

## Instruction Manual

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**HI 8510 - HI 8512**  
**HI 8710 - HI 8711**  
**HI 8720 - HI 931500**  
**HI 931501 - HI 932500**

### **Panel - Mounted ORP - pH Indicators and Controllers**



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These Instruments are in Compliance with the CE Directives

 **HANNA**  
instruments  
<http://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, as well as a precise idea of its versatility in a wide range of applications.

These instruments are in compliance with 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 noticeable damage, notify your Dealer.

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

## GENERAL DESCRIPTION

**HI 8510, HI 8512, HI 8710, HI 8711, HI 8720, HI 931500, HI 931501 and HI 932500** are pH-ORP panel-mounted indicators and controllers designed for simplicity of use in a wide range of industrial process applications.

The models are designed with DIN standard panel mount with membrane keypads on the front panel, a large LCD display and autodiagnostic functions (not **HI 931500, HI 931501 and HI 932500**).

Connections to the power supply, contacts and recorders are made through screw terminals on the rear panel.

Two models are available for **HI 8510, HI 8711, HI 8512, HI 8520**. The E-model accepts input direct from the pH or ORP electrode, while the T-model accepts a 2-wire current loop of 4 to 20 mA from a pH or ORP transmitter.

**HI 931500, HI 931501 and HI 932500** are equipped with a BNC socket to connect a pH-ORP electrode.

Other features include: recorder output in 0 to 20 mA or 4 to 20 mA; LED indicators which identify the controller mode.

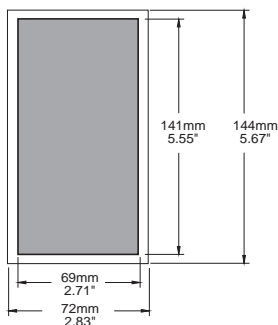
Using the pH indicators in conjunction with a 4-20mA output pH transmitter **HI 8614** or **HI 8614L** (with LCD display) and using the ORP indicators in conjunction with a 4-20 mA output ORP transmitter **HI 8615** or **HI 8615L** (with LCD display) will assure you of a strong, interference-free signal at distances up to 300 m (1000 ft).

All instruments are supplied with a plastic transparent front cover and mounting brackets (electrode and mains cable excluded).

## MECHANICAL DIMENSIONS

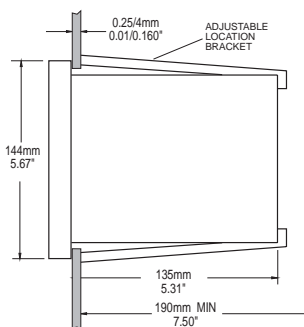
The meters have a DIN 43 700 casing in black anodized aluminum. Front and back of the instruments are supplied with shockproof ABS plastic and a transparent protective cover for the front panel.

### Front view of the panel-mounted unit.



These dimensions show the cutout size for the installation.

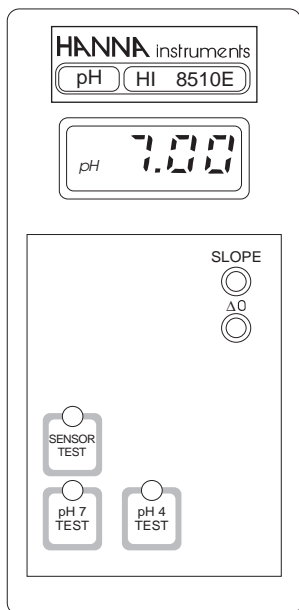
### Side view of the panel-mounted unit.



Adjustable location brackets (supplied with the meter) allow the indicator to slide into the cutout and will hold the unit securely in place. 190 mm (7.50") is the minimum amount of room required to install the indicator with the cables connected.

# FUNCTIONAL DESCRIPTION HI 8510 pH INDICATOR

## FRONT PANEL



### Keypad

#### **SENSOR TEST**

To display the mV response of the electrode in order to verify its working condition

#### **pH 7 TEST**

To verify the internal circuit of the meter in terms of Offset compensation

#### **pH 4 TEST**

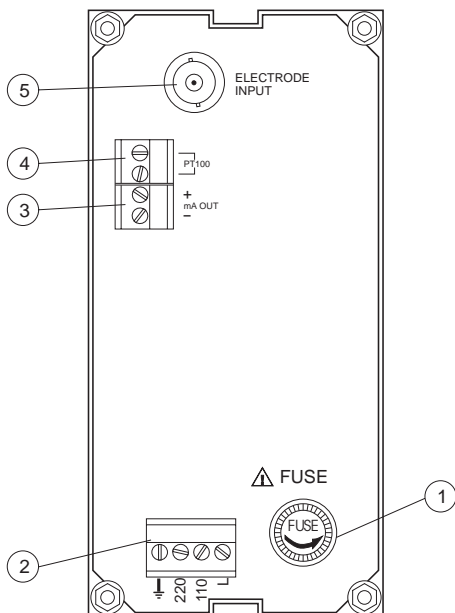
To verify the amplifier circuit of the meter

### Trimmers


**ΔO** For Offset calibration

**SLOPE** For Slope calibration

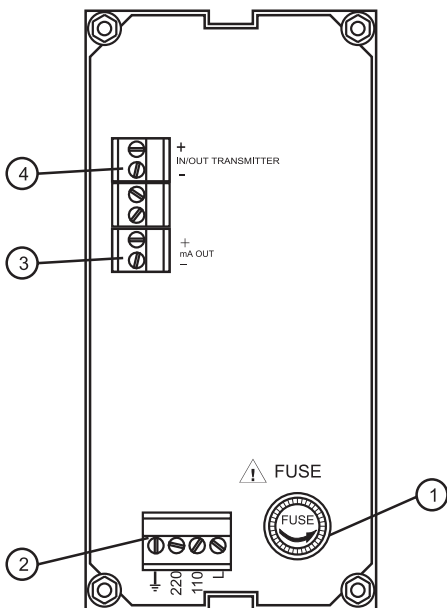
## REAR PANEL HI 8510E



1. Fuse Holder
2. Power supply
3. Recorder output
4. Connections for PT100 temperature sensor
5. BNC socket for pH electrode.

 Unplug the instrument from the power supply before replacing the fuse.

## REAR PANEL HI 8510T



1. Fuse Holder
2. Power supply
3. Recorder output
4. Connections to the transmitter.

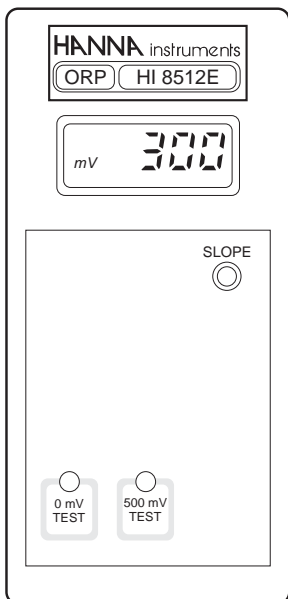


Unplug the instrument from the power supply before replacing the fuse.



# FUNCTIONAL DESCRIPTION HI 8512 ORP INDICATOR

## FRONT PANEL



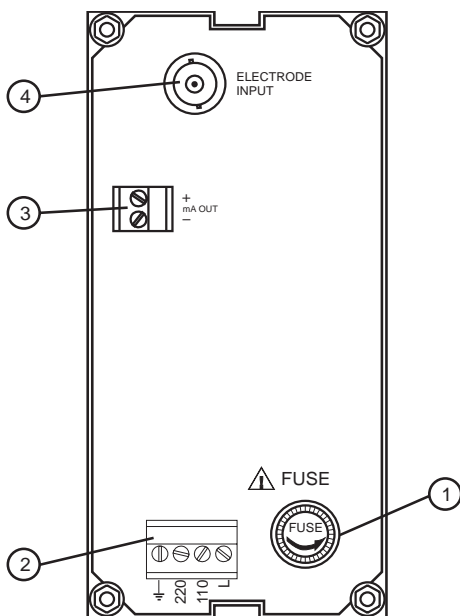
### Keypad

- 0 mV TEST** To verify the instrument calibration at point 0
- 500 mV TEST** To verify the slope at point 500 mV


### Trimmers

- SLOPE** For Slope calibration

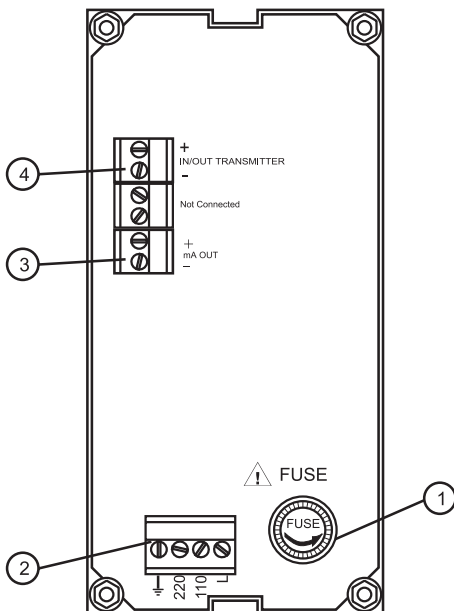
## REAR PANEL HI 8512E



1. Fuse Holder
2. Power supply
3. Recorder output
4. BNC socket for ORP electrode.

 Unplug the instrument from the power supply before replacing the fuse.

## REAR PANEL HI 8512T



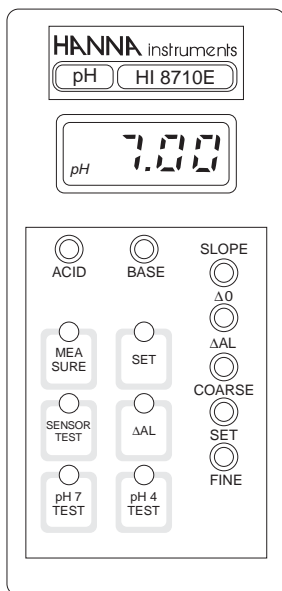
1. Fuse Holder
2. Power supply
3. Recorder output
4. Connections to the transmitter.



Unplug the instrument from the power supply before replacing the fuse.

# FUNCTIONAL DESCRIPTION HI 8710 pH CONTROLLER WITH ALARM

## FRONT PANEL



### Keypad

- SET** To set the working point of pH dosage
- MEASURE** To set HI 8710 on measurement mode and to enable the diagnostic tests
- SENSOR TEST** To display the mV response of the electrode in order to verify its working condition
- ΔAL** To display and set the tolerance of the alarm points
- pH 7 TEST** To verify the internal circuit of the meter in terms of Offset compensation
- pH 4 TEST** To verify the amplifier circuit of the meter

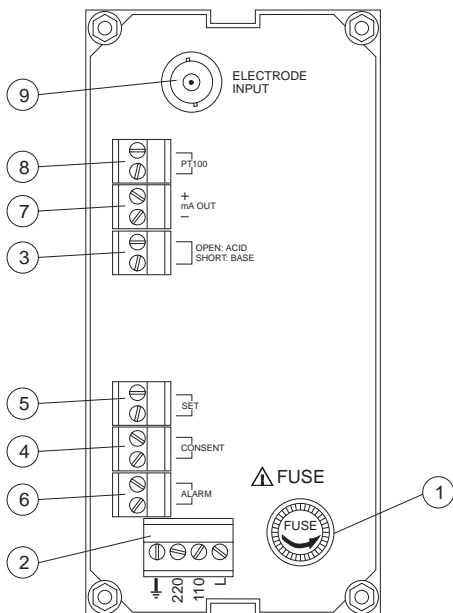
### Trimmers

- $\Delta O$**  For Offset calibration
- SLOPE** For Slope calibration
- $\Delta AL$**  To set the tolerance of the alarm
- SET/COARSE** To coarsely adjust the set point
- SET/FINE** To finely adjust the set point

### Leds

- ACID** To show the acid dosage is active
- BASE** To show the basic dosage is active
- $\Delta AL$  (blinking)** To show the alarm is active

## REAR PANEL HI 8710E

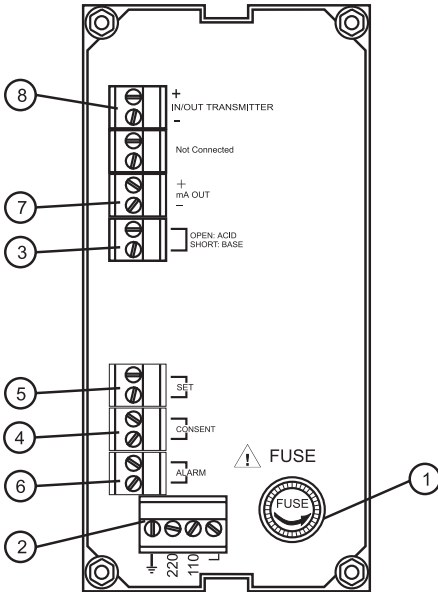


1. Fuse Holder
2. Power supply
3. Acid/Basic dosage selection
4. Reductant or oxidant dosage consent
5. Connections for dosing pump
6. Alarm contacts
7. Recorder output
8. Connections for PT100 temperature sensor
9. BNC socket for pH electrode.



Unplug the instrument from the power supply before replacing the fuse.

## REAR PANEL HI 8710T



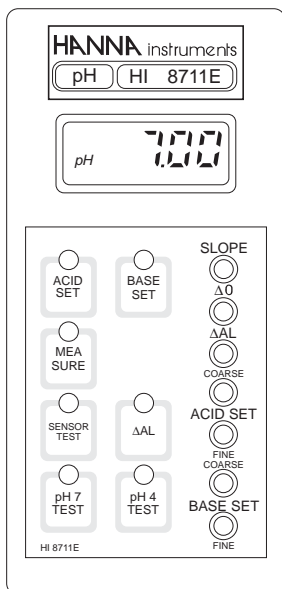
1. Fuse Holder
2. Power supply
3. Acid/Basic dosage selection
4. Reductant or oxidant dosage consent
5. Connections for dosing pump
6. Alarm contacts
7. Recorder output
8. Connections to the transmitter.



Unplug the instrument from the power supply before replacing the fuse.

# FUNCTIONAL DESCRIPTION HI 8711 DUAL OUTPUT pH CONTROLLER

## FRONT PANEL



### **Keypad**

#### **ACID SET**

To set the working point of acid dosage

#### **BASE SET**

To set the working point of basic dosage

#### **MEASURE**

To set HI 8711 on measurement mode and to enable the diagnostic tests

#### **SENSOR TEST**

To display the mV response of the electrode to verify its working condition.

#### **ΔAI**

To display and to set the tolerance of the alarm points



<b>pH 7 TEST</b>	To verify the internal circuit of the meter in terms of Offset compensation
<b>pH 4 TEST</b>	To verify the amplifier circuit of the meter

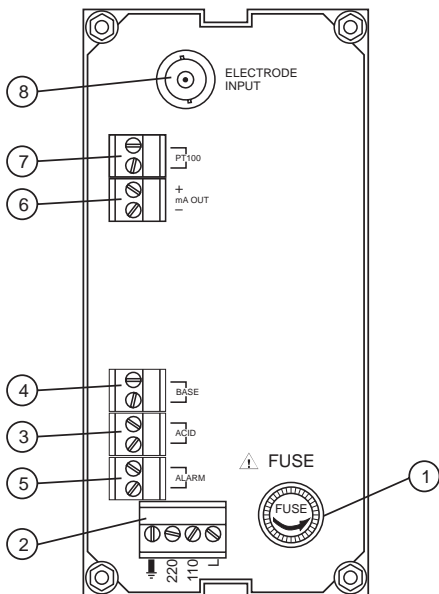
**Trimmers**

<b><math>\Delta O</math></b>	For Offset calibration
<b>SLOPE</b>	For Slope calibration
<b><math>\Delta AL</math></b>	To set the tolerance of the alarm
<b>ACID SET/COARSE</b>	To coarsely adjust the acid set point
<b>ACID SET/FINE</b>	To finely adjust the acid set point
<b>BASE SET/COARSE</b>	To coarsely adjust the basic set point
<b>BASE SET/FINE</b>	To finely adjust the basic set point

**Leds**

<b>ACID SET (Blinking)</b>	To show the acid dosage is active
<b>BASE SET (Blinking)</b>	To show the basic dosage is active
<b><math>\Delta AL</math> (Blinking)</b>	To show the alarm is active

## REAR PANEL HI 8711E

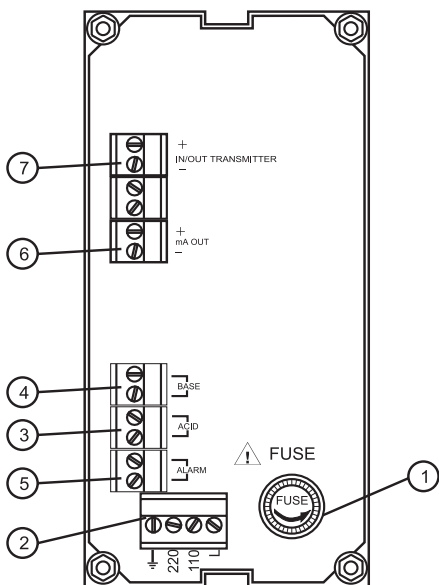


1. Fuse Holder
2. Power supply
3. Connections for dosing pump for acid
4. Connections for dosing pump for base
5. Alarm contacts
6. Recorder output
7. Connections for PT100 temperature sensor
8. BNC socket for pH electrode.




Unplug the instrument from the power supply before replacing the fuse.

## REAR PANEL HI 8711T

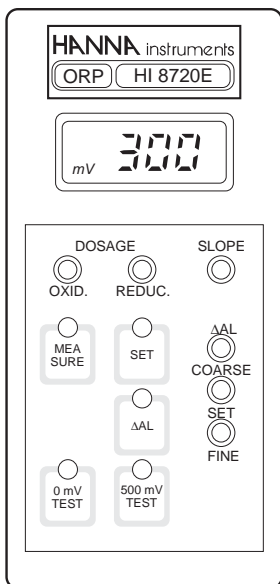


1. Fuse Holder
2. Power supply
3. Connections for dosing pump for acid
4. Connections for dosing pump for base
5. Alarm contacts
6. Recorder output
7. Connections to the transmitter.

 Unplug the instrument from the power supply before replacing the fuse.

# FUNCTIONAL DESCRIPTION HI 8720 ORP CONTROLLER

## FRONT PANEL



### Keypad

- SET** To set the working point of ORP dosage
- MEASURE** To set HI 8720 on measurement mode and to enable the diagnostic tests
- ΔAI** To display and to set the tolerance of the alarm points
- 0 mV TEST** To verify the instrument calibration at point 0
- 500 mV TEST** To verify the slope at point 500 mV

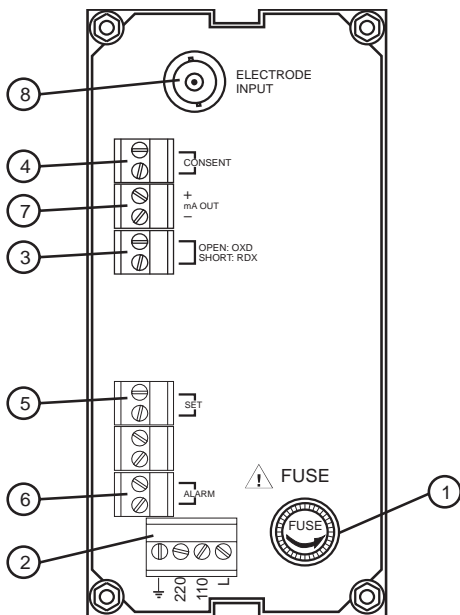
### Trimmers

- SLOPE** For Slope calibration
- ΔAL** To display and set the tolerance of the alarm points
- SET/COARSE** To coarsely adjust the set point
- SET/FINE** To finely adjust the set point

### Leds

- OXID** To show the oxidant dosage is active
- REDUC** To show the reductant dosage is active
- ΔAL (blinking)** To show the alarm is active

## REAR PANEL HI 8720E

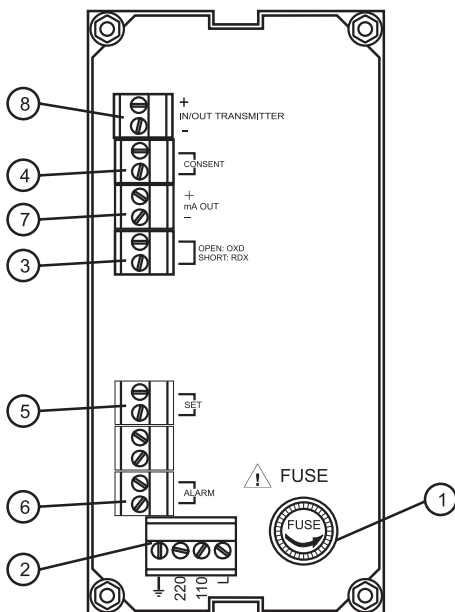


1. Fuse Holder
2. Power supply
3. Oxidant/Reductant dosage selection
4. Oxidant or reductant dosage consent
5. Connections for dosing pump
6. Alarm contacts
7. Recorder output
8. BNC socket for ORP electrode.



Unplug the instrument from the power supply before replacing the fuse.

## REAR PANEL HI 8720T



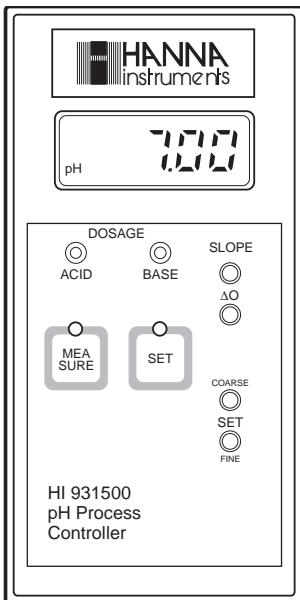
1. Fuse Holder
2. Power supply
3. Oxidant/Reductant dosage selection
4. Oxidant or Reductant dosage consent
5. Connections for dosing pump
6. Alarm contacts
7. Recorder output
8. Connections to the transmitter.



Unplug the instrument from the power supply before replacing the fuse.

# FUNCTIONAL DESCRIPTION HI 931500 SINGLE OUTPUT pH CONTROLLER

## FRONT PANEL



### Keypad

**SET** To set the working point of pH dosage

**MEASURE** To set HI 931500 on measurement mode

### Trimmers

**ΔO** For Offset calibration

**SLOPE** For Slope calibration

**SET/COARSE** To coarsely adjust the set point

**SET/FINE** To finely adjust the set point

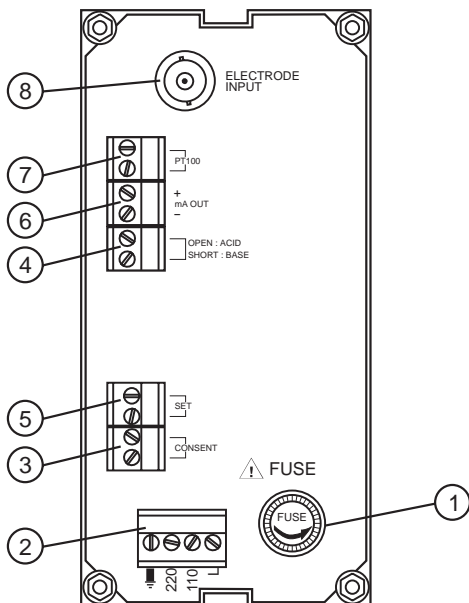
### Leds

**ACID** To show the acid dosage is active

**BASE** To show the basic dosage is active



## REAR PANEL HI 931500



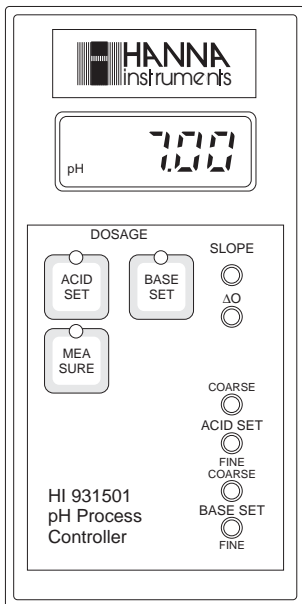
1. Fuse Holder
2. Power supply
3. Reductant or oxidant dosage consent
4. Acid/Basic dosage selection
5. Connections for Dosing Pumps
6. Recorder output
7. Connections for PT100 temperature sensor
8. BNC socket for pH electrode.



Unplug the instrument from the power supply before replacing the fuse.

# FUNCTIONAL DESCRIPTION HI 931501 DUAL OUTPUT pH CONTROLLER

## FRONT PANEL



### Keypad

- ACID SET** To set the working point of acid dosage
- BASE SET** To set the working point of basic dosage
- MEASURE** To set HI 931501 on measurement mode

### Trimmers

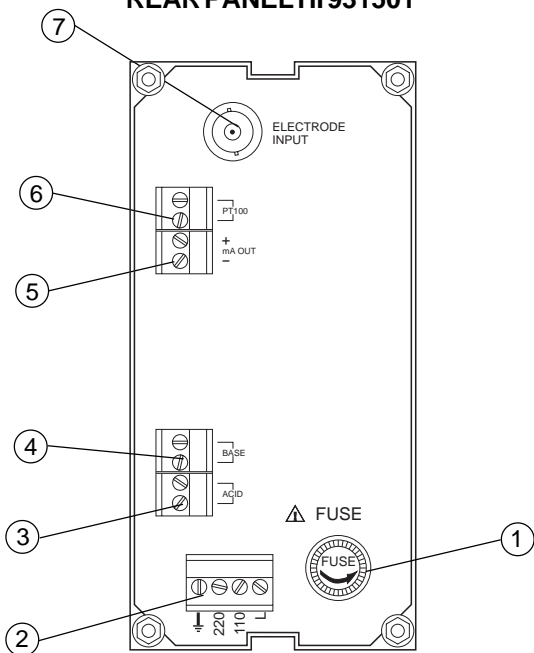
- ΔO** For Offset calibration
- SLOPE** For Slope calibration
- ACID SET/COARSE** To coarsely adjust the acid set point

<b>ACID SET/FINE</b>	To finely adjust the acid set point
<b>BASE SET/COARSE</b>	To coarsely adjust the basic set point
<b>BASE SET/FINE</b>	To finely adjust the basic set point


**Leds**

<b>ACID SET (Blinking)</b>	To show the acid dosage is active
<b>BASE SET (Blinking)</b>	To show the basic dosage is active
<b>MEASURE</b>	To show the meter is on measurement mode

## REAR PANEL HI 931501

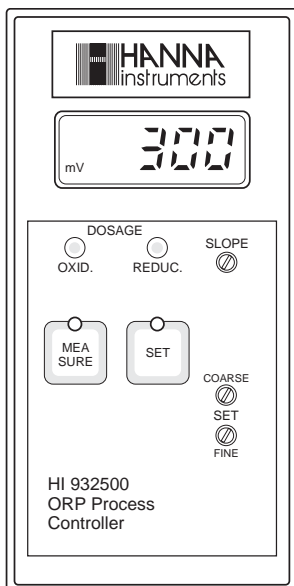


1. Fuse Holder
2. Power supply
3. Connections for dosing pump for acid
4. Connections for dosing pump for base
5. Recorder output
6. Connections for PT100 temperature sensor
7. BNC socket for pH electrode.

 Unplug the instrument from the power supply before replacing the fuse.

# FUNCTIONAL DESCRIPTION HI 932500 ORP CONTROLLER

## FRONT PANEL



### Keypad

- SET** To set the working point of ORP dosage
- MEASURE** To set HI 932500 on measurement mode

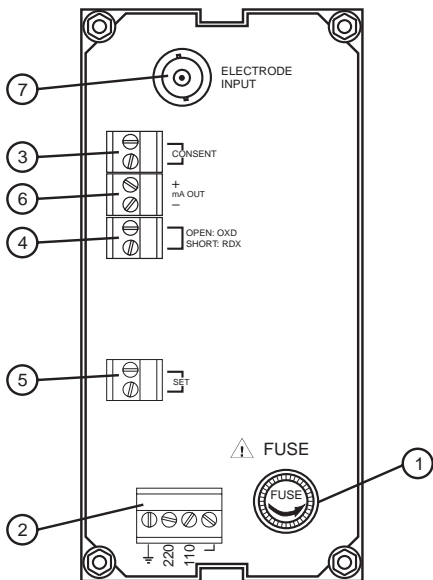
### Trimmers

- SLOPE** For Slope calibration
- SET/COARSE** To coarsely adjust the ORP set point
- SET/FINE** To finely adjust the ORP set point


### Leds

- OXID** To show the oxidant dosage is active
- REDUC** To show the reductant dosage is active

## REAR PANEL HI 932500



1. Fuse Holder
2. Power supply
3. Oxidant or reductant dosage consent
4. Oxidant/Reductant dosage selection
5. Connections for dosing pump
6. Recorder output
7. BNC socket for ORP electrode.

 Unplug the instrument from the power supply before replacing the fuse.

## SPECIFICATIONS HI 8510

	HI 8510E	HI 8510T
<b>Range</b>	0.00 to 14.00 pH	
<b>Resolution</b>	0.01 pH	
<b>Accuracy</b>	±0.02 pH	±0.5%
<b>Typical EMC Deviation</b>	±0.1 pH ±0.2 mA	±0.1 pH ±0.2 mA
<b>Installation Cat.</b>	II	
<b>Input</b>	10 <sup>12</sup> Ohm	4 to 20 mA
<b>Calibration</b>	Offset: ±2 pH ΔO trimmer Slope: 80 to 110% Slope trimmer	
<b>Temperature Compensation</b>	Fixed or automatic with PT100 from 0 to 100°C	
<b>Readout</b>	4-digit LCD plus graphic symbols	
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA (isolated)	
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz	
<b>Environment</b>	-10 to 50°C (14 to 122°F)	
<b>Weight</b>	1 kg (2.2 lb.)	

## SPECIFICATIONS HI 8512

	HI 8512E	HI 8512T
<b>Range</b>	-1000 to +1000 mV	
<b>Resolution</b>	1 mV	
<b>Accuracy</b>	±5 mV	±0.5%
<b>Typical EMC Deviation</b>	±6 mV ±0.2 mA	±6 mV ±0.2 mA
<b>Installation Cat.</b>	II	
<b>Input</b>	10 <sup>12</sup> Ohm	4 to 20 mA
<b>Calibration</b>	Slope: 90 to 110% slope trimmer	
<b>Readout</b>	4-digit LCD plus graphic symbols	
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA (isolated)	
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz	
<b>Environment</b>	-10 to 50°C (14 to 122°F)	
<b>Weight</b>	1 kg (2.2 lb.)	

## SPECIFICATIONS HI 8710

	HI 8710E	HI 8710T
<b>Range</b>	0.00 to 14.00 pH	
<b>Resolution</b>	0.01 pH	
<b>Accuracy</b>	±0.02 pH	±0.5%
<b>Typical EMC Deviation</b>	±0.1 pH ±0.2 mA	±0.1 pH ±0.2 mA
<b>Installation Cat.</b>	II	
<b>Input</b>	10 <sup>12</sup> Ohm	4 to 20 mA
<b>Calibration</b>	Offset: ±2 pH ΔO trimmer Slope: 80 to 110% Slope trimmer	
<b>Temperature Compensation</b>	Fixed or automatic with PT100 from 0 to 100°C	
<b>Set Point Relay</b>	One, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes	
<b>Alarm Relay</b>	One, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes	
<b>Readout</b>	4-digit LCD plus graphic symbols	
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA (isolated)	
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz	
<b>Environment</b>	-10 to 50°C (14 to 122°F)	
<b>Weight</b>	1 kg (2.2 lb.)	

## SPECIFICATIONS HI 8711

	HI 8711E	HI 8711T
<b>Range</b>	0.00 to 14.00 pH	
<b>Resolution</b>	0.01 pH	
<b>Accuracy</b>	±0.02 pH	±0.5%
<b>Typical EMC Deviation</b>	±0.1 pH ±0.2 mA	±0.1 pH ±0.2 mA
<b>Installation Cat.</b>	II	
<b>Input</b>	10 <sup>12</sup> Ohm	4 to 20 mA
<b>Calibration</b>	Offset: ±2 pH ΔO trimmer Slope: 80 to 110% Slope trimmer	
<b>Temperature Compensation</b>	Fixed or automatic with PT100 from 0 to 100°C	
<b>Set Point Relay</b>	Two, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes	
<b>Alarm Relay</b>	One, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes	
<b>Readout</b>	4-digit LCD plus graphic symbols	
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA (isolated)	
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz	
<b>Environment</b>	-10 to 50°C (14 to 122°F)	
<b>Weight</b>	1 kg (2.2 lb.)	



## SPECIFICATIONS HI 8720

	HI 8720E	HI 8720T
<b>Range</b>	-1000 to +1000 mV	
<b>Resolution</b>	1 mV	
<b>Accuracy</b>	±5 mV	±0.5%
<b>Typical EMC Deviation</b>	±6 mV ±0.2 mA	±6 mV ±0.2 mA
<b>Installation Cat.</b>	II	
<b>Input</b>	10 <sup>12</sup> Ohm	4 to 20 mA
<b>Calibration</b>	Slope: 90 to 110% Slope trimmer	
<b>Set Point Relay</b>	One, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes	
<b>Alarm Relay</b>	One, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes	
<b>Readout</b>	4-digit LCD plus graphic symbols	
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA (isolated)	
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz	
<b>Environment</b>	-10 to 50°C (14 to 122°F)	
<b>Weight</b>	1 kg (2.2 lb.)	

## SPECIFICATIONS HI 931500

	HI 931500
<b>Range</b>	0.00 to 14.00 pH
<b>Resolution</b>	0.01 pH
<b>Accuracy</b>	±0.02 pH
<b>Typical EMC Deviation</b>	±0.1 pH ±0.2 mA
<b>Installation Cat.</b>	II
<b>Input</b>	10 <sup>12</sup> Ohm
<b>Calibration</b>	Offset: ±2 pH ΔO trimmer Slope: 80 to 110% Slope trimmer
<b>Temperature Compensation</b>	Fixed or automatic with PT100 from 0 to 100°C
<b>Readout</b>	4-digit LCD plus graphic symbols
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA
<b>Set Point Relay</b>	One, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz
<b>Environment</b>	-10 to 50°C (14 to 122°F)
<b>Weight</b>	1 kg (2.2 lb.)

## SPECIFICATIONS HI 931501

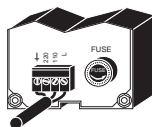
	<b>HI 931501</b>
<b>Range</b>	0.00 to 14.00 pH
<b>Resolution</b>	0.01 pH
<b>Accuracy</b>	±0.02 pH
<b>Typical EMC Deviation</b>	±0.1 pH ±0.2 mA
<b>Installation Cat.</b>	II
<b>Input</b>	10 <sup>12</sup> Ohm
<b>Calibration</b>	Offset: ±2 pH ΔO trimmer Slope: 80 to 110% Slope trimmer
<b>Temperature Compensation</b>	Fixed or automatic with PT100 from 0 to 100°C
<b>Readout</b>	4-digit LCD plus graphic symbols
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA
<b>Set Point Relay</b>	Two, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz
<b>Environment</b>	-10 to 50°C (14 to 122°F)
<b>Weight</b>	1 kg (2.2 lb.)

## SPECIFICATIONS HI 932500

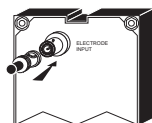
	<b>HI 932500</b>
<b>Range</b>	-1000 to +1000 mV
<b>Resolution</b>	1 mV
<b>Accuracy</b>	±5 mV
<b>Typical EMC Deviation</b>	±6 mV ±0.2 mA
<b>Installation Cat.</b>	II
<b>Input</b>	10 <sup>12</sup> Ohm
<b>Calibration</b>	Slope: 90 to 110% Slope trimmer
<b>Readout</b>	4-digit LCD plus graphic symbols
<b>Recorder Output</b>	0 to 20 mA or 4 to 20 mA
<b>Set Point Relay</b>	One, Isolated, 2 A, max 240 V, resistive load, 1.000.000 strokes
<b>Power Supply</b>	110/115 V or 220/240 V; 50/60 Hz
<b>Environment</b>	-10 to 50°C (14 to 122°F)
<b>Weight</b>	1 kg (2.2 lb.)

## INITIAL PREPARATION

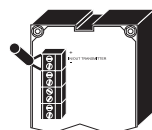
- Connect a 3-wire power cable to the 4-screw terminal strip; according to the voltage level as indicated and pay particular attention to the correct live, earth and neutral terminal connections.



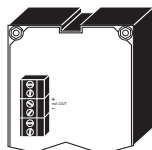
- For **Model E, HI 931500, HI 931501** and **HI 931500** connect the pH or ORP electrode to the BNC marked "ELECTRODE INPUT".



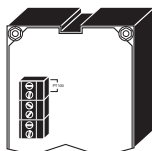
- For **Model T**, connect the 2 signal wires of the pH or ORP transmitter to the terminal marked "IN/OUT TRANSMITTER" paying particular attention to the indicated polarity.



- Recorder Terminals: these contacts are the output terminals for connection to a recorder. The output is from 0 to 20 mA / 4 to 20 mA as indicated and is proportional to the measured pH or ORP value.

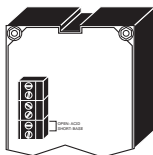


- PT 100 Terminals: these contacts connect the PT 100 temperature sensor for automatic temperature compensation of pH measurement. If temperature compensation is not required, connect a 110 Ohm, 0.25W resistor across the terminals (equivalent to a fixed temperature of 25°C/77°F).

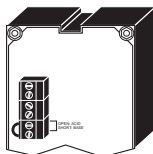


- **HI 8710** and **HI 931500** are single dosage controllers for dosing either acid or alkaline liquid.

If you plan to dose acid (e.g. in Hexavalent Chromium reduction), make an open circuit between ACID/BASE selection terminals (see rear panel descriptions #3 at page 12-13 and #4 at page 23).

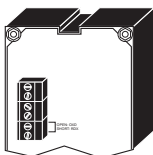


If you plan to dose alkaline (e.g. in Cyanide oxidation product), make a short circuit across the above mentioned terminals.

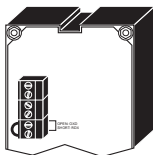


- **HI 8720** and **HI 932500** are single dosage controllers for dosing either oxidant or reductant liquid.

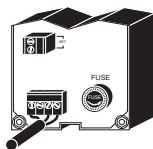
If you plan to dose oxidants (e.g. in cyanide oxidation), make an open circuit between oxidation/reduction selection terminals (see rear panel descriptions #3 at page 20-21 and #4 at page 28).



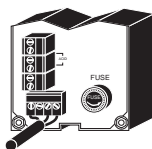
If you plan to dose reductants (e.g. in hexavalent chromium reduction), make a short circuit across the above mentioned terminals.



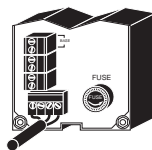
- Set Contacts (**HI 8710**, **HI 8720**, **HI 931500** and **HI 932500** only): these contacts (maximum 2A, 220 V) are for connection to the dosing pump to dose either acidic or alkaline liquids (**HI 8710** and **HI 931500** only) or to dose either oxidizing or reducing chemicals (**HI 8720** and **HI 932500** only). These contacts act only as a switch for the power to the drive.



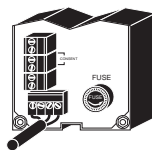
- Acid Contacts (**HI 8711** and **HI 931501** only): these two contacts are for the connection to the dosing pump for the acid. They act as a switch for the power to the drive.



- Base contact (**HI 8711** and **HI 931501** only): these two contacts are for the connection to the dosing pump for the base. They act as a switch for the power to the drive.



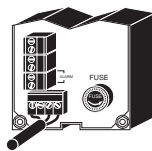
- Consent Contacts (**HI 8710**, **HI 8720**, **HI 931500** and **HI 932500** only): these contacts (maximum 2A, 220 V) are used for reduction and oxidation reactions when the pH controller is used in conjunction with an ORP Controller and viceversa. In these applications, the consent contacts of both meters are connected together to link the ORP and pH controllers so that ORP dosage will occur only if the actual pH value is correct. This is to avoid overdosage of oxidants or reductants which may lead to undesirable pollution.



The "Consent" contacts can be left open if **HI 8710** or **HI 931500** are used independently as pH controllers only.

The "Consent" should be shorted if **HI 8720** or **HI 932500** are used independently as ORP controllers only.

- Alarm Contacts (**HI 8710**, **HI 8711** and **HI 8720** only): if the measured pH or ORP is not within the tolerance of the set value, the alarm contact is closed. This can occur if there is insufficient dosage or if there is overdosage.



**Note:** all external cables to be connected to the rear panel should be ended with cable lugs.

## OPERATIONAL GUIDE

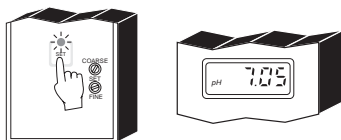
The setting of the various keys are made via the front panel keys and trimmers. When each key is pressed the LED is lighted indicating to the user that the function is in operation.

Make sure that the pH or the ORP meter with the electrode is calibrated before operating the instruments (see page 40-42).

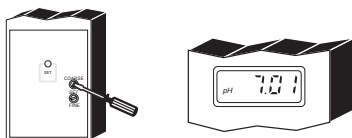
### **SET POINTS**

*HI 8710, HI 8720, HI 931500 and HI 932500 only*

To set the working point of pH or ORP dosage, press the "SET" key. The display will show the set value.



Use a small screwdriver to adjust the trimmers "COARSE" and "FINE" until the desired set value is displayed.

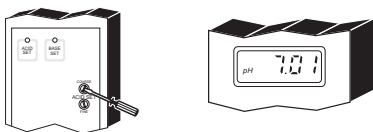


*HI 8711 and HI 931501 only*

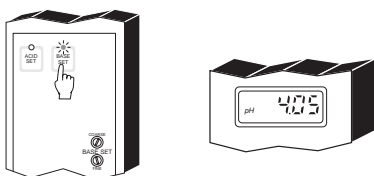
To set the working point of acid dosage, press the "ACID SET" key. The display will show the set value for acid dosage.



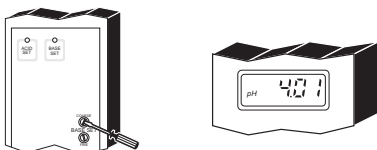
Use a small screwdriver to adjust the trimmers "ACID SET"/"COARSE" and "FINE" until the desired base set value is displayed.



To set the working point of base dosage, press the "BASE SET" key. The display will show the set value for base dosage.



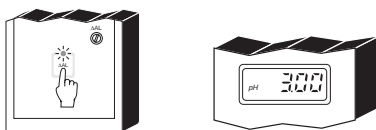
Use a small screwdriver to adjust the trimmers "BASE SET"/"COARSE" and "FINE" until the desired base set value is displayed.



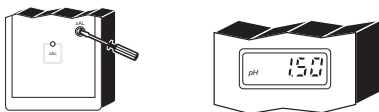
## **ALARMS**

*HI 8710, HI 8711 and HI 8720 only:*

To set the alarm, press the "ΔAL" key and the display will show the set tolerance for the alarm.



Use a small screwdriver to adjust the trimmers "ΔAL" until the desired tolerance is displayed.



For example:

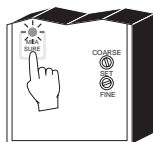
in **HI 8710** if the set value is pH 3 and a  $\Delta$ Alarm of 1.5 pH is chosen, the instrument gives an alarm every time the measured pH value is higher than 4.5 pH or lower than 1.5 pH.

In **HI 8711** if the set values are pH 7 and pH 8 and a  $\Delta$  Alarm of 1.5 pH is chosen, the instrument gives an alarm every time the measured pH value is higher than 9.5 pH or lower than 5.5 pH.

In **HI 8720** if the set value is 300 mV and the  $\Delta$ Alarm of 100 mV is chosen, the instrument gives an alarm every time the measured ORP value is higher than 400 mV or lower than 200 mV.

## **MEASUREMENTS**

After setting the pH or ORP value and the eventual alarm immerse the electrode in the test solution and press the "MEASURE" key.

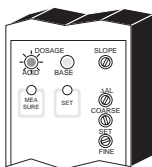


The actual pH or ORP value of the test solution is displayed.

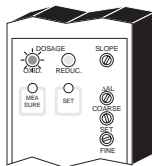




When acid is dosed, the ACID LED will be lighted, and when base is being dosed, the BASE LED will be lighted (**HI 8710**, **HI 931500** and **HI 931501** only).

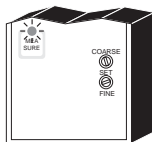


When oxidants are dosed, the OXID LED will be lighted, and when reductants are being dosed, the REDUC LED will be lighted (**HI 8720**, **HI 932500** only).

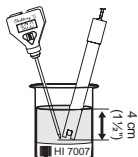


## pH CALIBRATION

Make sure you are in the measurement mode (MEASURE LED light is on) and not in the set mode before proceeding the calibration (not for **HI 8510**).



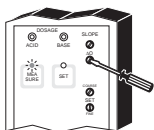
Note the temperature of the buffer with a ChecktempC or a glass thermometer.



Remove the protective cap from the electrode, rinse it with some pH 7.01 solution (HI 7007), then dip in pH 7.01 buffer.

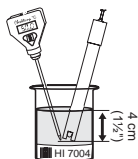
**Note:** the electrode should be submerged approximately 4 cm (1½") into the solution. The thermometer should be located as close to the pH electrode as possible.

Shake briefly and wait one minute before adjusting the  $\Delta O$  trimmer to display pH 7.01 on the LCD if the temperature of the buffer solution is at 25°C (77°F).



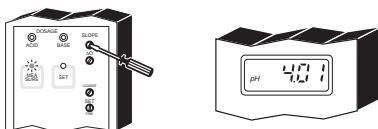
If the temperature of the buffer solution is not 25°C (77°F), refer to the chart on page 43 for the appropriate buffer value to adjust to the noted temperature.

Rinse the electrode and temperature sensor thoroughly in water and immerse them in pH4.01 (HI 7004) or pH 10.01 (HI 7010) buffer solution.



**Note:** to get accurate readings, use pH 4.01 if you are going to measure acid samples or pH 10.01 for alkaline measurements.

Shake briefly and wait one minute before adjusting the slope trimmer to display pH4.01 (or 10.01) on the LCD if the temperature of the buffer solution is at 25°C, if not refer to the chart on page 43 for appropriate buffer value for the corresponding temperature.



The calibration is now complete and the instrument is ready for use.

**Note:** If the meter is used in conjunction with a PT 100 temperature sensor, immerse it into the buffers during the calibration procedure.

## pH VALUES AT VARIOUS TEMPERATURE

Temperature has an effect on pH. The calibration buffer solutions are effected by temperature changes to a lesser degree than normal solutions.

Please refer to the following chart to perform the pH calibration:

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

For instance, if the buffer's temperature is 25°C (77°F), calibrate to read 4.01 or 7.01 or 10.01 on the display.

If the buffer's temperature is 20°C, calibrate to read 4.00/7.03/10.06 on the display.

If the buffer's temperature is 50°C, calibrate to read 4.06/6.98/9.82 on the display.

## pH DIAGNOSTIC TESTS

The **HI 8510**, **HI 8710** and **HI 8711** are the only pH controllers with built-in autodiagnostic functions to enable the user to check and troubleshoot any malfunctions.

The functions are made via front panel keys to isolate the cause of malfunction whether it is due to pH electrode contamination, internal offset circuit or the amplifier circuit.

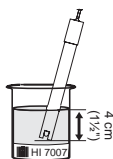
Follow the procedure describe below if you detect any malfunctioning of the instrument or electrode.

Press the "MEASURE" button before pressing any of the following keys.



### A) *Sensor Test*

Immerse the electrode in pH 7.01 buffer solution (HI 7007), press the "SENSOR TEST" key and the display shows the mV response of the electrode.



If the electrode is in good working condition, the value should be within  $\pm 30$  mV. A value between 30 mV and 60 mV or between -60 and -30 mV indicates some contamination of the electrode.

If the value is higher than 60 mV or lower than -60 mV the contamination is too high and the electrode should be replaced.

### B) *Internal Offset Circuit Test*

Press the "pH7 TEST" key and the display should show a value between 7 pH  $\pm$ 1 pH. This will verify the internal circuit of the meter in terms of the offset compensation.



### C) *Amplifier Circuit Test*

Press the "pH4 TEST" key and the display should show a value between 3.30 pH and 4.30 pH. This will verify the amplifier circuit of the meter.



## ORP DIAGNOSTIC TESTS

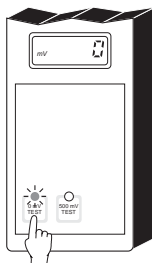
The **HI 8512** and **HI 8720** are the only ORP controllers with built-in autodiagnostic functions to enable the user to check and troubleshoot any malfunctions. The functions are made via front panel keys to isolate the cause of malfunction.

Press the "MEASURE" key before proceeding with the following tests (HI 8720 only).



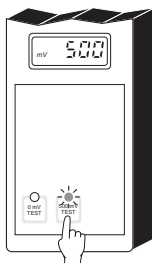
### A) 0 mV Test

Press the "0 mV TEST" key and the display should show a value of 0 mV  $\pm 10$  mV. This will verify instrument calibration at point 0.



### B) 500 mV Test

Press the "500 mV TEST" key and the display should show a value of 500 mV  $\pm 20$  mV. This will verify the slope at point 500 mV.



## LED INDICATION

The LEDs above all keys are designed to indicate the state of each function, whether it is active or the display is indicating the mode.

### **For HI 8711 and HI 931501 only**

Each LED can be in one of the following states:

- A) Light stays on      The mode is displayed on the LCD but is not active. E.g. alarm set point is displayed but the alarm contact is open.
- B) Light Blinking 25% On, 75% Off  
The mode is not displayed on the LCD but the mode is active. E.g. alarm contact is closed but the alarm set point is not displayed.
- C) Light Blinking 75% On, 25% Off  
The mode is active and being displayed.
- D) Light Off      The function is neither active nor displayed.



## TAKING REDOX MEASUREMENTS

Redox measurements allow the quantification of the oxidizing or reducing power of a solution, and are commonly expressed in mV.

Oxidation may be defined as the process during which a molecule (or an ion) loses electrons and reduction as the process by which electrons are gained.

Oxidation is always coupled together with reduction so that as one element gets oxidized, the other is automatically reduced, therefore the term oxidation-reduction is frequently used.

Redox potentials are measured by an electrode capable of absorbing or releasing electrons without causing a chemical reaction with the elements with which it comes into contact.

The electrodes most usually available for this purpose have gold or platinum surfaces; gold possesses a higher resistance than platinum in conditions of strong oxidation, while platinum is preferred for the measurements of oxidizing solutions containing halides and for more general uses.

When a platinum electrode is immersed in an oxidizing solution a monomolecular layer of oxygen is developed on its surface. This layer does not prevent the electrode from functioning, but it increases the response time. The opposite effect is obtained when the platinum surface absorbs hydrogen in the presence of reducing mediums. This phenomenon is rough on the electrode.

To make correct redox measurements the following conditions must prevail:

- The surface of the electrode must be cleaned and smooth.
- The surface of the electrode must undergo a preventive treatment depending on the solution to be measured has oxidizing or reductive characteristics.

Because the Pt/PtO system depends on the pH, the pretreatment of the electrode may be determined by the pH and the redox potential of the solution to be measured.

As a general rule, if the ORP mV reading corresponding to the pH solution value is higher than the value in the Table below, an oxidizing pre-treatment is necessary; otherwise a reducing pre-treatment is necessary:

pH	mV	pH	mV	pH	mV	pH	mV	pH	mV
0	990	1	920	2	860	3	800	4	740
5	680	6	640	7	580	8	520	9	460
10	400	11	340	12	280	13	220	14	160

Reducing pre-treatment: immerse the electrode for some minutes in **HI 7091**.

Oxidizing pre-treatment: immerse the electrode for some minutes in **HI 7092**.

If the pre-treatment is not performed, the electrode will take significantly longer to respond.

When working with electrodes of the refilling type, the electrolyte used for filling must be constantly kept at an adequate level (no less than 2½ centimeters from the filling hole) and topped up if necessary with **HI 7071** refilling solution.

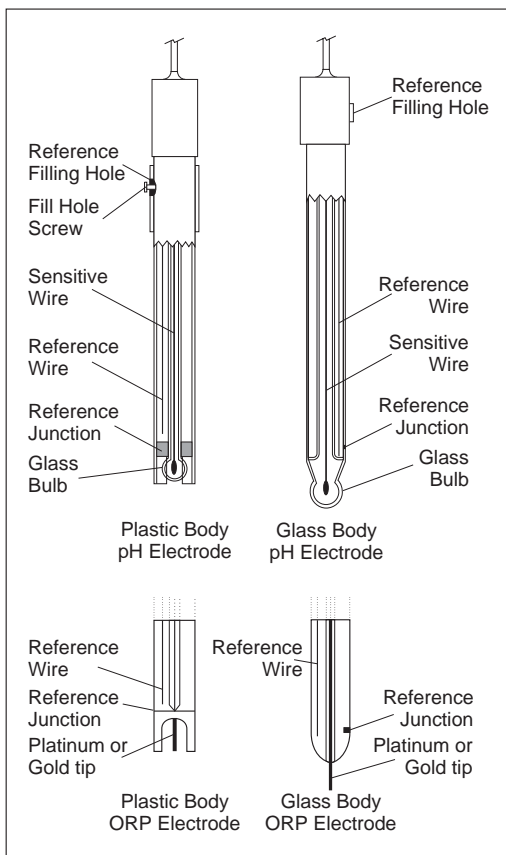
In the event that measurements are performed with solutions containing sulfides or proteins, the cleaning of the diaphragm of the reference electrode must be performed (see page 20, "Cleaning Procedure").

In order to have a correct functioning of the ORP electrode, immerse it into **HI 7020** and measure the response; the obtained value should be within 200 and 275 mV.

After this functional test, it is suggested to wash the electrode thoroughly with water and proceed to the oxidizing or reducing pre-treatment before taking measurements.

When not in use, the electrode tip should be kept moist and far from any type of mechanical stress which might cause damage. For this reason, the use of the protective cap supplied with the electrode and filled with **HI 70300** storage solution is advised.

## 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 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 **HI70300 Storage Solution** or, in its absence, **Filling Solution (HI7071 for single junction or HI7082 for double junction electrodes)**.

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

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

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

Refill the electrode with fresh electrolyte (**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 and Fat Cleaning Solution**.

**IMPORTANT:** After performing any of the cleaning procedures rinse the electrode thoroughly with distilled water, drain and refill the reference chamber with fresh electrolyte, (not necessary for GEL filled electrodes) and soak the electrode in **HI70300 or HI 80300 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): refill with **HI7071** for single junction or **HI7082** for double junction electrodes.
- **Dry Membrane/Junction:** Soak in **Storage Solution HI70300** for at least 1 hour.
- **Drifting:** Soak the electrode tip in warm Hanna Solution **HI7082** for one hour and rinse 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 (replace the electrode if cracks are found).
- **Slow Response/Excessive Drift:** Soak the tip in Hanna Solution **HI7061** for 30 minutes, rinse thoroughly in distilled water

and then follow the Cleaning Procedure above.

- **For ORP Electrodes:** polish the metal tip with a light abrasive paper (paying attention not to scratch the surface) and wash thoroughly with water.

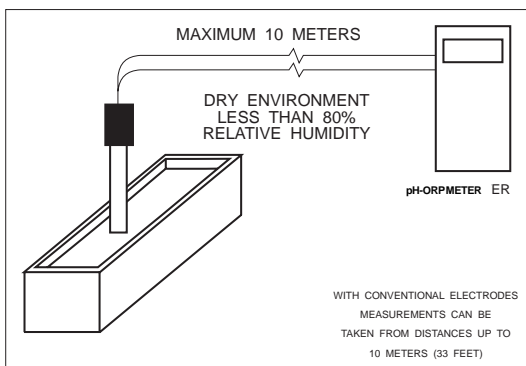


## SUGGESTED INSTALLATIONS

### SHORT DISTANCE, INDOOR INSTALLATION

Due to the low current involved, a very high grade of insulation is required.

A dry environment is needed in order to obtain a level of insulation not lower than  $10^{12} \Omega$ .



This type of connection is very delicate and requires constant attention to maintain proper operating conditions.

The conventional electrodes should be used in indoor applications only, and should not use a cable longer than 10 m (33').

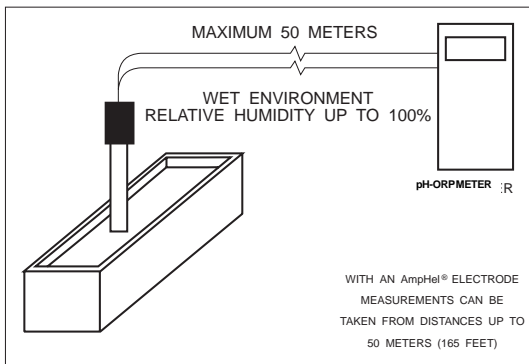
### MEDIUM DISTANCE, INDOOR/OUTDOOR INSTALLATION

When an outdoor installation is required, it is necessary to install a transmitter to obtain accurate readings at distances from 10 to 50 m (33-165').

Since the introduction of AmpHel® these distances are no longer a problem. You are now able to connect your meter directly to an AmpHel® electrode, saving the cost of a transmitter or costly coaxial cable.

The standard cable length of the AmpHel® electrode is 5 m (16.5'). Additional lengths of regular cable up to 50 m (165'), can be

installed without special connectors.

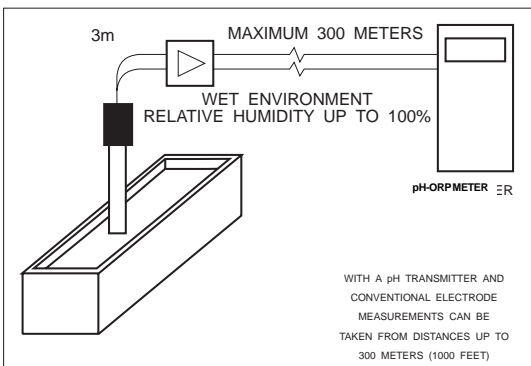


AmpHel® electrodes have a micro-amplifier in the electrode cap to boost the signal, drastically reducing susceptibility to noise and drift. With all of the components sealed in the electrode body, moisture up to 100% RH will not effect the signal.

### **LONG DISTANCE, INDOOR/OUTDOOR INSTALLATIONS, ISOLATED OUTPUT FOR COMPUTER INTERFACE**

If your application has a distance greater than 50 m (165'), it is necessary to install a transmitter between the electrode and the meter.

Hanna offers a full line of pH/ORP transmitters with or without LCD displays.



AmpHel® is a registered Trademark of "Hanna Instruments"

## ACCESSORIES

### **pH CALIBRATION SOLUTIONS**

- HI7004M** pH 4.01 Buffer Solution, 230 mL
- HI7004L** pH 4.01 Buffer Solution, 460 mL
- HI7006M** pH 6.86 Buffer Solution, 230 mL
- HI7006L** pH 6.86 Buffer Solution, 460 mL
- HI7007M** pH 7.01 Buffer Solution, 230 mL
- HI7007L** pH 7.01 Buffer Solution, 460 mL
- HI7009M** pH 9.18 Buffer Solution, 230 mL
- HI7009L** pH 9.18 Buffer Solution, 460 mL
- HI7010M** pH 10.01 Buffer Solution, 230 mL
- HI7010L** pH 10.01 Buffer Solution, 460 mL

### **ORP SOLUTIONS**

- HI 7020M** 200-275mV Buffer Solution, 230 mL
- HI 7020L** 200-275mV Buffer Solution, 460 mL
- HI 7091M** Pre-Treatment Reducing Solution, 230 mL
- HI 7091L** Pre-Treatment Reducing Solution, 460 mL
- HI 7092M** Pre-treatment Oxidizing Solution, 230 mL
- HI 7092L** Pre-Treatment Oxidizing Solution, 460 mL

### **ELECTRODE STORAGE SOLUTIONS**

- HI70300M** Storage Solution, 230 mL
- HI70300L** Storage Solution, 460 mL

### **ELECTRODE CLEANING SOLUTIONS**

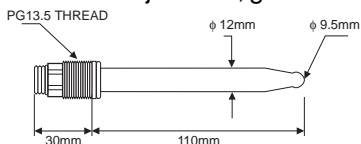
- HI7061M** General Cleaning Sol., 230 mL
- HI7061L** General Cleaning Sol., 460 mL
- HI7073M** Protein Cleaning Sol., 230 mL
- HI7073L** Protein Cleaning Sol., 460 mL
- HI7074M** Inorganic Cleaning Sol., 230 mL
- HI7074L** Inorganic Cleaning Sol., 460 mL
- HI7077M** Oil & Fat Cleaning Sol., 230 mL
- HI7077L** Oil & Fat Cleaning Sol., 460 mL

### **REFILLING ELECTROLYTE SOLUTIONS**

- HI7071** 3.5M KCl + AgCl Electrolyte, 4x50 mL, for single junction electrodes
- HI7072** 1M KNO<sub>3</sub> Electrolyte, 4x50 mL
- HI7082** 3.5M KCl Electrolyte, 4x50 mL, for double junction electrodes

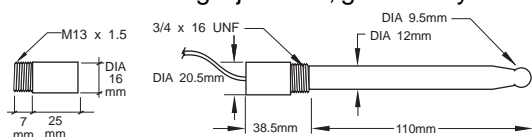
## pH ELECTRODES

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



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

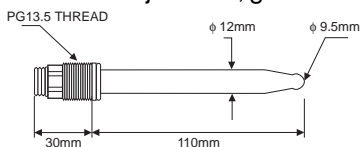
**HI 1130B/3** BNC connector, 3 m (9.9') cable, single junction, glass-body



**HI 1110S**

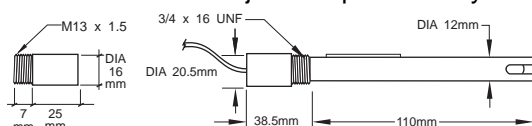
**HI 1130B/3**

**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

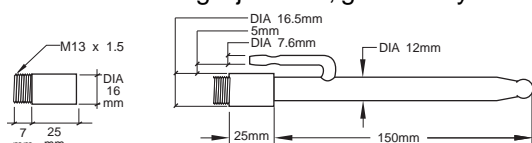


**HI 1114S**

**HI 1134B/3**

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

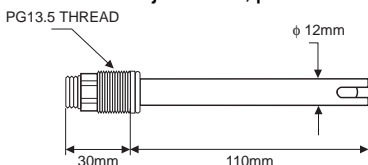
**HI 1135B/3** BNC connector, 3 m (9.9') cable, single junction, glass-body



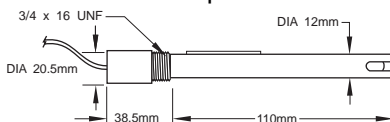
**HI 1115S**

**HI 1135B/3**

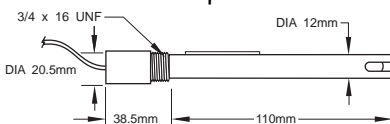
**HI 1210T** Screwcap PG13.5 connector, double junction, plastic-body



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

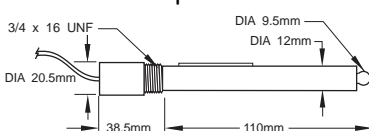


**HI 1911B** BNC connector, 1 m (3.3') cable, double junction, plastic-body, built-in amplifier

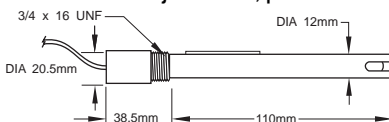


**HI 1912B** BNC connector, 1 m (3.3') cable, double junction, plastic-body, built-in amplifier

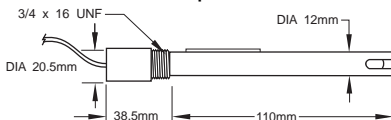
**HI 1912B/5** BNC connector, 5 m (16.5') cable, double junction, plastic-body, built-in amplifier



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

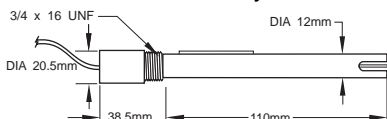


**HI 2910B/5** BNC connector, 5 m (16.5') cable, double junction, plastic-body, built-in amplifier



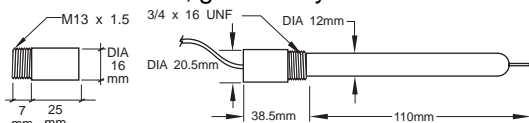
**ORPELECTRODES**

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



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

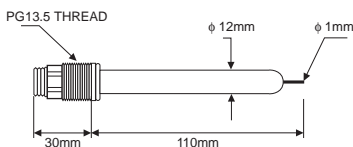
**HI 3130B/3** BNC connector, 3 m (9.9') cable, Pt, glass-body



**HI 3110S**

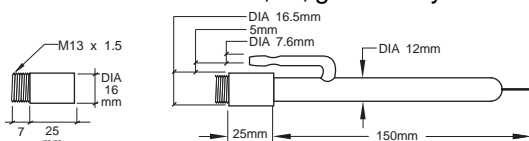
**HI 3130B/3**

**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

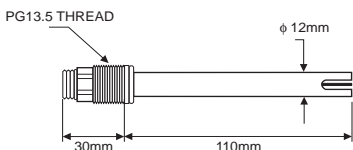


**HI 3115S**

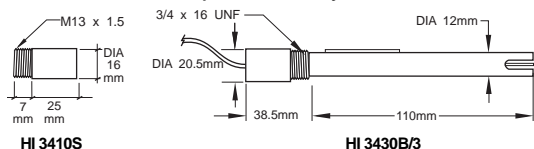
**HI 3135B/3**

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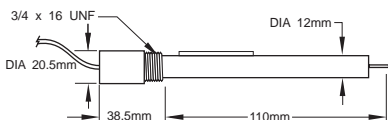
**HI 3210T** Screwcap PG13.5 connector, Pt, plastic-body



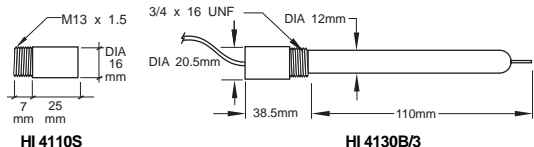
**HI 3410S** Screw connector, Pt, plastic-body  
**HI 3430B/3** BNC connector, 3 m (9.9') cable, Pt, plastic-body



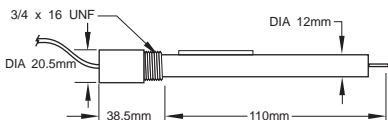
**HI 3410S**  
**HI 3430B/3**  
**HI 3932B/5** BNC connector, 5 m (16.5') cable, Pt, Ultem®-body, built-in amplifier



**HI 4110S** Screw-type connector, Au, glass-body  
**HI 4130B/3** BNC connector, 3 m (9.9') cable, Au, glass-body



**HI 4110S**  
**HI 4130B/3**  
**HI 4932B/5** BNC connector, 5 m (16.5') cable, Au, Ultem®-body, built-in amplifier



## **OTHER ACCESSORIES**

<b>ChecktempC</b>	Pocket-size thermometer with penetration probe and 0.1°C resolution (range -50.0 to 150.0°C)
<b>HI 76501/P</b>	Calibration Screwdriver (20 pcs)
<b>HI 8614</b>	pH Transmitter
<b>HI 8614L</b>	pH Transmitter with LCD Display
<b>HI 8615</b>	ORP Transmitter
<b>HI 8615L</b>	ORP Transmitter with LCD Display
<b>BL PUMPS</b>	Dosing Pumps with Flow Rate from 1.5 to 20 LPH
<b>HI 7871 &amp; HI 7873</b>	Level Controllers
<b>HI 6050 &amp; HI 6051</b>	Submersible Electrode Holders
<b>HI 6054 &amp; HI 6057</b>	Electrode Holders for In-Line Applications
<b>HI 778P</b>	Screened Coaxial Cable and Connectors for Screw-type pH/ORP Electrodes
<b>HI 8427</b>	pH and ORP Electrode Simulator with 1 m (3.3') Coaxial Cable ending in Female BNC Connectors (HI 7858/1)
<b>HI 931001</b>	pH and ORP Electrode Simulator with LCD Display and 1 m (3.3') Coaxial Cable ending in Female BNC Connectors (HI 7858/1)
<b>MANPROCR2</b>	Instruction Manual



## 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.

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

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


herewith certify that the process controllers

**HI 8510E HI 8510T HI 8512E HI 8512T**  
**HI 8710E HI 8710T HI 8720E HI 8720T**  
**HI 8711E HI 8711T HI 931500 HI 931501**  
**HI 932500**

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

<b>IEC 801-2</b>	Electrostatic Discharge
<b>IEC 801-3</b>	RF Radiated
<b>IEC 801-4</b>	Fast Transient
<b>EN 55022</b>	Radiated, Class B

Date of Issue: 29-03-1996

  
D. Volpato - Engineering Manager

On behalf of  
Hanna Instruments S.r.l.

### Recommendations for Users

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

Operation of these instruments in residential area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

The trimmers are sensitive to electrostatic discharges. It is recommended to use antistatic screwdrivers.

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 24VAC or 60VDC.

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

## HANNA LITERATURE

Hanna publishes a wide range of catalogs and handbooks for an equally wide range of applications.

The reference literature currently covers areas such as:

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

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

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

MANPROCR2  
01/02



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<http://www.hannainst.com>