2015-2016

Industrial Catalog

HANNA® instruments

Hanna Design and Manufacturing

In a short time, Hanna has reached its target to produce all of its instrumentation in-house. Since the introduction of its industrial science park located in Romania, the facility is equipped to support all phases of production such as product research and design, plastic injection molding, electronic assembly, glass blowing for electrodes, standards production and final assembly of product. Hanna oversees all aspects of its products from conception to the final quality check and packaging.

Our Woonsocket and Smithfield, RI facilities house our primary research and development centers and assemble select products such as titrators, ISEs, and HI921 autosampler.

Hanna also produces the packaging for all product lines. Each package is carefully designed for safety and practicality. The in-house control of all research, design and production steps provides continual quality control at all phases to assure the highest level of quality.

After continuous validation and testing, Hanna products undergo a final quality check before they are packaged and released to consumers.

In-house production affords Hanna the freedom to efficiently bring new and innovative products to market while continuously improving the quality and features of existing products to meet the needs of customers.

HANNA is the largest family-owned manufacturer of analytical instrumentation in the world.

For over 35 years, HANNA has delivered fresh and innovative products to its customers.

Contents

ISO 9001:2008 CERTIFIED

These instruments are manufactured in our European state-of-the-art ISO 9001:2008 production facility and is CE compliant to EN 61326-1 and EN 61010-1 standards.

Quick Connect Probe for HI98190

The HI98190 features probes with a quick connect DIN connector to make attaching and removing the probe simple and easy.

HI98190 • HI98191

Professional Waterproof Meters

pH/ORP and pH/ORP/ISE

- Waterproof
  - IP67 rated waterproof, rugged enclosure
- ISE measurement units (HI98191 only)
  - Extensive choice of units to display readings (ppm, ppt, g/L, µg/L, mg/L, M, mol/L, mmol/L, %, w/v, user)
- CAL Check™
  - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- Automatic or manual temperature compensation
- Calibration
  - Up to a five-point calibration with seven standard buffers and five custom buffers available
- AutoHold
  - Automatically holds the first stable reading on the display
- Log-on-demand
  - Store measurement data at the press of a button
- Calibration timeout
  - Alerts when calibration is due at a specified interval
- GLP
  - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- Backlit, graphic LCD display
- Connectivity
  - PC connectivity via opto-isolated micro-USB with HI92000 software
- Approximately 200 hour battery life
- Powered by (4) 1.5V AA batteries

For Universal Applications

HI98190 and HI98191 are IP67 rated waterproof meters designed for universal applications. HI98190 measures pH/ORP and temperature while HI98191 also includes ISE measurements.

Exchange out the pH probe for an ORP probe to obtain mV readings in the ±2000 mV range. HI98191 adds direct ion concentration readings for ISEs with a choice of units for calibration and display.

Specifications		HI98190	HI98191
pH	Range	-2.0 to 20.0 pH; -2.00 to 20.00 pH; -2.000 to 20.000 pH	
	Resolution	0.1 pH; 0.01 pH; 0.001 pH	
	Accuracy	±0.1 pH; ±0.01 pH; ±0.002 pH	
	Calibration	up to five-point calibration, seven standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) and five custom buffers	
	Temperature Compensation	automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F)	
mV	Range	±2000 mV	
	Resolution	0.1 mV	
	Accuracy	±0.2 mV	
	Relative mV Offset Range	±2000 mV	
ISE (HI98191 only)	Range	–	from $1 \cdot 10^{-7}$ to $9.99 \cdot 10^{10}$ concentration
	Resolution	–	3 digits 0.01; 0.1; 1; 10 concentration
	Accuracy	–	±0.5% of reading (monovalent ions), ±1% of reading (divalent ions)
	Calibration	–	up to five-point calibration, seven standard solutions available
Temperature	Range	-20.0 to 120.0 °C (-4.0 to 248.0°F)	
	Resolution	0.1°C (0.1°F)	
	Accuracy	±0.4°C (±0.8°F) (excluding probe error)	
Additional Specifications	pH Probe	HI12963 titanium body, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)	HI72911B titanium body, pH electrode with internal temperature sensor, BNC connector and 1 m (3.3' cable)
	Log-on-demand	200 samples (100 each pH/mV range)	300 samples (100 each pH/mV/ISE range)
Ordering Info		**HI98190** and **HI98191** are supplied with HI12963 pH electrode (HI98190), HI72911B pH electrode (HI98191), HI7662 temperature probe for use with ISEs (HI98191), HI7004M pH 4.01 buffer solution (230 mL), HI7007M pH 7.01 buffer solution (230 mL), electrode general cleaning solution sachet (2), 100 mL plastic beaker (2), HI92000 PC software, HI920015 micro USB cable, 1.5V AA batteries (4), instruction manual, quick start guide, quality certificate, and rugged carrying case with custom insert.	

HI98192

Professional Waterproof Meter

EC/TDS/Resistivity/Salinity Meter

- Waterproof
  - IP67 rated waterproof, rugged enclosure
- Calibration
  - Perform up to a five point calibration
- Temperature compensation
  - Automatic Temperature Compensation with configurable temperature coefficient range from 0.00 to 10.00%.°C
- Four-ring platinum probe
  - Probe can cover a wide range from 0.01 µS/cm to 1000 mS/cm (actual EC)
- Logging
  - Store measurement data at the press of a button with log-on-demand or lot logging
- GLP
  - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- AutoHold
  - Automatically holds the first stable reading on the display
- Calibration timeout
  - Alerts when calibration is due at a specified interval
- Help menu
  - On-screen context specific help is readily available at the press of a button
- Backlit, graphic LCD display
- Connectivity
  - PC connectivity via opto-isolated micro-USB with HI92000 software

For Universal Applications

HI98192 is a waterproof, portable conductivity meter that has an expanded conductivity range from 0.000 µS/cm to 400 mS/cm (1000 mS/cm actual EC), as well as TDS, resistivity and three salinity scales. This meter automatically recognizes the probe type (two or four ring) and allows the user to adjust the nominal cell constant. HI98192 is also ready to perform accurate EC measurement from groundwater to ultrapure water.

Quick Connect Probe

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

Specifications		HI98192
EC	Range	0 to 400 mS/cm (shows values up to 1000 mS/cm actual conductivity)** 0.001 to 9.999 µS/cm*; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 1000.0 mS/cm (autoranging)
	Resolution	0.001 µS/cm*; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm
	Accuracy	±1% of reading (±0.01 µS/cm or 1 digit, whichever is greater)
	Calibration	automatic up to five points with seven memorized standards (0.00 µS/cm, 84.0 µS/cm, 1.413 mS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm)
TDS	Range	0.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 g/L; 10.00 to 99.99 g/L; 100.0 to 400.0 g/L (autoranging)
	Resolution	0.01 ppm; 0.1 ppm; 0.001 g/L; 0.01 g/L; 0.1 g/L
	Accuracy	±1% of reading (±0.05 ppm or 1 digit, whichever is greater)
Resistivity	Range	1.0 to 99.9 Ω•cm; 100 to 999 Ω•cm; 1.00 to 9.99 KΩ•cm; 10.0 to 99.9 KΩ•cm; 100 to 999 KΩ•cm; 1.00 to 9.99 MΩ•cm; 10.0 to 100.0 MΩ•cm* (autoranging)
	Resolution	0.1 Ω•cm; 1 Ω•cm; 0.01 KΩ•cm; 0.1 KΩ•cm; 1 KΩ•cm; 0.01 MΩ•cm; 0.1 MΩ•cm*
	Accuracy	±1% of reading (±10 Ω or 1 digit, whichever is greater)
Salinity	Range	% NaCl: 0.0 to 400.0%; practical salinity: 0.00 to 42.00 (PSU); seawater scale: 0.00 to 80.00 (ppt)
	Resolution	0.1%; 0.01
	Accuracy	±1% of reading
	Calibration	max. one point only in % NaCl range with HI7037 standard; use conductivity calibration for all other ranges
Temperature	Range	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	±0.2°C; ±0.4°F (excluding probe error)
	Calibration	one or two points
Ordering Info		**HI98192** is supplied with HI763133 conductivity probe, HI7031M 1413 µS/cm calibration solution (230 mL), HI7035M 111.8 mS/cm calibration solution (230 mL), 100 mL plastic beaker (2), HI92000 PC software, HI920015 micro USB cable, 1.5V AA batteries (4), instruction manual, quick start guide, quality certificate, and rugged carrying case with custom insert.

* The 0.000 µS/cm EC range and 0.1 MΩ•cm resistivity range available with the optional HI763123 probe
**Uncompensated temperature reading

(†) Reduced to actual sensor limits

Quick Connect Probe

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

For Universal Applications

The HI98193 portable dissolved oxygen meter has extended ranges of up to 50.00 ppm and 600.0% saturation. When measuring dissolved oxygen, compensations for salinity, temperature and pressure are essential to improve the accuracy and precision of readings.

Salinity compensation allows for direct determination of dissolved oxygen in saline waters. Temperature compensation is automatic with the probes built-in sensor, which features a one or two-point calibration. Pressure compensation with the meter's built-in barometer can be validated against a reference barometer and if needed, can be recalibrated in user-selectable units (mmHg, inHg, atm, psi, kPa, mbar). With the internal barometer, the HI98193 is able to compensate for changes in barometric pressure so there is no need for charts, altitude information, or external barometric pressure information.

Other features include measurement, methods, and calculations for BOD, OUR, and SOUR.

		HI98193
DO	Range	0.00 to 50.00 mg/L (ppm); 0.0 to 600.0% saturation
	Resolution	0.01 mg/L (ppm); 0.1% saturation
	Accuracy (@25°C/77°F)	±1.5% of reading ±1 digit
	Calibration	automatic one or two point at 100 % (8.26 mg/L) and 0 % (0 mg/L); manual one point using a value entered by the user in % saturation or mg/L
Atmospheric Pressure	Range	450 to 850 mmHg
	Resolution	1 mmHg
	Accuracy (@25°C/77°F)	± 3 mmHg within ±15% from the calibration point
	Calibration	one-point at any in range pressure value
Temperature	Range	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy (@25°C/77°F)	±0.2°C; ±0.4°F (excluding probe error)
	Calibration	one or two-point at any in range temperature value
Ordering Info		**HI98193** is supplied with HI764073 DO probe, HI7040 bi-component zero oxygen solution (260 mL), HI7041S electrolyte solution (30 mL), preformed PTFE membrane caps (2), DO protective cap, o-rings (2), 100 mL plastic beaker (2), HI92000 PC software, HI920015 micro USB cable, 1.5V AA batteries (4), instruction manual, quick start guide, quality certificate, and rugged carrying case with custom insert.

HI98193

Professional Waterproof Meter

Dissolved Oxygen and BOD

- Choice of units
  - Display units in % saturation or mg/L (ppm)
- Salinity compensation
  - Users can set the salinity value
- Automatic pressure compensation
  - Built-in barometer with user-selectable units (mmHg, inHg, atm, psi, kPa, mbar)
- Built-in calculations
  - Determination of Biochemical Oxygen Demand (BOD), Oxygen Uptake Rate (OUR) and Specific Oxygen Uptake Rate (SOUR)
- Polarization
  - Automatic polarization of probe at startup
- Membrane caps
  - Ready-to-use PTFE preformed membrane caps
- Waterproof
  - IP67 rated waterproof, rugged enclosure
- Log-on-demand
  - Store measurement data at the press of a button
- GLP
  - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- AutoHold
  - Automatically holds the first stable reading on the display
- Calibration timeout
  - Alerts when calibration is due at a specified interval
- Help menu
  - On-screen context specific help is readily available at the press of a button
- Backlit LCD
- Clear display
  - Dot matrix display with multifunction virtual keys
- Connectivity
  - PC connectivity via opto-isolated micro-USB with HI92000 software
- 200 hour battery life
  - Approximately 200 hours of continuous use

HI98194 • HI98195 • HI98196

Multiparameter Waterproof Meter

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

- Waterproof
  - IP67 rated waterproof, rugged enclosure for meter; IP68 for probe
- Digital probe
  - Digital probe with integral temperature sensor and up to three ports for pH/ORP, EC and DO sensors
- Color coded, field replaceable sensors
- Auto-sensor recognition
- Quick calibration feature
  - Standardize pH and conductivity with one calibration solution
- Automatic barometric pressure compensation (HI98194, HI98196)
- Automatic temperature compensation
- Logging
  - Store up to 45,000 samples with log-on-demand or lot logging
- GLP
  - GLP data provides data from previous five calibrations to ensure Good Laboratory Practices are met
- Backlit LCD display with multifunction virtual keys
- Dedicated and virtual soft keys
- Quick Connect Probes
  - Fast, secure and waterproof connection
- PC connectivity via opto-isolated micro-USB with Hanna software
- Up to 360 hours of battery life powered by 1.5V AA batteries

For Universal Applications

These waterproof meters provide multiparameter measurement in compact and rugged, IP67 waterproof enclosures. Ideal for demanding applications, these meters feature our rugged, quick connect digital probes with field replaceable sensors.

A backlit, graphic LCD provides easy-to-read resolution even in low-lit areas. A combination of dedicated and soft keys allows easy, intuitive operation in a choice of languages.

Data Logging

These multiparameter meters allow storage of up to 45,000 continuous or log-on-demand samples with logging intervals from one second to three hours. Logged data can be later transferred to a PC with the HI920015 micro USB cable and Hanna HI9298194 software.

Dedicated HELP Button

The contextual HELP menu can be accessed to obtain on-screen information and assistance about each feature at the touch of a button.

Multifunction Sensor

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

HI98194 probe shown for example

pH

HI7698194-0 pH
HI7698194-1 pH/ORP

Conductivity

HI7698194-3 EC

Dissolved Oxygen

HI7698194-2 DO

Specifications		HI98194 (pH/EC/DO)	HI98195 (pH/EC)	HI98196 (pH/DO)
pH / mV	Range	0.00 to 14.00 pH / ±600.0 mV		
	Resolution	0.01 pH / 0.1 mV		
	Accuracy	±0.02 pH / ±0.5 mV		
	Calibration	automatic one, two, or three points with automatic recognition of five standard buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) or one custom buffer		
ORP	Range	±2000.0 mV		
	Resolution	0.1 mV		
	Accuracy	±1.0 mV		
	Calibration	automatic at one custom point (relative mV)		
EC	Range	0 to 200 mS/cm (absolute EC up to 400 mS/cm)		–
	Resolution	**manual:** 1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm; 1 mS/cm; **automatic:** 1 µS/cm from 0 to 9999 µS/cm; 0.01 mS/cm from 10.00 to 99.99 mS/cm; 0.1 mS/cm from 100.0 to 400.0 mS/cm; **automatic mS/cm:** 0.001 mS/cm from 0.000 to 9.999 mS/cm; 0.01 mS/cm from 10.00 to 99.99 mS/cm; 0.1 mS/cm from 100.0 to 400.0 mS/cm		–
	Accuracy	±1% of reading or ±1 µS/cm whichever is greater		–
	Calibration	automatic single point, with six standard solutions (84 µS/cm, 1413 µS/cm, 5.00 mS/cm, 12.88 mS/cm, 80.0 mS/cm, 111.8 mS/cm) or custom point		–
TDS	Range	0.0 to 400.0 ppt (g/L) (the maximum value depends on the TDS factor)		–
	Resolution	**manual:** 1 ppm (mg/L); 0.001 ppt (g/L); 0.01 ppt (g/L); 0.1 ppt (g/L); 1 ppt (g/L); **automatic:** 1 ppm (mg/L) from 0 to 9999 ppm (mg/L); 0.01 ppt (g/L) from 10.00 to 99.99 ppt (g/L); 0.1 ppt (g/L) from 100.0 to 400.0 ppt (g/L); **automatic ppt (g/L):** 0.001 ppt (g/L) from 0.000 to 9.999 ppt (g/L); 0.01 ppt (g/L) from 10.00 to 99.99 ppt (g/L); 0.1 ppt (g/L) from 100.0 to 400.0 ppt (g/L)		–
	Accuracy	±1% of reading or ±1 ppm (mg/L) whichever is greater		–
	Calibration	based on conductivity calibration		–
Resistivity	Range	0 to 999999 Ω•cm; 0 to 1000.0 kΩ•cm; 0 to 1.0000 MΩ•cm		–
	Resolution	dependent on resistivity reading		–
	Calibration	based on conductivity calibration		–
Salinity	Range	0.00 to 70.00 PSU		–
	Resolution	0.01 PSU		–
	Accuracy	±2% of reading or ±0.01 PSU whichever is greater		–
	Calibration	based on conductivity calibration		–
Seawater σ	Range	0.0 to 50.0 σ_t, σ_0, σ_{15}		–
	Resolution	0.1 σ_t, σ_0, σ_{15}		–
	Accuracy	±1 σ_t, σ_0, σ_{15}		–
	Calibration	based on conductivity calibration		–
Dissolved Oxygen	Range	0.0 to 500.0%; 0.00 to 50.00 ppm (mg/L)	–	0.0 to 500.0%; 0.00 to 50.00 ppm (mg/L)
	Resolution	0.1%; 0.01 ppm (mg/L)	–	0.1%; 0.01 ppm (mg/L)
	Accuracy	0.0 to 300.0%: ±1.5% of reading or ±1.0% whichever is greater; 300.0 to 500.0%: ±3% of reading; 0.00 to 30.00 ppm (mg/L): ±1.5% of reading or ±0.10 ppm (mg/L), whichever is greater; 30.00 ppm (mg/L) to 50.00 ppm (mg/L): ±3% of reading	–	0.0 to 300.0%: ±1.5% of reading or ±1.0% whichever is greater; 300.0 to 500.0%: ±3% of reading; 0.00 to 30.00 ppm (mg/L): ±1.5% of reading or ±0.10 ppm (mg/L), whichever is greater; 30.00 ppm (mg/L) to 50.00 ppm (mg/L): ±3% of reading
	Calibration	automatic one or two points at 0, 100% or one custom point	–	automatic one or two points at 0, 100% or one custom point
Atmospheric Pressure	Range	450 to 850 mm Hg; 17.72 to 33.46 in Hg; 600.0 to 1133.2 mbar; 8.702 to 16.436 psi; 0.5921 to 1.1184 atm; 60.00 to 113.32 kPa	–	450 to 850 mm Hg; 17.72 to 33.46 in Hg; 600.0 to 1133.2 mbar; 8.702 to 16.436 psi; 0.5921 to 1.1184 atm; 60.00 to 113.32 kPa
	Resolution	0.1 mm Hg; 0.01 in Hg; 0.1 mbar; 0.001 psi; 0.0001 atm; 0.01 kPa	–	0.1 mm Hg; 0.01 in Hg; 0.1 mbar; 0.001 psi; 0.0001 atm; 0.01 kPa
	Accuracy	±3 mm Hg within ±15°C from the temperature during calibration	–	±3 mm Hg within ±15°C from the temperature during calibration
	Calibration	automatic at one custom point	–	automatic at one custom point
Temperature	Range	-5.00 to 55.00°C; 23.00 to 131.00°F; 268.15 to 328.15K		
	Resolution	0.01°C; 0.01°F; 0.01K		
	Accuracy	±0.15°C; ±0.27°F; ±0.15K		
	Calibration	automatic at one custom point		

Ordering Info

HI98194 is supplied with HI7698194/4 probe, HI7698194-1 pH/ORP sensor, HI7698194-3 EC sensor and HI7698194-2 DO sensor, and HI76981942 probe maintenance kit.

HI98195 is supplied with HI7698195/4 probe, HI7698194-1 pH/ORP sensor, HI7698194-3 EC sensor, and HI76981952 probe maintenance kit.

HI98196 is supplied with HI7698196/4 probe, HI7698194-1 pH/ORP sensor, HI7698194-2 DO sensor, and HI76981942 probe maintenance kit.

All models include HI76981943 calibration beaker, HI9828-25 quick calibration solution, Hanna PC software, HI920015 micro USB cable, 1.5V AA batteries (4), instruction manual, quick start guide, quality certificate, and rugged carrying case with custom insert.

HI96711C

Chlorine, Free and Total Portable Photometer

- CAL Check™
- BEPS (Battery Error Prevention System)
- GLP Features

The HI96711C measures the free and total chlorine (Cl_2) content in water and wastewater.

Specifications	HI96711C Free and Total Chlorine	
Range	**Chlorine, Free (P1):** 0.00 to 5.00 mg/L (ppm); **Chlorine, Total (P2):** 0.00 to 5.00 mg/L (ppm)	
Resolution	0.01 mg/L from 0.00 to 3.50 mg/L (ppm); 0.10 mg/L above 3.50 mg/L (ppm)	
Accuracy @ 25°C (77°F)	±0.03 mg/L ±3% of reading	
Ordering Info	**HI96711C** includes photometer, CAL Check™ standards, sample cuvettes (2) with caps, 9V battery, scissors, cuvette cleaning cloth, instrument quality certificate, instruction manual and rigid carrying case. Reagents sold separately	
	HI93701-01	reagents for 100 tests (free Cl)
	HI93701-03	reagents for 300 tests (free Cl)
	HI93711-01	reagents for 100 tests (total Cl)
	HI93711-03	reagents for 300 tests (total Cl)

HI931001

pH/mV Precision Simulator

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

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

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

Specifications		HI931001
pH	Range	0.00 to 14.00 pH
	Resolution	0.01 pH
	Accuracy	±0.01 pH
mV	Range	-1000 to 1000 mV
	Resolution	1 mV
	Accuracy	±1 mV
Ordering Info	**HI931001** is supplied with HI7858/1 BNC/BNC coaxial cable	

HI931002

4-20 mA Amperometer

HI931002 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.

Simulator and Calibrator

HI931002 is a portable instrument designed for the Plant Repair and Maintenance Operator. This portable simulator can monitor a 4-20 mA signal from practically any process meter. The communication bus from process instrumentation can be simulated in any of the following modes:

- Passive drive/Calibrator mode:
  - HI931002 can set the 4-20 mA current values and the user can then adjust the process meter accordingly.
- Active drive/Simulator mode:
  - HI931002 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 transducers or current indicators.
- Passive measurement/Tester mode:
  - HI931002 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.

Specifications		HI931002
Ranges	Active Drive	2.00 to 19.99 mA; -1.50 to 14.00 pH
	Passive Drive	2.00 to 19.99 mA; -1.50 to 14.00 pH
	Active Measure	0.00 to 19.99 mA; -3.50 to 14.00 pH
	Passive Measure	0.00 to 19.99 mA; -3.50 to 14.00 pH
Additional Specifications	Resolution	0.01 mA; 0.01 pH
	Accuracy (@20°C/68°F)	±0.01 mA; ±0.01 pH
	Input Resistance	20Ω
	Fuse	5 x 20 mm, 200 mA, 250V
Ordering Info	**HI931002** is supplied with 1 m (3.3') connection cable, battery, 12 VDC adapter, and instructions.	

Hanna Mini Controllers

Hanna mini controllers have been designed for easy, affordable installation in tight spaces to perform simple, yet effective process control. Due to their compact size, they can be installed right next to tanks or vats.

These versatile controllers are ideal for a wide variety of process control applications.

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 boiler feed water conditioning, a 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 efficacy 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 water treatment. Chlorine, peroxide, and ozone are added oxidizers that increase the ORP value, 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 one second. ORP is also essential in chemical processing where reducing agents are used and a negative ORP value indicates 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. Water with a conductivity value of 0 to 140 µS/cm is considered "very soft," while 640 to 840 µS/cm is considered "hard" water. An increase in conductivity also 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, corrosion of piping, and damage to critical components.

TDS Mini Controllers

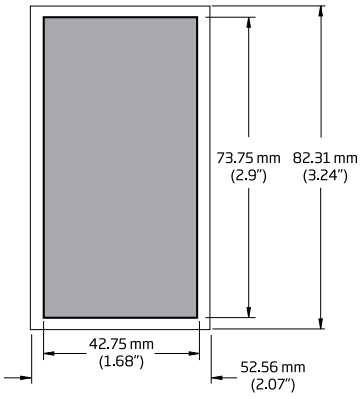
A TDS (total dissolved solids) measurement is an important indicator of water quality. An increase in TDS indicates an increase in the amount of dissolved solids (salts) present in the water. TDS monitoring and control is imperative in industrial applications such as feed water control, blow down activation in cooling towers, and water management. In these applications, high TDS will cause scaling and corrosion similar to high conductivity.

A TDS measurement is also an important indicator of the effectiveness of water conditioning, 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

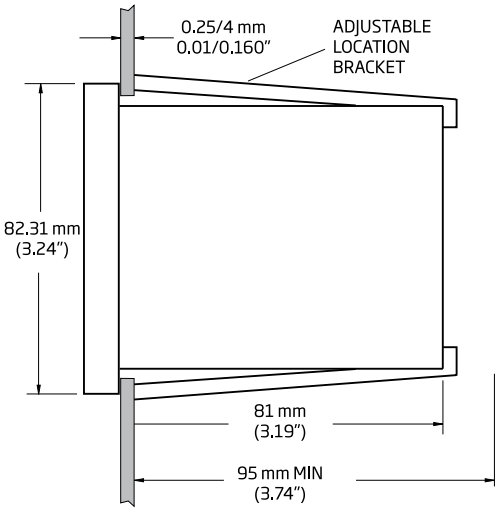
Resistivity, measured in Ω•M, is the optimal way to measure the quality of water produced by high purity systems, such as reverse osmosis (RO) systems and water conditioning equipment. As resistivity is the inverse of conductivity, it provides a more accurate characterization of water with very low conductive ability. 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 18 MΩ•cm.

BL Series Mechanical Dimensions



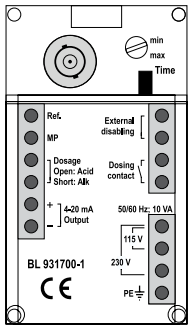
Front View

Dimensions show the cutout size for installation and also the outside dimensions of the panel.



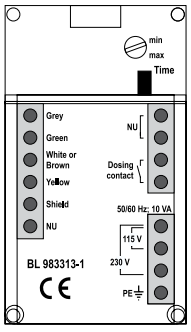
Side View

Adjustable location brackets allow the controller to slide into the cutout and will hold the unit securely in place.



Rear View

Rear view of pH and ORP models with electrical connections.



Rear View

Rear view conductivity, TDS and resistivity models with electrical connections.

BL931700

pH Mini Controller

with 4-20 mA Recorder Output

- Adjustable setpoint
- Fire-retardant casing
- Selectable overdose protection system
- Splash-resistant cover

Specifications	BL931700
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@25°C/77°F)	±0.02 pH
Calibration	manual, through offset and slope trimmers
Dosing Relay	maximum 2A (fuse protected), 250 Vac, 30 VDC
Dosing Selection	acid or alkaline contact open=acid dosage=relay ON if measurement > setpoint contact closed=alkaline dosage=relay ON if measurement < setpoint
Setpoint	adjustable from 0 to 14 pH
Overtime	adjustable, typically from 5 to approximately 30 minutes
Recorder Output	4 to 20 mA, accuracy ±0.20 mA, 500 Ω maximum load
Input Impedance	10^{12} Ohm
Ordering Info	**BL931700-0** (12 VDC) and **BL931700-1** (115/230V) are supplied with mounting brackets, transparent cover, and instruction manual.
Recommended Probe	**HI1001** PVDF body pH electrode with 1/2" NPT thread, BNC connector and 3 m (9.8') cable for continuous flow-thru monitoring (not included).

BL983313 • BL983320 • BL983322

EC Mini Controllers

Measuring in µS/cm

- Adjustable setpoint
- Fire-retardant casing
- Selectable overdose protection system
- Splash-resistant cover

Specifications	BL983313	BL983320	BL983322
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 (@25°C/77°F)	±2% F.S.	±2% F.S.	±2% F.S.
Setpoint	adjustable from 0 to 1999 µS/cm	adjustable from 0 to 199.9 µS/cm	adjustable from 0 to 19.99 µS/cm
Temperature Compensation	automatic from 5 to 50°C (41 to 122°F) with β =2%/°C		
Calibration	manual, with CAL trimmer		
Dosing Relay	maximum 2A (fuse protected), 250 Vac, 30 VDC contact closed when measure > setpoint		
Overtime	adjustable, typically from 5 to approximately 30 minutes		
Ordering Info	**BL983313-0** (12 VDC), **BL983313-1** (115/230V), **BL983320-0** (12 VDC), **BL983320-1** (115/230V), **BL983322-0** (12 VDC) and **BL983322-1** (115/230V) are supplied with mounting brackets, transparent cover, and instruction manual.		
Recommended Probe	**HI7634-00** EC/TDS probe with internal temperature sensor and 2 m (6.6') cable (not included).		

BL mini controllers are the perfect solution for water analysis and control

BL932700

ORP Mini Controller

with 4-20 mA Recorder Output

- Easy to handle
- Fire-retardant casing
- Selectable overdose protection system
- Splash-resistant cover

Specifications	BL932700
Range	±1000 mV
Resolution	1 mV
Accuracy (@25°C/77°F)	±5 mV
Calibration	manual, with CAL trimmer
Dosing Relay	maximum 2A (fuse protected), 250 Vac, 30 VDC
Dosing Selection	reducing or oxidizing, selectable on the back panel contact open=reductant dosage=relay ON if measure > setpoint contact closed=oxidant dosage=relay ON if measure < setpoint
Setpoint	adjustable from -1000 to 1000 mV
Overtime	adjustable, typically from 5 to approximately 30 minutes
Recorder Output	4 to 20 mA, accuracy ±0.20 mA, 500 Ω maximum load
Input Impedance	10^{12} Ohm
Ordering Info	**BL932700-0** (12 VDC) and **BL932700-1** (115/230V) are supplied with mounting brackets, transparent cover, and instruction manual.
Recommended Probe	**HI2001** PVDF body ORP electrode with 1/2" NPT thread, BNC connector, and 3 m (9.8') cable for continuous flow-thru monitoring (not included).

BL983315 • BL983319
BL983321 • BL983329

TDS Mini Controllers

- Adjustable overtime control
- Fire-retardant casing
- Selectable overdose protection system
- Splash-resistant cover

BL983324

TDS Mini Controller

- Fire-retardant casing
- Selectable overdose protection system
- Splash-resistant cover

Specifications	BL983315	BL983319	BL983321	BL983329
Range	0.0 to 199.9 mg/L (ppm)	0 to 1999 mg/L (ppm)	0.00 to 19.99 mg/L (ppm)	0 to 999 mg/L (ppm)
Resolution	0.1 mg/L (ppm)	1 mg/L (ppm)	0.01 mg/L (ppm)	1 mg/L (ppm)
Accuracy (@25°C/77°F)	±2% F.S.	±2% F.S.	±2% F.S.	±2% F.S.
TDS Conversion Factor	0.5	0.65	0.5	0.5
Dosing Relay	maximum 2A (fuse protected), 250 Vac, 30 VDC Contact close when measure:			
	> setpoint	< setpoint	> setpoint	> setpoint
Setpoint	adjustable from 0 to 199.9 mg/L (ppm)	adjustable from 0 to 1999 mg/L (ppm)	adjustable from 0 to 19.99 mg/L (ppm)	adjustable from 0 to 999 mg/L (ppm)
Temperature Compensation	automatic from 5 to 50°C (41 to 122°F) with β =2%/°C			
Calibration	manual, with CAL trimmer			
Overtime	adjustable, typically from 5 to approximately 30 minutes			
Ordering Info	**BL983315-0** (12 VDC), **BL983315-1** (115/230V), **BL983319-0** (12 VDC), **BL983319-1** (115/230V), **BL983321-0** (12 VDC), **BL983321-1** (115/230V), **BL983329-0** (12 VDC) and **BL983329-1** (115/230V) are supplied with mounting brackets, transparent cover, and instruction manual.			
Recommended Probe	**HI7634-00** EC/TDS probe with internal temperature sensor and 2 m (6.6') cable (not included).			

Specifications	BL983324
Range	0.0 to 49.9 mg/L (ppm)
Resolution	0.1 mg/L (ppm)
Accuracy (@25°C/77°F)	±2% F.S.
TDS Conversion Factor	0.5
Temperature Compensation	automatic from 5 to 50°C (41 to 122°F) with β=2%/°C
Calibration	manual, with CAL trimmer
Dosing Relay	maximum 2A (fuse protected), 250 Vac, 30 VDC contact closed when measure > setpoint
Setpoint	adjustable from 0 to 49.9 mg/L (ppm)
Overtime	adjustable, typically from 5 to approximately 30 minutes
Ordering Info	**BL983324-0** (12 VDC) and **BL983324-1** (115/230V) are supplied with mounting brackets, transparent cover, and instruction manual.
Recommended Probe	**HI7634-00** EC/TDS probe with internal temperature sensor and 2 m (6.6') cable (not included).

BL983314

Resistivity Mini Controller

- Fire-retardant casing
- Selectable overdose protection system
- Splash-resistant cover

The BL983314 is a simple to operate resistivity controller designed for ultra pure water, reverse osmosis, and water conditioning applications. The BL983314 resistivity controller is also ideal for continuous monitoring of process solutions.

Specifications	BL983314
Range	0.00 to 19.90 MΩ•cm
Resolution	0.10 MΩ•cm
Accuracy (@25°C/77°F)	±2% F.S.
Temperature Compensation	automatic and linear from 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	maximum 2A (fuse protected), 250 Vac, 30 Vdc contact closed when measure < setpoint
Setpoint	adjustable from 0 to 19.90 MΩ•cm
Overtime	adjustable, typically from 5 to approximately 30 minutes
Ordering Info	**BL983314-0** (12 VDC) and **BL983314-1** (115/230V) are supplied with mounting brackets, transparent cover, and instruction manual.
Recommended Probe	**HI3314** resistivity probe with 2 m (6.6') cable (included)

HI504

pH/ORP Digital Controller

with Sensor Check™

- Sensor Check™
  - Alerts the user if there is something wrong with the electrode
- CAL Check™
  - Alerts users of calibration status
- Alarm
  - Fail Safe Alarm System
- ATC
  - Automatic temperature compensation
- Logging
  - Logging of up to 100 system events
- Programmable cleaning cycles
- Programmable hold system
  - Allows users to stop the regulating action for programmable time periods

HI504 is a PID, proportional, or ON/OFF pH/ORP controller with up to two setpoints. The measurement configuration settings and control of pH and ORP are saved separately and permits users to switch between pH and ORP without losing settings. The pH channel can be calibrated at two points. The instrument has a full auto diagnostic procedure. Sensor Check™ is also available for pH probes.

The temperature is continuously monitored using a temperature sensor (Pt100 or Pt1000 type) and provides for automatic temperature compensation of pH.

One or two analog controller outputs (0–20 or 4–20 mA) can be configured for pH/ORP recording or controlling (only for models with PID), and relays can be used to control the process or be connected with alarm status.

Controller status is visible with LEDs on the front panel and on the LCD display.

The controllers logging feature can save up to 6000 pH/°C or ORP samples and the last 100 error, configuration, calibration, and cleaning events. This information is accessible from a PC through RS485 and HI92500 software. The powerful HI92500 software has graphing capabilities and can print graphs directly or can be saved as a bitmap. Data can be exported in common spreadsheet formats.

Specifications	HI504	
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 (@25°C/77°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 Input for the pH/ORP/°C Transmitter	RS485	
Other Digital Insulated Inputs	two digital insulated inputs: one for hold and one for the advanced cleaning; ON state: 5 to 24 VDC	
Digital Insulated Output	a digital insulated contact closed upon hold mode	
Temperature Compensation	automatic or manual, -30 to 130°C	
Power Consumption	10 VA	
Over Current Protection	400 mA 250V quick blow fuse	
Max. Oscillation Frequency	8 MHz	
Relays 1, 2, 3, 4	electromechanical relay SPDT contact outputs, 5A-250 VAC, 5A - 30 VDC (resistive load); fuse protected: 5A, 250V quick blow fuse	
Alarm Relay	electromechanical relay SPDT contact output, 5A - 250 VAC, 5A - 30 VDC (resistive load) fuse protected: 5A, 250V quick blow fuse	
Analog Output	two independent outputs, 0 - 22 mA (configuring as 0-20 mA or 4-20 mA)	
Analog Output Resolution	0.1% F.S.	
Analog Output Accuracy	± 2% F.S.	
Data logging	6000 pH/°C or ORP samples	
Ordering Info	Each HI504 model is supplied complete with mounting brackets and instructions. **Choose your configuration**	
	HI504222-1	dual setpoint, on/off and PID control, single analog output, 115V
	HI504222-2	dual setpoint, on/off and PID control, single analog output, 230V
	HI504224-0	dual setpoint, on/off and PID control, dual analog output, 24VDC/AC
	HI504224-1	dual setpoint, on/off and PID control, dual analog output, 115V
	HI504224-2	dual setpoint, on/off and PID control, dual analog output, 230V
	HI504924-1	dual setpoint, advanced cleaning, on/off and PID control, dual analog output, 115V
	HI504924-2	dual setpoint, advanced cleaning, on/off and PID control, dual analog output, 230V
Probes	**HI1006-2205**	flat tip pH electrode with PTFE junction, GP (general purpose) glass, BNC connection + Pt100 and 5m (16.4') cable
	HI2004-1005	flat tip ORP electrode with PTFE junction, platinum sensor, BNC connection and 5m (16.4') cable

HI710

Conductivity and TDS Digital Controller

with Four-ring Potentiometric Probe

- Automatic temperature compensation
- Up to two-point calibration
- Backlit LCD display

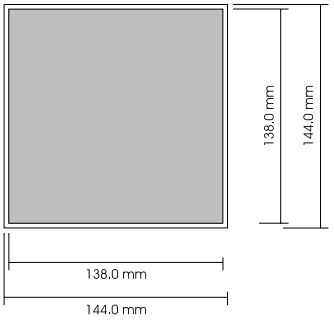
The HI710 offers state-of-the-art specifications for process control. It can be configured for ON/OFF, proportional, or PID control. Our exclusive technology enables them to be customized to best fit your application. Bright LEDs show the current status even from a distance. A menu-driven display aids 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 fast and simple. Password protection guarantees that the calibration and predetermined parameters cannot be altered unnecessarily. The controllers can operate with four-ring probe or 4-20 mA signal. They accept probes with or without a built-in Pt100 temperature sensor.

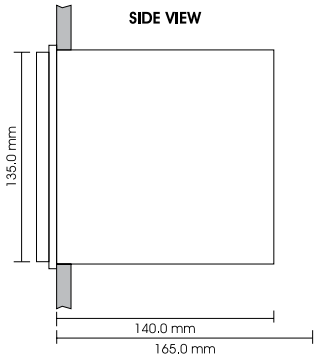
Specifications		HI710
Range	EC	0.0 to 199.9 µS/cm; 0 to 1999 µS/cm; 0.00 to 19.99 mS/cm; 0.0 to 199.9 mS/cm
	TDS	0.0 to 100.0 mg/L (ppm); 0 to 1000 mg/L (ppm); 0.00 to 10.00 g/L (ppt); 0.0 to 100.0 g/L (ppt)
	Temperature	-10.0 to 100.0°C
Additional Specifications	Resolution	**EC:** 0.1 µS; 1 µS; 0.01 mS; 0.1 mS; 0.1 °C **TDS:** 0.1 ppm; 1 ppm; 0.01 g/L (ppt); 0.1 g/L (ppt)
	TDS Conversion Factor	adjustable from 0.00 to 1.00
	Accuracy (@25°C/77°F)	±0.5% F.S. (EC / TDS); ±0.5°C (0 to 70°C); ±1°C (outside)
	EC Calibration	automatic or manual at one point
	Temperature Compensation	automatic or manual, -10 to 100°C with adjustable temperature coefficient from 0.00 to 10.00%/°C
	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
	Set Point Relay	two contact outputs SPDT 5A-250 VAC, 5A-30 VDC (resistive load), fuse protected (2A, 250V fast fuse)
	Alarm Relay	contact output SPDT 5A-250 VAC, 5A-30 VDC (resistive load), fuse protected (2A, 250V fast fuse
	Power Supply	115 VAC ±10% or 230 VAC ±10%; 50/60 Hz
	Power Consumption	15 VA
	Over Current Protection	400 mA 250V fast fuse
Ordering Info	HI710 is supplied with mounting brackets and instructions. **Choose your configuration** **HI710221-1** dual setpoint, on/off and PID controls, analog output, 115V **HI710221-2** dual setpoint, on/off and PID controls, analog output, 230V **HI710222-1** dual setpoint, on/off and PID controls, RS485 output, 115V **HI710222-2** dual setpoint, on/off and PID controls, RS485 output, 230V	
Probes	**HI7639**	in-line conductivity probe with Pt100 sensor and 3 m (9.9') cable

Mechanical Dimensions

Front View



Side View



HI720

Conductivity Process Digital Controller

Compatible with HI7650 Inductive Probe

- Inductive conductivity probe suitable for slurries and high EC measurements
- Choice of measurement modes
  - Conductivity
  - TDS
  - Concentration
- ATC
  - Automatic temperature compensation
- Logging
  - Logging of up to 100 system events

See the HI7650 Inductive Conductivity Probe **p.31**

HI720 is a PID, proportional or ON/OFF EC/TDS controller with one or two setpoints and includes an inductive conductivity probe.

The measurement configuration settings and EC and TDS control are saved separately and permits users to switch between EC and TDS without losing settings. TDS or a specific user defined curve can be used for concentration.

Temperature is continuously monitored using a temperature sensor (Pt100 or Pt1000 type) with ATC of conductivity. Conductivity temperature compensation parameters are fully customizable: linear or non-linear temperature compensation, reference temperature and temperature coefficient. Users can define the specific curve of temperature compensation.

The working conductivity range is user selectable and the conductivity calibration in one point is performed in a value that corresponds to the measurement range.

One or two analog controller outputs (0-20 or 4-20 mA) can be configured for recording or controlling (only for models with PID), and up to four relays can be used to control the process or be connected with alarm status. Controller status is visible with LEDs on the front panel and on LCD.

The controller logging feature can save the last 100 error, configuration, and calibration events. This information can be accessible from a PC through RS485 and HI92500 software. The controller also has a full auto diagnostic procedure.

Specifications	HI720
Range	0 to 2000 mS/cm (autoranging); -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 (@25°C/77°F)	±2% F.S. (conductivity) / ±0.5°C / ±1°F
Temperature Compensation	automatic or manual, -30 to 130°C
Temperature Probe	three-wire or two-wire Pt100 or Pt1000 sensor with automatic recognition and damage test
Digital Input	digital transmitter, hold and advanced cleaning inputs
Digital Output	one digital insulated contact closed upon hold mode
Analog Output	one or two 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
Power Consumption	10 VA
Max Oscillation Frequency	8 MHz
Ordering Info	Each HI720 model is supplied complete with mounting brackets and instructions. **Choose your configuration:** **HI720122-1** single setpoint, on/off and PID control, single analog output, 115V **HI720122-2** single setpoint, on/off and PID control, single analog output, 230V **HI720224-1** dual setpoint, on/off and PID control, dual analog output, 115V **HI720224-2** dual setpoint, on/off and PID control, dual analog output, 230V
Probes	**HI7650** inductive conductivity probe (see p. 31)

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 these process instruments superior to conventional controllers.

- Alarm feature
- Recorder output
- Low or high impedance input and analog inputs
- 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.
- LED indicators
  - The LEDs on the front panel light up to indicate the current operational mode.

HI8510

pH Analog Indicator

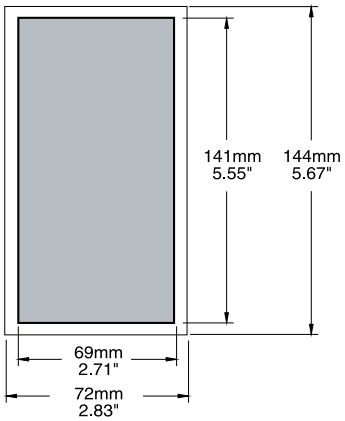
with Self Diagnostic Test

- Automatic temperature compensation
- Backlit LCD display
- Transparent, splash-proof front cover

HI8510 is ideal for monitoring pH in process control.

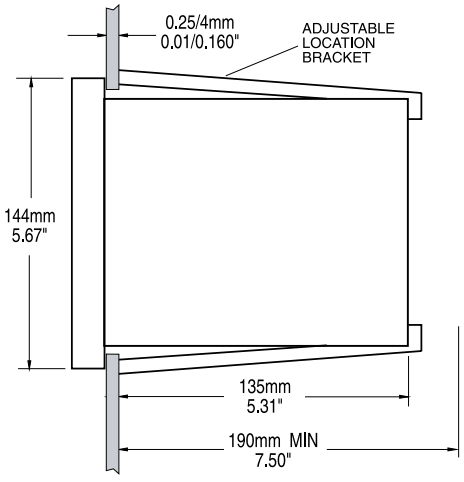
Specifications	HI8510	
Range	0.00 to 14.00 pH	
Resolution	0.01 pH	
Accuracy (@25°C/77°F)	±0.02 pH (0 to 100 °C); ±0.05 pH (-20 to 0 °C); ±0.5% (input transmitter)	
Input	high impedance 10^{12} Ohm; reference and matching pin inputs are available; 4-20 mA	
Power Output	±5 Vcc; 150 mA max load for amplified electrodes	
Calibration	offset: ±2 pH with OFFSET trimmer; slope: 80 to 110% with SLOPE trimmer	
Recorder Output	0-20 mA or 4-20 mA (isolated)	
Ordering Info	The **HI8510** is supplied complete with mounting brackets and instructions.	
Accessories	**HI931001**	pH / ORP electrode simulator with display
	HI8614N	pH transmitter
	HI8614LN	pH transmitter with display

Mechanical Dimensions



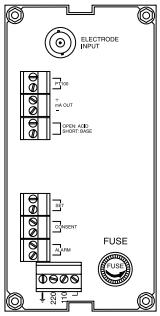
Front View

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.



Rear View

Rear view of the HI8710 shows the typical electrical connections.

HI8710

pH Analog Controller

with Self-Diagnostic Test

- Fail Safe Alarm System
- Automatic temperature compensation
- Backlit, LCD display
- Transparent, splash-proof front cover

HI8710 is a panel mounted pH controller with self-diagnostic test capabilities. Users 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.

HI8710 is a panel mounted pH controller with self-diagnostic test capabilities. When used in conjunction with the HI8720 ORP controller, the ODCD* function will ensure that the ORP dosage will start.

* ORP dosing consent device

Specifications	HI8710	
Range	0.00 to 14.00 pH	
Resolution	0.01 pH	
Accuracy (@25°C/77°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	
Recorder Output	0-20 mA or 4-20 mA (isolated)	
Set Point Relay	1, isolated, 2 A, max 240 V, resistive load, 1000000 strokes (not fuse protected)	
Set Point Range	0.00 to 14.00 pH	
Alarm Relay	1, isolated, 2 A, max 240 V, resistive load, 1000000 strokes (not fuse protected)	
Alarm 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	
Ordering Info	The **HI8710** is supplied complete with mounting brackets and instructions.	
Accessories	**HI1001**	pH continuous flow-thru electrode with BNC connector and 3 m cable
	HI931001	pH / ORP electrode simulator with display
	HI8614N	pH transmitter

HI8720

ORP Analog Controller

with Self-Diagnostic Test

- Backlit LCD display
- Transparent, splash-proof front cover

HI8720 allows the selection of a setpoint for oxidizing or reducing dosage.

When used in conjunction with the HI8710 pH controller, the ODCD* function (featured by the HI8710) 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, a large display, and autodiagnostic functions.

* ORP dosing consent device

Specifications	HI8720	
Range	±1999 mV	
Resolution	1 mV	
Accuracy (@25°C/77°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)	
Set Point Relay	1, isolated, 2 A, max 240 V, resistive load, 1000000 strokes (not fuse protected)	
Set Point Range	±1999 mV	
Alarm Relay	1, isolated, 2 A, max 240 V, resistive load, 1000000 strokes (not fuse protected)	
Alarm 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	
Ordering Info	The **HI8720** is supplied complete with mounting brackets and instructions.	
Accessories	**HI2001**	ORP continuous flow-thru electrode with BNC connector and 3 m cable
	HI8615N	ORP transmitter
	HI8615LN	ORP transmitter with display

HI943500C, HI943500D

EC Analog Controller

with Direct Input from Potentiometric Probe

- Automatic temperature compensation
- Backlit LCD display
- Transparent, splash-proof front cover

HI8410

Dissolved Oxygen Controller

with Extended Range and Analog Output

- Fail Safe Alarm System
- Automatic temperature compensation
- Backlit, LCD display
- Transparent, splash-proof front cover

These controllers allow direct connection of a potentiometric conductivity probe (HI7638) with a cable up to 20 m long, eliminating the need for a transmitter to amplify the signal.

The output configuration for connecting a recorder or a PLC can be chosen between 0-20 or 4-20 mA.

The Automatic Temperature Compensation (ATC) is performed directly by the HI3001, HI3002, and HI7638 probe with built-in temperature sensor.

The HI8410 is a panel mounted dissolved oxygen controller that is used to maintain and monitor the concentration of DO in a wide range of industrial process applications. The HI8410 uses a galvanic probe that typically requires less maintenance than a polarographic probe, making it ideal for long-term monitoring.

The setpoint 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 setpoint. This controller features single setpoint calibration in zero oxygen solution.

The DO probe is provided with a membrane covering the galvanic sensor and a built-in thermistor for temperature measurement and compensation.

Specifications	HI943500C	HI943500D
Range	0 to 1999 µS/cm	0.0 to 199.9 µS/cm
Resolution	1 µS/cm	0.1 µS/cm
Accuracy (@25°C/77°F)	±2% F.S.	
Calibration	manual, two-point, through offset and slope trimmers	
Recorder Output	4-20 mA (isolated)	
Set Point 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	
Ordering Info	The **HI943500** series is supplied complete with mounting brackets and instructions.	
Probes	**HI7638**	PEI/glass body, 75 mm conductivity probe with internal temperature sensor and 3/8" NPT thread (immersion)
	HI3001	PEI/PVDF body, 20 mm conductivity probe with internal temperature sensor, 1/2" NPT front thread (flow-thru) and 3/4" NPT back thread (submersion/pipe) mounting and 3 m (9.9') cable
	HI3002	PEI/PVDF body, 60 mm conductivity probe with internal temperature sensor, 1/2" NPT front thread (flow-thru) and 3/4" NPT back thread (submersion/pipe) mounting and 3 m (9.9') cable

Specifications	HI8410	
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 (ppm) or 1% (O_2) / 0.1°C	
Accuracy (@25°C/77°F)	±1% of reading (O_2) / ±0.2°C	
Calibration	manual, one-point, in saturated air	
Salinity Compensation	0 to 51 g/L (resolution 1 g/L)	
Probe (not included)	HI76410/4 with 4 m (13.1') cable or HI76410/10 with 10 m (32.8') 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 % O2; 0.1to 50.0 mg/L (mg/L (ppm) O_2	
Alarm Range	1.0 to 5.0 mg/L (ppm) O_2	
Hysteresis Range	0.5 to 2.4 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	
Ordering Info	The **HI8410** is supplied complete with mounting brackets and instructions.	
Probes	**HI76410/4**	galvanic DO probe (fixed) with internal temperature sensor, DIN connector and 4 m (13.1') cable
	HI76410/10	galvanic DO probe (fixed) with internal temperature sensor, DIN connector and 10 m (32.8') cable

Wall-Mounted Process Controllers

Hanna wall-mounted pH, ORP, and conductivity controllers are specifically designed to meet your process control requirements.

Alarm Feature

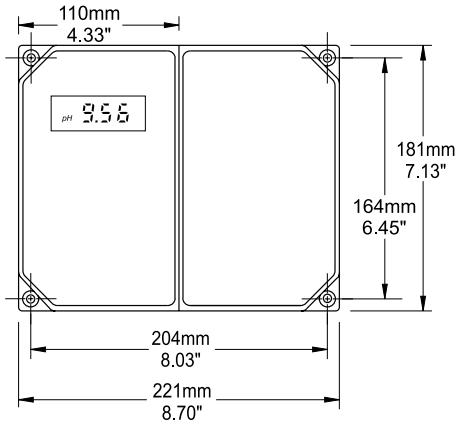
The Hanna wall-mounted series of controllers incorporate a triple contact alarm system that allows the user to select whether the alarm contacts will be in a normally open or normally closed position. When the measured value of the meter is out of range, the alarm is activated. The alarm will also be 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.

Quality Construction

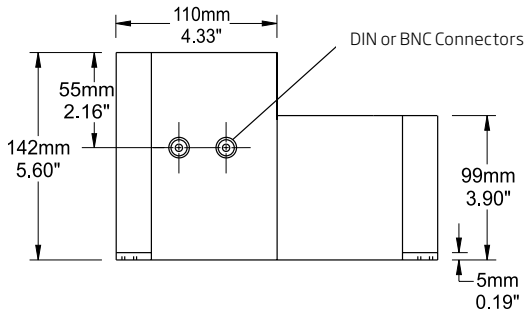
These controllers are housed in a rugged, modular, fiber-reinforced polypropylene housing. Polypropylene has properties that will resist the harmful effects of most chemicals. When in operation, and with the transparent protective cover installed, the units comply with IP54 standards. The modular design 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.

Mechanical Dimensions

Front View



Bottom View



HI21

Industrial Grade pH Digital Controller

Wall Mounted with Matching Pin

- Fail Safe Alarm System
- Automatic Temperature Compensation
- Up to three-point automatic calibration

The HI21 controller is a simple to operate, microprocessor-based pH process controller packed with features. With HI21 quick one, two or three point calibration at pH 4.01, 7.01 and 10.01. HI21 has a differential input, extending electrode life by eliminating ground loop current through the reference.

The Fail Safe Alarm System protects the HI21 against the pitfalls of process control such as power interruption or line failure.

Specifications	HI21
Range	0.00 to 14.00 pH; -9.9 to 120°C
Resolution	0.01 pH; 0.1°C
Accuracy	±0.02 pH; ±0.5°C
Input Impedance	10^{12} Ohm
pH Calibration	automatic, one, two or three-point, at pH 4.01, 7.01, 10.01
Analog Output	0 to 1 mA, 0 to 20 mA, 4 to 20 mA; 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC
Digital Output	RS485
Relays 1 and 2	electromechanical relay SPDT contact outputs, 5A-250 VAC
Alarm Relay	electromechanical relay SPDT contact output, 5A-250 VAC
Power Supply Output	±5V (for amplified electrodes)
Power Consumption	15 VA
Over Current Protection	400 mA, 250V, fast fuse
Ordering Info	**HI21211-1** with dual setpoint, on/off control, analog output, 115V is supplied with instructions.

HI22

Industrial Grade ORP Digital Controller

Wall-Mounted with Matching Pin

- Fail Safe Alarm System
- Automatic calibration

The HI22 has been engineered with the same outstanding quality and features as the HI21 meters.

The Fail Safe Alarm System protects these meters against the pitfall of process control such as power interruption or line failure. 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.

Specifications	HI22
Range	±2000 mV; -9.9 to 120°C
Resolution	1 mV; 0.1°C
Accuracy	±2 mV; ±0.5°C
Input Impedance	10^{12} Ohm
ORP Calibration	automatic, at 0 and 350 or 1900 mV
Analog Output	0 to 1 mA, 0 to 20 mA, 4 to 20 mA; 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC
Digital Output	RS485
Relays 1 and 2	electromechanical relay SPDT contact outputs, 5A-250 VAC
Alarm Relay	electromechanical relay SPDT contact output, 5A-250 VAC
Power Supply Output	±5V (for amplified electrodes)
Power Consumption	15 VA
Over Current Protection	400 mA, 250V, fast fuse
Ordering Info	**HI22111-1** with single setpoint, on/off controls, analog output, 115V is supplied with instructions.

HI23

Industrial Grade EC Digital Controller

Wall Mounted with Four-ring Potentiometric Probe

- Fail Safe Alarm System
- Automatic calibration
- Automatic Temperature Compensation

HI23 is a wall mounted, microprocessor conductivity controller that provides very accurate measurements due to the four-ring EC probe and Automatic Temperature Compensation (ATC) feature.

The input signal can come from a probe or a 4-20 mA transmitter.

Specifications	HI23
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; -10.0 to 100.0°C
Resolution	0.1 µS/cm, 1 µS/cm; 0.01 mS/cm, 0.1 mS/cm; 0.1 °C
Accuracy	0.5% F.S. (EC); ±0.5 °C (0 to 70°C); ±1 °C (outside)
Calibration	automatic, one-point
Probe	four-ring conductivity probe with built-in 3-wire Pt100 temperature sensor or conductivity probe + external Pt100 (not included)
Analog Input	4-20mA
Analog Output	0-10 VDC, 0-5 VDC or 1-5 VDC; 0-1mA, 0-20 mA or 4-20mA
Relays 1 and 2	electromechanical relay SPDT contact outputs, 5A-250 VAC
Alarm Relay	electromechanical relay SPDT contact output, 5A-250 VAC
Power Consumption	15 VA
Over Current Protection	400 mA, 250V, fast fuse
Ordering Info	**HI23211-1** with dual setpoint, on/off control, analog output, 115V is supplied with instructions.

MEADOS pH and ORP Measuring and Dosing System

Two Advanced Instruments in One

MEADOS pumps combine the powerful Blackstone dosing pumps with Hanna pH/ORP controllers. 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.

Easy Installation

Designed with mounting holes built into a rugged base, Blackstone pump/controllers are simple to install. They use a standard pH probe with a BNC connector to eliminate the need for any additional hardware. All of the controls and pump assemblies are conveniently located on the front of the unit. There is no need to uninstall the unit to access the pump head or control panel.

Rugged Construction

Blackstone pump/controllers are housed in rugged, fiber-reinforced polypropylene IP55 rated casings to prevent the 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.

Simple Pump Action

A positive displacement solenoid with few moving parts makes Blackstone pumps more reliable than motor driven pumps since there is no rotating parts, gears or cams; 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 set points, 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

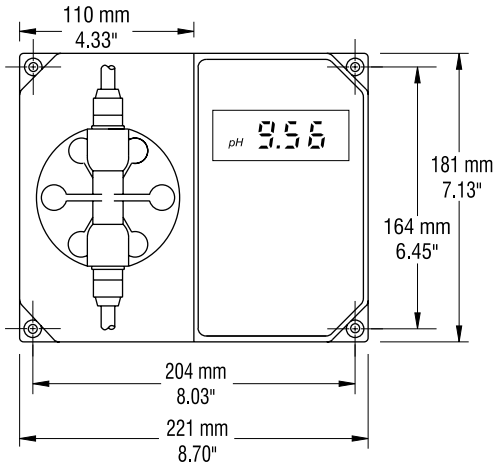
To enhance troubleshooting and the ability to record data while monitoring, Blackstone controller/pumps provide a recorder output. By simply attaching a recording device to the instrument's 4-20 mA output contacts, conveniently located on the front panel, you can obtain a hard copy of the results on 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 BL7916 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 setpoint (if dosing acid, this is an indication of insufficient dosage, a common symptom of the lack of chemicals). The BL7917's alarm will activate if the mV value is 200 mV lower than the setpoint (if dosing reducing chemicals, this indicates overdosage). The alarm will also activate if the value is 200 mV higher than the setpoint (if dosing reducing chemicals, this is an indication of lack of chemicals).

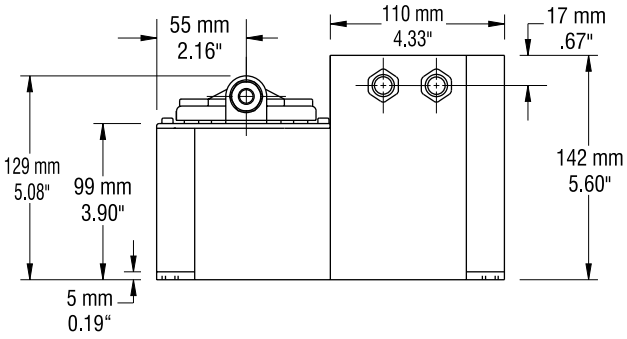
Auxiliary Dosing Contacts

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.



Front View

This series of instruments will mount easily in your plant using minimal of wall space. The controls and pump head are located in the front to allow easy access.



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 for rigidity.

Black Stone by Hanna

BL7916
pH Controller and Pump

- ±0.01 pH accuracy
- Isolated 4 to 20 mA recorder output.
- Proportional dosing
  - Slows the pump down when the measured pH level approaches the set value, which ensures precise dosage and avoids costly waste of chemicals due to overdosage
- Alarm contact
  - Activated whenever the pH value varies more than 2 pH units from the setpoint
- 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
  - Used for all parts that come into contact with liquid

Specifications	BL7916
Range	0.00 to 14.00 pH
Resolution	0.01 pH
Accuracy (@25°C/77°F)	±0.01 pH
Flow Rate	see table
Input Impedance	10^{12} Ohm
Dosage	proportional, acid or base, user selectable
Dosing Contact	1 isolated, 2A, max. 240V, resistive load, 1,000,000 strokes
Alarm Contact	1 isolated, 2A, max. 240V, resistive load, 1,000,000 strokes
Calibration	offset: ±1 pH with trimmer; slope: 85 to 115% with trimmer
Recorder Output	4-20 mA (isolated)
Ordering Info	**BL7916-1** is supplied with discharge and suction valves, polyethylene tubing, 115V power cable, and instructions

BL7916 PRESSURE/FLOW

BAR (PSI)	LPH (GPH)
0.5 (7.4)	13.3 (3.46)
1.0 (14.7)	11.7 (3.04)
2.0 (29.4)	10.1 (2.63)
3.0 (44.1)	9.0 (2.33)
4.0 (58.8)	7.8 (2.03)

Black Stone by Hanna

BL7917
ORP Controller and Pump

- ±5 mV accuracy
- Isolated 4 to 20 mA recorder output.
- Proportional dosing
  - Slows the pump down when the measured ORP level approaches the set value, to avoid over dosage of oxidizing or reducing agents
- Alarm contact
  - Is activated whenever the ORP reading varies more than 200 mV from the setpoint
- Auxiliary contacts
  - Allow users to attach a mixer or priming pump that is activated only when the pump is dosing
- PVDF, FPM/FKM and PTFE materials
  - Used for all parts that come into contact with liquid

Specifications	BL7917
Range	-999 mV to +999 mV
Resolution	1 mV
Accuracy (@20°C/68°F)	±5 mV
Flow Rate	see table
Input Impedance	10^{12} Ohm
Dosage	proportional, oxidizing or reducing, user selectable
Dosing Contact	1 isolated, 2A, max. 240V, resistive load, 1,000,000 strokes
Alarm Contact	1 isolated, 2A, max. 240V, resistive load, 1,000,000 strokes
Recorder Output	4-20 mA (isolated)
Ordering Info	**BL7917-1** is supplied with discharge and suction valves, polyethylene tubing, 115V power cable, and instructions.

BL7917 PRESSURE/FLOW

BAR (PSI)	LPH (GPH)
0.5 (7.4)	13.3 (3.46)
1.0 (14.7)	11.7 (3.04)
2.0 (29.4)	10.1 (2.63)
3.0 (44.1)	9.0 (2.33)
4.0 (58.8)	7.8 (2.03)

PCA300 Family

Chlorine, pH, ORP and Temperature Analyzers

- Alarm and warning system
- One to two-point calibration
- Backlit LCD display

Chlorine

Chlorine is a strong oxidizing agent that destroys mostly organic pollutants and bacteria. When dosing chlorine for disinfection, only a portion of the dosed chlorine remains active to actually continue the disinfection process.

When free chlorine combines with a nitrogen containing compound it becomes a less efficient disinfectant called chloramine. The sum of free chlorine and chloramines gives total chlorine. The target is to keep free and total chlorine equal, and thus to maintain the combined chlorine concentration (chloramines) near zero. The presence of chloramines is not desired because of the distinctive 'swimming pool' smell caused by combined chlorines species. Beside this unpleasant odor, chloramines can irritate the eyes and the mucous membranes.

Commercial chlorine for disinfection may be available as a gas (Cl_2), a liquid like sodium hypochlorite or bleach (NaOCl) or in a solid state like calcium hypochlorite, chloro-hydantoins or chloro-cyanuric acid compounds. These compounds, once dissolved in water, establish equilibrium between the hypochlorous acid (HOCl) and the hypochlorite ions (OCl^-). Although both forms are considered free chlorine, it is the hypochlorous acid that provides the strongest disinfecting and oxidizing characteristic of chlorine solutions; the amount of hypochlorous acid in chlorinated water depends upon the pH value of the solution. Changes in pH value will affect the HOCl equilibrium in relation to the hydrogen and hypochlorite ion; HOCl decreases and OCl^- increases as pH increases. At a low pH, almost all the free chlorine is in the molecular form HOCl. A pH of around 7.5, the ratio between HOCl and OCl^- is 50:50. Since the ionic form OCl^- is a slow acting sanitizer while the molecular HOCl is a fast acting, it is important to regularly measure the pH. As a general rule a pH of about 7.2 is recommended to maintain fast acting disinfection conditions.

Measurement and Control Cycle

The PCA has a control time cycle that can be set by the user according with the dimensions of the controlled system. The control process, dosing commands and alarms can be performed according to this time cycle. The range of cycle timing is from 3 to 90 minutes.

Chlorine Control

Four chlorine level setpoints can be adjusted by the operator: a proportional dosing setpoint, two alarm setpoints and a minimum level for dosing. The proportional dosing factor (1/Δ) is user selectable with a delta between 0.1 and 2 pH. Chlorine dosing system controls a SPST relay. Each alarm can be enabled or disabled.

pH Control

Three pH level setpoints can be adjusted by the operator: a control setpoint and two alarm setpoints. The pH control mode is user selectable; ON/OFF or proportional dosing. The proportional dosing factor (1/Δ) is user-selectable with a delta between 0.1 and 2 pH. The ON/OFF dosing hysteresis is user selectable between 0.05 and 2.00 pH. The pH dosing system controls a SPST relay.

Each pH, ORP and temperature alarm can be enabled or disabled, and two alarm levels can be set by the user also for temperature and ORP. Alarm condition controls a SPDT relay. The system error feature activates a relay to signal the need for operator intervention. System error condition controls a SPST relay.

Analog Output

Current outputs of 4-20 mA or 0-20 mA are available to drive external devices such as chart recorders. The analog output is fully programmable and can be proportional with chlorine concentration, pH, ORP, or temperature value. The limits of the analog output is selectable for each parameter.

Logging

The analyzers can store up to 3500 readings (at least 7 days at 3 minutes sampling interval) that can be available for consulting or downloading. Logged records contain the time stamp, full information about the parameter values and the alarm status at the time.

Alarm and Warning System

Through the system, users have the ability to enable or disable the low and high level of alarms for all parameters. The system also offers overdosing protection that generates an alarm if something within the system is not working properly. The system will stop processes until the error is corrected by the user. Time is displayed on the main panel and time related reminders are available for "old calibration," "reagent expired," and "SIM expired." All these warnings are generated based on user settings.

Mounting

These controllers are offered in an easy to access, wall-mounted casing that offers outstanding chemical, mechanical, and temperature resistance.

Specifications		PCA310	PCA320	PCA330
Free and Total Chlorine	Range	0.00 to 5.00 mg/L (ppm)	0.00 to 5.00 mg/L (ppm)	0.00 to 5.00 mg/L (ppm)
	Resolution	0.01 mg/L (ppm)	0.01 mg/L (ppm)	0.01 mg/L (ppm)
	Accuracy	± 8% or ±0.05 mg/L whichever is greater	± 8% or ±0.05 mg/L whichever is greater	± 8% or ±0.05 mg/L whichever is greater
pH	Range	–	0.00 to 14.00 pH	0.00 to 14.00 pH
	Resolution	–	0.01 pH	0.01 pH
	Accuracy	–	±0.05 pH	±0.05 pH
ORP	Range	–	–	0 to 2000 mV
	Resolution	–	–	1 mV
	Accuracy	–	–	±1 mV
Temperature	Range	–	5.0 to 75.0 °C (41 to 167 °F)	5.0 to 75.0 °C (41 to 167 °F)
	Resolution	–	0.1 °C	0.1 °C
	Accuracy	–	±0.5°C	±0.5°C
Additional Specifications	Chlorine Calibration	one-point		
	Chlorine Sampling Rate	adjustable from 3 to 90 minutes		
	Chlorine Dosage	proportional		
	Chlorine Delta	selectable from 0.1 to 5 mg/L (ppm)		
	pH Calibration	one or two-point or in-line calibration		
	pH Sampling Rate	adjustable from 3 to 120 seconds		
	pH Dosage	ON/OFF or proportional, relay or 4-20mA output		
	pH Delta	selectable from 0.1 to 2 pH (hysteresis adjustable from 0.05 to 2 pH)		
	Recorder Output	4-20mA, 0-20mA		
	PC Connectivity	RS485 port, galvanically isolated		
	Baud Rate	1200, 2400, 4800, 9600 bps		
	Data Logging	up to 3500 data points		
	Alarm Relay	SPDT contact with 5A, 230V resistive load		
	Dosing Relay	SPDT contact with 5A, 230V resistive load		
	System Error	SPDT contact with 5A, 230V resistive load		
	Inlet Pressure	0.07 to 4 bar with no external pressure regulator (for pressure exceeding four 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/Outlet Connection	12mm (1/2") male NPT fitting		
	Drain Connection	10mm (3/8") barb		
	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 Info

Each PCA300 series model is supplied with reagent bottles (2), reagent caps (2), 1 DPD compound powder, tubing, and instructions.

PCA310-1 free & total chlorine analyzer/control (115V);

PCA310-2 free & total chlorine analyzer/control (230V);

PCA320-1 free & total chlorine analyzer/control, pH control, temperature (115V);

PCA320-2 free & total chlorine analyzer/control, pH control, temperature (230V) ;

PCA330-1 free & total chlorine analyzer/control, pH control, ORP monitoring, temperature (115V);

PCA330-2 free & total chlorine analyzer/control, pH control, ORP monitoring, temperature (230V)

Accessories

HI1005	amplified pH electrode with matching pin and Pt100 (PCA320/330 only)
HI2008	amplified ORP electrode with matching pin (PCA330 only)
HI70431	total chlorine reagents set for PCA, recommended for long term measurements, 500 mL (2) + 6 g powder
HI70430	free chlorine reagents set for PCA, recommended for long term measurements, 500 mL (2) + 6 g powder
HI7004L	pH 4.01 buffer solution, 500 mL
HI7007L	pH 7.01 buffer solution, 500 mL
HI7010L	pH 10.01 buffer solution, 500 mL
HI7020L	200-275 mV buffer solution, 500 mL
HI7091L	pretreatment reducing solution, 500 mL
HI7092L	pretreatment oxidizing solution, 500 mL
HI70300L	storage solution, 500 mL
HI7061L	electrode cleaning solution, 500 mL
HI92500	Windows® compatible software

* After addition of 5 powder sachets (HI70452-0)

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. Industrial environments are often associated 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 an 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 traveled a great distance (up to 300 m, 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 two wires.

The signal current from the process controller is normally 4-20 mA. When the load is connected with the power supply return line, the signal current will be proportional in the range of 4-20 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 4-20 mA signal. All of these features, give Hanna transmitters the versatility to be used over long distances in almost any process control application.

Conductivity, Four-ring Technology

Hanna conductivity transmitters use four-ring potentiometric probes. As opposed to the more widely used two-electrode amperometric method, the four-ring Potentiometric method provides the highest accuracy and repeatability. When measuring liquids that have a high conductivity, the two-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.

Four-ring electrodes eliminate the polarization effect by splitting the four rings into two current and two voltage electrodes. When placed in a conductive liquid, the two 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.

HI98143

pH and EC Transmitter

with Galvanic Isolated Output

- Automatic Temperature Compensation
- PC compatible
- IP54 enclosure

The HI98143 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 ideal for remote process control applications.

Three 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 transmitters' Automatic Temperature Compenstion circuitry.

The transmitter can be connected to any pH or conductivity controller, recorder, PC, or any data monitoring device that accepts 0-1 V, 0-4 V or 4-20 mA input. HI98143 is an ideal tool for applications that require the monitoring of both pH and conductivity at the same time.

Specifications	**HI98143-01 • HI98143-04 • HI98143-20**
Range	0 to 14 pH; 0 to 10 mS/cm
Accuracy (@25°C/77°F)	±0.5% F.S. pH; ±2% f.s. EC
Calibration	manual, two-point, through trimmers: pH: offset and slope trimmers; EC: 0 and 5 mS/cm trimmers
pH Electrode	HI1001 pH electrode (suggested, not included), HI1283 matching pin (not included)
EC Probe	HI3001 (not included) with cell constant 2.1
Power Supply	12-24 VDC
Ordering Info	All HI98143 models are supplied with instructions. Choose your configuration **HI98143-01** pH/EC transmitter with 0-1 V isolated output **HI98143-04** pH/EC transmitter with 0-4 V isolated output **HI98143-20** pH/EC transmitter with 4-20 mA isolated output

HI8614LN features an LCD display

CLN and DLN models feature an LCD display

HI8614N • HI8614LN

pH Transmitters

with 4-20 mA Galvanically Isolated Output

- Automatic Temperature Compensation
- IP65 water-resistant enclosure
- Backlit LCD display (HI8614LN only)

HI8614N without LCD

The HI8614N 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 remaining independent of changes in load or cable capacitance.

Calibration is performed by the adjustment of two independent trimmers – slope and offset.

The transmitter can be connected to HI8510, HI8710 or HI8711 Hanna controllers, recorders, computers, or any data monitoring device that accepts 4 - 20 mA input.

HI8614"L" versions allow easy verification and monitoring of measured values and are easier to calibrate and maintain.

Specifications	HI8614N • HI8614LN
Range	0.00 to 14.00 pH; 4-20 mA
Resolution (for "L" models)	0.01 pH; 0.01 mA
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 HI76608 probe
Input Impedance	10^{12} Ohm
Recorder Output	4-20 mA (isolated)
Power Supply	HI8614N: 18-30 VDC; HI8614LN: 20-36 VDC
Load	max 500 Ohm
Ordering Info	**HI8614N** and **HI8614LN** (with display) is supplied with instructions.

HI8936 Series

Conductivity Transmitters

to use with Four-ring Probe

- Automatic Temperature Compensation)
- IP65 water-resistant enclosure
- Backlit LCD display (CLN and DLN models only)

AN and BN without LCD

HI8936 is a conductivity transmitter that utilizes a four-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. Direct connection of the probe to the transmitter assures a positive electrical connection with no signal loss over long distances.

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.

HI8936"L" versions allow easy verification and monitoring of measured values and are easier to calibrate and maintain.

The HI8936 series requires external power to the 4-20 mA current loop.

Specifications	HI8936CN HI8936CLN	HI8936DN HI8936DLN
Range	0 to 1999 µS/cm	0.0 to 199.9 µS/cm
Resolution	1 µS/cm	0.1 µS/cm
Accuracy	±2% F.S. (excluding probe error)	
Calibration	manual, two 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	HI7635 for in-line applications (recommended, not included)	
Recorder Output	4-20 mA, not isolated, max 500 Ohm	
Power Supply	without LCD: 12-30 VDC; with LCD: 17-36 VDC	
Ordering Info	All **HI8936** models are supplied complete with instructions.	

BlackStone Chemical Dosing Pumps

- IP65 protection
- One-piece diaphragm construction
- Minimal moving parts
- Excellent resistance to most chemicals

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, the pumps can be easily mounted anywhere in your plant. The rear of the pump housing also provides mounting holes to facilitate vertical mounting on a wall, tank, or machine. Since the pump valve assembly and controls for the unit are 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 users 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, allowing 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. 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 (right) shows how well PVDF and PTFE stand up to some of the most aggressive chemicals.

Black Stone by Hanna

Chemical Resistance Guide*

Chemical	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

* PARTIAL LISTING

Symbol Key

A - Excellent	B - Good	C - Fair	D - Acceptable (limited use)	E - Not recommended	X - Unknown

BL Series Dosing Pumps Benefits

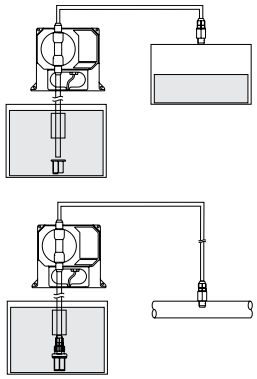
BlackStone's positive displacement solenoid-driven pumps use a minimum number of moving parts, therefore reducing the chance of mechanical failure. Part wear and oiling associated with motor-driven pumps (ball-bearings, gear drives, and cams) are not a concern with these pumps. BlackStone pumps are more 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.

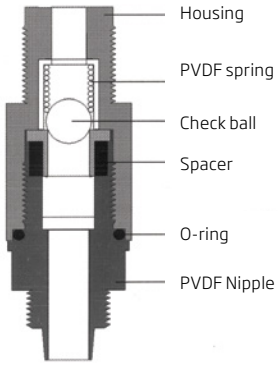
A wide range of BlackStone pumps with different dosing capacities are available for your specific dosing needs. Each pump is supplied with discharge and suction valves.

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.

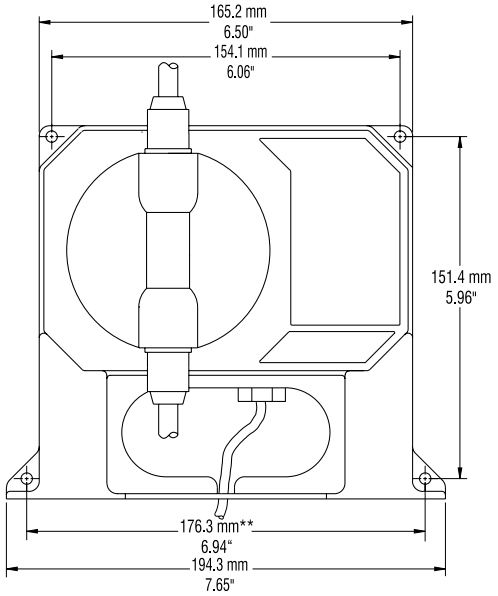
Typical Installations





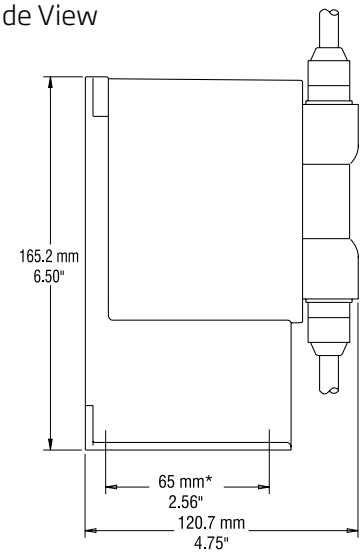
Mechanical Dimensions
for BlackStone Chemical Dosing Pumps

Front View



** Dimensions for floor and wall mounting

Side View



* Dimensions for floor mounting

Part Number	Max Output	Rated Pressure	Dosing Frequency strokes/min
With Large Diaphragm			
BL20	18.3 LPH (4.8 GPH)	0.5 bar (7.4 psi)	120
With Small Diaphragm			
BL5	5.0 LPH (1.3 GPH)	7 bar (101.5 psi)	120
BL1.5	1.5 LPH (0.4 GPH)	13 bar (188.5 psi)	120

Specifications	BL Series
Max Output	see table above
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
Self-priming	max height: 1.5 m (5 feet)
Power Supply	110/115 VAC or 220/240 VAC, 50/60Hz
Max Power Consumption	approximately 200 W
Protection	IP65

Ordering Information	
BL1.5-1	1.5 (0.4 GPH) LPH flow rate, 110/115 VAC
BL1.5-2	1.5 (0.4 GPH) LPH flow rate, 220/240 VAC
BL5-1	5.0 (1.3 GPH) LPH flow rate, 110/115 VAC
BL5-2	5.0 (1.3 GPH) LPH flow rate, 220/240 VAC
BL20-1	18.3 LPH (4.8 GPH) flow rate, 110/115 VAC
BL20-2	18.3 LPH (4.8 GPH) flow rate, 220/240 VAC

Flat Tip Industrial pH and ORP Electrodes

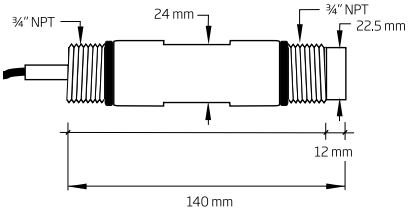
- Annular non-clogging PTFE junction
- Self-cleaning flat tip sensor
- Significantly reduced maintenance requirement
- Models especially designed for plating baths
- PVDF body
- Built-in potential matching pin
- Three different glass type pH sensors
- ORP electrodes with platinum or gold sensor
- 3/4" NPT external thread on both ends for easy installation

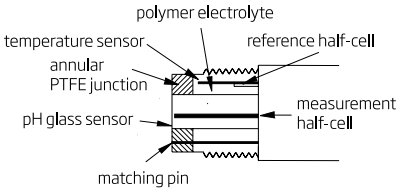
This series of industrial electrode feature a flat tip, virtually eliminating deposits that can foul the electrode, significantly reducing necessary maintenance. This characteristic makes flat tip electrodes ideal for continuous in-line monitoring and for solutions containing aggressive chemicals. The non-clogging PTFE junction is suitable for testing solutions with a high content of suspended solids or for high pressure installation.

Each pH and ORP electrode is provided with an internal matching pin that can avoid typical problems caused by grounding loop current, such as:

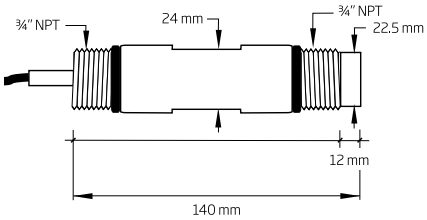
- Progressive damage of the electrode
- Fluctuating measurements
- Poor process regulation

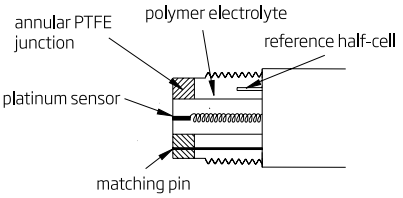
pH Electrode Dimensions

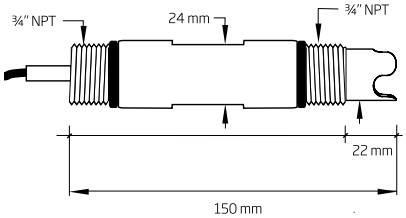


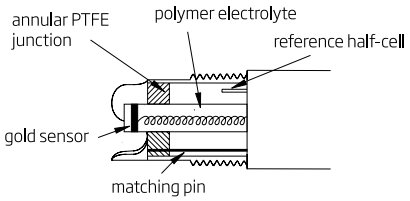


ORP Electrode Dimensions









pH Flat Tip Electrodes

HI1006-1005	flat tip pH electrode with PTFE junction, LT (low temperature) glass, BNC connection and 5m (16.4') cable
HI1006-1205	flat tip pH electrode with PTFE junction, LT (low temperature) glass, BNC connection + Pt100 and 5m (16.4') cable
HI1006-2005	flat tip pH electrode with PTFE junction, GP (general purpose) glass, BNC connection and 5m (16.4') cable
HI1006-2205	flat tip pH electrode with PTFE junction, GP (general purpose) glass, BNC connection + Pt100 and 5m (16.4') cable

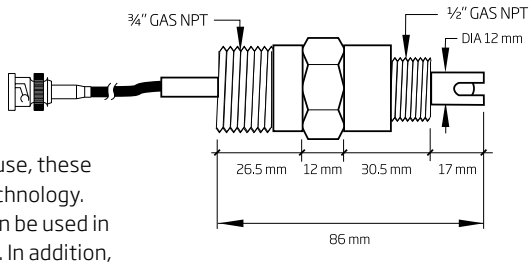
ORP Flat-tip Electrodes

HI2004-1005	flat tip ORP electrode with PTFE junction, platinum sensor, BNC connection and 5m (16.4') cable
HI2004-2005	flat tip ORP electrode with PTFE junction, gold sensor, BNC connection and 5m (16.4') cable

HI1000 and HI2000 Series

pH and ORP Electrodes for Continuous Flow-thru Monitoring

- ½" NPT external thread for in-line installation
- pH electrode with exclusive PTFE non-clogging membrane
- Double-junction technology



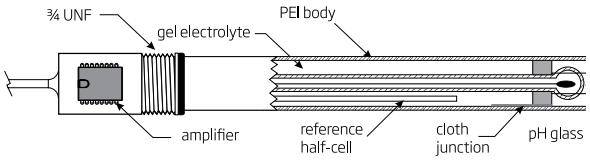
In order to reduce normal contamination coming from industrial use, these electrodes combine a polymer reference and double-junction technology. With this technology, no refilling is required and the electrode can be used in samples such as organic compounds, proteins, and heavy metals. In addition, 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.

Code	Junction	Electrolyte	Temperature	Max Pressure	Connector	Cable
pH Continuous Flow-thru Electrode						
HI1001	double, PTFE	polymer	-5 to 80°C	6 bar (87 psi)	BNC	3 m
ORP Continuous Flow-thru Electrode						
HI2001	double, PTFE	polymer	-5 to 80°C	6 bar (87 psi)	BNC	3 m

Amplified pH and ORP AmpHel® Electrodes

- Strong signal up to 75 m (246')
- Low noise coaxial cables are no longer required
- Measurements in unclean samples and high humidity conditions
- Glass sensor for specific applications



AmpHel® pH Electrodes with Internal Battery

Code	Body	Junction	Electrolyte	Glass Type	Temperature	Max Pressure	Connector	Cable
HI2910B	PEI	cloth	gel	GP	-5 to 70 °C	3 bar (43.5 psi)	BNC	1 m

AmpHel® ORP Electrodes with Internal Battery

Code	Body	Junction	Electrolyte	PIN Type	Temperature	Max Pressure	Connector	Cable
HI2930B/5	PEI	cloth	gel	platinum	-5 to 80 °C	3 bar (43.5 psi)	BNC	5 m

HI7635

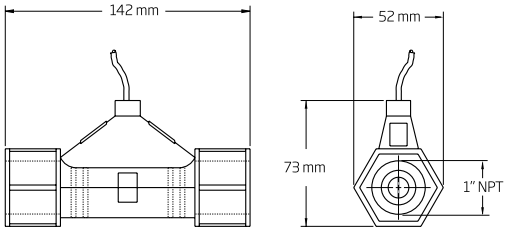
In-line Conductivity Probe

These conductivity probes combine the proven four-ring potentiometric method of measuring conductivity with platinum sensors. The universally acclaimed four-ring method provides an exceptionally stable measurement over a wider range. These probes do not suffer polarization, nor do they need frequent calibration or cell changes.

The built-in temperature sensor (select models) allows for automatically temperature compensated measurements and features easy operation and maintenance.

The majority of probes are provided with a 4 m cable incorporating color coded wires for easy connection to HI8936 transmitters, while others provide a DIN connection.

Typical connection of the HI7635 probe and the HI8936 transmitter to the HI8931 controller.



Code	Temperature Compensation	Body	Operating Temperature	Max Pressure (@25°C/77°F)	Cable/Connection
HI7635	automatic, 0 to 50°C with NTC sensor	polypropylene	0 to 80°C (32 to 176°F)	5 bar	4 m (13.1')/color coded wires

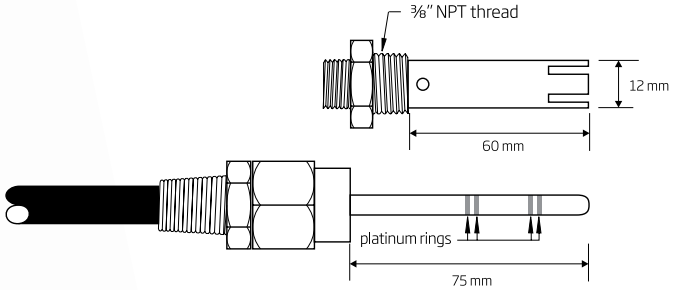
HI7638 • HI7639

In-line Conductivity Probes

with Platinum Ring

This conductivity probe combines the proven four-ring potentiometric method of measuring conductivity with platinum sensors. The universally acclaimed four-ring method provides an exceptionally stable measurement over a wider range. This probe does not suffer polarization, nor does it need frequent calibration or cell changes.

HI7639's built-in temperature sensor allows automatically temperature compensated measurements and features easy operation and maintenance.



HI7638

Code	Temperature Compensation	Body	Operating Temperature	Max Pressure (@25°C/77°F)	Cable/Connection
HI7638	automatic, 0 to 50°C with NTC sensor	PEI and glass	0 to 120°C (32 to 248°F)	5 bar (72.5 psi)	3 m (9.9')/Color coded wires
HI7639	automatic, 0 to 50°C with Pt100 sensor	PEI and glass	0 to 120°C (32 to 248°F)	5 bar (72.5 psi)	3 m (9.9')/Color coded wires

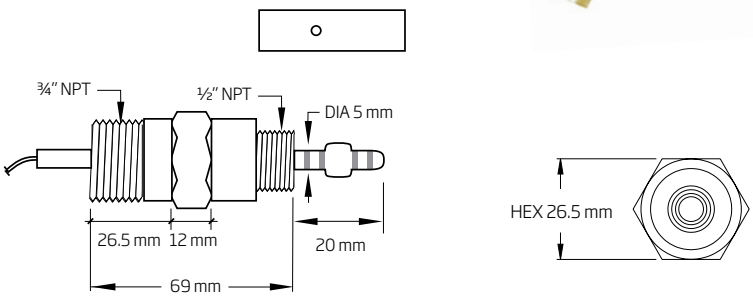
HI3001

Flow-thru Conductivity Probe

This four-ring probe measures conductivity with platinum sensors. HI3001 features standard ½" external thread on the front for flow-thru mounting and ¾" threads on the back for submersion or pipe mounting. HI3001 incorporates 3 m (9.9') of cable.

The protective probe cover is made of PEI and can be removed for quick maintenance. This probe can withstand temperatures up to 80°C (176°F) and 6 bars (87 psi) of pressure.

The HI3001 houses an NTC sensor for automatic temperature compensation.



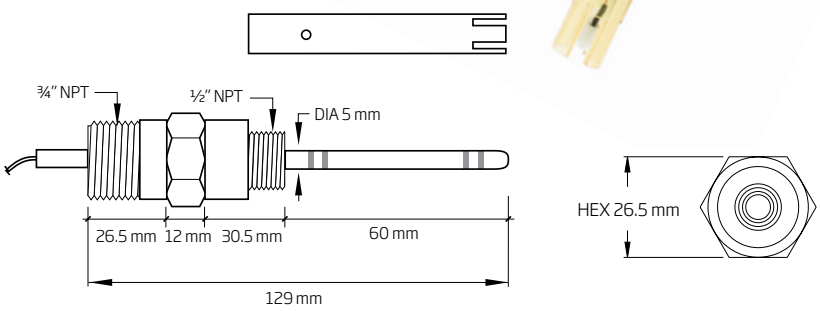
Code	Temperature Compensation	Body	Operating Temperature	Max Pressure (@25°C/77°F)	Cable
HI3001	automatic, 0 to 60°C with NTC sensor	PEI and PVDF	0 to 80°C (32 to 176°F)	6 bar (87 psi)	3 m (9.9')

HI3002

Submersion Probe

The HI3002 four-ring probe measures conductivity with platinum sensors. It features standard ½" external thread on the front for flow-thru mounting and ¾" threads on the back for submersion or pipe mounting. HI3002 incorporates 3 m (9.9') of cable.

The protective probe cover is made of PEI and can be removed for quick maintenance. This probe can withstand temperatures up to 80°C (176°F) and 6 bars (87 psi) of pressure. HI3002 also houses an NTC temperature sensor for automatically temperature compensated measurements.



Code	Temperature Compensation	Body	Operating Temperature	Max Pressure (@25°C/77°F)	Cable
HI3002	automatic, 0 to 60°C with NTC sensor	PEI and PVDF	0 to 80°C (32 to 176°F)	6 bar (87 psi)	3 m (9.9')

HI7650

Inductive Conductivity Probe

for HI720

Specifications	HI7650 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, approximately 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)	approximately 330 g (11.64 oz.)	
Ordering Info	**Choose your configuration**	
	HI7650-1105	PVC body, Pt100, 5 m cable
	HI7650-1110	PVC body, Pt100, 10 m cable
	HI7650-1115	PVC body, Pt100, 15 m cable

HI76409
Galvanic DO Probe
with Protective Cap

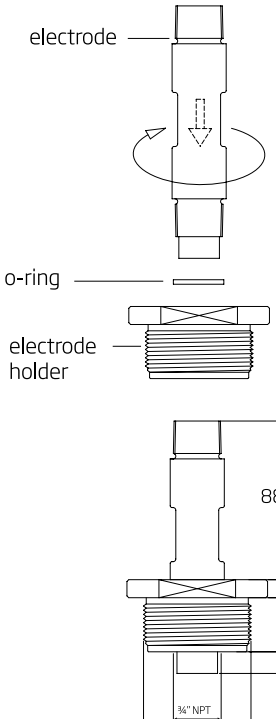
Unlike polarographic probes, galvanic DO probes require no conditioning time. When you need to measure multiple samples in a given period of time, simply turn on the meter and measure on demand.

Probe	Cable Length
HI76410/4	4 m (13')
HI76410/10	10 m (33')

HI60542
In-line Electrode Holder
for Direct Pipe Installation

HI60542 is a two inch NPT in-line PVC electrode holder ideal for direct pipe installation.

HI60542 has been designed specifically to be used with Hanna ¾" NPT process electrodes with built-in temperature sensor and matching pin.



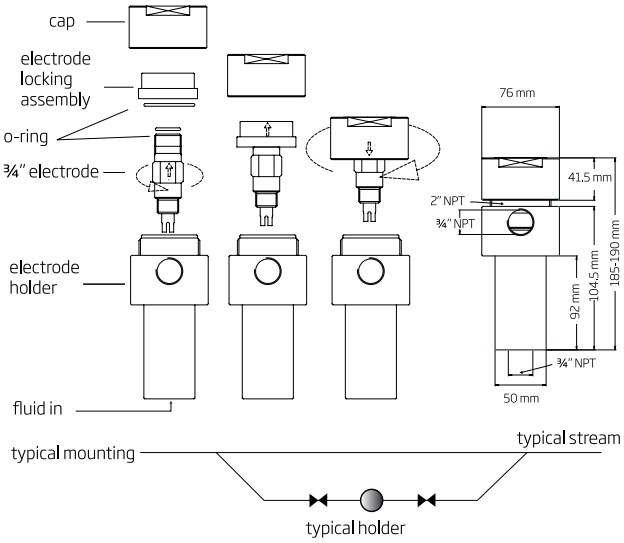
Specifications	HI60542
Electrode Holder Material	PVC
O-ring Material	NBR (Buna N)
Minimum Temperature	-10°C
Maximum Temperature	+60°C
Maximum Pressure	8 bar @25°C or 3 bar @50°C

HI60545
By-pass Loop Electrode Holder
No Downtime

HI60545 is an electrode holder designed for use in a bypass loop configuration.

HI60545 allows easy maintenance and calibration without shutting down the process. The design of HI60545 assures that the glass sensor remains wet even when system is not under pressure.

HI60545 is only for use with Hanna 1006 series probes that have a ¾" NPT fitting.



Specifications	HI60545
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

HI6050

Submersible Electrode Holder

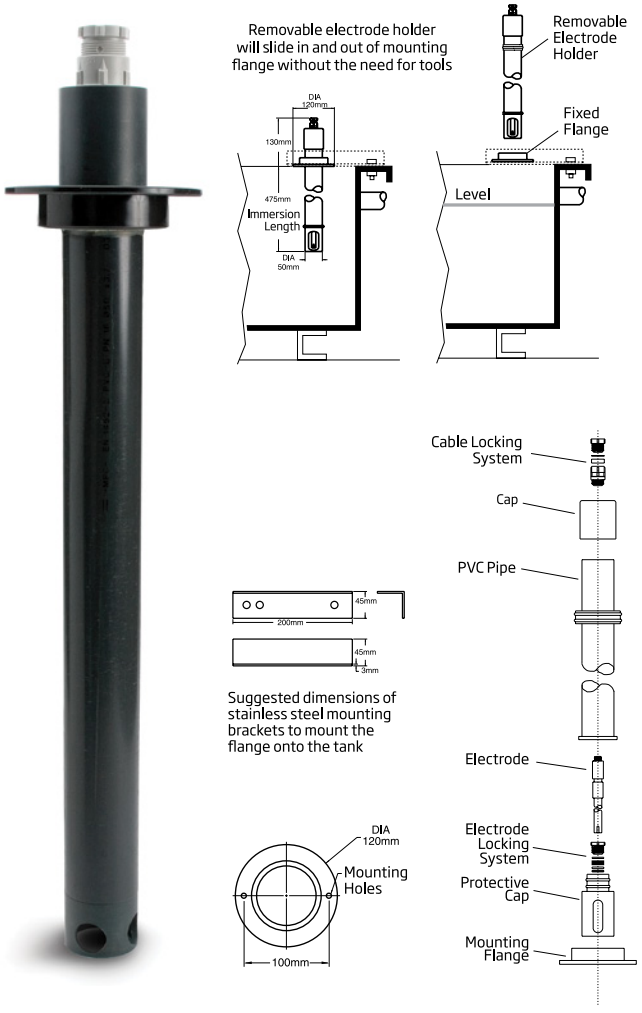
These electrode mounting systems are constructed in rugged PVC and will resist most of the chemicals associated with wastewater treatment.

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 tanks.

The figure illustrates the suggested bracket dimensions used for mounting. Once mounted to the tank, the electrode holder is a sturdy, protective housing that will extend the life of the 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
HI6050	605 mm (23.8")	0.8 kg (26 oz.)	475 mm (18.7")
HI6051	1105 mm (43.5")	1.2 kg (44 oz.)	975 mm (38.4")
HI6052	1605 mm (63.2")	2.0 kg (71 oz.)	1500 mm (59.1")

HI6054B

Electrode Holder

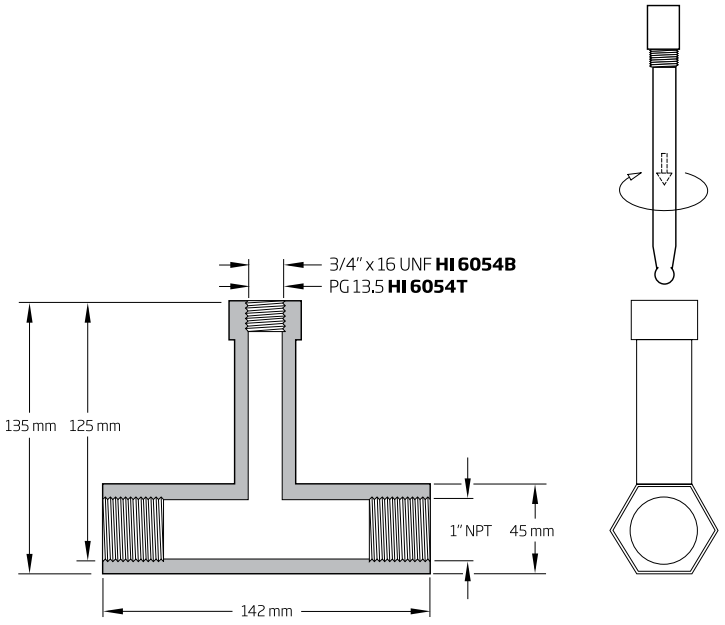
for In-line Applications

The HI6054B 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 of it.

Once installed, the electrode will remain in contact with the fluid at all times, allowing the most accurate readings possible.

The HI6054B is designed specifically to work with Hanna electrodes with external thread of ¾" x 16 UNF and PG 13.5 respectively.



HI7871 • HI7873

Mini Level Controllers

The HI7871 and HI7873 mini level controllers are ideal for liquid level control over distances of up to 100 m (330'). These instruments are highly compact and will fit in tight spaces.

These easy-to-use controllers are suited for nearly any liquid level application, such as industrial and municipal water treatment, nutrient tank control in farming, hydroponics, aquaculture and plating rinse baths.

The HI7871 features high and low level control, while the HI7873 includes an overflow alarm. Both instruments are connected to a two-wire transmitter (HI7874), which is ideal for level monitoring in remote applications.

A complete liquid level measuring system requires:

1) A controller (HI7871 or HI7873)
2) A bar holder with amplifier circuitry (HI7874)
3) A package of measuring bars (HI731324)
4) An undecal connector (HI7164)

Specifications	HI7871	HI7873
Transmission	max 100 m (330')	
Electrical Connection	HI7164 undecal connector (not included)	
Level Adjustment	high and low	high, low and overflow
Level Indication	high and low	high, low and overflow
Sensor Bars	three*	four **
Transmitter	HI7874 (not included)	HI7874 (not included)
Output Contact	one relay (2A/250 VAC, 30 VDC)	two relays (2A/250V, 30 VDC)
Ordering Info	**HI7871/115** (115V) is supplied with mounting brackets and instructions. **HI7871/220** (220V) is supplied with mounting brackets and instructions. **HI7873/115** (115V) is supplied with mounting brackets and instructions. **HI7873/220** (220V) is supplied with mounting brackets and instructions. **HI731324** measuring bar set for level controller	

*HI7871 requires 3 bars, one each for low and high levels and the third as a consent sensor.
**HI7873 requires 4 bars with the additional bar used for overflow measurement.

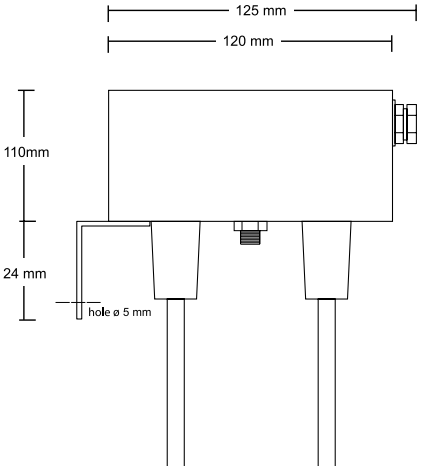
HI7874

Level Transmitter

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. These transmitters are easy to install and ideal for monitoring tanks and water conditioning plants.

The HI7874 transmitter was designed in conjunction with the HI7871 and HI7873 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.

The HI7874 is supplied with a sturdy mounting bracket for quick and easy installation.



HI7874
Level Transmitter with HI731324 Stainless Steel Measuring Bars

Specifications	HI7874
Transmission	max 100 m (330')
Electrical Connection	two-wire terminal
Level Adjustment	high, low, and overflow
Sensor Bars	three or four (not included)
Power Supply	from level controller
Ordering Info	**HI7874** is supplied with mounting bracket and instructions. **HI731324** measuring bar set for level controller

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Hanna products are manufactured in our ISO 9001:2008 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.

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