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## Instruction Manual

# HI 8614 • HI 8614L HI8615 • HI8615L

## pH and ORP Transmitters



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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 the correct use of the instrument.

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.

## TABLE OF CONTENTS

|   |    |
|---|----|
| Preliminary Examination .....   | 3  |
| General Description .....   | 3  |
| Specifications of HI 8614 & HI 8614L .....  | 5  |
| Specifications of HI 8615 & HI 8615L .....  | 6  |
| Terminal Board Connections .....  | 7  |
| pH Calibration with Automatic Temperature Compensation (HI 8614 & HI 8614L) ..... | 9  |
| pH Calibration with Manual Temperature Compensation (HI 8614 & HI 8614L) .....    | 13 |
| ORP Calibration (HI 8615 & HI 8615L) ....   | 14 |
| Electrode Conditioning and Maintenance ..   | 19 |
| Temperature-Resistance Correlation for HANNA pH Sensitive Glass .....             | 23 |
| Installation Procedure and Examples .....   | 25 |
| Accessories .....   | 28 |
| Warranty .....  | 34 |
| CE Declaration of Conformity .....  | 35 |

## 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 noticeable damage, notify your Dealer.

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

## GENERAL DESCRIPTION

**HI 8614 / HI 8614L** (pH) and **HI 8615 / HI 8615L** (ORP) are 2-wire water-resistant transmitters specially designed for long distance measurement of pH or ORP in industrial applications.

Two versions are available: the standard **HI 8614** and **HI 8615**, and the **HI 8614L** and **HI 8615L** models with LCD.

The LCD allows easy verification and monitoring of measured values, and provides easier calibration and maintainance.

The pH or ORP signal is transmitted in a 2-wire current loop in the range of 4 to 20 mA.

**HI 8614** and **HI 8614L** can be connected to the Hanna process instruments **HI 8510T**, **HI 8710T** or **HI 8711T**, or to any recorder, computer or data monitoring device that accepts 4 to 20 mA input.

**HI 8615** and **HI 8615L** can be connected to the Hanna meters **HI 8512T**, **HI 8720T** or to any recorder, computer or data monitor that accepts 4 to 20 mA input.

The transmitters use a universal BNC socket for quick and secure connection to any electrode with a BNC connector.

For **HI8614** and **HI8614L** the temperature compensation is performed by the transmitter's ATC circuitry if the temperature probe (**HI76608**, optional) is attached. If ATC is not required, it is possible to substitute the temperature probe with a fixed resistor.

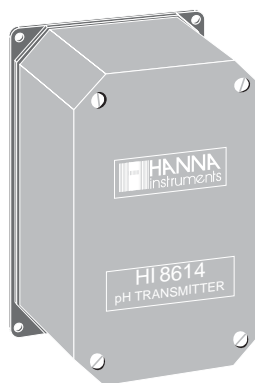
The input is isolated from the current loop to eliminate problems related to ground loop, low insulation cables, multiple electrode connections, and a common mode voltage of up to 100 V ensures true differential readings.

The terminal board of the transmitter provides for connection of power supply, pH or ORP electrodes and temperature probe (for **HI8614** and **HI8614L** models only).

The unit is enclosed in a protective casing conforming to IP 65 standards.

## SPECIFICATIONS OF HI8614 & HI8614L

|                                 |   |
|---------------------------------|---|
| <b>Range</b>                    | 4 to 20 mA / 0.00 to 14.00 pH   |
| <b>Resolution</b>               | 0.01 mA / 0.01 pH   |
| <b>Accuracy (@20°C/68°F)</b>    | ±0.02 mA / ±0.02 pH   |
| <b>Typical EMC Deviation</b>    | ±0.25 mA / ±0.2 pH  |
| <b>Calibration</b>              | Offset: ±2.2 mA / ±2 pH<br>Slope: ±0.5 mA / 86 to 116%                        |
| <b>Temperature Compensation</b> | Fixed or automatic from 0 to 100°C<br>(32 to 212°F) with <b>HI76608</b> probe |
| <b>Input Impedance</b>          | 10 <sup>12</sup> Ohm  |
| <b>Output</b>                   | 4-20 mA (isolated)  |
| <b>Installation Category</b>    | II  |
| <b>Protection</b>               | IP 65   |
| <b>Environment</b>              | 0 to 50°C (32 to 122°F);<br>RH max 95% non-condensing                         |
| <b>Power Supply</b>             | <b>HI8614:</b> 18 to 30 Vdc<br><b>HI8614L:</b> 20 to 36 Vdc                   |
| <b>Load</b>                     | Max 500 Ohm   |
| <b>Dimensions</b>               | 165 x 110 x 90 mm<br>(6.5 x 4.3 x 3.5")                                       |
| <b>Weight</b>                   | 1 kg (2.2 lb.)  |



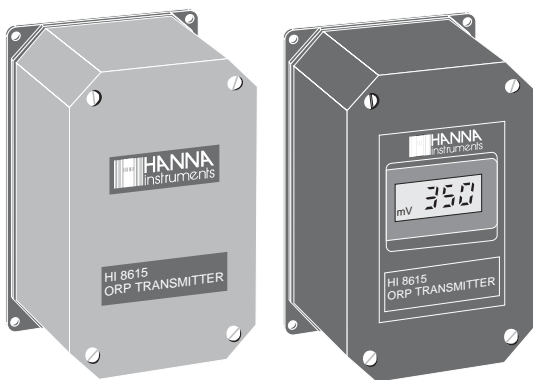
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5

## SPECIFICATIONS OF HI8615 & HI8615L

|                              |   |
|------------------------------|---|
| <b>Range</b>                 | 4 to 20 mA / $\pm 1000$ mV  |
| <b>Resolution</b>            | 0.01 mA / 1 mV  |
| <b>Accuracy (@20°C/68°F)</b> | $\pm 0.02$ mA / $\pm 5$ mV  |
| <b>Typical EMC Deviation</b> | $\pm 0.25$ mA / $\pm 15$ mV   |
| <b>Calibration</b>           | Offset: $\pm 0.8$ mA / $\pm 100$ mV<br>Slope: $\pm 0.8$ mA / 90 to 110% |
| <b>Input Impedance</b>       | $10^{12}$ Ohm   |
| <b>Output</b>                | 4-20 mA (isolated)  |
| <b>Installation Category</b> | II  |
| <b>Protection</b>            | IP 65   |
| <b>Environment</b>           | 0 to 50°C (32 to 122°F);<br>RH max 95% non-condensing                   |
| <b>Power Supply</b>          | <b>HI8615:</b> 18 to 30 Vdc<br><b>HI8615L:</b> 20 to 36 Vdc             |
| <b>Load</b>                  | Max 500 Ohm   |
| <b>Dimensions</b>            | 165 x 110 x 90 mm<br>(6.5 x 4.3 x 3.5")                                 |
| <b>Weight</b>                | 1 kg (2.2 lb.)  |

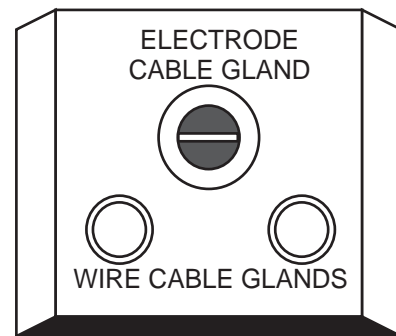


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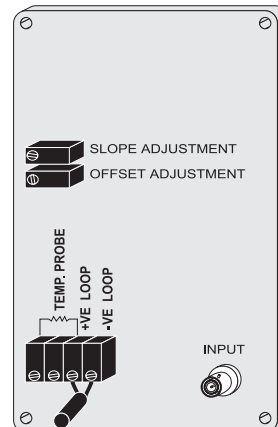
## TERMINAL BOARD CONNECTIONS

Unscrew the 4 screws and remove the top cover.

There are three cable glands on the transmitter cover. The large cable gland with the split in the rubber is for the electrode.



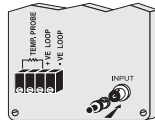
Connect the positive supply to the strip terminal "+VE LOOP" and the negative supply to the terminal "-VE LOOP" of the transmitter terminal block.



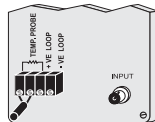
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The wire between the transmitter and the recorder/indicator/controller should be a PVC insulated two wire with a wire diameter of at least 0.7 mm. This wire is fed through one of the smaller cable glands. The maximum distance between the power supply and the amplifier is 300 m (1000'). It is not necessary to use shielded cable. The transmitter is protected against inversion of supply voltage.

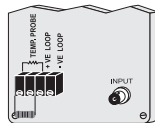
**Electrode connection:** connect the BNC of the cable to the BNC socket on the transmitter.



**For HI 8614 & HI 8614L only:** for automatic temperature compensation, connect the 2 terminals of the temperature probe (HI 76608, optional) to "TEMP. PROBE" terminals.



If automatic temperature compensation is not required, short the "TEMP. PROBE" terminals with a resistance according to the external temperature:



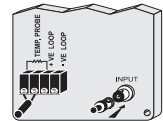
| Temperature (°C) | Resistance(Ohms) |
|------------------|------------------|
| 0                | 1634             |
| 10               | 1774             |
| 20               | 1922             |
| 30               | 2078             |
| 40               | 2242             |
| 50               | 2412             |
| 60               | 2590             |

A 2 kohm resistor is factory mounted for 25°C temperature compensation.

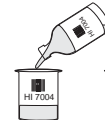
## pH CALIBRATION WITH AUTOMATIC TEMPERATURE COMPENSATION (HI 8614 & HI 8614L)

### Initial preparation

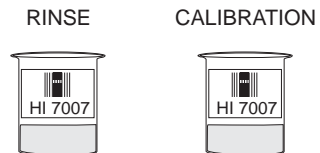
- Connect the pH electrode to the BNC socket.
- Connect the temperature probe to the transmitter.



Pour small quantities of pH 7.01 and pH 4.01 solution into two clean beakers.



For accurate calibration use two beakers for each buffer solution, the first one for rinsing the electrode, the second one for calibration.

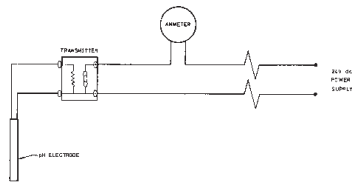


To get accurate readings, use pH 7.01 and pH 4.01 if you are going to measure acid samples or pH 7.01 and pH 10.01 for alkaline measurements.

**Note:** with **HI 8614L** the instruments display can be used during calibration without the need to connect the ammeter and the reading is directly expressed in pH units.

**Procedure**

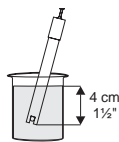
- Disconnect the +ve supply cable from "+VE LOOP" terminal and connect a 20mA f.s. ammeter between the +ve cable and "+VE LOOP" terminal.



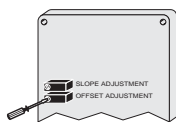
- Remove the protective cap from the electrode, rinse it with some pH 7.01 solution or immerse it in the pH 7 rinse solution, then immerse the pH electrode and temperature probe into pH 7.01 calibration buffer solution; shake briefly and wait for the reading to stabilize.



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

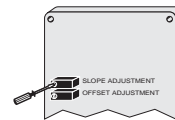


- Adjust the offset trimmer until the ammeter reads 12mA or the display shows "7.01" (**HI 8614L** only) if the temperature of the buffer is at 25°C.

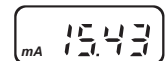


For other buffer temperatures, refer to page 13 for the appropriate mA / pH reading.

- Rinse the electrode with tap water or distilled water and a small amount of pH 4.01 or 10.01 buffer solution or immerse it in the pH 4 rinse solution (2nd calibration point). Dip the electrode and the temperature probe into pH 4.01 (or 10.01) calibration buffer solution, shake briefly and wait for a few minutes for reading to stabilize.
- Adjust the slope trimmer until the ammeter reads 8.58 mA or the display shows "4.01" at 25°C. For other buffer temperatures, refer to page 13 for the appropriate mA / pH reading (**HI 8614L**).



If you are using pH 10.01 buffer solution adjust the slope trimmer until the ammeter read 15.43 mA at 25°C (77°F) or the value indicated at page 13.



**FOR HI8614L ONLY**

The Display Module is factory calibrated, so that the LCD display results are referred to the 4-20 mA loop current (e.g. LCD displays 0.00 pH when loop current is 4.00 mA and displays 14.00 pH when current is 20.00 mA).

Under normal application, adjustment on this module may not be necessary.

If routine check is required, the following procedures shall be performed.

- Calibrate the transmitter module using an ammeter, as explained in the previous pages.
- Simulate a 4.00 mA loop current for the transmitter (i.e. pH 0.00 as Electrode input) and check for display reading.
- Simulate a 20.00 mA loop current for the transmitter (i.e. pH 14.00 as Electrode input) and check for display reading.

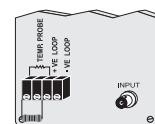
**Note:** when the instrument is used in conjunction with the Hanna indicator **HI 8510T** or controllers **HI 8710T**, **HI 8711T**, the calibration can also be performed on the indicator/controller. In this case slight calibration adjustment can be made on the indicator/controller even if the whole system calibration is advised, always starting from the transmitter.

### pH CALIBRATION WITH FIXED TEMPERATURE COMPENSATION (HI 8614 & HI 8614L only)

- Take the temperature of the buffer solutions using a Checktemp or a thermometer with a resolution of at least 1°.



- Connect the appropriate resistor to the "TEMP. PROBE" terminals (see page 6) depending on the temperature of the calibration solution.



- Follow the procedure as outlined in the calibration with automatic temperature compensation and use the thermometer reading to adjust the trimmer until the ammeter reads the value according to the following table.

| Temperature |     | pH 4.01 Buffer |       | pH 7.01 Buffer |        | pH 10.01 Buffer |        |
|-------------|-----|----------------|-------|----------------|--------|-----------------|--------|
| °C          | °F  | pH             | m A   | pH             | m A    | pH              | m A    |
| 0           | 32  | 4.01           | 8.576 | 7.13           | 12.137 | 10.32           | 15.789 |
| 5           | 41  | 4.00           | 8.565 | 7.10           | 12.103 | 10.24           | 15.697 |
| 10          | 50  | 4.00           | 8.565 | 7.07           | 12.069 | 10.18           | 15.629 |
| 15          | 59  | 4.00           | 8.565 | 7.04           | 12.034 | 10.12           | 15.560 |
| 20          | 68  | 4.00           | 8.565 | 7.03           | 12.023 | 10.06           | 15.491 |
| 25          | 77  | 4.01           | 8.576 | 7.01           | 12.000 | 10.01           | 15.434 |
| 30          | 86  | 4.02           | 8.587 | 7.00           | 11.989 | 9.96            | 15.377 |
| 35          | 95  | 4.03           | 8.599 | 6.99           | 11.977 | 9.92            | 15.331 |
| 40          | 104 | 4.04           | 8.610 | 6.98           | 11.966 | 9.88            | 15.285 |
| 45          | 113 | 4.05           | 8.622 | 6.98           | 11.966 | 9.85            | 15.251 |
| 50          | 122 | 4.06           | 8.633 | 6.98           | 11.966 | 9.82            | 15.217 |
| 55          | 131 | 4.07           | 8.645 | 6.98           | 11.966 | 9.79            | 15.182 |
| 60          | 140 | 4.09           | 8.667 | 6.98           | 11.966 | 9.77            | 15.159 |

## ORP CALIBRATION (HI8615 & HI8615L)

### Initial preparation

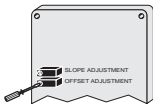
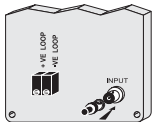
Disconnect the +ve supply cable from the "+VE LOOP" terminal and connect a 20 mA f.s. ammeter between the +ve cable and the "+VE LOOP" terminal. With **HI 8615L** the instrument display can be used during calibration without the need to connect the ammeter. In this case the values are directly expressed in mV units.

Pour a small quantity of HI 7020 ORP solution into a beaker.

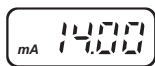
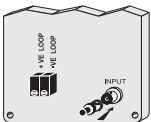


### Procedure

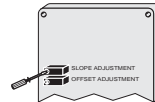
- Connect the shorting BNC connector to the ORP transmitter.
- Adjust the OFFSET ADJUSTMENT trimmer on the module for a display of 12 mA on the ammeter or 0 mV on the instrument display (**HI 8615L** only). This sets the zero point for the transmitter.



- Connect the ORP electrode to the transmitter and immerse the tip of the electrode into a beaker of HI7020 ORP calibration solution, and check that the ammeter reading lies between 13.6 and 14.2 mA or the instrument reading is between 200 and 275 mV at 25°C (**HI 8615L**).



- If the reading lies outside this range, adjust the slope adjustment trimmer on the transmitter for a reading just within this range.



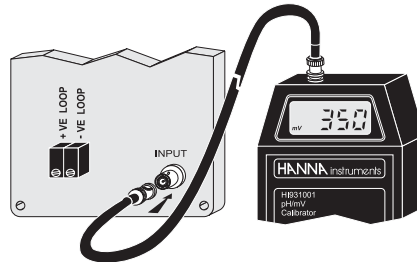
The unit is now calibrated.

A complete calibration of the transmitter module is advised periodically.

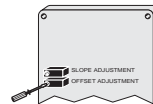
This calibration procedure requires the **HI 8427** or the **HI 931001** pH and ORP simulator to simulate the ORP electrode.

**HI 8427** or **HI 931001** produce a known signal into the system so that the faults of the system can be isolated.

- Connect the ORP transmitter to the simulator.



- Set the simulator to 0 mV and adjust the offset trimmer to read 12 mA on the ammeter or 0 mV on the HI 8615L display (**HI 8615L** only).





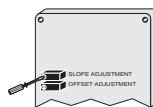
- Set the simulator to 350 mV and adjust the slope trimmer to read 14.8 mA on the ammeter or 350 mV on the HI 8615L display (HI 8615L only).



- Connect the ORP electrode to the module and immerse the tip of the electrode into the beaker of HI 7020 ORP solution and check that the ammeter reading lies between 13.6 and 14.2 mA or the instrument reading is between 200 and 275 mV at 25°C (HI 8615L only).



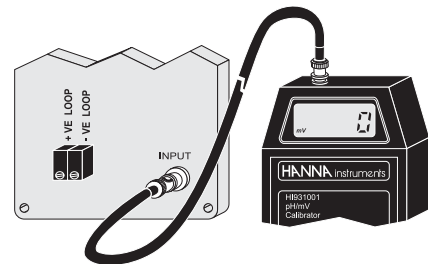
- Only if the reading lies outside this range, adjust the slope adjustment trimmer on the transmitter to reflect a reading within this range.



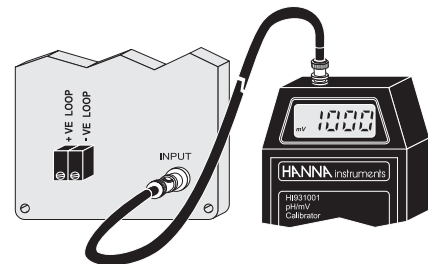
### **FOR HI8615L ONLY**

The HI 8615L is factory calibrated, and the displayed values are referenced to the 4-20 mA loop current (e.g. LCD displays -1000 mV when loop current is 4.00 mA and displays +1000 mV when current is 20.00 mA). Under normal application, adjustment on this module may not be necessary. If routine check is required, the following procedures shall be performed.

- Follow the above procedure for HI8615 (see page 12).
- Simulate a 12.00 mA loop current for the transmitter (i.e. 0 mV at Electrode input) and check display reading.



- Simulate a 20.00 mA loop current for the transmitter (e.g. +1000 mV at Electrode input) and check display reading.

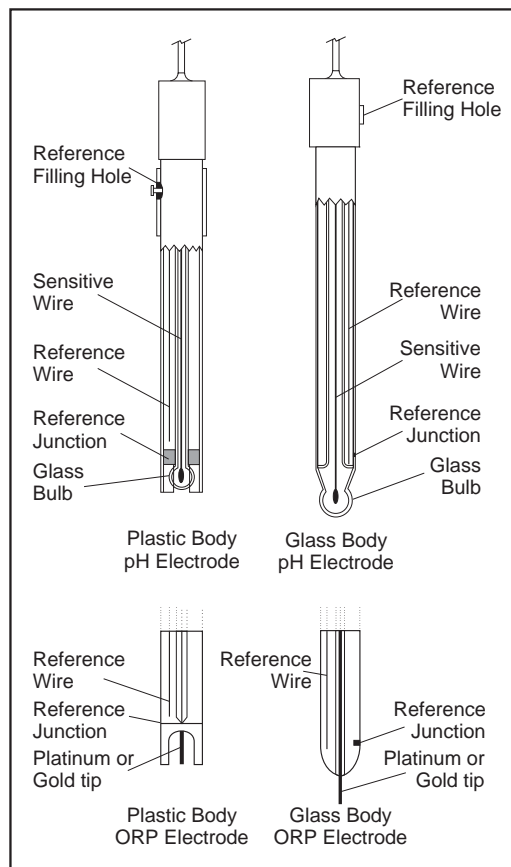


Please note:

|          |   |           |
|----------|---|-----------|
| -1000 mV | = | 4 mA      |
| 0 mV     | = | 12 mA     |
| 1000 mV  | = | 20 mA     |
| 350 mV   | = | 14.8 mA   |
| 200 mV   | = | 13.6 mA   |
| 275 mV   | = | 14.2 mA   |
| 1 mV     | = | 12.008 mA |

**Note:** when the meter is used in conjunction with the Hanna indicator **HI 8512T**, or the controller **HI 8720T**, the calibration can also be performed on the indicator/controller. In this case slight adjustment can be made on the indicator/controller even if the whole system calibration is advised, always starting from the transmitter.

## ELECTRODE CONDITIONING AND MAINTENANCE



### **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 **HI70300** storage solution for at least one hour.

#### ***For refillable electrodes***

If the fill solution (electrolyte) is more than 1 cm (½") below the fill hole, add **HI7082 3.5M KCl** electrolyte solution for double junction or **HI7071 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 (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 a few drops of the solution to be tested, before taking measurements.

#### **STORAGE**

To minimize clogging and assuring 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 **HI70300** storage solution or, in its absence, filling solution (**HI7071** for single junction or **HI7082** for double junction electrodes). Follow the Preparation Procedure above before taking measurements.

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

#### **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 on the electrode body, replace the electrode. Rinse off any salt deposits with water.

#### ***For refillable electrodes***

Refill it with fresh electrolyte (**HI7071** for single junction or **HI7082** for double junction electrodes). Allow the electrode to stand upright for 1 hour.

Follow the Storage Procedure above.

#### **CLEANING PROCEDURE**

*General* Soak in Hanna **HI7061** general cleaning solution for approximately 1 hour.

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

*Protein* Soak in Hanna **HI7073** protein cleaning solution for 15 minutes.

*Inorganic* Soak in Hanna **HI7074** inorganic cleaning solution for 15 minutes.

*Oil/grease* Rinse with Hanna **HI7077** Oil & 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 **HI70300** storage solution for at least 1 hour before taking measurements.

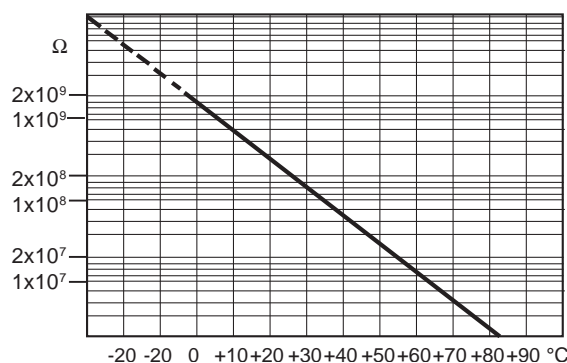
## **TROUBLESHOOTING**

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): **HI7071** for single junction or **HI7082** for double junction electrodes.
- **Dry Membrane/Junction:** soak in **HI70300** storage solution for at least one hour.
- **Drifting:** soak the electrode tip in warm Hanna solution **HI7082** for one hour and rinse the tip with distilled water. Refill with fresh **HI7071** for single junction electrodes and **HI7082** for double junction electrodes.
- **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 Hanna **HI7061** cleaning 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 for 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.

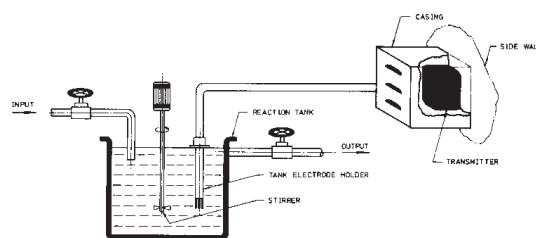
### Alkaline Error

| Sodium Ion Correction for the Glass at 20-25°C |       |       |
|--|-------|-------|
| Concentration                                  | pH    | Error |
| 0.1 Mol L <sup>-1</sup> Na <sup>+</sup>        | 13.00 | 0.10  |
|  | 13.50 | 0.14  |
|  | 14.00 | 0.20  |
| 1.0 Mol L <sup>-1</sup> Na <sup>+</sup>        | 12.50 | 0.10  |
|  | 13.00 | 0.18  |
|  | 13.50 | 0.29  |
|  | 14.00 | 0.40  |

## INSTALLATION PROCEDURE AND EXAMPLES

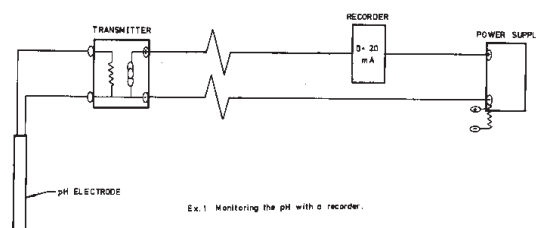
The HI 8614, HI 8614L, HI 8615 and HI 8615L transmitters may be wall mounted in any convenient location near the measurement point. To minimize thermal drift due to extreme temperature fluctuations during the measurement process, particularly if the measurement is conducted outdoors, it is best to protect the transmitter in an enclosed casing.

### General Installation Procedure

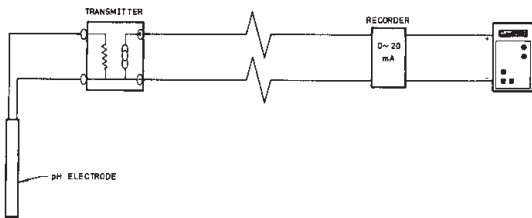


For most industrial application involving long term monitoring and control, it is also recommended to use tank electrode holders (HI 6050 or HI 6051) to protect the pH electrode and the temperature probe from contamination by the test solution.

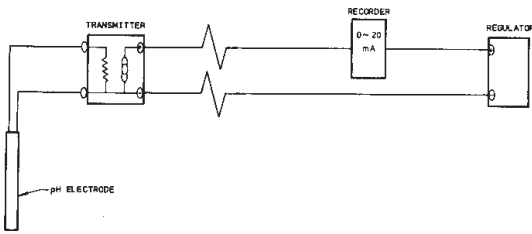
### Controlling the pH / ORP with a recorder



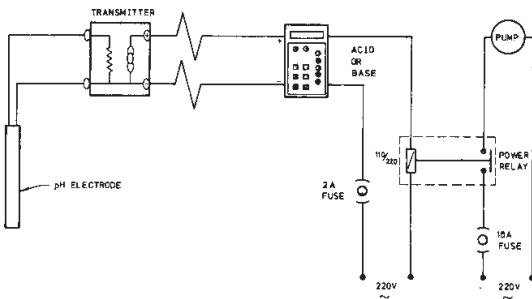
**Monitoring the pH/ORP with Panel Mounting  
pH (HI 8510)/ORP (HI 8512) Indicator**



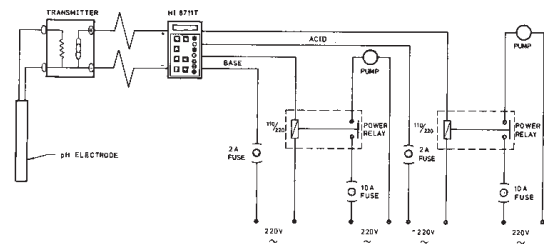
**Controlling the pH/ORP with  
an Industrial Regulator**



**Monitoring and Controlling the pH/ORP  
with Panel Mounting Indicator/Regulator  
and Dosage Control of either Acid or Base**



**Monitoring and Controlling the pH with  
(HI 8711) Panel Mounting Indicator/  
Regulator with Independent Dosage  
Control for Acid and Base**



## ACCESSORIES

### pH CALIBRATION SOLUTIONS

- HI 7004M** pH 4.01 buffer solution, 230 mL  
**HI 7004L** pH 4.01 buffer solution, 500 mL  
**HI 7006M** pH 6.86 buffer solution, 230 mL  
**HI 7006L** pH 6.86 buffer solution, 500 mL  
**HI 7007M** pH 7.01 buffer solution, 230 mL  
**HI 7007L** pH 7.01 buffer solution, 500 mL  
**HI 7009M** pH 9.18 buffer solution, 230 mL  
**HI 7009L** pH 9.18 buffer solution, 500 mL  
**HI 7010M** pH 10.01 buffer solution, 230 mL  
**HI 7010L** pH 10.01 buffer solution, 500 mL

### ORP SOLUTIONS

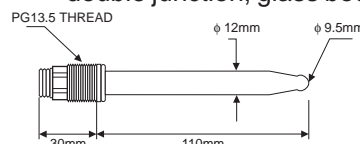
- HI 7020M** 200-275 mV test solution, 230 mL  
**HI 7020L** 200-275 mV test solution, 500 mL  
**HI 7091M** Reducing pretreatment solution, 230 mL  
**HI 7091L** Reducing pretreatment solution, 500 mL  
**HI 7092M** Oxidizing pretreatment solution, 230 mL  
**HI 7092L** Oxidizing pretreatment solution, 500 mL

### ELECTRODE MAINTENANCE SOLUTIONS

- HI 70300M** Storage solution, 230 mL  
**HI 70300L** Storage solution, 500 mL  
**HI 7061M** General cleaning solution, 230 mL  
**HI 7061L** General cleaning solution, 500 mL  
**HI 7073M** Protein cleaning solution, 230 mL  
**HI 7073L** Protein cleaning solution, 500 mL  
**HI 7074M** Inorganic cleaning solution, 230 mL  
**HI 7074L** Inorganic cleaning solution, 500 mL  
**HI 7077M** Oil & Fat cleaning solution, 230 mL  
**HI 7077L** Oil & Fat cleaning solution, 500 mL  
**HI 7071** 3.5M KCl + AgCl electrolyte solution, 4 x 50 mL bottle, for single junction electrodes  
**HI 7072** 1M KNO<sub>3</sub> electrolyte solution, 4 x 50 mL bottle  
**HI 7082** 3.5M KCl electrolyte solution, 4 x 50 mL bottle, for double junction electrodes

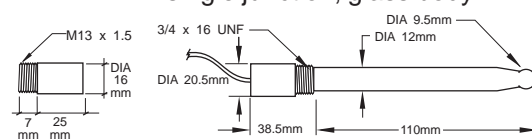
### pHELECTRODES

- HI 1090T** Screwcap PG13.5 connector, double junction, glass body



- HI 1110S** Screw connector, single junction, glass body

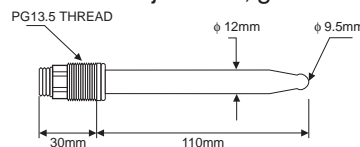
- HI 1130B/3** BNC connector, 3 m (9.9') cable, single junction, glass body



HI 1110S

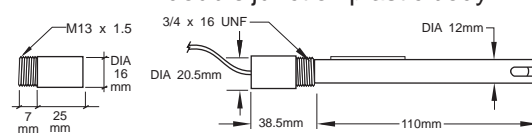
HI 1130B/3

- HI 1110T** Screwcap PG13.5 connector, double junction, glass body



- HI 1114S** Screw connector, double junction plastic body

- HI 1134B/3** BNC connector, 3 m (9.9') cable, double junction plastic body

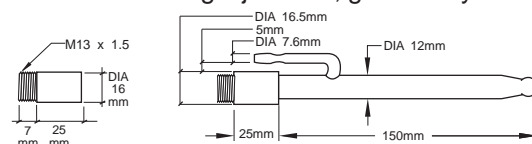


HI 1114S

HI 1134B/3

- HI 1115S** Screw connector, single junction, glass body

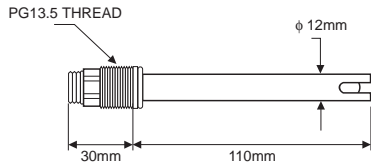
- HI 1135B/3** BNC connector, 3 m (9.9') cable, single junction, glass body



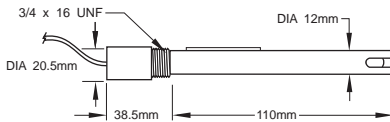
HI 1115S

HI 1135B/3

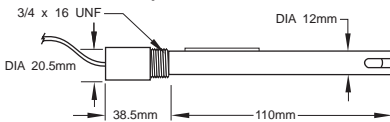
**HI 1210T** Screwcap PG13.5 connector, double junction, plastic body



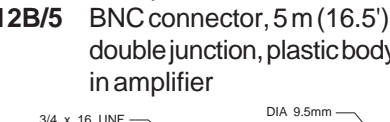
**HI 1910B** BNC connector, 1 m (3.3') cable, double junction, plastic body, built-in amplifier



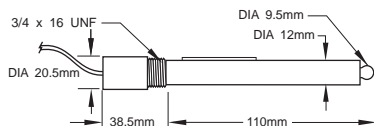
**HI 1911B** BNC connector, 1 m (3.3') cable, double junction, plastic body, built-in amplifier



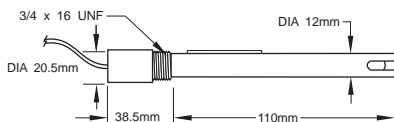
**HI 1912B** BNC connector, 1 m (3.3') cable, double junction, plastic body, built-in amplifier



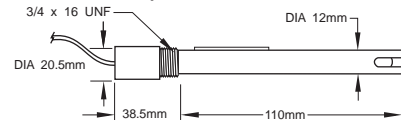
**HI 1912B/5** BNC connector, 5 m (16.5') cable, double junction, plastic body, built-in amplifier



**HI 2114B/5** BNC connector, 5 m (16.5') cable, double junction, plastic body

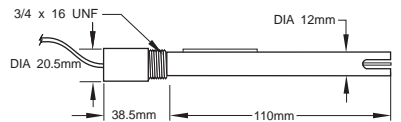


**HI 2910B/5** BNC connector, 5 m (16.5') cable, double junction, plastic body, built-in amplifier



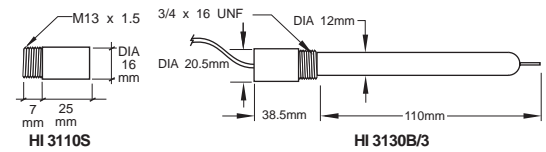
**ORPELECTRODES**

**HI 2930B/5** BNC connector, 5 m (16.5') cable, Pt, plastic body, built-in amplifier

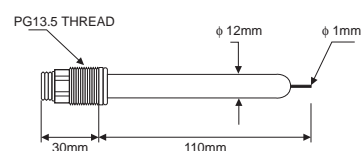


**HI 3110S** Screw-type connector, Pt, glass body

**HI 3130B/3** BNC connector, 3 m (9.9') cable, Pt, glass body

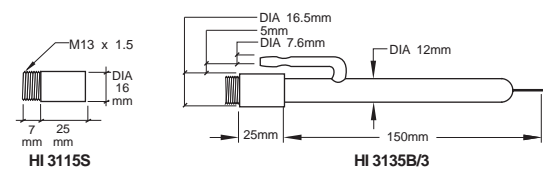


**HI 3110T** Screwcap PG13.5 connector, Pt, glass body



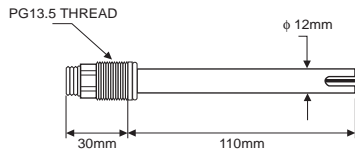
**HI 3115S** Screw-type connector, side-arm, Pt, glass body

**HI 3135B/3** BNC connector, 3 m (9.9') cable, side-arm, Pt, glass body

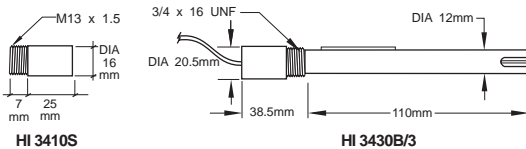




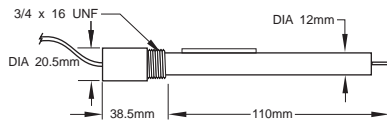
**HI 3210T** Screwcap PG13.5 connector, Pt, plastic body



**HI 3410S** Screw connector, Pt, plastic body  
**HI 3430B/3** BNC connector, 3 m (9.9') cable, Pt, plastic body

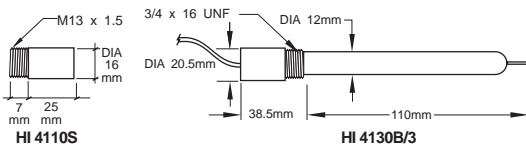


**HI 3932B/5** BNC connector, 5 m (16.5') cable, Pt, plastic body, built-in amplifier

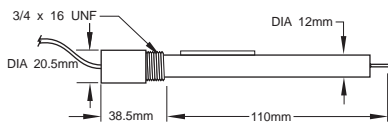


**HI 4110S** Screw-type connector, Au, glass body

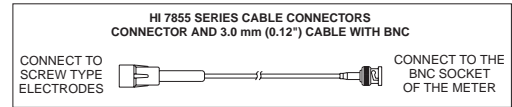
**HI 4130B/3** BNC connector, 3 m (9.9') cable, Au, glass body



**HI 4932B/5** BNC connector, 5 m (16.5') cable, Au, plastic body, built-in amplifier



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



- HI7855/1** Extension cable 1 m (3.3') long
- HI7855/3** Extension cable 3 m (9.9') long
- HI7855/5** Extension cable 5 m (16.5') long
- HI7855/10** Extension cable 10 m (33') long
- HI7855/15** Extension cable 15 m (49.5') long

**OTHER ACCESSORIES**

- BL PUMPS** Dosing pumps with flow rate from 1.5 to 20 lph
- HI98501** Pocket-size, thermometer with penetration probe and 0.1°C resolution (range -50.0 to 150.0°C)
- HI 6050 & HI 6051** Submersible electrode holders
- HI 6054 & HI 6057** Electrode holders for in-line applications
- HI 7871 & HI 7873** Level controllers
- HI8427** pH / ORP electrode simulator
- HI931001** pH / ORP electrode simulator with LCD

## 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 probes and the electrodes are warranted for a period of six months.**

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered. This warranty is limited to repair or replacement free of charge.

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. Obtain a Returned Goods Authorization from the Customer Service department first and then return the instrument with the Authorization # included along with shipment costs prepaid. If the repair is not covered by the warranty, you will be notified of the charge for repair or replacement. When shipping any instrument, make sure it is properly packaged for complete protection.

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

## CE DECLARATION OF CONFORMITY



### DECLARATION OF CONFORMITY

We

Hanna Instruments Italia Srl  
via E.Fermi, 10  
35030 Sarmeola di Rubano - PD  
ITALY

herewith certify that the pH and ORP transmitters

**HI 8614 HI 8614L HI8615 HI8615L**


have been tested and found to be in compliance with EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC according to the following applicable normative:

**EN 50082-1:** Electromagnetic Compatibility - Generic Immunity Standard  
**IEC 801-2** Electrostatic Discharge  
**IEC 801-3** RF Radiated  
**IEC 801-4** Fast Transient

**EN 50081-1:** Electromagnetic Compatibility - Generic Emission Standard  
**EN 55022** Radiated, Class B

**EN61010-1:** Safety requirements for electrical equipment for measurement, control and laboratory use

Date of Issue: 11-12-1998

  
P. Cesa - Technical Director  
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 area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

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

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