Testing laboratory

Water Test provides quick and reliable measurement of the four most important variables in water analysis: pH, ORP, conductivity and temperature.

The lightweight and compact body makes it perfect for use in the plant as well as the field. Superior in design and construction, Water Test is made of rugged VALOX® material which provides excellent protection from typical environmental conditions.

Water Test is engineered with such simplicity that even non-technical personnel can use it: fill the base of Water Test with the sample to be measured, press "RANGE" to select the mode and then simply read your measurement!

The rugged construction and simple operation make Water Test perfect for use in the fields of: water treatment analysis, waste water tests, ecological studies, aquaculture and hydroponic applications.

SPECIFICATIONS	PH	ORP	CONDUCTIVITY	TEMPERATURE
Range	0.0 to 14.0 pH	±1000 mV	0 to 1999 µS/cm	0.0 to 60.0°C
Resolution	0.1 pH	1 mV	1 µS/cm	0.1°C
Accuracy (@20°C/68°F)	±0.2 pH	±5 mV	±2% F.S.	±1°C
Calibration	manual, 2 points	factory calibrated	manual, 1 point	factory calibrated
Battery Type / Life	(3) 1.5V / approx. 200 hours of continuous use			
Environment	0 to 50°C (32 to 122°F); RH max 95%			
Dimensions	190 x 85 x 85 mm (7.5 x 3.3 x 3.3")			
Weight	260 g (9.2 oz.)			

ORDERING INFORMATION

HI 98204 (Water Test) is supplied with measuring compartment, batteries and instructions.

SOLUTIONS

HI 740088	Plastic vessel for sample
HI 7004M	pH 4.01 buffer solution, 250 mL
HI 7007M	pH 7.01 buffer solution, 250 mL
HI 7010M	pH 10.01 buffer solution, 250 mL
HI 7020M	200/275 mV test solution, 250 mL
HI 7031M	1413 µS/cm calibration solution, 250 mL
HI 70300M	Electrode storage solution, 250 mL
HI 7091M	Reducing solution, 250 mL
HI 7092M	Oxidizing solution, 250 mL

Carry a Water Test portable lab anywhere.



HANNA instruments®

With Great Products, Come Great Results™

Simple, Affordable Total Dissolved Solids Measurements

TDS 1 is a simple and affordable pocket tester for TDS measurements. Due to its internal sensor, TDS measurements are automatically compensated for temperature variations. Calibration can be performed in one point with a trimmer.

The tester is supplied with a cap that protects the probe when it is not in use.

Batteries can be easily replaced.

Light and small, TDS 1 is an ideal pocket meter to perform quick TDS measurements.

SPECIFICATIONS	TDS 1
Range	0 to 999 ppm (mg/L)
Resolution	1 ppm (mg/L)
Accuracy (@20°C/68°F)	±2% F.S.
Calibration Solution	HI 70080P
Calibration	manual, 1 point, through trimmer
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F)
Battery Type / Life	(4) 1.5V / approx. 150 hours
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	150 x 30 x 21 mm (5.9 x 1.2 x 0.8")
Weight	70 g (2.5 oz.)



ORDERING INFORMATION

TDS 1 is supplied with protective cap, calibration screwdriver, batteries and instructions

SOLUTIONS

HI 70080P 800 ppm calibration solution, (25) 20 mL sachets
HI 7080M 800 ppm calibration solution, 250 mL



replaceable

HI 98203 SALINTEST
Salt Content Meter

Measure the Salt Content of Water

Ideal for Aquaculture

Worldwide, fish farming has made great strides in the past two decades, with aquaculture becoming the prime source for quality seafood. As the methods and products keep changing, one crucial factor remains the same: the necessity for salinity testing.

The main component of salt in seawater is sodium chloride. The SALINTEST can help you monitor the concentration of sodium chloride, assuring high surety in aquaculture systems. SALINTEST is also ideal for marine fish tanks and aquariums.

Instruments for measuring salinity of seawater currently available on the market are cumbersome and difficult to use. HANNA has re-engineered this compact salt tester with a more durable, ergonomic casing and a larger LCD. Besides applications in aquaculture, SALINTEST is also ideal for checking salt concentrations in live fish storage tanks, tropical fish aquariums, refrigerated storage and oceanographic investigations.

SPECIFICATIONS	HI 98203 SALINTEST
Range	0.00 to 1.00 pNaCl (58.4 to 5.84 g/L NaCl)
Resolution	0.01 pNaCl
Accuracy (@20°C/68°F)	±0.02 pNaCl
Calibration	manual, 1 point
Battery Type / Life	(4) 1.5V / approx. 500 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	175 x 41 x 23 mm (6.9 x 1.6 x 0.9")
Weight	95 g (3.4 oz.)

ORDERING INFORMATION

HI 98203 (SALINTEST) is supplied with protective cap, calibration screwdriver, batteries and instructions.

SALINTEST is also supplied with a handy chart that converts readings into g/L of sodium chloride.

ELECTRODES

HI 73202 Spare electrode* for HI 98203

SOLUTIONS

HI 7081M 30 g/L NaCl solution, 250 mL
HI 7081L 30 g/L NaCl solution, 500 mL
HI 7061M Cleaning solution, 250 mL

* to be replaced by authorized technical personnel only

HI 98202 pNa
Water Hardness/Softness Tester



Test the Hardness of Water

The pNa is an easy-to-use and inexpensive instrument for determining water hardness/softness. The hardness of water is due to the presence of magnesium and calcium. These make washing difficult, waste soap and create unpleasant scum and scale deposits. With a zeolite system, the calcium and magnesium ions are substituted on a one-to-one basis with sodium ions from a conditioning resin. Once all the sodium ions are exhausted, the resin has to be regenerated. This is currently determined by estimating the volume of water that goes through the softener and guessing when to change the resin!

Even though this may work in some cases, it fails in most since the sodium content of feed water is never constant. As a result, either the resin is regenerated too early and wastes resources, or too late, risking damage due to scaling. With the pNa, you can measure the sodium content of feed water and exit water in seconds. When the resin is exhausted of sodium, there will be no exchange and the pNa will read the same value at the two ends. Only then should the resin be changed.

pNa takes guess work out of resin regeneration!

SPECIFICATIONS	HI 98202 PNA
Range	0.0 to 3.0 pNa (23 to 0.023 g/L Na^+)
Resolution	0.1 pNa
Accuracy (@20°C/68°F)	±0.2 pNa
Calibration	manual, 1 point
Battery Type / Life	(4) 1.5V / approx. 800 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	175 x 41 x 23 mm (6.9 x 1.6 x 0.9")
Weight	95 g (3.4 oz)

ORDERING INFORMATION

HI 98202 (pNa) is supplied with protective cap, calibration screwdriver, batteries and instructions.

ELECTRODES

HI 73202* Spare electrode for HI 98202

SOLUTIONS

HI 7080M 2.3 g/L Na^+ solution, 250 mL
HI 7080L 2.3 g/L Na^+ solution, 500 mL
HI 7061M Cleaning solution, 250 mL

* to be replaced by authorized technical personnel only



Water Purity Testers

Measuring the Purity of Water Inexpensively

Fast, on the spot tests for a wide variety of applications

Pure Water Test (PWT) enables you to check the purity of your distilled or demineralized water in laboratory or industrial environments. Ultra Pure Water (UPW) is an ideal tester for MΩ checks. PWT is ideally suited for fields such as Printed Circuit Board washing, laundry, steam cleaning, checking car battery water and all areas where distilled, demineralized or pure water is used. UPW is the first pure water tester to measure in 1/1000ths of micro-Siemens (µS) and provides on-the-spot and fast checks for minute traces of contamination in your water.

These testers are housed in a durable case that provides excellent protection against harsh industrial environments. The casing also features a larger LCD than previous models and with a more ergonomic shape is easier to handle.

- *Exposed temperature probe for fast response*
- *Graphite sensors for reduced polarization*



RESISTANCE OF DISTILLED/UPW	EQUIVALENT DEIONIZED WATER READING
1 MΩ	1.000 µS/cm
2 MΩ	0.500 µS/cm
5 MΩ	0.200 µS/cm
10 MΩ	0.100 µS/cm
15 MΩ	0.067 µS/cm
20 MΩ	0.050 µS/cm

SOME TYPICAL CONVERSIONS OF MEASUREMENTS PERFORMED WITH PWT

µS/CM READING	RESISTIVITY	MG/L NACL
99.9	10 KΩ	48
10	100 KΩ	4.6
1	1 MΩ	0.4
0.1	10 MΩ	0.02

SPECIFICATIONS	HI 98308 PWT	HI 98309 UPW
Range	0.0 to 99.9 µS/cm	0.000 to 1.999 µS/cm
Resolution	0.1 µS/cm	0.001 µS/cm
Accuracy (@20°C/68°F)	±2% F.S.	
Calibration	manual, 1 point	factory calibrated
Temperature Compensation	automatic, 0 to 50°C (32 to 122°F)	—
Battery Type / Life	(4) 1.5V / approx. 250 hours of continuous use	(4) 1.5V / approx. 250 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%	
Dimensions	175 x 41 x 23 mm (6.9 x 1.6 x 0.9")	
Weight	95 g (3.4 oz.)	

ORDERING INFORMATION

HI 98308 (PWT) is supplied with protective cap, calibration screwdriver, batteries and instructions.

HI 98309 (UPW) is supplied with protective cap, batteries and instructions.

ELECTRODES

HI 73308 Spare probe* for HI 98308

HI 73309 Spare probe* for HI 98309

SOLUTIONS

HI 70033P 84 µS/cm calibration solution, 20 mL sachets (25)

HI 7033M 84 µS/cm calibration solution, 250 mL

* to be replaced by authorized technical personnel only

HI 4321

Conductivity/TDS Meter

Research Grade Meter with Color Display and USP



HI 4521 pH/EC and HI 4522 pH/ISE/EC research grade meters are available in our pH section



Advanced Bench Meter with an Extended Range

HI 4321 is a research-grade laboratory EC/Resistivity/TDS/Salinity bench meter with a backlit 240 x 320 dot-matrix color screen and millesimal measuring resolution.

The HI 4321 features auto-recognition of probe type (2 or 4 ring and nominal cell constant) and has an extended range from 0.001 µS/cm to 1 S/cm. Users can choose from three different salinity scales (practical salinity, natural sea water and percent) and from two temperature compensation modes (linear and natural water). Temperature compensation can also be disabled for absolute conductivity measurements

The enhanced warning system, including acoustic signals, is in place to alert users when measuring outside the calibration range. This system will remind the user when a new calibration is due.

HI 4321 can be used to perform all 3 stages of USP <645> conductivity tests for water quality. The instrument provides clear directions on how to perform each testing stage, automatically monitors the temperature, conductivity and stability during testing and determines whether a sample is within USP limits.

This unit is equipped with auto standard recognition and can support custom calibration solutions. Obtain up to a 4-point calibration for enhanced accuracy over an extended measuring range.

Features also include real-time graphic displays, on-screen GLP data and a fully customizable SETUP menu. The HI 4321 may also be given a unique ID number. The user can consult the on-board contextual help key from any mode simply by pressing the HELP menu. All the features are available in English, Italian, Portuguese and Spanish. Connect to a PC via the USB or RS232 ports for PC connectivity with the use of HI 92000 Windows® compatible software. Data can then be exported in popular spreadsheet formats. Equipped with a 12 Vdc power supply.

Features

- *240 x 320 dot matrix color display*
- *Logging and graphing capabilities*
- *USB and RS 232 for computer compatibility*
- *EC, resistivity, TDS and salinity ranges*
- *Auto recognition of probe type (2 or 4 ring, and nominal cell constant)*
- *Extended range from 0.001 µS/cm to 1 S/cm*
- *Stages 1, 2 and 3 USP mode*
- *3 salinity scales: Practical salinity, Natural sea water, Percent*
- *Linear and natural water temperature compensation*

HANNA instruments
With Great Products, Come Great Results™

HI 983303 • HI 983306 • HI 983307 • HI 983308 • HI 983304

EC/TDS Meters

Water-Resistant with Visual Alarm



- *Continuous EC and TDS monitoring*
- *Just hang to install*
- *Visual LED alarms*

Install Anywhere Quickly and Easily

These water-resistant conductivity/TDS meters are the result of customer requests for accurate, affordable process monitoring with low maintenance.

Five different models are available to cover all applications. Each meter is supplied with a direct 2-pin probe and 2 m (6.6') cable with a ½" thread for flow-thru mounting. The probe has a temperature sensor to automatically compensate against temperature changes from 5 to 50°C (41 to 122°F) with a β of 2% per degree.

In the measurement mode, a red LED will warn the user in the event the reading is outside of the alarm interval. A front trimmer allows manual calibration at 1 point. The electrical circuitry is tightly sealed inside the water-resistant enclosure. EC and TDS can be installed anywhere quickly and easily with the casings molded eye. The casing has been specially designed to sit out of the way and will not roll off a table. The 12 Vdc power supply allows continuous monitoring over extended periods of time.

HI 983304 is specifically designed for use in demineralized and deionized water. When placed at the output of any demineralization system, the visual alarm will be activated as soon as the demineralizing equipment is exhausted. This exclusive feature will ensure maximum system efficiency with minimum investment.

Designed For Demineralized and Deionized Water

SPECIFICATIONS	HI 983303	HI 983306	HI 983307	HI 983308	HI 983304
Range	0 to 1990 µS/cm	0 to 1990 ppm (mg/L)	0.00 to 9.99 mS/cm	0.00 to 9.99 ppt (g/L)	0.00 to 19.99 µS/cm
Resolution	10 µS/cm	10 ppm	0.01 mS/cm	0.01 ppt	0.01 µS/cm
Accuracy (@20°C/68°F)	±2% F. S.				
Calibration	manual, 1 point, through trimmer				
Calibration Solution	HI 70031P	HI 70032P	HI 70039P	HI 70038P	—
Temperature Compensation	automatic, 5 to 50°C (41 to 122°F) with β=2%/°C				
Setpoint	200 to 1600 µS/cm	200 to 1600 ppm	0.70 to 3.50 mS/cm	0.70 to 3.50 ppt	1.00 to 5.00 µS/cm
Alarm	red LED blinks when measured value differs from setpoint more than:				
	+100 µS/cm	±100 ppm	±0.2 mS/cm	±0.2 ppt	over 1.00 µS/cm
Probe (included)	HI 7634/2	HI 7634/2	HI 7632/2	HI 7632/2	HI 7631/2
	all probes are provided with 2 m (6.6') cable and ½" thread for in-line installation				
Power supply	12 Vdc adapter (included)				
Environment	0 to 50°C (32 to 122°F); RH max 100%				
Dimensions	86 x 110 x 43 mm (3.4 x 4.3 x 1.7")				
Weight	215 g (7.6 oz.)				

ORDERING INFORMATION

HI 983303-01 (115V) and **HI 983303-02** (230V) and **HI 983306-01** (115V) and **HI 983306-02** (230V) are supplied with HI 7634/2 EC/TDS probe, Calibration screwdriver and 12 VDC power adapter.

HI 983307-01 (115V) and **HI 983307-02** (230V) and **HI 983308-01** (115V) and **HI 983308-02** (230V) are supplied with HI 7632/2 EC/TDS probe, Calibration screwdriver and 12 Vdc power adapter.

HI 983304-01 (115V) and **HI 983304-02** (230V) is supplied with HI 7631/2 EC/TDS probe, Calibration screwdriver and 12 Vdc power adapter.

ELECTRODES

HI 7632* EC probe, 2 m (6.6') cable

HI 7632/2* EC probe with 2 m (6.6') cable and 1/2" thread for in-line installation

HI 7632/3* EC probe with 2 m (6.6') cable and 3/4" thread for in-line installation

HI 7634* TDS probe, 2 m (6.6') cable*

HI 7634/2* TDS probe with 2 m (6.6') cable and 1/2" thread for in-line installation

HI 7634/3* TDS probe with 2 m (6.6') cable and 3/4" thread for in-line installation

HI 7631/2* EC probe with 2 m (6.6') cable and 1/2" thread for in-line installation

HI 7631/3* EC probe with 2 m (6.6') cable and 3/4" thread for in-line installation

SOLUTIONS

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 70039P 5.00 mS/cm calibration solution, 20 mL sachets (25)

HI 70038P 6.44 ppt calibration solution, 20 mL sachets (25)

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EURO)

*Replaceable by technical personnel only.

HANNA instruments

With Great Products, Come Great Results™

HI 993301 • HI 993302

EC / TDS / Temperature Monitors

with Back-lit Display for Agriculture

Made for Agricultural Environments

These indicators from HANNA have large, dual-level, backlit LCDs and display instantaneous readings of both EC or TDS and temperature—even from a distance.

Waterproof and chemically resistant, HI 993301 and HI 993302 have been designed to meet the Grower's need for equipment suited to the aggressive environments found in agricultural and hydroponics applications. At startup, HI 993301 and HI 993302 perform a self-check to ensure proper working condition.

These powerful instruments feature a stability indicator that prompts the user when to take the reading. Readings can be frozen on the LCD display by pressing the HOLD button.

Calibration and temperature compensation are automatic, while the EC/TDS conversion factor and temperature coefficient factor (β) are user adjustable for application specific measurements.

Choose your EC/TDS indicator according to the proper ranges of your application:

HI 993301: EC - 0 to 3999 µS/cm; TDS - 0 to 2000 ppm

HI 993302: EC - 0.00 to 20.00 mS/cm; TDS - 0.00 to 10.00 ppt

- *Waterproof*
- *Measure in °C or °F*
- *Adjustable TDS ratio*
- *Adjustable β*
- *Stability indicator*
- *Extra-large display*
- *12 Vdc power supply*



SPECIFICATIONS		HI 993301	HI 993302
Range	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm	0.00 to 10.00 ppt
	temperature	0.0 to 60.0°C / 32.0 to 140.0°F	0.0 to 60.0°C / 32.0 to 140.0°F
Resolution	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	temperature	0.1 °C (0.1°F)	0.1 °C (0.1°F)
Accuracy (@20°C/68°F)	EC	±2% F.S.	±2% F.S.
	TDS	±2% F.S.	±2% F.S.
	temperature	±0.5°C (±1°F)	±0.5°C (±1°F)
EC/TDS calibration		automatic, 1 point at 1413 µS/cm or 1382 ppm	automatic, 1 point at 12.88 mS/cm or 6.44 ppt
Probe		HI 7630 (included)	
EC/TDS conversion factor		adjustable from 0.45 to 1.00	
Temperature compensation		automatic with β adjustable from 0.0 to 2.4%/°C	
Power supply		12 Vdc adapter (included)	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		160 x 105 x 31 mm (6.3 x 4.1 x 1.2)	
Weight		190 g (6.7 oz.) - meter only	

ORDERING INFORMATION

HI 993301-01 (115V) and **HI 993301-02** (230V) is supplied with HI 70031 1413 µS/cm calibration solution, Hanna 12 Vdc power adapter and Instruction manual.

HI 993302-01 (115V) and **HI 993302-02** (230V) is supplied with HI 70030 12.88 mS/cm calibration solution, Hanna 12 Vdc power adapter and Instruction manual.

ELECTRODES

HI 7630 Conductivity probe*

SOLUTIONS

HI 7030M 12.88 mS/cm calibration solution, 250 mL

HI 70030P 12.88 mS/cm cal. kit, 20 mL sachets (25)

HI 7031M 1413 µS/cm calibration solution, 250 mL

HI 70031P 1413 µS/cm cal. kit, 20 mL sachets (25)

HI 7032M 1382 ppm calibration solution, 250 mL

HI 70032P 1382 ppm cal. kit, 20 mL sachets (25)

HI 7038M 6.44 ppt, calibration solution, 250 mL

HI 70038P 6.44 ppt cal kit, 20 mL sachets (25)

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EURO)

*Replaceable by technical personnel only.

HI 983301N • HI 983301N/5 • HI 983302N

EC and TDS Meters

Water Resistant



Hang in the Greenhouse or Over the Workbench

These state-of-the-art meters have been engineered with a host of features suited for the aggressive environments commonly found in agricultural applications. Housings and cable connections have been sealed against vapor and humidity.

Select HI 983301N for TDS measurements with the common 0.7 TDS conversion factor (4-4-2) or HI 983301N/5 which uses a 0.5 conversion factor.

Both the TDS and EC meters come with a probe specifically made for horticulture and hydroponics applications. The probe compensates for temperature variations automatically, is easy to clean, is very stable and needs little maintenance.

With a 12 Vdc power supply included with the meter, low battery failures are never an issue.

- *Low maintenance probes*
- *Hang right above the samples*
- *Probes are specially designed for horticulture and hydroponics applications*

SPECIFICATIONS	HI 983301N	HI 983301N/5	HI 983302N
Range	0 to 1990 ppm (mg/l)	0 to 1990 ppm (mg/l)	0.00 to 9.99 mS/cm
Resolution	10 ppm	10 ppm	0.01 mS/cm
Accuracy (@20°C/68°F)	2% F.S.		
Calibration	manual at 1 point, through trimmer		
Temperature compensation	automatic, 5 to 50°C (41 to 122°F) with ß=2%/°C		
TDS conversion factor	0.7	0.5	—
Probe	HI 7634 (included)		HI 7632 (included)
Power supply	12 Vdc adapter (included)		
Environment	0 to 50°C (32 to 122°F); RH max 100%		
Dimensions	86 x 110 x 43 mm (3.4 x 4.3 x 1.7")		
Weight	215 g (7.6 oz.)		

ORDERING INFORMATION

HI 983301N-01 (115V) and **HI 983301N-02** (230V) is supplied with HI 7634 probe, 12 Vdc adapter, 1500 ppm calibration solution (20 mL), calibration screwdriver and instructions.

HI 983301N/5-01 (115V) and **HI 983301N/5-02** (230V) is supplied with HI 7634 probe, 12 Vdc adapter, 1382 ppm calibration solution (20 mL), calibration screwdriver and instructions.

HI 983302N-01 (115V) and **HI 983302N-02** (230V) is supplied with HI 7632 probe, 12 Vdc adapter, 1413 mS/cm calibration solution (20 mL), calibration screwdriver and instructions.

ELECTRODES

HI 7632 EC probe, 2 m (6.6') cable*

HI 7632/2 EC probe with 2 m (6.6') cable and 1/2" thread for in-line installation*

HI 7632/3 EC probe with 2 m (6.6') cable and 3/4" thread for in-line installation*

HI 7634 TDS probe, 2 m (6.6') cable*

HI 7634/2 TDS probe with 2 m (6.6') cable and 1/2" thread for in-line installation*

HI 7634/3 TDS probe with 2 m (6.6') cable and 3/4" thread for in-line installation*

SOLUTIONS

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 70031P 1413 mS/cm calibration solution, 20 mL sachets (25)

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EURO)

*Replaceable by technical personnel only.

HANNA® instruments

With Great Products, Come Great Results™



HI 981504

pH/TDS/Temperature Monitor

with 3 Extra Large, Backlit Displays

Designed for continuous and simultaneous monitoring of pH, TDS and temperature.

Simply install the HI 981504 above the sample to be tested, plug the instrument in and immerse the probes. pH, TDS and temperature measurements will be simultaneously displayed on three backlit LCDs.

Users can easily select the temperature unit (°C or °F) through a switch on the back panel.

The HI 1286 gel-filled pH electrode is provided with a waterproof sheath to protect the BNC connector. The unique design of the electrode provides longer life in aggressive solutions. The HI 7634 TDS probe is easy to clean and requires little maintenance. Measurements are accurate and the meter can be calibrated at one or two points for pH and at a single point for TDS. Temperature range is factory calibrated.

Two models are available:

HI 981504/5 with 0.5 TDS factor

HI 981504/7 with 0.7 TDS factor

- *Simultaneous display of pH, TDS and Temperature*
- *3 backlit LCDs*
- *Continuous measurements*
- *Measure in °C or °F*
- *Extra-large displays*
- *12 VDC power supply*





SPECIFICATIONS	HI 981504
Range	pH: 0.0 to 14.0; TDS: 0 to 1990 ppm; Temperature: -10.0 to 60.0°C or -14.0 to 140.0°F
Resolution	pH: 0.1; TDS: 10 ppm; Temperature: 0.1°C or 0.1°F
Accuracy	pH: ±0.2; TDS: ±2% F.S.; Temperature: ±0.3°C or ±0.5°F
pH Calibration	Manual 2 points through trimmers
TDS Calibration	Manual 1 point through trimmer
TDS Factor	0.5 (HI 981504/5) or 0.7 (HI 981504/7)
Probes	pH: HI 1286 (included); TDS: HI 7634 (fixed); Temperature: Stainless steel, 2 m cable (fixed)
Temp. Compensation	Automatic, 5 to 50°C (41 to 122°F), for TDS readings only
Power Supply	12 Vdc power adapter (included)
Environment	0 to 50°C (32 to 122°F); 95% RH
Dimensions/Weight	160 x 110 x 35 mm (6.3 x 4.3 x 1.4")/560 g (1.2 lbs.)

ORDERING INFORMATION

HI 981504/5-01 (115V) and **HI 981504/5-02** (230V) and **HI 981504/7-01** (115V) and **HI 981504/7-02** (230V) is supplied with HI 1286 pH electrode, pH 4 and 7 buffer sachets (20 mL ea.), HI 7634 TDS probe, temperature probe, TDS sachet, (2) cleaning solution sachets, screwdriver, 12 Vdc power adapter and instructions.

ELECTRODES

HI 1286	Double junction, plastic body pH electrode with 2 m (6.6') cable and BNC connector.

SOLUTIONS

HI 7004M	pH 4.01 calibration solution, 250 mL
HI 70004P	pH 4.01 calibration solution, 20 mL sachets (25)
HI 7007M	pH 7.01 calibration solution, 250 mL
HI 70007P	pH 7.01 calibration solution, 20 mL sachets (25)
HI 7032M	1382 ppm calibration solution, 250 mL
HI 70032P	1382 ppm calibration solution, 20 mL sachets (25)
HI 70442M	1500 ppm calibration solution, 250 mL
HI 70442P	1500 ppm calibration solution, 20 mL sachets (25)
HI 70300M	Electrode storage solution, 250 mL
HI 7061M	Probe cleaning solution, 250 mL

ACCESSORIES

HI 731326	Calibration screwdriver, (20)

Conductivity Calibration Solutions

Quality Solutions for Laboratory Applications



BOTTLES

CODE	EC VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 6031	1413 µS/cm	500 mL	1 bottle		•
HI 6033	84 µS/cm	500 mL	1 bottle		•
HI 7030L	12880 µS/cm	500 mL	1 bottle		
HI 7030M	12880 µS/cm	250 mL	1 bottle		
HI 7030/1G	12880 µS/cm	1 Gallon (3.78 L)	1 bottle		
HI 7031L	1413 µS/cm	500 mL	1 bottle		
HI 7031L/C	1413 µS/cm	500 mL	1 bottle		•
HI 7031M	1413 µS/cm	250 mL	1 bottle		
HI 7031/1G	1413 µS/cm	1 Gallon (3.78 L)	1 bottle		
HI 7033L	84 µS/cm	500 mL	1 bottle		
HI 7033M	84 µS/cm	250 mL	1 bottle		
HI 7034L	80000 µS/cm	500 mL	1 bottle		
HI 7034M	80000 µS/cm	250 mL	1 bottle		
HI 7035L	111800 µS/cm	500 mL	1 bottle		
HI 7035M	111800 µS/cm	250 mL	1 bottle		
HI 7039L	5000 µS/cm	500 mL	1 bottle		
HI 7039M	5000 µS/cm	250 mL	1 bottle		
HI 8030L	12880 µS/cm	500 mL	1 bottle	•	
HI 8031L	1413 µS/cm	500 mL	1 bottle	•	
HI 8033L	84 µS/cm	500 mL	1 bottle	•	
HI 8034L	80000 µS/cm	500 mL	1 bottle	•	
HI 8035L	111800 µS/cm	500 mL	1 bottle	•	
HI 8039L	5000 µS/cm	500 mL	1 bottle	•	

CODE	EC VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70030C	12880 µS/cm	20 mL	25 sachets	•
HI 70030P	12880 µS/cm	20 mL	25 sachets	
HI 70031C	1413 µS/cm	20 mL	25 sachets	•
HI 70031P	1413 µS/cm	20 mL	25 sachets	
HI 70033C	84 µS/cm	20 mL	25 sachets	•
HI 70033P	84 µS/cm	20 mL	25 sachets	
HI 70039C	5000 µS/cm	20 mL	25 sachets	•
HI 70039P	5000 µS/cm	20 mL	25 sachets	
HI 77100C	1413 µS/cm & pH 7.01	20 mL	20 sachets (10 each)	•
HI 77100P	1413 µS/cm & pH 7.01	20 mL	20 sachets (10 each)	

Solutions for All Your Needs

The correct calibration of the instrument/sensor measuring system will ensure your results are accurate and reproducible.

The use of standard calibration solutions is fundamental for correctly calibrating the measuring system.

The HANNA wide range of conductivity calibration solutions has been produced to ensure the maximum accuracy for conductivity meters and probes.

Guaranteed Quality

Your conductivity meter can be calibrated in a few minutes right in your laboratory or in the field.

HANNA offers a wide range of conductivity solutions in different forms and values.

Each label shows the production batch number, expiration date and conductivity/temperature correlation table.

Certified Solutions

For those users that require documented accuracy, conductivity (EC) solutions are available in bottles or sachets with certificates of analysis.

FDA Compliant Bottles

HANNA solutions are offered in opaque, light-tight bottles that meet FDA requirements.

High Accuracy Solutions

HI 60xx high accuracy solutions are also available and are supplied with a certificate of analysis.

84 µS/cm | Cal. Solution

This 84 µS/cm conductivity solution makes it possible to calibrate instruments with a conductivity scale of up to 200 µS/cm, for example, in the measurement of pure or distilled water.

By using our single-dose 20 mL sachets, the freshness of the solution is guaranteed for every calibration.



BOTTLES

CODE	EC VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 6033	84 µS/cm (µmho/cm)	500 mL	1 bottle		•
HI 7033L	84 µS/cm (µmho/cm)	500 mL	1 bottle		
HI 7033M	84 µS/cm (µmho/cm)	250 mL	1 bottle		
HI 8033L	84 µS/cm (µmho/cm)	500 mL	1 bottle	•	

SACHETS

CODE	EC VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70033C	84 µS/cm (µmho/cm)	20 mL	25 sachets	•
HI 70033P	84 µS/cm (µmho/cm)	20 mL	25 sachets	

1413 µS/cm | Cal. Solution

The 1413 µS/cm solution is the one best suited for general use. This solution is also available in combined kits with the pH 7 buffer for easy calibration of multiparameter instruments.

It is also available in different sized bottles and in single-dose, ready-to-use sachets.

The HI 8031L solution is provided in an opaque bottle according to FDA (Food & Drug Administration) regulations, which prevents the reagent from damage due to extended exposure to light.

Our wide range of calibration solutions also includes solutions provided with a certificate of analysis, to satisfy the requirements of any application from the farm to the factory.



BOTTLES

CODE	EC VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 6031	1413 µS/cm (µmho/cm)	500 mL	1 bottle		•
HI 7031/1G	1413 µS/cm (µmho/cm)	1 Gallon (3.78 L)	1 bottle		
HI 7031L	1413 µS/cm (µmho/cm)	500 mL	1 bottle		
HI 7031L/C	1413 µS/cm (µmho/cm)	500 mL	1 bottle		•
HI 7031M	1413 µS/cm (µmho/cm)	250 mL	1 bottle		
HI 8031L	1413 µS/cm (µmho/cm)	500 mL	1 bottle	•	

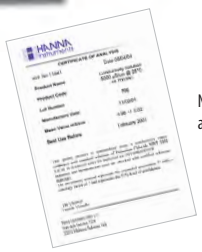
CODE	EC VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70031C	1413 µS/cm (µmho/cm)	20 mL	25 sachets	•
HI 70031P	1413 µS/cm (µmho/cm)	20 mL	25 sachets	
HI 77100C	1413 µS/cm & pH 7.01	20 mL	20 sachets (10 each)	•
HI 77100P	1413 µS/cm & pH 7.01	20 mL	20 sachets (10 each)	

Conductivity Calibration Solutions

Quality Solutions for Laboratory Applications

5000 µS/cm | Cal. Solution





Note: Certificate of analysis is available upon request.

This solution is ideal for those applications that need to achieve higher reading accuracies in a conductivity scale between 2000 µS/cm and 10000 µS/cm.

HANNA has created a 5000 µS/cm calibration solution in a wide range of sizes and packages to suit every application.

This solution is widely used in agriculture for monitoring and preparing nutrient solutions for proper crop production.

BOTTLES

CODE	EC VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE
HI 7039L	5000 µS/cm (µmho/cm)	500 mL	1 bottle	
HI 7039M	5000 µS/cm (µmho/cm)	250 mL	1 bottle	
HI 8039L	5000 µS/cm (µmho/cm)	500 mL	1 bottle	•

SACHETS

CODE	EC VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70039C	5000 µS/cm (µmho/cm)	20 mL	25 sachets	•
HI 70039P	5000 µS/cm (µmho/cm)	20 mL	25 sachets	

12880 µS/cm | Cal. Solution





Note: Certificate of analysis is available upon request.

The 12880 µS/cm (12.88 mS/cm) calibration solution is widely used to assure the proper performance of conductivity meters with a scale higher than 10 mS/cm.

This solution is used mainly for industrial applications and is available in various sizes to better meet clients' requirements.

BOTTLES

CODE	EC VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE
HI 7030/1G	12880 µS/cm (µmho/cm)	1 Gallon (3.78 L)	1 bottle	
HI 7030L	12880 µS/cm (µmho/cm)	500 mL	1 bottle	
HI 7030M	12880 µS/cm (µmho/cm)	250 mL	1 bottle	
HI 8030L	12880 µS/cm (µmho/cm)	500 mL	1 bottle	•

CODE	EC VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70030C	12880 µS/cm (µmho/cm)	20 mL	25 sachets	•
HI 70030P	12880 µS/cm (µmho/cm)	20 mL	25 sachets	

80000 µS/cm | Cal. Solution

HANNA 8000 µS/cm calibration solution is needed for the proper calibration of instrumentation used to measure high conductivity samples, such as very dirty wastewater, solutions with suspended materials and plating baths.

It is available in 2 different sizes and also in an FDA approved light shielded bottle.

This calibration solution is also ideal for use in the agroalimentary sector.



Note: Certificate of analysis is available upon request.

BOTTLES

CODE	EC VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE
HI 7034L	80000 µS/cm (µmho/cm)	500 mL	1 bottle	
HI 7034M	80000 µS/cm (µmho/cm)	250 mL	1 bottle	
HI 8034L	80000 µS/cm (µmho/cm)	500 mL	1 bottle	•

111800 µS/cm | Cal. Solution

This calibration solution is useful to calibrate instrumentation used to measure samples with conductivity higher than 100 mS/cm (100,000 µS/cm).

In fact, this solution makes it possible to calibrate instruments that perform under conditions of high salt concentrations.

This calibration solution is ideal for use in systems where phase limits have to be detected (e.g. separation of a substance from water), monitoring of bottle washing plants, beverage controls, check of acids or bases in electrodeposition processes and some plating baths.



Note: Certificate of analysis is available upon request.

CODE	EC VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE
HI 7035L	111800 µS/cm (µmho/cm)	500 mL	1 bottle	
HI 7035M	111800 µS/cm (µmho/cm)	250 mL	1 bottle	
HI 8035L	111800 µS/cm (µmho/cm)	500 mL	1 bottle	•

TDS Calibration Solutions

Quality Solutions for Laboratory Applications



TDS Solutions

HANNA is one of the few producers to offer calibration solutions for lab and field applications with packages from 20 to 500 mL. Our packaging has been designed to keep air and light from damaging the solution.

Material Safety Data Sheets

The material safety data sheets for all the HANNA solutions in this catalog are available on-line (visit www.hannainst.com) or upon request.

Expiration Date

The production batch number and the expiration date are reported on all of HANNA calibration solutions.

NIST Traceability

TDS solutions are produced with high-quality potassium chloride in various concentrations. They are standardized using a conductivity meter calibrated with NIST potassium chloride.

BOTTLES

CODE	TDS VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 6032	1382 ppm (mg/L)	500 mL	1 bottle	•
HI 7032L	1382 ppm (mg/L)	500 mL	1 bottle	
HI 7032M	1382 ppm (mg/L)	250 mL	1 bottle	
HI 7036L	12.41 ppt (g/L)	500 mL	1 bottle	
HI 7036M	12.41 ppt (g/L)	250 mL	1 bottle	
HI 70442L*	1500 ppm (mg/L)	500 mL	1 bottle	
HI 70442M*	1500 ppm (mg/L)	250 mL	1 bottle	

CODE	TDS VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70032C	1382 ppm (mg/L)	20 mL	25 sachets	•
HI 70032P	1382 ppm (mg/L)	20 mL	25 sachets	
HI 70032P/5	1382 ppm (mg/L)	20 mL	500 sachets	
HI 70038C	6.44 ppt (g/L)	20 mL	25 sachets	•
HI 70038P	6.44 ppt (g/L)	20 mL	25 sachets	
HI 70080C	800 ppm (mg/L)	20 mL	25 sachets	•
HI 70080P	800 ppm (mg/L)	20 mL	25 sachets	
HI 70442C*	1500 ppm (mg/L)	20 mL	25 sachets	•
HI 70442P*	1500 ppm (mg/L)	20 mL	25 sachets	
HI 77200C*	1500 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10 each)	•
HI 77200P*	1500 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10 each)	
HI 77300C	1382 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10 each)	•
HI 77300P	1382 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10 each)	

* TDS Conversion Factor 4-4-2: 0.65 ppm = 1 µS/cm (approximately).



HI 6032

Standard Solution

- *High Precision Standard Solution at 1382 ppm*
- *Certificate of Analysis*

HANNA instruments

With Great Products, Come Great Results™

HI 4321

Conductivity/TDS Meter

Research Grade Meter with Color Display and USP



EC USP Mode

HANNA's HI 4521 and HI 4321 can be used to perform all 3 stages of United States Pharmacopeia testing requirements for water quality (USP <645>).

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

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



SPECIFICATIONS

		HI 4321
Conductivity	Range	0.000 to 9.999 µS/cm; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 999.9 mS/cm; 1000 mS/cm
	Resolution	0.001 µS/cm; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm; 1 mS/cm
	Accuracy	±1% of reading (±0.01 µS/cm)
Resistivity	Range	1.00 to 99.99 Ohm•cm; 100.0 to 999.9 Ohm•cm; 1.000 to 9.999 kOhm•cm; 10.00 to 99.99 kOhm•cm; 100.0 to 999.9 kOhm•cm; 1.00 to 9.99 MOhm•cm; 10.0 to 100.0 MOhm•cm
	Resolution	0.01 Ohm•cm; 0.1 Ohm•cm; 0.001 kOhm•cm; 0.01 kOhm•cm; 0.1 kOhm•cm; 0.01 MOhm•cm; 0.1 MOhm•cm
	Accuracy	±2% of reading (±1 Ohm•cm)
TDS	Range	0.000 to 9.999 ppm; 10.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 ppt; 10.00 to 99.99 ppt; 100.0 to 400.0 ppt
	Resolution	0.001 ppm; 0.01 ppm; 0.1 ppm; 0.001 ppt; 0.01 ppt; 0.1 ppt
	Accuracy	±1% of reading (±0.01 ppm)
	Factor	0.40 to 1.00
Salinity	Range	Practical salinity: 0.00 to 42.00; Natural seawater: 0.00 to 80.00 ppt; Percent: 0.0 to 400.0%
	Resolution	0.01 for practical salinity/natural sea water; 0.1% for percent scale
	Accuracy	±1% of reading
Temperature	Range	-20.0 to 120°C; -4.0 to 248.0°F; 253.15 to 393.15K
	Resolution	0.1°C; 0.1°F; 0.1K
	Accuracy	±0.2°C; ±0.4°F; ±0.2K (excluding probe error)
Calibration	Conductivity	Auto standard recognition, custom calibration solution/4 point calibration
	Salinity	Percent scale—1 point (with HI 7037 standard)
	Temperature	3 points
Temperature Compensation		Linear and non-linear (natural water)
Log-on-demand/Auto Data Logging		10 Lots, 5000 samples per lot/10 Lots, 5000 samples per lot
Auto Endpoint		Yes
PC Connection		Opto-isolated USB and RS232
Display		240 x 320 dot-matrix color LCD with on-screen help, graphing, language selection and custom configuration
Power		12 Vdc adapter (included)
Dimensions/Weight		159 x 230 x 93 mm (6.3 x 9.1 x 3.7")/800 g (1.8 lbs.)

ORDERING INFORMATION

HI 4321-01 (115V) and **HI 4321-02** (230V) are supplied with 4-ring EC probe, HI 76404N electrode holder, power adapter and instruction manual.

ELECTRODES

HI 76312 Platinum 4-ring Conductivity/TDS probe with temperature sensor and 1 m (3.3') cable

HI 7662-T Temperature probe with 1 m (3.3') cable

SOLUTIONS

HI 7030L 12880 µS/cm calibration solution, 500 mL

HI 7031L 1413 µS/cm calibration solution, 500 mL

HI 70033P 84 µS/cm calibration solution, 20 mL sachets (25)

HI 7034L 80000 µS/cm calibration solution, 500 mL

HI 7035L 111800 µS/cm calibration solution, 500 mL

HI 7039L 5000 µS/cm calibration solution, 500 mL

HI 7037L Salinity solution, 500 mL

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 76404N Electrode holder

HI 92000 Windows® compatible software

HI 920010 RS232 cable for PC connection

HI 920013 USB cable for PC connection

HI 255

EC/TDS/NaCl and pH/mV Meter

for Laboratories





6 in 1 Bench Meter!

The HANNA HI 255 is a logging, microprocessor-based pH, ORP, Conductivity (EC), TDS, NaCl and temperature bench meter. A relative mV feature is also provided.

The conductivity measurements are compensated, manually or automatically, with the temperature sensor inside the conductivity probe. It is also possible to disable the temperature compensation and measure the actual conductivity.

The pH measurements are compensated for temperature effect manually or automatically with the HI 7662 temperature probe.

pH Calibration is possible with up to three points, using five memorized buffers (4.01, 6.86, 7.01, 9.18 and 10.01).

The autoranging feature of the EC and TDS functions automatically sets the instrument to the scale with the highest possible resolution.

The temperature coefficient is user selectable and the GLP feature provides a guarantee of data consistency.

An alarm time-out is available to alert the user that too much time has elapsed since last pH calibration.

The instrument can store data for later retrieval, at the user's request.

Quick Results

This meter was designed to satisfy the requests of many production and quality control laboratories that need quick multiple parameter measurement results with a single precision instrument.

No Interference

The pH and conductivity circuits are electrically separated, so that it is not necessary for the two probes to be simultaneously immersed in the same solution. The conductivity probe will not interfere with your pH measurements and the response of the pH electrode is immediately stable.

With a built-in logging function, measurements are stored in non-volatile memory, and can be transferred to a PC through the RS232 serial port. In addition to these features, HI 255 contains GLP features that store the calibration and measurement data of any sample, to be displayed upon request.

- *Measure 5 parameters and °C!*
- *GLP Features*
- *Log up to 200 samples*
- *Automatic Temperature Compensation*

HANNA instruments

With Great Products, Come Great Results™

EC/TDS/NaCl and pH/mV Meter

for Laboratories

Autoranging

The EC and TDS scales are autoranging. The meter automatically sets the scale with the highest possible resolution.

Good Laboratory Practice (GLP)

GLP is a set of functions that allows storage and retrieval of data regarding the status of the electrode. All data regarding pH, Rel mV, EC and NaCl is stored for the user to review when necessary.

Logging Function

Up to 200 LOG samples can be stored into memory.

PC Interface

Data can be transferred to the PC with the HI 92000 Windows® compatible software (optional). HI 92000 also offers graphing and on-line help feature.

SPECIFICATIONS		HI 255
Range	pH/ORP	-2.00 to 16.00 pH; -2.000 to 16.000 pH / ±699.9 mV; ±2000 mV
	EC	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm actual EC*
	TDS	0.00 to 14.99 ppm; 15.0 to 149.9 ppm; 150 to 1499 ppm 1.50 to 14.99 g/L; 15.0 to 100.0 g/L; up to 400.0 g/L actual TDS*
	NaCl	0.0 to 400.0% NaCl
	Temperature	-10 to 120.0 °C (pH); 0.0°C to 60.0°C (EC)
Resolution	pH/ORP	0.01 pH; 0.001 pH/ 0.1 mV (±699.9 mV); 1 mV (±2000 mV)
	EC	0.01 µS/cm; 0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm
	TDS	0.01 ppm; 0.1 ppm; 1 ppm; 0.01 g/L; 0.1 g/L
	NaCl	0.1% NaCl
	Temperature	0.1°C
Accuracy (@20°C)	pH / ORP	±0.01 pH; ±0.002 pH/ ±0.2 mV (±699.9 mV); ±1 mV (±2000 mV)
	EC	±1% of reading ±(0.05 µS/cm or 1 digit)
	TDS	±1% of reading ±(0.03 ppm or 1 digit)
	NaCl	±1% of reading
	Temperature	±0.4°C (excluding probe error)
Relative mV Offset		±2000 mV
Calibration (pH)		automatic, at 1, 2 or 3 points, with 5 memorized buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01)
Calibration (EC)		automatic, 1 point, with 6 memorized values (84.0 and 1413 µS/cm; 5.00, 12.88, 80.0 and 111.8 mS/cm)
Calibration (NaCl)		automatic, 1 point, with HI 7037L calibration solution
Temperature Compensation		manual or automatic, -10.0 to 120.0°C (14 to 248°F) for pH; 0.0 to 60.0°C (32 to 140°F) for EC (can be disabled for measuring actual EC and TDS values)
Temperature Coefficient		0.00 to 6.00%/°C (EC and TDS only); default value: 1.90%/C°
TDS Conversion Factor		0.40 to 0.80; default value: 0.50
pH Electrode		HI 1131B (included)
EC Probe		HI 76310 (included)
Temperature Probe		HI 7662 (included)
PC Connection		RS232 opto-isolated serial port
Data Logging		200 samples
Input Impedance		10^{12} Ohm
Power Supply		12 Vdc adapter (included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)

* with temperature compensation function disabled

ORDERING INFORMATION

HI 255-01 (115V) and **HI 255-02** (230V) is supplied with HI 1131B glass body, combination pH electrode, HI 76310 conductivity/TDS probe, HI 7662 temperature probe, HI 76404 electrode holder, pH 4 and pH 7 buffer solutions, HI 7071S electrolyte solution, 12 Vdc power adapter and instructions.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector
HI 76310	4-ring platinum sensor conductivity probe
HI 7662	Temperature probe

SOLUTIONS

HI 6004	pH 4.010 buffer solution, 500 mL
HI 6007	pH 7.010 buffer solution, 500 mL
HI 6010	pH 10.010 buffer solution, 500 mL
HI 7071	Electrolyte solution, 30 mL (4)
HI 70300L	Electrode storage solution, 500 mL
HI 7030L	12880 µS/cm calibration solution, 500 mL
HI 7031L	1413 µS/cm calibration solution, 500 mL
HI 7033L	84 µS/cm calibration solution, 500 mL
HI 7034L	80000 µS/cm calibration solution, 500 mL
HI 7035L	111800 µS/cm calibration solution, 500 mL
HI 7037L	Salinity standard solution, 500 mL

ACCESSORIES

HI 76404	Electrode holder
HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 92000	Windows® compatible software
HI 920010	Serial cable for PC connection
HI 180G**	Compact magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 190M**	Magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 200M**	Magnetic stirrer with AISI stainless steel cover material, max 1000 rpm, Speedsafe™

**** -1**: 110/115V, 50/60Hz **-2**: 220/240V, 50/60Hz



HI 2300

Auto-ranging EC, TDS, NaCl, Temperature Meter

with 4-ring Platinum Probe



4 Parameters in One Professional Instrument

HI 2300 performs EC, TDS (Total Dissolved Solids), percentage of NaCl and °C measurements. The auto-ranging feature for EC and TDS measurements sets the highest possible resolution automatically.

All measurements can be temperature compensated at 20 or 25°C. The Automatic Temperature Compensation (ATC) can also be disabled for measuring the actual conductivity and the compensation coefficient can be user selected. The stability indicator located on the LCD ensures accuracy.

Conductivity readings are performed by applying an alternate current to the 4-ring probe, which creates a variable voltage directy proportional to conductivity.

The GLP feature allows users to store and recall data about system status.

To communicate with the PC use the (optional) HI 92000 communication software. This software provides an exclusive online guide of all the commands available and allows data printing, plotting and exporting.

Auto-ranging

The EC and TDS scales are autoranging. The meter automatically sets the scale with the highest possible resolution.

Temperature Compensation

Three options of compensating temperature are available:

Automatic (ATC): The EC probe has a built-in temperature sensor which is used to automatically compensate the EC/TDS reading (from -9.9°C to 120.0°C), using the selected reference temperature.

Manual (MTC): The temperature value, shown on the secondary LCD, can be manually set with the ARROW keys. The compensation is referenced at the selected temperature. The "°C" tag blinks when this option is active.

No Compensation (NOTC): The temperature value shown on the secondary LCD is not taken into account. The reading displayed on the primary LCD is the actual EC or TDS value. The "°C" tag blinks when this option is active.

EC/TDS Calibration

EC calibration is a one-point procedure. Selectable calibration points are: 0.00 µS, 84.0 µS, 1413 µS, 5.00 mS, 12.88 mS, 80.0 mS, 111.8 mS.

NaCl Calibration

NaCl calibration is a one-point procedure at 100.0% NaCl. Use the HI 7037L calibration solution as a 100% NaCl standard solution.

Auto-ranging EC, TDS, NaCl, Temperature Meter

with 4-ring Platinum Probe

Good Laboratory Practice

Good Laboratory Practice (GLP) is a set of functions that allows storage and retrieval of data regarding the status of the system. After a successful calibration, the meter automatically stores the date and time of calibration, the calibration solution used and the resulting cell constant value. All this information can be recalled by the user.

Data Transfer to PC

Connect the meter to a PC through the RS232 serial port. Use the HI 920010 (9 to 9-pin) connection cable and HI 92000 Windows® compatible software (optional).

- *4-ring EC probe with internal temperature sensor*
- *Automatic (ATC), Manual (MTC) or No Temperature Compensation (NoTC)*
- *Auto-ranging*
- *Good Laboratory Practice*
- *PC compatible*



ORDERING INFORMATION

HI 2300-01 (115V) and **HI 2300-02** (230V) are supplied with HI 76310 conductivity probe, 12 Vdc power adapter and instruction manual.

ELECTRODES

HI 76310	4-ring Pt sensor EC probe with built-in temperature sensor and 1 m (3.3') cable

SOLUTIONS

HI 7030L	12880 µS/cm calibration solution, 500 mL
HI 7031L	1413 µS/cm calibration solution, 500 mL
HI 7033L	84 µS/cm calibration solution, 500 mL
HI 7034L	80000 µS/cm calibration solution, 500 mL
HI 7035L	111800 µS/cm calibration solution, 500 mL
HI 7039L	5000 µS/cm calibration solution, 500 mL
HI 7037L	Salinity solution, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EU)
HI 920010	Cable for PC connection
HI 92000	Windows® compatible software



HI 92000 — PC Software

SPECIFICATIONS		HI 2300
Range	EC	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm; 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm (actual EC)*
	TDS	0.00 to 14.99 mg/L (ppm); 15.0 to 149.9 mg/L (ppm); 150 to 1499 mg/L (ppm); 1.50 to 14.99 g/L (ppt); 15.0 to 100.0 g/L (ppt); up to 400.0 g/L (actual TDS)*, with 0.80 conversion factor
	NaCl	0.0 to 400.0%
	Temperature	-9.9 to 120.0°C
Resolution	EC	0.01 µS/cm; 0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm
	TDS	0.01 mg/L; 0.1 mg/L; 1 mg/L; 0.01 g/L; 0.1 g/L
	NaCl	0.1%
	Temperature	0.1°C
Accuracy	EC	±1% of reading ± (0.05 µS/cm or 1 digit)
	TDS	±1% of reading ± (0.03 mg/L or 1 digit)
	NaCl	±1% of reading
	Temperature	±0.4°C
Calibration	EC	automatic, 1 point with 6 memorized values (84, 1413, 5000, 12880, 80000, 111800 µS/cm)
	NaCl	1 point, with HI 7037 calibration solution
	Temperature	2-point, at 0 and 50°C (32 and 122°F)
Temperature Compensation		automatic or manual, 0 to 60°C (32 and 140°F)
Temperature Coefficient		selectable from 0.00 to 6.00%/°C (EC and TDS only)
TDS Conversion Factor		selectable from 0.40 to 0.80 (default value: 0.50)
Probe (included)		HI 76310, 4-ring platinum, internal temperature sensor
Auto-off		after 5 minutes of non-use (can be disabled)
Power Supply		12 Vdc power adapter (included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions/Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)

* with temperature compensation function disabled

CONTENTS

DISSOLVED OXYGEN

NAVIGATION

Introduction..... 4.2
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Portable Meters 4.7
Probes 4.16



HI 9146

Dissolved Oxygen Meter

Designed for Field Applications



Rugged DO Meter with Extended Range

HI 9146 is a water-resistant, microprocessor-based, Dissolved Oxygen meter with automatic calibration and temperature compensation (ATC).

D.O. measurements can be displayed in parts per million (ppm=mg/L) or in % saturation. The temperature range is indicated in Celsius from 0 to 50°C with 0.1 resolution. The HI 9146 also allows manual compensation of altitude and salinity values.

The polarographic probe, supplied with the instrument is provided with a protective cover for the membrane.

A HOLD button allows the user to freeze the reading on the LCD.

HI 9146 can be powered with batteries (with low battery indicator) or through a 12 Vdc adapter.

- *Extended altitude compensation*
- *Extended salinity compensation*
- *Designed for the field*

SPECIFICATIONS		HI 9146-04	HI 9146-10
Range	O_2	0.00 to 45.00 mg/L	
	% Saturation O_2	0.0 to 300.0%	
	Temperature	0.0 to 50.0°C	
Resolution	O_2	0.01 mg/L	
	% Saturation O_2	0.1%	
	Temperature	0.1°C	
Accuracy (@ 20°C)	O_2	±1.5% F.S.	
	% Saturation O_2	±1.5% F.S.	
	Temperature	±0.5°C	
Calibration		automatic, in air, at 100%	
Temperature Compensation		automatic, 0 to 50°C (32 to 122°F)	
Altitude Compensation		0 to 4 km (resolution 0.1 km)	
Salinity Compensation		0 to 80 g/L (resolution 1 g/L)	
Probe (included)		HI 76407/4F with 4 m cable	HI 76407/10F with 10 m cable
Power Supply		(4) 1.5V AA batteries / approx. 200 hours of continuous use; auto-off after 4 hrs of inactivity; or input for 12 Vdc power adapter	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight		500 g (1.1 lbs.)	

ORDERING INFORMATION

HI 9146-04 is supplied complete with HI 76407/4F probe with 4 m (13') cable and protective sleeve, 2 spare membranes, HI 7041S electrolyte solution (30 mL), batteries, hard carrying case and instructions.

HI 9146-10 is supplied complete with HI 76407/10F probe with 10 m (33') cable and protective sleeve, 2 spare membranes, HI 7041S electrolyte solution (30 mL), batteries, hard carrying case and instructions.

ELECTRODES

HI 76407/4F DO probe with 4 m (13') cable and protective sleeve

HI 76407/10F DO probe with 10 m (33') cable and protective sleeve

SOLUTIONS

HI 7041S Electrolyte solution for DO probe, 30 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc adapter

HI 710006 230 Vac/12 Vdc adapter

HI 76407A/P Replacement membranes (5)



PROtection

HI 76407/4F and HI 76407/10F

HI 76407/4F D.O. probe, is specially designed for field applications, where protection of the membrane from mechanical stress is required.

This probe is available with 4 m (13') or 10 m (33') cable:

HI 76407/4F with 4 m (13') cable
HI 76407/10F with 10 m (33') cable

HANNA instruments

With Great Products, Come Great Results™

HI 9142

Manual Calibration Dissolved Oxygen Meter

Waterproof and Easy to Use

Designed for Ease of Use in Tough Field Conditions

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

Field work can subject instrumentation to the inclemency of weather. Cold, rain, snow, dust and humidity can cause condensation to breech the housing. Once the housing has been compromised, the meter is susceptible to diminishing performance and life. The rugged, waterproof housing of the HI 9142 solves many of the 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 air.

The polarographic probe (HI 76407/4) is accurate to 0.3 ppm and is supplied with a 4m (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 with a 10m (33') cable and HI 76407/20 with a 20m (67') cable are available.

- *Automatic temperature compensation*
- *Designed for harsh conditions*
- *Affordable and efficient*
- *DO probe and rugged carrying case included*



SPECIFICATIONS	HI 9142
Range	0.0 to 19.9 mg/L
Resolution	0.1 mg/L
Accuracy (@20°C/68°F)	±1.5% F.S.
Calibration	manual, at 1 or 2 points (zero & slope)
Temp. Comp.	automatic, 0 to 30°C
Probe	HI 76407/4, polarographic, 4 m (13') (included)
Battery Type / Life	(4) 1.5V AA / approx. 500 hours of continous use
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4)
Weight	500 g (1.1 lbs.)

ORDERING INFORMATION

HI 9142 is supplied complete with HI 76407/4 probe with 4 m (13') cable, 2 spare membranes, HI 7041S electrolyte solution (30 mL), calibration screwdriver, batteries, rugged carrying case and instructions.

ELECTRODES

HI 76407/4 DO Probe with 4 m (13') cable
HI 76407/10 DO Probe with 10 m (33') cable
HI 76407/20 DO Probe with 20 m (67') cable

SOLUTIONS

HI 7040M Zero oxygen solution, 250 mL
HI 7040L Zero oxygen solution, 500 mL
HI 7041S Refilling electrolyte solution, 30 mL

ACCESSORIES

HI 76407A/P Replacement membranes (5)
HI 721317 Rugged carrying case

HI 7041S - Electrolyte Solution

It is crucial to the performance of your DO probe to keep the sensor active with regular maintenance. For this purpose, HANNA has developed HI 7041S electrolyte solution to refill the membrane cap.



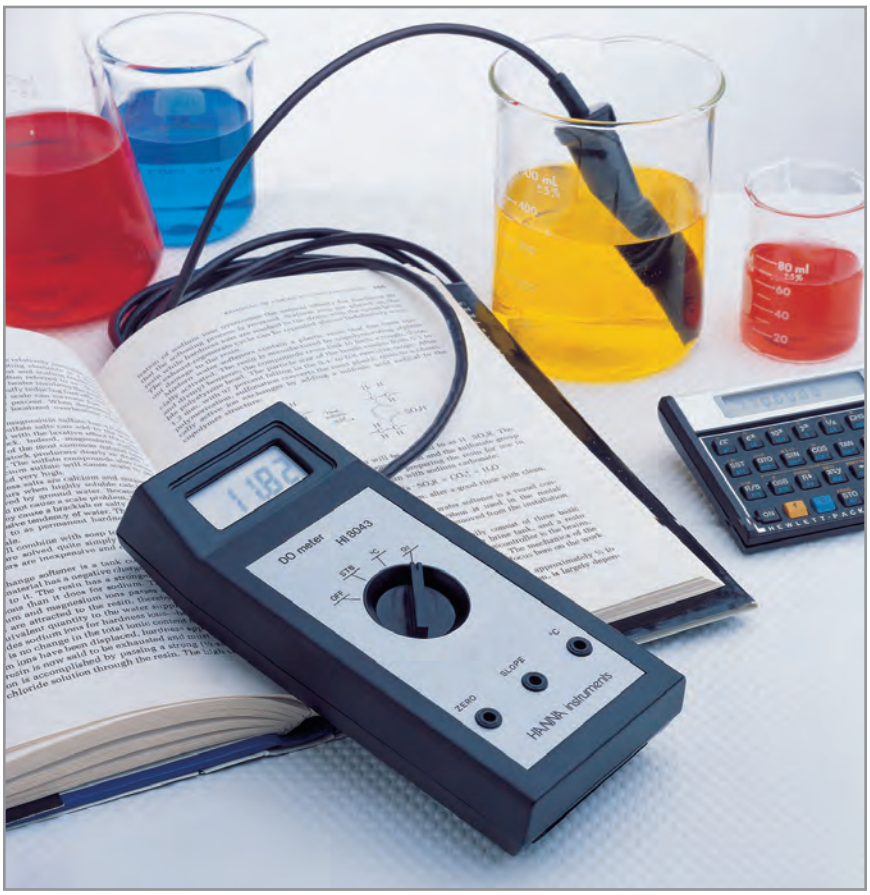
HI 7041S Refilling electrolyte solution (30 mL)

HI 8043

Dissolved Oxygen Meter

for Education

2 points



The Ideal DO Meter for Education

HI 8043 is a versatile D.O. meter ideal for use in school laboratories.

A common 9 Volt battery supplies the unit with up to 100 hours of continuous power, making it truly portable.

There is also a low battery warning that helps eliminate the possibility of taking an erroneous reading due to low power.

The simplicity of this meter is its greatest asset. Select the O_2 mode and the polarigraphic probe will supply you with accurate dissolved oxygen measurements in mg/L. Switch the dial to °C to display the temperature readings.

The Standby (STB) mode is particularly useful to keep the current flowing through the probe which is continuously polarized and ready for use.

SPECIFICATIONS		HI 8043
Range	O_2	0.00 to 19.99 mg/L
	Temperature	0.0 to 50.0°C
Resolution	O_2	0.01 mg/L
	Temperature	0.1°C
Accuracy (@20°C)	O_2	±1.5% F.S.
	Temperature	±0.5°C
Calibration		manual, 2 points (zero & slope)
Temperature Compensation		automatic 0 to 30°C
Probe		HI 76401, polarographic, 3 m (10') cable (included)
Battery Type / Life		(1) 9V / approximately 100 hours of continuous use
Environment		0 to 50°C (32 to 122°F); RH. max 95%
Dimensions		180 x 83 x 40 mm (7.1 x 3.3 x 1.6")
Weight		240 g (8.4 oz.)

ORDERING INFORMATION

HI 8043 is supplied with DO meter, HI 76401 DO probe, membrane cap (2), O-ring (2), protective cap, HI 7041S 30 mL electrolyte solution, screwdriver for calibration purposes, 9V battery (1) and Instruction manual.

ELECTRODES

HI 76401 D.O. probe with 3 m (10') cable

SOLUTIONS

HI 7040L Zero oxygen solution, 500 mL
HI 7040M Zero oxygen solution, 250 mL
HI 7041S Refilling electrolyte solution,30 mL

ACCESSORIES

HI 710001 Soft carrying case
HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 76407A/P Pack of 5 replacement membranes



EDUcation

HI 76401

HI 76401 D.O. probe, is ideal for classroom and field educational use. It's shorter cable and body length is easy to use and store away.

This probe is available with 3 m (10').

HI 76401 with 3 m (10') cable

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The "No Worry" Meter

The HANNA HI 93732N utilizes a sophisticated custom microprocessor and a modified Winkler method to measure Dissolved Oxygen accurately and quickly.

Measurements are made in a few short steps that can be performed by technical and non-technical operators alike.

In fact, all you need to do is insert a cuvet containing your sample into the meter and press ZERO. This will calibrate the meter to your sample in seconds.

Then add a few drops of the reagent to the sample to generate a color whose intensity depends on the D.O. content. Place the reacted sample back in the meter and the instrument will do the rest of the work for you!

HI 93732N will display the D.O. concentration in tenths of a ppm in clear digits on the large LCD.

There is no need to worry about temperature changes, membrane status or salinity variations.





HI 740038



HI 93732-01 *HI 93732-03*

SPECIFICATIONS	HI 93732N
Range	0.0 to 10.0 mg/L
Resolution	0.1 mg/L
Accuracy (@20°C/68°F)	±0.2 mg/L ±3% of reading
Light Source	LED (Light Emitting Diode) 470 nm
Light Life	Life of the instrument
Sensor	Silicon Photocell
Battery Type / Life	1 x 9V / approximately 40 hours of continuous use; Auto shut-off after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	180 x 83 x 46 mm (7.1 x 3.3 x 1.8")
Weight	290 g (10 oz.)
Method	Modified Winkler method; the reaction between Dissolved Oxygen and the reagent causes a yellow tint in sample.

ORDERING INFORMATION

HI 93732N is supplied with sample cuvets and caps (2), transport cap (1), 60 mL glass bottle with stopper (1) and 9V battery.

ACCESSORIES

HI 710009	Shockproof rubber boot, blue
HI 710010	Shockproof rubber boot, orange
HI 731318	Tissue for wiping cuvets (4)
HI 731321	Spare measurement cuvets (4)
HI 731325	Cap for cuvet (4)
HI 740038	60 mL glass bottle and stopper
HI 93703-50	Cleaning solution for cuvet, 230 mL
HI 93732-01	Reagent kit for DO (100 tests)
HI 93732-03	Reagent kit for DO (300 tests)

HI 9147

Dissolved Oxygen Meter

with Galvanic Probe for Fish Farming



Shown with protective rubber boot (included)

A DO Meter Designed for Aquaculture

HI 9147-04 DO Meter (with a 4 m cable) and HI 9147-10 DO Meter (with a 10 m cable) are specially designed for aquaculture applications. This unit is unique amoung our family of DO meters in that it comes with a galvanic probe.

Unlike polarographic probes, galvanic DO probes require no conditioning time. When you need to measure multiple samples in a given period of time, pick it up and measure immmediately and on demand.

HI 9147 is equipped with automatic temperature compensation plus user adjustable altitude and salinity compensations for the most accurate measurements. This unit comes with a rechargeable battery (inductive charger not included).

HI 9147 is a must have for DO sensitive organisms or high bio-load environments.

- *Designed specifically for aquaculture*
- *Backlit LCD*
- *Automatic temperature compensation*
- *Automatic salinity compensation*
- *Water-resistant*
- *Protective rubber boot included*

DO Levels at 100% Saturation					
	Salinity (ppt)				
Temperature	0	10	20	30	40
10°C / 50°F	13.0	12.2	11.4	10.6	9.8
15°C / 59°F	10.3	9.7	9.2	8.6	8.1
20°C / 68°F	9.4	8.8	8.4	7.9	7.4
25°C / 77°F	8.5	8.0	7.6	7.2	6.7
30°C / 86°F	7.8	7.4	7.0	6.6	6.2



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Dissolved Oxygen Meter

with Galvanic Probe for Fish Farming

Dissolved Oxygen

Arguably the most important parameter of water quality. Most species require a minimum of 3 ppm DO, but 8-10 ppm is preferable. Unlike other gases such as nitrogen, oxygen supersaturation doesn't usually result in gas bubble disease ("pop-eye"), so high levels generally aren't an issue.







In Charge



HI 710040
Battery charger (optional)

Rechargeable batteries with inductive charger

When the battery is low, you don't have to worry about carrying a spare one with you—the battery can be recharged with HANNA's optional inductive charger. Simply leave the meter on the charger for a few hours and you're ready to go. The charger can either be plugged in a standard 115V or 230V socket using the optional HANNA adapter.

ORDERING INFORMATION

HI 9147-04 is supplied with HI 76409/4 with 4 m (13') cable, (2) spare membranes with O-rings, electrolyte solution (30 ml), rubber protective boot, rechargeable battery, screwdriver and instructions.

HI 9147-10 is supplied with HI 76409/10 with 10 m (33') cable, (5) spare membranes with O-rings, electrolyte solution (30 ml), rubber protective boot, rechargeable battery, screwdriver and instructions.

PROBES

HI 76409/4* Galvanic DO probe with built-in temperature sensor and 4 m cable

HI 76409/10* Galvanic DO probe with built-in temperature sensor and 10 m cable

SOLUTIONS

HI 7042S Electrolyte solution for galvanic probes, 30 ml

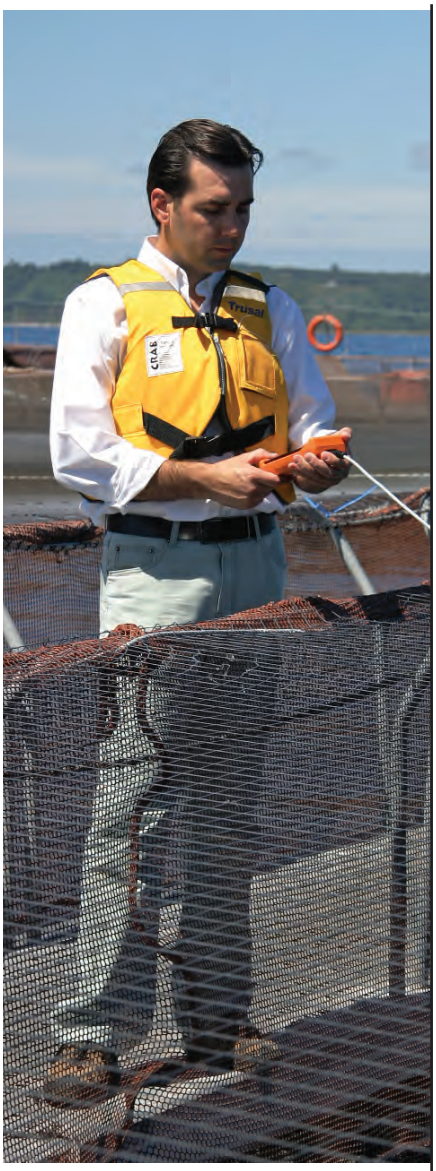
ACCESSORIES

HI 710040 Battery recharger
HI 76409-0 Protective sleeve for HI 76409 probes
HI 76409A/P Membranes for HI 76409 probes (5)
HI 710015 Shockproof rubber boot, blue color
HI 710016 Shockproof rubber boot, orange color
HI 731326 Calibration screwdriver (20)

*To be replaced by authorized personnel only

SPECIFICATIONS	*HI 9147*
Range	O_2: 0.0 to 50.0 mg/L; **% Saturation** O_2: 0 to 600 %; **Temperature:** -5.0 to 50.0°C
Resolution	O_2: 0.1 mg/L or 1%; **Temperature:** 0.1°C
Accuracy (@20°C/68°F)	O_2: ±1% of reading; **Temperature:** ±0.2°C
Calibration	Manual, in saturated air
Temp. Compensation	Automatic, -5 to 50°C (23°F to 122°F)
Salinity Compensation	0 to 51 g/L (1 g/L resolution)
Probe, fixed (included)	HI 76409/4 with 4 m (13') cable (included) or HI 76409/10 with 10 m (33') cable
Battery Type/Life	(1) 9V Ni-Mh, rechargeable/approx. 200 hours of continuous use without backlight; auto-off after 6 minutes of non-use;
Environment	0 to 50°C (32 to 122°F); 100% max RH
Dimensions	196 x 80 x 60 mm (7.7 x 3.1 x 2.4")
Weight	500 g (1.1 lbs.)

DO Probes and Accessories



HI 76407 • HI 76401

Standard DO Probe

With Several Cable Lengths to Choose From

HI 76407 and HI 76401 dissolved oxygen probes are extremely rugged making them perfect for laboratory as well as field applications. Calibration is fast, simple and all DO measurements are temperature compensated. The pre-tensioned, ready-made PTFE membrane can be changed in a few seconds without the need to stretch and cut the replacement.

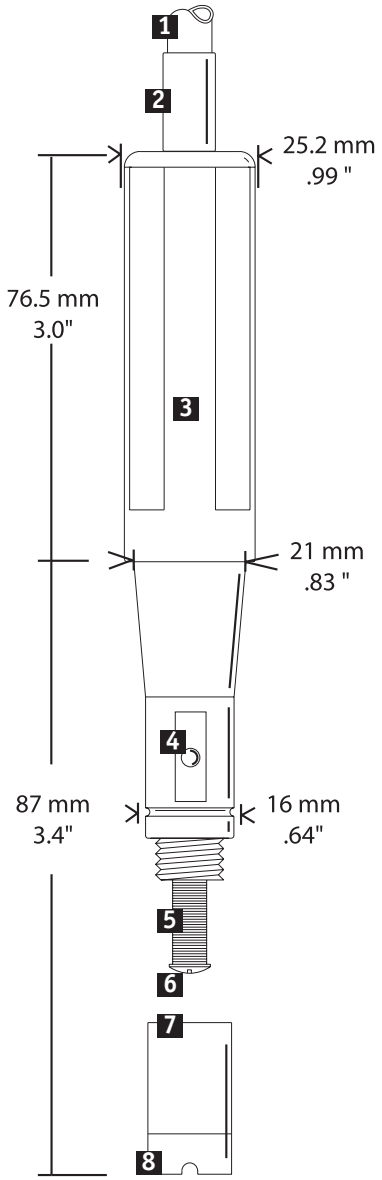
The HI 76407 is offered with several cable lengths to meet your specific needs.



PROBE	CABLE LENGTH	METER
HI 76401	3 meters (10')	HI 8043
HI 76407/2	2 meters (6.6')	HI 2400
HI 76407/4	4 meters (13')	HI 9142 HI 9143 HI 9145 HI 9141 HI 91410
HI 76407/10	10 meters (33')	as above
HI 76407/20	20 meters (67')	as above

HI 76407

1. Shielded, waterproof cable
2. Protective sheath
3. PEI probe for best field protection
4. Linearized and accurate thermistor temperature sensor protected behind a stainless steel cover
5. Silver wire anode element
6. Glass encapsulated platinum cathode
7. Potassium Chloride electrolyte solution (HI 7041S)
8. Thin permeable PTFE membrane isolates the sensor elements from the testing solution, but allows oxygen to enter (HI 76407A/P)



HANNA instruments

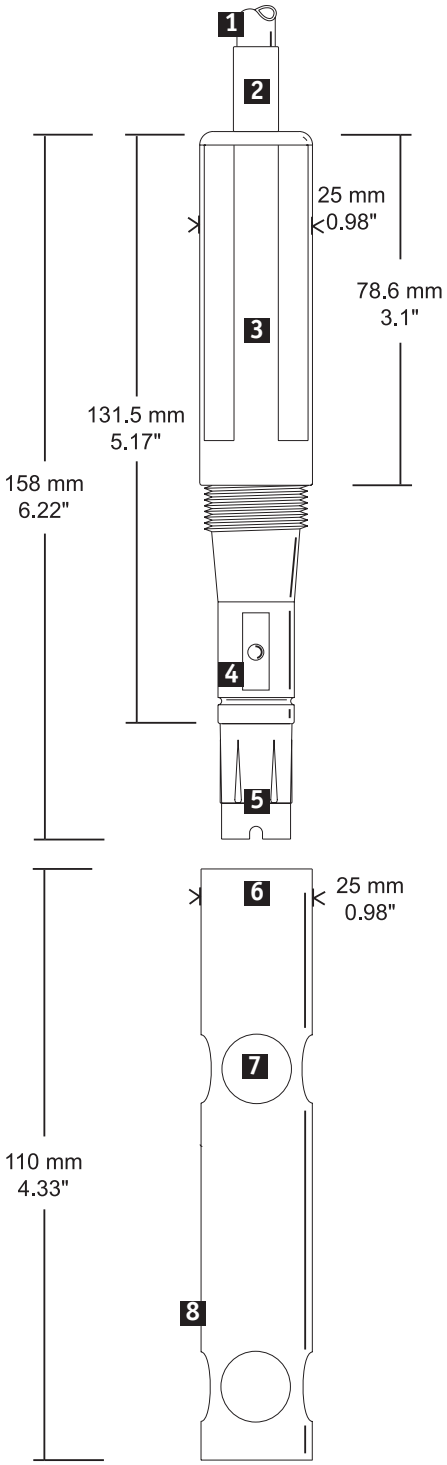
With Great Products, Come Great Results™

HI 76407/4F • HI 76407/10F

DO Probe with Protective Sheath

With with 4 m (13') or 10 m (33') Ideal for HI 9146

Perfect for laboratory and field applications, HANNA Dissolved Oxygen probes are extremely rugged. Calibration is fast and simple, and measurements are temperature compensated. The sensitive PTFE membrane can be changed in a few seconds.



1. Shielded, waterproof cable
2. Protective sheath
3. PEI probe for best field protection
4. Linearized and accurate thermistor temperature sensor protected behind a stainless steel cover
5. Permeable membrane
6. Glass encapsulated platinum cathode
7. Hole for solution cycling
8. Protective sleeve for field applications





HI 7041S • HI 7042S

Electrolye Solution

for Electrode Maintainance

It is crucial to the performance of your D.O. probe, to keep the sensor active with regular maintenance. For this purpose, HANNA has developed HI 7041S electrolyte solution to refill the membrane cap.

HI 7041S	Refilling electrolyte solution, 30 mL
HI 7042S	Electrolyte solution for galvanic probes, 30 ml

PROtection

PROBE	CABLE LENGTH	METER
HI 76407/4F	4 m (13')	HI 9146
HI 76407/10F	10 m (33')	HI 9146

DO Probes and Accessories

HI 76408

Thinner, Lighter DO Probe for Laboratories

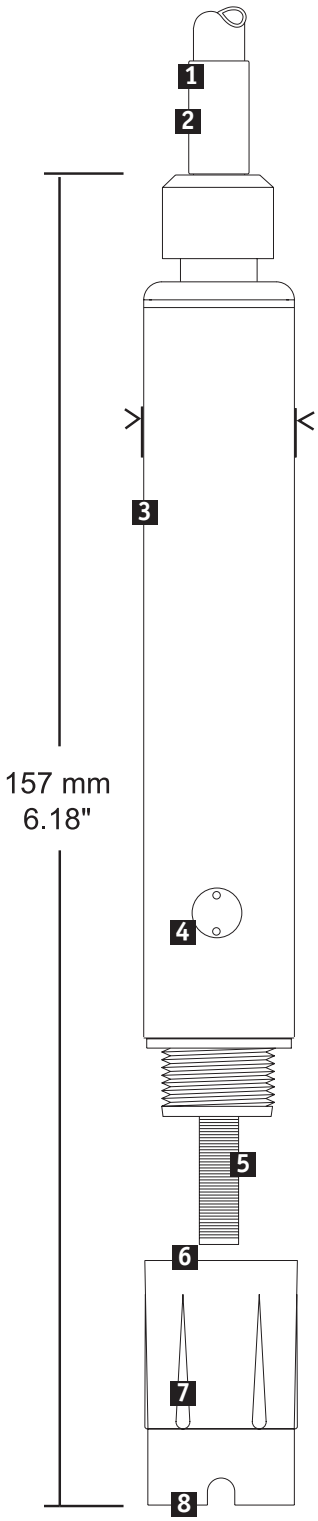
Light and thin DO probe with 1 m (3.3') cable

HANNA Dissolved Oxygen probes are extremely rugged and perfect for laboratory and field applications. Calibration is fast and simple, and measurements are temperature compensated. The sensitive PTFE membrane can be changed in a few seconds.



Thin and Light

PROBE	CABLE LENGTH	METER
HI 76408	1 m (3.3')	HI 2400



1. Shielded, waterproof cable
2. Protective sheath
3. PEI probe for best field protection
4. Linearized and accurate thermistor temperature sensor protected behind a stainless steel cover
5. Silver wire anode element
6. Glass encapsulated platinum cathode
7. Potassium Chloride electrolyte solution (HI 7041S)
8. Thin permeable PTFE membrane isolates the sensor elements from the testing solution, but allows oxygen to enter (HI 76407A/P)



HI 76407A/P

PTFE Membranes

Carry Extras for Assurance

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

HI 76407A/P contains 5 ready-to-use, replacement membranes.

Dissolved Oxygen Solutions

CODE	DESCRIPTION	BOTTLE
HI 7040M	Zero oxygen solution	250 mL
HI 7040L	Zero oxygen solution	500 mL
HI 7041S	Electrolyte solution for polarographic DO probes	30 mL
HI 7042S	Electrolyte solution for galvanic probes	30 mL

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Dissolved Oxygen Meters

Professional Instruments for a Variety of D.O. Applications

Product Spotlights



p 4.5

Research Grade Graphic Color LCD Meter

HANNA's research grade bench meter line expands to include HI 4421. HI 4421 features DO, BOD, OUR and SOUR measurement modes in a compact versatile instrument. These meters also feature a calibratable barometric pressure transducer. The color 240 x 320 dot matrix LCD is capable of displaying graphs, soft key menus, help screens and calibration reminders. HI 4421 also incorporates an intuitive menu system to help streamline your workflow process and provide accurate measurements quickly and efficiently. Measurements can be uploaded to a PC via USB or RS 232 with HANNA's optional software.



"Good service post sale, easy use of the meters..."

Oscar Hofmann
Responsible for Management of Quality and Environment.
Trusal S.A.
Chile

One of our Most Advanced Meters

HI 98186 dissolved oxygen meter includes barometric pressure measurement and calibration with a user selectable unit (mmHg, inHg, atm, mbar, psi, kPa) along with salinity, pressure and temperature compensation.

p 4.7





Designed for Aquaculture

HI 9147-04 DO Meter is specially designed for aquaculture applications. This unit is supplied with a galvanic probe.

This unit also equipped with a rechargeable battery (inductive charger optional) and protective rubber boot.

p 4.14



HANNA instruments

With Great Products, Come Great Results™

Dissolved Oxygen Meters

Professional Instruments for a Variety of D.O. Applications

Cutting Edge Technology

To bring users high performance and reliability, HANNA uses the latest in electronic and sensor technology in its line of Dissolved Oxygen meters. Being one of the few manufacturers of D.O. meters worldwide, HANNA has taken on the task of providing the industry with a diverse range of products that meet most application requirements.

The polarographic probe supplied with each meter is constructed with rugged PEI and an easy-to-change membrane cap. The cable length varies from 2 to 20 meters (6.6' to 67'). Each probe also incorporates a built-in temperature sensor for rapid response to variations in temperature.

Our new HI 4421 graphic display, color LCD bench meter features DO, BOD, OUR and SOUR measurement modes in a compact versatile instrument. The 240 x 320 dot matrix color LCD is capable of displaying graphs, soft key menus, help screens and calibration reminders.

The new HI 98186 dissolved oxygen meter completes our HI 9818x family and includes barometric pressure measurement and calibration with a user selectable unit (mmHg, inHg, atm, mbar, psi, kPa) and salinity, pressure and temperature compensation.

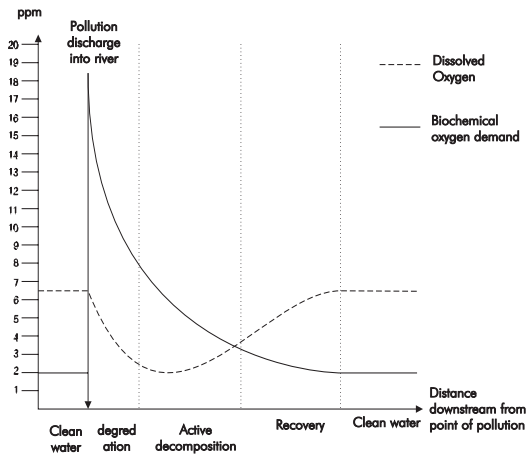
HANNA constantly listens to customer feedback and designs products around you. The new Oxy-Check™ HI 9147-04 DO Meter (with a 4 m cable) and HI 9147-10 DO Meter (with a 10 m cable) is specially designed for aquaculture applications. This unit is unique amoung our family of DO meters in that it comes with a galvanic probe. Unlike polarographic probes, galvanic DO probes require no conditioning time. An optional recharging cradle is available.

HI 9143, HI 9145 and HI 9146 use microprocessors for quick, reliable calibration. These meters compensate for the effects of salinity and altitude to ensure the highest level of accuracy. A waterproof housing provides protection from humid and dusty conditions.

These models measure D.O. from 0.00 to 45.00 mg/L and from 0.0 to 300.0% of O_2, so that even oxygenated water in fish farms and labs can be monitored with these portable meters.

HI 9141 was the world's first portable printing D.O. meter. HANNA recognized the need to give water treatment and fish farming industries the proper means to easily monitor and record D.O. levels.

Effect of pollution on dissolved oxygen



HI 91410 is the world's first portable logging D.O. meter. Up to 8000 readings can be stored into the meter's memory for retrieval at a later date or for transfer to a PC through HANNA's HI 9200 infrared transmitter.

HI 2400 logging D.O. bench meter measures, records and transmits data to a computer. The display gives step-by-step prompts for the D.O. and temperature calibration procedures. Salinity and altitude are automatically compensated and data can be logged at user selectable intervals. This meter also has an extended D.O. range for any application.



Wastewater Treatment



Fish Farming

Dissolved Oxygen Meters

Professional Instruments for a Variety of D.O. Applications



Definition

Oxygen meters are used to determine the quantity of dissolved oxygen in liquids. Two measurement scales are commonly utilized: parts per million (ppm), or the percentage saturation (%), which is defined as the percentage of oxygen dissolved in 1 liter of water. It is necessary to determine the quantity of dissolved oxygen present in water because it is an indicator of water quality. It is, therefore, important to monitor civil and industrial wastewater where low concentrations indicate pollution.

Applications

Dissolved oxygen meters are routinely used at the municipal wastewater treatment plant to monitor the nitrification/denitrification process. They are also used for measuring and monitoring the oxygen content at the various points in the water circuit of steam boiler installations. Another application of oxygen meters is in the prevention of metal corrosion, such as in heating systems, where one of the factors affecting the rate of corrosion is the percentage of oxygen present.

Another very important application is in fish farming, where oxygen levels have to be continuously monitored both to attain optimal reproduction and to prevent high mortality caused by low oxygen. Nuclear power stations are also suitable for oxygen measurement of their heavy water.

Principle of Operation

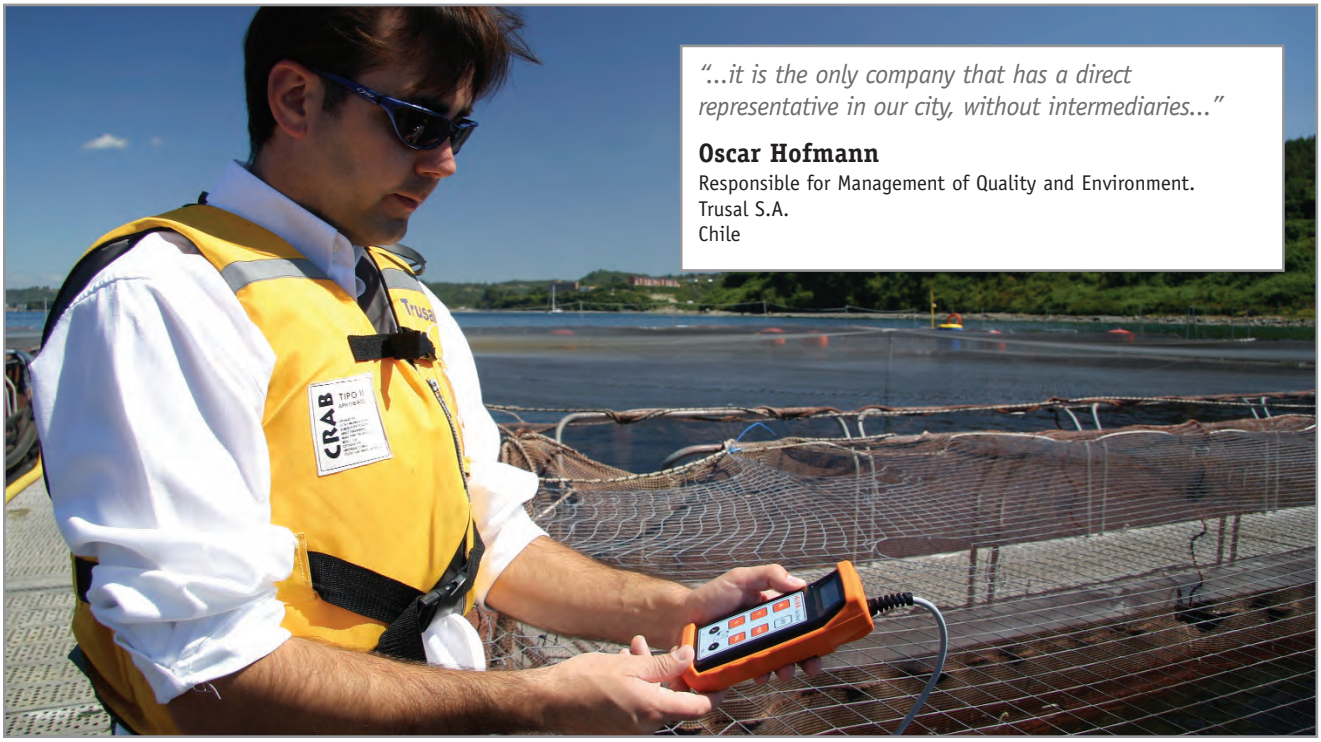
The conventional measurement system of D.O. consists of a meter and a Clark-type polarographic probe. The probe is the most important and delicate part of the system. The probe consists of a silver (Ag) anode wrapped with a platinum (Pt) wire that functions as the cathode. These are inserted into a protective cap filled with a potassium chloride (KCl) electrolyte solution. The cap ends in a PTFE membrane, a gas-permeable material that allows the passage of oxygen present in the solution, but not the solution itself.



Water Quality

By applying a potential of 790 mV, the oxygen present in the cell is reduced to hydroxide ions (OH^-) at the cathode, and silver chloride (AgCl) is deposited at the anode. This reaction provokes a current flux with intensity proportional to the quantity of oxygen present in the sample. The meter converts the current into the corresponding concentration of dissolved oxygen.

It should be noted that the solubility of oxygen is dependent on many factors including temperature, atmospheric pressure and salinity. Some of HANNA oxygen meters automatically compensate for these variables and ensure even greater accuracy.



"...it is the only company that has a direct representative in our city, without intermediaries..."

Oscar Hofmann
Responsible for Management of Quality and Environment.
Trusal S.A.
Chile

HI 4421

Dissolved Oxygen and BOD Meter

with Graphic, Color LCD Display

Advanced Dissolved Oxygen Measurement

HANNA's research grade bench meter line expands to include HI 4421. HI 4421 features DO, BOD, OUR and SOUR measurement modes in a compact versatile instrument. The color 240 x 320 dot matrix LCD is capable of displaying graphs, soft key menus, help screens and calibration reminders. HI 4421 also incorporates an intuitive menu system to help streamline your workflow process and provide accurate measurements quickly and efficiently. Measurements can be uploaded to a PC via USB or RS 232 with HANNA's optional software.

- *Extended range up to 90 ppm and 600% saturation*
- *True barometric atmospheric pressure compensation*
- *Automatic or user calibration*
- *Auto-hold to freeze LCD readings*
- *AutoEnd mode for DO*
- *Flexible logging with 3 modes*
- *BOD (biochemical oxygen demand), OUR (oxygen uptake rate) and SOUR (specific oxygen uptake rate)*
- *GLP*
- *Two selectable alarm limits*
- *Up to 100 logging lots, 200 OUR and SOUR reports and up to 200 BOD method entries*

BOD gives an indication of the biodegradable organic material present in a sample of water. The dissolved oxygen concentration is measured before and after an incubation period of 5 days and the BOD is calculated in mg per liter from the difference.

OUR and **SOUR** are used to determine the oxygen consumption or respiration rate. OUR is measured in mg of oxygen consumed per liter per hour, and SOUR is measured in mg of oxygen consumed per gram of volatile suspended solids per hour.



SPECIFICATIONS

		HI 4421
Range	Dissolved Oxygen	0.00 to 90.00 ppm; 0.0 to 600.0 % saturation
	Barometric Pressure	450 to 850 mmHg; 560 to 1133 mBar
	Salinity Compensation	0 to 45 ppt (g/L)
	Temperature	-20.0 to 120.0°C; -4.0 to 248°F; 253.1 to 393.1 K
Resolution	Dissolved Oxygen	0.01 ppm; 0.1% saturation
	Barometric Pressure	1 mm Hg
	Temperature	0.1°C/°F/K
Accuracy	Dissolved Oxygen	±1.5% of reading ±1 digit
	Barometric Pressure	±3 mm Hg + 1 least significant digit
	Temperature	±0.2°C/K/°F
Measurement Modes		Direct DO; BOD (biochemical oxygen demand); OUR (oxygen uptake rate); SOUR (specific oxygen uptake rate)
Calibration	DO	Automatic/user standard, 1 or 2 points
	Barometric Pressure	Single point
Temperature Compensation		0.0 to 50.0°C; 32.0 to 122.0°F; 237.1 to 323.1 K
Probe (included)		Polarographic with built-in temperature sensor
Logging	Record Samples	Up to 100 lots; 10000 samples/lot for automatic logging; 5000 samples/lot for manual logging
	Logging Interval	from 1 second and up
GLP		Last calibration data, calibration info
Alarm (DO, BOD, OUR, SOUR)		Inside and outside limits
PC Connection		Opto-isolated USB and RS232
Display		240 x 320 dot-matrix color LCD with on-screen help, graphing, language selection and custom configuration
Power Supply		12 Vdc adapter (included)
Dimensions / Weight		159 x 230 x 93 mm (6.3 x 9.1 x 3.7")/800 g (1.8 lbs.)

ORDERING INFORMATION

HI 4421-01 (115V) and **HI 4421-02** (230V) are supplied with HI 76408 DO probe, HI 7041S electrolyte solution (30 mL), HI 76407A membrane caps (2), HI 76404N electrode holder, power adapter and instruction manual.

PROBES

HI 76408 DO probe for laboratory use, with 1 m (3.3') cable

SOLUTIONS

HI 7040M Zero oxygen solution, 230 mL
HI 7040L Zero oxygen solution, 500 mL
HI 7041S Electrolyte solution, 30 mL

ACCESSORIES

HI 76407A/P Replacement membrane (5 pcs)
HI 76404N Electrode holder
HI 92000 Windows® compatible software
HI 920010 Serial cable for PC connection
HI 920013 USB cable for PC connection

HI 2400

DO Meter

for Laboratory



For Professional DO Monitoring

For Dissolved Oxygen measurements, HANNA offers the HI 2400—an essential instrument for testing pharmaceutical and food products as well as for monitoring in water treatment plants.

The user can choose to display DO readings in mg/L O_2 or % of saturation.

This meter can be used in any laboratory and for any type of water, as it allows measurement compensation both for altitude and salinity factors.

HI 2400 features an automatic calibration procedures at 1 or 2 points (at 0 and 100% O_2 saturation).

The automatic logging interval can be set to perform analysis and store data in non-volatile memory.

All logged data can be downloaded to your PC through an RS232 serial port. Memory can store up to 8000 samples.

This meter is suplied with a polarographic sensor which measures the current generated by the reaction of O_2 with Ag, for enhanced stability.

- *Automatic calibration*
- *Altitude, salinity and temperature compensation*
- *Data logging and storage*
- *PC compatible*
- *Polarographic DO probe included*

SPECIFICATIONS		HI 2400
Range	DO	0.00 to 45.00 mg/L (ppm)
	% Saturation O_2	0.0 to 300.0 %
	Temperature	0.0 to 50.0°C
Resolution	DO	0.01 mg/L (ppm)
	% Saturation O_2	0.1%
	Temperature	0.1°C
Accuracy (@20°C/68°F)	DO	±1.5% F.S.
	% Saturation O_2	±1.5% F.S.
	Temperature	±0.5°C
DO Calibration		automatic, 1 or 2 points at 0% (with HI 7040 solution) and 100% (in air)
Altitude Compensation		0 to 4000 m (with 100 m resolution)
Salinity Compensation		0 to 40 g/L (with 1 g/L resolution)
Temperature Compensation		automatic, 0.0 to 50.0°C
Probe		HI 76407/2 with 2 m (6.6') cable (included)
Logging Interval		1, 15, 30 seconds or 1, 2, 5, 15, 30, 60, 120, 180 minutes
PC connection		RS232 serial port (opto-isolated)
Power Supply		12 Vdc adapter
Environment		0 to 50°C; RH 95%
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)

ORDERING INFORMATION

HI 2400-01 (115V) and **HI 2400-02** (230V) are supplied with HI 76407/2 dissolved oxygen probe with 2 m (6.7') cable, HI 76407A membrane cap (2), HI 7041S electrolyte solution (30 mL), 12 Vdc power adapter and instructions.

PROBES

HI 76407/2 DO probe, 2 m (6.6') cable
HI 76407/4 DO probe, 4 m (13') cable
HI 76407/10 DO probe, 10 m (33') cable
HI 76407/20 DO probe, 20 m (67') cable
HI 76408 DO probe for laboratory use, with 1 m (3.3') cable

SOLUTIONS

HI 7040M Zero oxygen solution, 250 mL
HI 7040L Zero oxygen solution, 500 mL
HI 7041S Electrolyte solution, 30 mL

ACCESSORIES

HI 76407A/P Replacement membranes (5)
HI 92000 Windows® compatible software
HI 920010 Serial cable for PC connection



HI 76407A/P

PTFE Membranes

Carry Extra for Assurance

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

HI 76407A/P contains 5 ready-to-use, replacement membranes.

HANNA instruments

With Great Products, Come Great Results™

Dissolved Oxygen and BOD Meter

with Backlit Graphic LCD Display

Screen Highlights



BOD Parameters and Records

All necessary parameters for BOD testing can be set and displayed at once.

A list of all saved BOD data can be easily retrieved and shown on the LCD display.



BOD Results

BOD is calculated in mg per liter from the difference between the initial and final dissolved oxygen concentration readings.



OUR Results

Measured in mg of oxygen consumed per L per hour.



SOUR Results

Measured in mg of oxygen consumed per g of volatile suspended solids per hour.

BOD gives an indication of the biodegradable organic material present in a sample of water. The dissolved oxygen concentration is measured before and after an incubation period of 5 days and the BOD is calculated in mg per liter from the difference.

OUR and **SOUR** are used to determine the oxygen consumption or respiration rate. OUR is measured in mg of oxygen consumed per liter per hour, and SOUR is measured in mg of oxygen consumed per gram of volatile suspended solids per hour.

Industrial Grade Portable with Extended Range

HI 98186 dissolved oxygen meter includes barometric pressure measurement and calibration with a user selectable unit (mmHg, inHg, atm, mbar, psi, kPa) along with salinity, pressure and temperature compensation.

- *Extended range up to 50 ppm and 600% saturation*
- *Built-in barometer*
- *Salinity, pressure and temperature compensation*



Inductive charger



Batteries can be recharged using HANNA's inductive recharger. Simply leave the meter on the charger for a few hours and you're ready to go. The charger can be powered using the included HANNA adapter.

SPECIFICATIONS		HI 98186
Range	Dissolved Oxygen	0.00 to 50.00 ppm; 0.0 to 600.0 % saturation
	Barometric Pressure	450 to 850 mmHg
	Salinity Compensation	0 to 70 ppt (g/L)
	Temperature	-20.0 to 120.0°C (-4.0 to 248.0°F)
Resolution	Dissolved Oxygen	0.01 ppm; 0.1% saturation
	Barometric Pressure	1 mm Hg
	Temperature	0.1°C/°F
Accuracy	Dissolved Oxygen	0 to 300%: ±1.5% of reading or ±1.0%, whichever is greater; 300 to 600%: ±3% of reading; 0 to 30 mg/L: ±1.5% of reading or 0.10 mg/L, whichever is greater; 30 mg/L to 50 mg/L: ±3% of reading
	Barometric Pressure	± 3 mmHg within ±15% from the calibration point
	Temperature	±0.2°C/±0.4°F (excluding probe error)
Measurement Modes		Direct DO; BOD (biochemical oxygen demand); OUR (oxygen uptake rate); SOUR (specific oxygen uptake rate)
Calibration	Dissolved Oxygen	Automatic, 1 or 2 points or manual, 1 point
	Barometric Pressure	1 point
	Temperature	1 or 2 points
Temperature Compensation		Automatic from 0.0 to 50.0°C (32.0 to 122.0°F)
Probe		HI 76407/4F Polarographic with built-in temperature sensor + 4m cable
Logging		Log-on-demand 400 samples
PC Connectivity		Opto-isolated USB (with HI 92000 software)
Battery Type/Life		(4) 1.2V AA rechargeable batteries/approx. 200 hrs continuous use (without backlight); HI 710042 inductive recharger (included)
Auto-off		User Selectable: 5, 10, 30, 60 min or can be disabled
Environment / Dimensions / Weight		IP67 / 226.5 x 95 x 52 mm (8.9 x 3.75 x 2") / 525 g (1.1 lbs.)

ORDERING INFORMATION

HI 98186-01 (115V) and **HI 98186-02** (230V) are supplied with HI 76407/4F dissolved oxygen probe with built-in temperature sensor with 4 m (13') cable; (2) spare membranes; electrolyte solution; (4) rechargeable batteries; HI 710042 inductive battery charger with power adapter; rugged carrying case and instructions.

PROBES

HI 76407/10 DO probe with 10 m (33') cable
HI 76407/20 DO probe with 20 m (67') cable
HI 76407A/P 5 spare membranes

SOLUTIONS

HI 7040M Zero oxygen solution, 250 mL
HI 7040L Zero oxygen solution, 500 mL
HI 7041S Electrolyte solution, 30 mL

HI 9141 • HI 91410

Printing and Logging Dissolved Oxygen Meters

with storage up to 8,000 readings

PC compatible



Print On the Spot Records of your Measurements

HI 9141 and HI 91410 are portable, printing D.O. meters designed for continuous monitoring and recording at selectable time intervals. The low-impact printer uses regular paper that is easily sourced and will not fade over time.

HI 91410 combined all of the comprehensive printing functions of the HI 9141, with the capability to log measurements. In addition to supplying the user with instant print-outs of D.O., HI 91410 also provides data logging storage of up to 8000 readings. Scroll through the data at any time, print or even transfer to a computer system via (optional) HI 9200 infrared cradle. Simply place the meter on the cradle and, at the touch of a button, transfer all of the recorded lots in seconds. This infrared connection is important in humid environments, where a standard RS232 plug on a meter could become damaged.

In addition to the automatic calibration feature, both meters automatically compensate for two very important parameters: altitude from 0 to 1900 meters (6230'), and salinity from 0 to 40 g/L.

- *Store up to 8000 readings*
- *Computer compatible with optional infrared cradle and software*
- *Manually adjustable altitude and salinity compensation*

SPECIFICATIONS		HI 9141	HI 91410
Range	O_2	0.00 to 19.99 ppm (mg/L)	
	Temperature	0.0 to 50.0°C	
Resolution	O_2	0.01 ppm (mg/L)	
	Temperature	0.1°C	
Accuracy (@20°C)	O_2	±1.5% F.S.	
	Temperature	±0.5°C	
Calibration		automatic, in air, at 100%	
Temperature Compensation		automatic 0 to 30°C	
Altitude Compensation		0 to 1900 m (resolution 100 m)	
Salinity Compensation		0 to 40 g/L (resolution 1 g/L)	
Probe (included)		HI 76407/4 polarographic probe with 4 m (13') cable	
Printer		low power impact type-belt, common paper, 38 mm (HI 710034)	
Printing Intervals		selectable between 1, 2, 5, 10, 15, 30, 60, 120 and 180 minutes	
Logging Intervals		—	1, 2, 5, 10, 15, 30, 60, 120, 180 minutes
PC Connection		—	RS232 port with HI 9200 transmitter and HI 92000 software (not included)
Power Supply		(4) 1.5V AA / approx. 70 hours of continuous use (with rapid printing interval); auto-off after 4 hours of inactivity; or input for 12 Vdc power adapter	
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Dimensions		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight		550 g (1.21 lbs.)	

ORDERING INFORMATION

HI 9141 and **HI 91410** are supplied with batteries (4), DO probe with 4 m/13' cable (HI 76407/4), HI 76407A membrane cap (2), HI 7041S electrolyte solution (30 mL), paper rolls (5) and rugged carrying case

ELECTRODES

HI 76407/4 DO Probe with 4 m (13') cable
HI 76407/10 DO Probe with 10 m (33') cable
HI 76407/20 DO Probe with 20 m (67') cable

SOLUTIONS

HI 7041S Refilling electrolyte solution, 30 mL
HI 7040L Zero oxygen solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc adapter
HI 710006 230 Vac/12 Vdc adapter
HI 76407A/P Replacement membranes (5)
HI 9200/9 Infrared transmitter (9 pin)
HI 92000 Windows® compatible software
HI 710034 Paper rolls (10)
HI 710035 Ink cartridge (1)



HI 710034

HANNA instruments

With Great Products, Come Great Results™

Extended Range Dissolved Oxygen Meters

in Water-Resistant Casing

Designed to Withstand Harsh Conditions

Field work can subject instrumentation to the inclemency of weather. Cold, rain, snow, dust and humidity can cause condensation to enter the housing, which eventually compromises the meter and rapidly deminishes its performance and life. HI 9143 and HI 9145 are designed for harsh 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. Auto-calibration eliminates the need to use a screwdriver or other devices to adjust the reading.

The new and improved HI 9143 and HI 9145 measure and display O² from 0 to 300%, 0 to 45 mg/L and °C from 0 to 50°C.

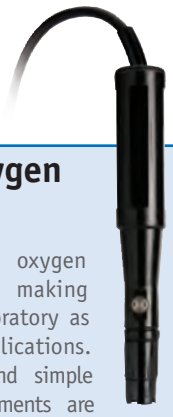
In addition to the features of HI 9145, HI 9143 also supplies the user with manual compensations for salinity and altitude factors. Both meters automatically compensate for the effects of temperature.

- *Altitude, salinity and temperature compensation*
- *Designed for the field*
- *Polarographic probe and rugged carrying case included*



SPECIFICATIONS		HI 9143	HI 9145
Range	O_2	0.00 to 45.00 mg/L	
	% Saturation O_2	0.0 to 300.0%	
	Temperature	0.0 to 50.0°C	
Resolution	O_2	0.01 mg/L	
	% Saturation O_2	0.1%	
	Temperature	0.1°C	
Accuracy (@ 20°C/68°F)	O_2	±1.5% F.S.	
	% Saturation O_2	±1.5% F.S.	
	Temperature	±0.5°C	
Calibration		automatic, in air, at 100%	
Temperature Compensation		automatic, 0 to 50°C (32 to 122°F)	
Altitude Compensation		0 to 1900 m; 100 m (328') resolution	—
Salinity Compensation		0 to 40 g/L; 1 g/L resolution	—
Probe (included)		HI 76407/4 polarographic probe with 4 m (13') cable	
Power Supply		(4) 1.5V AA batteries / approx. 200 hours of continuous use; auto-off after 4 hours of non-use; or input for 12 Vdc power adapter	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight		500 g (1.1 lbs.)	

Versatile



Dissolved Oxygen Probes

HI 76407 dissolved oxygen probes are rugged, making them perfect for laboratory as well as field applications. Calibration is fast and simple and all D.O. measurements are temperature compensated. The pre-tensioned and ready-made PTFE membrane can be changed in a few seconds without the need to stretch and cut the replacement.

The HI 76407 is offered with several cable lengths.

ORDERING INFORMATION

HI 9143 is supplied complete with HI 76407/4 probe with 4 m (13') cable, 2 spare membranes, HI 7041S electrolyte solution (30 mL), batteries, rugged carrying case and instructions.

HI 9145 is supplied complete with HI 76407/4 probe with 4 m (13') cable, 2 spare membranes, HI 7041S electrolyte solution (30 mL), batteries, rugged carrying case and instructions.

ELECTRODES

HI 76407/4 DO probe with 4 m (13') cable
HI 76407/10 DO probe with 10 m (33') cable
HI 76407/20 DO probe with 20 m (67') cable

SOLUTIONS

HI 7041S Refilling electrolyte solution, 30 mL
HI 7040L Zero oxygen solution, 500 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc adapter
HI 710006 230 Vac/12 Vdc adapter
HI 76407A/P Replacement membranes (5)
HI 721317 Rugged carrying case

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HI 3220 • HI 3221 • HI 3222

Laboratory pH Meters

with Backlit, Graphic LCD



Calibration Check™ pH/mV/ISE/Temperature Bench Meters

HANNA's HI 3000 series of professional bench meters are designed to provide high accuracy and ease of use both in the laboratory as well as in harsh industrial conditions.

These meters feature HANNA's exclusive Calibration Check™, a diagnostics system that ensures accurate readings every time. By alerting users of potential problems during the calibration process, the Calibration Check™ system eliminates erroneous readings due to dirty or faulty pH electrodes or contaminated buffer solutions. Throughout the calibration process, users are guided step-by-step by the on-screen tutorial. After calibration, a probe condition indicator is displayed on the LCD informing the user of the overall electrode status.

These instruments can be calibrated at up to 5 points with 7 standard buffers and an additional 5 custom buffers. HI 3222, HI 3221 and HI 3220 also feature a user selectable "Outside Calibration" warning as well as a user selectable "Calibration Time-out" warning.

HI 3222, HI 3221 and HI 3220 feature a powerful interactive user support menu system that assists you before, during and after measurement. On-screen tutorials guide users through set-up, calibration and measurement while context sensitive help of any screen is available at a push of a button. The help screen includes language specific assistance for menu parameters, calibration, log, contact information and accessories for your instrument.

HI 3000 series measures ORP with a resolution of 0.1 mV and also offers an extended temperature range from -20 to 120°C (-4 to 248°F) using HI 7662-T interchangeable probes.

HI 3221 and HI 3222 feature ISE measurement modes: HI 3221 displays ISE as ppm while the HI 3222 provides a choice of units (ppb, ppm, molarity, weight/volume %). The electrode type and unit selection capability of the HI 3222 and the ion charge selection capability of the HI 3221 make these instruments extremely versatile for a wide range of ISE measurements.

HI 3222, HI 3221 and HI 3220 feature three types of logging modes (for pH, ISE and mV): stability logging, interval logging and log-on-demand. Stability logging stores measurements once the electrode has stabilized in the solution. The user can set sensitivity between fast, medium and accurate. Interval logging stores data at user defined set time intervals and log-on-demand stores data at a touch of a button. Stored data includes the parameter, test results, offset and slope, date and time. The HI 3000 series can be connected to a PC via USB. HI 92000 Windows® compatible software (optional) aids in data management.

- *Single (HI 3220 and HI 3221) or dual (HI 3222) input channels*
- *Backlit, Graphic LCD*
- *Exclusive Calibration Check™*
- *Prompts and messages on the graphic LCD*
- *Stability, interval and Log-on-demand logging*
- *5 point calibration with 7 standard and 5 custom buffers*
- *Relative mV measurements*
- *Up to 400 sample memory capacity*
- *Auto HOLD to freeze readings on the display*
- *User selectable language*
- *GLP to view last calibration data for pH, Rel mV or ISE*
- *User selectable "Outside Calibration Range" warning*
- *User-selectable "Calibration Timeout" to remind when a new calibration is necessary*
- *PC interface via USB*

HANNA instruments

With Great Products, Come Great Results™

Laboratory pH Meters

with Backlit, Graphic LCD



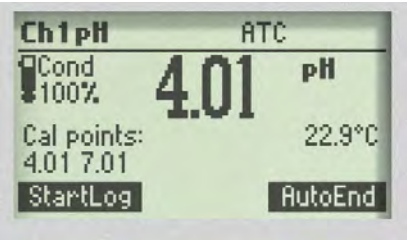
Measurement

The HI 322x series large backlit graphic display shows multiple messages along with the current measurement readings simultaneouly.

Screen specific commands can be easlily administered via soft keys located on the front panel.

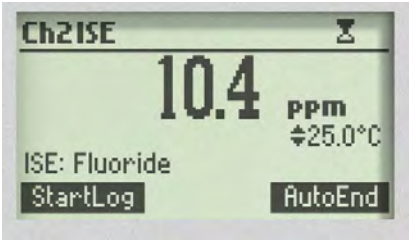
Help menus, set-up screens and more can be accessed through the button panel on the right.

Measurement Features



pH Measurement

pH readings are displayed along with temperature, calibration points, electrode condition, selected temperature compensation.



ISE Measurement

An ISE electrode can be attached to the HI 3221 and HI 3222.



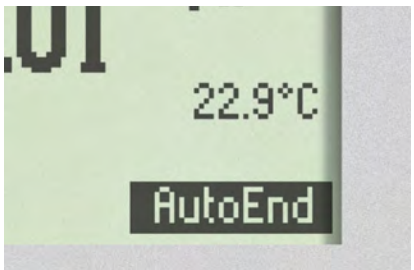
ORP Measurement

Just connect an optional ORP electrode to perform ORP measurements. Measurements are displayed with 0.1 mV resolution.



Relative mV Measurement

These instruments can also display Relative mV. When reading, the Relative mV will be displayed along with the Absolute mV value and the current temperature.



Temperature Measurement

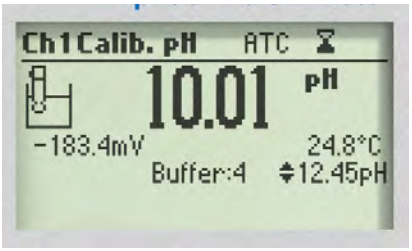
Use the HI 7662-T temperature probe to automatically compensate for pH measurements. Measurements can be displayed in °C or °F.

HI 3220 • HI 3221 • HI 3222

Laboratory pH Meters

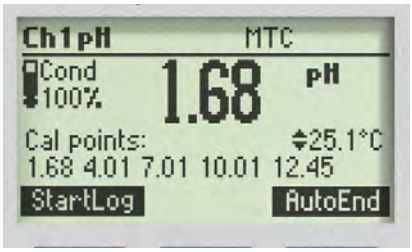
with Backlit, Graphic LCD

HANNA's Exclusive Calibration Check™ Features



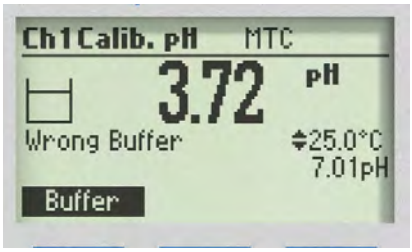
Calibration

Detailed messages throuhout the easy pH, ORP, Relative mV and ISE calibration process.



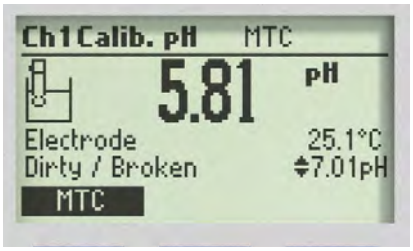
Electrode Condition

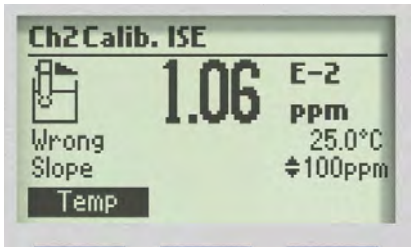
Electrode status is indicated on the display after calibration.

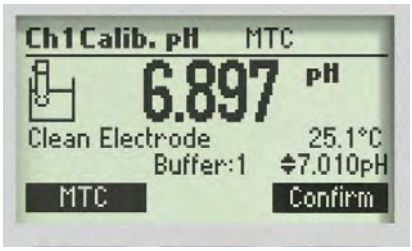


Wrong Buffer Warning

The "Wrong Buffer" warning is displayed when calibration cannot be confirmed.





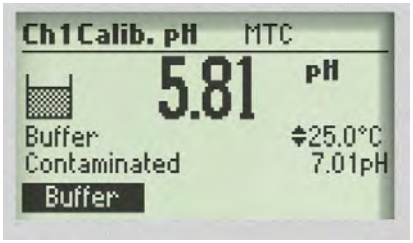


Wrong Slope Warning

The "Wrong Slope" warning message is displayed if the slope is out of the accepted range.

Clean Electrode Warning

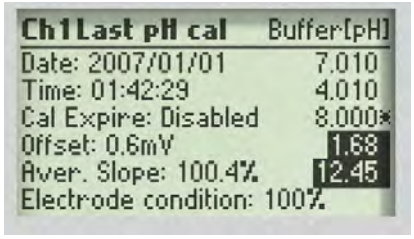
The "Clean Electrode" warning message is displayed to advise the user that the pH electrode may need to be cleaned.



Electrode Dirty/Broken and Buffer Contaminated Warnings

These warnings are displayed when the offset of the electrode is not in the accepted range and calibration cannot be confirmed. This could be the result of a broken electrode, or an electrode which needs to be cleaned. Also, the buffer solution quality could have been compromised and may need to be changed.

GLP — Good Laboratory Practice

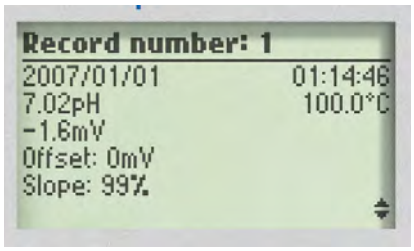


GLP

Last calibration data is stored automatically after a successful calibration. Calibration data can be easily accessed and includes calibration buffer, offset, slope and electrode condition information. Previous calibration points are shown in reverse text.

Logging

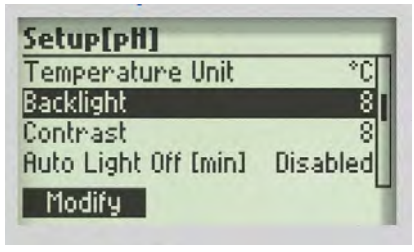




Log and View Results

This feature allows users to log pH, Rel mV or ISE measurements for later retrieval. All logged data can be transferred to a PC through USB.

Set-up



Set-up

General parameters can be easily modified through the set-up menus.

HANNA instruments

With Great Products, Come Great Results™

Laboratory pH Meters

with Backlit, Graphic LCD

SPECIFICATIONS		HI 3220	HI 3221	HI 3222
Range	pH	-2.0 to 20.0; -2.00 to 20.00; -2.000 to 20.000 pH		
	mV	±2000 mV		
	ISE	—	From 1.00 x 10^{-3} to 1.00 x 10^{5} ppm	From 1.00 x 10^{-7} to 9.99 x 10^{10} concentration (choice of units)
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0°F)		
Resolution	pH	0.1; 0.01; 0.001 pH		
	mV	0.1 mV		
	ISE	—	3 digits 0.01; 0.1; 1; 10 concentration	
	Temperature	0.1°C (0.1°F)		
Accuracy	pH	±0.01; ±0.002 pH		
	mV	±0.2 mV		
	ISE	—	±0.5% of reading (monovalent ions), ±1% of reading (divalent ions)	
	Temperature	±0.2°C (±0.4°F) (excluding probe error)		
Calibration	pH	Up to 5 point calibration, 7 standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 5 custom buffers		
	ISE	—	Up to 2 point calibration, 6 standard solutions (0.1, 1, 10, 100, 1000, 10000 ppm)	Up to 5 point calibration, 6 standard solutions (in units selected)
	Slope	From 80 to 110%		
Temperature Compensation (pH)		Manual or automatic from -20.0 to 120.0°C (-4.0 to 248.0°F)		
Input Channels		1	1	2
Probes		HI 1131B pH with BNC connector and HI 7662-T stainless steel temperature probe (included)		
Logging		Log-on-demand 200 samples	Log-on-demand 300 samples	Log-on-demand 400 samples
Lot Logging		5, 10, 30 sec 1, 2, 5, 10, 15, 30, 60, 120, 180 min (max 600 samples)		
PC Connectivity		Opto-isolated USB (with HI 92000 software)		
Input Impedance		10^{12} Ohms		
Power Supply		12 VDC		
Environment		0-50°C (32 to 122°F) Max. RH 55% non-condensing		
Dimensions		235 x 207 x 110 mm (9.2 x 8.14 x 4.33")		
Weight		1.8 kg (4.1 lbs.)		

ORDERING INFORMATION

HI 3220-01 (115V) and **HI 3220-02** (230V), **HI 3221-01** (115V) and **HI 3221-02** (230V), **HI 3222-01** (115V) and **HI 3222-02** (230V) are supplied with HI 1131B pH electrode with BNC connector and 1 m cable, HI 7662-T stainless steel temperature probe, pH 4 and 7 buffer solutions, cleaning solution, electrolyte solution, electrode holder, 12 Vdc power adapter and instructions.

ELECTRODES

All electrodes part numbers ending in "B" are supplied with a BNC connector & 1 m (3.3') cable, as shown below:

HI 1043B Use: *strong acid/alkalis*; Glass-body, double junction, refillable, combination pH electrode

HI 1053B Use: *emulsions*; Glass-body, triple ceramic, refillable, combination pH electrode

HI 1083B Use: *biotechnology*; Glass-body, open junction, refillable, combination pH electrode

HI 1131B Use: *general purpose*; Glass-body, single junction, refillable, combination pH electrode

HI 3230B Use: *general purpose*; Plastic-body, gel-filled, combination ORP electrode platinum

HI 7662-T Stainless steel temperature probe

SOLUTIONS

HI 5004 pH 4.01 buffer solution, 500 mL

HI 5007 pH 7.01 buffer solution, 500 mL

HI 5010 pH 10.01 buffer solution, 500 mL

HI 54710 pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.

HI 7020L ORP test solution, 200-275 mV, 500 mL

HI 7021L ORP test solution, 240 mV, 500 mL

HI 7022L ORP test solution, 470 mV, 500 mL

HI 7091L Reducing Pretreatment ORP solution, 500 mL

HI 7092L Oxidizing Pretreatment ORP solution, 500 mL

HI 7071 3.5M KCl + AgCl Electrolyte, (4) 30 mL, for single junction electrodes

HI 7082 3.5M KCl Electrolyte, (4) 30 mL, for double junction electrodes

HI 7061L Electrode cleaning solution, 500 mL

HI 70300L Electrode storage solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 740157 Plastic refilling pipette (20)

HI 76405 Electrode holder

HI 92000 Windows® compatible software

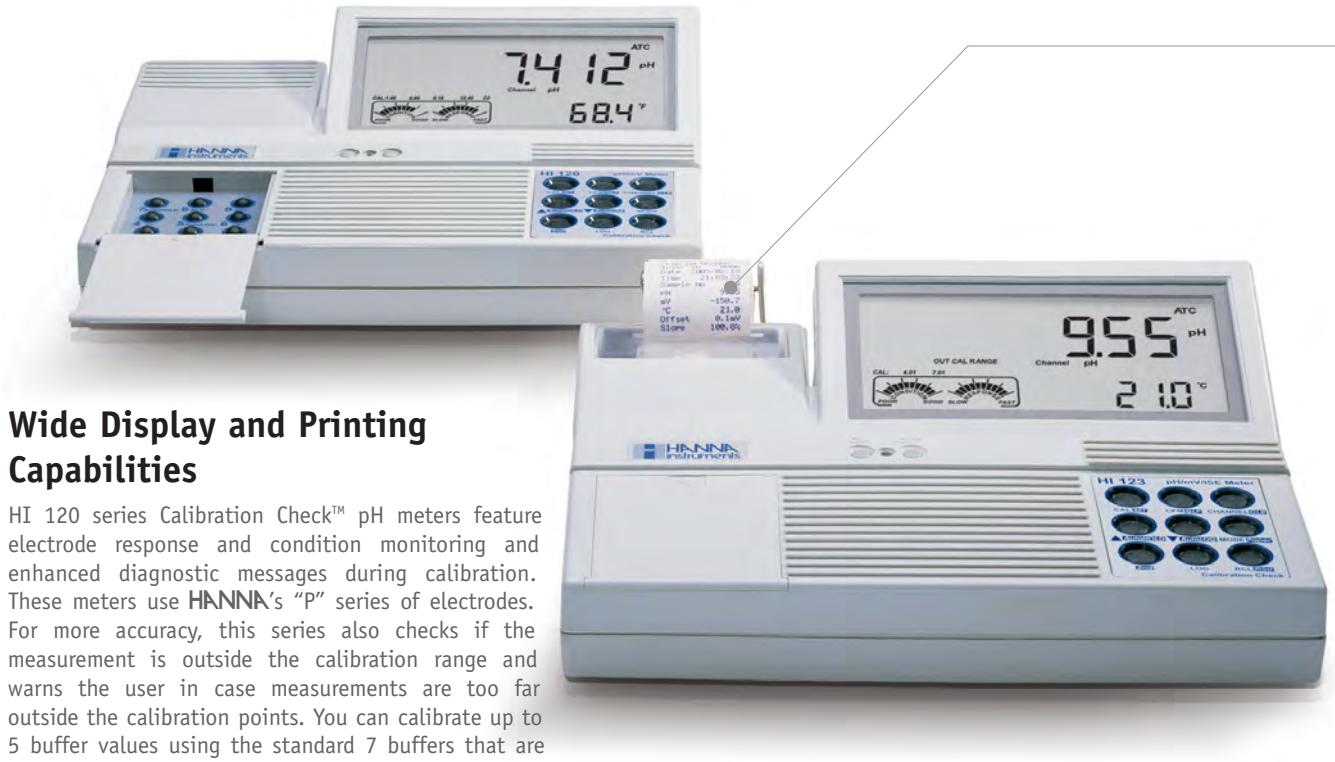
HI 920013 USB cable for PC connection

HI 120 • HI 121 • HI 122 • HI 123

Wide Screen Professional pH Meters

with Calibration Check™ and Automatic Data Logging

audible · 5 points · custom buffer · check electrode · electrode condition



Wide Display and Printing Capabilities

HI 120 series Calibration Check™ pH meters feature electrode response and condition monitoring and enhanced diagnostic messages during calibration. These meters use HANNA's "P" series of electrodes. For more accuracy, this series also checks if the measurement is outside the calibration range and warns the user in case measurements are too far outside the calibration points. You can calibrate up to 5 buffer values using the standard 7 buffers that are automatically recognized, or by using 2 custom buffer values. The buffer(s) used during calibration are displayed on the LCD even when in measurement mode.

HI 122 and HI 123 have a built-in impact printer which uses regular paper and does not fade with time. These models allow the user to print detailed information in four languages for specific help screens, GLP, logging and instrument set-up. Models HI 121 and HI 123 have dual inputs to measure both pH and ISE simultaneously.

Users can Log-on-demand up to 50 samples (50 samples per channel for dual channel meters). These meters have automatic data logging of up to 1000 points (1000 points per channel for dual channel meters) with flexible starting and stopping criteria.

Key Features

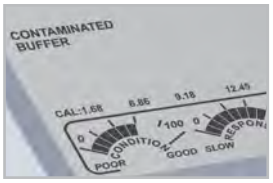
- *Calibration Check™ electrode response monitoring*
- *Out of calibration range warning*
- *GLP capabilities*
- *Auto-hold*
- *Separate pH and ISE channels (HI 121 & HI 123)*
- *5 calibration points with 2 custom buffers*
- *Large, custom LCD*
- *Built-in impact printer (HI 122 & HI 123)*
- *High and low audible alarms*

HANNA's Exclusive Calibration Check™

Calibration Check performs a set of diagnostic tests during calibration using the history of electrode slope and offset to detect problems that can cause loss of accuracy. Calibration Check™ Features are: • Enhanced Calibration Messages • Electrode Condition on LCD Display • Electrode Response Time on LCD Display • Calibration Alarm Time-Out • Out of Calibration Range



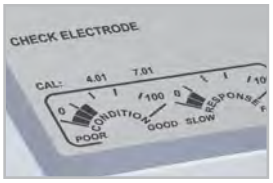
Out of calibration range warning: measuring samples outside the calibration range may result in loss of accuracy.



Contaminated buffer warning a contaminated buffer solution causes erroneous calibration curve resulting in loss of accuracy during measurement.



Clean pH electrode warning: a dirty pH electrode causes erroneous calibration curve resulting in loss of accuracy during measurement.



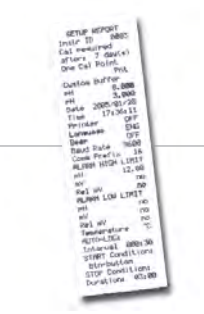
Check pH electrode warning: this message is displayed in the event the junction of the pH electrode is clogged.

HANNA instruments

With Great Products, Come Great Results™

Wide Screen Professional pH Meters

with Calibration Check™ and Automatic Data Logging



Printing (HI 122 & HI 123)

A complete set of information based on the measured, set or recorded data can be printed. Data can be printed on demand (for current reading in measurement mode, GLP and SETUP modes) or automatic (for AutoLOG and Log on demand modes).

Information includes: GLP pH • GLP Rel mV • GLP ION (HI 123) • Instrument Setup • Setup Report • Set Autolog Interval • Log On Demand • Start Autolog

SPECIFICATIONS		HI 120	HI 121	HI 122	HI 123
Range	pH	-2.00 to 16.00 pH / -2.000 to 16.000 pH			
	mV	±999.9 and ±2000 mV			
	Selective Ions	—	0.001 to 19999 ppm	—	0.001 to 19999 ppm
	Temperature	-20.0 to 120.0°C			
Resolution	pH	0.01 pH / 0.001 pH			
	mV	0.1 mV / 1 mV			
	Selective Ions	—	0.001 / 0.01 / 0.1 / 1 ppm	—	0.001 / 0.01 / 0.1 / 1 ppm
	Temperature	0.1°C			
Accuracy (@20°C)	pH	±0.01 pH / ±0.002 pH			
	mV	±0.2 mV (±699.9 mV) / ±0.5 mV (±999.9 mV) / ±1 mV (±2000 mV)			
	Selective Ions	—	±0.5% f.s.	—	±0.5% f.s.
	Temperature	±0.4°C			
BNC Inputs		1 for pH electrode	2 for pH electrode and/or ISE electrode	1 for pH electrode	2 for pH electrode and/or ISE electrode
Calibration Check		status of electrode condition and response time, status of the buffer solutions during calibration			
Relative mV Offset Range		±2000 mV			
pH Calibration		automatic, up to 5 point calibration standard with 7 buffers (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 2 custom buffers			
ISE Calibration		—	automatic, 1 or 2 point with 5 standard values (0.1,1,10,100, 1000 ppm)	—	automatic, 1 or 2 point with 5 standard values (0.1, 1, 10,100, 1000 ppm)
Temperature Compensation		automatic or manual, -20.0 to 120°C (-4 to 248°F)			
pH Electrode		HI 1131P, glass body, refillable, BNC + pin connectors, 1 m cable (included)			
Temperature Probe		HI 7662-T with 1 m (3.3') cable (included)			
Input Impedance		10^{12} Ohm			
Log-on-demand		50 samples	100 samples	50 samples	100 samples
Automatic Logging		1000 samples	2000 samples	1000 samples	2000 samples
PC Connection		RS232 serial port, optoisolated			
Printer		—		built-in, with 44 mm plain paper	
Power Supply		12 Vdc adapter (included)			
Environment		0 to 50°C (32 to 122°F); RH max 95%			
Dimensions / Weight		280 x 203 x 84 mm (11.0 x 8.0 x 3.3") / 1.9 kg (4.2 lbs.)			

ORDERING INFORMATION

HI 120-01 (115V) and **HI 120-02** (230V), **HI 121-01** (115V) and **HI 121-02** (230V), **HI 122-01** (115V) and **HI 122-02** (230V) and **HI 123-01** (115V) and **HI 123-02** (230V) are supplied with HI 1131P pH electrode with BNC connector and 1 m cable, HI 7662-T stainless steel temperature probe, pH 4 and 7 buffer solutions, 12 Vdc power adapter and instructions.

HI 122 & HI 123 are supplied with (5) paper rolls.

ELECTRODES

All electrode part numbers ending in "P" are supplied with a BNC and PIN connector & 1 m (3.3') cable, as shown below:

HI 1043P Use: *strong acid/alkalis*; Glass-body, double junction, refillable, combination pH electrode

HI 1053P Use: *emulsions*; Glass-body, triple ceramic, refillable, combination pH electrode

HI 1083P Use: *biotechnology*; Glass-body, open junction, refillable, combination pH electrode

HI 1131P Use: *general purpose*; Glass-body, single junction, refillable, combination pH electrode

HI 7662-T Temperature probe

SOLUTIONS

HI 5004 pH 4.01 buffer solution, 500 mL

HI 5007 pH 7.01 buffer solution, 500 mL

HI 5010 pH 10.01 buffer solution, 500 mL

HI 54710 pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.

HI 70300L Electrode storage solution, 500 mL

HI 7071 3.5M KCl + AgCl Electrolyte, (4) 30 mL, for single junction electrodes

HI 7072 1M KNO_3 Electrolyte, (4) 30 mL

HI 7082 3.5M KCl Electrolyte, (4) 30 mL, for double junction electrodes

HI 7073L Protein cleaning solution, 500 mL

HI 7074L Inorganic cleaning solution, 500 mL

HI 7077L Oil & Fat Cleaning Solution, 500 mL

ACCESSORIES

HI 710032 (10) Plain paper rolls (HI 122)

HI 710033 Replacement ink cartridge (HI 122)

HI 76405 Electrode holder

HI 92000 Windows® compatible software

HI 920010 RS232 cable for PC connection



HI 710032 — Plain Paper Rolls

HI 255

pH/mV and EC/TDS/NaCl Combination Meter

for Laboratories



6 in 1 Bench Meter!

HI 255 is a high performance precision instrument that measures a multitude of parameters. With this single laboratory bench meter you can measure pH, ORP, conductivity (EC), TDS, NaCl percentage and temperature.

Utilizing an external temperature probe, pH readings are automatically temperature compensated. To ensure a higher level of precision, pH calibrations are customizable - up to 3 calibration points, chosen from the 5 available memorized buffers. EC measurements can be compensated relative to a selected reference temperature. The EC calibration mode allows you to chose from among 6 recognized conductivity standards and perform a single-point calibration. The most suitable EC and TDS range for your application is automatically selected.

With a built-in logging function, measurements are stored in non volatile memory, and can be downloaded to a PC through the RS232 serial port. In addition to these features, HI 255 contains GLP features that store the calibration and measurement data of any sample, to be displayed upon request.

- *Autoranging*
- *Good Laboratory Practice*
- *Logging function*
- *PC interface*



HI 92000 — HANNA Software



HI 76404 — Electrode Holder

HANNA instruments

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pH/mV and EC/TDS/NaCl Combination Meter

for Laboratories

ORDERING INFORMATION

HI 255-01 (115V) and **HI 255-02** (230V) are supplied with HI 1131B glass body, combination pH electrode, HI 76310 conductivity /TDS probe, HI 7662 temperature probe, HI 76404 electrode holder, pH 4 and pH 7 buffer solutions, HI 7071S electrolyte solution, 12 Vdc power adapter and instructions.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector with 1m (3.3') cable
HI 76310	4-ring platinum sensor conductivity probe
HI 7662	Temperature probe

SOLUTIONS

HI 5004	pH 4.01 buffer solution, 500 mL
HI 5007	pH 7.01 buffer solution, 500 mL
HI 5010	pH 10.01 buffer solution, 500 mL
HI 54710	pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.
HI 70300L	Electrode storage solution, 500 mL
HI 7030L	12880 µS/cm calibration solution, 500 mL
HI 7031L	1413 µS/cm calibration solution, 500 mL
HI 7033L	84 µS/cm calibration solution, 500 mL
HI 7034L	80000 µS/cm calibration solution, 500 mL
HI 7035L	111800 µS/cm calibration solution, 500 mL
HI 7037L	Salinity standard solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 76404	Electrode holder
HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 92000	Windows® compatible software
HI 920010	RS232 cable for PC connection
HI 180G*	Compact magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 190M *	Magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 200M *	Magnetic stirrer with AISI stainless steel cover material, max 1000 rpm, Speedsafe™

* **-1**: 110/115V, 50/60Hz
-2: 220/240V, 50/60Hz



Quick Results

This meter was designed to satisfy the requests of many production and quality control laboratories that need quick multiple parameter measurement results with a single precision instrument.

No Interference

The pH and conductivity circuits have been electrically separated, so that it is not necessary for the two probes to be simultaneously immersed in the same solution. The conductivity probe will not interfere with your pH measurements and the response of the pH electrode is immediately stable.

SPECIFICATIONS		HI 255
Range	pH/ORP	-2.00 to 16.00 pH; -2.000 to 16.000 pH / ±699.9 mV; ±2000 mV
	EC	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm actual EC**
	TDS	0.00 to 14.99 ppm; 15.0 to 149.9 ppm; 150 to 1499 ppm 1.50 to 14.99 g/L; 15.0 to 100.0 g/L; up to 400.0 g/L actual TDS** (with 0.80 factor)
	NaCl	0.0 to 400.0% NaCl
	Temperature	-10 to 120.0 °C (pH); 0.0°C to 60.0°C (EC)
Resolution	pH/ORP	0.01 pH; 0.001 pH/ 0.1 mV (±699.9 mV); 1 mV (±2000 mV)
	EC	0.01 µS/cm; 0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm
	TDS	0.01 ppm; 0.1 ppm; 1 ppm; 0.01 g/L; 0.1 g/L
	NaCl	0.1% NaCl
	Temperature	0.1°C
Accuracy (@20°C)	pH / ORP	±0.01 pH; ±0.002 pH/ ±0.2 mV (±699.9 mV); ±1 mV (±2000 mV)
	EC	±1% of reading ±(0.05 µS/cm or 1 digit)
	TDS	±1% of reading ±(0.03 ppm or 1 digit)
	NaCl	±1% of reading
	Temperature	±0.4°C (excluding probe error)
Relative mV Offset		±2000 mV
Calibration (pH)		automatic, at 1, 2 or 3 points, with 5 memorized buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01)
Calibration (EC)		automatic, 1 point, with 6 memorized values (84.0 and 1413 µS/cm; 5.00, 12.88, 80.0 and 111.8 mS/cm)
Calibration (NaCl)		automatic, 1 point, with HI 7037L calibration solution
Temperature Compensation		manual or automatic, -10.0 to 120.0°C (14 to 248°F) for pH; 0.0 to 60.0°C (32 to 140°F) for EC (can be disabled for measuring actual EC and TDS values)
Temperature Coefficient		0.00 to 6.00%/°C (EC and TDS only); default value: 1.90%/C°
TDS Conversion Factor		0.40 to 0.80; default value: 0.50
pH Electrode		HI 1131B (included)
EC Probe		HI 76310 (included)
Temperature Probe		HI 7662 (included)
PC Connection		RS232 opto-isolated serial port
Data Logging		200 samples
Input Impedance		10^{12} Ohm
Power Supply		12 Vdc adapter (included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)

** with temperature compensation function disabled.

HI 221 • HI 223

Calibration Check™ pH Meters

with Logging of up to 500 Samples





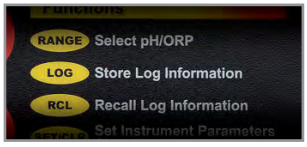
Key Features

- *Logging up to 500 samples*
- *Last calibration data*
- *Instrument ID number*
- *Real time clock*
- *PC interface*
- *Low profile that takes little bench space*



GLP

In addition to storing calibration data, the instruments can be programmed to give an alarm when a new calibration is required.



Log-On-Demand

Both instruments have a "Log-On-Demand" function to record 100 (HI 221) or 500 (HI 223) readings.



Recall

Readings logged with the HI 221 & HI 223 can be recalled at a later time.

Electrode Monitoring in a Bench Meter

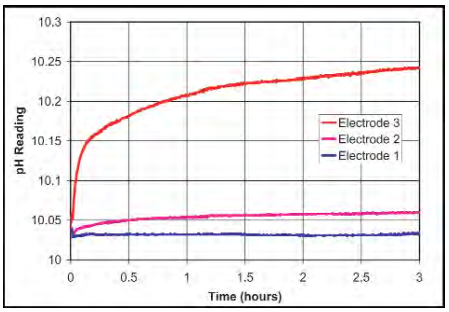
A pH electrode that is properly manufactured and kept clean will retain its measuring integrity for a long time. As a result of many factors such as age, poor maintenance or improper handling, any electrode in time will lose its integrity. HI 221 and HI 223 were designed to alert the user if the electrode integrity has been compromised.

The most common cause for pH measurement inaccuracies is an unclean or improperly cleaned electrode. This is very important to note, because during calibration, the instrument assumes that the electrode is clean and that the standardization curve created during the calibration process will remain a valid reference until the next calibration. pH meters on the market today will allow an offset of approximately ±60 mV. The deviation from 0 mV is not unusual, in fact it represents the true characteristics of the pH electrode. A dramatic deviation from 0 mV becomes a problem if it is the result of calibrating a dirty electrode.

HANNA HI 221 & HI 223 compare the characteristics of the pH electrode from one calibration to the next. In the case of large variances in the electrode condition that can only be the result of a soiled sensor, these meters alert the user that the electrode needs to be properly cleaned prior to calibration and measuring.

Figure A (right) shows that the pH measured by a dirty electrode changes over a short period of time. This results from the residue on the pH electrode bulb dissolving into the solution and the electrode gradually returning close to its true characteristics. The resulting pH measurements, based upon the calibration of a dirty electrode, will then be incorrect.

Figure A



Electrode 1 was properly cleaned prior to calibration. Electrodes 2 and 3 were not.

HANNA instruments

With Great Products, Come Great Results™

Calibration Check™ pH Meters

with Logging of up to 500 Samples



Calibration Check™ Features

- *Enhanced Calibration Messages*

  During calibration, the user is warned if one or more parameters are not suitable to perform an accurate calibration.

- *Electrode Condition on LCD Display*

  Determined from the electrode offset and slope.

- *Electrode Response Time on LCD Display*

  Determined from electrode performance during calibration.

- *Calibration Alarm Time Out*

  Can be programmed from 1 to 7 days or can be disabled.

How Calibration Check™ Works

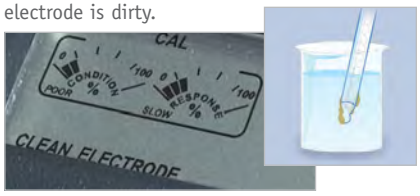
For Solutions

HI 221 and HI 223 are able to detect if the calibration buffer solution is contaminated.



For Electrodes

When a pH electrode is dirty, it has a slow response time & unstable reading. HI 221 and HI 223 warns the user in the event the electrode is dirty.



SPECIFICATIONS		HI 221	HI 223
Range	pH	-2.00 to 16.00	-2.00 to 16.00; -2.000 to 16.000
	mV	±699.9 mV; ±2000 mV	±999.9 mV; ±2000 mV
	Temperature	-20.0 to 120.0°C	
Resolution	pH	0.01	0.01; 0.001
	mV	0.1 (±699.9 mV); 1 (±2000 mV)	0.1 (±999.9 mV); 1 (±2000 mV)
	Temperature	0.1°C	
Accuracy	pH	±0.01	±0.01; ±0.002
	mV	±0.2 (±699.9 mV); ±1 (±2000mV)	±0.2 (±699.9 mV); ±0.5 (±999.9 mV); ±1 (±2000mV)
	Temperature	±0.4°C	
Calibration Check™		Status of electrode condition and response time; status of the buffer solutions during calibration	
pH Calibration		automatic, 1 or 2 point with 7 memorized values (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45)	
Temperature Compensation		manual or automatic, -20.0 to 120.0°C (-4 to 248°F)	
pH Electrode		HI 1131P glass-body, single junction, refillable, BNC + pin (included)	
Temperature Probe		HI 7669/2W stainless steel temperature probe (included)	
PC Connection		RS232 opto-isolated serial port	
Data Logging		100 points	500 points
Input Impedance		10^{12} Ohm	
Power Supply		12 Vdc adapter (included)	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)	

ORDERING INFORMATION

HI 221-01 (115V) and **HI 221-02** (230V) and **HI 223-01** (115V) and **HI 223-02** (230V) are supplied with HI 1131P glass-body combination pH electrode with 1m (3.3") cable, HI 7669/2w temperature probe, HI 76404 electrode holder, pH 4.01 & 7.01 Buffer solutions (20 mL), HI 7071S electrolyte solution, 12 Vdc power adapter and instruction manual.

ELECTRODES

Combination pH electrodes. All part codes ending with P are provided with BNC & Pin connectors, and 1 m (3.3') cable.

HI 1043P *Use: strong acids and bases.* Glass-body, double junction, refillable

HI 1053P *Use: emulsions.* Glass-body, triple ceramic junction, refillable

HI 1083P *Use: biotechnology.* Glass-body, open junction, refillable

HI 1131P *Use: general purpose.* Glass-body, ceramic junction, refillable

HI 1332P *Use: general purpose.* PEI body, double junction, refillable

SOLUTIONS

HI 5004 pH 4.01 buffer solution, 500 mL

HI 5007 pH 7.01 buffer solution, 500 mL

HI 5010 pH 10.01 buffer solution, 500 mL

HI 54710 pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 920010 RS232 cable for PC connection

HI 92000 Windows® compatible software



HI 92000 — Windows® Compatible Software

pH Meters

An Introduction

Introduction

Over the past three decades, the measurement and use of pH has grown dramatically. pH measurement has come out of the laboratory and is now being monitored in the environment, food industries, agriculture, horticulture, wastewater, pharmaceutical industry, cosmetic industry, fish farming, metal finishing, education and anywhere quality is important. This has meant that every application with its own operating environment and tolerances require specially designed products suitable to its needs. In addition, each market brings with it people with different backgrounds and technical training. Due to these market realities, HANNA has developed a complete range of meters, each catering to the specific needs of particular market segments.

You will also find that most of the meters featured in this catalog are supplied as complete kits. HANNA benchtop and portable instruments are typically supplied with electrodes as well as solutions to get you started.



p 5.4
p 5.10
p 5.20

Product Spotlights

HANNA Benchtop pH Meters

Our **HI 4000 series of research grade bench meters** incorporate many advanced features while maintaining a user friendly interface. With the large, dot matrix, backlit color LCD users can easily the navigate through menus and options without having to consult the manual.

These advanced meters are programmed with incremental methods for use with HANNA's new line of Ion Selective Electrodes.

Our selection of ISE's are available in either half-cell or combination design.

HI 3220, **HI 3221** and **HI 3222** adds a brand new design to our pH Bench meter line.

This design incorporates our advanced Calibration Check™ to alert the user of potential problems with the electrode.

At the push of a button, users can easily obtain GLP (Good Laboratory Practice) information.

HI 2210 and **HI 2211** improves upon our pH series bench line with a redesigned easy-to-read, large LCD and casing.

HI 2210 • HI 2211

pH Meters

with Large LCD

New Styling
Extra Wide LCD
Easy Viewing Angle



- *New Benchtop Design*
- *Extra Wide LCD (6.25" x 1.5")*
- *Automatic Calibration*
- *5 Standard Buffers*
- *Simultaneous display of pH and Temperature*
- *Automatic Temperature Compensation*
- *Extended mV Range (HI 2211)*

Simplicity in Design

The new HI 2211 and HI 2210 benchtop pH meters from HANNA are an affordable solution for laboratory testing without compromising accuracy.

These instruments feature an extra large (6.5" x 1.5") LCD which displays pH and temperature readings simultaneously. The large LCD also features a number of prompts and symbols that guide the user during the calibration operation, as well as during measurements.

These microprocessor based instruments provide pH readings that can be automatically temperatures compensated, as well as a stability indicator and a comprehensive step-by-step calibration procedure. Calibration can be performed at 1 or 2 points with 5 standard buffers.

HI 2210 and HI 2211 are supplied ready to use with a glass body pH electrode, temperature probe, electrode holder and a startup set of buffer solutions.

These units are compatible with a wide range of pH electrodes with BNC connectors.





HANNA instruments

With Great Products, Come Great Results™

Calibration Operations



First Calibration Point

When entering calibration mode with the CAL button, the instrument prompts the user to immerse the electrode into the first buffer (offset). A different buffer can be selected if desired.

The instrument will ask the user to confirm the first calibration point before prompting the second point. To perform a one point calibration, press CAL after the first point has been confirmed.



Second Calibration Point

After confirming the first calibration point, the instrument prompts the user to immerse the electrode in the second buffer (slope). The instrument will ask you to confirm the reading.



Wrong Buffer Warning

In the event a pH electrode is immersed into the wrong calibration buffer, the HI 2211 and HI 2210 will display "WRONG" on the LCD and will not allow confirmation of the buffer.

During this step, the memorized buffer may be changed to match the calibration buffer.



HI 76404 — Electrode Holder

HI 2211

HANNA's new HI 2211 is a microprocessor based pH, mV and temperature benchtop meter. It features an extra large LCD that displays pH or mV and temperature simultaneously. The extra large LCD (6.25" x 1.5") can be viewed from a distance in a lab.

This instrument can measure pH from -2.00 to 16.00 and can be calibrated at 1 or 2 points using 5 standard buffers. During calibration, prompts on the LCD guide the user through the process. Temperature compensation of the pH measurement can be automatic or manual between -9.9 to 120°C.

HI 2211 features a dual mV range (±399.9 or ±2000 mV) which can be used for ISE measurements, ORP measurements or to check the offset and slope of the pH electrode. Other features include a measurement memory function and a reading stability indicator.

The HI 2211 is supplied with an HI 1131B glass body combination pH electrode, HI 7662 temperature probe, electrode holder, power adapter and buffer solutions to get you started.

HI 2210

For less demanding applications, HANNA's HI 2210 includes all of the features of the HI 2211 with the exception of mV mode.

SPECIFICATIONS		HI 2210	HI 2211
Range	pH	-2.00 to 16.00 pH	
	mV	—	±399.9 mV ; ±2000 mV
	Temperature	-9.9 to 120.0°C	
Resolution	pH	0.01 pH	
	mV	—	0.1 mV; 1 mV
	Temperature	0.1°C	
Accuracy (@20°C)	pH	±0.01 pH	
	mV	—	±0.2 mV (±399.9 mV); ±1 mV (±2000 mV)
	Temperature	±0.5 °C (0.0 – 100.0 °C); ±1 °C (outside) (excluding probe error)	
pH Calibration		automatic, 1 or 2 points with 5 automatically recognized buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01)	
Temperature Compensation		automatic (with HI 7669/2W probe) or manual from -9.9 to 120°C	
pH Electrode		HI 1131B, glass-body, single junction, refillable, BNC connector, 1 m cable (included)	
Temperature Probe		HI 7662 with 1 m (3.3') cable (included)	
Input Impedance		10^{12} Ohm	
Power Supply		12 Vdc adapter (included)	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		240 x 182 x 74 mm (9.4 x 7.1 x 2.9")	
Weight		1.1 Kg (2.5 lb.); kit with holder 2.5 Kg (5.5 lb.)	

ORDERING INFORMATION

HI 2210-01 (115V) and **HI 2210-02** (230V), **HI 2211-01** (115V) and **HI 2211-02** (230V) are supplied with HI 1131B glass-body combination pH electrode with 1 m (3.3') cable, HI 7662 temperature probe, electrode holder, pH 4.01 & 7.01 buffer solutions (20 mL ea.), HI 7071S electrolyte solution, 12 Vdc power adapter and instruction manual.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector and 1 m (3.3') cable
HI 7662	Temperature probe

SOLUTIONS

HI 5004	pH 4.01 buffer solution, 500 mL
HI 5007	pH 7.01 buffer solution, 500 mL
HI 5010	pH 10.01 buffer solution, 500 mL
HI 54710	pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.
HI 70300L	Electrode storage solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 8427	pH/mV electrode simulator
HI 931001	pH/mV electrode simulator with display
HI 76404	Electrode holder

HI 250 • HI 251 • HI 253 • HI 254

pH/ISE Professional Meters

for Laboratory Workflows

audible | hold | 3 points | 5 points | PC compatible



- *Up to 5 point calibration*
- *Custom buffers*
- *GLP functions*
- *Log-on-Demand*

pH/ISE Bench Meters

These new pH/ORP bench meters are ideal for accurate and precise measurements for all laboratory needs. HI 253 can perform ion-selective measurements directly in ppm, as well as pH, ORP and temperature measurements.

A 5 point calibration can be made on the HI 254 by selecting from the 7 auto recognized standard pH buffers thus providing an extremely accurate calibration curve for difficult samples.

HI 250 and HI 251 are next generation pH meters that combine high technology and affordability with advanced new features. Both instruments can measure pH with centesimal resolution.

All of these meters can store up to 50 data sets in "non-volatile memory" that can be downloaded to a PC. These instruments incorporate GLP features so the user can recall calibration data at any time.

SPECIFICATIONS		HI 250	HI 251	HI 253	HI 254
Range	pH	-2.0 to 16.0 pH; -2.00 to 16.00 pH		-2.0 to 16.0 pH; -2.00 to 16.00 pH; -2.000 to 16.000 pH	
	mV	—	±699.9 mV; ±2000 mV	±699.9 mV; ±2000 mV	
	Selective Ions	—	—	0.001 to 19999 ppm	—
	Temperature	-9.9 to 120.0°C		-9.9 to 120.0°C	
Resolution	pH	0.1 pH; 0.01 pH		0.1 pH; ±0.01 pH; 0.001 pH	
	mV	—	0.1 mV (±699.9 mV); 1 mV (±2000 mV)	0.1 mV (±699.9 mV); 1 mV (±2000 mV)	
	Selective Ions	—	—	0.001 (0.001 to 9.999) ppm 0.01 (10 to 99.99) ppm 0.1 (100 to 999.9) ppm 1 (1000 to 19999) ppm	—
	Temperature	0.1°C		0.1°C	
Accuracy (@20°C)	pH	±0.1 pH; ±0.01 pH		±0.1 pH; ±0.01 pH; ±0.002 pH	
	mV	—	±0.2 mV (±699.9 mV); ±1 mV (±2000 mV)	±0.2 mV (±699.9 mV); ±1 mV (±2000 mV)	
	Selective Ions	—	—	±0.5%	—
	Temperature	±0.4°C (excluding probe error)		±0.4°C (excluding probe error)	
Relative mV Offset		—	± 2000 mV	± 2000 mV	
pH Calibration		automatic, up to 3 points with 5 memorized values (pH 4.01, 6.86, 7.01, 9.18, 10.01)			automatic, up to 5 points with 7 memorized buffers (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45)
ISE Calibration		—	—	automatic, 1 or 2 point (0.1, 1, 10, 100, 1000 ppm)	—
Temperature Compensation		automatic (with HI 7669/2W probe) or manual from -9.9 to 120°C			
pH Electrode		HI 1131B, glass-body, single junction, refillable, BNC connector, 1 m cable (included)			
Temperature Probe		HI 7669/2W with 1 m (3.3') cable (included)			
Input Impedance		10^{12} Ohm			
PC Connection		RS232 opto-isolated serial port			
Power Supply		12 Vdc adapter (included)			
Environment		0 to 50°C (32 to 122°F); RH max 95%			
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)			

ORDERING INFORMATION

HI 250-01 (115V) and **HI 250-02** (230V), **HI 251-01** (115V) and **HI 251-02** (230V), **HI 253-01** (115V) and **HI 253-02** (230V) and **HI 254-01** (115V) and **HI 254-02** (230V) are supplied with HI 1131B glass-body combination pH electrode with 1 m (3.3') cable, HI 7669/2W temperature probe, HI 76404 electrode holder, pH 4.01 & 7.01 buffer solutions (20 mL ea.), HI 7071S electrolyte solution, 12Vdc power adapter and instruction manual.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector with 1m (3.3') cable
HI 7669/2W	Temperature probe

SOLUTIONS

HI 5004	pH 4.01 buffer solution, 500 mL
HI 5007	pH 7.01 buffer solution, 500 mL
HI 5010	pH 10.01 buffer solution, 500 mL
HI 54710	pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 76404	Electrode holder
HI 92000	Windows® compatible software
HI 920010	RS232 cable for PC connection

HANNA instruments

With Great Products, Come Great Results™

PC compatible | 3 points | 5 points | hold | audible | custom pH buffer

HI 110 Series

High Precision pH Meters

for Professional Laboratories

For Challenging Applications

HI 112 and HI 113 are designed for those users that require the highest level of precision over the entire pH range. These meters are ideal for the most challenging applications where the sample pH may vary greatly. Depending on the level of precision required for each application, the user can select the pH resolution as 0.01 or 0.001.

A 5 point calibration may be performed on these meters. Choose the most suitable buffers for your system from the 7 standard buffers. If the memorized buffer values are not the most ideal for your application, HI 112 and HI 113 will allow you to manually set 2 custom pH values for calibration.

HI 110 and HI 111, are ideal for those users that need a higher level of precision in certain pH ranges. Automatic pH calibration can be performed at 3 points, by choosing the most suitable buffers from the 5 buffer values. HI 110 and HI 111 will also allow users to manually set 2 custom pH values for calibration most appropriate to you application range.

The HI 111 and 113 take mV measurements while HI 112 and HI 113 support RS232 computer connection. Data can be transferred with the HI 92000 application software.

The HI 110 Series features an extended temperature range (from -9.9 to 120°C), GLP functions, manual or automatic temperature compensation and custom buffers.



- *Up to 5 point calibration (HI 112 and HI 113)*
- *Custom buffers or 7 standard pH buffers*
- *GLP functions*

SPECIFICATIONS		HI 110	HI 111	HI 112	HI 113
Range	pH	-2.00 to 16.00 pH		-2.00 to 16.00; -2.000 to 16.000 pH	
	mV	—	±699.9 mV, ±2000 mV	—	±999.9 mV, ±2000 mV
	Temperature	-9.9 to 120.0°C			
Resolution	pH	0.01 pH		0.01 pH; 0.001 pH	
	mV	—	0.1mV; 1 mV	—	0.1mV; 1 mV
	Temperature	0.1°C			
Accuracy (@20°C)	pH	±0.01 pH		±0.01 pH; ±0.002 pH	
	mV	—	±0.2 mV; ±1 mV	—	±0.5 mV; ±1mV
	Temperature	±0.4°C			
Relative mV Offset		—	±2000 mV	—	±2000 mV
pH Calibration		automatic, up to 3 points with 5 memorized values (pH 4.01, 6.86, 7.01, 9.18, 10.01) + 2 custom buffers		automatic, up to 5 points with 7 memorized values (pH 1.68, 4.01, 6.86, 7.01, 9.18,10.01,12.45) + 2 custom buffers	
Analog Output		—			
Temperature Compensation		automatic (with HI 7669/2W probe) or manual from -9.9 to 120°C			
pH Electrode		HI 1131B, glass-body, single junction, refillable, BNC connector, 1 m cable (included)			
Temperature Probe		HI 7669/2W with 1 m (3.3') cable (included)			
Input Impedance		10^{12} Ohm			
PC Connection		—		RS232 opto-isolated serial port	
Power Supply		12 Vdc adapter (included)			
Environment		0 to 50°C (32 to 122°F); RH max 95%			
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)			

ORDERING INFORMATION

HI 110-01 (115V) and **HI 110-02** (230V), **HI 111-01** (115V) and **HI 111-02** (230V), **HI 112-01** (115V) and **HI 112-02** (230V) and **HI 113-01** (115V) and **HI 113-02** (230V) are supplied with HI 1131B pH electrode, HI 7669/2W temperature probe, pH 4 and pH 7 buffer sachets (20 mL ea.), electrode refilling solution, electrode holder, 12 Vdc power adapter and instructions.

ELECTRODES

HI 1131B Refillable pH electrode with BNC connector with 1m (3.3') cable

HI 7669/2W Temperature probe

SOLUTIONS

HI 5004 pH 4.01 buffer solution, 500 mL

HI 5007 pH 7.01 buffer solution, 500 mL

HI 5010 pH 10.01 buffer solution, 500 mL

HI 54710 pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 76404 Electrode holder

HI 92000 Windows® compatible software

HI 920010 Serial cable for PC connection

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EU)

HI 8427 pH/mV electrode simulator

HI 931001 pH/mV electrode simulator with display

pH 212 • pH 213

0.001 Resolution pH Meters

with PC Compatibility



- *0.001 pH resolution*
- *Store and recall measurements*
- *Stability Indicator*
- *pH and temperature displayed simultaneously*
- *PC Interface with RS 232*

SPECIFICATIONS		pH 212	pH 213
Range	pH	-2.00 to 16.00; -2.000 to 16.000	
	mV	—	-999.9 to +2000 mV
	Temperature	-9.9 to 120.0°C	
Resolution	pH	0.01 pH; 0.001 pH	
	mV	—	0.1 mV; 1 mV
	Temperature	0.1°C	
Accuracy (@20°C)	pH	±0.01 pH; ±0.002 pH	
	mV	—	±0.5 mV; ±1 mV
	Temperature	±0.4°C	
pH Calibration		automatic, 1 or 2 point with 5 memorized buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)	
Temperature Compensation		automatic (with HI 7669/2W probe) or manual from -9.9 to 120°C	
pH Electrode		HI 1131B, glass-body, single junction, refillable, BNC connector, 1 m cable (included)	
Temperature Probe		HI 7669/2W with 1 m (3.3') cable (included)	
Input Impedance		10^{12} Ohm	
PC Connection		RS232 opto-isolated serial port	
Power Supply		12 Vdc adapter (included)	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		240 x 182 x 74 mm (9.4 x 7.2 x 2.9")	
Weight		1.1 kg (2.4 lbs.)	

PC Compatible pH Bench Meters

With a resolution selectable between 0.01 and 0.001 over the -2 to 16 pH range, pH 212 and pH 213 are designed for those users that require added accuracy.

pH 213 also measures mV when used with ORP electrodes. The large horizontal display shows both pH (or mV) and temperature. All pH measurements are automatically compensated for the effects of temperature.

Calibration can be at one or two points aided by automatic buffer recognition at pH 4.01, 6.86, 7.01, 9.18 and 10.01.

These meters are equipped with a stability indicator and support proper calibration and accurate measurements. Store readings and recall them at a later time. The front label carries clear and concise information about how to operate the meter.

pH 212 and pH 213 are supplied complete and ready-to-use with a laboratory-grade glass electrode, stainless steel temperature probe, electrode holder, 12 Vdc power adapter and calibration buffers.

Both meters are also supplied with an opto-isolated RS232 port for PC connection.

ORDERING INFORMATION

pH 212-01 (115V) and **pH 212-02** (230V) and **pH 213-01** (115V) and **pH 213-02** (230V) are supplied with HI 1131B glass-body combination pH electrode with 1 m (3.3') cable, HI 7669/2W temperature probe, HI 76404 electrode holder, pH 4.01 & 7.01 buffer solutions (20mL each), HI 7071S electrolyte solution, 12 Vdc Power adapter and instruction manual.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector with 1m (3.3') cable
HI 7669/2W	Temperature probe

SOLUTIONS

HI 5004	pH 4.01 buffer solution, 500 mL
HI 5007	pH 7.01 buffer solution, 500 mL
HI 5010	pH 10.01 buffer solution, 500 mL
HI 54710	pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 76404	Electrode holder
HI 92000	Windows® compatible software
HI 920010	RS232 cable for PC connection

HANNA instruments
With Great Products, Come Great Results™

QC pH Meters

Easy-to-Operate, Ideal for Quality Control

Perfect for Quality Control Applications

pH 210 and pH 211 are advanced pH bench meters that are easy to operate, making them perfect for Quality Control laboratory applications.

pH 210 performs pH and temperature measurements, while pH 211 also measures in the mV range. Precise and inexpensive, these meters are ideal for a wide range of measurement applications.

Both instruments have 5 memorized buffers for calibration and the automatic recognition system eliminates calibration error. Users are guided through the calibration process with simple instructions on the display.

Temperature compensation is automatic through the supplied probe, and if necessary, the user can also set temperature compensation manually. The large display shows pH (or mV) and temperature values simultaneously.

pH 211R also features 0-5 V analog output to connect to a recording device.



- *Simple calibration instructions on display*
- *pH and temperature displayed simultaneously*
- *pH 211R features 0-5 V analog output*

ORDERING INFORMATION

pH 210-01 (115V) and **pH 210-02** (230V), **pH 211-01** (115V) and **pH 211-02** (230V) and **pH 211R-01** (115V) and **pH 211R-02** (230V) are supplied with HI 1131B glass-body combination pH electrode with 1 m (3.3') cable, HI 7669/2W temperature probe, HI 76404 electrode holder, pH 4.01 & 7.01 buffer solutions (20mL ea.), HI 7071S electrolyte solution, 12 Vdc power adapter and instruction manual.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector with 1m (3.3') cable
HI 7669/2W	Temperature probe

SOLUTIONS

HI 5004	pH 4.01 buffer solution, 500 mL
HI 5007	pH 7.01 buffer solution, 500 mL
HI 5010	pH 10.01 buffer solution, 500 mL
HI 54710	pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 8427	pH/mV electrode simulator
HI 931001	pH/mV electrode simulator with display
HI 76404	Electrode holder

SPECIFICATIONS

		pH 210	pH 211	pH 211R
Range	pH	-2.00 to 16.00 pH	-2.00 to 16.00 pH	
	mV	—	±399.9 mV ; ±2000 mV	
	Temperature	-9.9 to 120.0°C	-9.9 to 120.0°C	
Resolution	pH	0.01 pH	0.01 pH	
	mV	—	0.1 mV; 1 mV	
	Temperature	0.1°C	0.1°C	
Accuracy (@20°C)	pH	±0.01 pH	±0.01 pH	
	mV	—	±0.2 mV; ±1 mV	
	Temperature	±0.4°C	±0.4°C	
pH Calibration		automatic, 1 or 2 point with 5 memorized buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)		
Temperature Compensation		automatic (with HI 7669/2W probe) or manual from -9.9 to 120°C		
Analog Output		—	—	0-5 V
pH Electrode		HI 1131B, glass-body, single junction, refillable, BNC connector, 1 m cable (included)		
Temperature Probe		HI 7669/2W with 1 m (3.3') cable (included)		
Input Impedance		10^{12} Ohm		
Power Supply		12 Vdc adapter (included)		
Environment		0 to 50°C (32 to 122°F); RH max 95%		
Dimensions		240 x 182 x 74 mm (9.4 x 7.2 x 2.9")		
Weight		1.1 kg (2.4 lbs.)		

pH 209 • pH 209R

Educational pH/mV Bench Meter

An Easy to Use Meter for Students



An accurate and affordable teaching tool for educators.

pH 209 is a rugged laboratory pH meter, specifically designed for students and educators. The keypad has soft membrane keys for changing modes, and easy to use knobs for calibrating slope and offset.

The pH offset and slope are designed to be manually adjustable in order to easily explain the calibration concept and electrode characteristics to students.

Measurements in pH is performed with manual temperature compensation. The use of manual temperature compensation is used to demonstrate the effect of temperature on pH measurement.

The pH 209 and pH 209R also measure ORP (Oxidation Reduction Potential). For added versatility, pH 209R offers analog output (0 to 5 V) that represents the full pH and mV range.

Practicality, simplicity and comprehensive operating procedures make this meter one of the most popular student pH meters available today.

- *Affordable to fit into any learning institutions budget*
- *Rugged, lightweight and takes little benchspace*
- *Manual calibration*
- *pH 209R features 0-5 V analog output*
- *Supplied with pH electrode*

SPECIFICATIONS		pH 209	pH 209R
Range	pH	0.00 to 14.00 pH	
	mV	-1999 to 1999 mV	
Resolution	pH	0.01 pH	
	mV	1 mV	
Accuracy (@20°C)	pH	±0.01 pH	
	mV	±1 mV	
pH Calibration		manual, 2 point	
Temperature Compensation		manual, 0 to 100°C (32 to 212°F)	
pH Electrode		HI 1332B, double junction, refillable, BNC connector, 1 m (3.3') cable (included)	
Analog Output		—	0 to 5V
Input Impedance		10^{12} Ohm	
Power Supply		12 Vdc adapter (included)	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		240 x 182 x 74 mm (9.4 x 7.2 x 2.9")	
Weight		1.0 kg (2.2 lbs.)	

ORDERING INFORMATION

pH 209-01 (115V) and **pH 209-02** (230V) and **pH 209R-01** (115V) and **pH 209R-02** (230V) is supplied with HI 1332B plastic-body combination double-junction refillable pH electrode with BNC connector and 1m (3.3') cable, 12 Vdc adapter and instruction manual.

ELECTRODES

HI 1332B	Refillable pH electrode with BNC connector with 1m (3.3') cable
HI 3131B	ORP electrode with platinum sensor and BNC connector

SOLUTIONS

HI 7004L	pH 4.01 buffer solution, 500 mL
HI 7007L	pH 7.01buffer solution, 500 mL
HI 7010L	pH 10.01buffer solution, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7082	3.5M KCl electrolyte solution for double-junction electrodes, 30 mL (4)

ACCESSORIES

HI 76404	Electrode holder
HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 8427	pH/mV electrode simulator
HI 931001	pH/mV electrode simulator with display



HI 76404 — Electrode Holder

HANNA instruments

With Great Products, Come Great Results™

Basic pH Bench Meters

pH Measurement Has Never Been So Easy

Introduce Students to Water Quality Measurement

HANNA's philosophy has always been to satisfy customer needs in a diversity of fields. For this reason, many instruments have been equipped to measure a specific parameter. With this in mind we designed pH 20 and pH 21.

Compact and simple to use, they perform quick measurements and are suitable for education, where students are often first introduced to measuring instruments.

pH measurement accuracy is extremely important where water quality is of primary concern. This includes the food industry, textiles, water analysis, wastewater, as well as engineering, paper mills and leather tanning.

Both meters provide centesimal resolution. pH 21 also displays readings in mV and can be used for ORP measurements.

To provide users with more comprehensive information about a sample, measurements can be manually or automatically compensated for temperature while using HI 7662 probe (optional).

- *Easy to use meter for performing specific measurements*
- *Rugged, lightweight and takes little benchspace*
- *Automatic pH calibration*
- *Supplied with pH electrode*



SPECIFICATIONS		pH 20	pH 21
Range	pH	0.00 to 14.00 pH	
	mV	—	-1999 to 1999 mV
	Temperature	0.0 to 100.0 °C	
Resolution	pH	0.01 pH	
	mV	—	1 mV
	Temperature	0.1°C	
Accuracy	pH	±0.02 pH	
	mV	—	±2 mV
	Temperature	±1°C (excluding probe error)	
Temperature Compensation		manual (adjustable with arrow keys) or automatic from 0 to 100°C (with temperature probe)	
Probes		HI 1110B pH electrode (included); HI 7662 temperature probe (optional)	
pH Calibration		automatic, 1 or 2 point (pH 4.01, 7.01, 10.01)	
Input Impedance		10^{12} Ohm	
Power Supply		12 Vdc adapter (included)	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		230 x 170 x 75 mm (9.1 x 6.7 x 3.0")	
Weight		500 g (1.1 lbs.)	



pH 7 Solutions

ORDERING INFORMATION

pH 20-01 (115V) and **pH 20-02** (230V) is supplied with HI 1110B pH electrode, 12 Vdc power adapter and instructions

pH 21-01 (115V) and **pH 21-02** (230V) is supplied with HI 1110B pH electrode, 12 Vdc power adapter and instructions

ELECTRODES

HI 1110B	pH electrode with BNC connector and 1 m (3.3') cable
HI 3131B	ORP electrode with platinum sensor and BNC connector
HI 7662	Temperature probe

SOLUTIONS

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 70300L	Electrode storage solution, 500 mL
HI 70000P	Electrode rinsing solution, 20 mL sachets (25)

ACCESSORIES

HI 76405	Electrode holder
HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)

HI 207 • HI 208

All in One pH Meters

for Education



HI 207
without stirrer

HI 208
with stirrer

All in one.

Built-in Magnetic Stirrer*, Built-in Beaker holder and beaker-top electrode holder in one compact, lightweight unit.

Optimize Space in Busy Classrooms

HI 207 and HI 208 are all-in-one pH meters designed to meet classroom environments with features such as a built-in beaker holder, beaker-top electrode holder and 2-in-1 pH and temperature sensor. These instruments also feature an extended pH range, dual-level LCD with icons for stability and buffer recognition, automatic pH calibration with 2 sets of memorized buffers and temperature display in either Celsius or Fahrenheit. In addition, all readings are automatically compensated for temperature variations. In the classroom, these compact units reduce clutter and utilize a minimal amount of space on the desktop. Switch to battery power and the instrument can be taken outside the classroom for field studies. The units' small footprint enables them to be used in places usually not suitable for large, multi-unit set-ups. When lab time is over, the instruments are easily cleaned and can be placed out of the way—right away. HI 207 and HI 208 operate with the supplied 12 Vdc adapter or batteries.

- *Built-in Magnetic Stirrer**
- *Built-in Beaker holder and beaker-top electrode holder*
- *Dual-level LCD*
- *Automatic calibration*
- *°C and °F temperature scales*
- *Can be battery operated for portability*
- *Easy set-up and storage*
- *Compact and lightweight*

* Built-in magnetic stirrer for HI 208 only

SPECIFICATIONS

SPECIFICATIONS		HI 207	HI 208
Range	pH	-2.00 to 16.00 pH	
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F	
Resolution	pH	0.01 pH	
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.02 pH	
	Temperature	±0.5 (up to 60°C); ±1°C (up o 105°C) ±1°F (up to 140°F); ±2°F (up to 221°F) (excluding probe error)	
pH Calibration		automatic, 1 or 2 point with 2 sets of memorized buffer values (pH 4.01/7.01/10.01 or 4.01/6.86/9.18)	
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)	
Electrode		HI 1291D pH electrode with built-in temperature sensor (included)	
Built-in Magnetic Stirrer		No	Yes
Battery Type / Life		9V AA / approx. 500 hours of continuous use (without stirrer)	
Power supply		12 Vdc power supply	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions / Weight		192 L x 104 W x 134 H mm (7.5 L x 4.1 W x 5.2 H") / 420 g (14.8 oz.)	

ORDERING INFORMATION

HI 207-01 (115V) and **HI 207-02** (230V) All in One and **HI 208-01** (115V) and **HI 208-02** (230V) All in One are supplied with HI 1291D pH electrode with built-in temperature sensor, plastic beaker, pH electrode holder, calibration solutions, 12 Vdc power supply, 9V battery and instructions.

ELECTRODES

HI 1291D Plastic body pH electrode with built-in temperature sensor and 1 m (3.3') cable

SOLUTIONS

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 7061L General purpose cleaning solution, 500 mL
HI 70300L Electrode storage solution, 500 mL

ACCESSORIES

HI 740036 Plastic beakers, 50 mL (6)
HI 731316 Magnetic stir bars for HI 208, (5)
HI 740035 Electrode holder and 50 mL plastic beaker for HI 207 and HI 208



HI 740035 — Electrode Holder and Plastic 50 mL beaker

HANNA instruments

With Great Products, Come Great Results™

Compatible with all Windows® versions.

HI 9815
pH Turtle
View Measurements on Your Computer

Turn any PC in to a pH Meter

The HANNA pH Turtle (HI 9815) is a sophisticated, yet easy-to-use transmitter that turns any PC into a pH meter. Simply plug it into your PC's serial port and go! Within moments you can view pH measurements on your PC monitor.

HI 9815's user-friendly software from HANNA allows continuous real time data logging right from the desktop. This software can be operated in eight different languages: Dutch, English, French, German, Italian, Norwegian, Portuguese and Spanish. The main menu window of this powerful software contains a virtual pH meter display and continuously updates the logging data table and real-time graph with advanced zoom-in features.

The pH Turtle is also supplied with the HI 1333B double-junction, refillable pH electrode to ensure long life, even in varied and unclean samples. In addition, its rugged plastic body provides higher impact resistance.

- *Continuous real-time data-logging directly on the PC*
- *Includes pH electrode, RS 232 connection cable and software*
- *Inexpensive desktop solution*





PC, beaker and electrode holder not included.

SPECIFICATIONS	HI 9815
Range	0.0 to 14.0 pH
Resolution	0.1 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	automatic, at 1, 2 or 3 points directly from PC keyboard
Temperature Compensation	manual, 0 to 100°C (32 to 212°F)
pH Electrode	HI 1333B (included)
Input Impedance	10^{12} Ohm
PC Connection	RS232
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	Ø 88 x 40 mm (Ø 3.5 x 1.6")
Weight	250 g (8.8 oz.)

ORDERING INFORMATION

HI 9815 (pH Turtle) is supplied HI 1333B pH electrode with 1 meter (3.3') cable, BNC connector, software and instructions.

ELECTRODES

HI 1333B pH electrode with BNC connector and 1 m (3.3') cable

SOLUTIONS

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 77400P pH 4 and pH 7 buffer solution, (10) 20 mL sachets (5ea)
HI 70000P Electrode rinsing solution, 20 mL sachets (25)
HI 70300L Electrode storage solution, 500 mL
HI 7082 3.5M KCl Refilling electrolyte solution for double junction electrodes, 30 mL bottle (4)

ACCESSORIES

HI 76405 Electrode Holder and steel base

pH Meters

An Introduction



p 5.30



p 5.34



p 5.38

HANNA Portable pH Meters

HANNA's **HI 9818x series of graphic LCD portable meters** consist of 6 models for pH and ORP and pH/ORP/ISE measurement. All models feature Calibration Check™ electrode diagnostics, Log-on-demand, auto-endpoint and GLP functions. Select models are PC compatible via USB.

Battery recharging is fast with the use of the inductive charger.

Our **HI 9817x series of Calibration Check™ pH portable meters** measure pH/ORP/ISE with 5 point calibration in rugged waterproof casings. This series features dual-level, backlit LCD's, a calibration reminder, PC connectivity and auto HOLD to freeze readings on the display. In addition, this series incorporates an electrode condition graph on the LCD display for easy indication of electrode status after calibration.

The next standard in professional pH measurement

The HI 9126 is an evolution in professional, accurate, easy-to-use pH meters. These meters are designed to provide laboratory results in a sleek, simple design.

HANNA Testers

p 5.62

HANNA testers are ideal in applications where it is important to have quick and accurate sample readings. HANNA testers also provide the user with much more accurate and speedy results than test strips or chemical test kits.

HANNA was the first manufacturer in the world to introduce the concept of an easy-to-use tester, since then, HANNA has been the leader in tester technology, both in terms of innovation, as well as in market research. We are constantly looking for ways to improve our line and to solve new and existing market needs.

HANNA pH and ISE Electrodes

This catalog edition introduces our new Ion Selective Electrode line to compliment our new ISE capable pH instrumentation. ISE technology offers considerable advantages to analytical chemistry. These electrodes are ideal in a wide range of industries such as municipal water and wastewater treatment, research laboratories, agriculture, education, food processing, biomedical, metal finishing, industrial waste treatment and power generation.

Each electrode has been developed, produced and rigorously tested in our state-of-the-art ISO 9001:2000 U.S. production facility to ensure performance, durability and quick response.



p 5.112

HI 98180 • HI 98181 • HI 98182 • HI 98183 • HI 98184 • HI 98185

Graphic Display pH Meters

with USB and Rechargeable Batteries





Industrial Grade Portables

Ease of use and high-end features come together in our new family of pH, ISE, ORP, Conductivity (section 3) and Dissolved Oxygen (section 4) field instruments.

A backlit 128 x 64 pixel graphic LCD provides a clear display of measured parameters and set-up screens. Dedicated soft-keys allow fast and intuitive operation in a choice of languages with content sensitive on-screen help always available.

These instruments can be easily operated with one hand for field use and are housed in rugged waterproof or water resistant casings. The function key operation allows users to navigate from screen to screen with immediate access to important information such as calibration status, methods set up, units and logged data.

All instruments feature log-on-demand and a USB port to transfer stored data to a computer. Other common features include a user defined calibration due warning (to prevent errors due to old calibration), auto endpoint of measurement (the instrument freezes the LCD when the reading is stable), comprehensive GLP functions and °C or °F temperature display.

Feature Highlights

- *Exclusive Calibration Check™*
- *Rechargeable batteries with inductive recharger*
- *Backlit, graphic LCD and battery life on display*
- *Menu driven for ease of use*
- *Rugged, durable casing*
- *Soft-key extended functionality*
- *Multiple language selection*



- *GLP information (date, time, buffers, offset and slope %) at a push of a button.*

ISE Feature Highlights

- *Direct measurement in multiple units available on HI 98185 (ppm, ppt, g/L, mg/L, ppb, µg/L, mg/mL, M, mol/L, mmol/L, %w/v, user)*
- *Electrode type selection*
- *Up to 5 calibration points (select models)*

pH Feature Highlights

- *Calibration Check™*
- *0.001 pH resolution (select models)*
- *pH electrode with a built-in temperature sensor (select models)*
- *Up to 5 calibration points with standard or custom buffers (select models)*
- *Relative mV scale*

Rechargeable batteries with inductive recharger



These models have up to 200 hour extended battery life to guarantee long operation in the field. When the batteries are low, you don't have to worry about carrying a spare set with you—the batteries can be recharged with HANNA's inductive recharger. Simply leave the meter on the recharger for a few hours and you're ready to go. The recharger can be plugged into a standard 115V or 230V socket using the appropriate HANNA adapter.

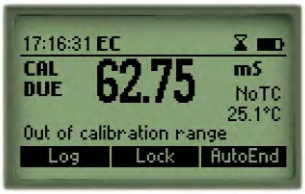
HANNA instruments

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Graphic Display pH Meters

with USB and Rechargeable Batteries

Screen Highlights



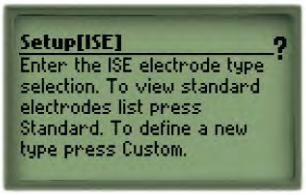
Measurement

Large backlit graphic display shows multiple messages along with the current measurement readings.



Language Selection

Help screens and guides are available in a choice of languages.



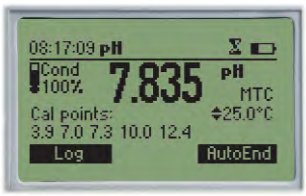
Help

Users can consult the on-screen help from any mode simply by pressing the HELP key. The instrument will then explain the function and options currently available.



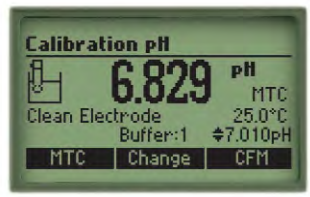
GLP

Comprehensive GLP functions are directly accessible by pressing the GLP key.



pH Measurement Screen

Electrode condition and the option to display calibration points.



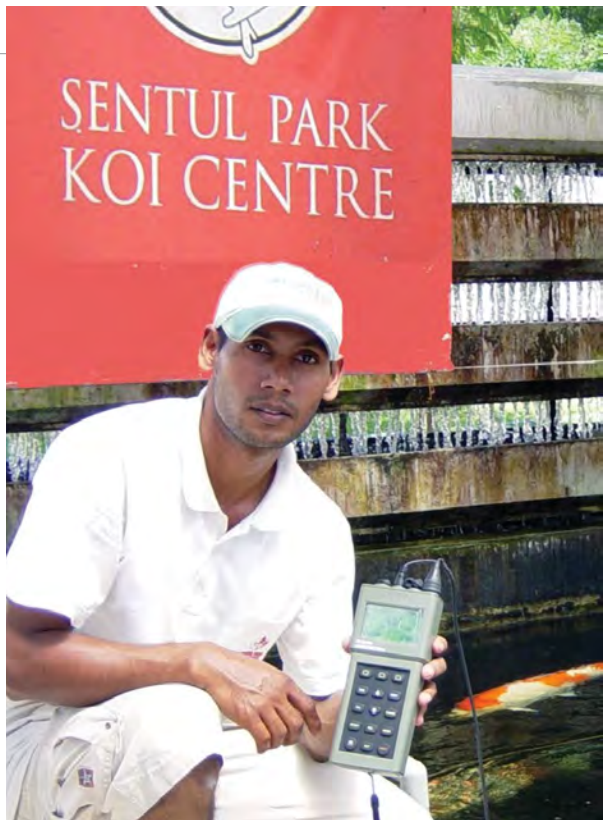
pH Calibration

Detailed Calibration Check™ messages.



ISE GLP

Calibration data, date and ID information are stored for retrieval at a later time.



"The reason for me to insist on HANNA products is simple: the professional service rendered to me is second to none as I've experienced so far in my career path."

MD. IKHLAS HOSSAIN (MR)
SITE MANAGER
YTL Sentul Park Koi Centre—Biggest Koi center in South East Asia
Malaysia



ISE Measurement Screen

Direct ISE readings shown in a choice of units (HI 98185). LCD also displays electrode type used, current temperature, remaining battery life, and time simultaneously.



ISE Calibration

Up to 5 point calibration with 6 standard solutions. Users are guided through the calibration procedure with step-by-step on-screen instructions.



ISE Setup Screen

HI 98185 allows direct choice of probe type and measurement unit while the HI 98184 reads only in ppm range.

HI 98180 • HI 98181 • HI 98182 • HI 98183 • HI 98184 • HI 98185

Graphic Display pH Meters

with USB and Rechargeable Batteries

Meters with pH and ORP ...

All meters feature HANNA's exclusive Calibration Check™: during calibration the pH electrode state is compared to the previous calibration and the user is warned in the event of significant changes to avoid erroneous calibration due to a bad/dirty electrode or a contaminated buffer. The electrode condition is always displayed on the LCD and the OUT OF CALIBRATION RANGE warning alerts the user if the measurement is taken too far from the calibration points.

For added versatility, these meters offer up to 5 calibration points using either HANNA's standard or user defined buffer values. An mV scale is also available for ORP measurements.



SPECIFICATIONS		HI 98180	HI 98181	HI 98182	HI 98183
Range	pH	-2.0 to 16.0; -2.00 to 16.00 pH		-2.0 to 20.0; -2.00 to 20.00; -2.000 to 20.000 pH	
	mV	—	±2000 mV	±2000 mV	
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0°F)		-20.0 to 120.0 °C (-4.0 to 248.0°F)	
Resolution	pH	0.1; 0.01 pH		0.1; 0.01; 0.001 pH	
	mV	—	0.1 mV	0.1 mV	
	Temperature	0.1°C (0.1°F)		0.1°C (0.1°F)	
Accuracy (@20°C)	pH	±0.01 pH		±0.01; ±0.002 pH	
	mV	—	±0.2mV	±0.2mV	
	Temperature	±0.4°C (±0.8°F) (excluding probe error)		±0.4°C (±0.8°F) (excluding probe error)	
Calibration	pH	Up to 2 point calibration, 7 standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45)	Up to 3 point calibration, 7 standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45)	Up to 5 point calibration, 7 standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 5 custom buffers	
	Slope	From 80 to 110%		From 80 to 110%	
Temperature Compensation		Manual or automatic from -20.0 to 120.0°C (-4.0 to 248.0°F)		Manual or automatic from -20.0 to 120.0°C (-4.0 to 248.0°F)	
Probes		HI 1230B pH electrode w/BNC and HI 7662 temperature probe		HI 1230B pH w/BNC and HI 7662 temperature probe	HI 72911B pH w/BNC and built-in temperature sensor
Logging		Single reading		Log-on-demand 200 samples	
PC Connectivity		—		Opto-isolated USB (with HI 92000 software)	
Input Impedance		10^{12} Ohms			
Battery Type/Life		(4) 1.2V AA rechargeable batteries/approx. 200 hrs continuous use (without backlight)			
Water Resistance		Water Resistant			Waterproof
Auto-off		User Selectable: 5, 10, 30, 60 min or can be disabled			
Environment		0 to 50°C (32 to 122°F); RH 95%			0 to 50°C (32 to 122°F); RH 100%
Dimensions/Weight		226.5 x 95 x 52 mm (8.9 x 3.75 x 2")/525 g (18.5 oz.)			

ORDERING INFORMATION

HI 98180-01 (115V) and **HI 98180-02** (230V), **HI 98181-01** (115V) and **HI 98181-02** (230V) and **HI 98182-01** (115V) and **HI 98182-02** (230V) are supplied with HI 1230B pH electrode and HI 7662 temperature probe, pH 4.01 and pH 7.01 buffer solutions, rechargeable batteries (4), HI 710042 inductive battery charger with power adapter, rugged carrying case and instructions.

HI 98183-01 (115V) and **HI 98183-02** (230V) is supplied with HI 72911B pH electrode with built-in temperature sensor, pH 4.01 and pH 7.01 buffer solutions, rechargeable batteries (4), HI 710042 inductive battery charger with power adapter, rugged carrying case and instructions.

HANNA instruments

With Great Products, Come Great Results™

... and pH, ORP with ISE

In addition to all the features of the pH models, these meters also include direct ion concentration determination with ion selective electrodes.

HI 98185 allows a choice of measurement units *(ppm, ppt, g/L, mg/L, ppb, µg/L, mg/mL, M, mol/L, mmol/L, % w/v, user)* and ISE type selection *(ammonia, bromide, cadmium, calcium, carbon dioxide, chloride, cupric, fluoride, iodide, lead, nitrate, potassium, silver, sulfate and sulfide)*.

HI 98184 measures in ppm and the ion charge or nominal electrode slope can be entered manually.

Up to 5 calibration points with six standard values are available.



SPECIFICATIONS		HI 98184	HI 98185
Range	pH	-2.0 to 20.0; -2.00 to 20.00; -2.000 to 20.000 pH	
	mV	±2000 mV	
	ISE	From 1.00 x 10^{-3} to 1.00 x 10^{5} ppm	From 1.00 x 10^{-7} to 9.99 x 10^{10} concentration (choice of units)
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0°F)	
Resolution	pH	0.1; 0.01; 0.001 pH	
	mV	0.1 mV	
	ISE	0.01; 0.1; 1; 10 concentration	
	Temperature	0.1°C (0.1°F)	
Accuracy	pH	±0.01; ±0.002 pH	
	mV	±0.2 mV	
	ISE	±0.5% of reading (monovalent ions), ±1% of reading (divalent ions)	
	Temperature	±0.4°C (±0.8°F) (excluding probe error)	
Calibration	pH	Up to 5 point calibration, 7 standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 5 custom buffers	
	ISE	Up to 2 point calibration, 6 standard solutions (0.1, 1, 10, 100, 1000, 10000 ppm)	Up to 5 point calibration, 6 standard solutions (choice of units)
	Slope	From 80 to 110%	
Temperature Compensation (pH)		Manual or automatic from -20.0 to 120.0°C (-4.0 to 248.0°F)	
Probes		HI 72911B pH w/BNC and built-in temperature sensor	
Logging		Log-on-demand 300 samples (100 each range)	
PC Connectivity		Opto-isolated USB (with HI 92000 software)	
Input Impedance		10^{12} Ohms	
Battery Type/Life		(4) 1.2V AA rechargeable batteries/ approx. 200 hrs continuous use (with backlight off)	
Water Resistance		Waterproof	
Auto-off		User Selectable: 5, 10, 30, 60 min or can be disabled	
Environment		0 to 50°C (32 to 122°F); RH 100%	
Dimensions/Weight		226.5 x 95 x 52 mm (8.9 x 3.75 x 2")/525 g (18.5 oz.)	

ORDERING INFORMATION cont.

HI 98184-01 (115V) and **HI 98184-02** (230V) and **HI 98185-01** (115V) and **HI 98185-02** (230V) are supplied with HI 72911B pH electrode with built-in temperature sensor, pH 4.01 and pH 7.01 buffer solutions, rechargeable batteries (4), HI 710042 inductive battery charger with power adapter, rugged carrying case and instructions.

ORDERING INFORMATION cont.

ELECTRODES

Combination pH electrodes. All part codes ending with P are provided with BNC & Pin connectors, and 1 m (3.3') cable.

HI 1043B	*Use: strong acids and bases*. Glass-body, double junction, refillable
HI 1053B	*Use: emulsions.* Glass-body, single junction, refillable
HI 1230B	*Use: general purpose.* PEI body, double junction, gel-filled
HI 72911B	*Use: general purpose.* Stainless steel body, double junction, gel-filled with built-in temperature sensor
FC 200B	*Use: Semi-solids and food products.* PVDF body, single junction, gel-filled
HI 3230B	*Use: For oxidizing reactions.* Platinum tipped ORP probe, PEI body, single junction, gel-filled
HI 4430B	*Use: Strong oxidizing solutions* Gold tipped ORP probe, PEI body, single junction, gel-filled

SOLUTIONS

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 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P	pH 10.01 buffer solution, 20 mL sachets (25)
HI 77400P	pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL
HI 7091L	ORP reducing pretreatment solution, 500 mL
HI 7092L	ORP oxidizing pretreatment solution, 500 mL
HI 7020L	ORP test solution @200-275 mV, 500 mL
HI 7021L	ORP test solution @240 mV, 500 mL
HI 7020L	ORP test solution @470 mV, 500 mL
HI 70000P	Electrode rinsing sol., 20 mL sachets (25)
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Cleaning solution, 500 mL
HI 7073L	Protein cleaning solution, 500 mL
HI 7074L	Inorganic cleaning solution, 500 mL
HI 7077L	Oil & fat cleaning solution, 500 mL
HI 7071	3.5M KCl + AgCl electrolyte solution for single junction electrodes, 30 mL (4)
HI 7082	3.5M KCl Refilling electrolyte solution for double junction electrodes, 30 mL bottle (4)

ACCESSORIES

HI 710042	Inductive battery recharger
HI 7662	Temperature probe with 1 m (3.3') screened cable
HI 920013	USB cable for PC connection
HI 92000	Windows® compatible software

HI 98170 • HI 98171 • HI 98172

pH/ORP/ISE Meters

with HANNA's Exclusive Calibration Check™



Splashproof Keypad

3 Models to Meet Your Application Requirements

HI 9817x series are state-of-the-art, heavy-duty portable pH meters with temperature probe input—this means changing one probe with another is easy (e.g., pH for ORP). Housed in a waterproof casing, these units are specifically designed to provide laboratory results and accuracy under demanding industrial and field conditions. They come equipped with a series of new diagnostic features to dramatically improve a measurement's reliability. Up to 5 calibration points—choose from 7 memorized buffers and 5 custom buffers. This provides the user with the flexibility necessary to adjust the calibration range and obtain the most accurate and precise readings possible.

For HI 98171 and HI 98172, change the pH sensor for an ORP sensor to obtain mV readings; adjustable between two ranges and accurate to ±0.2 mV.

For HI 98172, ISE sensors are calibrated up to 5 points and measurements are obtained in ppm concentrations.

All meters support HANNA's signature Calibration Check™. Calibration Check™ displays an electrode condition graph which informs the user of electrode status during calibration. If readings are taken too far outside the calibration range, the unit will warn the user with a graphic signal. Users may set a reminder to notify when calibration is due.

The HI 9817x Series is equipped with auto-end measuring mode that ensures readings are taken only when they are stable. GLP data is instantly accessible via a dedicated GLP key and Log-on-demand holds up to 150 records. All data can be downloaded to a PC via the RS232 connection. With up to 200 hours of extended battery life, these units will guarantee long operation in the field.

Key Features

- *Measure pH, mV or ISE with temperature*
- *Electrode diagnostics*
- *Backlit LCD with battery life on the display*
- *Docking station for battery recharge*
- *Waterproof protection*
- *"Outside Calibration Range" warning*
- *Settable "Cal Due" warning on display*
- *Up to 5 calibration points in 7 standard buffers*
- *Up to 5 custom buffers*
- *°C or °F unit selection*
- *Log On Demand up to 150 records (50 each range)*
- *Auto-end feature*
- *GLP feature*
- *RS232 PC connectivity (with HI 92000 software)*

Screen Highlights



Backlit Display

Large backlit display shows current measurement readings along with the electrode condition and battery life.



GLP

Comprehensive GLP functions are directly accessible by pressing the GLP key.



Calibration Messages

Messages on the LCD make calibration easy and accurate.

HANNA instruments

With Great Products, Come Great Results™

Electrode Condition Graph

Provides a quick and clear indication of electrode status after calibration.



Bargraph Indication	Condition value
All 5 bars	81 - 100%
4 bars	61 - 80%
3 bars	41 - 60%
2 bars	21 - 40%
1 bar	1 - 20%
1 bar blinking	0%
Frame only	Info not available

HI 710041 Inductive Battery Recharger

When the batteries are low, you don't have to worry about carrying a spare set with you—the batteries can be recharged with HANNA's inductive recharger. Simply leave the meter on the recharger for a few hours and you're ready to go!



The recharger can be plugged into a standard 115V or 230V socket using the appropriate HANNA adapter.

SPECIFICATIONS		HI 98170	HI 98171	HI 98172
Range	pH	-2.0 to 16.0; -2.00 to 16.00 pH		-2.00 to 16.00 pH
	mV	—	±699.9 mV; ±2000 mV	
	ISE	—		0.001 to 19990 ppm
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0°F)		
Resolution	pH	0.1; 0.01 pH		0.01 pH
	mV	—	0.1; 1 mV	
	ISE	—		0.001 ppm (0.001 to 1.999) 0.01 ppm (2.00 to 19.99) 0.1 ppm (20.0 to 199.9) 1 ppm (200 to 1999) 10 ppm (2000 to 19990)
	Temperature	0.1° (0.1°F)		
Accuracy	pH	±0.1; ±0.01 pH		±0.01 pH
	mV	—	±0.2 mV (±699.9 mV); ±1 mV (±2000 mV)	
	ISE	—		±0.5% f.s.
	Temperature	±0.4°C (±0.8°F) excluding probe error		
pH Calibration		Up to 5 calibration points; 7 standard buffers available (pH buffers 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) and 5 custom buffers		
ISE Calibration		—		Up to 5 point calibration, 6 standards available (0.1, 1, 10, 100, 1000, 10000 ppm)
Slope/Offset Calibration		±1 pH/From 80 to 110%		
Relative mV Offset Range		—	±2000 mV	
Temperature Compensation		Automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F)		
Electrodes		HI 1230B pH electrode; HI 7662 temperature probe (included)		
Logging		On demand, 50 samples on each range		
Computer Interface		RS232 (HI 92000 software required)		
Input Impedance		10^{12} Ohm		
Battery Type/Life		(4) 1.2V AA rechargeable batteries, approx. 200 hrs continuous use without backlight. Battery charger included. User-selectable auto off: 1-30 min. or disabled.		
Environment		0 to 50°C (32 to 122°F); RH 100%		
Dimensions/Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")/ 425 g (15 oz.)		

ORDERING INFORMATION

HI 98170-01 (115V) and **HI 98170-02** (230V), **HI 98171-01** (115V) and **HI 98171-02** (230V) and **HI 98172-01** (115V) and **HI 98172-02** (230V) are supplied with HI 1230B double-junction, pH electrode, HI 7662 stainless steel temperature probe, pH 4.01 and pH 7.01 buffer solutions (20 mL ea.), 100 mL plastic beaker, rechargeable batteries (4), HI 710041 inductive recharger with power adapter, rugged carrying case and instructions.

SOLUTIONS

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 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P	pH 10.01 buffer solution, 20 mL sachets (25)
HI 77400P	pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL
HI 7091L	ORP reducing pretreatment solution, 500 mL
HI 7092L	ORP oxidizing pretreatment solution, 500 mL
HI 7021L	ORP test solution @240 mV, 500 mL
HI 7022L	ORP test solution @470 mV, 500 mL
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710041	Inductive battery recharger
HI 920010	RS232 cable for PC connection
HI 92000	Windows® compatible software

HI 98230 • HI 98240

Printing and Logging pH Meters

with GLP and "Intelligent" Electrode



Print results or upload data to a PC

HI 98230 and HI 98240 are the perfect solution for any application where pH measurements need to be recorded. In fact, data can be stored or printed directly on demand or automatically. The stored data (up to 100 measurements on-demand and up to 1500 automatically) can be transferred to a PC with a standard RS232 serial connection using the optional HANNA infrared adapter and HI 92000 Windows® compatible software.

Featuring GLP (Good Laboratory Practice) capabilities, these meters incorporate HANNA "Intelligent" electrode technology. Smart electrodes have an EEPROM that stores calibration information. This allows the user to change probes without recalibrating since the information is stored in the probe and not the meter.

- *Backlit, Dual-level LCD*
- *Built-in impact printer*

SPECIFICATIONS

		HI 98230	HI 98240
Range	pH	-4.00 to 19.99 pH	
	mV	—	±400.0 mV; ±2000 mV
	Temperature	-10.0 to 120.0°C / -14.0 to 248.0°F	
Resolution	pH	0.01 pH	
	mV	—	0.1 mV (±400 mV); 1 mV (outside)
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.01 pH	
	mV	—	±0.5 mV (±400 mV); ±2 mV (outside)
	Temperature	±0.5°C (0 to 70°C); ±1°C (outside) / ±1°F (32 to 158°F); ±1.8°F (outside)	
pH Calibration		automatic, 1 or 2 point with 5 standard buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)	
mV Calibration		—	automatic, 2 point at 0, 350 mV or 3 point at 0, 350, 1900 mV
Temperature Compensation		automatic, -10 to 120°C (14 to 248°F)	
pH Electrode		HI 1618D smart electrode with temperature sensor, DIN connector and 1 m (3.3') cable (included)	
PC Connection		HI 9200/9 IR interface, connected to the computer RS232 serial port	
Logging / Printing Interval		selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes	
Power Supply		(4) 1.5V AA batteries / approx. 350 hours of continuous use (with backlight off) or 12 Vdc input	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions / Weight		220 x 87 x 75 mm (8.7 x 3.4 x 2.9") / 550 g (1.2 lbs.)	

ORDERING INFORMATION

HI 98230-01 (115 V) and **HI 98230-02** (230 V), **HI 98240-01** (115 V) and **HI 98240-02** (230 V) are supplied with amplified pH electrode with built-in temperature sensor and DIN connector, AA size alkaline batteries (4), pH 4.01 sachet (20 mL), pH 7.01 sachet (20 mL), 12 Vdc adapter, instruction manual, paper rolls (5) and rugged carrying case.

ELECTRODES

HI 1618D	Smart pH electrode with PEI body and DIN connector
HI 3620D	ORP electrode with PEI body

SOLUTIONS

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 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P	pH 10.01 buffer solution, 20 mL sachets (25)
HI 77400P	pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 76405	Electrode holder
HI 710034	Paper roll (10)
HI 710035	Ink cartridge (1)
HI 92000	Windows® compatible software
HI 9200/9	IR interface for PC connection

HANNA instruments

With Great Products, Come Great Results™

PC compatible · 2 points · lcd backlight · lcd display · B.E.P.S.

HI 98140 • HI 98150

"Intelligent" Electrode pH Meters

Waterproof with Log-On-Demand



Avoid Mistakes with HANNA's "Intelligent" Electrode

Even to this day HI 98140 and HI 98150 are two of the most innovative and popular portable pH meters ever offered.

These instruments feature IP 67 waterproof protection, GLP (Good Laboratory Practice) capabilities and use HANNA's "Intelligent" electrodes.

These electrodes incorporate a chip which memorizes the calibration data performed with a specific instrument. When the "Intelligent" electrode is attached to the meter again, it is automatically recognized. This technology allows the operator to switch probes without recalibrating, optimizing time and efficiency. It avoids erroneous measurement readings in the event that the amplified pH electrode is substituted after calibration. These "Intelligent" pH electrodes are equipped with a built-in temperature sensor—no need for an additional temperature probe here!

Additinally, HI 98140 and HI 98150 feature all the most advanced features of laboratory pH meters. Plus, they incorporate a dual level LCD to enhance operability in dimly lit locations. By pressing a button, these meters can log up to 500 measurements complete with date and hour. Stored data can be displayed later or downloaded to a computer through an RS232 serial port and the HI 92000 Windows® compatible software.

- *Backlit, Dual-level LCD*
- *-4.00 to 19.99 pH range*
- *Store and recall up to 500 measurements*



HI 92000 — HANNA Software

SPECIFICATIONS		HI 98140	HI 98150
Range	pH	-4.00 to 19.99 pH	
	mV	—	±600.0 mV; ±2000 mV
	Temperature	-20.0 to 120.0°C	
Resolution	pH	0.01 pH	
	mV	—	0.1 mV (±400 mV); 0.2 mV (±400 to ±600 mV); 1 mV (outside)
	Temperature	0.1°C (-10 to 120°C); 1°C (below -10°C)	
Accuracy (@20°C)	pH	±0.01 pH	
	mV	—	±0.2 mV (±400 mV); ±0.4 mV (±400 to ±600); ±2 mV (outside)
	Temperature	±0.4°C (0 to 70°C); ±1°C (outside)	
pH Calibration		automatic, 1 or 2 point with 5 memorized buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)	
mV Calibration		—	automatic, 2 point at 0, 350 mV or 3 point at 0, 350, 1900 mV
Temperature Compensation		automatic, -20 to 120°C (-4 to 248°F)	
pH Electrode		HI 1618D amplified pH electrode with built-in temperature sensor, plastic body and DIN connector (included)	
PC Connection		through RS232 serial port, using HI 920011 connection cable and HI 92000 software (optional)	
Power Supply		(4) 1.5V AA batteries / approx. 300 hours of continuous use (with backlight off) or 12 Vdc input	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions / Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4") / 500 g (1.1 lbs.)	

ORDERING INFORMATION

HI 98140-01 (115 V) and **HI 98140-02** (230 V), **HI 98150-01** (115 V) and **HI 98150-02** (230 V) are supplied with HI 1618 amplified pH electrode with built-in temperature sensor and DIN connector, pH 4.01 sachet (20 mL), pH 7.01 sachet (20 mL), instruction manual, AA size alkaline batteries (4), 12 Vdc adapter and rugged carrying case.

ELECTRODES

HI 1618D	"Intelligent" pH electrode with PEI body and DIN connector
HI 3620D	ORP electrode with PEI body

SOLUTIONS

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 77400P	pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 76405	Electrode holder
HI 92000	Windows® compatible software
HI 920011	Serial cable for PC connection

HI 9126

Calibration Check™ pH Meters

With Large Display





Shown actual Size

A new standard in pH Portable Instrumentation

The HI 9126 is the next generation in professional, accurate, easy-to-use pH meters. Designed to provide laboratory results in a sleek, portable design. The HI 9126 features HANNA's exclusive Calibration Check™ technology. Calibration Check™ monitors the pH bulb and reference junction of the electrode every time the instrument is calibrated. In the event of a dirty pH bulb, Calibration Check™ prompts the user that additional cleaning may be needed.

The extended multi-level LCD displays pH and temperature (°C or °F) readings simultaneously, while also displaying the electrode status and operational guides. The HI 9126 helps users through the calibration process with clear on-screen messages. The meter features a series of diagnostic features to improve measurement consistency and reliability.

Calibration is performed automatically at 1 or 2 points with 7 standard buffers and 2 custom buffers.

HI 9126 is supplied with rechargeable batteries and a inductive docking station for easy recharging.

The meter is provided with the BEPS (Battery Error Prevention System) which automatically turns the instrument off when the battery level is too low to ensure reliable readings.

The HI 9126 can also be used for ORP measurements in the mV range with 0.1 mV resolution.

- *Exclusive Calibration Check™*
- *Electrode condition monitoring*
- *Backlit, multi-level LCD*
- *On-screen operational guide*
- *Extended pH and temperature ranges*
- *Up to 7 standard buffers for calibration and 2 custom buffers*
- *User-selectable calibration timeout reminder*
- *Measures in °C or °F*
- *Waterproof*
- *Rechargeable batteries*
- *Inductive battery recharger docking station included*
- *BEPS (Battery Error Prevention System)*
- *pH electrode, temperature probe and hard carrying case included*

HANNA instruments

With Great Products, Come Great Results™

Calibration Check™ pH Meters

With Large Display







Rechargeable Batteries with Inductive Recharger

When the batteries are low, you don't have to worry about carrying a spare set with you—the batteries can be recharged with HANNA's inductive recharger. Simply leave the meter on the recharger for a few hours and you're ready to go. The recharger can be plugged into a standard 115V or 230V socket using the appropriate HANNA adapter.

Long Battery Life

HI 9126 has an extended battery life (up to 200 hours) to guarantee long operation in the field.



SPECIFICATIONS		HI 9126
Range	pH	-2.00 to 16.00 pH
	mV	±699.9 mV; ±1999 mV
	Temperature	-20.0 to 120.0°C / -4.0°F to 248.0°F
Resolution	pH	0.01 pH
	mV	0.1 mV; 1 mV
	Temperature	0.1°C / 0.1 °F
Accuracy (@20°C)	pH	±0.01 pH
	mV	±0.2 mV; ±1 mV
	Temperature	±0.4°C / ±0.8°F
Calibration Check		check of the electrode status during calibration
pH Calibration		automatic, 1 or 2 point with 7 memorized buffer values (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 2 custom buffers
Offset Calibration		±1 pH
Slope Calibration		From 80 to 108%
Temperature Compensation		automatic or manual, -20 to 120°C (-4 to 248°F) without temperature probe
pH Electrode		HI 1230B, double junction, PEI body, gel filled, BNC connector and 1 m (3.3') cable (included)
Temperature Probe		HI 7662 with 1 m (3.3') cable (included)
Input Impedance		10^{12} Ohm
Battery Type / Life		(4) 1.2V AAA rechargeable / approx. 200 hours of continuous use (with backlight off); auto-off after 20 minutes of non-use (can be disabled)
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		192 x 71.6 x 36 mm (7.5 x 2.8 x 1.4") / 525 g (15 oz.)

ORDERING INFORMATION

HI 9126-01 (115 V) and **HI 9126-02** (230 V) is supplied with HI 1230B combination double-junction, gel-filled pH electrode, HI 7662 stainless steel temperature probe with 1 m (3.3") cable, pH 4.01 & pH 7.01 buffer solutions (20 mL sachets), 100 mL plastic beaker, (4) 1.2 AAA rechargeable batteries (inside the instrument), HI 710044 inductive recharger* with power adapter, instruction manual and rugged carrying case.

ELECTRODES

HI 1230B pH electrode, double junction, PEI body, BNC connector, 1 m (3.3') cable

HI 3230B ORP electrode, gel filled, PEI body, with platinum sensor, BNC connector, 1 m (3.3') cable

HI 7662 Temperature probe

SOLUTIONS

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 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 76405 Electrode holder

HI 4221 • HI 4222 • HI 4521 • HI 4522

Research Grade pH Meters

with Color Display





pH Features

- *Exclusive Calibration Check™*
- *5 point calibration with standard and custom buffers*

ISE Features

- *Direct calibration and measurement in multiple units*
- *Incremental methods: Known addition, Known subtraction, Analyte addition and Analyte subtraction*

EC Features

- *EC, resistivity, TDS and salinity ranges*
- *Auto recognition of probe type (2 or 4 ring, and nominal cell constant)*
- *Extended range from 0.001 µS/cm to 1 mS/cm*
- *Stages 1, 2 and 3 USP mode*
- *3 salinity scales: Practical salinity, percent salinity and natural sea water*
- *Linear and natural water temperature compensation*

Key Features

- *240 x 320 Color Display*
- *Simultaneous dual graph display and real-time logging*
- *USB and RS232 for Computer Compatibility*
- *Multi-language interface*
- *GLP data*
- *Manual or automatic temperature compensation*
- *Relative mV scale*
- *Small footprint*
- *Menu screens are informative and navigation is intuitive*
- *Electrode holder (included) holds 3 probes and screws securely into the base of the Research Grade Meter series*

The two independant measuring channels of the HI 4222 are galvanically isolated to eliminate any noise and instability.

These two channels allows users to connect pH and ISE electrodes at the same time eliminating the need to switch probes .



HANNA instruments

With Great Products, Come Great Results™

HI 9124 • HI 9125

Auto-Instruction pH Meters

With Large Display



Two of our Most Popular Meters—Enhanced!

The HI 9124 and HI 9125 heavy-duty waterproof pH meters have been designed with the latest microprocessor technology to provide laboratory results and accuracy under harsh industrial conditions.

The large multi-level LCD displays the pH and temperature (°C or °F) simultaneously. Graphic symbols are provided to help the user during the calibration process.

The pH calibration procedure is automatic with 5 standard buffer values (4.01, 6.86, 7.01, 9.18 and 10.01), buffer recognition to avoid errors, and automatic temperature compensation.

HI 9125 can be used with ORP (Oxidation Reduction Potential) electrodes. The resolution automatically switches from 0.1 to 1 mV when the reading exceeds 700 mV.

As in the HI 9126, these meters utilize BEPS (Battery Error Prevention System) technology, which automatically turns the instrument off when the battery level is too low to ensure reliable readings.

HI 9125 and HI 9124's batteries are recharged using the included inductive docking station.

- *Backlit, multi-level LCD*
- *On-screen operational guide*
- *Extended pH and temperature ranges*
- *Up to 7 standard buffers for calibration and 2 custom buffers*
- *User-selectable calibration timeout reminder*
- *Measures in °C or °F*
- *Waterproof*
- *Rechargeable batteries*
- *Inductive battery recharger docking station included*
- *BEPS (Battery Error Prevention System)*
- *pH electrode, temperature probe and hard carrying case included*

HANNA instruments
With Great Products, Come Great Results™

Auto-Instruction pH Meters

With Large Display

Rechargeable Batteries with Inductive Recharger

When the batteries are low, you don't have to worry about carrying a spare set with you—the batteries can be recharged with HANNA's inductive recharger. Simply leave the meter on the recharger for a few hours and you're ready to go. The recharger can be plugged into a standard 115V or 230V socket using the appropriate HANNA adapter.

Long Battery Life

HI 9125 and HI 9124 have an extended battery life (up to 200 hours) to guarantee long operation in the field.





SPECIFICATIONS

		HI 9124	HI 9125
Range	pH	-2.00 to 16.00 pH	
	mV	—	±699.9 mV; ±1999 mV
	Temperature	20.0 to 120.0°C / -4.0°F to 248.0°F	
Resolution	pH	0.01 pH	
	mV	—	0.1 mV; 1 mV
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.01 pH	
	mV	—	±0.2 mV; ±1 mV
	Temperature	±0.4°C / ±0.8°F	
pH Calibration		automatic, 1 or 2 point with 5 standard buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01)	
Offset Calibration		±1 pH	
Slope Calibration		from 80 to 108%	
Temperature Compensation		automatic or manual, 20.0 to 120.0°C / -4.0°F to 248.0°F	
pH Electrode		HI 1230B, double junction, gel filled, BNC connector and 1 m cable (included)	
Temperature Probe		HI 7662 with 1 m (3.3') cable (included)	
Input Impedance		10^{12} Ohm	
Battery Type / Life		(4) 1.2V AAA rechargeable batteries / approx. 200 hours of continuous use; auto-off after 20 minutes of non-use (can be disabled)	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions		191.5 x 71.6 x 36 mm (7.5 x 2.8 x 1.4")	
Weight		425 g (15 oz)	

ORDERING INFORMATION

HI 9125-01 (115 V) and **HI 9125-02** (230 V) and **HI 9124-01** (115 V) and **HI 9124-02** (230 V) are supplied with HI 1230B combination double-junction, gel-filled pH electrode, HI 7662 stainless steel temperature probe with 1 m (3.3") cable, pH 4.01 & pH 7.01 buffer solutions (20 mL sachets), 100 mL plastic beaker, (4) 1.2 AAA rechargeable batteries (inside the instrument), HI 710044 inductive recharger with power adapter, instruction manual and rugged carrying case.

ELECTRODES

HI 1230B	pH electrode, double junction, PEI body, BNC connector, 1 m (3.3') cable
HI 3230B	ORP electrode, gel filled, PEI body, with platinum sensor, BNC connector, 1 m (3.3') cable
HI 7662	Temperature probe

SOLUTIONS

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 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P	pH 10.01 buffer solution, 20 mL sachets (25)
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 76405	Electrode holder



HI 76405 — Electrode Holder

HI 98160

Auto-Endpoint pH Meter

Store and Recall up to 500 Measurements

B.E.P.S. | lcd display | backlight | hold | 2 points | compatible



- *Backlit, dual-level LCD*
- *8 standard buffers for calibration*
- *Store and recall up to 500 measurements*
- *HOLD button to freeze display*
- *Extended pH and temperature ranges*
- *PC compatible through RS232 serial port*
- *Battery Error Prevention System*
- *Supplied ready to use in a hard carrying case*



HI 70300L — Electrode Storage Solution

Auto-Endpoint for Accurate Recording

The portable HI 98160 pH meter greatly simplifies the process of recording measurements with our new Auto-Endpoint feature. This feature automatically enters the HOLD mode when the reading is stable for easy recording of on-screen measurements.

HI 98160 is equipped with automatic calibration at 1 or 2 points (choose from 8 standard buffers) and assures reliable readings over the entire measurement range.

HI 98160 has a backlit display making readings clear even in dark environments.

Users can store information pertaining to each reading at the touch of a button. More than 500 measurements, complete with date and time, can be stored and recalled.

Measurements can also be transferred to the computer via the RS232 serial port, using the optional HI 92000 Windows® compatible software and HI 920011 connection cable.

SPECIFICATIONS		HI 98160
Range	pH	-4.00 to 19.99 pH
	mV	±600.0 mV; ±2000 mV
	Temperature	-20.0 to 120.0°C
Resolution	pH	0.01 pH
	mV	0.1 mV (±400 mV); 0.2 mV (±400 to ±600 mV); 1 mV (outside)
	Temperature	0.1°C (-10 to 120°C); 1°C (below -10°C)
Accuracy (@20°C)	pH	±0.01 pH
	mV	±0.2 mV (±400 mV); ±0.4 mV (±400 to ±600); ±2 mV (outside)
	Temperature	±0.2°C (0 to 70°C); ±1°C (outside) (excluding probe error)
pH Calibration		automatic, 1 or 2 point with 8 standard buffer values (pH 1.68, 3.00, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45)
mV Calibration		automatic, 2 point at 0, 350 mV or 3 point at 0, 350, 1900 mV
Temperature Compensation		automatic or manual, -20 to 120°C (-4 to 248°F)
pH Electrode		HI 1230B/C double junction, gel filled, BNC connector with protective sleeve (included)
Temperature Probe		HI 7662 (included)
PC Connection		through RS232 serial port, using HI 920011 connection cable (optional) and HI 92000 software (optional)
Input Impedance		10^{12} Ohm
Battery Type / Life		(4) 1.5V AA / approx. 300 hours of continuous use (with backlight off)
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4") / 500 g (1.1 lbs.)

ORDERING INFORMATION

HI 98160 is supplied with HI 1230B/C pH electrode, HI 7662 temperature probe, pH 4 and pH 7 buffer sachets, electrode cleaning solution, batteries, rugged carrying case and instructions

ELECTRODES

HI 1230B/C pH electrode, double junction, PEI body, BNC connector with protective sleeve, 1 m (3.3') cable

HI 3230B ORP electrode, gel filled, PEI body, with platinum sensor, BNC connector, 1 m (3.3') cable

HI 7662 Temperature probe

SOLUTIONS

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 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 77400P pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)

ACCESSORIES

HI 92000 Windows® compatible software

HI 920011 RS232 cable for PC connection

HANNA instruments

With Great Products, Come Great Results™

Calibration Check™ pH Meter

Capable of Withstanding Harsh Industrial Conditions

Withstands the Punishment of Heavy Use

HI 9026 is an advanced pH/ORP meter specifically designed to provide affordable and precise results under harsh industrial conditions.

Choose from 7 standard buffer values for pH calibration or program up to 2 custom buffer values to best fit to your application. Utilizing HANNA's advanced Calibration Check™, when calibration is complete, the electrode condition is displayed indicating that either the electrode is working properly or it needs to be cleaned or replaced. Users can also set up a calibration reminder from 1 to 14 days and be alerted when it is time to recalibrate the meter.

HI 9026 is housed in a heavy-duty waterproof casing and can also use ORP electrodes.



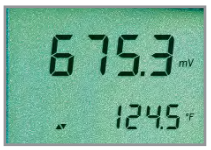
Easy On-screen Guide

Users can select parameters such as sound, auto-off timer, temperature scale, special calibration segments and "Expired Calibration Timer".



Message Alerts

During calibration the HI 9026 continuously checks calibration parameters. This feature alerts the user when the electrode is dirty and could cause erroneous measurements.



Backlit LCD

The backlit LCD allows users to perform measurements in poorly lit locations.



4 7

Tags indicating the pH buffers used for last calibration

SPECIFICATIONS		HI 9026
Range	pH	-2.00 to 16.00 pH
	mV	±699.9 mV; ±1999 mV
	Temperature	-20.0 to 120.0°C / -4.0°F to 248.0°F
Resolution	pH	0.01 pH
	mV	0.1 mV; 1 mV
	Temperature	0.1°C / 0.1 °F
Accuracy (@20°C)	pH	±0.01 pH
	mV	±0.2 mV; ±1 mV
	Temperature	±0.4°C / ±0.8°F
Calibration Check		check of the electrode status during calibration
pH Calibration		automatic, 1 or 2 point with 7 memorized buffer values (pH 1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 2 custom buffers
Temperature Compensation		automatic or manual, -20 to 120°C (-4 to 248°F)
pH Electrode		HI 1230B, double junction, PEI body, gel filled, BNC connector and 1 m (3.3') cable (included)
Temperature Probe		HI 7662 with 1 m (3.3') cable (included)
Input Impedance		10^{12} Ohm
Battery Type / Life		(4) 1.5V AA / approx. 500 hours of continuous use (with backlight off); auto-off after 20 minutes of non-use (can be disabled)
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4") / 500 g (1.1 lbs.)

- *Exclusive Calibration Check™*
- *Backlit, dual-level LCD*
- *pH electrode, temperature probe and hard carrying case included!*
- *Electrode monitoring*
- *7 standard buffers for calibration and 2 custom buffers*
- *Display hold and memory storage*
- *Real time clock for accurate calibration monitoring*
- *User-selectable calibration reminder*
- *Extended pH and temperature ranges*
- *Measures in °C or °F*
- *Stability indicator*
- *Waterproof*

ORDERING INFORMATION

HI 9026 is supplied with HI 1230B pH electrode, HI 7662 temperature probe, pH 4 and pH 7 buffer sachets, 100 mL plastic beaker, batteries, rugged carrying case and instructions.

ELECTRODES

HI 1230B	pH electrode, double junction, PEI body, BNC connector, 1 m (3.3') cable
HI 3230B	ORP electrode, gel filled, PEI body, with platinum sensor, BNC connector, 1 m (3.3') cable
HI 7662	Temperature probe

SOLUTIONS

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 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P	pH 10.01 buffer solution, 20 mL sachets (25)
HI 77400P	pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)

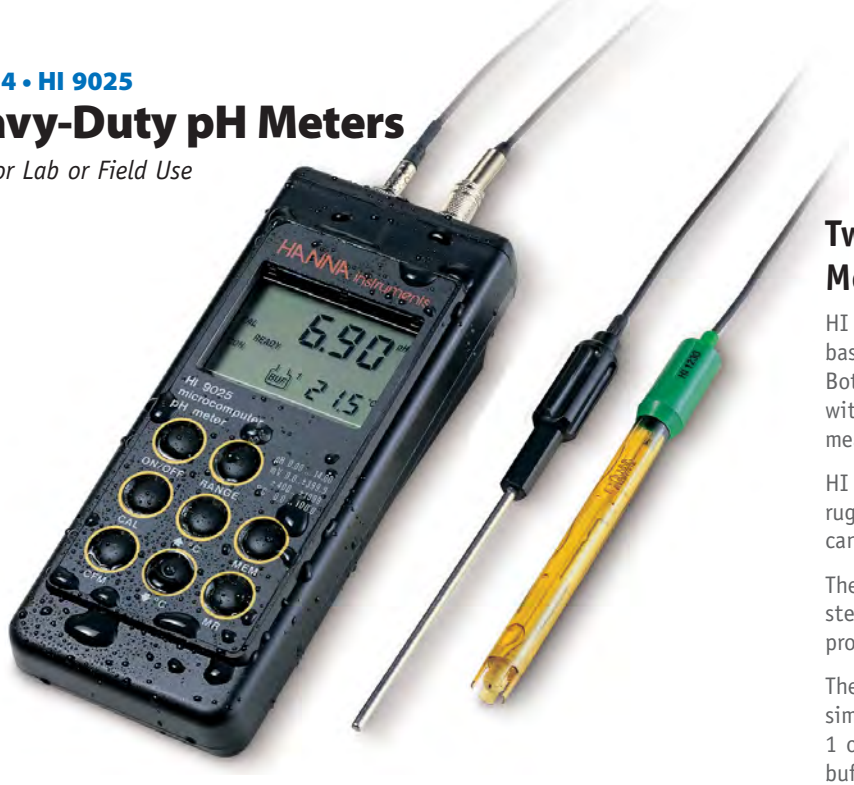


HI 721317 — Carrying Case

HI 9024 • HI 9025

Heavy-Duty pH Meters

Ideal for Lab or Field Use



upgraded · B.E.P.S. · 2 points

Two of our Most Popular Meters!

HI 9024 and HI 9025 are microprocessor-based pH meters in waterproof casings. Both meters measure pH and temperature with the HI 9025 also adding ORP measurement in the mV range.

HI 9024 and HI 9025 are housed in rugged and waterproof ABS casings that can withstand harsh environments.

The HI 9024 and HI 9025 guides the user step-by-step through the calibration process with graphic symbols.

The automatic calibration procedure is simple and quick and can be performed at 1 or 2 points selected from 5 memorized buffers. A stability indicator assures a correct calibration, and to preserve battery life, both meters feature automatic shut-off.

- *5 memorized buffers for calibration*
- *Measures temperature in °C or °F*
- *Automatic pH calibration*
- *Battery Error Prevention System*
- *Supplied ready to use in a hard carrying case*

SPECIFICATIONS		HI 9024	HI 9025
Range	pH	0.00 to 14.00 pH	
	mV	—	±399.9 mV; ±1999 mV
	Temperature	0.0 to 100.0°C / 32.0°F to 212.0°F	
Resolution	pH	0.01 pH	
	mV	—	0.1 mV; 1 mV
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.01 pH	
	mV	—	±0.2 mV; ±1 mV
	Temperature	±0.4°C / ±0.8°F	
pH Calibration		automatic, 1 or 2 point with 5 standard buffer values (pH 4.01, 6.86, 7.01, 9.18, 10.01); offset calibration: ±1 pH; slope calibration: 70 to 108%	
Temperature Compensation		automatic or manual, -5 to 105°C (23°F to 221°F)	
pH Electrode		HI 1230B, double junction, gel filled, BNC connector and 1 m cable (included)	
Temperature Probe		HI 7669/2W with 1 m (3.3') cable (included)	
Input Impedance		10^{12} Ohm	
Battery Type / Life		(4) 1.5V AA / approx. 500 hours of continuous use; auto-off after 20 minutes of non-use (can be disabled)	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions / Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4") / 500 g (1.1 lbs.)	

ORDERING INFORMATION

HI 9024 and **HI 9025** are supplied with HI 1230B double-junction pH electrode, HI 7669/2W temperature probe, pH 4.01 and 7.0 buffer solutions, 20 mL, sample vessel, batteries (4), rugged carrying case and instructions.

ELECTRODES

HI 1230B	pH electrode, double junction, PEI body, BNC connector with 1 m (3.3') cable
HI 3230B	ORP electrode, gel filled, PEI body,BNC connector with 1 m (3.3') cable
HI 7669/2W	Temperature probe

SOLUTIONS

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 77400P	pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

ACCESSORIES

HI 76405	Electrode holder
HI 8427	pH/mV electrode simulator
HI 931001	pH/mV electrode simulator with display



HI 8427 — pH/mV Electrode Simulator



HI 76405 — Electrode Holder

HANNA instruments

With Great Products, Come Great Results™

B.E.P.S. 2 points

HI 9210N

Heavy-Duty pH Meter

with Amplified Sensor

Heavy Duty pH Meter for Around the Plant Tasks

The HI 9210N heavy-duty pH meter is designed to provide laboratory results and accuracy under the harshest of industrial conditions.

HI 9210N is supplied with a rugged pH electrode which incorporates the reference electrode, pH sensitive bulb, temperature sensor and a miniaturized pre-amplifier into a single body. The electrode signal is pre-amplified to give better protection against noise and electromagnetic interference, a common problem in industrial applications.

Calibration is manual and the trimmers are placed behind a protective cover. This assures that the unit can be calibrated at any pH buffer value. The protective cover also keeps the meter watertight and prevents the calibration from being tampered with.

Even though the HI 9210N's battery life is an incredible 2000 hours, a low-voltage indicator appears on the screen to alert the user that there is only 20 hours of battery life left. Afterwards, the BEPS (Battery Error Prevention System) will stop any false readings by shutting the meter off.

- *2,000 hour battery life*
- *Equipped with B.E.P.S. (Battery Error Prevention System)*
- *Amplified Sensor for better noise protection*





HI 721317 — Carrying Case

SPECIFICATIONS		HI 9210N
Range	pH	0.00 to 14.00 pH
	Temperature	0.0 to 70.0°C
Resolution	pH	0.01 pH
	Temperature	0.1°C
Accuracy (a 20°C)	pH	±0.02 pH
	Temperature	±0.5°C
pH Calibration		manual, 2 point, through offset and slope trimmers
	Offset Calibration	±1 pH
	Slope Calibration	85 to 105%
Temperature Compensation		automatic, 0 to 70°C (32 to 158°F)
pH Electrode		HI 1217D, with built-in temperature sensor and amplifier, gel filled, DIN connector and 1 m (3.3') cable (included)
Input Impedance		10^{12} Ohm
Battery Type / Life		(4) 1.5V AA / approx. 2000 hours of continuous use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4") / 500 g (1.1 lbs.)

ORDERING INFORMATION

HI 9210N is supplied with HI 1217D pH electrode with internal temperature sensor, batteries and instructions

ELECTRODES

HI 1217D pH electrode with temperature sensor, amplifier and DIN connector with 1 m (3.3') cable

SOLUTIONS

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 77400P pH 4 and pH 7 buffer sachets, (10) 20 mL, (5)

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 721317 Rugged carrying case

HI 76405 Electrode holder

HI 8424

Slim pH Meter

Waterproof with Automatic Calibration & Temperature Compensation

upgraded · B.E.P.S. · lcd display · audible · hold · 2 points



Top Performance in a Sleek, Lightweight Design

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 and temperature measurements with high accuracy and fast response.

The mV measurements auto-range and change resolution from 0.1 to 1 mV when readings reach ±699.9 mV.

pH slope changes due to temperature variation are automatically or manually compensated for, from -20 to 120°C (-4.0 to 248.0°F).

The meter has 3 standard buffer values (pH 4.01, 7.01, 10.01), and automatic buffer recognition to avoid errors during calibration. When powered on, the percentage of remaining battery life is indicated on the display pannel.

The HOLD function can freeze the reading on the display to be manually recorded at a more convenient time.

Choose from °C or °F. Users can enable or disable the Auto-off feature, the acoustic signal and the back-lit display. In addition, HI 8424 indicates the buffer values used for the most recent calibration.

- *Small form and lightweight*
- *Battery life displayed on LCD*
- *Auto shut-off*

SPECIFICATIONS

SPECIFICATIONS		HI 8424
Range	pH	-2.00 to 16.00 pH
	mV	±699.9 mV; ±1999 mV
	Temperature	-20.0 to 120.0°C / -4.0 to 248.0°F
Resolution	pH	0.01
	mV	0.1 mV; 1 mV
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.01
	mV	±0.2 mV; ±1 mV
	Temperature	±0.4°C / ±0.8°F
pH Calibration		automatic, 1 or 2 point with 3 memorized buffer values (pH 4.01, 7.01, 10.01)
	Offset Calibration	±1 pH
	Slope Calibration	75 to 110%
Input Impedance		10^{12} Ohm
Temperature Compensation		automatic, -20 to 120°C (-4 to 248°F) or manual without temperature probe
pH Electrode		HI 1230B, double junction, gel filled PEI body, BNC connector, 1 m cable (included)
Temperature Probe		HI 7662 with 1 m cable (included)
Battery Type / Life		9V / approx. 150 hours of continuous use; auto-off after 20 minutes of non-use or disabled (user-selectable)
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		164 x 76 x 45 mm (6.5 x 3.0 x 1.8") / 180 g (6.3 oz.)

ORDERING INFORMATION

HI 8424 is supplied with HI 1230B pH electrode, HI 7662 temperature probe, calibration and cleaning solutions, battery, protective case and instructions

ELECTRODES

HI 1230B	pH electrode, gel filled, PEI body, BNC connector with 1 m (3.3') cable
HI 1332B	ORP electrode, gel filled, PEI body, BNC connector with 1 m (3.3') cable
HI 7662	Temperature probe

SOLUTIONS

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 70300L	Electrode storage solution, 500 mL

ACCESSORIES

HI 710015	Shockproof rubber boot, blue
HI 710016	Shockproof rubber boot, orange
HI 710022	Spare protective case
HI 76405	Electrode holder
HI 8427	pH/mV electrode simulator
HI 931001	pH/mV electrode simulator with display



HI 710015 — Shockproof Boot

HANNA instruments

With Great Products, Come Great Results™

HI 8915

pH/mV/°C Meter

with Recorder Output

Attach a plotter or recorder directly

HI 8915 is a handheld pH meter with Automatic Temperature Compensation. This portable instrument combines accurate pH measuring with recorder output.

For a hard copy of the measured values, two recorder output terminals on the front panel make it possible to attach a plotter or recorder directly to the meter.

The large LCD displays a pH or mV to indicate the operational mode in use.

Pressing the 'HOLD' key will freeze the reading on the display. Calibration is performed simply through two trimmers on the front panel.

The HI 721311 optional accessory kit includes a rugged carrying case, pH 4 and pH 7 buffer solutions and screwdriver.

- *HOLD feature to "freeze" current readings on the LCD display*
- *Manual calibration*
- *pH electrode and temperature probe included*





HI 721311 — Carrying Case

SPECIFICATIONS		HI 8915
Range	pH	0.00 to 14.00 pH
	mV	-1999 to +1999 mV
	Temperature	0.0 to 100.0°C
Resolution	pH	0.01 pH
	mV	1 mV
	Temperature	0.1°C
Accuracy (@20°C)	pH	±0.01 pH
	mV	±1 mV
	Temperature	±0.5°C
pH Calibration		manual, 2 point, through offset and slope trimmers
	Offset Calibration	±1 pH
	Slope Calibration	85 to 105%
Temperature Compensation		automatic, 0 to 70°C (32 to 158°F) or fix at 25°C (77°F) without temperature probe
pH Electrode		HI 1230B, double junction, gel filled, BNC connector and 1 m cable (included)
Temperature Probe		HI 7669AW with 1 m cable (included)
Input Impedance		10^{12} Ohm
Recorder Output		100 mV/pH; 1 mV/mV; 10 mV/°C
Battery Type / Life		(1) 9V / approx. 100 hours of continuous use
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight		185 x 82 x 53 mm (7.3 x 3.2 x 2.1") / 265 g (9.3 oz.)

ORDERING INFORMATION

HI 8915 is supplied with HI 1230B pH electrode, HI 7669AW temperature probe, calibration screwdriver, battery and instructions.

ELECTRODES

HI 1230B pH electrode, gel filled, PEI body, BNC connector with 1 m (3.3') cable

HI 1332B ORP electrode, gel filled, PEI body, BNC connector with 1 m (3.3') cable

HI 7669AW Temperature probe

SOLUTIONS

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 70300L Electrode storage solution, 500 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 710001 Soft carrying case

HI 721311 Rugged carrying case

HI 76405 Electrode holder

HI 8427 pH/mV electrode simulator

HI 931001 pH/mV electrode simulator with display

HI 83140 • HI 8314 • HI 83141

pH/mV/Temperature Meter

with Clean & Cal and Fail Safe Technology



SPECIFICATIONS		HI 83140	HI 8314	HI 83141
Range	pH	0.00 to 14.00 pH		
	mV	±1999 mV		
	Temperature	0.0 to 100.0°C		
Resolution	pH	0.01 pH		
	mV	1 mV		
	Temperature	0.1°C		
Accuracy (@20°C)	pH	±0.01 pH		
	mV	±1 mV		
	Temperature	±0.4°C (excluding probe error)		
pH Calibration		manual, 2 point, through trimmers (offset ±1 pH; slope: 85 to 105%)		
Clean & Cal technology		Yes	N/A	N/A
Temperature Compensation		automatic, 0 to 70°C (32 to 158 °F)		
pH Electrode		HI 1217-6 with internal temperature sensor, DIN connector and 1 m cable (included)	HI 1217D pH electrode, double junction, gel filled, with internal temperature sensor, DIN connector and 1 m cable (included)	HI 1230B pH electrode (included) and HI 7669AW temperature probe, BNC connector (included)
Input Impedance		10^{12} Ohm		
Battery Type / Life		(1) 9V / approx. 100 hours of continuous use		
Environment		0 to 50°C (32 to 122°F); RH max 95%		
Dimensions / Weight		164 x 76 x 45 mm (6.5 x 3.0 x 1.8") / 180 g (6.3 oz.)		

Make Sure Your Electrode is a Top Performer!

Environmental or mechanical problems often affect pH measurements. Typically, in these conditions, pH meters give a false pH 7 reading. In most applications, pH 7 is the expected value, therefore the user is not aware of the problem.

Examples of a false pH 7 reading:

- the glass bulb of the pH electrode is broken
- loss of signal (up to hundreds of Meg ohms) of the electrode/meter connection cable, due to environmental humidity
- cable or connector short circuit

To prevent erroneous readings due to system failures, HANNA presents the HI 83140. Should any of the above listed problems occur, HI 83140 will read pH 4. Since the user is not expecting this value, they will be immediately warned about the system performance.

The Clean and Cal function helps avoid a systematic measurement error due to the calibration of a dirty pH electrode. Simply immerse the electrode in the HI 50021 Check solution and press the Check button: if the green LED lights up, you're good to go, if the red LED turns on, the probe needs cleaning before being calibrated.

HI 83140 and **HI 8314** uses pH electrodes with a DIN connector and internal temperature sensor.

HI 83140 also features Clean and Cal Technology.

HI 83141 is provided with separate connectors for a pH electrode (BNC) and temperature probe.

ORDERING INFORMATION

HI 83140 is supplied with HI 1217-6 pH electrode, pH 4 and pH 7 buffer sachets, HI 700661 cleaning solution 20 mL sachet (2), HI 50021 check solution 20 mL sachet (2), calibration screwdriver, battery, protective case and instructions.

HI 8314 is supplied with HI 1217D pH electrode, calibration and cleaning solutions, calibration screwdriver, battery, protective case and instructions.

HI 83141 is supplied with HI 1230B pH electrode, HI 7669AW temperature probe, calibration and cleaning solutions, calibration screwdriver, battery, protective case and instructions.

ELECTRODES

HI 1217-6	Combination pH electrode with internal temperature sensor, DIN connector and 1 m (3.3') cable
HI 1217D	Combination pH electrode, gel filled, double junction, internal temperature sensor, DIN connector and 1 m (3.3') cable
HI 1230B	pH electrode, gel filled, double junction, PEI body, BNC connector and 1 m (3.3') cable

SOLUTIONS

HI 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 50021P	Check solution, 20 mL sachets (25)
HI 700661P	Electrode cleaning solution, 20 mL sachets (25)

ACCESSORIES

HI 76405	Electrode holder
HI 8427	pH/mV electrode simulator
HI 931001	pH/mV electrode simulator with display
HI 710015	Shockproof rubber boot, blue
HI 710016	Shockproof rubber boot, orange
HI 710022	Spare protective case
HI 7669AW	Temperature probe

HANNA instruments

With Great Products, Come Great Results™

Educational pH Meter

for Schools and Universities

The Ideal Teaching Tool

HI 8010 and HI 8014 are rugged, hand-held pH meters specifically designed with ease of use in mind. These affordable meters are ideal for education and field applications.

HI 8010 and HI 8014 perform pH measurements with manual temperature compensation. HI 8014 also performs ORP measurements. Users can easily select between the different measurement modes: pH, ORP or temperature compensation, depending on the model. 2-point calibration can be performed with trimmers on the front panel. The set values are stored even when the meter is shut off.

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

- *Manual calibration*
- *Easy mode selection*
- *Rugged to withstand heavy use*



SPECIFICATIONS		HI 8010	HI 8014
Range	pH	0.00 to 14.00 pH	
	mV	—	-1999 to +1999 mV
Resolution	pH	0.01 pH	
	mV	—	1 mV
Accuracy (@20°C)	pH	±0.01pH	
	mV	—	±1 mV
pH Calibration		manual, 2 point, through trimmers (offset ±1 pH; slope: 85 to 105%)	
Temperature Compensation		manual, 0 to 100°C (32 to 212°F)	
pH Electrode		HI 1230B, combination, double junction, BNC connector, 1 m cable (included)	
Input Impedance		10^{12} Ohm	
Battery Type / Life		(1) 9V / approx. 100 hours of continuous use	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions / Weight		185 x 82 x 53 mm (7.3 x 3.2 x 2.1") / 265 g (9.3 oz.)	



HI 710010 — Shockproof Boot



HI 710001 — Soft Carrying Case

ORDERING INFORMATION

HI 8010 and **HI 8014** are supplied with HI 1230B pH electrode, battery and instructions.

ELECTRODES

HI 1230B pH electrode, double junction, PEI body, BNC connector with 1 m (3.3') cable

HI 1332B pH electrode, double junction, PEI body, refillable with BNC connector and 1 m (3.3') cable

HI 3230B ORP electrode, gel filled, BNC connector with 1 m (3.3') cable

SOLUTIONS

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 77400P pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)

HI 70300L Electrode storage solution, 500 mL

HI 7082 3.5M KCl Refilling electrolyte solution for double junction electrodes, 30 mL bottle (4)

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 710001 Soft carrying case

HI 721311 Rugged carrying case

HI 76405 Electrode holder

HI 8427 pH/mV electrode simulator

HI 931001 pH/mV electrode simulator with display

USB compatible

HI 4221 • HI 4222 • HI 4521 • HI 4522

Research Grade pH Meters

with Color Display



Research Grade, Professional Benchtop Instruments

HANNA's new family of research grade laboratory benchtop instruments feature a 240 x 320 dot-matrix color display with on-screen help, simultaneous graphing, language selection and custom configuration.

HANNA's research grade pH meters feature a 5 point calibration with a choice of custom or standard buffers and provide the user with the exclusive Calibration Check™ diagnostic system. ISE models allow direct calibration and measurement with a choice of units as well as incremental methods.

Our new HI 4522 pH/ISE/EC and HI 4521 pH/EC meters also feature resistivity, TDS and salinity measuring scales. EC has an extended range from 0.001 µS/cm to 1 mS/cm with auto recognition of the probe type used. Salinity measurements can be displayed in practical salinity, percent salinity and natural sea water.

Models that incorporate conductivity measurement (including HI 4321 in our conductivity section) feature United States Pharmacopia (USP <645>) modes for stage 1, 2 or 3 validation. Temperature compensation can be either linear or natural water.

All models are equipped with USB and RS232 ports for PC connectivity and offer logging, graphing and GLP capabilities.



HI 4522 *HI 4521* *HI 4222* *HI 4221*

HI 9214

Stick pH and Temperature Meter





Easily replaceable pH electrode

Designed for Maximum Portability

HI 9214 is a compact, stick-type, microprocessor-based pH/°C meter designed to be easily carried anywhere.

HI 9214 features are: interchangeable plastic-body electrode, simple controls on the front panel, low battery detector, simple calibration procedure and lightweight ABS plastic housing.

The HI 12170 pH-electrode has a built-in temperature sensor for quick and accurate temperature measurements and automatic temperature compensation.

The meter has three buffer values (pH 4.01, pH 7.01, pH 10.01) and automatic buffer recognition to avoid errors during calibration. There are no trimmers making calibration an easy process, even for non-technical personnel.

The electrode screws directly onto the meter's housing without requiring cables or separate temperature probes.

The electrode PEI body is rugged and will stand up to the effects of most chemicals in the lab and industry.

- *Built-in temperature sensor*
- *Automatic Temperature Compensation*
- *HOLD button to freeze readings*

SPECIFICATIONS

		HI 9214
Range	pH	-2.00 to 16.00
	Temperature	-5.0 to 70.0°C
Resolution	pH	0.01 pH
	Temperature	0.1°C
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C
pH Calibration		automatic, 1 or 2 point with auto buffer recognition (pH 4.01, 7.01, 10.01)
Temperature Compensation		automatic, -5 to 70°C (23 to 158°F)
pH Electrode		HI 12170, PEI body, gel filled, with internal temperature sensor and screw connector (included)
Input Impedance		10^{12} Ohm
Battery Type / Life		1 x 9V / approx. 700 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight		185 x 42 x 26 mm (7.3 x 1.7 x 1.0") / 160 g (5.6 oz.)

ORDERING INFORMATION

HI 9214 is supplied with HI 12170 pH electrode, battery, soft carrying case and instructions.

ELECTRODES

HI 12170 pH electrode, gel-filled with internal temp sensor and screw connector for HI 9214

SOLUTIONS

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 77400P pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5)
HI 70300L Electrode storage solution, 500 mL

ACCESSORIES

HI 710003 Soft carrying case



HI 710003 — Soft Carrying Case

HANNA instruments

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2 points | hold | audible | B.E.P.S. | lcd display | check electrode

HI 991003 • HI 991002 • HI 991001

Extended Range pH Meters

with Amplified pH Electrode

No-nonsense Approach to pH Measurement

HI 991003 is the first pH meter that can measure pH, pH-mV (to check the electrode status), ORP and temperature with only one probe.

HI 991003 is largely used to control plating bath wastewater, swimming pool water quality and potable water sanitizing processes.

HI 991003 is provided with our unique Sensor Check™ feature that allows the user to establish pH probe status before performing measurements.

HI 991002 reads pH, ORP and temperature

HI 991001 reads pH and temperature.

- *Simultaneously measures pH and ORP (HI 991002 and HI 991003)*
- *Sensor Check™ Technology (HI 991003)*
- *Extended pH range*
- *Waterproof casing*
- *1500 hour battery life (approx.)*



Probe features an unbreakable stainless steel casing



HI 710008 — Shockproof Boot

SPECIFICATIONS		HI 991001	HI 991002	HI 991003
Range	pH	-2.00 to 16.00		
	pH-mV	—	—	±825 mV
	ORP	—	±1999 mV	
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F		
Resolution	pH	0.01 pH		
	pH-mV	—	—	1 mV
	ORP	—	1 mV	
	Temperature	0.1°C / 0.1°F		
Accuracy (@20°C)	pH	±0.02 pH		
	pH-mV	—		±1 mV
	ORP	—	±2 mV	
	Temperature	±0.5°C (up to 60°C), ±1°C (outside) / ±1.0°F (up to 140°F), ±2°F (outside)		
pH Calibration		automatic, 1 or 2 point with 2 sets of memorized buffers (pH 4.01/7.01/10.01 or 4.01/6.86/9.18)		
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)		
Probe		HI 1296D amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)	HI 1297D, amplified, combination pH/ORP probe with internal temperature sensor, DIN connector and 1 m (3.3') cabble (included)	
Battery Type / Life		(3) 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use		
Environment		0 to 50°C (32 to 122°F); RH max 100%		
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)		

ORDERING INFORMATION

HI 991003 and **HI 991002** are supplied with HI 1297D pH/ORP probe with internal temperature sensor, pH 4 and pH 7 buffer sachets, HI 700661 electrode cleaning solution (2) 20 mL, batteries, rugged carrying case and instructions.

HI 991001 is supplied with HI 1296D pH probe with internal temperature sensor, pH 4 and pH 7 buffer sachets, HI 700661 electrode cleaning solution (2) 20 mL, batteries, rugged carrying case and instructions.

ELECTRODES

HI 1297D Combination pH/ORP probe with internal temperature sensor, amplifier, DIN connector and 1 m (3.3') cable

HI 1296D Combination pH probe with internal temperature sensor, amplifier, DIN connector and 1 m (3.3') cable

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 77400P pH 4 and pH 7 buffer solution, (10) 20 mL sachets, (5 ea.)

HI 70300L Electrode storage solution, 500 mL

HI 7061L Electrode cleaning solution, 500 mL

HI 7020L 200/275 mV test solution, 500 mL

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 99131

Plating Bath pH Meter

with Flat-tipped, Titanium Cage, Amplified pH/Temperature Electrode





Probe features an unbreakable titanium casing

Built Tough for Industrial Applications

HI 99131 is a waterproof, portable pH and temperature meter ideal for use in plating baths. HI 62911 double junction pH probe (included) utilizes proven recessed flat-tip technology for long-life. The recessed flat tip is easy to clean and prevents solids in solutions from collecting on the sensor.

The titanium body functions as a potential matching pin for increased stability of readings and an extended sensor life. The probe tip incorporates an annular PTFE junction that maximizes surface contact to enhance response and stability. Additionally, the integrated temperature sensor eliminates the need for an external probe. A mini pre-amplifier incorporated into the electrode renders the meter impervious to noise and interferences.

The meter reads from -2.00 to 16.00 pH, while simultaneously showing the temperature in °C or °F. Graphic icons guide operations and a stability indicator with hold feature, determine when to freeze the reading for easy record keeping. Calibration is performed automatically at one or two points, selectable by the user between 2 memorized buffer sets.

Battery life is over 1500 hours and, at startup, the LCD shows the remaining battery power. In addition, BEPS (Battery Error Prevention System) prevents inaccurate readings due to low voltage and an 8 minute auto-off feature saves battery life.

- *Flat-tipped pH electrode is encased in a titanum body for maximum protection and shielding*
- *Easy 2 button operation*
- *1500 hour battery life (approx.)*

SPECIFICATIONS		HI 99131
.Range	pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C (up to 60°C), ±1°C (outside) ±1.0°F (up to 140°F), ±2°F (outside)
pH Calibration		automatic, 1 or 2 point with 2 sets of memorized buffers (pH 4.01/7.01/10.01 or 4.01/6.86/9.18)
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)
pH Probe		HI 62911D, amplified, with titanium cage, internal temperature sensor and Matching-Pin (included)
Battery Type / Life		3 x 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99131 is supplied with HI 62911D pH/temperature probe, 1.5V AA alkaline batteries (3), instruction manual and plastic carrying case.

ELECTRODES

HI 62911D pH probe, double junction, with titanium cage

SOLUTIONS

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 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)
HI 70300L Electrode storage solution, 500 mL
HI 700661 Electrode cleaning solution, 20 mL sachets (25)

ACCESSORIES

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange



HI 710007 — Shockproof Boot

HANNA instruments

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HI 99141

Boiler and Cooling Tower pH Meter

with Flat-tipped, Titanium Cage, Amplified pH/Temperature Electrode

Accuracy and Reliability on the Job

HI 99141 is a waterproof, portable pH and temperature meter, specifically designed for boiler and cooling tower applications.

HI 72911 double-junction pH probe (included) has a flat tip sensor in an unbreakable stainless steel body. The flat tip sensor is easy to clean and prevents solids in solutions from collecting on the sensor. This probe features a large annular PTFE junction for maximum surface contact which provides increased response and stability. This advanced electrode also contains an integral temperature sensor and a pre-amplifier to reduce electrode noise and intererence.

The meter reads from -2 to 16 pH, while simultaneously showing the temperature in °C or °F. Graphic icons guide operations. A stability indicator with HOLD feature determines when to freeze the reading for easy record keeping.

Calibration is performed automatically at one or two points with standard or NIST calibration buffers. Battery life is over 1500 hours and at startup, the LCD displays the remaining battery power. In addition, BEPS (Battery Error Prevention System) prevents bad readings due to low voltage. To save battery life, the HI 99141 incorporates an auto-off period at 8 minutes to save battery life.

- *Flat-tipped pH electrode is encased in a stainless steel body for maximum protection*
- *Easy 2 button operation*
- *1500 hour battery life (approx.)*
- *Waterproof*



Probe features an unbreakable stainless steel casing

SPECIFICATIONS		HI 99141
Range	pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C (up to 60°C), ±1°C (outside) ±1.0°F (up to 140°F), ±2°F (outside)
pH Calibration		automatic, 1 or 2 point with 2 sets of standard buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)
pH Probe		HI 72911D, pre-amplified, AISI 316 stainless steel body with internal temperature sensor (included)
Battery Type / Life		(3) 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)



ORDERING INFORMATION

HI 99141 is supplied with HI 72911D pH/temperature probe, (3) 1.5V AA alkaline batteries, instruction manual and plastic carrying case.

ELECTRODES

HI 72911D pH probe, double junction, with AISI 316 stainless steel body

SOLUTIONS

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 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)
HI 70300L Electrode storage solution, 500 mL
HI 700661 Electrode cleaning solution, 20 mL sachets (25)

ACCESSORIES

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange

HI 99171

Leather and Paper pH Meter

with Specially Designed Flat Tipped Probe



Production and Packing Area Portablility

Direct pH measurement on paper and leather is fast and accurate with the HI 99171 pH meter, HI 99171 utilizes a flat tip probe designed to optimize surface contact with the sample.

pH measurement of papers and cartons is important, not only in the production phase, but also in the packaging phase.

The food industry, for example, performs many compatibility tests; one of these is pH.

Measurements are automatically compensated for the effects of temperature and the LCD continuously displays the samples current temperature. All operations can be simply performed with 2 buttons; messages and symbols are displayed to guide the user through measurement and calibration procedures.

pH and temperature ranges are extended, from -2.00 to 16.00 pH and -5.0 to 105.0 °C, respectively. Calibration is automatic at 1 or 2 points, selectable by the user between 2 standard buffer sets.

Battery life is more than 1500 hours and the percent of remaining charge is displayed while the meter is on. HI 99171 turns off automatically after 8 minutes of inactivity.

- *Extended pH range*
- *Simple 2 button operation*
- *Measurement and calibration on-screen guides*
- *1500 hour battery life (approx.)*
- *Auto shut-off*

SPECIFICATIONS		HI 99171
Range	pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C (up to 60°C), ±1°C (outside) ±1.0°F (up to 140°F), ±2°F (outside)
pH Calibration		automatic, 1 or 2 point with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)
pH Electrode		HI 1414D, pre-amplified, flat tip, with internal temperature sensor (included)
Battery Type / Life		(3) 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99171 is supplied with HI 1414D pH/temperature probe, HI 70004 pH 4.01 buffer 20 mL, HI 70007 pH 7.01 buffer 20 mL, HI 700680 cleaning solution for cellulose deposits 20 mL (2), HI 70960 conductive electrolyte solution for pH measurement 30 mL, 1.5V AA alkaline batteries (3) and instruction manual

ELECTRODES

HI 1414D pre-amplified pH electrode with flat tip, internal temperature sensor and DIN connector

SOLUTIONS

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 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)
HI 77400P pH 4 and pH 7 buffer solution, 20 mL sachets (5 ea.)
HI 70300L Electrode storage solution, 500 mL
HI 70960 Electrolyte solution for sample preparation, 30 mL
HI 700680P Cleaning solution for cellulose deposits, 20 mL sachets (25)

ACCESSORIES

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange



HI 710007 — Shockproof Boot

HANNA instruments

With Great Products, Come Great Results™

A Complete Kit for Direct Soil Measurement

The HI 99121 kit has been designed to measure pH directly in soil accurately and quickly. Every item in this kit has been made to facilitate measurements in the field without compromising accuracy. With HI 99121 you can test both 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 HI 1292D pH electrode has been specifically designed for direct soil measurement. It has a conical, rugged tip and can be directly inserted in moist or soft soil. The electrode incorporates a temperature sensor right near the tip to enable it to measure and quickly compensate for temperature.

Use the specially made HI 7051M soil preparation solution for higher degrees of accuracy, or for stony ground where the electrode may be damaged. This solution is included in the package to help you measure pH more precisely by diluting the soil sample.

The dual-level LCD shows the pH value from -2 to 16 with 0.01 resolution. It simultaneously displays the temperature on the secondary level. With a menu-driven custom microprocessor, users are guided by clear prompts during operation and calibration.

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



HI 700663P — Electrode Cleaning Solution



SPECIFICATIONS		HI 99121
Range	pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C (up to 60°C), ±1°C (outside) ±1.0°F (up to 140°F), ±2°F (outside)
pH Calibration		automatic, 1 or 2 point with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)
pH Electrode		HI 1292D, refillable, glass body, with internal temperature sensor, DIN connector and 1 m cable (included)
Battery Type / Life		(3) 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99121 is supplied with HI 1292D pH electrode, HI 721319 soil auger, HI 7051M soil preparation solution, pH 4.01 buffer solution (20 mL), pH 7.01 buffer solution (20 mL), hard carrying case and 100 ml plastic beaker.

ELECTRODES

HI 1292D pH electrode for soil measurement, with internal temperature sensor and DIN connector

SOLUTIONS

HI 7004L pH 4.01 buffer solution, 500 mL
HI 7007L pH 7.01 buffer solution, 500 mL
HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 7071 Electrolyte solution, 30 mL (4)
HI 7051M Soil preparation solution, 250 mL
HI 700663P Cleaning solution for inorganic soil deposits, 20 mL sachets (25)
HI 700664P Cleaning solution for organic soil deposits, 20 mL sachets (25)

ACCESSORIES

HI 721319 Ground auger
HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange

HI 99161

Food and Dairy pH Meter

Waterproof for Dairy Products



Specifically Designed for the Food Sector

HI 99161's waterproof casing provides excellent protection from the water and humidity typically present in the food industry.

HI 99161 is supplied with the FC 202D pH electrode with built-in temperature sensor—specially designed for use with food and semi-solids. This electrode features a rugged, easy to clean, PVDF body that tapers to a strong conical tip ideal for semisolid applications such as meats and cheeses. The electrode has a free diffusion reference junction which prevents the typical problems of clogging in viscous and semisolid samples.

The electrolyte used in the FC 202D electrode is free from poisonous silver chloride, which prevents contamination of the sample.

HI 99161 allows automatic calibration at either NIST or standard buffer sets with auto recognition and a stability indicator.

The temperature is continuously displayed on the secondary level of the large LCD.

The meter runs on common 1.5 AA type batteries and the LCD provides battery level at startup

- *pH Probe with built-in temperature sensor*
- *Easy to clean probe resists clogging*
- *Easy dual button operation*
- *1500 hour battery life (approx.)*

SPECIFICATIONS	HI 99161
Range	0.00 to 14.00 pH 0.0 to 60.0°C; 32.0 to 140.0°F
Resolution	0.01 pH; 0.1°C; 0.1°F
Accuracy	±0.01 pH; ±0.1°C; ±0.2°F
pH Calibration	automatic, 1 or 2 point with 2 sets of standard pH buffers (pH 4.01/7.01/10.01 or 4.01/6.86/9.18)
Temperature Compensation	automatic, 0 to 60°C (32 to 140°F)
pH Electrode	FC 202D, with DIN connector and 1 m (3.3') cable (included)
Battery Type / Life	(4) 1.5V AAA / approx. 1000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight	150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99161 is supplied with FC 202D pH electrode with built-in temperature sensor, DIN connector and conical tip designed for the food industry.

ELECTRODES

FC 202D	Amplified pH electrode with built-in temperature sensor, DIN connector and 1 m (3.3') cable

SOLUTIONS

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 700630L	Acid cleaning solution for meat grease and fats, 500 mL
HI 700631L	Alkaline cleaning solution for meat grease and fats, 500 mL
HI 700641P	Cleaning & disinfection sol. for dairy products, 20 mL sachets (25)
HI 700642P	Cleaning solution for cheese deposits, 20 mL sachets (25)

ACCESSORIES

HI 710007	Shockproof rubber boot, blue
HI 710008	Shockproof rubber boot, orange
HI 721312	Rugged carrying case



HI 710007 — Shockproof Boot

HANNA instruments

With Great Products, Come Great Results™

2 points | hold | audible | lcd display | COMPLIANT HACCP | B.E.P.S.

HI 99163

Meat pH Meter

with a pH Probe and Stainless Steel Penetration Blade

Fast and Accurate Internal and Surface Measurements

HI 99163 is a specific instrument for the pH analysis of meat products. With only 2 buttons this pH meter is simple to use. All necessary information is clearly displayed on the LCD.

Beside displaying pH and temperature, the LCD of the HI 99163 also indicates the reading stability and battery level at startup.

Calibration is automatic at 1 or 2 points that is selectable between 2 recognized buffer sets.

The specially designed FC 232D electrode incorporates many essential features to perform accurately and reliably without damaging the sample. FC 232D's external body material is non-toxic and food compatible. The replaceable penetration blade allows the user to insert the probe into the meat. The FC 232D's probe body has an external thread to securely screw on the stainless steel penetration blade.

This ideal meat probe features a built-in temperature sensor with automatic temperature compensation and an open junction to avoid a clogged reference.

- *pH Probe with built-in temperature sensor*
- *Easy to clean probe resists clogging*
- *Stainless Steel penetration blade for probe included*
- *1500 hour battery life (approx.)*



SPECIFICATIONS		HI 99163
Range	pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C (up to 60°C), ±1°C (outside) ±1.0°F (up to 140°F), ±2°F (outside)
pH Calibration		automatic, 1 or 2 point with 2 sets of memorized buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)
pH Electrode		FC 232D, amplified, food compatible body material, built-in temperature sensor, thread for blade insertion (included)
Battery Type / Life		(3) 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99163 is supplied with FC 232D amplified pH/temperature probe with stainless steel blade tip, DIN connector and 1 m (3.3') cable, pH 4.01 buffer (20 mL), pH 7.01 buffer (20 mL), (2) HI 700630 Acid cleaning solution for meat grease and fats (20 mL), (3) 1.5V AA alkaline batteries and instruction manual.

ELECTRODES

FC 232D Pre-amplified pH electrode with food compatible body, built-in temperature sensor and thread for blade insertion

FC 098 20 mm stainless steel blade for FC 232D electrode

FC 099 35 mm stainless steel blade for FC 232D electrode

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachet (25)

HI 7004L pH 4.01 buffer solution, 500 mL

HI 70006P pH 6.86 buffer solution, 20 mL sachet (25)

HI 7006L pH 6.86 buffer solution, 500 mL

HI 70007P pH 7.01 buffer solution, 20 mL sachet (25)

HI 7007L pH 7.01 buffer solution, 500 mL

HI 70300L Storage solution, 500 mL

HI 7061L General purpose cleaning solution, 500 mL

HI 700630P Acid cleaning solution for meat grease and fats, 20 mL sachet (25)

HI 70630L Acid cleaning solution for meat grease and fats, 500 mL

HI 70631L Alkaline cleaning sol. for meat grease and fats, 500 mL

HI 70632L Cleaning & disinfection solution for blood products, 500 mL

ACCESSORIES

HI 710007 Shockproof rubber boot, blue

HI 710008 Shockproof rubber boot, orange

HI 721312 Rugged carrying case



HI 721312 — Carrying Case

HI 99181

Skin pH Meter

with Flat-tipped Probe





Measure pH Directly on Skin

HI 99181 is a new pH meter from HANNA, specifically designed for skin analysis. Essential for labs researching the biological compatibility of cosmetics and pharmaceuticals, HI 99181 provides affordable, fast, simple measurements without compromising precision.

HI 1414D/50 has a special flat tip electrode that permits perfect contact between probe and sample. Equipped with a built-in temperature sensor, pH values are adjusted for Nernst slope temperature effects. The calibration is automatic at 1 or 2 points, selectable between 2 standard buffer sets. It features an automatic step-by-step guide to calibration, enhanced with easy to understand messages and symbols.

The reading can be captured on the display with the HOLD button. The user can select not only the pH calibration buffer set, but also the temperature measurement unit (°C or °F). This laboratory instrument measures wide pH and temperature ranges, from -2.00 to 16.00 pH, and from -5.0 to 105.0 °C.

Battery life is more than 1500 hours and is displayed at startup as a percentage. HI 99181 turns itself off after 8 minutes of inactivity.

- *Extended pH range*
- *Simple 2 button operation*
- *Specially designed flat-tipped skin probe*
- *1500 hour battery life (approx.)*
- *Auto shut-off*

SPECIFICATIONS		HI 99181
Range	pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 105.0°C / 23.0 to 221.0°F
Resolution	pH	0.01 pH
	Temperature	0.1°C / 0.1°F
Accuracy (@20°C)	pH	±0.02 pH
	Temperature	±0.5°C (up to 60°C), ±1°C (outside) ±1.0°F (up to 140°F), ±2°F (outside)
pH Calibration		automatic, 1 or 2 point with 2 sets of standard buffers (pH 4.01, 7.01, 10.01 or 4.01, 6.86, 9.18)
Temperature Compensation		automatic, -5 to 105°C (23 to 221°F)
pH Electrode		HI 1414D/50, pre-amplified, flat tip, with internal temperature sensor, 50 mm (2.0") long body (included)
Battery Type / Life		3 x 1.5V AA / approx. 1500 hours of continuous use; auto-off after 8 minutes of non-use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210 g (7.4 oz.)

ORDERING INFORMATION

HI 99181 is supplied with HI 1414D/50 pH/temperature probe with flat tip, 50mm-long body, DIN connector and 1 m (3.3') cable, HI 70004 pH 4.01 buffer 20 mL, HI 70007 pH 7.01 buffer 20 mL, HI 700620 cleaning & disinfection solution for skin residuals 20 mL (2), HI 700621 cleaning solution for skin grease and sebum 20 mL (2), 1.5V AA alkaline batteries (3) and instruction manual

ELECTRODES

HI 1414D/50 pH electrode with flat tip, glass body, internal temperature sensor and DIN connector

SOLUTIONS

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 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)
HI 77400P pH 4 and pH 7 buffer sachets, 20 mL sachets (25)
HI 70300L Electrode storage solution, 500 mL
HI 700620P Cleaning & disinfection solution for skin residuals, 20 mL sachets (25)
HI 700621P Cleaning solution for skin grease and sebum, 20 mL sachets (25)

ACCESSORIES

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange



HI 710008 — Shockproof Boot

HANNA instruments

With Great Products, Come Great Results™

Waterproof and Accurate

HI 98402 measures fluoride from 0.05 mg/L to 1.9 g/L in 5 distinct scales. With auto-ranging HI 98402 automatically selects the range that provides the best resolution. All results are displayed directly in fluoride concentration. In order to guarantee maximum repeatability, measurements are performed using the HI 4010 fluoride specific electrode and the separate HI 5313 reference electrode.

HI 98402 compensates for temperature automatically from 5 to 35°C using the optional HI 7662 stainless steel temperature probe. The temperature measured together with fluoride concentrations are displayed on the large LCD simultaneously.

All operations are microprocessor controlled for added precision and simplicity. Calibration is automatic at one or two points.

The calibration points can be chosen among 1 mg/L (ppm), 2 mg/L, 10 mg/L, 100 mg/L and 1000 mg/L.

HI 98402 is supplied in a rugged carrying case complete with batteries that provide up to 120 hours of continuous operation.

- *Direct measurements in mg/L or g/L*
- *Waterproof, rugged housing for indoor/outdoor applications*
- *Extensive fluoride scale*



SPECIFICATIONS		HI 98402
Range	Fluoride	0.050 to 0.500 mg/L (ppm); 0.50 to 5.00 mg/L; 5.0 to 50.0 mg/L; 50 to 500 mg/L; 0.50 to 1.90 g/L
	Temperature	0.0 to 50.0°C
Resolution	Fluoride	0.001 mg/L (ppm); 0.01 mg/L; 0.1 mg/L; 1 mg/L; 0.01 g/L
	Temperature	0.1°C
Accuracy	Fluoride	±5% of reading or ±0.02 ppm (with ±3°C from calibration temperature)
	Temperature	±0.5°C
Calibration		automatic, 1 or 2 point at 1 mg/L, 2 mg/L, 10 mg/L, 100 mg/L and 1000 mg/L
Temperature Compensation		automatic, 5 to 35°C (with temperature probe)
Electrodes		HI 4010 fluoride electrode with BNC and 1 m (3.3') cable HI 5313 reference electrode with 1 m (3.3') cable (not included)
Temperature Probe		HI 7662 with 1 m (3.3') cable (not included)
Input Impedance		10^{12} Ohm
Battery Type / Life		(4) 1.5V AA / approx. 120 hours of continuous use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		196 x 80 x 60 mm (7.7 x 3.1 x 2.4") / 500 g (1.1 lbs.)



HI 721317 — Rugged Carrying Case

ORDERING INFORMATION

HI 98402 is supplied with batteries, rugged carrying case and instructions.

ELECTRODES

HI 4010	Fluoride electrode with BNC and 1 m (3.3') cable
HI 5313	Reference electrode with 1 m (3.3') cable
HI 7662	Temperature probe with 1 m (3.3') cable

SOLUTIONS

HI 4010-01	0.1 M fluoride solution, 500 mL
HI 4010-02	100 ppm fluoride solution, 500 mL
HI 4010-03	1000 ppm fluoride solution, 500 mL
HI 4010-30	Kit of fluoride solutions including HI 4010-00, HI 4010-10 and HI 4010-11
HI 4010-11	1 ppm mixed with TISAB II fluoride solution, 500 mL
HI 4010-12	2 ppm mixed with TISAB II fluoride solution, 500 mL
HI 4010-10	10 ppm mixed with TISAB II fluoride solution, 500 mL
HI 4010-00	TISAB II fluoride solution, 500 mL
HI 4010-05	TISAB II fluoride solution, 1 gallon

ACCESSORIES

HI 76405	Electrode holder
HI 721317	Rugged carrying case

HI 4221 • HI 4222 • HI 4521 • HI 4522

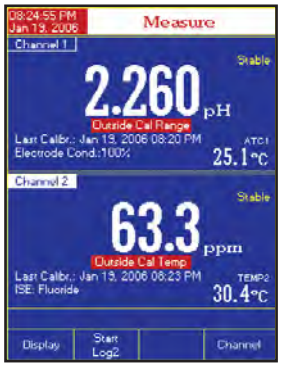
Research Grade pH Meters

with Color Display

pH Calibration Check™

Proper calibration of both the pH meter and pH electrode system is critical in order to achieve reliable results. HANNA's exclusive Calibration Check™ system includes several features to help users reach that goal.



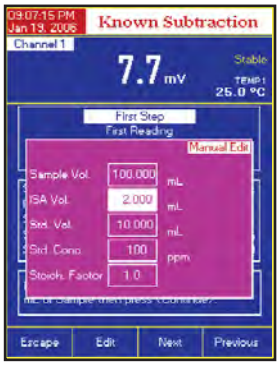




- *Each time a pH calibration is performed, the instrument compares the new calibration with the previous one. When this comparison indicates a significant difference, the message alerts the user to either clean the electrode, check the buffer or both.*
- *When measurements are taken too far from the calibration points, the instrument will warn the user with a message on the LCD.*
- *The condition of the pH electrode after calibration is shown on the display to track functionality.*
- *To avoid taking readings with old calibrations, the instrument can be set to automatically remind the user at defined intervals when the instrument needs to be recalibrated.*
- *For reporting purposes, GLP information is available at a push of a button.*

ISE Incremental Methods

Ion concentration determinations with ISE's can be made faster and easier using the streamlined Incremental Methods.







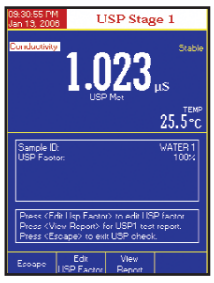
Incremental methods involve adding a standard to a sample, or sample to a standard. A mV change occurs due to this addition. Historically the user would then use mathematical equations to determine the ion concentration of the sample; but with the HI 4522 and HI 4222, sample concentrations are calculated automatically and then logged into an ISE method report. 200 reports can be saved for future recall. The entire process can be repeated on multiple samples without having to reenter the parameters used to calculate the unknown sample concentration.

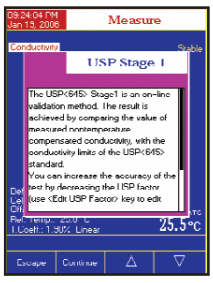
Incremental Method techniques can reduce errors from variables such as temperature, viscosity, pH or ionic strength. The electrodes remain immersed throughout the process thus reducing measurement time as well as eliminating sample carry over and its associated errors.

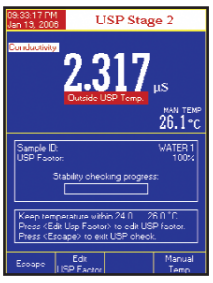
Known Addition, Known Subtraction, Analyte Addition, and Analyte Subtraction methods are the standard method choices provided.

EC USP Mode

HANNA's HI 4522 and HI 4521 can be used to perform all 3 stages of United States Pharmacopeia testing requirements for water quality (USP <645>).









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

Comprehensive results are shown once the samples have passed any one of the three stages. These results are displayed on a single screen at the end of the test. Up to 200 reports can be saved for future recall.

HANNA instruments

With Great Products, Come Great Results™

HI 931100 • HI 931101

Salinity and Sodium Content Meter

HACCP Compliant



2 Powerful HACCP Compliant Instruments

HANNA has designed two rugged waterproof salinity and sodium meters for regular use in both laboratory conditions as well as harsh processing environments.

HI 931100 is an ion-selective meter that uses the FC 300B sodium electrode to read the salt (NaCl) content of a solution. This powerful instrument has four ranges, capable of measuring concentrations from 0.150 g/L to 300 g/L.

HI 931100 auto ranges from sample to sample over an extremely broad range without the need for recalibration.

HI 931101 employs the FC 300B combination sodium electrode (not included) to provide sodium readings from 15.0 mg/L to 60 g/L. The calibration process is automatic at 2 points, the first is at 2.3 g/L while the second can be either at 0.23 g/L (low range) or at 23.0 g/L (high range). The meter also has a 0 to 3 pNa range.

A separate temperature probe, HI 7662, provides readings from 0 to 80°C.

- *HI 931100 measures 4 NaCl ranges*
- *Displays parameter and temperature readings simutaneously*
- *Automatic calibration*

SPECIFICATIONS		HI 931100	HI 931101
Range	NaCl	0.150 to 1.500; 1.50 to 15.00; 15.0 to 150.0; 150 to 300 g/L	0.00 to 3.00 pNa; 15.0 to 150.0 mg/L Na; 0.150 to 1.500; 1.50 to 15.00; 15.0 to 60.0 g/L Na
	°C	0.0 to 80.0°C	
Resolution	NaCl	0.001; 0.01; 0.1; 1 g/L	0.01 pNa; 0.1 mg/L Na; 0.001; 0.01; 0.1; 1 g/L Na
	°C	0.1°C	
Accuracy (@20°C)	NaCl	±5% of reading	±0.05 pNa; ±5% of reading (Na)
	°C	±0.5°C	
Calibration		Automatic, 1 or 2 point at 3.00 g/L (HI 7083) and 0.30 g/L (HI 7085) or 30.0 g/L (HI 7081)	Automatic, 1 or 2 point at 2.3 g/L | (HI 7080) and 0.23 g/L (HI 7087) or 23.0 g/L (HI 7086)
Temperature Compensation		fixed at 25°C (77°F)	
Electrode		FC 300B combination sodium electrode with BNC connector and 1 m (3.3') cable (not included)	
Temperature Probe		HI 7662 temperature probe with 1 m (3.3') cable (not included)	
Input Impedance		10^{12} Ohm	
Battery Type / Life		(4) 1.5V AA / approx. 200 hours of continuous use	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions		196 x 80 x 60 mm (7.7 x 3.1 x 2.4")	
Weight		500 g (1.1 lbs.)	

ORDERING INFORMATION

HI 931100 and **HI 931101** are supplied with batteries, rugged carrying case and instructions.

ELECTRODES

FC 300B Combination sodium electrode with BNC connector with 1 m (3.3') cable

HI 7662 Temperature probe

SOLUTIONS

HI 7080L 2.3 g/L Na solution, 500 mL

HI 7081L 30 g/L NaCl solution, 500 mL

HI 7083L 3 g/L NaCl solution, 500 mL

HI 7085L 0.3 g/L NaCl solution, 500 mL

HI 7086L 23.0 g/L Na solution, 500 mL

HI 7087L 0.23 g/L Na solution, 500 mL

HI 7090L ISA solution, 500 mL

ACCESSORIES

HI 76405 Electrode holder

HI 721317 Rugged carrying case



HI 76405 — Electrode Holder

HANNA instruments

With Great Products, Come Great Results™

A Portable Reference for Your pH and ORP Meters and Electrodes

HI 8427 is designed specifically to simulate pH and ORP electrodes to confirm proper functioning of your meter. Standard pH electrode ranges are selectable with a dial on the front panel. The pH range is pH 0, pH 2, pH 4, pH 7, pH 10, pH 12 and pH 14 with the mV range being -1900 mV, -350 mV, +350 mV and +1900 mV.

The HI 8427 has manual temperature compensation from 0 to 50°C (32 to 122°F) allows temperature simulation. Provided with a universal BNC connector, this unit is also a high impedance tester, for cable and connector inspection with a leakage sensitivity of 10^9 ohm. This unique tester is a "one of a kind" in the industry that eliminates the need for very expensive MΩ meters.

Sometimes it is difficult to work out whether a particular malfunction is due to the meter or the electrode. If you have been in this position, the HANNA precision HI 931001 pH/ORP electrode simulator is the perfect solution for you. By simply connecting HI 931001 to your meter's input socket and turning the dials, pH readings can be simulated from 0 to 14 pH in 0.01 steps. The output signals all correspond to pH values at 25°C and your pH meter should be able to check the span of your pH meter.

For the mV range, HI 931001 can simulate output from -1000 to +1000 mV in 1 mV steps.

- *Simulate output to discover malfunctions*
- *Simulate temperature*
- *Provided with universal BNC connector*



HI 710001 — Soft Carrying Case



SPECIFICATIONS		HI 8427	HI 931001
Range	pH	0, 2, 4, 7, 10, 12, 14	0.00 to 14.00
	mV	-1900, -350, 350, 1900	-1000 to 1000
Resolution	pH	—	0.01
	mV	—	1
Accuracy (@ 20°C)	pH	±0.1	±0.01
	mV	±5	±1
Impedance test		10^9 Ohm	—
Temperature Compensation		manual, 0 to 50°C	all output values are simulated at 25°C
Battery Type / Life		1 x 9V / approx. 100 hours of use	1 x 9V / approx. 500 hours of use
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		185 x 82 x 53 mm (7.3 x 3.2 x 2.1")	
Weight		255 g (9.0 oz.)	320 g (11.3 oz.)

ORDERING INFORMATION

HI 8427 and **HI 931001** are supplied with HI 7858/1 BNC/BNC coaxial cable

ELECTRODES

HI 7858/1 BNC/BNC connection cable, 1 m (3.3') long
HI 7858/3 BNC/BNC connection cable, 3 m (9.8') long
HI 7858/5 BNC/BNC connection cable, 5 m (16.4') long
HI 7858/10 BNC/BNC connection cable, 10 m (33') long
HI 7858/15 BNC/BNC connection cable, 15 m (49') long

ACCESSORIES

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 710001 Soft carrying case
HI 721316 Rugged carrying case

HI 98129 • HI 98130

pH/Conductivity/TDS Testers

Waterproof and Designed to Float



On-screen Battery Life

LCD indicates the percentage of battery power remaining upon startup.



Standard or N.I.S.T Buffer Calibration

Auto calibration is performed with 2 sets of memorized buffers for greater accuracy.



Adjustable TDS Ratio

For measurement accuracy, users can choose between different conductivity to TDS conversion factors.



The Ultimate in HANNA Combination Testers!

HI 98129 and HI 98130 are waterproof testers that offer high accuracy pH, EC/TDS and temperature measurements in a single tester! No more switching between meters for your routine measurements. These floating, waterproof testers have a large easy-to-read, dual-level LCD and automatic shut-off. pH and EC/TDS readings are automatically temperature compensated (ATC).

Your tester no longer needs to be thrown away when the pH sensor is exhausted. 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. This gives these meters an extended life.

The EC/TDS conversion factor is user selectable, as is the temperature compensation coefficient (β).

Fast, efficient, accurate and portable, the Combo pH, EC/TDS and temperature tester brings you all the features you've asked for and more!

Replaceable pH electrode cartridge



The Combo features an easy-to-replace pH electrode and has an extendable cloth junction. The sturdy, snap-in connector means there are no pins to bend or break.

High accuracy



The graphite conductivity electrode provides greater accuracy because it cannot be contaminated by salt deposits in the solution. The exposed temperature sensor provides fast response times, and guarantees accurate temperature compensated readings.

SPECIFICATIONS		HI 98129	HI 98130
Range	pH	0.00 to 14.00 pH	
	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm	0.00 to 10.00 ppt
	Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	
Resolution	pH	0.01 pH	
	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.05 pH	
	EC / TDS	±2% F.S.	
	Temperature	±0.5°C /±1°F	
Temperature Compensation		pH: automatic; EC/TDS: automatic with β adjustable from 0.0 to 2.4% / °C	
Calibration	pH	automatic, 1 or 2 points with 2 sets of standard buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)	
	EC / TDS	automatic, 1 point at 1413 µS/cm or 1382 ppm	automatic, 1 point at 12.88 mS/cm or 6.44 ppt
TDS Conversion Factor		adjustable, from 0.45 to 1.00	
pH Electrode		HI 73127 (replaceable; included)	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Battery Type / Life		(4) 1.5V / approx. 100 hours of continuous use, auto-off after 8 minutes of non-use	
Dimensions/Weight		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")/100 g (3.5 oz.)	

ORDERING INFORMATION

HI 98129 and **HI 98130** are supplied with 1.5V batteries (4), HI 73127 pH electrode and HI 73128 Tool to remove the pH electrode.

ELECTRODES

HI 73127 Spare pH electrode for Combo

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 70030P 12.88 mS/cm buffer solution, 20 mL sachets (25)

HI 70031P 1413 µS/cm buffer solution, 20 mL sachets (25)

HI 70032P 1382 ppm buffer solution, 20 mL sachets (25)

HI 70038P 6.44 ppt buffer solution, 20 mL sachets (25)

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

HI 70300M Electrode storage solution, 250 mL

HI 7061M Electrode cleaning solution, 250 mL

ACCESSORIES

HI 73128 Electrode removal tool

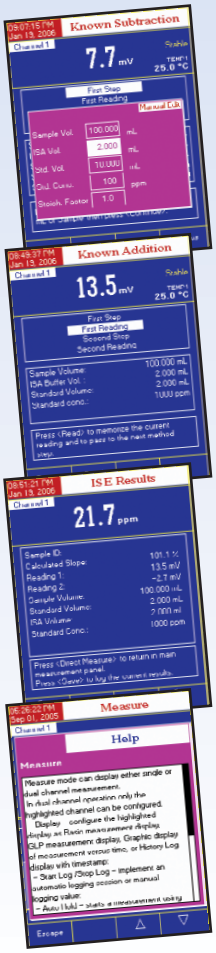
HANNA instruments

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Research Grade pH Meters

with Color Display

Incremental Method Analysis Example



First Step — An Example for Known Addition

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

When repeating the analysis on additional samples, the settings do not need to be reentered.

Sequence of Readings

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

A mV measurement is initially taken. The user is then prompted for the addtion of a known standard and then a second measurement is taken.

Results

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

At this time, results can be saved into an ISE Methods Report (if necessary, the user can edit the settings without having to redo the entire analysis). Multiple samples analysis is possible without having to reenter set-up data.

Contextual Help Screen

Users can consult the on-screen help from any mode simply by pressing the HELP key.

The instrument will then display the meaning and options available of the current screen.



LCD Display Examples

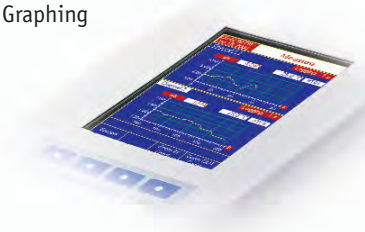
Dual Channel Display



Real Time Logging



Simultaneous Dual-channel Graphing



Calibration Data shown for both channels



ORDERING INFORMATION

HI 4221-01 (115V) and **HI 4221-02** (230V) are supplied with glass body pH electrode, temperature probe, power adapter, pH 4 and pH 7 buffer solutions, electrode refilling solution, electrode holder and instructions.

HI 4222-01 (115V) and **HI 4222-02** (230V) are supplied with glass body pH electrode, temperature probe, power adapter, pH 4 and pH 7 buffer solutions, electrode refilling solution, electrode holder and instructions.

HI 4521-01 (115V) and **HI 4521-02** (230V) are supplied with 4-ring EC probe, glass body pH electrode, temperature probe, power adapter, pH 4 and pH 7 buffer solutions, electrode refilling solution, electrode holder and instructions.

HI 4522-01 (115V) and **HI 4522-02** (230V) are supplied with 4-ring EC probe, glass body pH electrode, temperature probe, power adapter, pH 4 and pH 7 buffer solutions, electrode refilling solution, electrode holder and instructions.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector and 1m (3.3') cable
HI 76312	Platinum 4-ring Conductivity/TDS probe with temperature sensor and 1 m (3.3') cable
HI 7662-T	Temperature probe

SOLUTIONS

HI 5004	pH 4.01 buffer solution, 500 mL
HI 5007	pH 7.01 buffer solution, 500 mL
HI 5010	pH 10.01 buffer solution, 500 mL
HI 54710	pH 4.01, pH 7.01 and pH 10.01 buffer solution, 500 mL ea.
HI 70300L	Electrode storage solution, 500 mL
HI 7061L	Electrode cleaning solution, 500 mL

HI 50XX buffers are technical buffers with ±.01 accuracy and are provided with certificate

ACCESSORIES

HI 76404N	Electrode holder
HI 92000	Windows® compatible software
HI 920010	RS232 cable for PC connection
HI 920013	USB cable for PC connection
HI 190M *	Magnetic stirrer with ABS plastic cover max 1000 rpm, Speedsafe™
HI 200M *	Magnetic stirrer with AISI stainless steel cover, max 1000 rpm, Speedsafe™

* **-1**: 110/115V, 50/60Hz **-2**: 220/240V, 50/60Hz

HI 4221 • HI 4222 • HI 4521 • HI 4522

Research Grade pH Meters

with Color Display

SPECIFICATIONS		HI 4522	HI 4521	HI 4222	HI 4221
pH	Range	-2.0 to 20.0; -2.00 to 20.00; -2.000 to 20.000 pH			
	Resolution	0.1 pH; 0.01 pH; 0.001 pH			
	Accuracy	±0.1 pH; ±0.01 pH; ±0.002 pH			
mV	Range	±2000 mV			
	Resolution	0.1 mV			
	Accuracy	±0.2 mV			
ISE	Range	1 x 10^{-7} to 9.99 x 10^{10} concentration ±0.2 mV	—	1 x 10^{-7} to 9.99 x 10^{10} concentration ±0.2 mV	—
	Resolution	1; 0.1; 0.01 concentration	—	1; 0.1; 0.01 concentration	—
	Accuracy	±0.5% (monovalent ions); ±1% (divalent ions)	—	±0.5% (monovalent ions); ±1% (divalent ions)	—
Conductivity	Range	0.000 to 9.999 µS/cm; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 999.9 mS/cm; 1000 mS/cm		—	
	Resolution	0.001 µS/cm; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm; 1 mS/cm		—	
	Accuracy	±1% of reading (±0.01 µS/cm)		—	
Resistivity	Range	1.00 to 99.99 Ohm•cm; 100.0 to 999.9 Ohm•cm; 1.000 to 9.999 kOhm•cm; 10.00 to 99.99 kOhm•cm; 100.0 to 999.9 kOhm•cm; 1.00 to 9.99 MOhm•cm; 10.0 to 100.0 MOhm•cm		—	
	Resolution	0.01 Ohm•cm; 0.1 Ohm•cm; 0.001 kOhm•cm; 0.01 kOhm•cm; 0.1 kOhm•cm; 0.01 MOhm•cm; 0.1 MOhm•cm		—	
	Accuracy	±2% of reading (±1 Ohm•cm)		—	
TDS	Range	0.000 to 9.999 ppm; 10.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 ppt; 10.00 to 99.99 ppt; 100.0 to 400.0 ppt		—	
	Resolution	0.001 ppm; 0.01 ppm; 0.1 ppm; 0.001 ppt; 0.01 ppt; 0.1 ppt		—	
	Accuracy	±1% of reading (±0.01 ppm)		—	
	Factor	0.40 to 1.00		—	
Salinity	Range	Practical salinity: 0.00 to 42.00; Natural seawater: 0.00 to 80.00 ppt; Percent: 0.0 to 400.0%		—	
	Resolution	0.01 for practical salinity/natural sea water; 0.1% for percent scale		—	
	Accuracy	±1% of reading		—	
Temperature	Range	-20.0 to 120°C; -4.0 to 248.0°F; 253.15 to 393.15K			
	Resolution	0.1°C; 0.1°F; 0.1K			
	Accuracy	±0.2°C; ±0.4°F; ±0.2K			
Calibration	pH	Automatic, Up to five-point calibration, 8 standard buffers available (1.68, 3.00, 4.01, 6.86, 7.01,9.18, 10.01, 12.45), and 5 custom buffers			
	ISE	Automatic, Up to 5 point calibration, 5 fixed standard solutions available for each measurement unit, and 5 user defined standards	—	Automatic, Up to 5 point calibration, 5 fixed standard solutions available for each measurement unit, and 5 user defined standards	—
	Conductivity	Up to 4 point calibration with standard or custom values		—	
	Salinity	Percent scale—1 point (with HI 7037 solution)		—	
	Temperature	3 points			
Relative mV Offset Range		±2000 mV			
Input Channel(s)		1 pH/mV /ISE + 1 EC	1 pH/mV + 1 EC	2 pH/mV/ISE	1 pH/mV
Calibration Check™		pH electrode and buffer condition			
Temperature Compensation		pH: Automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F); EC: Linear and non-linear (natural water)			
Log-on-demand		100 Lots, 5000 samples per lot			
Logging Intervals		User defined, minimum 1 second			
Auto Endpoint		Yes			
PC Connection		Opto-isolated USB and RS232			
Display		240 x 320 dot-matrix color LCD with on-screen help, graphing, language selection and custom configuration			
Power		12 Vdc adapter (included)			
Dimensions/Weight		160 x 231 x 94 mm (6.3 x 9.1 x 3.7")/800 g (1.8 lbs.)			

HANNA instruments

With Great Products, Come Great Results™



"The Calibration Check™ option on the HI 9026 is my assurance that measurements are accurate..."

MR. M VAN NOORT
PROCESS ENGINEER
Rijnplant
the Netherlands

Mr. van Noort uses the HI 9026 combined with the FC 200B electrode to take more than 200 measurements each week. They measure directly in soil and 'plugs' by using the FC 200B, only a small hole is necessary, to assure minimal damage.

Stick pH Meter

with Amplified pH Electrode

The Piccolo® Series

PICCOLO® is a revolutionary pH meter with a 4-in-1 electrode and amplifier.

Conventional pH meters are susceptible to the weak high impedance signal which makes the electrode, connector, cable and meter vulnerable to noise, humidity and dirty environments. PICCOLO® has overcome these problems with a pre-amplified electrode delivering a strong signal to the meter. The 4-in-1 interchangeable electrode is inexpensive and rugged and houses the pH sensor, reference system, temperature sensor and the amplifier module.

PICCOLO® with a 9 cm (3.5") electrode (HI 1280).

PICCOLO® 2 with a 16 cm (6.3") electrode (HI 1290).

PICCOLO® plus with a 16 cm (6.3") electrode (HI 1295) and temperature readout on LCD.

- *Pre-amplified electrode*
- *Narrow probe*
- *Easy to hold and operate*



PICCOLO® plus



PICCOLO® 2

PICCOLO®

SPECIFICATIONS	*HI 98111 (PICCOLO®)*	*HI 98112 (PICCOLO®2)*	*HI 98113 (PICCOLO® plus)*
Range	1.00 to 13.00 pH	1.00 to 13.00 pH	1.00 to 13.00 pH; 0.0 to 70.0°C
Resolution	0.01 pH	0.01 pH	0.01 pH; 0.1°C
Accuracy (@20°C/68°F)	±0.01 pH	±0.01 pH	±0.01 pH; ±1°C
Calibration	manual, 2 points		
Temperature Compensation	automatic, 0 to 70°C (32 to 150°F)		
Electrode	HI 1280 (included)	HI 1290 (included)	HI 1295 (included)
Battery Type / Life	(3) 1.5V / approx. 100 hours of continuous use		
Environment	0 to 50°C (32 to 122°F); RH max 95%		
Dimensions (with electrode)	194 x 29 x 15 mm (7.6 x 1.1 x 0.6")	265 x 29 x 15 mm (10.4 x 1.1 x 0.6")	
Weight	70 g (2.5 oz.)		

ORDERING INFORMATION

All PICCOLO® models are supplied complete with pH electrode, pH 4.01 & pH 7.01 sachets, calibration screwdriver, batteries, rugged carrying case and instructions.

HI 98111 (PICCOLO®) is supplied with 90 mm (3.5") HI 1280 amplified pH electrode.

HI 98112 (PICCOLO®2) is supplied with 160 mm (6.3") HI 1290 amplified pH electrode.

HI 98113 (PICCOLO® plus) is supplied with HI 1295 amplified electrode with temperature sensor.

ELECTRODES

HI 1280	Spare pH electrode for Piccolo® (90 mm / 3.5")
HI 1290	Spare pH electrode for Piccolo®2 (160 mm / 6.3")
HI 1295	Spare pH electrode for Piccolo® plus (160 mm / 6.3")

SOLUTIONS

HI 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P	pH 10.01 buffer solution, 20 mL sachets (25)
HI 7004M	pH 4.01 buffer solution, 250 mL
HI 7007M	pH 7.01 buffer solution, 250 mL bottle
HI 7010M	pH 10.01 buffer solution, 250 mL
HI 70300M	Electrode storage solution, 250 mL
HI 7061M	Cleaning solution, 250 mL

HI 991401

pH and Temperature Monitor

with Large Backlit LCD



Dual-level Backlit LCD

Ideal for Agriculture and Aquariums

This indicator from HANNA has a large, dual-level, backlit LCD to give users instantaneous readings of both pH and temperature that can be easily read in dim light. The HI 991401 microprocessor provides for automatic calibration, automatic buffer selection and automatic temperature compensation.

HI 991401's waterproof housing has been designed to meet the grower's need and is well suited to withstand the aggressive environments found in agricultural and hydroponics applications. Measurements are highly accurate and can be verified with one or two point calibrations. With a 12 Vdc power supply included with the meter, low battery failures are never an issue.

The interchangeable pH electrode has been specially designed to address the needs of growers. It's design guarantees greater clogging resistance in fertilizer solutions with high concentrations of phosphate, nitrate, etc. This major improvement ensures longer life for your electrode!

- *Waterproof*
- *Measure in °C or °F*
- *Stability indicator*
- *Extra-large display*
- *12 VDC power supply*

SPECIFICATIONS		HI 991401
Range	pH	0.0 to 14.0 pH
	temperature	0.0 to 60.0°C (32.0 to 140.0°F)
Resolution	pH	0.1 pH
	temperature	0.1°C (0.1°F)
Accuracy (@20°C/68°F)	pH	±0.1 pH
	temperature	±0.5°C (±1°F)
Probes		HI 1293D pH electrode (included) and HI 1294 temperature probe (fixed)
pH calibration		automatic, 1 or 2 points with 2 sets of memorized buffers (pH 4.01/ 7.01/10.01 or pH 4.01/6.86/9.18)
Temperature compensation		automatic
Input impedance		10^{12} Ohm
Power supply		12 Vdc adapter (included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions		160 x 105 x 31 mm (6.3 x 4.1 x 1.2)
Weight		190 g (6.7 oz.) - meter only

ORDERING INFORMATION

HI 991401-01 (115V) and **HI 991401-02** (230V) is supplied with pH 4.01 and 7.01 buffer solutions 20 mL, HI 1293D pH-electrode with differential input signal, Hanna 12 VDC power adapter and instruction manual

ELECTRODES

HI 1293D	pH electrode with DIN connector and external thread
HI 1294	Temperature probe*

SOLUTIONS

HI 7004M	pH 4.01 calibration solution, 250 mL
HI 7007M	pH 7.01 calibration solution, 250 mL
HI 7010M	pH 10.01 calibration solution, 250 mL
HI 77400P	pH 4 and pH 7 solution, (10) 20mL sachets, (5)
HI 70300M	Electrode storage solution, 250 mL
HI 7061M	Electrode cleaning solution, 250 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)

*Replaceable by technical personnel only.

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Built for Growers

The pH indicator HI 981401N has been designed to meet the Grower's need for equipment suited to the aggressive environments found in agricultural and hydroponics applications. The housing is water-resistant and features a molded eye which allows installation right above the sample to be monitored.

Measurements are highly accurate and can be verified with two point calibration. With a 12 Vdc power supply included with the meter, low battery failures are never an issue. The electrode is interchangeable and the connector is well-protected behind a waterproof sheathing. The meter is supplied with a stainless steel probe, preventing potential grounding problems and ensuring extended electrode life.

The gel-filled pH electrode has been specially designed to address the needs of growers. Its design guarantees greater clogging resistance in fertilizer solutions with high concentrations of phosphate, nitrate, etc.

- *Water resistant*
- *1 or 2 point calibration*
- *Electrode clog resistance*



HI 70300L — Electrode Storage Solution



HI 7004 — pH Solutions



Grounding pin prevents electrical noise (from light, motors, pumps, etc...) from interfering with readings.

SPECIFICATIONS	HI 981401N
Range	0.0 to 14.0 pH
Resolution	0.1 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	manual 2 point, at pH 4 and 7
pH electrode	HI 1286, plastic body, double junction, PTFE membrane, with 2m (6.6') cable and BNC connector (included)
Input impedance	10^{12} Ohm
Power supply	12 Vdc power adapter (included)
Environment	0 to 50°C; RH max 100%
Dimensions	86 x 110 x 43 mm (3.4 x 4.3 x 1.7")
Weight	150 g (5.3 oz.)

ORDERING INFORMATION

HI 981401N-01 (115V) and **HI 981401N-02** (230V) is supplied with HI 1286 pH electrode, 12 Vdc adapter, HI 1283 stainless steel grounding bar, pH 4 and pH 7 calibration solutions (20 mL), calibration screwdriver and instructions.

ELECTRODES

HI 1286 pH electrode, 2 m (6.6') cable

HI 1283* Stainless steel grounding bar with 2 m (6.6') cable

SOLUTIONS

HI 70000P Electrode rinsing solution, 20 mL sachets (25)

HI 7004M pH 4.01 calibration solution, 250 mL

HI 7007M pH 7.01 calibration solution, 250 mL

HI 77400P pH 4 and pH 7 solution, (10) 20mL sachets, (5)

HI 70300M Electrode storage solution, 250 mL

HI 70300L Electrode storage solution, 500 mL

HI 7061M Electrode cleaning solution, 250 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc power adapter, US plug

HI 710006 230 Vac/12 Vdc power adapter, European plug

*Replaceable by technical personnel only.

HI 981400

pH Meter and Indicator

with Alarm for QC and HACCP



Ideal for QC and HACCP

pH is monitored at different stages of food preparation and processing to guarantee safety, improve production and enhance quality. The pH of raw ingredients such as milk and meat is measured to ensure that standards have been properly met. Along with temperature and water activity, pH also affects the shelf-life of foodstuffs. For example, by bringing the pH value below 4.5, growth and multiplication of pathogens are inhibited.

HI 981400 is a compact and affordable indicator designed to check the pH of food. It has a large LCD and comes with a molded eye for convenient positioning above a QC bench, or at the goods-in area. An ideal pH value can be set between 4.0 and 7.5 pH through a trimmer on the back of the unit. Should the pH exceed this user selectable limit, an incorporated LED will alert the user with a flashing light. This important feature permits pH control to be delegated to inexperienced operators.

SPECIFICATIONS	HI 981400
Range	0.0 to 14.0 pH
Resolution	0.1 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	manual, 1 or 2-points
Setpoint	adjustable from 4.6 to 7.5 pH
Alarm	red LED (blinks when pH reading > setpoint)
Input impedance	10^{12} Ohm
Power supply	12 Vdc adapter (included)
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions	86 x 110 x 43 mm (3.4 x 4.3 x 1.7")
Weight	150 g (5.3 oz.)

ORDERING INFORMATION

HI 981400-01 (115V) and **HI 981400-02** (230V) is supplied with calibration screwdriver, pH 4.01 and 7.01 buffer solutions, 20 mL and 12 VDC power adapter.

ELECTRODES

FC 200B	pH electrode for food and HACCP, with BNC connector
FC 230B	pH electrode for meat, with BNC connector
FC 098	Stainless steel blade for meat penetration, 20 mm (for use with FC 230B)
FC 099	Stainless steel blade for meat penetration, 35 mm (for use with FC 230B)

SOLUTIONS

HI 70000P	Electrode rinsing solution, 20 mL sachets (25)
HI 7004M	pH 4.01 calibration solution, 250 mL
HI 7007M	pH 7.01 calibration solution, 250 mL
HI 77400P	pH 4 and pH 7 solution, (10) 20mL sachets, (5)
HI 70300M	Electrode storage solution, 250 mL
HI 7061M	Electrode cleaning solution, 250 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)

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pH and ORP Indicator

with LED Alarm Signals

Accurate pH and ORP Monitoring

HI 981406 has been specially designed for water treatment and swimming pool applications where both pH and ORP need to be monitored. Instead of sourcing two different meters. you can now continuously measure both pH and ORP with HI 981406

There are two separate adjustable setpoints for pH and ORP. Once the pH setpoint is exceeded, the appropriate LED light will come on to alert the operator. Likewise, once the ORP level drops below the setpoint, the red ORP light will stay on.

HI 981406 is supplied with HI 1283 ground probe. The HI 1283 ground probe provides you with more reliable readouts by supressing current effects, which are found in pools. The optional HI 2114P/2 pH electrode and HI 3214P/2 ORP electrode are designed specifically for swimming pools. Both probes are constructed with a specially-designed fiber salt-bridge making each particularly resistant to clogging in pools.

- *Continuous monitoring*
- *Displays pH and mV simultaneously*
- *Adjustable setpoints*



Grounding pin prevents electrical noise (from light, motors, pumps, etc...) from interfering with readings.

ORDERING INFORMATION

HI 981406-01 (115V) and **HI 981406-02** (230V) is supplied with HI 1283 grounding bar, calibration screwdriver and 12 VDC power adapter.

ELECTRODES

HI 2114P/2	pH electrode with plastic body, BNC and 2 m (6.6') cable
HI 3214P/2	ORP electrode with plastic body, BNC and 2 m (6.6') cable
HI 1283	Grounding bar, stainless steel, 2 m (6.6')*

SOLUTIONS

HI 70000P	Rinse solution 20 mL sachets (25)
HI 70004P	pH 4 cal. sol. 20 mL sachets (25)
HI 70007P	pH 7 cal. sol. 20 mL sachets (25)
HI 7020M	200-275 mV cal. sol., 250 mL
HI 7091M	Pretreatment reducing sol., 250 mL
HI 7092M	Pretreatment oxiding sol., 250 mL
HI 70300M	Storage solution, 250 mL
HI 7061M	Electrode cleaning solution, 250 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)

SPECIFICATIONS

		HI 981406
Range	pH	0.0 to 14.0 pH
	ORP	±999 mV
Resolution	pH	0.1 pH
	ORP	1 mV
Accuracy (@20°C/68°F)	pH	±0.2 pH
	ORP	±5 mV
pH calibration		manual, 1 or 2 points
Setpoints		pH: adjustable from 5.0 to 9.0 pH; ORP: adjustable from 350 to 850 mV
Alarms		2 red LEDs (1 for pH and 1 for ORP), light up for pH value > setpoint and/or ORP value < setpoint
Probes		HI 2114P/2 replaceable pH electrode (not included); HI 3214P/2 replaceable ORP electrode (not included); HI 1283 potential matching pin with 2 m (6.6') cable (included)
Input impedance		10^{12} Ohm
Power supply		12 Vdc adapter (included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions		165 x 110 x 35 mm (6.4 x 4.3 x 1.4")
Weight		300 g (10.6 oz.)

*Replaceable by technical personnel only.

HI 982401

ORP Indicator

with Alarm Signal



SPECIFICATIONS	HI 982401
Range	±999 mV
Resolution	1 mV
Accuracy (@20°C/68°F)	±5 mV
Setpoint	adjustable from 350 to 850 mV
Alarm	red LED; blinks for ORP value < setpoint
ORP electrode	HI 3214P/2, with platinum sensor, plastic body, double fiber junction, gel electrolyte, 2 m (6.6') cable and BNC connector (not included)
Input impedance	10^{12} Ohm
Power supply	12 Vdc adapter (included)
Environment	0 to 50°C; RH. max 100%
Dimensions	86 x 110 x 43 mm (3.4 x 4.3 x 1.7")
Weight	150 g (5.3 oz.)

Ideal for Pool, Spa and Small Process Applications

HI 982401 is a simple-to-operate, continuous monitor for ORP (Oxidation Reduction Potential) measurements. It measures in the ORP range from -999 to +999 mV. Operators can also set the ORP level at which their application will produce the best results.

The HI 982401 front case incorporates a large, bright LED indicator. Should the measurements fall below the user-selectable ORP values, the red LED flashes and alerts the operate to the undesired condition. Even from a distance, operators can check for status readings.

HI 982401 has been produced for monitoring swimming pools, spas and research facilities where ORP specific monitoring is needed

Thanks to its compact size of 9 cm (3.3") diameter, HI 982401 with its electrode HI 3214P/2, can be mounted in confined spaces and right next to the vat or barrel containing the sample. This casing also incorporates a molded eye so that it can be easily mounted with a single screw.

- *Continuous ORP monitoring*
- *Visual LED alarm*
- *Platinum electrode available*

ORDERING INFORMATION

HI 982401-01 (115V) and **HI 982401-02** (230V) is supplied with screwdriver and 12 VDC power adapter

ELECTRODES

HI 3214P/2	ORP electrode with Platinum sensor, gel filled, BNC connector and 2 m (6.6') cable
HI 7020M	ORP solution @200-275 mV, 230 mL

SOLUTIONS

HI 7091M	Pretreatment reducing solution, 250 mL
HI 7092M	Pretreatment oxidizing solution, 250 mL
HI 70300M	Electrode storage solution, 250 mL
HI 7061M	Electrode cleaning solution, 250 mL

ACCESSORIES

HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)

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Glass in Venice

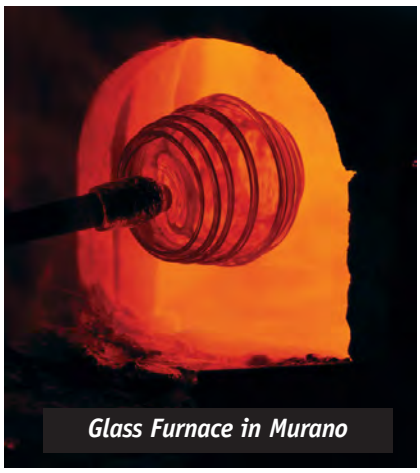
Glass work was known to ancient Egyptians, Sumeri and Romans. During the Middle Ages this knowledge was lost only to reappear at the time of the Renaissance around the middle of the thirteenth century in Venice. In 1287, due to the high number of glass melting furnace fires, the Republic of Venice decided to move all glass production to the nearby island of Murano.

Toward the middle of the fifteenth century, master glassmakers added potassium oxide to the original batches and invented crystal. For more than three centuries the Republic of Venice protected its glass making experience and technology.

In the year 1612, a priest and alchemist from Florence, Antonio Neri, published a booklet which met with much success: "The art of glass making". For the first time the exact proportions of the various components, sodium, calcium and silicon were made public. After that date, the secrets for the production of glass became known worldwide and Venice could no longer protect its secrets.

In 1981, HANNA developed its own technologies with the help of the Experimental Institute for Glass in Murano. From that date, our company has offered the best in glass technology and the largest range of pH electrodes that cannot be imitated.

We are determined to rigorously apply the science and art of glass electrode production to the diverse requirements found in scientific, environmental, and industrial laboratories around the world.


Glass Furnace in Murano



Murano



pH Electrode Reference Chart

*a guide to choosing the electrode that best fits your application**

pH ELECTRODES

APPLICATION	RECOMMENDED ELECTRODES	SPECIFICATIONS	PAGE
Aquarium	HI 1332B/D/P, HI 1312S	double ceramic junction, refillable	
Beauty cream	FC 212D	open junction, viscolene	
Beer	HI 1131B/D/P, HI 1111S	ceramic junction, refillable	
Biotechnology (< 100 µl)	HI 1083B/D/P	open junction, viscolene	
Bread	HI 2031B/D, HI 2020S	ceramic junction, refillable	
Cheese	FC 200B/D/S	open junction, viscolene	
	FC 200B/D/S	open junction, viscolene	
	FC 202D	open junction, viscolene	
	FC 240B	open junction, viscolene	
	FC 250B	open junction, viscolene	
Chlorine titrations	HI 3118B	electrode for titrations	
Cooling towers	HI 72911D	PTFE junction, polymer filled	
Dairy products	FC 911B/D	double ceramic junction, refillable	
	FC 250B	open junction, viscolene	
	FC 300B/D	ceramic junction, refillable	
	FC 201D	open junction, viscolene	
	FC 100B/D	double ceramic junction, refillable	
	FC 203D	open junction, viscolene	
	FC 211D	open junction, viscolene	
Emulsions	HI 1053B/D/P, HI 1050S	triple ceramic junction, refillable	
	HI 1612D	triple ceramic junction, refillable	
Environmental	HI 1217D/S	ceramic junction, gel filled	
Flasks	HI 1331B/D, HI 1311S	ceramic junction, refillable	
Fluoride	FC 301B + HI 5313	FC 301B measurement, HI 5313B reference	
Food industry (general use)	FC 100B/D	double ceramic junction, refillable	
	FC 911B/D	double ceramic junction, refillable	
Fruit	FC 200B/D/S	open junction, viscolene	
	FC 202D	open junction, viscolene	
	FC 220B/D	triple ceramic junction, refillable	
	FC 230B/D	open junction, viscolene	
Fruit juices, organic	FC 210B/D	double open junction, viscolene	
General use for solutions with pH value around 7	HI 1217-6D	single ceramic junction, gel filled	
	HI 1285-6	cloth junction, gel filled	
Ham and Sausages	FC 200B/D/S	open junction, viscolene	
	FC 202D	open junction, viscolene	
	FC 230B/D	open junction, viscolene	
	HI 2031B/D, HI 2020S	ceramic junction, refillable	
High humidity	FC 911B/D	double ceramic junction, refillable	
High purity water	HI 1053B/D/P, HI 1050S	triple ceramic junction, refillable	
Horticulture and Nurseries	HI 1053B/D/P, HI 1050S	triple ceramic junction, refillable	
	FC 200 B/D/S	open junction, viscolene	
	FC 202D	open junction, viscolene	
Industrial wastewater	HI 1296D	cloth junction, gel filled	
	HI 1297D	cloth junction, gel filled	
Laboratory (general use)	HI 1131B/D/P, HI 1111S	ceramic junction, refillable	
	HI 1230B/D, HI 1210S	double ceramic junction, gel filled	
	HI 2110B	pH half cell	
	HI 5311	double ceramic junction, refillable	
	HI 5412	ceramic junction, refillable	
	HI 3131B/D/P, HI 3111S	ceramic junction, refillable	
	HI 1217D/S, HI 1611D	ceramic junction, refillable	
	HI 1610D	ceramic junction, refillable	
	HI 1615D	ceramic junction, refillable	
	HI 1616D	ceramic junction, gel filled	
Leather and Paper	HI 1413B	open junction, viscolene	
	HI 1413B/50, HI 1413S/50	open junction, viscolene	
Lemon juice	FC 100B/D	double ceramic junction, refillable	
Meat	FC 200B/D/S	open junction, viscolene	
	FC 230B/D	open junction, viscolene	
	HI 2031B/D, HI 2020S	ceramic junction, refillable	

*Unsure about which electrode to choose? Give your local HANNA office a call for assistance.

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pH Electrode Reference Chart

*a guide to choosing the electrode that best fits your application**

pH ELECTRODES

APPLICATION	RECOMMENDED ELECTRODES	SPECIFICATIONS	PAGE
Meat	FC 400B/D	open junction, viscolene	
	FC 201D, FC 232D	open junction, viscolene	
Milk and yogurt	FC 210B/D	double open junction, viscolene	
	FC 201D	open junction, viscolene	
	FC 212D	open junction, viscolene	
Mineral water	HI 1153B/D	triple ceramic junction, refillable	
Paint	HI 1053B/D/P, HI 1050S	triple ceramic junction, refillable	
Paper	HI 1413B	open junction, viscolene	
	HI 1414D	open junction, viscolene	
	HI 1413B/50, HI 1413S/50	open junction, viscolene	
	HI 1414D/50	open junction, viscolene	
Photographic chemicals	HI 1230B/D, HI 1210S	double ceramic junction, gel filled	
	HI 1618D	cloth junction, gel filled	
Plating bath	HI 62911D	PTFE junction, polymer filled	
Protein solutions	FC 210B/D	double open junction, viscolene	
Quality control	HI 1332B/D/P, HI 1312S	double ceramic junction, refillable	
	FC 100B	double ceramic junction, refillable	
Samples with fluoride	HI 1143B/D	single ceramic junction, refillable	
Semi solid products	HI 2031B/D, HI 2020S	ceramic junction, refillable	
Skin	HI 1413B, HI 1413B/50, HI 1413S/50	open junction, gel filled	
Soil	HI 1292D	triple ceramic junction, refillable	
Soil samples	HI 1230B/D, HI 1210S	double ceramic junction, gel filled	
	HI 1617D	triple ceramic junction, refillable	
	HI 1292D	triple ceramic junction, refillable	
Solvents	HI 1043B/D/P, HI 1040S	double ceramic junction, refillable	
Strong acid	HI 1043B/D/P, HI 1040S	double ceramic junction, refillable	
	HI 1135B	double ceramic junction, refillable	
Surface measurements	HI 1413B, HI 1413B/50, HI 1413S/50	open junction, viscolene	
Swimming pool, Municipal water	HI 1297D	cloth junction, gel filled	
Titrations with constant temperature range	HI 5412 + HI 2110B	HI 5412 measurement, HI 2110B reference	
	HI 1131B/D/P , HI 1111S	ceramic junction, refillable	
Titrations with wide temperature range	HI 5311 + HI 2110B	HI 5311 measurement, HI 2110B reference	
	HI 1131B/D/P , HI 1111S	ceramic junction, refillable	
Tris buffer	HI 1144B/D	ceramic junction, refillable	
	HI 1343B/D	single ceramic junction, refillable	
	HI 5412	single ceramic junction, refillable	
	HI 5413	PTFE junction, refillable	
	HI 5414	double ceramic junction, refillable	
Vials and Test tubes	HI 1093B	open junction, viscolene	
	HI 1330B/D/P, HI 1310S	ceramic junction, refillable	
Wine and Must	HI 1048B/D/P	CPS™ open junction, refillable	
Wine processing	FC 220B/D	triple ceramic junction, refillable	

ORP ELECTRODES

PART NUMBER	SPECIFICATIONS	PAGE
HI 3230B/D, HI 3210S	Platinum sensor, ceramic junction, gel filled	
HI 3618D	Platinum sensor, ceramic junction, refillable	
HI 3619D	Platinum sensor, ceramic junction, refillable	
HI 3620D	Platinum sensor, ceramic junction, gel filled	
HI 4430B/D, HI 4410S	Gold sensor, ceramic junction, gel filled	
HI 4619D	Gold sensor, ceramic junction, gel filled	

*Unsure about which electrode to choose? Give your local HANNA office a call for assistance.

pH Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA



Combination and Special pH and ORP Electrodes

A Wide Range

In recent years technology has made considerable progress in electrode manufacturing, achieving notable high levels of accuracy. Today an electrode is an accurate, compact sensor that is easy to use. Because of its qualities and the ease with which it can be cleaned, the glass body is close to the ideal solution for measuring pH; the only problem is its fragility. This has pushed manufacturers toward the production of electrodes with a stronger protective sheathing—a plastic cylinder. This has solved the problem of fragility but at the cost of performance; plastic electrodes do not break but cannot withstand high temperatures and are more difficult to clean. Fortunately, HANNA manufactures both types of electrodes to suit a variety of applications. HANNA is the major European producer and for decades has not failed to provide technologically innovative products for its scientific clientele throughout the world. We introduced the first electrode with enclosed temperature sensor in 1984 and the first pre-amplified electrode with AmpHel® connector in 1988. HANNA, backed by its many years of experience, continuously innovates in the electrode manufacturing and design field.

Tip shape

Spherical Sensor



A **Spherical tip** is recommended for general use in aqueous or liquid solutions and provides a wide surface of contact with the sample.

Conical Tip Sensor



A **Conical tip** is recommended for the measurement of semisolid products, emulsions, cheese, meat and food in general.

Flat Tip Sensor



A **Flat tip** is recommended for direct surface measurement on skin, leather, paper, etc.

Water Conductivity and pH Measurement

pH measurements require some conductivity for the sample to be tested. The exact conductivity varies with electrodes, but values lower than 200 µS/cm may be troublesome. Demineralized water does not have sufficient ionic strength for a correct pH measurement.

In the case of low conductivity values, when working below 200 µS/cm, we suggest the use of specific electrodes, such as our HI 1053B.

pH Measurement

pH measurements are typically performed with electrodes made with a special pH sensitive glass sensing tip. Fourteen decades of concentrations can be reliably measured using proven technology. Over the last few years, some companies have also offered ISFET technology. Fueled by the FDA's decision to avoid the use of glass in food processing, ISFETS were introduced to the marketplace but were found to suffer from drift and instability. ISFETS may have limited use, but pH glass is still the far better choice for the majority of applications.

HANNA Offers Different Shaped Membranes

Glass electrodes are available with different shaped membranes; spherical membranes, conical shaped membranes or flat tips. For analysis of small samples, micro-electrodes are also available.

HANNA Offers 4 Different pH Sensitive Glass Formulations

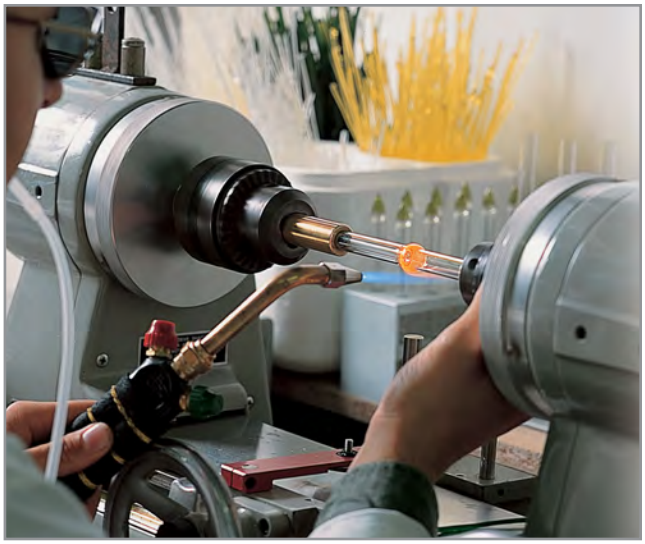
HANNA utilizes 4 different types of pH sensitive glass in the production of our vast offering of pH electrodes. To optimize a pH measurement for a particular application, the pH glass characteristics are considered as well as exterior materials, reference junctions and ease of use. HANNA provides the best material and performance for a particular application to ensure reliability of measurement. For example, when measuring at temperature extremes, glass impedance is an important factor to consider. As a general rule, the pH glass impedance doubles for every 10°C (50°F) drop in temperature. Very high impedance results in a very noisy, erratic signal that is prone to errors in measurement. HANNA offers LT a low impedance glass for these applications. At elevated temperatures, glass can dissolve readily, shortening the life and performance of the sensor. HANNA offers HT glass for these applications.

GLASS MEMBRANE	APPLICATION
GP	General Purpose
HT	High Temperature
LT	Low Temperature
HF	Samples with Fluoride

GP Glass

The GP sensitive glass represents the premium model and offers the best responses over the entire pH range and can be used for a wide range of temperature and pH. Best conditions are obtained with a sphere with a diameter of 9.5 mm (0.37") and a system with impedance of 100 MΩ, but good readings can also be obtained with spheres of smaller diameter.

As the diameter of the sphere is reduced, the system impedance increases, the response time goes from the usual 2 seconds for the 9.5 mm (0.37") sphere to about 6 seconds with a 3 mm (0.12") sphere.



HT Glass

Designed for extended use at elevated temperature and pH greater than 12. The glass impedance has a temperature coefficient of about 14.3% per degree Celsius. An electrode having an impedance of 100 MΩ at 25°C (77°F), at a temperature of 32°C (90°F) will have an impedance of about 50 MΩ and at 18°C (64°F) an impedance of about 200 MΩ. Impedances less than 1Ω are dangerous for the sensor, which will degrade in a short time.

For high temperature applications, sensitive glass with an impedance of about 400 MΩ at 25°C (77°F) has been produced. This solution makes it possible to carry out normal operations for long periods at 90°C (194°F) and for a few weeks at 100°C (212°F). It should be obvious that these electrodes are to be used with due care at room temperature where the response time rises sharply.

LT Glass

This glass should be used for low temperature work (under 60°C) and is not suited for a pH greater than 10. Temperatures below -8°C (17°F) will cause the mechanical destruction of the sensor. The system impedance should not exceed 1,000 MΩ, otherwise the reading becomes too slow, even exceeding 30 seconds, which is less than ideal for industrial and bench measurements. With such slow response times, process control would not be effective. For industrial and bench applications, a different batch of sensitive glass has been prepared with an impedance at 25°C (77°F) of 40 MΩ. At a temperature of -5°C (23°F) the impedance does not exceed 650 MΩ so that the response time is acceptable for industrial control (see our Process section).

HF Glass

HF sensitive glass has been produced for aggressive environments in the presence of hydrofluoric acid. With this formulation a tenfold increase has been achieved for the average life of an electrode from an average of 10 to at least 100 operating days (with pH values greater than 2 and fluorides content less than 2 g/L). The alkaline error for this type of sensitive glass is very high and is not suited for pH measurements greater than 10.00.

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HI 98121 • HI 98120

pH/ORP and ORP Testers

Waterproof and Floating with Dual-level LCD



pH and ORP readings in ONE Tester!

HI 98120 is a waterproof ORP and temperature meter while HI 98121 measures pH, ORP and temperature. The housing of these testers have been completely sealed against humidity and are designed to float.

The exposed stainless steel temperature sensor on these models facilitates faster and more accurate temperature measurement.

- HANNA's *exclusive cartridge pH and ORP electrode*

  Electrode replacement with the stainless steel round connector means there are no pins to bend or break during replacement.
- *Cloth extendable pH junction (HI 98121)*

  When the cloth junction becomes clogged and response time is sluggish, simply pull out 3 mm (1/8") to clear the clogging which will improve response time and stability.
- *Dual-level LCD*
- *Automatic Temperature Compensation (HI 98121)*
- *Automatic Calibration (HI 98121)*
- *Battery % Level at startup and stability indicator*

SPECIFICATIONS		HI 98120	HI 98121
Range	ORP	± 1000 mV	
	pH	—	-2.00 to 16.00 pH
	Temperature	-5.0 to 60.0°C / 23.0 to 140.0°F	
Resolution	ORP	1 mV	
	pH	—	0.01 pH
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	ORP	±2 mV	
	pH	—	±0.05 pH
	Temperature	±0.5°C / ±1°F	
Calibration	ORP	factory calibrated	
	pH	—	automatic, 1 or 2 points with 2 sets of memorized buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)
Temperature Compensation		—	automatic for pH readings
Electrodes		HI 73127 replaceable pH electrode (included); fixed ORP sensor	
Battery Type / Life		(4) 1.5V with BEPS / approx. 250 hours of continuous use; auto-off after 8 minutes of non-use	
Environment		-5 to 50°C (23 to 122°F); RH max 100%	
Dimensions		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")	
Weight		100 g (3.5 oz.)	

ORDERING INFORMATION

HI 98120 (ORP)is supplied with HI 73120 ORP electrode, HI 73128 Electrode removal tool and 1.5V batteries (4)

HI 98121 (ORP/pH) is supplied with HI 73127 pH electrode, HI 73128 Electrode removal tool and 1.5V batteries (4)

ELECTRODES

HI 73127	Spare pH electrode (HI 98121)
HI 73120	Spare ORP electrode (HI 98120)

SOLUTIONS

HI 7004M	pH 4.01 buffer solution, 250 mL
HI 7007M	pH 7.01 buffer solution, 250 mL
HI 7010M	pH 10.01 buffer solution, 250 mL
HI 7021M	ORP test solution (240 mV), 250 mL
HI 7022M	ORP test solution (470 mV), 250 mL
HI 70300L	Storage solution, 460 mL



HI 73127 — pH Electrode

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pH Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA

pH Electrode Manufacturing

HANNA uses glass blowing technology, which is typical of the Murano masters, with sensitive glass sticks fused in controlled batches. Only this technique, which exposes the sensitive glass to the high fusion temperature for a few seconds, can guarantee the consistancy and quality of the pH half-cell.

Other producers use the continuous fusion technique in crucibles with induction furnaces. In this case the glass is exposed to the fusion temperature for hours and it is difficult to retain the quality of the product due to the evaporation of some of its components.

Electrode Body

Until the seventies, it was a common practice to offer two half-cells separately, glass electrode and reference electrode. Nowadays it is much more common to offer the two cells as a single combined electrode. The reference electrode is still used as a single half-cell for ion-selective electrodes (ISE). The pH bulb with sensitive glass is welded to a tube of common glass which is not pH sensitive. The pH electrode, separate or combined, can be produced as an all-glass unit, which is ideal for laboratory use, or with the protection of a body made of a plastic material that is compatible with a chemical environment. HANNA uses PEI resin, PVDF for industrial applications, PVC and other materials. To increase immunity to electrostatic and magnetic field disturbances, the electrode can have a body made of stainless steel or titanium. In this case the metallic tube functions as a matching pin.



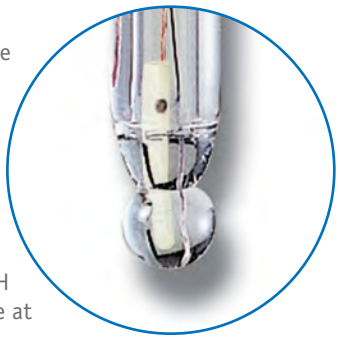
Titanium Cased Electrode

Matching Pin

The reference half-cell is in direct contact with the liquid to be analyzed. In the case that currents (electrolysis) or conductivity measurements are present in the same sample, the magnetic fields that have been created are picked up by the reference electrode and the measurement of the pH is altered. The matching pin isolates these current/magnetic fields from the reference electrode.

HANNA has introduced a number of models provided with the matching pin design for safe and precise pH measurements.

How Temperature Effects pH Measurements



The pH of your sample may change value with temperature. An example is pH buffers whose well-characterized values are published on the bottle. Temperature compensation in pH does not compensate for the change in pH of your sample from temperature. Rather, pH compensation yields the pH value at the temperature of measurement.

A well made pH electrode matches internal voltages from the reference half-cell and sensor so they cancel each other out. The only variable is the sample which is compared to standard pH buffers.

The table below illustrates the effect temperature has on silver/silver chloride reference half-cell. HANNA matches the internal half-cells so changes in voltage with temperature virtually cancel one another out.

Change of the EMF for the Ag/AgCl Reference Half-Cell with Variation of Temperature

TEMPERATURE	EMF (mV)	
°C	3.5 M	SATURATED
05	218.7	218.7
10	215.2	213.8
15	211.7	208.9
20	208.2	204.0
25	204.6	198.9
30	200.9	193.9
35	197.1	188.7

A well made pH electrode is a electromechanical device that follows the Nernst equation:

$$E_{obs} = E_c + \mathbf{ln(10)RT\ /\ nF}\ \log(a_{H}+)$$

$\mathbf{E_{obs}}$ = Observed potential (sum of reference and liquid junction potentials)

$\mathbf{E_c}$ = Reference potential including other stable and fixed potentials

$\mathbf{A_{H+}}$ = The hydrogen ion activity

T = Temperature in Kelvin (C° + 273.15)

n = Valency of the ion measured (1)

F = Faraday's constant (9.6485×10^4)

R = Gas constant (8.31432J / KMol)

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From this equation one can see if the temperature T changes the term **ln(10)RT / nF**, which is known as the slope factor, will change also. The table below illustrates the change in slope factor for changes in temperature.

EMF OF SENSITIVE GLASS	
TEMPERATURE (°C)	**EMF (mV PER pH UNIT)**
05	55.18
10	56.18
15	57.18
20	58.17
25	59.16
30	60.15
35	61.14

The ability to compensate changes in the Nernst slope factor in the least possible time requires the integration of the temperature sensor inside the electrode. It is also far more convenient for one electrode to move. Unfortunately, by having the temperature sensor there, the cabling to the instrument became a nightmare. Four lead cables with appropriate insulation for shielding became so bulky, it was difficult to carry around. In 1988 HANNA incorporated preamplifiers in some of their pH electrodes used with portable instrumentation. This popular design has permitted us to use less bulky cables and have the advantage of the integral sensor incorporated with the pH. The preamplifier converts the high inpedance signal to a low impedance signal and the bulky insulated cables are not needed.

Other functions can also be added to the electronic circuit's memory. Electrode production data (its DNA) and the recognition of the model code of the electrode are two examples the instrument can use this data thus avoiding calibration errors.

Another important use is offered by the possibility to correlate the instrument calibration to the electrode. When the user has to use a different electrode for a different application, the instrument will recognize the new electrode and can tell if it has been previously calibrated and proceed correctly.

This technology has spread from industrial to laboratory measurements.

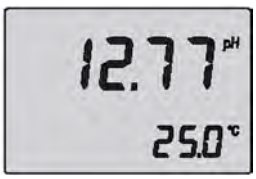
Alkaline Error

Alkaline error is when the electrode reads sodium ions as hygrogen ions. The pH reads lower than it should. The tables below show the sodium error of typical pH sensors (comparison between 4 manufacturers and 4 HANNA glass):

Measured Values @20-25°C (68-77°F) with Na^+ 0.1 M								
CORRECTION TO THE MEASURED VALUES								
OTHER MANUFACTURERS					HANNA instruments®			
pH	**A**	**B**	**C**	**D**	**GP**	**HT**	**LT**	**HF**
10.5	0.03							0.06
11.0	0.05	0.07	0.04					0.15
11.5	0.08		0.06	0.01			0.05	0.22
12.0	0.15	0.23	0.10	0.01	0.01		0.18	0.30
12.5	0.25		0.16	0.05	0.11	0.05	0.28	
13.0	0.48	0.46	0.26	0.11	0.23	0.11	0.35	
13.5			0.40	0.16	0.35	0.16	0.45	
14.0		0.82		0.21	0.48	0.20	0.54	

Measured Values @20-25°C (68-77°F) with Na^+ 1 M								
CORRECTION TO THE MEASURED VALUES								
OTHER MANUFACTURERS					HANNA instruments®			
pH	**A**	**B**	**C**	**D**	**GP**	**HT**	**LT**	**HF**
10.0	0.05		0.05				0.01	0.05
10.5	0.09		0.08				0.14	0.25
11.0	0.15		0.14	0.03	0.02		0.30	0.48
11.5	0.25		0.22	0.06	0.11	0.01	0.46	0.71
12.0	0.48		0.35	0.10	0.21	0.06	0.62	
12.5			0.50	0.14	0.32	0.11	0.79	
13.0				0.18	0.43	0.15		
13.5				0.23	0.45	0.21		
14.0				0.28	0.65	0.27		

Incorrect Reading



Correct Reading



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pH Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA

Half-Cell/Reference Electrodes

All potentiometric measurements are taken with two electrodes, one is a sensor with a potential that varies as a function of the concentration of the species to be measured and a reference electrode which keeps its potential constant. The mV read is the difference of the two values.

Calomel Electrode


Calomel Electrode

The calomel electrode has a cartridge containing some mercury in contact with a with mercuric chloride paste. It is dipped into a solution of potassium chloride which is in contact with the sample to be measured through a ceramic filter.

The concentration of potassium chloride varies from saturated down to 0.1 M. The calomel electrode responds very slowly to temperature changes; it could even take hours to come to thermal equilibrium and it cannot be used for temperatures higher than 70°C (158°F). There are also concerns regarding mercury in the environment.

The table below shows the half-cell potential (mV) provided by the calomel electrode with temperature:

Temperature	KCl Concentration				
°C	0.1 M	3.0 M	3.5 M	4.0 M	Saturated
10	336.2	260.2	255.6		254.3
15	336.2	258.5	253.8		251.1
20	335.9	256.9	252.0		247.9
25	335.6	254.9	250.1	245.9	244.4
30	335.1	253.0	248.1	243.8	241.1
35	334.4	250.8	246.0	241.6	237.6
40	333.6	248.7	243.9	239.3	234.0

Silver/Silver Chloride Half-Cell

The silver/silver chloride electrode is made of a pure silver wire electrocoated with a layer of silver chloride. The electrode is then dipped in a potassium chloride solution in contact with the sample to be measured through a ceramic filter.


Electrode with Ag/AgCl Reference

Since the concentrated potassium chloride dissolves the silver chloride, the electrolyte is first saturated with silver chloride.

The Ag/AgCl half-cell responds to the temperature changes much faster than the calomel electrode and may be used at temperatures higher than 70°C (158°F) for a long period of time.

The advantages due to the fast response and wide range of operating temperatures have contributed in making the Ag/AgCl reference half-cell very popular. It is also safer to handle.

The table below shows the potential (mV) supplied by the half-cell

Temperature	KCl Concentration	
°C	3.5 M	Saturated
10	215.2	213.8
15	211.7	208.9
20	208.2	204.0
25	204.6	198.9
30	200.9	193.9
35	197.1	188.7
40	193.3	183.5

Reference Half-Cell Junction

The reference half-cell must be constructed so as to allow contact between the liquid inside the half-cell and the liquid being tested. The fill solution must meet various requirements:

- No substances be introduced in the sample that may interfere with the solution to be measured
- The solution to be measured must not react with the solution of the reference half-cell
- The solution to be measured must not react chemically with the solution of the reference half-cell.


Ceramic Junction

The junction (the part in contact between the two liquids) is made with materials that must not interfere or be chemically attacked by the solutions. The materials most commonly used are:

Ceramic filter with different porosities. Normally used in electrodes with glass bodies, because ceramic is easily welded to glass.

Filters of porous PTFE (PolyTetraFluoro-Ethylene), these also with different porosities. Because of its chemical advantages, PTFE is widely used in industrial applications.

Filters with microporous gauze. Their application is increasing because, as the cloth like material is pulled out from its position, the junction is renewed with an uncontaminated fresh surface.


Cloth Junction

Other types of junctions include:

Open junction. The reference half-cell is filled with a special gel which comes into direct contact with the solution to be measured. An advantage of an open junction is low contact resistance and virtually impossible to clog.

Capillary junction. Can be made with frosted glass, using the microporosity of the frosted parts of the contact surface. The advantage of a capillary junction is that the contact can be easily removed and cleaned with special cleaning solutions.

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pH Measuring System

HANNA put a lot of effort in the development of efficient pH measuring systems. the required components for a pH measurement are:

1. **A pH Electrode**: Sensor half-cell of an electrochemical cell that typically contains a special glass composition membrane that generates a voltage in response to hydrogen ion concentration. This sensor is often found combined with a reference electrode to form a combination.
2. **Reference Electrode**: The other half-cell of the electrochemical cell. It supplies a *stable* voltage which any changes from the pH electrode are measured. It also provides electrical continuity with the solution being analyzed via it's liquid junction.
3. **High Input Impedance Meter**: It is the measurement device that processes the voltage form the electrochemical cell and converts it into a meaningful measurement unit (pH). The measurement is done with virtually zero current flow to prevent polarization of the electrodes. Modern pH meters also may provide sensor diagnostics, automatic buffer recognition, calibration reminders and user prompts.
4. **Chemical pH Buffers**: Stable well characterized standards for calibration. Two or more pH buffers that bracket the sample pH range are suggested for the most accurate results.
5. **A Thermometer or Temperature Probe**: The temperature is required to calibrate the electrode properly, as buffers have different values at different temperatures. An auxiliary or built-in temperature probe and automatic buffer recognition ensures the calibration and measurement is temperature compensated automatically, thus eliminating error.
6. **A Magnetic Stirrer**: Used in a laboratory setting, a magnetic stirrer together with magnetic stir bars continually agitate the buffer and/or samples to keep them homogenous without temperature or sample gradients.

One Stop Shopping

Unlike other instrument manufacturers, HANNA produces all of the components of a pH measurement system. Having all facets under our control ensures top quality, prompt deliveries and equipment that works together correctly. It should not come as a surprise that HANNA has been able to create innovative and useful accessories for this product line as well.

Clean pH Electrodes

A clean pH Electrode provides the best measurement. HANNA has studied the effects of a soiled pH surface on electrode efficiency and has solved the problem of how to clean a pH glass surface properly.

As mentioned previously, a pH measurement requires two half-cell potentials. The pH sensor is sensitive to changes in hydrogen ion concentration and is normally made from a special gass membrane bulb. Inside the glass bulb a buffered (close to pH 7) chloride containing solution is permanantly sealed with a silver wire coated with silver chloride. This forms a stable internal pH sensor voltage. If the external bulb surface was placed into this same buffered solution, the voltage difference would be zero or very small. As the hydrogen concentration was changed on the outside of the bulb (sample side), the glass bulb produces an electrical potential equal to 58.17 mV for each unit of pH (at 20°/68°F). The actual value that is generated depends on the exact pH glass composition used in producing the pH sensor. Each manufacturer uses slightly different compositions of components but most pH glass contains these components in these proportions: 21.6% Na_2O, 6.4% CaO and 72% SiO_2.

A Dirty Bulb



When the surface of a pH bulb is not perfectly clean (i.e. 10% coated), there is a 10% reduction in sample contact with the external bulb. Let us assume the pH sensor is in a sample of pH 4 but has a greasy deposit (value pH 7) on 10% of it. The voltage (EMF) the sensor will generate can be calculated...

- 90% of the sphere: pH 7 inside and pH 4 outside = 0.9 x 3 x 58.17 = 0 mV
- 10% of the sphere: pH 7 inside and pH 7 outside = 0.1 x 0 x 58.17 = 0 mV (portion of the dirty sphere)
- The available EMF will then be 157.059 mV. In the case of a clean electrode, the EMF would have been:
- 100% of the sphere: pH 7 inside and pH 4 outside = 1 x 3 x 58.17 = 174.51 mV

Therefore a dirty electrode supplies less EMF than a clean one.

Instrument Calibration

pH meter calibration depends on the specific characteristics of the electrode. The electrode is first placed in the solution at pH 7 and the instrument offset is calibrated, then the electrode is placed in the solution at pH 4 or pH 10 and the slope of the instrument is calibrated. After the instrument has been calibrated it can work accurately for a few hours or weeks depending on the characteristics of the liquid to be tested.

If the electrode is clean, the slope retained in the instrument will be 174.5 mV (see the example presented earlier), which when divided by the 3 pH units of difference gives 58.1 mV for each unit of pH.

If the electrode is dirty, the slope will be 157.1/3=52.4 mV for each unit of pH. Now just imagine how an instrument would behave if it were calibrated with a slope of 52.3 mV rather than 58.1 mV. As long as the dirt remains in its original position, the instrument will give correct measurements. If the dirt circulates while the pH bulb remains in contact with the solution to be tested, the instrument will again measure correctly with a slope of 58.1 mV but the instrument which had been previously calibrated to respond to 52.3 mV will display incorrect pH values. In this case each reading will have a systematic error of 11.11 %.

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pH Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA

Dirt Could Come From Anywhere

Eyeglasses are commonly used and it is well known how easily they become dirty. Each small spot represents a percentage error when it comes to measuring the pH.

HANNA offers instruments that are capable of detecting calibration errors due to spots (dirt), look for the symbol on the right throughout our catalog. In addition, it has developed a wide range of cleaning solutions for pH electrodes that makes this operation easy for users.

pH Electrode Conditioning and Conservation

The glass electrode should not be used when it is dry. The bulb must always be hydrated or the active layer degenerates and it will then take hours to restore equilibrium.

The electrode should be kept in a HI 70300 pH storage solution or in a buffer solution at pH 4 or pH 7. We do not advise storage of the electrode in alkaline buffer solutions with values higher than pH 9.18 or deionized water.

Reference electrodes also benefit from being kept wet with HI 70300 solution. If the reference is stored dry, evaporation of electrolyte results in salt crystals forming around the ceramic junction. These crystals are easily washed off but there is also danger of the porous junction developing air pockets. Instability results until the ceramic is wetted through.

With ceramic diaphragms, this equilibrium can be achieved by immersion in HI 70300 solution for a few hours. When PTFE is used, an immersion of 24 hours may be necessary. Avoid the use of deionized water to store glass and reference electrodes. Deionized water promotes osmosis with the salty solution inside the reference electrode and a higher rate of diffusion.

Reference electrodes have both gels and liquid filling solutions (typical for laboratory electrodes). When liquid fill solutions are used, the fill hole on the electrode body must be kept open during measurements to ensure positive head pressure and promote flow of electrolyte through the junction from inside the electrolyte reservoir to the outside of it. This promotes the formation of a good stable liquid junction. Unscrew the fill hole cap during measurements and close it afterward for storage.

The liquid filling solution level should be restored to just below the fill hole level by using the appropriate electrolyte and a syringe. The level should not drop below 50% of the electrode length and should always be above the level of the immersed sensor.

Electrolyte Solutions

HI 7071 : KCl 3.5 M saturated with AgCl
HI 7082 : KCl 3.5 M without AgCl
HI 7072 : KNO_3 1 M
HI 8093 : KCl 1 M + AgCl

Single-Junction Reference

This is the most common model, where a Ag/AgCl wire is dipped into a 3.5 molar KCl + Ag Cl solution. As explained in the section on reference electrodes, the electrolyte must be saturated with AgCl to avoid dissolution in the KCl electrolyte. It allows the possibility that traces of AgCl will come into contact with the sample solution forming silver precipitates which may block the junction.

Double-Junction Reference



HI 1230B
pH Electrode with
Double Ceramic Junction

This silver/silver chloride based half-cell has two chambers for electrolyte. The internal chamber houses the silver/silver chloride wire and electrolyte containing chloride and AgCl. It contacts the outer chamber through a porous ceramic junction. The outer chamber serves as a silver free buffer zone. The electrolyte may be 3.5 M KCl or 1 M KNO_3 for example. A second junction contacts the sample from this chamber. The advantage of this design is the absence of silver in the electrolyte. Since silver reacts with tris buffer and heavy metals to form a precipitate. Keeping the silver within the inner chamber and KCl in the outer chamber prevents the precipitation and results in a cleaner junction, free from silver precipitates.

The disadvantage is, such an electrode has a greater heat capacity, which may be a problem when measuring laboratory samples at different temperatures. The double junctino reference is widely used with process electrode designs, especially when taking measurements inside pipes with operating pressures up to 8 bar.

HANNA's Fail Safe Technology



HI 1217-6
F.S.T.

A typical pH electrode is designed to generate 0.0 mV EMF at a pH of 7. But a zero mV reading can occur for many reasons.

- Healthy electrode at pH 7
- Cable short circuited
- Connector is short circuited
- pH bulb is broken
- The cable is leaking
- The high impedance stage for tyhe pH meter is damaged.

HANNA has introduced innovations in electrodes and instruments that takes the guess work out of normal readings and a failur mode that produses a 0 mV signal. HANNA's F.S.T. (Fail Safe Technology) is an active system that provides an mV value different from the one seen at 7 pH to delineate the difference between failure and normal operation.

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On a normal electrode, the electrolyte inside the sensitive bulb has a value of pH 7. The electrode is sensitive to the pH difference between the inside and outside surfaces of the bulb. Therefore:

- pH 7 inside & pH 4 outside = 3 x 58.17 mV = 174.51 mV

When the bulb is in a solution with pH 7 the electrode has 0.0 mV EMF:

- pH 7 inside & pH 7 outside = 0 x 58.17 mV = 0 mV

HANNA's F.S.T. produces electrodes with an internal electrolyte at pH 4:

- pH 4 inside & pH 4 outside = 0 x 58.17 mV = 0 mV
- pH 4 inside & pH 7 outside= -3 x 58.17 mV = -174.51 mV

Therefore at pH 7 the electrode supplies -174.51 mV and not 0 mV. This way pH 7 readings are avoided every time the system does not function.

This solution is available in the HI 83140 and HI 9813-6 pH meters, and in the HI 1217-6 and HI 1285-6 electrodes.

Connectors for pH Electrodes

As previously described, a pH electrode is made of a half cell of pH sensitive glass and a reference electrode. From the tip of each electrode a connecting wire comes out. A pH electrode needs therefore 2 conductors.



BNC and DIN Connectors

A special insulated cable is required to carry the high impedance mV signal from the pH sensor without experiencing a voltage drop and error in pH value. pH glass impedance is found to vary from a few MΩ up to 800 MΩ depending on glass type and temperature. To ensure a precise measurement (0.001 pH), the connecting cable requirement is extremely important and must have an impedance 14,000 times greater than that of the glass electrode (800 MΩ x 14,000 = 11.2 x 10^{12}Ω).

Any insulation of less than 10^{12} Ω will result in wrong readings. In case of leakage a drained current from the electrode occurs. A pH measurement must be made with no current flow.

Leakage currents higher than 2 pA (picoamps) will damage the electrode and cause it to polarize. An electrode that has supplied a few picoamps just for a few seconds, will take hours to regain its capacity to take measurements.

At the end of the cable there is a two-conductor connector. The most common version, capable of holding the high value of the required insulation, is the BNC connector with PTFE insulation.

The use of the BNC connectors may become obsolete because of the severe limitations imposed by the use of only two wires.

Cable Length for pH Measurement

As already explained, a pH electrode has a base impedance of 100 MΩ and, depending on the temperature, could also reach 800 MΩ.

The connecting cable must be coaxial with the inside well insulated (PTFE). The cable is, therefore, a condenser, which means that the higher the system impedance, the higher the charging time of the condenser. The time for recharging the condenser also corresponds to the time needed for a correct reading.

Because of the limitations that have been mentioned, cables longer than 5 meters (16') should be avoided.

In industrial installations, a signal from the sensor often has to travel much greater distances than 5 meters (16'). Often a device known as a 2 wire transmitter is used to convert the voltage from the sensor to a current for transmission. The current can travel long distances to a recording device, controller or other devices that can use the 4-20 mA signal. The HI 8614 and HI 8614L (pictured) are two wire transmitters that have water-tight cases and galvanically isolated power requirements. (HI 8614: 18 to 30 Vdc, HI 8614L: 20 to 36 Vdc). These transmitters carry the 4-20 mA signal over the same two wires as power. The local indication of pH near the sensor makes installation of the pH electrode quick and easy. The downside of this technology is the receiving device must accept and utilize the current input.



Another approach for carrying a pH signal a long distance without loss of signal or noise is realized with the HANNA AmpHel® sensor. This preamplified pH sensor contains its own high impedance pH amplifier with required batteries. The typical high impedance signal from a pH bulb is reduced to a low impedance signal. The low impedance signal can be carried long distances (100 m; 328') without degradation in signal. The preamplifier has a life of approximately 3 years from the date of production. This long life exceeds the typical life of a pH glass bulb.

Troubled Installations Due to Cable Issues: Cable Leakage

A high impedance coaxial cable, when installed more than 5 meters away from the electrode could also be subject to current leakage. Quite often, installers place sensor cables in conduits and bury them underground. During the installation of the cable, the insulation may become nicked or crimped from being pulled around sharp corners or rubbing against burrs in the pipes. The braided metallic screen that carried the reference half-cell signal is found under the outer wire sheath and could be exposed to the surface of the conduit.

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pH Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA



Underground conduit installations can become humid during rainy seasons and form a conductive path to the conduit. If the reference signal becomes "grounded", the reference voltage can be altered by many mV and the pH measurements will be in error. This is another good reason to avoid pH cable lengths greater than 5 meters.

Patch Cable Connections

Some manufacturers have adopted the use of integral sensor connectors that are used with a separate patch cable. The connector is mounted directly to the top of the electrode, where it connects to a separate cable connector on a patch cable of wire. The patch cable remains connected to the meter, or through a conduit as a permanent attachment. The top of the electrode is vulnerable to process moisture or condensation. This connection has been found to suffer from moisture penetration that results in voltage drops due to loss of cable insulation. In critical control applications, a drift in pH could cause harmful additions to the process that could ruin an entire process batch.

ORP Electrodes

When oxidizing and/or reducing agents are dissolved into an aqeous sample, they react with materials present and produce a voltage (EMF) that is related to the ratio of oxidized to reduce the species in the sample. An electron exchange can develop between this solution and an inert metal sensor immersed in the solution, and the voltage can be measured (when compared to a reference electrode) with a pH/mV meter. This type of measurement is known as redox or ORP, and the units of measurement are the mV. At a glance, an ORP electrode may look very similar to a pH electrode. Like a combined pH electrode, both the "sensor" and the reference are housed in a common body. A common use for this type of sensor is as an indicator in an ORP type titration.

The scale of measurement may be positive (indicating oxidizing) or negative (indicating reducing). Note: When zero mV is observed, it is really an oxidizing situation because the reference voltage (~200 mV for an Ag/AgCl with KCl electrolyte) is included in the observed mV value. In some cases the user may wish to offset the reading to remove the reference contribution. The mV is then said to be approaching the absolute mV scale that references a SHE (standard hydrogen electrode).

An ORP electrode must be chemically inert; it cannot be oxidized or reduced itself. It must also have the proper surface characteristics to promote rapid electron exchange, a property known as high exchange current density. Two noble metals have proven to work well for this purpose. Pure platinum and pure gold are both used in the construction of ORP sensors.



Platinum Ring



Platinum Pin

The platinum sensor is often preferred because it is mechanically simpler and safer to produce. Platinum can be welded to glass and has the same thermal coefficient.

Sensors made of gold cannot be welded to the glass and are often placed in plastic supports applied to the glass or plastic tube by means of tiny elastomeric bungs. The gold or platinum sensor signal is carried through the electrode body, and together with the reference signal is conducted to the measurement meter via a coaxial cable with BNC connector.

An ORP system does not have a high impedance source (like a pH bulb), but is a potentiometric device that produces a voltage (like pH). It also uses similar cables, connectors and calibration solutions. For this reason a high impedance electronic meter (pH) with many user friendly features are a benefit for this measurement also.

Because of the close relationship between pH and ORP, there is a scale that takes into account the ratio (mV) ORP/pH, the rH scale. The rH range varies from 0 to 42, where the extreme values represent the reducing effect of an atmosphere of pure hydrogen (rH=0) and to the oxidizing effect of an atmosphere of pure oxygen (rH=42), respectively.

This is the formula for obtaining the rH value:

$$\mathbf{rH} = \frac{\text{mV}}{0.0992\ (273.14 + \text{T})} + 2\ \text{pH}$$

where T is the temperature (°C) of the sample, ***mV*** *is the ORP (mV) reading, and* ***pH*** *is the pH value of the sample.*

The rH scale is not used in the instruments available on the market and the direct mV reading from the electrode is preferred, within the ±2000 mV range, without compensation/correlation with the pH/temperature value.

RECOMMENDED OPERATING TEMPERATURE	
A	-5 to 30°C (23 to 86°F)
B	20 to 40°C (86 to 104°F)
C	30 to 85°C (104 to 185°F)

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2 points | B.E.P.S. | replaceable | lcd display | hold

HI 98127 (pHep®4) • HI 98128 (pHep®5)

pH/Temperature Testers

Waterproof with Replaceable Electrode Cartridge

The Tester That Started a Revolution

When HANNA introduced its first version of the pHep (pH electronic paper) in 1986, it immediately revolutionized the standard in pH measurement. The pHep's ease-of-use in combination with its affordability made it possible for non-technical and technical personnel alike to measure pH on the spot. Since its introduction, over 1 million pHeps have been used by satisfied customers around the world.

We at HANNA have always valued the comments and suggestions coming from our customers. With their input, we have included all of the features they have asked for and more! The pHep 4 and pHep 5 include features such as a dual-level LCD, battery level indicator, replaceable pH electrode cartridge, stability indicator, automatic shut-off and automatic calibration all in a waterproof casing that floats.

pHep®4 & pHep®5







Replaceable pH Electrode

HANNA's exclusive cartridge pH electrode. Electrode replacement with the stainless steel round connector means there are no pins to bend or break during replacement.



Cloth re-newable junction

When the cloth junction becomes dirty from routine testing, simply pull out 3 mm (1/8") to increase response time and stability.



Temperature Sensor

The pHep®4 and pHep®5's exposed temperature sensor provides fast response time, and its proximity to the pH electrode guarantees much more accurate temperature compensated readings.

ORDERING INFORMATION

HI 98127 (pHep®4) and **HI 98128** (pHep®5) are supplied with HI 73127 pH electrode, HI 73128 Electrode removal tool and 1.5V batteries (4).

SOLUTIONS

HI 70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI 70006P	pH 6.86 buffer solution, 20 mL sachets (25)
HI 70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI 70009P	pH 9.18 buffer solution, 20 mL sachets (25)
HI 70010P	pH 10.01 buffer solution, 20 mL sachets (25)

ACCESSORIES

HI 73127	Spare electrode
HI 73128	Electrode removal tool

SPECIFICATIONS

		HI 98127 (pHep®4)	HI 98128 (pHep®5)
Range	pH	-2.0 to 16.0 pH	-2.00 to 16.00 pH
	Temperature	-5.0 to 60.0°C / 23.0 to 140.0°F	
Resolution	pH	0.1 pH	0.01 pH
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.1 pH	±0.05 pH
	Temperature	±0.5°C /±1°F	
pH Calibration		automatic, at 1 or 2 points with 2 sets of standard buffers (pH 4.01 / 7.01 / 10.01 or pH 4.01 / 6.86 / 9.18)	
Temperature Compensation		automatic	
Battery Type / Life		(4) 1.5V with BEPS / approx. 300 hours of continuous use; auto-off after 8 minutes of non-use	
Environment		-5 to 50°C (23 to 122°F); RH max 100%	
Dimensions		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")	
Weight		100 g (3.5 oz.)	

HI 98103GC
Direct Sample pH Tester
Growers Field Checker® for Direct Measurement



Determine the pH of Fruit Directly on the Fruit Surface

The Growers Field Checker® (HI 98103GC) allows the user to determine the pH of fruit and plant tissue 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® works with you to obtain superior crops. The Growers Field Checker® is supplied with a flat-tipped pH probe which allows for minimal liquid sample.

- *Take measurements directly on surface of a sample*
- *High accuracy with 0.01 pH resolution*
- *1 or 2-point fast and accurate calibration*
- *Exceptionally long battery life of 3000 hours*
- *Specialized electrode with an open junction for fast response*

SPECIFICATIONS	HI 98103GC (Growes Field Checker®)
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	manual, 1 or 2 points
Electrode	HI 1413S/50 (included)
Battery Type / Life	(2) 1.5V / approx. 3000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	66 x 50 x 25 mm (2.6 x 2.0 x 1.0") - without probe
Weight	50 g (1.8 oz.)

ORDERING INFORMATION
HI 98103GC (Growers Field Checker®) is supplied with a HI 1413S/50 flat-tipped pH probe which allows for minimal liquid sample, scewdriver and instructions.

SOLUTIONS
HI 77400P pH 4 and pH 7 buffer sachets, (10) 20 mL, (5)
HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 7004M pH 4.01 buffer solution, 250 mL
HI 7007M pH 7.01 buffer solution, 250 mL
HI 70300M Electrode storage solution, 250 mL
HI 7061M Cleaning solution, 250 mL

HI 98201
ORP Tester
for Quick spot tests



Ideal for Swimming Pools and Spas

Oxidation Reduction is a process by which a molecule or ion loses or gains electrons. This occurs most readily in water treatment and in pool and spa maintenance where an oxidizer, such as chlorine, is added to the water to destroy contaminants. The higher the ORP value, the greater the sanitizing power of your water.

HI 98201 ORP is a unique hand-held tester developed for quick and affordable tests. This ORP tester can provide a valuable indication of water quality. This tester utilizes a platinum electrode and HANNA unique renewable cloth junction, that can be pulled out when clogging occurs, reactivating the reference and restoring the electrode.

SPECIFICATIONS	HI 98201
Range	±999 mV
Resolution	1 mV
Accuracy (@20°C/68°F)	±5 mV
Battery Type / Life	(4) 1.5V AA / approx. 700 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions (meter only)	175 x 41 x 23 mm (6.9 x 1.6 x 0.9")
Weight (meter only)	95 g (3.4 oz.)

ORDERING INFORMATION
HI 98201 (ORP) is supplied with protective cap, batteries and instructions

ELECTRODES
HI 73201 Spare ORP electrode*

SOLUTIONS
HI 7020M ORP test solution 200/275 mV, 250 mL
HI 7091M Reducing solution, 250 mL
HI 7092M Oxidizing solution, 250 mL

*to be replaced by authorized personnel only

HANNA instruments

With Great Products, Come Great Results™

replaceable

HI 981408
pH Stick Tester
for Fertigation Solutions

Designed for Growers

HI 981408 has been specifically designed to address the needs of operators in hydroponics, greenhouses and nurseries.

The meter has all the characteristics necessary to check the pH of the fertilizer solution during preparation. Sturdy and waterproof, it also floats so that it can be quickly retrieved if accidentally dropped in the tank.

To resolve the problem of frequent battery replacement, our R&D team has produced a meter that will run for 2000 hours continuously on common AA-type batteries. This translates into more than 2 years of continuous use up to 2 hours a day, seven days a week! Calibration has been simplified to one-point through a dial on the front of the meter. The outer casing also incorporates a molded eye so you can hang the meter when not in use.

- *Shock-resistant casing*
- *Long probe is ideal for tanks and vats*
- *2000 hours of operation on 2 AA batteries*





ORDERING INFORMATION

HI 981408 is supplied with HI 1219 pH electrode, pH 7 buffer solution, batteries and instructions

ELECTRODES

HI 1219 Spare double junction pH electrode

SOLUTIONS

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 70300M Electrode storage solution, 250 mL
HI 7061M Cleaning solution, 250 mL

SPECIFICATIONS	HI 981408
Range	0.0 to 14.0 pH
Resolution	0.1 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	manual, 1 point
Electrode	HI 1219 pH electrode, 240 mm (9.4") long, with double junction and DIN connector (included)
Battery Type / Life	(2) 1.5V AA / approx. 2000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions (meter only)	86 x 94 x 33 mm (3.4 x 3.7 x 1.3")
Weight (meter only)	150 g (5.3 oz.)

HI 98109 Skincheck™ • HI 98110 Skincheck™1

Skin pH Tester

A First Step to Healthy, Balanced Skin



Ideal for Dermatologists, Cosmetologists, Estheticians and other skin care professionals

Easy Non-intrusive pH Measurement

The health and beauty industry has been searching for a professional product that can determine the pH value of the scalp, hair strands and skin, quickly, accurately and inexpensively.

HANNA offers Skincheck™, the first pH meter that makes it possible for you to easily measure pH in this application.

Skincheck™ measures pH in just a few seconds with a special flat-tip electrode specifically designed to measure pH on body surfaces. Skincheck™ has a measurement range that covers the full spectrum of hair and skin pH levels. Measurements are quickly displayed on a large easy-to-read LCD with an accuracy of ±0.2 pH.

Skincheck is an absolute must for hair care specialists, beauty salons, cosmeticians, beauticians, dermatologists and the cosmetic industry.

- *Fast accurate results*
- *Cable model is ideal for easy viewing and for self measurements*
- *Approximately 3000 hours of operation*

SPECIFICATIONS	HI 98109 (Skincheck™)	HI 98110 (Skincheck™)
Range	0.00 to 14.00 pH	
Resolution	0.01 pH	
Accuracy (@20°C/68°F)	±0.2 pH	
Calibration	manual, 1 or 2 points	
Electrode	HI 1413S/50 (included)	HI 1413B/50 (included)
Battery Type / Life	(2) 1.5V / approx. 3000 hours of continuous use	
Environment	0 to 50°C (32 to 122°C); RH max 95%	
Dimensions	66 x 50 x 25 mm (2.6 x 2.0 x 1.0")	
Weight (with electrode)	70 g (2.5 oz.)	90 g (3.2 oz.)

ORDERING INFORMATION

HI 98109 (Skincheck™) is supplied with HI 1413S/50 pH electrode, calibration screwdriver, batteries and instructions

HI 98110 (Skincheck™1) is supplied with HI 1413B/50 pH electrode with 1 m (3.3') cable, calibration screwdriver, batteries and instructions

ELECTRODES

HI 1413B/50 Spare pH electrode for Skincheck™1 with BNC connector and 1 m (3.3') cable

HI 1413S/50 Spare pH electrode for Skincheck™with screw connector

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 7004M pH 4.01 buffer solution, 250 mL

HI 7007M pH 7.01 buffer solution, 250 mL

HI 7010M pH 10.01 buffer solution, 250 mL

HI 70300M Electrode storage solution, 250 mL

HI 7061M Cleaning solution, 250 mL



HANNA instruments

With Great Products, Come Great Results™



HI 98106 Champ® • HI 98107 pHep® • HI 98108 pHep®+

Electronic pH Tester

with Replaceable Electrode

The Standard for Quick, On-The-Spot Testing

Introduced in 1986, the pHep revolutionized pH measurement by providing everyone with a simple, inexpensive pocket pH tester.

Each instrument in the pHep® family comes with a protective cap that doubles as a measurement vessel. With our innovative non-clogging cloth junction the pHep® lasts much longer. Simply pull out 1-2 mm (1/8") of the extendable cloth junction to increase stability and response time. The temperature sensor of the pHep® + is exposed for rapid temperature compensation.



SPECIFICATIONS	HI 98106 (Champ ®)	HI 98107 (pHep®)	HI 98108 (pHep®+)
Range	0.0 to 14.0 pH		
Resolution	0.1 pH		
Accuracy (@20°C/68°F)	±0.2 pH	±0.1 pH	±0.1 pH
Calibration	manual, 1 point	manual, 2 point	manual, 2 points
Temp. Compensation	—	—	automatic, 0 to 50°C
Battery Type / Life	(4) 1.5V / approx. 800 hours of continuous use	(4) 1.5V / approx. 700 hours of continuous use	(4) 1.5V / approx. 200 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%		
Dimensions	175 x 41 x 23 mm (6.9 x 1.6 x 0.9")		
Weight	95 g (3.4 oz.)		

ORDERING INFORMATION

HI 98106 (Champ®) is supplied with protective cap, calibration screwdriver, batteries and instructions.

HI 98107 (pHep®) is supplied with protective cap, calibration screwdriver, batteries and instructions.

HI 98108 (pHep®+) is supplied with protective cap, calibration screwdriver, batteries and instructions.

ELECTRODES

HI 73106* Spare electrode for HI 98106 and HI 98107

HI 73108* Spare electrode for HI 98108

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 7004M pH 4.01 buffer solution, 250 mL

HI 7007M pH 7.01 buffer solution, 250 mL

HI 7010M pH 10.01 buffer solution, 250 mL

HI 70300M Electrode storage solution, 250 mL

HI 7061M Cleaning solution, 250 mL

* To be replaced by authorized technical personnel only.



HI 96106 Champ® • HI 96107 pHep® • HI 96108 pHep®+

The Original pHep®

Quick pH Measurements

Simple, precise and rugged, pHep® is the answer to the inaccuracy observed with litmus paper.

This tester family includes 3 models:

HI 96106 (Champ®): pH tester with 1 calibration point

HI 96107 (pHep®): pH tester with 1 calibration point and ±0.1 pH accuracy

HI 96108 (pHep®+): combining pHep®'s characteristics with automatic temperature compensation (ATC) and calibration at 2 points. The ATC system measures the temperature of the sample and compensates the pH reading. Precision is increased by this feature even in quick measurements.

SPECIFICATIONS	HI 96106 (Champ ®)	HI 96107 (pHep®)	HI 96108 (pHep®+)
Range	0.0 to 14.0 pH	0.0 to 14.0 pH	0.0 to 14.0 pH
Resolution	0.1 pH	0.1 pH	0.1 pH
Accuracy (@20°C/68°F)	±0.2 pH	±0.1 pH	±0.1 pH
Calibration	manual, 1 point	manual, 1 point	manual, 2 points
Temp. Compensation	—	—	automatic, 0 to 50°C
Battery Type / Life	3 x 1.5V / approx. 150 hours		
Environment	0 to 50°C (32 to 122°F); RH max 95%		
Dimensions	150 x 30 x 21 mm (5.9 x 1.2 x 0.8")		
Weight	70 g (2.5 oz.)		

ORDERING INFORMATION

HI 96106 (Champ®) is supplied with protective cap, calibration screwdriver, batteries and instructions

HI 96107 (pHep®) is supplied with protective cap, calibration screwdriver, batteries and instructions

HI 96108 (pHep®+) is supplied with protective cap, calibration screwdriver, batteries and instructions

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 70300M Electrode storage solution, 250 mL

HI 7061M Cleaning solution, 250 mL

HI 98103
Checker® pH Tester

with Replaceable Electrode



The industry's most popular pocket-sized pH tester at the cost of a few rolls of litmus paper

The Checker® supplies users with fast and accurate readings from 0 to 14 pH with a resolution of 0.01 pH. This compact tester features a large easy-to-read LCD and simple to perform 2-point calibration.

The pH electrode of the Checker® can be easily replaced. You only need to unscrew the electrode from the meter body and screw on a new one.

The Checker® is fast, accurate, lightweight and with 3000 hours of battery life, you don't have to worry about frequent battery replacement.

Testing pH has never been easier!

- *High accuracy with 0.01 pH resolution*
- *2-point fast and accurate calibration*
- *Usable with virtually any electrode that shares the same connector*
- *3000 hours of battery life*
- *Small diameter probe fits easily into a test tube*

SPECIFICATIONS	HI 98103 Checker®
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	manual, 1 or 2 points
Electrode	HI 1270 (included)
Battery Type / Life	(2) 1.5V / approx. 3000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	66 x 50 x 25 mm (2.6 x 2.0 x 1.0") - without probe
Weight	50 g (1.8 oz.)

ORDERING INFORMATION

HI 98103 (Checker®) is supplied with HI 1270 screw-type pH electrode

ELECTRODES

HI 1270 pH electrode with screw-type connector

SOLUTIONS

HI 77400P pH 4 and pH 7 buffer sachets 20 mL, (5 ea.)
HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)
HI 7004M pH 4.01 buffer solution, 250 mL
HI 7007M pH 7.01 buffer solution, 250 mL
HI 7010M pH 10.01 buffer solution, 250 mL
HI 70300M Electrode storage solution, 250 mL
HI 7061M Cleaning solution, 250 mL

HI 99104
Education pH Tester

with Double Junction Replaceable Electrode



Versatile pH Testers for educational use.

HI 99104 is an ideal pocket tester for educational purposes.

Designed with a 0.01 pH resolution and two-point manual calibration through easy-to-reach trimmers, it immediately displays pH variations to reflect the smallest change in the sample.

Unlike conventional testers, HI 99104 has a long and slim stem, ideal for measurements in small samples or test tubes.

HI 99104 is supplied with a rugged, plastic body electrode and a screw connector that allows for quick and easy electrode replacement.

Additionally, it's low power demand allows for 1000 hours of battery life with common 1.5V batteries!

- *Accurate and economical measurements*
- *Simple calibration*
- *Long battery life*
- *Small diameter probe fits easily into a test tube*

SPECIFICATIONS	HI 99104
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	manual, 1 or 2 points
pH Electrode	HI 1270 (included)
Battery Type / Life	(2) 1.5V / approx. 1000 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	200 x 28 x 20 mm (7.9 x 1.1 x 0.8")
Weight	46 g (1.6 oz.)

ORDERING INFORMATION

HI 99104 is supplied with HI 1270 pH electrode, batteries and instructions

ELECTRODES

HI 1270 pH electrode with screw-type connector

SOLUTIONS

HI 77400P pH 4 and pH 7 buffer sachets 20 mL, (5 ea.)
HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)
HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)
HI **70010P** pH 10.01 buffer solution, 20 mL sachets (25)
HI 7004M pH 4.01 buffer solution, 250 mL
HI 7007M pH 7.01 buffer solution, 250 mL
HI 7010M pH 10.01 buffer solution, 250 mL
HI 70300M Electrode storage solution, 250 mL
HI 7061M Cleaning solution, 250 mL

HANNA instruments

With Great Products, Come Great Results™

HI 981402

pH Indicator

Water Resistant with Visual Alarm

Continuous Monitoring in Outdoor and Humid Environments

HI 981402 is a water-resistant pH meter with a built-in 3½ digital LCD. The meter is supplied with the HI 1286 double-junction, plastic-body, gel-filled combination pH electrode with a flexible 2 meter (6.6') cable. The BNC connector is protected by a waterproof sheath. The electrode also has a unique clog-resistant PTFE junction that enhances both probe life and accuracy.

The alarm setpoint can be selected anywhere in the 3 to 11 pH range. A red LED warns the user in the event the reading is outside the setpoint by more than ±0.5 pH. Calibration can be manually performed at 2 points through two easily accessible trimmers on the front of the unit.

The meter is suited for outdoor installations and highly humid environments. In addition, the molded keyhole holder allows the meter to be installed close to the sample. The 12 Vdc power supply is ideal for continuous monitoring over extended periods of time.

- *Water resistant*
- *LED alarm*
- *Clog-resistant electrode*





SPECIFICATIONS	HI 981402
Range	0.0 to 14.0 pH
Resolution	0.1 pH
Accuracy (@20°C/68°F)	±0.2 pH
Calibration	manual, 1 or 2-points
Setpoint	adjustable from 3.0 to 11.0 pH
Alarm	red LED (blinks when pH reading differs from the setpoint more than ±0.5 pH)
pH electrode	HI 1286, plastic body, double junction PTFE junction, with 2m (6.6') cable and BNC connector (included)
Input impedance	10^{12} Ohm
Power supply	12 Vdc adapter (included)
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions	86 x 110 x 43 mm (3.4 x 4.3 x 1.7")
Weight	150 g (5.3 oz.)

ORDERING INFORMATION

HI 981402-01 (115V) and **HI 981402-02** (230V) is supplied with HI 1286 pH electrode, Calibration screwdriver and 12 VDC power adapter.

ELECTRODES

HI 1286 pH electrode, 2 m (6.6') cable

SOLUTIONS

HI 70000P Electrode rinsing solution, 20 mL sachets (25)

HI 7004M pH 4.01 calibration solution, 250 mL

HI 7007M pH 7.01 calibration solution, 250 mL

HI 77400P pH 4 and pH 7 solution, (10) 20mL sachets,.(5)

HI 70300M Electrode storage solution, 250 mL

HI 7061M Electrode cleaning solution, 250 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EURO)

Combination pH and ORP Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA

HI 104XY	CONNECTOR
HI 1043B	BNC
HI 1040S	Screw Cap
HI 1043P	BNC + PIN*

HI 105XY	CONNECTOR
HI 1053B	BNC
HI 1050S	Screw Cap
HI 1053P	BNC + PIN*

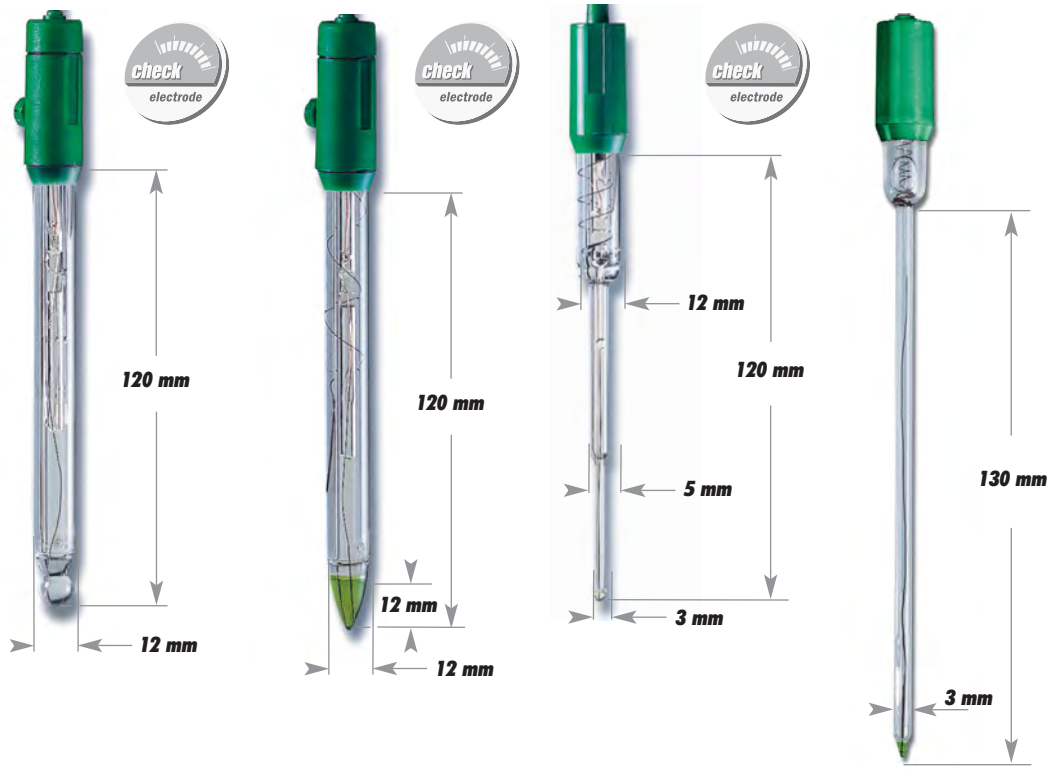
HI 1083X	Connector
HI 1083B	BNC
HI 1083P	BNC + PIN*

HI 1093X	Connector
HI 1093B	BNC

* For pH meters with CAL CHECK™ system

* For pH meters with CAL CHECK™ system

* For pH meters with CAL CHECK™ system



CODE	HI 104XY	HI 105XY	HI 1083X	HI 1093X
Description	Refillable, combination pH electrode with double junction	Refillable, combination pH electrode with conical bulb	Refillable, combination pH electrode with micro bulb for small samples	Refillable, combination pH electrode with extended length & micro bulb
Reference	Double, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Ceramic, triple / 40-50 µL/H	Open	Open
Electrolyte	KCl 3.5M	KCl 3.5M + AgCl	Viscolene	Viscolene
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 14 T: 0 to 100°C (32 to 212°F)	pH: 0 to 12 T: -5 to 100°C (23 to 212°F)	pH: 0 to 13 T: 0 to 50°C (32 to 122°F)	pH: 0 to 13 T: -5 to 50°C (23 to 122°F)
Tip /Shape	Spheric (dia: 9.5 mm)	Conic (12 x 12 mm)	Spheric (dia: 3 mm)	Spheric (dia: 3 mm)
Temperature Sensor	No	No	No	No
Amplifier	No	No	No	No
Body Material	Glass	Glass	Glass	Glass
Cable	Coaxial; 1 m (3.3')**	Coaxial; 1 m (3.3')**	Coaxial; 1 m (3.3')**	Coaxial; 1 m (3.3')
Recommended Use	Hydrocarbon, paints, solvents, sea water, strong acid and base, high conductivity samples, Tris buffer	Fats and creams, soil samples, potable water, semi solid products, low conductivity solutions, emulsions	Biotechnology, samples < 100 µl	NMR tubes
** Not for models with screw cap.	Recommended Operating Temperature 30 to 85°C (104 to 185°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Food Industry Specific Electrodes

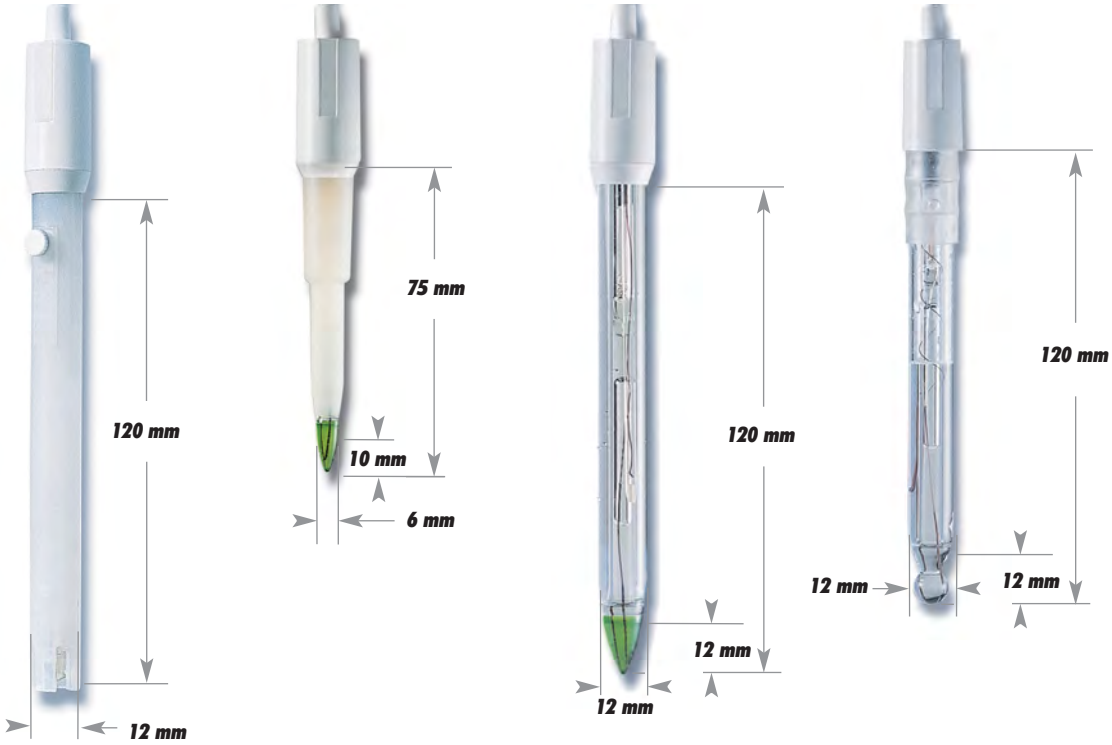
Designed for Laboratories, Food Processing, Goods-in Areas and Service Industries

FC 100X	CONNECTOR
FC 100B	BNC

FC 200X	CONNECTOR
FC 200B	BNC
FC 200S	Screw Cap

FC 210X	CONNECTOR
FC 210B	BNC

FC 220X	CONNECTOR
FC 220B	BNC



CODE	FC 100X	FC 200X	FC 210X	FC 220X
Description	pH electrode	pH electrode	pH electrode	pH electrode
Reference	Double, Ag/AgCl	Single, Ag/AgCl	Double, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Open	Open	Ceramic, triple / 40-50 µL/H
Electrolyte	KCl 3.5M	Viscolene	Viscolene	KCl 3.5M + AgCl
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)	pH: 0 to 12 T: 0 to 100°C (32 to 212°F)
Tip /Shape	Spheric (dia: 7.5 mm)	Conic (6 x 10 mm)	Conic (12 x 12 mm)	Spheric (dia: 9.5 mm)
Temperature Sensor	No	No	No	No
Amplifier	No	No	No	No
Body Material	PVDF	PVDF	Glass	Glass
Cable**	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')
Recommended Use	Cheese	Milk, yogurt, dairy products, semi solid foods	Milk, yogurt, creams	Creams, fruit juices, sauces
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)

** Not for models with screw cap.

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Food Industry Specific Electrodes

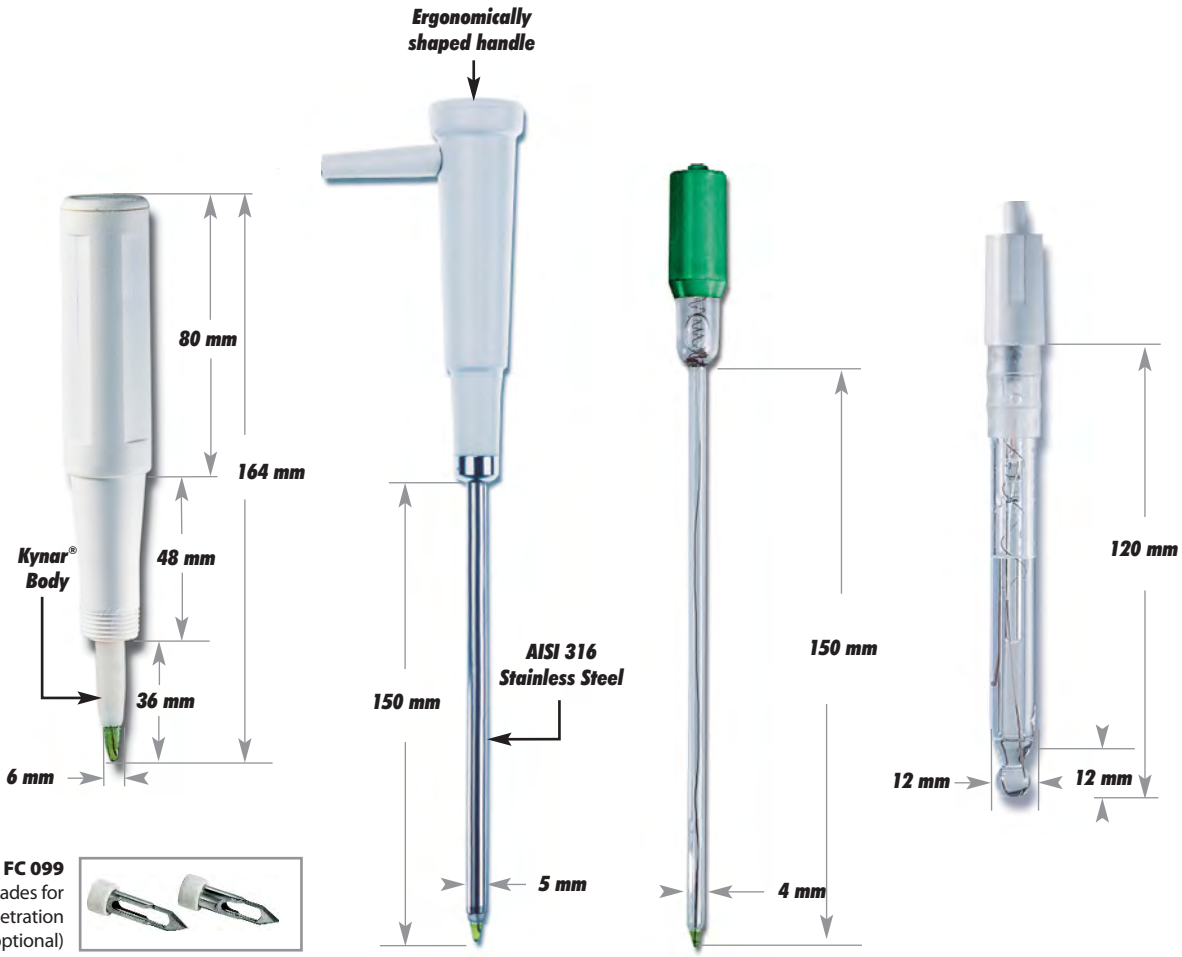
Designed for Laboratories, Food Processing, Goods-in Areas and Service Industries

FC 230X	CONNECTOR
FC 230B	BNC

FC 240X	CONNECTOR
FC 240B	BNC

FC 250X	CONNECTOR
FC 250B	BNC

FC 300X	CONNECTOR
FC 300B	BNC



FC 098 and **FC 099** stainless steel blades for meat penetration (optional)

CODE	FC 230X	FC 240X	FC 250X	FC 300X
Description	Combination pH electrode with PVDF outer body	Combination pH electrode with stainless steel sheath	Combination pH electrode with long, thin body	Combination sodium ion electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl	Double, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Open	Open	Open	Ceramic, triple / 40-50 µL/H
Electrolyte	Viscolene	Viscolene	Viscolene	KCl 3.5M + AgCl
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)	pH: 0 to 13 T: 0 to 50°C (32 to 122°F)	pH: 0 to 13 T: 0 to 50°C (32 to 122°F)	Na+: 10^{-4} to $3x10^{2}$ g/L / T: 0 to 100°C (32 to 212°F)
Tip /Shape	Conic (6 x 10 mm)	Conic (3 x 5 mm)	Conic (3 x 5 mm)	Spheric (dia: 9.5 mm)
Temperature Sensor	No	No	No	No
Amplifier	No	No	No	No
Body Material	PVDF	AISI 316	Glass	Glass
Cable	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')
Recommended Use	Meat, semi frozen products	Dairy products, cheese quality control	Dairy products, semi mature cheese	Food products, laboratory
	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Food Industry Specific Electrodes

Designed for Laboratories, Food Processing, Goods-in Areas and Service Industries

FC 301X	CONNECTOR
FC 301B	BNC

FC 400X	CONNECTOR
FC 400B	BNC

HI 1048X	CONNECTOR
HI 1048B	BNC
HI 1048P	BNC + PIN*

* To be used with pH meter with CAL CHECK™ system

HI 1153X	CONNECTOR
HI 1153B	BNC









CODE	FC 301X	FC 400X	HI 1048X	HI 1153X
Description	Fluoride electrode	pH electrode	pH electrode with Clogging Prevention System (CPS™)	pH electrode
Reference	—	Single, Ag/AgCl	Double, Ag/AgCl	Double, Ag/AgCl
Junction / Flow Rate	—	Open	Open, CPS™	Ceramic, triple / 40-50 µL/H
Electrolyte	—	Viscolene	KCl 3.5M	KCl 3.5M
Max Pressure	0.1 bar	0.1 bar	0.1 bar	0.1 bar
Range	Fluoride: 10^{-6} to saturation / T: -5 to 35°C (23 to 95°F)	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)	pH: 0 to 13 T: -5 to 80°C (23 to 176°F)	pH: 0 to 13 T: 0 to 100°C (32 to 212°F)
Tip /Shape	Flat	Conic (3 x 5 mm)	Spheric (dia: 8 mm)	Spheric (dia: 9.5 mm)
Temperature Sensor	No	No	No	No
Amplifier	No	No	No	No
Body Material	PEI	PVDF	Glass	Glass
Cable	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')
Recommended Use	Wastewater, heavy-duty applications, glass production, electronic industry	Meat	Wine, must	Mineral water
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

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Food Industry Specific "Intelligent" Electrodes**

Designed for Laboratories, Food Processing, Goods-in Areas and Service Industries

FC 20XY	CONNECTOR
FC 201D	DIN
FC 202D†	DIN

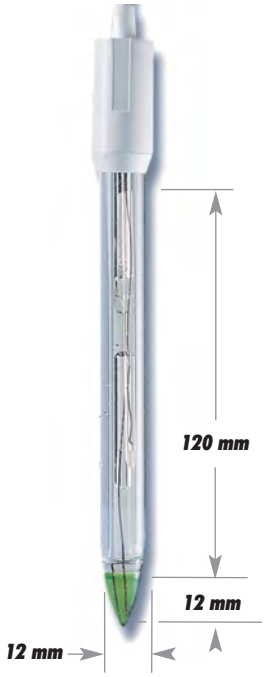
† To be used with **HI 99161**

FC 212X	CONNECTOR
FC 212D	DIN

FC 23XY	CONNECTOR
FC 231D	DIN
FC 232D*	DIN

* To be used with **HI 99163**









FC 098 and **FC 099** stainless steel blades for meat penetration

CODE	FC 201XY	FC 212X	FC 23XY
Description	pH electrode	pH electrode	pH electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction	Open	Open	Open
Electrolyte	Viscolene	Viscolene	Viscolene
Max Pressure	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)
Tip /Shape	Conic (6 x 10 mm)	Conic (12 x 12 mm)	Conic (6 x 10 mm)
Temperature Sensor	Yes	Yes	Yes
Amplifier	Yes	Yes	Yes
Body Material	PVDF	Glass	PVDF
Cable	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	Milk, yogurt, dairy products, meat, semi solid foods	Milk, yogurt, creams	Meat
	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)

** To be used with **HI 98140**, **HI 98150**, **HI 98230** and **HI 98240** pH meters.

Food Industry Electrode

with Amplifier

FC 911X	CONNECTOR
FC 911B	BNC

Special Application Electrodes

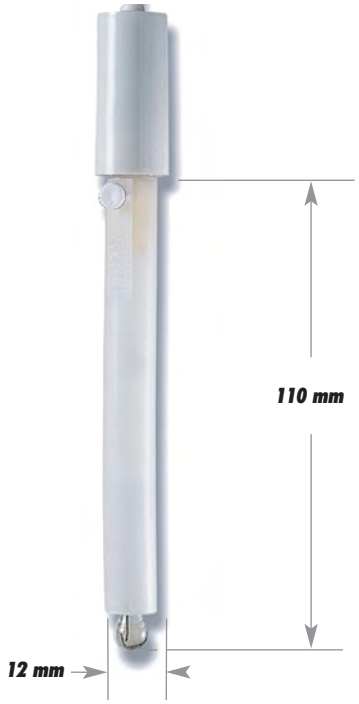
Electrodes to Perform a Specific Analysis

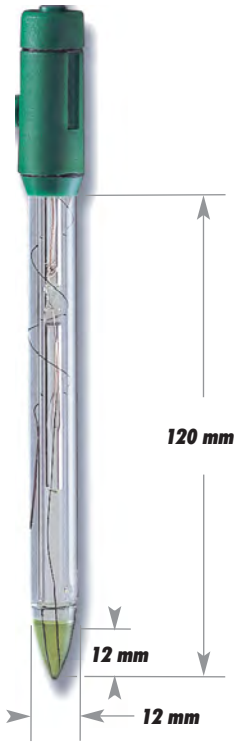
HI 1292X	CONNECTOR
HI 1292D	7-pin DIN*

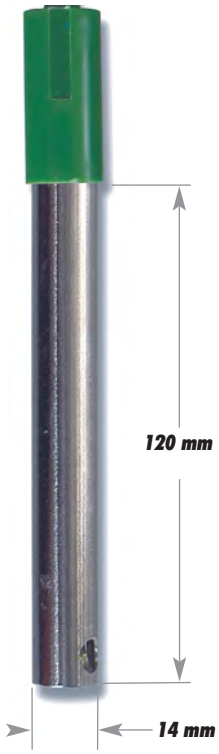
* To be used with **HI 99121**

HI 1296X	CONNECTOR
HI 1296D	DIN**

** To be used with **HI 991001**







CODE	FC 911X
Description	pH electrode with amplifier
Reference	Double, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H
Electrolyte	KCl 3.5M
Max Pressure	0.1 bar
Range	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)
Tip /Shape	Spheric (dia: 7.5 mm)
Temperature Sensor	No
Amplifier	Yes
Body Material	PVDF
Cable	Coaxial; 1 m (3.3')
Recommended Use	Creams, fruit juices, sauces

Recommended Operating Temperature
20 to 40°C (86 to 104°F)

CODE	HI 1292X	HI 1296X
Description	pH electrode	pH electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, triple / 40-50 µL/H	Cloth
Electrolyte	KCl 3.5M + AgCl	Gel
Max Pressure	0.1 bar	3 bar
Range	pH: 0 to 12 T: -5 to 100°C (23 to 212°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)
Tip /Shape	Conic (12 x 12 mm)	Spheric (dia: 5 mm)
Temperature Sensor	Yes	Yes
Amplifier	Yes	Yes
Body Material	Glass	AISI 316 stainless steel
Cable	7-pole; 1 m (3.3')	5-pole; 1 m (3.3')
Recommended Use	Direct soil pH measurement, soil solution	Wastewater
	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

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Special Application Electrodes

Electrodes to Perform a Specific Analysis

HI 1297X	CONNECTOR
HI 1297D	DIN*

* To be used with **HI 991002** and **HI 991003**

HI 1413X	CONNECTOR
HI 1413B	BNC

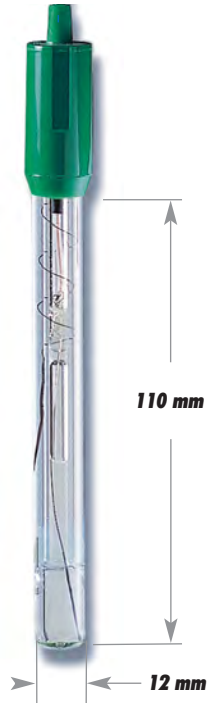
HI 1413X/50	CONN.
HI 1413B/50	BNC‡
HI 1413S/50	Screw Cap‡

‡ To be used with **Skincheck™** series

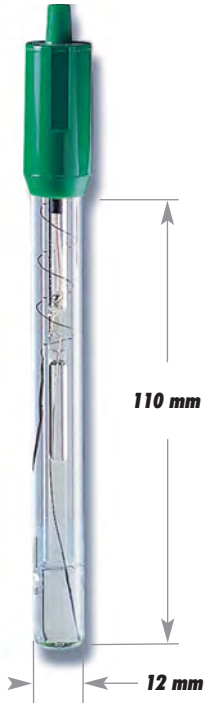
HI 1414X	CONNECTOR
HI 1414D	7-pin DIN†

† To be used with **HI 99171**









CODE	HI 1297X	HI 1413X	HI 1413X/50	HI 1414X
Description	pH/ORP electrode with titanium cage	pH electrode	pH electrode	pH electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction	Cloth	Open	Open	Open
Electrolyte	Gel	Viscolene	Viscolene	Viscolene
Max Pressure	3 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 13; ORP T: 0 to 80°C (32 to 176°F)	pH: 0 to 12 T: -5 to 50°C (23 to 122°F)	pH: 0 to 12 T: -5 to 50°C (23 to 122°F)	pH: 0 to 12 T: -5 to 50°C (23 to 122°F)
Tip /Shape	pH: Conic (3 mm) ORP: Platinum sensor	Flat	Flat	Flat
Temperature Sensor	Yes	No	No	Yes
Amplifier	Yes	No	No	Yes
Body Material	AISI 316 stainless steel	Glass	Glass	Glass
Cable**	7-pole; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	Wastewater, municipal water, water treatment, swimming pools	Surfaces, skin, leather, paper, emulsions	Skin, scalp	Surface, leather, paper, emulsions
** Not for models with screw cap.	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Special Application Electrodes

Electrodes to Perform a Specific Analysis

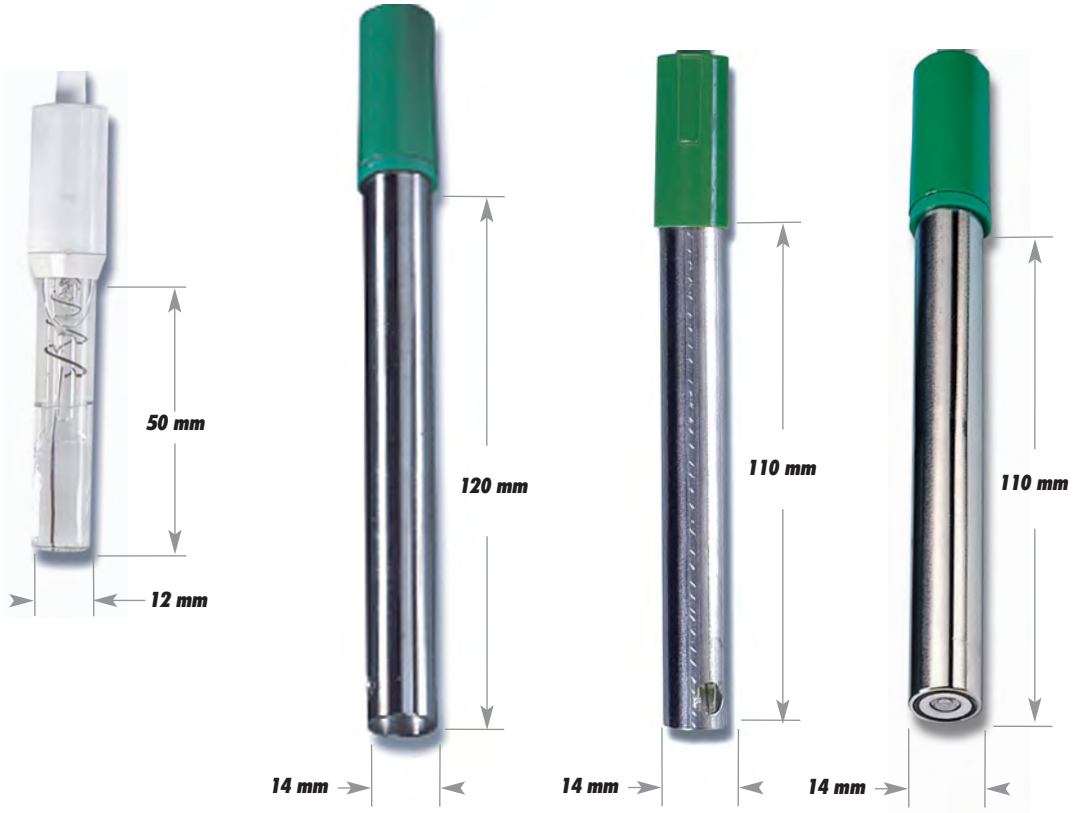
HI 1414X/50 CONN.	HI 62911X CONNECTOR	HI 62920X CONNECTOR	HI 72911X CONNECTOR
HI 1414D/50 DIN*	HI 62911D DIN**	HI 62920D DIN†	HI 72911D DIN‡

* To be used with **HI 99181**

** To be used with **HI 99131**

† To be used with **HI 504920**

‡ To be used with **HI 99141**



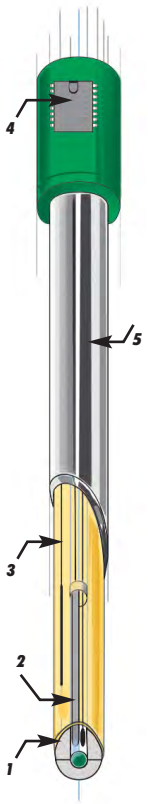
CODE	HI 1414X/50	HI 62911X	HI 62920X	HI 72911X
Description	pH electrode	pH electrode	pH electrode	pH electrode
Reference	Single, Ag/AgCl	Double, Ag/AgCl	Double, Ag/AgCl	Double, Ag/AgCl
Junction	Open	PTFE	PTFE	PTFE
Electrolyte	Viscolene	Polymer	Polymer	Polymer
Max Pressure	0.1 bar	3 bar	3 bar	3 bar
Range	pH: 0 to 12 T: -5 to 50°C (23 to 122°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)
Tip /Shape	Flat	Flat	Flat	Flat
Temperature Sensor	Yes	Yes	Yes	Yes
Amplifier	Yes	Yes	Yes	Yes
Body Material	Glass	Titanium cage working as Matching Pin	Titanium cage working as Matching Pin	AISI 316 stainless steel
Cable	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 2 m (6.6')	7-pole; 1 m (3.3')
Recommended Use	Skin, scalp	Plating baths	Industrial applications	Cooling towers, boilers
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

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Fail Safe Technology Electrodes

Electrodes with HANNA's F.S.T.



Titanium Casings

The HI 62911 and HI 62920 advanced electrodes with Titanium cage also feature:

1) Annular PTFE junction for clogging prevention
2) Double junction and polymer electrolyte for enhanced protection against contamination of the reference electrolyte
3) Built-in temperature sensor for ATC and, therefore, accurate readings
4) Built-in amplifier for reducing the effect of electromagnetic interferences, typical of the industrial environments
5) Matching Pin

Fail Safe Technology

The development of new technologies and the diffusion of environmental controls have urged the need to measure the pH.

As a result, the use of pH meters is spreading, opening the way to more specific and demanding requirements.

It is for this very reason that HANNA is suggesting the new Fail Safe Technology (F.S.T.).

In fact, for all cases where the pH value is close to 7, the electrodes produced thus far fail to make a distinction between a correct reading and a malfunction.

The F.S.Technology overcomes this inconvenience by modifying the production process of the electrodes and the reading system of the related instruments.

This new system makes it easy to identify erroneous readings in solutions having a pH value close to 7, since the pH meter will display a pH value close to 4.

The problem with the common pH electrodes is due to the fact that they relate the pH value of 7 to an EMF equal to 0 mV. But the EMF may be equal to 0 mV under many circumstances, as for example, when the connecting cable is short circuited, or if there is a connector leakage.

In such cases, the pH meter will always read pH 7, even when the electrode is dipped into a very acidic or alkaline solution.

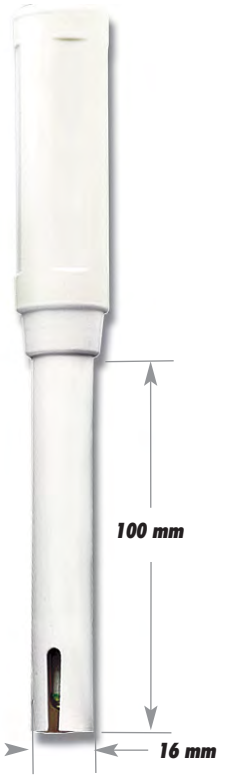
The F.S.Technology, instead, assigns the 0 mV value to pH 4, so that in all those cases with pH equal to 7, if the electrode leaks, the cable short circuits, or there is liquid on the connectors, the instrument will display a pH 4 reading and the operator will be immediately alerted.

HI 1217-6X CONNECTOR
HI 1217-6D DIN*

* To be used with **HI 83140**

HI 1285-X Multi-pin for HI 9813 series
HI 1285-6 w/temperature sensor & CAL-CHECK™





CODE	HI 1217-6	HI1285
Description	pH electrode	pH electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow rate	Ceramic, single / 15-20 µL/H	Cloth
Electrolyte	Gel	Gel
Max Pressure	2 bar	0.1 bar
Range	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 / EC T: 0 to 60°C (32 to 140°F)
Tip / Shape	Spheric (dia: 5.0 mm)	Spheric (dia: 8.0 mm)
Temperature Sensor	Yes	Yes
Amplifier	Yes	Yes
Body Material	PEI	Polypropylene
Cable	5-pole; 1 m (3.3')	7-pole; 2 m (3.3')')
Recommended Use	Field applications, environmental monitoring	Greenhouses, hydroponics, environmental monitoring, water treatment, boilers, cooling towers
Recommended Operating Temperature	20 to 40°C (86 to 104°F)	20 to 40°C (86 to 104°F)

pH Half Cells

Designed and Created by the Manufacturer ... HANNA instruments®

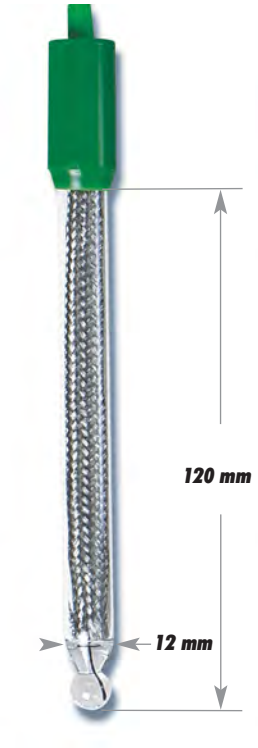
ORP Half Cells

HI 2110X	CONNECTOR
HI 2110B	BNC

HI 2112X	CONNECTOR
HI 2112B	BNC

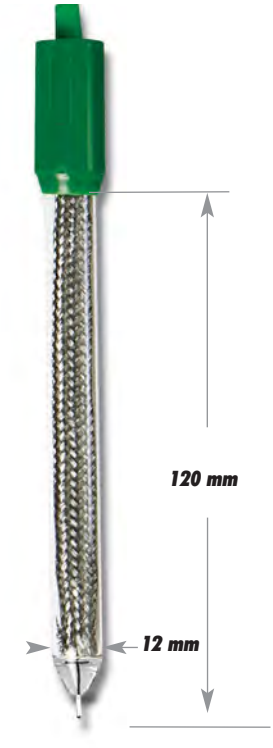
HI 3133X	CONNECTOR
HI 3133B	BNC

HI 2111X	CONNECTOR
HI 2111B	BNC









CODE	HI 2110X	HI 2111X	HI 2112X
Description	pH half-cell	pH half-cell	pH half-cell
pH Half Cell	—	—	—
Range	pH: 0 to 12 T: -5 to 80°C (23 to 176°F)	pH: 0 to 14 T: 0 to 100°C (32 to 212°F)	pH: 0 to 13 T: -5 to 80°C (23 to 176°F)
Tip /Shape	Spheric (dia: 9.5 mm)	Spheric (dia: 9.5 mm)	Spheric (dia: 7.5 mm)
Body Material	Glass	Glass	PEI
Cable	Coaxial	Coaxial	Coaxial
Recommended Use	Titration	General purpose, strong alkaline solutions	General purpose
	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 30 to 85°C (104 to 185°F	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

CODE	HI 3133X
Description	ORP half-cell
ORP Half Cell	Platinum
Range	mV T: -5 to 80°C (23 to 176°F)
Tip /Shape	Platinum pin
Body Material	Glass
Cable	Coaxial
Recommended Use	General purpose, potentiometric titration
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

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Reference Electrodes

Double and Single Reference Electrodes

HI 5110X	CONNECTOR
HI 5110B	BNC

HI 5412	CONNECTOR
HI 5412	4 mm Banana

HI 5414	CONNECTOR
HI 5414	4 mm Banana

HI 5413	CONNECTOR
HI 5413	4 mm Banana









CODE	HI 5110X
Description	ORP half-cell
ORP Half Cell	Ag
Range	mV T: -5 to 80°C (23 to 176°F)
Tip /Shape	Cylindric (dia: 3 mm)
Body Material	Glass
Cable	Coaxial
Recommended Use	Argentometric titration

Recommended Operating Temperature
20 to 40°C (86 to 104°F)

CODE	HI 5412	HI 5413	HI 5414
Description	Reference electrode	Reference electrode	Reference electrode
Reference	Single, Hg/Hg_2Cl_2	Single, Hg/Hg_2Cl_2	Single, Hg/Hg_2Cl2
Junction/FlowRate	Ceramic, single / 15-20 µL/H	PTFE sleeve	Ceramic, double
Electrolyte	KCl 3.5M	KCl 3.5M	KCl 3.5M
Max Pressure	0.1 bar	0.1 bar	3 bar with back pressure
Range	T: -5 to 60°C (23 to 140°F)	T: -5 to 60°C (23 to 140°F)	T: -5 to 60°C (23 to 140°F)
Body Material	Glass	Glass	Glass
Cable	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	General purpose, ISE, titrations	Samples with suspended solids, ISE	Measurements with remote filling
	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)

High Pressure or High Concentration of Contaminants.

Because of the special electrode recharge system of the HI 5414, it is possible to connect an outside container to increase the amount of electrolyte of the reference half-cell and thus the pressure inside the electrode. By so doing, the junction will be able to work in high-pressure environments without the danger of implosion.



Combination pH and ORP Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA

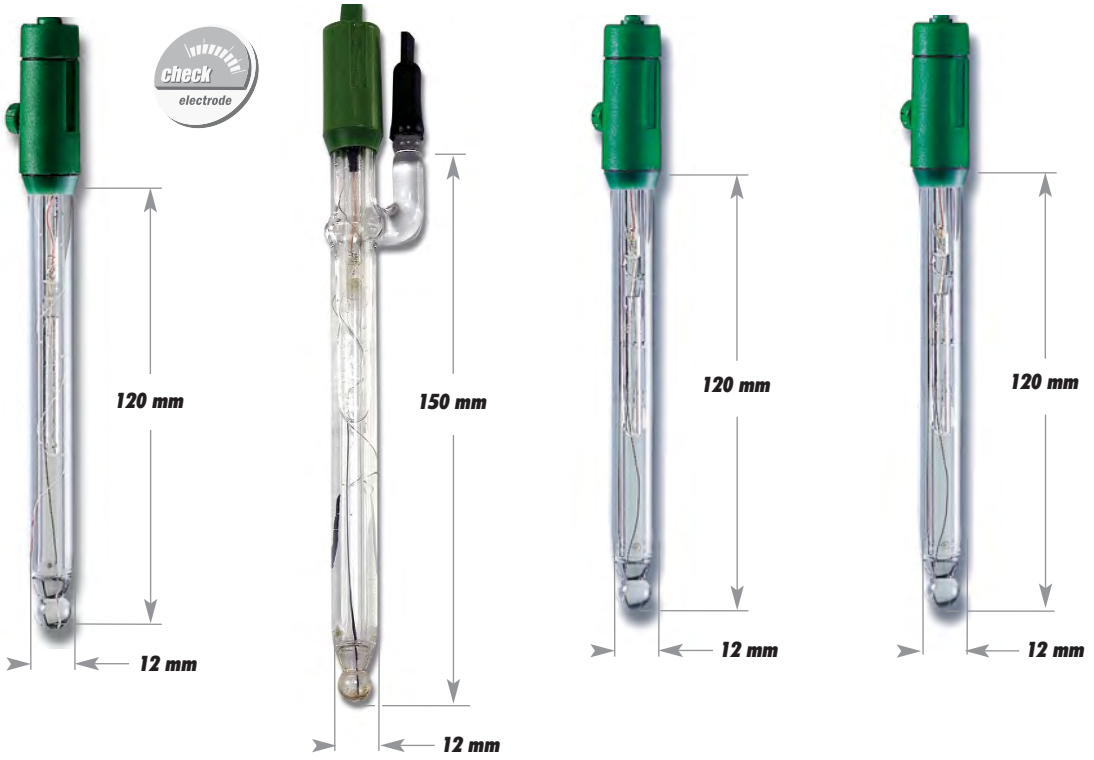
HI 11X1Y	CONNECTOR
HI 1131B	BNC
HI 1111S	Screw Cap
HI 1131P	BNC + PIN*

HI 1135X	CONNECTOR
HI 1135B	BNC

HI 1143X	CONNECTOR
HI 1143B	BNC

HI 1144X	CONNECTOR
HI 1144B	BNC

* For pH meters with CAL CHECK™ system



CODE	HI 11X1Y	HI 1135X	HI 1143X	HI 1144X
Description	Refillable, combination pH electrode	Refillable, combination pH electrode side arm construction & fast flow rate	Refillable, combination pH electrode used for applications containing fluoride	Refillable, combination pH electrode with calomel references
Reference	Single, Ag/AgCl	Double, Ag/AgCl	Double, Ag/AgCl	Single, Hg/Hg_2Cl_2
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Ceramic, double / 40-50 µL/H	Ceramic, single / 15-20 µL/H	Ceramic
Electrolyte	KCl 3.5M + AgCl	KCl 3.5M	KCl 3.5M	KCl 3.5M
Max Pressure	0.1 bar	3 bar with back pressure	0.1 bar	0.1 bar
Range	pH: 0 to 13 T: -5 to 100°C (23 to 212°F)	pH: 0 to 14 T: -5 to 100°C (23 to 212°F)	pH: 0 to 10 T: -5 to 60°C (23 to 140°F)	pH: 0 to 14 T: 0 to 60°C (32 to 140°F)
Tip /Shape	Spheric (dia: 9.5 mm)	Spheric (dia: 9.5 mm)	Spheric (dia: 9.5 mm)	Spheric (dia: 9.5 mm)
Temperature Sensor	No	No	No	No
Amplifier	No	No	No	No
Body Material	Glass	Glass	Glass	Glass
Cable	Coaxial; 1 m (3.3')**	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')
Recommended Use	Laboratory general purpose, beer	Continuous monitoring with remote filling	Samples with fluoride (max 2 g/L @ pH 2 and temperature < 60°C)	Tris buffer
** Not for models with screw cap.	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 30 to 85°C (104 to 185°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

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Reference Electrodes

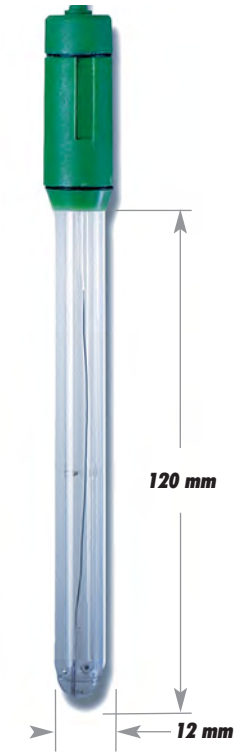
Double and Single Reference Electrodes

HI 5311	CONNECTOR
HI 5311	4 mm Banana

HI 5312	CONNECTOR
HI 5312	4 mm Banana

HI 5313	CONNECTOR
HI 5313	4 mm Banana

HI 5314	CONNECTOR
HI 5314	4 mm Banana









CODE	HI 5311	HI 5312	HI 5313	HI 5314
Description	Reference electrode	Reference electrode	Reference electrode	Reference electrode
Reference	Double, Ag/AgCl	Double, Ag/AgCl	Single, Ag/AgCl	Double, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	PTFE sleeve	Ceramic	Ceramic, double
Electrolyte	KCl 3.5M	KCl 3.5M	Gel (KCl 1M + AgCl)	KCl 3.5M
Max Pressure	0.1 bar	0.1 bar	0.1 bar	3 bar with back pressure
Range	T: -5 to 100°C (23 to 212°F)	T: -5 to 100°C (23 to 212°F)	T: -5 to 35°C (23 to 95°F)	T: -5 to 100°C (23 to 212°F)
Body Material	Glass	Glass	PEI	Glass
Cable	1 m (3.3')	1 m (3.3')	1 m (3.3')	1 m (3.3')
Recommended Use	General purpose (wide temperature range), titrations	Titrations, samples with suspended solids	Used with FC 301B	Measurements with remote filling
	Recommended Operating Temperature 30 to 85°C (104 to 185°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 30 to 85°C (104 to 185°F

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Spare Electrodes

Electrodes that Accompany Specific Instruments

HI 12170	CONNECTOR
HI 12170	3-pole Screw Cap*

* To be used with **HI 9214N**

HI 1219	CONNECTOR
HI 1219	Screw Cap**

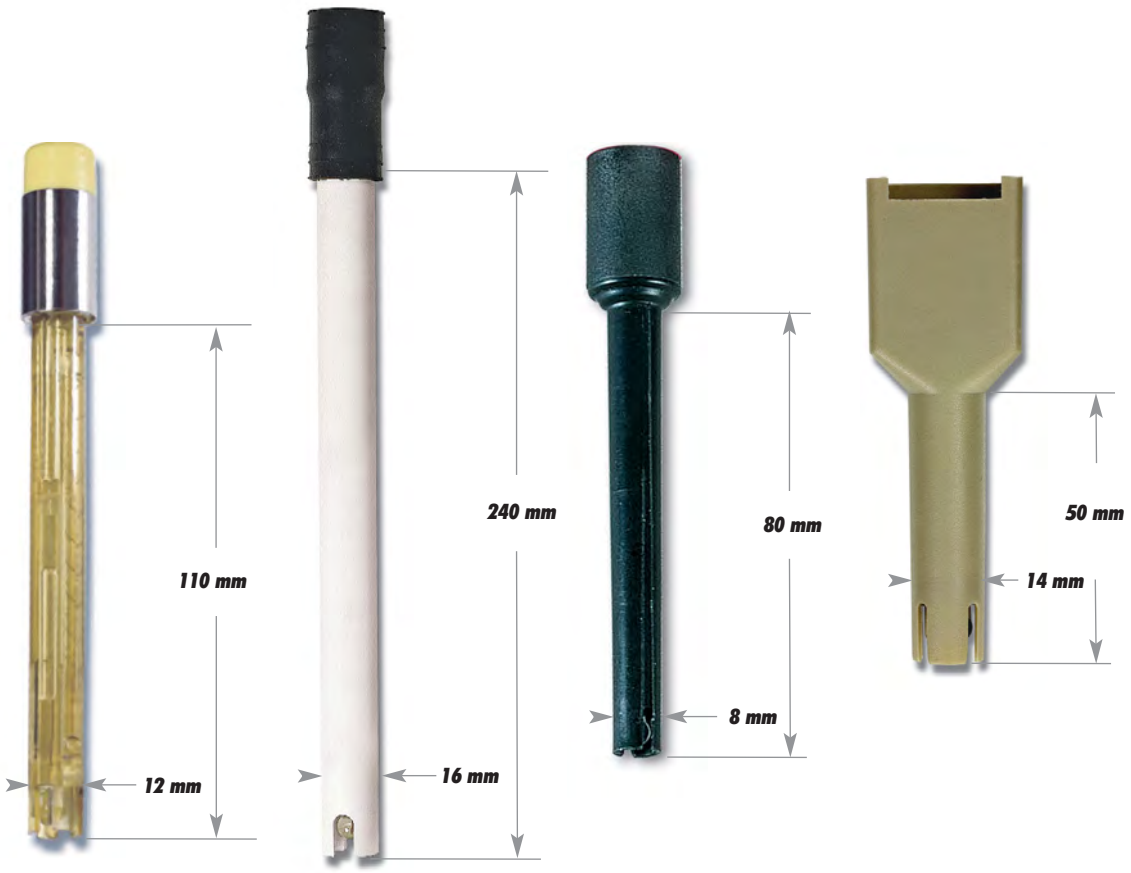
** To be used with **HI 981408**

HI 1270	CONNECTOR
HI 1270	Screw Cap†

† To be used with **HI 98103** and **HI 99104**

HI 1280	CONNECTOR
HI 1280	Multi-pin‡

‡ To be used with **HI 98111**



CODE	HI 12170	HI 1219	HI 1270	HI 1280
Description	Spare electrode	Spare electrode	Spare electrode	Spare electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Cloth	Cloth	Ceramic, single
Electrolyte	Gel	Gel	Gel	Gel
Max Pressure	2 bar	3 bar	0.1 bar	0.1 bar
Range	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 T: 0 to 60°C (32 to 140°F)	pH: 0 to 13 T: 0 to 50°C (32 to 122°F)	pH: 0 to 13 T: 0 to 70°C (32 to 158°F)
Tip /Shape	Spheric (dia: 5.0 mm)	Spheric (dia: 5.0 mm)	Spheric (dia: 3.0 mm)	Spheric (dia: 5.0 mm)
Temperature Sensor	Yes	No	No	Yes
Amplifier	No	No	No	Yes
Body Material	PEI	Polypropylene	Polypropylene	Polypropylene
Cable	No	No	No	No
Recommended Use	General purpose	Field applications, fertigation solutions	General purpose, field applications	General purpose, field applications
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Spare Electrodes

Electrodes that Accompany Specific Instruments

HI 1285-X	Multi-pin*
HI 1285-0	Cloth junction, gel filled
HI 1285-5	w/Temperature Sensor

* To be used with **HI 9811**, **HI 9812** and **HI 9813** series

HI 1286	CONNECTOR
HI 1286	BNC**

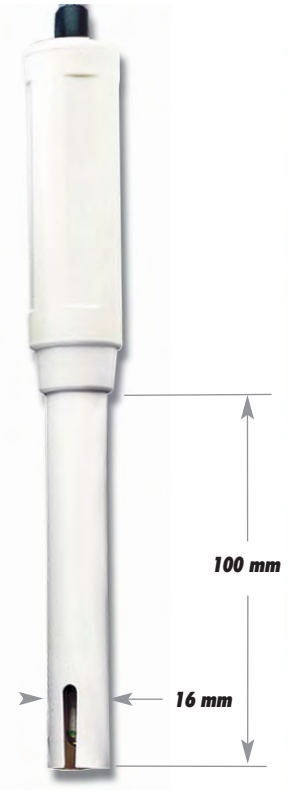
** To be used with **HI 981401N** and **HI 981402**

HI 1288	CONNECTOR
HI 1288	DIN†

† To be used with HI 991300 and HI 991301

HI 1290	Multi-pin*
HI 1290	Ceramic junction, gel filled

To be used with **HI 98112**









CODE	HI 1285-X	HI 1286	HI 1288	HI 1290
Description	Spare electrode	Spare electrode	Spare electrode	Spare electrode
Reference	Single, Ag/AgCl	Double, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Cloth	Teflon®	Cloth	Ceramic, single / 15-20 µL/H
Electrolyte	Gel	Polymer	Gel	Gel
Max Pressure	0.1 bar	3 bar	1 bar	0.2 bar
Range	pH: 0 to 13 / EC T: 0 to 60°C (32 to 140°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13; EC T: 0 to 60°C (32 to 140°F)	pH: 0 to 13 T: 0 to 70°C (32 to 158°F)
Tip /Shape	Spheric (dia: 8.0 mm)	Spheric (dia: 7.5 mm)	Spheric (dia: 8.5 mm)	Spheric (dia: 5.0 mm)
Temperature Sensor	Yes	No	Yes	Yes
Amplifier	Yes	No	Yes	Yes
Body Material	Polypropylene	PEI	PVC	Polypropylene
Cable	7-pole; 2 m (6.6')	Coaxial; 2 m (6.6')	7-pole; 2 m (6.6')	No
Recommended Use	Greenhouses, hydroponics, environmental monitoring, water treatment, boilers, cooling towers	General purpose, water treatment, agriculture	General purpose, water treatment, agriculture, boilers, cooling towers	General purpose, field applications
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

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Spare Electrodes

Electrodes that Accompany Specific Instruments

HI 1293	CONNECTOR
HI 1293	BNC

HI 1295	Multi-pin*
HI 1295	Ceramic junction, gel filled

To be used with **HI 98113**

HI 1333X	CONNECTOR
HI 1333B	BNC; Cloth Junction, gel filled

HI 2114P	Multi-pin*
HI 2114P	Cloth junction, gel filled

To be used with **HI 981406**



CODE	HI 1293	HI 1295	HI 1333X	HI 2114P
Description	Spare electrode	Spare electrode	Spare electrode	Spare electrode
Reference	Double, Ag/AgCl	Single, Ag/AgCl	Double, Ag/AgCl	Double, Ag/AgCl
Junction / Flow Rate	Teflon®	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Cloth
Electrolyte	Polymer	Gel	KCl 3.5M	Gel
Max Pressure	3 bar	2 bar	0.1 bar	3 bar
Range	pH: 0 to 13 T: 0 to 70°C (32 to 158°F))	pH: 0 to 13 T: 0 to 70°C (32 to 158°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)
Tip /Shape	Spheric (dia: 7.5 mm)	Spheric (dia: 5.0 mm)	Spheric (dia: 7.5 mm)	Spheric (dia: 7.5 mm)
Temperature Sensor	No	Yes	No	No
Amplifier	Yes	Yes	No	No
Body Material	PEI	Polypropylene	PEI	PEI
Cable	5-pole; 2 m (6.6')	No	Coaxial; 1 m (3.3')	Coaxial; 2 m (6.6')
Recommended Use	Hydroponics, greenhouses	General purpose, field applications	Field applications	General purpose, agriculture
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Spare Electrodes

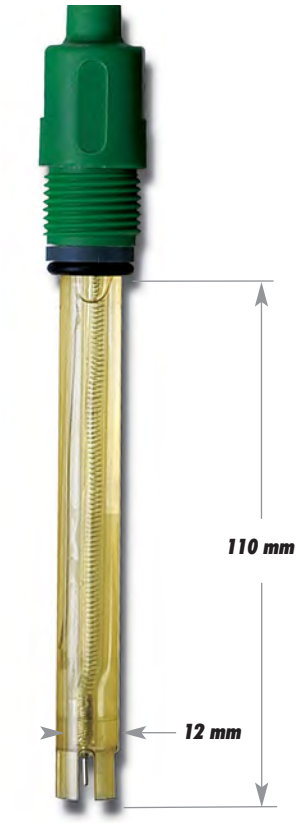
Electrodes that Accompany Specific Instruments

HI 3214P*	
HI 3214P	Cloth junction, gel filled

*To be used with **HI 981406** and **HI 982401**

HI 1110B	CONNECTOR
HI 1110B	BNC**

To be used with **pH 20 and **pH 21**





CODE	HI 3214P	HI 1110B
Description	Spare electrode	Spare electrode
Reference	Double, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Cloth	Ceramic, single / 15-20 µL/H
Electrolyte	Gel	Gel
Max Pressure	3 bar	0.1 bar
Range	ORP T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 T: -5 to 100°C (23 to 212°F)
Tip /Shape	Platinum pin	Spheric (dia: 9.5 mm)
Temperature Sensor	No	No
Amplifier	No	No
Body Material	PEI	Glass
Cable	Coaxial; 2 m (6.6')	Coaxial; 1 m (3.3')
Recommended Use	General purpose, agriculture, disinfection	Laboratory general use
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

HI 1286: Measuring pH In Agriculture



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Combination pH and ORP Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA

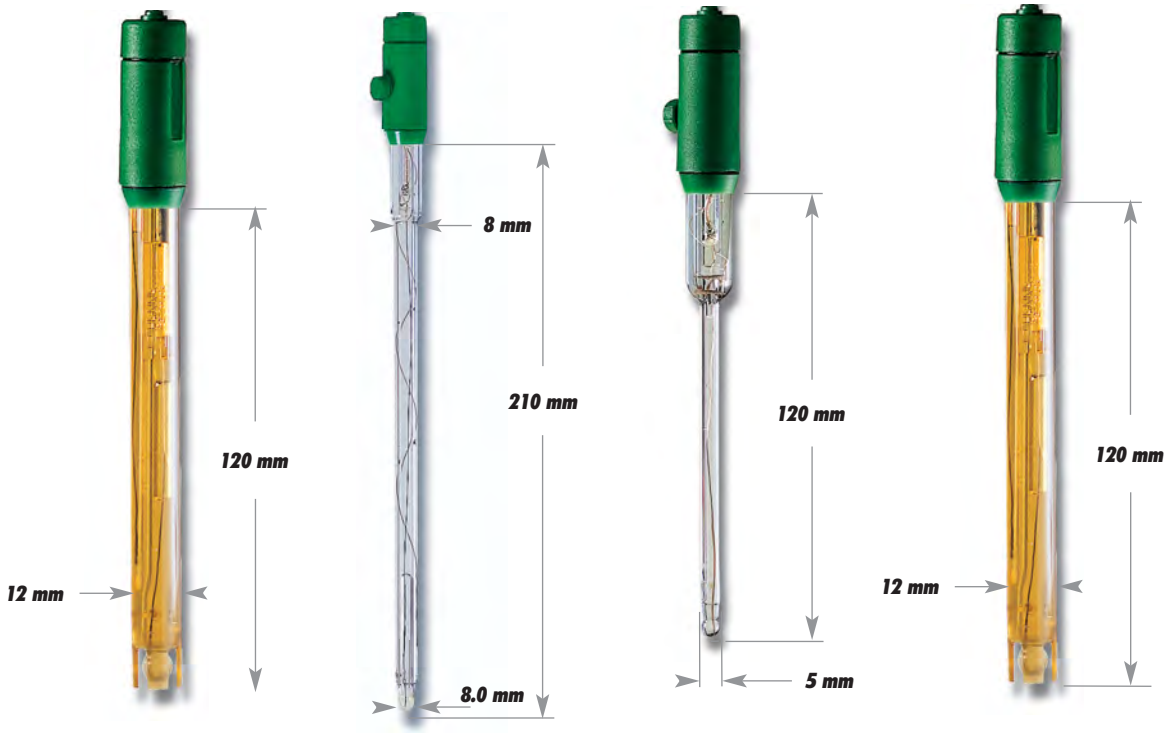
HI 12X0Y	CONNECTOR
HI 1230B	BNC
HI 1210S	Screw Cap

HI 13X1Y	CONNECTOR
HI 1331B	BNC
HI 1311S	Screw Cap

HI 13X0Y	CONNECTOR
HI 1330B	BNC
HI 1310S	Screw Cap
HI 1330P	BNC + PIN*

HI 1343X	CONNECTOR
HI 1343B	BNC

* For pH meters with CAL CHECK™ system



CODE	HI 12X0Y	HI 13X1Y	HI 13X0Y	HI 1343Y
Description	combination pH electrode	combination pH electrode	combination pH electrode	combination pH electrode
Reference	Double, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl	Single, Hg/Hg_2Cl_2
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H
Electrolyte	Gel	KCl 3.5M + AgCl	KCl 3.5M + AgCl	KCl 3.5M
Max Pressure	2 bar	0.1 bar	0.1 bar	0.1 bar
Range	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 T: -5 to 100°C (23 to 212°F)	pH: 0 to 13 T: -5 to 100°C (23 to 212°F)	pH: 0 to 14 T: -5 to 60°C (23 to 140°F)
Tip /Shape	Spheric (dia: 7.5 mm)	Spheric (dia: 7.5 mm)	Spheric (dia: 5 mm)	Spheric (dia: 7.5 mm)
Temperature Sensor	No	No	No	No
Amplifier	No	No	No	No
Body Material	PEI	Glass	Glass	PEI
Cable	Coaxial; 1 m (3.3')**	Coaxial; 1 m (3.3')**	Coaxial; 1 m (3.3')**	Coaxial; 1 m (3.3')
Recommended Use	Field applications	Specific for flasks	Specific for vials and test tubes	Specific for Tris buffer

** Not for models with screw cap.

Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Combination pH and ORP Electrodes

pH and ORP Electrodes Designed and Manufactured by HANNA



"...a pH meter that helps you to follow strict procedures"

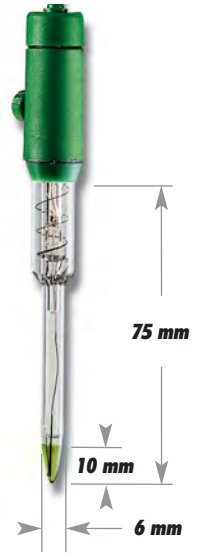
Mrs. L. Paalvast
Company: Mediq Jan Heyns
Bereidingsapotheek, the Netherlands
Medicine producer for 5 pharmacies.

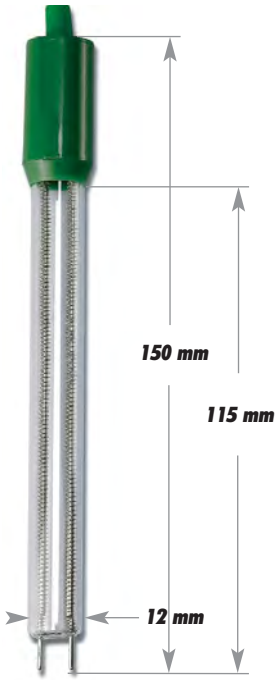
HI 20XYZ	CONNECTOR
HI 2031B	BNC
HI 2020S	Screw Cap

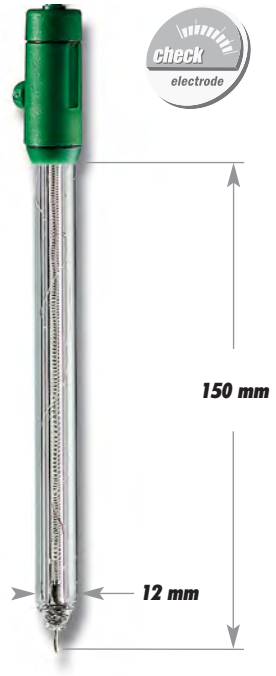
HI 3118X	CONNECTOR
HI 3118B	BNC

HI 31X1Y	CONNECTOR
HI 3131B	BNC
HI 3111S	Screw Cap
HI 3131P	BNC + PIN*

* For pH meters with CAL CHECK™ system







CODE	HI 20XYZ	HI 3118X	HI 31X1Y
Description	Refillable, spear tip combination pH electrode	Dual platinum electrode for amperometric titration	Refillable combination ORP electrode
Reference	Single, Ag/AgCl	—	Single, Ag/AgCl
Amperometric Cell	—	Platinum-Platinum	—
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	—	Ceramic, single / 15-20 µL/H
Electrolyte	KCl 3.5M + AgCl	—	KCl 3.5M + AgCl
Max Pressure	0.1 bar	—	0.1 bar
Range	pH: 0 to 12 T: -5 to 100°C (23 to 212°F)	T: -5 to 100°C (23 to 212°F)	ORP T: -5 to 100°C (23 to 212°F)
Tip /Shape	Conic (6 x 10 mm)	2-pin platinum	Platinum pin
Temperature Sensor	No	—	No
Amplifier	No	—	No
Body Material	Glass	Glass	Glass
Cable	Coaxial; 1 m (3.3')**	Bipolar	Coaxial; 1 m (3.3')**
Recommended Use	Dairy and semi solid products	Chlorine titration ASTM D 1253-86	Laboratory general use, ORP titrations
	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

** Not for models with screw cap.

HANNA instruments

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"Intelligent" pH and ORP Electrodes*

pH and ORP Electrodes Designed and Manufactured by HANNA

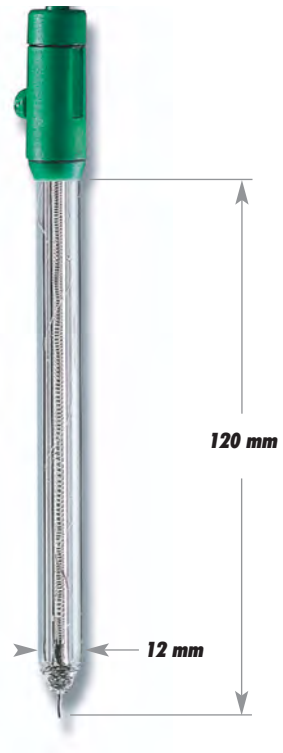
"Intelligent Electrodes"

HANNA's "Intelligent" electrodes are a breakthrough in electrode technology. These revolutionary electrodes incorporate microchips that memorize calibration data.

The "intelligent" electrode is recognized the moment it is connected to the meter. Once calibrated, several electrodes can be used in series without requiring new calibration. The meter can provide timely prompts about electrode status and even advide when to replace it. These "intelligent" electrodes also incorporate a temperature sensor for automatic temperature compensation.



HI 3619X	CONNECTOR
HI 3619D*	DIN



CODE	HI 3619X
Description	ORP electrode
Reference	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H
Electrolyte	KCl 3.5M + AgCl
Max Pressure	0.1 bar
Range	ORP: ±2000 mV T: -5 to 80°C (23 to 176°F)
Tip /Shape	Platinum pin
Temperature Sensor	No
Amplifier	Yes
Body Material	Glass
Cable	7-pole; 1 m (3.3')
Recommended Use	Laboratory general use, disinfection

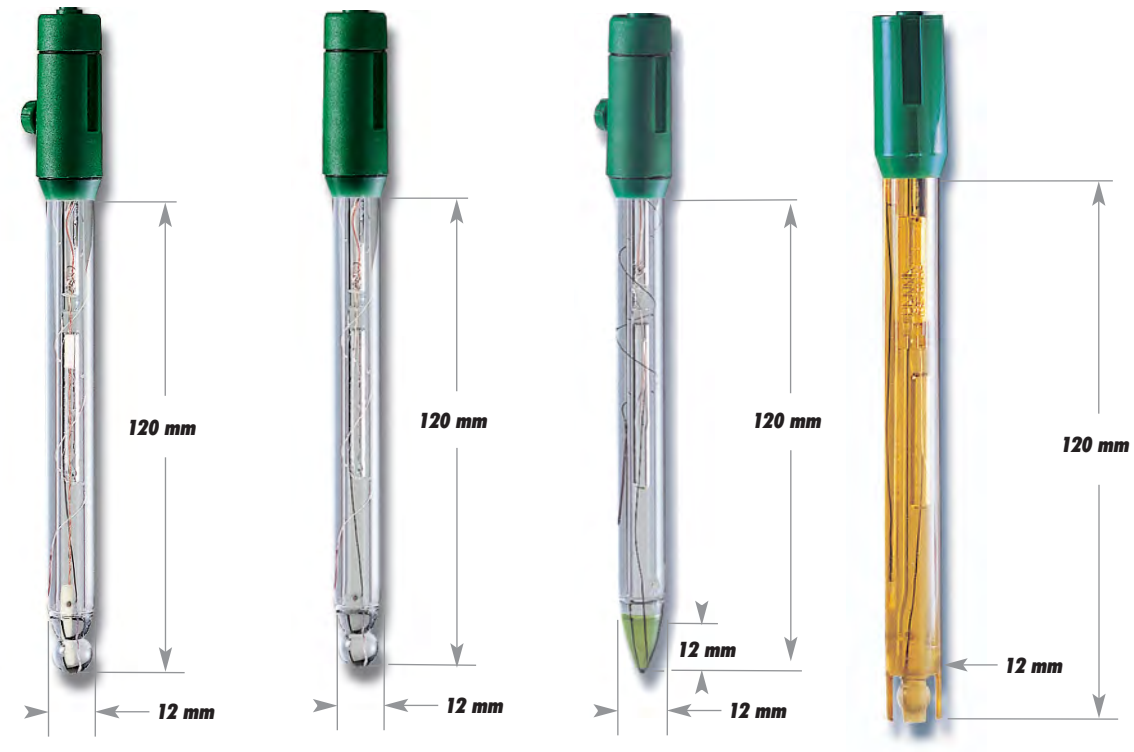
Recommended Operating Temperature
20 to 40°C (86 to 104°F)

* To be used with **HI 98140**, **HI 98150**, **HI 98230** and **HI 98240** pH meters.

"Intelligent" pH and ORP Electrodes*

pH and ORP Electrodes Designed and Manufactured by HANNA

HI 1615X CONNECTOR		HI 1616X CONNECTOR		HI 1617X CONNECTOR		HI 1618X CONNECTOR	
HI 1615D*	7-pin DIN	HI 1616D*	7-pin DIN	HI 1617D*	7-pin DIN	HI 1618D*	7-pin DIN



CODE	HI 1615X	HI 1616X	HI 1617X	HI 1618X
Description	pH electrode	pH electrode	pH electrode	pH electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Ceramic, triple / 40-50 µL/H	Cloth
Electrolyte	KCl 3.5M + AgCl	Gel	KCl 3.5M + AgCl	Gel
Max Pressure	0.1 bar	up to 2 bar	0.1 bar	3 bar
Range	pH: 0 to 13 T: -5 to 100°C (23 to 212°F)	pH: 0 to 14 T: 0 to 100°C (32 to 212°F)	pH: 0 to 12 T: -5 to 100°C (23 to 212°F)	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)
Tip /Shape	Spheric (dia: 9.5 mm)	Spheric (dia: 9.5 mm)	Conic (12 x 12 mm)	Spheric (dia: 5 mm)
Temperature Sensor	Yes	Yes	Yes	Yes
Amplifier	Yes	Yes	Yes	Yes
Body Material	Glass	Glass	Glass	Ultem®
Cable	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')	7-pole; 1 m (3.3')
Recommended Use	Laboratory general use	Continuous monitoring	Fats and creams, soil samples, semi solid products, low conductivity solutions, emulsions	Field applications
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

* To be used with the **HI 98140**, **HI 98150**, **HI 98230** and **HI 98240** pH meters.

HANNA instruments

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Special ORP Electrodes

with Amplified Electrodes and Platinum or Gold Tips

HI 3618X	CONNECTOR
HI 3618D	DIN

To be used with **HI 9210N** and **HI 8314**

HI 3620X	CONNECTOR
HI 3620D	DIN

Intelligent electrode

HI 4619X	CONNECTOR
HI 4619D	DIN

To be used with **HI 9210N** and **HI 8314**

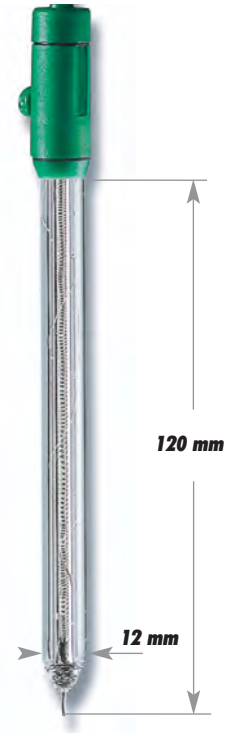
ORP measurements are used as an effective measure of the sanitation of pool, spa and potable water. E. Coli bacteria presence in water depends on the ORP value. ORP is a reliable indicator of bacteriological water quality.

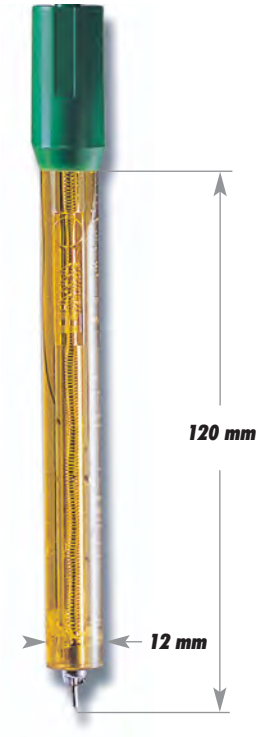
Installing and checking the electrode

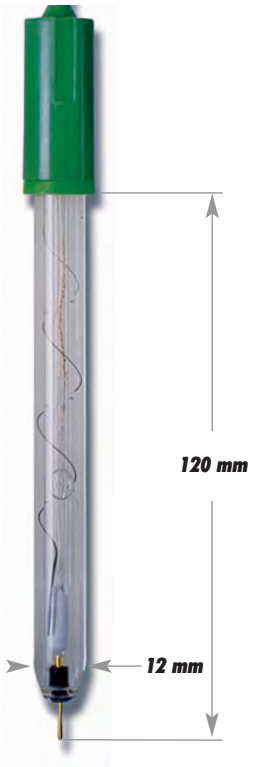
ORP electrodes can be used on any HANNA pH/ORP meter.

1) After removing the protective cap from the electrode and opening the fill hole cover, soak the tip in warm tap water. This will enhance the flow of the reference junction.

2) To check the function of the electrode, immerse the tip in HI 7020 ORP test solution (HI 7020). The value should be between 200 and 275 mV. Oxidizing or reduction treatment with HI 7092 or HI 7091 will prepare the electrode's surface and speed initial response time.







CODE	HI 3618X	HI 3620X	HI 4619X
Description	ORP electrode	ORP electrode	ORP electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Ceramic, triple / 40-50 µL/H
Electrolyte	KCl 3.5M + AgCl	Gel	Gel
Max Pressure	0.1 bar	2 bar	2 bar
Range	ORP: ±2000 mV T: -5 to 100°C (23 to 212°)	ORP: ±2000 mV T: 0 to 80°C (32 to 176°F)	ORP: ±2000 mV T: -5 to 100°C (23 to 212°)
Tip /Shape	Platinum pin	Platinum pin	Gold pin
Temperature Sensor	Yes	No	Yes
Amplifier	Yes	Yes	Yes
Body Material	Glass	PEI	Glass
Cable	5-pole; 1 m (3.3')	7-pole; 1 m (3.3')	5-pole; 1 m (3.3')
Recommended Use	Laboratory	Field applications, swimming pools	Strong oxidants, disinfection with ozone
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Amplified pH Electrodes with Temperature Sensor

pH Electrodes with Temperature Measurement Capability

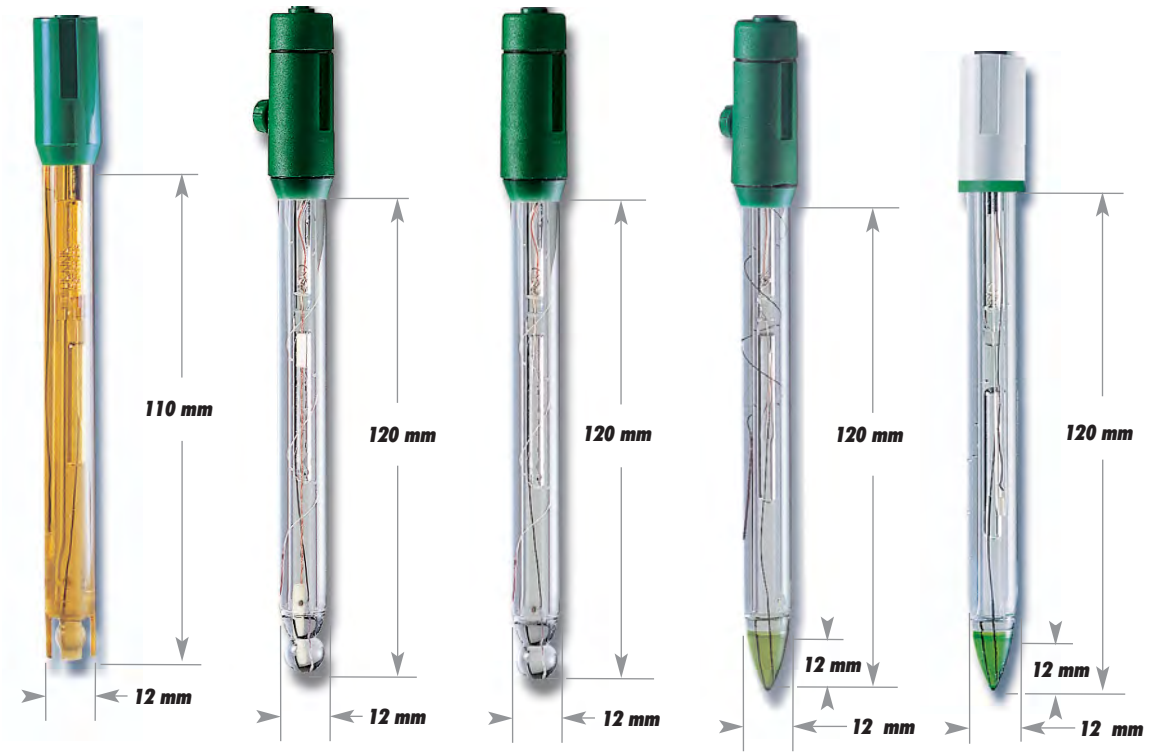
HI 1217X	CONNECTOR
HI 1217D	DIN*
HI 1217S	Screw Cap†

HI 1611X	CONNECTOR
HI 1611D	DIN*

FC 211X	CONNECTOR
FC 211D	DIN*

HI 1610X	CONNECTOR
HI 1610D	DIN*

HI 1612X	CONNECTOR
HI 1612D	DIN*



CODE	HI 1217X	HI 1610X	HI 1611X	HI 1612X	FC 211X
Description	pH electrode	pH electrode	pH electrode	pH electrode	pH electrode
Reference	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Ceramic, triple / 40-50 µL/H	Open
Electrolyte	Gel	KCl 3.5M + AgCl	Gel	KCl 3.5M + AgCl	Viscolene
Max Pressure	2 bar	0.1 bar	2 bar	0.1 bar	0.1 bar
Range	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	pH: 0 to 13 T: -5 to 100°C (23 to 212°F)	pH: 0 to 14 T: 0 to 100°C (32 to 212°F)	pH: 0 to 12 T: -5 to 100°C (23 to 212°F)	pH: 0 to 12 T: 0 to 50°C (32 to 122°F)
Tip /Shape	Spheric (dia: 5.0 mm)	Spheric (dia: 9.5 mm)	Spheric (dia: 9.5 mm)	Conic (12 x 12 mm)	Conic (12 x 12 mm)
Temperature Sensor	Yes	Yes	Yes	Yes	Yes
Amplifier	Yes	Yes	Yes	Yes	Yes
Body Material	PEI	Glass	Glass	Glass	Glass
Cable**	5-pole; 1 m (3.3')	5-pole; 1 m (3.3')	5-pole; 1 m (3.3')	5-pole; 1 m (3.3')	5-pole; 1 m (3.3')
Recommended Use	General purpose	Laboratory general use	Continuous monitoring	Emulsions, semi solid samples	Milk, yogurt, cream
	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 20 to 40°C (86 to 104°F)	Recommended Operating Temperature 30 to 85°C (104 to 185°F	Recommended Operating Temperature -5 to 30°C (23 to 86°F) + 20 to 40°C (86 to 104°F)	Recommended Operating Temperature -5 to 30°C (23 to 86°F)

** Not for models with screw cap.

*To be used with **HI 9210N** and **HI 8314**

† To be used with **HI 9214**

HANNA instruments

With Great Products, Come Great Results™

Rugged pH and ORP Electrodes

Designed for General Use

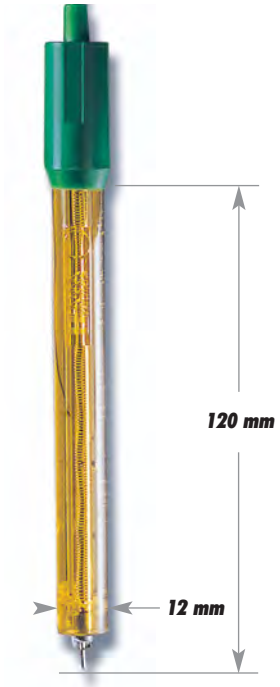
HI 13X2Y	CONNECTOR
HI 1332B	BNC
HI 1312S	Screw Cap
HI 1332P	BNC + PIN*

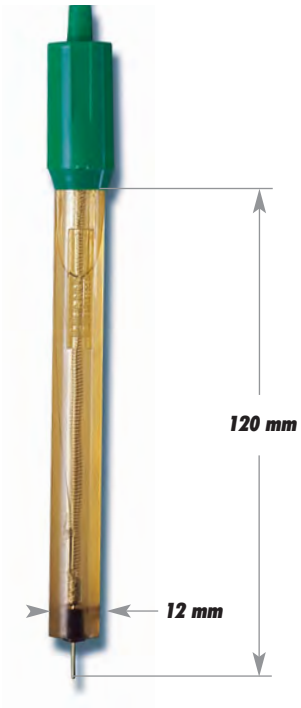
HI 32X0Y	CONNECTOR
HI 3230B	BNC
HI 3210S	Screw Cap

HI 44X0Y	CONNECTOR
HI 4430B	BNC
HI 4410S	Screw Cap

* For pH meters with CAL CHECK™ system







CODE	HI 13X2Y	HI 32X0Y	HI 44X0Y
Description	pH electrode	ORP electrode	Gel filled, combination ORP electrode with gold contact
Reference	Double, Ag/AgCl	Single, Ag/AgCl	Single, Ag/AgCl
Junction / Flow Rate	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H	Ceramic, single / 15-20 µL/H
Electrolyte	KCl 3.5M	Gel	Gel
Max Pressure	0.1 bar	2 bar	2 bar
Range	pH: 0 to 13 T: 0 to 80°C (32 to 176°F)	ORP: ±2000 mV T: 0 to 80°C (32 to 176°F)	ORP: ±2000 mV T: 0 to 80°C (32 to 176°F)
Tip /Shape	Spheric (dia: 7.5 mm)	Platinum pin	Gold pin
Temperature Sensor	No	No	No
Amplifier	No	No	No
Body Material	PEI	PEI	PEI
Cable**	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')	Coaxial; 1 m (3.3')
Recommended Use	Chemicals, field applications, quality control	Municipal water, quality control	Oxidants, ozone

** Not for models with screw cap.

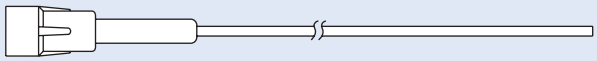
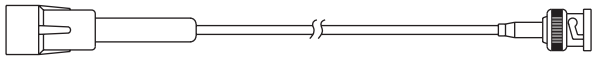
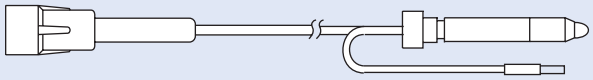
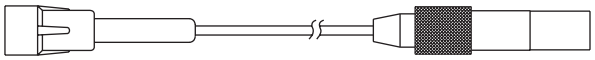
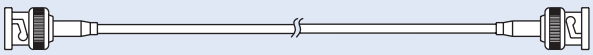
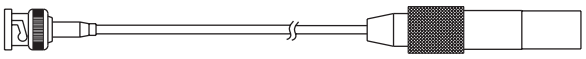
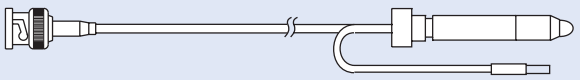
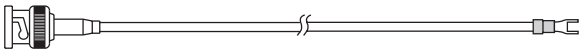
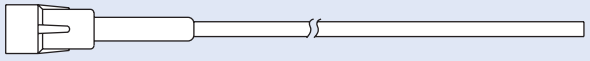
Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Recommended Operating Temperature 20 to 40°C (86 to 104°F)

Cables

Electrode

PART NUMBER	CABLE LENGTH	CABLES / CONNECTORS	DESCRIPTION
HI 7854/1 HI 7854/10 HI 7854/15 HI 7854/3 HI 7854/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		3.0 mm (0.12") cable with screw type connectors
HI 7855/1 HI 7855/10 HI 7855/15 HI 7855/3 HI 7855/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		3.0 mm (0.12") cable with screw type and BNC connectors
HI 7856/1 HI 7856/10 HI 7856/15 HI 7856/3 HI 7856/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		3.0 mm (0.12") cable with screw type and US Standard connectors
HI 7857/1 HI 7857/10 HI 7857/15 HI 7857/3 HI 7857/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		3.0 mm (0.12") cable with screw type and DIN connectors
HI 7858/1 HI 7858/10 HI 7858/15 HI 7858/3 HI 7858/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		3.0 mm (0.12") cable with BNC connectors
HI 7859/1 HI 7859/10 HI 7859/15 HI 7859/3 HI 7859/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 metri		3.0 mm (0.12") cable with BNC and DIN connectors
HI 7860/1 HI 7860/10 HI 7860/15 HI 7860/3 HI 7860/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		3.0 mm (0.12") cable with BNC and US Standard connectors
HI 7861/1 HI 7861/10 HI 7861/15 HI 7861/3 HI 7861/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		3.0 mm (0.12") cable with BNC and spade lug connectors
HI 778P/1 HI 778P/10 HI 778P/15 HI 778P/3 HI 778P/5	1 m (3.3') 10 m (33') 15 m (49.5') 3 m (9.9') 5 m (16.5')		5.0 mm (0.2") cable with screw type connectors

ISE Solutions

Solutions Designed for our ISE Electrodes



HANNA ISE Standards

Our wide selection of HANNA ISE Standards are made and bottled in our own state-of-the-art solutions facility. ISE Standards are required for direct and incremental measurement techniques and are available with Certificate of Analysis.

CODE	DESCRIPTION	SIZE
HI 4001-01	0.1 M ammonia std.	500 mL
HI 4001-02	100 ppm ammonia std. (as N)	500 mL
HI 4001-03	1000 ppm ammonia std. (as N)	500 mL
HI 4002-01	0.1 M bromide std.	500 mL
HI 4003-01	0.1 M cadmium std.	500 mL
HI 4004-01	0.1 M calcium std.	500 mL
HI 4005-01	0.1 M carbon dioxide std.	500 mL
HI 4005-03	1000 ppm carbon dioxide std. (as $CaCO_3$)	500 mL
HI 4007-01	0.1 M chloride std.	500 mL
HI 4007-02	100 ppm chloride std.	500 mL
HI 4007-03	1000 ppm chloride std.	500 mL
HI 4008-01	0.1 M cupric std.	500 mL
HI 4010-01	0.1 M fluoride std.	500 mL
HI 4010-02	100 ppm fluoride std.	500 mL
HI 4010-03	1000 ppm fluoride std.	500 mL
HI 4010-10	10 ppm fluoride std. premixed with TISAB II	500 mL
HI 4010-11	1 ppm fluoride std. premixed with TISAB II	500 mL
HI 4010-12	2 ppm fluoride std. premixed with TISAB II	500 mL
HI 4010-30	(4) 1 ppm, (4) 10 ppm fluoride std. with (4) TISAB II	500 mL
HI 4011-01	0.1 M iodide std.	500 mL
HI 4012-01	0.1 M lead std.	500 mL
HI 4012-21	0.1 M sulfate std.	500 mL
HI 4013-01	0.1 M nitrate std.	500 mL
HI 4013-02	100 ppm nitrate std.	500 mL
HI 4013-03	1000 ppm nitrate std.	500 mL
HI 4014-01	0.1 M potassium std.	500 mL
HI 4015-01	0.1 M silver std.	500 mL

HANNA Gas Sensor Fill Solutions

CODE	DESCRIPTION	SIZE
HI 4001-40	Ammonia filling solution	(4) 30 mL bottles
HI 4005-40	Carbon dioxide filling solution	(4) 30 mL bottles

Specific "Solutions" for ISE Sensors

CODE	DESCRIPTION	SIZE
HI 4000-47	pH 4 and pH 7 buffers with chloride background. Used to check glass internal of gas sensors.	10 packages ea. and 2 beakers
HI 4001-45	Conditioning solution for HI 4101	500 mL
HI 4004-45	Conditioning Solution for calcium electrodes	500 mL
HI 4005-45	Conditioning Solution for HI 4105	500 mL



HANNA instruments
With Great Products, Come Great Results™

ISE Solutions

Solutions Designed for our ISE Electrodes



Ionic Strength Adjusters (ISA)

HANNA Ionic Strength Adjusters (ISA) are formulated to provide a constant ionic strength in sample and standards alike, thus permitting concentration rather than activity measurements to be made. In some cases ISA's adjust pH and eliminate matrix effects.

CODE	DESCRIPTION	SIZE
HI 4000-00	ISA for halide electrodes	500 mL
HI 4001-00	Alkaline ISA for ammonia/cyanide	500 mL
HI 4004-00	Calcium ISA	500 mL
HI 4005-00	Carbon dioxide ISA	500mL
HI 4010-00	TISAB II (for fluoride)	500 mL
HI 4010-05	TISAB II (for fluoride)	1 gallon
HI 4010-06	TISAB III concentrate (for fluoride)	500 mL
HI 4012-00	Lead or sulfate ISA	500 mL
HI 4013-00	Nitrate ISA	500 mL
HI 4013-06	Nitrate interferent suppressent ISA	500 mL
HI 4014-00	Potassium ISA	500 mL
HI 4015-00	SAOB (sulfide antioxidant buffer)	500 mL, 1pkg (2 components)

HANNA Accessories

HANNA replacement parts and accessories keep your measurements fast and accurate.

CODE	DESCRIPTION
HI 4000-50	Liquid membrane sensor handle
HI 4000-51	Gas sensor replacement pH for Ammonia Sensor
HI 4000-52	Gas sensor membrane cap for Ammonia
HI 4000-54	Gas sensor replacement pH for Carbon Dioxide Sensor
HI 4000-70	Halide polishing strip
HI 4001-51	Ammonia membrane kit (20 loose)
HI 4004-51	Calcium module for half-cell
HI 4104-51	Calcium module for combination
HI 4005-53	Carbon dioxide membrane kit (3 caps)
HI 4110-51	Fluoride module for combination electrode
HI 4013-53	Nitrate module 3 pack for half-cell
HI 4113-53	Nitrate module 3 pack for combination
HI 4014-51	Potassium module for half-cell
HI 4114-51	Potassium module for combination
HI 740155P	Capillary pipettes (20 pcs)
HI 740159	Plastic tweezers

HANNA Silver-free Reference Fill Solutions

Recommended for our Combination ISE Electrodes and the HANNA HI 5315 reference electrode. Reference electrodes should be topped off daily with the correct filling solution for optimum measurement performance. These solutions are silver free to eliminate silver preciptates found with standard electrolytes.

CODE	DESCRIPTION	SIZE
HI 7072	Electrolyte solution, 1 M KNO_3	(4) 30 mL bottles
HI 7075	Electrolyte solution with KNO_3 and KCl	(4) 30 mL bottles
HI 7076	Electrolyte solution, 1 M NaCl	(4) 30 mL bottles
HI 7078	Electrolyte solution, $(NH_4)_2SO_4$	(4) 30 mL bottles
HI 7082	Electrolyte solution, 3.5 M KCl	(4) 30 mL bottles

pH and ORP Solutions

A Solution for Every Need

Calibration and Cleaning Solutions for Electrodes and Probes

The fundamental use of calibration and cleaning solutions is to correctly maintain electrode operation to produce accurate and reproducible readings. Often readings are not correct because the sensors have not been properly handled. Using HANNA's wide range of solutions will help guarantee correct cleaning and calibration of electrodes and probes for maximum performance.

Our application engineered solutions have been produced with reference instruments calibrated with the highest precision NIST standards. Our range of buffer and cleaning solutions have been extended with 3 new lines: the *HI 50xx series* of technical buffer solutions which allow for calibration of pH meters from 1.00 to 13.00 pH; *HI 60xx series* of solutions with millesimal resolutions available for pH measurements with an accuracy of ±0.002 pH and *application specific cleaning solutions* available in bottles of 250 and 500 mL as well as in small sachets of 20 mL each.

Ready-to-Use Solutions

Buffer solutions that can be prepared in small batches from capsules, tablets or powders, are called "fresh" because they are prepared at the time of use. They are considered to be, but are not, very precise. The quality of buffer solutions depends on many factors that intervene during production: the quantity and quality of the chemicals and also distilled water that has been used in preparing the batches as well as the temperature and the instruments used to prepare them.

HANNA buffer solutions are prepared using chemicals that have been checked very carefully, *within an aseptic environment* and *with the highest precision reference instruments*.

The main standard buffer solutions produced by HANNA are available in bottles or in sealed sachets, complete with or without certificate of analysis.

HANNA solutions are more convenient than the so called "fresh" solutions. The following pages show all the series of calibration solutions in the various types of packages that will satisfy every application need and will always guarantee precise readings.

A Complete Range

The entire range of HANNA's solutions includes:

- *pH buffer solutions*
- *Standard solutions for conductivity, TDS, turbidity, salinity and ISE calibration*
- *ORP test and pretreatment solutions*
- *Reference fill solutions for refillable electrodes*
- *General and specific cleaning solutions for electrodes*
- *Solutions for electrode maintenance*
- *Solutions for sample preparation*



Solutions are available in many sizes to satisfy all different applications, from 20 mL sachets all the way to 3.78 L (1 Gallon) containers for the large quantities used in analytical laboratories.

For safety and traceability, all HANNA solutions are provided with a label showing the batch number and expiration date.

Ready-to-Use Single-Dose Sachets



Custom-made Solutions

Get the best out of your instruments using single-dose HANNA calibration and maintenance solutions. A wide range of solutions for pH, conductivity, TDS and cleaning is available in the form of practical 20 mL sachets.

Each sealed, light-tight sachet holds just the right amount of calibration solution ready for use.

Every time your instrument is calibrated using these HANNA sachets, it is like using a newly-opened bottle of solution.

Practical, Safe and Ready-to-Use

Single-dose sachets are ready for use and are available in different packages, with 10, 25 and 500 pieces. Each sachet is well sealed to ensure the longest life and maximum freshness for the solution

Single-Dose Certified Solutions in Sachets

Solutions in sachets are also available with a certificate of analysis. Just like in our bottled solutions, the certificate shows the date of production, batch number and expiration date.

Combination Kits

To be more practical, HANNA solutions are also available in combined kits. These kits are useful for multiparameter instruments or for two-point calibration.

HANNA instruments

With Great Products, Come Great Results™

Custom Solutions



New Series of Solutions

To meet the requirements of various applications, the following categories of solutions are also available:

HI 50xx series, technical solutions: they allow for calibration at all units of pH from pH 1.00 to pH 13.00.

HI 60xx series, millesimal solutions: they allow for the correct calibration of pH meters with millesimal readings.

HI 706xx series, cleaning solutions: an indispensable tool when electrodes are used continuously. Produced with the purpose of ensuring correct readings in widely varied areas of application, they guarantee precise measurement and long electrode life.



pH and ORP Solutions

A Solution for Every Need

Certified Solutions

For those operators who request it, we provide standard solutions complete with certificate of analysis. These certificates are prepared against NIST standards to avoid any possible error in determining the actual pH value.

The use of these certified HANNA solutions adds a further factor of accuracy to your most critical measurements. The certificates show the date of production, batch number, accuracy rating and the expiration date.



All solutions belonging to the series HI 50xx and HI 60xx are provided with a certificate of analysis. The certified solutions belonging to the HI 70xx series are identified by the letter "C" at the end of the part number.

Table of Reference Temperatures

All calibration solutions are provided with a label presenting a reference table of the relationship between pH or conductivity values and the temperature. This will save time and, most important, will prevent calibration errors especially during field measurements.

Bottles that Meet FDA Standards

In order for you to be certain of the accuracy of your instruments over time, ask for HANNA solutions in FDA type bottles (US Food & Drug Administration). These non-transparent bottles block light from reacting with light sensitive solutions thus promoting solution stability under adverse conditions.

Material Safety Data Sheet

Material Safety Data Sheets (MSDS) for each of the solutions included in the HANNA catalog can be downloaded from our website at: www.hannainst.com.



HI 5000 Series

pH Technical Calibration Solutions

A Complete Scale of Buffer Solutions



Precise Measurements

To obtain precise and valid pH measurements, the pH meter and pH electrode must be calibrated at a minimum of 2 different points, close to the value of the sample to be tested.

HANNA offers a complete range of pH buffer solutions, that will satisfy all your calibration needs and which have been extended with two additional lines: the HI 50xx series of technical buffer solutions (shown on these pages,) and the solutions with millesimal resolution, HI 60xx.

Technical Solutions (±0.01 pH) for Each Point of the pH Scale.



This complete scale of buffer solutions offers a higher degree of accuracy for pH measurements in specific areas of application, such as in monitoring the pH of must and wine. This line includes 13 solutions starting from a value of pH 1.00 up to pH 13.00 with an accuracy of ±0.01 pH, thus covering every point of the pH scale.

These solutions are dedicated to those applications that require extremely accurate pH monitoring, and are also available with certificate of analysis prepared by comparison against NIST standards.

Also available are solution bottles, that are colored according to a given standard calibration value: HI 5004-R (Red), HI 5007-G (Green) and HI 5010-V (Violet).

BOTTLES		
pH VALUE @25°C	**CODE**	**PACKAGE**
1.00	HI 5001	(1) 500 mL
1.68	HI 5016	(1) 500 mL
2.00	HI 5002	(1) 500 mL
2.00	HI 5002-01	(1) 1 L
2.00	HI 5002-36	(36) 500 mL
3.00	HI 5003	(1) 1 L
3.00	HI 5003-36	(36)500 mL
3.79	HI 5037	(1) 500 mL
4.01	HI 5004	(1) 500 mL
4.01	HI 5004-01	(1) 1 L
4.01	HI 5004-12	(12) 500 mL
4.01	HI 5004-36	(36) 500 mL
4.01	HI 5004-R	(1) 500 mL
4.01	HI 5004-R08	(1) 1 G (3.78 L)
4.01	HI 5004-R36	(36) 500 mL
4.63	HI 5046	(1) 500 mL
4.63	HI 5046-01	(1) 1 L
5.00	HI 5005	(1) 500 mL
5.00	HI 5005-01	(1) 1 L
6.00	HI 5006	(1) 500 mL
6.00	HI 5006-01	(1) 1 L
6.00	HI 5006-36	(36) 500 mL
6.86	HI 5068	(1) 500 mL
7.01	HI 5007	(1) 500 mL
7.01	HI 5007-01	(1) 1 L
7.01	HI 5007-12	(12) 500 mL
7.01	HI 5007-36	(36) 500 mL
7.01	HI 5007-G	(1) 500 mL
7.01	HI 5007-G08	(1) 1 G (3.78 L)
7.01	HI 5007-G36	(36) 500 mL
7.41	HI 5074	(1) 500 mL
7.41	HI 5074-01	(1) 1 L
8.00	HI 5008	(1) 500 mL
8.00	HI 5008-01	(1) 1 L
8.00	HI 5008-36	(36) 500 mL
9.00	HI 5009	(1) 500 mL
9.00	HI 5009-01	(1) 1 L
9.00	HI 5009-36	(36) 500 mL
9.18	HI 5091	(1) 500 mL
10.01	HI 5010	(1) 500 mL
10.01	HI 5010-01	(1) 1 L
10.01	HI 5010-12	(12) 500 mL
10.01	HI 5010-36	(36) 500 mL
10.01	HI 5010-V	(1) 500 mL
10.01	HI 5010-V08	(1) 1 G (3.78 L)
10.01	HI 5010-V36	(36) 500 mL
11.00	HI 5011	(1) 500 mL
12.00	HI 5012	(1) 500 mL
12.45	HI 5124	(1) 500 mL
13.00	HI 5013	(1) 500 mL

pH Technical Calibration Solutions

A Complete Scale of Buffer Solutions

SACHETS		
pH VALUE @25°C	**CODE**	**PACKAGE**
1.00	HI 50001-01	(10) 20 mL
1.00	HI 50001-02	(25) 20 mL
1.68	HI 50016-01	(10) 20 mL
1.68	HI 50016-02	(25) 20 mL
2.00	HI 50002-01	(10) 20 mL
2.00	HI 50002-02	(25) 20 mL
3.00	HI 50003-01	(10) 20 mL
3.00	HI 50003-02	(25) 20 mL
3.79	HI 50037-01	(10) 20 mL
3.79	HI 50037-02	(25) 20 mL
4.01	HI 50004-01	(10)20 mL
4.01	HI 50004-02	(25) 20 mL
4.63	HI 50046-01	(25) 20 mL
4.63	HI 50046-02	(25) 20 mL
5.00	HI 50005-01	(10) 20 mL
5.00	HI 50005-02	(25) 20 mL
6.00	HI 50006-01	(10) 20 mL
6.00	HI 50006-02	(25) 20 mL
6.86	HI 50068-01	(10) 20 mL
6.86	HI 50068-02	(25) 20 mL
7.01	HI 50007-01	(10) 20 mL
7.01	HI 50007-02	(25) 20 mL
7.41	HI 50074-01	(10) 20 mL
7.41	HI 50074-02	(25) 20 mL
8.00	HI 50008-01	(10) 20 mL
8.00	HI 50008-02	(25) 20 mL
9.00	HI 50009-01	(10) 20 mL
9.00	HI 50009-02	(25) 20 mL
9.18	HI 50091-01	(10) 20 mL
9.18	HI 50091-02	(25) 20 mL
10.01	HI 50010-01	(10) 20 mL
10.01	HI 50010-02	(25) 20 mL
11.00	HI 50011-01	(10) 20 mL
11.00	HI 50011-02	(25) 20 mL
12.00	HI 50012-01	(10) 20 mL
12.00	HI 50012-02	(25) 20 mL
12.45	HI 50124-01	(10) 20 mL
12.45	HI 50124-02	(25) 20 mL
13.00	HI 50013-01	(10) 20 mL
13.00	HI 50013-02	(25) 20 mL



Easy to Use Single Dose Sachets

For the highest level of reliability of field instrumentation, technical solutions are also provided in convenient single-dose sachets.

Calibration solution sachets are sold in boxes containing 10 or 25 pieces to satisfy requirements for daily use.



HANNA Combo Kits

Use our combination kits for easy ordering and reordering.

SOLUTION COMBINATION KITS - BOTTLE		
CODE	**SOLUTIONS (pH VALUE @25°C)**	**BOTTLE**
HI 54710	pH 4.01, pH 7.01, pH 10.01	(3) 500 mL
HI 54710-10	pH 4.01, pH 7.01, pH 10.01, HI 70300L	(4) 500 mL
HI 54710-11	pH 4.01, pH 7.01, pH 10.01, HI 70300L, HI 7061L	(5) 500 mL
HI 54710-12	pH 4.01, pH 7.01, pH 10.01, HI 70300L, HI 7061L, HI 7071L	(6) 500 mL
HI 54710-13	pH 4.01, pH 7.01, pH 10.01, HI 70300L, HI 7061L, HI 7072L	(6) 500 mL

HI 6000 Series

pH Millesimal Calibration Solutions

with ±0.002 pH Accuracy

Millesimal Calibration Solutions

This line of buffers with millesimal accuracy (±0.002 pH), HI 60xx, has been prepared to meet the increasing need for assured accuracy in pH measurements. Each bottle of the series HI 60xx is provided with a certificate of analysis, prepared by comparison with NIST standards.

MILLESIMAL BUFFER SOLUTIONS (±0.002 pH) - BOTTLE

pH VALUE @25°C	CODE	PACKAGE	pH VALUE @25°C	CODE	PACKAGE
1.000	HI 6001	(1) 500 mL	7.010	HI 6007	(1) 500 mL
1.000	HI 6001-01	(1) 1 L	7.010	HI 6007-01	(1) 1 L
1.679	HI 6016	(1) 500 mL	7.413	HI 6074	(1) 500 mL
1.679	HI 6016-01	(1) 1 L	7.413	HI 6074-01	(1) 1 L
2.000	HI 6002	(1) 500 mL	8.000	HI 6008	(1) 500 mL
2.000	HI 6002-01	(1) 1 L	8.000	HI 6008-01	(1) 1 L
3.000	HI 6003	(1) 500 mL	9.000	HI 6009	(1) 500 mL
3.000	HI 6003-01	(1) 1 L	9.000	HI 6009-01	(1) 1 L
3.788	HI 6037	(1) 500 mL	9.177	HI 6091	(1) 500 mL
3.788	HI 6037-01	(1) 1 L	9.177	HI 6091-01	(1) 1 L
4.010	HI 6004	(1) 500 mL	10.010	HI 6010	(1) 500 mL
4.010	HI 6004-01	(1) 1 L	10.010	HI 6010-01	(1) 1 L
4.630	HI 6046	(1) 500 mL	11.000	HI 6011	(1) 500 mL
4.630	HI 6046-01	(1) 1 L	11.000	HI 6011-01	(1) 1 L
5.000	HI 6005	(1) 500 mL	12.000	HI 6012	(1) 500 mL
5.000	HI 6005-01	(1) 1 L	12.000	HI 6012-01	(1) 1 L
6.000	HI 6006	(1) 500 mL	12.450	HI 6124	(1) 500 mL
6.000	HI 6006-01	(1) 1 L	12.450	HI 6124-01	(1) 1 L
6.862	HI 6068	(1) 500 mL	13.000	HI 6013	(1) 500 mL
6.862	HI 6068-01	(1) 1 L	13.000	HI 6013-01	(1) 1 L



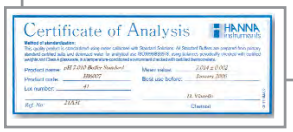
Light **Tight**

Multiple Use Bottles

Easy Range Identification

The colors on the HI 60xx series packaging correspond to a given standard pH value. They make it easy and safe to identify the buffers to be used.





Certificates of Analysis are included.

MILLESIMAL BUFFER SOLUTIONS (±0.002 pH) - SACHET

pH VALUE @25°C	CODE	PACKAGE	pH VALUE @25°C	CODE	PACKAGE
1.000	HI 60001-01	(10) 20 mL	7.010	HI 60007-01	(10) 20 mL
1.000	HI 60001-02	(25) 20 mL	7.010	HI 60007-02	(25) 20 mL
1.679	HI 60016-01	(10) 20 mL	7.413	HI 60074-01	(10) 20 mL
1.679	HI 60016-02	(25) 20 mL	7.413	HI 60074-02	(25) 20 mL
2.000	HI 60002-01	(10) 20 mL	8.000	HI 60008-01	(10) 20 mL
2.000	HI 60002-02	(25) 20 mL	8.000	HI 60008-02	(25) 20 mL
3.000	HI 60003-01	(10) 20 mL	9.000	HI 60009-01	(10) 20 mL
3.000	HI 60003-02	(25) 20 mL	9.000	HI 60009-02	(25) 20 mL
3.788	HI 60037-01	(10) 20 mL	9.177	HI 60091-01	(10) 20 mL
3.788	HI 60037-02	(25) 20 mL	9.177	HI 60091-02	(25) 20 mL
4.010	HI 60004-01	(10) 20 mL	10.010	HI 60010-01	(10) 20 mL
4.010	HI 60004-02	(25) 20 mL	10.010	HI 60010-02	(25) 20 mL
4.630	HI 60046-01	(10) 20 mL	11.000	HI 60011-01	(10) 20 mL
4.630	HI 60046-02	(25) 20 mL	11.000	HI 60011-02	(25) 20 mL
5.000	HI 60005-01	(10) 20 mL	12.000	HI 60012-01	(10) 20 mL
5.000	HI 60005-02	(25) 20 mL	12.000	HI 60012-02	(25) 20 mL
6.000	HI 60006-01	(10) 20 mL	12.450	HI 60124-01	(10) 20 mL
6.000	HI 60006-02	(25) 20 mL	12.450	HI 60124-02	(25) 20 mL
6.862	HI 60068-01	(10) 20 mL	13.000	HI 60013-01	(10) 20 mL
6.862	HI 60068-02	(25) 20 mL	13.000	HI 60013-02	(25) 20 mL

Millesimal Calibration Solution Sachets

This series is also available in handy sachets to perform accurate calibrations on-site or in the field. Single dose sachet solutions are safe, easy to carry and always fresh.



Individually **Packaged**

Single-use Sachets

HANNA instruments

With Great Products, Come Great Results™

pH Standard Calibration Solutions

Quality Solutions for Laboratory Applications

1.68 | Buffer Solution

Plating bath samples, food samples and waste samples are often acidic in nature. To increase accuracy of your measurment at lower pH, it is important to calibrate your electrode and meter at that pH also. HANNA pH 1.68 buffer is available to fufill this requirement. pH 1.68 buffer solution allows you to calibrate your measurement system in the acid pH range and bracket your acidic samples by using a second value at 4 pH or near 7 pH.

Our millesimal series offers ±0.002 certified accuracy and our HI 5016 technical grade solution offers ±0.01 certified accuracy. Standard NIST traceable (no certification included) 1.68 pH buffer with ±0.01 accuracy is available in two sizes.



BOTTLES

CODE	pH VALUE @25°C	SIZE	PACKAGE
HI 7001L	1.68	500 mL	1 bottle
HI 7001M	1.68	250 mL	1 bottle

4.01 | Buffer Solution

HANNA buffer solutions are prepared according to precise formulas and are standardized with a pH electrode and meter calibrated with NIST standards. This buffer value is widely used in water purification plants, in the food industry and where ever the pH is expected to be slightly acidic.

All pH 4 solutions show batch number, expiration date and the correlation table between pH and temperature.

Certified buffers are available with our technical and millesimal series. Standard NIST traceable (no certification included) 4.01 pH buffer with ±0.01 accuracy is available in several convenient sizes.



HANNA pH 4 buffer is standardized against NIST references.

BOTTLES

CODE	pH VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 7004/1G	4.01	1 Gallon (3.78 L)	1 bottle		
HI 7004/1L	4.01	1 L	1 bottle		
HI 7004L	4.01	500 mL	1 bottle		
HI 7004L/C	4.01	500 mL	1 bottle		•
HI 7004M	4.01	250 mL	1 bottle		
HI 8004/1L	4.01	1 L	1 bottle	•	
HI 8004L	4.01	500 mL	1 bottle	•	
HI 8004L/C	4.01	500 mL	1 bottle	•	•

SACHETS

CODE	pH VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70004C	4.01	20 mL	25 sachets	•
HI 70004P	4.01	20 mL	25 sachets	
HI 7004P/5	4.01	20 mL	500 sachets	
HI 77400C	4.01 & 7.01	20 mL	10 sachets (5 each)	•
HI 77400P	4.01 & 7.01	20 mL	10 sachets (5 each)	

pH Standard Calibration Solutions

Quality Solutions for Laboratory Applications

6.86 | Buffer Solution



Traceability with Reference to NIST Standards

The buffer solution at pH 6.86 is standardized with a pH electrode and meter calibrated with NIST buffer solutions. The buffer is certified against to NIST standards.

Many of our latest portable and bench microprocessor instruments, may now be calibrated both with pH 6.86 or pH 7.01 buffers.

The HANNA range of pH 6.86 buffer solutions has been expanded and stability has been improved to match the stability of pH 7.

BOTTLES

CODE	pH VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 7006/1G	6.86	1 Gallon (3.78 L)	1 bottle		
HI 7006/1L	6.86	1 L	1 bottle		
HI 7006L	6.86	500 mL	1 bottle		
HI 7006L/C	6.86	500 mL	1 bottle		•
HI 7006M	6.86	250 mL	1 bottle		
HI 8006/1L	6.86	1 L	1 bottle	•	
HI 8006L	6.86	500 mL	1 bottle	•	
HI 8006L/C	6.86	500 mL	1 bottle	•	•

SACHETS

CODE	pH VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70006C	6.86	20 mL	25 sachets	•
HI 70006P	6.86	20 mL	25 sachets	

7.01 | Buffer Solution

pH 7.01 is the most widely used among all buffer solutions. For this reason we have prepared it in a wider variety of sizes to meet application demand.

HANNA pH buffer solutions are standardized against NIST reference solutions.



FDA Approved Bottle

For maximum reliability choose our solutions in bottles that meet the FDA standards (US Food & Drug Administration) that protect the solutions from extended exposure to light.

BOTTLES

CODE	pH VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 7007/1G	7.01	1 Gallon (3.78 L)	1 bottle		
HI 7007/1L	7.01	1 L	1 bottle		
HI 7007L	7.01	500 mL	1 bottle		
HI 7007L/C	7.01	500 mL	1 bottle		•
HI 7007M	7.01	230 mL	1 bottle		
HI 8007/1L	7.01	1 L	1 bottle	•	
HI 8007L	7.01	500 mL	1 bottle	•	
HI 8007L/C	7.01	500 mL	1 bottle	•	•

SACHETS

CODE	pH VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70007C	7.01	20 mL	25 sachets	•
HI 70007P	7.01	20 mL	25 sachets	
HI 7007P/5	7.01	20 mL	500 sachets	
HI 770710C	10.01 & 7.01	20 mL	10 sachets (5)	•
HI 770710P	10.01 & 7.01	20 mL	10 sachets (5)	
HI 77100C	1413 µS/cm & pH 7.01	20 mL	20 sachets (10)	•
HI 77100P	1413 µS/cm & pH 7.01	20 mL	20 sachets (10)	
HI 77200C*	1500 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10)	•
HI 77200P*	1500 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10)	
HI 77300C	1382 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10)	•
HI 77300P	1382 ppm (mg/L) & pH 7.01	20 mL	20 sachets (10)	
HI 77400C	4.01 & 7.01	20 mL	10 sachets (5)	•
HI 77400P	4.01 & 7.01	20 mL	10 sachets (5)	
HI 77700C	7.01	20 mL	10 sachets (5)	•
HI 77700P	7.01	20 mL	10 sachets (5)	

* TDS Conversion Factor 4-4-2: 0.65 ppm = 1 µS/cm (approximately).

HANNA instruments
With Great Products, Come Great Results™

pH Standard Calibration Solutions

Quality Solutions for Laboratory Applications

To increase accuracy of your measurement in an alkaline environment, it is important to calibrate your electrode and meter in that pH range and to preferably bracket your sample values. HANNA offers both pH 9.18 buffer and 10.01 buffer to fufill this requirement.

Our millesimal series offers ±0.002 pH certified accuracy. Our HI 5091 technical grade solution offers ±0.01 pH certified accuracy. Standard NIST traceable (no certification included) 9.18 pH buffer with ±0.01 pH accuracy is available in several size bottles. The label indicates the batch code, expiration data and pH/temperature correlation table.

9.18 | Buffer Solution



BOTTLES

CODE	pH VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 7009/1G	9.18	1 Gallon (3.78 L)	1 bottle		
HI 7009/1L	9.18	1 L	1 bottle		
HI 7009L	9.18	500 mL	1 bottle		
HI 7009L/C	9.18	500 mL	1 bottle		•
HI 7009M	9.18	250 mL	1 bottle		
HI 8009/L	9.18	500 mL	1 bottle	•	
HI 8009/1L	9.18	1 L	1 bottle	•	
HI 8009L/C	9.18	500 mL	1 bottle	•	•

SACHETS

CODE	pH VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70009C	9.18	20 mL	25 sachets	•
HI 70009P	9.18	20 mL	25 sachets	

Traceability with NIST Reference Standard

HANNA buffer solutions are prepared using very pure chemicals, in closely controlled laboratories, and with pH meters calibrated with NIST references.

10.01 | Buffer Solution



pH 10.01 solution is commonly used to calibrate equipment used for analyzing basic samples. pH 10 buffer solution is available in various forms: choose the one that best fits your needs.

BOTTLES

CODE	pH VALUE @25°C	SIZE	PACKAGE	FDA BOTTLE	CERTIFICATE OF ANALYSIS
HI 7010/1G	10.01	1 Gallon (3.78 L)	1 bottle		
HI 7010/1L	10.01	1 L	1 bottle		
HI 7010L	10.01	500 mL	1 bottle		
HI 7010L/C	10.01	500 mL	1 bottle		•
HI 7010M	10.01	250 mL	1 bottle		
HI 8010/1L	10.01	1 L	1 bottle	•	
HI 8010L	10.01	500 mL	1 bottle	•	
HI 8010L/C	10.01	500 mL	1 bottle	•	•

SACHETS

CODE	pH VALUE @25°C	SIZE	PACKAGE	CERTIFICATE OF ANALYSIS
HI 70010C	10.01	20 mL	25 sachets	•
HI 70010P	10.01	20 mL	25 sachets	
HI 70010P/5	10.01	20 mL	500 sachets	
HI 770710C	10.01 & 7.01	20 mL	10 sachets (5)	•
HI 770710P	10.01 & 7.01	20 mL	10 sachets (5)	

Traceability with NIST Standard Reference

HANNA pH 10 buffers are carefully prepared using the highest quality ingredients available and are standardized with NIST references.

Ion Selective Electrodes

For HANNA's New Generation of Instruments

ISE Electrode Types

HANNA's ion selective electrodes can be grouped into three general categories based upon construction.



Solid State Electrodes are available as both single half-cells or as combination electrodes complete with reference electrode. These electrodes incorporate a solid sensing surface made of compressed silver halides, or solid crystalline material. HANNA's offering includes sensors for the determination of bromide, cadmium, chloride, cupric, cyanide, fluoride, iodide, lead and silver ions. Solid body construction is rugged for long life.

Theory: A solid state electrode develops a voltage due to ion-exchange occurring between the sample and the inorganic membrane. An equilibrium mechanism occurs due to the very limited solubility of the membrane material in the sample.

Liquid Membrane Electrodes are available as single half-cells or as combination electrodes complete with reference electrode. The sensing surfaces of these electrodes are comprised of a homogeneous polymer matrix containing organic ion-exchangers selective for the determined ion. These sensors incorporate easily replaceable membrane modules and are available for measurements of nitrate, potassium and calcium.

Theory: The potassium electrode was one of the earliest liquid membrane sensors developed of this type. The membrane is usually in the form of a thin disc of PVC impregnated with the antibiotic valinomycin. The exchanger, also known an ionophore, is a ring structure that fits potassium ions inside like a lock and key. This type of membrane is not as rugged as the solid state type so they are designed for easy replacement of the sensing module.

Gas Sensors are combinatizon electrodes that detect dissolved gases in a solution. No external reference is required for these electrodes. The sensing element is separated from the sample solution by a gas permeable membrane. HANNA's offering includes the HI 4101 Ammonia electrode and the HI 4105 Carbon Dioxide electrode.

Theory: A gas sensor works due to the partial pressure of the measured gas in solution. The dissolved gas in the sample diffuses into the membrane and changes the pH in a thin film of unbuffered electrolyte on the surface of the internal pH sensor. Diffusion continues until the partial pressure of the sample and the thin film is the same. The pH change is proportional to the dissolved gas in the sample.

ORP, Refill, Cleaning and Storage Solutions

Ensure the Maximum Life of Your Electrodes

ORP Test and Pretreatment | Solutions

CODE	DESCRIPTION	PACKAGE
HI 7020L	ORP Test Solution at 200/275 mV (@20°C)	500 mL bottle
HI 7020M	ORP Test Solution at 200/275 mV (@20°C)	250 mL bottle
HI 7021L	ORP Test Solution at 240 mV (@20°C)	500 mL bottle
HI 7021M	ORP Test Solution at 240 mV (@20°C)	250 mL bottle
HI 7022L	ORP Test Solution at 470 mV (@20°C)	500 mL bottle
HI 7022M	ORP Test Solution at 470 mV (@20°C)	250 mL bottle
HI 7091L	Reducing Pretreatment Solution	500 mL bottle
HI 7091M	Reducing Pretreatment Solution	250 mL bottle
HI 7092L	Oxidizing Pretreatment Solution	500 mL bottle
HI 7092M	Oxidizing Pretreatment Solution	250 mL bottle

Electrode Refilling | Solutions

CODE	DESCRIPTION	PACKAGE
HI 7071	Electrolyte Solution, 3.5M KCl + AgCl	(4) 30 mL bottle
HI 7071L	Electrolyte Solution, 3.5M KCl + AgCl	500 mL bottle
HI 7072	Electrolyte Solution, 1M KNO_3	(4) 30 mL bottle
HI 7072L	Electrolyte Solution, 1M KNO_3	500 mL bottle
HI 7075	Electrolyte Solution, 1.7M KNO_3, 0.7M KCl	(4) 30 mL bottle
HI 7076	Electrolyte Solution, 1.0M NaCl	(4) 30 mL bottle
HI 7078	Electrolyte Solution, 1.7M KNO_3, 0.7M KCl	(4) 30 mL bottle
HI 7082	Electrolyte Solution, 0.5M $(NH_4)_2$ SO_4	(4) 30 mL bottle
HI 8071	Electrolyte Solution, 3.5M KCl + AgCl	(4) 30 mL FDA bottle
HI 8072	Electrolyte Solution, 1M KNO_3	(4) 30 mL FDA bottle
HI 8082	Electrolyte Solution, 3.5M KCl	(4) 30 mL FDA bottle
HI 8093	Electrolyte Solution, 1M KCl + AgCl	(4) 30 mL FDA bottle

Electrode Storage | Solutions

CODE	DESCRIPTION	PACKAGE
HI 70300L	Electrode Storage Solution	500 mL bottle
HI 70300M	Electrode Storage Solution	250 mL bottle
HI 80300L	Electrode Storage Solution	500 mL FDA bottle
HI 80300M	Electrode Storage Solution	250 mL FDA bottle

Cleaning | Solutions for General Use

CODE	APPLICATION	PACKAGE
HI 70000P	Rinsing	(25) 20 mL sachet
HI 7061L	General Purpose	500 mL bottle
HI 7061M	General Purpose	250 mL bottle
HI 7073L	Proteins	500 mL bottle
HI 7073M	Proteins	250 mL bottle
HI 7074L	Inorganic Substances	500 mL bottle
HI 7074M	Inorganic Substances	250 mL bottle
HI 7077L	Oil and Fats	500 mL bottle
HI 7077M	Oil and Fats	250 mL bottle
HI 8061L	General Purpose	500 mL FDA bottle
HI 8061M	General Purpose	250 mL FDA bottle
HI 8073L	Proteins	500 mL FDA bottle
HI 8073M	Proteins	250 mL FDA bottle
HI 8077L	Oil and Fats	500 mL FDA bottle
HI 8077M	Oil and Fats	250 mL FDA bottle

ORP Standard Solutions

ORP standard solutions allows users to test the precision of ORP electrodes. For example, by immersing the electrode in HI 7020 solution, readings should fall within the 200 to 275 mV range (@20°C/68°F).

If the reading is outside the indicated interval, clean and condition your ORP electrode in HANNA pretreatment solution.

Use HI 7092 for oxidizing or HI 7091 for reducing pretreatment.

Electrode Fill Solutions

The electrolyte level in refillable electrodes should be checked before performing any measurement. If the level is low, refill with the proper electrolyte solution to ensure the correct electrode performace.

This simple maintenance helps guarantee adequate head pressure to promote efficiency and precision of your refillable electrodes.

Some electrolyte solutions are also available in FDA compliant bottles.

Electrode Storage Solutions

To minimize junction clogging and ensure fast response time, always keep the glass bulb and the junction of your pH electrode moist. Store the electrode with a few drops of HI 70300 storage or pH 7 buffer solution in the protective cap.

General Cleaning



Clean the liquid junction of your electrodes once a day or at least once a week to prevent junction clogging and to maintain accuracy. Immerse the electrode in the proper cleaning solution for at least 15-20 minutes.

HANNA offers a wide range of cleaning solutions, for general purpose and specific applications to dissolve many deposits from the electrode, and thus ensure correct measurements.

Sample Preparation | Solutions

CODE	DESCRIPTION	PACKAGE
HI 7051M	Soil Sample Preparation Solution	250 mL bottle
HI 7051L	Soil Sample Preparation Solution	500 mL bottle
HI 70960	Preparation Solution for Solid or Semi Solid Samples	30 mL bottle

HANNA instruments

With Great Products, Come Great Results™

Standard Solutions

for Turbidity, Salinity and Fluoride



Turbidity Standard Solutions

The HANNA turbidity calibration solutions are referenced to the AMCO AEPA-1 standards, at 0, 10, 20 and 500 FTU.

They are preferred to the formazine based standards, as they are non-toxic, stable, reusable and long-lasting.

Sodium Standard Solutions

The sodium and sodium chloride standard solutions allow you to perform an accurate calibration of the pocket sized, portable and bench salinity meters.

These solutions are available in 250 or 500 mL bottles, and also in opaque bottles that meet the FDA (Food & Drug Administration) specifications.

Fluoride Standard Solutions

These standard solutions allow you to calibrate all instruments that measure fluoride using ion-specific sensors.

The most common applications include drinking water, the analysis of water from springs close to volcanic rocks, or the cosmetics, pharmaceutical, glass and steel industries.

Fluoride Standard Solutions

CODE	DESCRIPTION	BOTTLE
HI 7023/1L	TISAB Solution	1 L
HI 7023L	TISAB Solution	500 mL
HI 70701/1L	Standard Solution at 1 g/L F^-	1 L
HI 70701L	Standard Solution at 1 g/L F^-	500 mL
HI 70701M	Standard Solution at 1 g/L F^-	250 mL
HI 70702/1L	Standard Solution at 10 mg/L F^-	1 L
HI 70702L	Standard Solution at 10 mg/L F^-	500 mL
HI 70702M	Standard Solution at 10 mg/L F^-	250 mL
HI 70703/1L	Standard Solution at 100 mg/L F^-	1 L
HI 70703L	Standard Solution at 100 mg/L F^-	500 mL
HI 70703M	Standard Solution at 100 mg/L F^-	250 mL

Turbidity Standard Solutions

CODE	DESCRIPTION	PACKAGE
HI 93102-0	AMCO-AEPA-1 Calibration Solution at 0 NTU	30 mL bottle
HI 93102-20	AMCO-AEPA-1 Calibration Solution at 20 NTU	30 mL bottle
HI 93124-0	Standard Solution at 0 EBC	30 mL bottle
HI 93124-1	Standard Solution at 2.5 EBC	30 mL bottle
HI 93124-2	Standard Solution at 125 EBC	30 mL bottle
HI 93703-0	AMCO-AEPA-1 Calibration Solution at 0 FTU	30 mL bottle
HI 93703-05	AMCO-AEPA-1 Calibration Solution at 500 FTU	30 mL bottle
HI 93703-10	AMCO-AEPA-1 Calibration Solution at 10 FTU	30 mL bottle

Sodium (Na^+) Standard Solutions

CODE	DESCRIPTION	PACKAGE
HI 7080L	Standard Solution at 2.3 g/L Na^+	500 mL bottle
HI 7080M	Standard Solution at 2.3 g/L Na^+	250 mL bottle
HI 7086L	Standard Solution at 23 g/L Na^+	500 mL bottle
HI 7086M	Standard Solution at 23 g/L Na^+	250 mL bottle
HI 7087L	Standard Solution at 0.23 g/L Na^+	500 mL bottle
HI 7087M	Standard Solution at 0.23 g/L Na^+	250 mL bottle
HI 8080L	Standard Solution at 2.3 g/L Na^+	500 mL FDA bottle
HI 8080M	Standard Solution at 2.3 g/L Na^+	250 mL FDA bottle
HI 8086L	Standard Solution at 23 g/L Na^+	500 mL FDA bottle
HI 8086M	Standard Solution at 23 g/L Na^+	250 mL FDA bottle
HI 8087L	Standard Solution at 0.23 g/L Na^+	500 mL FDA bottle
HI 8087M	Standard Solution at 0.23 g/L Na^+	250 mL FDA bottle

Sodium Chloride (NaCl) Standard Solutions

CODE	DESCRIPTION	PACKAGE
HI 7037L	Calibration solution for % Readings (100% NaCl)	500 mL bottle
HI 7037M	Calibration solution for % Readings (100% NaCl)	250 mL bottle
HI 7081L	Standard Solution at 30 g/L NaCl	500 mL bottle
HI 7081M	Standard Solution at 30 g/L NaCl	250 mL bottle
HI 7083L	Standard Solution at 3.0 g/L NaCl	500 mL bottle
HI 7083M	Standard Solution at 3.0 g/L NaCl	250 mL bottle
HI 7084L	Standard Solution at 58.4 g/L NaCl	500 mL bottle
HI 7084M	Standard Solution at 58.4 g/L NaCl	250 mL bottle
HI 7085L	Standard Solution at 0.3 g/L NaCl	500 mL bottle
HI 7085M	Standard Solution at 0.3 g/L NaCl	250 mL bottle
HI 7088L	Standard Solution at 5.84 g/L NaCl	500 mL bottle
HI 7088M	Standard Solution at 5.84 g/L NaCl	250 mL bottle
HI 7089L	Standard Solution at 125 g/L NaCl	500 mL bottle
HI 7089M	Standard Solution at 125 g/L NaCl	250 mL bottle
HI 7090L	ISA Solution	500 mL bottle
HI 7090M	ISA Solution	250 mL bottle
HI 8084L	Standard Solution at 58.4 g/L NaCl	500 mL FDA bottle
HI 8084M	Standard Solution at 58.4 g/L NaCl	250 mL FDA bottle
HI 8088L	Standard Solution at 5.84 g/L NaCl	500 mL FDA bottle
HI 8088M	Standard Solution at 5.84 g/L NaCl	250 mL FDA bottle
HI 8089L	Standard Solution at 125 g/L NaCl	500 mL FDA bottle
HI 8089M	Standard Solution at 125 g/L NaCl	250 mL FDA bottle
HI 8095L	Standard Solution at 146 g/L NaCl	500 mL FDA bottle
HI 8095M	Standard Solution at 146 g/L NaCl	250 mL FDA bottle

New Specific Application Cleaning Solutions

Solutions Dedicated to Clean Specific Stains and Deposits

BOTTLES

CODE	DESCRIPTION	SIZE
HI 70620L	Cleaning and Disinfection Solution for Skin Residuals (Cosmetic Industry)	500 mL
HI 70620M	Cleaning and Disinfection Solution for Skin Residuals (Cosmetic Industry)	250 mL
HI 70621L	Cleaning Solution for Skin Grease and Sebum (Cosmetic Industry)	500 mL
HI 70621M	Cleaning Solution for Skin Grease and Sebum (Cosmetic Industry)	250 mL
HI 70630L	Acid Cleaning Solution for Meat Grease and Fats (Food Industry)	500 mL
HI 70630M	Acid Cleaning Solution for Meat Grease and Fats (Food Industry)	250 mL
HI 70631L	Alkaline Cleaning Solution for Meat Grease and Fats (Food Industry)	500 mL
HI 70631M	Alkaline Cleaning Solution for Meat Grease and Fats (Food Industry)	250 mL
HI 70632L	Cleaning and Disinfection Solution for Blood Products	500 mL
HI 70632M	Cleaning and Disinfection Solution for Blood Products	250 mL
HI 70635L	Cleaning Solution for Wine Deposits (Wine-Making)	500 mL
HI 70635M	Cleaning Solution for Wine Deposits (Wine-Making)	250 mL
HI 70636L	Cleaning Solution for Wine Stains (Wine-Making)	500 mL
HI 70636M	Cleaning Solution for Wine Stains (Wine-Making)	250 mL
HI 70640L	Cleaning Solution for Milk Deposits (Food Industry)	500 mL
HI 70640M	Cleaning Solution for Milk Deposits (Food Industry)	250 mL
HI 70641L	Cleaning and Disinfection Solution for Dairy Products (Food Industry)	500 mL
HI 70641M	Cleaning and Disinfection Solution for Dairy Products (Food Industry)	250 mL
HI 70642L	Cleaning Solution for Cheese Deposits (Food Industry)	500 mL
HI 70642M	Cleaning Solution for Cheese Deposits (Food Industry)	250 mL
HI 70663L	Cleaning Solution for Soil Deposits (Agriculture)	500 mL
HI 70663M	Cleaning Solution for Soil Deposits (Agriculture)	250 mL
HI 70664L	Cleaning Solution for Humus Deposits (Agriculture)	500 mL
HI 70664M	Cleaning Solution for Humus Deposits (Agriculture)	250 mL
HI 70670L	Cleaning Solution for Salt Deposits (Industrial Processes)	500 mL
HI 70670M	Cleaning Solution for Salt Deposits (Industrial Processes)	250 mL
HI 70671L	Cleaning and Disinfection Solution for Algae, Fungi and Bacteria (Industrial Processes)	500 mL
HI 70671M	Cleaning and Disinfection Solution for Algae, Fungi and Bacteria (Industrial Processes)	250 mL
HI 70680L	Cleaning Solution for Cellulose Deposits	500 mL
HI 70680M	Cleaning Solution for Cellulose Deposits	250 mL
HI 70681L	Cleaning Solution for Ink Stains	500 mL
HI 70681M	Cleaning Solution for Ink Stains	250 mL

SACHETS

CODE	DESCRIPTION	QTY/SIZE
HI 700620P	Cleaning and Disinfection Solution for Skin Residuals (Cosmetic Industry)	(25) 20 mL
HI 700621P	Cleaning Solution for Skin Grease and Sebum (Cosmetic Industry)	(25) 20 mL
HI 700630P	Acid Cleaning Solution for Meat Grease and Fats (Food Industry)	(25) 20 mL
HI 700635P	Cleaning Solution for Wine Deposits (Wine-Making)	(25) 20 mL
HI 700636P	Cleaning Solution for Wine Stains (Wine-Making)	(25) 20 mL
HI 700640P	Cleaning Solution for Milk Deposits (Food Industry)	(25) 20 mL
HI 700641P	Cleaning and Disinfection Solution for Dairy Products (Food Industry)	(25) 20 mL
HI 700642P	Cleaning Solution for Cheese Deposits (Food Industry)	(25) 20 mL
HI 700661P	General Purpose Cleaning Solution for Agriculture	(25) 20 mL
HI 700663P	Cleaning Solution for Soil Deposits (Agriculture)	(25) 20 mL
HI 700664P	Cleaning Solution for Humus Deposits (Agriculture)	(25) 20 mL
HI 700670P	Cleaning Solution for Salt Deposits (Industrial Processes)	(25) 20 mL
HI 700671P	Cleaning and Disinfection Solution for Algae, Fungi and Bacteria (Industrial Processes)	(25) 20 mL
HI 700680P	Cleaning Solution for Ink Stains	(25) 20 mL

Cleaning Solution Series

Focused Cleaning for A Top Performing Sensor

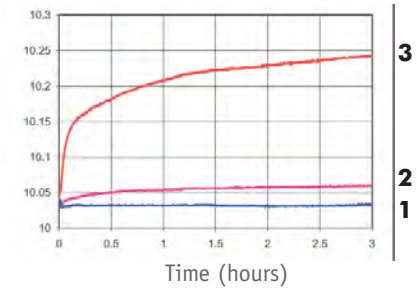
In many applications, electrodes become dirty from use and produce negative results on their efficiency. Since this dirt cannot be removed during normal use, special cleaning solutions are needed.

HANNA has prepared a complete line of cleaning and disinfection solutions that eliminate impurities and residues left on electrode surfaces when immersed in special samples. Such samples include wines, musts, oils, soil, industrial solutions, grease, algae, and dairy products.

The *Cleaning Solution Series* ensures the maximum efficiency and accuracy of your sensors when used for it's designated application.

This line of products are available in 250 and 500 mL bottles as well as 20 mL sachets in packs of 25.

Readings of Electrodes Cleaned with Different Procedures



Electrode 1 has been properly cleaned before calibration. Electrodes 2 & 3 have not been properly cleaned.



The easy to open and always fresh sachet package is a practical and ideal solution for field measurements.

HANNA instruments

With Great Products, Come Great Results™

Reference and Combination Electrodes

HANNA's reference electrode is used with our half-cell ISE sensors to provide accurate and repeatable measurements. HANNA's combination electrodes incorporate the measuring electrode with the reference making them ideal for field measurements.





Reference Electrodes are used to provide a stable voltage and electrolytic contact to permit a voltage gradient to be measured across a measurement membrane such as an ISE. HANNA has designed an easy to use, unbreakable plastic, double junction, quick fill, sleeve style reference electrode with a cone style junction to work with the ion selective electrode family of sensors. The design forms the liquid junction with the test solution at the tip of the junction cone and not further up the cone surface. The design produces a highly stable reference electrode with reasonable low flow rates. The model HI 5315 is a silver/silver chloride electrode half-cell with a permanent gel filled internal cell. The outer fill solution is easily replaceable and serves as a buffer zone between the internal chloride ion containing gel and the sample solution. HANNA offers a complete line of silver-free fill solutions to optimize your ion measurement. A fast responding liquid junction, excellent reproducibility, and ease of use will mark this reference as your "best" in the lab.

Combination Electrodes include a sensor and reference electrode in a single electrode body. Our combination ion selective electrodes provide the same selectivity and response as our ISE half-cells, but include our superior double junction reference into the same electrode body. Combination solid state electrodes have a built in solid state sensor and quick refillable reference electrode. Our liquid membrane and fluoride combination electrodes have replaceable module construction and the HANNA double junction reference stability.

Three Methods of Analysis

Potentiometric ion analyses with ISEs are performed by use of one of three methods, each entailing its own advantages: Direct Potentiometry, Incremental Methods, and Potentiometric Titration. HANNA offers a solution for each of these methods, for more details please refer to our Solutions Section.

HI 4101 • HI 4002 • HI 4102 • HI 4003 • HI 4103

Ammonia • Bromide • Cadmium

Ion Selective Electrodes



PARAMETER	AMMONIA	BROMIDE		CADMIUM	
CODE	HI 4101	HI 4002	HI 4102	HI 4003	HI 4103
Type	Gas-Sensing; Combination	Solid-state; Half-cell	Solid-state; Combination	Solid-state; Half-cell	Solid-state; Combination
Measurement Range	1M to 1X 10^{-5}M 17000 to 0.02 ppm	1M to 1X 10^{-6}M 79910 to 0.08 ppm	1M to 1X 10^{-6}M 79910 to 0.08 ppm	1M to 1X 10^{-7}M 11200 to 0.01 ppm	1M to 1X 10^{-7}M 11200 to 0.01 ppm
Optimum pH Range	>11	2 to 12.5	2 to 12.5	2 to 12.5	2 to 12.5
Temperature Range	0 to 40°C	0 to 80°C	0 to 80°C	0 to 80°C	0 to 80°C
Approximate Slope	-56	-56	-56	+28	+28
Body O.D.	12 mm	12 mm	12 mm	12 mm	12 mm
Insertion Length	120 mm	120 mm	120 mm	120 mm	120 mm
Body Material	Delrin	Epoxy	PEI	Epoxy	PEI
Cable	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial
Connector	BNC	BNC	BNC	BNC	BNC
Possible Applications	Determination of ammonium, ammonia in wine, beer, water, waste water and soil	Determination of free bromide ions in emulsified food products, beverages, plants, soils and as an indicator for titration		Used as an indicator for titrations using chelates	

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Calcium • Carbon Dioxide • Chloride

Ion Selective Electrodes

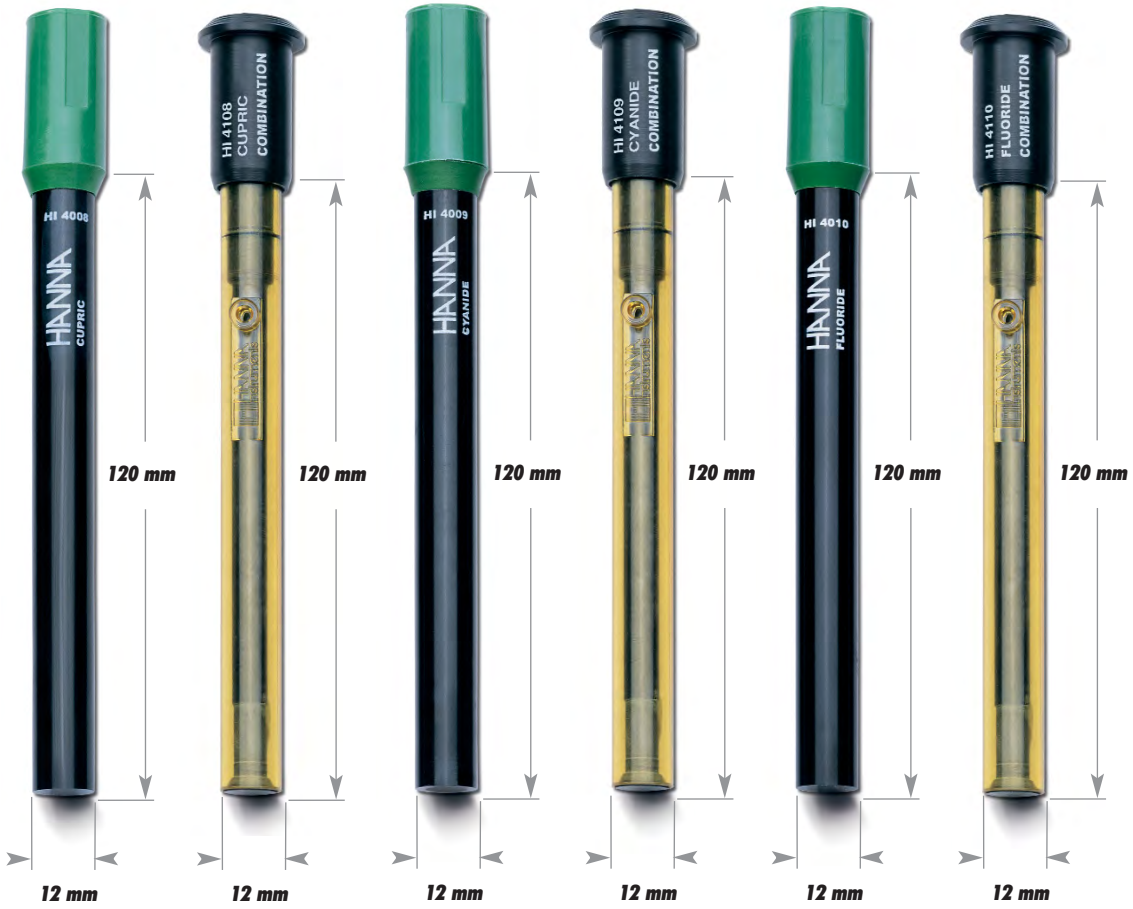


PARAMETER	CALCIUM		CARBON DIOXIDE	CHLORIDE	
CODE	HI 4004	HI 4104	HI 4105	HI 4007	HI 4107
Type	Polymer Membrane; Half-cell	Polymer Membrane; Combination	Gas Sensing; Combination	Solid-state; Half-cell	Solid-state; Combination
Measurement Range	1M to 3X 10^{-6}M 40080 to 0.12 ppm	1M to 3X 10^{-6}M 40080 to 0.12 ppm	1X 10^{-2}M to 1X 10^{-4}M 440 to 4.4 ppm	1M to 5X 10^{-5}M 35000 to 1.8 ppm	1M to 5X 10^{-5}M 35000 to 1.8 ppm
Optimum pH Range	4 to 10	4 to 10	4.2 to 5.2	2 to 11	2 to 11
Temperature Range	0 to 40°C	0 to 40°C	0 to 40°C	0 to 80°C	0 to 80°C
Approximate Slope	+28	+28	+54	-57	-57
Body O.D.	12 mm	12 mm	12 mm	12 mm	12 mm
Insertion Length	120 mm	120 mm	120 mm	120 mm	120 mm
Body Material	PVC	PEI/PVC	Delrin	Epoxy	PEI
Cable	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial
Connector	BNC	BNC	BNC	BNC	BNC
Possible Applications	Determination of free calcium in beverages, water, and seawater		Determination of carbonates as CO_2 in water, soft drinks and wine samples	Determination of free chloride ions in emulsified food products, beverages, plants, soils and as an indicator for titration	

HI 4008 • HI 4108 • HI 4009 • HI 4109 • HI 4010 • HI 4110

Cupric • Cyanide • Fluoride

Ion Selective Electrodes

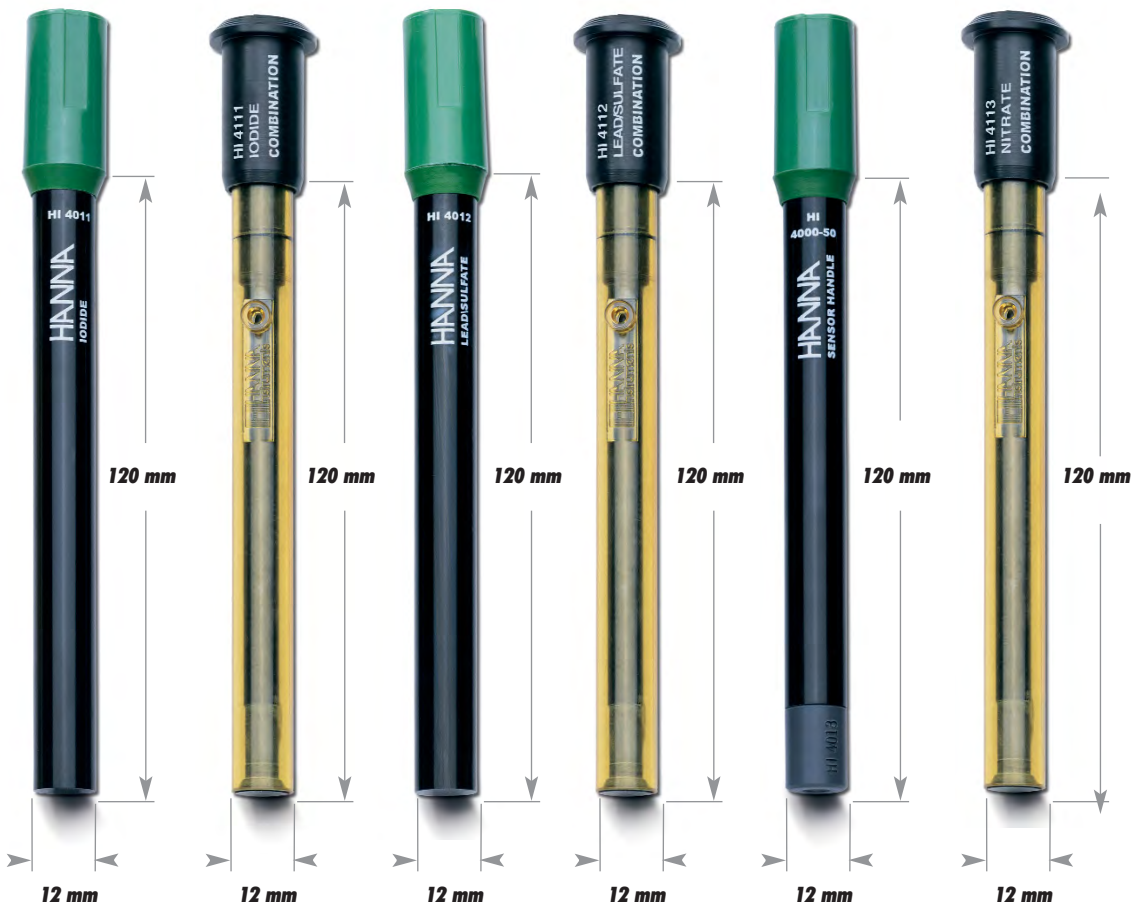


PARAMETER	CUPRIC		CYANIDE		FLUORIDE	
CODE	HI 4008	HI 4108	HI 4009	HI 4109	HI 4010	HI 4110
Type	Solid-state; Half-cell	Solid-state; Combination	Solid-state; Half-cell	Solid-state; Combination	Solid-state; Half-cell	Solid-state; Combination
Measurement Range	0.1M to 1X 10^{-6}M 6354 to 0.06 ppm	0.1M to 1X 10^{-6}M 6354 to 0.06 ppm	10^{-2}M to 1X 10^{-6}M 260 to 0.02 ppm	10^{-2}M to 1X 10^{-6}M 260 to 0.02 ppm	1M to 1X 10^{-6}M Sat. to 0.02 ppm	1M to 1X 10^{-6}M Sat. to 0.02 ppm
Optimum pH Range	2 to 12.5	2 to 12.5	>11	>11	5 to 8	5 to 8
Temperature Range	0 to 80°C	0 to 80°C	0 to 80°C	0 to 80°C	0 to 80°C	0 to 80°C
Approximate Slope	26	26	-57	-57	-56	-56
Body O.D.	12 mm	12 mm	12 mm	12 mm	12 mm	12 mm
Insertion Length	120 mm	120 mm	120 mm	120 mm	120 mm	120 mm
Body Material	Epoxy	PEI	Epoxy	PEI	Epoxy	PEI/Epoxy
Cable	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial
Connector	BNC	BNC	BNC	BNC	BNC	BNC
Possible Applications	Used as an indicator for titrations using chelates		Determination of free cyanide ions in plating baths, waste water and in plant and soil samples		Determination of free fluoride in potable water, soft drinks, wine, plants, emulsified food products, plating and pickling acids	

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Iodide • Lead/Sulfate • Nitrate

Ion Selective Electrodes



PARAMETER	IODIDE		LEAD/SULFATE		NITRATE	
CODE	HI 4011	HI 4111	HI 4012	HI 4112	HI 4013	HI 4113
Type	Solid-state; Half-cell	Solid-state; Combination	Solid-state; Half-cell	Solid-state; Combination	Polymer Membrane; Half-cell	Polymer Membrane; Combination
Measurement Range	1M to 1X 10^{-7}M 127000 to 0.01 ppm	1M to 1X 10^{-7}M 127000 to 0.01 ppm	0.1M to 1X 10^{-6}M 20700 to 0.21 ppm	0.1M to 1X 10^{-6}M 20700 to 0.21 ppm	1.0M to 1X 10^{-5}M 6200 to .62 ppm	1.0M to 1X 10^{-5}M 6200 to .62 ppm
Optimum pH Range	2 to 13	2 to 13	4 to 7	4 to 7	3.0 to 8	3.0 to 8
Temperature Range	0 to 80°C	0 to 80°C	0 to 80°C	0 to 80°C	0 to 40°C	0 to 40°C
Approximate Slope	-56	-56	+25	+25	-56	-56
Body O.D.	12 mm	12 mm	12 mm	12 mm	12 mm	12 mm
Insertion Length	120 mm	120 mm	120 mm	120 mm	120 mm	120 mm
Body Material	Epoxy	PEI	Epoxy	PEI	PVC	PEI/PVC
Cable	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial
Connector	BNC	BNC	BNC	BNC	BNC	BNC
Possible Applications	Determination of free iodide ions in emulsified food samples (iodized table salt), plants and for titration		Determination of lead ions in plating baths and as an indicator for titrations		Determination of free nitrate in natural waters (fresh and sea), and in emulsified food and plant samples	

4114 • HI 4015 • HI 4115 • HI 5315

Potassium • Silver/Sulfide • Reference

Ion Selective Electrodes



PARAMETER	POTASSIUM		SILVER/SULFIDE		REFERENCE
CODE	HI 4014	HI 4114	HI 4015	HI 4115	HI 5315
Type	Polymer Membrane; Half-cell	Polymer Membrane; Combination	Solid-state; Half-cell	Solid-state; Combination	N/A
Measurement Range	1M to 1X 10^{-6}M 39100 to .039 ppm	1M to 1X 10^{-6}M 39100 to .039 ppm	Ag^+ 1.0M to 1X 10^{-6}M 107900 to 0.11ppm $S^=$ 1.0M to 1X 10^{-7}M 32100 to 0.003 ppm	Ag^+ 1.0M to 1X 10^{-6}M 107900 to 0.11ppm $S^=$ 1.0M to 1X 10^{-7}M 32100 to 0.003 ppm	N/A
Optimum pH Range	1.5 to 12.0	1.5 to 12.0	Ag^+ 2 to 8 $S^=$ 12 to 14	Ag^+ 2 to 8 $S^=$ 12 to 14	N/A
Temperature Range	0 to 40°C	0 to 40°C	0 to 80°C	0 to 80°C	0 to 80°C
Approximate Slope	+56	+56	+56 Ag^+ / -28 $S^=$	+56 Ag^+ / -28 $S^=$	N/A
Body O.D.	12 mm	12 mm	12 mm	12 mm	12 mm
Insertion Length	120 mm	120 mm	120 mm	120 mm	120 mm
Body Material	PVC	PEI/PVC	Epoxy	PEI	PEI
Cable	1m coaxial	1m coaxial	1m coaxial	1m coaxial	1m coaxial
Connector	BNC	BNC	BNC	BNC	Banana
Possible Applications	Determination of potassium ions in wine, waters, soils and biological samples.		As an indicator for titrations using silver nitrate. For the determination of sulfide ions in waters, paper liquors, natural waters and soils.		To complete the electrical circuit and to provide a stable reference voltage for ISE half-cells

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Sensors and Accessories Reference Chart

ELECTRODE	TYPE	HALF-CELL	COMBINATION	ISA	FILLING SOLUTION	STD 1	STD 2	STD 3	OTHER
Ammonia	Gas	—	HI 4101	HI 4001-00	HI 4001-40	HI 4001-01 0.1 M	HI 4001-02 100 ppm	HI 4001-03 1000 ppm	HI 4000-52 replacement cap HI 4001-51 membrane kit HI 4000-51 replacement pH internal and cap for Ammonia HI 4001-45 conditioning solution HI 4000-47 4 and 7 pH with salt
Bromide	Solid	HI 4002	HI 4102	HI 4000-00	HI 7072	HI 4002-01 0.1 M			HI 4000-70 polishing strip
Cadmium	Solid	HI 4003	HI 4103	HI 4000-00	HI 7072	HI 4003-01 0.1 M			HI 4000-70 polishing strip
Calcium	Polymer membrane	HI 4004	HI 4104	HI 4004-00	HI 7082	HI 4004-01 0.1 M			HI 4004-51 module HI 4104-51 module for combination HI 4004-45 Conditioning Solution
Carbon Dioxide	Gas	—	HI 4105	HI 4005-00	HI 4005-40	HI 4005-01 0.1 M		HI 4005-03 1000 ppm	HI 4000-54 replacement pH internal & cap for CO_2 HI 4005-53 CO_2 membrane kit (3 pack) HI 4000-47 4 and 7 pH with salt HI 4005-45 Conditioning Solution
Chloride	Solid	HI 4007	HI 4107	HI 4000-00	HI 7072	HI 4007-01 0.1 M	HI 4007-02 100 ppm	HI 4007-03 1000 ppm	HI 4000-70 polishing strip
Cupric	Solid	HI 4008	HI 4108	HI 4000-00	HI 7072	HI 4008-01 0.1 M			HI 4000-70 polishing strip
Cyanide	Solid	HI 4009	HI 4109	HI 4001-00	HI 7072				HI 4000-70 polishing strip
Fluoride	Solid	HI 4010	HI 4110	HI 4010-00 HI 4010-05 HI 4010-06 HI 4010-30	HI 7075	HI 4010-01 0.1M	HI 4010-02 100 ppm	HI 4010-03 1000 pm	HI 4010-11 1 ppm with TISAB II HI 4010-12 2 ppm with TISAB II HI 4010-10 10 ppm with TISAB II HI 4110-51 module for combination HI 4010-30 Fluoride measurement kit
Iodide	Solid	HI 4011	HI 4111	HI 4000-00	HI 7072	HI 4011-01 0.1 M			HI 4000-70 polishing strip
Lead/Sulfate	Solid	HI 4012	HI 4112	HI 4012-00	HI 7072	HI 4012-01 Lead HI 4012-21 Sulfate 0.1 M			HI 4000-70 polishing strip
Nitrate	Polymer membrane	HI 4013	HI 4113	HI 4013-00	HI 7078	HI 4013-01 0.1 M	HI 4013-02 100 ppm	HI 4013-03 1000 ppm	HI 4013-53 module (3 pack) HI 4113-53 module for combination (3 pack) HI 4013-06 Interferent suppressent ISA
Potassium	Polymer membrane	HI 4014	HI 4114	HI 4014-00	HI 7076	HI 4014-01 0.1 M			HI 4014-51 module HI 4114-51 module for combination
Silver/Sulfide	Solid	HI 4015	HI 4115	HI 4000-00 (Ag^+) HI 4015-00 ($S^=$)	HI 7072	HI 4015-01 0.1 M Silver			HI 4000-70 polishing strip
Reference	—	HI 5315			HI 7072 HI 7075 HI 7076 HI 7082 HI 7078				

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HI 84431

Total Titratable Alkalinity Titrator



- *User-friendly interface*
- *Dedicated HELP key*
- *Simple to operate*
- *Log on demand up to 100 samples (50 for pH measurement; 50 for titration results)*
- *GLP feature, to view last calibration data for pH electrode and pump*
- *PC interface via USB connection*

Total Titratable Alkalinity Measurement

The HI 84431 is an automatic titrator designed for easy, fast and accurate analysis of Total Titratable Alkalinity in water. Potentiometric endpoint determination, peristaltic titrant delivery and integrated magnetic stirring systems eliminate the error and technique dependent results associated with manual titrations.

The accuracy of the instrument is ensured by performing a peristaltic pump calibration using the provided HANNA standard. The HI 84431 endpoint determination algorithm analyzes the pH vs. volume curve to determine the exact pH endpoint and performs the necessary calculations. The results are displayed in mg/L $CaCO_3$ or meq/L $CaCO_3$ units on the graphic display.

An intuitive interface makes the instrument simple to use. A dedicated HELP key guides the user through set-up and calibration sequences, reports instrument status and aids in troubleshooting.

HI 84431 features include: log on demand for up to 100 samples (50 pH measurements, 50 titration results), GLP compliance and PC interface via USB.

SPECIFICATIONS		HI 84431
Range	Titratable Alkalinity (Low Range)	mg/L : 10.0 - 500.0 mg/L as $CaCO_3$ meq/L : 0.2 - 10.0 meq/L
	Titratable Alkalinity (High Range)	mg/L : 400 - 4000 mg/L as $CaCO_3$ meq/L : 8 - 80 meq/L
	pH	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0 °F)
Resolution	Titratable Alkalinity (Low Range)	0.1 mg/L; 0.1 meq/L
	Titratable Alkalinity (High Range)	1 mg/L; 1 meq/L
	pH	0.1 pH / 0.01 pH
	Temperature	0.1 °C
Accuracy	Titratable Alkalinity (Low Range)	5% of reading
	Titratable Alkalinity (High Range)	5% of reading
	pH	± 0.01 pH
	Temperature	±0.4 °C without probe error
Titration Method		Acid-base titration (total alkalinity)/(strong alkalinity)
Titration Principle		End point titration: 4.5 pH / 8.3 pH
Pump Volume		0.5 mL/min
Stirring Speed		600 rpm
pH Temperature Compensation		manual or automatic from: -20 to 120 °C (-4 to 248 °F)
Logging	Titration	Up to 50 samples
	pH	Up to 50 samples
pH Calibration		1, 2 or 3 point calibration; 3 available buffers (4.01; 8.30; 10.01)
pH Electrode		HI 1131B (included)
Temperature Probe		HI 7662-M (included)
Environment		0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power Supply		12 Vdc power adapter
Dimensions/Weight		208 × 214 × 163 mm (8.2 × 8.4 × 6.4") (with beaker)/2200 g (77 oz.)

ORDERING INFORMATION

HI 84431-01 (115V) and **HI 84431-02** (230V) are supplied with HI 1131B pH electrode, HI 7071 filling solution (30 mL), HI 7662-M temperature probe, HI 84431-50 titrant low range (100 mL), HI 84431-51 titrant high range (100 mL), HI 84431-55M pump calibration solution (230 mL), HI 7061 cleaning solution, HI 7004M pH 4.01 buffer solution (230 mL), HI 70083M pH 8.30 buffer solution (230 mL), HI 7010M pH 10.01 buffer solution (230 mL), 100 mL beakers (2), tube set with dispensing tip, Stir bars (medium 2 pcs.), 12 Vdc power adapter, Instruction manual and quick reference guide.



ACCESSORIES

HI 84431-50 Titrant solution for low range (100 mL)
HI 84431-51 Titrant solution for high range (100 mL)
HI 84431-55M Pump calibration solution (230 mL)
HI 84431-70 Reagents kit for low and high range (about 150 titrations)
HI 84431-71 Reagents kit for low range (about 150 titrations)
HI 84431-72 Reagents kit for high range (about 150 titrations)
HI 70483M Tube set with cap for titrant bottle and tip
HI 731319 Stir bar, 25 x 7 mm (10 pcs)
HI 731342 Pipette for automatic dosage 2000 µL
HI 731352 Tip for 2000 µL graduated pipette (4pcs.)
HI 731341 Pipette for automatic dosage 1000 µL
HI 731351 Tip for 1000 µL graduated pipette (25pcs.)

HANNA instruments

With Great Products, Come Great Results™

HI 84429

Titratable Acids Mini Titrator and pH Meter

Low cost, easy to use meter that provides professional results quickly and accurately

DAIRY line

Perform a Complete Analysis with One Compact Meter!

A Better Product for Quality Production

HI 84429 is a low cost, easy to use, microprocessor-based automatic titrator and pH meter that benefits from HANNA's years of experience as a manufacturer of analytical instruments. HI 84429 performs automatic analysis with all the necessary calculations through a clear and simple interface.

This advanced automatic titrator and pH meter has a powerful and effective built-in algorithm to analyze the shape of the pH electrode response and determines the reaction completion. By pressing the START key, the instrument automatically conducts an end point titration and result is immediately displayed. The HI 84429 has a simple and reliable peristaltic pump to ensure accuracy and repeatability.

The HI 84429 comes with a pre-programmed analysis method designed for Total Titratable Acidity measurements on milk as well as a pH electrode, temperature probe, solutions and tubing.

The determination of total acids in dairy products is made according to a neutralization reaction; that is the reaction between the acids found in dairy products and a base. This type of reaction forms the basis of titration methods of analyzing acids.

Titratable acidity is measured on a degassed sample at the end point of 8.30 pH. The results are expressed in °SH, °Thm °D or % l.a.





HI 84429

Titratable Acids Mini Titrator and pH Meter

Low cost, easy to use meter that provides professional results quickly and accurately



DAIRY line

SPECIFICATIONS FOR HI 84429 TITRATOR	°SH	°Th	°D	% l.a.
Titratable Acidity Range	0.0 to 15.0 °SH	0 to 40 °Th	0 to 30 °D	0.00 to 0.35 % l.a.
Titratable Acidity HR (High Range) Range	10 to 75 °SH	20 to 200 °Th	20 to 175 °D	0.0 to 2.0 % l.a.
Titratable Acidity Resolution	0.1 °SH	1 °Th	1 °D	0.1% l.a.
Titratable Acidity HR Resolution	0.5 °SH	1 °Th	1 °D	0.1% l.a.
Accuracy	5% of reading			
Titration Methods	Acid-base titration			
Principle	End point titration, 8.30 pH			
Pump Debit	0.5 mL/min			
Stirring Speed	1500 rpm			

SPECIFICATIONS FOR HI 84429 PH AND TEMPERATURE METER

Range	pH	-2.0 to 16.0 pH; -2.00 to 16.00 pH
	Temperature	-20.0 to 120.0 °C (-4 to 248°F)
Resolution	pH	0.1 pH; 0.01 pH
	Temperature	0.1°C
Accuracy	pH	±0.01 pH
	Temperature	±0 to 4°C (excluding probe error)
pH Electrode		FC 210 B (included)
Temperature Probe		HI 7662-T (included)

GENERAL SPECIFICATIONS FOR HI 84429

Environment	0 to 50°C (32 to 122°F); max 95% non-condensing
Power Supply	115V/230 Vac; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") with beaker
Weight	2200 g (77 oz.)

ORDERING INFORMATION

HI 84429-01 (115V) and **HI 84429-02** (230V) are supplied with a reagent set for 20 titrations, 50 mL beakers (2), 20 mL beakers (2), tube set with cap, pH electrode, temperature probe, stir bar, 1 mL syringe, milk deposit cleaning solution sachets (2), pH 7.01 buffer sachets (2), pH 4.01 buffer sachets (2), power cable and instructions.

REQUIRED REAGENTS

HI 84429-50 Titrant
HI 84429-55 Standard, 2 mL
HI 84429-60 pH 8.30 buffer solution, 50 mL

HANNA instruments

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HI 84100

Sulfur Dioxide Mini Titrator

For the Determination of Sulfur Dioxide for Wine Analysis

Free and Total Sulfur Dioxide

An important reason for adding SO_2 is to avoid oxidation. When there is oxygen around, SO_2 itself becomes oxidized before phenol compounds in the wine, and so acts as an oxygen scavenger. Also, SO_2 suppresses the activity of enzymes that cause browning and other problems.

What is really protecting your wine is molecular SO_2. When you add SO_2, depending of circumstances, some of it immediately becomes bound. The relationship between the amount of SO_2 and amount of SO_2 remaining free is complex. It is clear, however, that is largely governed by the total SO_2 content of the wine. The rate of binding decreases as the free SO_2 concentration increases. The exact relationship between free and bound (total-free) SO_2 will vary from wine to wine.

Below 30-60 ppm, 33% to 50% of SO_2 addition becomes bounded. What remains is called "free" and it is divided in two parts. The larger, and relatively ineffective free part is "bisulphite" (HSO^3). The smaller part of the free is the active molecular. The amount of molecular SO_2 in your wine depends both on the level of free SO_2 present as well as pH. For instance, at pH 3.2, the amount of the free SO_2 for 0.8 ppm molecular SO_2 is 22 ppm. At pH 3.5, you will need 43 ppm free - essentially double.

In most situations, 0.8 pp, molecular SO_2 during bulk storage and at bottling will provide you with adequate protection from oxidation and bacterial action. This includes prevention of malolactic bacteria as well.

It is important to remember that the amount of free SO_2 in the wine depends on three things: how much is added, how much was present before the addition and how much of your addition promptly becomes bound.

The level at which molecular SO_2 can be detected by the human senses is about 2.0 ppm. This is also the level which is needed for maximum protection of your wine. This is particularly true in the case of sweet, and most notably, botrytised wines.

The HANNA HI 84100 offers the possibility to test free or total SO_2 in all the wines including the red ones, that are difficult to test with manual methods because the color changes are hardly seen.



- *Titrator, magnetic stirrer, electrode & reagent holder in one compact unit*
- *Results in minutes*
- *Simple to operate*

SPECIFICATIONS	HI 84100 mini Titrator
Range	0 to 400 ppm of SO_2
Resolution	1 ppm
Accuracy	5% of reading
Method	Ripper titrimetric method
Principle	Equivelance point redox titration
Sample Volume	50 mL
ORP Electrode	HI 3148B/50 (included)
Pump Dosing	0.5 mL/min
Stirring Speed	1500 rpm
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	115V/230 Vac; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

ORDERING INFORMATION

HI 84100-01 (115V) and **HI 84100-02** (230V) is supplied with reagent set for 20 titrations, 50 mL beakers (2), 20 mL beakers (2), scissors, tube set with cap, ORP electrode, stir bar, power cable, 30 mL bottle of electrode refill solution, 1 mL syringe, wine deposits cleaning solution sachets (2), wine stain cleaning solution sachets (2) and instructions.

PROBES

HI 3148B/50 ORP Probe with shorter cable

SOLUTIONS

HI 70300L Electrode storage solution, (500 mL)
HI 70635 Cleaning solution for wine deposits (500 mL)
HI 70636 Cleaning solution for wine stains (500 mL)
HI 7082 Electrode filling solution, 30 mL (4)

REAGENTS

HI 84100-50 Titrant solution (110 mL)
HI 84100-51 Alkaline reagent (500 mL)
HI 84100-52 Acid reagent for total SO_2 determination (500 mL)
HI 84100-53 Acid reagent for free SO_2 determination (500 mL)
HI 84100-54 Stabilizer reagent (25)
HI 84100-55 Calibration standard (500 mL)

ACCESSORIES

HI 70483T Tube set with cap for titrant bottle and tip
HI 731316 Stir bar (5)
HI 740036P Beaker 50 mL (10)
HI 740037P Beaker 20 mL (10)

HI 84102

Titratable Total Acidity Mini Titrator

For the Determination of Titratable Total Acidity for Wine Analysis



- *Titrator, magnetic stirrer, electrode & reagent holder in one compact unit*
- *Results in minutes*
- *Simple to operate*

Titratable Total Acidity

Acids occur naturally during the growing of grapes as as part of the fermentation process wines show lower levels of acid when there are hot growing seasons or when the grapes come from hotter regions. In the proper proportion, acids are a desirable trait and give the wine character.

The three predominant acids in wine are tartaric, malic, and citric, all of which are intrinsic to the grape. Tartaric acid is the principal acid in grapes and is a component that promotes a crisp flavor and graceful again in wine. A moderate amount of a wine's acid comes from malic acid, which contributes to fruitiness, and a small amount comes from citric acid. Wine also contains trace amounts of other acids. The least desirable acid in wine is acetic acid, which, when preset in more than a nominal amount, give swine a sour vinegary aspect.

Total acidity, also called, titratable acidity, is the sum of the fixed and volatile acids. in the United States the total acidity is usually expressed in terms of tartaric acid, even though the other acids are measured.

Total acidity directly effects the color and flavor of wine and, depending on the style of the wine, is sought in a perfect balance with the sweet and bitter sensations of other components. Too much acidity makes wine tart and sharp; too little makes wines flat, flabby and uninteresting. Proper acidity in wine is what makes it refreshing and an ideal accompaniment to food.

The proper acid level of a wine varies, with sweeter wines generally requiring somewhat higher levels to retain the proper balance. For dry table wine the acceptable range is usually 0.60 to 0.75%; for sweet wine it's 0.70 to 0.85%.

SPECIFICATIONS	HI 84102 mini Titrator
Range	0.0 to 25.0 g/L of tartaric acid
Resolution	0.1 g/L
Accuracy	5% of reading
Method	Acid-base titration method
Principle	End-point titration
pH Calibration	1 point in selected end-point: 7.00 pH or 8.20 pH
Sample Volume	2 mL
Temperature Compensation	Automatic from 0.0 to 100.0°C
pH Electrode	HI 1048B (included)
Temperature Probe	HI 7662-T (included)
Pump Dosing	0.5 mL/min
Stirring Speed	1500 rpm
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Power Supply	115V/230 Vac; 50-60Hz; 10VA
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)
Weight	2200 g (77.6 oz.)

ORDERING INFORMATION

HI 84102-01 (115V) and **HI 84102-02** (230V) is supplied with reagent set for 20 titrations, 2000 µL automatic pipette, plastic tips for 2000 µL automatic pipette (2), 50 mL beakers (2), tube set with cap, pH electrode, temperature probe, stir bar, power cable, 30 mL bottle of refill solution, mL syringe (1), wine deposits cleaning solution sachets (2), wine stain cleaning solution sachets (2) and instruction manual.

ELECTRODES

HI 1048B pH Electrode
HI 7662-T Temperature Probe

SOLUTIONS

HI 70300L Electrode storage solution, 500 mL
HI 70635 Cleaning solution for wine deposits, 500 mL
HI 70636 Cleaning solution for wine stains, 500 mL
HI 7082 Electrode filling solution, 30 mL (4)
HI 84102-50 Titrant solution, 110 mL
HI 84102-55 Calibration standard, 100 mL
HI 84102-60 Buffer solution 1, pH 7.00, 500 mL
HI 84102-61 Buffer solution 2, pH 8.20, 500 mL

ACCESSORIES

HI 70483T Tube set with cap for titrant bottle and tip
HI 731316 Stir bar (5)
HI 731342 Automatic pipette 2000 µL
HI 731352 Tips for 2000 µL automatic pipette (4)
HI 740036P Beaker 50 mL (10)
HI 7662-T Temperature probe

HANNA instruments

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Titration

Titration: Some History

In 1855, the German chemist, Friedrich Mohrn, defined titration as the "weighing without scale" method, because this process allows determination of the concentration of a sample without using complex instrumentation.

A manual titration requires high accuracy and precision, both in the preparation of the material, and the use of precisely dosed reagents. The operation must be repeated at least 3 times to obtain a reliable measured value. This procedure makes the manual analytical technique very long and fastidious.

On the other hand, the infinite applications that titration presents, can't be neglected, both for the organic and inorganic parameters. In some applications, for example, in the food industry, the determination of the content of sulphur dioxide in must and wine, and the level of acidity in cheese are still determined manually using the Soxhlet method. See the table below for other applications.

Titration, moreover, can be of different types: potentiometric, amperometric, spectrophotometric, etc., depending on the properties of the monitored system.

The growing need for faster results, has lead HANNA to develop the new titrators HI 901 and HI 902, two instruments that permit the automation of the titration procedures, while providing quick and reliable data.





Applications			
Food Industry	Acidity	Water Analysis	pH
	Chloride		Conductivity
	pH		Alkalinity
	SO_2 free and total		Chloride
	Sugar		Hardness
	Peroxide		COD
	Fatty Acids		Sulfate
	Vitamine C		Ammonia
	Acetic Acid		Fluoride
	Relative Humidity		Nitrate
Petrochemical	TAN	Chemical Products	NaOH
	TBN		KOH
	Br_2 Index		Carbonate
	Chloride		Ca^{2+}, Mg^{2+}
	Sulphide		Heavy Metals
	Mercaptan		Ag^{+}
Pharmaceutical	Titration with $HClO_4$	Plating Industry	Ag^{+}
	Ca^{2+}, Mg^{2+}		Ni^{2+}
	Carbonate		Zn^{2+}
	Enzymatic Determinations		Cr^{3+}, Cu^{2+}, etc



"As a manufacturer of edible and pharmaceutical gelatin, Rebière Ingredients follows strict standards of quality to supply demanding customers with very particular needs. Only the HI 902 could provide us with such flexibility. From it's countless tools to to the clarity of analysis help, the HI 902 brings unquestioned precision."

HANNA URIO
PROCESS ENGINEER
Rebière Ingredientes Alimentícios Ltda
São Paulo, Brazil

HI 901 • HI 902

Automatic Titration Systems

with Clip-Lock™ Exchangeable Burette System and Automatic Burette Recognition

HI 901 and HI 902 Automatic Titrators Feature:

- *320 x 240 pixel LCD w/backlight*
- *Precise dosing system (accuracy under 0.1% of burette volume)*
- *Supports up to 10,000 titration methods (standard and user defined)*
- *Clip Lock™ — change burettes quickly with auto burette recognition*
- *Dynamic/Linear dosing feature*
- *Fixed end point potential or pH*
- *Equivalence point detection (first derivative and second derivative)*
- *The results are displayed directly in the selected units*
- *Titration graph can be displayed on-screen and saved*
- *User customized reports can be printed, saved on floppy disk or transferred to PC via RS232 interface*
- *Reminders for titrant age and standardization expiration*
- *Self diagnostic features for peripheral devices including pump, valve, burette and stirrer*



HANNA instruments

With Great Products, Come Great Results™

Automatic Titration Systems

with Clip-Lock™ Exchangeable Burette System and Automatic Burette Recognition

Powerful Customization, Accurate Analysis

HI 901 and HI 902 are automatic titrators from HANNA that compliment our wide range of products dedicated to quick and accurate laboratory analysis. HI 902 also features the addition of back-titration capabilities.

Each unit is provided with a host of numerous features suitable for routine sample analysis. HI 901 and HI 902 perform acid/base, potentiometric and amperometric titrations.

With our exclusive Clip Lock™ system for burette replacement, changing from one titrant to another is done in a flash! Often, preliminary titration operations are very long and arduous. A burette often needs to be adjusted for correct dosing, which extends waiting time for new sample analysis. HANNA has engineered a way to solve this problem.

The innovative Clip Lock™ system allows users to change burettes in two simple steps, passing from one titrant to the next without any problem. Additionally, HI 901 and HI 902 automatically recognizes the volume of the new burette.



Stirrer

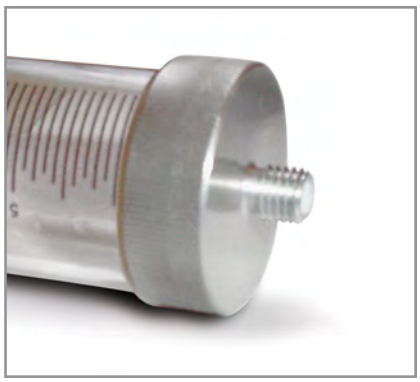
The optional stirrer ensures an effective mixing with a selectable speed from 100 to 2500 rpm.

These versatile titrators support up to 10,000 methods: standard or user defined. When powered on, the instrument initiates an internal diagnostics check and then readies itself for the first titration of the day. A large LCD screen clearly shows the chosen method, correlated information and also indicates which parameters may be adjusted. A real-time titration curve is shown on the display; this feature is useful when new methods are tested or when a procedure needs to be optimized. At the end of the titration, all data, including the graph, are automatically stored in memory and can be copied to disk via the built-in floppy drive or through direct connection with the serial cable supplied with the titrator. The titrators are equipped with an RS485 serial port.

Burette maintenance is simple and completely automated. The user can decide to purge it or wash it and can select how many washings to perform.

Both HI 901 and HI 902 can drive two pumps, with the HI 902 incorporating a more advanced system. While the HI 901 can drive the two pumps separately, HI 902 can also drive them concurrently and perform back titrations. HI 902 can perform more complex functions with the ability to determine more than one equivalence point.

Users can connect pH or ORP electrodes to this unit, as well as create a complete workstation with a PC, monitor, keyboard and printer. This unit complies with GLP specifications, providing validation support for analysis. All GLP information from each sample can be stored, including ID number, date and time of analysis, electrode ID code and last calibration date.



Automatic Burette Volume Recognition

This feature makes exchanging titrants convenient, safe and fast.

Up to 100 reports of analysis, complete with titration curve graphing is possible. A calibration "time-out" can be set and the user can be advised when the pH electrode needs to be calibrated. The instrument's status can be viewed clearly on the large LCD screen. Contained in the set-up menu, features like language, display brightness, resolution, pH electrode calibration, date and hour can be adjusted. During analysis, the titration is displayed in real-time together with the stored data. Date, hour, temperature (when probe is connected) and warning messages such as a pH electrode calibration message can all be displayed for your convenience.

Quick Change

Keep several burretes on hand for a quick change.



HI 901 • HI 902

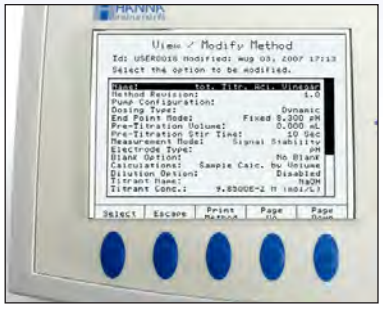
Automatic Titration Systems

with Clip-Lock™ Exchangeable Burette System and Automatic Burette Recognition

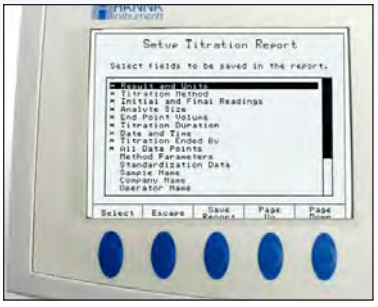
Keep an accurate record of analyses!

HANNA's 900 Series titration systems are easily incorporated into any existing GLP data management program:

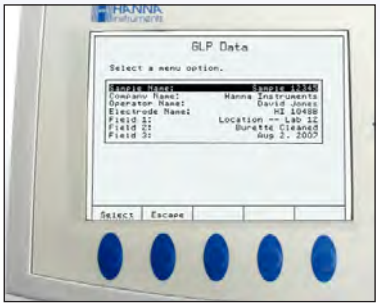
- *Users can easily record all necessary GLP information with every sample including sample identification, company and operator name, date, time, electrode ID codes and calibration information.*
- *Data can also be transferred using the integral floppy disk drive for communication with a PC or even other titration systems. Special memory cards are not required.*
- *All test results can be transferred directly to a PC.*
- *Users can print reports of analyses directly from the titrator using a standard parallel printer.*
- *An external monitor and keyboard can be attached for added versatility.*
- *RS485 port for future expansion.*



Custom methods



Record up to 100 reports



Incorporate HANNA 900 series titrators into any GLP data management program

View
Store
Print
with HANNA
PC Connectivity

A Complete Analysis

These instruments perform a complete analysis comprising of sample preparation, dispensing of titrant solution, stirring, measuring and waiting times, recognition of the end point and storing the results. All the parameters that a titration requires are grouped into a method.

The titrators are already supplied with a set of standard methods or you can create your own. Using a floppy disk or connecting the titrator to the HI 900 PC application, methods (standard and user) can be upgraded, stored or deleted.



PC Connectivity

The HI 900 series titrators can be connected to a computer in conjunction with HANNA software.



VGA Display Connectivity

The information shown on the titrator display can be viewed on a standard VGA display via a 15-pin socket.



Printer Connectivity

The HI 900 series titrators accept a variety of parallel printers for printing of data.



PC Keyboard Connectivity

An external PC compatible keyboard can be connected.

Automatic Titration Systems

with Clip-Lock™ Exchangeable Burette System and Automatic Burette Recognition



Clip-Lock™ Exchangeable Burette System

With Clip-Lock™, it only takes a couple of seconds to exchange the reagent burettes to perform a different titration.

With conventional titrators, there is the risk of cross contamination of titrants when exchanging reagents. Reconfiguring the titrator for different sample methods consumes time and reagents. Each method may need different reagents and care must be used when purging and cleaning the burette. To avoid these problems, HANNA introduces the Clip-Lock™ exchangeable burette system to prevent cross contamination while reducing loss of time and reagents. Burettes simply slide out for quick exchanges and detaching the aspiration and dispensing tubes from the titrant bottles is easy.

Having several prepared burettes on hand will make the HANNA 900 series the fastest and most versatile titration systems available. Interrupting an important cycle of analysis due to a malfunctioning burette is a thing of the past. With the HANNA Clip-Lock™ system you can simply substitute the burette and complete all your tests with the same titrant!

HANNA's burettes feature a threaded screw connection to prevent leakage problems. Burettes are available in 5 mL, 10 mL & 25 mL sizes and are made of chemically resistant material to ensure many years of trouble-free operation.



A. Aspiration Tube (Titrant Inlet)
B. Dispensing Tube (Titrant Outlet)
C. Burette Assembly
D. Light Shield (in closed state)
E. Burette Support
F. Support Bar
G. Sliding Positioning Collar
H. Dispensing Tip
I. Temperature Sensor
J. pH Electrode
K. Stirrer Propeller
L. Stirrer Stand
M. Numeric Keys
N. Function Keys
O. Help Key
P. Arrow Keys
Q. Option Keys
R. 320 x 240 Pixel Graphic LCD

HI 901 • HI 902

Automatic Titration Systems

with Clip-Lock™ Exchangeable Burette System and Automatic Burette Recognition

SPECIFICATIONS	mV	pH	TEMPERATURE
Range	-2000.0 to 2000.0 mV	-2.000 to 20.000 pH	-5.0 to 105.0°C/23 to 221°F/268.2 to 378.2 K
Resolution	0.1 mV	0.1/0.01/0.001 pH	0.1°C/0.1°F/0.1K
Accuracy	±0.1 mV (@25°C/77°F)	±0.001 pH (@25°C/77°F)	±0.1°C/±0.2°F/±0.1K (excluding probe error)
Burette Sizes	5, 10, and 25 mL		
Burette Resolution	1/40000		
Display Resolution	0.001 mL		
Dosing Accuracy	±0.1% of full burette volume		
Display	Graphic LCD, 320 x 240 pixel LCD		
Languages	English, Italian, Portuguese, Spanish		
Methods	Up to 10,000 methods (standard and user-defined)		
Burette Auto-Detection	Burette size is automatically recognized when inserted into the unit		
Programmable Stirrer	Propeller type, 100-2500 RPM, automatically held within 10% of the set value, resolution 100 rpm		
Flow Rate	User-selectable from 0.1 mL/min to 2 x burette volumes/min		
pH/mV Measurement	Titrators can also perform direct pH and mV measurements		
Temperature Compensation	Manual or automatic (ATC)		
pH Calibration	Manual or automatic at 1-5 points with 4 buffer sets or custom buffers		
Potentiometric Titrations	Acid-Base (pH or mV-Mode), Redox, Precipitation, Complexometric, Non-Aqueous, Ion-Selective, Argentometric (in mV-mode only)		
HI 901 Titration Methods	Fixed mV or pH end-point detection & first equivalency point detection (with the 1st or 2nd derivatives)		
HI 902 Titration Methods	Fixed mV or pH end-point detection & multiple equivalency point detection (with the 1st or 2nd derivatives); back titration		
Measurement Units	User specified expression of concentration units to suit specific calculation requirements		
Real Time & Stored Graphs	mV-Volume or pH-Volume titration curve, 1st derivative curve or 2nd derivative curve, in pH-mode or mV-mode; pH/mV values versus time-datalogging results		
Data Storage:	Up to 100 complete titration and pH/mV logging complete reports		
Disk Drive:	Built-in 3.5" floppy disk drive allows storage and transfer of configurations, preprogrammed methods, custom methods, titration reports and bitmap graph files		
Peripherals	Connections for VGA display, PC-keyboard, parallel printer, RS 232 input, interface for future expansion		
GLP Conformity	Instrumentation data storage and printing capabilities		
Operating Environment	10 to 40°C (50 to 104°F), up to 95% RH		
Storage Environment	-20 to 70°C (-4 to 158°F), up to 95% RH		
Power	110V/220 Vac; 50-60Hz		
Dimensions	Width x Depth x Height = 390 x 350 x 380 mm (15.3 x 13.8 x 14.9 in)		
Weight	approx. 10 kg (22 lbs.) with one pump and stirrer assembly		

ORDERING INFORMATION

HI 901-01 (115V) and **HI 901-02** (230V) is supplied with (1) 25 mL glass burette, (1) burette driver assembly, power adapter and instructions.

HI 902-01 (115V) and **HI 902-02** (230V) back titration and multiple end-point titrators are supplied with (1) 25 mL glass burette, (1) burette driver assembly, power adapter and instructions.

HANNA instruments®

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Total Titratable Acidity Titrator

Total Titratable Acidity Measurement

The HI 84430 is an automatic titrator designed for easy, fast and accurate analysis of Total Titratable Acidity in water. Potentiometric endpoint determination, peristaltic titrant delivery and integrated magnetic stirring systems eliminate the error and technique dependent results associated with manual titrations.

The accuracy of the instrument is ensured by performing a peristaltic pump calibration using the provided HANNA standard. The HI 84430 endpoint determination algorithm analyzes the pH vs. volume curve to determine the exact pH endpoint and performs the necessary calculations. The results are displayed in mg/L $CaCO_3$ or meq/L $CaCO_3$ units on the graphic display.

An intuitive interface makes the instrument simple to use. A dedicated HELP key guides the user through set-up and calibration sequences, reports instrument status and aids in troubleshooting.

HI 84430 features include: log on demand for up to 100 samples (50 pH measurements, 50 titration results), GLP compliance and PC interface via USB.

- *User-friendly interface*
- *Dedicated HELP key*
- *Simple to operate*
- *Log on demand up to 100 samples (50 for pH measurement; 50 for titration results)*
- *GLP feature, to view last calibration data for pH electrode and pump*
- *PC interface via USB connection*



ORDERING INFORMATION

HI 84430-01 (115V) and **HI 84430-02** (230V) are supplied with HI 1131B pH electrode, HI 7071 filling solution (30 mL), HI 7662-M temperature probe, HI 84430-50 titrant low range (100 mL), HI 84430-51 titrant high range (100 mL), HI 84430-55 pump calibration solution (230 mL), HI 84430 additional reagent (30 mL), HI 7061 cleaning solution, HI 7001M pH 1.68 buffer solution (230 mL), HI 7004M pH 4.01 buffer solution (230 mL), HI 70083M pH 8.30 buffer solution (230 mL), 100 mL beakers (2), tube set with dispensing tip, stir bars (medium 2 pcs.), 12 Vdc power adapter, instruction manual, and quick reference guide.

SPECIFICATIONS		HI 84430
Range	Titratable Acidity (Low Range)	mg/L : 15.0 - 500.0 mg/L as $CaCO_3$ meq/L : 0.3 - 10.0 meq/L
	Titratable Acidity (High Range)	mg/L : 400 - 4000 mg/L as $CaCO_3$ meq/L : 8 - 80 meq/L
	pH	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Temperature	-20.0 to 120.0 °C (-4.0 to 248.0 °F)
Resolution	Titratable Acidity (Low Range)	0.1 mg/L; 0.1 meq/L
	Titratable Acidity (High Range)	1 mg/L; 1 meq/L
	pH	0.1 pH / 0.01 pH
	Temperature	0.1 °C
Accuracy	Titratable Acidity (Low Range)	5% of reading
	Titratable Acidity (High Range)	5% of reading
	pH	± 0.01 pH
	Temperature	±0.4 °C without probe error
Titration Method		Acid-base titration (total acidity)/(strong acidity)
Titration Principle		End point titration : 8.30 pH / 3.7 pH
Pump Volume		0.5 mL/min
Stirring Speed		600 rpm
pH Temperature Compensation		manual or automatic from: -20 to 120 °C (-4 to 248 °F)
Logging	Titration	Up to 50 samples
	pH	Up to 50 samples
pH Calibration		1, 2 or 3 point calibration; 3 available buffers (1.68, 4.01; 8.30)
pH Electrode		HI 1131B (included)
Temperature Probe		HI 7662-M (included)
Environment		0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power Supply		12 Vdc power adapter
Dimensions/Weight		208 × 214 × 163 mm (8.2 × 8.4 × 6.4") (with beaker)/2200 g (77 oz.)



ACCESSORIES

HI 84430-50 Titrant solution for low range (100 mL)
HI 84430-51 Titrant solution for high range (100 mL)
HI 84430-55 Pump calibration solution (500 mL)
HI 84430-58 Additional reagent (30 mL)
HI 84430-70 Reagents kit for low and high range (about 150 titrations)
HI 84430-71 Reagents kit for low range (about 150 titrations)
HI 84430-72 Reagents kit for high range (about 150 titrations)
HI 70483M Tube set with cap for titrant bottle and tip
HI 731319 Stir bar, 25 x 7 mm (10 pcs)
HI 731342 Pipette for automatic dosage, 2000 µL
HI 731352 Tip for 2000 µL graduated pipette (4pcs.)
HI 731341 Pipette for automatic dosage, 1000 µL
HI 731351 Tip for 1000 µL graduated pipette (25pcs.)

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MAGNETIC STIRRERS

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Speedsafe™



Comparison Chart



Product Spotlights

Compact and Lightweight Stirrers

The HI 190M, HI 190MB and HI 200M are compact and lightweight, so that lack of laboratory bench space is no longer a concern.

HI 190M and HI 190MB come supplied with an ABS cover that will resist the harmful effects of chemicals that are accidentally spilled.

HI 200M is supplied with an AISI 316 stainless steel cover. This model is ideal for applications that create exothermic reactions.

Compact Round Edge Mini-stirrers are ideal for Laboratories, Schools and Anywhere Space is a Concern.

Common stirrers are manufactured with steel and aluminum components. These units are often too large and heavy to fit in the limited space of a laboratory. HANNA HI 180 series is compact, lightweight, inexpensive and designed in a special round shape without any sharp corners.

Advanced Features

- *Stirring Capacity up to 5 Liters*
- *AISI 316 Cover Material and ABS Plastic Cover Material*
- *Adjusting Speed Between 100 and 1000 RPM*
- *High/Low Dual Speed Range for Best RPM Settings*
- *Speedsafe™ Technology Stops Acceleration When Load is Removed*

Magnetic Stirrers

with Speedsafe™ Technology



Speedsafe™ from HANNA

There are two types of magnetic stirrers; mechanical and electronic. Most manufacturers of magnetic stirrers use the mechanical approach. They use steel and aluminum for the structural material and outdated methods of speed control. These units are not only very heavy, but also very inaccurate. The use of these materials and methods appear to make the units rugged and strong. But, they are instead, cumbersome and outdated.

Something as simple as completely dissolving salts in a medium, is in reality, a science. Often this cannot be achieved with simple mechanical processes. The only choice that the user has with mechanical products is to increase the stirring time or the temperature. With electronics, you can do more... the HANNA approach is electronic.

Speed Sensor and Limiter: Each HANNA stirrer is equipped with a speed sensing device (opto-sensor) coupled with an FVC (frequency voltage converter), which monitors the speed. As the speed reaches a preset maximum level, the speed limiter shuts down the VCO to slow down the motor speed. This ensures that when the load is suddenly removed from the stirrer, the motor will not accelerate to such a high speed that will be hazardous to both the user and the stirrer; a feature not commonly found in conventional stirrers.



Accuracy: Adjusting the stirring speed with a mechanical stirrer is inaccurate. Similar to the "ZOOM" function of a microscope, you can have access to two separate ranges of speed by using electronics. This assures maximum repeatability in experiments and processing.

Auto-feedback: In addition, with the HANNA auto-feedback stirrer, any change in viscosity or volume of the solution is automatically compensated for, to keep the speed constant.

Sophisticated Engineering

Ingenius design, employing sophisticated electronic technology, offers the best performance. Parts are engineered and manufactured to strict specifications to ensure absolute reliability. All components are mounted into a molded casing covered with a stainless steel plate, which is splash proof and chemically resistant. Minimal vibration and a well balanced rotating arm provides years of trouble free operation that HANNA's users are familiar with.

Safety

An ON/OFF switch and a fuse located at the rear panel provides easy access to shut off power, in the event of a short circuit. The circuitry is grounded to the case for additional protection.



HI 180

Magnetic Mini-Stirrers

Distinctive and Compact with ABS Protective Casing



HANNA Compact Round Edge Mini-stirrers are ideal for Laboratories, Schools and Anywhere Space is a Concern.

Common stirrers are manufactured with steel and aluminum components. These units are often too large and heavy to fit in the limited space of a laboratory. HANNA HI 180 series is compact, lightweight, inexpensive and designed in a special round shape without any sharp corners. Lack of laboratory bench space is no longer a concern.

Often, in the lab, a sample is removed from a typical stirrer before reducing the speed. Normally, this would cause the motor to accelerate until it is destroyed. Not so with HANNA stirrers. HANNA stirrers incorporate electronic controls that allow the user to regulate the speed with greater precision. In addition to speed control, a *Speedsafe*™ mechanism will assure that the maximum speed will never be exceeded.

Available in nine colors, light yellow, light sea-green, light blue, yellow, green, dark blue, red, grey and ivory. Several HI 180 stirrers can be placed on a laboratory bench with their colors helping to identify the different samples.

- *Dynamic design*

  Easy to handle, these lightweight and compact stirrers need little room and are quickly recognizable even on the busiest benches.

- *Built to last*

  Glass-free chemical resistant housing resists damage by accidental falls or scratches.

SPECIFICATIONS		HI 180
Maximum Stirring Capacity		1 liter
Speed Range	Min.	100 rpm
	Max.	1000 rpm
Power Supply		110/115 Vac or 220/240 Vac, 50/60 Hz
Installation Category		II
Cover Material		ABS plastic
Environment		0 to 50°C (32 to 122°F) ; RH max 95%
Dimensions		137 mm (dia) x 51 mm (h)
Weight		640 g (1.4 lbs.)

ORDERING INFORMATION

All models are supplied complete with micro stir bar and instructions

HI 180 A-1 Light yellow mini-stirrer, 110/115 Vac
HI 180 A-2 Light yellow mini-stirrer, 220/240 Vac
HI 180 B-1 Light sea-green mini-stirrer, 110/115 Vac
HI 180 B-2 Light sea-green, 220/240 Vac
HI 180 C-1 Light blue mini-stirrer, 110/115 Vac
HI 180 C-2 Light blue mini-stirrer, 220/240 Vac
HI 180 D-1 Yellow mini-stirrer, 110/115 Vac
HI 180 D-2 Yellow mini-stirrer, 220/240 Vac
HI 180 E-1 Green mini-stirrer, 110/115 Vac
HI 180 E-2 Green mini-stirrer, 220/240 Vac
HI 180 F-1 Blue mini-stirrer, 110/115 Vac
HI 180 F-2 Blue mini-stirrer, 220/240 Vac
HI 180 G-1 Red mini-stirrer, 110/115 Vac
HI 180 G-2 Red mini-stirrer, 220/240 Vac
HI 180 H-1 Grey mini-stirrer, 110/115 Vac
HI 180 H-2 Grey mini-stirrer, 220/240 Vac
HI 180 I-1 Ivory mini-stirrer, 110/115 Vac
HI 180 I-2 Ivory mini-stirrer, 220/240 Vac

ACCESSORIES

HI 731319 Magnetic stir bar (10)

With Great Products, Come Great Results™

Magnetic Mini-Stirrers

Our Most Popular Stirrers

Speedsafe™

Compact and Lightweight Stirrers

Common stirrers are manufactured with steel and aluminum components. These units are often too large and heavy to fit in the limited space of a laboratory. The HI 190M, HI 190MB and HI 200M are compact and lightweight, so that lack of laboratory bench space is no longer a concern.

These stirrers incorporate electronic controls that allow the user to regulate the speed with greater precision. Often, in the lab, a sample is removed from the stirrer before reducing the speed. This would cause the motor of conventional equipment to accelerate until it is destroyed. This does not pose a problem with HANNA mini-stirrers. In fact, the internal *Speedsafe*™ mechanism will ensure that the maximum speed is never exceeded.

HI 190M and HI 190M-0 come supplied with an ABS cover that will resist the harmful effects of chemicals that are accidentally spilled. The ABS-covered mini-stirrer is available in two versions: HI 190M operating at 110 or 220 Vac and HI 190M-0 at 12 Vdc. This provides you with the flexibility to choose between field and lab models, as well as being able to use the HI 190M-0 for applications where a low input voltage is a must.

HI 200M is supplied with an AISI 316 stainless steel cover. This model is ideal for applications that create exothermic reactions.

- *Compact Size*

  The compact size of these stirer allows users to maximize bench space for efficiency and safety.

- *Safety*

  Speedsafe limits the maximum speed to 1000 rpm even if the load is suddenly removed.

- *Chemical Resistance*

  The ABS housing of the HI 190M and HI 190 M-0 resists most harmful chemicals in the lab.



SPECIFICATIONS		HI 190M	HI 190M-0	HI 200M
Maximum Stirring Capacity		1 liter (0.26 gallons)		
Speed Range	Min.	100 rpm		
	Max.	1000 rpm		
Power Supply		110/115 Vac or 220/240 Vac, 50/60Hz	12 Vdc	110/115 Vac or 230/240 Vac, 50/60Hz
Installation Category		II		
Cover Material		ABS plastic	ABS plastic	AISI 316 Stainless Steel
Environment		0 to 50°C (32 to 122°F); RH max 95%		
Dimensions		120 x 120 x 45 mm (4.8 x 4.8 x 1.8")		
Weight		640 g (1.4 lbs.)	610 g (1.3 lbs.)	710 g (1.6 lbs.)

ORDERING INFORMATION

HI 190M, HI 190M-0 and HI 200M are supplied complete with micro stir bar and instructions.

HI 190M-1 mini-stirrer with ABS cover, 110/115 Vac

HI 190M-2 mini-stirrer with ABS cover, 220/240 Vac

HI 190M-0 mini-stirrer with ABS cover, 12 Vdc

HI 200M-1 stainless steel cover, 110/115 Vac

HI 200M-2 stainless steel cover, 220/240 Vac

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US) (HI 190MB only)

HI 710006 230 Vac/12 Vdc pwr adapter (EURO) (EURO) (HI 190MB only)

HI 731319 Magnetic stir bar (10)

HI 300N • HI 310N

Speedsafe™

Magnetic Stirrers

for Heavy-Duty Applications



Large Capacity Stirring

HI 300N and HI 310N are heavy-duty stirrers. HI 300N can stir up to 2.5 liters (0.66 gallons) of liquid and the HI 310N can stir up to 5.0 liters (1.3 gallons). This makes them perfect for laboratory use as well as use in production. Electronic controls are incorporated into these stirrers that allow the user to regulate the speed with greater precision. With HANNA's *Speedsafe*™, a limiter will assure that the maximum speed will never be exceeded. Often, in the lab, a sample is removed from the stirrer before reducing the speed. This would normally cause the motor to accelerate until it is destroyed.

HI 310N also has an automatic feedback feature. The motor is electronically controlled to maintain the chosen speed as the load changes. If the viscosity or the level (fluid weight) increases or decreases, the circuitry will adjust the output power to keep the speed constant.

SPECIFICATIONS		HI 300N	HI 310N
Maximum Stirring Capacity		2.5 liters	5 liters
Speed Range	Min.	100 rpm	
	Max.	800 to 1000 rpm	
Auto-Feedback		–	standard
Power Supply		110/115 Vac or 230/240 Vac, 50/60 Hz	
Installation Category		II	
Cover Material		AISI 316 stainless steel	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions		180 x 180 x 70 mm (7.1 x 7.1 x 2.8")	
Weight		1.4 kg (3.1 lbs.)	

ORDERING INFORMATION

HI 300N and **HI 310N** are supplied with micro stir bar and instructions.

HI 300N-1 magnetic stirrer, stainless steel cover, 110/115 Vac
HI 300N-2 magnetic stirrer, stainless steel cover, 220/240 Vac
HI 310N-1 magnetic stirrer, stainless steel cover, 110/115 Vac
HI 310N-2 magnetic stirrer, stainless steel cover, 220/240 Vac

ACCESSORIES

HI 731320 Magnetic stir bar (10)

HI 301N • HI 311N

Speedsafe™

Magnetic Stirrers

2-Speed Stirring



2-Speeds with 2.5 or 5 L Capacity

HI 301N and HI 311N are heavy-duty stirrers that offer dual range precision. HI 301N can stir up to 2.5 liters (0.66 gallons) of liquid and HI 311N can stir up to 5.0 liters (1.3 gallons).

Similar to the "ZOOM" function of a microscope, these stirrers allow access to two separate stirring ranges. In each range, the speed can be fine tuned for exacting accuracy. This assures maximum repeatability in experiments and processing for laboratory, as well as production use.

In addition to speed control, a limiter will assure that the maximum speed will never be exceeded (*Speedsafe*™). HANNA stirrers incorporate a VCO device that will stop the motor from accelerating as soon as the load is removed.

HI 311N also has an automatic feedback feature. The motor is electronically controlled to maintain the choosen speed as the load changes. If the viscosity or the level (fluid weight) increases or decreases, the circuitry will adjust the output power.

SPECIFICATIONS		HI 301N	HI 311N
Maximum Stirring Capacity		2.5 liters	5 liters
Speed Range	Low	100 to 500 rpm	
	High	100 to 800/1000 rpm	
Auto-Feedback		–	standard
Power Supply		110/115 Vac or 230/240 Vac, 50/60 Hz	
Installation Category		II	
Cover Material		AISI 316 stainless steel	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions / Weight		180 x 180 x 70 mm (7.1 x 7.1 x 2.8") / 1.4 kg (3.1 lbs.)	

ORDERING INFORMATION

HI 301N and **HI 311N** are supplied with magnetic stir bar and instructions

HI 301N-1 magnetic stirrer, stainless steel cover, 110/115 Vac
HI 301N-2 magnetic stirrer, stainless steel cover, 220/240 Vac
HI 311N-1 magnetic stirrer, stainless steel cover, 110/115 Vac
HI 311N-2 magnetic stirrer, stainless steel cover, 220/240 Vac

ACCESSORIES

HI 731320 Magnetic stir bar (10)

HI 302N • HI 312N

Speedsafe™

Magnetic Stirrers

with Auto-Reverse



Stir Samples in 2 Directions

HI 312N is a powerful stirrer that stirs up to 5.0 liters (1.3 gallons). The HI 302N model can stir up to 2.5 liters (0.66 gallons). It is often desirable to stir your samples in two directions. This will achieve maximum homogeneity and solubility. An advanced circuit allows HI 302N and HI 312N to reverse the direction of the stirring at a user selected inteval. The inteval can be adjusted from 30 seconds up to 3 minutes.

In addition to precision speed control, a limiter will also assure that the maximum speed will never be exceeded.

During repeated testing, samples are often removed from the stirrer before the speed is reduced. This could cause the motor to accelerate until it destroys itself. HANNA stirrers incorporate a VCO device that stops the motor from accelerating as soon as the load is removed (*Speedsafe*™). In addition to this feature, HI 312N also has an automatic feedback feature. The motor is electronically controlled to maintain the chosen speed as the load changes. If the viscosity or the level (fluid weight) increases or decreases, the circuitry will adjust the output power.

SPECIFICATIONS		HI 302N	HI 312N
Maximum Stirring Capacity		2.5 liters	5 liters
Speed Range	Low	100 rpm	
	High	800 to 1000 rpm	
Auto-Feedback		–	standard
Reverse Interval		from 30 seconds to 3 minutes	
Power Supply		110/115 Vac or 220/240V, 50/60 Hz	
Installation Category		II	
Cover Material		AISI 316 stainless steel	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions / Weight		180 x 180 x 70 mm (7.1 x 7.1 x 2.8") / 1.4 kg (3.1 lb.)	

ORDERING INFORMATION

HI 302N and **HI 312N** are supplied with magnetic stir bar and instructions

HI 302N-1 magnetic stirrer, stainless steel cover, 110/115 Vac
HI 302N-2 magnetic stirrer, stainless steel cover, 220/240 Vac
HI 312N-1 magnetic stirrer, stainless steel cover, 110/115 Vac
HI 312N-2 magnetic stirrer, stainless steel cover, 220/240 Vac

ACCESSORIES

HI 731320 Magnetic stir bar (10)

HI 303N

Speedsafe™

Magnetic Stirrers

Two-Speed with Tachometer



Exact RPM on LCD Display

QC stations and labs must be able to repeat tests and processes. In order to do this, this specifications must be clear at all times. When stirring a solution, the RPMs are a very crucial factor. Without a tachometer, there is no way of knowing the exact RPMs and therefore no way of repeating the process. The HI 301N solves this problem by incorporating and LCD tachometer. These stirrers also allow precise stirring repeatability by using two separate ranges. In each range, the speed can be fine tuned for exacting accuracy. This assures maximum repeatability in experiments and processing for laboratory as well as production use.

In addition to speed control, a limiter will assure that the maximum speed will never be exceeded (*Speedsafe*™). HANNA stirrers incorporate VCO device that will stop the motor from accelerating as soon as the load is removed.

SPECIFICATIONS		HI 303N
Maximum Stirring Capacity		2.5 liters
Speed Range	Low	100 to 500 rpm
	High	100 to 1000 rpm
Tachometer		0 to 1000 rpm, 4-digit LCD
Power Supply		110/115 Vac or 220/240 Vac, 50/60 Hz
Installation Category		II
Cover Material		AISI 316 stainless steel
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions		180 x 180 x 70 mm (7.1 x 7.1 x 2.8")
Weight		1.4 kg (3.1 lbs.)

ORDERING INFORMATION

HI 303N-1 magnetic stirrer, stainless steel cover, 110/115 Vac, micro stir bar and instructions

HI 303N-2 magnetic stirrer, stainless steel cover, 220/240 Vac, micro stir bar and instructions

ACCESSORIES

HI 731320 Magnetic sir bar (10)

HI 304N

Magnetic Stirrers

Auto-Reverse with Tachometer

Speedsafe™



Stir in 2 Directions with RPM on Display

When stirring a solution, to work with a constant speed (Revolutions Per Minute) is an important factor in ensuring that the best repeatability in tests and processes is achieved. Without a tachometer, there is no way of knowing the RPMs. HI 304N is a heavy-duty stirrer with a built-in tachometer. It is often desirable to stir in two directions in order to achieve maximum homogeneity. An advanced circuit allows HI 304N to reverse the direction of the stir at a user selected interval. The interval can be adjusted from 30 seconds up to 3 minutes. In addition to precision speed control, a limiter will also assure that the maximum speed will never be exceeded (*Speedsafe*™). Often, a sample is removed from the stirrer before the uses reduces the speed with ordinary stirrers. This can cause the motor to accelerate until it is destroyed. HANNA stirrers incorporate a VCO device that will stop the motor from accelerating as soon as the load is removed.

SPECIFICATIONS		HI 304N
Maximum Stirring Capacity		2.5 liters
Speed Range	Low	100 rpm
	High	800 to 1000 rpm
Tachometer		4-digit LCD
Reverse Interval		from 30 seconds to 3 minutes
Power Supply		110/115 Vac or 220/240 Vac, 50/60 Hz
Installation Category		II
Cover Material		AISI 316 stainless steel
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight		180 x 180 x 70 mm (7.1 x 7.1 x 2.8") / 1.4 kg (3.1 lbs.)

ORDERING INFORMATION

HI 304N-1 magnetic stirrer, stainless steel cover, 110/115 Vac, micro stir bar and instructions.

HI 304N-2 magnetic stirrer, stainless steel cover, 220/240 Vac, micro stir bar and instructions.

ACCESSORIES

HI 731320 Magnetic stir bar (10)

HI 322N • HI 324N

Magnetic Stirrers

Timer Controlled

Speedsafe™



Timed Stirring for Efficiency

HI 322N and HI 324N incorporate a timer control that will turn the motor off after the selected amount of time. The time is adjustable from 5 minutes to 2 hours. This feature allows the user to carry out other tasks without worrying about over or under stirring. These units are heavy-duty stirrers. HI 322N and HI 324N can stir up to 5.0 liters (1.3 gallons), making them ideal for laboratory and production use.

These stirrers allow regulated speed control. A limiter will assure the maximum speed is never exceeded (*Speedsafe*™), and a VCO device stops motor acceleration as soon as a load is removed.

HI 322N and HI 324N have an automatic feedback feature with HI 324N also incorporating an LCD tachometer. The motor is electronically controlled to maintain the chosen speed as the load changes. If the viscosity or the level increases or decreases, the circuitry will adjust the output power. The RPM display guarantees repeatability in QC tests and research by constantly displaying the RPMs.

SPECIFICATIONS		HI 322N	HI 324N
Maximum Stirring Capacity		5 liters	
Speed Range	Low	100 rpm	
	High	800 to 1000 rpm	
Auto-Feedback		standard	
Timer Range		from 5 minutes to 2 hours	
Tachometer		–	standard, 4-digit LCD
Power Supply		110/115 Vac or 220/240 Vac, 50/60 Hz	
Installation Category		II	
Cover Material		AISI 316 stainless steel	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Dimensions / Weight		180 x 180 x 70 mm (7.1 x 7.1 x 2.8") / 1.4 kg (3.1 lb.)	

ORDERING INFORMATION

HI 322N-1 magnetic stirrer, stainless steel cover, 110/115 Vac, micro stir bar and instructions.

HI 322N-2 magnetic stirrer, stainless steel cover, 220/240 Vac, micro stir bar and instructions.

HI 324N-1 magnetic stirrer, stainless steel cover, 110/115 Vac, micro stir bar and instructions.

HI 324N-2 magnetic stirrer, stainless steel cover, 220/240 Vac, micro stir bar and instructions.

ACCESSORIES

HI 731320 Magnetic stir bar (10)

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HI 9828

Multiparameter Meter

with Intelligent Probe and T.I.S. — Tag Identification System



HI 769828 Multiparameter, Intelligent Probe

HANNA's HI 769828 multiparameter probe incorporates a built-in microprocessor and amplifiers that convert the high impedance signals from the sensors of the probe eliminating common problems associated with high impedance signals such as limitation of cable length and noise. This allows the probe to have a reliable communication with the meter and also immediately warns the user of problems such as a broken cable. The standard cable lengths of the probe are 4, 10 and 20 meters (13, 32 and 64 feet) and custom lengths are also available.

The probe also features HANNA's Quick Calibration which allows the user to calibrate pH and conductivity with one solution in a single, simple step. Dissolved Oxygen is also calibrated in one step in saturated air. The probe houses 5 of the 6 measured parameters: pH, ORP, EC, dissolved oxygen and temperature. The sensors are all independently replaceable and are easy to maintain and keep clean. The sensors are protected by an outer PVC/stainless steel sleeve and cap which is suitable for use in 2" wells. The probe housing is rated IP68 standard.

Sensor replacement is quick and easy with screw type connectors and color coded sensors.

The **galvanic DO sensor** does not require polarization time so it's ready at a moment's notice.

The **4-ring conductivity system** ensures stable conductivity readings that are immune to surface coating. Absolute conductivity, temperature corrected conductivity, salinity, specific gravity and TDS determinations are possible with measurements from this sensor.

The HI 9828 **automatically recognizes** the presence of either the pH or pH/ORP sensor.

Both sensors have a cloth junction which allows greater sensitivity, and are gel filled for improved resistance to contamination.

The meter also displays pH in mV readings—ideal for trouble shooting.

HI 9828 is supplied complete with a probe maintenance kit.

This kit includes HI 7042S (electrolyte solution for DO sensor), (5) O-rings for DO sensor, a small brush, (5) O-rings for multiparameter probe and a syringe with grease to lubricate the O-rings.









Fast Tracker™ Tag Identification System

HANNA's iButton® Tag Identification System simplifies test logging. iButton®s with a unique ID can be installed at various sampling sites. When the matching connector of the meter contacts the button and measurements are logged, they are labeled with the alphanumeric user-entered location ID. Location, date, time and measurements are logged into the meter which can be transferred to a PC.

Multiparameter Meter

with Intelligent Probe and T.I.S. — Tag Identification System

ORDERING INFORMATION

HI 9828-01 (115V) and **HI 9828-02** (230V) is supplied with HI 769828 multisensor probe (pH/ORP, EC, DO, temperaure), HI 9828-25 quick calibration standard solution (500 mL), probe maintenance kit, rechargeable C size Ni-MH batteries (4), power adapter & cable, car 12V accessory outlet adapter, HI 7698281 USB interface cable, HI 92000 Windows® compatible software and instruction manual in a rugged carrying case.

x=4, 4 m probe cable
x=10, 10 m probe cable
x=20, 20 m probe cable
Up to 100m

HI 9828/ x

PROBES

HI 769828-0 pH sensor, single junction, non refillable
HI 769828-1 pH/ORP sensor
HI 769828-2 DO sensor
HI 769828-3 EC sensor

QUICK CALIBRATION SOLUTIONS

HI 9828-25 Quick calibration solution, 500 mL
HI 9828-27 Quick calibration solution, 1 G

pH CALIBRATION SOLUTIONS

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

ORP CALIBRATION SOLUTIONS

HI 7021L ORP test solution @240 mV, 500 mL
HI 7022L ORP test solution @470 mV, 500 mL

DISSOLVED OXYGEN SOLUTIONS

HI 7040L Zero oxygen solution, 500 mL
HI 7042S Electrolyte solution, 30 mL

CONDUCTIVITY CALIBRATION SOLUTIONS

HI 7030L 12880 µS/cm solution, 500 mL
HI 7031L 1413 µS/cm solution, 500 mL
HI 7033L 84 µS/cm solution, 500 mL
HI 7034L 80000 µS/cm solution, 500 mL
HI 7035L 111800 µS/cm solution, 500 mL
HI 7039L 5000 µS/cm solution, 500 mL

TDS CALIBRATION SOLUTIONS

HI 7032L 1382 ppm (mg/L) solution, 500 mL
HI 7036L 12.41 ppt (g/L) solution, 500 mL

CLEANING AND MAINTENANCE SOLUTIONS

HI 70300L Electrode storage solution, 500 mL
HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 7698281 USB interface cable
HI 7698282 Probe maintenance kit
HI 7698283 Calibration beaker
HI 7698284 Flow cell
HI 710045 Power supply cable
HI 710046 Lighter cigarette cable
HI 710005 115 Vac/12 Vdc pwr adapter (US)
HI 710006 230 Vac/12 Vdc pwr adapter (EU)
HI 710012 230 Vac/12 Vdc, pwr adapter (UK)
HI 710013 230 Vac/12 Vdc, pwr adapter (S.A.)
HI 710014 230 Vac/12 Vdc, pwr adapter (AUS.)
HI 92000 Software application
HI 920005 iButton® with holder (5 pcs)

SPECIFICATION

SPECIFICATION		HI 9828
pH	Range	0.00 to 14.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
mV of pH input	Range	±600.0 mV
	Resolution	0.1 mV
	Accuracy	±0.5 mV
ORP	Range	±2000.0 mV
	Resolution	0.1 mV
	Accuracy	±1.0 mV
Dissolved Oxygen	Range	0.0 to 500.0% / 0.00 to 50.00 mg/L
	Resolution	0.1% / 0.01 mg/L
	Accuracy	0.0 to 300.0%: ±1.5% of reading or ±1.0% whichever is greater; 300.0 to 500.0%: ±3% of reading; 0.00 to 30.00 mg/L: ±1.5% of reading or 0.10 mg/L whichever is greater; 30.00 mg/L to 50.00 mg/L: ±3% of reading
Conductivity	Range	0.000 to 200.000 mS/cm (actual EC up to 400 mS/cm)
	Resolution	Manual: 1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm; 1 mS/cm; Automatic: 1 µS/cm from 0 to 9999 µS/cm; 0.01 mS/cm from 10.00 to 99.99 mS/cm ; 0.1 mS/cm from 100.0 to 400.0 mS/cm; Automatic mS/cm: 0.001 mS/cm from 0.000 to 9.999 mS/cm; 0.01 mS/cm from 10.00 to 99.99 mS/cm; 0.1 mS/cm from 100.0 to 400.0 mS/cm
	Accuracy	±1% of reading or ±1 µS/cm whichever is greater
Resistivity	Range	0 to 999999 Ω•cm; 0 to 1000.0 kΩ•cm; 0 to 1.0000 MΩ•cm
	Resolution	Dependent on resistivity reading
TDS	Range	0 to 400000 mg/L or ppm (the maximum value depends on the TDS factor)
	Resolution	Manual: 1 mg/L (ppm); 0.001 g/L (ppt); 0.01g/L (ppt); 0.1 g/L (ppt); 1 g/L (ppt); Auto-range scales: 1 mg/L (ppm) from 0 to 9999 mg/L (ppm); 0.01 g/L (ppt) from 10.00 to 99.99 g/L (ppt); 0.1 g/L (ppt) from 100.0 to 400.0 g/L (ppt); Auto-range g/L (ppt) scales: 0.001 g/L (ppt) from 0.000 to 9.999 g/L (ppt); 0.01 g/L (ppt) from 10.00 to 99.99 g/L (ppt); 0.1 g/L (ppt) from 100.0 to 400.0 g/L (ppt)
	Accuracy	±1% of reading or ±1 mg/L
Salinity	Range	0.00 to 70.00 PSU (Practical Salinity Scale)
	Resolution	0.01 PSU
	Accuracy	±2% of reading or 0.01 PSU whichever is greater
Seawater Specific Gravity	Range	0.0 to 50.0 σt, σ0, σ15
	Resolution	0.1 σt, σ0, σ15
	Accuracy	±1 σt, σ0, σ15
Atm. Pressure	Range	450 to 850 mmHg; 17.72 to 33.46 inHg; 600.0 to 1133.2 mbar; 8.702 to 16.436 psi; 0.5921 to 1.1184 atm; 60.00 to 113.32 kPa
	Resolution	0.1 mmHg; 0.01 inHg; 0.1 mbar; 0.001 psi; 0.0001 atm; 0.01 kPa
	Accuracy	±3 mmHg within ±15°C from the temperature during calibration
Temperature	Range	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K
	Resolution	0.01°C; 0.01°F; 0.01K
	Accuracy	±0.15°C; ±0.27°F; ±0.15K
Calibration	pH	Automatic 1, 2, or 3 points with 5 memorized standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or 1 custom buffer
	ORP	Automatic at 1 custom point
	Conductivity, Salinity	Automatic 1 point with 6 memorized standards (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm) or custom point
	DO	Automatic 1 or 2 points at 0, 100% or 1 custom point
	Resistivity, TDS, σ	Based on conductivity or salinity calibration
	Atm. Pressure	Automatic at 1 custom point
	Temperature	Automatic at 1 custom point
Temperature Compensation		Automatic from -5 to 55°C (23 to 131°F)
Logging Memory		Up to 60000 samples with 13 measurements each
Logging Interval		1 second to 3 hours
Computer Interface		USB (with HI 92000 software)
Waterproof Protection		Meter IP67, Probe IP68
Environment		0 to 50°C (32 to 122°F); RH 100%
Power Supply		(4) 1.5V alkaline C cells (approx. 150 hours of continuous use without backlight) /(4) 1.2V rechargeable C cells (approx. 70 hours of continuous use without backlight)
Dimensions		Meter: 221 x 115 x 55 mm (8.7 x 4.5 x 2.2"); Probe: 270 x 46 mm DIA (10.6 x 1.8" DIA)
Weight		Meter: 750g (26.5 oz.); Probe: 750g (26.5 oz.)

HI 991300 • HI 991301

pH/EC/TDS/Temperature Meters

Waterproof with Advanced Features



SPECIFICATIONS		HI 991300	HI 991301
Range	pH	0.00 to 14.00 pH	
	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm (mg/L)	0.00 to 10.00 ppt (g/L)
	Temperature	0.0 to 60.0°C (32.0 to 140.0°F)	
Resolution	pH	0.01 pH	
	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temperature	0.1°C (0.1°F)	
Accuracy (@20°C/68°F)	pH	±0.01 pH	
	EC	±2% F.S.	
	TDS	±2% F.S.	
	Temperature	±0.5°C (±1.0°F)	
TDS Conversion Factor		selectable 0.45 to 1.00 with 0.01 increments (default 0.50)	
pH Calibration		automatic at 1 or 2 points with 2 sets of memorized standard buffers (pH 4.01/7.01/10.01 or pH 4.01/6.86/9.18)	
EC/TDS Calibration		automatic, 1 point at 1382 ppm (CONV=0.5) or at 1500 ppm (CONV =0.7) or at 1413 µS/cm	automatic, 1 point at 6.44 ppt (CONV=0.5) or at 9.02 ppt (CONV=0.7) or at 12880 µS/cm
Temperature Compensation	pH	automatic	
	EC/TDS	automatic with selectable β from 0.0 to 2.4%/°C with 0.1 increments	
Probe		HI 1288, pH/EC/TDS/T, DIN connector, 1 m (3.3') cable (included)	
Battery Type / Life		(4) 1.5V AAA / approximately 500 hours of continuous use	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions / Weight		150 x 80 x 36 mm (5.9 x 3.1 x 1.4") / 210g (7.4 oz.)	

ORDERING INFORMATION

HI 991300 and **HI 991301** are supplied with HI 1288 probe with 1 m (3.3') cable, batteries, rugged carrying case and instructions.

ELECTRODES

HI 1288 pH/conductivity probe with built-in temperature sensor, DIN connector and 1 m (3.3') cable

SOLUTIONS

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 7030L 12880 µS/cm calibration solution, 500 mL
HI 7031L 1413 µS/cm calibration solution, 500 mL
HI 7032L 1382 ppm (mg/L) calibration solution, 500 mL
HI 7038L 6.44 ppt calibration solution, 500 mL
HI 70442L 1500 ppm calibration solution, 500 mL
HI 70300L Electrode storage solution, 500 mL
HI 7061L Electrode cleaning solution, 500 mL

ACCESSORIES

HI 710007 Shockproof rubber boot, blue
HI 710008 Shockproof rubber boot, orange

2 Button Operation for Demanding Applications

HANNA offers you a choice of 2 meters to meet your exacting requirements.

HI 991300 and HI 991301 both measure pH, electrical conductivity, total dissolved solids and temperature in a single instrument. To increase precision, you can select the meter which will work best with your range of conductivity—from purified to brackish waters.

There are only 2 buttons, yet you can select from a range of calibration buffers and even the temperature scale (°C or °F) most familiar to you. The housing is waterproof and rated for IP 67 conditions.

The multi-parameter probe, HI 1288, includes pH, EC/TDS and temperature in one convenient, rugged handle.

Other user selectable features include different TDS factors from 0.45 to 1.00, and a range of temperature coefficients (β) from 0.0 to 2.4%. Also selectable are standardized buffer recognition values.

To ensure against interference from transient electrical noise, a solid-state amplifier is integrated into the probe.

- *4 parameters - one probe*
- *Extendable cloth junction*
- *Waterproof casing*



HANNA instruments

With Great Products, Come Great Results™

HI 9813-6

pH/EC/TDS/Temperature Combined Meter

Water Resistant and Features F.S.T. - Fail Safe Technology

Designed for Growers

pH electrodes are commonly designed to produce an output signal equal to 0 mV when immersed in a solution with pH 7. But a constant output value at pH 7 occurs as a result of certain adverse events, such as:

- A broken bulb in the pH electrode
- A short circuit in the cable or connector
- Magnetic force leakage in the cable or connector (for example, in case of excessive humidity)

In these situations, the instrument displays a false reading at pH 7 and the user may not be aware that corrective measures are necessary; particularly if the user is anticipating a neutral pH reading. To avoid this problem, HANNA developed F.S.T. technology.

With this special security system, a system failure will force a fixed value close to pH 4, rather than pH 7, and render the problem clearer to the user.

For extra confidence in your measurements, the meter is equipped with two LEDs and a "CHECK" button. While pressing this button, upon immersing the electrode in the CAL CHECK™ solution HI 50021P, one of the LEDs will light up to indicate the status of the meter. The green LED ("OK") indicates the probe is working correctly, while the red LED "C&C" (Clean & Cal) indicates the electrode needs attention.

- *Exclusive Clean & Cal feature*
- *Fast response probe*
- *°C measurement*



HI 710022 Protective Case



SPECIFICATIONS		HI 9813-6
Range	pH	0.0 to 14.0 pH
	EC	0.00 to 4.00 mS/cm
	TDS	0 to 1999 ppm (mg/L)
	Temperature	0.0 to 60.0°C
Resolution	pH	0.1 pH
	EC	0.01 mS/cm
	TDS	1 ppm (mg/L)
	Temperature	0.1°C
Accuracy (@20°C/68°F)	pH	±0.1 pH
	EC	±2% F.S.
	TDS	±2% F.S.
	Temperature	±0.5°C
TDS Conversion Factor		0.56 to 0.72 ppm = 1 µS/cm
Calibration		manual at 1 point (all parameters except temperature)
Temperature Compensation		automatic 0 to 50°C (32 to 122°F) with ß=2%/°C (EC/TDS only)
Probe		HI 1285-6, pH/EC/TDS/T, with Clean & Cal, 1 m (3.3') cable (included)
Battery Type / Life		9V / approximately 150 hours of continous use
Environment		0 to 50°C (32 to 122°F); RH max 100%
Dimensions / Weight		165 x 75 x 45 mm (6.9 x 2.9 x 1.8") / 180 g (6.3 oz.)

ORDERING INFORMATION

HI 9813-6 is supplied with HI 1285-6 pH/EC/TDS/°C probe with Clean & Cal, HI 50021 test solution sachets (2), pH 7.01 calibration solution sachet (20 mL), 1.41 mS/cm and 1500 ppm calibration solution sachets (1 ea.) , cleaning solution sachet (2), protective case, 9V battery and instruction manual.

PROBES

HI 1285-6 pH/EC/TDS/°C probe, with Clean & Cal, 1 m (3.3) cable

SOLUTIONS

HI 70300L Elecrode storage solution, 500 mL
HI 7061L Cleaning solution, 500 mL
HI 77100P pH 7 and 1413 µS/cm calibration solution (20) 20 mL sachets, (10)
HI 77200P pH 7 and 1500 ppm calibration solution (20) 20 mL sachets, (10)
HI 50021P Clean & Cal solution 20 mL sachets (25)

ACCESSORIES

HI 710015 Shockproof rubber boot, blue
HI 710016 Shockproof rubber boot, orange
HI 710022 Blue protective case

HI 9813-0 • HI 9813-5

Rugged pH/EC/TDS Meters

for Growers



Rugged Meters Designed for Agriculture

HI 9813-0 allows you to measure pH, EC and TDS with just one instrument! This meter has a full-spectrum pH measurement range.

The EC range goes to 4.00 mS/cm. In the TDS range, both instruments use a conversion factor from 0.56 to 0.72 for fertilizer readings, to ensure your measurements fully conform to industry standards.

The specially engineered HI 1285-0 probe is interchangeable and the pH electrode utilizes a fiber junction and gel electrolyte which are particularly suitable when used in fertilizer solutions.

HI 9813-0 and **HI 9813-5** measure TDS in the 0 to 1999 ppm range.

HI 9813-5 also performs temperature measurements, with the special probe HI 1285-5

- *Measure pH, EC and TDS*
- *Fast response probe*
- *Compact and lightweight*

SPECIFICATIONS		HI 9813	HI 9813-5
Range	pH	0.0 to 14.0 pH	
	EC	0.00 to 4.00 mS/cm	
	TDS	0 to 1999 ppm (mg/L)	
	Temperature	—	0.0 to 60.0°C
Resolution	pH	0.1 pH	
	EC	0.01 mS/cm	
	TDS	1 ppm (mg/L)	
	Temperature	—	0.1°C
Accuracy (@20°C/68°F)	pH	±0.1 pH	
	EC	±2% F.S.	
	TDS	±2% F.S.	
	Temperature	—	±0.5°C
TDS Conversion Factor		0.56 to 0.72 ppm = 1 µS/cm	
Calibration		manual at 1 point (all parameters except temperature)	
Temperature Compensation		automatic, 0 to 50°C (32 to 122°F) with β=2%/°C (EC/TDS only)	
Probe		HI 1285-0, pH/EC/TDS, 1 m cable (included)	HI 1285-5, pH/EC/TDS/°C, 1 m cable (included)
Battery Type / Life		9V / approximately 150 hours of continous use	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions / Weight		165 x 75 x 45 mm (6.9 x 2.9 x 1.8") / 180 g (6.3 oz.)	

ORDERING INFORMATION

HI 9813-0 is supplied with HI 1285-0 pH/EC/TDS probe, pH 7.01 calibration solution sachet (20 mL), 1.41 mS/cm and 1500 ppm calibration solution sachets (1 ea.) , cleaning solution sachet (2), protective case, 9V battery and instruction manual.

HI 9813-5 is supplied with HI 1285-5 pH/EC/TDS/°C probe, pH 7.01 calibration solution sachet (20 mL), 1.41 mS/cm and 1500 ppm calibration solution sachets (1 ea.) , cleaning solution sachet (2), protective case, 9V battery and instruction manual.

ELECTRODES

HI 1285-0	pH/EC/TDS probe, 1 m (3.3') cable
HI 1285-5	pH/EC/TDS/°C probe, 1 m (3.3') cable

SOLUTIONS

HI 70300L	Elecrode storage solution, 500 mL
HI 7061L	Cleaning solution, 500 mL
HI 77100P	pH 7 and 1413 µS/cm calibration solution (20) 20 mL sachets, (10)
HI 77200P	pH 7 and 1500 ppm calibration solution (20) 20 mL sachets, (10)
HI 77400P	pH 4 and 7 calibration solution (10) 20 mL sachets, (5).

ACCESSORIES

HI 710015	Shockproof rubber boot, blue
HI 710016	Shockproof rubber boot, orange
HI 710022	Blue protective case

pH/EC/TDS Meters

Ideal for Measurements in the Field

Versatile Instruments for Water Conditioning

Reduce your necessary tool set for field water-quality analysis. HI 9812-0 and HI 9812-5 are easy to use waterproof portable instruments for field measurements of pH, conductivity and TDS. HI 9812-0 and HI 9812-5 measure pH from 0.0 to 14.0 and measures TDS from 0 to 1990 mg/L—ideal for the water conditioning field. Calibration has been simplified to one point for both pH and conductivity/TDS modes.

Both HI 9812-0 and HI 9812-5 are equipped with Automatic Temperature Compensation to remove the effects of temperature on your pH, conductivity and TDS measurements. In addition, the BEPS (Battery Error Prevention System) will alert the user when low batteries could affect the readings.

HI 9812-0 uses our 4-in-1 replaceable HI 1285-0 probe, while HI 9812-5 uses HI 1285-5. No probe changes are required when switching your measured parameter between pH, conductivity and TDS.

Specifically engineered for water-quality applications, the pH electrode features a fiber junction and gel electrolyte that provides faster response and reduced contamination.

Finally, HI 9812-5 also measures temperature in °C.

- *Lightweight and easy to carry*
- *BEPS equipped to warn users when low batteries could effect readings*
- *Probe, batteries, carrying case and starter solutions included*



SPECIFICATIONS		HI 9812-0	HI 9812-5
Range	pH	0.0 to 14.0 pH	
	EC	0 to 1990 µS/cm	
	TDS	0 to 1990 ppm (mg/L)	
	Temperature	—	0 to 60°C
Resolution	pH	0.1 pH	
	EC	10 µS/cm	
	TDS	10 ppm (mg/L)	
	Temperature	—	1°C
Accuracy (@20°C/68°F)	pH	±0.1 pH	
	EC	±2% F.S.	
	TDS	±2% F.S.	
	Temperature	—	±1°C
TDS Conversion Factor		0.5 ppm = 1 µS/cm	
Calibration		manual at 1 point (all parameters, except temperature)	
Temperature Compensation		automatic 0 to 50°C with ß = 2% /°C (EC/TDS only)	
Probe		HI 1285-0, pH/EC/TDS, 1 m (3.3') cable (included)	HI 1285-5, pH/EC/TDS/T, 1 m (3.3') cable (included)
Battery Type / Life		9V / approximately 150 hours of continuous use	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Dimensions / Weight		165 x 75 x 45 mm (6.9 x 2.9 x 1.8") / 180 g (6.3 oz.)	

ORDERING INFORMATION

HI 9812-0 is supplied with HI 1285-0 pH/EC/TDS probe, pH 7.01 calibration solution sachet (20 mL), 1382 ppm and 1413 µS/cm calibration solution sachets (1 ea.), cleaning solution sachet (2), protective case, 9 V battery and instructions.

HI 9812-5 is supplied with HI 1285-5 pH/EC/TDS/°C probe, pH 7.01 calibration solution sachet (20 mL), 1382 ppm and 1413 µS/cm calibration solution sachets (1 ea.), cleaning solution sachet (2), protective case, 9 V battery and instructions.

ELECTRODES

HI 1285-0	pH/EC/TDS probe, 1 m (3.3') cable
HI 1285-5	pH/EC/TDS/°C probe, 1 m (3.3') cable

SOLUTIONS

HI 70300L	Elecrode storage solution, 500 mL
HI 7061L	Cleaning solution, 500 mL
HI 77100P	pH 7 and 1413 µS/cm calibration solution (20) 20 mL sachets, (10)
HI 77300P	pH 7 and 1382 ppm calibration solution (20) 20 mL sachets, (10).
HI 77400P	pH 4 and 7 calibration solution (10) 20 mL sachets, (5)

ACCESSORIES

HI 710015	Shockproof rubber boot, blue
HI 710016	Shockproof rubber boot, orange
HI 710022	Blue protective case



HI 710022 Protective Case

HI 9811-0 • HI 9811-5

pH and Conductivity to 6000 µS/cm Meters

with Water Resistant Casings

upgraded B.E.P.S.



Ideal for Industrial, Commercial and Agricultural Use

HI 9811-0 and HI 9811-5 are waterproof portable meters for field measurements of pH, conductivity and TDS. These multiparameter meters reduce the number of instruments required for water quality analysis. The rugged housing has been specifically designed to withstand the heavy demand of field applications. HI 9811-0 and HI 9811-5 measures pH from 0 to 14 with 0.1 resolution. The instrument also measures conductivity from 0 to 6000 µS/cm and TDS from 0 to 3000 mg/L. These ranges make both meters perfect for use in boilers and cooling towers, as well as printing and agriculture applications. Calibration is simplified to one point for both pH and conductivity/ TDS modes.

HI 9811-0 and HI 9811-5 both feature Automatic Temperature Compensation and BEPS (Battery Error Prevention System) which alerts the user when low batteries could adversely affect readings.

HI 9811-0 uses the 4-in-1 replaceable probe HI 1285-0 for pH/EC/TDS, while the HI 9811-5 uses the HI 1285-5 probe, which measures pH/EC/TDS and °C.

- *Measure pH, EC from 0 to 6000 µS/cm and TDS*
- *Lightweight and easy to carry*
- *BEPS equipped to warn users when low batteries could effect readings*
- *Probe, batteries, carrying case and starter solutions included*

SPECIFICATIONS		HI 9811-0	HI 9811-5
Range	pH	0.0 to 14.0 pH	
	EC	0 to 6000 µS/cm	
	TDS	0 to 3000 mg/L (ppm)	
	Temperature	—	0.0 to 70.0°C
Resolution	pH	0.1 pH	
	EC	10 µS/cm	
	TDS	10 mg/L	
	Temperature	—	0.1°C
Accuracy (@20°C/68°F)	pH	±0.1 pH	
	EC	±2% F.S.	
	TDS	±2% F.S.	
	Temperature	—	±0.5°C
TDS Conversion Factor		0.5 mg/L = 1 µS/cm	
Calibration		manual at 1 point (all parameters except temperature)	
Temperature Compensation		automatic 0 to 50°C with ß = 2% /°C (EC/TDS only)	
Probe		HI 1285-0 pH/EC/TDS, 1 m cable (included)	HI 1285-5 pH/EC/TDS/T, 1 m cable (included)
Battery Type / Life		9V / approximately 150 hours of continous use	
Environment		0 to 50°C (32 to 122°F); RH 100%	
Dimensions / Weight		165 x 75 x 45 mm (6.9 x 2.9 x 1.8") / 180 g (6.3 oz.)	

ORDERING INFORMATION

HI 9811-0 is supplied with HI 1285-0 pH/EC/TDS probe, pH 7.01 calibration solution sachet (20 mL), 1382 ppm and 1413 µS/cm calibration solution sachets (1 ea.), cleaning solution sachet (2), protective case, 9 V battery and instructions.

HI 9811-5 is supplied with HI 1285-5 pH/EC/TDS/°C probe, pH 7.01 calibration solution sachet (20 mL), 1382 ppm and 1413 µS/cm calibration solution sachets (1 ea.), cleaning solution sachet (2), protective case, 9 V battery and instructions.

ELECTRODES

HI 1285-0	pH/EC/TDS probe, 1 m (3.3') cable
HI 1285-5	pH/EC/TDS/T probe, 1 m (3.3') cable

SOLUTIONS

HI 70300L	Elecrode storage solution, 500 mL
HI 7061L	Cleaning solution, 500 mL
HI 77100P	pH 7 and 1413 µS/cm calibration solution (20) 20 mL, (10)
HI 77300P	pH 7 and 1382 ppm calibration solution (20) 20 mL, (10)
HI 77400P	pH 4 and 7 calibration solution (10) 20 mL, (5)

ACCESSORIES

HI 710015	Shockproof rubber boot, blue
HI 710016	Shockproof rubber boot, orange
HI 710022	Blue protective case



HI 70300L — Electrode Storage Solution

HANNA instruments

With Great Products, Come Great Results™

hold | replaceable | lcd display | B.E.P.S.

HI 98129 • HI 98130

pH/Conductivity/TDS Testers

Waterproof and Designed to Float

The Ultimate in HANNA Combination Testers!

HI 98129 and HI 98130 are waterproof testers that offer high accuracy pH, EC/TDS and temperature measurements in a single tester! No more switching between meters for your routine measurements. These floating, waterproof testers have a large easy-to-read, dual-level LCD and automatic shut-off. pH and EC/TDS readings are automatically temperature compensated (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. This gives these meters an extended life. Your tester no longer needs to be thrown away when the pH sensor is exhausted.

The EC/TDS conversion factor is user selectable as well as the temperature compensation coefficient (β).

Fast, efficient, accurate and portable, the Combo pH, EC/TDS and temperature tester brings you all the features you've asked for and more!

Replaceable pH electrode cartridge



The Combo features an easy-to-replace pH electrode and has an extendable cloth junction. The sturdy, snap-in connector means there are no pins to bend or break.

High accuracy



The graphite conductivity electrode provides greater accuracy because it cannot be contaminated by salt deposits in the solution. The exposed temperature sensor provides fast response times, and guarantees accurate temperature compensated readings.

On-screen Battery Life



LCD indicates the percentage of battery power remaining upon startup.

Standard or N.I.S.T Buffer Calibration



Auto calibration is performed with 2 sets of memorized buffers for greater accuracy.

Adjustable TDS Ratio



For measurement accuracy, users can choose between different conductivity to TDS conversion factors.



SPECIFICATIONS		HI 98129	HI 98130
Range	pH	0.00 to 14.00 pH	
	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm	0.00 to 10.00 ppt
	Temperature	0.0 to 60.0°C / 32.0 to 140.0°F	
Resolution	pH	0.01 pH	
	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	Temperature	0.1°C / 0.1°F	
Accuracy (@20°C)	pH	±0.05 pH	
	EC / TDS	±2% F.S.	
	Temperature	±0.5°C /±1°F	
Temperature Compensation		pH: automatic; EC/TDS: automatic with β adjustable from 0.0 to 2.4% / °C	
Calibration	pH	automatic, 1 or 2 points with 2 sets of standard buffers (pH 4.01 / 7.01 / 10.01 or 4.01 / 6.86 / 9.18)	
	EC / TDS	automatic, 1 point at 1413 µS/cm or 1382 ppm	automatic, 1 point at 12.88 mS/cm or 6.44 ppt
TDS Conversion Factor		adjustable, from 0.45 to 1.00	
pH Electrode		HI 73127 (replaceable; included)	
Environment		0 to 50°C (32 to 122°F); RH max 100%	
Battery Type / Life		(4) 1.5V / approx. 100 hours of continuous use, auto-off after 8 minutes of non-use	
Dimensions/Weight		163 x 40 x 26 mm (6.4 x 1.6 x 1.0")/100 g (3.5 oz.)	

ORDERING INFORMATION

HI 98129 (*Combo*) and **HI 98130** (*Combo*) are supplied with 1.5V batteries (4), HI 73127 pH electrode and HI 73128 electrode removal tool.

ELECTRODES

HI 73127 Spare pH electrode for (*Combo*)

SOLUTIONS

HI 70004P pH 4.01 buffer solution, 20 mL sachets (25)

HI 70006P pH 6.86 buffer solution, 20 mL sachets (25)

HI 70007P pH 7.01 buffer solution, 20 mL sachets (25)

HI 70009P pH 9.18 buffer solution, 20 mL sachets (25)

HI 70010P pH 10.01 buffer solution, 20 mL sachets (25)

HI 70030P 12.88 mS/cm buffer solution, 20 mL sachets (25)

HI 70031P 1413 µS/cm buffer solution, 20 mL sachets (25)

HI 70032P 1382 ppm buffer solution, 20 mL sachets (25)

HI 70038P 6.44 ppt buffer solution, 20 mL sachets (25)

HI 70442P 1500 ppm buffer solution, 20 mL sachets (25)

HI 70300M Electrode storage solution, 250 mL

HI 7061M Electrode cleaning solution, 250 mL

ACCESSORIES

HI 73128 Electrode removal tool

HI 98204

pH/ORP/EC Tester

with °C Temperature Measurement



- *4 instruments in 1*
- *Long battery life*
- *Lightweight with built in handle*
- *Easy to take measurements*

ORDERING INFORMATION

HI 98204 (Water Test) is supplied with measuring compartment, batteries and instructions.

Water Test—A Portable Water Testing laboratory



Water Test provides quick and reliable measurement of the four most important variables in water analysis: pH, ORP, conductivity and temperature.

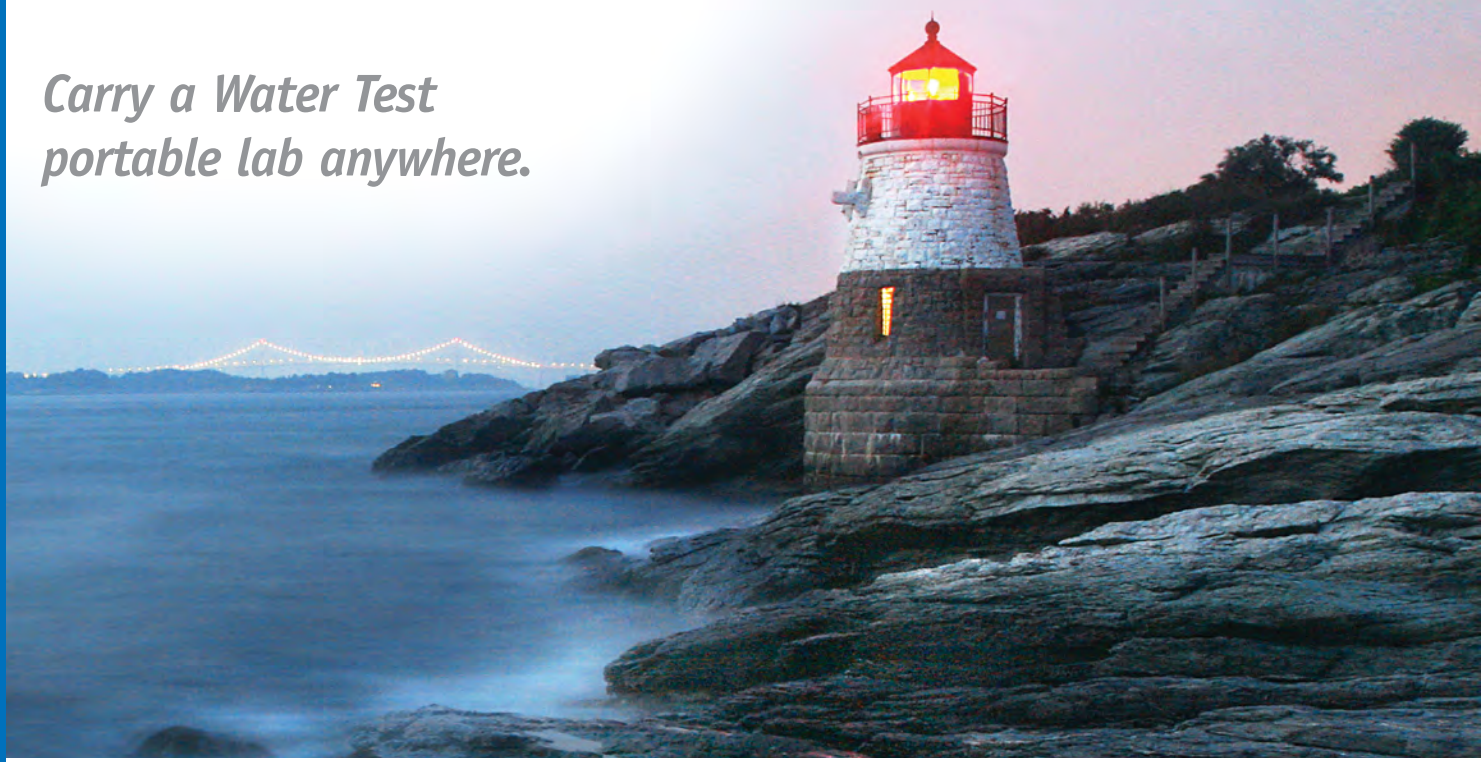
The lightweight and compact package makes it perfect for use in the plant as well as the field. Superior in design and construction, Water Test is made of rugged VALOX® material which provides excellent protection from typical environmental conditions.

Water Test is engineered with such simplicity that even non-technical personnel can use it: Fill the base of Water Test with the sample to be measured, press "RANGE" to select the mode and then simply read your measurement!

The rugged construction and simple operation make Water Test perfect for use in the fields of water treatment analysis, waste water tests, ecological studies, aquaculture and hydroponic applications.

SPECIFICATIONS	pH	ORP	Conductivity	Temperature
Range	0.0 to 14.0 pH	±1000 mV	0 a 1999 µS/cm	0.0 to 60.0°C
Resolution	0.1 pH	1 mV	1 µS/cm	0.1°C
Accuracy (@20°C/68°F)	±0.2 pH	±5 mV	±2% F.S.	±1°C
Calibration	manual, 2 points	factory calibrated	manual, 1 point	factory calibrated
Battery Type / Life	(3) 1.5V / approx. 200 hours of continuo us use			
Environment	0 to 50°C (32 to 122°F); RH max 95%			
Dimensions	190 x 85 x 85 mm (7.5 x 3.3 x 3.3")			
Weight	260 g (9.2 oz.)			

Carry a Water Test portable lab anywhere.



HANNA instruments

With Great Products, Come Great Results™



HI 981504

pH/TDS/Temperature Monitor

with 3 Extra Large, Backlit Displays

Designed for continuous and simultaneous monitoring of pH, TDS and temperature.

Simply install the HI 981504 above the sample to be tested, plug the instrument in and immerse the probes. pH, TDS and temperature measurements will be simultaneously displayed on three backlit LCDs.

Users can easily select the temperature unit (°C or °F) through a switch on the back panel.

The HI 1286 gel-filled pH electrode is provided with a waterproof sheath to protect the BNC connector. The unique design of the electrode provides longer life in aggressive solutions. The HI 7634 TDS probe is easy to clean and requires little maintenance. Measurements are accurate and the meter can be calibrated at one or two points for pH and at a single point for TDS. Temperature range is factory calibrated.

Two models are available:

HI 981504/5 with 0.5 TDS factor

HI 981504/7 with 0.7 TDS factor

- *Simultaneous display of pH, TDS and Temperature*
- *3 backlit LCDs*
- *Continuous measurements*
- *Measure in °C or °F*
- *Extra-large displays*
- *12 VDC power supply*





SPECIFICATIONS	HI 981504
Range	pH: 0.0 to 14.0; TDS: 0 to 1990 ppm; Temperature: -10.0 to 60.0°C or -14.0 to 140.0°F
Resolution	pH: 0.1; TDS: 10 ppm; Temperature: 0.1°C or 0.1°F
Accuracy	pH: ±0.2; TDS: ±2% F.S.; Temperature: ±0.3°C or ±0.5°F
pH Calibration	Manual 2 points through trimmers
TDS Calibration	Manual 1 point through trimmer
TDS Factor	0.5 (HI 981504/5) or 0.7 (HI 981504/7)
Probes	pH: HI 1286 (included); TDS: HI 7634 (fixed); Temperature: Stainless steel, 2 m cable (fixed)
Temp. Compensation	Automatic, 5 to 50°C (41 to 122°F), for TDS readings only
Power Supply	12 Vdc power adapter (included)
Environment	0 to 50°C (32 to 122°F); 95% RH
Dimensions/Weight	160 x 110 x 35 mm (6.3 x 4.3 x 1.4")/560 g (1.2 lbs.)

ORDERING INFORMATION

HI 981504/5-01 (115V) and **HI 981504/5-02** (230V) and **HI 981504/7-01** (115V) and **HI 981504/7-02** (230V) is supplied with HI 1286 pH electrode, pH 4 and 7 buffer sachets (20 mL ea.), HI 7634 TDS probe, temperature probe, TDS sachet, (2) cleaning solution sachets, screwdriver, 12 Vdc power adapter and instructions.

ELECTRODES

HI 1286 Double junction, plastic body pH electrode with 2 m (6.6') cable and BNC connector.

SOLUTIONS

HI 7004M pH 4.01 calibration solution, 250 mL

HI 70004P pH 4.01 calibration solution, 20 mL sachets (25)

HI 7007M pH 7.01 calibration solution, 250 mL

HI 70007P pH 7.01 calibration solution, 20 mL sachets (25)

HI 7032M 1382 ppm calibration solution, 250 mL

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 70442M 1500 ppm calibration solution, 250 mL

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

HI 70300M Electrode storage solution, 250 mL

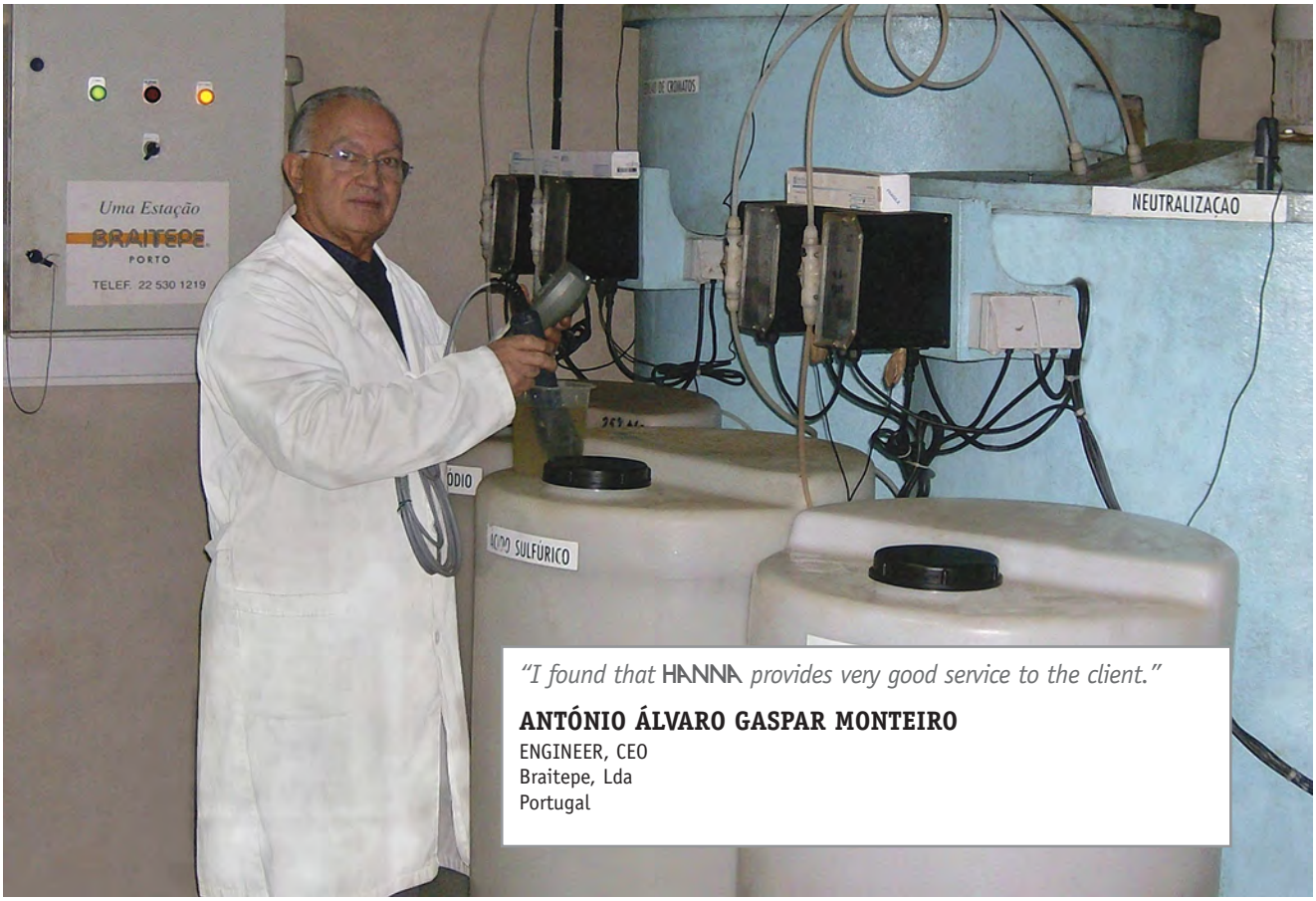
HI 7061M Probe cleaning solution, 250 mL

ACCESSORIES

HI 731326 Calibration screwdriver, (20)

Combination Meters

for Efficient Multiple Parameter Measurement



"I found that HANNA provides very good service to the client."

ANTÓNIO ÁLVARO GASPAR MONTEIRO
ENGINEER, CEO
Braitepe, Lda
Portugal

Product Spotlights



p 7.4

Research Grade Graphic Color LCD Meters

HI 4521 and HI 4522 are USP compliant research-grade laboratory pH/EC and pH/ISE/EC bench meters with a backlit 240 x 320 dot-matrix color screen and millesimal measuring resolution.



p 7.8

Measure up to 13 Parameters, Display up to 12 on the same screen

HANNA's new HI 9828 is a multiparameter portable instrument that monitors up to 13 different water quality parameters (6 measured, 7 calculated). The meter has a 128 x 64 pixel dot matrix backlit LCD that automatically sizes the digits and allows full configuration of each parameter measured, units and language selection, and on-screen graphing.

HI 991404 • HI 991405

pH/EC/TDS/Temperature Monitors

with Backlit Display



Continuous High Accuracy Measurements

The Combo HI 991404 and HI 991405 series meters from HANNA are designed for continuous, high accuracy pH, EC/TDS and temperature measurements. These microprocessor indicators continuously monitor the three most important nutrient parameters in hydroponics, greenhouses and horticultural applications with a single meter. These indicators feature a large, dual-level, backlit LCD to give you instantaneous readings of pH, EC or TDS and temperature, even from a distance.

At startup, these indicators perform a self-check to assure proper working condition. The HI 991404 and HI 991405's stability indicator and hold features let the user know when to take readings and freeze the display for easy and accurate recording.

Calibration and temperature compensation is automatic, while the EC/TDS conversion factor and temperature coefficient (β) are user adjustable for application-specific measurements.

These instruments are supplied with an advanced, non-clogging double junction pH electrode and a rugged conductivity probe that will withstand even the most aggressive environments. The instruments are powered by a 12 Vdc transformer and are easy to install and use, making them the ideal choice for all continuous monitoring applications.

- *Waterproof*
- *Adjustable TDS ratio*
- *Adjustable β*
- *Stability indicator*
- *Extra-large display*
- *12 Vdc power supply*

SPECIFICATIONS		HI 991404	HI 991405
Range	pH	0.0 to 14.0 pH	0.0 to 14.0 pH
	EC	0 to 3999 µS/cm	0.00 to 20.00 mS/cm
	TDS	0 to 2000 ppm (mg/L)	0.00 to 10.00 ppt (g/L)
	temperature	0.0 to 60.0°C / 32.0 to 140.0°F	0.0 to 60.0°C / 32.0 to 140.0°F
Resolution	pH	0.1 pH	0.1 pH
	EC	1 µS/cm	0.01 mS/cm
	TDS	1 ppm	0.01 ppt
	temperature	0.1°C (o 0.1°F)	0.1°C (0.1°F)
Accuracy (@20°C/68°F)	pH	±0.1 pH	
	EC/TDS	±2% F.S.	
	temperature	±0.5°C (±1°F)	
Temperature compensation		pH: automatic; EC/TDS: automatic with β adjustable from 0.0 to 2.4%/°C	
pH Calibration		pH: automatic, 1 or 2 points with 2 sets of memorized buffers	
EC/TDS Calibration		automatic, 1 point at 1413 µS/cm or 1382 ppm	automatic, 1 point at 12.88 mS/cm or 6.44 ppt
pH electrode		HI 1293D (included)	
EC/TDS probe		HI 7630 (fixed)	
EC/TDS conversion factor		adjustable from 0.45 to 1.00	
Environment		0 to 50°C (32 to 122°F); RH max 95%	
Input impedance		10^{12} Ohm	
Power supply		12 Vdc adapter (included)	
Dimensions/Weight (meter only)		160 x 105 x 31 mm (6.3 x 4.1 x 1.2)/190 g (6.7 oz.)	

ORDERING INFORMATION

HI 991404-01 (115V) and **HI 991404-02** (230V) and **HI 991405-01** (115V) and **HI 991405-02** (230V) are supplied complete with HI 1293D pH electrode, fixed HI 7630 probe, pH and EC calibration solutions, 12 Vdc adapter and instructions.

ELECTRODES

HI 7630 Conductivity probe*

HI 1293D pH electrode with DIN connector and internal matching pin

SOLUTIONS

HI 7004M pH 4.01 calibration solution, 250 mL

HI 7007M pH 7.01 calibration solution, 250 mL

HI 7010M pH 10.01 calibration solution, 250 mL

HI 70030P 12.88 mS/cm calibration solution, 20 mL sachets (25)

HI 70031P 1413 µS/cm calibration solution, 20 mL sachets (25)

HI 70032P 1382 ppm calibration solution, 20 mL sachets (25)

HI 70038P 6.44 ppt calibration solution, 20 mL sachets (25)

HI 70442P 1500 ppm calibration solution, 20 mL sachets (25)

HI 70300M Electrode storage solution, 250 mL

HI 7061M Probe cleaning solution, 250 mL

ACCESSORIES

HI 710005 115 Vac/12 Vdc pwr adapter (US)

HI 710006 230 Vac/12 Vdc pwr adapter (EURO)

*Replaceable by technical personnel only.

HANNA instruments®

With Great Products, Come Great Results™

Combination Meters

for Efficient Multiple Parameter Measurement



Simple and Advanced Multiparameter Instruments

Combination instruments are the ideal solution in applications that require the user to accurately test the levels of several parameters at the same time.

HANNA's line of combination instruments can substitute the need for 2 or more individual meters—saving time and space.

HANNA continually devotes itself to developing new time, cost and space saving solutions for busy laboratory and field users.



New Bench Meters

HI 4521 and HI 4522are USP compliant research-grade laboratory pH/EC and pH/ISE/EC bench meters with a backlit 240 x 320 dot-matrix color screen and millesimal measuring resolution. Both meters are dual-channel and the HI 4522 also features ISE functionality.

Both meters can be used to perform all 3 stages of USP <645> conductivity tests for water quality and our exclusive Calibration Check™ diagnostics system keeps the user informed about the quality and condition of the electrode and buffer groups for calibration.

New Portable Meter

HANNA's new HI 9828 is a multiparameter portable instrument that monitors up to 13 different water quality parameters (6 measured, 7 calculated). The meter has a 128 x 64 pixel dot matrix, backlit LCD that automatically sizes the digits to fit up to 12 measurements on-screen at once. For monitoring and recording data, HI 9828 is equipped with HANNA's exclusive *Fast Tracker*™ – *Tag Identification System*: iButton©s with unique ID numbers can be installed at any number of sampling sites and are used to record specific location information when logging. The meter incorporates comprehensive GLP features and trasferring of data via USB connection.

For HI 9828 field calibration, HANNA's Quick Calibration allows users to standardize pH, conductivity and oxygen with one solution.

HI 4522 • HI 4521

Combination Meter

Research Grade Meters with Color Display, Calibration Check™ and USP





FEATURES

- *240 x 320 Dot Matrix Color Display*
- *Logging and Graphing Capabilities*
- *USB and RS 232 for Computer Compatibility*
- *Auto recognition of probe type (2 or 4 ring, and nominal cell constant)*
- *Stages 1, 2 and 3 USP mode*
- *3 salinity scales: Practical salinity, Natural sea water, Percent*
- *Linear and natural water temperature compensation*
- *Exclusive HANNA Calibration Check™*

The Right Choice in Research Grade Instruments.

HI 4521 and HI 4522 are USP compliant research-grade laboratory pH/EC and pH/ISE/EC bench meters with a backlit 240 x 320 dot-matrix color screen and millesimal measuring resolution. HI 4521 is dual-channel. while HI 4522 adds ISE and is single channel

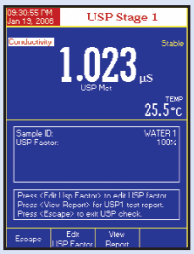
Features include auto-logging and real-time graphic displays, auto-end point mode and fully customizable SETUP options. This unit allows for automatic or manual temperature compensation. For accountability, on-screen GLP data displays concurrent measurement readout and logged graph data, calibration information, including buffer values and expiration date.

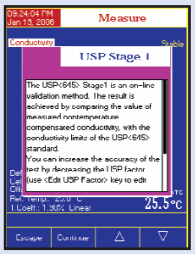
For ISE measurements, an ionic strength constant value is stored with GLP data (HI 4522). During ISE Mode, the user has a choice of several incremental methods. With the option to choose up to 5 calibration points for pH (selected from a list of 5 custom and 8 memorized buffers), the system can be fitted to any desired measuring range.

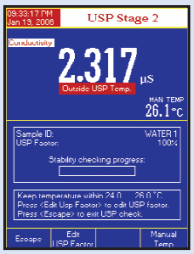
HANNA's exclusive Calibration Check™ diagnostic system keeps the user informed about the quality and condition of the electrode and buffers used for calibration. An enhanced warning system, with acoustic signals, is in place to alert the user when measuring outside the calibration range. This system will also remind the user when a new calibration is due, or when the wrong buffer is being used during calibration. These units may also be given a unique ID number. The user can consult the on-board contextual help from any mode simply by pressing the HELP menu. All the features are available in English, Italian, French and Spanish. The two measurement channels of HI 4521 and HI 4522 are galvanically isolated to eliminate instability.

Both meters can be used to perform all 3 stages of USP <645> conductivity tests for water quality. This instrument provides clear directions on how to perform each testing stage, automatically monitors the temperature, conductivity and stability during testing and determines whether a sample is within USP limits.

These units are equipped with USB and RS232 ports for PC connectivity and a 12 Vdc power supply.











EC USP Mode

HANNA's HI 4522 and HI 4521 can be used to perform all 3 stages of United States Pharmacopeia (USP) testing requirements for water quality.

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

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

pH Calibration Check™

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

HI 4522 • HI 4521

Combination Meter

Research Grade Meters with Color Display, Calibration Check™ and USP

Dual Channel Display





ORDERING INFORMATION

HI 4521-01 (115V) and **HI 4521-02** (230V) are supplied with 4-ring EC probe, glass body pH electrode, temperature probe, power adapter, pH 4 and pH 7 buffer solutions, electrode refilling solution, electrode holder and instructions

HI 4522-01 (115V) and **HI 4522-02** (230V) are supplied with 4-ring EC probe, glass body pH electrode, temperature probe, power adapter, pH 4 and pH 7 buffer solutions, electrode refilling solution, electrode holder and instructions

SOLUTIONS

HI 7030L	12880 µS/cm cal. sol., 500 mL
HI 7031L	1413 µS/cm calibration so., 500 mL
HI 7033L	84 µS/cm calibration sol., 500 mL
HI 7034L	80000 µS/cm cal. sol., 500 mL
HI 7035L	111800 µS/cm cal. sol., 500 mL
HI 7039L	5000 µS/cm calibration sol., 500 mL
HI 7037L	Calibration solution, 500 mL
HI 6016	pH 1.677 buffer solution, 500 mL
HI 6004	pH 4.010 buffer solution, 500 mL
HI 6007	pH 7.010 buffer solution, 500 mL
HI 6010	pH 10.010 buffer solution, 500 mL
HI 6124	pH 12.450 buffer solution, 500 mL
HI 77400P	pH 4 and pH 7 solution, (10) 20 mL sachets (5 ea.)

ACCESSORIES

HI 76404N	Electrode holder
HI 92000	Windows® compatible software
HI 920013	USB cable for PC connection
HI 920010	RS232 cable for PC connection
HI 180G*	Compact magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 190M *	Magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 200M *	Magnetic stirrer with AISI stainless steel cover material, max 1000 rpm, Speedsafe™

* **-1**: 110/115V, 50/60Hz
-2: 220/240V, 50/60Hz



SPECIFICATIONS

		HI 4522	HI 4521
pH	Range	-2.0 to 20.0; -2.00 to 20.00; -2.000 to 20.000 pH	
	Resolution	0.1 pH; 0.01 pH; 0.001 pH	
	Accuracy	±0.1 pH; ±0.01 pH; ±0.002 pH	
mV	Range	±2000 mV	
	Resolution	0.1 mV	
	Accuracy	±0.2 mV	
ISE	Range	1 x 10^{-7} to 9.99 x 10^{10} concentration	—
	Resolution	1; 0.1; 0.01 concentration	—
	Accuracy	±0.5% (monovalent ions); ±1%	—
Conductivity	Range	0.000 to 9.999 µS/cm; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 999.9 mS/cm; 1000 mS/cm	
	Resolution	0.001 µS/cm; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm; 1 mS/cm	
	Accuracy	±1% of reading (±0.01 µS/cm)	
Resistivity	Range	1.00 to 99.99 Ohm•cm; 100.0 to 999.9 Ohm•cm; 1.000 to 9.999 kOhm•cm; 10.00 to 99.99 kOhm•cm; 100.0 to 999.9 kOhm•cm; 1.00 to 9.99 MOhm•cm; 10.0 to 100.0 MOhm•cm	
	Resolution	0.01 Ohm•cm; 0.1 Ohm•cm; 0.001 kOhm•cm; 0.01 kOhm•cm; 0.1 kOhm•cm; 0.01 MOhm•cm; 0.1 MOhm•cm	
	Accuracy	±2% of reading (±1 Ohm•cm)	
TDS	Range	0.000 to 9.999 ppm; 10.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 ppt; 10.00 to 99.99 ppt; 100.0 to 400.0 ppt	
	Resolution	0.001 ppm; 0.01 ppm; 0.1 ppm; 0.001 ppt; 0.01 ppt; 0.1 ppt	
	Accuracy	±1% of reading (±0.01 ppm)	
	Factor	0.40 to 1.00	
Salinity	Range	Practical salinity: 0.00 to 42.00; Natural seawater: 0.00 to 80.00 ppt; Percent: 0.0 to 400.0%	
	Resolution	0.01 for practical salinity/natural sea water; 0.1% for percent scale	
	Accuracy	±1% of reading	
Temperature	Range	-20.0 to 120°C; -4.0 to 248.0°F; 253.15 to 393.15K	
	Resolution	0.1°C; 0.1°F; 0.1K	
	Accuracy	±0.2°C; ±0.4°F; ±0.2K	
Calibration	pH	Automatic up to 5 points with 8 memorized values (pH 1.68, 3.00, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + 5 custom buffers	
	ISE	Automatic, up to 5 points with 6 standard + 5 custom values	—
	Conductivity	Auto standard recognition, custom calibration solution/4 point calibration	
	Salinity	Percent scale—1 point (with HI 7037 buffer)	
	Temperature	3 points	
Relative mV Offset Range		±2000 mV	
Input Channel(s)		1 pH/mV/ISE + 1 EC	1 pH/mV + 1 EC
Calibration Check		pH electrode and buffer condition	
Temperature Compensation	pH	Automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F)	
	EC	Linear and non-linear (natural water)	
Log-on-demand		10 Lots, 5000 samples per lot	
Auto Data Logging		10 Lots, 5000 samples per lot	
PC Connection		Opto-isolated USB and RS232	
Display		240 x 320 dot-matrix color LCD with on-screen help, graphing, language selection and custom configuration	
Power Supply		12 Vdc adapter (included)	
Dimensions/Weight		159 x 230 x 93 mm (6.3 x 9.1 x 3.7")/800 g (1.8 lbs.)	

HI 255

EC/TDS/NaCl and pH/mV Meter

for Laboratories



6 in 1 Bench Meter!

The HANNA HI 255 is a logging, microprocessor-based pH, ORP, Conductivity (EC), TDS, NaCl and temperature bench meter. A relative mV feature is also provided.

pH measurements are compensated for temperature effect manually or automatically with the HI 7662 temperature probe.

pH Calibration is possible with up to three points, using five memorized buffers (4.01, 6.86, 7.01, 9.18 and 10.01).

The autoranging feature of the EC and TDS functions automatically sets the instrument to the scale with the highest possible resolution.

Conductivity measurements are compensated, manually or automatically, with the temperature sensor inside the conductivity probe. It is also possible to disable the temperature compensation and measure the actual conductivity.

The temperature coefficient is user selectable and the GLP feature provides a guarantee of data consistency.

An alarm time-out is available to alert the user that too much time has elapsed since last pH calibration.

The instrument can store data for later retrieval, at the user's request.

Quick Results

This meter was designed to satisfy the requests of many production and quality control laboratories that need quick multiple parameter measurement results with a single precision instrument.

No Interference

The pH and conductivity circuits have been electrically separated, so that it is not necessary for the two probes to be simultaneously immersed in the same solution. The conductivity probe will not interfere with your pH measurements and the response of the pH electrode is immediately stable.

With a built-in logging function, measurements are stored in non-volatile memory, and can be transferred to a PC through the RS232 serial port. In addition to these features, HI 255 contains GLP features that store the calibration and measurement data of any sample, to be displayed upon request.

- *Autoranging*
- *Good Laboratory Practice*
- *Logging function*
- *PC interface*

HANNA instruments

With Great Products, Come Great Results™

EC/TDS/NaCl and pH/mV Meter

for Laboratories

Autoranging

The EC and TDS scales are autoranging. The meter automatically sets the scale with the highest possible resolution.

Good Laboratory Practice (GLP)

GLP is a set of functions that allows storage and retrieval of data regarding the status of the electrode. All data regarding pH, Rel mV, EC and NaCl is stored for the user to review when necessary.

Logging Function

Up to 200 LOG samples can be stored into memory.

PC Interface

Data transmission from the instrument to the PC can be done with the HI 92000 Windows® compatible software (optional). HI 92000 also offers graphing and on-line help feature.

SPECIFICATIONS		HI 255
Range	pH/ORP	-2.00 to 16.00 pH; -2.000 to 16.000 pH / ±699.9 mV; ±2000 mV
	EC	0.00 to 29.99 µS/cm; 30.0 to 299.9 µS/cm; 300 to 2999 µS/cm 3.00 to 29.99 mS/cm; 30.0 to 200.0 mS/cm; up to 500.0 mS/cm actual EC*
	TDS	0.00 to 14.99 ppm; 15.0 to 149.9 ppm; 150 to 1499 ppm 1.50 to 14.99 g/L; 15.0 to 100.0 g/L; up to 400.0 g/L actual TDS*
	NaCl	0.0 to 400.0% NaCl
	Temperature	-10 to 120.0 °C (pH); 0.0°C to 60.0°C (EC)
Resolution	pH/ORP	0.01 pH; 0.001 pH/ 0.1 mV (±699.9 mV); 1 mV (±2000 mV)
	EC	0.01 µS/cm; 0.1 µS/cm; 1 µS/cm; 0.01 mS/cm; 0.1 mS/cm
	TDS	0.01 ppm; 0.1 ppm; 1 ppm; 0.01 g/L; 0.1 g/L
	NaCl	0.1% NaCl
	Temperature	0.1°C
Accuracy (@20°C)	pH / ORP	±0.01 pH; ±0.002 pH/ ±0.2 mV (±699.9 mV); ±1 mV (±2000 mV)
	EC	±1% of reading ±(0.05 µS/cm or 1 digit)
	TDS	±1% of reading ±(0.03 ppm or 1 digit)
	NaCl	±1% of reading
	Temperature	±0.4°C (excluding probe error)
Relative mV Offset		±2000 mV
Calibration (pH)		automatic, at 1, 2 or 3 points, with 5 memorized buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01)
Calibration (EC)		automatic, 1 point, with 6 memorized values (84.0 and 1413 µS/cm; 5.00, 12.88, 80.0 and 111.8 mS/cm)
Calibration (NaCl)		automatic, 1 point, with HI 7037L calibration solution
Temperature Compensation		manual or automatic, -10.0 to 120.0°C (14 to 248°F) for pH; 0.0 to 60.0°C (32 to 140°F) for EC (can be disabled for measuring actual EC and TDS values)
Temperature Coefficient		0.00 to 6.00%/°C (EC and TDS only); default value: 1.90%/C°
TDS Conversion Factor		0.40 to 0.80; default value: 0.50
pH Electrode		HI 1131B (included)
EC Probe		HI 76310 (included)
Temperature Probe		HI 7662 (included)
PC Connection		RS232 opto-isolated serial port
Data Logging		200 samples
Input Impedance		10^{12} Ohm
Power Supply		12 Vdc adapter (included)
Environment		0 to 50°C (32 to 122°F); RH max 95%
Dimensions / Weight		240 x 182 x 74 mm (9.4 x 7.2 x 2.9") / 1.1 kg (2.4 lbs.)

* with temperature compensation function disabled

ORDERING INFORMATION

HI 255-01 (115V) and **HI 255-02** (230V) are supplied with HI 1131B glass body, combination pH electrode, HI 76310 conductivity /TDS probe, HI 7662 temperature probe, HI 76404 electrode holder, pH 4 and pH 7 buffer solutions, HI 7071S electrolyte solution, 12 Vdc power adapter and instructions.

ELECTRODES

HI 1131B	Refillable pH electrode with BNC connector
HI 76310	4-ring platinum sensor conductivity probe
HI 7662	Temperature probe

SOLUTIONS

HI 6004	pH 4.010 buffer solution, 500 mL
HI 6007	pH 7.010 buffer solution, 500 mL
HI 6010	pH 10.010 buffer solution, 500 mL
HI 7071	Electrolyte solution, 30 mL (4)
HI 70300L	Electrode storage solution, 500 mL
HI 7030L	12880 µS/cm calibration solution, 500 mL
HI 7031L	1413 µS/cm calibration solution, 500 mL
HI 7033L	84 µS/cm calibration solution, 500 mL
HI 7034L	80000 µS/cm calibration solution, 500 mL
HI 7035L	111800 µS/cm calibration solution, 500 mL
HI 7037L	Salinity standard solution, 500 mL

ACCESSORIES

HI 76404	Electrode holder
HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 92000	Windows® compatible software
HI 920010	Serial cable for PC connection
HI 180G*	Compact magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 190M *	Magnetic stirrer with ABS plastic cover material, max 1000 rpm, Speedsafe™
HI 200M *	Magnetic stirrer with AISI stainless steel cover material, max 1000 rpm, Speedsafe™

* **-1**: 110/115V, 50/60Hz
-2: 220/240V, 50/60Hz



HI 9828

Multiparameter Meter

with Intelligent Probe and Fast Tracker™ Tag Identification System

fast tracker | lcd backlight | custom pH buffer | 3 points | USB compatible

Backlit LCD can display up to 12 Measurements at a time



Probe cable available in 4, 10, 20 meter lengths. Need a different length? Give us a call!

pH, pH/mV, ORP, % saturation DO, mg/L DO, EC, absolute EC, resistivity, TDS, salinity, seawater specific gravity, atmospheric pressure, temperature

HANNA's new HI 9828 is a multiparameter portable instrument that monitors up to 13 different water quality parameters (6 measured, 7 calculated). The meter has a 128 x 64 pixel dot matrix backlit LCD that automatically sizes the digits and allows full configuration of each parameter measured, units and language selection, and on-screen graphing. Each parameter is fully supported by the on-screen context sensitive help, both in the calibration mode and during measurement. For monitoring and recording data, HI 9828 is equipped with HANNA's exclusive Fast Tracker™ – Tag Identification System: iButton®s with unique ID numbers can be installed at any number of sampling sites and are used to record specific location information when logging. The meter incorporates comprehensive GLP features and the downloading of data via USB connection.

Designed for outdoor environments, the meter is impact resistant and waterproof up to IP67 standards (30 minutes immersion under 1 m of water). The multi sensor probe can be left underwater (IP68 standard).

For field calibration, HANNA's Quick Calibration allows users to standardize pH, and conductivity with one solution.

FastTracker™ A new revolution in organized data management

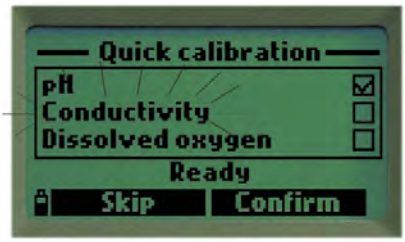
Feature Highlights

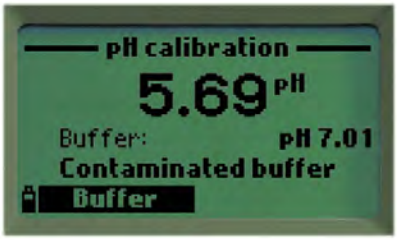
- *Display up to 12 parameters*
- *Graphic LCD with backlight*
- *Meter features IP67 and probe features IP68 waterproof protection*
- *Exclusive Fast Tracker™—Tag I.D. System simplifies test logging*
- *Quick Calibration feature*
- *Built-in barometer*
- *Measurement check eliminates any erroneous readings*
- *Auto recognition of pH and ORP probe*
- *Logger function memorizes the data of all connected sensors*
- *Log-on-demand and automatic logging (up to 60,000 samples)*
- *Can display logged data as graphs*
- *USB for PC connectivity*
- *Auto-range of EC and TDS readings*
- *Good Laboratory Practice feature with the last 5 calibrations recorded*
- *All sensors are field replaceable*
- *Meter accepts both alkaline and rechargeable batteries*
- *Rugged probe with stainless steel tip has a diameter under 2" for wells and pipes*

HANNA instruments

With Great Products, Come Great Results™

Fully Configurable Measurement Screen





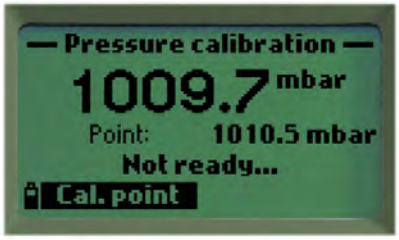
Calibration

In the field, the Quick Calibration feature verifies probe functionality and calibration with a single calibration solution (HI 9828-25). Simply screw the calibration beaker filled with solution onto the probe, select "Quick calibration" from the menu and press OK. Individual calibration may also be performed using multiple calibration points.

"Instead of walking around with several different meters, I only need to carry one!"

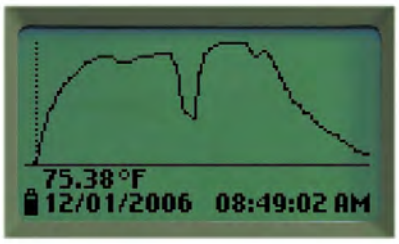
MR. F. BRABANDER
Kwekerij de Singel
the Netherlands





Pressure

Atmospheric pressure calibration and measurement can be made in a choice of units.



Graphing

Trend graphing may be viewed on the display or copied to a PC. Select the Lot to be displayed, select the parameter from a pick list, then OK. The sample date and time stamp will also be displayed.



Help

The context sensitive help screen is always accessible.

CONTENTS

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NAVIGATION

Multiparameter Bench Meters **9.2**

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HI 83218

Multiparameter Photometer

for Environmental Analysis

Application Designed Photometers

B.E.P.S.

PC compatible



Ideal for environmental professionals as well as students.

Environmental Tests in the Lab or Field

HI 83218 combines all the necessary tests for environmental analysis in one bench meter. HI 83218 works with 9V batteries or a 12 Vdc power adapter, making it ideal for laboratories as well as for quick results in the field.

The HI 83218 is designed to be simple to use and offer high precision measurements at a low cost per test. This multi-parameter photometer provides for the analysis of six important environmental parameters in nine ranges. Measured parameters include ammonia, chromium VI, cyanide, nitrate, nitrite and phosphorus. In order to improve resolution and cover a wider range, there are dual scales for ammonia, chromium and nitrite.

To perform a measurement simply insert a cuvet containing the water to be measured and press the ZERO button. Next add the appropriate reagent and press the READ button. The concentration is displayed directly in mg/L and µg/L on the large LCD!

TEST	RANGE	METHOD	REAGENTS
Ammonia HR	0.0 to 50.0 mg/L	Nessler	HI 93733-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Cyanide	0.000 to 0.200 mg/L	Pyridine-Pyrazalone	HI 93714-01
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01

All reagents with -01 final code are for 100 tests.

SPECIFICATIONS	
Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83218-01 (115V) and **HI 83218-02** (230V) is supplied with cuvets (2), batteries, 12 Vdc adapter and instructions.

HANNA instruments

With Great Products, Come Great Results™

Measure 24 Critical Environmental Parameters

With HI 83206, twenty-four parameters are packed into a self-contained compact casing measuring 230 x 165 x 70 mm (9 x 6.5 x 2.8") and weighing only 1½ pounds (640 grams)!

Critical parameters such as pH, dissolved oxygen, nitrite, ammonia and chlorine can be accurately and rapidly measured with just one unit without the need to carry a multitude of instruments or test kits.

Reagents are necessary and sold separately. All numbers listed are for 100 tests unless otherwise noted. The replacement reagents are cost effective and in fact HI 83206 can often measure a parameter at a lower cost-per-test than most chemical test kits. The HI 83206's accuracy is far superior to what test kits can offer.





SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83206-01 (115V) and **HI 83206-02** (230V) is supplied with cuvets (3), bottle for DO test, batteries, 12 Vdc adapter and instructions.

TEST	RANGE	METHOD	REAGENT CODE
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Color	0 to 500 PCU	Chloroplatinate	—
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Cyanuric Acid	0 to 80 mg/L	Turbidimetric	HI 93722-01
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nickel LR	0.000 to 1.000 mg/L	PAN	HI 93740-01**
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

* For Chlorine, liquid reagents are available
** Reagents for 50 tests

All reagents with -01 final code are for 100 tests.

HI 83225

Nutrient Analysis Photometer

7 parameters for Greenhouses and Hydroponics

Application Designed Photometers

B.E.P.S.

PC compatible



Extended Parameter Grow Master for Nutrient Analysis

HI 83225 is designed for the hydroponics and greenhouse industries to measure nutrients commonly present in fertilizer enriched solutions. This photometer measures ammonia, phosphorus, nitrate, potassium, calcium, magnesium and sulfate. Ammonia, phosphorus, nitrate and potassium can be measured in three distinct ranges of low, medium and high concentrations. This way accuracy is maximized for each nutrient and for every concentration.

Due to simplicity of operation, you no longer need to send off your samples and then wait for the results to come back. With the HI 83225, you can test the presence and strength of nutrients right on the spot. This can translate itself into a substantial saving and improved yield over a period of time. The internal microprocessor provides high accuracy and simplifies operations to the degree that even non-technical operators can use this meter.

This meter is supplied most accessories. Reagents are necessary and sold separately. All numbers listed are for 100 tests unless otherwise noted. HI 83225 runs on batteries as well as a 12 Vdc adapter and is supplied with both. An exclusive positive-locking system ensures that the cuvet is in the same position every time it is placed into the measurement cell. Display codes aid the user in routine operations. The meter has an auto-shut off feature, turning the unit off after 10 minutes of non-use.

Reagents are in liquid or powder form and are supplied in bottles or in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability.

The HI 83225 can be connected to a personal computer via the HI 920010 RS 232 cable. The HI 92000 HANNA Windows® Compatible Software aids the user to manage all test data.

- *Measures 7 parameters*
- *3 ranges for ammonia, nitrate, phosphorus and potassium*
- *Economical tests*
- *Lightweight*



HI 731318 — Cuvet Cleaning Cloth

HANNA instruments

With Great Products, Come Great Results™

HI 83225

Nutrient Analysis Photometer

7 parameters for Greenhouses and Hydroponics

Plant Nutrition

The three elements that are most needed by plants are nitrogen (N), phosphorous (P) and potassium (K).

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.

TEST	RANGE	METHOD	REAGENTS
Ammonia LR	0.0 to 10.0 mg/L	Nessler	HI 93715-01 (100 tests) HI 93715-03 (300 tests)
Ammonia MR	0.0 to 50.0 mg/L	Nessler	HI 93715-01 (100 tests) HI 93715-03 (300 tests)
Ammonia HR	0 to 100 mg/L	Nessler	HI 93715-01 (100 tests) HI 93715-03 (300 tests)
Nitrate LR	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01 (100 tests) HI 93728-03 (300 tests)
Nitrate MR	0 to 150 mg/L	Cadmium Reduction	HI 93728-01 (100 tests) HI 93728-03 (300 tests)
Nitrate HR	0 to 300 mg/L	Cadmium Reduction	HI 93728-01 (100 tests) HI 93728-03 (300 tests)
Phosphorus LR	0.0 to 10.0 mg/L	Amino Acid	HI 93706-01 (100 tests) HI 93706-03 (300 tests)
Phosphorus MR	0.0 to 50.0 mg/L	Amino Acid	HI 93706-01 (100 tests) HI 93706-03 (300 tests)
Phosphorus HR	0 to 100 mg/L	Amino Acid	HI 93706-01 (100 tests) HI 93706-03 (300 tests)
Potassium LR	0.0 to 20.0 mg/L	Turbidimetric	HI 93750-01 (100 tests) HI 93750-03 (300 tests)
Potassium MR	10 to 100 mg/L	Turbidimetric	HI 93750-01 (100 tests) HI 93750-03 (300 tests)
Potassium HR	20 to 200 mg/L	Turbidimetric	HI 93750-01 (100 tests) HI 93750-03 (300 tests)
Calcium	0 to 400 mg/L	Oxalate	HI 937521-01 (50 tests) HI 937521-03 (150 tests)
Magnesium	0 to 150 mg/L	Calmagite	HI 937520-01 (50 tests) HI 937520-03 (150 tests)
Sulfate	0 to 150 mg/L	Turbidimetric	HI 93751-01 (100 tests) HI 93751-03 (300 tests)

SPECIFICATIONS

Light Source	Tungsten lamps with narrow band interference filters at 420/525/610/466 nm
Light Detector	Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83225-01 (115V) and **HI 83225-02** (230V) is supplied with measuring cuvets (4), batteries, 12 Vdc adapter and instructions.

HI 83225C-01 (115V) and **HI 83225C-02** (230V) kit includes accessories for HI 83225: rugged carrying case, 100 mL and 170 mL beaker, 60 mL and 5 mL syringes, 1 filter-holder and 25 filters, 100 mL cylinder, demineralizer bottle, 2 pipettes, 1.5 mL spoon and active carbon for 50 tests.

REAGENTS

HI 93706-01 100 Phosphorus tests
HI 93706-03 300 Phosphorus tests
HI 93715-01 100 Ammonia tests
HI 93715-03 300 Ammonia tests
HI 93728-01 100 Nitrate tests
HI 93728-03 300 Nitrate tests
HI 93750-01 100 Potassium tests
HI 93750-03 300 Potassium tests
HI 93751-01 100 Sulfate tests
HI 93751-03 300 Sulfate tests
HI 937520-01 50 Magnesium tests
HI 937520-03 150 Magnesium tests
HI 937521-01 50 Calcium tests
HI 937521-03 150 Calcium tests

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Glass cuvets (4)
HI 731325N New cap for cuvet (4)
HI 740034 Cap for 100 mL beaker (6)
HI 740036 Plastic beaker, 100 mL (6)
HI 740157 Plastic refilling pipette (20)
HI 92000 Windows® Compatible Software
HI 920010 PC connection cable
HI 740223 170 mL plastic beaker
HI 740224 170 mL plastic beakers (12)
HI 740225 60 mL graduated syringe
HI 740226 5 mL graduated syringe
HI 740227 Filter assembly
HI 740228 Filter discs (25)
HI 740229 100 mL Polypropylene cylinder
HI 740230 Demineralized water, 250 mL
HI 93703-54 Dried resin (100 g)
HI 93703-55 Activated Carbon (50)

HI 83215

Nutrient Analysis Photometer

4 parameters for Greenhouses and Hydroponics

Application Designed Photometers

B.E.P.S.

PC compatible





Don't wait for lab results!

HI 83215 is designed for the hydroponics and greenhouse industries to measure nutrients commonly present in fertilizer enriched solutions. This 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.

Due to simplicity of operation, you no longer need to send off your samples and then wait for the results to come back. With the HI 83215, you can test the presence and strength of nutrients right on the spot. This can translate itself into a substantial saving and improved yield over a period of time. The internal microprocessor provides high accuracy and simplifies operations to the degree that even non-technical operators can use this meter.

The meter is supplied with most accessories. Reagents are necessary and sold separately. All numbers listed are for 100 tests unless otherwise noted. HI 83215 runs on batteries as well as a 12 Vdc adapter and is supplied with both. Add to this the unit's light weight and you have a bench meter that is just at home in the field and the horticulturist's lab.

- *Easy to use*
- *3 ranges for each parameter*
- *Economical tests*
- *Lightweight*

TEST	RANGE	METHOD	REAGENTS
Ammonia LR	0.0 to 10.0 mg/L	Nessler	HI 93715-01
Ammonia MR	0.0 to 50.0 mg/L	Nessler	HI 93715-01
Ammonia HR	0 to 100 mg/L	Nessler	HI 93715-01
Nitrate LR	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrate MR	0 to 150 mg/L	Cadmium Reduction	HI 93728-01
Nitrate HR	0 to 300 mg/L	Cadmium Reduction	HI 93728-01
Phosphorus LR	0.0 to 10.0 mg/L	Amino Acid	HI 93706-01
Phosphorus MR	0.0 to 50.0 mg/L	Amino Acid	HI 93706-01
Phosphorus HR	0 to 100 mg/L	Amino Acid	HI 93706-01
Potassium LR	0.0 to 20.0 mg/L	Turbidimetric	HI 93750-01
Potassium MR	10 to 100 mg/L	Turbidimetric	HI 93750-01
Potassium HR	20 to 200 mg/L	Turbidimetric	HI 93750-01

All reagents with *-01* final code are for 100 tests. Replace *-01* with *-03* for 300 tests.

"When a grower asked me to make him a perfect fertigation program, first of all I analyze the macro and micro element concentration of the soil and water what he uses. For this job I use HANNA's fotometers (HI83200—complete lab, HI83215—grow master, HI93751—sulfate, HI93753—chloride, HI93752—Ca+Mg high range)..."

Imre Mácsai
Independent Agricultural Consultant, Hungary

SPECIFICATIONS

Light Source	3 tungsten lamps with narrow band interference filters at 420/525/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83215-01 (115V) and **HI 83215-02** (230V) is supplied with measuring cuvets (4), batteries, 12 Vdc adapter and instructions.

HI 83215C-01 (115V) and **HI 83215C-02** (230V) kit includes accessories for HI 83215: rugged carrying case, 100 mL and 170 mL beaker, 60 mL and 5 mL syringes, 1 filter-holder and 25 filters, 100 mL cylinder, demineralizer bottle, 2 pipettes, 1.5 mL spoon and active carbon for 50 tests.

HANNA instruments

With Great Products, Come Great Results™

Suction Lysimeter

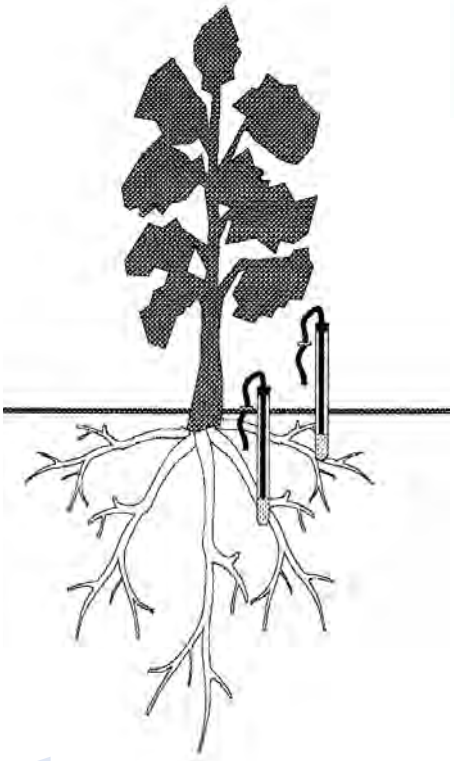
for Soil Monitoring at Root Level

Root Level Monitoring

The HI 83900 suction lysimeter is built with a porous ceramic cap connected to a transparent tube for soil solution extraction. A rubber capillary is inserted in the tube passing through a rubber cap and reaching the ceramic tip.

The HI 83900 series lysimeter is an ideal tool for collecting soil solution samples and then perform quantitative chemical analysis. In this way the operator can easily monitor the level of nutrients, such as ammonia, nitrate, phosphorous and potassium, sulfate, calcium, magnesium.

The ceramic tip of the lysimeter can be used in all types of soil, and it is made of sinterized material that does not react with nutrient elements. The soil solution, therefore, is not affected by the chemical composition of the ceramic cap, and the test results are always precise and reliable.



Use HI 83900 in conjuntion with our our HI 83215

The HI 83900 allows the extraction of a solution from the soil by creating a vacuum (negative pressure or suction) inside the sampler tube, that exceeds the soil water tension. This will establish an hydraulic gradient for the solution to flow through the porous ceramic cap and into the lysimeter tube. Typically, a vacuum of about -60 cb (centibar) should be drawn.

For better monitoring the soil solution composition throughout an entire growth period of crops, at least two lysimeters should be installed in the root zone of a representative plant, one at the upper part and the other in the lower part of the root zone.

For better accuracy and repeatability of results, it is recommended to replicate the above described installation in at least two more locations.

Available in 3 Lengths

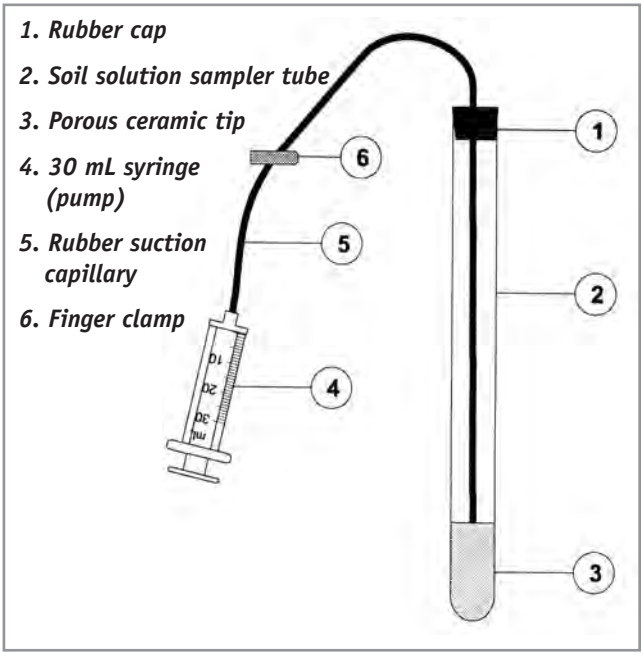


HI 83900-30
30 cm (0.98')

HI 83900-60
60 cm (1.97')

HI 83900-90
90 cm (2.95')

- *Perfect companion to the HI 83225 and HI 83215*
- *Monitor soil composition right at the roots*
- *Easy to use*



ORDERING INFORMATION

HI 83900-30 is comprised of 30 cm (0.98') tube sampler tube ending with porous ceramic tip, capillary rubber tube with rubber cap and finger clamp, cleaning solution stater kit (120 mL bottle), 30 mL syringe and instructions.

HI 83900-60 is comprised of 60 cm (1.97') tube sampler tube ending with porous ceramic tip, capillary rubber tube with rubber cap and finger clamp, cleaning solution stater kit (120 mL bottle), 30 mL syringe and instructions.

HI 83900-90 is comprised of 90 cm (2.95') tube sampler tube ending with porous ceramic tip, capillary rubber tube with rubber cap and finger clamp, cleaning solution stater kit (120 mL bottle), 30 mL syringe and instructionsl.

ACCESSORIES

HI 83900-25 Cleaning solution kit, 500 mL

HI 83221

Honey Color Analyzer

ADP Application Designed Photometers

B.E.P.S. PC compatible



No More Judging By Eye!

HI 83221 is a complete and ready-to-use kit for the analysis of the color of honey. It is made up of a professional photometer with direct readings in mm Pfund, 5 measurement cuvets and analytical-grade glycerin for accurate calibration.

No more guessing: with HI 83221 you can easily and quickly obtain immediate and unanimous readings. In addition, the ease of use allows it to work in the laboratory or in the field.

- *Immediate Results*
- *Digital Readout*
- *No More Judging by Eye*



Why this instrument is so important

The natural color of honey presents many tonalities: from straw yellow to amber, from dark amber to almost black with a hint of red. The color of untreated honey originates from the botanical varieties used by the bees: for this reason, its coloration allows one to commercially identify the original floral type.

USDA COLOR STANDARDS DESIGNATIONS	COLOR RANGE PFUND SCALES (MM)
Water White	≤ 8 or less
Extra White	> 8 - ≤ 17
White	> 17 - ≤ 34
Extra Light Amber	> 34 - ≤ 50
Light Amber	> 50 - ≤ 85
Amber	> 85 - ≤ 114
Dark Amber	> 114

In addition, the color of honey tends to darken with age or change according to the method of conservation or production used by beekeepers, (for example: the use of old beehives, contact with metals, the temperature of conservation, exposure to light, etc.). The classes of color are expressed in millimeters (mm) on the Pfund scale, compared to an analytical standard scale of reference on the graduation of glycerin.

HI 93703-56



SPECIFICATIONS	HI 83221
Light Source	2 tungsten lamps with narrow band interference filter
Light Detector	2 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230 x 165 x 70 mm (9 x 6.5 x 2.8")
Weight	640 g (22.6 oz.)

TEST	RANGE	METHOD
Honey Color	0 to 150 mm Pfund	Direct measure

ORDERING INFORMATION

HI 83221-01 (115V) and **HI 83221-02** (230V) is supplied with cuvets (5), 9V batteries (2), cuvet holder, protective cap, 12 Vdc adapter, 30 mL glycerine and instruction manual.

HI 83221C-01 (115V) and **HI 83221C-02** (230V) consists of HI 83221 (listed above) and C22190 honey refractometer.

ACCESSORIES

HI 93703-56 Consists of 82 matched square cuvets, 30 mL of glycerol and (2) 5 mL syringes (75 tests average)

C 22190 Honey Refractometer

HANNA instruments

With Great Products, Come Great Results™

For Daily Home and Commercial Swimming Pool and Spa Monitoring

Swimming pool and Spa water parameters, like chlorine and pH need to be monitored daily. Even though chlorine is used in pools and spas to disinfect water, its effectiveness actually depends on the pH value.

If both of these parameters are not constantly checked concentration levels could become low, and a growth of micro-organisms dangerous to health can occur.

On the other hand, if the chlorine level is too high (beside the use of chemical products) the water takes on an unpleasant smell and it can cause eye irritation.

Cyanuric acid is used as a stabilizing agent for chlorine, especially in summer months or in heated pools. Alkalinity and hardness controls are equally important, as they permit the maintenance of water in a balanced condition and they prevent corrosion or deposit problems.

HI 83216 and HI 83226 are practical electronic photometers designed to monitor these parameters. The measuring procedure is simple: just put a sample in the cuvet and zero the meter. Then add reagents and insert the cuvet again in the meter. The analysis result will be shown on the display. With HI 83216, the 6 most important parameters for swimming pools, such as pH, free, total chlorine and alkalinity can be measured. With HI 83226 also bromine, ozone and metals like iron and copper can be analyzed.



HI 83216 shown with accessories

ORDERING INFORMATION

HI 83216-01 (115V) and **HI 83216-02** (230V) and **HI 83226-01** (115V) and **HI 83226-02** (230 V) are supplied with rugged carrying case, cuvets (4), batteries, scissors, cuvet cleaning cloth and instructions.



HI 83216 TEST	RANGE	METHOD	REAGENT CODE
Alkalinity	0 to 500 mg/L (as $CaCO_3$)	Colorimetric	HI 93755-01
Chlorine, Free	0.00 to 5.00 mg/L	DPD	HI 93701-01
Chlorine, Total	0.00 to 5.00 mg/L	DPD	HI 93711-01
Cyanuric Acid	0 to 200 mg/L	Turbidimetric	HI 93722-01
Hardness (Calcium)	0 to 500 mg/L (as $CaCO_3$)	Colorimetric	HI 93756-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01

HI 83226 TEST	RANGE	METHOD	REAGENT CODE
Alkalinity	0 to 500 mg/L (as $CaCO_3$)	Colorimetric	HI 93755-01
Bromine	0.00 to 10.00 mg/L	DPD	HI 93716-01
Chlorine, Free	0.00 to 5.00 mg/L	DPD	HI 93701-01
Chlorine, Total	0.00 to 5.00 mg/L	DPD	HI 93711-01
Copper, Free	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper, Total	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702T-01
Cyanuric Acid	0 to 200 mg/L	Turbidimetric	HI 93722-01
Hardness (Calcium)	0 to 500 mg/L (as $CaCO_3$)	Colorimetric	HI 93756-01
Iron	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Ozone	0.00 to 2.00 mg/L	Colorimetric	HI 93757-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01

SPECIFICATIONS

Light Source	2 tungsten lamps with narrow band interference filters at 525/575 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230 x 165 x 70 mm (9 x 6.5 x 2.8")
Weight	640 g (22.6 oz.)

HI 83212

Multiparameter Photometer

A Comprehensive Meter for Power Plants

Application Designed Photometers

B.E.P.S.

PC compatible



Measure Crucial Parameters All Around the Power Plant

Ammonia levels are often tested in boiler feedwater and industrial waste.

Chlorine is used to sanitize cooling towers and industrial equipment.

Copper is often added to water to hinder growth of plankton and algae.

Hydrazine has bactericidal properties and scavenges oxygen.

Molybdenum is used as a corrosion inhibitor in cooling towers while **Phosphate** can enter water streams due to boiler blow-downs and is added to reduce scaling.

Silica, on the other hand, can be a major source of scaling while **silver** is a toxic pollutant and needs to be monitored in effluents.

These and other critical factors in power plants can now be measured with the HANNA HI 83212 bench meter. To keep a tab on all these variables with just one meter, simply use the HI 83212 multi-parameter photometer.

- *Ideal in the lab or carry around the plant*
- *Easy to operate*
- *Compact and lightweight*

TEST	RANGE	METHOD	REAGENT CODE
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Hydrazine	0 to 400 µg/L	p-Dimethylaminobenzaldehyde	HI 93704-01
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 95705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**

* For Chlorine, liquid reagents are available
** Reagents for 50 tests

SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filterss at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83212-01 (115V) and **HI 83212-02** (230V) is supplied with cuvets (2), batteries, 12 Vdc adapter and instructions.

HANNA instruments

With Great Products, Come Great Results™

PC compatible | B.E.P.S.

ADP Application Designed Photometers

HI 83210

Multiparameter Photometer

for Pulp and Paper Mills

Quality Assurance in Your Pulp and Paper Mill

HI 83210 is a microprocessor based multipurpose meter specially designed to measure several important parameters in the pulp and paper industries.

- *Microprocessor assures quick and reliable results*





- *12 parameters in one benchtop unit*
- *Highly portable: works with both 9V battery as well as 12-20 Vdc power outlet*
- *Self-diagnostic and error messages*
- *Uses DPD for chlorine, Phenol Red for pH, Amino and Ascorbic Acid for phosphate*
- *Simple-to-use with only 6 keys*
- *Select a different parameter by simply pressing the program keys*
- *Large dual-level LCD display showing measurements in ppm, pH units or PCU*

SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83210-01 (115V) and **HI 83210-02** (230V) is supplied with cuvets (3), bottle for DO test, batteries, 12 Vdc adapter and instructions.

TEST	RANGE	METHOD	REAGENT CODE
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Chlorine Dioxide	0.00 to 2.00 mg/L	Chlorophenol Red	HI 93738-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Color	0 to 500 PCU	Platinum Cobalt	—
Dissolved Oxygen (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

* For Chlorine, liquid reagents are available
** Reagents for 50 tests
All reagents with -01 final code are for 100 tests.



HI 83200 2008 Series

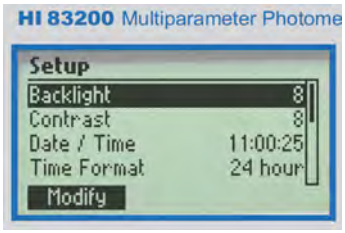
Multiparameter Photometer

Measure up to 45 Parameters

Application Designed Photometers

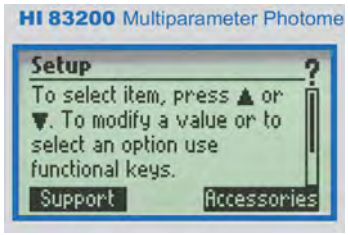
lcd backlight | B.E.P.S. | USB compatible





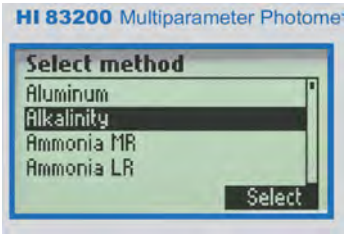
Setup Button

Instrument preferences such as backlight intensity and screen contrast can be changed via the setup button.



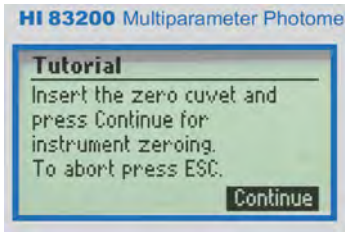
HELP Button

Screen specific help can viewed at the touch of a button.



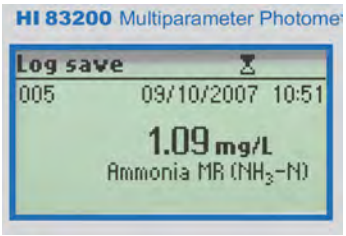
Method Selection

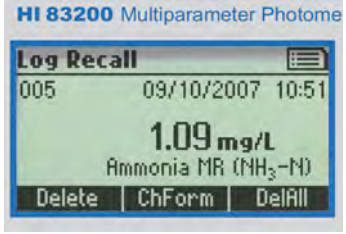
Users can easily select parameters via the Method button.



On-screen Tutorial

With the tutorial function enabled, short guides relating to current operation are displayed.





Save and Recall Logged Data at the Touch of a Button

Simply touching the LOG button users can save readings into memory. Pressing the RCL button brings back logged information for viewing on-screen. The logged information can later be transferred to a PC using the HI 92000 Windows® compatible software for further study.

Extended Parameter Set and Feature Rich

HI 83200 2008 Series is a multiparameter bench colorimeter dedicated for laboratory analysis. It can measure up to 45 methods using specific liquid or powder reagents. The amount of reagent is precisely dosed to ensure maximum repeatability.

The 2008 Series of the HI 83200 benchtop photometer from HANNA offers all the features from our previous popular series plus many upgrades and improvements that make these instruments much more versatile and easy to use.

These instruments have been completely redesigned to accommodate more sophisticated optical systems, resulting in greater reproducibility of tests. These new casings feature a cuvette compartment door that eliminate external light disturbances.

The 2008 Series also feature a graphic, backlit LCD which greatly enhances user friendliness. The method selection and set up modes are clearly shown on the LCD. Each method's measuring procedure is displayed on the LCD taking the user step by step through the process. At any stage in the measurement process or during setup, the help button will show context sensitive help. All these features are available in a user selectable language. Additionally, the help screen also list the required reagent sets, accessories and customer support contact information.

The 2008 Series eliminates confusion by automatically converting readings to other chemical forms. Common conversions are available at the touch of a button.

Other features included in the 2008 Series are a USB connection to transfer logged data (the instruments allow up to 200 data points) and the capability to run on rechargeable batteries or a 12 Vdc power adapter (included).

- *Log and recall data at a push of a button*
- *Light blocking cuvet holder*
- *Backlit LCD*
- *Batter Error Prevention System (BEPS)*
- *PC compatible via USB*
- *On-screen tutorial and context sensitive help screens*
- *Powered by rechargeable batteries or 12 VDC*

HANNA instruments

With Great Products, Come Great Results™

HI 83207

Multiparameter Photometer

for Industrial Wastewater Monitoring

Application Designed Photometers

B.E.P.S.

PC compatible



Monitor 20 Critcal Industrial Wastewater Parameters

With HI 83207 industrial wastewater can be monitored quickly, accurately and at a comparable cost of chemical test kits.

Twenty of the most critical parameters in typical industrial wastewater can now be checked with just one instrument.

Zero your sample in seconds, add reagents and place it back in the meter. Accurate readout on an LCD without all the hassle!

With HI 83207 your measurements are displayed precisely on a large LCD. No need to match colors, use charts and multipliers, or anxiously await a color change.

- *Ideal in the lab or carry around the plant*
- *Easy to operate*
- *Compact and lightweight*



TEST	RANGE	METHOD	REAGENT CODE
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Color	0 to 500 PCU	Platinum Cobalt	—
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Fluoride	0.00 to 2.00 mg/L	SPADNS	HI 93729-01
Manganese HR	0.0 to 20.0 mg/L	Periodate	HI 93709-01
Manganese LR	0 to 300 µg/L	PAN	HI 93748-01**
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nickel LR	0.000 to 1.000 mg/L	PAN	HI 93740-01**
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

* For Chlorine, liquid reagents are available
** Reagents for 50 tests

All reagents with -01 final code are for 100 tests.

SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83207-01 (115V) and **HI 83207-02** (230V) is supplied with cuvets (3), bottle for DO test, batteries, 12 Vdc adapter and instructions.

HANNA instruments

With Great Products, Come Great Results™

PC compatible | B.E.P.S. | ADP Application Designed Photometers

Measure 24 of the Most Important Metals and Chemicals in Municipal Wastewater

HI 83213 is a multi-parameter instrument that can also run on common 9V batteries to measure 24 of the most important chemicals and metals in municipal wastewater.

- *Only 6 keys to perform all measurements*
  Can be transported anywhere: can run on battery power
- *24 different meters and test kits packaged into one handy meter*
- *Large LCD with self-diagnostic messages*
- *Built-in RS232 port to download to your PC*





SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83213-01 (115V) and **HI 83213-02** (230V) is supplied with cuvets (3), bottle for DO test, batteries, 12 Vdc adapter and instructions.

TEST	RANGE	METHOD	REAGENT CODE
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Bromine	0.00 to 8.00 mg/L	DPD	HI 93716-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Color	0 to 500 PCU	Platinum Cobalt	—
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Iodine	0.0 to 12.5 mg/L	DPD	HI 93718-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nickel LR	0.000 to 1.000 mg/L	PAN	HI 93740-01**
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

* For Chlorine, liquid reagents are available
** Reagents for 50 tests
All reagents with -01 final code are for 100 tests.

HI 83208

Multiparameter Photometer

for Water Conditioning

Application Designed Photometers

B.E.P.S.

PC compatible



Water Conditioning Measurement Made Simple

23 of the most critical parameters for water conditioning can now be simply monitored with just one photometer. Instead of having to carry multiple meters and tons of chemical test kits with different color cubes, indicators and instructions, why not just use one simple-to-use meter!

HI 83208 measures important water conditioning parameters such as pH, nitrate, iron, D.O. and zinc.

All you need to do is collect a water sample in the provided cuvet. Zero it to ensure optimal accuracy. Then add the reagents to the sample and place the cuvet back in the meter. The measurements are then shown in clear figures on a large LCD.

Water conditioning control has never been this simple.



TEST	RANGE	METHOD	REAGENT CODE
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Fluoride	0.00 to 2.00 mg/L	SPADNS	HI 93729-01
Iron HR	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Iron LR	0 to 400 µg/L	TPTZ	HI 93746-01**
Manganese HR	0.0 to 20.0 mg/L	Periodate	HI 93709-01
Manganese LR	0 to 300 µg/L	PAN	HI 93748-01**
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nickel LR	0.000 to 1.000 mg/L	PAN	HI 93740-01**
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

* For Chlorine, liquid reagents are available
** Reagents for 50 tests

All reagents with -01 final code are for 100 tests.

SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83208-01 (115V) and **HI 83208-02** (230V) is supplied with cuvets (2), bottle for DO test, batteries, 12 Vdc adapter and instructions.

HANNA instruments

With Great Products, Come Great Results™

USB compatible | ICD backlight

ADP Application Designed Photometers

HI 83224

COD Meter and Multiparameter Photometer

With Bar Code Recognition of Sample Vials

- *Measures Ammonia, Chlorine, COD, Nitrate, Nitrogen and Phosphorus*
- *Bar code reader detects the method and range automatically*
- *Three operation modes: Automatic, Semi-automatic and Manual*
- *Bar coded pre-dosed reagent vials*
- *On-screen step-by-step tutorial*
- *Logs up to 200 samples*
- *Context sensitive help screen at a touch of a button*
- *Selection of languages*
- *USB connection*
- *Graphic LCD*



A Complete Lab for Wastewater Analysis

The HI 83224 is a multiparameter bench photometer that has 15 methods for measurement of COD, chlorine, nitrate, nitrogen and phosphorus.

Automatic recognition of bar coded samples is an exciting feature of the HI 83224. This advanced meter scans each vial inserted into the vial holder and automatically identifies the sample method and range. This feature eliminates errors and simplifies the testing process.

The HI 83224 features a powerful interactive user support system that assists you before, during and after analysis. On-screen tutorials guide you through set-up, calibration and measurement while context sensitive help screens are available at a push of a button.

HI 83224 uses a new series of pre-dosed reagent vials for the 15 methods. Each reagent vial is bar coded with specific reagent information at our factory (with the exception of chlorine). This information is automatically scanned by the HI 83224 to assure that the vial and method are the same.

Users have the choice of operating the HI 83224 in automatic mode, semi-automatic mode and manual mode.

HI 83224 can log and recall up to 200 different measurements. Stored data includes parameter, test results, sample number, lot number, instrument id, date and time. HI 83224 bench photometer can be connected to a PC via USB. The HI 92000 Windows® compatible software (optional) aids users in managing data.

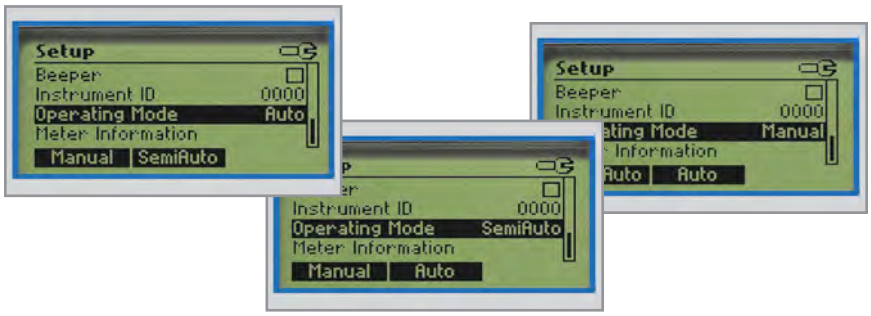
Operating Mode

The instrument has 3 operating modes.

In Automatic mode, no user involvement is required in the method selection.

In Semi-Automatic mode, user involvement is required when a different vial is identified related to the current method.

In Manual mode, the user involvement is required at every level in the method selection.



HI 83224

COD Meter and Multiparameter Photometer

With Bar Code Recognition of Sample Vials

Automatic Sample Scanning

Avoid vial confusion and wrong samples with bar code identification

Sample vials inserted into the HI 83224 are identified using bar codes. The bar codes for different methods are shown in the table below. For parameters that don't use a bar coded reagent, the vials supplied with the instrument should be used. The bar code has 4 digits. The first 2 digits are for parameter identification and the second 2 digits are for reagent lot ID.

HI 83224 has a powerful interactive help system that assists the user during the analysis process. At a touch of a button, users can get detailed help tailored to the current information on the LCD. A tutorial mode is also available and can be accessed via the setup menu.

Vial Identification

Vials for different methods can be distinguished by a bar code printed on the vial and the cap color.

Part Code	Method	Vial bar code
HI 94764A-25	Ammonia, LR	01xx
HI 94764B-25	Ammonia HR	02xx
HI 93701-01	Chlorine, Free	N/A
HI 93711-01	Chlorine, Total	N/A
HI 94766-50	Nitrate	05xx
HI 94767A-50	Nitrogen, Total LR	16xx 06xx
HI 94767B-50	Nitrogen, Total HR	17xx 07xx
HI 94754A-25	Oxygen Demand, Chemical (COD) LR	12xx
HI 94754B-25	Oxygen Demand, Chemical (COD) MR	13xx
HI 94754C-25	Oxygen Demand, Chemical (COD) HR	24xx
HI 94758A-50	Phosphorus, Reactive	30xx
HI 94758B-50	Phosphorus, Acid Hydrolyzable	31xx
HI 94758C-50	Phosphorus, Total	32xx
HI 94763A-50	Phosphorus, Reactive HR	33xx
HI 94763B-50	Phosphorus, Total HR	34xx

Note: xx represents the reagent lot code.



Identification

Bar coded vials provide automatic recognition of samples and ranges.

Once placed in the holder, the HI 83224 scans the sample and displays the results on-screen.



HANNA instruments

With Great Products, Come Great Results™

HI 83224

COD Meter and Multiparameter Photometer

With Bar Code Recognition of Sample Vials

SPECIFICATIONS	HI 83224
Light source	Tungsten lamps with narrow-band interference filters
Light detector	Silicon photocells
Data Logging	Up to 200 samples
Power supply	230 Vac or 115Vac power adapter
Dimensions	235 x 212 x 143 mm (9.2 x 8.34 x 5.62")
Weight	2.3 kg (5.1 lb)

METHOD	RANGE	RESOLUTION	PRECISION	METHOD	REAGENT CODE
Ammonia LR	0.00 to 3.00 mg/L (as NH_3^-N)	0.01 mg/L	±0.03 @ 1.50 mg/L	Nessler	HI 94764A-25 (25 tests)
Ammonia HR	0 to 100 mg/L (as NH_3^-N)	1 mg/L	±3 @ 50 mg/L	Nessler	HI 94764B-25 (25 tests)
Chlorine, free ‡	0.00 to 5.00 mg/L	0.01 mg/L from 0.00 to 0.99 mg/L; 0.1 mg/L above 0.99 mg/L	±0.04 @ 1.00 mg/L	DPD	HI 93701-01 (100 tests)
Chlorine, total ‡	0.00 to 5.00 mg/L	0.01 mg/L from 0.00 to 0.99 mg/L; 0.1 mg/L above 0.99 mg/L	±0.04 @ 1.00 mg/L	DPD	HI 93711-01 (100 tests)
Chemical Oxygen Demand LR	0 to 150 mg/L (as COD)	1 mg/L	±4 @ 150 mg/L	Dichromate, Mercuric Sulfate	HI 94754A-25 (25 tests)
Chemical Oxygen Demand MR	0 to 1500 mg/L (as COD)	1 mg/L	±22 @ 1000 mg/L	Dichromate, Mercuric Sulfate	HI 94754B-25 (25 tests)
Chemical Oxygen Demand HR	0 to 15000 mg/L (as COD)	10 mg/L	±220 @ 10000 mg/L	Dichromate, Mercuric Sulfate	HI 94754C-25 (25 tests)
Nitrate	0.0 to 30.0 mg/L (as NO_3-N)	0.1 mg/L	±0.5 @ 25 mg/L	Chromotropic Acid	HI 94766-50 (50 tests)
Nitrogen, Total LR	0.0 to 25.0 mg/L (as N)	0.1 mg/L	±0.5 @ 15 mg/L	Chromotropic Acid	HI 94767A-50 (50 tests)
Nitrogen, Total HR	10 to 150 mg/L (as N)	1 mg/L	±3 @ 75 mg/L	Chromotropic Acid	HI 94767B-50 (50 tests)
Phosphorus, Acid Hydrolyzable	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.02 @ 0.80 mg/L	Ascorbic acid	HI 94758B-50 (50 tests)
Phosphorus, Reactive	0.00 to 1.60 mg/L (as P)	0.01 mg/L	±0.02 @ 0.80 mg/L	Ascorbic acid	HI 94758A-50 (50 tests)
Phosphorus, Reactive HR	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±1.0 @ 25.0 mg/L	Vanadomolybdophosphoric acid	HI 94763A-50 (50 tests)
Phosphorus, Total	0.00 to 1.15 mg/L (as P)	0.01 mg/L	±0.02 @ 0.80 mg/L	Ascorbic acid	HI 94758C-50 (50 tests)
Phosphorus, Total HR	0.0 to 32.6 mg/L (as P)	0.1 mg/L	±1.0 @ 25.0 mg/L	Vanadomolybdophosphoric acid	HI 94763B-50 (50 tests)

‡ For chlorine analysis, liquid reagents are also available.

Some analytical methods require digestion of the sample. For digestion of the vials, use the HANNA HI 839800 reactor only.
For safety, the optional HI 740217 safety shield and HI 740216 test tube cooling rack for the HI 839800 are strongly recommended.

ORDERING INFORMATION

HI 83224-01 (115V) and **HI 83224-02** (230V) are supplied with sample vials (10), vial cleaning cloths (4), scissors and instruction manual.

SOLUTIONS and REAGENTS

HI 93701-01	100 free chlorine tests
HI 93701-03	300 free chlorine tests
HI 93711-01	100 total chlorine tests
HI 93711-03	300 total chlorine tests
HI 94754A-25	25 COD LR tests
HI 94754B-25	25 COD MR tests
HI 94754C-25	25 COD HR tests
HI 94758A-50	50 reactive phosphorus tests
HI 94758B-50	50 acid hydrolyzable phosphorus tests
HI 94758C-50	50 total phosphorus tests
HI 94763A-50	50 reactive phosphorus HR tests
HI 94763B-50	50 total phosphorus HR tests
HI 94764A-25	25 ammonia LR tests
HI 94764B-25	25 ammonia HR tests
HI 94766-50	50 nitrate tests
HI 94767A-50	50 total nitrogen LR tests
HI 94767B-50	50 total nitrogen HR tests
HI 94703-50	Vial cleaning solution, 250 mL

ACCESSORIES

HI 839800-01	HANNA Reactor (115 Vac)
HI 839800-02	HANNA Reactor (230 Vac)
HI 731318	Cloth for wiping vials (4)
HI 731340	200 µL automatic pipette
HI 731341	1000 µL automatic pipette
HI 731342	2000 µL automatic pipette
HI 731350	Tips for HI 731340 (25)
HI 731351	Tips for HI 731341 (25)
HI 731352	Tips for HI 731342 (4)
HI 740142	1 mL graduated syringe
HI 740143	1 mL graduated syringe (6 pcs)
HI 740144	Pipette tip (6 pcs)
HI 740157	Plastic refilling pipette (20 pcs)
HI 740216	Test tube cooling rack (25 holes)
HI 740217	Laboratory bench safety shield
HI 92000	Windows® Compatible Software



HI 731340 200 µL Automatic Pipette

HI 83099
COD Meter

Measure COD and 36 Additional Parameters



- *Easy COD measurement*
- *Outstanding measurement quality*
- *Save space in your laboratory*

A Complete Laboratory at Your Fingertips

HI 83099 is one of the most versatile photometers on the market. In addition to COD, this meter measures up to 36 of the most important water quality parameters.

This compact photometer operates in three different ranges to cover virtually every COD application: 0-150 mg/L, 0-1500 mg/L and 0-15000 mg/L. The HI 83099 meets the design requirements of USEPA 410.4, guaranteeing high quality measurements suited for reporting purposes.

HI 83099 is extremely simple to use. The front mask lists all the parameters in a numerical order and the display shows the same numbers for quick reference during testing.

The meter can be zeroed in seconds and the reagents cost much less than what you may have been used to paying.

Parameter	Range	Method	Reagent Code‡
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 9.99 mg/L	Nessler	HI 93715-01
Bromine	0.00 to 8.00 mg/L	DPD	HI 93716-01
Chlorine, free‡	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine, total‡	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chlorine dioxide	0.00 to 2.00 mg/L	Chlorophenol red	HI 93738-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazine	HI 93749-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazine	HI 93723-01
COD LR	0 to 150 mg/L	Dichromate EPA* Dichromate Hg-free† Dichromate ISO**	HI 93754D-25 HI 93754F-25 HI 93754A-25
COD MR	0 to 1500 mg/L 0 to 1000 mg/L	Dichromate EPA* Dichromate Hg-free† Dichromate ISO**	HI 93754B-25 HI 93754E-25 HI 93754G-25
COD HR	0 to 15000 mg/L	Dichromate	HI 93754C-25
Color	0 to 500 PCU	Platinum Cobalt	—
Copper LR	0 to 990 µg/L	Bicinchoninate	HI 95747-01
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Cyanide	0.000 to 0.200 mg/L	Pyridine-Pyrazalone	HI 93714-01
Cyanuric acid	0 to 80 mg/L	Turbidimetric	HI 93722-01
Fluoride	0.00 to 2.00 mg/L	SPADNS	HI 93729-01
Hardness (Calcium)	0.00 to 2.70 mg/L	Calmagite	HI 93720-01
Hardness (Magnesium)	0.00 to 2.00 mg/L	EDTA	HI 93719-01
Hydrazine	0 to 400 µg/L	p-Dimethylaminobenzaldehyde	HI 93704-01
Iodine	0.0 to 12.5 mg/L	DPD	HI 93718-01
Iron LR	0 to 400 µg/L	TPTZ	HI 93746-01
Iron HR	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Manganese HR	0.0 to 20.0 mg/L	Periodate oxidation	HI 93709-01
Manganese LR	0 to 300 µg/L	PAN	HI 93748-01
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nitrate	0.0 to 30.0 mg/L	Cadmium reduction	HI 93728-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotation	HI 93707-01
Nitrite HR	0 to 150 mg/L	Ferrous sulfate	HI 93708-01
Oxygen, Dissolved	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol red	HI 93710-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic acid	HI 93713-01
Phosphate HR	0.0 to 30.0 mg/L	Amino acid	HI 93717-01
Phosphorus	0.0 to 15.0 mg/L	Amino acid	HI 93706-01
Silica	0.00 to 2.00 mg/L	Dimolybdate	HI 93705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70mm (9.1x6.5x2.6")
Weight	640 g (1.4 lbs.)

ORDERING INFORMATION

HI 83099-01 (115V) and **HI 83099-02** (230V) is supplied with glass cuvets (3), cell protective cap, batteries, 12 Vdc adapter and instructions.

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 3898	Test kit for chloride concentration
HI 839800-01	HANNA reactor (115 Vac)
HI 839800-02	HANNA Reactor (230 Vac)
HI 151-00	Thermometer with stainless steel probe
HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 731318	Cuvet cleaning cloth (4)
HI 731321	Measurement cuvet (4)
HI 731325N	Cuvet cap (4)
HI 740216	Test tube cooling rack (25 tube capacity)
HI 740217	Laboratory bench safety shield
HI 92000	Windows® compatible application software
HI 920010	Serial cable for PC conn. (9 pin)

Notes:
* Method with chromium-sulfuric acid is officially recognized by EPA for wastewater analysis.
** The HI 93754F-25 and HI 93754G-25 method follows the official method ISO 15705.
† This method is recommended for general purpose analysis with no chloride interference.
‡ For chlorine analysis, liquid reagents are also available.

HANNA instruments

With Great Products, Come Great Results™

PC compatible B.E.P.S.

HI 83214

COD Meter

for Wastewater Analysis



Great Feature Set for Wastewater Professionals

- *Easy COD measurement*

  HI 83214 multi-parameter photometer is pre-calibrated to measure COD levels at three ranges at the touch of a key pad.

- *Outstanding measurement quality*

  HI 83214 employs an advanced optical system, assuring high accuracy measurements throughout the entire range.

- *Save space in your laboratory.*

  The compact size of the HI 83214 photometer allows the user to eliminate the clutter of bulkier and more costly spectrophotometers.

A Complete Wastewater Analysis System

The HI 83214 multi-parameter photometer is a compact instrument featuring different ranges and methods, suitable for a wide range of applications.

HI 83214 is designed and built to perform COD analysis in accordance with EPA 410.4 and ISO 15705:2002 standards. Ensuring accurate and repeatable results, it is the ideal tool for documenting waste treatment processes.

Besides the fundamental parameter of COD, HI 83214 also measures total ammonia, free and total chlorine, nitrate, nitrogen and total reactive phosphorus.

HI 83214 allows for a complete wastewater analysis in a single powerful instrument.

ORDERING INFORMATION

HI 83214-01 (115V) and **HI 83214-02** (230V) is supplied with glass cuvets (5), batteries, 12 Vdc adapter and instructions

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 3898	Test kit for fast analysis of chloride concentration
HI 839800-01	HANNA reactor (115 Vac)
HI 839800-02	HANNA reactor (230 Vac)
HI 151-00	Thermometer with stainless steel probe
HI 710005	115 Vac/12 Vdc pwr adapter (US)
HI 710006	230 Vac/12 Vdc pwr adapter (EURO)
HI 731311	Cuvets with caps for HI 83214
HI 731318	Cuvet cleaning cloth (4)
HI 731321	Measurement cuvet (4)
HI 731325N	Cuvet cap (4)
HI 731340	200 µL automatic pipette
HI 731341	1000 µL automatic pipette
HI 731342	2000 µL automatic pipette
HI 731350	Tips for 200 µL automatic pipette (25)
HI 731351	Tip for 1000 µL automatic pipette (25)
HI 731352	Tip for 2000 µL automatic pipette (4)
HI 740216	Test tube cooling rack (25 tube capacity)
HI 740217	Laboratory bench safety shield
HI 740219	COD test tube adapter for HI 83099
HI 92000	Windows® compatible application software
HI 920010	Serial cable for PC connection (9 pin)

Notes:

* Method with chromium-sulfuric acid is officiallly recognized by EPA for wastewater analysis.

** The HI 93754F-25 and HI 93754G-25 method follows the official method ISO 15705.

† This method is recommended for general purpose analysis with no chloride interference

SPECIFICATIONS

Light Source	3 tungsten lamps with narrow band interference filters at 420/525/610 nm
Light Detector	3 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230 x 165 x 70 mm (9 x 6.5 x 2.8")
Weight	640 g (22.6 oz.)

PARAMETER	RANGE	METHOD	REAGENT CODE
Ammonia, LR	0.00 to 3.00 mg/L	Nessler	HI 93764A-25
Ammonia, HR	0 to 100 mg/L	Nessler	HI 93764B-25
Chlorine, free	0.00 to 5.00 mg/L	DPD	HI 93701-01, HI 93701-03
Chlorine, total	0.00 to 5.00 mg/L	DPD	HI 93711-01, HI 93711-03
Nitrate	0.0 to 30.0 mg/L	Chromotropic acid	HI 93766-50
Nitrogen, total	0.0 to 25.0 mg/L	Chromotropic acid	HI 93767A-50
Nitrogen, total HR	10 to 150 mg/L	Chromotropic acid	HI 93767B-50
COD LR, EPA*	0 to 150 mg/L	Dichromate	HI 93754A-25
COD MR, EPA*	0 to 1500 mg/L	Dichromate	HI 93754B-25
COD HR	0 to 15000 mg/L	Dichromate	HI 93754C-25
COD LR, Mercury-free†	0 to 150 mg/L	Dichromate, mercury-free	HI 93754D-25
COD MR, Mercury-free†	0 to 1500 mg/L	Dichromate, mercury-free	HI 93754E-25
COD LR, ISO**	0 to 150 mg/L	Dichromate	HI 93754F-25
COD MR, ISO**	0 to 1000 mg/L	Dichromate	HI 93754G-25
Phosphorus, reactive	0.00 to 5.00 mg/L	Ascorbic acid	HI 93758A-50
Phosphorus, acid hydrolyzable	0.00 to 5.00 mg/L	Ascorbic acid	HI 93758B-50
Phosphorus, total	0.00 to 3.50 mg/L	Ascorbic acid	HI 93758C-50
Phosphorus, reactive HR	0.0 to 100.0 mg/L	Vanadomolybdophosphoric acid	HI 93763A-50
Phosphorus, total HR	0.0 to 100.0 mg/L	Vanadomolybdophosphoric acid	HI 93763B-50

HI 96711

Free/Total Chlorine Photometer

with Fast Tracker™ — Tag Identification System Technology



FastTracker™
A new revolution in organized data management

The HANNA
Fast Tracker™ system
is a **new revolution** in simple and
organized data management.

Fast Tracker™ *Tag Identification System (T.I.S.)*

HANNA's exclusive Fast Tracker™ — Tag Identification System simplifies test logging while retaining the management versatility needed to search, filter and export data. The system, designed for scientific and industrial applications, helps verify that samples have truly been taken at pre-established locations during safety audits and inspections.

The Fast Tracker™ system is easy to install and operate. Just place the iButton® tags near your sampling sites that need to be regularly checked. This meter identifies and authenticates logged data by storing the iButton® serial number, time and date stamp by simply touching the iButton® with the matching connector on the instrument. The number of tags that can be installed is unlimited and each tag has a unique identification code.

With our HI 92000 Windows® compatible application software, users can sort or filter all collected test data using different criteria such as specific sampling location, parameter, date and time intervals or fixed range to filter measured values. The data can be plotted in a graph, exported to other common Windows® applications or printed for reporting purposes.

Photometers Loaded with HANNA Innovations

The HANNA HI 96711 is an auto-diagnostic, microprocessor-based, portable photometer that benefits from HANNA years of experience as manufacturer of analytical instruments.

HI 96711 measures free & total chlorine and features quick traceability of each measured sample.

The advanced optical system is based on a tungsten lamp and a narrow-band interference filter that allows highly accurate and repeatable readings.

As a result of the iButton® technology, this meter can associate a time and location label to every record. The iButton® is mounted on the top of the meter and you have to just touch the tag that identifies the sample location before performing each measurement.

The meter can log up to 99 measurements in the internal memory and all stored data can be downloaded to a PC through the RS232 serial port and the HI 92000 software.

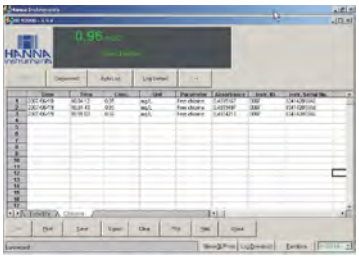
The sample traceability system allows users to collect and manage data in a very simple and error free way. All measurements can be quickly organized by time or by sample. The check function allows the user to validate the good performance of the instrument at any time.

- *CAL CHECK™ validation*
- *Exclusive Tag Identification System (Fast Tracker™)*
- *Logging of up to 99 records*
- *Supplied as a kit*
- *PC compatibility*



Multiparameter Photometer

Measure up to 45 Parameters



Data Management

Data can be managed using the HI 92000 Windows® compatible software.



Cuvet Holder with Door

The HI 83200 2008 Series' cuvet cover aids in stopping stray light from effecting measurements.

ORDERING INFORMATION

HI 83200-01 2008 series (115V) and **HI 83200-02** 2008 series (230V) are supplied with cuvettes (4), bottle for DO test, 12 Vdc adapter and instruction manual.

HI 83200C-01 2008 series (115V) and **HI 83200C-02** 2008 series (230V) are supplied with a rugged carrying case, cuvettes (4), bottle for DO tests, scissors, cuvette cleaning cloths (4), 12 VDC adapter, and an instruction manual.

ACCESSORIES

HI 721310	9V battery (10 pcs)
HI 731318	Tissue for wiping cuvets (4 pcs)
HI 731321	Glass cuvets (4 pcs)
HI 731325N	New cap for cuvet (4 pcs)
HI 740034	Cap for 100 mL beaker (6 pcs)
HI 740036	100 mL plastic beaker (6 pcs)
HI 740038	60 mL glass bottle and stopper
HI 740142	1 mL graduated syringe
HI 740143	1 mL graduated syringe (6 pcs)
HI 740144	Pipette tip (6 pcs)
HI 740157	Plastic pipette (20 pcs)
HI 740220	25 mL glass cylinder with cap (2 pcs)
HI 740223	170 mL plastic beaker
HI 740224	170 mL plastic beaker (12 pcs)
HI 740225	60 mL graduated syringe
HI 740226	5 mL graduated syringe
HI 740227	Filter assembly
HI 740228	Filter disc (25 pcs)
HI 740229	100 mL Polypropylene cylinder
HI 740230	230 mL Demineralized water
HI 92000	Windows® Compatible Software
HI 920010	PC connection cable
HI 93703-50	Cuvets cleaning solution (230 mL)
HI 93703-54	Dried resin (100 g)
HI 93703-55	Activated Carbon (50 pcs)

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SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	built-in rechargeable batteries or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Logging	200 data points
Computer Interface	USB
Environment	0 to 50°C (32 to 122°F); RH max 90% non-condensing
Dimensions	230 x 200 x 110 mm (9 x 7.9 x 4.3")
Weight	900 g (32 oz.)

TEST	RANGE	METHOD	REAGENT CODE
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Alkalinity	0 to 500 mg/L	Colorimetric	HI 93755-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Bromine	0.00 to 8.00 mg/L	DPD	HI 93716-01
Calcium	0 to 400 mg/L	Oxalate	HI 937521-01**
Chlorine Dioxide	0.00 to 2.00 mg/L	Chlorophenol Red	HI 93738-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Color	0 to 500 PCU	Colorimetric Platinum Cobalt	—
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Cyanide	0.000 to 0.200 mg/L	Pyridine-Pyrazalone	HI 93714-01
Cyanuric Acid	0 to 80 mg/L	Turbidimetric	HI 93722-01
Fluoride	0.00 to 2.00 mg/L	SPADNS	HI 93729-01
Hardness (calcium)	0.00 to 2.70 mg/L	Colorimetric	HI 93720-01
Hardness (magnesium)	0.00 to 2.00 mg/L	Colorimetric	HI 93719-01
Hydrazine	0 to 400 µg/L	p-Dimethylaminobenzaldehyde	HI 93704-01
Iodine	0.0 to 12.5 mg/L	DPD	HI 93718-01
Iron HR	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Iron LR	0 to 400 µg/L	TPTZ	HI 93746-01**
Magnesium	0 to 150 mg/L	Calmagite	HI 937520-01**
Manganese HR	0.0 to 20.0 mg/L	Periodate Oxidation	HI 93709-01
Manganese LR	0 to 300 µg/L	PAN	HI 93748-01**
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nickel LR	0.000 mg/L to 1.000 mg/L	PAN	HI 93740-01**
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
Ozone	0.00 to 2.00 mg/L	DPD	HI 93757-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Potassium HR	20 to 200 mg/L	Turbidimetric Tetraphenylborate	HI 93750-01
Potassium MR	10 to 100 mg/L	Turbidimetric Tetraphenylborate	HI 93750-01
Potassium LR	0.0 to 20.0 mg/L	Turbidimetric Tetraphenylborate	HI 93750-01
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Sulfate	0 to 150 mg/L	Turbidimetric	HI 93751-01
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

All reagents with -01 final code are for 100 tests unless noted otherwise.
* For Chlorine, liquid reagents are available..
** Reagents for 50 tests

HI 832xx

Multiparameter Bench Photometers

HANNA's *Professional Multiparameter Photometers*

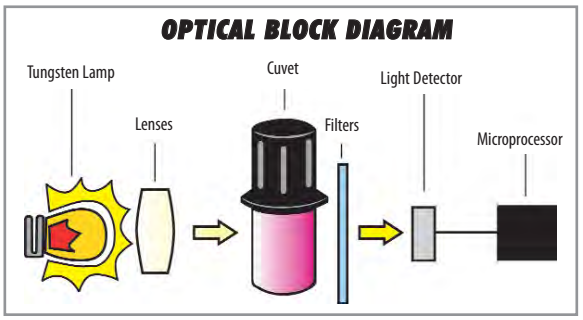


Features

1. The LCD provides user-friendly prompts and auto-diagnostic messages
2. Program numbers are displayed right on the secondary LCD
3. With a built-in RS 232 interface, you can download all the data to your PC

   The HI 832xx series of bench meters can also run with batteries (2) 9V for more than 2000 readings - useful for those spots where power outlets are not readily available
4. All meters use an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell for an accurate readouts.
5. Measure up to 36 parameters with the HI 832xx series
6. Simply press "Read Direct" and the measurement is visualized in seconds
7. Counts down the amount of time needed for the chemical reaction - an important feature to ensure an accurate measurement
8. Calibrates the meter with your sample (blank) to ensure accurate measurement every time

The HANNA series of bench meters run on 12-20 Vdc to satisfy UL and CSA requirements.



The HI 832xx series has an innovative automatic adjustment system of the luminous intensity of the lamp. Just insert the sample and the meter automatically adjusts the luminous intensity to ensure the best accuracy.

ADP

Application Designed Photometers

Since 1978, HANNA's philosophy has been founded on the introduction of instruments developed according to the needs of a specific application or industry.

From this philosophy we have created **ADP: Application Designed Photometers** to satisfy the needs of your specific application or industry.

Aquaculture	HI 83203
Boilers & Cooling Towers	HI 83205
Chemical Manufacturers	HI 83211
Education	HI 83209
Environmental Apps	HI 83218
Environmental Testing	HI 83206
Honey Color Analysis	HI 83221
Laboratories	HI 83200
Laboratories, with COD	HI 83099
Nutrient Analyses	HI 83215
Pool and Spa Apps	HI 83216
Pool and Spa Apps	HI 83226
Power Plant Utilities	HI 83212
Pulp & Paper Mills	HI 83210
Wastewater Analysis	HI 83214
Wastewater, Industrial	HI 83207
Wastewater, Municipal	HI 83213
Water Conditioning	HI 83208

HANNA instruments

With Great Products, Come Great Results™

PC compatible | B.E.P.S.

ADP Application Designed Photometers

HI 83200

Multiparameter Photometer

Measure up to 36 Parameters

Built for Labs, Flexible for Field Use

HI 83200 is one of the most versatile photometers on the market. Just one meter measures up to 36 of the most important water quality parameters.

HI 83200, like other instruments in this series, runs for hours on common 9V batteries. In addition, it can operate continuously with a 12 Vdc adapter

HI 83200 is also extremely simple to use. The front mask lists all the parameters in numerical order and the display shows the same numbers for a quick reference during testing.

The meter can be zeroed with a blank (unreacted sample) in seconds and the reagents cost much less than what you have been paying. All this and much more at a fraction of the cost of expensive and complex spectrophotometers!

All meters use an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell.

A built-in RS232 port ensures that data can be transferred to your PC for further study. Use our optional HI 92000 Windows® compatible software to get the most out of your meter.

- *PC compatible*
- *User friendly prompts and auto-diagnostic messages on LCD*



SPECIFICATIONS	HI 83200
Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83200-01 (115V) and **HI 83200-02** (230V) are supplied with cuvets (3), bottle for DO test, batteries, 12 Vdc adapter and instructions.

* For Chlorine, liquid reagents are available..
** Reagents for 50 tests

TEST	RANGE	METHOD	REAGENT CODE
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Bromine	0.00 to 8.00 mg/L	DPD	HI 93716-01
Chlorine Dioxide	0.00 to 2.00 mg/L	Chlorophenol Red	HI 93738-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Color	0 to 500 PCU	Platinum Cobalt	—
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Cyanide	0.000 to 0.200 mg/L	Pyridine-Pyrazalone	HI 93714-01
Cyanuric Acid	0 to 80 mg/L	Turbidimetric	HI 93722-01
Fluoride	0.00 to 2.00 mg/L	SPADNS	HI 93729-01
Hardness (calcium)	0.00 to 2.70 mg/L	Colorimetric	HI 93720-01
Hardness (magnesium)	0.00 to 2.00 mg/L	Colorimetric	HI 93719-01
Hydrazine	0 to 400 µg/L	p-Dimethylaminobenzaldehyde	HI 93704-01
Iodine	0.0 to 12.5 mg/L	DPD	HI 93718-01
Iron HR	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Iron LR	0 to 400 µg/L	TPTZ	HI 93746-01**
Manganese HR	0.0 to 20.0 mg/L	Periodate	HI 93709-01
Manganese LR	0 to 300 µg/L	PAN	HI 93748-01**
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

HI 83203
Multiparameter Photometer
for Aquaculture

Application Designed Photometers

B.E.P.S.

PC compatible



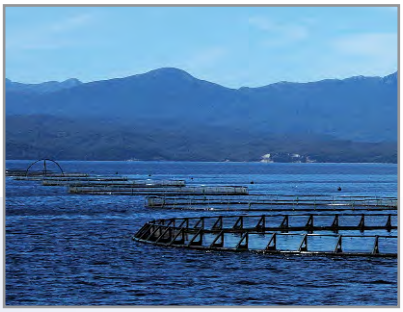
Measure Crucial Aquaculture Parameters

With the ever increasing depletion of fish stocks in the open seas, aquaculture has gained prominence and can prove essential to our future dietary needs. Monitoring and controlling parameters such as the oxygen level as well as pH and nitrate content in water is vital in ensuring profitable fish production.

Accurate control can prevent disease, increase production and even reduce the premiums on crop insurance. Research personnel, fish farm operators and wildlife specialists now have one compact and easy-to-use meter to keep a close tab on the most important parameters in aquaculture.

Simply take a sample of water and place it in the unit to be zeroed. Add reagents to it and place it back in the HI 83203. The meter will then show you the relevant value in mg/L or µg/L in clear digits on a large LCD. No need to match colors, calibrate probes or change membranes. HI 83203 saves time so that you may get on with more rewarding tasks, such as producing more fish!

It helps to be specific!



Water quality is the beginning and the end of fish health. Barely detectable levels of contaminants can accumulate in your livestock's bodies, making them more vulnerable to disease and stress. Vital trace elements often need to be maintained at levels too low for chemical kits to accurately detect. Keep fish, plants, and invertebrates healthy and happy by frequently testing with HANNA's line of ion specific photometers. We make one for just about every possible analysis, from bromine to iodine to dissolved oxygen and more.

TEST	RANGE	METHOD	REAGENTS
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Chlorine free*	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine total*	0.00 to 3.50 mg/L	DPD	HI 93711-01
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01

* For Chlorine measurements, liquid reagents are available

All reagents with -01 final code are for 100 tests.

SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83203-01 (115V) and **HI 83203-02** (230V) is supplied with cuvets (2), bottle for DO test, batteries, 12 Vdc adapter and instructions.

HANNA instruments

With Great Products, Come Great Results™

PC compatible | B.E.P.S.

ADP Application Designed Photometers

HI 83205

Multiparameter Photometer

for Boilers and Cooling Towers

Accurate and Affordable Boiler and Cooling Tower Monitoring

HI 83205 provides engineers and maintenance personnel with an innovative and cost-effective way to monitor boilers and cooling towers. With just one unit, technicians can keep an eye on 24 parameters needed for proper and efficient functioning of their systems. The parameters that HI 83205 monitors include: iron, whose presence can be an important indication of corrosion; chlorine to circumvent microbiological fouling; dissolved oxygen, whose presence causes corrosion; silica can point to a contamination of the feed water while phosphate is important to reduce scaling.

These and many other vital parameters can now be measured with just one unit at a cost-per-test that is comparable with chemical test kits. The part numbers that are under the reagent code column refer to reagent sets for 100 tests unless noted otherwise (**).





SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V batteries or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83205-01 (115V) and **HI 83205-02** (230V) is supplied with cuvets (2), bottle for DO test, batteries, 12 Vdc adapter and instructions.

TEST	RANGE	METHOD	REAGENT CODE
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Bromine	0.00 to 8.00 mg/L	DPD	HI 93716-01
Chlorine Dioxide	0.00 to 2.00 mg/L	Chlorophenol Red	HI 93738-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Hydrazine	0 to 400 µg/L	p-Dimethylaminobenzaldehyde	HI 93704-01
Iron HR	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Iron LR	0 to 400 µg/L	TPTZ	HI 93746-01**
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

* For Chlorine, liquid reagents are available, .
** Reagents for 50 tests

All reagents with -01 final code are for 100 tests.

HI 83211

Multiparameter Photometer

for Chemical Manufacturers

Application Designed Photometers

B.E.P.S.

PC compatible



Accurate, Affordable Tests for Chemical Manufacturers

HI 83211 is a multipurpose photometer with the HANNA quality and design that makes tasks simpler.

Just pick up a sample, zero it, add reagents and place it back in the meter for direct readout on a large LCD.

HI 83211 can run on a built-in 9V battery as well as from an external source. This facilitates its transportation to different locations within a plant for onsite measurement.

Bench meters rarely have been made this portable! HI 83211 measures only a few centimeters in height and width, and weighs merely 640 grams.

Reagents are necessary and sold separately. All numbers listed are for 100 tests unless otherwise noted.

TEST	RANGE	METHOD	REAGENT CODE
Aluminum	0.00 to 1.00 mg/L	Aluminon	HI 93712-01
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Chromium VI HR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Chromium VI LR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Cyanuric Acid	0 to 80 mg/L	Turbidimetric	HI 93722-01
Iodine	0.0 to 12.5 mg/L	DPD	HI 93718-01
Iron HR	0.00 to 5.00 mg/L	Phenantroline	HI 93721-01
Iron LR	0 to 400 µg/L	TPTZ	HI 93746-01**
Molybdenum	0.0 to 40.0 mg/L	Mercaptoacetic Acid	HI 93730-01
Nickel HR	0.00 to 7.00 g/L	Photometric	HI 93726-01
Nickel LR	0.000 to 1.000 mg/L	PAN	HI 93740-01**
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

For a comprehensive list of reagents page 8.75

All reagents with -01 final code are for 100 tests.

** Reagents for 50 tests



SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83211-01 (115V) and **HI 83211-02** (230V) is supplied with cuvets (2), batteries, 12 Vdc adapter and instructions.

HANNA instruments

With Great Products, Come Great Results™

HI 83209

Multiparameter Photometer

for Education

20 Water Quality Parameters in One Educational Meter

Finally, a meter made for education that is economical and simple to use with uncompromising accuracy.

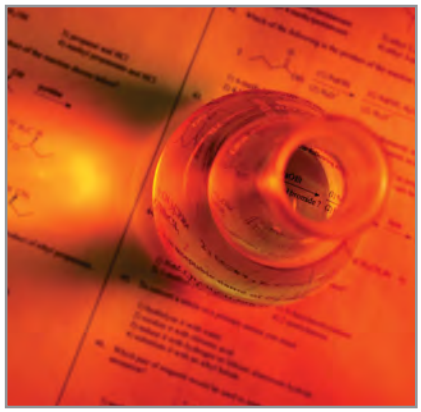
HI 83209 measures 20 different water quality parameters with lab precision at a comparable cost-per-test as chemical test kits!

Simply press the up or down arrows to access one of 20 critical parameters built into this handy meter.

HI 83209 has been designed to be used both indoors and out. In fact, with its splashproof keyboard, lightweight, battery and 12 Vdc adapter, HI 83209 is as equally at home in a busy school lab as out near a pond.

- *Ideal in the lab or field*
- *Can blend seamlessly into lesson plans*





SPECIFICATIONS

Light Source	4 tungsten lamps with narrow band interference filters at 420/525/575/610 nm
Light Detector	4 Silicon Photocells
Power Supply	(2) 9V battery or 12 Vdc adapter
Auto-off	after 10 minutes of non-use
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	230x165x70 mm (9x6.5x2.8")
Weight	640 g (22.6 oz.)

ORDERING INFORMATION

HI 83209-01 (115V) and **HI 83209-02** (230V) is supplied with cuvets (3), bottle for DO test, batteries, 12 Vdc adapter and instructions.

TEST	RANGE	METHOD	REAGENT CODE
Ammonia LR	0.00 to 3.00 mg/L	Nessler	HI 93700-01
Ammonia MR	0.00 to 10.00 mg/L	Nessler	HI 93715-01
Chlorine*, Free	0.00 to 2.50 mg/L	DPD	HI 93701-01
Chlorine*, Total	0.00 to 3.50 mg/L	DPD	HI 93711-01
Chromium VI HR	0 to 300 µg/L	Diphenylcarbohydrazide	HI 93749-01
Chromium VI LR	0 to 1000 µg/L	Diphenylcarbohydrazide	HI 93723-01
Color	0 to 500 PCU	Chloroplatinate	—
Copper HR	0.00 to 5.00 mg/L	Bicinchoninate	HI 93702-01
Copper LR	0 to 1000 µg/L	Bicinchoninate	HI 95747-01
Nitrate	0.0 to 30.0 mg/L	Cadmium Reduction	HI 93728-01
Nitrite HR	0 to 150 mg/L	Ferrous Sulfate	HI 93708-01
Nitrite LR	0.00 to 0.35 mg/L	Diazotization	HI 93707-01
Oxygen, Dissolved (DO)	0.0 to 10.0 mg/L	Winkler	HI 93732-01
pH	6.5 to 8.5 pH	Phenol Red	HI 93710-01
Phosphate HR	0.0 to 30.0 mg/L	Amino Acid	HI 93717-01
Phosphate LR	0.00 to 2.50 mg/L	Ascorbic Acid	HI 93713-01
Phosphorus	0.0 to 15.0 mg/L	Amino Acid	HI 93706-01
Silica	0.00 to 2.00 mg/L	Heteropoly blue	HI 93705-01
Silver	0.000 to 1.000 mg/L	PAN	HI 93737-01**
Zinc	0.00 to 3.00 mg/L	Zincon	HI 93731-01

* For Chlorine, liquid reagents are available
** Reagents for 50 tests

All reagents with -01 final code are for 100 tests.

HI 96711

Free/Total Chlorine Photometer

with Fast Tracker™ — Tag Identification System Technology



"C" Version Supplied as a kit

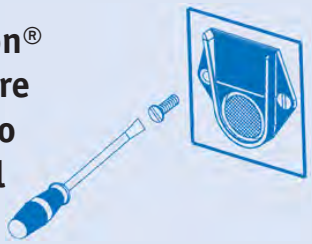


Peace of mind.

CAL CHECK™ Calibration Validation

With HANNA's exclusive CAL CHECK™ validation function users are able to verify the performance of the instrument at any time. Taking just a few short steps, the validation procedure is user friendly and ensures that the meter is properly calibrated.

iButton® Tags are Easy to Install



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



SPECIFICATIONS		HI 96711
Range	Free Chlorine	0.00 to 5.00 mg/L
	Total Chlorine	0.00 to 5.00 mg/L
Resolution		0.01 mg/L 0.00 to 3.50 mg/L; 0.10 mg/L above 3.50 mg/L
Precision		±0.02 mg/L to 1.00 mg/L
Light Source		Tungsten lamp with narrow band interference filter 525 nm
Light Detector		Silicon Photocell
Power Supply		(1) 9V battery
Auto-off		After 10 min of non-use in measuring mode After 1 hour of non-use in calibration mode
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing
Data-Logging		99 records
Serial Interface		RS232 with 9600 baud rate
Dimensions		216 x 83 x 65 mm (8.5 x 3.3 x 2.5")
Weight		420 g (17 oz.)
Method		Adaptation of USEPA 330.5 Method and Standard Methods 4500-Cl G

ORDERING INFORMATION

HI 96711 is supplied with (2) sample cuvets with caps, (10) reagent powder packets, (4) batteries and instruction manual.

HI 96711C is supplied with (2) sample cuvets with caps, (3) CAL CHECK™ cuvets, (10) reagent powder packets, cuvet cleaning cloth, (4) batteries, scissors and instruction manual in a hard carrying case.

REAGENTS

HI 93701-01 Reagents for 100 tests (Free Chlorine)
HI 93701-03 Reagents for 300 tests (Free Chlorine)
HI 93711-01 Reagents for 100 tests (Total Chlorine)
HI 93711-03 Reagents for 300 tests (Total Chlorine)
HI 95701-11 CAL CHECK™ standard cuvets for Free Chlorine
HI 95711-11 CAL CHECK™ standard cuvets for Total Chlorine

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 920005 iButton® TAGs (5)
HI 92000 Software for PC connection, Windows® compatible
HI 920011 Serial cable for PC connection
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)

HI 96781

Free and Total Chlorine Photometer

Water Resistant and CAL CHECK™



- *Built-in timer or direct read*

For Free and Total Chlorine Concentrations

The HI 96781 meter measures the free and total chlorine (Cl_2) content in water samples in the 0.00 to 5.00 mg/L (ppm) range.

It has the advanced optical system based on a special tungsten lamp and a narrow band interference filter that allows the most accurate and repeatable readings. The instrument is factory calibrated and the electronic and optical design minimizes the need of frequent calibration.

With the powerful CAL CHECK™ validation function, you are able to validate performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagents are in powder form and supplied in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability.

SPECIFICATIONS		HI 96781
Range	Free Chlorine	0.00 to 5.00 mg/L
	Total Chlorine	0.00 to 5.00 mg/L
Resolution		0.01 mg/L (0.10 mg/L over 3.50 mg/L)
Precision		±0.02 mg/L @ 1.00 mg/L
Light Source		Tungsten lamp
Light Detector		Silicon Photocell with narrow band interference filter @ 525 nm
Power Supply		(1) 9V battery
Auto-off		After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions		192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight		290 g (10 oz.)
Method		Adaptation of the USEPA method 330.5 and Standard Method 4500-Cl G.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96781 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96781C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 93701-01 Reagents for 100 Free Chlorine tests
HI 93701-03 Reagents for 300 Free Chlorine tests
HI 93711-01 Reagents for 100 Total Chlorine tests
HI 93711-03 Reagents for 300 Total Chlorine tests
HI 95701-11 CAL CHECK™ Standard Cuvets for Free Chlorine (1 set)
HI 95711-11 CAL CHECK™ Standard Cuvets for Total Chlorine (1 set)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps(4)



HI 731318 — Cuvet Cleaning Cloth

HANNA instruments

With Great Products, Come Great Results™

HI 96747

Copper, Low Range Photometer

Water Resistant and CAL CHECK™

Simple Copper Measurement for a Wide Variety of Applications

The HI 96747 meter measures the free dissolved Copper (Cu) content in water samples in the 0.000 to 1.500 mg/L (ppm) range. The method is an adaptation of the USEPA approved bicinchoninate method. It has the advanced optical system based on a special tungsten lamp and a narrow band interference filter that allows most accurate and repeatable readings. The instrument is factory calibrated and the electronic and optical design minimizes the need of frequent calibration.

With the powerful CAL CHECK™ validation function, you are able to validate performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagent is in powder form and is supplied in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability.



HI 731331 — Measuring Cuvets



SPECIFICATIONS	HI 96747
Range	0.000 to 1.500 mg/L
Resolution	0.001 mg/L for measurement; 0.01 mg/L for calibration and validation
Precision	±0.015 mg/L to 0.750 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 560 nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the USEPA approved bicinchoninate method.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96747 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96747C is supplied with CAL CHECK™ standard cuvets and reagents, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95747-11 CAL CHECK™ Standard Cuvets (1 set)
HI 95747-01 Reagents for 100 tests
HI 95747-03 Reagents for 300 tests

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)

HI 96769

Anionic Detergents Photometer

Water Resistant and CAL CHECK™



Measure Harmful Detergents in Water Supplies, Water Treatment Plants and more.

Detergents are produced in large quantities and are widely used in many applications. Due to their common use, detergents are introduced into the water supply through domestic and industrial drains.

Detergents are harmful to water treatment plants, due to the scum that is created by emulsifying oil and grease. So, by law, detergent concentrations must be monitored in wastewaters.

The HI 96769 meter measures the Anionic surfactants in the 0.00 to 3.50 mg/L (ppm) range, in drinking, surface and waste waters. The method is an adaptation of the USEPA method 425.1 and Standard Methods for the Examination of Water and Wastewater, 20th edition, 5540C, Anionic Surfactants by MBAS (Methylene Blue Active Subtances).

With the powerful CAL CHECK™ validation function, you are able to validate performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instruments ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagent is in liquid form and is supplied in bottles. The amount of reagent is precisely dosed by use of the supplied pipettes to ensure the maximum repeatability.

SPECIFICATIONS	HI 96769
Range	0.00 to 3.50 mg/L (as LAS, Linear Alkylbenzene Sulfonate)
Resolution	0.01 mg/L
Precision	±0.04 mg/L @ 1.00 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 610 nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Dimensions / Weight	192 x 102 x 67 mm (7.6 x 4 x 2.6") / 290 g (10 oz.)
Method	Adaptation of the USEPA method 425.1 for drinking waters, surface waters, domestic and industrial wastes and Standard Methods, 20th edition, 5540C, Anionic Surfactants by MBAS.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96769 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96769C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, (1) long glass vial (25 mL) with cap, (3) plastic pipettes, 9V battery, cuvet cleaning cloth and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95769-01 Reagent kit for 40 tests

HI 95769-11 CAL CHECK™ Standard Cuvets (1 set)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740220 2 glass vials with cap, 25 mL

HI 740029P 9V Batteries (10)

HI 721310 9V Batteries (100)

HI 731318 Cuvet cleaning cloth

HI 731331 Measuring cuvets (4)

HI 731335 Cuvet caps (4)

HANNA instruments

With Great Products, Come Great Results™

HI 96729

Fluoride, Low Range Photometer

Water Resistant and CAL CHECK™

Measure Fluoride LR Accurately

A high concentration of fluoride can be harmful, so its presence needs to be monitored. HANNA offers the HI 96729, including an automatic 2000 µL automatic pipette.

With the powerful CAL CHECK™ validation function, you are able to validate good performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The automatic pipette is a fast and precise tool to safely dose liquid reagents. The automatic pipette's tip is also can be changed.

The reagent is in liquid form and is supplied in bottles. The amount of reagent is precisely dosed to be used by the supplied automatic pipette for maximum repeatability.

One of the most important interfering element for fluoride is chlorine, present in some applications such as drinking waters.

HANNA suggests using the HI 93703-53 liquid reagent with dropper to remove chlorine interference. This reagent is very quick and practical to use, just add a drop to every 2 mg/L of chlorine to eliminate its interference.



SPECIFICATIONS	HI 96729
Range	0.00 to 2.00 mg/L
Resolution	0.01 mg/L
Precision	±0.03 mg/L to 1.00 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 575nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the EPA method 340.1 and Standard Methods for the Examination of Water and Wastewater, 20th edition, SPANDS method.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96729 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96729C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, (1) 2000 µL automatic pipette with cap, (1) pipette tip, 9V battery, cuvet cleaning cloth and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95729-11 CAL CHECK™ Standard Cuvets (1 set)
HI 93703-53 Chlorine remover
HI 93729-01 Reagents for 100 tests
HI 93729-03 Reagents for 300 tests

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)
HI 731342 2000 mL automatic pipette, fixed volume
HI 731352 Tips for 2000 mL automatic pipette (4)

HI 96721

Iron, High Range Photometer

Water Resistant and CAL CHECK™



SPECIFICATIONS	HI 96721
Range	0.00 to 5.00 mg/L
Resolution	0.01 mg/L
Precision	±0.01 mg/L to 1.50 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 525 nm
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the USEPA method 315B and Standard Method 3500-Fe B.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96721 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96721C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95721-11 CAL CHECK™ Standard Cuvets (1 set)
HI 93721-01 Reagent kit for 100 tests
HI 93721-03 Reagent kit for 300 tests

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)



HI 731318 — Cuvet Cleaning Cloth

Iron, A Crucial Parameter to Monitor for Industrial Applications

Iron is naturally present in water in low concentrations, but it reaches high concentrations in wastewater effluents. Iron concentrations must be monitored as it is an indicator of corrosion in boilers and cooling towers.

The HI 96721 meter measures total iron (Fe) content in water samples in the 0.00 to 5.00 mg/L (ppm) range. The method is an adaptation of the USEPA Method 315B for natural and treated waters, and Standard Method 3500-Fe B for water and wastewater.

With the powerful CAL CHECK™ validation function, you are able to validate good performance of your instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagent contains both a reducing and a complexing agent: the first converts all but very most resistant forms of iron present in the sample to the ferrous (Fe2+) or soluble state; the second reacts with the ferrous iron to form the characteristic orange-colored complex.

The reagent is in powder form and is supplied in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability.

Maple Syrup Photometers

Water Resistant

Stay Consistant and Improve Quality of Your Maple Syrup Production!

The HI 96759 and HI 96760 handheld, portable maple syrup transmittance analyzers are high precision, USDA (HI 96759) or Canada Federal and Quebec (HI 96760) compliant photometers that bring judging "by eye" to an end.

HANNA maple syrup transmittance analyzers 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 cuvets having a 10 mm light path.

When the syrup color is very light, that can be compared to minimum standards of light transmittance, the quality level is very high, while when the color is very dark, the classification level is low. High quality syrup, must not have suspensions, bad odors and must have a minimum density of 66.0 Brix (20°C).

These instruments are water resistant and the lamp and filter units are protected from dust or dirt by a cover. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.*



MAPLE SYRUP GRADE DESIGNATIONS

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

SPECIFICATIONS	HI 96759 (USA) • HI 96760 (CAN)
Range	0.0 to100.0% trasmittance
Resolution	0.1% trasmittance
Precision	±1% to 75% trasmittance
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter 560 nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)

HI 93703-56



ORDERING INFORMATION

HI 95759 is supplied with square, sample cuvets (5), 9V battery, light shield cap (1), 5 mL syringes (2), rigid carrying case and 30 mL glycerol (1) and instruction manual.

HI 96760 is supplied with square, sample cuvets (5), 9V battery, light shield cap (1), 5 mL syringes (2), rigid carrying case and 30 mL glycerol (1) and instruction manual.

*These maple photometers do not feature CAL CHECK™

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 93703-56 Consists of 82 matched square cuvets, 30 mL of glycerol and (2) 5 mL syringes (75 tests average)
HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)

HI 96707

Nitrite, Low Range Photometer

Water Resistant and CAL CHECK™



Affordable Nitrite Analysis

The HI 96707 meter measures the Nitrogen-Nitrite (NO_2^--N) content in the 0.000 to 0.600 mg/L (ppm) range, in drinking, surface and saline water samples and in domestic and industrial wastes. The method is an adaptation of an EPA approved method.

The HI 96707 is an auto diagnostic portable microprocessor meter that benefits from HANNA's years of experience as a manufacturer of analytical instruments. It has the advanced optical system based on a special tungsten lamp and a narrow band interference filter that allows most accurate and repeatable readings. All instruments are factory calibrated and the electronic and optical design minimizes the need of frequent calibration.

With the powerful CAL CHECK™ validation function, you are able to validate performance of your instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagent is in powder form and is supplied in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability.

SPECIFICATIONS	HI 96707
Range	0.000 to 0.600 mg/L (as NO_2^--N)
Resolution	0.001 mg/L
Precision	±0.001 mg/L to 0.100 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 525 nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10' of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of an EPA approved method.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96707 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96707C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95707-11 CAL CHECK™ Standard Cuvets (1 set)
HI 93707-01 Reagents for 100 tests
HI 93707-03 Reagents for 300 tests

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)

With Great Products, Come Great Results™

Phosphate, HR and Phosphorus Photometers

Water Resistant and CAL CHECK™

Quick and Affordable Phosphate and Phosphorus tests

Phosphates are widely used in agriculture as fertilizers, in detergents, and they can be used in industrial process boilers to prevent corrosion.

Phosphates are important for the life of many plants and animals, but used in large quantities, they can affect the process of eutrophication.

The HI 96717 meter measures phosphate (PO_4^{3-}) content in water samples in the 0.0 to 30.0 mg/L (ppm) range.

Phosphorus is present as phosphate in water and wastewater. Phosphates in water comes from biological and industrial drains.

The HI 96706 meter measures the phosphorus (P) content in water samples in the 0.0 to 15.0 mg/L (ppm) range.

With the powerful CAL CHECK™ validation function, you are able to validate performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of these instruments and recalibrate if necessary.

The instruments are water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instruments ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

These meters use an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagents for both instruments are in powder and liquid form and are supplied in packets and bottles. The amount of reagent is precisely dosed to ensure the maximum repeatability.



SPECIFICATIONS	HI 96717	HI 96706
Range	0.0 to 30.0 mg/L	0.0 to 15.0 mg/L
Resolution	0.1 mg/L	
Precision	±0.5 mg/L @ 12.0 mg/L	±0.2 mg/L to 6.0 mg/L
Light Source	Tungsten lamp	
Light Detector	Silicon Photocell with narrow band interference filter @ 525 nm	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Power Supply	(1) 9V battery	
Auto-off	After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.	After 10 minutes of non-use in measuring mode; after 1 hour of non-use in calibration mode
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")	
Weight	290 g (10 oz.)	
Method	Amino Acid Method, adapted from Standard Method for the Examination of Water and Wastewater.	



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96717 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96717C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

HI 96706 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96706C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95717-11 CAL CHECK™ Standard Cuvets (1 set)

HI 93717-01 Reagents for 100 tests

HI 93717-03 Reagents for 300 tests

HI 95706-11 CAL CHECK™ Standard Cuvets (1 set)

HI 93706-01 Reagents for 100 tests

HI 93706-03 Reagents for 300 tests

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 721310 9V batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731331 Measuring cuvets (4)

HI 731335 Cuvet caps (4)

HI 96770
Silica Photometer
Water Resistant and CAL CHECK™



Test Silica Accurately

The HI 96770 meter measures the molybdate reactive silica (SiO_2) content in water samples in the 0 to 200 mg/L (ppm) range. The method is an adaption of the USEPA METHOD 370.1 for drinking, surface and saline waters, domestic and industrial wastes and Standard Method 4500-SiO_2 C.

With the powerful CAL CHECK™ validation function, you are able to validate performance of your instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

It has the advanced optical system based on a Light Emitting Diode (LED) and a narrow band interference filter that allows most accurate and repeatable readings.

The instrument is water resistant and the LED and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagents are in powder form and are supplied in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability.

SPECIFICATIONS	HI 96770
Range	0 to 200 mg/L (SiO_2)
Resolution	1 mg/L
Precision	±5 mg/L @ 100 mg/L
Light Source	Light Emitting Diode
Light Detector	Silicon Photocell with narrow band interference filter @ 466 nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measuring mode; after 1 hour of non-use in calibration mode
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the USEPA METHOD 370.1 for drinking, surface and saline waters, domestic and industrial wastes and Standard Method 4500-SiO_2 C.



Available as a KIT
Just choose the "C" version
*HI 96715**C** kit version shown.*

ORDERING INFORMATION
HI 96770 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96770C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS
HI 96770-11 CAL CHECK™ Standard Cuvets (1 set)
HI 96770-01 Reagents for 100 high range tests
HI 96770-03 Reagents for 300 high range tests

SOLUTIONS
HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES
HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)



HI 731318 — Cuvet Cleaning Cloth

HANNA instruments

With Great Products, Come Great Results™

HI 96765

Blood Plasma Analyzer

Water Resistant

Blood Plasma Analyzer for Practical Simplicity in Measurements

HI 96765 performs analysis of centrifuged animal blood plasma coming from abattoirs for quality evaluation.

Quality is valued with sample absorbance and checked by measuring its color, expressed in Quality Units.

When blood cells are damaged, hemoglobin is present in plasma and results in a high reading.

Therefore, the lower the reading in Quality Units (low color), the higher the blood plasma quality. This special instrument reads blood plasma quality from 0 to 10 units.

Designed to be practical, HI 96765 is equipped with a microprocessor system that checks the readings before displaying the correct value.*



SPECIFICATIONS	HI 96765
Range	0.0 to 10.0 units
Resolution	0.1 unit
Precision	±0.2 to 5.0 unit
Light Source	L.E.D. to 555 nm
Light Detector	Silicon Photocell
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measuring mode
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Colorimetric

ORDERING INFORMATION

HI 96765 is supplied with a protective cap, rugged carrying case, 9V battery and instructions.

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)



HI 731331 — Measuring Cuvets



HI 731318 — Cuvet Cleaning Cloth

*HI 96765 does not feature CAL CHECK™

HI 96 series

Water Resistant Single Parameter Photometers

with HANNA's Exclusive CAL CHECK™



READ/TIMER function

Counts down to appropriate time interval before a reading is displayed. This feature ensures consistency in measurements across multiple users.

Photometers Designed for Laboratory Benchtops and Handheld Field Use

HANNA's new line of single parameter photometers includes instruments to measure ammonia, chlorine at several ranges, copper, anionic detergents, fluoride, iron, nitrite, phosphate, phosphorus and more. This series features water resistance, a large dual-level LCD, an advanced optical system and HANNA's exclusive CAL CHECK™ validation function. The advanced optical system is based on a special tungsten lamp (model HI 96715 features an LED) and a narrow band interference filter assuring accurate readings every time.

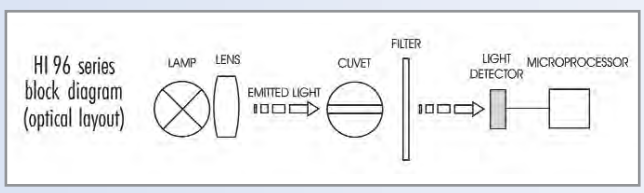
With the exclusive CAL CHECK™ validation function users are able to verify the performance of the instrument at any time. Taking just a few short steps, the validation procedure is extremely user friendly and ensures that the meter is properly calibrated. Just use the exclusive HANNA ready-made, NiST traceable standards to verify the performance of the instrument and recalibrate as necessary. All instruments are factory calibrated and the electronic and optical design minimizes the need for frequent calibration.

Ideal for field applications, these meters are water resistant and the lamp and filter measuring system is protected from dust or dirt by a transparent cup. Display codes aid the user in routine operations and include a low battery warning. An auto shut-off feature turns the instruments off after 10 minutes of non-use.

The cuvet is made from special optical glass to obtain best results and an exclusive positive-locking system ensures that the cuvet is in the same position every time it is placed into the measurement cell. The cell is designed to fit a wide mouth cuvet making it easier to add both samples and reagents.

The reagents are in powder or liquid form and the amount of reagent is precisely dosed to ensure maximum repeatability.

- *Large, dual-level LCD*
- *Water-resistant*
- *Accuracy verification*
- *User calibration*
- *Certified calibration & verification standards*
- *Secondary standards for calibration and verification*
- *EPA compliant*
- *Custom ranges*
- *Long battery life*
- *Order the "C" version for a complete kit*





Calibration Date on Display

The HI 96 series of photometers display the last time calibration was performed so you may schedule routine calibrations—ideal for ISO and Good Laboratory Practice environments.

HANNA instruments

With Great Products, Come Great Results™

HI 93 Series
Photometers

Complete, Portable Custom Laboratories

HANNA Ion Specific Meters have resolved the problems of easy, on site measurements of parameters such as chlorine, ammonia and copper. These portable instruments are dedicated to a specific ion, and unlike conventional spectrophotometers and Ion Selective Electrodes, are faster and simpler to use. You have none of the normal associations with Ion Selective Electrodes such as preparation time, temperature compensation or a slower response time!



Aquaculture

HANNA photometers utilize custom microprocessors with a diode photocell to detect a single parameter. The readings are shown in large digits on a clear LCD. No need to worry about matching up colors or guessing where one color zone starts and the other finishes as with chemical test kits or test strips. These meters use an exclusive positive-locking system to ensure that the cuvet is in the same place every time it is placed into the measurement cell. Quick, simple and precise!

Lightweight and Portable

The casings of HANNA portable line of Ion Specific Meters are specifically engineered to perfectly fit the palm of your hand. Weighing less than 300 grams (11 ounces), these portable meters are ideal for spot-checks at landfills, streambeds, water sources or inside any lab!

Display Codes

The LCD can display codes to aid users in routine operations.

Long Battery Life

With a battery life lasting a minimum of 300 tests and an auto-shut off feature that will turn the instrument off after 10 minutes of non-use, you are guaranteed long periods of trouble-free operation. No surprises with these meters: the display will give you a low battery warning and a few extra measurements before new batteries are necessary.



Aquariums

Quick and Simple-to-Use

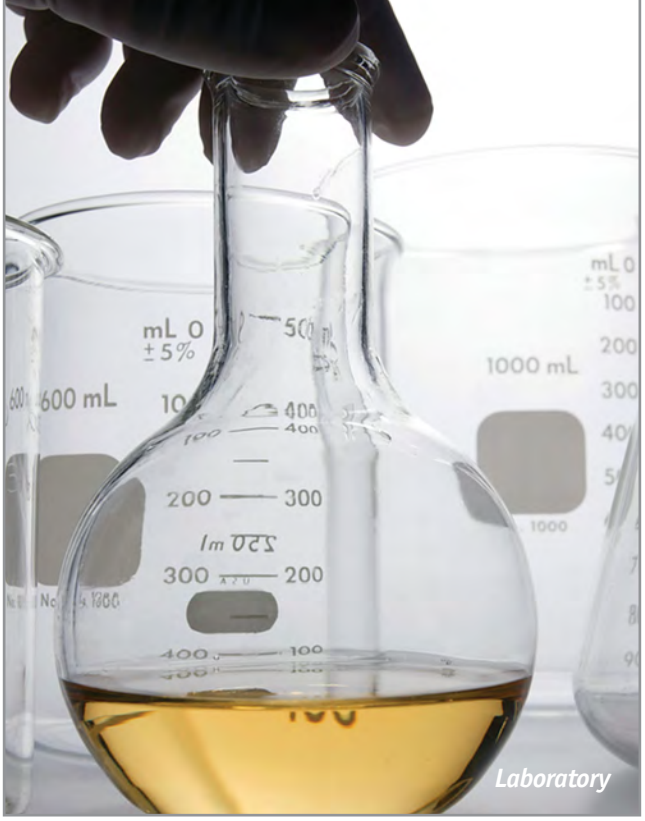
All you need to do to operate these meters is zero your sample, dissolve a readily soluble powder or add a few drops of a reagent in the cuvet and take a reading. A cuvet cap is supplied with the meter to prevent outside light from interfering with measurements.

Tests Made Inexpensive

Each HANNA meter comes supplied complete with cuvets in attractive packaging. A wide selection of inexpensive reagents for 100 or 300 tests further reduces your cost-per-test. The meters will in fact cost less than the several test kits needed to cover the same range! The reagents are in powder form and are supplied in packets. The amount of reagent is precisely dosed to ensure maximum repeatability.



Water Quality Control



Method of Analysis

Principle of Operation

The color of every object we see is determined by a process of absorption and emission of the electromagnetic radiation (light) of its molecules. Photometric analysis is based on the principle that many substances react with each other and form a color which can indicate the concentration of the substance to be measured. When a substance is exposed to a beam of light of intensity I_0 a portion of the radiation is absorbed by the substance's molecules, and a radiation of intensity I lower than I_0 is emitted.

The quantity of radiation absorbed is given by the Beer-Lambert Law:

$$\mathbf{A = \log I_0 / I}$$

Absorbance is also given by: $\mathbf{A = \varepsilon_\lambda\ c\ d}$

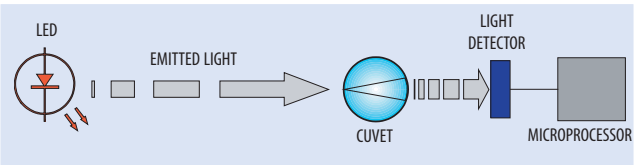
where ε_λ molar extinction coefficient of the substance at wavelength λ;

c molar concentration of the substance;

d optical distance light travels through sample;

Therefore, the concentration (**c**) can be calculated from the color of the substance determined by the emitted radiation (**I**), as the other factors are known.

A typical block diagram of a photometer is shown below:



A monochromatic LED (Light Emitting Diode) emits radiation at a single wavelength, supplying the system with the intensity (I_0). Since a substance absorbs the color complimentary to the one it emits (for example, a substance appears yellow because it absorbs blue light), HANNA photometers use LEDs that emit the appropriate wavelength to measure the sample.

The optical distance is measured by the dimension of the cuvet containing the sample. The photoelectric cell collects the radiation (I) emitted by the sample and converts it into an electric current, producing a potential in the mV range. The microprocessor uses this potential to convert the incoming value into the desired measuring unit and to display it on the LCD.

In fact, the preparation of the solution to be measured occurs under known conditions, which are programmed into the meter's microprocessor in the form of a calibration curve. This curve is used as a reference for each measurement. It is then possible to determine unknown concentrations of a sample by inducing a colorimetric reaction, and thus obtain the mV related to the emitted intensity (I) (the color of the sample). By employing the calibration curve, one can determine the concentration of the sample that corresponds to the mV value.



Pools and Spas

The measurement process is done in two phases: setting the meter to zero, and then the actual measurement. The first phase consists of collecting a sample of the substance in the calibration cuvet and inserting it in the meter. In this way, a reference value is set up, so that it is possible to establish how much the color of the substance has varied in the next phase, after treating the sample in the measuring cuvet with a reagent.

The cuvet has a very important role because it is an optical element, and thus requires careful attention. First of all, it is important that both the measurement and the calibration cuvets are optically identical to provide the same measurement conditions. It is also necessary that the cuvet's surface is clean and not scratched, in order to avoid measurement interference due to unwanted reflection and absorption of light.

HI 93 series

Aluminum, Ammonia Photometers



Potable water should contain very limited concentrations of **Aluminum** in order to be considered of good quality. In fact, concentrations that are higher than 1.0 mg/L will make the water taste unpleasant. In addition, authorities have imposed a maximum level of aluminum in potable water of 0.2 mg/L.

Ammonia is often an excellent indication of the presence of animal or plant microbiological decay. It is tested in fish farms (fresh and salt water tanks) due to the damaging effects of its toxic nature. Its presence in rivers and reservoirs normally points to agricultural and/or civil pollutants. Ammonia is tested in lakes, rivers, portable water, boiler feed water, sewage, industrial and waste water. Ion Selective electrodes currently used for these measurements require up to 5 minutes for a stable response time and normally last 3 to 6 months. With chemical test kits, 3 or 4 kits using color cubes are needed to cover the full range. The best increment with chemical test kits is never better than 0.1 mg/L and in most cases, only 0.5 mg/L.

HANNA offers instruments for low, medium and high ammonia concentrations.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Aluminum	HI 93712	0.00 to 1.00 mg/L	±0.02 mg/L ±4% of reading	@ 470 nm	Adaptation of the aluminon method.
Ammonia LR	HI 93700	0.00 to 3.00 mg/L	±0.04 mg/L ±4% of reading	@ 470 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426-92, Nessler method.
Ammonia MR	HI 93715	0.00 to 9.99 mg/L	±0.05 mg/L ±5% of reading	@ 470 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426-92, Nessler method.
Ammonia* HR	HI 93733	0.0 to 50.0 mg/L	±0.5 mg/L ±5% of reading	@ 470 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426-92, Nessler method.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

* HI 93733 measures Ammonium Ion; to obtain Ammonia concentration multiply the value by 0.944

ORDERING INFORMATION

HI 93712 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

HI 93700 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

HI 93700C kit includes HI 93700, hard carrying case and reagents and instructions.

HI 93715 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93715C kit includes HI 93715, hard carrying case and reagents and instructions.

HI 93733 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

REAGENTS AND STANDARDS

for HI 93712

HI 93712-01 Reagent kit for 100 tests (Al)
HI 93712-03 Reagent kit for 300 tests (Al)

for HI 93700; HI 93715; HI 93733

HI 93700-01 Reagent kit for 100 tests ($N\text{-}NH_3$ LR)
HI 93700-03 Reagent kit for 300 tests ($N\text{-}NH_3$ LR)
HI 93715-01 Reagent kit for 100 tests ($N\text{-}NH_3$ MR)
HI 93715-03 Reagent kit for 300 tests ($N\text{-}NH_3$ MR)
HI 93733-01 Reagent kit for 100 tests (NH_4^+ HR)
HI 93733-03 Reagent kit for 300 tests (NH_4^+ HR)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 721310 9V batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Measuring cuvets (4)
HI 731325 Cuvet caps (4)
HI 740218 Rugged carrying case



HI 710010 — Shockproof Boot

HANNA instruments

With Great Products, Come Great Results™

Bromine, Chloride, Chlorine Photometers

Bromine is often utilized instead of chlorine as a disinfectant because of its less volatile nature. Its action has more effective results when the pH value is above 7.4, and the main application is pools, spas and hot tubs. Like all chemicals used for this purpose, the concentration must be within acceptable limits, which varies according to the application.

Chloride ions are one of the major inorganic anions in water and wastewater. Although high concentrations of chloride in water are not known to be toxic to humans, its regulation is mainly due to adverse effects on taste. It is essential to monitor chloride concentrations in boiler systems to prevent metal parts from being damaged. In high levels, chloride can corrode stainless steel. The level of chloride concentrations in boiler and cooling towers varies from small quantities to very high levels. Furthermore high levels of chloride can be toxic to plant life.

Chloride is a common non-toxic material present in small amounts in drinking water and produces a detectable salty taste at the aesthetic objective level of 250 mg/L (limit referred to the EPA Maximum Contaminant Level [MCL]). Measured levels are normally under 20 mg/L (ppm).

Chlorine is the most commonly used water disinfectant. Applications vary such as treating drinking water, wastewater, pool and spa sanitization, food processing and sterilization.



SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Bromine	HI 93716	0.00 to 8.00 mg/L	±0.08 mg/L ±3% of reading	@ 555 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18 th edition, DPD method.
Chloride	HI 93753	0.0 to 20.0 mg/L	±0.5 mg/L ±6% of reading	@ 470 nm	Adaptation of the mercury(II) thiocyanate method.
Chlorine, Free	HI 93701	0.00 to 2.50 mg/L	±0.03 mg/L ±3% of reading	@ 555 nm	Adaptation of the EPA recommended DPD method 330.5.
Chlorine, Free and Total	HI 93711	0.00 to 2.50 mg/L; 0.00 to 3.50 mg/L	±0.03 mg/L ±3% of reading	@ 555 nm	Adaptation of the EPA recommended DPD method 330.5.

Chlorine continued on next page

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93716 is supplied with 9V battery, sample cuvets and caps (2) , transport cap (1) and instructions.

HI 93753 is supplied with 9V battery, sample cuvettes and caps (2), transport cap (1) and instructions.

HI 93701 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93701C kit includes HI 93701, hard carrying case, reagents and instructions.

HI 93711 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93711C kit includes HI 93711, hard carrying case, reagents and instructions.

REAGENTS AND STANDARDS

for HI 93716

HI 93716-01 Reagent kit for 100 tests (Br_2)

HI 93716-03 Reagent kit for 300 tests (Br_2)

for HI 93753

HI 93753-01 Reagent kit for 100 tests (Cl^-)

HI 93753-03 Reagent kit for 300 tests (Cl^-)

for HI 93701 and HI 93711

HI 93701-01 Powder reagent kit for 100 tests (free chlorine)

HI 93701-03 Powder reagent kit for 300 tests (free chlorine)

HI 93701-F Liquid reagent kit for 300 tests (free chlorine)

HI 93701-T Liquid reagent kit for 300 tests* (total chlorine)

HI 93711-D3 DPD3 Reagent for 600 tests (total chlorine)

* HI 93701-T contains both HI 93701-F and HI 93711-D3

HI 93711-01 Powder reagent kit for 100 tests (total chlorine)

HI 93711-03 Powder reagent kit for 300 tests (total chlorine)

CALIBRATION STANDARDS FOR FREE CHLORINE

HI 93701-11 0.00, 0.25, 0.50 and 1.00 mg/L Free Cl_2 (1 ea.)

HI 93701-00 0.00 mg/L Free Cl_2 (4)

HI 93701-25 0.25 mg/L Free Cl_2 (4)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case

HI 93 series

Chlorine, Chlorine Dioxide, Chromium Photometers



Chlorine is the most commonly used water disinfectant. Applications vary such as treating drinking water, wastewater, pool and spa sanitization, food processing and sterilization.

Chlorine dioxide is used primarily as a disinfectant in potable water and also in various industrial processes. In potable water applications, it is gaining popularity over chlorine, considering that it does not generate trihalomethanes when reacting with organic compounds. In industrial applications, it is used as a bleaching agent in such applications as pulp and paper.

At normal temperatures **Chromium** is corrosion-resistant. For this reason, it plays an important role in the plating industry as well as cooling towers. In addition, it has certain qualities that make it useful in the production processes of the textile industry.

Hexavalent chromium is the most common form in which the metal is used, however, being highly toxic it needs to be continuously monitored in industrial wastes.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Chlorine HR, Free and Total	HI 93734	0.00 to 9.99 mg/L; 0.00 to 9.99 mg/L	±0.03 mg/L ±3% of reading	@ 555 nm	Adaptation of the EPA recommended DPD method 330.5.
Chlorine Dioxide	HI 93738	0.00 to 2.00 mg/L	±0.01 mg/L ±5% of reading	@ 585 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed.; Chlorophenol Red Method.
Chromium VI HR	HI 93723	0 to 1000 µg/L	±5 µg/L ±4% of reading	@ 555 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1687-92, diphenylcarbohydrazide method.
Chromium VI LR	HI 93749	0 to300 µg/L	±1 µg/L ±4% of reading	@ 555 nm	Adaptation of the ASTM Manual of Water and Environmental Technology, D1687-92, diphenylcarbohydrazide method.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93734 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93738 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93723 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93749 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

REAGENTS

for HI 93734

HI 93734-01 Liquid reagent kit for 100 tests (free and total chlorine)

HI 93734-03 Liquid reagent kit for 300 tests (free and total chlorine)

HI 93701-50 0.50 mg/L Free Cl_2 (4)

HI 93701-00 0.00 mg/L Free Cl_2 (4)

HI 93701-10 1.00 mg/L Free Cl_2 (4)

HI 93701-11 0.00, 0.25, 0.50, 1.00 mg/L Free Cl_2 (4)

for HI 93738

HI 93738-01 Reagent kit for 100 tests (ClO_2)

HI 93738-03 Reagent kit for 300 tests(ClO_2)

for HI 93723

HI 93723-01 Reagent kit for 100 tests (Cr VI HR)

HI 93723-03 Reagent kit for 300 tests (Cr VI HR)

for HI 93749

HI 93749-01 Reagent kit for 100 tests (Cr VI LR)

HI 93749-03 Reagent kit for 300 tests (Cr VI LR)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case



HI 731318 — Cuvet Cleaning Cloth

HANNA instruments
With Great Products, Come Great Results™

Color, Copper, Cyanide, Cyanuric Acid (CYS) Photometers



Color together with odor, taste and turbidity form an integral part of our sensory system. The term "color" is normally used to indicate "true" color, i.e. the color of water from which turbidity has been removed. The term "apparent color" refers to color due to both substances in solutions and suspended matter. Apparent color is obtained without filtering the original sample. Color in water is due to natural ions such as iron and manganese as well as plankton, humus and peat materials. Industrial waste, especially from textile, paper and pulp processes can also contribute to presence of color. A colored water is also a result of agricultural pollution.

Copper is found in effluents and natural water both as suspended solids and salt. A high concentration is toxic for plants and animals, which accounts for its rigorous monitoring by the authorities and industry. Lower concentrations are often employed to contain the growth of plankton and algae.

Cyanide is a pollutant that originates mostly from metallurgical and galvanic industrial plants. Cyanide is extremely poisonous to the human nervous system, and it is therefore imperative to monitor and control its level in potable water. Due to this, European norms limit the concentration of cyanide in drinking water to 0.05 mg/L, while the EPA has established that the maximum level is not to exceed 0.2 mg/L. Continuous monitoring in waste effluents is required, and cyanide is removed using alkaline chlorination procedures.

Cyanuric Acid (CYS) is best known as a stabilizing reagent for chlorine. It is widely applied in swimming pool and spa treatment programs to slow down the decomposition of hypochlorous acid. In outside pool areas, this process is accelerated by the effects of UV rays. When applied properly it can save up to 80% of normal chlorine consumption in pools during peak months.

Cyanuric acid is also used in chlorinated beaches, selective herbicides and whitening agents.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Color	HI 93727	0 to 500 PCU (Platinum Cobalt Units)	±10 PCU ±5% of reading	@ 470 nm	Colorimetric Platinum Cobalt Units
Copper	HI 93702	0.00 to 5.00 mg/L	±0.2 mg/L ±4% of reading	@ 585 nm	Adaptation of the EPA approved method.
Cyanide	HI 93714	0.000 to 0.200 mg/L	±0.005 mg/L ±3% of reading	@ 585 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed.
Cyanuric Acid	HI 93722	0 to 80 mg/L	±1 mg/L ±15% of reading	@ 555 nm	Adaptation of the turbidimetric method.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93727 is supplied with 9V battery, sample cuvets and caps (3), transport cap (1) and instructions.

HI 93702 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93714 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93722 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

REAGENTS AND STANDARDS

for HI 93702

HI 93702-01 Reagent kit for 100 tests (Cu HR)

HI 93702-03 Reagent kit for 300 tests (Cu HR)

HI 93702T-01 Reagent kit for 100 tests (Cu HR)

HI 93702T-03 Reagent kit for 300 tests (Cu HR)

for HI 93714

HI 93714-01 Reagent kit for 100 tests (CN^-)

HI 93714-03 Reagent kit for 300 tests(CN^-)

for HI 93722

HI 93722-01 Reagent kit for 100 tests (CYS)

HI 93722-03 Reagent kit for 300 tests (CYS)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution ,250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case



HI 731331 — Measuring Cuvets

HI 93 series

Fluoride, Mg Hardness, Ca Hardness Photometers



Fluoride is best known for preventing tooth decay. Water authorities often add fluoride to drinking water to maintain approximately a 1.0 mg/L concentration. Fluoride can be found naturally in ground water, particularly if a reservoir is in the proximity of draws of sea water. While fluoride does help prevent tooth decay, too little can be ineffective and too much can cause staining.

Water, with exception to distilled water, contains dissolved salts (magnesium and calcium carbonates). The concentration of these salts determines the water **Hardness**, which can be expressed in calcium carbonate or magnesium carbonate. The sum of these two represents the total hardness level.

The presence of dissolved salts is due to the fact that water often comes from underground sources which are in turn made up of rain water filtered through deep ground layers. Rain water eventually reaches a waterproof flooring and forms a natural tank which is also called the water bearing stratum. By passing through the various layers of soil and rock, rain water dissolves some of the mineral substances. Hardness is a consequence of the type of rock layers which the water passes through and of its permanence in the water bearing stratum.

In addition, this parameter is also related to the phenomenon of pipe rusting in water heating and cooling systems, reverse osmosis and demineralization plants.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Fluoride	HI 93729	0.00 to 2.00 mg/L	±5% of reading	@ 585 nm	Adaptation of the SPADNS method
Fluoride HR	HI 93739	0.0 to 20.0 mg/L	±0.5 ppm ±3% of reading	@ 585 nm	Adaptation of the SPADNS method.
Mg Hardness	HI 93719	0.00 to 2.00 mg/L	±0.11 mg/L ±5% of reading	@ 555 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. EDTA colorimetric method.
Ca Hardness	HI 93720	0.00 to 2.70 mg/L	±0.11 ±5% of reading	@ 555 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed.Calmagite method.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93729 is supplied with 9V battery, sample cuvets and caps (2), transport cap and instructions.

HI 93729C kit includes HI 93729, hard carrying case, reagents and instructions.

HI 93739 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93719 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93720 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

REAGENTS AND STANDARDS

for HI 93729

HI 93729-01 Reagent kit for 100 tests (F^- LR)

HI 93729-03 Reagent kit for 300 tests (F^- LR)

for HI 93739

HI 93739-01 Reagent kit for 100 tests (F^- HR)

HI 93739-03 Reagent kit for 300 tests (F^- HR)

HI 93703-53 Reagent for chlorine reducing concentration

for HI 93719

HI 93719-01 Reagent kit for 100 tests (Mg Hardness)

HI 93719-03 Reagent kit for 300 tests (Mg Hardness)

for HI 93720

HI 93720-01 Reagent kit for 100 tests (Ca Hardness)

HI 93720-03 Reagent kit for 300 tests (Ca Hardness)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvet (4)

HI 731325 Cuvet cap (4)

HI 731341 Automatic pipette, 1000 µL fixed volume

HI 731342 Automatic pipette, 2000 µL fixed volume

HI 731351 Tip for automatic pipette 1000 µL (25)

HI 731352 Tip for automatic pipette 2000 µL (4)

HI 740218 Rugged carrying case

Total Hardness, Hydrazine, Iodine Photometers

Total hardness, that is the presence of magnesium and calcium, is due mainly to the run-off water dissolving these salts as it flows or filters through different strata. Hardness can also cause scaling of pipes in cooling and heating systems.

Hydrazine is a liquid chemical substance normally used in high pressure heating plants because of its properties as an oxygen inhibitor. It is added to avoid scaling and corrosion in the plant itself. Hydrazine reacts with dissolved oxygen to yield nitrogen and water, so that hydrazine has the advantage over the sulfite treatment because it does not produce any dissolved solids in the boiled water. Hydrazine is also used in tanks because it controls the growth of bacteria.

High concentrations of hydrazine can create a reaction with ammonia, which may result in damage to parts made of copper.

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



SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Total Hardness	HI 93735	**LR:** 0 to 250 mg/L (ppm); **MR:** 200 to 500 mg/L (ppm); **HR:** 400 to 750 mg/L (ppm); **°f:** 0 to 25; 20 to 50; 40 to 75; **°D:** 0.0 to 13.9; 11.1 to 27.8; 22.2 to 41.7; **°E:** 0.0 to 17.5; 14.0 to 35.0; 28.0 to 52.5	±5 mg/L or ±4% of reading (0 to 250 mg/L); ±7 mg/L or ±3% (200 to 500 mg/L); ±10 mg/L or ±2% (400 to 750 mg/L)	@ 470 nm	Adaptation of the EPA 130.1 method.
Hydrazine	HI 93704	0 to 400 µg/L	±3% f.s.	@ 470 nm	Adaptation of the ASTM Manual of Water and Enviromental Technology, D1385-88 Dimethylaminobenzaldehyde method for natural and treated water.
Iodine	HI 93718	0.0 to 12.5 mg/L	±0.1 mg/L ±5% of reading	@ 555 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93735 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93704 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93718 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

REAGENTS AND STANDARDS

HI 93735-00 Reagent kit for 100 tests (0-250 mg/L)

HI 93735-01 Reagent kit for 100 tests (200-500 mg/L)

HI 93735-02 Reagent kit for 100 tests (400-750 mg/L)

HI 93735-0 Reagent kit for 100 tests (0-750 mg/L)

for HI 93704

HI 93704-01 Reagent kit for 100 tests (N_2H_4)

HI 93704-03 Reagent kit for 300 tests (N_2H_4)

for HI 93718

HI 93718-01 Reagent kit for 100 tests (I_2)

HI 93718-03 Reagent kit for 300 tests (I_2)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 721310 9V Batteries (100)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case

HI 93 series

Iron, Manganese, Molybdenum Photometers



The **Iron** concentration in water needs to be monitored because it becomes harmful above certain levels.

In domestic water, for instance, iron can unpleasantly alter the taste, stain laundry, damage kitchenware and favor the growth of certain bacteria. Iron is also an indicator of ongoing corrosion in industrial plants or in water cooling and heating systems. Moreover, iron is normally monitored in mining wastewater to avoid contamination.

Manganese is one of the most common metals present in nature and is used in many industrial applications, for example, in the production of fertilizers and in the pharmaceutical industry.

Manganese salts are also used in iron alloys (steel manufacturing) and non-iron alloys as it improves their corrosion resistance and hardness.

Manganese is not considered to be dangerous, but high concentrations of this metal in water will alter the taste and smell. In industry, manganese can produce corrosion and incrustations to pipes when found in high concentrations.

Molybdenum or molybdate are salts often used in industrial cooling towers. They are nontoxic and continue to become more popular over chromates as a corrosion inhibitor. Molybdenum has a wide variety of applications as an alloying agent in steel and cast iron, a pigment for inks and paints and also as a multipurpose solid lubricant.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Iron HR	HI 93721	0.00 to 5.00 mg/L	±0.04 mg/L ±2% of reading	@ 470 nm	Adaptation of the phenantroline EPA recommended method 315B for natural and treated waters.
Iron LR	HI 93746	0 to 400 µg/L	±10 µg/L ±8% of reading	@ 555 nm	Adaptation of the TPTZ method;
Manganese HR	HI 93709	0.0 to 20.0 mg/L	±0.2 mg/L ±3% of reading	@ 555 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. Periodate Oxidation Method.
Manganese LR	HI 93748	0 to 300 µg/L	±2 µg/L ±3% of reading	@ 555 nm	Adaptation of the PAN method.
Molybdenum	HI 93730	0.0 to 40.0 mg/L	±0.3 mg/L ±5% of reading	@ 470 nm	Adaptation of the mercaptoacetic acid method.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93721 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93721C kit includes HI 93721, hard carrying case, reagents and instructions.

HI 93746 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93709 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93748 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93730 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

REAGENTS AND STANDARDS

for HI 93721

HI 93721-01 Reagent kit for 100 tests (Fe HR)

HI 93721-03 Reagent kit for 300 tests (Fe HR)

for HI 93746

HI 93746-01 Reagent kit for 50 tests (Fe LR)

HI 93746-03 Reagent kit for 150 tests (Fe LR)

for HI 93709

HI 93709-01 Reagent kit for 100 tests (Mn HR)

HI 93709-03 Reagent kit for 300 tests (Mn HR)

for HI 93748

HI 93748-01 Reagent kit for 50 tests (Mn LR)

HI 93748-03 Reagent kit for 150 tests (Mn LR)

for HI 93730

HI 93730-01 Reagent kit for 100 tests (Mo)

HI 93730-03 Reagent kit for 300 tests (Mo)

SOLUTONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case

HANNA instruments

With Great Products, Come Great Results™

Nickel, Nitrate Photometers

Nickel is commonly utilized by the electroplating industry in processes utilizing stainless steel, cobalt or nickel alloys.

Even though nickel is regarded as non-toxic to humans, concentrations found in wastewater exceeding 0.5 mg/L can cause damage to certain plants and aquatic life.

Nickel is also used in batteries, fuel cells and hydrogenation of vegetable oils in the food industry.

Nitrates are present in nature as a result of decomposition of organic microorganisms or due to their use as fertilizers. Nitrates reduce to nitrites, which in turn easily combine to form substances dangerous to man.

A maximum level of 45 mg/L is established as a worldwide guideline for nitrate concentration in water. In Europe, the maximum consented level of nitrates in potable water is 50.0 mg/L, while in the USA the EPA has established a guideline for the maximum level of nitrate nitrogen of 10 mg/L (NO_3^--N), which corresponds to 45.0 mg/L of nitrates.



SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Nickel HR	HI 93726	0.00 to 7.00 g/L	±4% of reading	@ 555 nm	Adaptation of the photometric method.
Nickel LR	HI 93740	0.000 to 1.000 mg/L	±0.010 mg/L ±7% of reading	@ 555 nm	Adaptation of the PAN method
Nitrate	HI 93728	0.0 to 30.0 mg/L (NO_3^--N)	±0.5 mg/L ±10% of reading	@ 555 nm	Adaptation of the cadmium reduction method.
Nitrate	HI 93828	0 to 100 mg/L (NO_3^-)	±5 mg/L ±5% of reading	@ 555 nm	Adaptation of the cadmium reduction method.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93726 is supplied with 9V battery, sample cuvets and caps (2) , transport cap (1) and instructions.

HI 93740 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93728 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93728C is supplied with HI 93728, hard carrying case, reagents and instructions.

HI 93828 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93828C is supplied with HI 93828, hard carrying case, reagents and instructions.

REAGENTS AND STANDARDS

for HI 93726

HI 93726-01 Reagent kit for 100 tests (Ni HR)
HI 93726-03 Reagent kit for 300 tests (Ni HR)

for HI 93740

HI 93740-01 Reagent kit for 50 tests (Ni LR)
HI 93740-03 Reagent kit for 150 tests (Ni LR)

for HI 93728

HI 93728-01 Reagent kit for 100 tests (NO_3^--N)
HI 93728-03 Reagent kit for 300 tests (NO_3^--N)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 740029P 9V Batteries (10)
2HI 731318 Cuvet cleaning cloth (4)
HI 731321 Measuring cuvets (4)
HI 731325 Cuvet caps (4)
HI 740218 Rugged carrying case



HI 710010 — Shockproof Boot

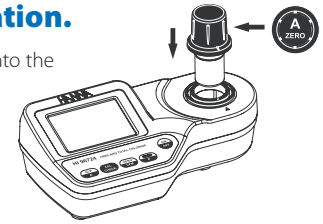
Water Resistant Single Parameter Photometers

with HANNA's Exclusive CAL CHECK™

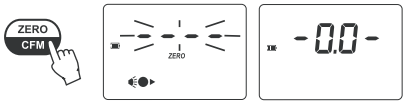
CAL CHECK™ Validation*

2-step validation procedure to ensure proper calibration.

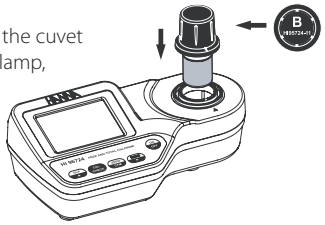
Place the CAL CHECK™ Standard A into the cuvet holder and press ZERO/CFM. The lamp, cuvet and detector icons will appear on the display followed by "-0.0-". The meter is now zeroed and ready for validation.



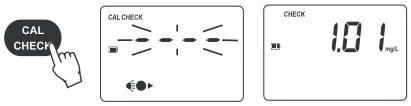
Zero the meter prior to validation...



Place the CAL CHECK™ standard B into the cuvet holder and press CAL CHECK™. The lamp, cuvet and detector icons together with "CAL CHECK" will appear on the display. At the end of the measurement the display will show the validation standard value.



... and compare accuracy against a known standard.

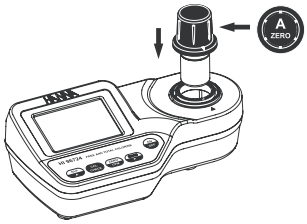


CAL CHECK™ Calibration*

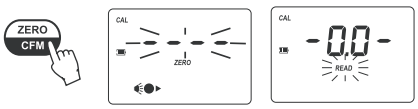


Calibrate your instrument quickly and easily.

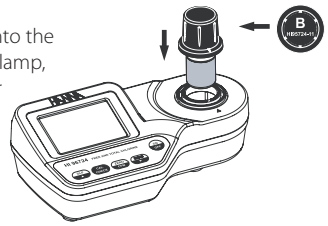
Press and hold CAL CHECK™ for three seconds to enter calibration mode. Place the CAL CHECK™ Standard A into the cuvet holder and press ZERO/CFM. The lamp, cuvet and detector icons will appear on the display followed by "-0.0-". The meter is now zeroed and ready for calibration.



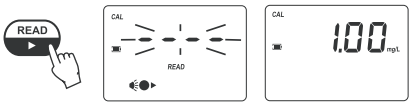
Zero the meter prior to calibration...



Place the CAL CHECK™ Standard B into the cuvet holder. Press READ/▶ and the lamp, cuvet and detector icons will appear on the display. After measurement the instrument will show the Cal Check™ Standard value.



... and calibrate to a known standard.



The reading should be within specifications as reported in the CAL CHECK™ Standard Certificate. If the value is found out of the specifications, please check that the cuvets are free of fingerprints, oil or dirt and repeat validation. If results are still found out of specifications, then recalibrate the instrument.

* HI 96724 is shown as an example for validation/calibration. **Each CAL CHECK™ cuvet is clearly labeled to its respective measurement. Please read the full instruction manual before validation/calibration.



Available as a KIT

Includes CAL CHECK™ standard cuvets, cuvet cleaning cloth and scissors (when applicable) bundled in a deluxe hardshell carrying case

Just choose the part # that ends with "C". Eg: HI 96715C



Peace of mind.

When performing measurements you need to know that the instrument you are using is right on. With HANNA's exclusive CAL CHECK™ feature you can now rest assured. Simply insert the factory calibrated standard of a known concentration and verify that your instrument is accurate.

HI 93 series

Nitrite, Dissolved Oxygen, Phosphate Photometers



Nitrites are an intermediate product in the nitrogen cycle and are produced by ammonia oxidation with water, or even originate in industrial waste directly. They must not be present in drinking water.

Nitrites can be harmful to aquatic organisms even in low concentrations and for this reason, they are closely monitored in aquaculture facilities. In cooling towers, however, an adequate amount of nitrites is necessary to prevent corrosion.

In high concentrations, they can be harmful to the environment and to humans. They are, therefore, normally monitored to verify the quality of water for domestic use, as well as lakes and ponds.

In aquaculture, **Dissolved Oxygen** is arguably the most important parameter of water quality. Most species require a minimum of 3 ppm DO, 8-10 ppm is preferable. Unlike other gases such as nitrogen, oxygen supersaturation doesn't usually result in gas bubble disease ("pop-eye"), so high levels generally aren't an issue.

Phosphates are particularly important for the growth and development of plant roots, and hence are one of the most common fertilizers used in agriculture.

In addition, phosphates are usually utilized in detergents and are needed, in small quantities, for heating systems. However, high concentrations of phosphates can cause environmental pollution: they are for example a primary cause of eutrophication.

For these reasons, it is necessary to closely monitor the phosphate levels present in both civil and industrial waste water.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Nitrite LR	HI 93707	0.00 to 0.35 mg/L	±0.02 mg/L ±4% of reading	@ 470 nm	Adaptation of the EPA method 354.1.
Nitrite HR	HI 93708	0 to 150 mg/L	±4 mg/L ±4% of reading	@ 585 nm	Adaptation of the Ferrous Sulfate method.
Dissolved Oxygen	HI 93732N	0.0 to 10.0 mg/L	±0.2 mg/L ±3% of reading	@ 470 nm	Modified Winkler Method.
Phosphate LR	HI 93713	0.00 to 2.50 mg/L	±0.04 mg/L ±4% of reading	@ 890 nm	Adaptation of the ascorbic acid method.
Phosphate HR	HI 93717	0.0 to 30.0 mg/L	±1 mg/L ±4% of reading	@ 470 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93707 is supplied with 9V Battery, Sample Cuvets and Caps (2), Transport Cap (1) and instructions.

HI 93708 is supplied with 9V Battery, Sample Cuvets and Caps (2), Transport Cap (1) and instructions.

HI 93732N is supplied with Sample Cuvets and Caps (2), Transport Cap (1), 60 mL glass Bottle with Stopper (1), 9V Battery and instructions.

HI 93713 is supplied with 9V Battery, Sample Cuvets and Caps (2) and Transport Cap (1)

HI 93713C is supplied with HI 93713, rugged carrying case, reagents and instructions.

HI 93717 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

REAGENTS AND STANDARDS

for HI 93707

HI 93707-01 Reagent kit for 100 tests ($N\text{-}NO_2^-$ LR)

HI 93707-03 Reagent kit for 300 tests ($N\text{-}NO_2^-$ LR)

for HI 93708

HI 93708-01 Reagent kit for 100 tests (NO_2^- HR)

HI 93708-03 Reagent kit for 300 tests (NO_2^- HR)

for HI 93732

HI 93732-01 Reagent kit for 100 tests (D.O.)

HI 93732-03 Reagent kit for 300 tests (D.O.)

for HI 93713

HI 93713-01 Reagent kit for 100 tests (PO_4^{3-} LR)

HI 93713-03 Reagent kit for 300 tests (PO_4^{3-} LR)

for HI 93717

HI 93717-01 Reagent kit for 100 tests (PO_4^{3-} HR)

HI 93717-03 Reagent kit for 300 tests (PO_4^{3-} HR)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740038 60 mL glass bottle and stopper
HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 740029P 9V Batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Measuring cuvets (4)
HI 731325 Cuvet caps (4)
HI 740218 Rugged carrying case

HANNA instruments

With Great Products, Come Great Results™

Phosphorus, Potassium, Silica Photometers

Phosphorus is found in nature as phosphates. Its concentration in water is monitored because it causes corrosion when present in high levels. It is also an essential parameter for the growth of microorganisms and algae, which are often unwanted in tanks and reserves of water.

Phosphorus is also an essential element to plant growth and is needed in large amounts.

Potassium as a chemical element is commonly found in nature. It is present in soil and drinking water and is also an essential element for the growth of plants and animals.

The concentration of potassium is important in determining the quality of soil in applications such as greenhouses, agriculture and horticulture. Potassium salts are also a common component of fertilizers.

Silica is found in all natural waters in the dissolved mineral form. Silica is only slightly soluble in water; solubility and therefore the form of silica in water depends on the pH level of the water and on the minerals containing silica in contact with water.

Its presence in industrial applications is undesirable since it causes scale. In particular, high pressure turbines are highly effected by this factor.

Heating systems and reverse osmosis plants also require monitoring of silica.



SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Phosphorus	HI 93706	0.0 to 15.0 mg/L	±0.3 mg/L ±4% of reading	@ 470 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater,18th ed.
Potassium	HI 93750	0.00 to 50.0 mg/L	±0.5 mg/L ±5% of reading (0.00 to 9.95 mg/L); ±1 mg/L ±5% of reading (10.0 to 50.0 mg/L)	@ 470 nm	Adaptation of the Turbidimetric Tetraphenylborate Method.
Silica	HI 93705	0.00 to 2.00 mg/L	±0.03 mg/L ±3% of reading	@ 890 nm	Adaptation of the ASTM D859 method of the heteropoly blue method.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93706 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93750 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93705 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

REAGENTS AND STANDARDS

for HI 93706

HI 93706-01 Reagent kit for 100 tests (P)

HI 93706-03 Reagent kit for 300 tests (P)

for HI 93750

HI 93750-01 Reagent kit for 100 tests (K)

HI 93750-03 Reagent kit for 300 tests (K)

for HI 93705

HI 93705-01 Reagent kit for 100 tests (SiO_2)

HI 93705-03 Reagent kit for 300 tests (SiO_2)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case



HI 710009 — Shockproof Boot

HI 93 series

Silver, Sulfate, Zinc Photometers



Small quantities of **Silver** are bacteriostatic or bactericidal. As a result, it is at times used in disinfection of pools and spas, as well as in water filters.

However, the presence of silver in water is generally indicative of pollution from mainly film manufacturers, film processors and surface finishers. In fact, silver levels are closely monitored in these sectors since its presence can cause discoloration of the skin, eyes and mucous membranes.

Sulfate is widely present in natural waters in different concentrations. Sulfate concentration is to be kept within a strict range for drinking water, especially since the value can be high near mine drainage points.

Sulfate is also rigorously tested in the production of beverages such as beer, due to its significant effect upon odor and taste.

Sulfate is added to certain types of boilers to help precipitate calcium and magnesium and to inhibit encrustation. Too much sulfate can be corrosive in high pressure boilers, electric turbines and their heat exchangers. In fact, in these applications it is important to keep the level below a specific limit. Similar checks of sulfate presence are carried out in water used for different production cycles, including those of semiconductors.

Even though **Zinc** is nontoxic to human beings, concentrations above 5 mg/L can cause a bitter, astringent taste. This level of zinc can result in a milky, iridescent color in alkaline waters and irritate the human digestive system.

Zinc in low quantities, however, is a beneficial and essential element necessary for body growth. In fact, US drinking water contains an average of 1.33 mg/L of zinc.

Zinc is normally introduced into drinking water through industrial effluents, especially due to dezincification of brass and deterioration of galvanized iron.

In addition to drinking water, zinc is measured in surface finishing, boilers and cooling towers, water conditioning, effluent waters and many other applications.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Silver	HI 93737	0.000 to 1.000 mg/L	±0.005 mg/L ±10% of reading	@ 555 nm	PAN method.
Sulfate	HI 93751	0 to 150 mg/L	±1 mg/L ±5% of reading	@ 470 nm	Adaptation of the turbidimetric method.
Zinc	HI 93731	0.00 to 3.00 mg/L	±0.03 mg/L ±3% of reading	@ 585 nm	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed.

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93737 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1)

HI 93751 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1)

HI 93731 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1)

REAGENTS AND STANDARDS

for HI 93737

HI 93737-01 Reagent kit for 50 tests (Ag)

HI 93737-03 Reagent kit for 150 tests (Ag)

for HI 93751

HI 93751-01 Reagent kit for 100 tests (SO_4^{2-})

HI 93751-03 Reagent kit for 300 tests (SO_4^{2-})

for HI 93731

HI 93731-01 Reagent kit for 100 tests (Zn)

HI 93731-03 Reagent kit for 300 tests (Zn)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case

HANNA instruments

With Great Products, Come Great Results™

Calcium and Magnesium, Chlorine and pH, Cyanuric Acid and pH Photometers

HI 93752 is a two-in-one microprocessor-based instrument that measures two important parameters in agriculture and hydroponics. HI 93752 has been designed to perfectly fit the needs of these applications in one portable photometer.

HANNA instruments® has developed HI 93710, a portable microprocessor-based instrument to measure pH, free chlorine and total chlorine, three critical parameters to ensure good water quality.

In swimming pools, spas and similar applications, cyanuric acid helps to stabilize the breakdown of chlorine, especially in sunlight. Frequent testing of both cyanuric acid and pH will help to minimize chlorine consumption.

A single instrument can now be used to measure both pH and cyanuric acid. **HI 93724** photometer is easy and saves time and expense of setting up separate tests.



SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Calcium and Magnesium HR	HI 93752	Ca: 0 to 400 mg/L Mg: 0 to 150 mg/L	Ca: ±10 mg/L ±5% of reading Mg: ±3 mg/L ±3% of reading	@ 470 nm	Ca: Adaptation of the Oxalate method Mg: Adaptation of the Calmagite method
Free and Total Chlorine, pH	HI 93710	Free Chlorine: 0.00 to 2.50 mg/L Total Chlorine: 0.00 to 3.50 mg/L pH: 5.9 to 8.5 pH	Chlorine: 0.01 mg/L pH: ±0.1 pH	@ 555 nm	Chlorine: Adaptation of the EPA recommended DPD method 330.5, pH: Phenol red method
Cyanuric Acid and pH Meter	HI 93724	Cyanuric Acid: 0 to 80 mg/L pH: 5.9 to 8.5 pH	Cyanuric Acid: ±1 mg/L ±15% of reading pH: ±0.1	@ 555 nm	Cyanuric Acid: Adaptation of the turbidimetric method pH: Phenol red method

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93752 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

HI 93710 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

HI 93710C is supplied with HI 93710, hard carrying case and reagents and instructions.

HI 93724 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

REAGENTS AND STANDARDS

for HI 93752

HI 93752-01 Reagent kit for 100 tests (50 tests for Ca and 50 tests for Mg)

HI 93752-03 Reagent kit for 300 tests (150 tests for Ca and 150 tests for Mg)

for HI 93710

HI 93701-01 Reagent kit for 100 tests (Free Cl_2)

HI 93701-03 Reagent kit for 300 tests (Free Cl_2)

HI 93701-F Liquid reagent Kit for 300 tests (Free Cl_2)

HI 93701-T Liquid reagent Kit for 300 tests (Total Cl_2)

HI 93710-01 Reagent kit for 100 tests (pH)

HI 93710-03 Reagent kit for 300 tests (pH)

HI 93711-01 Reagent kit for 100 tests (Total Cl_2)

HI 93711-03 Reagent kit for 300 tests (Total Cl_2)

HI 93711-D3 DPD3 reagent for 600 tests (Total Cl_2)

for HI 93724

HI 93710-01 Reagent kit for 100 tests (pH)

HI 93710-03 Reagent kit for 300 tests (pH)

HI 93722-01 Reagent kit for 100 tests (CYS)

HI 93722-03 Reagent kit for 300 tests (CYS)

CALIBRATION STANDARDS FOR FREE CHLORINE

HI 93701-00 0.00 mg/L Free Cl_2 (4)

HI 93701-25 0.25 mg/L Free Cl_2 (4)

HI 93701-50 0.50 mg/L Free Cl_2 (4)

HI 93701-10 1.00 mg/L Free Cl_2 (4)

HI 93701-11 0.00, 0.25, 0.50, 1.00 mg/L Free Cl_2 (4)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue

HI 710010 Shockproof rubber boot, orange

HI 740029P 9V Batteries (10)

HI 731318 Cuvet cleaning cloth (4)

HI 731321 Measuring cuvets (4)

HI 731325 Cuvet caps (4)

HI 740218 Rugged carrying case

HI 93 series

pH and Total Hardness, Iron and Total Hardness, Iron and Manganese Photometers



Constant monitoring of hardness levels is critical in many applications. Water hardness is easily noticed in laundry applications, where its presence greatly reduces the effectiveness of soaps and detergents.

High levels of hardness in the water supply is also a major industrial concern. The scaling caused by hard water in pipes and equipment can cause costly loss of efficiency and result in the failure of machinery.

The **HI 93725** measures pH and total hardness for industrial and municipal applications.

The iron concentration in water needs to be monitored since it can become harmful above certain levels. In domestic water, for instance, iron can alter the taste and make it unpleasant to drink. It can also stain laundry, damage kitchen wares and favor the growth of certain bacteria. Low levels of iron are also critical in beverage production.

With the **HI 93741** you can keep a watchful eye over both iron and hardness levels.

Manganese, in high concentrations, can produce corrosion and scaling in pipes, which is a serious industrial concern.

The HANNA solution for these applications is the **HI 93742**, a hand-held photometer which measures low range iron and manganese.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
pH and Total Hardness	HI 93725	pH: 5.9 to 8.5 pH Total Hardness: 0.00 to 4.70 mg/L	pH: ±0.1 Total Hardness: ±0.11 mg/L ±5% of reading	@ 555 nm	pH: Phenol red method Total Hardness: Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed., Calmagite/Colorimetric method
Iron and Total Hardness	HI 93741	Iron: 0 to 400 µg/L Total Hardness: 0.00 to 4.70 mg/L	Iron: ±10 µm/L ±8% of reading Total Hardness: ±0.11 mg/L ±5% of reading	@ 555 nm	Iron: Adaptation of the TPTZ method Total Hardness: Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed.)
Iron and Manganese LR	HI 93742	Iron: 0 to 400 µg/L Manganese: 0 to 300 µg/L	Iron: ±10 µg/L ±8% of reading Manganese: ±2 µg/L ±3% of reading	@ 555 nm	Iron: Adaptation of the TPTZ method Manganese: Adaptation of the PAN method

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93725 is supplied with 9V battery, sample cuvets and caps (3) and transport cap (1)

HI 93741 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1)

HI 93742 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1)

REAGENTS AND STANDARDS

for HI 93725

HI 93710-01 Reagent kit for 100 tests (pH)
HI 93710-03 Reagent kit for 300 tests (pH)
HI 93719-01 Reagent kit for 100 tests (Total Hardness)
HI 93719-03 Reagent kit for 100 tests (Total Hardness)

for HI 93741

HI 93746-01 Reagent kit for 100 tests (Fe LR)
HI 93746-03 Reagent kit for 300 tests (Fe LR)
HI 93719-01 Reagent kit for 100 tests (total hardness)
HI 93719-03 Reagent kit for 300 tests (total hardness)

for HI 93742

HI 93746-01 Reagent kit for 50 tests (Fe LR)
HI 93746-03 Reagent kit for150 tests (Fe LR)
HI 93748-01 Reagent kit for 50 tests (Mn LR)
HI 93748-03 Reagent kit for 150 tests (Mn LR)
HI 93701-11 0.00, 0.25, 0.50, 1.00 mg/L Free Cl_2 (4)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 740029P 9V Batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Measuring cuvets (4)
HI 731325 Cuvet caps (4)
HI 740218 Rugged carrying case

Iron and pH; Total Hardness, Iron and pH; Chlorine, Cyanuric Acid and pH Photometers

With **HI 93743**, you can measure pH in a few short and quick steps. The measurements are also impervious to temperature variations—a common source of error with conventional pH meters.

HI 93743 can also measure iron, a prime cause of unpleasant taste in drinking water and damage to kitchen ware and laundry.

Three important parameters measured with just one meter! The easy-to-use **HI 93744** can replace several meters or test kits to practically perform the same tests with better accuracy.

The **HI 93104** is specifically designed for swimming pool and spa applications. This rugged meter features the four most common parameters for these applications.



SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Iron LR and pH	HI 93743	Iron: 0 to 400 µg/L pH: 5.9 to 8.5 pH	Iron: ±10 µg/L ±8% of reading pH: ±0.1 pH	@ 555 nm	Iron: Adaptation of the TPTZ method pH: Phenol red method
Total Hardness, Iron LR and pH	HI 93744	Iron: 0 to 400 µg/L pH: 5.9 to 8.5 pH Total Hardness: 0.00 to 4.70 mg/L	Iron: ±10 µg/L ±8% of reading pH: ±0.1 pH Total Hardness: ±0.11 mg/L ±5% of reading	@ 555 nm	Fe: Adaptation of the TPTZ method pH: Phenol red method Total Hardness: Adaptation of theStandard Methods for the Examination of Water and Wastewater, 18th ed. Calmagite/colorimetric method
Chlorine, CYS and pH	HI 93104	Free Chlorine: 0.00 to 2.50 mg/L Total Chlorine: 0.00 to 3.50 mg/L Cyanuric Acid: 0 to 80 mg/L pH: 5.9 to 8.5 pH	Chlorine: ±0.03 mg/L ±3% of reading Cyanuric Acid: ±1 mg/L ±15% of reading pH: ±0.1 pH	@ 555 nm	Chlorine:Adaptation of the EPA recommended DPD method 330.5 ; Cyanuric Acid: Adaptation of the Turbidimetric method; pH: Phenol red method

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93743 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

HI 93744 is supplied with 9V battery, sample cuvets and caps (2) and transport cap (1) and instructions.

HI 93104 is supplied with 2 cuvets, battery and instructions and instructions.

HI 93104C is supplied with HI 93104, hard carrying case and reagents and instructions.

REAGENTS AND STANDARDS

for HI 93743

HI 93710-01 Reagent kit to100 tests (pH)
HI 93710-03 Reagent kit to 300 tests (pH)
HI 93746-01 Reagent kit to 50 test (Fe LR)
HI 93746-03 Reagent kit to 150 (Fe LR)

for HI 93744

HI 93710-01 Reagent kit for 100 tests (pH)
HI 93710-03 Reagent kit for 300 tests (pH)
HI 93746-01 Reagent kit for 50 test (Fe LR)
HI 93746-03 Reagent kit for 150 test (Fe LR)
HI 93719-01 Reagent kit for 100 tests (Total Hardness)
HI 93719-03 Reagent kit for 300 tests (Total Hardness)

for HI 93104

HI 93701-01 Reagent kit for 100 tests (free Cl_2)
HI 93701-03 Reagent kit for 300 tests (free Cl_2)
HI 93701-F Liquid reagent for 300 tests (free Cl_2)
HI 93701-T Liquid reagent for 300 tests (Total Cl_2)
HI 93710-01 Reagent kit for 100 tests (pH)
HI 93710-03 Reagent kit for 300 tests (pH)
HI 93711-01 Reagent kit for 100 tests (Total Cl_2)
HI 93711-03 Reagent kit for 300 tests (Total Cl_2)
HI 93722-01 Reagent kit for 100 tests (CYS)
HI 93722-03 Reagent kit for 300 tests (CYS)

CALIBRATION STANDARDS FOR FREE CHLORINE

HI 93701-00 0.00 mg/L Free Cl_2 (4)
HI 93701-25 0.25 mg/L Free Cl_2 (4)
HI 93701-50 0.50 mg/L Free Cl_2 (4)
HI 93701-10 1.00 mg/L Free Cl_2 (4)
HI 93701-11 0.00, 0.25, 0.50, 1.00 mg/L Free Cl_2 (4)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 740029P 9V Batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Measuring cuvets (4)
HI 731325 Cuvet caps (4)
HI 740218 Rugged carrying case

HI 93 series

Chlorine, Total Hardness, Iron and pH; Bromine, Chlorine, Cyanuric Acid, Iron, Iodine and pH Photometers



Chlorine and pH are two of the most closely monitored parameters in water quality tests.

Hardness is also an important parameter, attentively regulated to reduce waste or ensure proper functioning of equipment. Iron can cause an unpleasant taste or stain kitchen ware or laundry.

With **HI 93745** you have a powerful instrument to keep all these parameters under control.

The microprocessor-based HI 93745 has been factory programmed to read the above parameters with such ease that it can be operated by technical and non-technical personnel alike.

This top-of-the-range multi-parameter photometer can save you time and money. If you need a simple, but professional meter measuring the most important constituents of water, especially in pools and spas, then **HI 93101** has been designed for you.

SPECIFICATIONS

PARAMETER	CODE	RANGE	ACCURACY	NARROW BAND FILTER	METHOD
Free and Total Chlorine, Total Hardness, Iron, pH	HI 93745	Free Chlorine: 0.00 to 2.50 mg/L Total Chlorine: 0.00 to 3.50 mg/L Total Hardness: 0.00 to 4.70 mg/L Iron: 0 to 400 µg/L pH: 5.9 to 8.5 pH	Chlorine: ±0.03 mg/L ±3% of reading; Total Hardness: ±0.11 mg/L ±5% of reading; Iron: ±10 µg/L ±8% of reading; pH: ±0.1 pH	@ 555 nm	Chlorine: Adaptation of the EPA 330.5 Method, DPD Total Hardness: Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th ed. Calmagite/colorimetric method; Iron: Adaptation of TPTZ method; pH: Phenol red method
Bromine, Chlorine, Cyanuric Acid, Iron, Iodine, pH	HI 93101	Bromine: 0.00 to 8.00 mg/L Free Chlorine: 0.00 to 2.50 mg/L Total Chlorine: 0.00 to 3.50 mg/L Cyanuric Acid: 0 to 80 mg/L Iron: 0 to 400 µg/L Iodine: 0.0 to 12.5 mg/L pH: 5.9 to 8.5 pH	Bromine: ±0.08 mg/L ±3% Chlorine: ±0.03 mg/L ±3% Cyanuric Acid: ±1 mg/L ±15% Iron: ±10 µg/L ±8% Iodine: ±0.1 mg/L ±5% of reading pH: ±0.1	@ 555 nm	Br_2 / Cl_2: DPD / DPD Cyanuric Acid / Iron: Turbidimetric / TPTZ I_2 / pH: DPD / Phenol red

SPECIFICATIONS common to all models

Light Source	LED (Light Emitting Diode)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Battery Type/Life	(1) 9V / approx. 40 hours of continuous use
Auto Shut-off	After 10 min. of non-use
Dimensions/Weight	180 x 83 x 46 mm (7.1 x 3.3 x 1.8"); 290 g (10 oz.)

ORDERING INFORMATION

HI 93745 is supplied with 9V battery, sample cuvets and caps (2), transport cap (1) and instructions.

HI 93101 is supplied with 2 cuvets, battery and instructions

REAGENTS AND STANDARDS

for HI 93745

HI 93701-01 Reagent kit for 100 tests (Free Chlorine)
HI 93701-03 Reagent kit for 300 tests (Free Chlorine)
HI 93701-F Liquid reagent kit for 300 tests (Free Chlorine)
HI 93701-T Liquid reagent kit for 300 tests (Total Chlorine)
HI 93701-11 Standard Free Chlorine 0.00, 0.25, 0.50, 1.00 mg/L
HI 93710-01 Reagent kit for 100 tests (pH)
HI 93710-03 Reagent kit for 300 tests (pH)
HI 93711-01 Reagent kit for 100 tests (Total Chlorine)
HI 93711-03 Reagent kit for 300 tests (Total Chlorine)
HI 93711-D3 DPD3 reagent for 600 tests (Total Chlorine)
HI 93719-01 Reagent kit for 100 tests (Total Hardness)
HI 93719-03 Reagent kit for 300 tests (Total Hardness)
HI 93746-01 Reagent kit for 50 tests (Fe LR)
HI 93746-03 Reagent kit for 150 tests (Fe LR)

for HI 93101

HI 93701-01 Powder reagent kit for 100 tests (Free Chlorine)
HI 93701-F Liquid reagent kit for 300 tests (Free Chlorine)
HI 93701-T Liquid reagent kit for 300 tests (Total Chlorine)
HI 93711-D3 DPD3 reagent for 600 tests (Total Chlorine)
HI 93701-11 Standard Free Chlorine 0.00, 0.25, 0.50, 1.00 mg/L
HI 93710-01 Reagent kit for 100 tests (pH)
HI 93711-01 Powder reagent kit for 100 tests (Total Chlorine)
HI 93716-01 Reagent kit for 100 tests (bromine)
HI 93718-01 Reagent kit for 100 tests (iodine)
HI 93722-01 Reagent kit for 100 tests (CYS)
HI 93746-01 Reagent kit for 50 tests (Iron LR)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 740029P 9V Batteries (10)
HI 731318 Cuvet cleaning cloth (4)
HI 731321 Measuring cuvets (4)
HI 731325 Cuvet caps (4)
HI 740218 Rugged carrying case

HANNA instruments
With Great Products, Come Great Results™

Standard Reagents

for Single and Multiparameter Photometers

TEST	REAGENT KIT	NO. OF TESTS
Alkalinity	HI 93755-01	100
	HI 93755-03	300
Aluminum	HI 93712-01	100
	HI 93712-03	300
Ammonia HR	HI 93764B-25	25
	HI 93733-01	100
	HI 93733-03	300
Ammonia MR	HI 93715-0	100
	HI 93715-03	300
Ammonia LR	HI 93700-01	100
	HI 93700-03	300
	HI 93764A-25	25
Bromine	HI 93716-01	100
	HI 93716-03	300
Calcium and Magnesium	HI 93752-01	100
	HI 93752-03	100
Chloride	HI 93753-01	100
	HI 93753-03	300
Chlorine Dioxide	HI 93738-01	100
	HI 93738-03	300
Chlorine UHR	HI 95771-01	100
	HI 95771-03	300
Chlorine, Free	HI 93701-01	100
	HI 93701-03	300
	HI 93701-F	300
Chlorine, Free and Total HR	HI 93734-01	100
	HI 93734-03	300
Chlorine, Free ULR	HI 95762-01	100
	HI 95762-03	300
Chlorine, Total	HI 93711-01	100
	HI 93711-03	300
	HI 93701-T	300
Chlorine, Total ULR	HI 95761-01	100
	HI 95761-03	300
Chromium VI HR	HI 93723-01	100
	HI 93723-03	300
Chromium VI LR	HI 93749-01	100
	HI 93749-03	300
COD, HR	HI 93754C-25	25
COD, LR EPA*	HI 93754A-25	25
COD, LR ISO**	HI 93754F-25	25
COD, LR Mercury Free***	HI 93754D-25	25
COD, MR EPA*	HI 93754B-25	25
COD, MR ISO**	HI 93754G-25	25
COD, MR Mercury Free***	HI 93754E-25	25
Copper HR	HI 93702-01	100
	HI 93702-03	300
	total HI 93702T-01	100
	total HI 93702T-03	300
Copper LR	HI 95747-01	100
	HI 95747-03	300
Cyanide	HI 93714-01	100
	HI 93714-03	300
Cyanuric Acid	HI 93722-01	100
	HI 93722-03	300
Detergents, Anionic	HI 95769-01	40
Fluoride HR	HI 93739-01	100
	HI 93739-03	300
Fluoride LR	HI 93729-01	100
	HI 93729-03	300
Hardness (Calcium)	HI 93720-01	100
	HI 93720-03	300

* The chromium-sulfuric acid method is officially recognized by EPA for wastewater test
** HI 93754F-25 and HI 93754G-25 method is according to ISO 15705 method
*** It is a recommended method for generic test and for samples without chloride

TEST	REAGENT KIT	NO. OF TESTS
Hardness (Magnesium) and Total Hardness	HI 93719-01	100
	HI 93719-03	300
Hardness, Total HR	HI 93735-02	100
Hardness, Total LR	HI 93735-00	100
Hardness, Total LR+MR+HR	HI 93735-0	100
Hardness, Total MR	HI 93735-01	100
Hydrazine	HI 93704-01	100
	HI 93704-03	300
Iodine	HI 93718-01	100
	HI 93718-03	300
Iron HR	HI 93721-01	100
	HI 93721-03	300
Iron LR	HI 93746-01	50
	HI 93746-03	150
Manganese HR	HI 93709-01	100
	HI 93709-03	300
Manganese LR	HI 93748-01	50
	HI 93748-03	150
Molybdenum	HI 93730-01	100
	HI 93730-03	300
Nickel HR	HI 93726-01	100
	HI 93726-03	300
Nickel LR	HI 93740-01	50
	HI 93740-03	150
Nitrate	HI 93728-01	100
	HI 93728-03	300
Nitrite HR	HI 93766-50	50
	HI 93708-01	100
	HI 93708-03	300
Nitrite LR	HI 93707-01	100
	HI 93707-03	300
Nitrogen, Total HR	HI 93767B-50	50
Nitrogen, Total LR	HI 93767A-50	50
Oxygen, Dissolved (D.O.)	HI 93732-01	100
	HI 93732-03	300
Ozone	HI 93757-01	100
	HI 93757-03	300
pH	HI 93710-01	100
	HI 93710-03	300
Phosphate HR	HI 93717-01	100
	HI 93717-03	300
Phosphate LR	HI 93713-01	100
	HI 93713-03	300
Phosphorus	HI 93706-01	100
	HI 93706-03	300
Phosphorus, Acid and Hydrolizable	HI 93758B-50	50
Phosphorus Reactive HR	HI 93763A-50	50
Phosphorus Reactive LR	HI 93758A-50	50
Phosphorus Total HR	HI 93763B-50	50
Phosphorus Total LR	HI 93758C-50	50
Potassium	HI 93750-01	100
	HI 93750-03	300
Silica	HI 93705-01	100
	HI 93705-03	300
Silver	HI 93737-01	50
	HI 93737-03	150
Sulfate	HI 93751-01	100
	HI 93751-03	300
Zinc	HI 93731-01	100
	HI 93731-03	300

CAL CHECK™ Standard Reagents

for HI 96 series and HI 95 series Photometers



HI 96 Series



HI 96711



HI 95 Series

HI 96701 • HI 95701

HI 93701-01 Powder reagents for 100 tests (Free Chlorine)
HI 93701-03 Powder reagents for 300 tests (Free Chlorine)
HI 95701-11 CAL CHECK™ standard cuvets

HI 96762 • HI 95762

HI 95762-01 Powder reagents for 100 tests (Free Chlorine)
HI 95762-03 Powder reagents for 300 tests (Free Chlorine)
HI 95762-11 CAL CHECK™ standard cuvets

HI 96761 • HI 95761

HI 95761-01 Powder reagents for 100 tests (total chlorine)
HI 95761-03 Powder reagents for 300 tests (total chlorine)
HI 95761-11 CAL CHECK™ standard cuvets

HI 96711 • HI 96781 • HI 95711

HI 93701-01 Powder reagents for 100 tests (Free Chlorine)
HI 93701-03 Powder reagents for 300 tests (Free Chlorine)
HI 93711-01 Powder reagents for 100 tests (Total Chlorine)
HI 93711-03 Powder reagents for 300 tests (Total Chlorine)
HI 95701-11 CAL CHECK™ standard cuvets for Free Chlorine
HI 95711-11 CAL CHECK™ standard cuvets for Total Chlorine

HI 96724 • HI 95724

HI 93701-T Liquid reagents for 300 tests of Total Chlorine
HI 93701-F Liquid reagents for 300 tests of Free Chlorine
HI 93711-D3 DPD3 reagent for 200 tests of Total Chlorine
HI 95724-11 CAL CHECK™ standard cuvets

HI 96734 • HI 95734

HI 93734-01 Powder reagents for 100 tests (Free or Total Chlorine)
HI 93734-03 Powder reagents for 300 tests (Free or Total Chlorine)
HI 95734-11 CAL CHECK™ standard cuvets

HI 96771 • HI 95771

HI 95771-01 Powder reagents for 100 tests
HI 95771-03 Powder reagents for 300 tests
HI 95771-11 CAL CHECK™ standard cuvets

HI 96747 • HI 95747

HI 95747-01 Reagents for 100 tests
HI 95747-03 Reagents for 300 tests
HI 95747-11 CAL CHECK™ standard cuvets

HI 96769 • HI 95769

HI 95769-01 Reagent kit for 40 tests
HI 95769-11 CAL CHECK™ standard cuvets

HI 96729 • HI 95729

HI 93703-53 Reagent for chlorine dropper
HI 93729-01 Reagents for 100 tests
HI 93729-03 Reagents for 300 tests
HI 95729-11 CAL CHECK™ standard cuvets

HI 96721 • HI 95721

HI 93721-01 Reagent kit for 100 tests
HI 93721-03 Reagent kit for 300 tests
HI 95721-11 CAL CHECK™ standard cuvets

HI 96715 • HI 95715

HI 93715-01 Reagents for 100 tests
HI 93715-03 Reagents for 300 tests
HI 95715-11 CAL CHECK™ standard

HI 96707 • HI 95707

HI 93707-01 Reagents for 100 tests
HI 93707-03 Reagents for 300 tests
HI 95707-11 CAL CHECK™ standard cuvets

HI 96706 • HI 95706

HI 93706-01 Reagents for 100 tests
HI 93706-03 Reagents for 300 tests
HI 95706-11 CAL CHECK™ standard cuvets

HI 96717 • HI 95717

HI 93717-01 Reagents for 100 tests
HI 93717-03 Reagents for 300 tests
HI 95717-11 CAL CHECK™ standard cuvets

HI 96770

HI 93717-01 Reagents for 100 tests
HI 93717-03 Reagents for 300 tests
HI 95770-11 CAL CHECK™ standard cuvets

HI 83, 96, 95 and 93 series
Photometer Accessories

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 710009 Shockproof rubber boot, blue
HI 710010 Shockproof rubber boot, orange
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4) (HI 95, 96 series)
HI 731335 Cuvet caps (4) (HI 95, 96 series)
HI 731321 Measuring cuvets (4) (HI 93, 83 series)
HI 731325 Cuvet caps (4) (HI 93 series)
HI 731325N Cuvet caps (4) (HI 83 series)



HI 710009 Shockproof Boot



HI 710010 Shockproof Boot



HI 731318 Cuvet Cleaning Cloth



HI 731331 Measuring Cuvets

HANNA instruments

With Great Products, Come Great Results™

HI 96715

Ammonia, Medium Range Photometer

Water Resistant and CAL CHECK™



Easy to Use, Accurate Ammonia Measurements

ammonia is naturally present in water, it is the product of the microbiological protein decay of animals and plants. High ammonia concentrations in surface waters indicate domestic pollution. Moreover, ammonia and its compounds are used as fertilizers.

The HI 96715 meter measures the ammonia nitrogen (NH_3-N) content in water samples in the 0.00 to 9.99 mg/L (ppm) range. The method is an adaptation from ASTM Manual of Water and Environmental Technology, D1426-93, Nessler Method.

HI 96715 has the advanced optical system based on a special tungsten lamp and a narrow band interference filter that allows more accurate and repeatable readings. The instrument is factory calibrated and the electronic and optical design minimizes the need for frequent calibration.

With the powerful CAL CHECK™ validation function, users are able to validate performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the LED and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter also uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger opening making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The HI 96715 reagents are in liquid form and are supplied in bottles. Just invert and count 4 drops from each bottle. The amount of reagent is precisely dosed to ensure the maximum repeatability.

SPECIFICATIONS	HI 96715
Range	0.00 to 9.99 mg/L (as NH_3-N)
Resolution	0.01 mg/L for measurement; 0.1 mg/L for Calibration and validation
Precision	±0.12 mg/L @ 6.00 mg/L
Light Source	LED (Light Emitting Diode)
Light Detector	Silicon Photocell with narrow band interference filter @ 466 nm
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measuring mode After 1 hour of non-use in calibration mode with last reading reminder
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the ASTM Manual of Water and Environmental Technology, D1426-93, Nessler



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96715 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96715C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95715-11 CAL CHECK™ Standard Cuvets (1 set)
HI 93715-01 Reagents for 100 tests
HI 93715-03 Reagents for 300 tests

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)
HI 721310 9V Batteries (100)
HI 731318 Cuvet cleaning cloth (4)
HI 731331 Measuring cuvets (4)
HI 731335 Cuvet caps (4)

HANNA instruments

With Great Products, Come Great Results™

Chlorine, Ultra High Range Photometers

Water Resistant and CAL CHECK™

Measure High Concentrations Accurately and Affordably

Responding to requirements to perform chlorine analysis at high concentrations, HANNA offers HI 96734 and HI 96771.

HI 96734 permits free and total chlorine analysis up to 10.00 ppm. This instrument is dedicated to monitor overchlorination through to chloramine destruction.

HI 96771 is a photometer developed to check chlorine dosing in disinfection processesses with high concentrations of chlorine. Thanks to the extended range from 0 to 500 ppm, it is ideal for the food industry, such as in fruit and vegetable washing.

With the powerful CAL CHECK™ validation function, users are able to validate performance of the instruments at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instruments and recalibrate if necessary.

The instruments are water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup.

These meters use an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagents are in powder and liquid form and are supplied in packets and bottles respectively. The amount of reagent is precisely dosed to ensure the maximum repeatability.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*



SPECIFICATIONS		HI 96734	HI 96771
Range	Free Chlorine	0.00 to 10.00 mg/L	LR: 0.00 to 5.00 mg/L HR: 0 to 500 mg/L
	Total Chlorine	0.00 to 10.00 mg/L	—
Resolution		0.01 mg/L (0.10 mg/L above 3.50 mg/L)	LR: 1 mg/L (0.10 mg/L above 3.50 mg/L) HR: 1 mg/L (10 mg/L above 200 mg/L)
Precision		±0.06 mg/L to 3.00 mg/L	LR: ±0.02 mg/L @ 1.00 mg/L HR: ±2 mg/L @ 100 mg/L
Light Source		Tungsten lamp	
Light Detector		Silicon Photocell with narrow band interference filter @ 525nm	
Power Supply		(1) 9V battery	
Auto-off		After 10 minutes of non-use in measuring mode After 1 hour of non-use in calibration mode with last reading reminder	
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Dimensions		192 x 102 x 67 mm (7.6 x 4 x 2.6")	
Weight		290 g (10 oz.)	
Method		Adaptation of the USEPA method 330.5 and Standard Method 4500-Cl G.	Adaptation of Standard Methods for the Examination of Water and Wastewater, 20th edition, 4500-Cl.

ORDERING INFORMATION

HI 96734 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96734C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

HI 96771 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96771C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

For HI 96734

HI 93734-01 Powder reagents for 100 tests (Free or Total Chlorine)

HI 93734-03 Powder reagents for 300 tests (Free or Total Chlorine)

HI 95734-11 CAL CHECK™ Standard Cuvets (1 set)

For HI 96771

HI 93701-01 Reagents for 100 Free Chlorine tests

HI 93701-03 Reagents for 300 Free Chlorine tests

HI 95771-01 Powder reagents for 100 tests

HI 95771-03 Powder reagents for 300 tests

HI 95771-11 CAL CHECK™ standard cuvets for HI 95771

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)

HI 721310 9V Batteries (100)

HI 731318 Cuvet cleaning cloth (4)

HI 731331 Measuring cuvets (4)

HI 731335 Cuvet caps(4)

HI 96701

Free Chlorine Photometer

Water Resistant and CAL CHECK™



Free Cl_2 Measurement for Water Treatment Applications

Chlorine is the most common water disinfectant. It is used in many water treatment applications such as industrial and municipal wastewater, the food industry and swimming pools.

HI 96701 is a photometer that measures free chlorine with high resolution and precision and shows results immediately on the display. Simple, quick, economical and accurate, this meter is the optimum solution for chlorine measurements in the field.

The HI 96701 meter measures the free chlorine (Cl_2) content in water samples in the 0.00 to 5.00 mg/L (ppm) range.

With the powerful CAL CHECK™ validation function, you are able to validate performance of your instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagent is in powder form and is supplied in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability.

SPECIFICATIONS	HI 96701
Range	0.00 to 5.00 mg/L
Resolution	0.01 mg/L 0.00 to 3.50 mg/L; 0.10 mg/L (> 3.50 mg/L)
Precision	±0.02 mg/L @ 1.00 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 525nm
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measurement mode; After 1 hour of non-use in calibration mode; with last reading reminder.
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the USEPA method 330.5 and Standard Method 4500-Cl G.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96701 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96701C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 93701-01 Powder reagents for 100 tests (Free Chlorine)

HI 93701-03 Powder reagents for 300 tests (Free Chlorine)

HI 95701-11 CAL CHECK™ Standard Cuvets (1 set)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)

HI 721310 9V Batteries (100)

HI 731318 Cuvet cleaning cloth (4)

HI 731331 Measuring cuvets (4)

HI 731335 Cuvet caps(4)

With Great Products, Come Great Results™

HI 96762

Trace Free Chlorine Photometer

Water Resistant and CAL CHECK™

Trace Free Chlorine Measurement

Chlorine is the most common water disinfectant. It is used in many water treatment applications: drinking water, wastewater, the food and beverage industry and swimming pools.

HI 96762 was specially developed to measure low concentrations of free chlorine in water. The HI 96762 measures the free chlorine (Cl_2) content in water samples in the 0.000 to 0.500 mg/L (ppm) range. The method used is an adaptation of the Standard Method 4500-Cl G for drinking water.

With the powerful CAL CHECK™ validation function, you are able to validate good performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is splash waterproof and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagent is in powder form and is supplied in packets. The amount of reagent is precisely dosed to ensure the maximum repeatability



SPECIFICATIONS	HI 96762
Range, Free Chlorine	0.000 to 0.500 mg/L
Resolution	0.001 mg/L
Precision	±0.004 mg/L to 0.200 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 525 nm
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the Standard Method 4500-Cl G.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96762 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96762C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95762-01 Powder reagents for 100 tests (Free Chlorine)

HI 95762-03 Powder reagents for 300 tests (Free Chlorine)

HI 95762-11 CAL CHECK™ Standard Cuvets (1 set)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)

HI 721310 9V Batteries (100)

HI 731318 Cuvet cleaning cloth (4)

HI 731331 Measuring cuvets (4)

HI 731335 Cuvet caps(4)

HI 96761

Trace Total Chlorine Photometer

Water Resistant and CAL CHECK™



For the Analysis of Trace Total Chlorine Concentrations

The HI 96761 is an auto diagnostic portable microprocessor meter that benefits from HANNA's years of experience as a manufacturer of analytical instruments.

It has the advanced optical system based on a special tungsten lamp and a narrow band interference filter that allows the most accurate and repeatable readings. The instrument is factory calibrated and the electronic and optical design minimizes the need of frequent calibration.

With the powerful CAL CHECK™ validation function, you are able to validate performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagent is in powder form and is supplied in packets and the amount of reagent is precisely dosed to ensure the maximum repeatability.

SPECIFICATIONS	HI 96761
Range, Total Chlorine	0.000 to 0.500 mg/L
Resolution	0.001 mg/L
Precision	±0.004 mg/L @ 0.200 mg/L
Light Source	Tungsten lamp
Light Detector	Silicon Photocell with narrow band interference filter @ 525 nm
Power Supply	(1) 9V battery
Auto-off	After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight	290 g (10 oz.)
Method	Adaptation of the Standard Method 4500-Cl G.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96761 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96761C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 95761-01 Powder reagents for 100 tests (total chlorine)

HI 95761-03 Powder reagents for 300 tests (total chlorine)

HI 95761-11 CAL CHECK™ Standard Cuvets (1 set)

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)

HI 721310 9V Batteries (100)

HI 731318 Cuvet cleaning cloth (4)

HI 731331 Measuring cuvets (4)

HI 731335 Cuvet caps(4)



HI 731331 — Measuring Cuvets

HANNA instruments

With Great Products, Come Great Results™

validation B.E.P.S.

HI 96724

Free and Total Chlorine Photometer

Water Resistant and CAL CHECK™

Designed for Drinking Water Applications

The HI 96724 meter measures the free and total chlorine (Cl_2) content in water samples in the 0.00 to 5.00 mg/L (ppm) range. The method is an adaptation of the USEPA Method 330.5 for wastewater, and Standard Method 4500-Cl G for drinking water. The HI 96724 incorporates an advanced optical system based on a special tungsten lamp and a narrow band interference filter that allows the most accurate and repeatable readings. The instrument is factory calibrated and the electronic and optical design minimizes the need of frequent calibration.

With the powerful CAL CHECK™ validation function, you are able to validate good performance of the instrument at any time. The validation procedure is extremely user friendly. Just use the exclusive HANNA ready-made, NIST traceable standards to verify the performance of the instrument and recalibrate if necessary.

The instrument is water resistant and the lamp and filter units are protected from dust or dirt by a transparent cup. This makes the instrument ideal for field applications. Display messages aid the user in routine operation. The meter has an auto-shut off feature that will turn off the instrument after 10 minutes of non use in measurement mode or after 1 hour if left in calibration mode.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same position every time it is placed into the measurement cell. It is designed to fit a cuvet with a larger neck making it easier to add both sample and reagents. The cuvet is made from special optical glass to obtain best results.

The reagents are in liquid form and are supplied in dropper bottles. The amount of reagent is precisely dosed to ensure the maximum repeatability.



HI 731318 — Glass Cleaning Cloths



SPECIFICATIONS		HI 96724
Range	Free Chlorine	0.00 to 5.00 mg/L
	Total Chlorine	0.00 to 5.00 mg/L
Resolution		0.01 mg/L (0.10 mg/L over 3.50 mg/L)
Precision		±0.03 mg/L to 1.00 mg/L
Light Source		Tungsten lamp
Light Detector		Silicon Photocell with narrow band interference filter @ 525 nm
Power Supply		(1) 9V battery
Auto-off		After 10 minutes of non-use in measurement mode; after 1 hour of non-use in calibration mode; with last reading reminder.
Environment		0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions		192 x 102 x 67 mm (7.6 x 4 x 2.6")
Weight		290 g (10 oz.)
Method		Adaptation of the USEPA method 330.5 and Standard Method 4500-Cl G.



Available as a KIT

Just choose the "C" version

*HI 96715**C** kit version shown.*

ORDERING INFORMATION

HI 96724 is supplied with (2) sample cuvets with caps, 9V battery and instruction manual.

HI 96724C is supplied with CAL CHECK™ standard cuvets, (2) sample cuvets with caps, 9V battery, cuvet cleaning cloth, scissors and instruction manual in a hard carrying case.

REAGENTS AND STANDARDS

HI 93701-T* Liquid reagents for 300 tests of Total Chlorine

HI 93701-F Liquid reagents for 300 tests of Free Chlorine

HI 93711-D3 DPD3 reagent for 200 tests of Total Chlorine

HI 95724-11 CAL CHECK™ standard cuvets for HI 95724

*HI 93701-T contains HI 93701-F and HI 93711-D3 reagents

SOLUTIONS

HI 93703-50 Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 740029P 9V Batteries (10)

HI 721310 9V Batteries (100)

HI 731318 Cuvet cleaning cloth (4)

HI 731331 Measuring cuvets (4)

HI 731335 Cuvet caps(4)