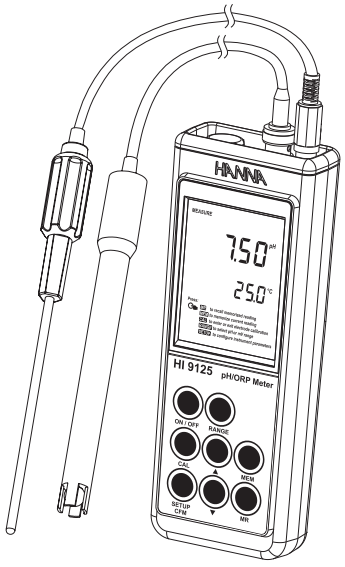
Instruction Manual

HI 9124 HI 9125

Portable Waterproof pH Meters



HANNA® instruments
www.hannainst.com

Dear Customer,

Thank you for choosing a Hanna Instruments product.

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

WARRANTY

HI 9124 & **HI 9125** are guaranteed for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions. Electrodes and probes are guaranteed for six months. This warranty is limited to repair or replacement free of charge.

Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered.

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

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PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it to make sure that no damage has occurred during shipping.

If there is any damage, notify your dealer or the nearest Hanna Customer Service Center.

Each meter is supplied with:

- **HI 1230B** non refillable combination double-junction pH electrode with gelled electrolyte.
- **HI 7662** stainless steel temperature probe with 1 m (3.3") cable
- **pH 4.01 & pH 7.01** buffer solutions, 20 mL sachet
- 100 mL plastic beaker
- 3 x 1.5V AAA, batteries
- Instruction manual
- Rugged carrying case

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

GENERAL DESCRIPTION

The **HI 9124** and **HI 9125** are state-of-the-art rugged waterproof, hand held pH meters designed to provide laboratory results and accuracy under harsh industrial conditions.

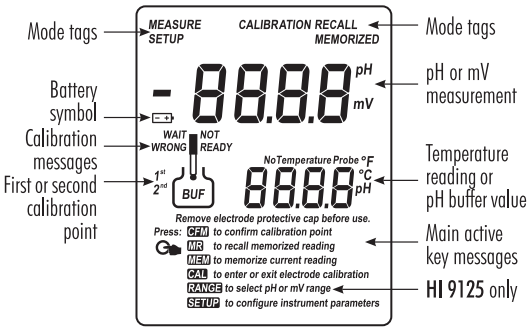
A large multi-level LCD, with clear indications related to the electrode and instrument status, pH and temperature displayed simultaneously, and user friendly symbols and text instructions during calibration.

The pH calibration procedure is automatic with 5 auto recognized buffers (4.01, 6.86, 7.01, 9.18 and 10.01) and automatic temperature compensation.

The **HI 9125** can be used with ORP (Oxidation Reduction Potential) electrodes. mV measurements automatically change from 0.1 to 1 mV resolution when the reading reaches 700 mV.

LCD MESSAGE GUIDE

TAGS & SYMBOLS



- **Mode tags** lights up for indicating the corresponding active mode, and blinks for warning the user.

  MEASURE on: measurement mode.

  SETUP on: SETUP menu mode has been entered.

  CALIBRATION on: calibration mode has been entered.

  MEMORIZE on: measurement stored in the internal memory and frozen on the display

  RECALL MEMORIZED on: stored value recalled.

- **Battery symbol blinking**: low battery condition. Batteries should be replaced.

- **Calibration messages**.

  WAIT NOT READY blinking: buffer has been recognized, but reading is not stable.

  READY on: buffer has been recognized and reading is stable.

  WRONG (BUF) **and WRONG** (probe) **blinking** alternatively: wrong buffer, value not recognized.

- **Main active key messages** light up for indicating the corresponding active key.

  CFM blinking: ask for confirmation of calibration or set value.

  MR on: MR key available.

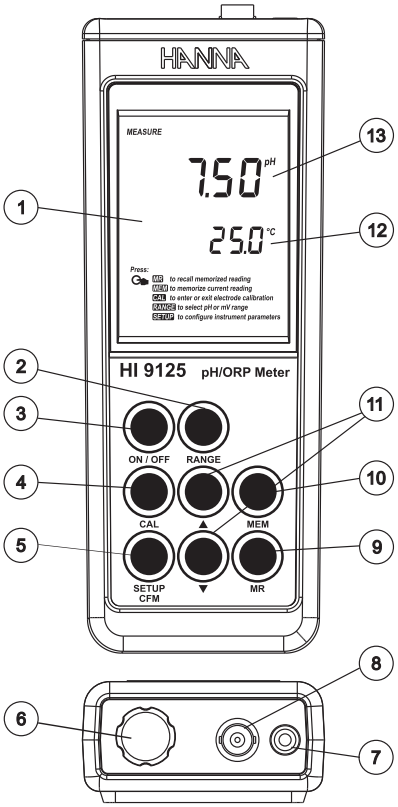
  MEM on: MEM key available.

  CAL on: CAL key available.

  RANGE on: RANGE key available. (**HI 9125** only)

  SETUP on: SETUP key available.

FUNCTIONAL DESCRIPTION



1) Liquid Crystal Display (LCD).
2) **RANGE** key, to select pH or mV (**HI 9125** only).
3) **ON/OFF** key, to turn the meter ON and OFF.
4) **CAL** key, to enter or exit calibration mode.
5) **SETUP/CFM** key, to enter SETUP mode or to confirm calibration.
6) Battery compartment cap.
7) Temperature probe socket.
8) BNC electrode connector.
9) **MR** key, to recall stored value from memory.
10) **MEM** key, to store reading in memory.
11) ▲ and ▼ keys, for manual temperature setting, or selecting pH buffer value.
12) Secondary display.
13) Primary display.

SPECIFICATIONS

RANGE	-2.00 to 16.00 pH
	±699.9 mV / ±1999 mV (HI 9125 only)
	-20.0 to 120.0 °C (-4.0 to 248.0 °F)
RESOLUTION	0.01 pH
	0.1 mV / 1 mV (**HI 9125** only)
	0.1 °C (0.1 °F)
ACCURACY @ 20 °C / 68 °F	±0.01 pH
	±0.2 mV / ±1 mV (**HI 9125** only)
	±0.4 °C (±0.8 °F) (excluding probe error)
Typical EMC Deviation	±0.02 pH
	±0.2 mV / ±1 mV (**HI 9125** only)
	±0.4 °C (±0.8 °F)
pH Calibration	1 or 2-point, with 5 memorized buffers (4.01, 6.86, 7.01, 9.18, 10.01)
Offset Calibration	±1 pH
Slope Calibration	From 80 to 108%
Temperature Compensation	Automatic, from -20.0 to 120.0 °C (-4.0 to 248.0 °F) or manual, without temperature probe
pH Electrode	**HI 1230B** (included)
Temperature Probe	**HI 7662** (included)
Input Impedance	10^{12} ohms
Battery Type & Life	3 x 1.5V AAA batteries approx. 200 hours of continuous use
Auto-off	User selectable: 20 minutes or disabled
Dimensions	185x72x36 mm (7.3x2.8x1.4")
Weight	300 g (10.6 oz.)
Environment	0 — 50 °C (32 — 122 °F) max RH 100%
Warranty	2 years

OPERATIONAL GUIDE

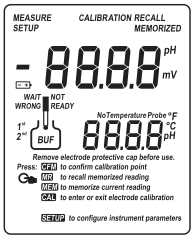
INITIAL PREPARATION

The instrument is supplied with batteries. In order to place the batteries inside the instrument follow the instructions from page 16.

To prepare the instrument for use, connect the pH electrode and the temperature probe to the BNC and temperature sockets on the top of the instrument. The temperature probe can be used independently to take temperature measurements, or it can be used in conjunction with the pH electrode to utilize Automatic Temperature Compensation (ATC) mode. If the probe is disconnected, temperature can also be set manually with the **ARROW** keys.

Turn the instrument ON by pressing **ON/OFF**.

At start-up the display will show all the LCD segments and then the battery percentage while the instrument performs a self check (or as long as the button is held).



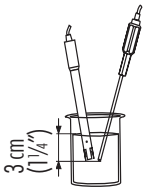
The meter automatically enters measurement mode.

After measurement, switch the meter off. Clean the electrode and store it with a few drops of **HI 70300** storage solution in the protective cap.

To save batteries, the auto-off feature turns the meter off after 20 minutes with no button pressed. To disable this feature, see "Setup Menu" section on page 14.

pH MEASUREMENTS

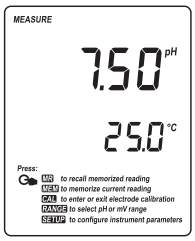
Calibrate the meter and pH electrode before taking measurements. See page 10 for details. To take a pH measurement remove the electrode's protective cap, rinse off pH sensing tip. Submerse the electrode and the temperature probe 3 cm (1¼") into the sample and stir gently.



If necessary, press the **RANGE** key until the display shows pH mode (**HI 9125** only).

Allow time for the reading to stabilize.

The LCD will show the pH measurement and the temperature of the sample.



If several measurements are taken successively in different samples, rinse the electrode thoroughly with deionized or tap water and a small amount of the sample to be measured.

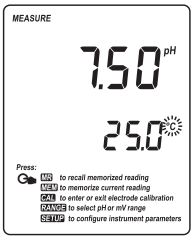
The pH value of the sample is directly affected by temperature. In order for the meter to measure the pH accurately, the value must be compensated for temperature. If the sample temperature is different from the temperature at which the pH electrode was kept, allow a few minutes for thermal equilibrium.

To use the meter's Automatic Temperature Compensation feature, submerse the temperature probe into the sample as close to the electrode as possible and wait for a few minutes.

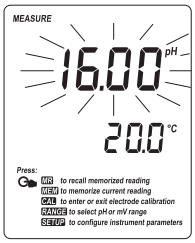
If manual temperature compensation is desired the temperature probe must be disconnected from the instrument.

The display will show the default temperature of "**25 °C**", or the last temperature set with the "**°C**" (or "**°F**") indicator blinking.

The temperature can now be adjusted with the **ARROW** keys. Set the value at the sample temperature.



Notes:
- When the reading is out of range, the display will flash the closest full-scale value.
- If using pH electrode while in mV mode, the meter will measure the mV generated by the pH electrode.

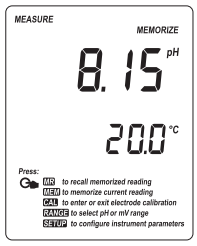


ORP MEASUREMENTS (HI 9125 only)

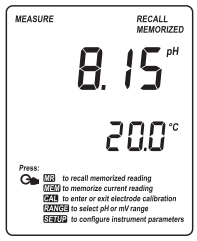
To perform ORP measurements, connect an optional ORP electrode (see "Accessories" section) to the meter and turn it ON.
If necessary, enter the mV mode by pressing **RANGE** until the display changes to mV.
Submerse the ORP electrode 3 cm (1¼") into the sample to be tested and wait a few minutes for the reading to stabilize.
Measurements within the ±699.9 mV range are displayed with 0.1 mV resolution, while outside this range the resolution automatically switches to 1 mV.
For accurate ORP measurements, the surface of the electrode must be clean and smooth. Pretreatment solutions are available to condition the electrode and improve its response time (see "Accessories" section).

MEM & MR FUNCTIONS

The instrument allows the user to store the current measurement (pH and temperature, or mV and temperature) into internal memory by pressing the **MEM** key. The "**MEMORIZE**" tag lights up on display.



Stored values can be recalled by pressing **MR**: the display will show the values and the "**RECALL MEMORIZED**" tag as long as the button is pressed.



pH CALIBRATION

It is recommended to calibrate the instrument frequently, especially if high accuracy is required.

The pH range should be recalibrated:

- Whenever the pH electrode or temperature probe is replaced.
- At least once a week.
- After testing aggressive chemicals.
- When extreme accuracy is required.

PREPARATION

Pour a small quantity of buffer solution into clean beakers. For accurate calibration use two beakers for each buffer solution, the first one for rinsing the electrode and the second one for calibration.

PROCEDURE

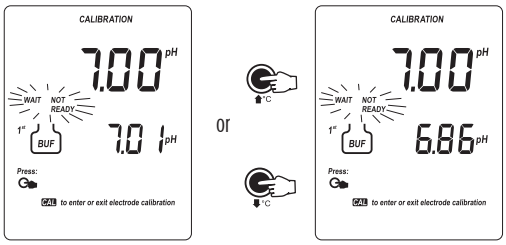
In order to perform pH calibration:

- Make sure that the meter is in the pH mode (**HI 9125** only).
- Remove the protective cap and rinse the electrode with some of the buffer solution to be used for the first calibration point.

There is a choice of 5 memorized buffers: 4.01, 6.86, 7.01, 9.18 and 10.01 pH.

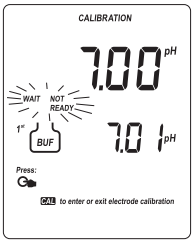
TWO-POINT CALIBRATION

- Press the **CAL** key. The "**CAL**" and "BUF" indicators will be displayed. The secondary LCD will display buffer "**7.01**". If a different calibration buffer is desired (e.g. "**6.86**"), use the **ARROW** keys to change the displayed value.

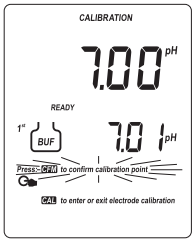


- Submerse the electrode approx. 3 cm (1¼") into the solution, place the temperature probe as close as possible to the electrode and stir gently.

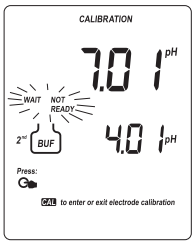
- The LCD will flash the "**WAIT NOT READY**" message.



- Once the reading is stable, if it is not close to the selected buffer, "**WRONG** BUF" and "**WRONG**" will blink alternatively; if it is close to the selected buffer the display will change to "**READY**" and blinking "**Press: CFM to confirm calibration point**".



- Press the **CFM** key to confirm the calibration: the meter stores the offset calibration point. The calibrated reading is then displayed on the primary LCD while the secondary LCD will show the second buffer to be used for calibration (pH 4.01).



- After the first calibration point is confirmed, submerse the electrode into the second buffer (pH 4.01, 10.01 or 9.18) and stir gently. Choose pH 4.01 for acidic samples, and pH 10.01 or 9.18 for alkaline solutions.
- Submerse the electrode approx. 3 cm (1¼") into the solution, place the temperature probe as close as possible to the electrode and stir gently.
- Select the second buffer value on the secondary display by pressing the **ARROW** keys.

- If the reading is not close to the selected buffer, "**WRONG** BUF" and "**WRONG** ↕" will blink alternatively;
- If the reading is close to the selected buffer and the reading is stable, the "**READY**" symbol is displayed and the "**CFM**" symbol starts blinking on the LCD, asking for confirmation.
- Press the **CFM** key: the value is stored into memory and the meter returns to normal mode.

Notes: • The meter automatically skips the buffer used for the first calibration point to avoid erroneous procedure. A difference of at least 1.5 pH unit is required between the two buffers used for the offset and slope calibration: once calibrated at either pH 7.01 or 6.86, the instrument automatically ignores the other value for the second point (same for pH 10.01 and 9.18).

- During calibration, the secondary LCD shows the selected buffer value. For the **HI 9125** model, it is possible to display the buffer temperature during calibration by pressing **RANGE**.
- To clear a previous calibration and return to the default values, in calibration mode press **CFM**, then **CAL** before the first buffer is accepted. The LCD will show "**CLr CAL**" for one second, and then will return to normal mode.

ONE-POINT CALIBRATION

For optimum accuracy it is always recommended to perform a two-point calibration, but for a faster operation a single-point calibration can be used. pH 7.01 or pH 6.86 (NIST) are normally used for this purpose, even though the meters can be calibrated with any of the 5 memorized calibration values.

After calibrating the first point (see above), press the **CAL** key to end the calibration procedure.

pH BUFFER TEMPERATURE DEPENDENCE

Temperature has an effect on pH. The calibration buffer solutions are affected by temperature changes to a lesser degree than normal solutions. During calibration the instrument will automatically calibrate to the pH value corresponding to the measured or set temperature.

TEMP		pH BUFFERS				
°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	7.05	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	9.11	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	4.08	6.84	6.98	8.99	9.79
60	140	4.09	6.84	6.98	8.97	9.77
65	149	4.11	6.84	6.99	8.95	9.76
70	158	4.12	6.85	6.99	8.93	9.75
75	167	4.14	6.86	7.00	8.91	9.74
80	176	4.16	6.87	7.01	8.89	9.74
85	185	4.17	6.87	7.02	8.87	9.74
90	194	4.19	6.88	7.03	8.85	9.75
95	203	4.20	6.89	7.04	8.83	9.76

During calibration the instrument will display the pH buffer value at 25 °C.

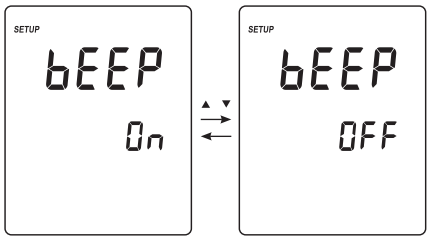
SETUP MENU

Instrument allows the user to configure several parameters through the Setup Menu.

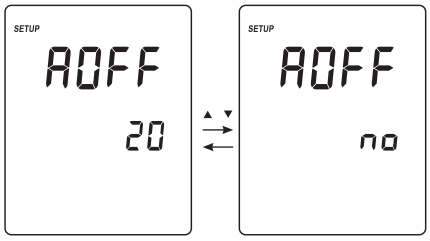
To enter the SETUP mode, while in measurement mode, press and hold the **SETUP** key for about 5 seconds. When the key is released the first parameter will be displayed.

Once the menu is entered, each parameter can be changed by using the **ARROW** keys; then pressing the **CFM** key will confirm the value and scroll to the next parameter.

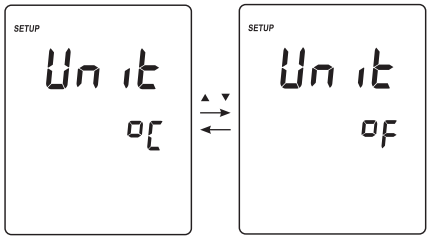
1. Audible signal: On (default) or Off



2. Auto-off feature: 20 minutes (default) or disabled



3. Temperature measure unit: °C (default) or °F



After setting the last parameter, pressing the **CFM** key will confirm the value and return to measurement mode.

mV CALIBRATION (HI 9125 only)

HI 9125 has been precalibrated for mV range at the factory.

For optimum accuracy, it is recommended to recalibrate the meter for mV readings at least once a year. Contact your Dealer or the nearest Hanna Customer Service Center for more information.

TEMPERATURE CALIBRATION

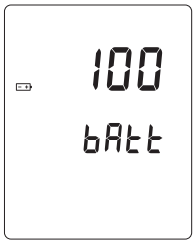
HI 9124 & HI 9125 have been precalibrated for temperature at the factory.

For optimum accuracy, it is recommended to recalibrate the meter for temperature at least once a year. Contact your Dealer or the nearest Hanna Customer Service Center for more information.

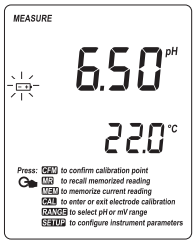
BATTERIES REPLACEMENT

The instrument is supplied with batteries. First time you start working with the instrument, insert the supplied batteries in the battery compartment observing the correct polarity (see page 17).

At start-up the battery percentage is displayed.



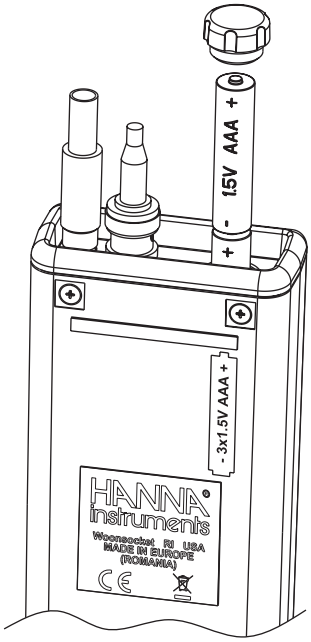
If the batteries become weak, the display will flash the battery symbol to advise the user that approximately 1 hour of working time remains. It is recommended to change the batteries as soon as the battery symbol appears blinking.



The instrument is also provided with the BEPS (Battery Error Prevention System) feature which automatically turns the instrument off when the battery level is too low to ensure reliable readings. At start-up the display will show "**0 batt**" for few seconds, then the instrument automatically turns off.

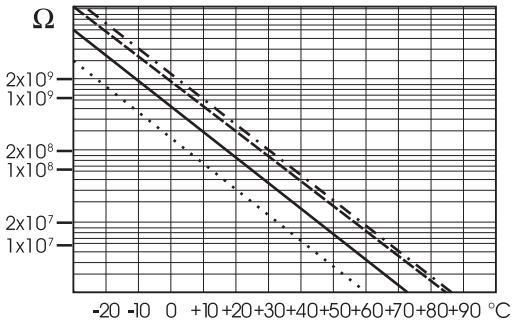
To replace the batteries, follow the next steps:

- Turn the instrument OFF.
- Open the battery compartment cap (located on the top of the instrument).
- Remove old batteries.
- Insert three new 1.5V AAA batteries in the battery compartment, observing the polarity on the rear of the instrument.
- Reattach the battery compartment cap.



TEMPERATURE CORRELATION FOR pH SENSITIVE GLASS

The resistance of glass electrodes partially depends on temperature. The lower the temperature, the higher the resistance. It takes more time for the reading to stabilize if the resistance is higher. In addition, the response time will suffer to a greater degree at temperatures below 25 °C.



Since the resistance of the pH electrode is in the range of 50 – 200 Mohms, the current across the membrane is in the pico Ampere range. Large currents can disturb the calibration of the electrode for many hours.

For these reasons high humidity environments, short circuits and static discharges can be detrimental to a stable pH reading.

The pH electrode's life also depends on the temperature. If constantly used at high temperatures, the electrode life is drastically reduced.

Typical Electrode Life

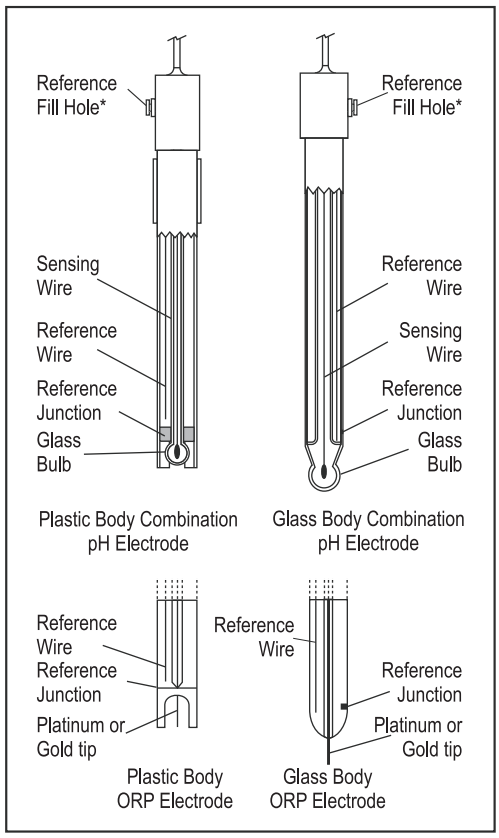
Ambient Temperature	1 – 3 years
90 °C	Less than 4 months
120 °C	Less than 1 month

Alkaline Error

High concentrations of sodium ions interfere with readings in alkaline solutions. The pH at which the interference starts to be significant depends upon the composition of the glass. This interference is called alkaline error and causes the pH to be underestimated. Hanna's glass formulations have the indicated characteristics.

Sodium Ion Correction for Glass at 20-25 °C		
Concentration	pH	Error
0.1 Mol L^{-1} Na^+	13.00	0.10
	13.50	0.14
	14.00	0.20
1.0 Mol L^{-1} Na^+	12.50	0.10
	13.00	0.18
	13.50	0.29
	14.00	0.40

ELECTRODE CONDITIONING & MAINTENANCE



* Not present in gel electrodes.

PREPARATION PROCEDURE

Remove the electrode 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 or longer.

For refillable electrodes, if the refill solution (electrolyte) is more than 2½ cm (1") below the fill hole, add the appropriate Electrolyte Solution.

MEASUREMENT

Rinse the electrode tip with distilled water, submerse it 3 cm (1¼") in the sample and stir gently for a few 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 any measurements.

STORAGE PROCEDURE

To minimize clogging and ensure a quick response time, the glass bulb and the junction should always be kept moist.
When not in use, store it with a few drops of **HI 70300** storage solution in the protective cap.
NEVER STORE THE ELECTRODE IN DISTILLED OR DEIONIZED WATER.

PERIODIC MAINTENANCE

Inspect electrode and cable. The cable must be intact. No cracks should be seen on the electrode stem or bulb. If any scratches or cracks are present, replace the electrode. Rinse off any salt deposits with water.
Connectors must be perfectly clean and dry.

For refillable electrodes:

Refill the electrode with fresh electrolyte (see the electrode's specifications to select the correct refilling solution). Allow the electrode to stand upright for 1 hour. Follow the Storage Procedure above.

For nonrefillable electrodes:

Do not be concerned if crystals form in the gel. This will not effect pH electrode response.

CLEANING PROCEDURE

• General	Soak in Hanna **HI 7061** General Cleaning Solution for approximately ½ hour.
• Protein	Soak in Hanna **HI 7073** Protein Cleaning Solution for 15 min.
• Inorganic	Soak in Hanna **HI 7074** Inorganic CleaningSolution for 15 min.
• Oil/grease	Rinse with Hanna **HI 7077** Oil & Fat Cleaning Solution for 1 min.

IMPORTANT: After performing any of the cleaning procedures, rinse the electrode thoroughly with distilled water and soak it in **HI 70300** Storage Solution for at least 1 hour before taking measurements.

TROUBLESHOOTING GUIDE

SYMPTOMS	PROBLEM	SOLUTION
Slow reponse/excessive drift.	Dirty pH electrode.	The electrode needs to be cleaned. Follow the cleaning procedure on page 20.
Reading fluctuates up and down (noise).	Clogged/dirty junction. Low electrolyte level (refillable electrodes only).	Clean the electrode. Refill with fresh electrolyte (refillable electrodes only). Check cable and connector.
Display shows blinking full scale value.	Reading out of range.	Verify the electrode is connected. Check that the sample is within measurable range. Verify that the electrode is in contact with the solution.
Display shows blinking "°C" or "°F".	Broken temperature probe.	Replace temperature probe.
Meter does not work with temperature probe.	Broken temperature probe. Wrong temperature probe.	Replace temperature probe.
Display shows blinking battery symbol.	Low battery level.	Replace the batteries.
Meter fails to calibrate or gives faulty readings.	Broken pH electrode.	Replace electrode.
"**WRONG CALIBRATION**" is displayed during pH calibration procedure.	Wrong or contaminated buffer.	Check that buffer solution is correct and fresh.
Meter shuts off.	Dead batteries or Auto-off feature is enabled: in this case, meter shuts off after 20 min of non-use.	Replace the batteries; Press **ON/OFF**.
"**Er0**", "**Er1**", "**Er2**" message at start up.	EEPROM error.	Contact your dealer or any Hanna Service Center.
"**Clr**" message at start up.	Loaded default pH calibration values.	Perform pH calibration.

ACCESSORIES

pH CALIBRATION SOLUTIONS

HI 70004P	pH 4.01 Buffer Solution, 20 mL sachet, 25 pcs
HI 70007P	pH 7.01 Buffer Solution, 20 mL sachet, 25 pcs
HI 70010P	pH 10.01 Buffer Solution, 20 mL sachet, 25 pcs
HI 7004L	pH 4.01 Buffer Solution, 500 mL bottle
HI 7004M	pH 4.01 Buffer Solution, 230 mL bottle
HI 7006L	pH 6.86 Buffer Solution, 500 mL bottle
HI 7006M	pH 6.86 Buffer Solution, 230 mL bottle
HI 7007M	pH 7.01 Buffer Solution, 500 mL bottle
HI 7007M	pH 7.01 Buffer Solution, 230 mL bottle
HI 7009L	pH 9.18 Buffer Solution, 500 mL bottle
HI 7009M	pH 9.18 Buffer Solution, 230 mL bottle
HI 7010L	pH 10.01 Buffer Solution, 500 mL bottle
HI 7010M	pH 10.01 Buffer Solution, 230 mL bottle

ELECTRODE STORAGE SOLUTION

HI 70300L	Storage Solution, 500 mL bottle
HI 70300M	Storage Solution, 230 mL bottle

ELECTRODE CLEANING SOLUTIONS

HI 70000P	Electrode Rinse Solution, 20 mL sachet, 25 pcs
HI 7061L	General Cleaning Solution, 500 mL bottle
HI 7061M	General Cleaning Solution, 230 mL bottle
HI 7073L	Protein Cleaning Solution, 500 mL bottle
HI 7073M	Protein Cleaning Solution, 230 mL bottle
HI 7074L	Inorganic Cleaning Solution, 500 mL bottle
HI 7074M	Inorganic Cleaning Solution, 230 mL bottle
HI 7077L	Oil & Fat Cleaning Solution, 500 mL bottle
HI 7077M	Oil & Fat Cleaning Solution, 230 mL bottle

REFILLING ELECTROLYTE SOLUTIONS (50 mL, 4 pcs)

HI 7071	3.5M KCl + AgCl Electrolyte for single junction electrodes
HI 7072	1M KNO_3 Electrolyte
HI 7082	3.5M KCl Electrolyte for double junction electrodes
HI 8093	1M KCl + AgCl Electrolyte

ORP PRETREATMENT SOLUTIONS

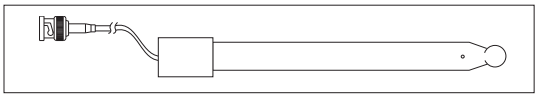
HI 7091L	Reducing Pretreatment Solution, 500 mL bottle
HI 7091M	Reducing Pretreatment Solution, 230 mL bottle
HI 7092L	Oxidizing Pretreatment Solution, 500 mL bottle
HI 7092M	Oxidizing Pretreatment Solution, 230 mL bottle

ORP SOLUTIONS

HI 7020L	Test Solution 200-275 mV, 500 mL bottle
HI 7020M	Test Solution 200-275 mV, 230 mL bottle
HI 7021L	Test Solution 240 mV, 500 mL bottle
HI 7021M	Test Solution 240 mV, 230 mL bottle
HI 7022L	Test Solution 470 mV, 500 mL bottle
HI 7022M	Test Solution 470 mV, 230 mL bottle

pH ELECTRODES

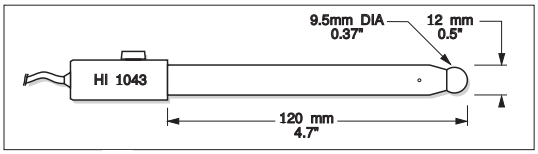
All electrodes part numbers ending in B are supplied with a BNC connector and 1 m (3.3') cable, as shown below:



HI 1043B

Glass-body, double junction, refillable, combination **pH** electrode.

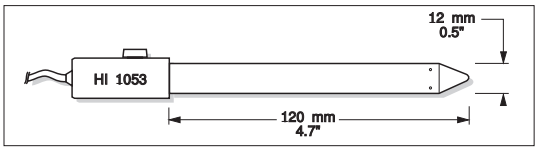
Use: strong acid/alkali.



HI 1053B

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

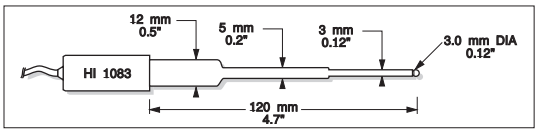
Use: emulsions.



HI 1083B

Glass-body, micro, Viscolene, non-refillable, combination **pH** electrode.

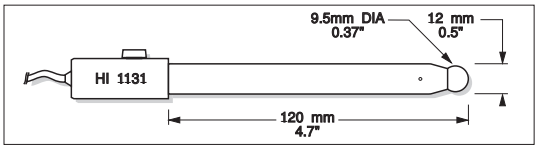
Use: biotechnology, micro titration.



HI 1131B

Glass-body, single junction, refillable, combination **pH** electrode.

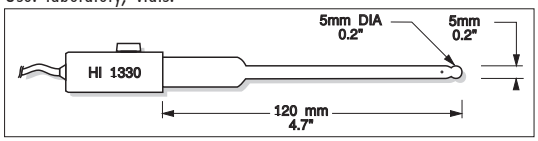
Use: general purpose.



HI 1330B

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

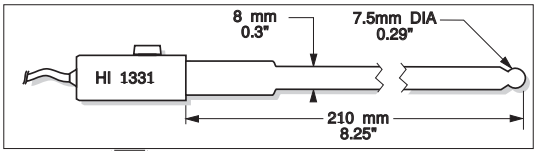
Use: laboratory, vials.



HI 1331B

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

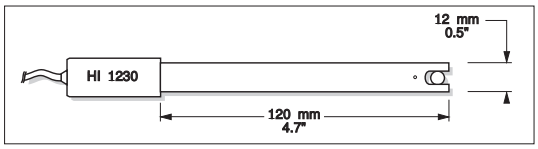
Use: flasks.



HI 1230B

Plastic-body (**PES**), double junction, gel-filled, combination **pH** electrode.

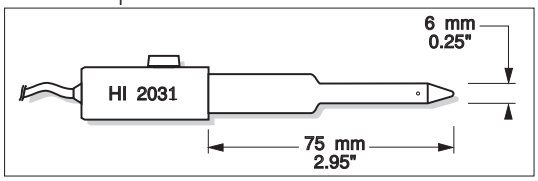
Use: general, field.



HI 2031B

Glass-body, semimicro, conic, refillable, combination **pH** electrode.

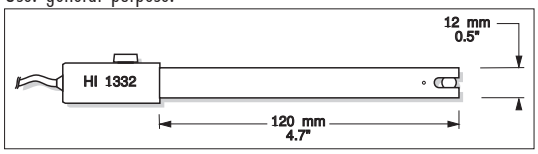
Use: semisolid products.



HI 1332B

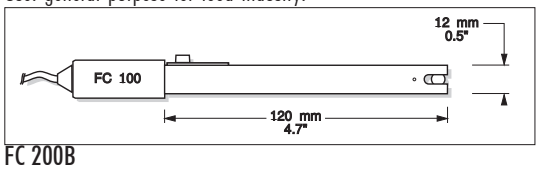
Plastic-body (**PES**), double junction, refillable, combination **pH** electrode.

Use: general purpose.



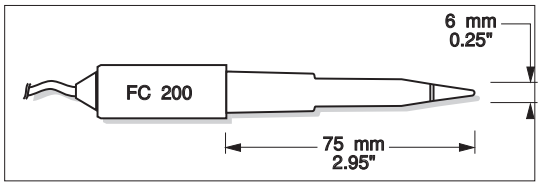
FC 100B

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



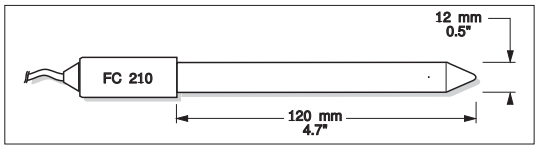
FC 200B

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



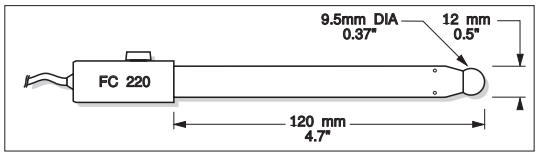
FC 210B

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



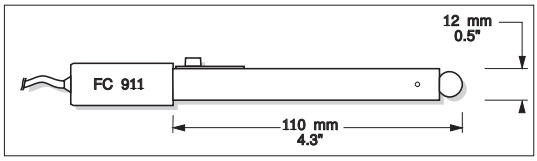
FC 220B

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



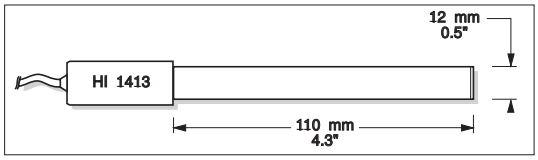
FC 911B

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



HI 1413B

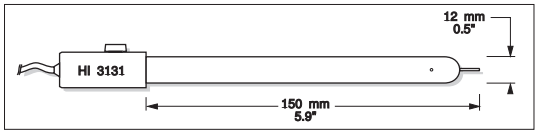
Glass-body, single junction, flat tip, Viscolene, non-refillable, combination **pH** electrode. Use: surface measurement.



ORP ELECTRODES

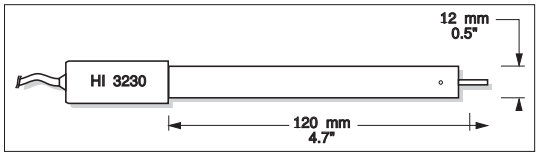
HI 3131B

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



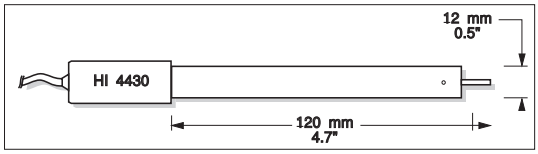
HI 3230B

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



HI 4430B

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



Consult the Hanna General Catalog for a complete and wide selection of electrodes.

OTHER ACCESSORIES

HI 721317	Rugged carrying case
HI 740157	Plastic electrode refilling pipet (20 pcs)
HI 76405	Electrode holder
HI 7662	Temperature probe with 1 m (3.3') screened cable
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

RECOMMENDATIONS FOR USERS

Before using these products, make sure 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, requiring the operator to follow all necessary steps to correct interferences.

The glass bulb at the end of the pH 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 instruments' EMC performance.

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

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

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Printed in EUROPE
(ROMANIA)

MAN9125Y 09/10