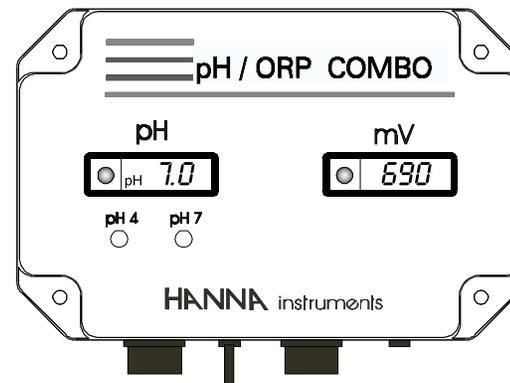


Instruction Manual

**pH / ORP COMBO
(HI 981406)**

**pH & ORP Monitor
with Visual Alarm**



PRINTED IN PORTUGAL, IS 981406R2 10/99



w w w . h a n n a c a n . c o m



w w w . h a n n a c a n . c o m



This Instrument is in
Compliance with the
CE Directives

Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for a correct operation. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at techserv@hannacan.com.

These instruments are in compliance with the CE directives EN 50081-1 and EN 50082-1.

PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully. If any damage has occurred during shipment, immediately notify your Dealer or the nearest Hanna Customer Service Center.

The meter is supplied with:

- **HI 1283** grounding probe
- Calibration screwdriver
- 12 VDC power adapter

Note: Conserve all packing material until the instrument has been observed to function correctly. Any defective item must be returned in its original packing.

CE DECLARATION OF CONFORMITY

Recommendations for users

Before using this product, make sure that it is entirely suitable for the environment in which it is used. Operation of this instrument in residential areas could cause unacceptable interference to radio and TV equipment.

The glass bulb at the end of the electrode is sensitive to electrostatic discharges. Avoid touching the bulb at all times. During operation, ESD wrist straps should be worn to avoid possible damage to the electrode by electrostatic discharges.

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

To avoid electrical shock, do not use this instrument when voltage at the measurement surface exceeds 24 VAC or 60 VDC. To avoid damage or burns, do not perform any measurement in microwave ovens.

	
CE DECLARATION OF CONFORMITY	
We	
Hanna Instruments Srl Via E. Fermi, 10 20050 Sarnonola di Rabano (PD) ITALY	
hereby certify that the meter	
HI 981406	
Has been tested and found to be in compliance with the following regulations:	
EMC 89/243	Electromagnetic Discharge
EMC 89/32	RF Radiation
EMC 89/34	Fast Transients
EN 55022	Radiated, Class B
EN 60954	User Safety Requirement
Date of Issue: 10/06/2009	 D. Volpato - Engineering Manager On behalf of Hanna Instruments S.r.l.

WARRANTY

HI 981406 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. The electrodes are warranted for a period of one year. This warranty is limited to repair or replacement free of charge. Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered. If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection. To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

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

ACCESSORIES

HI 2114P/2	Double-junction, plastic body pH electrode with 2 m (6.6') cable and BNC connector
HI 3214P/2	Double-junction, plastic body ORP electrode with 2 m (6.6') cable and BNC connector
HI 1283 *	Stainless steel grounding probe with 2 m (6.6') cable
HI 70004P	pH 4.01 solution, 20 mL sachet (25 pcs)
HI 70007P	pH 7.01 solution, 20 mL sachet (25 pcs)
HI 70010P	pH 10.01 solution, 20 mL sachet (25 pcs)
HI 7004M	pH 4.01 solution, 230 mL bottle
HI 7007M	pH 7.01 solution, 230 mL bottle
HI 7010M	pH 10.01 solution, 230 mL bottle
HI 7020M	ORP 200/275 mV solution, 230 mL
HI 7092M	Oxidizing solution, 230 mL
HI 7061M	Electrode cleaning solution, 230 mL bottle
HI 710005	12 VDC power adapter, US plug
HI 710006	12 VDC power adapter, European plug
HI 710012	12 VDC power adapter, Australian plug
HI 710013	12 VDC power adapter, Southern Africa plug
HI 710014	12 VDC power adapter, UK plug

* To be replaced only by authorized service technicians

GENERAL DESCRIPTION

HI 981406, pH and ORP Monitor, is specially designed to meet the needs of simple continuous monitoring.

You can simply install the meter in the vicinity of a pool or the sample for continuous measurement of both pH and ORP.

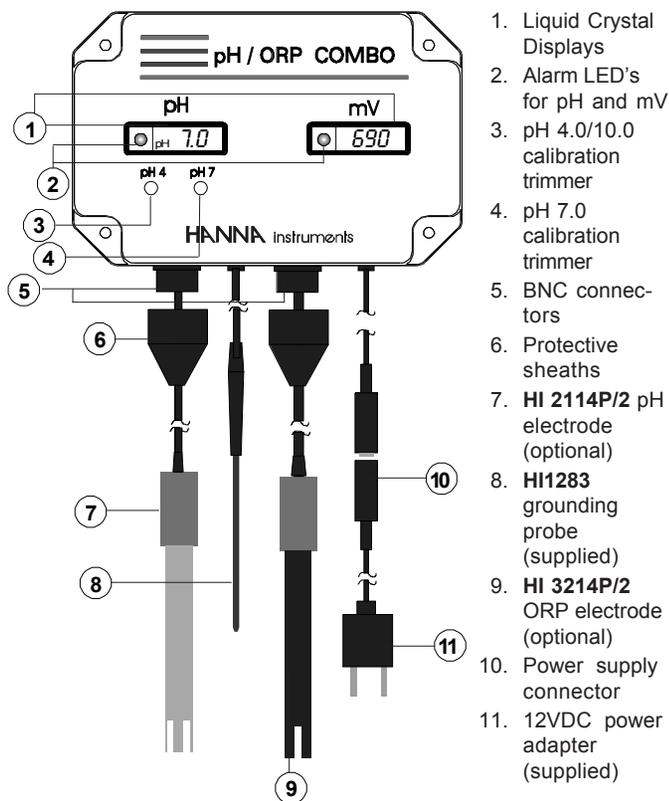
The optimal **HI 2114P/2** and **HI 3214P/2** gel-filled pH and ORP electrodes are specially made for the pool applications. The BNC connector is protected behind a waterproof sheath.

You can select your own setpoint and be alerted through flashing LEDs when the values are outside limits and an intervention is required. The pH LED blinks when the values are higher than the setpoint. The ORP LED flashes when the measurements are below the setpoint.

Measurements are accurate and the meter can be calibrated at one or two points for pH.

You no longer need to worry about battery changes either: the unit runs without interruption on 12 VDC supplied adapter.

FUNCTIONAL DESCRIPTION



1. Liquid Crystal Displays
2. Alarm LED's for pH and mV
3. pH 4.0/10.0 calibration trimmer
4. pH 7.0 calibration trimmer
5. BNC connectors
6. Protective sheaths
7. HI 2114P/2 pH electrode (optional)
8. HI1283 grounding probe (supplied)
9. HI 3214P/2 ORP electrode (optional)
10. Power supply connector
11. 12VDC power adapter (supplied)

pH CALIBRATION

The instrument must be recalibrated whenever:

- a) The pH electrode is cleaned or replaced.
- b) Where high accuracy is required.
- c) At least once a month.

pH Calibration

Pour a small quantities of pH 7.0 (HI 7007) and pH 10.0 (HI 7010) solution (or alternatively pH4.0) into two clean beakers.

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

pH 4.0 (HI 7004) is recommended for measuring acidic samples. Use pH 10.0 (HI 7010) if subsequent samples are alkaline.

- Turn the meter on and make sure that the MEASURE/SET switch is on MEASURE (inside the back cover).
- Remove the protective cap from the electrode, rinse and immerse it in the pH 7.0 buffer. Stir gently and then wait a couple of minutes for the reading to stabilize.

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

- Adjust the right hand trimmer (pH 7) with the calibration screwdriver until the LCD shows pH 7.0.
- Rinse and immerse the pH electrode in the pH 10.0 (or pH 4.0) buffer and stir gently.
- Wait a couple of minutes and then adjust the left hand trimmer (pH 4) until the LCD shows the value of the second buffer.

The pH calibration is now complete.

Electrode Maintenance

- When not in use, rinse the electrodes with water to minimize contamination and store them with a few drops of storage (**HI 70300**) solution in the protective cap. Always replace the protective cap when not in use.
DO NOT USE DISTILLED OR DEIONIZED WATER FOR STORAGE PURPOSES.
- If the electrodes have been left dry, soak the tips in a storage (**HI 70300**) solution overnight to reactivate them.
- To minimize clogging and provide longer life for the electrodes, it is recommended to clean them at least once a month. Immerse the tip of the electrodes in a **HI 7061** cleaning solution for ½ hour and then rinse with tap water.

ORP Electrode

Check the accuracy of the meter by immersing the ORP electrode in a **HI 7020** solution. The reading should be between 200 and 275 mV at 20°C (68°F). Otherwise clean the platinum tip of the electrode by rubbing it with a soft cotton or lint-free cloth soaked with **HI 7061** cleaning solution, or alcohol

After cleaning, condition the ORP electrode by leaving it in a pretreatment oxidizing (**HI 7092**) solution for ½ an hour.

SPECIFICATIONS

HI 981406 pH/ORP COMBO

Range	0.0 to 14.0 pH 0 to 999 mV
Resolution	0.1 pH 1 mV
Accuracy (@20°C/68°F)	±0.2 pH ±5mV
Setpoint	5.0 to 9.0 pH 350 to 850 mV
pH Alarm	LED blinks when pH reading is higher than setpoint
ORP Alarm	LED blinks when ORP reading is lower than setpoint
pH Calibration	Manual at 1 or 2 point
Electrodes	HI 2114P/2 replaceable pH electrode (optional) HI 3214P/2 replaceable ORP electrode (optional) HI 1283 grounding probe (included)
Power supply	External 12 VDC (adaptor included)
Dimensions	165 x 110 x 35 mm (6.5 x 4.3 x 1.4")
Weight	300 g (10.6 oz.)

OPERATIONAL GUIDE

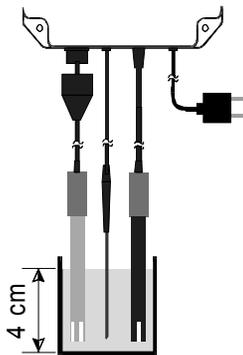
pH and ORP Electrodes Connection

In order to protect the instrument against vapors and humidity, the BNC connectors are shielded behind waterproof sheaths.

- Slide the protective sheaths down. Connect the pH and the ORP electrodes to the BNC connectors and then slide the protective sheaths back up to the casing. For maximum waterproof protection, make sure the connectors are completely covered.
- Do not be alarmed if white crystals appear around the electrode protective cap. This is normal with pH and ORP electrodes and they dissolve when rinsed with water.

Taking Measurements

- Turn the meter on by connecting the 12VDC power adapter to the meter and the mains.
- Remove the protective cap from the pH and ORP electrodes.
- Immerse the tips (4cm/1½") of pH, ORP electrodes and ground probe in the sample. In order not to affect the accuracy of measurements, electrodes should not touch or stand close to the vessel's walls or bottom.
- The 2 LCD's will show the pH and ORP values. Allow the readings to stabilize.



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Adjusting the Setpoint

With **HI981406** you can select your own setpoints and be alerted through two independent pH and ORP alarm LED's when an abnormal situation arises.

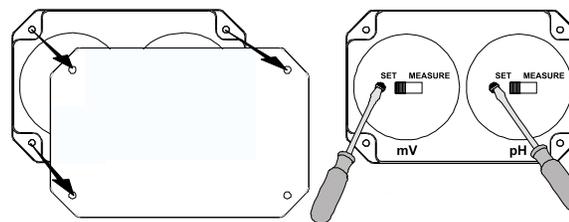
- Unscrew and remove the rear panel and gasket seal to access the MEASURE/SET switches and move them to the left (SET).
- With a small screwdriver adjust the setpoint trimmers to display the desired value shown on the LCD. You can choose to adjust one or both setpoints at once inside the following ranges:

pH: from 5.0 to 9.0

ORP: from 350 to 850 mV

The pH LED blinks when the pH is higher than the setpoint

The ORP LED blinks when the ORP is lower than the setpoint.



- Move the switches back to MEASURE and secure the rear panel properly replacing the gasket.

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