

SOIL PH METER

Model : PH-212

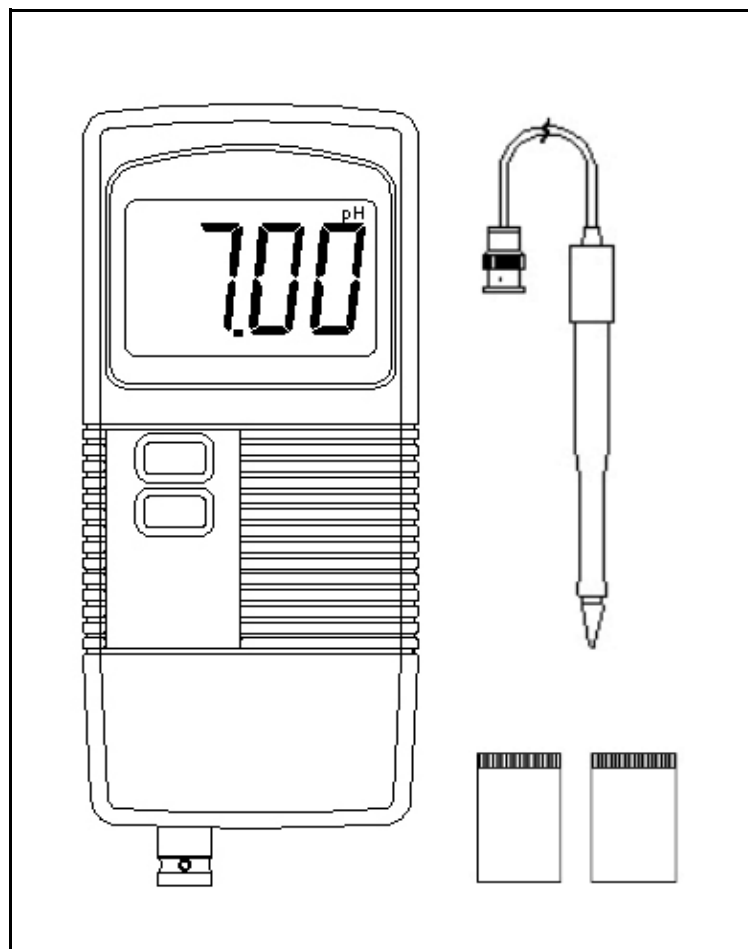


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1. FEATURES

* Kits with pH meter, soil pH electrode, pH 4.0 /pH 7.0 standard buffer solution and carrying case.
* Spear Tip pH electrode (included), ideal for penetration pH measurement into soil, meats, cheese and other type of measurements requiring sample penetration. The electrode features a very durable glass measuring spear packaged in a rugged virtually unbreakable epoxy body.
* Build in Slop (pH 4, pH 10) and Cal. (pH 7) adjust VR.
* Large LCD display.
* Easy operation, compact size.
* Water resistance on the front panel.
* Full line optional general purpose pH electrodes.
* Application : Agriculture, Gardening, Food industrial, Education, School, Colleges, Laboratory, Industrial and Quality control.

2. SPECIFICATIONS

2-1 Meter

Display	13 mm (0.5") LCD, 3 1/2 digits.
Measurement Range	0 to 14 pH x 0.01 pH
Resolution	0.01 pH

Accuracy	± 0.07 pH(pH5 to pH 9) ± 0.1 pH(pH4 to pH4.9, pH9.1 to pH10) ± 0.2 pH(pH1 to pH3.9, pH10.1 to pH13) * <i>Meter only.</i> * $23 \pm 5 \text{ }^{\circ}\text{C}$
Input Impedance	10^{12} ohms.
Temperature Compensation	Not necessary to make adjustment.
Sampling Time	Approx. 0.4 second.
Hold Function	To freeze the display reading value.
Operating Temperature	0 to 50 °C (32 to 122 °F)
Operating Humidity	Less than 80% RH.
Calibration Knob	External pH 4 (slope adj.) & pH 7 (Cal. adj.).
Power Supply	006P DC 9V battery.
Power Consumption	Approx. 2.0 mA.
Dimension	135 x 60 x 33 mm, (5.3 x 2.4 x 1.3 inch).
Weight	196 g/0.43 LB (including battery).
pH electrode (Optional)	Any connector pH Electrode with BNC connector.

Standard Accessories	Instruction Manual.....	1 PC.
	Soil pH electrode, PE-06HD.....	1 PC.
	pH 4.0 buffer solution.....	1 PC.
	pH 7.0 buffer solution.....	1 PC.
	Screw driver.....	1 PC.
	Carrying case.....	1 PC.

2-1 Soil pH Electrode (included)

pH Measuring Range	1 to 13 pH (typical 0 to 14 pH).
pH Operation Temperature	5 to 60 °C (41 to 140 °F).
pH Electrode Structure	Combination type.
Reference of pH Electrode	Ag/AgCl, Double Junction.
Zero Potential for pH Value	7± 1 pH.
Repeatability	0.05 pH.
Response time	≥ 2 minutes.
Body Material	Epoxy.
Connector	BNC.
Mechanical Protection	With protection bottle (soaker bottle) on the electrode head.
Weight	68 g (including cable & socket).
Dimensions	Body length - 160 mm. Body Dia. - 12 mm. Cable length - 1000 mm.

3. FRONT PANEL DESCRIPTION

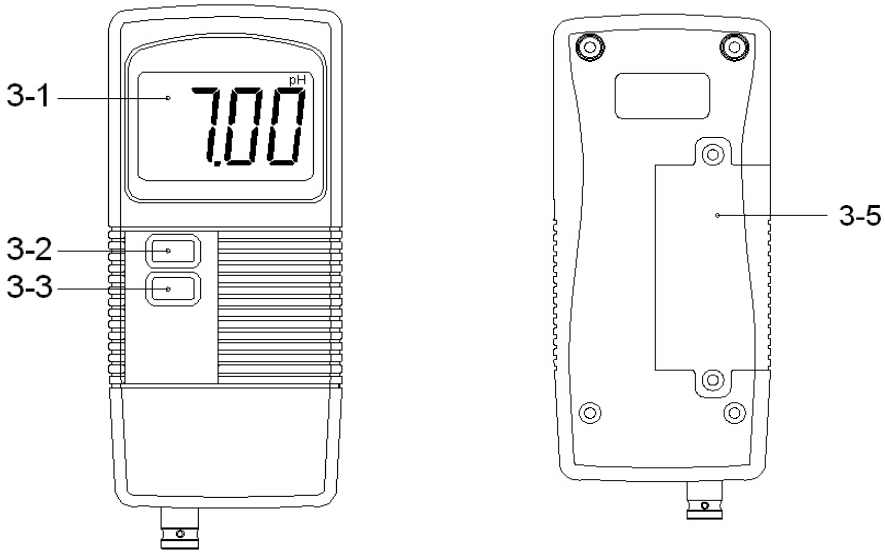
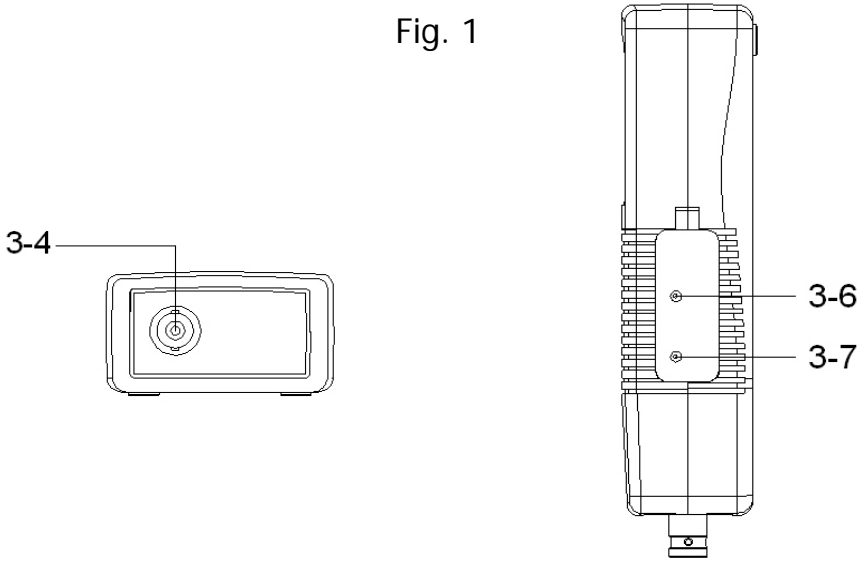
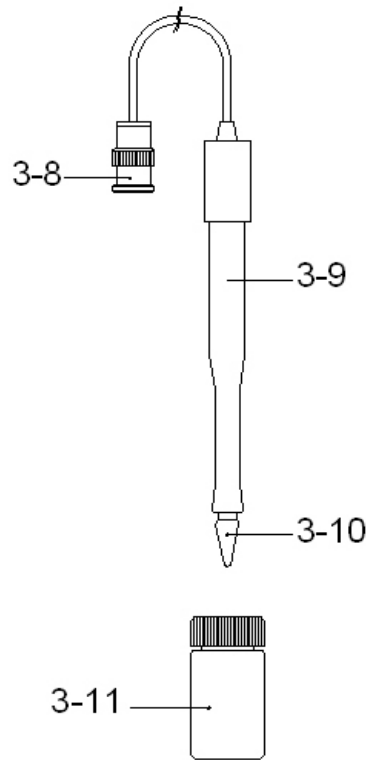


Fig. 1





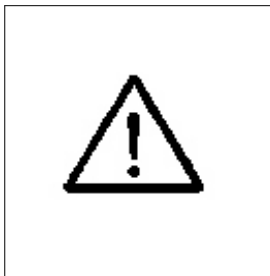
- 3-1 Display
- 3-2 Power On/OFF Button
- 3-3 Hold Button
- 3-4 pH Electrode BNC Socket
- 3-5 Battery compartment/Cover
- 3-6 CAL. (pH 7) Adjust VR
- 3-7 SLOPE (pH 4/pH 10) Adjust VR
- 3-8 Electrode BNC Plug
- 3-9 Electrode Handle
- 3-10 Electrode Sensing Head (Spear Tip Head)
- 3-11 Protection bottle for Electrode

4. MEASURING PROCEDURE

After the instrument and pH electrode are calibrated, then the unit is now ready for measuring.

** The calibration procedure, please refer chapter 5, page 6.*

- 1) Connect the combination pH Electrode to the " BNC socket " (3-4, Fig. 1).
- 2) Power on the instrument by using " Power ON/OFF Button ".
- 3) Place the electrode into the measured soil or other type penetration material (such as cheese, meats...) or solution, then the instrument will display the pH value.



- * Electrode (attached) is the rough and durable penetration electrode. However user should operate the electrode very carefully.
- * The electrode is the consumer accessory, after the electrode is used, if the damage of the Electrode Sensing Head (Spear Tip Head), it is without warranty.

- 4) After make the measurement, please rinse the electrode in distilled water.

5. pH CALIBRATING PROCEDURE

5-1 Calibrating Consideration

These pH meter already calibrated by mV signal that simulated from the ideal pH Electrode mV output base on 25 °C environment. However

- a) An ideal electrode will produce 0 mV at pH 7.00, but most electrodes are slightly off.*
- b) The measuring environment temperature may not near 25 °C (15 to 35 °C).*

It is necessary to make the following calibration procedures (5-3 or 5-4), if the user need to keep instrument combined electrode within high accuracy.

5-2 Requiring Equipment for Calibration

- 1) Combination pH Electrode (included)
- 2) Two buffer solutions (included) : pH 7.00 & pH 4.00 (or pH 10.00).

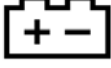
5-3 Two Points Calibration

- 1) Connect the combination pH Electrode to the " BNC Socket " (3-4, Fig. 1) and place electrode into buffer pH 7.00 solution.
- 2) Power on the instrument by pushing the " Power ON/OFF Button " (3-2, Fig. 1).
- 3) Adjust " CAL. (pH7) Adjust VR " (3-6, Fig. 1) until the display reading values same as 7.00 exactly.
- 4) Rinse the electrode in distilled water.
- 5) Place electrode into buffer pH 4.00 (pH 10.00) solution. Adjust " SLOP(pH4/pH10) Adjust VR " (3-7, Fig. 1) until the display reading values same as 4.00 (10.00) exactly.
- 6) Repeat above 2) to 5) procedures two times at least.

5-4 Single Point Calibration

- 1) Connect the combination pH Electrode to the " BNC Socket " (3-4, Fig. 1) and place electrode into a standard buffer solution (for example pH 7.00 or other larger values as possible).
- 2) Power on the instrument by pushing the " Power ON/OFF button " (3-2, Fig. 1).
- 3) Adjust " CAL. (pH7) Adjust VR " (3-6, Fig. 1) until the display reading values same as the values of above standard buffer solution exactly.

6. REPLACEMENT OF BATTERY

- 1) When the left corner of LCD display show "  " , It is necessary to replace the battery. However, in-spec measurement may still be made for several hours after Low Battery Indicator appears before the instrument become inaccurate.
- 2) To replace the battery, remove the " Battery Cover " (3-5, Fig. 1) on the rear cabinet.
- 3) Take out the battery, install a new one (006P DC 9V) and reinstall the batter:5

7. ELECTRODE STORAGE, CLEANING and RECONDITIONING

7-1 Electrode Storage

When pH readings are made infrequently, for example, several days or weeks apart, the electrode can be stored simply by replacing it in its soaker bottle. First, slide the cap onto the electrode, then the o-ring, then insert the electrode into the bottle and firmly tighten the cap. If the solution in the soaker bottle is missing, fill the bottle with pH 4 buffer.

7-2 Electrode Cleaning

Coating of the pH bulb can lead to erroneous readings including shortened span. The type of coating will determine the cleaning technique. Soft coatings can be removed by vigorous stirring or by use of a squirt bottle. Organic chemical or hard coatings should be chemically removed. Only in extreme cases should the bulb be mechanically cleaned as abrasion can lead to permanent damage. If cleaning does not restore performance, reconditioning may be tried.

7-3. RECONDITIONING

When reconditioning is required due to electrode aging , the following chemical treatments can be tried. They are presented in the order of the severity of their attack on the pH glass and may not improve (and in some case actually further deteriorate) electrode performance.

Note :

Use proper precautions when handling these hazardous chemicals. Ammonium bifluoride and HF (hydrofluoric acid) are extremely hazardous and should only be used by qualified personnel.

- 1) Immerse the electrode tip in 0.1N HCl for 15 seconds, rinse in tap water and then immerse tip in 0.1N NaOH for is seconds and rinse in tap water. Repeat this sequence three times and then recheck the electrode performance. If performance has not been restored, try Step 2.
- 2) Immerse the tip in a 20% solution of $\text{NH}_4\text{F}\cdot\text{HF}$ (ammonium bifluoride) for 2 or 3 minutes, rinse in tap water and recheck performance. If performance has not been restored, try Step 3.
- 3) Immerse electrode tip in 5% HF for 10 to 15 seconds, rinse well in tap water, quickly rinse in 5N HCl, rinse well in tap water and recheck performance. If performance has not been restored it is time to get another epoxy body, sealed reference combination pH electrode.

8. OPTIONAL ACCESSORIES

pH ELECTRODE

Model : PE-03

General purpose pH electrode with BNC connector.

Range : 1 to 13 pH (typical 0 to 14 pH).

Epoxy body, Body size : 12 mm dia. x 160 mm.

Cable length : 1 meter.

pH ELECTRODE

Model : PE-11

General purpose & high quality pH electrode with BNC connector.

Range : 1 to 13 pH (typical 0 to 14 pH).

Epoxy body, Body size : 9.5 mm dia. x 120 mm.

Cable length : 1 meter.