HANNA instruments HI5522 Multiparameter with GPS User Guide

H15522
Research Grade Meter
pH/ORP/ISE and EC/TDS/Resistivity/Salinity and Temperature
Multiparameter
User Guide

Contents

1 HI5522 Multiparameter with GPS
2 Customizable User Interface
3 pH and EC Features
4 ISE Features
5 Additional Features by Screen
6 Documents / Resources
7 Related Posts

HI5522 Multiparameter with GPS

The HI5522 is an advanced research grade benchtop pH/ORP/ISE and EC/TDS/Salinity/Resistivity meter that is completely customizable with a large color LCD, capacitive touch keys, and USB port for computer connectivity. The HI5522 is a two-channel meter that allows for simultaneous measure of pH, ORP, or ISE on one channel and EC, TDS, Salinity, or Resistivity on the other. Channel one has a BNC connection for use with the expansive line of pH, ORP, and ISE electrodes that Hanna Instruments offers. The meter is supplied with the HI1131B glass body, double junction, combination pH electrode that operates over a wide temperature range from 0 to 100°C. All readings are automatically compensated for temperature variations with the separate HI7662-T temperature probe or from the built in temperature sensor of the conductivity probe on Channel Two. The HI5522 is supplied with the HI76312 four-ring conductivity probe that operates over a wide range from 0.000 pS/cm to 1000.0 mS/cm*. 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 pS/cm or mS/cm. All readings are automatically compensated for temperature variations with a built in temperature sensor. The temperature correction coefficient is adjustable from 0.00 to 10.00 %/°C.

As a pH meter the HI5522 can be calibrated up to five points with a choice of eight pre-programmed buffers or five custom buffers. The HI5522 features Hanna's exclusive CAL Checkm to alert the user of potential problems during the pH calibration process. Indicators displayed during calibration include "Electrode Dirty/Broken" and "Buffer Contaminated." The overall probe condition based on the offset and slope characteristic of the electrode is displayed as a percentage after calibration is complete.
In ISE mode the HI5522 can be calibrated up to five points with a choice of five fixed standards or five user defined in any concentration unit. The calibration data including date, time, standards used and slope can be viewed at any time along with the current measurement by selecting the Good Laboratory Practice (GLP) display option.
As an EC/TDS/Salinity/Resistivity meter the HI5522 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. The calibration data including date, time, and standards used, offset and cell factor can be accessed at any time along with the current measurement by selecting the Good Laboratory Practice (GLP) display option.
For the measurement of high purity water used in pharmaceutical manufacturing, the HI5522 is programmed with the three stages of the USP <645> method. Once a stage is meta report is generated and can be saved. Up to 200 reports can be stored and transferred to a Windows® compatible computer using the supplied USB cable and software.
Three selectable logging modes are available: automatic, manual and AutoHold logging. Up to 100,000 data points can be recorded in 100 lots with 50,000 records max/lot on each channel and exported to a computer for data review and storage.

Customizable User Interface

The user interface of the HI5522 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 HI5522 features a color graphic LCD with on-screen help, graphic, and custom color configurations. The display allows for real-time graphing and the use of virtual keys provide for an intuitive user interface.

Capacitive Touch

The HI5522 features sensitive capacitive touch buttons for accurate keystrokes when navigating menus and screens. There are four dedicated keys that are used for routine operations including calibration and switching measurement modes and four virtual keys that change based upon use. The capacitive touch technology ensures the buttons never get clogged with sample residue.

Four Ring Conductivity Probe

All readings are performed with the H176312 four-ring conductivity probe that has 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. The four-ring design allows for this probe to be used over a wide range of measurements.

Choice of Calibration

Automatic buffer recognition, semiautomatic, and direct manual entry pH calibration options are available for calibrating up to five points, from a selection of eight standard buffers and up to five custom buffers. For the conductivity channel the calibration can be set to automatic standard recognition or user entry along with a choice of single or multi-point. Calibration can be performed up to four points when multi-point is selected.

CAL Check™

CAL Check alerts users to potential problems during the calibration of the pH electrode. Indicators include "Electrode Dirty/Broken;' "Buffer Contaminated," electrode response time and the overall probe condition as a percentage that is based on the offset and slope characteristics.

GLP Data

HI5522 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.

ISE Measurement with Choice of Concentration Units

The H15522 allows for calibration and readings in choice of concentration units. The choices of concentration units include ppt, g/L, mg/mL, ppm, mg/L, pg/L, ppb, pg/L, mg/mL, M, mol/L, mmol/L, %w/v and a user-defined unit.

ISE Measurement with Incremental Methods

The known addition, known subtraction, analyte addition, and analyte subtraction incremental methods are pre-programmed into the HI5522. Simply follow the on screen guided procedure and the meter will perform the calculation automatically allowing for a higher level of accuracy to be obtained as compared to a direct ISE measurement.

Data Logging

Three selectable logging modes are available on the HI5522: 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 H192000 software (both sold separately).

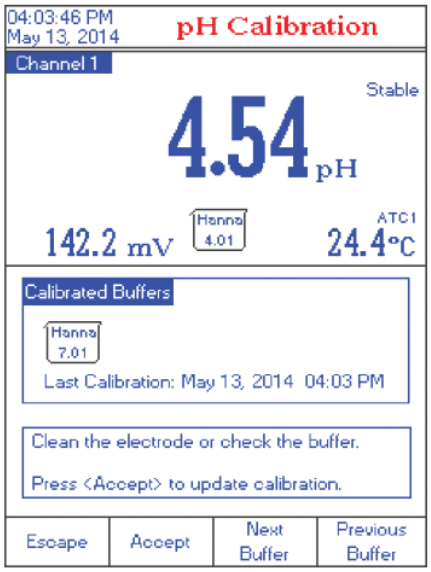
Contextual Help

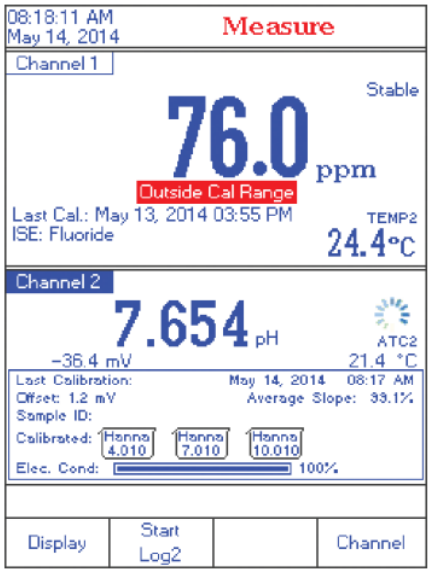
Contextual help is always available through a dedicated “HELP” key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.

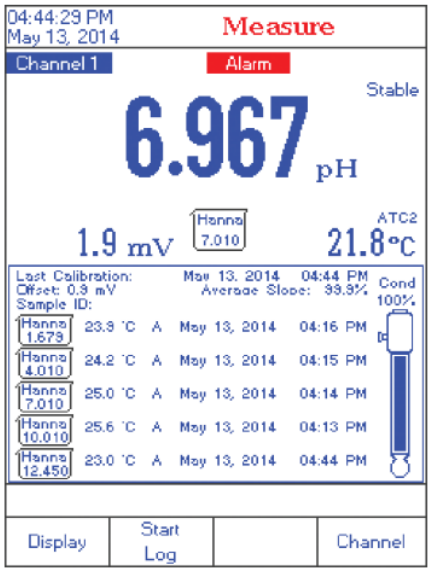
pH and EC Features

pH CAL CheckTM 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, as well as the date and time.
- To avoid taking readings with old calibrations, the instrument automatically reminds the user when the calibration has expired.







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.

ISE Features

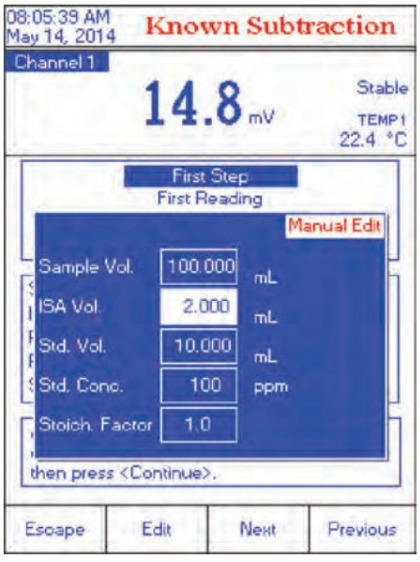
ISE Incremental Methods

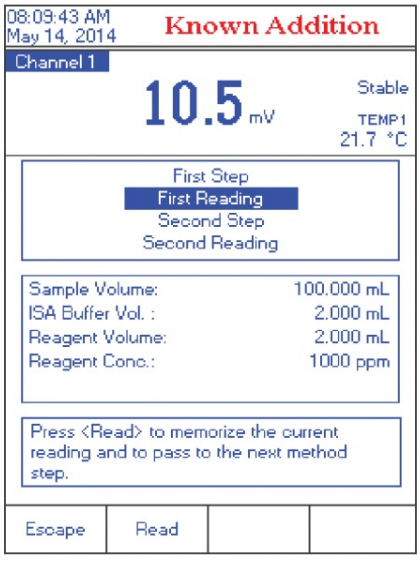
Ion concentration determinations with ISEs can be made faster and easier using the streamlined incremental methods.

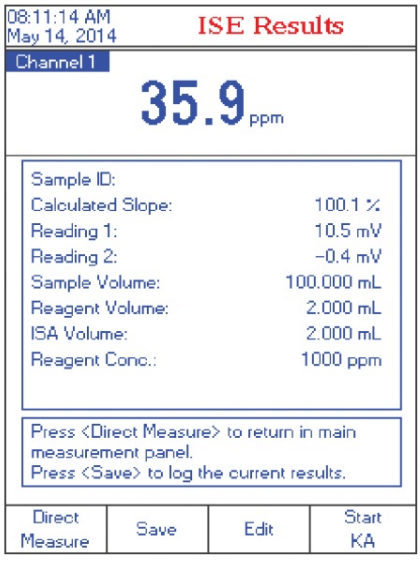
Incremental methods involve adding a standard to a sample or sample to a standard and detecting the mV change that occurs due to the addition, and this difference determines the concentration. Historically the user would use mathematical equations to determine the ion concentration of the sample; the H15522, 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 H15522.







First Step

The first step in performing an incremental method analysis is to e nter the required parameters including sample, ISA and standard volumes, as well as standard conce ntration and stoichiometric factor. When repeating the analysis on an other 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 mad e before the addition; next is the ad dition, followed by the second mV measurement.

Results

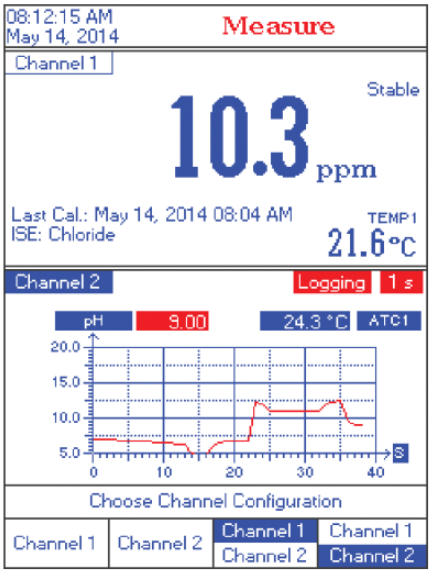
The results are automatically calcul ated and shown together with all th e parameters used.

At this time, results can be saved in to an ISE Methods Report and print ed using the HI92000 PC software.

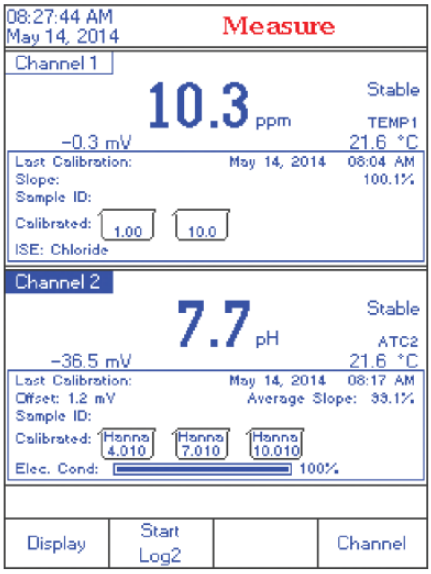
- Low Profile

  HI5522 features a low profile with an ideal viewing angle

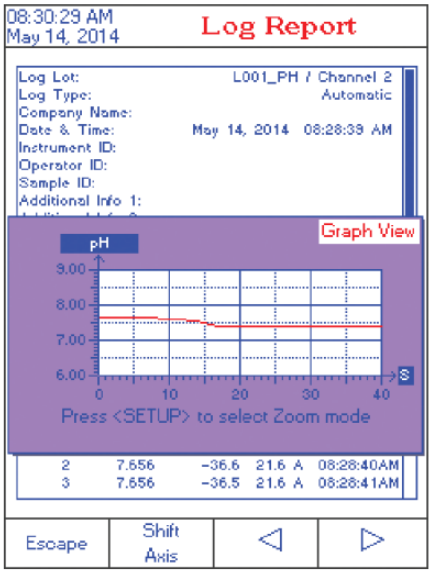
Additional Features by Screen



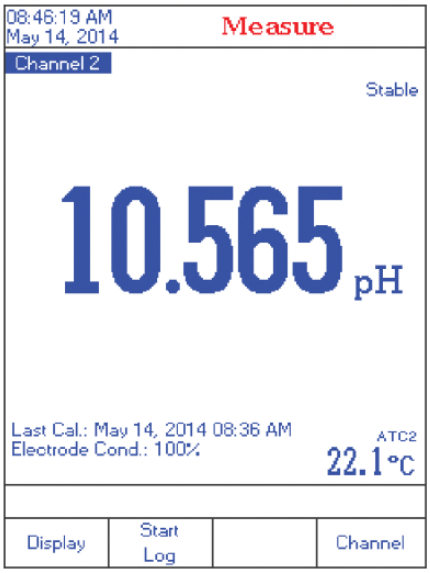
Channel Configuration



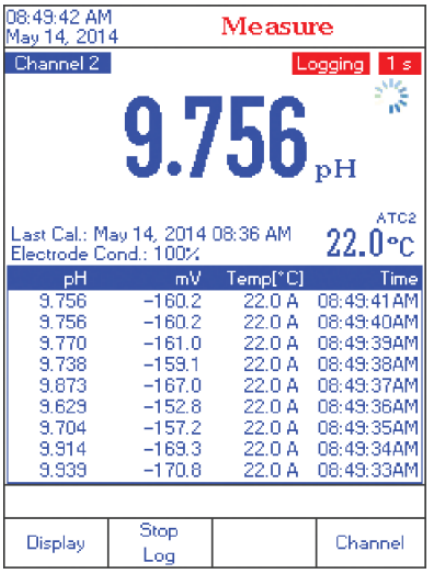
Good Laboratory Practices



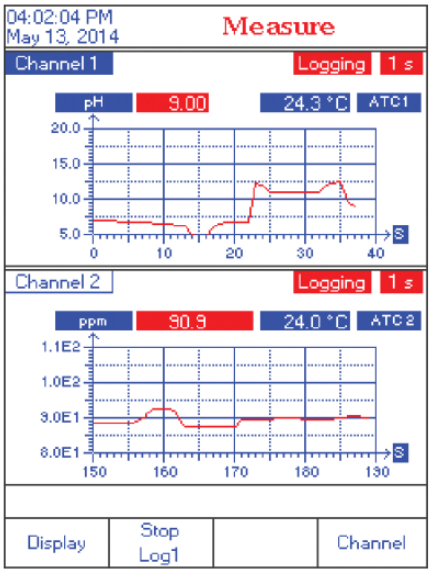
Log Recall



Basic Display



Real-Time Logging



Simultaneous Dual-Channel Graphing

Dual Channels
The two measurement channels of the 1-115522 are galvanically isolated to eliminate noise and instability. In ISE mode, this instrument provides a choice of several incremental methods. Communication is via opto-isolated USB.

Specifications		H15522
pH	Range	-2.0 to 20.0 pH; -2.00 to 20.00; -2.000 to 20.000 pH
	Resolution	0.1 pH; 0.01 pH; 0.001 pH
	Accuracy	±0.1 pH; ±0.01 pH; ±0.002 pH ±1 LSD
	Calibration	automatic, up to five-point calibration, eight standard buffers available (1 .68, 3.00,4.01, 6.86, 7.01,9.18, 10.01,12.45), and five custom buffers
	Temperature Comp ensation	automatic or manual from -20.0 to 120.0°C/-4.0 to 248.0°F/253.15 to 39 3.15K
mV	Range	±2000mV
	Resolution	0.1 mV
	Accuracy	±0.2 my ±1 LSD
ISE	Range	1 x 10-6 to 9.99 x 1010 concentration
	Resolution	1; 0.1; 0.01; 0.001 concentration
	Accuracy	±0.5% (monovalent ions); ±1% (divalent ions)
	Calibration	automatic, up to five-point calibration, seven fixed standard solutions av ailable for each measurement unit, and five 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)
	Range	0.000 to 9.999 pS/cm; 10.00 to 99.99 pS/cm;100.0 to 999.9 pS/cm; 1.00 0 to 9.999 mS/cm; 10.00 to 99.99 mS/cm; 100.0 to 1000.0 mS/cm absol ute EC*

EC	Resolution	0.001 pS/cm; 0.01 uS/cm; 0.1 pS/cm; 0.001 mS/cm; 0.01 mS/cm; 0.1 m S/cm
	Accuracy	±1% of reading (±0.01 pS/cm)
	Cell Constant	0.0500 to 200.00
	Cell Type	4-pole cell
	Calibration	automatic standard recognition, user standard single point / multi-point c alibration
	Calibration Remind er	yes
	Temperature Coeffi cient	0.00 to 10.00 %/°C
	Temperature Comp ensation	disabled, linear and non-linear (natural water)
	Reference Tempera ture	5.0 to 30.0°C
	Profiles	up to 10,5 each channel
	USP Compliant	k 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 1.0 0 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)
Resistivity	Range	1.0 to 99.9 Q•cm; 100 to 999 Q•cm; 1.00 to 9.99 kO•cm; 10.0 to 99.9 k O•cm;100 to 999 Idi•cm; 1.00 to 9.99 MO•cm;10.0 to 100.0 MO•cm
	Resolution	0.1 O•cm; 1 O•cm; 0.01 kO•cm; 0.1 kO•cm; 1 kO•cm; 0.01 MO•tm; 0.1 Mean
	Accuracy	±2% of reading (±1 tl•cm)
Salinity	Range	practical scale: 0.00 to 42.00 psu; natural sea water scale: 0.00 to 80.0 0 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); all others through EC
Additional Spe cifications	pH Electrode	HI1131B glass body pH electrode with BNC connector and 1 m (3.3′) c able (included)
	EC Probe	HI76312 platinum, four-ring EC/TDS probe with and 1 m (33′) cable (in cluded)
	Temperature Probe	HI7662-W stainless steel temperature probe with 1 in (3.3′) cable (inclu ded)
	Input Channel(s)	1 pH/ORP/ISE + 1 EC
	GLP	cell constant, reference temperature/coefficient, calibration points, cal ti me stamp, probe offset for conductivity
	Logging	record : Up to 100 lots, 50,000 records max/lot / maximum 100,000 dat a points/channel; interval: 14 selectable between 1 second and 180 mi nutes; type: automatic, manual, AutoHOLD; additional: 200 records US P; 200 records incremental methods
	PC Connection	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 3.71/1.2 kg (2.64 lbs.)
Ordering Infor mation	HI5522-01 (115V) and HI5522-02 (230V) are supplied with H111318 pH electrode, 11176312 EC/TDS probe, 1117662-W temperature probe, pH 4.01 buffer solution sachet (2), pH 7.01 buf fer solution sachet (2), pH 10.01 buffer solution sachet (2),1413pS/cm conductivity standard sachet (2), 12880 pS/cm conductivity standard sachet (2), H1700601 electrode cleaning soluti on sachet (2), HI7082 3.5M KCI electrolyte solution (30 mL), HI76404W electrode holder,12 V DC adapter, capillary dropper pipette, quality certificate, quick start guide and instruction manu al.	

Uncompensated conductivity (or TDS) is the conductivity (or TDS) value without temperature compensation.
Reduced to actual probe limits pH and ORP electrodes begin on page 2.134;

pH and ORP solutions begin on page 2.154; ISE electrodes and solutions begin on page 3.24; EL TDS and salinity solutions begin on page 5.34

www.hannainst.com

Documents / Resources

	HANNA instruments HI5522 Multiparameter with GPS [pdf] User Guide HI5522 Multiparameter with GPS, HI5522, HI5522 Multiparameter, Multiparameter with GPS, Multiparameter, GPS Multiparameter