

ULTRAPEN™ PT5

TEMPERATURE CONTROLLED, FULL CALIBRATION PROCEDURE

This calibration procedure is recommended in order to obtain the best results, especially when measuring sample solutions at the extremes of the PT5's specified temperature or DO ranges.

NOTE: The further the sample temperature is from the temperature at which calibration was performed, the greater the chance of error.

I. EQUIPMENT AND SUPPLIES REQUIRED

General

- 1 ea. – Hot Plate with Magnetic Stirrer; Must be capable of sustaining temperature levels to $\pm 1^{\circ}\text{C}$.
 - For solution temperatures below ambient, a refrigerated, circulating water bath should be used (not shown).
- 1 ea. – Thermometer (Digital or Mercury Column). Must be accurate to at least $\pm 1^{\circ}\text{C}$, preferably $\pm 0.25^{\circ}\text{C}$
- 1 ea. – Glass Beaker (≈ 300 ml): For rinsing sensor before and after ZERO calibration.
- 1 ea. – Magnetic Stir Bar
- 1L – Water (DI, RO, or distilled).

For ZERO Calibration

- 1 ea. – Glass Beaker (≈ 100 ml)
- 2 oz (≈ 59 ml)– 0 ppm Dissolved Oxygen Calibration Solution (Myron L® Company P/N DOSOL).

For WATER Calibration

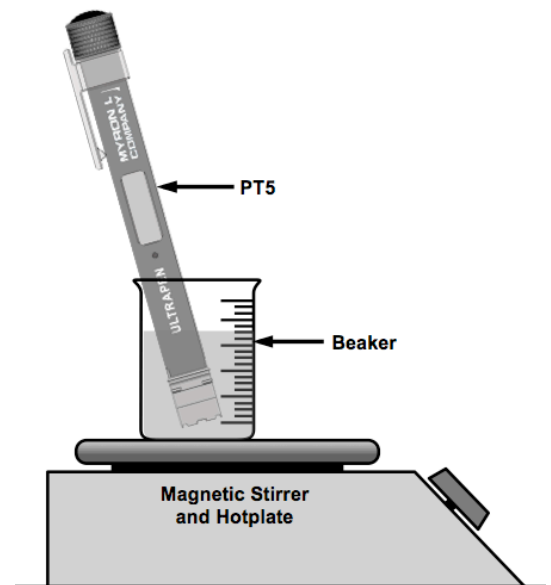
- 1 ea. – Glass Beaker (≈ 1 L)
- 1 ea. – Aquarium Air Pump with 1L / min capacity or better.
- 1 ea. – Aquarium Air Stone: Approximately 1.5" L x 0.49"W (3.9 cm L x 1.3 cm W)
- Aquarium Air Tubing (As required)

II. GENERAL NOTES and PREPATION

- Both the **ZERO** and **WATER** calibration must be performed at the same temperature as the target sample solution to be tested.
 - Once you've calibrated the PT5 at a specific temperature, if the target solution changes temperature more than 5°C , the PT5 should be recalibrated at the new temperature.
- It is important to make sure that the PT5 sensor is completely submerged during the calibration process.
- All glassware should be clean and dry before use.
- Prepare the rinse water: Pour approximately 200 ml of DI water into the 300 ml beaker.
- Attach the air stone to the aquarium pump with the aquarium tubing.

III. ZERO CALIBRATION

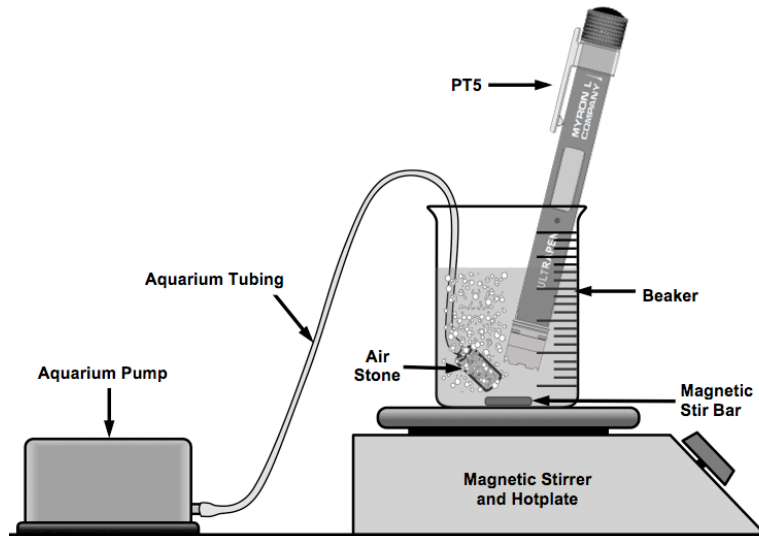
1. Pour the 2 oz. of zero calibration solution into the 100 ml beaker.
2. Place the beaker of zero calibration solution onto the hot plate.
3. Turn ON the hot plate and set it for the target temperature.
4. Let the ZERO calibration solution stabilize at the target temperature.
 - Verify the temperature of the solution using the thermometer (not shown in diagram).
 - Make sure the solution is within $\pm 1^{\circ}\text{C}$ of the target temperature before proceeding.
5. Rinse the PT5 sensor by swirling it in the rinse water for several seconds.
6. Carefully blot the sensor membrane with a soft, clean cloth or tissue to remove any water drops.
7. Completely submerge the sensor in zero calibration solution.
8. Wait 5 minutes for the PT5 sensor to equilibrate.
9. Keeping the sensor submerged in the zero calibration solution, press and release the push button to turn the PT5 ON.
10. Press and hold the push button to enter menu mode. Release the push button while "CAL" is displayed.
11. Press and hold the push button. The display will alternate between the following:
 - "0 CAL", "Air CAL", "H2O CAL", and "ESC".
12. Release the push button when "0 CAL" is displayed.
 - Calibration may take as long as 3 minutes or more.
13. When completed, the PT5 will display "SAVED", and turn OFF.
14. Remove the beaker of zero calibration solution from the hot plate.



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15. Rinse PT5 in clean water (preferably DI, RO, or purified water).
16. Fill the hydration cap with enough clean water to soak the sponge inside and place it onto the DO sensor all of the way to the cap stop.
17. Allow the DO sensor to stabilize to the water-saturated air inside the hydration cap for 5-10 minutes.
18. Proceed to the air-saturated **WATER** calibration.



IV. WATER CALIBRATION (Air-Saturated Water)

1. Pour 800 ml of (DI, RO or distilled) water into the 1L beaker.
 2. Place the beaker of water onto the hot plate.
 3. Drop the magnetic stir bar into the beaker.
 4. Place the Air stone into the beaker of water.
 - Make sure it is at the bottom of the beaker but will not interfere with the stir bar.
 5. Turn ON the aquarium pump.
 - The bubbles should be small and numerous.
 - If there are only a few, large bubbles, replace the air stone with a new one.
 6. Turn ON the hot plate and set it for the target temperature.
 7. Turn ON the stirrer, set to approximately 500 rpm.
 8. Let the air bubble through the water for at least 30 minutes.
 9. Verify the temperature of the solution using the thermometer (not shown in diagram).
 - Make sure the solution is within $\pm 1^{\circ}\text{C}$ of the target temperature before proceeding.
 10. Rinse the PT5 sensor by swirling it in the rinse water for several seconds.
 11. Carefully blot the sensor membrane with a soft, clean cloth or tissue to remove any water drops.
 12. Completely submerge the sensor in the aerated, temperature controlled water.
- DO NOT:**
- Let the sensor interfere with the stir bar motion.
 - Hold the sensor directly over the air stone or in the bubble stream
13. Wait 5 minutes for the PT5 sensor to equilibrate.
 14. Keeping the sensor submerged in the aerated water solution, press and release the push button to turn the PT5 ON.
 15. Press and hold the push button to enter menu mode. Release the push button while "CAL" is displayed.
 16. Press and hold the push button. The display will alternate between the following:
 - "0 CAL", "Air CAL", "H2O CAL", and "ESC".
 17. Release the push button when "H2O CAL" is displayed.
 18. Swirl the PT5 constantly while it performs the calibration.
 - Calibration may take as long as 3 minutes or more.
 19. When completed, the PT5 will display "SAVED", and turn OFF.