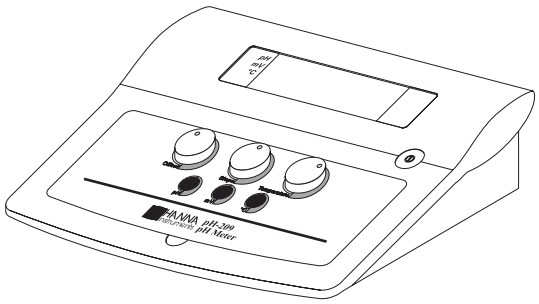
Instruction Manual

pH 209V

Complete Laboratory Kit for pH & ORP Measurements in Wine, Must and Grape Juice



HANNA instruments®

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.

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.

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PRELIMINARY EXAMINATION

Remove the kit from the packing material and examine it carefully to make sure that no damage has occurred during shipping. If there is any damage, notify your dealer.

The kit includes:

- **pH 209** bench pH meter
- **HI 1048B** pH electrode
- **HI 98501** electronic thermometer
- pH 3 and pH 7 buffer solutions (20 mL sachet each)
- **HI 700635** and **HI 700636** specific cleaning solutions (20 mL each)
- **HI 7082** electrode refilling solution (30 mL bottle) and syringe
- **HI 76404** electrode holder
- 12 Vdc adapter and 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 with the supplied accessories.

GENERAL DESCRIPTION

pH 209V is a complete laboratory kit for pH and ORP measurements in wine, must and grape juice.

The kit also includes a special pH electrode (**HI 1048B**), which has been designed for application in must and wine analysis, and a digital thermometer (**HI 98501**) for measuring temperature and for using as reference during manual temperature compensation procedure of pH readings.

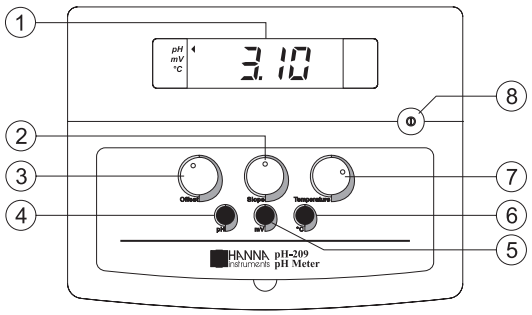
The **HI 1048B** is a refillable pH electrode provided with a porous PTFE junction sleeve, which ensures the right electrolyte flux, avoids clogging and allows accurate pH measurements in "difficult" samples as must and wine.

This meter can be calibrated at 2 points, pH 7 and pH 3, and it is provided with an easy manual temperature compensation.

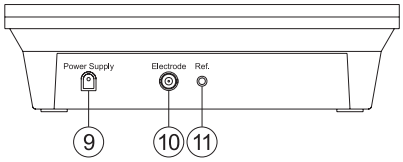
The adjustable knobs are located on the front panel for easy operations.

FUNCTIONAL DESCRIPTION

Front Panel



Rear Panel



1) Liquid Crystal Display (LCD)
2) pH slope adjustment knob
3) pH offset adjustment knob
4) pH range selection key
5) mV range selection key
6) °C range selection key
7) Temperature setting knob
8) ON/OFF switch
9) Power adapter socket
10) BNC connector for pH (or ORP) electrode
11) Electrode reference socket

SPECIFICATIONS

Range	0.00 to 14.00 pH / ±1999 mV
Resolution	0.01 pH / 1 mV
Accuracy (@20°C)	±0.01 pH / ±1 mV
Typical EMC Deviation	±0.03 pH / ±2 mV
pH Calibration	Manual, 2 point, through offset and slope knobs
Temperature Compensation	Manual, from 0 to 100°C (32 to 212°F)
pH Electrode (included)	**HI 1048B** glass body, double junction, refillable, with BNC and 1 m (3.3') cable
Input Impedance	10^{12} ohm
Power Supply	12 Vdc adapter (included)
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing
Dimensions	240 x 182 x 74 mm (9.4x7.2x2.9")
Weight	1.0 kg (2.2 lb.) - meter only

OPERATIONAL GUIDE

Power connection

Plug the 12 Vdc adapter into the power supply socket (#9 on page 4).

Note: Make sure the main line is protected by a fuse.

Electrode connection

For **pH** or **ORP** electrodes with internal reference, connect the electrode to the BNC socket on the rear panel (#10 on page 4).

For electrodes with separate reference, plug the BNC connector of the electrode to the BNC socket (#10 on page 4), and the reference electrode to the proper socket (#11 on page 4) on the rear panel.

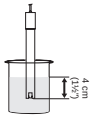
Note: To prevent damage to the electrode, remove the pH electrode from the solution before turning the meter off. With the meter OFF, detach the electrode and immerse it in the storage solution.

TAKING pH MEASUREMENTS

Make sure that the instrument has been calibrated for pH before taking pH measurements.

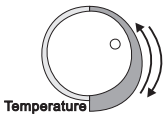
- Switch the instrument on by pressing the ON/OFF button.

- Immerse the electrode tip (4 cm/1½") into the sample and shake briefly.



- Take the temperature of the solution with the supplied **HI 98501** thermometer (e.g. 25°C).

- Press the °C key to display temperature setting on the LCD and adjust the temperature knob to display the temperature of the sample.



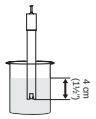
- Press the pH key to display the pH measurement.
- The display shows the pH value of the test solution compensated for temperature.

If measurements are taken in different samples successively, it is recommended to rinse thoroughly the electrode with water, and then for some of the next solution to be measured.

TAKING ORP MEASUREMENTS

pH 209 can also measure ORP, using an ORP electrode. Hanna Instruments offers a variety of ORP electrodes for this purpose. Contact your dealer for more information.

- Connect the ORP electrode to the meter and submerge the tip (4 cm / 1½") into the sample to be tested.



Note: ORP measurements are not compensated for temperature variation.

- Press the mV key to enter the mV mode and allow a few minutes for the reading to stabilize.
- The display will show the ORP (mV) value.

AFTER MEASUREMENTS

- Press the ON/OFF button to switch the instrument off.

pH CALIBRATION

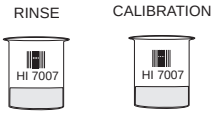
IMPORTANT

For better accuracy it is recommended to calibrate the instrument frequently. Calibration should be performed whenever the pH electrode is replaced, after performing a cleaning procedure or changing the reference electrolyte, and at least once a month.

INITIAL PREPARATION

Pour small quantities of pH 7.01 (**HI 7007**) and pH 3.00 (**HI 5003**) solutions into clean beakers.

For accurate calibration, use two beakers for each buffer solution; the first for rinsing the electrode, the second for calibration.



Note: The electrode should be submerged at least 4 cm (1½") into the solution.

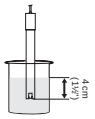
PROCEDURE

Note: If you need to calibrate to NBS standards, use pH 6.86 (**HI 7006**) solution instead of pH 7.01.

Use the supplied **HI 98501** thermometer as reference.

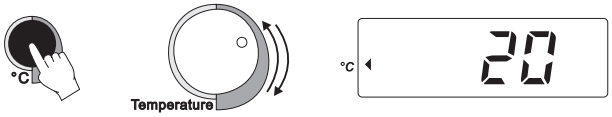
- Switch the instrument on by pressing the ON/OFF button.

- Rinse and immerse the pH electrode in pH 7.01 buffer and shake briefly. Wait a couple of minutes for the reading to stabilize.



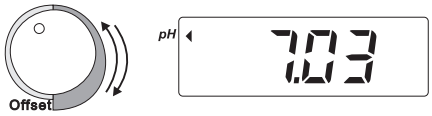
- Note the temperature of the buffer solution using the supplied **HI 98501** thermometer (e.g. 20°C).

- Press the °C key to select temperature setting, then adjust the Temperature knob until the LCD shows the noted temperature.

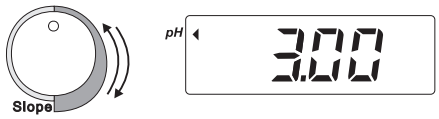


- Press the pH key to select pH measurement.

- Wait a couple of minutes, then adjust the OFFSET knob until the display shows the pH value at the noted temperature (see the "pH versus temperature" chart at page 10).



- Rinse and immerse the pH electrode in pH 3.00 buffer and shake briefly.
- Wait a couple of minutes, then adjust the SLOPE knob until the display shows the pH value at the noted temperature (see the "pH versus temperature" chart at page 10).



- The pH calibration is now complete.

pH VALUES AT VARIOUS TEMPERATURES

pH readings are strongly affected by temperature. The calibration buffer solutions are affected by temperature changes to a lesser degree than normal solutions.

For manual temperature calibration please refer to the following chart.

TEMP		pH VALUES		
°C	°F	3.00	6.86	7.01
0	32	3.07	6.98	7.13
5	41	3.05	6.95	7.10
10	50	3.03	6.92	7.07
15	59	3.02	6.90	7.04
20	68	3.00	6.88	7.03
25	77	3.00	6.86	7.01
30	86	3.00	6.85	7.00
35	95	3.00	6.84	6.99
40	104	2.99	6.84	6.98
45	113	2.99	6.83	6.98
50	122	2.99	6.83	6.98
55	131	2.99	6.84	6.98
60	140	2.99	6.84	6.98
65	149	2.99	6.85	6.99
70	158	3.00	6.85	6.99

pH ELECTRODE MAINTENANCE

Note: To prevent damage to the electrode, remove the pH electrode from the sample before turning the meter off. With the meter OFF, detach the electrode from the meter and immerse it in the storage solution.

Preparation

Remove the electrode 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.

Sensitive bulb

To avoid clogging problems and ensure a fast response, the bulb must be kept moist at any time. Store the electrode with few drops of **HI 70300** storage solution in the protective cap. NEVER USE DISTILLED OR DEIONIZED WATER FOR STORING PURPOSES.

Periodic maintenance

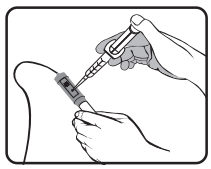
Inspect electrode and cable. The cable used for the connection to the meter must be intact and there must be no points of broken insulation. The connector must be perfectly clean and dry. If any scratches or cracks are present, replace the electrode.

Refilling the electrode

ALWAYS VERIFY THE ELECTROLYTE LEVEL.

If the electrolyte level is more than 2 cm below the refilling hole, unscrew and remove the refilling hole cap.

Add the 3.5M KCl electrolyte solution (**HI 7082**) by using the supplied syringe. Tighten back the cap. Wait at least 1 hour before using the electrode.

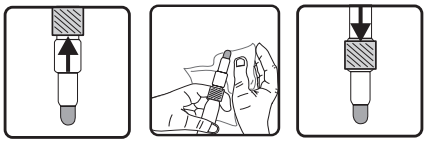


Cleaning procedure

After use, clean the electrode by immersing it in the proper cleaning solution (**HI 700635** or **HI 700636**) for 5 minutes.

If case of slow and unreliable readings, it is recommended to perform the following procedure for cleaning the junction:

1. Shift upwards the PTFE collar. If the collar does not shift easily, immerse it into warm water.
2. Wipe gently the electrode surface with a soft and clean tissue.
3. In case of persistent wine or must residual, wet the tissue with cleaning solution (**HI 700635** or **HI 700636**).
4. Put back the collar in its original position.



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 fresh **HI 7082** solution.
- **Dry Membrane/Junction:** soak in **HI 70300** storage solution for 1 hour.
- **Drifting:** soak the electrode tip in warm (approx. 50-60°C) **HI 7082** solution for one hour and rinse the tip with distilled water. Refill with fresh **HI 7082** solution.
- **Low Slope:** refer to the cleaning procedure above.
- **No Slope:** check the electrode for cracks in glass stem or bulb and replace the electrode.
- **Slow Response/Excessive Drift:** soak the tip in **HI 7061** solution for 30 minutes, rinse thoroughly in distilled water and then follow the cleaning procedure above.

ACCESSORIES

pH CALIBRATION SOLUTIONS

HI 50003-01	pH 3.00 buffer solution, 20 mL sachet, 10 pcs
HI 50003-02	pH 3.00 buffer solution, 20 mL sachet, 25 pcs
HI 70007P	pH 7.01 buffer solution, 20 mL sachet, 25 pcs
HI 5003	pH 3.00 buffer solution, 500 mL bottle
HI 7006L	pH 6.86 buffer solution, 500 mL bottle
HI 7007L	pH 7.01 buffer solution, 500 mL bottle
HI 8006L	pH 6.86 buffer solution in FDA bottle, 500 mL
HI 8007L	pH 7.01 buffer solution in FDA bottle, 500 mL

ELECTRODE STORAGE SOLUTION

HI 70300L	Storage solution, 500 mL bottle
HI 80300L	Storage solution in FDA bottle, 500 mL

ELECTRODE CLEANING SOLUTIONS

HI 70000P	Electrode rinsing solution, 20 mL sachet, 25 pcs
HI 7061L	General cleaning solution, 500 mL bottle
HI 70635L	Cleaning solution for wine deposits, 500 mL bottle
HI 70636L	Cleaning solution for wine stains, 500 mL bottle
HI 7073L	Protein cleaning solution, 500 mL bottle
HI 7074L	Inorganic cleaning solution, 500 mL bottle
HI 7077L	Oil & Fat cleaning solution, 500 mL bottle
HI 8061L	General cleaning solution in FDA bottle, 500 mL
HI 8073L	Protein cleaning solution in FDA bottle, 500 mL
HI 8077L	Oil & Fat Cleaning solution in FDA bottle, 500 mL

ELECTROLYTE SOLUTION

HI 7082	3.5M KCl electrolyte solution, 4 x 30 mL, for double junction electrodes
HI 8082	3.5M KCl electrolyte solution in FDA bottle, 4 x 30 mL, for double junction electrodes

ORP PRETREATMENT SOLUTIONS

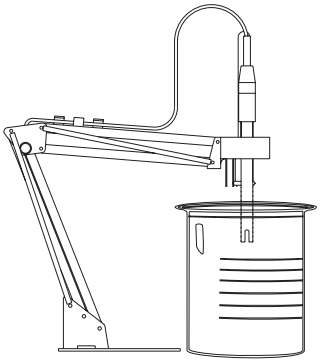
HI 7091L	Reducing pretreatment solution, 500 mL bottle
HI 7092L	Oxidizing pretreatment solution, 500 mL bottle

ELECTRODES

HI 1048B	Glass body, double junction, refillable pH electrode with BNC connector and 1 m (3.3') cable, for wine, must and grape juice
FC 100B	PVDF body, double junction, refillable, pH electrode with BNC connector and 1 m (3.3') cable, for food industry
FC 200B	PVDF body, open junction, conic tip, Viscolene, non-refillable pH electrode with BNC connector and 1 m (3.3') cable, for meat & cheese
FC 210B	Glass body, double junction, conic tip, Viscolene, non-refillable pH electrode with BNC connector and 1 m (3.3') cable, for milk and yogurt
HI 3131B	Glass body, refillable, platinum ORP electrode
HI 3230B	Plastic body, gel-filled, platinum ORP electrode
HI 4430B	Plastic body, gel-filled, gold ORP electrode

OTHER ACCESSORIES

HI 710005	115 Vac/12 Vdc power adapter, US plug
HI 710006	230 Vac/12 Vdc power adapter, European plug
HI 76405	Electrode holder



HI 8427	pH and ORP electrode simulator with 1 m (3.3') coaxial cable ending in female BNC connectors
HI 931001	pH and ORP electrode simulator with LCD and 1 m (3.3') coaxial cable ending in female BNC connectors
HI 98501	Pocket-size thermometer (range -50.0 to 150.0°C)

WARRANTY

All Hanna Instruments **meters are guaranteed for two years** against defects in workmanship and materials when used for their intended purpose and maintained according to instructions.

Electrodes and probes are guaranteed 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 shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

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

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 area could cause unacceptable interferences to radio and TV equipment, requiring the operator to take all necessary steps to correct interferences.

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

To maintain the EMC performance of this equipment, the recommended cables noted in the user's manual must be used. 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 damage or burns, do not perform any measurement in microwave ovens.

SALES AND TECHNICAL SERVICE CONTACTS

Australia:
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