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## Definition of Conductivity

Electrolytic conductivity, abbreviated as EC, is a measurement made in which electrical charges on atomic or larger sized particles in a medium are moved under the influence of a potential difference. EC is a measure of concentration however it is non-specific for ion type. An ion is a charged particle present in the solution that contributes to the current flow. Ions are formed when a salt such as sodium chloride is dissolved in water to form particles having electrical charges. Sodium chloride for example, separates into  $\text{Na}^+$  and  $\text{Cl}^-$ . This is a simplified definition for the measurement is affected by many things such as the type of ionic compound(s) dissolved in the water; the ions mobility, the solution viscosity, temperature as well as concentration.

Electrical conductance, the ability of a substance to conduct an electrical current is the reciprocal of electrical resistance. "Conductance" and "resistance" depend on the geometrical dimensions of the substance being measured. Conductivity and resistivity are "normalized" terms that are used to denote a bulk intrinsic property of a substance. This is the measurement a standardized EC probe on a conductivity or resistivity meter provides. Conductivity measurements can be used to provide additional industry specific measurements; TDS, Salinity and USP compliant conductivity. Many of Hanna's meters provide these measurements also.

## Units of Measurement

Electrical Resistivity  $\rho$  (Greek rho), also called Specific Resistance (1cm cube) uses units of Ohm.cm. For example, ultrapure water is said to have a value of 18.16 Mohm.cm.at 25°C.

Electrical Conductivity  $\sigma$  (Greek sigma and other symbols used also, is the reciprocal of resistivity and uses units of Siemens/cm (S/cm, mS/cm,  $\mu\text{S}/\text{cm}$ , dS/m). For example, ultrapure water is said to have a conductivity of: .055 $\mu\text{S}/\text{cm}$  at 25°C.

The IUPAC convension

1000 microSiemens/cm ( $\mu\text{S}/\text{cm}$ ) = 1.0 milliSiemen/cm (mS/cm).

Note: Prior to 1971 mho/cm was the unit used for conductivity. This unit can still be found in some older literature.

## Conductivity versus Resistivity

Although conductivity and resistivity are reciprocal units that may be converted easily, convention uses resistivity for very low electrolyte concentrations or trace contaminants i.e. ultrapure water, and conductivity for expressing meaningful salt levels i.e. seawater; electroplating baths, acid concentrations. Electrode style and measurement techniques also contribute to success in making conductivity or resistivity measurements reliably. Conductivity measurements can be used to provide useful industry specific measurements such as TDS, Salinity and USP compliant conductivity and many of Hanna's conductivity meters provide the computing power to provide these measurements automatically.

## TDS

TDS (total dissolved solids), is a method used to determine solid content in a solution. To determine TDS, the solution whose volume is known is evaporated and the residue weighed. A conductivity measurement is commonly used to estimate TDS (Total Dissolved Solids) based on the assumption the solids are predominately ionic in nature and the relationship between the dissolved ions and conductivity is known. TDS uses units of mg/L (ppm), or g/L. On some meters the user can input the TDS factor for the conversion. On more basic units the factor is automatically set to 0.50 A typical

TDS factor for strong ionic solutions is 0.5, while for weak ionic solutions (e.g. fertilizers) is 0.7.

$\text{TDS} = \text{factor} \times \text{EC}_{25}$

For example: 100 $\mu\text{S}/\text{cm}$  conductivity is a TDS of 50ppm when the factor is 0.5.

## Conductivity/Resistivity/TDS of Commonly Measured Substances

Sample at 25°C	M $\Omega$ •cm	$\mu\text{S}/\text{cm}$	mS/cm	TDS
Ultrapure Water	18.16	.055		
Power Plant Boiler Water	1.0	1.0		0.5 ppm
Drinking Water		500-800	0.5 to 0.8	250 to 400 ppm
Ocean Water		53000	53.0	9.24 g/L
1M NaCl		85000	85.0	42.5 g/L
5% NaOH		223000	223	
50% NaOH		150000	150	
1M HCl		332000	332	
10% HCl		700000	700	
32% HCl		700000	700	
31% HNO <sub>3</sub>		865000	865	

## Salinity

Conductivity measurements can be used for determining salinity as it relates to general oceanographic

use. Three measurement scales are in use and depending on the sophistication of the meter, are available for salinity measurement in Seawater. The 3 scales are Practical Salinity Scale (PSU); 1978, Percent Scale (%);and Natural Seawater Scale(g/L); 1966.

Practical salinity and the Natural Seawater require a conductivity calibration. The meters have the algorithms to convert the measurement to the desired scale. NaCl % requires a calibration in HI70371 standard. Portable meters with this measurement make it easy to measure salinity in salt water aquariums and brackish waters.

## Conductivity and Temperature

Conductivity changes with ion concentration and with temperature. For example, a standard potassium chloride solution used for calibration of a cell constant and conductivity bridge, changes conductivity as tabulated at right.

Having two variables changing would make it near impossible to take useful conductivity measurements. If the temperature was held constant, the conductivity measurement would only have the variable of ion concentration. Absolute conductivity is a conductivity measurement without temperature compensation. If the conductivity change with temperature change of a solution is a known characteristic, the Conductivity measurements can be corrected to a reference temperature (typically 20 or 25°C) by carefully measuring the solution temperature. Fortunately, Hanna EC sensors incorporate an integral temperature sensor to measure solution temperature. Compensation corrects the measured conductivity to a reference temperature by applying a fixed factor  $\beta$  for linear compensation. High end meters allow adjustment of  $\beta$  to compensate for various solutions and permit adjustment of a reference temperature over a wider range of temperatures.  $\beta$  for neutral salts is typically between 1.5 to 2.2%/°C.

Conductivity 0.01m KCl	
°C	uS/cm
21	1305
22	1332
23	1359
24	1386
25	1413
26	1441
27	1468
28	1496

$$EC_{25} = \frac{EC_x}{(1 + \beta_{25}(T_x - 25))}$$

## Typical Temperature Coefficients of Various Solutions

Sample	Percent / °C	Sample	Percent / °C
Ultrapure Water	4.55	10% HCl	1.32
NaCl	2.12	5% H <sub>2</sub> SO <sub>4</sub>	0.96
5% NaOH	1.72	98% H <sub>2</sub> SO <sub>4</sub>	2.84

Non-linear temperature compensation for Natural waters is found some high end bench meters.

## (USP) United States Pharmacopeia Compliant Conductivity

Conductivity measurements are used for the preparation of pharmaceutical water for injection (WFI) worldwide. Hanna EC probes and meters can permit you to meet USP <645> Water Conductivity Requirements and European Pharmacopoeia 2.2.38 Conductivity Test for USP & EP Purified Water and Water for Injection. USP <645> with three stage compliance uses conductivity as a basis of ionic contaminants. Factors such as accuracy, resolution, cell constant certainty and ability to measure absolute conductivity are required. Stage 1 uses in-line conductivity measurements for compliance and a temperature/conductivity limit for compliance. Water that does not pass the Stage 1 limits must then be tested to Stage 2 requirements. This is a laboratory based technique that is streamlined using our meters with USP application firmware. They offer programmable set points to exceed the minimum meet USP and EP requirements and

prompts to guide the technician. Water that does not pass at Stage 2 must be tested for pH.

Using Hanna conductivity will help to meet the goals of the USP Purified Water and WFI requirements that include improved water quality, improved equipment reliability and reduction in the number of required tests.

## Conductivity Calibration

Conductivity standards are salt solutions for which the conductivity and temperature dependence are known. A well-defined relationship between Potassium Chloride concentration and electrolytic conductivity exists so KCl solutions are typically used as standards. A standard is used to determine the cell constant, in theory a defined geometric constant volume. Standards of 84  $\mu$ S/cm, 1413  $\mu$ S/cm, 5.00 mS/cm, or 12.88 mS/cm, 80 mS/cm and 111.8 mS/cm are manufactured by Hanna. Calibration is conducted with a value close to the samples conductivity. If the exact cell constant is known, some meters permit the manual input of the factor. This ensures maximum flexibility and measurement accuracy. Our research grade bench meters allow several points values to be calibrated for improved accuracy over a wider measurement range.

## Types of Conductivity

Three types of conductivity probes are manufactured by Hanna, The simplest design is a 2-Electrode Probe that utilizes an amperometric approach to make the measurement; a known AC voltage is applied at a specific frequency between a pair of electrodes in solution. The current produced is measured and reported in conductivity units referenced to a calibrated standard. Electrodes are made of graphite or metal. Fouling due to mineral deposits and polarization at high concentrations are drawbacks of this technology. Two electrode probes are best used in clean water applications when conductivities remain less than 5 mS/cm.

Four electrode conductivity (four-ring conductivity) utilizes a potentiometric approach to make the measurement; an alternating current is applied to the outer two "drive" electrodes to induce a current in the solution. The voltage is measured between the inner pair of electrodes in solution. The voltage is proportional the conductivity. This technology extends the linear range of measurement over three decades. Electrodes are made of graphite, stainless steel or Platinum. Polarization effects are reduced.

Both two and four electrode probes may incorporate a outer sleeve over the cell channel. The sleeve must stay in place during the measurement as this defines the volume of solution measured and the cell factor of the probe.

The third type of conductivity probe manufactured by Hanna is often found in industrial processes connected to a controller. An Inductive, Electrodeless or Toroidal conductivity probe uses two or more toroidal transformers which are inductively coupled side by side and encased in an inert plastic sheath. By applying a high frequency voltage to the drive toroid, a magnetic field develops that induces a current in the surrounding solution. A receiver toroid on the other side of the sensor measures the strength of the induced current. The strength depends on the conductivity of the solution. The benefits of this technology are no polarization effects, choice of material encapsulation can produce chemical resistant and relative immunity to fouling, and solutions are not needed for calibration.



HI6321

## Advanced Conductivity Meter

Conductivity/Resistivity/TDS/Salinity/Temperature

See page 5.6



HI98192

## Professional Waterproof Meters

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

See page 5.26



HI2003

## edge® EC

Innovation in a single parameter

See page 5.22



HI98197

## Professional Waterproof Meter

for Ultrapure Water

See page 5.29

## Benchtop Meters

	EC Range	pH Range	ISE Range	DO Range	Resistivity Range	ORP Range	TDS Range	Salinity Range	Temperature Range(s)	EC Calibration Points	EC Calibration Solutions	ATC (Automatic Temperature Compensation)	Logging	GLP	Capacitive Touch Buttons	User Accounts	Touchscreen Interface	Wireless Connectivity	USB	PC Connectivity	Fully Customizable	Advanced Customization	Auto End Feature	AutoRanging	Benchmark, Portable & Wall-Mount	Page
HI6321	•				•		•	•	•	multi	6	•	•	•	•	•	•	•	A, C	•	•	•	•	•	•	5.6
HI5321	•				•		•	•	°C/°FK	4	†	•	•	•	•				device	•	•		•	•	•	5.16
edge®	•	•*		•*			•	•	°C/°F	1	6	•	•	•	•				A, micro	•				•	•	5.18
edge EC	•						•	•	°C/°F	1	6	•	•	•	•				A, micro	•				•	•	5.22

† auto standard recognition, custom calibration solution  
 \* Using compatible pH or DO probes respectively

## Portable Meters

	EC Range	pH Range	Resistivity Range	ORP Range	TDS Range	Salinity Range	Temperature Range(s)	EC Calibration Points	EC Calibration Solutions	ATC (Automatic Temperature Compensation)	BEPS	Logging	GLP	HOLD Feature	PC Connectivity	AutoRanging	AutoEnd	Waterproof	Flow Cell for WiFi Applications	Page
HI98192	•		•		•	•	°C	5	7	•	•	•	•		•	•	•	•		5.26
HI98197	•		•		•	•	°C	5	7	•	•	•	•		•	•	•	•	•	5.29
HI99300	•				•		°C/°F	1	1	•	•			•				•		5.33
HI99301	•				•		°C/°F	1	1	•	•			•				•		5.33
HI8733	•							1		•								•		5.34
HI8734					•													•		5.35

# Advanced Conductivity Meter

Conductivity/Resistivity/TDS/Salinity/  
Temperature



HI6321 is a streamlined benchtop meter with a large touch screen display, comprised of a housing and an integrated conductivity measurement module.

Compact and easy to operate, the HI6321 includes Hanna's HI7631233 four-ring conductivity/resistivity/TDS/salinity probe.

Recommended for a wide range of industrial process water applications, HI7631233 provides stable measurements over a wide measurement range and does not require frequent calibrations. An integral temperature sensor measures the process temperature and adjusts the measured conductivity to a reference temperature by applying specialized compensation algorithms:

- Linear: appropriate when it is assumed that the temperature coefficient of variation has the same value for all measurement temperatures.
- Standard: appropriate for high-purity water measurements and documented in ASTM Standard D5391-14. This setting should be used for >1Mohm.cm resistivity measurements.
- Natural: appropriate for natural ground, well, or surface water (or water with similar composition) in accordance with ISO7888 standard.

The result is reliable electrolytic conductivity (EC), TDS (Total Dissolved Solids), resistivity, or Seawater Salinity in percent, psu, or ppt units.

TDS is a calculated value based on the conductivity of the solution ( $TDS = \text{factor} \times EC_{25}$ ). A TDS factor is a conversion factor used to change an EC measurement to a ppm measurement.

Sal psu: The practical salinity of seawater relates the ratio of electrical conductivity of a normal seawater sample at 15 °C and 1 atmosphere to a potassium chloride solution (KCl) with a mass of 32.4356 g/Kg water at the same temperature and pressure. Under these conditions the ratio is equal to 1 and  $S=35$ . The practical salinity scale may be applied to values 0 through 42.00 psu at temperatures between 0 to 35 °C.

Sal ppt: measurements expressed in ppt are based on the Natural Seawater Scale that extends from 0.00 to 80.00 g/L and covers 10 to 31 °C temperature range. It determines the salinity based upon a conductivity ratio of sample to standard seawater at 15 °C and an approximate salinity value of 35 in seawater.

Sal %: in this scale 100% salinity is equivalent to roughly 10% solids.

## User interface

- 7-inch capacitive touch screen with multi-touch support
- Capacitive touch back, home and system menu keys
- User-friendly icons and symbols allow users to easily navigate and interpret the instrument functions.
- The user can select between five different views:
  - Basic measurement configuration
  - Simple GLP with calibration information
  - Full GLP with electrode status and calibration point details
  - Live updated, interactive graph
  - Tabulated data with date, time, and notes

## Measurement

- Measure  $\mu\text{S}/\text{cm}$ ,  $\text{mS}/\text{cm}$  (Conductivity);  $\Omega\text{-cm}$ ,  $\text{k}\Omega\text{-cm}$ ,  $\text{M}\Omega\text{-cm}$  (Resistivity); ppm, ppt (TDS); ppt, PSU, % (Salinity) with temperature
- Application-specific profiles allow quick and direct measurement without the need to update the sensor and system settings

- Active log during measurement
- Measurement stability indicator (using the Stability Criteria setting)
- Reading modes: direct and direct/autohold
- Temperature compensation can be Automatic or set manually
- Audible and/or alarm messages for measurements outside of predefined limits
- Galvanic isolation for conductivity measurement

## Calibration

- Standard single point salinity calibration in 100% salinity standard, with the reading salinity scale set to %
- Standard single or multiple conductivity calibration with standards
- Non-volatile memory saves data and settings

## Logging

- Data log collection of at least 1,000,000 data points (with time and date stamp)
- Logging types: manual, automatic, autohold
- Sample ID for manual and Autohold data

## Connectivity features & services

- Transfer logged data to a USB thumb drive
- Log files that include measurements and calibration data (as .csv file)
- FTP and email for log export via Ethernet and Wi-Fi connection
- USB type A for USB stick, keyboard, and printer
- USB type C for USB stick and PC connection

## Help section for meter guidance

- Video support presentation of main functionalities





### 1. Capacitive touch screen with multi-touch support

The benchtop unit has a 7-inch color display with 800 x 480p resolution. The capacitive, multi-touch screen supports video playback and data plotting.

### 2. Back key

### 3. Home key

### 4. System Menu key

This key will enter the system menu where User accounts, System Settings, and Logging can be configured. The Help menu is also accessed on the system menu screen.

### 5. Stability indicator

### 6. Current date

### 7. Current time

### 8. Main reading

### 9. Probe icon

### 10. Calibration information: Electrode condition, Offset, Slope, Date and Time

### 11. Buffer trays

### 12. Temp. reading

### 13. Measurement setup menu

Opens sensor setup parameters.

### 14. User name (default shown)

### 15. Direct/Autohold Readings

When Direct/Autohold is selected, measurement reading is held on display when measurement stability is reached. This option removes the subjective nature of stability as a measurement that has not reached equilibrium will not be used.

When not selected, sample measurements are displayed continuously.

### 16. Logging space availability

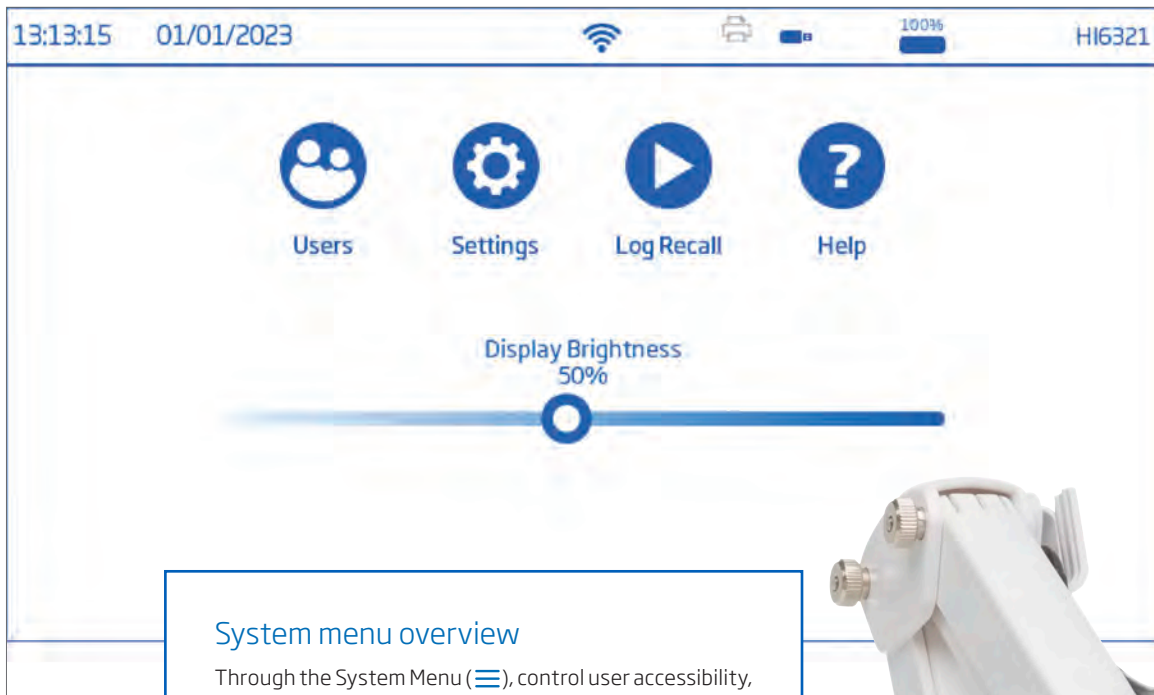
### 17. Logging start

### 18. USB connection status

### 19. Peripheral connection status

### 20. Wireless network connection status





**System menu overview**

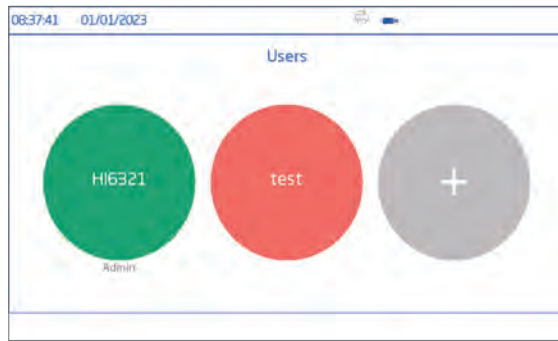
Through the System Menu (☰), control user accessibility, system and connectivity configuration, access logged data and video-supported help.

- Add and delete user accounts through Users (👤).
- Access Network Connectivity, System and Info tabs through Settings (⚙️).
- Log Recall (▶️) recalls stored log sessions (Automatic continuous logging, Manual, or Autohold).
- Help (❓) guides users with video-supported help.



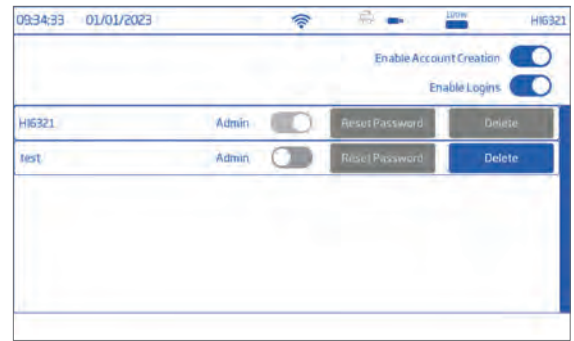


## Users



### Custom Users

New administrator or standard user accounts can be created. Standard accounts can be configured for specific accessibility.

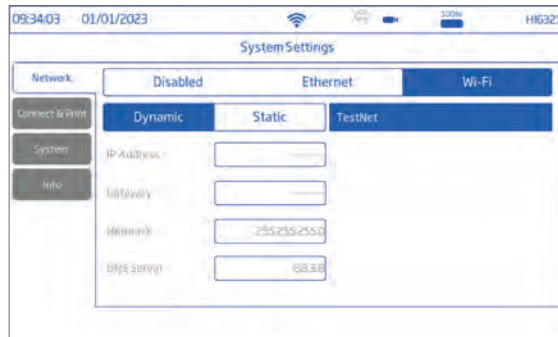


### User Account Management

Administrators can create and manage accounts from the Account Management Screen.

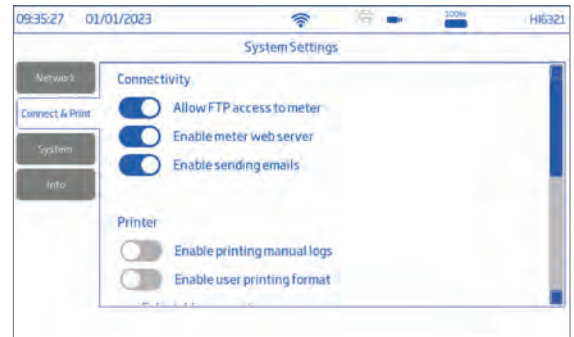


## Settings



### Network Screen

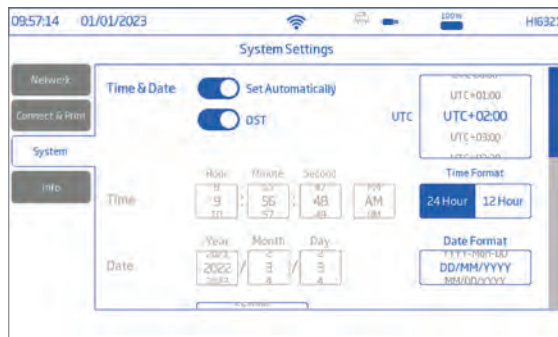
Determine how measurement logs are shared through network settings. Users can select network to be connected via Ethernet or Wi-Fi, or Disabled.



### Connect and Print Screen

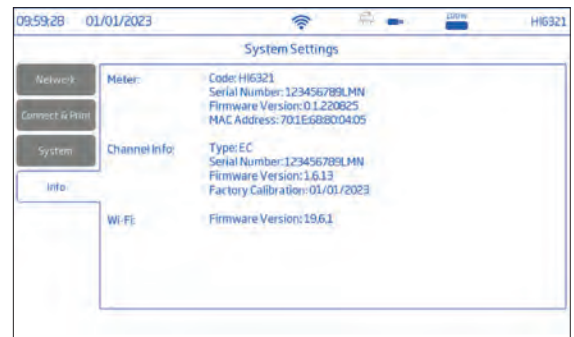
Activate connectivity options to allow the meter to connect to other devices.

- FTP access to meter, permits log file transfer to a FTP site and to connect the meter FTP server to a client for log download.
- Meter web server, permits log file download to a web client.
- Sending emails, permits log files to be transferred by email.



### System Screen

The system screen enables users to configure options such as: Time, Date, Language, Meter ID, Decimal Separator, Backlight Saver, Audible signals, Startup Tutorial, and Factory Settings restore.



### Info Screen

Displays information on meter, channel serial number, and Wi-Fi firmware version.



## Log Recall

Name	Parameter	Start/Stop	Share To
EC_20220303101404.csv	Conductivity	13:14:04 03/03/2022 13:14:30 03/03/2022	USB-A FTP Email Cancel
RES_20220303101447.csv	Resistivity	13:14:47 03/03/2022 13:14:50 03/03/2022	
SAL_20220303101507.csv	Salinity	13:15:07 03/03/2022 13:15:10 03/03/2022	
TDS_20220303101458.csv	TDS	13:14:50 03/03/2022 13:15:01 03/03/2022	

### Log History and Sharing

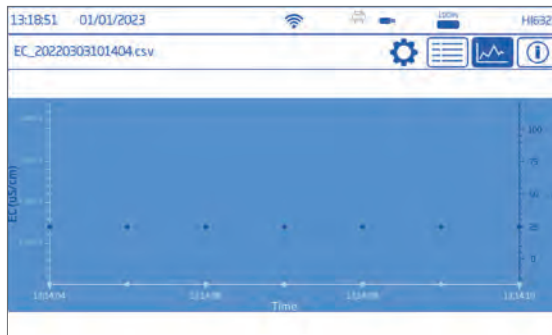
The item allows users access and management (selection, deletion, and sharing) of measurement data. Only the user who generated the data has access to the logs created by that user.

Data can be viewed tabulated (complete with date, time, and notes), or plotted (as graph).

Log files can be shared via USB, FTP, web server and email.

EC (uS/cm)	T(°C)	Date	Time	Notes
1416	25.0	03/03/2022	13:14:04	"H"
1416	25.0	03/03/2022	13:14:05	"H"
1416	25.0	03/03/2022	13:14:06	"H"
1416	25.0	03/03/2022	13:14:07	"H"
1416	25.0	03/03/2022	13:14:08	"H"
1416	25.0	03/03/2022	13:14:09	"H"
1416	25.0	03/03/2022	13:14:10	"H"

### Table View



### Graph View

GENERAL INFORMATION	
Username:	H16321
Profile:	default_EC
INSTRUMENT	
Instrument Name:	H16321-101
Serial Number:	123456789LMN
Firmware Version:	0.1.230825
CHANNEL INFO	
Channel Number:	1
Channel Name:	EC

### Log Detail

Tapping the information icon displays log details such as user and profile name, instrument name and serial number, channel, lot information, as well as GLP data.



## Help

**Hanna Tutorial System**

- 1. H16321 First Look
- 2. Getting Started
  - 2.1. Get familiar with functionalities
  - 2.2. Users
  - 2.3. Meter settings
  - 2.4. Setting measurement
- 3. General Operations
- 4. General Operations
- 5. Troubleshooting guide
- 6. Accessories and Warranty

**2.1. Get familiar with functionalities**  
Screens explained  
Main View - This screen shows the current measurement according to the measurement settings and give access to the user calibration and measurement settings options.

Main Menu - This screen gives the user access to the 5 main icons

### On-board Help

The HELP menu supports users with a brief overview of the system's main functionalities through text and video tutorials.

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**2.4. Setting up measurement**  
Your measurement screen can be configured by pressing **Q**.

Channel Settings

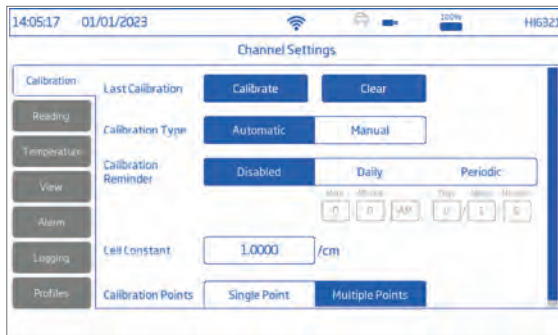
Channel: EC

Mode: mV

READING: Mode (pH, mV, Rel. mV)

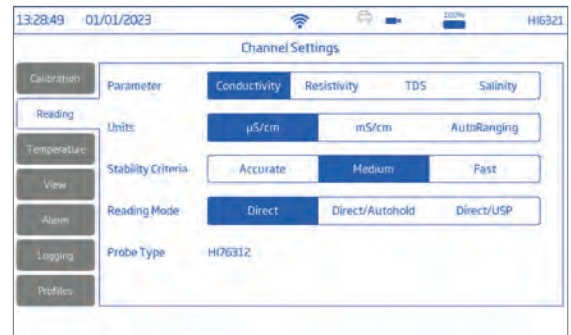


## Measurement Setup Configuration



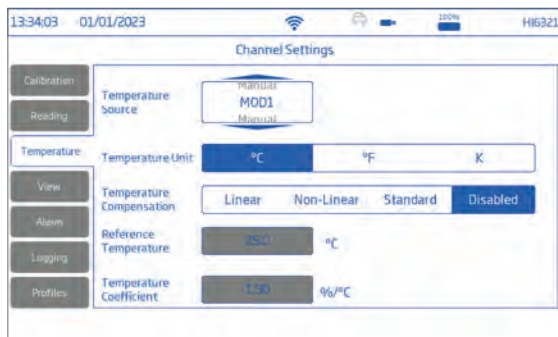
### Calibration

Customize calibration options such as Last Calibration, Calibration Type (Automatic, Manual), Calibration Reminder (Disabled, Daily, Periodic), Cell Constant, Calibration Points.



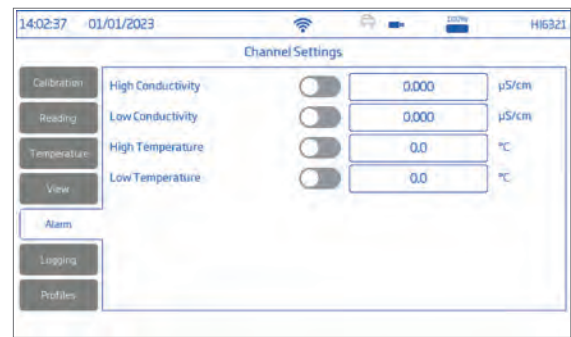
### Reading

Customize measurement options such as Parameter, Units, Stability Criteria, Reading Mode



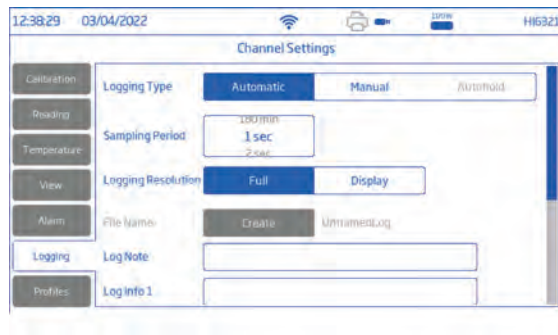
### Temperature

Customize temperature options such as Source, Unit (Celsius, Fahrenheit, Kelvin), compensation algorithm (Linear, Non-Linear, Standard, or Disabled), Reference Temperature, and Temperature Coefficient.



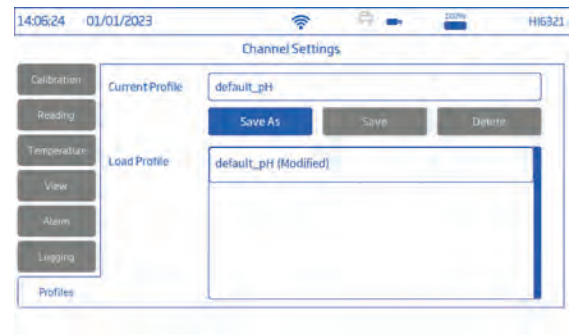
### Alarm configuration

Alarm configuration allows users to set the high and low threshold limits for the measured parameters. When the parameter is enabled and the measurement exceeds the high-limit value or drops below the low-limit value, the alarm is triggered and will appear on the message banner along with an audible alarm (if Alarm Beepers is enabled).



### Logging

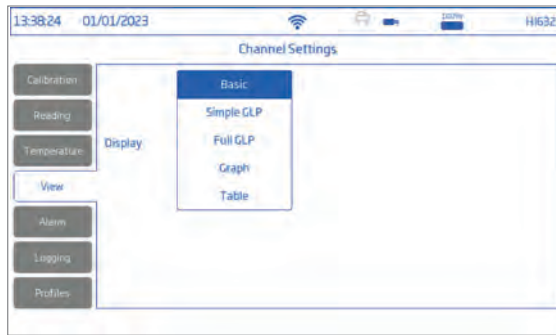
Logging Type (automatic, manual or autohold), Sampling Period (Automatic), Logging Resolution, File Name (with Manual type selected), Log Note and Info, Sample ID (Increment or Manual) can be configured under this option menu.



### Profiles

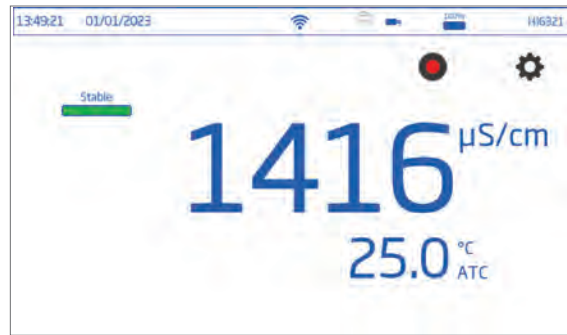
A profile is a sensor setup complete with required measurement unit, temperature unit, display preference, and alarm threshold options.

Once saved the profile can be loaded for applications that require similar configurations.



### View Configuration

Select the preferred display from the view screen. Option to select between: Basic, Simple GLP, Full GLP, Graph, Table.



### Basic View

Basic screen displays the measured value, measurement unit as well as temperature source.



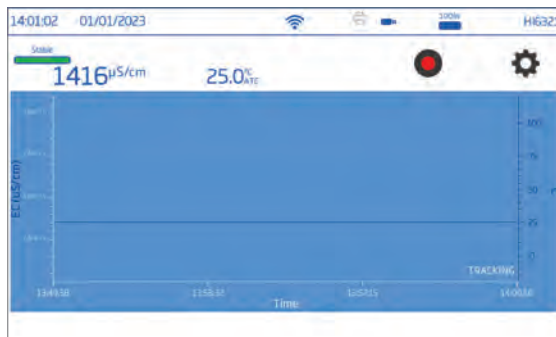
### Simple GLP View

In addition to data displayed when Basic option is selected, screen also displays: last calibration date and time and offset value.



### Full GLP View

In addition to data displayed when Simple GLP option is selected, screen also displays: electrode symbol, used buffers trays together with calibration date and time.



### Graph View

When Graph is selected, the measured value is plotted as a graph.

EC (µS/cm)	T (°C)	Time	Date	Notes
1416	25.0	14:01:37	31/08/2022	
1416	25.0	14:01:36	31/08/2022	
1416	25.0	14:01:35	31/08/2022	
1416	25.0	14:01:34	31/08/2022	
1416	25.0	14:01:33	31/08/2022	
1416	25.0	14:01:32	31/08/2022	
1416	25.0	14:01:31	31/08/2022	
1416	25.0	14:01:30	31/08/2022	
1416	25.0	14:01:29	31/08/2022	
1416	25.0	14:01:28	31/08/2022	
1416	25.0	14:01:27	31/08/2022	

### Table

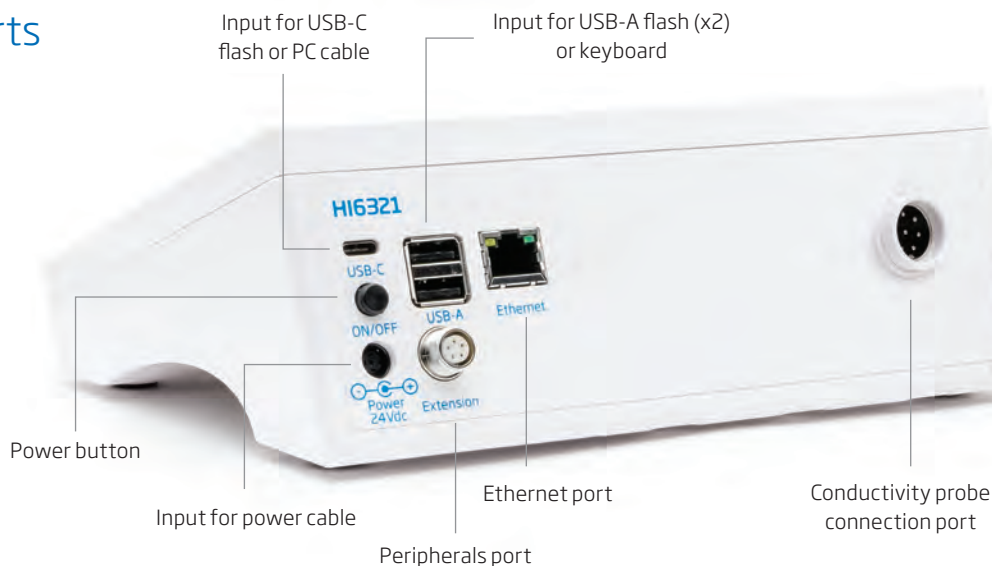
When Table is selected, the measured values are displayed tabulated (complete with date, time, and notes made during logging). The newest data is displayed on the top of the table.

## Electrode Holder

HI6321 is supplied with an electrode holder featuring a flexible arm. The holder can be mounted on either side quickly and provides secure support for electrodes while taking measurements in sample containers.



## Rear Ports



### Specifications

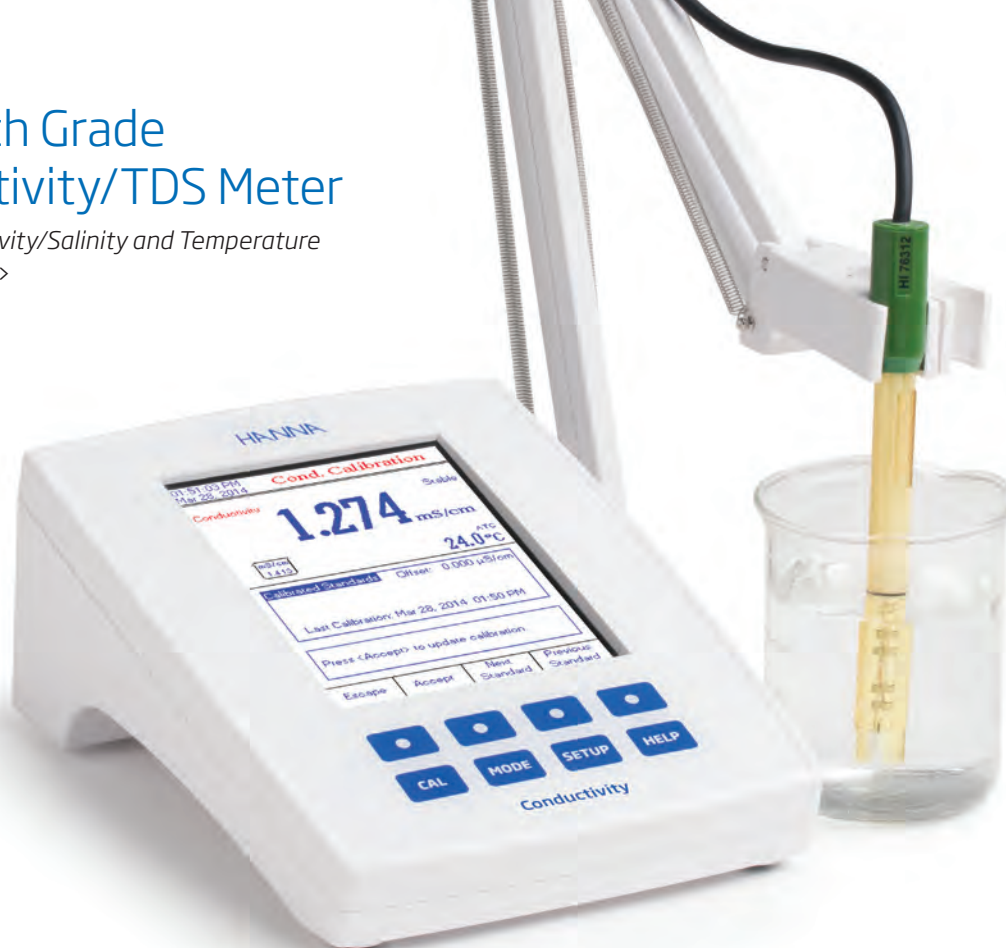
#### HI6321

Conductivity	Range	0.000 to 9.999 $\mu\text{S/cm}$ ; 10.00 to 99.99 $\mu\text{S/cm}$ ; 100.0 to 999.9 $\mu\text{S/cm}$ ; 1.000 to 9.999 $\text{mS/cm}$ ; 10.00 to 99.99 $\text{mS/cm}$ ; 100.0 to 1000.0 $\text{mS/cm}$
	Resolution	0.001 $\mu\text{S/cm}$ ; 0.01 $\mu\text{S/cm}$ ; 0.1 $\mu\text{S/cm}$ ; 0.001 $\text{mS/cm}$ ; 0.01 $\text{mS/cm}$ ; 0.1 $\text{mS/cm}$
	Accuracy	$\pm 1\%$ of reading ( $\pm 0.01 \mu\text{S/cm}$ )
Resistivity	Range	1.0 to 99.9 $\Omega\text{-cm}$ ; 100 to 999 $\Omega\text{-cm}$ ; 1.00 to 9.99 $\text{K}\Omega\text{-cm}$ ; 10.0 to 99.9 $\text{K}\Omega\text{-cm}$ ; 100 to 999 $\text{K}\Omega\text{-cm}$ ; 1.00 to 9.99 $\text{M}\Omega\text{-cm}$ ; 10.0 to 100.0 $\text{M}\Omega\text{-cm}$
	Resolution	0.1 $\Omega\text{-cm}$ ; 1 $\Omega\text{-cm}$ ; 0.01 $\text{K}\Omega\text{-cm}$ ; 0.1 $\text{K}\Omega\text{-cm}$ ; 1 $\text{K}\Omega\text{-cm}$ ; 0.01 $\text{M}\Omega\text{-cm}$ ; 0.1 $\text{M}\Omega\text{-cm}$
	Accuracy	$\pm 1\%$ of reading ( $\pm 1 \Omega\text{-cm}$ )

Total Dissolved Solids (TDS)	Range	0.000 to 9.999 ppm; 10.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 ppt; 10.00 to 99.99 ppt; 100.0 to 400.0 ppt; actual TDS (with 1.00 factor)
	Resolution	0.001 ppm; 0.01 ppm; 0.1 ppm; 0.001 ppt; 0.01 ppt; 0.1 ppt
	Accuracy	±1 % of reading (±0.01 ppm)
Salinity	Range	0.00 to 42.00 PSU - Practical Scale 0.00 to 80.00 ppt - Natural Sea Water 0.0 to 400.0 % - Percent Scale
	Resolution	0.01 for Practical Scale / Natural Sea Water 0.1 % for Percent Scale
	Accuracy	±1 % of reading
Temperature	Range	-20.0 to 120.0 °C -4.0 to 248.0 °F 253.0 to 393.0 K
	Resolution	0.1 °C; 0.1 °F; 0.1 K
	Accuracy	±0.2 °C; ±0.4 °F; ±0.2 K
Conductivity Calibration	Calibration points	Auto standard recognition / User standard, Single Point / Multi Point calibration
	Standard solutions	84.00 µS/cm, 1.413 mS/cm, 5.000 mS/cm, 12.88 mS/cm, 80.00 mS/cm, 111.8 mS/cm
	Reminder	Disabled Daily: 0 min. to 23 hours and 59 min. Periodic: 1 min. to 500 days, 23 hours and 59 min.
Resistivity Calibration	Uses Conductivity	
Salinity Calibration	1 point for Percent Scale	
Temperature Compensation	Automatic or Manual	
Reading	Modes	Direct Direct/Autohold
	Stability criteria	Accurate Medium Fast
	Sampling rate	1000 ms
EC Views	Basic	Measurement (EC, Resistivity, TDS, Salinity, Temperature) Stability status
	Simple GLP	Basic view information Last calibration date, offset
	Full GLP	Simple GLP information and calibration point details
	Table	Measurements updated every second are displayed in table
	Graph (Plot)	Measurement versus time graph can be panned or zoomed (pinch-to-zoom technology)
Logging	Type	Automatic, Manual, Autohold
	Number of records	50 000 maximum per file Stores at least 1 000 000 data points per user
	Automatic interval	1, 2, 5, 10, 30 seconds 1, 2, 5, 10, 15, 30, 60, 120, 150, 180 minutes
	Sample ID	Incremental mode
	Export option	.csv file format
Users	Up to 9 users and the default administrator account	
Connectivity	USB-A	2 ports for keyboard input or USB thumb drive
	USB-C	1 port for PC connectivity and USB-C type thumb drive
	Wi-Fi & Ethernet	FTP Web server Log transfer and download Email
	RS232	Connecting peripherals
Power supply	DC adapter 100-240AC to 24VDC 2.5A	
Environment	0 - 50 °C / 32 - 122 °F / 273 - 323 K maximum 95% RH non-condensing	
Dimensions	205 x 160 x 77 mm (8.0 x 6.2 x 3.0")	
Weight	Approximately 1.2 kg (26.5 lbs.)	
Ordering Information	<b>HI6321</b> is supplied with HI7631233 probe; HI764060 electrode holder; capillary pipette; 24 VDC power adapter; USB-C to USB-A cable; probe quality certificate; quick reference guide with instrument quality certificate.	

# Research Grade Conductivity/TDS Meter

EC/TDS/Resistivity/Salinity and Temperature  
with USP <645>



The HI5321 is an advanced research grade benchtop EC/TDS/Salinity/Resistivity meter that is completely customizable with a large color LCD, capacitive touch keys, and USB port for computer connectivity.

## Customizable User Interface

The user interface of the HI5321 allows the user to show measurements in various modes: basic measurement with or without GLP information, real-time graphing, and logging data. Calibration stability criteria can be adjusted from fast, moderate, and accurate. Programmable alarm limits can be set to inside or outside allowable limits.

## Color Graphic LCD

The HI5321 features a color graphic LCD with on-screen help, graphic, and custom color configurations. The display allows for real-time graphing.

## Capacitive Touch

The HI5321 features sensitive capacitive touch buttons for accurate keystrokes when navigating menus and screens.

## Auto-ranging

The meter can be set to auto-ranging in which the meter chooses the appropriate conductivity range from seven ranges or fixed range in which the meter will only display reading in  $\mu\text{S}/\text{cm}$  or  $\text{mS}/\text{cm}$ .

## Automatic Temperature Compensation

All readings are automatically compensated for temperature variations with a built in temperature sensor.

## Calibration

The HI5321 can be calibrated up to four points with a choice of six pre-programmed conductivity standards or user defined custom standards. Resistivity, TDS, Practical Salinity (PSU) and Natural Seawater Scale are calibrated through conductivity. The % NaCl is calibrated to single point with the HI7037 salinity standard.

## GLP Data

HI5321 includes a GLP Feature that allows users to view calibration data and calibration expiration information at the touch of a key. Calibration data include date, time, standards used for calibration.

## Data Logging

Three selectable logging modes are available on the HI5321: automatic, manual, and AutoHold logging. Automatic and manual logs up to 100 lots with 50,000 records max/lot, with up to 100,000 total data points. Automatic logging features the option to save data according to sampling period and interval.

## Data Transfer

Data can be transferred to a PC with USB cable and HI92000 software (both sold separately).

## Contextual Help

Contextual help is always available through a dedicated "HELP" key

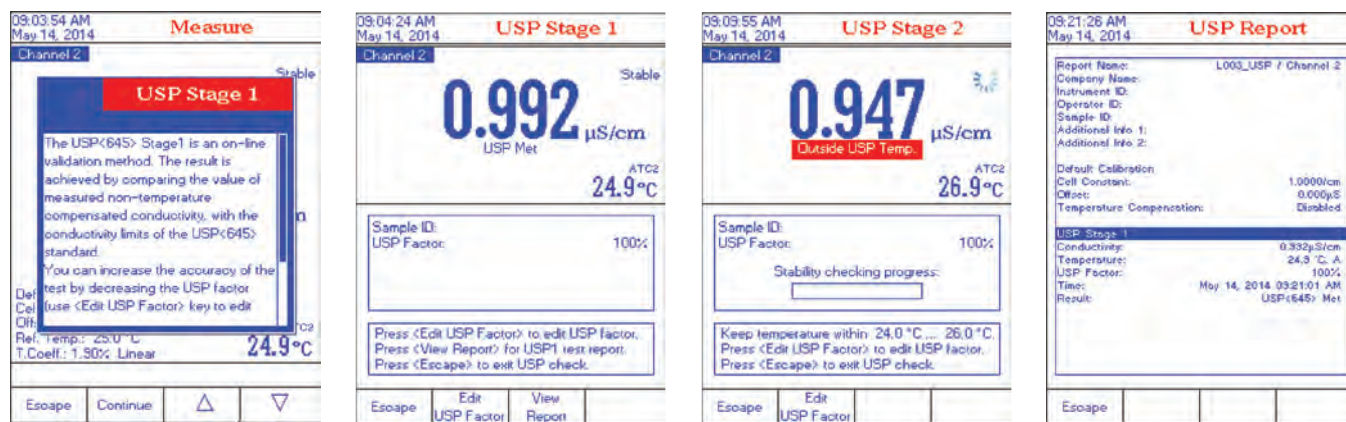
## Four-ring Conductivity Probe

All readings are performed with the HI76312 four-ring conductivity probe with a built in temperature sensor for automatic temperature correction. The four rings are made with platinum and the body of the electrode is made of Polyetherimide (PEI) plastic that is resistant to many harsh chemicals.



## USP &lt;645&gt;

For the measurement of high purity water used in pharmaceutical manufacturing, the HI5321 is programmed with the first two stages of the USP <645> method. Once a stage is met a report is generated and can be saved. Up to 200 reports can be stored and transferred to a Windows® compatible computer using a USB cable and software (sold separately).



## Specifications

## HI5321

EC	Range	0.000 to 9.999 $\mu\text{S}/\text{cm}$ ; 10.00 to 99.99 $\mu\text{S}/\text{cm}$ ; 100.0 to 999.9 $\mu\text{S}/\text{cm}$ ; 1.000 to 9.999 $\text{mS}/\text{cm}$ ; 10.00 to 99.99 $\text{mS}/\text{cm}$ ; 100.0 to 1000.0 $\text{mS}/\text{cm}$
	Resolution	0.001 $\mu\text{S}/\text{cm}$ ; 0.01 $\mu\text{S}/\text{cm}$ ; 0.1 $\mu\text{S}/\text{cm}$ ; 0.001 $\text{mS}/\text{cm}$ ; 0.01 $\text{mS}/\text{cm}$ ; 0.1 $\text{mS}/\text{cm}$
	Accuracy	$\pm 1\%$ of reading ( $\pm 0.01 \mu\text{S}/\text{cm}$ )
	Cell Constant	0.0500 to 200.00/cm
	Cell Type	4 cells
	Calibration	automatic standard recognition, user standard, single point / multi-point calibration
	EC Calibration Solution	84.00 $\mu\text{S}/\text{cm}$ , 1.413 $\text{mS}/\text{cm}$ , 5.000 $\text{mS}/\text{cm}$ , 12.88 $\text{mS}/\text{cm}$ , 80.00 $\text{mS}/\text{cm}$ , 111.8 $\text{mS}/\text{cm}$
	Calibration Reminder	yes
	Temperature Compensation	disabled, linear and non-linear (natural water)
	Temperature Coefficient	0.00 to 10.00 %/°C
	Reference Temperature	5.0 to 30.0°C
	Profiles	up to 10
USP <645> Application	yes	
TDS	Range	0.000 to 9.999 ppm; 10.00 to 99.99 ppm; 100.0 to 999.9 ppm; 1.000 to 9.999 ppt; 10.00 to 99.99 ppt; 100.0 to 400.0 ppt actual TDS (with 1.00 factor)
	Resolution	0.001 ppm; 0.01 ppm; 0.1 ppm; 0.001 ppt; 0.01 ppt; 0.1 ppt
	Accuracy	$\pm 1\%$ of reading ( $\pm 0.01 \text{ppm}$ )
Resistivity	Range	1.0 to 99.9 $\Omega \cdot \text{cm}$ ; 100 to 999 $\Omega \cdot \text{cm}$ ; 1.00 to 9.99 $\text{k}\Omega \cdot \text{cm}$ ; 10.0 to 99.9 $\text{k}\Omega \cdot \text{cm}$ ; 100 to 999 $\text{k}\Omega \cdot \text{cm}$ ; 1.00 to 9.99 $\text{M}\Omega \cdot \text{cm}$ ; 10.0 to 100.0 $\text{M}\Omega \cdot \text{cm}$
	Resolution	0.1 $\Omega \cdot \text{cm}$ ; 1 $\Omega \cdot \text{cm}$ ; 0.01 $\text{k}\Omega \cdot \text{cm}$ ; 0.1 $\text{k}\Omega \cdot \text{cm}$ ; 1 $\text{k}\Omega \cdot \text{cm}$ ; 0.01 $\text{M}\Omega \cdot \text{cm}$ ; 0.1 $\text{M}\Omega \cdot \text{cm}$
	Accuracy	$\pm 1\%$ of reading ( $\pm 1 \Omega \cdot \text{cm}$ )
Calibration	Uses Conductivity	
Salinity	Range	practical scale: 0.00 to 42.00 psu; natural sea water scale: 0.00 to 80.00 ppt; percent scale: 0.0 to 400.0%
	Resolution	0.01 for practical scale/natural sea water scale; 0.1% for percent scale
	Accuracy	$\pm 1\%$ of reading
Calibration	percent scale – one-point (with HI7037 standard)	
Temperature*	Range	-20.0 to 120.0°C; -4.0 to 248.0°F; 253.15 to 393.15K
	Resolution	0.1°C; 0.1°F; 0.1K
	Accuracy	$\pm 0.2^\circ\text{C}$ ; $\pm 0.4^\circ\text{F}$ ; $\pm 0.2\text{K}$ (without probe)
Calibration	User calibration in 3 points (0, 50, 100 °C)	
Additional Specifications	EC Probe	HI76312 platinum, four-ring EC/TDS probe with and 1 m (3.3') cable (included)
	GLP	Probe cell constant / offset, reference temperature, compensation coefficient, calibration points, calibration time stamp
	Logging	<b>record</b> : Up to 100 lots, 50,000 records max/lot / maximum 100,000 data points; <b>interval</b> : 14 selectable between 1 second and 180 minutes; <b>type</b> : Automatic, Log on demand, AutoHold; <b>additional</b> : 200 records USP
	PC Connection	Opto-isolated USB
	Power Supply	12 VDC adapter (included)
	Environment	0 to 50°C (32 to 122°F; 273 to 323K) RH max 95% non-condensing
	Dimensions / Weight	160 x 231 x 94 mm (6.3 x 9.1 x 3.7") / 1.2 kg (2.64 lbs.)
Ordering Information	<b>HI5321-01</b> (115V) and <b>HI5321-02</b> (230V) are supplied with HI76312 EC/TDS probe, 1413 $\mu\text{S}/\text{cm}$ conductivity standard sachet (4), 12880 $\mu\text{S}/\text{cm}$ conductivity standard sachet (2), 5000 $\mu\text{S}/\text{cm}$ conductivity standard sachet (2), electrode rinse solution sachet (2), HI76404W electrode holder, 12 VDC adapter, capillary dropper pipette, quality certificate, quick start guide and instruction manual.	

(\*) Reduced to actual probe limits



## The world's most innovative pH, EC and DO meter

edge's groundbreaking design is the culmination of Hanna's vision, design capabilities, integrated production and world class R&D. The edge is rich in features to accommodate the needs of a vast amount of customers. For those that prefer very simplistic operation there is a basic mode operation with simplified menu and options while for those who require advanced features there is the full featured standard operating mode. edge is available as a pH, conductivity or dissolved oxygen kit and any edge kit can be upgraded with additional probes to measure pH, conductivity and dissolved oxygen.

## edge® technical features

### Rechargeable Battery

edge has a built in rechargeable battery that is charged when the meter is in the plugged in benchtop or wall mount cradle. The battery can also be recharged through the micro USB port with either a USB port from a computer or directly to the power supply.



### Two USB ports

edge includes one standard USB for exporting data to a flash drive. edge also includes one micro USB port for exporting files to your computer as well as for charging when the cradle is not available.



### Clear, full text readout

edge features clear, full text guides displayed on the bottom of the screen. There is no need to decipher scrambled abbreviations or symbols; these helpful messages guide you through every process quickly and easily.



### Data logging

edge allows you to store up to 1000 log records of data. Data sets include readings, GLP data, date and time.

\* Using edge compatible pH electrodes



### GLP

Data of the last calibration you perform is stored in the sensor including the date, time, and buffers used. When the sensor is connected to edge, GLP data is automatically transferred.

### Two Operating Modes

edge can be used in Extended or Basic Operating Modes. Extended Mode enables all edge features while Basic Mode reduces features—ideal for routine measurements by displaying a simplified screen and features.

### edge pH Features\*



### CAL Check™ (pH only)

Hanna's exclusive CAL Check feature analyzes the pH electrode response in the pH buffers during the calibration process to alert the user of potential problems such as a contaminated buffer or dirty electrode. After calibration, indicators for probe condition are displayed on the measurement screen. The probe condition is based on offset and slope characteristics of the pH electrode.

### Sensor Check™ (pH only)

When used with Hanna's electrodes equipped with a matching pin, edge constantly checks the impedance of the pH measuring electrode to notify you in real time in the event of glass breakage. During calibration, Sensor Check checks the state of the junction. The reference junction is also evaluated and reported on the display.

### ORP Measurement

edge measures ORP with edge compatible ORP probes.

## edge design features



### Capacitive touch keypad

edge features sensitive capacitive touch buttons for accurate keystrokes when navigating edge's menus and screens. Since they are part of the screen, the buttons can never get clogged with sample residue.



### Easy to read LCD

edge features a 5.5" (14 cm) LCD display that you can clearly view from over 5 m (16.4'). The large display, with its wide 150° viewing angle, provides one of the easiest to read LCDs in the industry.



### Zero footprint

Using the wall mount cradle (included), edge can be placed on a wall, leaving zero footprint on the benchtop space. The cradle has a built-in connector to power and charge the batteries.



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

The versatile design of edge® enables it to be used as a portable, wall-mount or benchtop meter. edge simplifies measurement, configuration, calibration, diagnostics, logging and transferring data directly to a computer or USB drive.



### Portable field unit

edge is ideal for field use due to its light weight, large screen, and thin design. It can easily be slipped into a backpack or messenger bag. The battery life lasts up to 8 hours when used as a portable device.



### Wall-mount cradle

The included wall-mount cradle makes it easy to conserve space on the benchtop while also charging edge with the AC adapter. The cradle is ideal for continuous monitoring applications.



### Electrode holder with built-in cradle

The electrode holder features a swivel, adjustable arm with a built-in cradle to hold edge securely in place at the optimum viewing angle.



## Digital electrodes

edge® measures pH, conductivity and dissolved oxygen through its unique digital electrodes. These digital electrodes are auto-recognized, providing sensor type, calibration data and a serial number when connected to edge by an easy to plug-in 3.5mm connector.

- Simply connect each probe via the 3.5 mm jack, Digital Smart Electrodes are automatically recognized

- **Digital four-ring conductivity probe**
  - Covers all ranges from 0.00  $\mu\text{S}/\text{cm}$  to 500  $\text{mS}/\text{cm}$  (absolute EC)
- **Accuracy**
  - $\pm 1\%$  of the reading ( $\pm 0.05 \mu\text{S}/\text{cm}$  or 1 digit, whichever is greater)
- **Calibration**
  - Offset (0  $\mu\text{S}/\text{cm}$ ) and cell factor calibration
  - Choice of five standards (auto-recognition)
- **Data logging**
  - Manual log-on-demand
  - Manual log-on-stability
  - Interval logging
- **Auto-ranging or manual range selection**
- **EC, TDS and salinity reading modes**
- **Temperature compensation**
  - Automatic
  - NoTC (absolute)
- **GLP data**
  - Records date, time, offset and cell factor
- Data of the last performed calibration is stored in the probe: date, time, cell constant, temperature coefficient, reference temperature and battery status. When the probe is connected to edge®EC, GLP data is automatically transferred
- **Adjustable EC to TDS conversion factor**
- **Adjustable temperature correction coefficient**
- **Seawater salinity units**
  - % NaCl
  - PSU
  - g/L



### Sleek design

Incredibly thin and lightweight, edge measures just 1/2" (12 mm) thick and weighs just 8.8 ounces (250 g).

All edge compatible pH, EC and dissolved oxygen digital probes are interchangeable with edge.

Specifications	HI2030 edge	
EC	Range	0.00 to 29.99 $\mu\text{S}/\text{cm}$ ; 30.0 to 299.9 $\mu\text{S}/\text{cm}$ ; 300 to 2999 $\mu\text{S}/\text{cm}$ ; 3.00 to 29.99 $\text{mS}/\text{cm}$ ; 30.0 to 200.0 $\text{mS}/\text{cm}$ ; up to 500.0 $\text{mS}/\text{cm}$ absolute EC**
	Resolution	0.01 $\mu\text{S}/\text{cm}$ ; 0.1 $\mu\text{S}/\text{cm}$ ; 1 $\mu\text{S}/\text{cm}$ ; 0.01 $\text{mS}/\text{cm}$ ; 0.1 $\text{mS}/\text{cm}$
	Accuracy (@25°C/77°F)	$\pm 1\%$ of reading ( $\pm 0.05 \mu\text{S}/\text{cm}$ or 1 digit, whichever is greater)
	Calibration	single cell factor calibration; six standards available: 84 $\mu\text{S}/\text{cm}$ , 1413 $\mu\text{S}/\text{cm}$ , 5.00 $\text{mS}/\text{cm}$ , 12.88 $\text{mS}/\text{cm}$ , 80.0 $\text{mS}/\text{cm}$ , 111.8 $\text{mS}/\text{cm}$ , one point offset: 0.00 $\mu\text{S}/\text{cm}$
	Temperature Coefficient	0.00 to 6.00%/°C (for EC and TDS only), default value is 1.90%/°C
TDS	Range	0.00 to 14.99 $\text{mg}/\text{L}$ (ppm); 15.0 to 149.9 $\text{mg}/\text{L}$ (ppm); 150 to 1499 $\text{mg}/\text{L}$ (ppm); 1.50 to 14.99 $\text{g}/\text{L}$ ; 15.0 to 100.0 $\text{g}/\text{L}$ ; up to 400.0 $\text{g}/\text{L}$ absolute TDS using 0.80 conversion factor**
	Resolution	0.01 $\text{mg}/\text{L}$ (ppm); 0.1 $\text{mg}/\text{L}$ (ppm); 1 (ppm); 0.01 $\text{g}/\text{L}$ ; 0.1 $\text{g}/\text{L}$
	Accuracy (@25°C/77°F)	$\pm 1\%$ of reading ( $\pm 0.03 \text{ppm}$ or 1 digit, whichever is greater)
	Calibration	through EC calibration
	TDS Factor	0.40 to 0.80 (default value is 0.50)
Salinity†	Range	0.0 to 400.0 % NaCl; 2.00 to 42.00 PSU; 0.0 to 80.0 $\text{g}/\text{L}$
	Resolution	0.1 % NaCl; 0.01 PSU; 0.01 $\text{g}/\text{L}$
	Accuracy (@25°C/77°F)	$\pm 1\%$ of reading
	Calibration	PSU and $\text{g}/\text{L}$ through EC calibration; % NaCl – one-point with HI7037 sea water standard
Temperature	Range*	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	$\pm 0.5^\circ\text{C}$ ; $\pm 0.9^\circ\text{F}$
Additional Specifications	Probe (included in EC kit)	HI763100 digital four-ring conductivity probe with 3.5 mm (1/8") connector and 1 m (3.3') cable
	Logging	up to 1000† (400 for basic mode) records organized in: manual log-on-demand (max. 200 logs), manual log-on-stability (max. 200 logs), interval logging† (max. 600 samples; 100 lots)
	Connectivity	1 USB port for storage; 1 micro USB port for charging and PC connectivity
	Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
	Power Supply	5 VDC adapter (included)
	Dimensions / Weight	202 x 140 x 12 mm (7.9" x 5.5" x 0.5") / 250 g (8.82 oz)
Ordering Information	<p><b>HI2030-01</b> (115V) and <b>HI2030-02</b> (230V) EC kit also includes: HI763100 Conductivity probe, 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard sachets (4), 12880 <math>\mu\text{S}/\text{cm}</math> conductivity standard sachets (2), 5000 <math>\mu\text{S}/\text{cm}</math> conductivity standard sachets (2), and electrode rinse solution sachets (2).</p> <p>All edge compatible pH, EC and DO digital probes are interchangeable with HI2030 and can be ordered separately.</p>	

\* temperature limits will be reduced to actual probe limits \*\* with temperature compensation function disabled  
 † standard mode only



## edge<sup>®</sup>EC–Innovation in a Single Parameter

edge EC's groundbreaking design is the culmination of Hanna's vision, design capabilities, integrated production and world class R&D. edge EC is a single meter that can measure EC, TDS, and salinity..

### Additional feature information

- **Digital four-ring conductivity probe**
  - Covers all ranges from 0.00  $\mu\text{S}/\text{cm}$  to 500  $\text{mS}/\text{cm}$  (absolute EC)
- **Accuracy**
  - $\pm 1\%$  of the reading ( $\pm 0.05 \mu\text{S}/\text{cm}$  or 1 digit, whichever is greater)
- **Calibration**
  - Offset (0  $\mu\text{S}/\text{cm}$ ) and cell factor calibration
  - Choice of 5 standards (auto-recognition)
- **Data logging**
  - Manual log-on-demand
  - Manual log-on-stability
  - Interval logging
- **GLP data**
  - Records date, time, offset and cell factor
  - Data of the last performed calibration is stored in the probe: date, time, cell constant, temperature coefficient, reference temperature and battery status. When the probe is connected to edge<sup>®</sup>EC, GLP data is automatically transferred
- **Auto-ranging or manual range selection**
- **EC, TDS and salinity reading modes**
- **Temperature compensation**
  - Automatic
  - NoTC (absolute)
- **Adjustable EC to TDS conversion factor**
- **Adjustable temperature correction coefficient**
- **Seawater salinity units**
  - % NaCl
  - PSU
  - g/L

## edge®EC technical features

### Rechargeable Battery

edge EC has a built in rechargeable battery that is charged when the meter is in the plugged in benchtop or wall mount cradle. The battery can also be recharged through the micro USB port with either a USB port from a computer or directly to the power supply.



### Two USB ports

edge EC includes one standard USB for exporting data to a flash drive. edge EC also includes one micro USB port for exporting files to your computer as well as for charging when the cradle is not available.



### Clear, full text readout

edge features clear, full text guides displayed on the bottom of the screen. There is no need to decipher scrambled abbreviations or symbols; these helpful messages guide you through every process quickly and easily.



### Data logging

edge EC allows you to store up to 1000 log records of data. Logging data sets include readings, GLP data, date and time.



### GLP

Data of the last calibration you perform is stored in the sensor including the date, time, and buffers used. When the sensor is connected to edge EC, GLP data is automatically transferred.

### Two Operating Modes

edge EC can be used in Extended or Basic Operating Modes. Extended Mode enables all edge features while Basic Mode reduces features—ideal for routine measurements by displaying a simplified screen and features.

## edge EC design features



### Capacitive touch keypad

edge EC features sensitive capacitive touch buttons for accurate keystrokes when navigating edge's menus and screens. Since they are part of the screen, the buttons can never get clogged with sample residue.



### Easy to read LCD

edge EC features a 5.5" (14 cm) LCD display that you can clearly view from over 5 m (16.4'). The large display, with its wide 150° viewing angle, provides one of the easiest to read LCDs in the industry.



### Zero footprint

Using the wall mount cradle (included), edge EC can be placed on a wall, leaving zero footprint on the benchtop space. The cradle has a built-in connector to power and charge the batteries.



### 3.5 mm probe input

Plugging an electrode in has never been simpler; no alignments or broken pins, simply connect the 3.5 mm plug and begin. Digital electrodes are automatically recognized.



### Sleek design

Incredibly thin and lightweight, edge measures just 1/2" (12 mm) thick and weighs just 8.8 ounces (250 g).

### Accepts edge EC compatible conductivity probe



## A hybrid meter that can be used in portable, wall-mount and benchtop configurations

The versatile design of edge®EC enables it to be used as a portable, wall-mount or benchtop meter. edge EC simplifies measurement, configuration, calibration, diagnostics, logging and transferring data directly to a computer or USB drive.



### Portable field unit

edge EC is ideal for field use due to its light weight, large screen, and thin design. It can easily be slipped into a backpack or messenger bag. The battery life lasts up to 8 hours when used as a portable device.



### Wall-mount cradle

The included wall-mount cradle makes it easy to conserve space on the benchtop while also charging edge EC with the AC adapter. The cradle is ideal for continuous monitoring applications.



### Electrode holder with built-in cradle

The electrode holder features a swivel, adjustable arm with a built-in cradle to hold edge EC securely in place at the optimum viewing angle.



## Digital electrodes

edge®EC performs measurements through its unique digital electrodes. These digital electrodes are auto-recognized, providing sensor type, calibration data and a serial number when connected to edge EC by an easy to plug-in 3.5 mm connector.

## Conductivity probe

### HI763100 (included)

Conductivity probe with temperature sensor

Recommended for general purpose



Specifications	HI2003 edge EC	
EC	Range	0.00 to 29.99 $\mu\text{S}/\text{cm}$ ; 30.0 to 299.9 $\mu\text{S}/\text{cm}$ ; 300 to 2999 $\mu\text{S}/\text{cm}$ ; 3.00 to 29.99 $\text{mS}/\text{cm}$ ; 30.0 to 200.0 $\text{mS}/\text{cm}$ ; up to 500.0 $\text{mS}/\text{cm}$ absolute EC**
	Resolution	0.01 $\mu\text{S}/\text{cm}$ ; 0.1 $\mu\text{S}/\text{cm}$ ; 1 $\mu\text{S}/\text{cm}$ ; 0.01 $\text{mS}/\text{cm}$ ; 0.1 $\text{mS}/\text{cm}$
	Accuracy (@25°C/77°F)	$\pm 1\%$ of reading ( $\pm 0.05$ $\mu\text{S}/\text{cm}$ or 1 digit, whichever is greater)
	Calibration	single cell factor calibration; six standards available: 84 $\mu\text{S}/\text{cm}$ , 1413 $\mu\text{S}/\text{cm}$ , 5.00 $\text{mS}/\text{cm}$ , 12.88 $\text{mS}/\text{cm}$ , 80.0 $\text{mS}/\text{cm}$ , 111.8 $\text{mS}/\text{cm}$ , one point offset: 0.00 $\mu\text{S}/\text{cm}$
	Temperature Coefficient	0.00 to 6.00%/°C (for EC and TDS only), default value is 1.90%/°C
TDS	Range	0.00 to 14.99 $\text{mg}/\text{L}$ (ppm); 15.0 to 149.9 $\text{mg}/\text{L}$ (ppm); 150 to 1499 $\text{mg}/\text{L}$ (ppm); 1.50 to 14.99 $\text{g}/\text{L}$ ; 15.0 to 100.0 $\text{g}/\text{L}$ ; up to 400.0 $\text{g}/\text{L}$ absolute TDS using 0.80 conversion factor**
	Resolution	0.01 $\text{mg}/\text{L}$ (ppm); 0.1 $\text{mg}/\text{L}$ (ppm); 1 (ppm); 0.01 $\text{g}/\text{L}$ ; 0.1 $\text{g}/\text{L}$
	Accuracy (@25°C/77°F)	$\pm 1\%$ of reading ( $\pm 0.03$ ppm or 1 digit, whichever is greater)
	Calibration	through EC calibration
	TDS Factor	0.40 to 0.80 (default value is 0.50)
Salinity†	Range	0.0 to 400.0 % NaCl; 2.00 to 42.00 PSU; 0.0 to 80.0 $\text{g}/\text{L}$
	Resolution	0.1 % NaCl; 0.01 PSU; 0.01 $\text{g}/\text{L}$
	Accuracy (@25°C/77°F)	$\pm 1\%$ of reading
	Calibration	PSU and $\text{g}/\text{L}$ through EC calibration; % NaCl – one-point with HI7037 sea water standard
Temperature	Range*	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	$\pm 0.5^\circ\text{C}$ ; $\pm 0.9^\circ\text{F}$
Additional Specifications	Probe	HI763100 digital four-ring conductivity probe with 3.5 mm (1/8") connector and 1 m (3.3') cable
	Logging	up to 1000† (400 for basic mode) records organized in: manual log-on-demand (max. 200 logs), manual log-on-stability (max. 200 logs), interval logging† (max. 600 samples; 100 lots)
	Connectivity	1 USB port for storage; 1 micro USB port for charging and PC connectivity
	Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
	Power Supply	5 VDC adapter (included)
	Dimensions	202 x 140 x 12 mm (7.9" x 5.5" x 0.5")
	Weight	250 g (8.82 oz.)
Ordering Information	<p><b>HI2003-01</b> (115V) and <b>HI2003-02</b> (230V) edge EC includes: HI763100 Conductivity probe, 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard sachets (4), 12880 <math>\mu\text{S}/\text{cm}</math> conductivity standard sachets (2), 5000 <math>\mu\text{S}/\text{cm}</math> conductivity standard sachets (2), electrode rinse solution sachets (2), benchtop docking station with electrode holder, wall-mount cradle, USB cable, 5 VDC power adapter, quality certificates and instruction manual.</p> <p><b>HI2003-03</b> includes the above without probe.</p>	

\* temperature limits will be reduced to actual probe limits

\*\* with temperature compensation function disabled

† standard mode only

HI98192

## Professional Waterproof Meters

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

- **Waterproof**
  - IP67 rated waterproof, rugged enclosure
- **Salinity readings**
  - Salinity can be displayed as % NaCl, seawater scale (ppt) or practical salinity scale (PSU)
- **Calibration**
  - Perform up to a five point calibration for enhanced accuracy
- **Temperature compensation**
  - Automatic Temperature Compensation
  - Configurable temperature coefficient range from 0.00 to 10.00%.°C
- **Four-ring stainless steel probe**
  - This probe can cover low EC samples to 1000 mS/cm (actual EC)
- **Clear display**
  - Dot matrix display with multifunction virtual keys
- **AutoHold**
  - Automatically holds the first stable reading on the display
- **Calibration timeout**
  - Alerts when calibration is due at a specified interval
- **Connectivity**
  - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
  - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Approximately 100 hour battery life**
  - Powered by (4) 1.5V AA batteries
- **Intuitive keypad**
  - Most of the available options such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
  - Each meter is supplied complete with sensor, calibration solution, beakers, PC software and connection cable, instruction manual, quick start guide and batteries in a rugged, custom carrying case.



### For Universal Applications

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



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

HI710034 Orange



### Backlit Graphic LCD Display

The HI98192 features a backlit graphic LCD with on-screen help. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

### Waterproof Protection

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

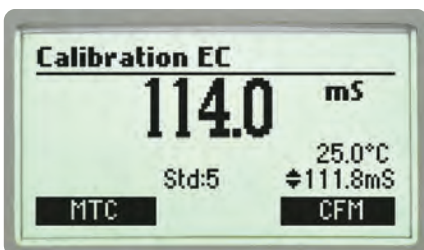


### Quick connect probe

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

### PC Connectivity

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

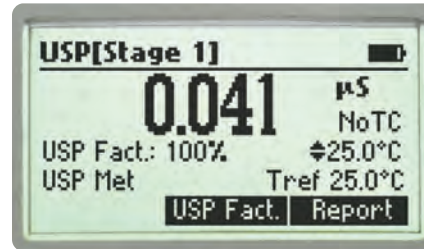


### Calibration

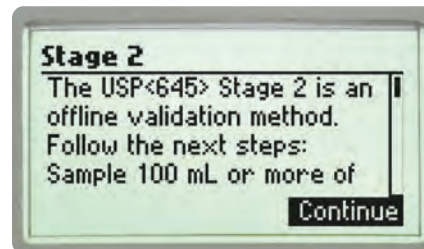
Choose from seven memorized standards and obtain up to a five point conductivity calibration. For salinity (% range), HI7037 standard allows users to perform a one point calibration.

### USP <645>

HI98192 can be used to perform all three stages of USP method required for EC measurement of ultrapure water and generates a report when the any of the three stages are met.



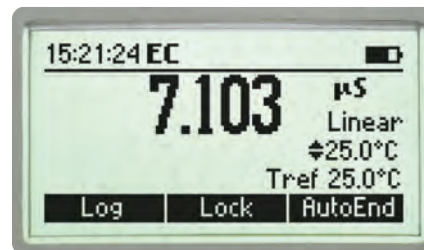
- Three stages of conformity
  - Performs all 3 stages of USP <645> water quality testing requirements



- On-screen guide
  - Users are provided with on-screen instructions for each USP stage



- Progress bar
  - Displays reading stability progress towards meeting stage 2 requirements



### Measurement

EC and TDS measurements are fully customizable and include: cell constant selection between 0.010 and 10.000, selection of linear or natural water (non-linear) or no temperature compensation (for actual conductivity reading), configurable temperature compensation coefficient range

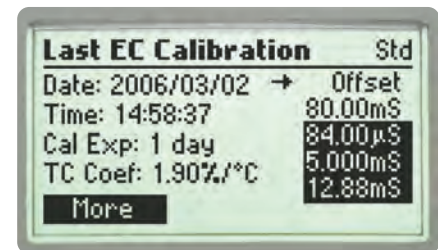
from 0.00 to 10.00%/°C, choice of reference temperatures of 15°C, 20°C and 25°C, and a selectable TDS factor between 0.40 and 1.00.

Ten sets of customized measurement parameters can be stored as a user profile and later recalled.



### Data Logging

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



### GLP

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



### AutoHold

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

### Dedicated Help Key

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

## Rugged custom carrying case

The HI98192 meter, probe, and all accessories are supplied in the HI720192 rugged carrying case designed to provide years of use. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.



Specifications	HI98192	
EC	Range	0 to 400 mS/cm (shows values up to 1000 mS/cm actual conductivity)** 0.001 to 9.999 $\mu$ S/cm*; 10.00 to 99.99 $\mu$ S/cm; 100.0 to 999.9 $\mu$ S/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 $\mu$ S/cm*; 0.01 $\mu$ S/cm; 0.1 $\mu$ S/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm
	Accuracy	$\pm$ 1% of reading ( $\pm$ 0.01 $\mu$ S/cm or 1 digit, whichever is greater)
	Calibration	automatic up to five points with seven memorized standards (0.00 $\mu$ S/cm, 84.0 $\mu$ S/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	$\pm$ 1% of reading ( $\pm$ 0.05 ppm or 1 digit, whichever is greater)
Resistivity	Range	1.0 to 99.9 $\Omega$ •cm; 100 to 999 $\Omega$ •cm; 1.00 to 9.99 K $\Omega$ •cm; 10.0 to 99.9 K $\Omega$ •cm; 100 to 999 K $\Omega$ •cm; 1.00 to 9.99 M $\Omega$ •cm; 10.0 to 100.0 M $\Omega$ •cm* (autoranging)
	Resolution	0.1 $\Omega$ •cm; 1 $\Omega$ •cm; 0.01 K $\Omega$ •cm; 0.1 K $\Omega$ •cm; 1 K $\Omega$ •cm; 0.01 M $\Omega$ •cm; 0.1 M $\Omega$ •cm*
	Accuracy	$\pm$ 1% of reading ( $\pm$ 10 $\Omega$ 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	$\pm$ 1% of reading
	Calibration	max. one point only in % NaCl range with HI7037 standard; use conductivity calibration for all other ranges
Temperature <sup>†</sup>	Range	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	$\pm$ 0.2°C; $\pm$ 0.4°F (excluding probe error)
	Calibration	one or two points
Additional Specifications	Cell Constant Setup	0.010 to 10.000
	Temperature Compensation	NoTC, linear (-20.0 to 120.0°C (-4.0 to 248.0°F)), non linear (0 to 36°C (32 to 98.6°F)) ISO/DIS 7888 std
	Reference Temperature	15°C, 20°C and 25°C
	Temperature Coefficient	0.00 to 10.00 %/°C
	TDS Factor	0.40 to 1.00
	Probe	HI763133 stainless steel, four-ring conductivity/TDS probe with internal temperature sensor and 1.5 m (4.9') cable (included)
	Logging	log-on-demand: 400 samples; lot logging: 5, 10, 30 sec, 1, 2, 5, 10, 15, 30, 60, 120, 180 min (max 1000 samples)
	Memorized Profiles	up to 10
	Measurement Modes	autorange, autoend, lock and fixed range
	PC Connectivity	opto-isolated sealed USB (with HI92000 software and micro USB cable)
	Battery Type / Life	1.5V AA batteries (4) / approximately 100 hours of continuous use (without backlight), 25 hours with backlight;
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions/Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
	Ordering Information	<b>HI98192</b> is supplied with HI763133 stainless steel, four-ring conductivity/TDS probe, HI7031M 1413 $\mu$ S/cm calibration solution (230 mL), HI7035M 111.8 mS/cm calibration solution (230 mL), 100 mL plastic beaker (2), HI92000 PC software, HI920015 micro USB cable, 1.5V AA batteries (4), quick start guide, quality certificate and instruction manual in an HI720192 rugged carrying case with custom insert.
Accessories	<b>HI710034</b> orange protective rubber boot	

\* The 0.001  $\mu$ S/cm EC range and 0.1 M $\Omega$ •cm Resistivity range are not available with the 1.5 m cable probe  
 \*\*Uncompensated temperature reading  
 (†) Reduced to actual sensor limits



## For Ultrapure Water Applications

HI98197 is a waterproof, portable EC (conductivity) meter that has an expanded conductivity range from 0.000  $\mu\text{S}/\text{cm}$  to 400  $\text{mS}/\text{cm}$ , as well as TDS (total dissolved solids), resistivity, and three salinity scales. This meter offers a quick connect four-ring platinum probe and allows the user to adjust the nominal cell constant. HI98197 is also ready to perform all three stages of USP <645> method required for EC measurement of water for injection.

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

HI710034 Orange

HI98197

# Professional Waterproof Meter

for Ultrapure Water

- **Waterproof**
  - IP67 rated waterproof, rugged enclosure
- **Conductivity and resistivity**
  - High resolution of 0.001  $\mu\text{S}/\text{cm}$  for conductivity and 0.1  $\text{M}\Omega\cdot\text{cm}$  for resistivity
- **Calibration**
  - Perform up to a five point calibration for enhanced accuracy
- **Temperature compensation**
  - Automatic Temperature Compensation
  - Configurable temperature coefficient range from 0.00 to 10.00%/°C
- **Four-ring platinum probe**
  - This probe can cover low EC samples to 1000  $\text{mS}/\text{cm}$  (actual EC)
- **Approximately 100 hour battery life**
  - Powered by (4) 1.5V AA batteries
- **Clear display**
  - Graphic LCD display with multifunction virtual keys
- **AutoHold**
  - Automatically holds the first stable reading on the display
- **Enhanced calibration**
  - An "out of calibration range" warning blinks if the measurement range is not covered by the current calibration
- **Calibration timeout**
  - Alerts when calibration is due at a specified interval
- **Connectivity**
  - PC connectivity via opto-isolated micro-USB with HI92000 software
- **Data logging**
  - The HI98197 allows storage of up to 400 log-on-demand samples or 1000 lot logging samples that can be later transferred to a PC with the supplied USB cable and software
- **GLP**
  - GLP data provides information from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
  - Most of the available options such as GLP information, help, range, calibration, and backlight have a dedicated button



### Backlit Graphic LCD Display

The HI98197 features a backlit graphic LCD with on-screen help. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

### Waterproof Protection

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



### Quick connect probe

The HI763123 four-ring platinum conductivity probe with a threaded connection features a quick connect DIN connector to make attaching and removing the probe simple and easy.

### Calibration

Choose from seven memorized standards and obtain up to a five point conductivity calibration. For salinity (% range), HI7037 standard allows users to perform a one point calibration.

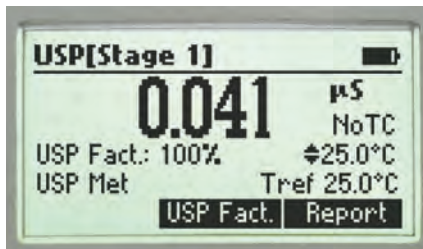
### Measurement

EC and TDS measurements are fully customizable and include: cell constant selection between 0.010 and 10.000, selection of linear or natural water (non-linear) or no temperature compensation (for actual conductivity reading), configurable temperature compensation coefficient range from 0.00 to 10.00%/°C, choice of reference temperatures of 15°C, 20°C and 25°C, and a selectable TDS factor between 0.40 and 1.00.

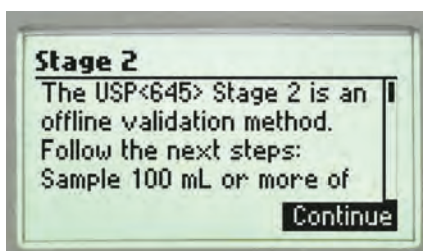
Ten sets of customized measurement parameters can be stored as a user profile and later recalled.

### USP <645>

HI98197 can be used to perform all three stages of USP <645> method required for EC measurement of water for injection and generates a report when the any of the three stages are met.



- Three stages of conformity
  - Performs all 3 stages of USP <645> water quality testing requirements



- On-screen guide
  - Users are provided with on-screen instructions for each USP stage

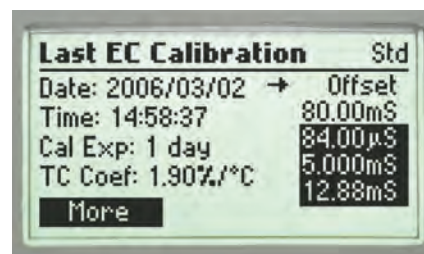


- Progress bar
  - Displays reading stability progress towards meeting stage 2 requirements



### Data Logging

The HI98197's allows storage of up to 400 log-on-demand samples or 1000 lot logging samples that can be later transferred to a PC with the supplied HI920015 USB cable and HI92000 software.



### GLP

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

### Intuitive Keypad

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

### AutoHold

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

### Dedicated Help Key

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

### Setup screen

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

### PC Connectivity

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

### Long Battery Life

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

## Designed for Water Professionals

High purity water used in power generation, semiconductor manufacturing, and other industries can be difficult to measure due to the ability of carbon dioxide ( $\text{CO}_2$ ) to diffuse into water and form carbonic acid ( $\text{H}_2\text{CO}_3$ ). Carbonic acid quickly dissociates into hydrogen ions ( $\text{H}^+$ ) and bicarbonate ions ( $\text{HCO}_3^-$ ). These ions will increase the conductivity and decrease the resistivity of the water. In order to measure high purity water accurately it is necessary to perform a continuous flow measurement. HI98197 uses the HI763123 platinum, four-ring probe with a threaded connection that is screwed into a stainless steel body flow cell. The flow cell is then connected to a water source to more accurately determine the conductivity or resistivity without exposure to air. HI98197 is an ideal meter for monitoring the efficiency of a mixed bed resin or equivalent system that produces high purity water of  $18.2 \text{ M}\Omega \cdot \text{cm}$  at  $25^\circ\text{C}$ .



HI605453 flow cell  
for ultrapure water





## Supplied complete

HI98197 is supplied complete with sensor, flow cell, tubing, calibration solution, beakers, PC software and connection cable, instruction manual, quick start guide and batteries in the HI720197 rugged, custom carrying case.

Specifications	HI98197	
EC	Range	0.000 to 9.999 $\mu\text{S}/\text{cm}$ ; 10.00 to 99.99 $\mu\text{S}/\text{cm}$ ; 100.0 to 999.9 $\mu\text{S}/\text{cm}$ ; 1.000 to 9.999 $\text{mS}/\text{cm}$ ; 10.00 to 99.99 $\text{mS}/\text{cm}$ ; 100.0 to 1000.0 $\text{mS}/\text{cm}$ (actual conductivity*; temperature compensated to 400 $\text{mS}/\text{cm}$ )
	Resolution	0.001 $\mu\text{S}/\text{cm}$ ; 0.01 $\mu\text{S}/\text{cm}$ ; 0.1 $\mu\text{S}/\text{cm}$ ; 0.001 $\text{mS}/\text{cm}$ ; 0.01 $\text{mS}/\text{cm}$ ; 0.1 $\text{mS}/\text{cm}$
	Accuracy	$\pm 1\%$ of reading ( $\pm 0.01 \mu\text{S}/\text{cm}$ or 1 digit, whichever is greater)
	Calibration	automatic up to five points with seven memorized standards (0.00 $\mu\text{S}/\text{cm}$ , 84.0 $\mu\text{S}/\text{cm}$ , 1.413 $\text{mS}/\text{cm}$ , 5.00 $\text{mS}/\text{cm}$ , 12.88 $\text{mS}/\text{cm}$ , 80.0 $\text{mS}/\text{cm}$ , 111.8 $\text{mS}/\text{cm}$ )
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	$\pm 1\%$ of reading ( $\pm 0.05 \text{ ppm}$ or 1 digit, whichever is greater)
Resistivity	Range	1.0 to 99.9 $\Omega \cdot \text{cm}$ ; 100 to 999 $\Omega \cdot \text{cm}$ ; 1.00 to 9.99 $\text{K}\Omega \cdot \text{cm}$ ; 10.0 to 99.9 $\text{K}\Omega \cdot \text{cm}$ ; 100 to 999 $\text{K}\Omega \cdot \text{cm}$ ; 1.00 to 9.99 $\text{M}\Omega \cdot \text{cm}$ ; 10.0 to 100.0 $\text{M}\Omega \cdot \text{cm}$ (autoranging)
	Resolution	0.1 $\Omega \cdot \text{cm}$ ; 1 $\Omega \cdot \text{cm}$ ; 0.01 $\text{K}\Omega \cdot \text{cm}$ ; 0.1 $\text{K}\Omega \cdot \text{cm}$ ; 1 $\text{K}\Omega \cdot \text{cm}$ ; 0.01 $\text{M}\Omega \cdot \text{cm}$ ; 0.1 $\text{M}\Omega \cdot \text{cm}$
	Accuracy	$\pm 1\%$ of reading ( $\pm 10 \Omega$ 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	$\pm 1\%$ of reading
	Calibration	max. one point only in % NaCl range with HI7037 standard; use conductivity calibration for all other ranges
Temperature <sup>†</sup>	Range	-20.0 to 120.0°C; -4.0 to 248.0°F
	Resolution	0.1°C; 0.1°F
	Accuracy	$\pm 0.2^\circ\text{C}$ ; $\pm 0.4^\circ\text{F}$ (excluding probe error)
	Calibration	one or two points
Additional Specifications	Cell Constant Setup	0.010 to 10.000
	Temperature Compensation	NoTC, linear (-20.0 to 120.0°C; -4.0 to 248.0°F), non linear (0 to 36°C; 32 to 98.6°F) ISO/DIS 7888 std
	Reference Temperature	15°C, 20°C, and 25°C
	Temperature Coefficient	0.00 to 10.00 %/°C
	TDS Factor	0.40 to 1.00
	Probe	HI763123 platinum, four-ring conductivity/TDS probe with internal temperature sensor and 1 m (3.3') cable (included)
	Logging	log-on-demand: 400 samples; lot logging: 5, 10, 30 sec, 1, 2, 5, 10, 15, 30, 60, 120, 180 min (max 1000 samples)
	Memorized Profiles	up to 10
	Measurement Modes	autorange, autoend, lock, and fixed range
	PC Connectivity	opto-isolated sealed USB (with HI92000 software and micro USB cable)
	Battery Type / Life	1.5V AA batteries (4) / approximately 100 hours of continuous use (without backlight), 25 hours with backlight
	Auto-off	user selectable: 5, 10, 30, 60 min, disabled
	Environment	0 to 50°C (32 to 122°F); RH 100% IP67
	Dimensions/Weight	185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)
	Ordering Information	<b>HI98197</b> is supplied with HI763123 platinum, four-ring conductivity/TDS probe with internal temperature sensor and 1 m (3.3') cable, HI605453 stainless steel flow cell for ultrapure water, tubing, HI7031M 1413 $\mu\text{S}/\text{cm}$ calibration solution (230 mL), HI7033M 84 $\mu\text{S}/\text{cm}$ calibration solution (230 mL), 100 mL plastic beaker (2), HI92000 PC software, HI920015 micro USB cable, 1.5V batteries (4), quality certificate, instruction manual and quick start guide in an HI720197 rugged carrying case with custom insert.
Accessories	<b>HI710034</b> orange protective rubber boot	

\*Uncompensated temperature reading  
 (†) Reduced to actual sensor limits





HI99300 · HI99301

## Portable EC Meters

EC/TDS and Temperature

- Simultaneous EC/TDS and temperature measurements on a large dual-line LCD display
- User-friendly Design
  - With only two buttons, meter operation could not be simpler. Two buttons allow you to quickly adjust settings, select the measurement range, and choose calibration buffer sets.
- Durable IP67 waterproof casing
  - Designed to withstand the knocks, drops, and spills of real life, the new IP67 body ensures top performance in any environment. These meters are totally protected against dust and water intrusion from any direction.
- Watertight Connection
  - A Quick Connect DIN connector makes attaching and removing the probe simple and easy. The rubber coating protects the cable and creates a sealed connection for added reliability.

- HOLD button
  - Freezes the reading on the display
- Selectable temperature unit (°C or °F)
- Battery life indication and low battery detection

HI99300 and HI99301 are conductivity, total dissolved solids and temperature meters designed to meet the requirements encountered in manufacturing and environmental testing protocols.

To increase precision, these models feature a different conductivity range, to cover applications from purified to brackish waters.

The supplied multi-parameter probe includes EC/TDS and temperature in one convenient, rugged probe.

Other user selectable features include different TDS factors from 0.45 to 1.00, and a range of temperature coefficients ( $\beta$ ) from 0.0 to 2.4% for better solution temperature compensation.

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



HI710028 Orange  
HI710029 Blue  
HI710030 Green

Specifications	HI99300	HI99301	
EC	Range	0 to 3999 $\mu\text{S}/\text{cm}^*$	0.00 to 20.00 $\text{mS}/\text{cm}^*$
	Resolution	1 $\mu\text{S}/\text{cm}$	0.01 $\text{mS}/\text{cm}$
	Accuracy (@25°C/77°F)	$\pm 2\%$ F.S.	$\pm 2\%$ F.S.
TDS	Range	0 to 2000 ppm (mg/L)	0.00 to 10.00 ppt (g/L)
	Resolution	1 ppm (mg/L)	0.01 ppt (g/L)
	Accuracy (@25°C/77°F)	$\pm 2\%$ F.S.	$\pm 2\%$ F.S.
Temperature	Range	0.0 to 60.0°C/32.0 to 140.0°F	0.0 to 60.0°C/32.0 to 140.0°F
	Resolution	0.1°C/0.1°F	0.1°C/0.1°F
	Accuracy (@25°C/77°F)	$\pm 0.5^\circ\text{C}/\pm 1.0^\circ\text{F}$	$\pm 0.5^\circ\text{C}/\pm 1.0^\circ\text{F}$
Additional Specifications	Calibration	automatic, one point at 1413 $\mu\text{S}/\text{cm}$ or 1382 ppm (CONV 0.5) or 1500 ppm (CONV 0.7)	automatic, one point at 12.88 $\text{mS}/\text{cm}$ or 6.44 ppt (CONV 0.5) or 9.02 ppt (CONV 0.7)
	EC/TDS Temperature Compensation	automatic, with $\beta$ selectable from 0.0 to 2.4% / °C with 0.1 increments	
	TDS conversion factor	Selectable from 0.45 to 1.00 with 0.01 increments	
	Probe (included)	HI763063 EC/TDS/temperature sensor, DIN connector and 1 m (3.3') cable	
	Battery Type / Life	1.5V AAA (3) / approx. 500 hours of continuous use	
	Auto-Off	user selectable: after 8 min, 60 min or disabled	
	Environment	0 to 50°C (32 to 122°F); RH max. 100%	
	Meter Dimensions	154 x 63 x 30 mm (6.1 x 2.5 x 1.2")	
	Meter Mass (with batteries)	196 g (6.91 oz.)	
	Case Ingress Protection Rating	IP67	
Ordering Information	<p><b>HI99300</b> is supplied with HI763063 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable, HI70031 1413 <math>\mu\text{S}/\text{cm}</math> and HI70032 1382 ppm calibration solution sachets, 100 mL beaker, 1.5V AAA batteries (3), calibration certificate of meter, calibration certificate of probe, instruction manual and HI710142 rugged carrying case.</p> <p><b>HI99301</b> is supplied with HI763063 pH/EC/TDS probe with built-in temperature sensor, DIN connector and 1m (3.3') cable, HI70030 12880 <math>\mu\text{S}/\text{cm}</math> and HI70038 6.44 ppt calibration solution sachets, 100 mL beaker, 1.5V AAA batteries (3), calibration certificate of meter, calibration certificate of probe, instruction manual and HI710142 rugged carrying case.</p>		

\* displays  $\mu\text{S}$  for  $\mu\text{S}/\text{cm}$ .  
\* displays  $\text{mS}$  for  $\text{mS}/\text{cm}$ .

HI8733

## Multi-range EC Meters

- Automatic temperature compensation (ATC)
- Help feature
  - On-screen user guides
- One-point calibration
  - One-point calibration
- Waterproof

The HI8733 conductivity meter has been designed for use in areas of production and quality control.

This meter utilize a four ring potentiometric probe that offers greater versatility over typical amperometric designs. This rugged probe is made of PVC and is ideal for indoor as well as outdoor measurements.

HI8733's conductivity measurements can be automatically temperature compensated by using the HI76302W probe with built-in temperature sensor.



### Specifications HI8733

Range	0.0 to 199.9 $\mu\text{S}/\text{cm}$ ; 0 to 1999 $\mu\text{S}/\text{cm}$ 0.00 to 19.99 $\text{mS}/\text{cm}$ ; 0.0 to 199.9 $\text{mS}/\text{cm}$
Resolution	0.1 $\mu\text{S}/\text{cm}$ ; 1 $\mu\text{S}/\text{cm}$ 0.01 $\text{mS}/\text{cm}$ ; 0.1 $\text{mS}/\text{cm}$
Accuracy (@25°C/77°F)	$\pm 1\%$ F.S. (excluding probe error)
Calibration	manual, one-point through EC knob
Temperature Compensation	automatic, 0 to 50°C (32 to 122°F) with $\beta$ adjustable from 0 to 2.5%/°C
Probe	HI76302W four-ring conductivity probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
Battery Type / Life	9V / approximately 100 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions	145 x 80 x 36 mm (5.7 x 3.1 x 1.4")
Weight	230 g (8.1 oz.)
Ordering Information	<b>HI8733</b> is supplied with HI76302W conductivity probe, 12880 $\mu\text{S}/\text{cm}$ HI70030 calibration solution sachet, battery, instructions and rugged carrying case.
Accessories	<b>HI710007</b> blue shockproof rubber boot <b>HI710008</b> orange shockproof rubber boot

HI8734

## TDS Meter

- One-point calibration
- Waterproof



The HI8734 has not only been specifically designed for the water conditioning industry, but particularly in the softening, demineralization, reverse osmosis and drinking water applications.

Three ranges of measurement ensure the highest accuracy possible. All three ranges can be executed at the touch of a button, without having to change the conductivity probe. This makes it very easy to switch applications without having to worry about recalibration.

To enhance accuracy and efficiency, MTC (Manual Temperature Compensation) is available using a knob on the front panel.

For the best protection in the field, the four-ring potentiometric probe is made of rugged PVC. To access difficult areas, the probe is supplied with a 1 m (3.3') cable.

The ratio between conductivity and TDS is factory set at 0.5.

Specifications	HI8734
Range	0.0 to 199.9 mg/L (ppm); 0 to 1999 mg/L (ppm); 0.00 to 19.99 g/L (ppt)
Resolution	0.1 mg/L (ppm); 1 mg/L (ppm); 0.01 g/L (ppt)
Accuracy (@25°C/77°F)	±1% F.S. (excluding probe error)
Calibration	manual, one-point through TDS knob
Temperature Compensation	manual from 0 to 50°C (32 to 122°F) with $\beta = 2\%/^{\circ}\text{C}$
TDS Factor	0.5
Probe	HI76301D four ring conductivity probe with DIN connector and 1 m (3.3') cable (included)
Battery Type / Life	9V / approximately 100 hours of continuous use
Environment	0 to 50°C (32 to 122°F); RH max 100%
Dimensions	145 x 80 x 36 mm (5.7 x 3.1 x 1.4")
Weight	230 g (8.1 oz.)
Ordering Information	<b>HI8734</b> is supplied with HI76301D conductivity probe, HI70032 1382 mg/L (ppm) calibration solution sachet, battery, instructions and rugged carrying case.
Accessories	<b>HI710007</b> blue shockproof rubber boot <b>HI710008</b> orange shockproof rubber boot

# EC Calibration Solutions

Quality Solutions for Laboratory Applications

- **Safety Data Sheets**
  - Safety data sheets for all Hanna solutions are available at [hannainst.com](http://hannainst.com) or upon request.
- **Expiration date**
  - The production batch number, expiration date, and temperature correlation table are reported on all Hanna calibration solutions.
- **NIST traceability**
  - Standardized using a conductivity meter and probe calibrated against NIST primary standard solutions or primary standard solutions prepared following NIST guidelines.
- **Air-tight bottles**
  - Air tight bottle with tamper-proof seal of freshness to ensure quality.
- **FDA compliant bottles (HI80xx)**
  - Hanna solutions are offered in opaque, light-tight bottles that meet FDA requirements.
- **High Accuracy Solutions (HI60xx)**
  - HI60xx high accuracy solutions are also available and are supplied with a certificate of analysis.



## 84 µS/cm Calibration Solution

This 84 µS/cm conductivity solution makes it possible to calibrate instruments with a conductivity scale of up to 200 µS/cm, in the measurement of pure or distilled water.

## 84 µS/cm Bottles

Code	EC Value @25°C	Size	Package	FDA Bottle	Certificate of Analysis
HI6033	84 µS/cm	500 mL	1 bottle		•
HI7033/1L	84 µS/cm	1 L	1 bottle		
HI7033L	84 µS/cm	500 mL	1 bottle		
HI7033M	84 µS/cm	230 mL	1 bottle		
HI5033-12	84 µS/cm	120 mL	1 bottle		
HI8033L	84 µS/cm	500 mL	1 bottle	•	•

# EC Calibration Solutions

Quality Solutions for Laboratory Applications



- **Safety Data Sheets**
  - Safety data sheets for all Hanna solutions are available at [hannainst.com](http://hannainst.com) or upon request.
- **Expiration date**
  - The production batch number, expiration date, and temperature correlation table are reported on all Hanna calibration solutions.
- **NIST traceability**
  - Standardized using a conductivity meter and probe calibrated against NIST primary standard solutions or primary standard solutions prepared following NIST guidelines.
- **Air-tight bottles**
  - Air tight bottle with tamper-proof seal of freshness to ensure quality.
- **Single use sachets**
  - Light block packaging prevents oxidation from UV light that could alter the value. Every sachet is as fresh as the day it was packaged.
- **FDA compliant bottles (HI80xx)**
  - Hanna solutions are offered in opaque, light-tight bottles that meet FDA requirements.
- **High Accuracy Solutions (HI60xx)**
  - HI60xx high accuracy solutions are also available and are supplied with a certificate of analysis.

## 1413 µS/cm Calibration Solution

The 1413 µS/cm calibration solution is best suited for general use. This solution is also available in combined sachet kits with Hanna pH 7 buffer for easy calibration of multiparameter instruments.



## 1413 µS/cm Bottles

Code	EC Value @25°C	Size	Package	FDA Bottle	Certificate of Analysis
HI6031	1413 µS/cm	500 mL	1 bottle		•
HI7031/1G	1413 µS/cm	1 G (3.78 L)	1 bottle		
HI7031/1L	1413 µS/cm	1 L	1 bottle		
HI7031L	1413 µS/cm	500 mL	1 bottle		
HI7031L/C	1413 µS/cm	500 mL	1 bottle		•
HI7031M	1413 µS/cm	230 mL	1 bottle		
HI5031-12	1413 µS/cm	120 mL	1 bottle		
HI7031-023	1.41 mS/cm	230 mL (GroLine®)	1 bottle		•
HI7031-012	1.41 mS/cm	120 mL (GroLine)	1 bottle		•
HI8031L	1413 µS/cm	500 mL	1 bottle	•	•

## 1413 µS/cm Sachets

Code	EC Value @25°C	Size	Package	Certificate of Analysis
HI70031C	1413 µS/cm	20 mL	25 sachets	•
HI70031G	1.41 mS/cm	20 mL (GroLine)	25 sachets	•
HI70031P	1413 µS/cm	20 mL	25 sachets	
HI77100C	1413 µS/cm & pH 7.01	20 mL	20 sachets (10 ea)	•
HI77100P	1413 µS/cm & pH 7.01	20 mL	20 sachets (10 ea)	

# EC Calibration Solutions

Quality Solutions for Laboratory Applications

- **Safety Data Sheets**
  - Safety data sheets for all Hanna solutions are available at [hannainst.com](http://hannainst.com) or upon request.
- **Expiration date**
  - The production batch number, expiration date, and temperature correlation table are reported on all Hanna calibration solutions.
- **NIST traceability**
  - Standardized using a conductivity meter and probe calibrated against NIST primary standard solutions or primary standard solutions prepared following NIST guidelines.
- **Air-tight bottles**
  - Air tight bottle with tamper-proof seal of freshness to ensure quality.
- **Single use sachets**
  - Light block packaging prevents oxidation from UV light that could alter the value. Every sachet is as fresh as the day it was packaged.
- **FDA compliant bottles (HI80xx)**
  - Hanna solutions are offered in opaque, light-tight bottles that meet FDA requirements.



## 5000 µS/cm Bottles

Code	EC Value @25°C	Size	Package	FDA Bottle	Certificate of Analysis
HI7039/1L	5000 µS/cm	1 L	1 bottle		
HI7039L	5000 µS/cm	500 mL	1 bottle		
HI7039M	5000 µS/cm	250 mL	1 bottle		
HI7039-023	5000 µS/cm	230 mL (GroLine®)	1 bottle		•
HI7039-012	5000 µS/cm	120 mL (GroLine)	1 bottle		•
HI8039L	5000 µS/cm	500 mL	1 bottle	•	•

## 5000 µS/cm Calibration Solution

This calibration solution is ideal for applications that need to achieve higher reading accuracies in a conductivity scale between 2,000 µS/cm and 10,000 µS/cm. This solution is widely used in agriculture for monitoring and preparing nutrient solutions for proper crop production.



## 5000 µS/cm Sachets

Code	EC Value @25°C	Size	Package	Certificate of Analysis
HI70039C	5000 µS/cm	20 mL	25 sachets	•
HI70039G	5000 µS/cm	20 mL (GroLine)	25 sachets	•
HI70039P	5000 µS/cm	20 mL	25 sachets	

# EC Calibration Solutions

Quality Solutions for Laboratory Applications

- **Safety Data Sheets**
  - Safety data sheets for all Hanna solutions are available at [hannainst.com](http://hannainst.com) or upon request.
- **Expiration date**
  - The production batch number, expiration date, and temperature correlation table are reported on all Hanna calibration solutions.
- **NIST traceability**
  - Standardized using a conductivity meter and probe calibrated against NIST primary standard solutions or primary standard solutions prepared following NIST guidelines.
- **Air-tight bottles**
  - Air tight bottle with tamper-proof seal of freshness to ensure quality.
- **Single use sachets**
  - Light block packaging prevents oxidation from UV light that could alter the value. Every sachet is as fresh as the day it was packaged.
- **FDA compliant bottles (HI80xx)**
  - Hanna solutions are offered in opaque, light-tight bottles that meet FDA requirements.



## 12880 µS/cm Bottles

Code	EC Value @25°C	Size	Package	FDA Bottle	Certificate of Analysis
HI7030/1G	12880 µS/cm	1 G (3.78 L)	1 bottle		
HI7030/1L	12880 µS/cm	1 L	1 bottle		
HI7030L	12880 µS/cm	500 mL	1 bottle		
HI7030L/C	12880 µS/cm	500 mL	1 bottle		•
HI7030M	12880 µS/cm	250 mL	1 bottle		
HI5030-12	12880 µS/cm	120 mL	1 bottle		
HI8030L	12880 µS/cm	500 mL	1 bottle	•	•

## 12880 µS/cm Calibration Solution

The 12880 µS/cm (12.88 mS/cm) calibration solution is widely used to assure the proper performance of conductivity meters with a scale higher than 10 mS/cm.



## 12880 µS/cm Sachets

Code	EC Value @25°C	Size	Package	Certificate of Analysis
HI70030C	12880 µS/cm	20 mL	25 sachets	•
HI70030P	12880 µS/cm	20 mL	25 sachets	
HI700304P	12880 µS/cm	20 mL (Pool Line)	25 sachets	

# EC Calibration Solutions

Quality Solutions for Laboratory Applications

- **Safety Data Sheets**
  - Safety data sheets for all Hanna solutions are available at [hannainst.com](http://hannainst.com) or upon request.
- **Expiration date**
  - The production batch number, expiration date, and temperature correlation table are reported on all Hanna calibration solutions.
- **NIST traceability**
  - Standardized using a conductivity meter and probe calibrated against NIST primary standard solutions or primary standard solutions prepared following NIST guidelines.
- **Air-tight bottles**
  - Air tight bottle with tamper-proof seal of freshness to ensure quality.
- **FDA compliant bottles (HI80xx)**
  - Hanna solutions are offered in opaque, light-tight bottles that meet FDA requirements.



## 80000 µS/cm Calibration Solution

The 80,000 µS/cm calibration solution is needed for the proper calibration of instrumentation used to measure high conductivity samples such as wastewater, solutions with suspended solids and plating baths.

This calibration solution is also ideal for use in the agroalimentary sector.

## 111800 µS/cm Calibration Solution

This calibration solution is useful to calibrate instrumentation used to measure samples with conductivity higher than 100 mS/cm (100,000 µS/cm).

In fact, this solution makes it possible to calibrate instruments that perform under conditions of high salt concentrations.

This calibration solution is ideal for use in systems where phase limits have to be detected (e.g. separation of a substance from water), monitoring of bottle washing plants, beverage controls, check of acids or bases in electrodeposition processes and some plating baths.

## 80000 µS/cm Bottles

Code	EC Value @25°C	Size	Package	FDA Bottle	Certificate of Analysis
HI7034/1L	80000 µS/cm	1 L	1 bottle		
HI7034L	80000 µS/cm	500 mL	1 bottle		
HI7034M	80000 µS/cm	250 mL	1 bottle		
HI5034-12	80000 µS/cm	120 mL	1 bottle		
HI8034L	80000 µS/cm	500 mL	1 bottle	•	•

## 111800 µS/cm Bottles

Code	EC Value @25°C	Size	Package	FDA Bottle	Certificate of Analysis
HI7035/1L	111800 µS/cm	1 L	1 bottle		
HI7035L	111800 µS/cm	500 mL	1 bottle		
HI7035M	111800 µS/cm	230 mL	1 bottle		
HI8035L	111800 µS/cm	500 mL	1 bottle	•	•





## TDS Calibration Solutions

Quality Solutions for Laboratory Applications

- **Safety data sheets**
  - Safety data sheets for all Hanna solutions are available at [hannainst.com](http://hannainst.com) or upon request.
- **Expiration date**
  - The production batch number, expiration date, and temperature correlation table are reported on all Hanna calibration solutions.
- **NIST traceability**
  - Standardized using a conductivity meter and probe calibrated against NIST primary standard solutions or primary standard solutions prepared following NIST guidelines.
- **Air-tight bottles**
  - Air tight bottle with tamper-proof seal of freshness to ensure quality.
- **Single use sachets**
  - Light block packaging prevents oxidation from UV light that could alter the value. Every sachet is as fresh as the day it was packaged.

### TDS Solutions

Hanna TDS calibration solutions are prepared against a NIST traceable potassium chloride solution.

Hanna TDS solutions have the lot number and expiration date clearly marked on the label and are air tight with a tamper-proof seal to ensure the quality of the solution. Hanna's line of TDS calibration solutions have been specially formulated to have an expiration of 5 years from the date of manufacture for an unopened bottle.



### TDS Bottles

Code	TDS Value @25°C	Size	Package	Certificate of Analysis
HI6032	1382 mg/L (ppm)	500 mL	1 bottle	•
HI7032/1L	1382 mg/L (ppm)	1 L	1 bottle	
HI7032L	1382 mg/L (ppm)	500 mL	1 bottle	
HI7032M	1382 mg/L (ppm)	250 mL	1 bottle	
HI7036/1L	12.41 g/L (ppt)	1 L	1 bottle	
HI7036L	12.41 g/L (ppt)	500 mL	1 bottle	
HI70442/1L*	1500 mg/L (ppm)	500 mL	1 bottle	
HI70442L*	1500 mg/L (ppm)	500 mL	1 bottle	
HI70442M*	1500 mg/L (ppm)	250 mL	1 bottle	

### TDS Sachets

Code	TDS Value @25°C	Size	Package	Certificate of Analysis
HI70032C	1382 mg/L (ppm)	20 mL	25 sachets	•
HI70032P	1382 mg/L (ppm)	20 mL	25 sachets	
HI70038C	6.44 g/L (ppt)	20 mL	25 sachets	•
HI70038P	6.44 g/L (ppt)	20 mL	25 sachets	
HI700384P	6.44 g/L (ppt) (Pool Line)	20 mL	25 sachets	
HI70080C	800 mg/L (ppm)	20 mL	25 sachets	•
HI70080P	800 mg/L (ppm)	20 mL	25 sachets	
HI70442P*	1500 mg/L (ppm)	20 mL	25 sachets	
HI77200P*	1500 mg/L (ppm) & pH 7.01	20 mL	20 sachets (10 ea)	

\* TDS Conversion Factor 4-4-2: 0.65 ppm = 1 µS/cm (approximately).

## Quick Cal

## pH/EC Quick Cal Calibration Solution

Quick Cal is for use with Hanna's GroLine® pH and/or EC/TDS meters. Using the Quick Cal function found in compatible meters allows for single-point calibration for pH and/or conductivity sensors.

- Calibration solution for Gro line pH and EC/TDS meters
- pH calibration buffer value of pH 6.86
- EC calibration standard value of 5,000  $\mu\text{S}/\text{cm}$  (5.00  $\text{mS}/\text{cm}$ )
- Safety Data Sheets
  - Safety data sheets for all Hanna solutions are available at [hannainst.com](http://hannainst.com) or upon request.
- Expiration date
  - The production batch number, expiration date, and temperature correlation table are reported on all Hanna calibration solutions.
- NIST traceability
  - Standardized using a pH meter calibrated by means of two standard solutions prepared from NIST standard reference materials. A conductivity meter and probe calibrated against NIST primary standard solutions or primary standard solutions prepared following NIST guidelines.



## Quick Cal pH/EC Bottles

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

Code	Size	Certificate of Analysis
HI5036-050	500 mL (GroLine)	•
HI5036-023	230 mL (GroLine)	•
HI5036-012	120 mL (GroLine)	•

## Quick Cal pH/EC Sachets

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

Code	Size	Certificate of Analysis
HI50036P	20 mL sachets, 25 pcs. (GroLine)	-

## Seawater Salinity Calibration Solutions

Hanna calibration solutions have the lot number and expiration date clearly marked on the label. All bottles are air tight with a tamper-proof seal to ensure the quality of the solution.

HI7037 is a premium quality calibration solution for seawater salinity according to the 1902 International Council for the Exploration of the Sea (ICES) percent scale.

- Air tight bottle with tamper-proof seal to ensure quality.
- Lot number and expiration date printed on each label.



## Salinity Bottles

Code	Description	Size	Package
HI7037L	100% NaCl	500 mL	1 bottle
HI7037M	100% NaCl	250 mL	1 bottle
HI70024L	35.00 ppt (Marine Line)	500 mL	1 bottle
HI70024M	35.00 ppt (Marine Line)	230 mL	1 bottle

## Salinity Sachets

Code	Description	Size	Package
HI70024P	35.00 ppt (Marine Line)	20 mL	25 pcs

