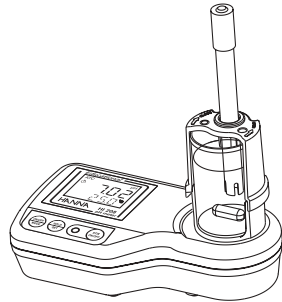


Instruction Manual

HI 208 HI 207

Educational pH/Temperature Bench Meters with Built-in Stirrer



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.

Each instrument is supplied with:

- **HI 1291D** pH/Temperature probe with DIN connector and 0.5 m (1.6') cable
- **pH 4.01 & 7.01** buffer solutions (20 mL each)
- Plastic beaker
- Electrode holder
- Rubber O-ring
- Magnetic stir bar (**HI 208** only)
- 12Vdc power adapter
- Instruction manual

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

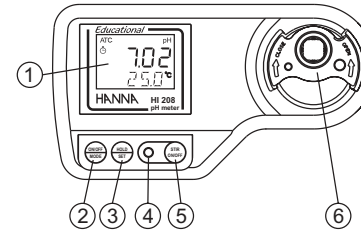
HI 207 and **HI 208** are microprocessor-based pH and temperature bench meters.

Main features include: extended pH and temperature ranges; built-in magnetic stirrer (**HI 208** only); large dual-line display; automatic pH calibration at one or two points, with two memorized buffer sets (standard or NIST); selectable temperature unit (°C or °F).

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

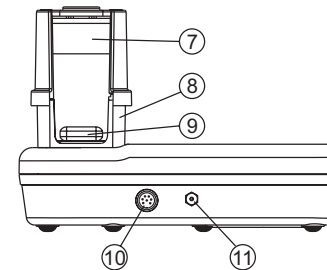
FUNCTIONAL DESCRIPTION

Front Panel



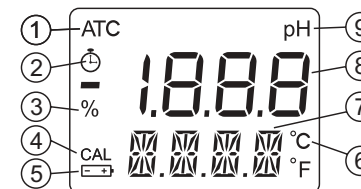
- 1- Liquid Crystal Display (LCD).
- 2- ON/OFF/MODE key, to turn the instrument ON or OFF, to quit calibration/freezing mode or to set parameters in SETUP.
- 3- HOLD/SET key, to freeze the display, to select the temperature unit or the calibration buffer set, or to reset to the default calibration.
- 4- Stirrer status LED indicator (**HI 208** only).
- 5- STIR ON/OFF key (**HI 208** only), to start/stop the stirrer.
- 6- Electrode holder.

Rear Panel



- 7- Plastic beaker.
- 8- Beaker holder.
- 9- Magnetic stir bar (**HI 208** only).
- 10- DIN connector for probe.
- 11- Socket for power adapter.

LCD DESCRIPTION



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

SPECIFICATIONS

Range (*)	-2.00 to 16.00 pH -5.0 to 105.0 °C / 23.0 to 221.0 °F
Resolution	0.01 pH 0.1 °C / 0.1 °F
Accuracy (@20°C/68°F)	±0.02 pH ±0.5 °C up to 60 °C; ±1 °C outside ±1 °F up to 140 °F; ±2 °F outside
Typical EMC Deviation	±0.02 pH ±0.2 °C or ±0.4 °F
Temperature Compensation	Automatic
pH Calibration	Automatic, 1 or 2 point with 2 sets of standardized buffers (pH 4.01/7.01/10.01 or 4.01/6.86/9.18)
Probe (included)	HI 1291D amplified pH/Temperature probe with DIN connector and 0.5 m (1.6') cable
Stirrer (HI 208 only)	Built-in magnetic stirrer at 500 rpm
Power supply	12 Vdc adapter or 9V alkaline battery
Battery life	Approx. 200 hours without stirrer
Environment	0 to 50 °C (32 to 122 °F); max RH 95%
Dimensions	192 x 104 x 134 mm (7.6 x 4.1 x 5.3")
Weight	420 g (14.8 oz.)

(*) The temperature range is limited to 80 °C (176 °F) if using the **HI 1291D** probe.

OPERATIONAL GUIDE

To connect the probe

With the instrument OFF, connect the **HI 1291D** probe to the DIN connector on the rear panel of the instrument by aligning the pins and pushing it 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

Plug the 12 Vdc adapter into the appropriate socket or use a 9V alkaline battery to power on the instrument.

Press the ON/OFF/MODE key until the display lights up. At start up, all the LCD segments are displayed for one second, then the percentage of the remaining battery life is shown for another second (e.g. % 98 BATT). The instrument then enters normal measurement mode.

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

Note: If using a battery and its percentage is under 15%, the stirrer will not work.

To freeze the display

While in measurement mode, press the HOLD/SET key. The "HOLD" message will appear on the secondary display and the reading will be frozen on the LCD (e.g. pH 5.73 HOLD). Press any key to return to normal measurement mode.

To turn the meter OFF

While in normal measurement mode, press the ON/OFF/MODE key. The "OFF" message will appear on the secondary display. Release the key.

Note: The instrument is provided with an acoustic signal feature, which is heard every time a key is pressed.

Note: When the instrument detects the absence of the probe, the "ATC" tag turns off and the secondary display shows a default temperature value of 25 °C (77 °F) blinking. When the probe is connected, the instrument automatically returns to the Automatic Temperature Compensation mode, the "ATC" tag turns on, and the measured temperature is shown on the secondary display.

pH MEASUREMENT & CALIBRATION

- Make sure the instrument has been calibrated before use.
- If the probe is dry, soak it in **HI 70300** storage solution for one hour to reactivate it.
- Make sure that the stirrer LED is off or press the STIR ON/OFF key to stop the stirrer (**HI 208** only).
- Place the beaker with the solution to be tested into the beaker holder and attach the electrode holder.
- Insert the probe in the electrode holder and use the supplied rubber O-ring for probe in order to immerse the probe tip approximately 4 cm (1½") into the sample to be measured.
- Press STIR ON/OFF to start the stirrer (**HI 208** only) and wait until the stability indicator turns off. While the stirrer is on, the stirrer LED also is on.
- The LCD shows the pH value automatically compensated for temperature variations 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

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 week.
- From normal mode press and hold the ON/OFF/MODE key until "OFF" message on the secondary display is replaced by "CAL". Release the key.
 - The LCD enters the calibration mode, displaying "pH 7.01 USE" (or "pH 6.86 USE" if the NIST buffer set was selected) and "CAL" tag blinking. After 1 second the instrument activates the automatic buffer recognition feature. If a valid buffer is detected, then its value is shown on the primary display, and "REC" message appears on the secondary display. If no valid buffer is detected, the instrument keeps the "USE" message active for 12 seconds, and then replaces it with "WRNG", to indicate an invalid buffer.

- For a *single-point calibration* with pH 4.01, 9.18 or 10.01 buffer, the meter automatically accepts the calibration when the reading is stable; the meter will show the accepted buffer, with the "OK 1" message, and an audible signal is produced. After 1 second the meter automatically returns to normal measurement mode. If a single-point calibration with pH 7.01 or 6.86 buffer is desired, then after the calibration point has been accepted, the ON/OFF/MODE key must be pressed in order to return to normal measurement mode. After the key is pressed, the instrument shows "7.01" (or "6.86") - "OK 1", and an audible signal is produced. After 1 second, the instrument automatically returns to normal measurement mode.

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

- 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 displayed. If a valid buffer (pH 4.01, pH 10.01 or pH 9.18) is detected, then the instrument completes the calibration procedure. When the buffer is accepted, the LCD shows its value with the "OK 2" message. The instrument then returns to normal measurement mode.

Note: When the calibration procedure is completed, the "CAL" tag turns 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 ON/OFF/MODE key. The secondary display shows "ESC" message for 1 second and the instrument returns to normal mode.
- To reset to the default values and clear a previous calibration, press the HOLD/SET key after entering calibration mode and before the first point is accepted. The secondary display shows "CLR" message for 1 second, the instrument resets to the default calibration and the "CAL" tag turns off.

INSTRUMENT SETUP

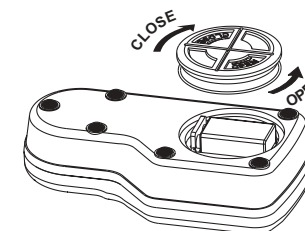
The SETUP mode allows the selection of the temperature unit and the pH buffer set. To enter SETUP mode, press and hold the ON/OFF/MODE key until "CAL" message on the secondary display is replaced by "TEMP" and the current temperature unit (e.g. TEMP °C). Then:

- *for °C/°F selection*, use the HOLD/SET key. After the temperature unit has been selected, press the ON/OFF/MODE key to enter the buffer set selection mode; press ON/OFF/MODE twice to return to normal measurement mode.
- *to change the calibration buffer set*, after setting the temperature unit, the instrument 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 HOLD/SET key, then press ON/OFF/MODE to return to normal mode.

BATTERY REPLACEMENT

Battery replacement must only take place in a non-hazardous area and using the battery type specified in this instruction manual.

Simply rotate the battery cover from the bottom of the instrument as shown in the figure, and replace the battery while paying attention to the correct polarity. Replace the cover.



ACCESSORIES

HI 1291D	pH/Temperature probe with DIN connector and 0.5 m (1.6') cable
HI 7004	pH 4.01 buffer solution, 500 mL
HI 7006	pH 6.86 buffer solution, 500 mL
HI 7007	pH 7.01 buffer solution, 500 mL
HI 7009	pH 9.18 buffer solution, 500 mL
HI 7010	pH 10.01 buffer solution, 500 mL
HI 70300L	Storage solution, 500 mL
HI 7061L	Cleaning solution, 500 mL