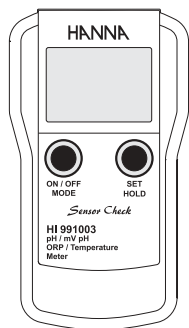


# Instruction Manual

## HI 991003

### Portable pH/ORP/Temperature Meter with Sensor Check



#### 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 are warranted for a period of six months.

This warranty is limited to repair or replacement free of charge. Damage due to accidents, 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 problem. 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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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.

This instrument is in compliance with the CE directives.

#### PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If noticeable damage is evident, notify your dealer.

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

#### GENERAL DESCRIPTION

HI 991003 is a portable pH/pH-mV/ORP/temperature meter, with unique Sensor Check feature, that allows the user to determine the electrode status at any time.

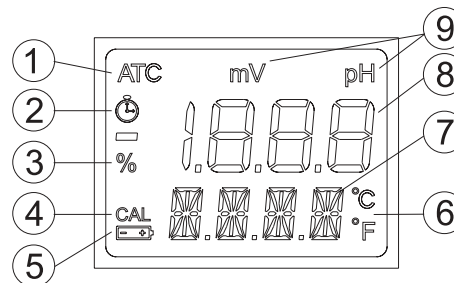
Main features also include: extended measurement ranges; waterproof and compact casing; large dual-line LCD; low battery detection; automatic pH calibration at one or two points with two memorized buffer sets; selectable temperature unit (°C or °F).

The pH/ORP electrode has a built-in temperature sensor for simultaneous pH (or mV) and temperature readings, and also contains a mini amplifier to render measurements impervious to noise and electrical interferences.

Each meter comes together with

- HI 1297D pH/ORP/temperature probe with DIN connector and 1 m (3.3') cable
- 3x1.5V AA alkaline batteries
- instruction manual
- plastic carrying case.

#### LCD DESCRIPTION



1. Automatic Temperature Compensation indicator
2. Stability indicator
3. Battery percentage
4. pH calibration indicator
5. Low battery indicator
6. Selectable temperature unit
7. Secondary display
8. Primary display
9. Measuring unit for primary display

#### ACCESSORIES

- HI 1297D Combination amplified pH/ORP/temperature probe with DIN and 1 m (3.3') cable
- HI 1296D Combination amplified pH/temperature probe with DIN connector and 1 m (3.3') cable
- HI 7004L pH 4.01 buffer solution, 500 mL
- HI 7006L pH 6.86 buffer solution, 500 mL
- HI 7007L pH 7.01 buffer solution, 500 mL
- HI 7009L pH 9.18 buffer solution, 500 mL
- HI 7010L pH 10.01 buffer solution, 500 mL
- HI 70300L Storage solution, 500 mL
- HI 7061L Cleaning solution, 500 mL
- HI 77400P Calibration kit (pH 4&7, 20 mL, 5 pcs each)
- HI 721312 Hard carrying case
- HI 710007 Blue shockproof rubber boot
- HI 76405 Electrode holder

#### SPECIFICATIONS

<b>Range (*)</b>	-2.00 to 16.00 pH ±825 mV (pH-mV) ±1999 mV (ORP) -5.0 to 105.0°C / 23.0 to 221.0°F
<b>Resolution</b>	0.01 pH 1 mV 0.1°C / 0.1°F
<b>Accuracy (@20°C/68°F)</b>	±0.02 pH ±2 mV ±0.5°C up to 60°C; ±1°C outside ±1°F up to 140°F; ±2°F outside
<b>Typical EMC Deviation</b>	±0.02 pH ±2 mV ±0.2°C or ±0.4°F
<b>Temperature Compensation</b>	Automatic for pH readings
<b>pH Calibration</b>	Automatic, 1 or 2 point with 2 sets of standardized buffers (4.01/7.01/10.01 or 4.01/6.86/9.18)
<b>mV Calibration</b>	factory calibrated

<b>Probe (included)</b>	HI 1297D amplified pH/ORP/temperature probe with DIN connector and 1 m (3.3') cable
<b>Battery Type</b>	3 x 1.5V AA / IEC LR6
<b>Battery Life</b>	approx. 1500 hours
<b>Auto-off</b>	after 8 minutes of nonuse
<b>Environment</b>	0 to 50°C (32 to 122°F); RH 100%
<b>Dimensions</b>	150 x 80 x 38 mm (5.9 x 3.2 x 1.5")
<b>Weight</b>	245 g (8.6 oz.)

(\*) the temperature range is limited to 80°C (176°F) if using the HI1296D or HI1297D probes.

To clean the meter, use water only.

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

## OPERATIONAL GUIDE

### To connect the probe

With the meter turned off, connect the **HI 1297D** probe to the DIN socket on the top of the meter by aligning the pins and pushing in the plug. Tighten the nut to ensure a good connection. Remove the protective cap from the probe before taking any measurements.

### To turn the meter ON

Press the ON/OFF/MODE button until the display lights up. At start-up, all the LCD segments are displayed for 1 second, then the percent indication of the remaining battery life is shown for another second (E.g. % 100 BATT). The meter then enters the normal measuring mode.

**Note:** If the display needs to be checked, keep the ON button pressed while turning the meter on. The meter will display all segments as long as the button is pressed.

### To select the measurement range

While in normal measurement mode, press the SET/HOLD button to select pH, pH-mV or ORP (mV) measurement range.

**Note:** "pH-mV" indicates the mV value equivalent to the pH.

### 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 (E.g. pH 5.73 HOLD). Press any button to return to normal mode.

### To turn the meter OFF

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

**Note:** the meter is provided with an acoustic signal feature, which can be disabled using the switch located in the battery compartment.

**Note:** When the meter detects the absence of a temperature probe at its input, the Automatic Temperature Compensation is turned off, and the meter uses a default value of 25°C (77°F) for the temperature measurement and compensation. In this condition, the secondary LCD shows 25.0°C (77.0°F) blinking. When a probe is connected, the meter automatically returns to the ATC mode, the ATC tag is turned on, and the temperature is shown on the secondary display.

## pH MEASUREMENT & CALIBRATION

- Make sure the meter has been calibrated before use.
- If the probe is dry, soak it in **HI 70300** storage solution for one hour to reactivate it.
- Set the meter to pH range.
- Place the probe into the sample to be tested.
- Stir briefly and wait until the ☺ symbol on the top left of the LCD is turned off.
- The LCD shows the pH value (automatically compensated for temperature) and the temperature of the solution.
- If measurements are taken in different samples successively, rinse the probe tip thoroughly to eliminate cross-contamination. After cleaning, rinse the probe tip with some of the sample to be measured.

### pH calibration

- Press and hold the ON/OFF/MODE button until OFF on the secondary display 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 display. If no valid buffer is detected, the meter keeps the USE indication active for 12 seconds, and then it replaces it with WRNG, indicating that 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 measurement is stable; the meter will show on the primary display the accepted buffer, with the message "OK 1" on the secondary display, and an audible signal is produced. After 1 second, the meter automatically returns to the normal mode. If a single-point calibration with buffers pH 7.01 or 6.86 is desired, then after the calibration point has been accepted the ON/OFF/MODE button must be pressed in order to return to the normal measuring mode. After the button is pressed, the meter shows "7.01" (or "6.86") - "OK 1", and an audible signal is produced. After 1 second, the meter automatically returns to

the normal measuring mode.

- For a *two-point calibration*, place the probe in pH 7.01 (or pH 6.86) buffer. After the 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 on the secondary display. The meter then 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

- 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 ON/OFF/MODE button. The secondary LCD displays ESC for 1 second and the meter returns to normal 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.

## SENSOR CHECK

The Sensor Check feature allows the user to check the electrode status at any time. This is possible by setting the meter to pH-mV range.

The **offset value** is the reading of the electrode immersed in pH7 buffer (@25°C/77°F). If this reading is outside the range  $\pm 40$  mV, the electrode is considered "poor" and it is recommended to replace it with a new one.

The **slope value** of the electrode is the difference between readings in pH7 and in pH4 buffers. For a new electrode this is about 174 mV (@25°C/77°F). With time, the slope value decreases. When it reaches the value of about 150 mV, the electrode is considered "poor", and it is recommended to replace it with a new one.

**Note:** Always recalibrate the meter after replacing the electrode.

**Note:** To ensure reliable readings, the electrode must be cleaned with cleaning solution before measuring the offset and the slope.

## ORP MEASUREMENT

- Make sure the probe is connected.
- Set the meter to ORP (mV) range.
- Place the probe into the sample to be tested, stir briefly and wait until the ☺ symbol on the top left of the LCD is turned off.
- The meter will show the ORP (mV) value and the temperature of the sample.

**Note:** The ORP range is factory calibrated.

**Note:** ATC tag turns off because the mV readings are not temperature compensated.


## METER SETUP

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

To enter the Setup mode, press and hold the ON/OFF/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 ON/OFF/MODE to enter the buffer set selection mode; press ON/OFF/MODE 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 4.01/6.86/9.18). Change the set with the SET/HOLD button, then press ON/OFF/MODE to return to normal mode.

## BATTERY REPLACEMENT

The meter displays the remaining battery percentage when turned on. When the level is below 5%, the  symbol on the bottom left of the LCD blinks to indicate a low battery condition. If the battery level is low enough to cause erroneous readings, the Battery Error Prevention System (BEPS) turns the meter off.

Unscrew the 4 screws located on the back of the meter and carefully replace the 3 AA batteries located in the battery compartment, while paying attention to their polarity. Reattach the back making sure that the gasket is in place and tighten the 4 screws.