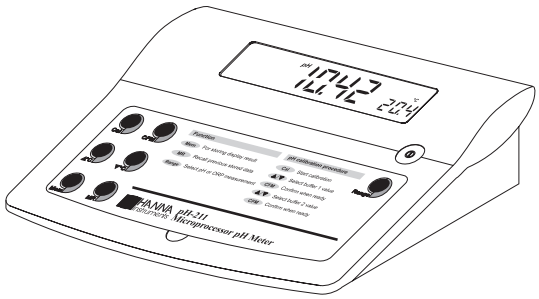
**Instruction Manual**

# pH211R

## Microprocessor-based Bench pH/mV/°C Meter with Analog Output




HANNA instruments®

www.hannainst.com

Dear Customer,

Thank you for choosing a Hanna Instruments Product.

Please read this instruction manual carefully before using the instrument.

This manual will provide you with all the necessary information for correct use of the instrument, as well as a precise idea of its versatility in a wide range of applications.

If you need additional technical information, do not hesitate to e-mail us at **tech@hannainst.com**.

This instrument is in compliance with the CE directives.

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## PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipping. If there is any damage, notify your Dealer.

Each meter is supplied with:

- **HI 1131B** glass body pH electrode with BNC and 1 m cable
- **HI 7669/2W** temperature probe
- **HI 76404** electrode holder
- pH 4.01 & pH 7.01 buffer solutions (20 mL each)
- **HI 7071S** electrolyte solution
- 12 Vdc power adapter
- Instruction manual

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

## GENERAL DESCRIPTION

The Hanna **pH 211R** is an advanced microprocessor based bench pH meter easy to operate, perfect for quality control laboratories.

**pH 211R** also measures in the temperature and mV ranges.

Temperature compensation is automatic thanks to the **HI 7669/2W** temperature probe supplied with the instrument. If necessary the user can also set temperature compensation manually.

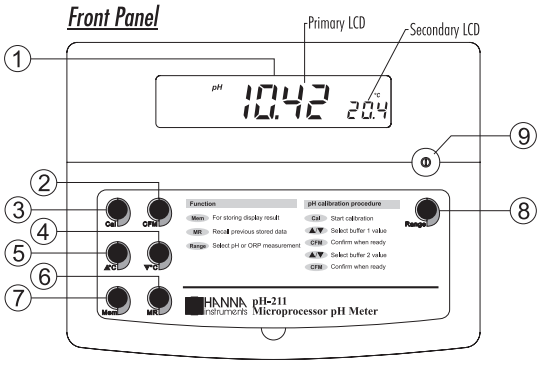
The large display shows pH (or mV) and temperature values simultaneously.

The user is guided through the calibration process with simple instructions on the display.

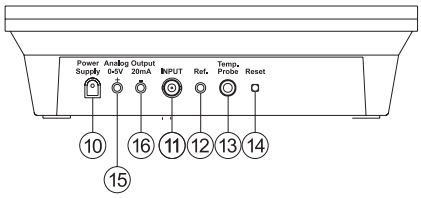
The meter also features 0 to 5 V analog output.

## FUNCTIONAL DESCRIPTION

*Front Panel*




*Rear Panel*




1) Liquid Crystal Display (LCD)
2) **CFM** key, to confirm calibration values
3) **CAL** key, to enter or exit calibration mode
4) ▼°C key, to manually decrease temperature or select pH buffer
5) ▲°C key, to manually increase temperature or select pH buffer
6) **MR** key, to recall the stored value
7) **MEM** key, to store a value in memory
8) **RANGE** key, to select measurement range
9) **ON/OFF** button, to switch the meter on and off
10) Socket for power adapter
11) BNC connector for measurement electrode
12) Reference electrode connector
13) Temperature probe socket
14) RESET button
15) Positive (+) analog output connector
16) Negative (-) analog output connector



## SPECIFICATIONS

| | |
|---|---|
| **Range** | -2.00 to 16.00 pH<br>±399.9 / ±2000 mV<br>-9.9 to 120.0°C |
| **Resolution** | 0.01 pH<br>0.1 / 1 mV<br>0.1°C |
| **Accuracy (@20°C/68°F)** | ±0.01 pH<br>±0.2 / ±1 mV<br>±0.5°C |
| **Typical EMC Deviation** | ±0.03 pH<br>±2 mV / ±0.3°C |
| **pH Calibration** | Automatic, 1 or 2 point<br>with 5 memorized buffers (pH 4.01, 6.86, 7.01, 9.18, 10.01) |
| **Temperature Compensation** | Automatic (with **HI 7669/2W** probe) or manual<br>-9.9 to 120°C (14 to 248°F) |
| **pH Electrode** | **HI 1131B** glass body, double junction, refillable,<br>BNC connector and 1 m cable (**included**) |
| **Temperature Probe** | **HI 7669/2W** (**included**) |
| **Input Impedance** | $10^{12}$ Ω |
| **Analog Output** | 0 to 5 VCC not isolated |
| **Analog Output Accuracy** | ±10 mV |
| **Power supply** | 12 Vdc adapter (**included**) |
| **Environment** | 0 to 50°C (32 to 122°F); RH max 95% |
| **Dimensions** | 240 x 182 x 74 mm (9.4 x 7.1 x 2.9") |
| **Weight** | 1.1 kg (2.4 lb.) |

## OPERATIONAL GUIDE

### Power Connection

Plug the 12 Vdc adapter into the power supply socket.

**Note:** Make sure the mains line is protected by a fuse.

### Electrode and Probe Connections

Connect the BNC of the pH or ORP electrode to the BNC socket on the rear panel.

For electrodes with a separate reference, connect the reference electrode plug to the reference socket (#12 on page 4).

For temperature measurements and automatic temperature compensation, connect the temperature probe to the appropriate socket.

**Note:** To prevent damage to the pH electrode, remove it from the solution before turning the meter off.

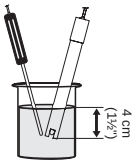
With the meter OFF, detach the electrode from the meter and immerse it in the storage solution.

### TAKING pH MEASUREMENTS

Make sure that the instrument has been calibrated for pH before taking pH measurements.

- Switch the instrument on by pressing the ON button. The meter automatically defaults to the pH measurement mode.

- Submerge the tip (4 cm / 1½") of the electrode and temperature probe into the sample to be tested. Allow a couple of minutes for the electrode to stabilize.




- The pH reading is displayed on the primary LCD and temperature on the secondary one.


- To view the mV reading, press the RANGE key.





If measurements are taken successively in different samples, it is recommended to rinse the electrode thoroughly with water and then with some of the next sample to be measured.

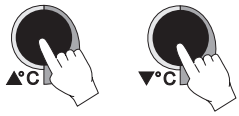
pH readings are affected by temperature. In order for the meter to measure the pH accurately, temperature must be taken into consideration. To use the Automatic Temperature Compensation (ATC) feature, submerge the **HI 7669/2W** temperature probe into the sample as close to the electrode as possible and wait for a couple of minutes.

If the temperature of the sample is known or tests are always performed at the same temperature, you can simply manually compensate for it. For this purpose the temperature probe must be disconnected.

The display will then show the default temperature of 25°C with the "°C" symbol blinking.


Note the temperature of the sample using a ***ChecktempC*** (**HI 98501**) or another accurate thermometer as reference.

The temperature can now be adjusted with the ▲°C and ▼°C keys.




### TAKING ORP MEASUREMENTS

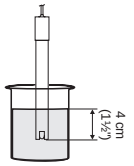
An optional ORP electrode must be used to perform ORP measurements (see accessories).

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.

- Switch the meter on and press the RANGE key to enter the mV mode.


- Submerge the ORP electrode tip (4 cm / 1½") into the sample. Allow a few minutes for the reading to stabilize.




- The meter displays the mV reading on the primary LCD.


- If reading is out of range, "---" will appear on the LCD.


## TAKING TEMPERATURE MEASUREMENTS

Connect the **HI 7669/2W** temperature probe to the proper socket on the rear panel and turn the instrument on. Dip the temperature probe in the sample and allow the reading to stabilize.

## HOLD FUNCTION

Press and hold the MEM key. The last reading will be frozen on the display until MEM is released. During this operation, the MEM indicator is also shown on the LCD.



Press MR to recall the previously memorized reading. The value will be displayed with the MEM indicator on the LCD.




## OUTPUT RECORDER FUNCTION

Connect the recorder to the analog output socket and turn the instrument ON. The value on the analog output will be related with the pH or mV value displayed on the LCD as follows:

| | | | |
|---|---|---|---|
| pH: | 0 | 7 | 14 |
| mV: | -2000 | 0 | 2000 |
| analog output: | 0 V | 2.5 V | 5 V |

## RESET

The RESET button (#14 on page 4) should only be used when the instrument displays erroneous messages due to strong electrical interference or when the power supply was disconnected before switching the meter off.

After pressing RESET, always recelibrate the unit before proceeding.

# pH CALIBRATION

Frequent calibration is recommended. Moreover, the instrument should be re-calibrated for pH:

a) whenever the pH electrode is replaced
b) at least once a week
c) after testing aggressive chemicals
d) if higher accuracy is required
e) after the RESET button has been pressed

## PREPARATION

Pour small quantities of the buffer solutions into clean beakers. If possible use plastic beakers to minimize any EMC interferences.

For accurate calibration and to minimize cross contamination use two beakers for each buffer solution. One for rinsing the electrode and the second for calibration.

If you are measuring in the acid range, use pH 4.01 as second buffer; if you are measuring in the alkaline range, use pH 10.01 or pH 9.18 as second buffer.

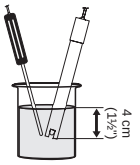
## PROCEDURE

Five memorized buffer values are available for calibration: pH 4.01, 6.86, 7.01, 9.18 and 10.01.

Calibration can be performed at 1 or 2 points. For best accuracy, a 2 point calibration is recommended.

## One-Point Calibration

- Immerse pH electrode and temperature probe approximately 4 cm (1½") into any of the available buffer solutions (pH 4.01, 6.86, 7.01, 9.18 or 10.01) and stir gently. The temperature probe should be close to the pH electrode.



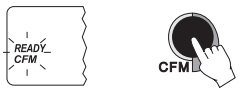

- Press CAL. The "CAL" and "BUF 1" indicators, and "7.01" will be displayed.


**Note:** The buffer value displayed on the secondary LCD, varies with temperature. For example, at 20ºC it shows 4.00, 7.03 and 10.06, while at 25ºC it shows 4.01, 7.01 and 10.01.

- If necessary, press ▲°C or ▼°C to select a different buffer value.

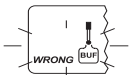

- The "NOT READY" indication will blink on the LCD until the reading has stabilized.


- When the reading is stable, "READY" and "CFM" will blink. Press CFM to confirm the calibration.




- If the reading is close to the selected buffer value, the meter stores the calibration point. The "Stor" message appears on the LCD for 1 second, then the buffer value is displayed on the primary LCD and the secondary LCD displays the second expected buffer value.


- If the measured value is not close to the selected buffer, the "WRONG BUF " and "WRONG " symbols will blink alternately.




In this case check if the correct buffer has been used or refresh the electrode by following the maintenance procedure (see "Electrode Maintenance" section). If necessary change the buffer or the electrode.

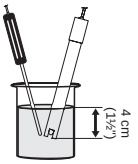


- Press CAL to quit calibration. The meter will save the one-point calibration data and return to normal mode.

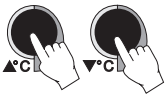

## Two-Point Calibration

Any two of the 5 memorized buffers can be used for this purpose. However, it is recommended to choose pH 6.86 or 7.01 as the first point and pH 4.01 (acidic sample) or pH 9.18/10.01 (alkaline environment) as the second point.

- After the first calibration point is confirmed, immerse pH electrode and temperature probe approx. 4 cm (1½") in the second buffer solution and stir gently. The temperature probe should be close to the pH electrode.




- If necessary, press ▲°C or ▼°C to select a different buffer value.

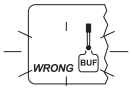



**Note:** The meter will automatically skip the buffer used for the first point. It also skips pH 6.86 if 7.01 was used, and viceversa, and pH 9.18 if 10.01 was used, and viceversa.

- The "NOT READY" indication will blink on LCD until the reading has stabilized.


- When the reading is stable, "READY" and "CFM" will blink. Press CFM to confirm the calibration.


- If the reading is close to the selected buffer, the meter stores the calibration point, displays the "Stor" message for 1 second and returns to normal operational mode.
- If the measured value is not close to the selected buffer, "WRONG BUF" and "WRONG " will blink alternately.



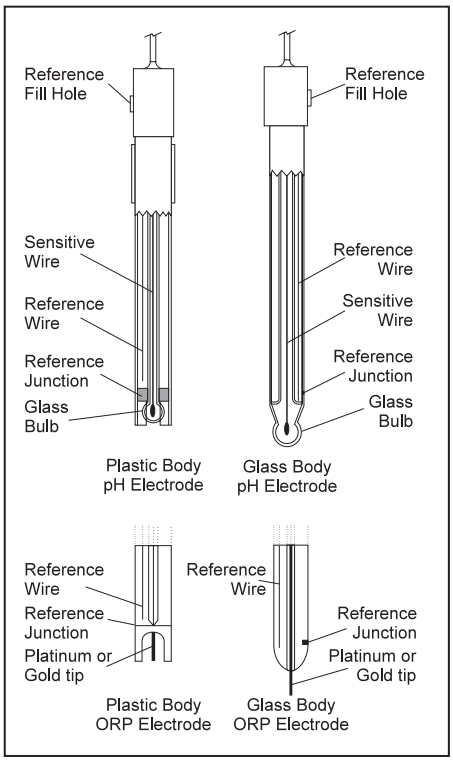

In this case check if the correct buffer has been used, or refresh the electrode by following the maintenance procedure (see "Electrode Maintenance" section). If necessary change buffer or electrode.

**Note:** Press RANGE to display the temperature reading on the LCD during calibration.

## ELECTRODE CONDITIONING & MAINTENANCE

**Note:** To prevent damage to the pH electrode, remove it from the solution before turning the meter off.

With the meter OFF, detach the electrode from the instrument and immerse it in the storage solution.




## PREPARATION

Remove the protective cap.

DO NOT BE ALARMED IF SALT DEPOSITS ARE PRESENT. This is normal with electrodes and they will disappear when rinsed with water.

During transport tiny bubbles of air may form inside the glass bulb affecting proper functioning of the electrode. These bubbles can be removed by "shaking down" the electrode as you would do with a glass thermometer.

If the bulb and/or junction is dry, soak the electrode in **HI 70300** storage solution for at least one hour.



### For refillable electrodes

If the filling solution (electrolyte) is more than 2.5 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 a faster response, unscrew the fill hole screw during measurements.

### For AmpHel® electrodes

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

## MEASUREMENT

Rinse the electrode tip with distilled water. Immerse the tip (bottom 4 cm /1½") 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 a few drops of the solution to be tested, before taking 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.

Replace the solution in the protective cap with a few drops of **HI 70300** storage solution or, in its absence, filling solution (**HI 7071** for single junction or **HI 7082** for double junction electrodes). 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 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 reference chamber 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.

## CLEANING PROCEDURE

General Soak in Hanna **HI 7061** general cleaning solution for approximately 30 minutes.

Removal of films, dirt or deposits on the membrane/junction:

- *Protein* Soak in Hanna **HI 7073 p**rotein cleaning solution for 15 minutes.
- *Inorganic* Soak in Hanna **HI 7074** inorganic cleaning solution for 15 minutes.
- *Oil/grease* Rinse with **HI 7077** Oil & Fat cleaning solution.

**IMPORTANT:** After performing any of the cleaning procedures rinse the electrode thoroughly with distilled water, 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 measurements.

## TROUBLESHOOTING

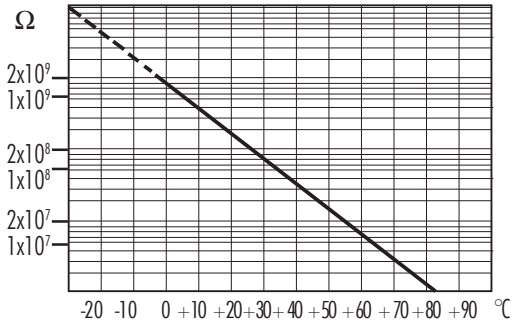
Evaluate the performance of your electrode based on the following.

- **Noise** (readings fluctuate up and down) could be due to:
  - **Clogged/Dirty Junction:** refer to the Cleaning Procedure.
  - **Loss of shielding** due to low electrolyte level (in refillable electrodes only): refill with fresh **HI 7071** for single junction or **HI 7082** for double junction electrodes.
- **Dry Membrane/Junction:** soak in **HI 70300** storage solution for at least 1 hour.
- **Drifting:** soak the electrode tip in warm (approx. 50-60°C) Hanna **HI 7082** solution for one hour and rinse the tip with distilled water. Refill with fresh **HI 7071** for single junction electrodes and **HI 7082** for double junction electrodes (refillable electrodes only).
- **Low Slope:** refer to the cleaning procedure above.
- **No Slope:** check the electrode for cracks in glass stem or bulb and replace the electrode.
- **Slow Response/Excessive Drift:** soak the tip in **HI 7061** solution for 30 minutes, rinse thoroughly in distilled water and then follow the Cleaning Procedure above.



## TEMPERATURE-RESISTANCE CORRELATION FOR HANNA pH SENSITIVE GLASS

The resistance of glass electrodes partially depends on the temperature. The lower the temperature, the higher the resistance. It takes longer 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 10°C.




Since the resistance of the pH electrode is in the range of 200 Mohm, 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** are 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.

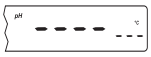
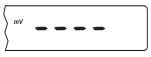
| **Typical Electrode Life** | |
|---|---|
| **Ambient Temperature** | **1- 3 years** |
| **90 °C** | **Less than 4 months** |
| **120°C** | **Less than 1 month** |

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 the alkaline error and causes the pH to be underestimated. Hanna's glass formulations have the indicated characteristics.

**Alkaline Error**

| Sodium Ion Correction for the 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 |

## TROUBLESHOOTING GUIDE

| Symptoms | Problem | Solution |
|---|---|---|
| The meter is slow in responding or gives faulty readings | 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 for calibration | Out of order pH electrode | Follow the cleaning procedure. If this doesn't work replace the electrode |
| The reading drifts | Defective pH electrode | Replace the electrode |
| Display shows:  | Out of range pH scale | a) Recalibrate<br>b) Make sure the pH sample is in the 0 to 14 range<br>c) Check the electrolyte level and the general state of the pH electrode |
| Display shows:  | Out of range temperature scale | Make sure the temperature is in the 0 to 100°C range and the temperature probe is plugged in |
| Display shows:  | Out of range mV scale | Electrode not connected |
| Display shows: "WRONG BUF1" and "WRONG" | Erroneous buffer solution used for offset calibration | Make sure the buffer setting is correct and the solution is fresh. Replace the buffer if necessary |
| | Defective electrode | Replace the electrode |
| Display shows: "WRONG BUF2" and "WRONG" | Erroneous buffer solution used for slope calibration | Make sure the buffer setting is correct and the solution is fresh. Replace the buffer if necessary |
| | Defective electrode | Replace the electrode |
| The meter does not work with the temperature probe | Out of order temperature probe | Replace the probe |
| The meter fails to calibrate or gives faulty readings | Out of order pH electrode | Replace the electrode |



## 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 7006L** pH 6.86 buffer solution, 500 mL bottle
**HI 7007L** pH 7.01 buffer solution, 500 mL bottle
**HI 7009L** pH 9.18 buffer solution, 500 mL bottle
**HI 7010L** pH 10.01 buffer solution, 500 mL bottle
**HI 8004L** pH 4.01 buffer solution in FDA bottle, 500 mL
**HI 8006L** pH 6.86 buffer solution in FDA bottle, 500 mL
**HI 8007L** pH 7.01 buffer solution in FDA bottle, 500 mL
**HI 8009L** pH 9.18 buffer solution in FDA bottle, 500 mL
**HI 8010L** pH 10.01 buffer solution in FDA bottle, 500 mL

### ELECTRODE MAINTENANCE SOLUTIONS

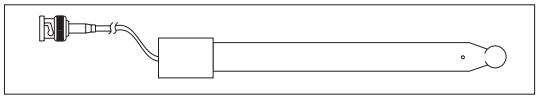
**HI 70300L** Storage solution, 500 mL bottle
**HI 80300L** Storage solution in FDA bottle, 500 mL
**HI 70000P** Rinsing solution, 20 mL sachet, 25 pcs
**HI 7061L** General cleaning solution, 500 mL bottle
**HI 8061L** General cleaning solution in FDA bottle, 500 mL
**HI 7073L** Protein cleaning solution, 500 mL bottle
**HI 8073L** Protein cleaning solution in FDA bottle, 500 mL
**HI 7074L** Inorganic cleaning solution, 500 mL bottle
**HI 7077L** Oil & Fat cleaning solution, 500 mL bottle
**HI 8077L** Oil & Fat cleaning solution in FDA bottle, 500 mL
**HI 7071** 3.5M KCl+AgCl electrolyte solution, 4 x 50 mL bottle, for single junction electrodes
**HI 8071** 3.5M KCl+AgCl electrolyte solution in FDA bottle, 4 x 50 mL, for single junction electrodes
**HI 7072** 1M $KNO_3$ electrolyte solution, 4 x 50 mL bottle
**HI 8072** 1M $KNO_3$ electrolyte solution in FDA bottle, 4 x 50 mL
**HI 7082** 3.5M KCl electrolyte solution 4 x 50 mL bottle, for double junction electrodes
**HI 8082** 3.5M KCl electrolyte solution in FDA bottle, 4 x 50 mL, for double junction electrodes

## ORP PRETREATMENT SOLUTIONS

**HI 7091L** Reducing pretreatment solution, 500 mL bottle
**HI 7092L** Oxidizing pretreatment solution, 500 mL bottle

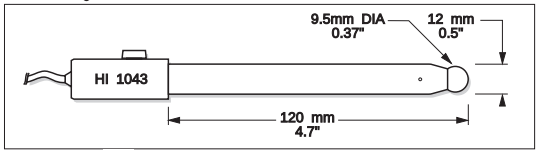
## pH ELECTRODES

All electrode part numbers ending in B are supplied with BNC connector and 1 m (3.3') cable.



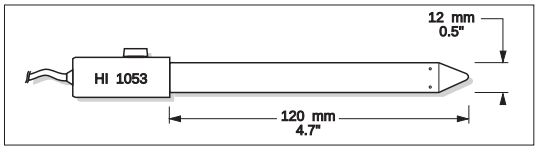
### HI 1043B

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



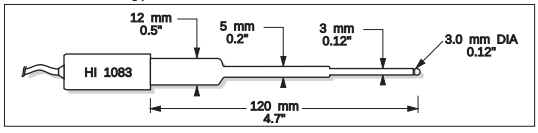

### HI 1053B

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



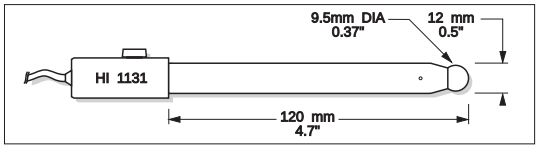

### HI 1083B

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




### HI 1131B

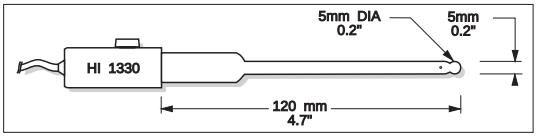
Glass body, single junction, refillable, combination pH electrode. Use: general purpose.





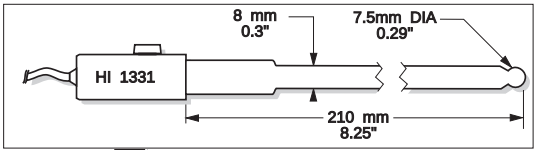

### HI 1330B

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



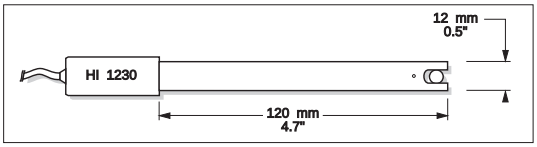

### HI 1331B

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



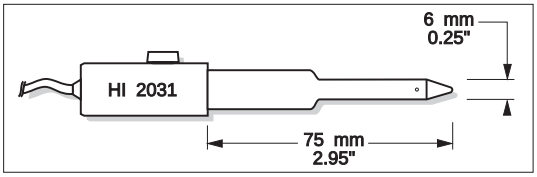

### HI 1230B

Plastic body, double junction, gel-filled, combination pH electrode. Use: general, field.



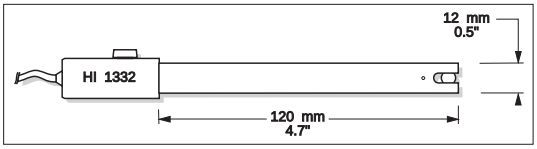

### HI 2031B

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



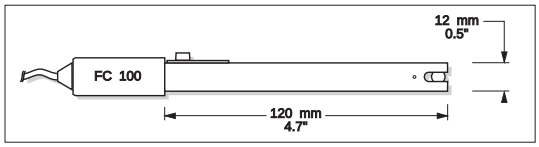

### HI 1332B

Plastic body, double junction, refillable, combination pH electrode. Use: general purpose.



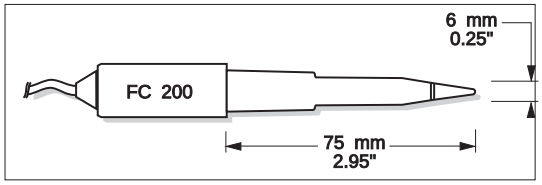
### FC 100B

PVDF body, double junction, refillable, combination pH electrode. Use: general purpose for food industry.



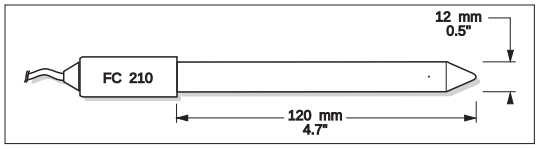

### FC 200B

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



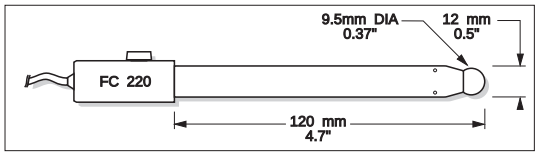

### FC 210B

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



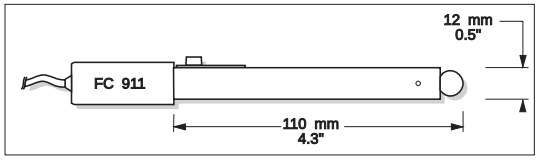

### FC 220B

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




### FC 911B

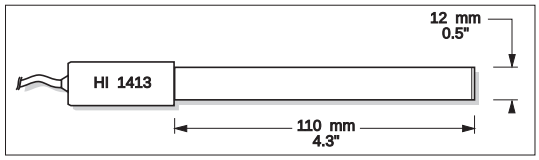
PVDF body, double junction, refillable with built-in amplifier, combination pH electrode. Use: very high humidity.






### HI 1413B

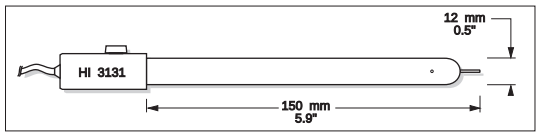
Glass body, single junction, flat tip, Viscolene, non-refillable, combination pH electrode. Use: surface measurement.




## ORP ELECTRODES

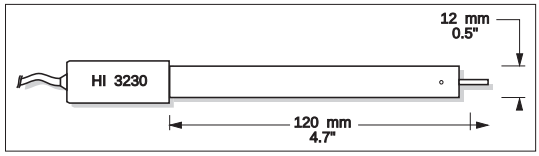
### HI 3131B

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



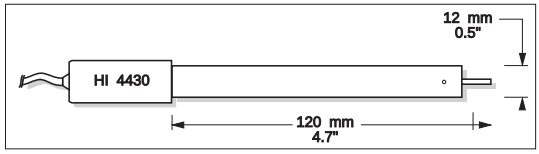

### HI 3230B

Plastic body, gel-filled, combination platinum ORP electrode. Use: general purpose.



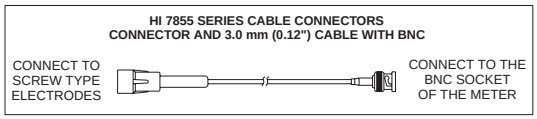

### HI 4430B

Plastic body, gel-filled, combination gold ORP electrode. Use: general purpose.



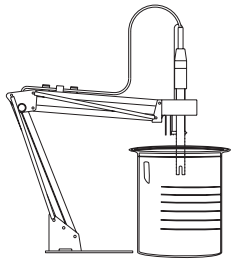
Extension cables for screw-type electrodes (screw to BNC adapter)

**HI 7855/1** Extension cable 1 m (3.3') long
**HI 7855/3** Extension cable 3 m (9.9') long




## OTHER ACCESSORIES

**HI 710005** Voltage adapter, 115 Vac / 12 Vdc, US plug
**HI 710006** Voltage adapter, 230 Vac / 12 Vdc, European plug
**HI 710012** Voltage adapter, 230 Vac / 12 Vdc, UK plug
**HI 710013** Voltage adapter, 230 Vac / 12 Vdc, S.Africa plug
**HI 710014** Voltage adapter, 230 Vac / 12 Vdc, Australian plug
**HI 76404** Electrode holder



**HI 7669/2W** Temperature probe with 1 m (3.3') cable
**HI 8427** pH/ORP electrode simulator
**HI 931001** pH/ORP electrode simulator with LCD
**HI 98501** ***ChecktempC*** pocket-size thermometer (range: -50.0 to 150.0°C)



## WARRANTY

All Hanna Instruments **meters 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 a period of six months**.
This warranty is limited to repair or replacement free of charge.
Damage 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.



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

Recommendations for Users

Before using this product, make sure that it is entirely suitable for the environment in which it is used. Operation of this instrument in residential areas could cause unacceptable interferences to radio and TV equipment, requiring the operator to take 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 instrument's EMC performance.
To avoid electrical shock, do not use this instrument when voltages at the measurement surface exceed 24 Vac or 60 Vdc.
To avoid damages or burns, do not perform any measurement in microwave ovens.

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