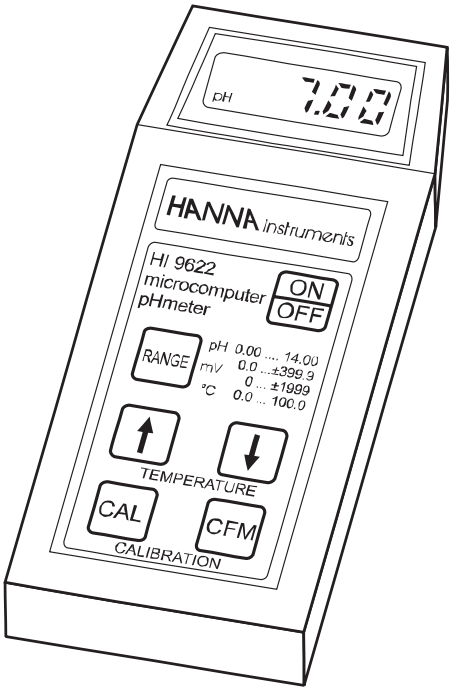
Instruction Manual

HI 8014 - HI 8314
HI 8424 - HI 8915
HI 9214 - HI 931000
HI 9622
Portable
pH Meters



HANNA instruments
Manufacturers since 1978

CE
These Instruments are in Compliance with the CE Directives

Dear Customer,

Thank you for choosing a Hanna product.

Please read this instruction manual carefully before using the meter. This manual will provide you with the necessary information for a correct use of the instrument, as well as a more precise idea of its versatility. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

These instruments are in compliance with the CE directives.

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HANNA instruments

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If noticeable damage is found, notify your Dealer or the nearest Hanna Customer Service Center.

Note: *Save all packing material until you are sure that the instrument functions correctly. Any defective item must be returned in the original packing together with the supplied accessories.*

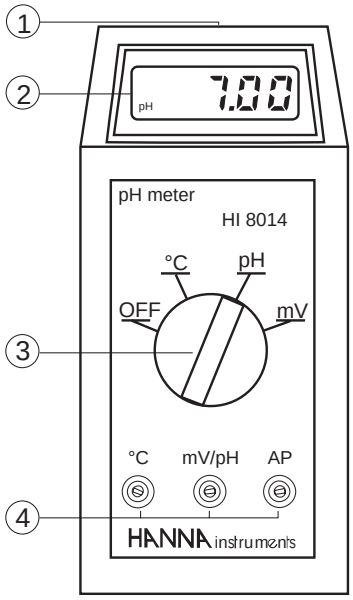
GENERAL DESCRIPTION

HI 8014, **HI 8314**, **HI 8424**, **HI 8915**, **HI 931000** *and* **HI 9622** *are hand-held pH/mV meters.* **HI 9214** *is a compact stick pH meter designed to be carried anywhere.*

Common features are: interchangeable plastic-body electrodes, simple controls on the front panel, low battery detector, large easy-to-read LCD display, simple calibration procedure and lightweight ABS plastic housing.

- **HI 8014** *is an affordable portable* **pH/mV meter**. *The pH or mV ranges are easily selected with a rotary knob. A °C range is also provided for manual temperature compensation.* **HI 8014** *comes supplied with:* **HI 1332B** *combination, double-junction, refillable pH electrode, a 9V battery and a calibration screwdriver.*
- **HI 8314** *is a* **pH/mV/°C meter** *designed for simplicity of use in taking pH, mV (ORP) and temperature measurements. The pH, mV and °C ranges are easily selected through a membrane keyboard on the front panel. Temperature compensation of pH is automatic when the temperature probe is connected and calibration adjustments are easily made with two trimmers on the front panel.* **HI 8314** *comes supplied with:* **HI 1230B** *combination, double-junction, gel pH electrode,* **HI 7669AW** *temperature probe, a 9V battery and a calibration screwdriver.*
- **HI 8424** *is a portable microprocessor-based* **pH/mV/°C meter**. *It features a user-friendly membrane keyboard, automatic calibration and error codes to guide the user in calibration and troubleshooting. The meter has three memorized buffer values: pH 4.01, 7.01 and 10.01. It can also be used for ISE and ORP measurements with automatic range switching when readings exceed ±399.9 mV.* **HI 8424** *comes supplied with:* **HI 1230B** *combination, double-junction, gel pH electrode,* **HI 7669AW** *temperature probe and a 9V battery.*
- **HI 8915** *is a portable* **pH/mV/°C meter** *that combines accurate pH measurements with a recorder output capability and automatic temperature compensation. Two recorder output terminals make it possible to attach a plotter or recorder directly to the meter for a hard copy of the measurements. Pressing the HOLD key will freeze the reading on the display. Calibration is performed using the two trimmers on the front panel.* **HI 8915** *comes supplied with:* **HI 1230B** *combination, double-junction, gel pH electrode,* **HI 7669AW** *temperature probe, a 9V battery and a calibration screwdriver.*
- **HI 9214** *is a compact microprocessor-based* **pH/°C meter**. *The electrode has a built-in temperature sensor for quick and accurate temperature measurements and temperature compensation. The meter has three memorized buffer values (pH 4.01, 7.01, and 10.01) and automatic buffer recognition to avoid errors during calibration.* **HI 9214** *comes supplied with:* **HI 1217S** *screw-type combination gel pH/°C electrode, a 9V battery and* **HI 710003** *soft carrying case.*
- **HI 931000** *is a compact, microprocessor-based* **pH/°C meter** *with a 4-in-1 pH electrode (pH/°C electrode with built-in temperature sensor and signal amplifier). Optional shockproof rubberboots are also available to prolong the life of the meter and to prevent damage (see page 51).* **HI 931000** *comes supplied with:* **HI 1217D** *combination gel pH/°C electrode, with a built-in temperature sensor and signal amplifier, a 9V battery and* **HI 710004** *soft carrying case.*
- **HI 9622** *is a portable microprocessor-based* **pH/mV/°C meter** *which meets the* **GLP** *(Good Laboratory Practice) requirements and memorizes the last calibration date. The meter has three memorized buffer values: pH 4.01, 7.01 and 10.01. The meter can also be used for ISE and ORP measurements with automatic range switching when readings exceed ±399.9 mV.* **HI 9622** *comes supplied with:* **HI 1230B** *combination, double-junction, gel pH electrode,* **HI 7669/2W** *temperature probe and a 9V battery.*

FUNCTIONAL DESCRIPTION HI 8014

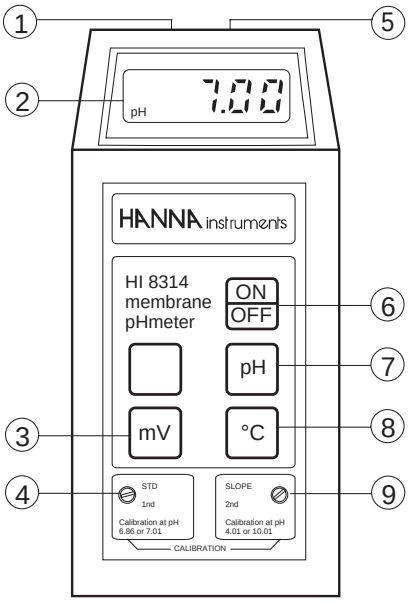


1) *BNC socket for combination pH electrodes.*
2) *Liquid Crystal Display (LCD).*
3) Rotary Knob *with the following selectable positions:*
   - **OFF** *To switch the meter off (in any other position the instrument is on).*
   - **°C** *To display the manual temperature setting (through □C trimmer).*
   - **pH** *To display the pH value.*
   - **mV** *To display the mV (ORP) readings when using an ORP electrode or the mV equivalent to the pH values when using a pH electrode.*
4) Trimmers:
   - **°C** *To set temperature manually.*
   - **mV/pH** *For SLOPE calibration of pH.*
   - **AP** *For OFFSET calibration of pH.*

SPECIFICATIONS HI 8014

		HI 8014
Range	pH	*0.00 to 14.00*
	mV	*0 to ±1999*
Resolution	pH	*0.01*
mV	*1*	
Accuracy	pH	*±0.01*
(@20°C/68°F)	mV	*±1*
Typical EMC	pH	*±0.05*
Deviation	mV	*±8*
pH Calibration		*Manual 2 point through offset and slope trimmers*
Offset Calibration		*±1 pH*
Slope Calibration		*from 85 to 105%*
Temperature Compensation		*Manual from 0 to 100□C (32 to 212□F)*
Electrode		HI 1332B *combination, double-junction, refillable pH electrode with BNC connector and 1 m (3.3') cable* (included)
Input Impedance		*10^{12} ohm*
Battery Type		*1 x 9 volt*
Life		*100 hours of continuous use*
Environment		*0 to 50□C (32 to 122□F); max 95% RH non-condensing*
Dimensions		*185 x 82 x 45 mm (7.3 x 3.2 x 1.8")*
Weight		*520 g (1.1 lb.)*

FUNCTIONAL DESCRIPTION HI 8314

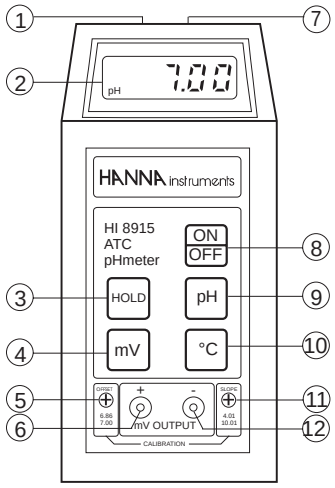


1) *BNC socket for combination pH or ORP electrodes.*
2) *Liquid Crystal Display (LCD).*
3) **mV** *to display the mV (ORP) readings when using an ORP electrode; or the mV equivalent to pH values when using a pH electrode.*
4) **STD** *trimmer for OFFSET calibration of pH.*
5) *Phono plug socket for HI 7669AW temperature probe.*
6) **ON/OFF** *to switch the instrument on or off.*
7) **pH** *to display the pH value.*
8) **°C** *to display the temperature measurement (when the temperature probe is disconnected, the LCD will show 25□C).*
9) **SLOPE** *trimmer for SLOPE calibration of pH.*

SPECIFICATIONS HI 8314

		HI 8314
Range	pH	*0.00 to 14.00*
	mV	*0 to ±1999*
	°C	*0.0 to 100.0*
Resolution	pH	*0.01*
mV	*1*	
°C	*0.1*	
Accuracy	pH	*±0.01*
(@20°C/68°F)	mV	*±1*
°C	*±0.4*	
Typical EMC	pH	*±0.05*
Deviation	mV	*±5*
°C	*±1*	
pH Calibration		*Manual 2 point through offset and slope trimmers*
Offset Calibration		*±1 pH*
Slope Calibration		*from 85 to 105%*
Temperature Compensation		*Automatic from 0 to 70□C (32 to 158□F) or fixed at 25□C (77□F) with temperature probe detached*
Electrode		**HI 1230B** *combination, double-junction, gel-filled pH electrode with BNC connector and 1 m (3.3') cable* **(included)**
Temperature Probe		**HI 7669AW** *(included)*
Input Impedance		*10^{12} ohm*
Battery Type		*1 x 9 volt*
Life		*100 hours of continuous use*
Environment		*0 to 50□C (32 to 122□F); max 95% RH non-condensing*
Dimensions		*185 x 82 x 45 mm (7.3 x 3.2 x 1.8")*
Weight		*570 g (1.3 lb.)*

FUNCTIONAL DESCRIPTION HI 8915

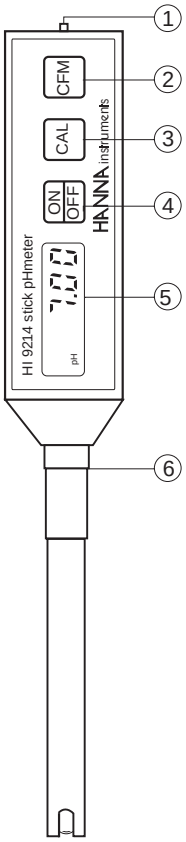


1) *BNC socket for combination pH or ORP electrodes.*
2) *Liquid Crystal Dysplay (LCD).*
3) **HOLD** *to freeze the reading on the display.*
4) **mV** *to display the mV (ORP) readings when using an ORP electrode; or the mV equivalent to the pH values when using a pH electrode.*
5) **OFFSET** *trimmer for OFFSET calibration of pH*
6) *+ recorder output (mV output, positive connection).*
7) *Phono plug socket for HI 7669AW temperature probe.*
8) **ON/OFF** *to switch the instrument on or off.*
9) **pH** *to display the pH value.*
10) **°C** *to display the temperature measurement (when the temperature probe is disconnected, the LCD will show 25□C).*
11) **SLOPE** *trimmer for SLOPE calibration of pH.*
12) *- recorder output (mV output, negative connection).*

SPECIFICATIONS HI 8915

		HI 8915
Range	pH	*0.00 to 14.00*
	mV	*0 to ±1999*
	°C	*0.0 to 100.0*
Resolution	pH	*0.01*
mV	*1*	
°C	*0.1*	
Accuracy	pH	*±0.01*
(@20°C/68°F)	mV	*±1*
°C	*±0.5*	
Typical EMC	pH	*±0.02*
Deviation	mV	*±1*
°C	*±0.8*	
pH Calibration		*Manual 2 point through*
offset and slope trimmers		
Offset Calibration		*±1 pH*
Slope Calibration		*from 85 to 105%*
Temperature		*Automatic from 0 to 70□C (32 to*
*158□F)*Compensation		*or fixed at*
25□C (77□F)		*with temperature*
probe detached		
Electrode		HI 1230B *combination, double-junction,*
		gel-filled pH electrode with BNC connector
		and 1 m (3.3') cable (included)
Temperature		HI 7669AW (included)
Probe		
Input Impedance		*10^{12} ohm*
Recorder Output		*100 mV/pH*
		1mV/mV
		10mV/□C
Battery Type		*1 x 9 volt*
Life		*100 hours of continuous use*
Environment		*0 to 50□C (32 to 122□F);*
max 95% RH non-condensing		
Dimensions		*185 x 82 x 45 mm*
		(7.3 x 3.2 x 1.8")
Weight		*570 g (1.3 lb.)*

FUNCTIONAL DESCRIPTION HI 9214

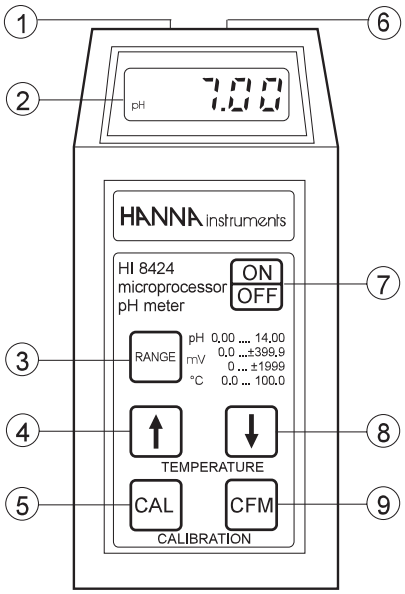


1) □C *button, located on the top of the meter, to display temperature measurements.*
2) **CFM** *to confirm calibration values.*
3) **CAL** *to enter calibration mode or to select buffer.*
4) **ON/OFF** *to switch the instrument on or off.*
5) *Liquid Crystal Display (LCD).*
6) *Screw-type socket for combination pH electrode with built-in temperature sensor.*

SPECIFICATIONS HI 9214

		HI 9214
Range	pH	*0.00 to 14.00*
	°C	*0.0 to 70.0*
Resolution	pH	*0.01*
°C	*0.1*	
Accuracy	pH	*±0.02*
(@20°C/68°F)	°C	*±0.5*
Typical EMC	pH	*±0.08*
Deviation	°C	*±1*
pH Calibration		*Automatic 2 point with 3 memorized standard buffers (pH 7.01, 4.01 or 10.01)*
Offset Calibration		*±1 pH*
Slope Calibration		*from 85 to 105%*
Temperature Compensation		*Automatic from 0 to 70□C (32 to 158□F)*
Electrode *pH/□C (*included*)*		HI 1217S *gel combination*
Input Impedance		*10^{12} ohm*
Battery Type		*1 x 9 volt*
Life		*100 hours of continuous use Auto-off after 8 minutes of non-use*
Environment *max 95% RH non-condensing*		*0 to 50□C (32 to 122□F);*
Dimensions		*185 x 42 x 26 mm (7.3 x 1.6 x 1.0")*
Weight		*350 g (12.3 oz.)*

FUNCTIONAL DESCRIPTION HI 8424

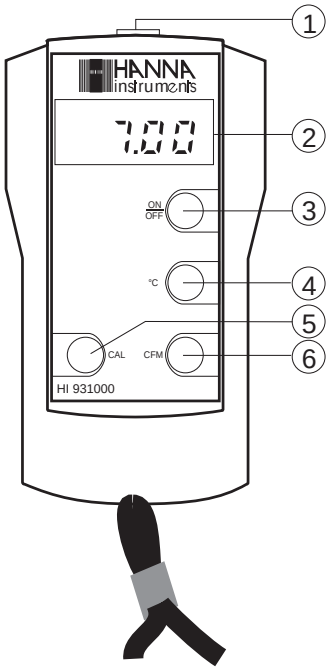


1) *BNC socket for combination pH or ORP electrodes.*
2) *Liquid Crystal display (LCD).*
3) **RANGE** *to select the pH, □C or mV range.*
4) **UP arrow** *to set temperature manually when temperature probe is disconnected.*
5) **CAL** *to enter calibration mode.*
6) *Phono plug socket for temperature probe HI 7669AW.*
7) **ON/OFF** *to switch the instrument on or off.*
8) **DOWN arrow** *to set temperature manually when temperature probe is disconnected.*
9) **CFM** *to confirm calibration data.*

SPECIFICATIONS HI 8424

		HI 8424	
Range	pH	*0.00 to 14.00*	
	ISE	*0.0 to ±399.9 mV*	
	ORP	*±400 to ±1999 mV*	
	°C	*0.0 to 100.0*	
Resolution	pH	*0.01*	
ISE	*0.1mV*		ORP
1mV		°C	*0.1*
Accuracy	pH	*±0.01*	
(@20°C/68°F)	ISE	*±0.2mV*	
	ORP	*±1mV*	
	°C	*±0.4*	
Typical EMC	pH	*±0.02*	
Deviation	ISE	*±0.2*	
ORP	*±1*		°C
±0.4			
pH Calibration		*Automatic 2 point with 3 memorized standard buffers (pH 7.01, 4.01 or 10.01)*	
Offset Calibration		*±1.0 pH*	
Slope Calibration		*from 70 to 108%*	
Temperature Compensation		*Automatic from 0 to 100□C (32 to 212□F) or manual without temperature probe*	
Electrode		**HI 1230B** *combination, double-junction, gel pH electrode with BNC connector and 1 m (3.3') cable* (**included**)	
Temperature Probe		**HI 7669AW** (**included**)	
Input Impedance		*10^{12} ohm*	
Battery Type		*1 x 9 volt*	
Life		*100 hours of continuous use*	
Environment		*0 to 50□C (32 to 122□F); max 95% RH non-condensing*	
Dimensions		*185 x 82 x 45 mm (7.3 x 3.2 x 1.8")*	
Weight		*520 g (1.1 lb.)*	

FUNCTIONAL DESCRIPTION HI 931000

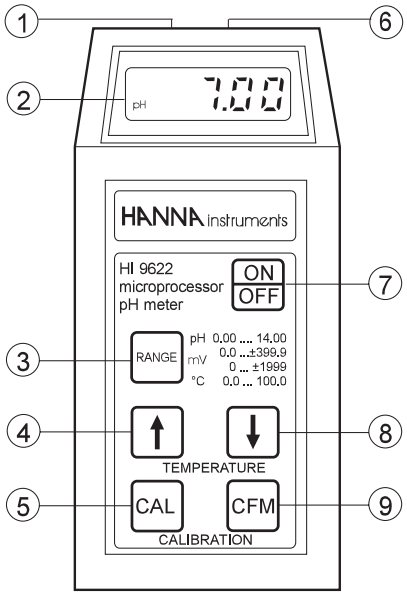


1) *DIN socket for combination pH/□C electrode.*
2) *Liquid Crystal Display (LCD).*
3) **ON/OFF** *to switch the instrument on or off.*
4) **°C** *to display the measured temperature (press and hold).*
5) **CAL** *to enter calibration mode.*
6) **CFM** *to confirm calibration data.*

SPECIFICATIONS HI 931000

		HI 931000
Range	pH	*0.00 to 14.00*
	°C	*0.0 to 70.0*
Resolution	pH	*0.01*
°C	*0.1*	
Accuracy	pH	*±0.01*
(@20°C/68°F)	°C	*±0.5*
Typical EMC	pH	*±0.30*
Deviation	°C	*±1*
pH Calibration		*Automatic 2 point with 3 memorized standard buffers (pH 7.01, 4.01, 10.01)*
Temperature Compensation		*Automatic from 0 to 70□C (32 to 158□F)*
Electrode		**HI 1217D** *combination 4-in-1 gel pH electrode with built-in temperature sensor and amplifier* **(included)**
Battery Type		*1 x 9 volt*
Life		*300 hours of continuous use Auto-off after 8 minutes of non-use*
Environment		*0 to 50□C (32 to 122□F); max 95% RH non-condensing*
Dimensions		*143 x 80 x 38 mm (5.6 x 3.2 x 1.5")*
Weight		*360 g (12.7 oz.)*

FUNCTIONAL DESCRIPTION HI 9622



1) *BNC socket for combination pH or ORP electrode.*
2) *Liquid Crystal display (LCD).*
3) **RANGE** *to select the pH, □C or mV range.*
4) **UP arrow** *to set the month and day for calibration data recall and the temperature for manual compensation (when temperature probe is disconnected).*
5) **CAL** *to enter calibration mode.*
6) *Socket for temperature probe HI 7669/2W.*
7) **ON/OFF** *to switch the instrument on or off.*
8) **DOWN arrow** *to set the month and day for calibration data recall and the temperature for manual compensation (when temperature probe is disconnected).*
9) **CFM** *to confirm calibration data.*

SPECIFICATIONS HI 9622

		HI 9622
Range	pH	*0.00 to 14.00*
	ISE	*0.0 to ±399.9 mV*
	ORP	*±400 to ±1999 mV*
	°C	*0.0 to 100.0*
Resolution	pH	*0.01*
ISE	*0.1mV*	ORP
1mV		°C *0.1*
Accuracy	pH	*±0.01*
(@20°C/68°F)	ISE	*±0.2mV*
	ORP	*±1mV*
	°C	*±0.4*
Typical EMC	pH	*±0.01*
Deviation	ISE	*±0.2mV*
	ORP	*±1mV*
	°C	*±0.5*
pH Calibration		*Automatic 2 point with 3 memorized standard buffers (pH 7.01, 4.01 or 10.01)*
Offset Calibration		*±1.0 pH*
Slope Calibration		*from 70 to 108%*
Temperature Compensation		*Automatic from 0 to 100□C (32 to 212□F) or manual without temperature probe*
Electrode		**HI 1230B** *combination gel pH electrode*
Temperature Probe		*BNC and 1 m (3.3') cable* (**included**) **HI 7669/2W** (**included**)
Input Impedance		*10^{12} ohm*
Battery Type		*1 x 9 volt*
Life		*100 hours of continuous use*
Environment		*0 to 50□C (32 to 122□F); max 95% RH non-condensing*
Dimensions		*185 x 82 x 45 mm (7.3 x 3.2 x 1.8")*
Weight		*520 g (1.1 lb.)*

OPERATIONAL GUIDE

INITIAL PREPARATION

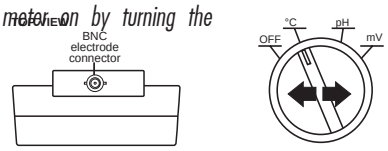
Each meter is supplied complete with a 9V battery. Slide off the battery compartment cover on the back of the meter (see page 43), install the battery while paying attention to its polarity.

Always remove the electrode protective cap before taking any measurements. If the electrode has been left dry, soak the tip (bottom 4 cm/1½") in a pH 7 or pH 4 buffer solution for a few hours or overnight to reactivate it.

For HI 8014:

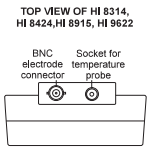
Connect the pH electrode to the BNC socket on the top of the meter.

Turn the meter on by turning the rotary knob to the °C, pH or mV position.



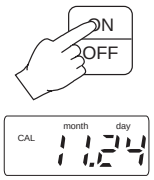
For HI 8314, HI 8915, HI 8424 and HI 9622:

Connect the pH electrode to the BNC socket on the top of the instrument. Connect the temperature probe to the other socket. The temperature probe can be used independently to take temperature measurements, or it can be used in conjunction with the pH electrode to utilize the meter's ATC capability. With HI 8424 *and* HI 9622*, when the probe is disconnected, temperature can also be set manually (see page 22).*



Turn the meter on by pressing ON/OFF.

With HI 9622*, the display will show the previous calibration date (month & date) for 3 seconds.*



For HI 9214:

Connect the pH electrode to the screw connector on the meter. Be sure that the electrode and the meter connections are clean and dry to ensure a positive contact. Turn the meter on pressing ON/OFF.

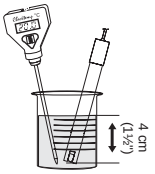
For HI 931000:

Attach the pH/°C electrode to the DIN socket on the top of the meter, tighten the retainer ring and turn the meter on by pressing ON/OFF.

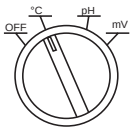
TAKING pH MEASUREMENTS

For HI 8014:

To take a pH measurement simply submerge the tip (4cm/1½") of the electrode and a ChecktempC (or an accurate thermometer) in the sample to be tested.

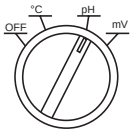


Turn the rotary knob to the °C position to display temperature setting on the LCD.



Using the provided screwdriver, turn the temperature trimmer to display the temperature measured by ChecktempC (or an accurate thermometer), e.g. 25°C..

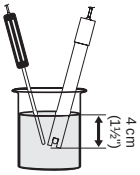
Turn the rotary knob to the pH position to display the pH measurement.



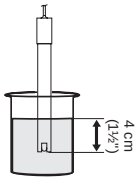
Shake the electrode briefly and allow a couple of minutes for the electrode to adjust and stabilize. The display will show the pH value compensated for the manually adjusted temperature.

For HI 8314, HI 8424, HI 8915 and HI 9622:

To take a pH measurement simply submerge the tip (4cm/1½") of the electrode and the temperature probe in the sample to be tested.



<u>For HI 9214 and HI 931000:</u> *Simply submerge the tip (4cm/1½") of the combination pH/temperature electrode in the sample.*



*Turn the instrument ON. Select the pH mode (*HI 8314 *and* HI 8915 *only) or press the RANGE key until the display changes to pH (*HI 8424 *and* HI 9622 *only).*

Shake the electrode briefly and allow a couple of minutes for the reading to stabilize. The display will show the pH value compensated for temperature.

<u>For HI 9214 and HI 931000:</u>

After submerging the electrode in the sample, wait until the stability indicator "Δ" stops blinking. The pH readout is also temperature compensated.

In order to take accurate pH measurements, make sure that the instrument is calibrated for pH before use (see page 25).

For a faster response time when using refillable electrodes*, unscrew the refill hole cap.*

If measurements are taken in different samples successively, it is recommended to rinse clean the electrode thoroughly in between samples to eliminate cross-contamination. After cleaning, rinse the electrode with some of the sample to be measured.

TEMPERATURE COMPENSATION

The pH reading is directly affected by temperature. In order for the meter to measure the pH accurately temperature must be taken into consideration.

HI 9214 *and* HI 931000 *use an electrode with a built-in temperature sensor and therefore no additional temperature probe is needed.*

To use the Automatic Temperature Compensation feature of HI 8314*,* HI 8424*,* HI 8915 *and* HI 9622*, submerge the temperature probe into the sample as close to the electrode as possible and wait for a couple of minutes. The displayed pH reading is compensated for the temperature variance.*

If you know the temperature of the sample you can also manually

compensate for it (HI 8424 and HI 9622 only). In this case, the temperature probe must be disconnected. HI 8014 provides only for manual compensation.

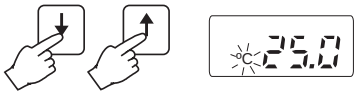
With HI 8314 *and* HI 8915 *when the temperature probe is disconnected, the pH reading will be compensated at 25□C. If a different compensation is required, reattach the probe.*

MANUAL TEMPERATURE COMPENSATION FOR HI 8424 & HI 9622

If the temperature probe is out if order or if temperature is to be set manually, unplug the probe *and record the temperature of the sample with a ChecktempC or an accurate thermometer.*

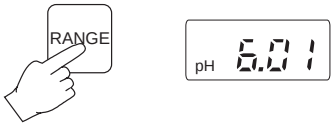
- *Press RANGE to select temperature mode. The "□C" symbol will blink to indicate that the temperature probe is not connected.*

- *Press the UP and DOWN arrow keys to display and set the*



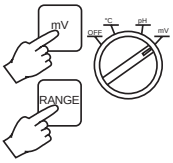
sample temperature (e.g. 25.0□C).

- *Press RANGE to select the pH measurement mode and immerse the pH electrode into the solution. The displayed pH reading will be temperature compensated (in this case at 25□C).*



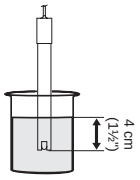
ORP MEASUREMENTS (HI 8014, HI 8314, HI 8424, HI 8915 AND HI 9622)

Connect an ORP electrode to the BNC socket on the top of the meter.



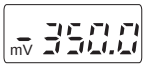
*To enter the "mV" mode (ORP Oxidation Reduction Potential) turn the instrument ON and select the mV mode (*HI 8014, HI 8314 and HI 8915*) or press the RANGE key until the display changes to mV (*HI 8424 and HI 9622*).*

To measure the mV of a sample submerge the ORP electrode tip (4 cm/1½") in the sample to be tested.



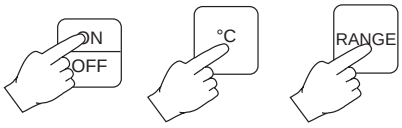
Allow a few minutes for the readings to stabilize. Also, see page 42 for more information about REDOX measurements.

Note (for HI 8424 and HI 9622): *the resolution is 0.1 mV for values within the ±400mV range.*



TAKING TEMPERATURE MEASUREMENTS (EXCEPT HI 8014)

Turn the instrument ON and press □C *(***HI 8314 and HI 8915**) **or RANGE** *(***HI 8424** *and* **HI 9622***).*

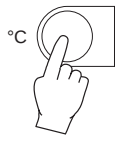


Make sure the temperature probe (for **HI 8314**, **HI 8915**, **HI 8424** *and* **HI 9622***) or pH/*□C *electrode (for* **HI 9214** *and* **HI 931000***) is connected to the meter.*

Dip the temperature probe or the pH/□C *electrode into the sample and allow the reading to stabilize (a couple of minutes).*

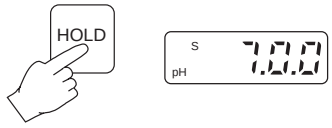
For **HI 9214***: To display the measured temperature, press and hold the* □C *button on the top of the meter. When the button is released, the display will return to the pH reading.*

For **HI 931000***: To display the measured temperature, press and hold the* □C *key. When the key is released, the display will return to the pH reading.*



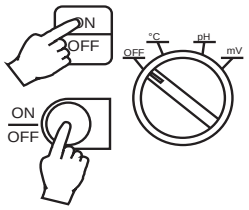
HOLD FUNCTION (HI 8915 ONLY)

The hold function is activated by the HOLD key. The measured value is frozen on the display when this key is pressed. "S" symbol will appear on the display to indicate the holding (storage) mode. Press the HOLD key again to return to regular operational mode.



AFTER MEASUREMENTS

After measurements switch the instrument off to save the battery. For **HI 9214***: when not in use, disconnect the electrode from the meter and cover the threaded connector with the supplied protective cap.*



pH CALIBRATION

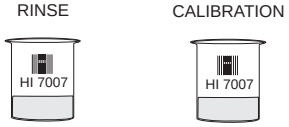
For best accuracy, frequent calibration of the instrument is recommended. The instrument should be recalibrated for pH:

a) Whenever the pH electrode or temperature probe is replaced.
b) At least once a month.
c) After testing aggressive chemicals.
d) Whenever the battery has been replaced.
e) Where greater accuracy is required.

PREPARATION

Pour small quantities of pH 7.01 (HI 7007 or HI 8007) and pH 4.01 (HI 7004 or HI 8004) solution into two clean beakers.

For accurate calibration use two beakers for each buffer solution, the first one for rinsing the tip of the electrode, the second one for calibration. This way, contamination of the buffers is minimized.

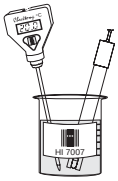


To obtain accurate readings, use pH 7.01 (HI 7007 or HI 8007) and pH 4.01 (HI 7004 or HI 8004) if you are going to measure acidic samples or pH 7.01 (HI 7007 or HI 8007) and pH 10.01 (HI 7010 or HI 8010) for alkaline measurements.

If you need to calibrate **HI 8014, HI 8314 and HI 8915** *to NBS standards, use pH 6.86 (HI 7006 or HI 8006) instead of pH 7.01 and pH 9.18 (HI 7009 or HI 8009) instead of pH 10.01.*

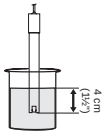
PROCEDURE FOR HI 8014

- *Remove the protective cap from the electrode, rinse and immerse it in pH 7.01 buffer and stir gently. Wait a couple of minutes for the reading to stabilize.*

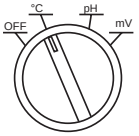


Note: *the electrode should be submerged approximately 4 cm (1½") into the solution. A ChecktempC should be located close to the pH electrode.*

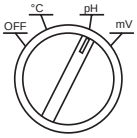
· *Take the temperature of the buffer solution with a ChecktempC (or an accurate ther*



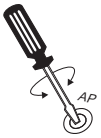
mometer), e.g. 20□C.



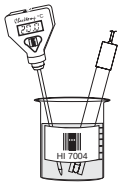
· *Set the rotary knob to □C to display the manual temperature setting.*
· *Adjust the □C trimmer until the LCD shows the measured temperature*



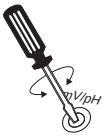
· *Set the rotary knob to pH to display pH measurement and wait for the reading to stabilize.*
· *Adjust the AP trimmer with a small screwdriver until the LCD shows the pH value at the above temperature (see the pH versus temperature chart on page 35).*

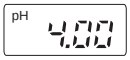


• *Rinse and immerse the pH electrode in pH 4.01 or pH 10.01 buffer (2nd calibration point) and stir gently.*



· *Wait a couple of minutes and adjust the mV/pH trimmer until the LCD shows the pH value at the noted temperature (see page 35 for pH versus temperature chart).*



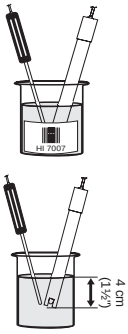


The pH calibration is now complete.

PROCEDURE FOR HI 8314 & HI 8915

· *Switch the meter on after connecting the pH electrode and the temperature probe.*

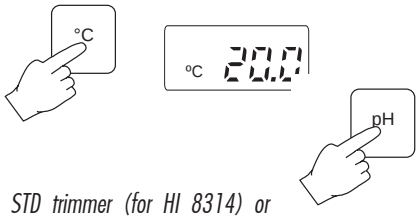
· *Remove the protective cap from the electrode, rinse the tip of the electrode with some pH 7.01 solution, then immerse the pH electrode and temperature probe in a pH 7.01 buffer solution. Stir gently and wait a couple of minutes for thermal equilibrium.*



Note: *the electrode should be submerged approximately 4 cm (1½") into the solution. The temperature probe should be located close to the pH electrode.*

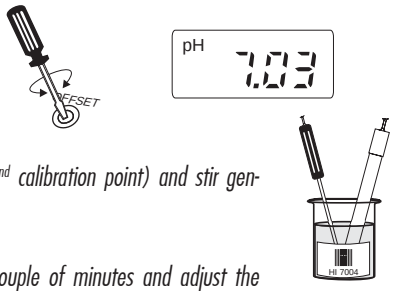
· *Press C to display the temperature of the buffer (e.g. 20.0 C).*

· *Press the pH key to read pH values. Stir gently and wait for a couple of minutes.*

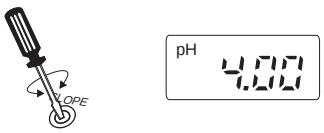


· *Adjust the STD trimmer (for HI 8314) or OFFSET trimmer (for HI 8915) on the lower left of the front panel until LCD shows the pH value at the noted temperature (see the pH versus temperature chart on page 35).*

• *Rinse and immerse the pH electrode in pH 4.01 or pH 10.01 buffer (2nd calibration point) and stir gently.*



· *Wait a couple of minutes and adjust the SLOPE trimmer on the lower right of the front panel until the LCD shows the pH value at the noted temperature.*



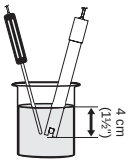
The pH calibration is now complete.

PROCEDURE FOR HI 8424

· *Switch the meter on after connecting the pH electrode and the temperature probe.*

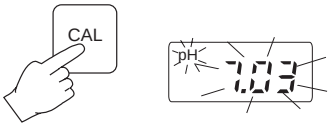
· *Remove the protective cap from the electrode, rinse the tip of the electrode with some pH 7.01 solution, then immerse the pH electrode and temperature probe into a pH 7.01 buffer solution. Stir gently and wait a couple of minutes for thermal equilibrium.*

Note: *The electrode should be submerged approximately 4 cm (1½") in the solution. The temperature probe should be close to the pH electrode.*

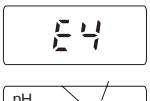


• *Press RANGE to display pH measurement.*

· *Press CAL. A temperature compensated buffer value together with the pH symbol will be displayed, e.g. if the temperature is 25°C, the display will show "pH 7.01". If the buffer temperature is 20°C, the display will show "pH 7.03" (see page 35).*

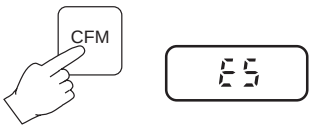


If "E4" appears, the calibration solution is wrong or is out of specifications and needs to be replaced.



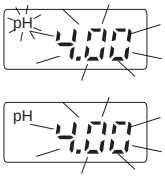
· *Wait until the "pH" symbol stops flashing which means that the reading is stable.*

• *Press CFM. The symbol "E5" will appear to indicate that offset calibration is complete but the electrode is still in pH 7.01 buffer, and the meter expects a pH 4.01 or 10.01 buffer.*



- *Rinse the electrode and temperature probe before immersing them into pH 4.01 or pH 10.01 calibration buffer. Stir gently and wait for thermal equilibrium.*

- *The symbol "E5" should disappear and a temperature compensated buffer value starts blinking.*
- *Wait until the pH symbol stops flashing.*



- *Press CFM to confirm the calibration.*

The instrument is now calibrated and will remain calibrated even when it is turned off.

Note: *The meter will lose the calibration if the battery is removed.*

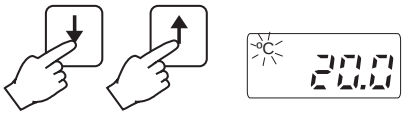
If for some reason the temperature probe is out of order, or a <u>manual temperature compensation</u> *is required, follow the procedure below:*

- *Make sure the temperature probe is detached.*
- *Press RANGE to select the temperature mode.*

- *Place the pH electrode into the pH 7.01 buffer and shake it briefly. Wait a couple of minutes for thermal equilibrium.*

- *Note the temperature of the buffer with a ChecktempC (or an accurate thermometer), e.g. 20.0□C.*

- *Use the UP and DOWN arrow keys to adjust the temperature manually to the above value.*
- *Follow the calibration procedure on the previous page.*



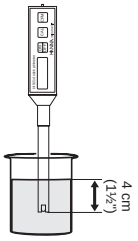
PROCEDURE FOR HI 9214:

- *Turn the meter on.*

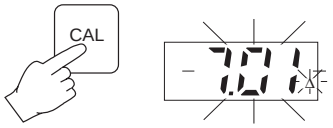
Note: *The stability indicator "Δ" blinks when the electrode is not immersed in the solution.*

- *Remove the protective cap from the pH/C electrode. Rinse the tip of the electrode with some pH 7.01 solution, then immerse it in a pH 7.01 buffer solution. Stir gently and wait a couple of minutes for the reading to stabilize.*

Note: *The electrode should be submerged approximately 4 cm (1½") in the solution.*



- *Press CAL. The display will flash "7.01 Δ".*



- *Wait until the stability indicator "Δ" stops flashing.*

- *Press CFM to confirm the first buffer solution.*

- *If the ON/OFF key is pressed at this point, the calibration process will end with only the offset (one-point) calibration. For best accuracy, however, it is recommended that two-point calibration is performed.*
- *The LCD will now flash "4.01 Δ". If the CAL key is pressed, the slope calibration will change to "10.01 Δ".*

- *Rinse the pH electrode with some pH 4.01 or 10.01 buffer solution (2nd calibration point).*
- *Dip the electrode into the pH 4.01 (or pH 10.01) buffer solution.*

- *Stir gently and wait until the stability indicator "Δ" stops flashing.*

- *Press CFM to confirm the acceptance of the second buffer solution.*

pH calibration is now complete and the meter returns to the measurement mode.

PROCEDURE FOR HI 931000

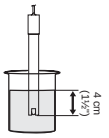
- *Turn the meter on.*

Note: *The stability indicator "Δ" blinks when the electrode reading is unstable.*

- *Press CAL and the display will flash "7.01 Δ".*
- *Remove the protective cap from the electrode, rinse the tip of the electrode with*

some pH 7.01 solution, then immerse it in a pH 7.01 buffer solution. Stir gently and wait a couple of minutes for thermal equilibrium.

Note: *The electrode should be submerged approximately 4 cm (1½") in the solution.*



- *When electrode has stabilized, the stability indicator "Δ" stops flashing.*

- *Press CFM to confirm the first buffer solution.*

- *If the ON/OFF key is pressed at this point, the calibration process will end with only the offset (one-point) calibration. For best accuracy, however, it is recommended that a two-point calibration is performed.*
- *The LCD will now blink "4.01 Δ". pH 10.01 can be selected by pressing the CAL key.*

- *Rinse with pH 4.01 (or pH 10.01) buffer solution (2nd calibration point).*

- *Dip the electrode into a pH 4.01 (or pH 10.01) buffer solution.*
- *Stir gently and wait until the stability indicator "Δ" stops flashing.*

- *Press CFM to confirm the second buffer solution.*

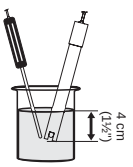
The meter is now calibrated and will return to operational mode.

PROCEDURE FOR HI 9622

- *Switch the meter on after connecting the pH electrode and the temperature probe and the meter will display the previous calibration date (month & day) for 3 seconds.*
- *Remove the protective cap from the electrode, rinse the tip of*

the electrode with some pH 7.01 solution, then immerse the pH electrode and temperature probe in the pH 7.01 buffer solution. Stir gently and wait a couple of minutes for thermal equilibrium.

Note: *The electrode should be submerged approximately 4 cm (1½") in the solution. The temperature probe should be close to the pH electrode.*

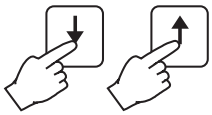


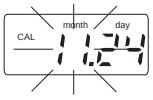
• *Press RANGE to display pH measurement.*

· *Press CAL to start calibration and to display the last calibration date again.*

Note: *If you want to retain the older calibration date, simply press the CFM key twice to bypass the month and day entry.*

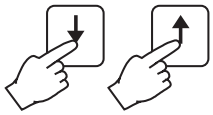
· *Using the UP and DOWN keys, enter the month while the "month" symbol and the two left digits blink.*

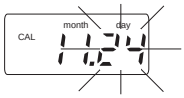




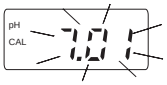
· *Press CFM.*

· *The "day" symbol and the two right digits will start blinking. Using the UP and DOWN keys, enter the day.*

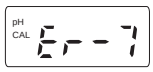




· *Press CFM to enter the new calibration date. The meter will request pH 7.01 buffer value and the display will show:*

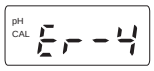


If "Er-7" appears, the calibration solution is wrong or is out of specifications and needs to be replaced.



· *When "CAL" disappears and the meter displays "CFM", press CFM to confirm the offset calibration.*

· *The meter will request pH 4.01 or 10.01 buffer by showing "Er-4". This indicates that the instrument is ready for the second point calibration*



Note: *Only by pressing CFM, offset calibration and the date are memorized.*

• *Rinse the electrode and temperature probe before immersing them in a pH 4.01 or pH 10.01 calibration buffer. Stir gently and wait a couple of minutes for thermal equilibrium. The display will show the value of the temperature compensated buffer solution.*

· *When "CAL" disappears and the meter displays "CFM" press CFM to confirm the slope calibration.*

The instrument is now calibrated and will remain calibrated even when it is turned off.

Note: *The meter will lose calibration if the battery is removed.*

If for some reason the temperature probe is out of order, or a <u>manual temperature compensation</u> *is required, follow the procedure below:*

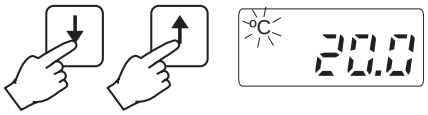
• *Make sure the temperature probe is detached.*

· *Press RANGE to select the temperature mode.*

· *Place the tip of the pH electrode into the pH 7.01 buffer and stir gently. Wait a couple of minutes for thermal equilibrium.*

· *Note the temperature of the buffer with a ChecktempC (or an accurate thermometer), e.g. 20.0 C.*

- *Use the UP and DOWN keys to set the temperature manually to the above value.*



- *Follow the rest of the calibration procedure as described previously (see page 32).*

pH VALUES AT VARIOUS TEMPERATURES

*For manual temperature compensation during calibration (*HI 8014*,* HI 8424 *and* HI 9622*), please refer to the following chart.*

TEMP		pH VALUES				
°C	°F	4.01	6.86	7.01	9.18	10.01
0	32	4.01	6.98	7.13	9.46	10.32
5	41	4.00	6.95	7.10	9.39	10.24
10	50	4.00	6.92	7.07	9.33	10.18
15	59	4.00	6.90	7.04	9.27	10.12
20	68	4.00	6.88	7.03	9.22	10.06
25	77	4.01	6.86	7.01	9.18	10.01
30	86	4.02	6.85	7.00	9.14	9.96
35	95	4.03	6.84	6.99	9.10	9.92
40	104	4.04	6.84	6.98	9.07	9.88
45	113	4.05	6.83	6.98	9.04	9.85
50	122	4.06	6.83	6.98	9.01	9.82
55	131	4.07	6.84	6.98	8.99	9.79
60	140	4.09	6.84	6.98	8.97	9.77
65	149	4.11	6.85	6.99	8.95	9.76
70	158	4.12	6.85	6.99	8.93	9.75

For instance, if the buffer temperature is 25 C, the display should show pH 4.01 or 7.01 or 10.01. With the temperature at 20 C, the display should show pH 4.00 or 7.03 or 10.06. Likewise, at 50 C, the display should show pH 4.06 or 6.98 or 9.82.

TEMPERATURE CALIBRATION

HI 8314, HI 8915, HI 8424, HI 9214, HI 931000 *and* HI 9622 *have been accurately precalibrated for temperature at the factory.*

For optimum accuracy, it is recommended that you have your pH meter recalibrated for temperature at least once a year.

Contact your Dealer or the nearest Hanna Customer Service Center for more information.

mV OUTPUT

It is possible to attach the HI 8915 *to a recorder or plotter using the mV output sockets.*

pH, mV and C readings can be transmitted through the output sockets at a voltage that proportionally matches the displayed value.

For example, when the meter reads 2.00, 7.00 or 12.00 pH, it emits a 200, 700 or 1200 mV signal, respectively.

This makes it unnecessary to use conversion tables and charts.

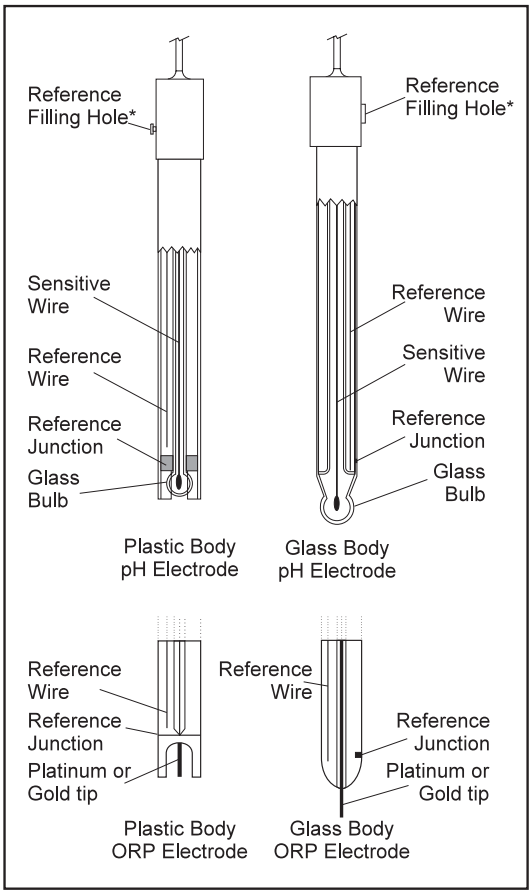
The output signals for the three measurement ranges of the meter are 100 mV for every pH unit, 1mV for every mV unit and 10 mV for every degree centigrade.

TROUBLESHOOTING GUIDE

SYMPTOMS	PROBLEM	SOLUTION
The meter fails to calibrate or gives faulty readings	*Erroneous buffer solution used for calibration.*	*Check the buffer solution and replace it if necessary*
	An out of order pH electrode	*Replace the pH electrode*
The meter is slow in responding or gives faulty readouts	*The electrode is not working or the reference junction is clogged*	*Leave the electrode in a storage solution after cleaning the junction. If problem persists, replace the electrode*
The meter does not accept the 2nd buffer solution	*Erroneous buffer solution used for slope calibration*	*Check the buffer solution and replace it if necessary*
	An out of order pH electrode	*Follow the cleaning procedure. If this doesn't work replace the electrode*
The reading drifts	*A clogged or an out of order pH electrode*	*Follow the cleaning procedure and replace the pH electrode if necessary*
The meter does not work with the temperature probe	*An out of order probe*	*Replace the probe.*
For HI 8424 only *Display shows "E1"*	*Out of range- pH scale*	*a) Check the calibration b) Ensure that the pH value is between 0 and 14 c) Check the level of electrolyte and the state of the electrode itself*
Display shows "E2"		*Make sure the temperature value is within 0 and 100□C*
Display shows "E3"	*Out of range- □C scale*	*Make sure the mV value is within ±1999*
Display shows "E4"	*Out of range- mV scale*	*Make sure the buffer solution used is pH 7 and replace it if necessary*
	Erroneous buffer solution used for offset calibration	*Replace the pH electrode*
	An out of order pH electrode	

SYMPTOMS	PROBLEM	SOLUTION
For HI 8424 only *Display shows "E5"*	*Erroneous buffer solution used for slope calibration*	*Use fresh buffer solution*
	An out of order pH electrode	*Replace the electrode*
For HI 9622 only *Display shows "pH—"*	*Out of range- pH scale*	*a) Check the calibration b) Ensure that the pH value is between 0 and 14 c) Check the level of electrolyte and the state of the electrode itself*
Display shows "□C" blinking	*No temperature probe attached*	*Make sure the temperature probe is attached properly*
Display shows "mV—"	*Out of range- mV scale*	*Make sure the mV value is within ±1999*
Display shows "Er-7"	*Erroneous pH 7 buffer solution used for offset calibration*	*Use fresh pH 7 buffer solution*
	An out of order pH electrode	*Replace the electrode*
Display shows "Er-4"	*Erroneous pH 4 buffer solution used for slope calibration*	*Use fresh pH 4 buffer solution*
	An out of order pH electrode	*Replace the electrode*
Display shows "Er-10"	*Erroneous pH 10 buffer solution used for slope calibration*	*Use fresh pH 10 buffer solution*
	An out of order pH electrode	*Replace the electrode*
For HI 9214 & HI 931000 only		
Ec	*Wrong buffer*	*Change the buffer solution.*
	Unfit electrode	*Clean, condition and if necessary change the electrode.*
Eb	*Low battery*	*Replace the battery.*
Er	*Over-Range*	*Repeat conditioning.*
	Dry electrode	

ELECTRODE CONDITIONING AND MAINTENANCE



** Only available with refillable electrodes.*

PREPARATION

Remove the protective cap.

DO NOT BE ALARMED IF ANY SALT DEPOSITS ARE PRESENT.

This is normal with electrodes and they will disappear when rinsed with water.

During transport tiny bubbles of air may have formed inside the glass bulb. The electrode cannot function properly under these conditions. These bubbles can be removed by "shaking down" the electrode as you would do with a glass thermometer.

If the bulb and/or junction are dry, soak the electrode in **HI 70300** **Storage Solution** *for at least one hour.*

For refillable electrodes:

If the refill solution (electrolyte) is more than 2½ cm (1") below the fill hole, add **HI 7082** *3.5M KCl Electrolyte Solution for double junction or* **HI 7071** *3.5M KCl+AgCl Electrolyte Solution for single junction electrodes.*

For AmpHel® electrodes:

If the electrode does not respond to pH changes, the battery is run down and the electrode should be replaced.

TEST MEASUREMENT

Rinse the electrode tip with distilled water.

Immerse the tip (bottom 4 cm / 1½") in the sample and stir gently for approx. 30 seconds.

For a faster response and to avoid cross contamination of the samples, rinse the electrode tip with the solution to be tested, before taking your measurements.

STORAGE

To minimize clogging and assure a quick response time, the glass bulb and the junction should be kept moist and not allowed to dry out.

When not in use, replace the solution in the protective cap with a few drops of **HI 70300** *Storage Solution or, in its absence,* **HI 7007** *pH 7.01 Buffer Solution.*

Follow the Preparation Procedure above before taking measurements.

Note: *NEVER STORE THE ELECTRODE IN DISTILLED OR DEIONIZED WATER.*

PERIODIC MAINTENANCE

Inspect the electrode and the cable. The cable used for the connection to the meter must be intact and there must be no points of broken insulation on the cable or cracks on the electrode stem or bulb.

Connectors must be perfectly clean and dry. If any scratches or cracks are present, replace the electrode. Rinse off any salt deposits with water.

For refillable electrodes:

*Refill the electrode with fresh electrolyte (***HI 7071** *for single junction or* **HI 7082** *for double junction electrodes). Allow the electrode to stand upright for 1 hour. Follow the Storage Procedure above.*

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CLEANING PROCEDURE

General	*Soak in Hanna* **HI 7061** *General Cleaning Solution for approximately ½ hour.*
Removal of films, dirt or deposits on the membrane/junction:	
Protein	*Soak in Hanna* **HI 7073** *Protein Cleaning Solution for 15 minutes.*
Inorganic	*Soak in Hanna* **HI 7074** *Inorganic Cleaning Solution for 15 minutes.*
Oil/grease	*Rinse with Hanna* **HI 7077** *Oil and Fat Cleaning Solution.*

IMPORTANT: *After performing any of the cleaning procedures rinse the electrode thoroughly with distilled water, drain and refill the reference chamber with fresh electrolyte, (not necessary for gel-filled electrodes) and soak the electrode in* **HI 70300** *Storage Solution for at least 1 hour before taking a measurement.*

TROUBLESHOOTING

Evaluate your electrode performance based on the following.

- **Noise** *(Readings fluctuate up and down) could be due to:*
  - **Clogged/Dirty Junction:** *Refer to the Cleaning Procedure above.*
  - **Loss of shielding** *due to low electrolyte level (in refillable electrodes only): refill with* **HI 7071** *for single junction or* **HI 7082** *for double junction electrodes.*
- **Dry Membrane/Junction:** *Soak in Storage Solution* **HI 70300** *for at least 1 hour.*
- **Drifting:** *Soak the electrode tip in warm Hanna Solution* **HI 7082** *for one hour and rinse tip with distilled water (refill with fresh* **HI 7071** *for single junction electrodes and* **HI 7082** *for double junction electrodes if necessary).*
- **Low Slope:** *Refer to the cleaning procedure above.*
- **No Slope:**
  - *Check the electrode for cracks in glass stem or bulb (replace the electrode if cracks are found).*
  - *Make sure cable and connections are not damaged nor lying in a pool of water or solution.*
- **Slow Response/Excessive Drift:** *Soak the tip in Hanna Solution* **HI 7061** *for 30 minutes, rinse thoroughly in distilled water and then follow the Cleaning Procedure above.*
- **For ORP Electrodes:** *polish the metal tip with a lightly abrasive paper (paying attention not to scratch the surface) and wash thoroughly with water.*

Note: *For field applications, it is always recommended to keep a spare electrode handy. When anomalies are not resolved with a simple maintenance, change the electrode (and recalibrate the meter) to see if the problem is alleviated.*

TAKING REDOX MEASUREMENTS

HI 8014, **HI 8314**, **HI 8424**, **HI 8915** *and* **HI 9622** *have the capability to take ORP measurements. An optional ORP electrode must be used to perform these measurements.*

Oxidation-reduction potential (REDOX) measurements provide the quantification of the oxidizing or reducing power of the sample tested.

To correctly perform a redox measurement, the surface of the ORP electrode must be clean and smooth.

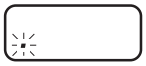
When not in use, the tip of the electrode should be kept moist and safe from any mechanical stress which might cause damage to the glass/platinum junction.

BATTERY REPLACEMENT

All meters are powered by a 9V battery that is located on the rear of the instrument.

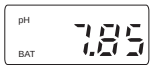
The meters provide the following, when the battery becomes weak:

- HI 8014, *reaching a certain minimum threshold, automatically switches the LCD off.*
- HI 8314, HI 8915, HI 8424 *display a blinking additional decimal point on the bottom left hand side of the LCD.*



- HI 9214 *and* HI 931000 *display "Eb".*

- HI 9622 *displays "BAT" on the bottom left hand side of the LCD.*



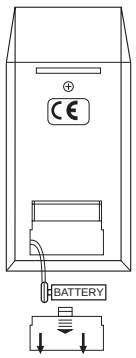
When the low battery indicator appears only a few hours of battery life is remaining. It is recommended that the battery be replaced immediately, since a low battery may also result in loss of calibration data or unreliable measurements.

Replacement must only take place in a non-hazardous area using an alkaline 9V battery.

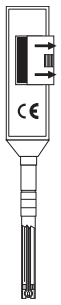
To access the battery, remove the battery cover by applying pressure in the direction indicated below. Replace the old battery with a new one, while paying attention to its polarity.

Note: *The instrument should be recalibrated after changing the battery.*

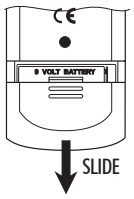
HI 8014 - HI 8314
HI 8424 - HI 8915
HI 9622



HI 9214



HI 931000



DISPLAY CODE GUIDE

HI 8014, HI 8314, HI 8424, HI 8915, HI 9214 AND HI 9622

°C *Symbol indicates the meter is in temperature mode. A flashing □C symbol in HI 8424 and HI 9622 means that the temperature probe is not connected or the cable is damaged*

pH *Symbol indicates the meter is in pH mode.*

HI 8014, HI 8314, HI 8424, HI 8915 AND HI 9622

mV *Symbol indicates the meter is in mV mode.*

HI 8424

E1 *Out of range in pH scale*

E2 *Out of range in □C scale*

E3 *Out of range in mV scale*

E4 *Erroneous buffer solution used for offset calibration or out of order electrode*

E5 *Erroneous buffer solution used for slope calibration or out of order electrode*

HI 8915

S *Symbol to indicate the display is frozen (Hold function).*

HI 9214 AND HI 931000

Δ *Stability indicator*

Ec *Wrong buffer: Change the buffer solution;*
Unfit electrode: Clean and condition the electrode.

Eb *Low battery: Replace the battery.*

Er *Over-Range: Dry electrode, repeat conditioning.*

HI 9622

pH---- *Out of range in pH scale*

mV---- *Out of range in mV scale*

Er-7 *Erroneous pH 7 buffer solution used for offset calibration or out of order electrode*

Er-4 *Erroneous pH 4 buffer solution used for slope calibration or out of order electrode*

Er-10 *Erroneous pH 10 buffer solution used for slope calibration or out of order electrode*

BAT *Low battery*

ACCESSORIES

pH CALIBRATION SOLUTIONS

HI 70004P *pH 4.01 Buffer Sachets, 25 x 20 mL*
HI 7004M *pH 4.01 Buffer Solution, 230 mL*
HI 7004L *pH 4.01 Buffer Solution, 460 mL*
HI 7006M *pH 6.86 Buffer Solution, 230 mL*
HI 7006L *pH 6.86 Buffer Solution, 460 mL*
HI 70007P *pH 7.01 Buffer Sachets, 25 x 20 mL*
HI 7007M *pH 7.01 Buffer Solution, 230 mL*
HI 7007L *pH 7.01 Buffer Solution, 460 mL*
HI 7009M *pH 9.18 Buffer Solution, 230 mL*
HI 7009L *pH 9.18 Buffer Solution, 460 mL*
HI 70010P *pH 10.01 Buffer Sachets, 25 x 20 mL*
HI 7010M *pH 10.01 Buffer Solution, 230 mL*
HI 7010L *pH 10.01 Buffer Solution, 460 mL*

pH CALIBRATION SOLUTIONS IN FDA APPROVED BOTTLE

HI 8004L *pH 4.01 Buffer Solution, 460 mL*
HI 8006L *pH 6.86 Buffer Solution, 460 mL*
HI 8007L *pH 7.01 Buffer Solution, 460 mL*
HI 8009L *pH 9.18 Buffer Solution, 460 mL*
HI 8010L *pH 10.01 Buffer Solution, 460 mL*

ELECTRODE STORAGE SOLUTIONS

HI 70300M *Storage Solution, 230 mL*
HI 70300L *Storage Solution, 460 mL*

ELECTRODE STORAGE SOLUTIONS IN FDA APPROVED BOTTLE

HI 80300M *Storage Solution, 230 mL*
HI 80300L *Storage Solution, 460 mL*

ELECTRODE CLEANING SOLUTIONS

HI 70000P *Electrode Rinsing Sachets, 25 x 20 mL*
HI 7061M *General Cleaning Solution, 230 mL*
HI 7061L *General Cleaning Solution, 460 mL*
HI 7073M *Protein Cleaning Solution, 230 mL*
HI 7073L *Protein Cleaning Solution, 460 mL*

HI 7074M *Inorganic Cleaning Solution, 230 mL*
HI 7074L *Inorganic Cleaning Solution, 460 mL*
HI 7077M *Oil & Fat Cleaning Solution, 230 mL*
HI 7077L *Oil & Fat Cleaning Solution, 460 mL*

ELECTRODE CLEANING SOLUTIONS IN FDA APPROVED BOTTLE

HI 8061M *General Cleaning Solution, 230 mL*
HI 8061L *General Cleaning Solution, 460 mL*
HI 8073M *Protein Cleaning Solution, 230 mL*
HI 8073L *Protein Cleaning Solution, 230 mL*
HI 8077M *Oil & Fat Cleaning Solution, 230 mL*
HI 8077L *Oil & Fat Cleaning Solution, 460 mL*

REFILLING ELECTROLYTE SOLUTIONS

HI 7071 *3.5M KCl + AgCl Electrolyte, 4 x 50 mL, for single junction electrodes*
HI 7072 *1M KNO_3 Electrolyte, 4 x 50 mL*
HI 7082 *3.5M KCl Electrolyte, 4 x 50 mL, for double junction electrodes*

REFILLING ELECTROLYTE SOLUTIONS IN FDA APPROVED BOTTLE

HI 8071 *3.5M KCl + AgCl Electrolyte, 4 x 50 mL, for single junction electrodes*
HI 8072 *1M KNO_3 Electrolyte, 4 x 50 mL*
HI 8082 *3.5M KCl Electrolyte, 4 x 50 mL, for double junction electrodes*

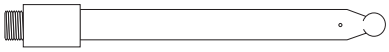
ORP PRETREATMENT SOLUTIONS

HI 7091M *Reducing Pretreatment Solution, 230 mL*
HI 7091L *Reducing Pretreatment Solution, 460 mL*
HI 7092M *Oxidizing Pretreatment Solution, 230 mL*
HI 7092L *Oxidizing Pretreatment Solution, 460 mL*
HI 7020M *Test Solution, 200 - 275 mV, 230 mL*
HI 7020L *Test Solution, 200 - 275 mV, 460 mL*

pH ELECTRODES

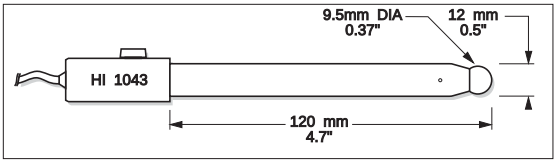
B = BNC CONNECTION PLUG + 1 m (3.3') CABLE

S = SCREW-TYPE CONNECTOR



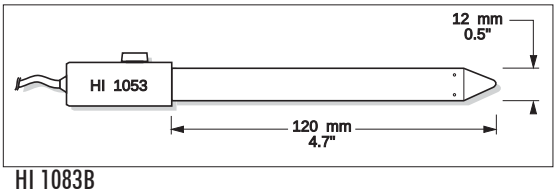
HI 1043B / HI 1040S

Glass-body, double junction, refillable, combination **pH** *electrode. Use: strong acid/alkali.*



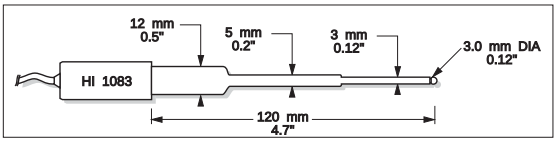
HI 1053B / HI 1050S

Glass-body, triple ceramic, conic shape, refillable, combination **pH** *electrode. Use: emulsions.*



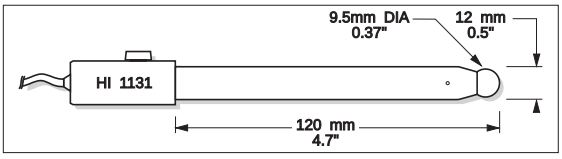
HI 1083B

Glass-body, micro, Viscolene, non-refillable, combination **pH** *electrode. Use: biotechnology, micro titration.*



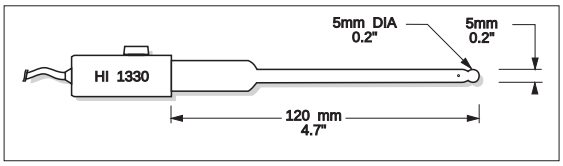
HI 1131B / HI 1111S

Glass-body, single junction, refillable, combination **pH** *electrode. Use: general purpose.*



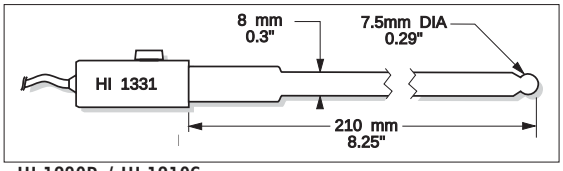
HI 1330B / HI 1310S

Glass-body, semimicro, single junction, refillable, combination **pH** *electrode. Use: laboratory.*



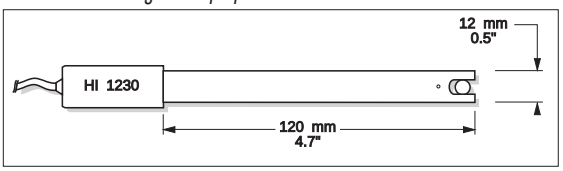
HI 1331B / HI 1311S

Glass-body, semimicro, single junction, refillable, combination **pH** *electrode. Use: flasks.*



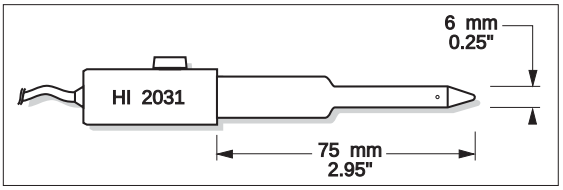
HI 1230B / HI 1210S

Plastic-body (Ultem®), double junction, gel-filled, combination **pH** *electrode. Use: general purpose.*



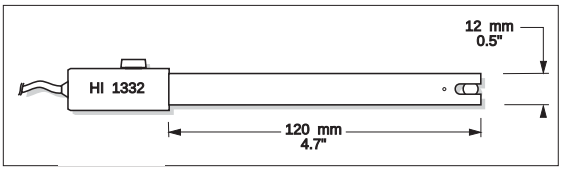
HI 2031B / HI 2020S

Glass-body, semimicro, conic, refillable, combination **pH** *electrode. Use: semisolid products.*



HI 1332B / HI 1312S

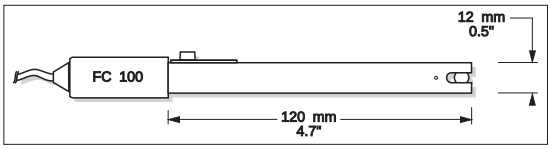
Plastic-body (Ultem®), double junction, refillable, combination **pH** *electrode. Use: general purpose.*



Ultem® is registered Trademark of "General Electrics Co."

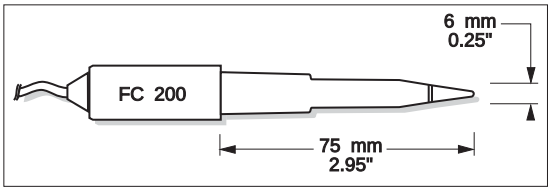
FC 100B

Plastic-body (Kynar®), double junction, refillable, combination **pH** *electrode. Use: general purpose for food industry.*



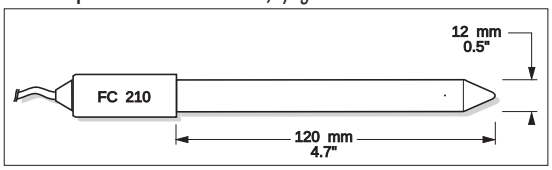
FC 200B / FC 200S

Plastic-body (Kynar®), single junction, conic, Viscolene, non-refillable, combination **pH** *electrode. Use: meat & cheese.*



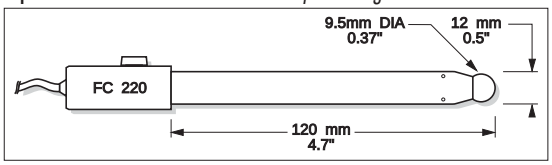
FC 210B

Glass-body, double junction, conic, Viscolene, non-refillable combination **pH** *electrode. Use: milk, yogurt.*



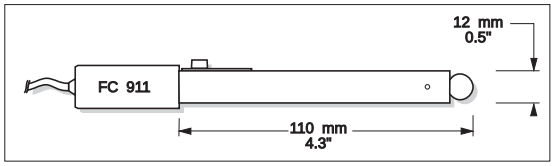
FC 220B

Glass-body, triple ceramic, single junction, refillable, combination **pH** *electrode. Use: food processing.*



FC 911B

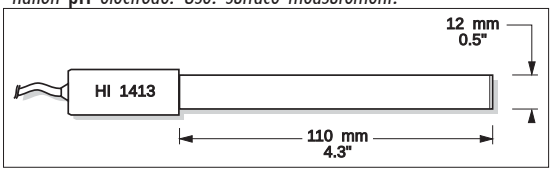
Plastic-body (Kynar®), double junction, refillable with built-in amplifier, combination **pH** *electrode. Use: very high humidity.*



Kynar® is registered Trademark of "Pennwalt Corp."

HI 1413B

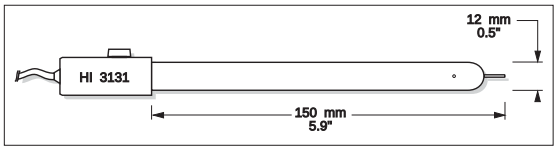
Glass-body, single junction, flat tip, Viscolene, non-refillable combination **pH** *electrode. Use: surface measurement.*



ORP ELECTRODES

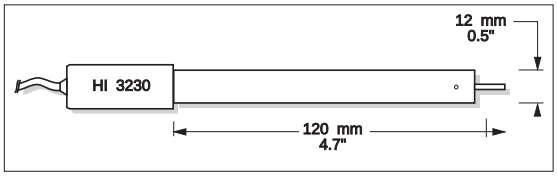
HI 3131B / HI 3111S

Glass-body, refillable, combination platinum **ORP** *electrode. Use: titration.*



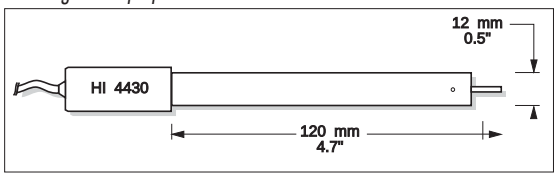
HI 3230B / HI 3210S

Plastic-body (Ultem®), gel-filled, combination platinum **ORP** *electrode. Use: general purpose.*



HI 4430B / HI 4410S

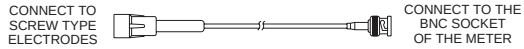
Plastic-body (Ultem®), gel-filled, combination gold **ORP** *electrode. Use: general purpose.*



Ultem® is registered Trademark of "General Electrics Co."

EXTENSION CABLES FOR SCREW-TYPE ELECTRODES (SCREW TO BNC CONNECTOR)

HI 7855 SERIES CABLE CONNECTORS
CONNECTOR AND 3.0 mm (0.12") CABLE WITH BNC



HI 7855/1 *Extension cable 1 m (3.3') long*

HI 7855/3 *Extension cable 3 m (9.9') long*

OTHER ACCESSORIES

HI 710001 *Soft carrying case for* **HI 8014**, **HI 8314**, **HI 8424**, **HI 8915** *and* **HI 9622**

HI 710003 *Soft carrying case for* **HI 9214**

HI 710004 *Soft carrying case for* **HI 931000**, *(instrument only)*

ChecktempC *Pocket-size thermometer (range -50.0 to 150.0□C)*

HI 76405 *Electrode holder*

HI 731326 *Small screwdrivers (20 each) for calibration (***HI 8014**, **HI 8314**, **HI 8915***)*

HI 7669AW *Temperature probe with 1 m (3.3') screened cable (***HI 8314**, **HI 8915**, **HI 8424***)*

HI 7669/2W *Temperature probe with 1 m (3.3') screened cable (***HI 9622***)*

HI 721311 *Rugged carrying case for* **HI 8014**, **HI 8314**, **HI 8915** *with pH 4.01 and pH 7.01 solutions and screwdriver*

HI 721312 *Rugged carrying case for* **HI 8424** *with pH 4.01 and pH 7.01 solutions*

HI 8427 *pH and ORP electrode simulator with 1 m (3.3') coaxial cable ending in female BNC connectors*

HI 931001 *pH and ORP electrode simulator with LCD and 1 m (3.3') coaxial cable ending in female BNC connectors*

HI 710007 *Shockproof, blue rubberboot for* **HI 931000**

HI 710008 *Shockproof, orange rubberboot for* **HI 931000**

HI 710009 *Blue rubberboot (except for HI 931000)*

HI 710010 *Orange rubberboot (except for HI 931000)*

HI 710031 *General-purpose rugged carrying case*

ELECTRODE APPLICATION REFERENCE GUIDE

Application	Electrodes*
1. Aquarium	*HI 1332B, HI 1312S*
2. Bath-water	*HI 1130B, HI 1110S*
3. Beer	*HI 1131B, HI 1111S*
4. Bread	*HI 2031B, FC 200B, HI 2020S, FC 200S*
5. Cheese	*FC 200B, FC 200S*
6. Dairy products	*FC 911B, FC 100B*
7. Dirty water	*HI 1230B, HI 1210S*
8. Emulsions	*HI 1053B, HI 1050S*
9. Environment	*HI 1230B, HI 1210S*
10. Flasks	*HI 1331B, HI 1310S*
11. Food industry general use	*FC 911B, FC 100B*
12. Fruit	*FC 200B, FC 220B, FC 200S*
13. Fruit juices, organic	*FC 210B*
14. Galvanizing waste solution	*HI 1130B, HI 1110S*
15. High purity water	*HI 1053B, HI 1050S*
16. Horticulture	*HI 1053B, FC 200B, HI 1050S, FC 200S*
17. Laboratory general use	*HI 1131B, HI 1230B, HI 1332B, HI 1330B HI 1111S, HI 1210S, HI 1312S, HI 1310S*
18. Leather	*HI 1413B, HI 1410S*
19. Lemon juice	*FC 100B*
20. Meat	*FC 200B, HI 2031B, FC 200S, HI 2020S*
21. Micro plate sampling of less than 100mL	*HI 1083B*
22. Milk and Yogurt	*FC 210B*
23. Paints	*HI 1053B, HI 1050S*
24. Paper	*HI 1413B, HI 1410S*
25. Photographic chemicals	*HI 1230B, HI 1210S*
26. Quality control	*HI 1332B, HI 1312S*
27. Sausages	*FC 200B, HI 2031B, FC 200S, HI 2020S*
28. Semi-solid products	*HI 2031B, HI 2020S*
29. Skin	*HI 1413B, HI 1410S*
30. Soil samples	*HI 1230B, HI 1210S*
31. Solvents	*HI 1043B, HI 1040S*
32. Strong acid	*HI 1043B, HI 1040S*
33. Submersion application	*HI 1130B, HI 1110S*
34. Surface measurements	*HI 1413B, HI 1410S*
35. Swimming pool	*H I1130B, HI 2114P/2*
36. Titrations with constant temperature range	*HI 1131B, HI 1111S*
37. Titrations with wide temperature range	*HI 1131B, HI 1111S*
38. Very high humidity	*FC 911B*
39. Vials and test tube	*HI 1330B, HI 1310S*
40. Wine processing	*FC 220B*

B = BNC-type connector *S = Screw-type connector*

** All electrodes ending with "B" are supplied with 1m (3") cable and BNC Connector*

WARRANTY

All Hanna Instruments meters are warranted for two years *against defects in workmanship and materials when used for their intended purpose and maintained according to instructions.* The electrodes and the probes are warranted for a period of six months. *This warranty is limited to repair or replacement free of charge.*

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization number from the Customer Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

OTHER PRODUCTS FROM HANNA

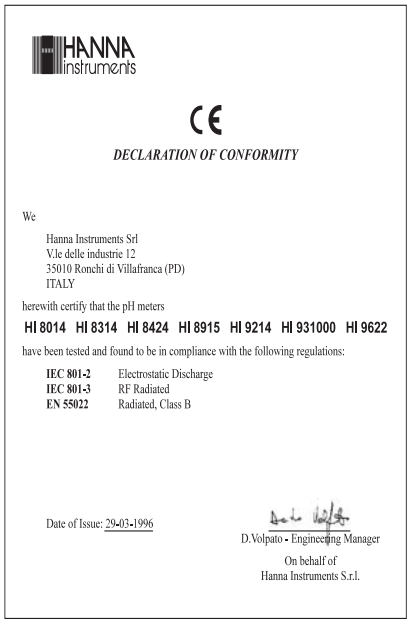
- *CALIBRATION AND MAINTENANCE SOLUTIONS*
- *CHEMICAL TEST KITS*
- *CHLORINE METERS*
- *CONDUCTIVITY/TDS METERS*
- *DISSOLVED OXYGEN METERS*
- *HYGROMETERS*
- *ION SPECIFIC METERS (Colorimeters)*
- *MAGNETIC STIRRERS*
- *Na/NaCl METERS*
- *pH/ORP/Na ELECTRODES*
- *PROBES (DO, µS/cm, RH, T, TDS)*
- *PUMPS*
- *REAGENTS*
- *SOFTWARE*
- *THERMOMETERS*
- *TITRATORS*
- *TRANSMITTERS*
- *TURBIDITY METERS*
- *Wide Range of Accessories*

Most Hanna meters are available in the following formats:

- *BENCH-TOP METERS*
- *POCKET-SIZED METERS*
- *PORTABLE METERS*
- *PRINTING/LOGGING METERS*
- *PROCESS METERS (Panel and Wall-mounted)*
- *WATERPROOF METERS*
- *METERS FOR FOOD INDUSTRY*

For additional information, contact your dealer or the nearest Hanna Customer Service Center. You can also e-mail us at: tech@hannainst.com.

CE DECLARATION OF CONFORMITY



HANNA instruments

CE

DECLARATION OF CONFORMITY

We

Hanna Instruments Srl
V.le delle industrie 12
35010 Ronchi di Villafranca (PD)
ITALY

herewith certify that the pH meters

HI 8014 HI 8314 HI 8424 HI 8915 HI 9214 HI 931000 HI 9622

have been tested and found to be in compliance with the following regulations:

IEC 801-2	Electrostatic Discharge
IEC 801-3	RF Radiated
EN 55022	Radiated, Class B

Date of Issue: 29-03-1996

D.Volpato - Engineering Manager
On behalf of
Hanna Instruments S.r.l.

Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential areas could cause unacceptable interferences to radio and TV equipment.

The glass bulb at the end of the electrode is sensitive to electrostatic discharges. Avoid touching this glass bulb at all times.

During operation, ESD wrist straps should be worn to avoid possible damage to the electrode by electrostatic discharges.

Any variation introduced by the user to the supplied equipment may degrade the instrument's EMC performance.

To avoid electrical shock, do not use these instruments when voltages at the measurement surface exceed 24VAC or 60VDC.

For HI 8424 and HI 9622: the position of the probes' cable (the pH electrode and the temperature probe) could effect the measurements. In order to minimize these effects due to external electromagnetic fields, it is recommended to keep parallel the cables of the two probes and as close as possible to the instrument.

In particular cases HI 8915 could change its operating mode. In such cases, press any key to return to normal operating conditions.

In particular cases, HI 8314 and HI 9214 could turn off. In such cases, turn the meters on by pressing the ON/OFF key.

To avoid damages or burns, do not perform any measurement in microwave ovens.

HANNA LITERATURE

Hanna publishes a wide range of catalogs and handbooks for an equally wide range of applications. The reference literature currently covers areas such as:

- Water Treatment
- Process
- Swimming Pools
- Agriculture
- Food
- Laboratory
- Thermometry

and many others. New reference material is constantly being added to the library.

For these and other catalogs, handbooks and leaflets, contact your dealer or the Hanna Customer Service Center nearest to you. To find the Hanna Office in your vicinity, check our home page at www.hannainst.com.

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HANNA instruments

http://www.hannainst.com