**Standard Operating Procedure**

**pH Meter Use and Calibration**

1. **Purpose**

This procedure describes how to calibrate and use a pH meter.

1. **Method Summary**

Perform at least a 2-point calibration at room temperature using standard buffers that bracket (one above and one below) the expected sample range. You can also perform a 1-point calibration, but make sure that the buffer value is close to the sample value you are measuring. Use the pH meter to perform a reading.

**3.0 When it should be performed:**

Calibration should be performed at least every time used, on a daily basis, after cleaning or if the readings become unsteady.

**4.0 Equipment**

pH electrode

pH meter

temperature probe

standard pH buffers 4.01; 7.00; and 10.00.

Kimwipes

waste container

wash bottle -triply deionized water

beakers

**5.0 pH Meter**

**Connecting the Electrode and Temperature Probe**

1. To connect the Acorn meter to your electrode, align the post of the meter's connector with the slots on the electrode's connector, push together and twist the electrode connector 1/2 turn until it clicks into place. To remove, simply rotate the connector counter-clockwise until it unlocks, and slide the connector off the socket.
2. Insert the phono jack of the temperature sensor into the socket on the meter. Unplug the phono jack when not in use.

**Switching the meter on**

Press the ON/OFF key to power up your meter. All the LCD segments display for a few seconds as the meter goes through a self-diagnostic test. The LCD then switches into pH measurement mode. If the LCD then displays "Ur", the electrode is not properly connected, it is faulty, the temperature sensor is faulty, or there is an open circuit.

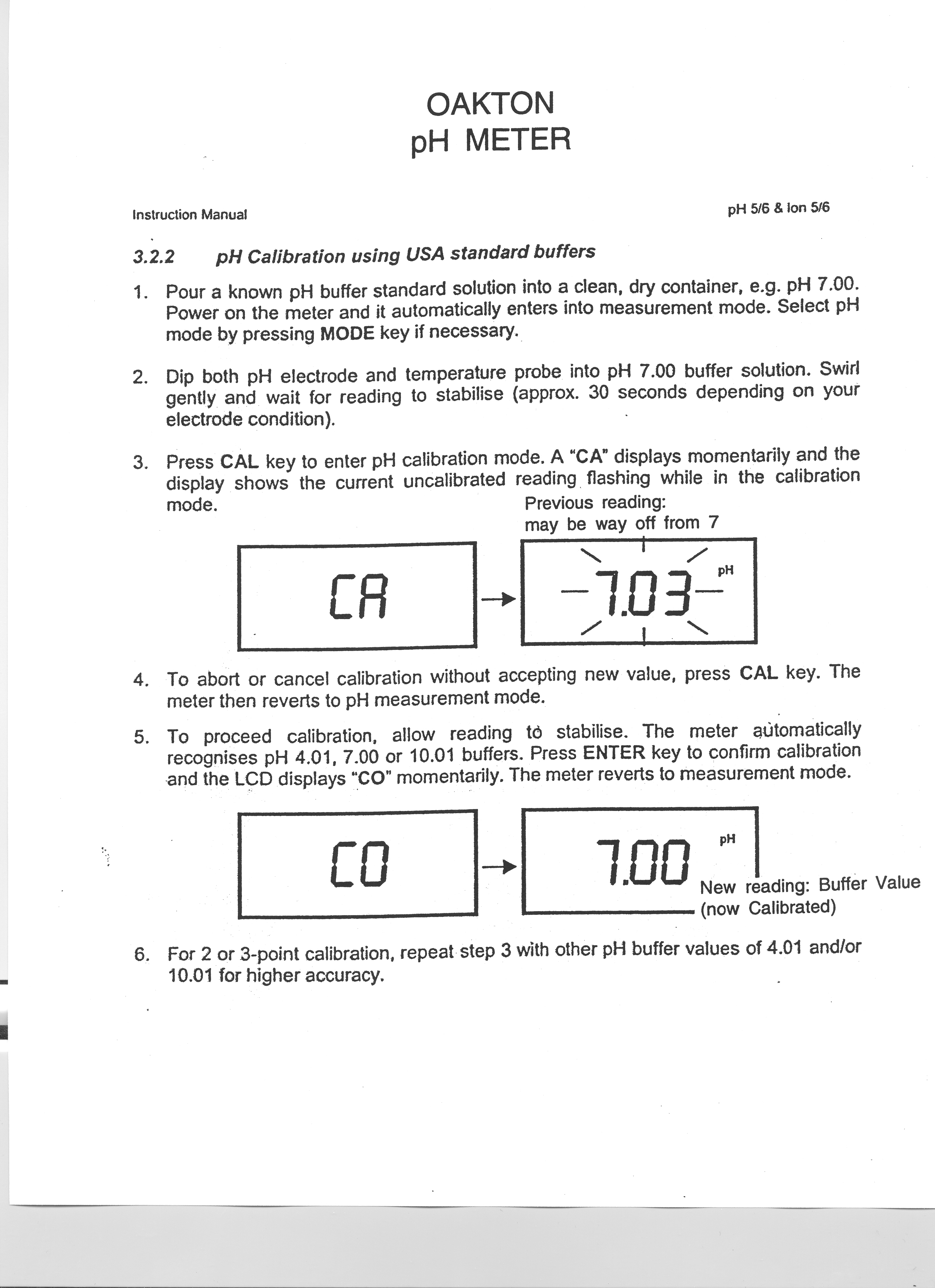
**Before use:** remove the electrode soaker bottle. If the electrode has been stored dry, condition the glass bulb by soaking it in tap water for 30 minutes. This hydrates the

glass bulb if the electrode is too dry, or has not been used for a long period of time.

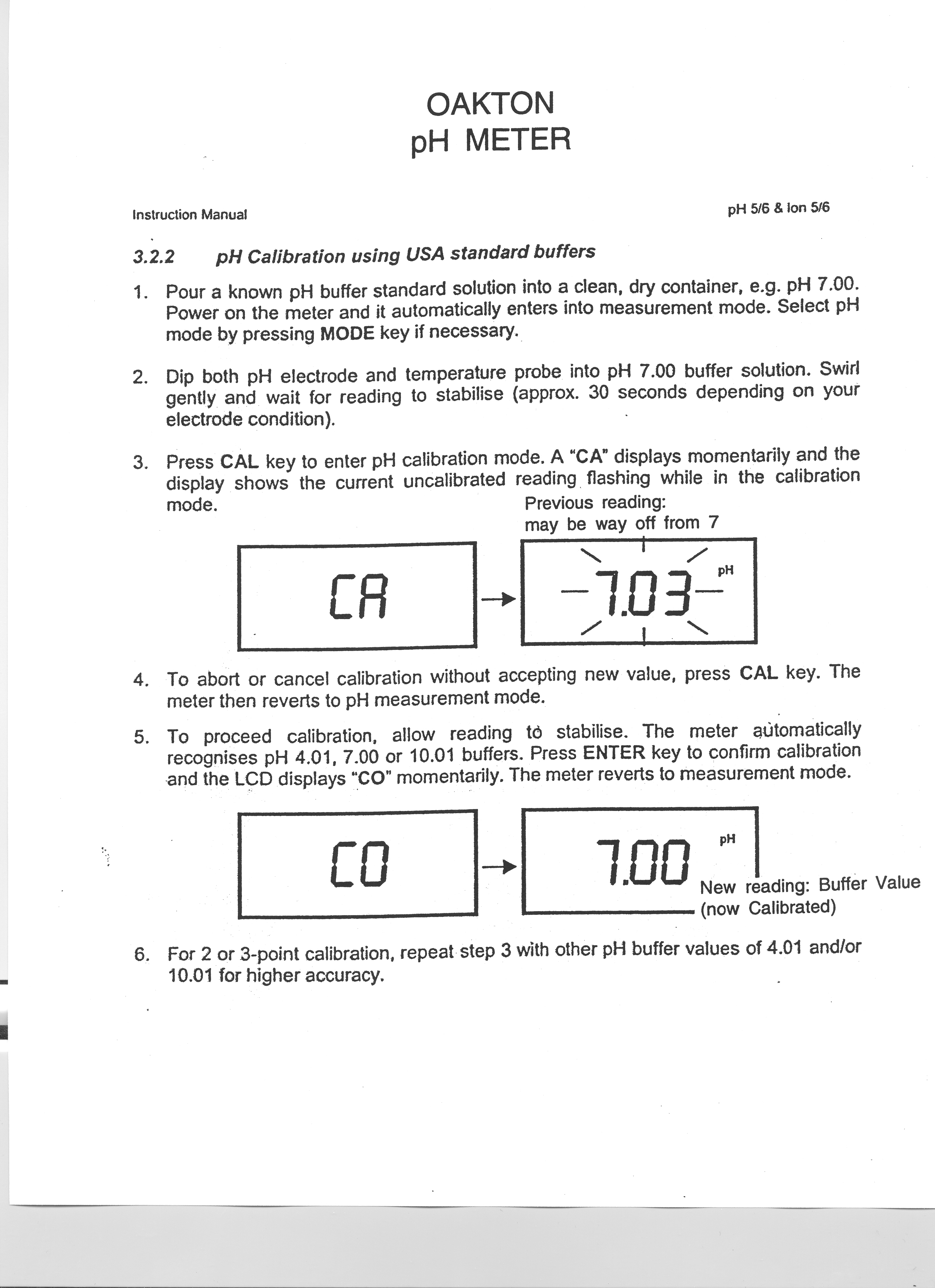
**Calibration Procedure**

1. Complete the **pH Meter Calibration Sheet Appendix 1**

1. Pour a known pH buffer standard solution into a clean dry container.
2. Power on the meter. Meter will automatically enter pH measurement mode. Select pH mode by pressing MODE key if necessary.
3. Rinse electrode thoroughly with deionized water or a rinse solution. **DO NOT wipe the electrode;** this causes a build-up of electrostatic charge on the glass surface.
4. Dip both the electrode and temperature sensor into pH 7.00 buffer solution. The glass bulb must be completely immersed into the sample. Stir gently, and wait for reading to stabilize (approximately 30 seconds to 1 minute - depending on your electrode condition).
5. Press CAL key to enter the calibration mode. A“CA” displays momentarily and the display shows the current uncalibrated reading flashing while in calibration mode CAlibration. See figure.



1. To abort or cancel calibration without accepting new value, press **CAL** key. The meter then reverts to pH measurement mode.
2. Allow the reading to stabilize. The meter automatically recognizes 7.00, 4.01 or 10.00 buffers.
3. Press ENTER key once to confirm calibration.
4. The LCD displays “CO” to indicate the calibration point has been confirmed. The meter exits calibration mode and returns to measurement mode.



1. Repeat with pH buffers 4.01 and/or 10.00 for best accuracy.
2. If the meter fails to calibrate, indicate on **pH Meter Calibration Sheet and get another electrode or meter.**

**NOTE**: This meter has automatic buffer recognition which identifies the correct pH buffer values during calibration. If buffers other than 4.01, 7.00 or 10.00 are used, or the electrode has worn out, the LCD will flash "Er1".

**5. Measurement**

**Taking Measurements**

1. Rinse both calibrated electrode and temperature sensor with distilled water. **DO NOT wipe the electrode;** this causes a build-up of electrostatic charge on the glass surface.
2. Turn meter on. Press MODE key to select desired parameter (pH, mV, Temperature).
3. Dip electrode and temperature sensor approximately 1" to 2" into sample. Ensure the bulb is covered by the solution.
4. Stir gently and wait for display to stabilize. Note reading.
5. **Hold function** To freeze your reading, press the HOLD key once. The LCD show "HO" to indicate the HOLD function is activated. Press HOLD key again to deactivate the HOLD function and return to measurement mode.

**After measuring**

1. Rinse the electrode and reference junction in deionized water.
2. Store the electrode as for best results, keep the pH bulb wet. Store the pH bulb in the electrode soaker bottle filled with electrode storage solution. Or you can store the electrode in a pH 4 buffer with 1/100 part saturated KCl. Other pH buffers are also suitable for storage. **NEVER use deionized water for storage.**

**Electrode cleaning**

1. Because your pH electrode is susceptible to dirt and contamination, clean it every

one to three months depending on extent and condition of use.

1. Clean the electrode in a mild detergent solution. Wipe the probe with a soft tissue

paper. Avoid touching the glass membrane with your fingers.

1. Wash thoroughly in tap water and then in distilled water.
2. Recalibrate your meter after cleaning the electrode.

**Special Cleaning Tips**

**Salt deposit:** dissolve the deposit by immersing the electrode in tap water for ten to

fifteen minutes. Then thoroughly rinse with distilled water.

**Oil/grease film:** wash electrode pH bulb gently in detergent solution. Rinse electrode

tip with distilled water.

**Clogged reference junction:** heat a diluted KCl solution for 60-80°C. Place the sensing

part of the electrode into the heated solution for about 10 minutes. Allow the

electrode to cool in some unheated KCl solution.

**Protein deposits:** prepare a 1% pepsin solution in 0.1M of HCl. Set the electrode in

the solution for five to ten minutes. Rinse the electrode with distilled water.

***References*: Operating instructions, pH 5 and pH 6 Acorn Series Meters, Oakton**  8/98**APPENDIX 1:**

**pH Meter Calibration**

**pH meter # :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**pH electrode # :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Brand :**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Calibration :** 🞎**pH 4.00** 🞎 **pH 7.00** 🞎 **pH 10.00**

**Test Conditions :**

🞎Temperature probe

Test temperature :­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ °C

**Damages :** 🞎 None

🞎 Type of damage \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Evaluation :**

🞎 Test passes (calibrates)

🞎 Test not passed (won’t calibrate) 🞎 returned to Lab Instructor

**Date : ­­­­­­­­­­­­­­­­­­­­­­­­­­**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Examiner :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_