

## Research Grade Meters

pH/ORP/ISE and EC/TDS/Resistivity/Salinity and Temperature



### Measure up to Eight Parameters

HI5521 and HI5522 are research grade benchtop instruments that feature eight measurement parameters: pH, mV (for Oxidation Reduction Potential), ISE (HI5522 only), conductivity, resistivity, TDS, salinity and temperature.

These instruments incorporate dual channels with a separate temperature input and support external reference electrodes required by half cell pH and ISE sensors.

Up to a four-point automatic or custom standard conductivity calibration can be performed in up to four points, as well as adjustable probe cell constant. One fixed-point salinity calibration can be performed on the percent scale only. Three salinity ranges are available: practical scale, natural sea water scale and percent scale.

HI5522 features up to five-point manual selection and custom standard ISE calibration with up to five standard solutions and up to five custom solutions with or without temperature compensation. From the on-screen list, users can select their ISE electrode parameter along with the standard configuration profile or create their own.



- Capacitive touch keypad
- Clear user interface
- CAL Check™ for pH
  - Alerts users of calibration status
- Five-point calibration (HI5522)
  - Five point pH and ISE calibration
- Logging
  - Large log memory with different logging methods
- Specific Applications
  - EC specific applications: USP <645> method, salinity in seawater, TDS
  - ISE Specific Applications: incremental methods
- Multiple input channels
  - pH/ORP/(ISE, HI5522) and EC/TDS/Resistivity/Salinity
- On-screen help
  - Users can consult the on-screen help from any mode simply by pressing the HELP key.

## Highly Customizable

The display is customizable and capable of displaying two channels at the same time, showing the measurements in various modes: basic measurement with or without GLP information, graph or logging data. The display colors are also selectable.

Up to 10 profiles (5 for each channel) can be saved and recalled for both instruments, eliminating the need to reconfigure each time a different electrode is used. User definable configurations can include: temperature compensation modes, isopotential points for pH and ISE (HI5522 only), measurement units of ISE concentrations, ISE electrode type (HI5522 only), and temperature units.

## User-friendly Features

These instruments offer multi-language support and contextual help is available through a dedicated help key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through all measurement and calibration procedures to ensure readings are taken correctly.

## CAL Check™ for pH

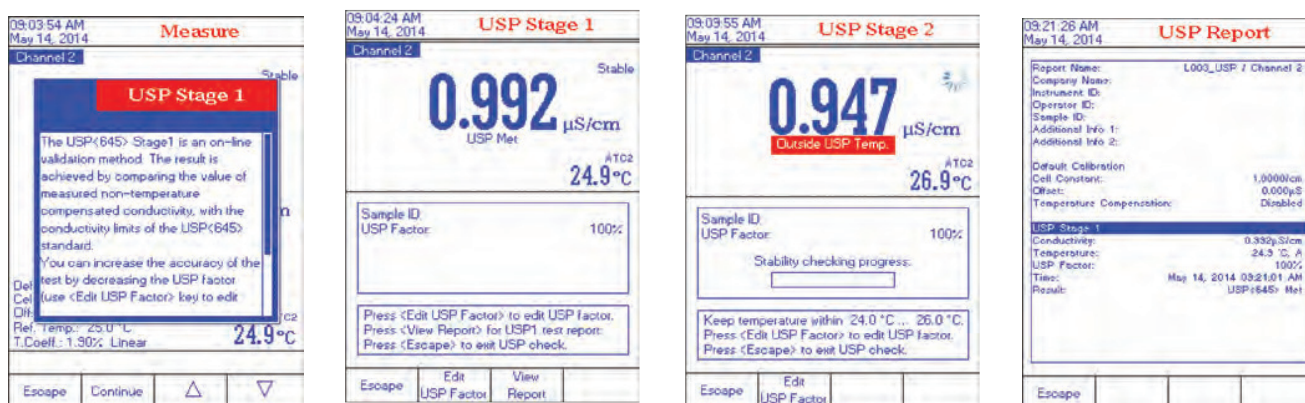
Hanna's pH CAL Check™ ensures accurate readings every time by alerting users of potential problems during the calibration process. The CAL Check™ system eliminates erroneous readings due to dirty or faulty pH electrodes or contaminated pH buffer solutions. After the guided calibration process, electrode condition is evaluated and an indicator is displayed informing the user of the overall pH electrode status.

### EC USP Mode

Hanna's HI5522 and HI5521 together with EC probes can be used for conductivity measurements required to prepare water for injection (WFI) according to USP <645>.

The instruments give clear instructions on how to perform each stage and automatically check that the temperature, conductivity and stability are within USP limits.

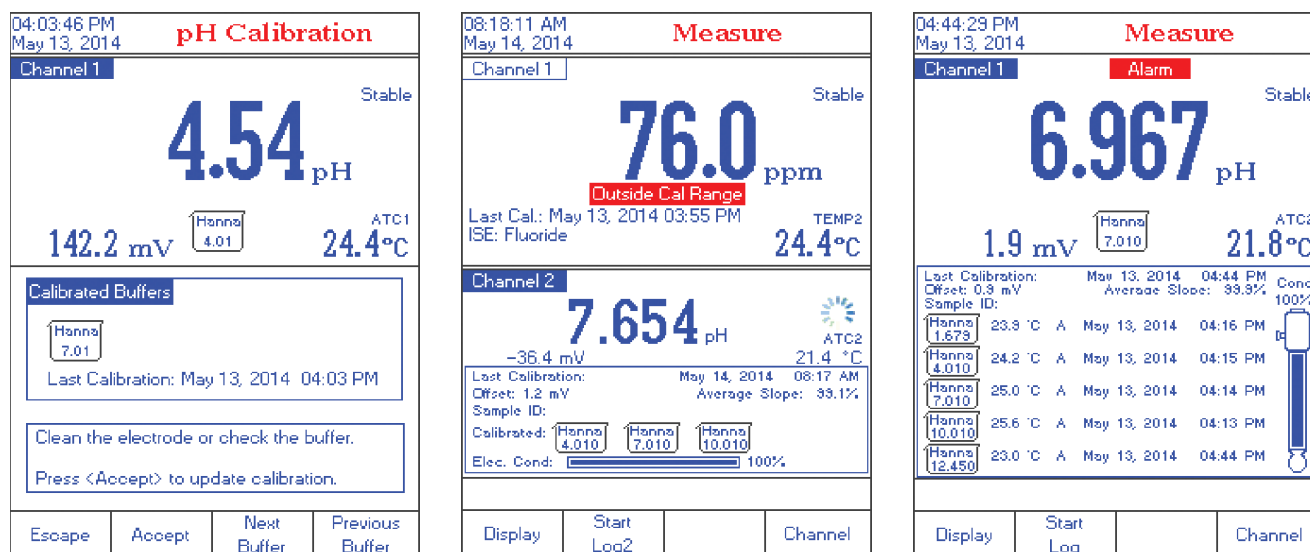
Comprehensive results are shown on a single screen at the end of the test. Up to 200 reports can be saved for future recall.



### pH CAL Check™

Proper calibration of the pH electrode system is critical in order to achieve reliable results. Hanna's exclusive CAL Check™ system includes several features to help users reach that goal.

- Each time a pH calibration is performed, the instrument compares the new calibration with the previous one. When this comparison indicates a significant difference, the message alerts the user to either clean the electrode, check the buffer or both.
- When measurements are taken too far from the calibration points, the instrument will warn the user with a message on the LCD.
- The condition of the pH electrode after calibration is shown on the display to track aging.
- To avoid taking readings with old calibrations, the instrument automatically reminds the user when the calibration has expired.



## ISE Features (HI5522)

### ISE Incremental Methods

Ion concentration determinations with ISEs can be made faster and easier using the streamlined incremental methods.

Incremental methods involve adding a standard to a sample or sample to a standard and detecting the mV change that occurs due to the addition, and this difference determines the concentration. Historically the user would use mathematical equations to determine the ion concentration of the sample; the HI5522, sample concentrations are calculated automatically and then logged into an ISE method report; up to 200 reports can be saved for future recall. The entire process can be repeated on multiple samples without reentering sets of parameters. Reports can be printed using HI92000 PC software.

Incremental method techniques can reduce errors from variables such as temperature, viscosity, pH or ionic strength. The electrodes remain immersed throughout the process, thus reducing measurement time as well as eliminating sample carry over and its associated errors.

Known Addition, Known Subtraction, Analyte Addition, and Analyte Subtraction methods are standard method choices provided by the HI5522.

08:05:39 AM May 14, 2014		Known Subtraction	
Channel 1		Stable	
14.8 mV		TEMP1 22.4 °C	
First Step First Reading			
Manual Edit			
Sample Vol.	100.000	mL	
ISA Vol.	2.000	mL	
Std. Vol.	10.000	mL	
Std. Conc.	100	ppm	
Stoich. Factor	1.0		
then press <Continue>.			
Escape	Edit	Next	Previous

08:09:43 AM May 14, 2014		Known Addition	
Channel 1		Stable	
10.5 mV		TEMP1 21.7 °C	
First Step First Reading			
Second Step Second Reading			
Sample Volume:	100.000	mL	
ISA Buffer Vol.:	2.000	mL	
Reagent Volume:	2.000	mL	
Reagent Conc.:	1000	ppm	
Press <Read> to memorize the current reading and to pass to the next method step.			
Escape	Read		

08:11:14 AM May 14, 2014		ISE Results	
Channel 1		Stable	
35.9 ppm			
Sample ID:			
Calculated Slope:	100.1 %		
Reading 1:	10.5 mV		
Reading 2:	-0.4 mV		
Sample Volume:	100.000	mL	
Reagent Volume:	2.000	mL	
ISA Volume:	2.000	mL	
Reagent Conc.:	1000	ppm	
Press <Direct Measure> to return in main measurement panel. Press <Save> to log the current results.			
Direct Measure	Save	Edit	Start KA

### First Step

The first step in performing an incremental method analysis is to enter the required parameters including sample, ISA and standard volumes, as well as standard concentration and stoichiometric factor.

When repeating the analysis on another sample, the parameters do not need to be reentered.

### Sequence of Readings

Once the variables are entered, the user is guided step-by-step through the measurement process.

The initial mV measurement is made before the addition; next is the addition, followed by the second mV measurement.

### Results

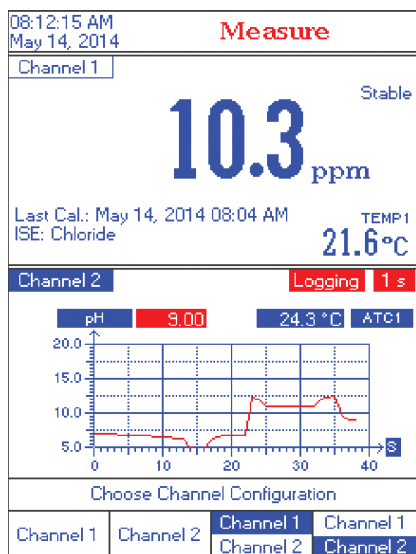
The results are automatically calculated and shown together with all the parameters used.

At this time, results can be saved into an ISE Methods Report and printed using the HI92000 PC software. If necessary, the user can edit the parameters without having to redo the entire analysis. Multiple sample analysis is enabled without having to reenter set-up data.

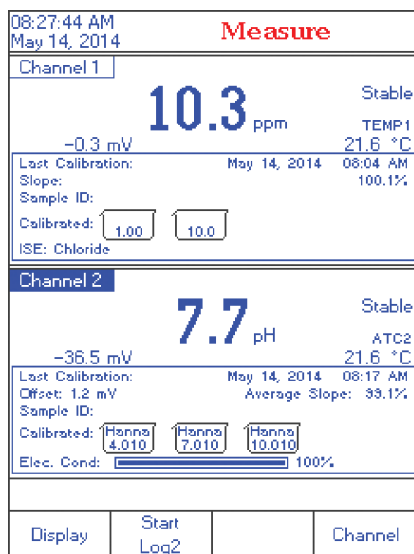


- Low Profile
  - These instruments feature a low profile with an ideal viewing angle

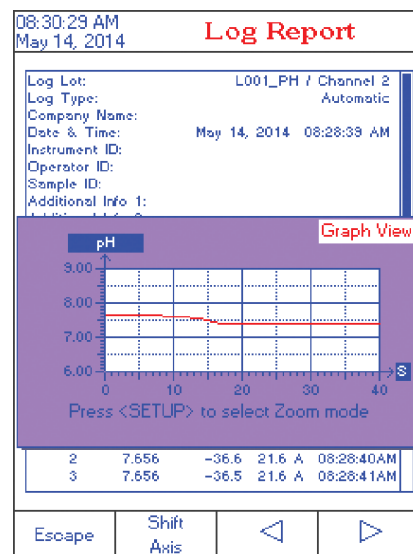
## Additional Features by Screen (depending on model)



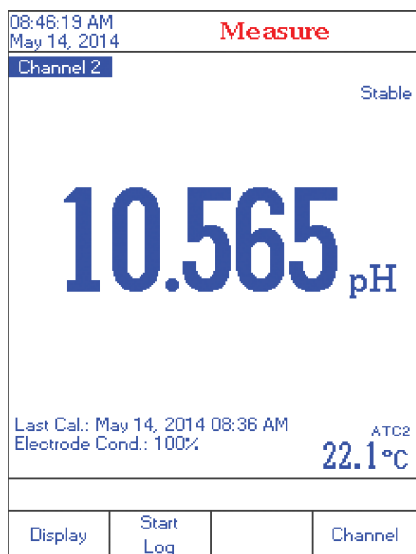
Channel Configuration



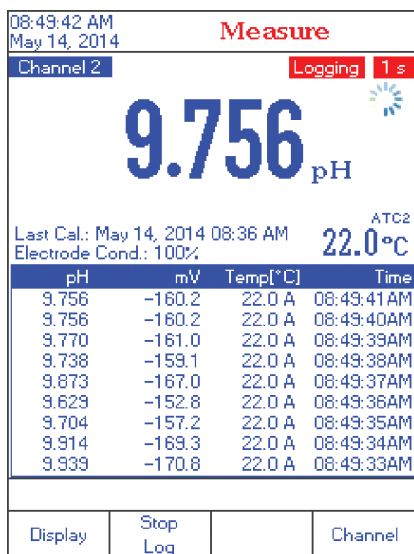
Good Laboratory Practices



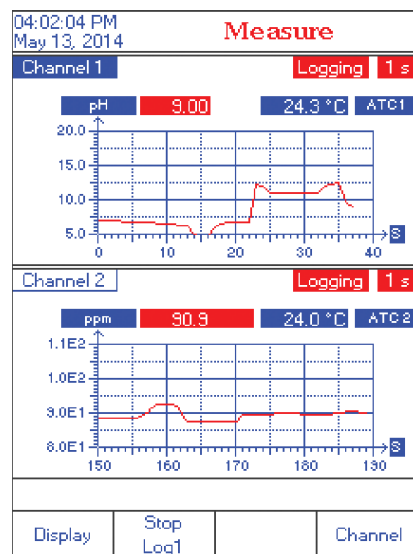
Log Recall



Simple Readout Available



Real-Time Logging



Simultaneous Dual-Channel Graphing



## Dual Channels

The two measurement channels of the HI5522 and HI5521 are galvanically isolated to eliminate noise and instability.

In ISE mode (HI5522), these instruments provide the user with a choice of several incremental methods. Communication is via opto-isolated USB ports.

Specifications	HI5521	HI5522
pH	Range	-2.000 to 20.000 pH
	Resolution	0.1 pH; 0.01 pH; 0.001 pH
	Accuracy	±0.1 pH; ±0.01 pH; ±0.002 pH ±1 LSD
	Calibration	automatic, up to five-point calibration, eight standard buffers available, and five custom buffers
	Temperature Compensation	automatic or manual from -20.0 to 120.0°C/-4.0 to 248.0°F/253.15 to 393.15K
mV	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	±0.2 mV ±1 LSD
ISE	Range	-
	Resolution	-
	Accuracy	-
	Calibration	automatic, up to five-point calibration, five fixed standard solutions available for each measurement unit, and 5 user defined standards
Temperature**	Range	-20.0 to 120°C; -4.0 to 248.0°F; 253.15 to 393.15K
	Resolution	0.1°C; 0.1°F; 0.1K
	Accuracy	±0.2°C; ±0.4°F; ±0.2K (without probe)
EC	Range	0.000 to 9,999 µS/cm; 10.00 to 99.99 µS/cm; 100.0 to 999.9 µS/cm; 1.000 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 1000.0 mS/cm absolute EC*
	Resolution	0.001 µS/cm; 0.01 µS/cm; 0.1 µS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 mS/cm
	Accuracy	±1% of reading (±0.01 µS/cm)
	Cell Constant	0.0500 to 200.00
	Cell Type	4 cells
	Calibration	automatic standard recognition, user standard single point / multi-point calibration
	Calibration Reminder	yes
	Temperature Coefficient	0.00 to 10.00 %/°C
	Temperature Compensation	disabled, linear and non-linear (natural water)
	Reference Temperature	5.0 to 30.0°C
	Profiles	up to 10, 5 each channel
	USP Compliant	yes
	TDS	Range
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)
Resistivity	Range	1.0 to 99.9 Ω•cm; 100 to 999 Ω•cm; 1.00 to 9.99 kΩ•cm; 10.0 to 99.9 kΩ•cm; 100 to 999 kΩ•cm; 1.00 to 9.99 MΩ•cm; 10.0 to 100.0 MΩ•cm
	Resolution	0.1 Ω•cm; 1 Ω•cm; 0.01 kΩ•cm; 0.1 kΩ•cm; 1 kΩ•cm; 0.01 MΩ•cm; 0.1 MΩ•cm
	Accuracy	±2% of reading (±1 Ω•cm)
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	±1% of reading
	Calibration	percent scale—one-point (with HI7037 standard)
Additional Specifications	pH Electrode	HI1131B glass body pH electrode with BNC connector and 1 m (3.3') cable (included)
	EC Probe	HI76312 platinum, four-ring EC/TDS probe with and 1 m (3.3') cable (included)
	Temperature Probe	HI7662-T stainless steel temperature probe with 1 m (3.3') cable (included)
	Input Channel(s)	1 pH/ORP + 1 EC
	GLP	cell constant, reference temperature/coefficient, calibration points, cal time stamp, probe offset for conductivity
	Logging	<b>record:</b> 100,000 data point storage/channel, up to 100 lots with max. 50,000 records/lot; <b>interval:</b> settable between 1 second and max log time of 180 minutes; <b>type:</b> automatic, manual, AutoHOLD; <b>additional:</b> 200 records USP; 200 records incremental methods (HI5522)
	PC Connection	USB and RS232
	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.)	
<b>Ordering Information</b>	<b>HI5521-01</b> (115V), <b>HI5521-02</b> (230V), <b>HI5522-01</b> (115V) and <b>HI5522-02</b> (230V) are supplied with HI76312 EC/TDS probe, HI1131B pH electrode, HI7662-T temperature probe, HI70004 pH 4.01 buffer solution sachet, HI70007 pH 7.01 buffer solution sachet, HI700601 electrode cleaning solution sachet (2), HI7082 3.5M KCL electrolyte solution (30 mL), HI76404N electrode holder, 12 VDC adapter and instructions.	

pH and ORP electrodes begin on page 3.77; pH and ORP solutions begin on page 3.100; ISE electrodes and solutions begin on page 4.22; EC, TDS and salinity solutions begin on page 6.42

(\*) Absolute conductivity (or TDS) is the conductivity (or TDS) value without temperature compensation.  
(\*\*) Reduced to actual probe limits

