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## USER INSTRUCTION MANUAL

### ISFET pH METER

### MODEL 24003

#### Caution:

1. Keep standard solution, reference electrode, and battery out of reach of children. In the event that protective cap, battery or reference electrode is swallowed, induce vomiting promptly and call your doctor immediately.
2. In the event that standard solutions or KCI solution of reference electrode enters the eyes or touches the skin, immediately wash thoroughly with tap water. If irritation persists, consult a physician.

#### Features:

- |  |                                  |                                      |
|--|----------------------------------|--------------------------------------|
| 1. Measure pH via a solid-state ISFET        | 4. Just one drop of samples      | 7. Convenient one point calibration. |
| 2. Eliminate fragile, bulky glass electrodes | 5. Quick response                |                                      |
| 3. Replaceable reference electrode           | 6. Compact and portable pH meter |                                      |

<p><b>1 Sensor Probe</b></p> <p><b>2 pH Sensor</b></p> <p><b>3 Reference Electrode</b></p> <p><b>4 Liquid Junction</b></p> <p><b>5 LCD</b></p> <p><b>6 POWER Button</b></p> <p><b>7 CAL Button</b></p> <p><b>8 Protective Cap</b></p> <p><b>9 Bubble</b></p>	<p>The pH sensor and the reference electrode Solid-state ISFET with temperature sensor Saturated KClAg/AgCl electrode Measurement is made when liquid junction and pH sensor are connected by solutions.</p> <p><b>CAL light</b> : Calibrating. Measurement cannot be made.</p> <p><b>CAL blink</b> : During calibration.</p> <p><b>CAL off</b> : Measurement can be made.</p> <p><b>BAT light</b> : Replace batteries.</p> <p><b>Er light</b> : Calibration error. Measurement cannot be made.</p> <p>ON-OFF switch button of power supply Button for calibration</p> <p>Store the electrodes with the cap after use. Indicating the life of the reference electrode.</p>
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#### ON-OFF of Power Supply:

1. To turn on the pH meter, briefly hold down the power button. The following will be indicated on the LCD for one second.
2. To turn it off, hold down the same button. (The power will automatically turn off after one hour of being turned on.)

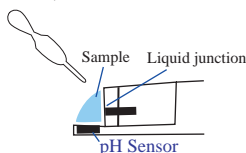


#### Note on Calibration and Measurement

1. Prior to the first use, never fail to calibrate.
2. If you use this meter under the following conditions, "Er" will remain in the display and measurement cannot be made:
  - No standard solution on the tip of the sensor probe.
  - Disconnection between the pH sensor and the liquid junction with standard solution.
  - The surface of the pH sensor is covered with bubbles.
  - Excessive dirt on the surface of the pH meter.
  - Disassembling the reference electrode to the meter.
  - Reference electrode service life is over.
3. Measurement cannot be made while LCD indicates "CAL". Please make sure to calibrate.
4. The calibration requires the use of only one buffer, pH 7.0 standard solution. If you calibrate without the standard, your measurement may be inaccurate.
5. Measurement will not be made correctly when reference electrode exceeds the service life.
6. For best results in testing tap water, rain water or clean water, it is recommended that you rinse the electrode with the same solutions to be measured or with distilled water, to reduce the electrode contamination.
7. Although there is automatic temperature compensation, try to keep both sample and standard solution at the same temperature for optimum results.
8. To measure solids or soil, dissolve it in distilled water or tap water.
9. Always clean the surface of the sensor. Refer to "Cleaning the Sensor".

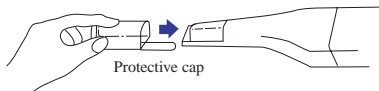
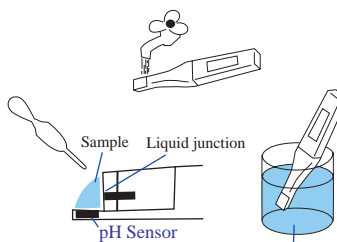
#### Calibration:

1. Remove the protective cap.
2. Turn on the pH meter.
3. Rinse the tip of the probe with tap water. Remove the liquid.
4. Apply the one drop of pH 7.0 standard to the tip of the sensor probe. Confirm that the pH sensor 2 and the liquid junction 4 are connected with the standard solution.
5. Using a pen tip, depress the CAL button. "CAL" sign will blink in the LCD display until a stable calibration reading is obtained.
6. When the "CAL" mark disappears, calibration is complete. The display should read pH "7.0".
7. Rinse the tip with tap water and remove the liquid.



#### pH Measuring:

1. You can now use the meter to measure pH of your sample solutions. A drop of sample solution may be placed on the probe tip in the same manner as the standard. You may also dip the tip of the probe into solutions.
2. Read display for pH value.
3. For storage, clean the electrodes with water to reduce the contamination. Replace the sensor cap on the tip of the probe.

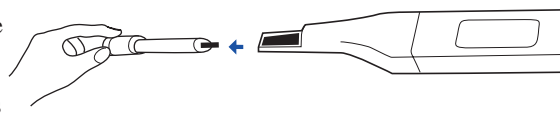


## Cautions:

1. This pH meter is for pH value measurement of water solutions. Contact your dealer before using the meter to control, monitor and measure pH value that affects the body.
2. The pH sensor on the tip of the sensor probe should never be scratched or come in contact with sharp objects which can damage the sensor.
3. Do not bend or drop the pH meter.
4. Do not disassemble the reference electrode.
5. Do not press POWER or CAL button in water.
6. If the pH meter has fallen into water, remove it immediately. Do not leave it in water for it is not waterproof. (It is splash-proof)
7. Do not replace batteries or the reference electrode when the meter is wet. Water may enter inside and cause error.
8. Do not press the POWER and CAL buttons with sharp objects.
9. Do not expose the pH sensor to direct sunlight and strong light, especially outdoor use.
10. Do not use the pH meter when the temperature is outside 5-40°C (41-104°F).
11. Do not place the pH meter close to heaters or expose to direct sunlight. Avoid extremely high temperatures.
12. Do not expose and clean any part of the pH meter to/with the following which will damage the unit:  
Organic solvents (acetone, benzene, thinner, oils, and fats, etc.) Strong acids (pH 0-2). Strong alkalis (pH 12-14). Surfactants. Adhesive agents.
13. If the display does not show the proper pH value of a sample, stop measurement immediately and recalibrate the meter.
14. For the first use or after long term storage, dip the tip of the sensor probe into water for ten minutes before calibration. Otherwise unstable data will be displayed.
15. It is not unusual to find something like white powder or solution on the pH sensor. Rinse it before use. Refer to "Cleaning the Sensor".
16. In the event that standard solution enters an eye or touches the skin, wash off immediately with tap water.
17. Exhausted battery should not be thrown into a fire or recharged. Keep exhausted battery out of reach of children. If a battery is swallowed, induce vomiting promptly and call your doctor immediately.

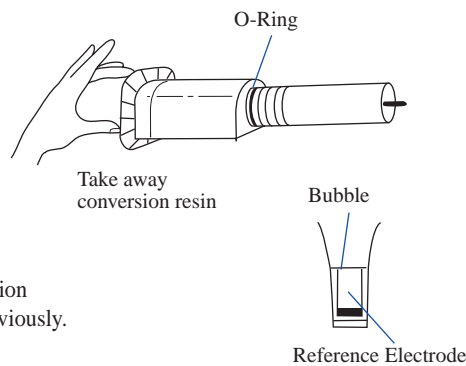
## Replacing the Reference Electrode:

1. Wipe water off the pH meter.
2. Pull the reference electrode out of the pH meter as shown to the right.
3. Confirm that the water tight O-ring is properly seated on the new one.
4. Insert in the pH meter firmly.
5. Confirm that calibration is accurate.



### When Reference Electrode is to be Replaced:

1. The contents of the reference have decreased to about half volume when the bubble has enlarged as shown to the right.
2. The required length for response or stabilization increases for the same solution measured previously.



## CAUTION:

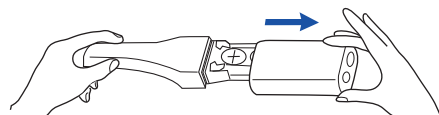
- Do not remove reference electrode when pH meter is wet. Water entering the meter will cause errors.
- Water-tightness will be broken and cause errors if:
  - Reference electrode is not in its proper place;
  - Watertight O-ring is not in its proper place;
  - Watertight O-ring is placed together with foreign matter.

### Note:

1. The service life of reference electrode should vary according to frequency of measurement, temperature or other measurement conditions.
2. The catalog number of spare reference electrode is 24106.

## Replacing the Batteries:

1. Thoroughly wipe water off the pH meter.
2. Pull out the upper housing of the pH meter as shown to the right.
3. Remove the batteries.
4. Put in two new batteries with "+" surface upward.
5. Make sure that a watertight O-ring is properly placed in the housing of the pH meter.
6. Reassemble the housing of the pH meter.
7. Make sure that the power supply is turned on.

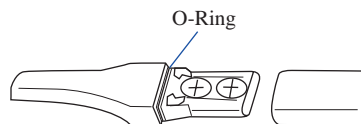


Remove the batteries and put in the new ones



### When batteries are to be replaced:

1. LCD shows "BAT" while power is turned on.
2. LCD shows nothing when you press power button.



## CAUTION:

Do not remove the housing of the pH meter when it is wet, water entering the unit should cause error.

Insufficient water-tightness should result in error if:

- Housing of pH meter is not in its proper place;
- Watertight O-ring is not in its proper place;
- Watertight O-ring is placed together with foreign matter.

Recalibrate the pH meter after batteries are replaced.

If the pH meter does not work properly, check voltage of the batteries and repeat the procedure.

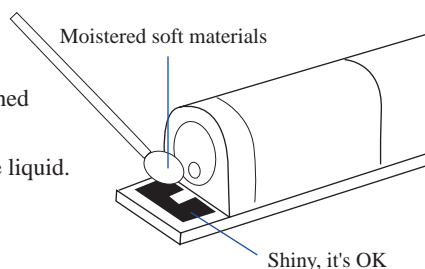
Always use two CR2032 Lithium batteries.

## Cleaning the sensor:

## CAUTION:

When pH sensor has dust and dirt on the surface, clean as follows:

1. Wipe the surface of the pH sensor with a moistened soft material.
2. Turn a chip into flush with water and remove the liquid.
3. Make sure that calibration is accurate.



- Do not scratch or damage the pH sensor.
- Do not press the reference electrode.
- If you can find something like white powder or solutions on the pH sensor, clean it before using the meter.
- Do not clean the pH sensor with thinner or benzene.