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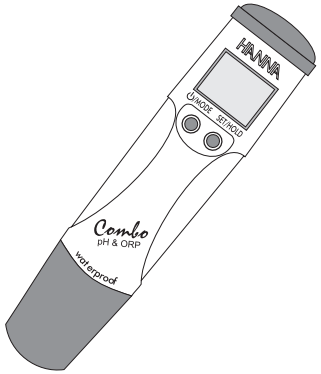
Instruction Manual

HI 98121

Waterproof pH / ORP & Temperature Meter



HANNA® instruments

WARRANTY

HI 98121 is **warranted for one year** against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. **The electrode is warranted for a period of six months**. 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 the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. 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.

Dear Customer,

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

This instrument is in compliance with the CE directives.

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.
Each meter is supplied with:

- **HI 73127** pH electrode
- **HI 73128** Electrode removal tool
- 4 x 1.5V batteries

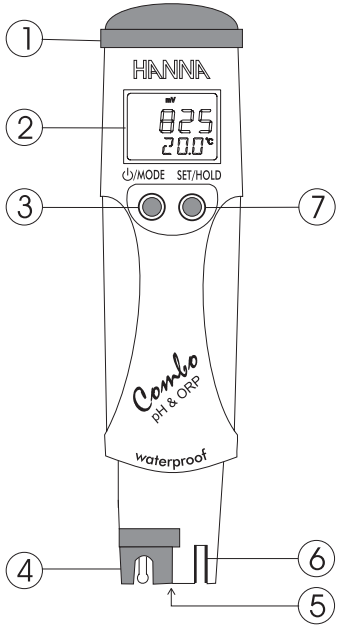
Note: Conserve all packing material until the instrument has been observed to function correctly. Any defective item must be returned in its original packing.

US DESIGN PATENT
D462,024

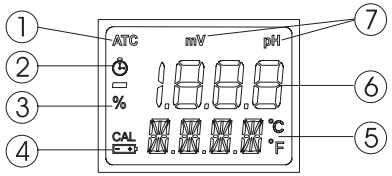
GENERAL DESCRIPTION

HI 98121 is a waterproof pH, ORP and temperature meter. The housing has been completely sealed against humidity and designed to float.
All pH readings are automatically temperature compensated (ATC), and temperature values can be displayed in °C or °F units.
The meter can be calibrated at one or two points for pH (with auto-buffer recognition and against five memorized buffer values), while the mV (ORP) range is factory calibrated.
Measurements are highly accurate with a unique stability indicator right on the LCD.
This meter is also provided with battery level indication at start-up, and with a low battery symbol which warns the user when the batteries need to be replaced.
In addition the Battery Error Prevention System (BEPS) avoids erroneous reading caused by low voltage level by turning the meter off.
The **HI 73127** pH electrode, supplied with the meter, is interchangeable and can be easily replaced by the user.
The stainless steel encapsulated temperature sensor facilitates faster and more accurate temperature measurement and compensation.

FUNCTIONAL DESCRIPTION



1. Battery compartment
2. Liquid Crystal Display (LCD)
3. ON/OFF/MODE button
4. **HI 73127** pH electrode
5. Temperature sensor (behind)
6. ORP electrode
7. SET/HOLD button



1. Automatic Temperature Compensation Indicator
2. Stability indicator
3. Battery life percentage indicator
4. Low battery indicator
5. Secondary display
6. Primary display
7. Measuring unit for primary display

CE DECLARATION OF CONFORMITY

HANNA instruments

CE

DECLARATION OF CONFORMITY

We

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

herewith certify that the pH / ORP & temperature meter

HI 98121

has 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 normatives:

EN 50082-1: Electromagnetic Compatibility - Generic Immunity Standard
IEC 61000-4-2 Electrostatic Discharge
IEC 61000-4-3 RF Radiated

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: 13.02.2002

A.Marsilio - Technical Director
On behalf of
Hanna Instruments S.r.l.

Recommendations for Users
Before using this product, make sure that it is entirely suitable for the environment in which it is used.
The glass bulb at the end of the electrode is sensitive to electrostatic discharges. Avoid touching the glass bulb and the ORP electrode at all times.
Any variation introduced by the user to the supplied equipment may degrade the instrument's EMC performance.
To avoid electrical shock, do not use this instrument when voltages at the measurement surface exceed 24 VAC or 60 VDC. To avoid damages or burns, do not perform any measurement in microwave ovens.

ACCESSORIES

HI 73127	Replaceable pH electrode
HI 73128	Electrode removal tool
HI 70004P	pH 4.01 solution, 20 mL sachet (25 pcs)
HI 70006P	pH 6.86 solution, 20 mL sachet (25 pcs)
HI 70007P	pH 7.01 solution, 20 mL sachet (25 pcs)
HI 70009P	pH 9.18 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 7006M	pH 6.86 solution, 230 mL bottle
HI 7007M	pH 7.01 solution, 230 mL bottle
HI 7009M	pH 9.18 solution, 230 mL bottle
HI 7010M	pH 10.01 solution, 230 mL bottle
HI 7021M	ORP test solution (240 mV), 230 mL bottle
HI 7022M	ORP test solution (470 mV), 230 mL bottle
HI 7061M	Electrode cleaning solution, 230 mL bottle
HI 70300M	Electrode storage solution, 230 mL bottle
HI 7091M	Pretreatment reducing solution, 230 mL
HI 7092M	Pretreatment oxidizing solution, 230 mL

IST98121 05/05

SPECIFICATIONS

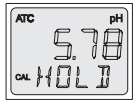
Range	-2.00 to 16.00 pH
	±1000 mV
	-5.0 to 60.0°C / 23.0 to 140.0°F
Resolution	0.01 pH
	1 mV
	0.1°C or 0.1°F
Accuracy	±0.05 pH
(@20°C/68°F)	±2 mV
	±0.5°C or ±1°F
Typical EMC	±0.02 pH
Deviation	±2 mV
	±0.3°C or ±0.6°F
Temp. Compensation	Automatic for pH
Calibration	pH: at 1 or 2 points with 2 sets of memorized buffers (pH 4.01/7.01/10.01 or pH 4.01/6.86/9.18)
	ORP: factory calibrated
Electrode	HI 73127 pH electrode (included)
Environment	-5 to 50°C (23 to 122°F); RH 100%
Battery Type / Life	4 x 1.5V / approx. 250 hours
Auto-off	After 8 minutes of non-use
Dimensions	163 x 40 x 26 mm (6.4 x 1.6 x 1.0")
Weight	100 g (3.5 oz)

OPERATIONAL GUIDE

To turn the meter on and to check battery status

Press and hold the ⏻/MODE button until the LCD lights up. All the used segments on the LCD will be visible for 1 second (or as long as the button is pressed), followed by the percent indication of the remaining battery life (E.g. % 100 BATT).

To freeze the display



While in measurement mode, press the SET/HOLD button until HOLD appears on the secondary display. The reading will be frozen on the LCD.

Press any button to return to normal mode.

To turn the meter off

While in measurement mode, press the ⏻/MODE button. OFF will appear on the secondary display. Release the button.

Note: If measurements are taken in different samples successively, rinse the probe thoroughly to eliminate cross-contamination; and after cleaning, rinse the probe with some of the sample to be measured.

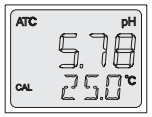
pH MEASUREMENTS & CALIBRATION

Taking measurements

Select pH mode with the SET/HOLD button.

Submerge the electrode in the solution to be tested while stirring it gently.

The measurements should be taken when the stability symbol ▯ on the top left of the LCD disappears.



The pH value automatically compensated for temperature is shown on the primary LCD while the secondary LCD shows the temperature of the sample.

Note: Before taking any pH measurement make sure the meter has been calibrated (CAL tag present on the LCD).

pH Calibration

For better accuracy, frequent calibration of the instrument is recommended. In addition, the instrument must be recalibrated whenever:

a) The pH electrode is replaced.
b) After testing aggressive chemicals.
c) Where high accuracy is required.
d) At least once a month.

Calibration procedure

From normal measuring mode, press and hold the ⏻/MODE button until OFF on the secondary LCD is replaced by CAL. Release the button. The LCD enters the calibration mode displaying "pH 7.01 USE" (or "pH 6.86 USE" if the NIST buffer set was selected).

After 1 second the meter activates the automatic buffer recognition feature. If a valid buffer is detected then its value is shown on the primary display and REC appears on the secondary LCD. If no valid buffer is detected, the meter keeps the USE indication active for 12 seconds, and then it replaces it with WRNG, indicating the sample being measured is not a valid buffer.

• For a single-point calibration with buffers pH 4.01, 9.18 or 10.01, the meter automatically accepts the calibration when the reading is stable; the meter displays the accepted buffer, with the message "OK 1". After 1 second the meter automatically returns to the normal measuring mode.

If a single-point calibration with buffer pH 7.01 (or pH 6.86) is desired, then after the calibration point has been accepted the ⏻/MODE button must be pressed in order to return to normal mode. After the button is pressed, the meter shows "7.01" (or "6.86") - "OK 1" and, after 1 second, it automatically returns to the normal measuring mode.

Note: It is always recommended to carry out a two-point calibration for better accuracy.

• For a two-point calibration, place the electrode in pH 7.01 (or pH 6.86) buffer. After the first calibration point has been accepted, the "pH 4.01 USE" message appears. The message is held for 12 seconds, unless a valid buffer is recognized. If no valid buffer is recognized, then the WRNG message is shown. If a valid buffer (pH 4.01, pH 10.01, or pH 9.18) is detected, then the meter completes the calibration procedure. When the buffer is accepted, the LCD shows the accepted value with the "OK 2" message, and then the meter returns to the normal measuring mode.

Note: When the calibration procedure is completed, the CAL tag is turned on.

To quit calibration and to reset to the default values

• After entering the calibration mode and before the first point is accepted, it is possible to quit the procedure and return to the last calibration data by pressing the ⏻/MODE button. The secondary LCD displays "ESC" for 1 second and the meter returns to the normal measuring mode.

• To reset to the default values and clear a previous calibration, press the SET/HOLD button after entering the calibration mode and before the first point is accepted. The secondary LCD displays "CLR" for 1 second, the meter resets to the default calibration and the CAL tag on the LCD disappears.

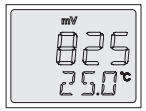
ORP MEASUREMENTS

Taking measurements

Select ORP mode with the SET/HOLD button.

Submerge the electrode in the solution to be tested.

The measurements should be taken when the stability symbol ▯ on the top left of the LCD disappears.



The ORP (mV) value is shown on the primary LCD while the secondary LCD shows the temperature of the sample.

The ORP range is factory calibrated

Contact your nearest Hanna Service Center for recalibration, if necessary.

SETUP

Setup mode allows the selection of temperature unit and pH buffer set.

To enter the Setup mode, select pH mode and then press the ⏻/MODE button until CAL on the secondary display is replaced by TEMP and the current temperature unit (E.g. TEMP °C). Then:

• *for °C/°F selection*: Use the SET/HOLD button. After the temperature unit has been selected, press the ⏻/MODE button to enter the buffer set selection mode; press the ⏻/MODE button twice to return to the normal measuring mode.

• *to change the calibration buffer set*: After setting the temperature unit, the meter will show the current buffer set: "pH 7.01 BUFF" (for 4.01/7.01/10.01) or "pH 6.86 BUFF" (for NIST 4.01/6.86/9.18). Change the set with the SET/HOLD button, then press ⏻/MODE to return to the normal measuring mode.

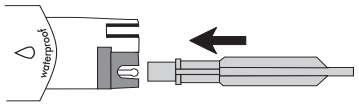
ELECTRODE MAINTENANCE

• When not in use, rinse the electrodes with water to minimize contamination and store them with a few drops of **HI 70300** storage solution in the protective cap after use. DO NOT USE DISTILLED OR DEIONIZED WATER FOR STORAGE PURPOSES.

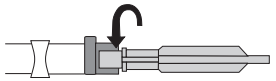
• If the electrodes have been left dry, soak in storage solution for at least one hour to reactivate them.

• To prolong the life of the electrodes, it is recommended to clean them monthly by immersing them in the **HI 7061** cleaning solution for half an hour. Afterwards, rinse it thoroughly with tap water and recalibrate the meter.

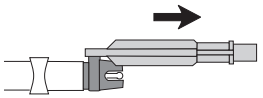
• The pH electrode can be easily replaced by using the supplied tool (**HI 73128**). Insert the tool into the probe cavity as shown below.



Rotate the electrode counterclockwise.



Pull the electrode out by using the other side of the tool.

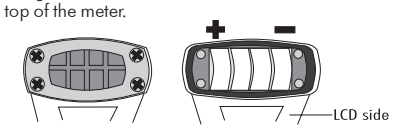


Insert a new pH electrode following the above instructions in reverse order.

BATTERY REPLACEMENT

The meter displays the remaining battery percentage every time it is switched on. When the battery level is below 5%, the ▭ symbol on the bottom left of the LCD lights up to indicate a low battery condition. The batteries should be replaced soon. If the battery level is low enough to cause erroneous readings, the meter shows "0%" and the Battery Error Prevention System (BEPS) will automatically turn the meter off.

To change the batteries, remove the 4 screws located on the top of the meter.



Once the top has been removed, carefully replace the 4 batteries located in the compartment while paying attention to their polarity.

Replace the top, making sure that the gasket is properly seated in place, and tighten the screws to ensure a watertight seal.