MYRON L® COMPANY
Water Quality Instrumentation
Accuracy • Reliability • Simplicity

Operation Manual

ULTRAPENx2™ PTBT5

Dissolved Oxygen & Temperature Pocket Tester

For use with PTBTX2™ App
and Your iOS™ or Android™ Mobile Device

Download on the App Store

GET IT ON Google Play

Bluetooth® Enabled

PTBT5OM-X2 01-20

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ULTRAPENX2™ PTBT5 Operation Manual

Dissolved Oxygen (DO) and Temperature Pen for use with your Mobile Device Running the PTBTX2™ App

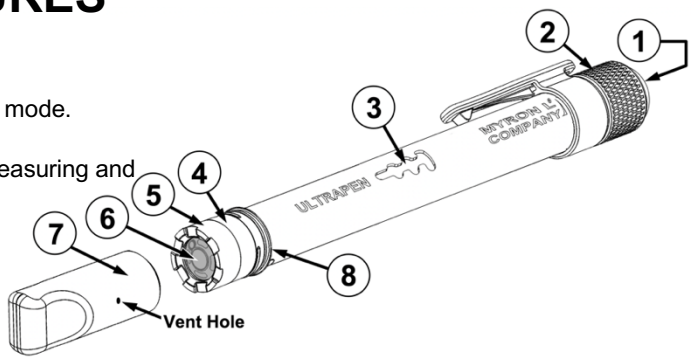
INTRODUCTION

Thank you for purchasing the Myron L® Company ULTRAPENX2 ™ PTBT5 Dissolved Oxygen (DO) Pen. This instrument is designed to be extremely accurate, fast, and simple to use in diverse water quality applications. Advanced features include:

- Real time readings.
- Proprietary sensor design and microprocessor-based circuitry that measures DO with an accuracy of up to ± 2%.
- Temperature compensation algorithm that dynamically corrects for changes in membrane / sample temperature.
- Adjustment for Altitude and sample Salinity.
- Three calibration methods, **AIR** (Water Saturated Air), **WATER** (Air Saturated Water), and **ZERO** (0 ppm DO).
- A rugged, reliable design with an aircraft aluminum body.
- Waterproof housing.
- Replacement membranes contained in easy to install, screw-on caps.
- Bluetooth® Enabled.

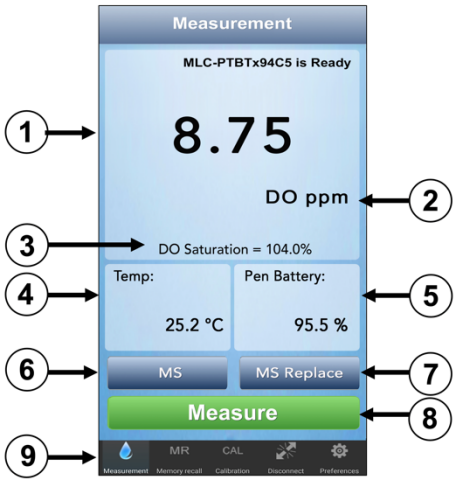
FEATURES

I. PTBT5 - LAYOUT



1. **PEN BUTTON** – Press to turn PTBT5 ON and place it in Standby mode.
2. **BATTERY CAP** – Unscrew to change battery.
3. **LED INDICATOR LIGHT** – Flashes rapidly when the PTBT5 is measuring and once every 5 seconds when the PTBT5 is in Standby mode.
4. **DO SENSOR BODY** – Contains electrodes and reagent for Dissolved Oxygen and Temperature measurements.
5. **DO SENSOR CAP** – Holds the DO sensor membrane in place.
6. **DO MEMBRANE –** Permeable membrane through which Dissolved Oxygen passes.
7. **PROTECTIVE / HYDRATION CAP** – Protects sensor from damage. The sensor should be kept moist at all times.
   - Always replace the protective / hydration cap containing a sponge moistened with DI, RO or distilled water.
   - See the MAINTENANCE section below for instructions for storing > 1 month.
   - When removing or replacing the cap, gently wiggle it back and forth while pulling / pushing. **DO NOT twist!**
   - **Vent Hole:** Allows air pressure to equalize during AIR calibration.
8. **CAP STOP** – Pushing the protective / hydration cap beyond the cap stop could damage the sensor.

II PTBTX2 APP MEASUREMENT SCREEN



1. **MEASUREMENT VALUE FIELD** – Displays the measured value of the solution. When the PTBT5 turns OFF, displays the message, "Ultrapen is Offline".
2. **UNITS OF MEASURE** – Displays DO units of measure (ppm or %).
3. **SECONDARY MESSAGE FIELD –** In Default mode displays DO Saturation. Otherwise displays the current parameter (DO Concentration or Saturation)
4. **SOLUTION TEMPERATURE** – Measured temperature of the solution.
5. **PTBT5 BATTERY LEVEL** – Flashes RED when PTBT5 battery is ≤ 25%.
6. **MEMORY STORE BUTTON** – Tap here to record the measurement in the App's database.
7. **MEMORY REPLACE BUTTON** – Tap here to replace a previously stored measurement with data from a new measurement.
8. **MEASURE BUTTON –** Tap this to start a new measurement.
9. **FEATURE NAVIGATION BAR** – These buttons activate various App features.

III. FEATURE NAVIGATION BAR

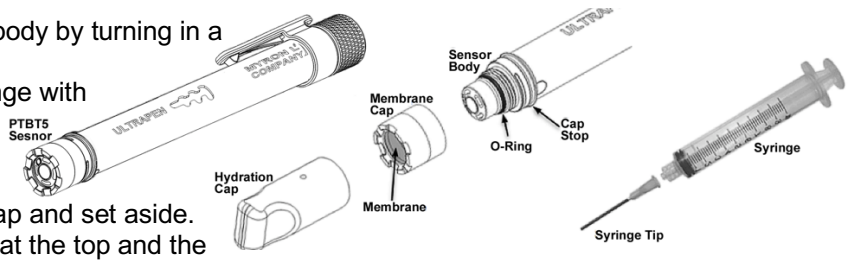
This bar appears at the bottom of all screens. It's used to navigate between the App's main functional areas.

MEASUREMENT – Returns the App to the Measurement screen.
MEMORY RECALL – Displays a list of saved measurements.
CALIBRATION – Places the App in Calibration mode.
CONNECT – Opens the App's Bluetooth Connect / Disconnect screen. Once a PTBT5 is connected to the App the button label changes to say, "Disconnect."
PREFERENCES – Opens the App's Preferences & Settings modes, including an internet link to the full App Operation Manual (HELP).

ULTRAPENX2™ PTBT5 Operation Manual

Dissolved Oxygen (DO) and Temperature Pen for use with your Mobile Device Running the PTBTX2™ App

PREPARING THE DO SENSOR



1. Unscrew the membrane cap from the sensor body by turning in a counter-clockwise direction.
2. Attach the tip onto the syringe and fill the syringe with DO electrolyte solution.
3. Rinse the inside of the membrane cap with electrolyte solution.
4. Pour some electrolyte inside the membrane cap and set aside.
5. Hold the PTBT5 vertically with the DO sensor at the top and the sensor opening facing up.
6. Insert the syringe tip into one of the four openings of the sensor body as far as it can go.
7. Slowly fill the electrolyte well with electrolyte.
8. Hold the electrolyte filled sensor body in one hand and bring the electrolyte filled membrane cap closer with your other hand.
9. Tilt the membrane cap and place it onto the sensor body.
10. Carefully start turning the membrane cap clockwise until it tightens firmly to the sensor body. Some electrolyte may escape.
11. Rinse any residual electrolyte from the outside of the sensor body with clean water (DI, RO or distilled).
12 Fill the protective / hydration cap with enough clean water to soak the sponge inside (preferably DI, RO, or distilled water).
13. Place the protective / hydration cap onto the DO sensor all the way to the cap stop.
14. Before using the PTBT5, let the new sensor stabilize for 2-4 hours with the protective / hydration cap in place.

USING THE PTBT5

STEP 1 – DOWNLOAD THE "ULTRAPEN PTBTX2" APP

On Download on the App Store and GET IT ON Google Play look for Apple X2 MYRON L COMPANY Google X2 MYRON L COMPANY

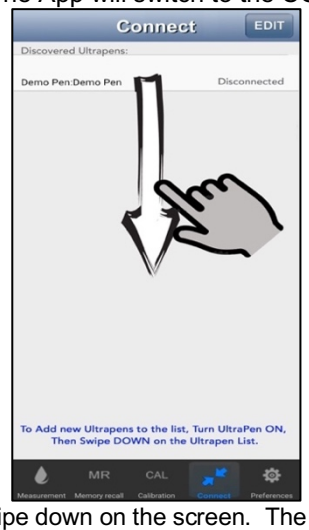
SYSTEM REQUIREMENTS

iOS device running iOS 10.0 or later.
If you are using an iPad,
Search for iPhone Apps.

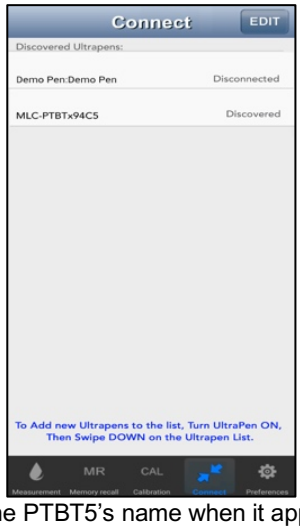
Android device running OS 7.0 or later.

STEP 2 – CONNECT THE PTBT5 TO THE APP

1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.
2. On your Device's Home screen, tap the blue **PTBTX2** icon to open the PTBTX2 App.
3. Tap the CONNECT button at the bottom of the App display.
   - The App will switch to the CONNECT screen.



4. Swipe down on the screen. The PTBT5 will appear on the list.



5. Tap the PTBT5's name when it appears. Default: ***MLC-PTBTX[Hexadecimal ID]***

6. The PTBT5 will move to the top of the list and a check mark will appear.

NOTES:

- Some Mobile Devices switch their wireless transmitters to a low power mode when their battery level gets too low.
- This could affect how easily your PTBT5 and your device connect and communicate.
- **ALWAYS** keep your Mobile Device charge level as high as possible. If it is <40%, plug your Mobile Device into a charger.

STEP 3 – CHOOSE A MEASUREMENT PARAMETER SETTING

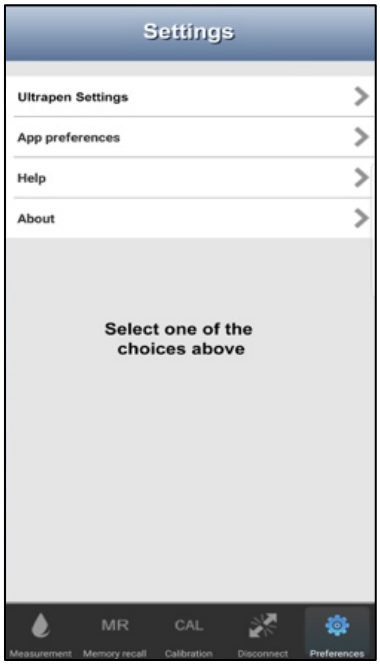
The PTBT5 allows you to select one of three different ways to display DO measurements:

- **DEFAULT MODE**: Displays DO Concentration (ppm) and DO Saturation (%) simultaneously.
- **DO CONCENTRATION**: Displays DO Concentration (ppm) only.
- **DO SATURATION:** Displays DO Saturation (%) only.

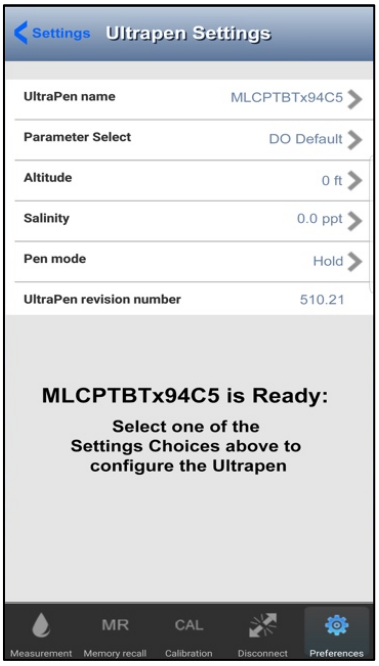
To choose which DO Parameter to display during measurements:

1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.
2. Tap the PREFERENCES button 

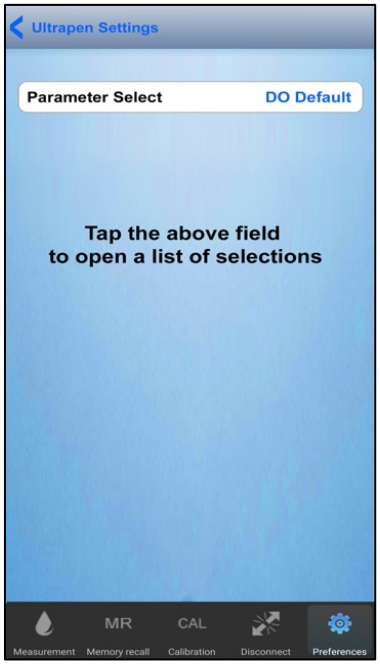
in the Feature Navigation Bar.



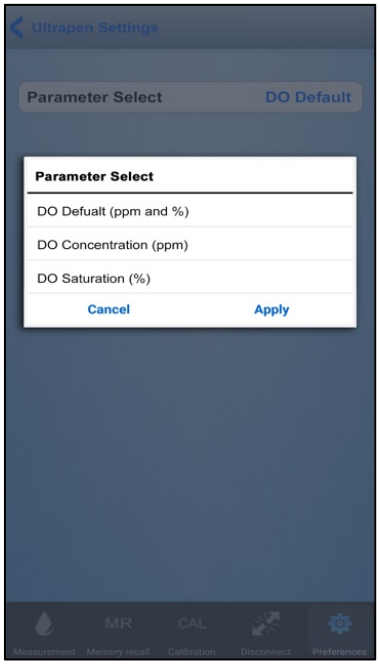
3. Tap the line that says **Ultrapen Settings**.



4. Tap the Parameter Select line.



5. The App will display the current parameter setting.
6. Tap the Parameter field.



7. Select the measurement parameter.
8. Tap **APPLY**. The App will update the PTBT5 parameter.

STEP 4 – CHOOSE THE ULTRAPEN MODE SETTING

The PTBT5 has two Ultrapen measurement modes:

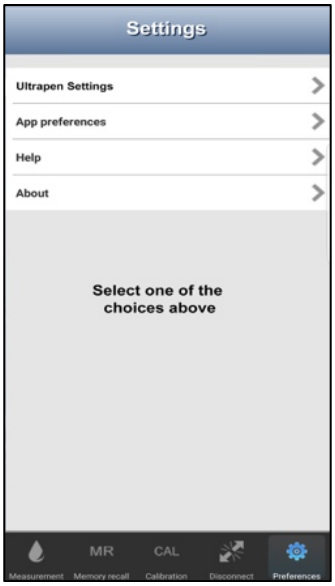
- **HOLD** mode (Default) – The PTBT5 displays measurements in real time until the measurement has stabilized, then the App displays the final reading and puts the PTBT5 into Standby mode.
- **LIVE** mode – The PTBT5 sends a series of real-time readings that are displayed continuously for up to 5 minutes after which the final reading is held on the App's display and the App places the PTBT5 into Standby mode. The user may end the LIVE mode measurement series at any time prior to that by tapping the BLUE button on the App display.

To select one of these modes:

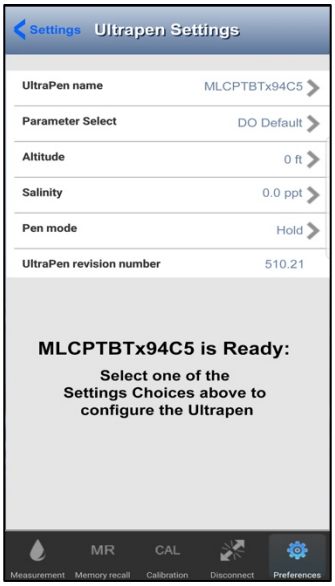
1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.

2. Tap the PREFERENCES button 

in the Feature Navigation Bar.



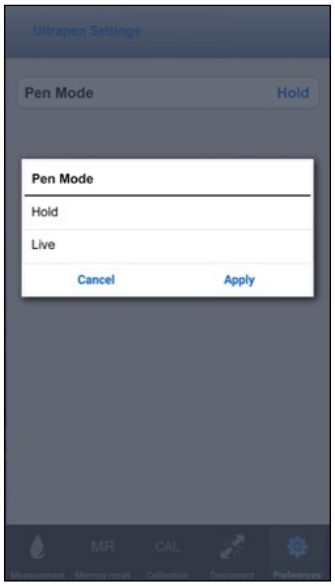
3. Tap the line that says **Ultrapen Settings**.



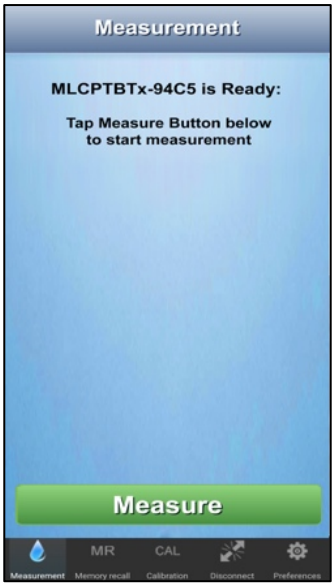
4. Tap the Pen Mode line on the screen.

5. The App will display the current mode setting.

6. Tap the Pen Mode field.



7. Select Live or Hold, then tap **APPLY**.



8. Return to the Measurement screen and tap the GREEN Measure Button.

9. Either tap the BLUE button to manually stop LIVE mode, or it will stop by itself after 5 minutes.

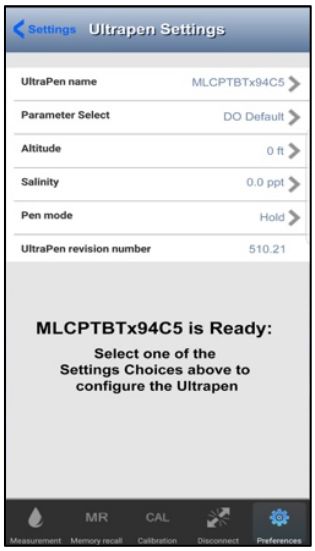
STEP 5 – SET THE LOCATION ALTITUDE

Altitude significantly effects the amount of oxygen that can dissolve in water. As altitude increases, the amount of dissolved oxygen decreases. **BEFORE** making any DO measurements it is important to adjust the Altitude setting of the PTBT5. Altitude can be adjusted in 100 ft. increments.

1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.

2. Tap the PREFERENCES button 

in the Feature Navigation Bar.

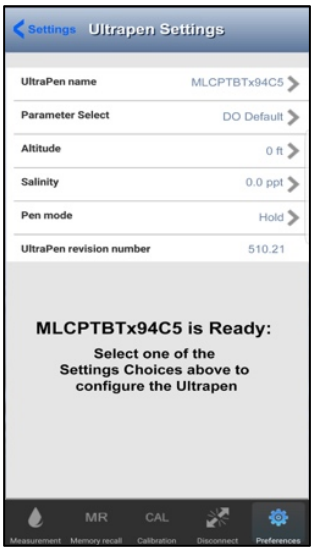


3. Tap the Altitude line.

4. When the Altitude Adjust screen appears, tap the Altitude field.

5. Slide the two selection wheels up or down to set the altitude to the nearest 100 ft.

6. Tap **Apply**.



7. Tap “Settings” in the upper left to return to the main settings screen.

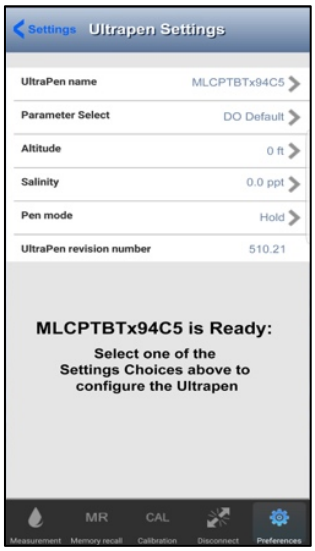
STEP 6 – SET THE SAMPLE SALINITY

Salinity also effects the amount of oxygen that can dissolve in water. As salinity increases, the amount of dissolved oxygen decreases. BEFORE making any DO measurements it is important to adjust the Salinity setting of the PTBT5. Salinity can be adjusted in 1 ppt increments.

1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.

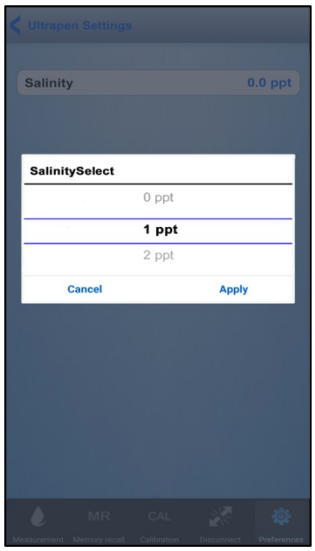
2. Tap the PREFERENCES button 

in the Feature Navigation Bar.



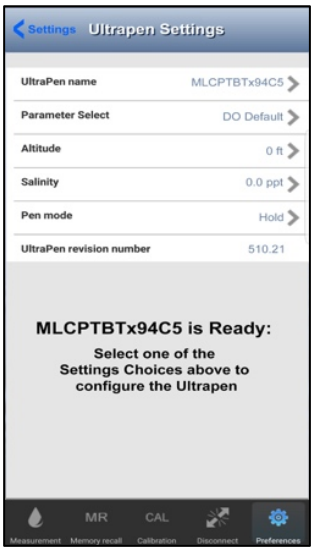
3. Tap the Salinity line.

4. When the Salinity Adjust screen appears, tap the Salinity field.



5. Slide the selection wheel up or down to set the Salinity to the nearest 1 ppt.

6. Tap **Apply**.



7. Tap “Settings” in the upper left to return to the main settings screen.

DISSOLVED OXYGEN MEASUREMENT

I. MEASUREMENT SETUP

ALWAYS:

1. Makes sure that the DO sensor is filled with electrolyte and allowed to stabilize.
2. Adjust the PTBT5 Altitude to match that of the measurement location.
3. Adjust the PTBT5 Salinity to match that of the sample solution.
4. Perform at least an AIR (water-saturated air) calibration of the PTBT5.
   - For best results, perform a Temperature Controlled, Full Calibration (see the CALIBRATION sections below).
   - If the expected measurement is < 3 ppm, perform a ZERO calibration (see the CALIBRATION sections below).

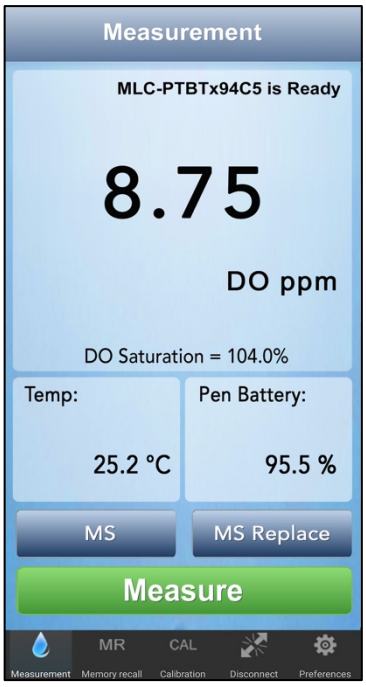
II. PTBT5 HOLD MODE MEASUREMENTS

1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.
2. **COMPLETELY** submerge the PTBT5 sensor in the sample solution.
3. Allow the PTBT5 to equilibrate by submerging the sensor in the sample solution for 1 minute prior to making a measurement.
4. Tap the MEASUREMENT button 

in the Feature Navigation Bar.

5. Tap the GREEN Measure button.

6. Swirl the pen in the sample while the PTBT5 is measuring. The PTBT5's LED will flash rapidly.
   - The Measure button will be inactive.



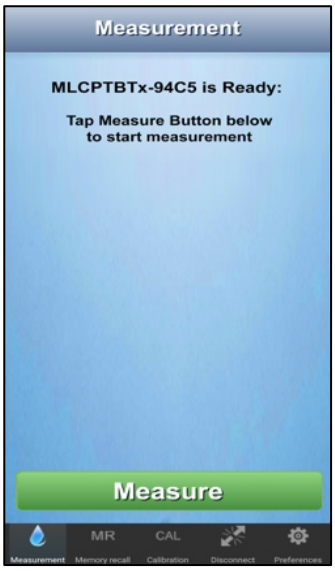
7. When the PTBT5 completes the measurement the App will display the values.
   - The Measure button will turn GREEN and be active.

- **MS Button**
  Tap to record the last measurement.
- **MS Replace Button**
  Tap to replace data in an existing record with data from the last measurement.

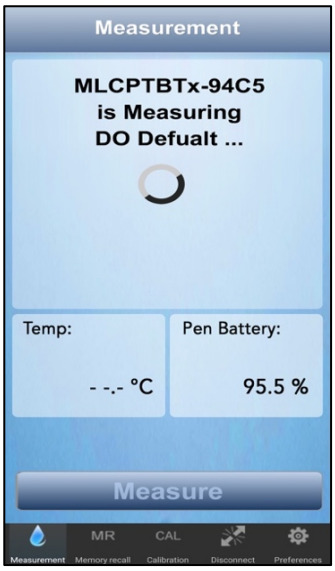
III. PTBT5 LIVE MODE MEASUREMENTS

1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.
2. **COMPLETELY** submerge the PTBT5 sensor in the sample solution.
3. Allow the PTBT5 to equilibrate by submerging the sensor in the sample solution for 1 minute prior to making a measurement.
4. Tap the MEASUREMENT button 

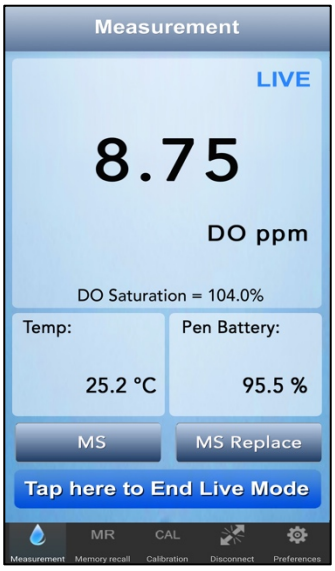
in the Feature Navigation Bar.



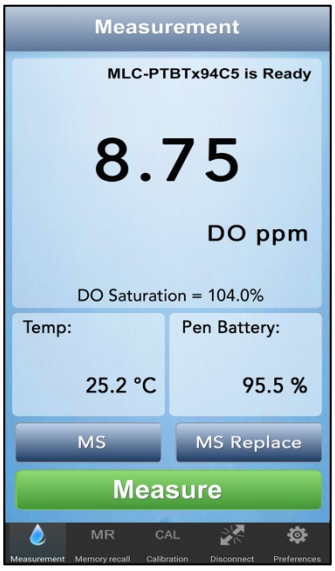
5. Tap the GREEN Measure button.



6. Swirl the pen in the sample while the PTBT5 is measuring. The PTBT5's LED will flash rapidly.



7. When the PTBT5 stabilizes, it will begin displaying measurements.
   a. A flashing, BLUE, LIVE mode indictor will appear in the upper right corner of the Measurement field.
   b. A BLUE button will appear that allows the user to manually end LIVE mode measurements at any time.
8. Continue swirling the Ultrapen in the sample solution while the LIVE mode measurement series is continuing.



9. After 5 minutes, or if the user taps the BLUE "End Live Mode" button, the Ultrapen will send its last measurement result and put itself in Standby mode.
10. The App will display the final measurement values.

MS Button: During LIVE mode, tapping the MS button will allow you to store each new measurement. Once you save the measurement, the App will automatically return to the LIVE mode Measurement screen.

CALIBRATION

I. GENERAL NOTES:

- It is recommended that the PTBT5 be calibrated before each series of tests.
- Verify calibration if readings are not as expected. If the expected measurement is < 3 ppm, **ZERO** point calibration is particularly important.
- For greatest accuracy, see the section titled: Temperature Controlled, Full Calibration.

Accuracy After Calibration:

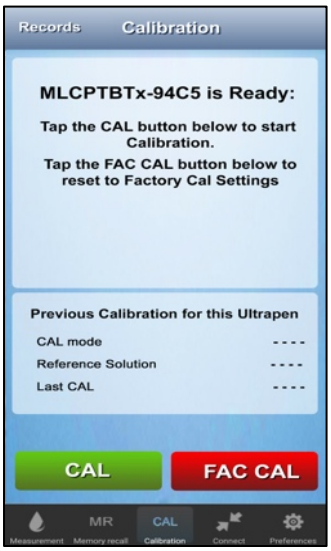
- **ZERO** Calibration + **AIR** Calibration @ 25°C:
  - **Saturation**:
    - 0-100%: ± 45 counts; >100%: ± 4.5% of the reading (>5°C to ≤ 55°C).
  - **Concentration**:
    - ± 0.45 ppm or ± 4.5 % of the reading, whichever is greater (up to 40˚C).
- **ZERO** Calibration + **WATER** Calibration @ 25°C:
  - **Saturation:**
    - 0-100%: ± 35 counts.
    - >100%: ± 3.5% of the reading (>5°C to ≤ 55°C).
  - **Concentration**:
    - ± 0.35 ppm or ± 3.5 % of the reading, whichever is greater (up to 40˚C).
- **TEMPERATURE CONTROLLED, FULL CALIBRATION** @ >5°C to ≤ 55°C:
  - **Saturation:**
    - 0-100.0%: ± 20 counts; >100%: ± 2% of the reading (>5°C to ≤ 55°C).
  - **Concentration**:
    - ±0.2 ppm or ±2% of the reading, whichever is greater (up to 40˚C).

II. SENSOR CHECK

The Sensor Check is a built in feature to check the amplitude of the signal from the sensor. This is used as a troubleshooting tool only, and is not designed to detect all sources of failure.

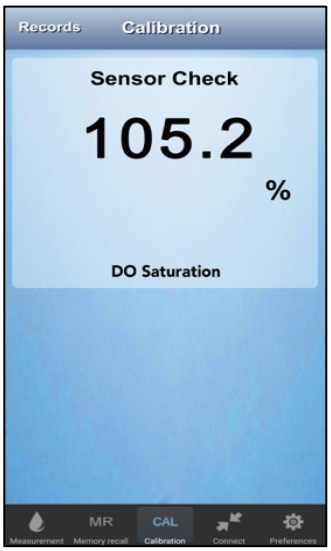
1. Remove the protective / hydration cap from the DO sensor.
2. Dip the sensor in clean DI, RO, or purified water.
3. **CAREFULLY** blot the sensor membrane with a soft, clean, lint-free cloth or tissue to remove any water drops.
4. Fill the protective / hydration cap with enough DI, RO, or distilled water to soak the sponge inside.
5. Hold the PTBT5 upright with the DO sensor down and insert the sensor into the cap. Make sure there is a good seal between the sensor and the cap.
   - **DO NOT** insert the sensor so far that the vent hole is covered.
6. Press and release the PEN BUTTON on the PTBT5 to turn it ON and place the PTBT5 into Standby mode.
7. Tap the CAL button 

in the Feature Navigation Bar.



8. The Initial CAL screen will appear.
9. Tap the CAL button.

10. On the Secondary CAL screen, tap the Sensor Check button.



11. The App will display the raw DO Saturation value.

12. The value displayed will include temperature compensation, but no calibration constant will have been applied.
13. The Sensor is **GOOD**, if the value displayed is ≥ 57.5%.

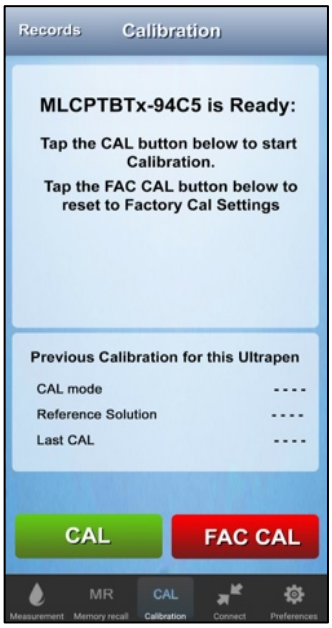
NOTE: If the result is <57.5%, the sensor is not in optimal condition. The sensor may need to be cleaned, the membrane cap assembly may need to be replaced, or the entire sensor may need to be replaced (See MAINTENANCE section below).

14. Tap the **DONE** button to return to the main calibration screen.

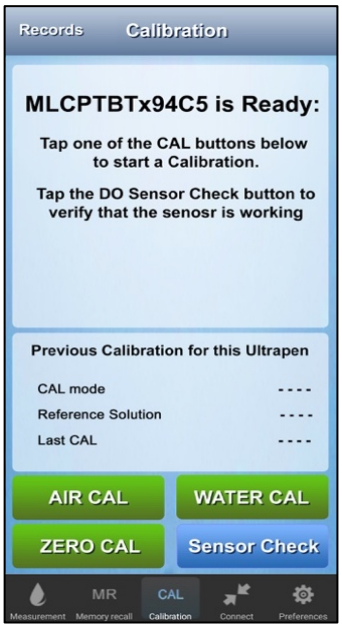
III. ZERO CALIBRATION

1. Remove the protective / hydration cap from the DO sensor.
2. Dip the sensor in clean DI, RO, or purified water.
3. **CAREFULLY** blot the sensor membrane with a soft, clean, lint-free cloth or tissue to remove any water drops.
4. Pour enough DO zero calibration solution (P/N DOSOL) into a beaker or cup to COMPLETELY submerge the DO Sensor.
5. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.
6. Submerge the PTBT5 sensor in the calibration solution.
   - Allow the PTBT5 to stabilize for 1 minute prior to performing a calibration.
7. Tap the Calibration button 

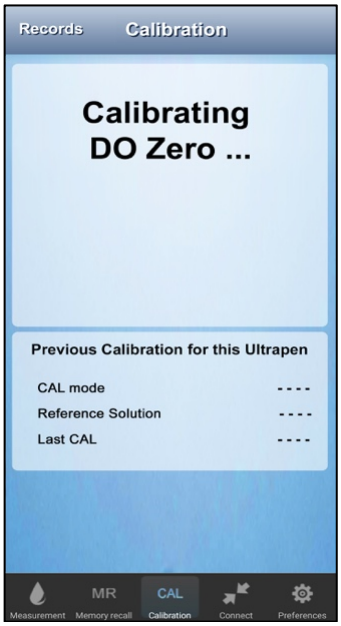
in the Feature Navigation Bar.



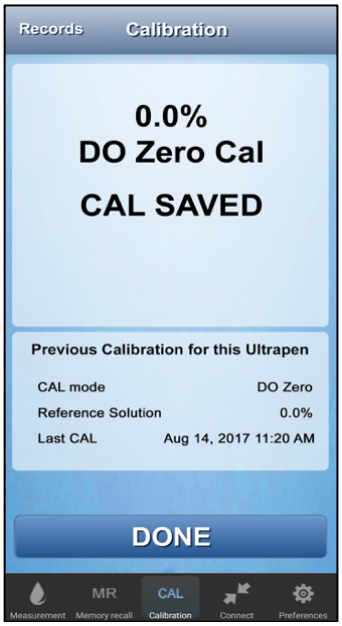
8. The Initial CAL screen will appear.
9. Tap the CAL button.



10. On the Secondary CAL screen, tap the **ZERO CAL** button.



11. The PTBT5 will perform the ZERO calibration.



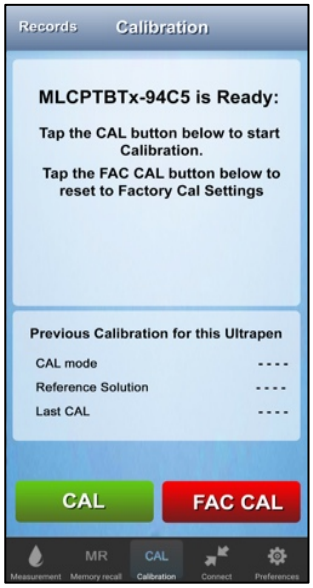
12. When the Calibration is done the App displays the values and saves a CAL record.

NOTE: The AFTER CAL result should be 0.0 %.

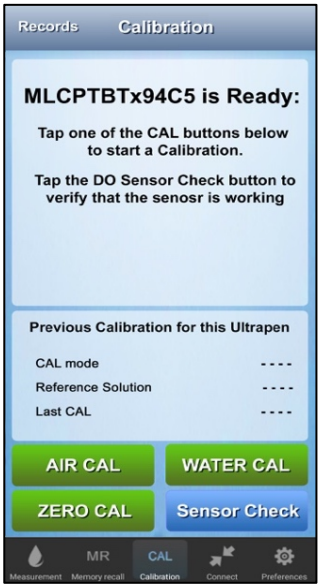
IV. AIR CALIBRATION (WATER-SATURATED AIR)

1. Remove the protective / hydration cap from the DO sensor.
2. Dip the sensor in clean DI, RO, or purified water.
3. **CAREFULLY** blot the sensor membrane with a soft, clean, lint-free cloth or tissue to remove any water drops.
4. Fill the protective / hydration cap with enough DI, RO, or distilled water to soak the sponge inside.
5. Hold the PTBT5 upright with the DO sensor down and insert the sensor into the cap. Make sure there is a good seal between the sensor and the cap.
   - **DO NOT** insert the sensor so far that the vent hole is covered.
6. Press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.
7. Tap the CAL button 

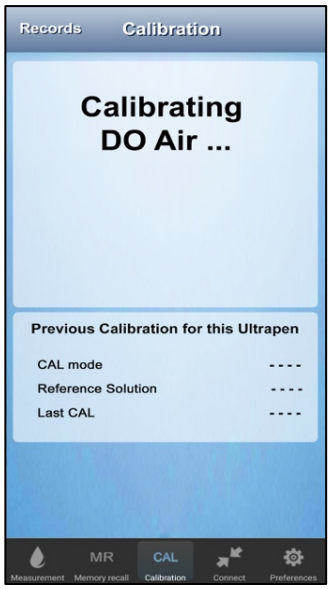
in the Feature Navigation Bar.



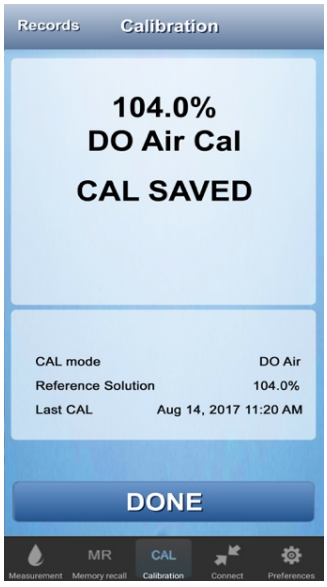
8. The Initial CAL screen will appear.
9. Tap the CAL button.



10. On the Secondary CAL screen, tap the **AIR CAL** button.



11. The PTBT5 will perform the Air calibration.



12. When the calibration is done the App displays the values and saves a calibrarion record.

NOTE: Verify the calibration by performing a Saturation measurement with the protective / hydration cap still in place.

- The result should be 104% ± 2%.

V. WATER CALIBRATION (AIR-SATURATED WATER)

EQUIPMENT AND SUPPLIES REQUIRED

- 1 ea. – Glass Beaker (≈ 1L).
- 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).

1. Prepare an air-saturated water solution by bubbling air through DI, RO, or distilled water for a minimum of 30 minutes.
- Continue bubbling air through the water during the entire calibration.

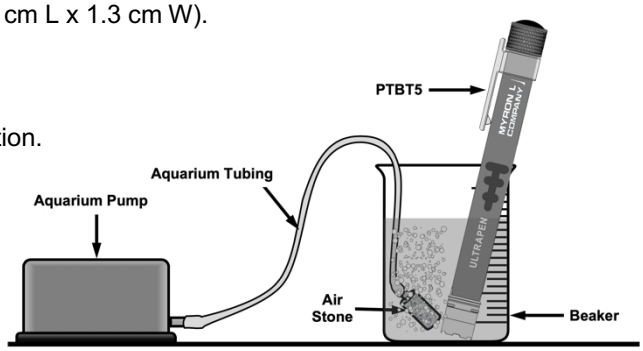
2. Remove the protective / hydration cap from the DO sensor.

3. Dip the sensor in clean DI, RO, or purified water.

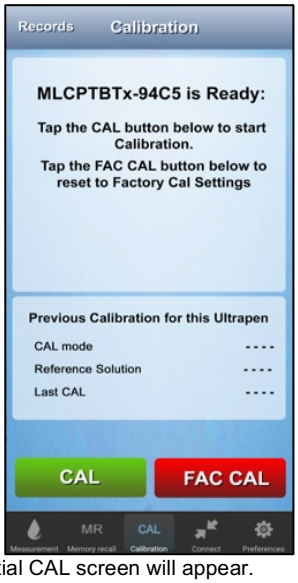
4 **CAREFULLY** blot the sensor membrane with a soft, clean, lint-free cloth or tissue to remove any water drops.

5. Submerge the sensor in the oxygenated water but away from the bubble stream.

6. Press and release the PEN BUTTON to turn the PTBT5 ON.

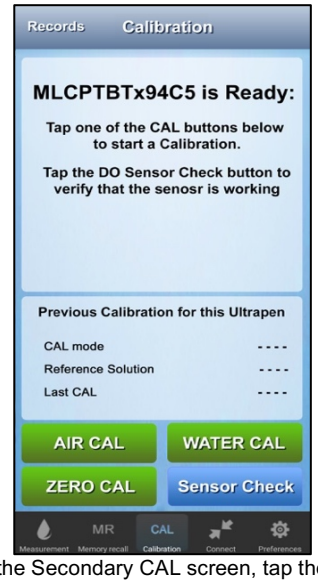


7. Tap the CAL button CAL Calibration in the Feature Navigation Bar.

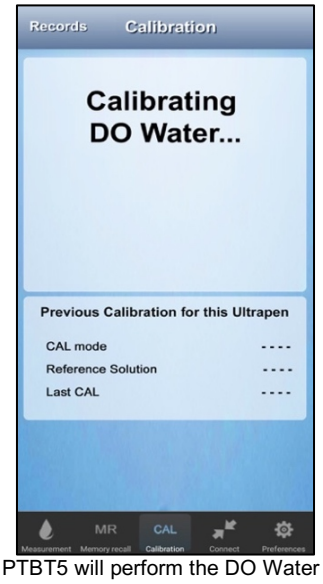


8. The Initial CAL screen will appear.

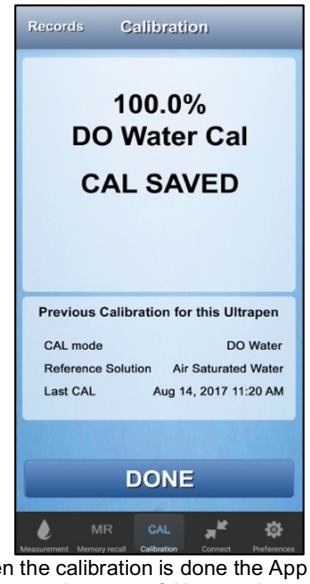
9. Tap the CAL button.



10. On the Secondary CAL screen, tap the WATER CAL button.



11. The PTBT5 will perform the DO Water calibration.



12. When the calibration is done the App displays the values and saves a CAL record.

NOTE: Verify the calibration by performing a Saturation measurement with the sensor immersed in the oxygenated water.

The result should be 100% ± 2%.

VI. TEMPERATURE CONTROLLED, FULL CALIBRATION PROCEDURE

A. GENERAL NOTES AND PREPARATION

- 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 PTBT5 at a specific temperature, if the target sample solution changes temperature more than 5°C, the PTBT5 should be recalibrated at the new temperature.
- It is important to make sure that the PTBT5 sensor is completely submerged during the calibration process.
- All glassware should be clean and dry before use.

B. EQUIPMENT AND SUPPLIES REQUIRED

- 1 ea. – Hot Plate with Magnetic Stirrer: Must be capable of sustaining temperature levels to ± 1°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 ± 1°C, preferably ± 0.25°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

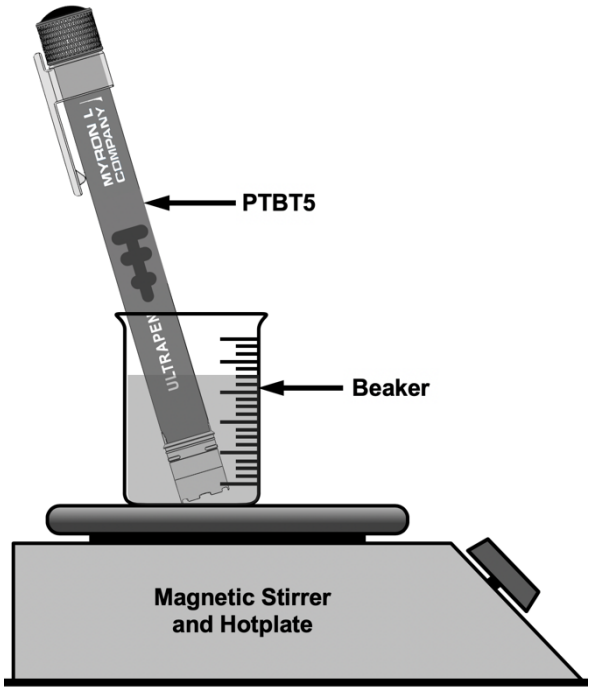
- 1 ea. – Glass Beaker (≈ 100 ml).
- 2 oz. (≈ 59 ml) – 0 ppm Dissolved Oxygen Calibration Solution (Myron L® Company P/N **DOSOL**).

For WATER Calibration

- 1 ea. – Glass Beaker (≈ 1L).
- 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).

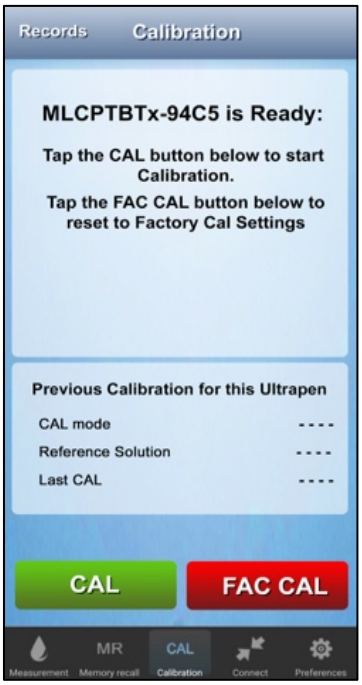
TEMPERATURE CONTROLLED ZERO CALIBRATION

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 ± 1°C of the target temperature before proceeding.
5. Remove the protective / hydration cap from the DO sensor.
6. Submerge the PTBT5 sensor in the rinse water and swirl for several seconds.
7. Remove the sensor from the rinse water and carefully blot the sensor membrane with a soft, clean cloth or tissue to remove any water drops.
8 Completely submerge the sensor in temperature controlled ZERO calibration solution.
9. Wait 5 minutes for the PTBT5 sensor to equilibrate.
10. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.



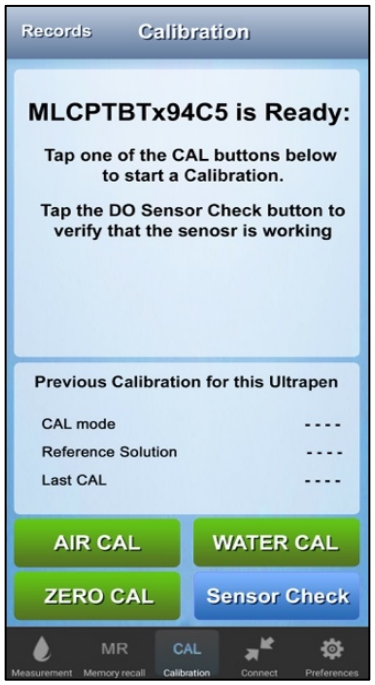
11. Tap the Calibration button 

in the Feature Navigation Bar.

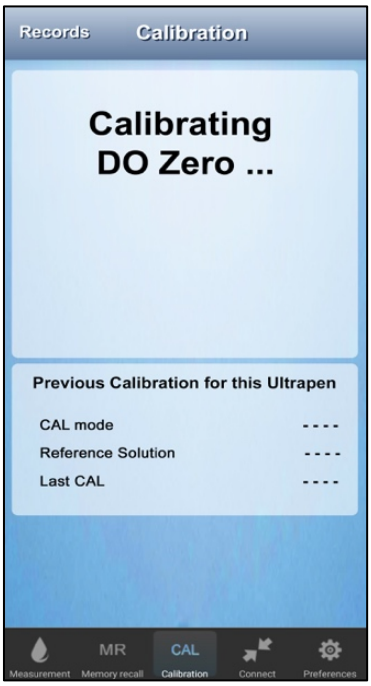


12. The Initial CAL screen will appear.

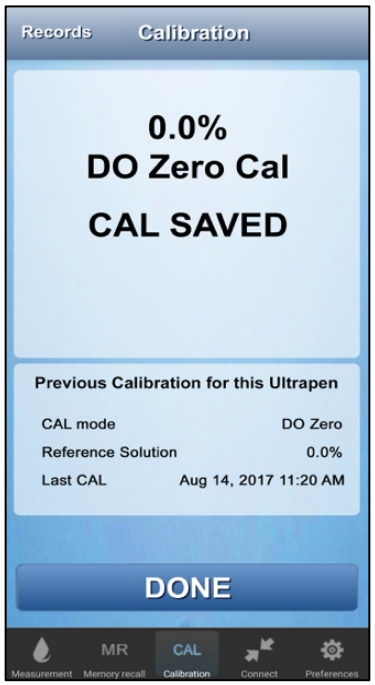
13. Tap the CAL button.



14. On the Secondary CAL screen, tap the ZERO CAL button.



15. The PTBT5 will perform the ZERO calibration.



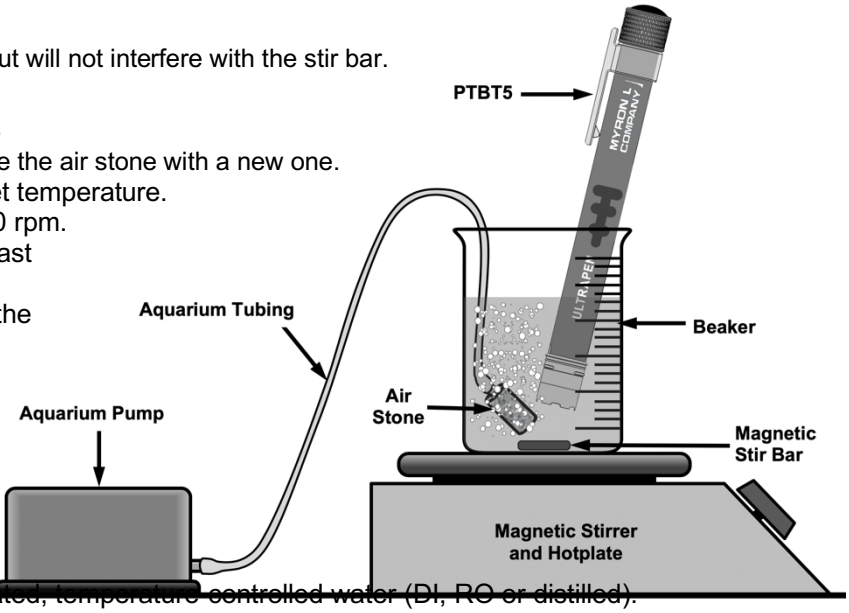
16. When the calibration is done the App displays the values and saves a calibration record.

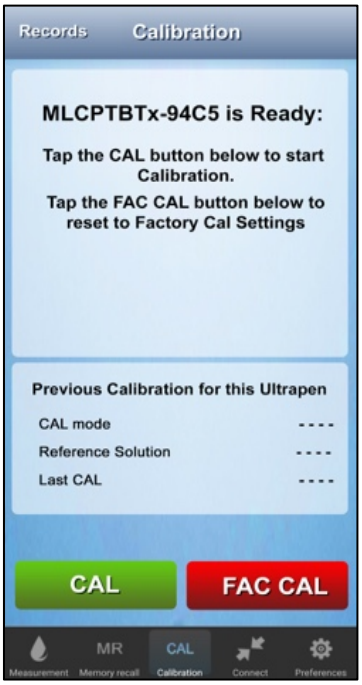
17. Remove the beaker of ZERO calibration solution from the hot plate.
18. Remove the DO sensor from the ZERO calibration solution.
19. Rinse PTBT5 in clean water (preferably DI, RO, or distilled water).
20. Fill the protective / hydration cap with enough clean water to soak the sponge inside and place it onto the DO sensor all the way to the cap stop.
21. Allow the DO sensor to stabilize to the water-saturated air inside the protective / hydration cap for 5-10 minutes.
22. Proceed to **TEMPERTURE CONTROLLED WATER CALIBRATION** (Air-Saturated Water).

D. TEMPERATURE CONTROLLED WATER CALIBRATION

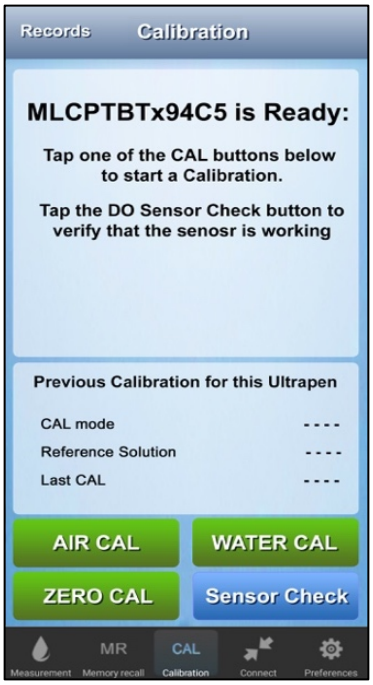
1. Pour 800 ml of DI, RO, or distilled water into the 1L beaker.
2. Place the beaker of water onto the hot plate.
3. Drop the magnetic stir bar into the beaker.
4. Place the air stone into the beaker of water.
   - Make sure it is at the bottom of the beaker but will not interfere with the stir bar.
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 ± 1°C of the target temperature before proceeding.
10. Rinse the PTBT5 sensor by swirling it in the rinse water for several seconds.
11. Carefully blot the sensor membrane with a soft, clean, lint-free cloth or tissue to remove any water drops.
12. Completely submerge the sensor in the aerated, temperature controlled water (DI, RO or distilled).
    - **DO NOT:** Let the sensor interfere with the stir bar motion.
    - **DO NOT:** Hold the sensor directly over the air stone or in the bubble stream.
13. Wait 5 minutes for the PTBT5 sensor to equilibrate.
14. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.
15. Tap the Calibration button 

in the Feature Navigation Bar.

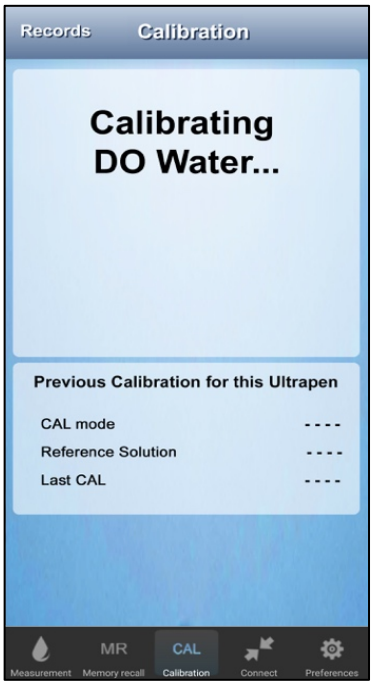




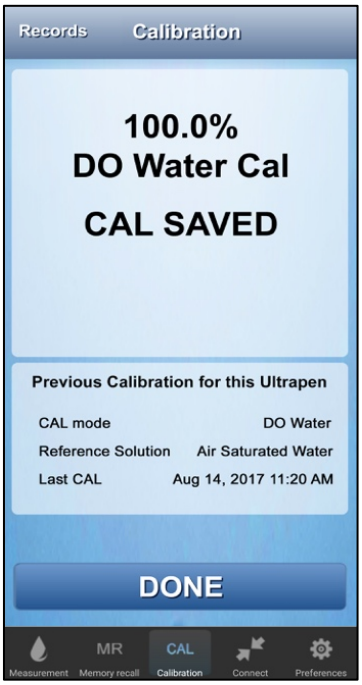
16. The Initial CAL screen will appear.
17. Tap the CAL button.



18. On the Secondary CAL screen, tap the WATER CAL button.



19. The PTBT5 will perform the WATER calibration.



20. When the calibration is done the App displays the values and saves a CAL record.

21. Fill the protective / hydration cap with enough clean water to soak the sponge inside and place it onto the DO sensor all the way to the Cap Stop.

VII. FACTORY CALIBRATION RESET

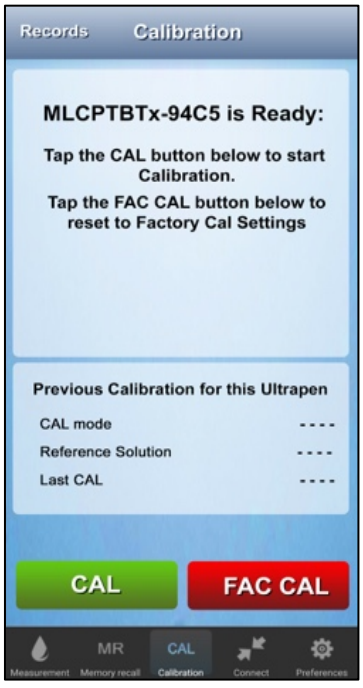
The PTBT5 can be returned to factory default calibration settings using the FAC CAL function. This will erase any stored calibration data and does **NOT** take the condition of the sensor or the sensor membrane into consideration.

To return your PTBT5 to factory calibration:

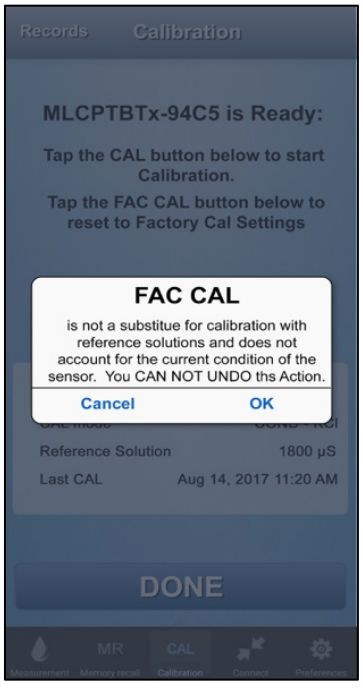
1. If the PTBT5 is OFF, press and release the PEN BUTTON to turn the PTBT5 ON and place it in Standby mode.

2. Tap the Calibration button 

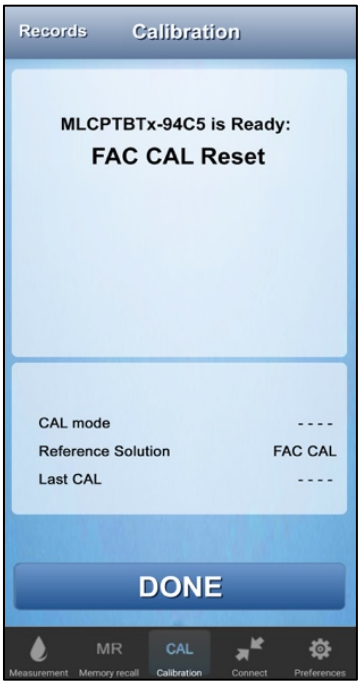
in the Feature Navigation Bar.



3. The Initial CAL screen will appear.
4. Tap the FAC CAL button.



5. Tap OK to reset the PTBT5 calibration.
6. Tap CANCEL to leave it unchanged.



7. Tap the DONE button to return to the Initial CAL screen.

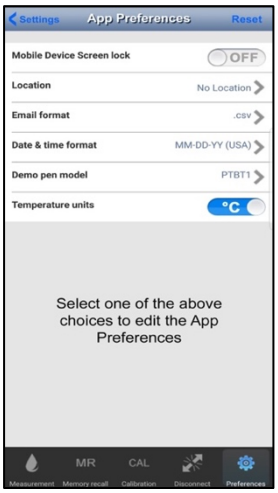
EXPORTING DATA FILES

SELECTING AN EXPORT FORMAT:

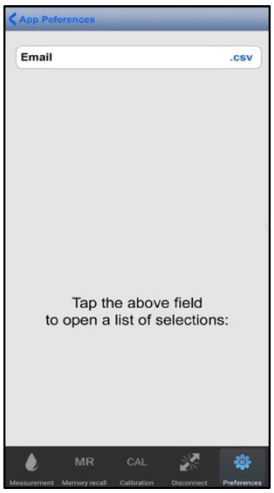
Data records can be exported from the PTBTX2 App as either .csv, .xls or .xlsx formatted files.

1. Tap the **PREFERENCES** 

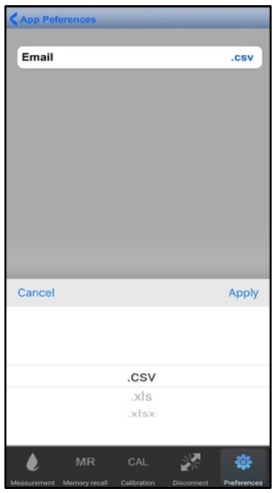
button in the Feature Navigation Bar.
2. Select App Preferences from the list that appears.



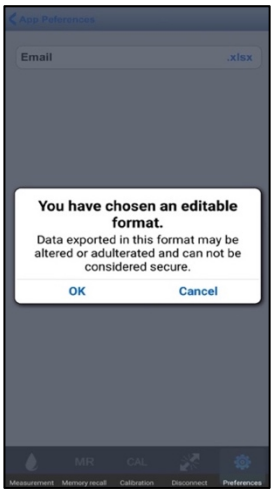
3. The main App Preferences screen will appear.
4. Tap the Email Format line.



5. The Email Format Edit screen will appear showing the current setting.
6. Tap anywhere inside the Email field.



7. A menu will appear with the email format options.
8. Make your selection and tap APPLY.

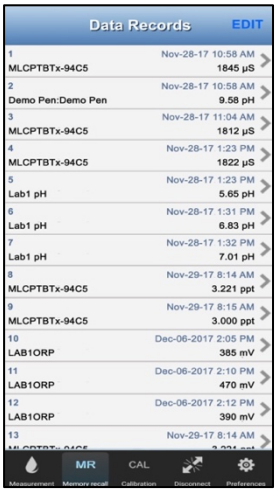


9. A Data Security warning message will appear.
10. Tap OK to accept the new Email Format.

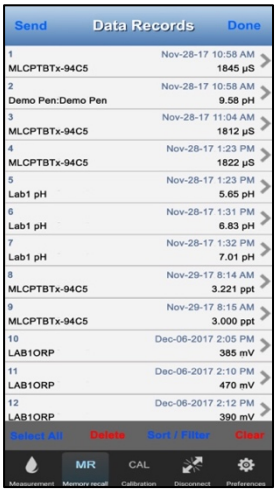
EXPORTING DATA FILES:

1. Tap the **MEMORY RECALL** 

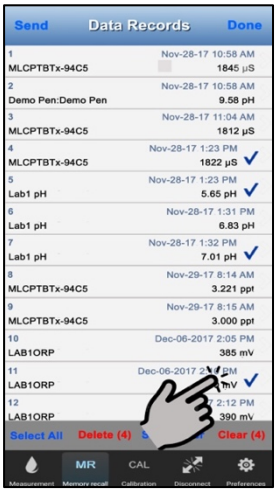
button in the Feature Navigation Bar.



2. Tap the **EDIT** button in the top right of the screen.



3. The Record List will switch to Edit mode.
4. If the records you want to select do not appear on the screen, swipe **UP** or **DOWN** until you find them.



5. Select individual records you wish to email by tapping each record.
6. The **DELETE** and **CLEAR** buttons will increment to show the number of records selected.

7. Tap the SELECT ALL button to select the entire list.
   a) This selects the entire list including records not currently shown on the screen.
8. Once you've selected the records, tap the SEND button in the upper left.
9. A standard email screen for your device will appear.
   - The selected records will be automatically added to the email as an attachment in the chosen format.
   - Add email addresses and a cover letter as you normally would when sending an email on your device type.

MAINTENANCE

NOTE: The PTBT5 MUST be recalibrated any time: the DO sensor is replaced; the DO membrane or the electrolyte is replaced, or; the zinc electrode is cleaned.

I. ROUTINE MAINTENANCE

1. After each use **ALWAYS** rinse the DO sensor with DI, RO, or distilled water and then carefully blot the sensor membrane with a soft, clean cloth or tissue to remove any water drops.
2. **ALWAYS** replace the protective / hydration cap on the DO sensor after each use.
3. Do not drop, throw, or otherwise strike the PTBT5. This voids the warranty.
4. Do not store the PTBT5 in a location where the ambient temperatures exceed its operating / storage temperature limits.
5. **DO NOT** remove the DO sensor membrane except to replace it with a new membrane or to replace / refill the electrolyte. Unnecessarily removing and replacing the same membrane can degrade the quality of the DO measurements.

II. STORAGE

The PTBT5 sensor is continuously oxidizing and reducing even while unused, causing white zinc oxide particles to build up inside the sensor. If you need to store the PTBT5, follow the instructions below.

Short-term storage (less than a month):
The sensor should be kept moist with the protective / hydration cap containing a sponge moistened with DI, RO or distilled water.

Long-term storage (a month or longer):
After setup, the zinc anode will be immersed in electrolyte solution and will be continuously oxidizing, even while unused. For long-term storage it is best to remove the electrolyte, rinse the sensor and membrane cap, and store it dry. You should also remove the battery from the PTBT5.
To prepare the sensor for long term storage:

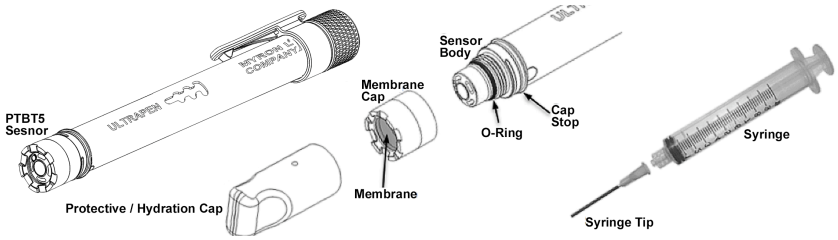
1. Remove the membrane cap by turning it counter-clockwise.
2. Rinse the membrane cap thoroughly with DI, RO, or distilled water, gently pat it dry with a soft lint-free cloth, and place it to the side.
   - BE CAREFUL not to harm the membrane.
3. Discard all the electrolyte solution from the sensor's electrolyte well.
4. Fill a syringe with DI, RO, or distilled water.
5. Holding the open sensor sideways or upside down over a sink insert the syringe tip into one of the four openings of the sensor body and thoroughly flush the electrolyte well with DI, RO or distilled water. Shake all the water out of the sensor, and repeat 3-4 times.
6. Shake all the water from the sensor, pat dry with a soft lint-free cloth, and allow the sensor to completely dry out.
7. Remove the sponge from the protective / hydration cap.
8. Rinse the protective / hydration cap with clean water then dry it with a soft lint-free cloth.
9. Once the sensor, membrane cap, and protective / hydration cap are thoroughly dry, reinstall the membrane cap and protective / hydration cap.
10. The foam from the protective / hydration cap should be stored separately, as any moisture in the sensor will promote oxidation.
11. Remove the battery from the PTBT5.
12. Store the PTBT5 in a cool dry location.

- **NOTE**: When you are ready to use the PTBT5 after long-term storage, follow the sensor setup instructions. Verify the membrane is not torn or otherwise damaged. If oxidation is present inside the sensor, clean the sensor prior to sensor setup (see MAINTENANCE, Section VI).

III. REPLACING / REFILLING THE DO SENSOR ELECTROLYTE SOLUTION

NOTES:

- When excess bubbles have formed inside the electrolyte well, you should refill the electrolyte solution. Minimizing air bubbles inside the electrolyte well will improve accuracy.
- Always avoid touching the membrane.
- When too many white zinc oxide particles have formed inside the electrolyte solution, or readings are not as they should be, replace the electrolyte solution.
- If you get erroneous readings after changing the membrane cap and performing the proper calibration, completely change the DO sensor electrolyte solution.



ELECTROLYTE REPLACEMENT PROCEDURE

1. Unscrew the membrane cap from the sensor body by turning in a counter-clockwise direction.
2. Discard all the electrolyte solution from the electrolyte well.
3. Assemble the syringe by installing the tip onto the body.
4. Fill the syringe with DO electrolyte solution.
5. Insert the syringe tip into one of the four openings of the sensor body.
6. Hold the PTBT5 vertically with the DO sensor at the top and the sensor opening facing up and fill the electrolyte well with DO electrolyte solution.
7. Discard all the electrolyte solution from the electrolyte well. This step rinses out the electrolyte well.
8. Insert the syringe tip into one of the four openings of the sensor body as far as it can go inside the electrolyte well.
9. Hold the PTBT5 vertically with the DO sensor at the top and the sensor opening facing up and slowly fill the electrolyte well with electrolyte. This also helps to minimize air bubbles.
   - Top off with more electrolyte after removing the syringe from the sensor body.
10. Rinse the inside of the membrane cap with electrolyte solution.
11. Pour some electrolyte inside the membrane cap to minimize air bubbles that may occur during assembly.
12. Hold the electrolyte filled sensor body in one hand and bring the electrolyte filled membrane cap closer with your other hand.
13. Tilt the membrane cap and place it onto the sensor body.
14. Carefully start turning the membrane cap clockwise until it tightens firmly to the sensor body.
    - While you are screwing the membrane cap on the sensor body, some electrolyte may escape.
15. Rinse any residual electrolyte from the outside of the sensor body with clean water (preferably DI, RO or distilled water).
16. Fill the protective / hydration cap with enough clean water to soak the sponge inside with clean water (preferably DI, RO, or distilled water).
17. Place the protective / hydration cap onto the DO sensor all the way to the cap stop.
18. Let the new sensor stabilize for 2-4 hours with the protective / hydration cap installed before using the PTBT5 again.

IV. DO MEMBRANE REPLACEMENT

If the sensor gives erroneous readings after calibration, replace the membrane cap.

NOTES: THE FOLLOWING CONDITIONS MAY CAUSE THE DO MEMBRANE TO REQUIRE MORE FREQUENT REPLACEMENT.

- Using the PTBT5 in extreme test conditions (e.g. high temperature) may degrade the membrane material.
- The membrane material can be clogged due to the white zinc oxide particles detaching from the zinc coil or contamination due to oils.
- If the membrane becomes ripped, dented, punctured, or otherwise damaged, replace it immediately.
- Always avoid touching the membrane.

MEMBRANE REPLACEMENT PROCEDURE

NOTE: Avoid touching the membrane surface at all times.

1. Remove the older membrane cap from the sensor body by turning it counter clockwise.
   - The sensor will lose some electrolyte.
2. Fill the syringe with electrolyte solution.
3. Replace the electrolyte that was lost during the removal of the membrane cap by:
   a. Holding the PTBT5 vertically with the DO sensor at the top and the sensor opening facing up.
   b. Inserting the syringe tip through one of the four openings in the sensor body as far as it can go inside the electrolyte well.
      - This helps to minimize air bubbles in the sensor electrolyte to improve accuracy.
   c. Slowly fill the electrolyte well.
      Top off with more electrolyte after removing the syringe from the sensor body. This also helps to minimize air bubbles.
4. Pour some electrolyte inside the membrane cap as well to minimize air bubbles.
5. Hold the electrolyte filled sensor body in one hand and bring the electrolyte filled membrane cap closer with your other hand.
6. Tilt the membrane cap and place it onto the sensor body.
7. Carefully start turning the membrane cap clockwise until it firmly tightens to the sensor body.
   - While you are screwing the membrane cap on the sensor body, some electrolyte may escape.
8. Rinse any residual electrolyte from the outside of the sensor body with clean water (preferrably DI, RO or distilled water).
9. Fill the protective / hydration cap with just enough water (DI, RO, or distilled water) to soak the sponge inside.
10. Place the protective / hydration cap onto the DO sensor all the way to the cap stop.
11. Let the new membrane cap activate for 2-4 hours with the protective / hydration cap installed before using the PTBT5 again.

NOTE: If the sensor O-ring is damaged or lost, replace it with the new O-ring that was included in the kit (Part # DOM5K).

V. CLEANING THE DO SENSOR

The PTBT5's DO sensor does not need frequent cleaning. Usually replacing the electrolyte solution and/or replacing the membrane cap rejuvenates the sensor.

NOTES: The sensor is continuously oxidizing and reducing even while unused.

- When too many white zinc oxide particles form on the zinc electrode, clean the sensor.
- Large amounts of zinc oxide particles can clog the DO membrane.
- **NOTE**: You may need to remove the sensor from the PTBT5 to see the zinc oxide particles inside the sensor.
  - Follow the instructions in Section VI below.
  - **ALWAYS** reinsert the DO Sensor into the PTBT5 body before proceeding with the cleaning operation.
- If it has been a long time since the PTBT5 was used, clean the zinc coil and replenish the sensor with fresh electrolyte.
- Always avoid touching the membrane or silver cathode, as oil from your fingers will compromise measurements.

CLEANING PROCEDURE

1. Remove the membrane cap by turning it counter-clockwise and place it to the side.
   - If you are going to reuse the membrane cap gently wash it with clean water (preferably DI, RO, or distilled water) to get rid of any particles that may have built up during use. **BE CAREFUL** not to damage the membrane.
2. Discard all the electrolyte solution from the electrolyte well.
3. Fill a clean syringe with white vinegar.
4. Hold the PTBT5 vertically with the sensor at the top.
5. Insert the syringe tip into one of the four openings of the sensor body as far as it can go inside the electrolyte well.
6. Inject vinegar into the electrolyte well until the sensor is filled to the top.
7. Leave the vinegar inside the electrolyte well for 5 minutes.
8. Discard the vinegar.
9. Clean the syringe thoroughly with clean water (preferrably DI, RO or distilled water).
10. Fill the syringe with DI, RO, or distilled water.

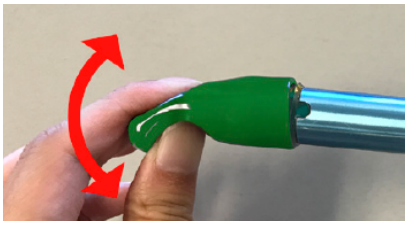
11. Holding the open sensor sideways or upside down over a sink insert the syringe tip into one of the four openings of the sensor body and thoroughly flush the electrolyte well with clean water (preferrably DI, RO or distilled water).
    - Repeat 3-4 times.
12. Fill a new syringe with DO electrolyte solution.
    - **DO NOT USE** the same syringe to refill the electrolyte well with electrolyte that you have previously used to clean the sensor.
13. Holding the open sensor sideways or upside down over a sink insert the syringe tip into one of the four openings of the sensor body and thoroughly flush the electrolyte well with electrolyte solution.
14. Refill the syringe with DO electrolyte solution.
15. Insert the syringe tip into one of the four openings of the sensor body as far as it can go inside the electrolyte well.
    - This helps to minimize air bubbles in the sensor electrolyte to improve accuracy.
16. Hold the PTBT5 vertically with the DO sensor at the top and the sensor opening facing up and slowly fill the electrolyte well with electrolyte. This also helps to minimize air bubbles.
    - Top off with more electrolyte after removing the syringe from the sensor body.
17. Pour some electrolyte inside the membrane cap as well to minimize air bubbles that may occur during assembly.
18. Hold the electrolyte filled sensor body in one hand and bring the electrolyte filled membrane cap closer with your other hand.
19. Tilt the membrane cap and place it onto the sensor body.
20. Carefully start turning the membrane cap clockwise until it tightens firmly to the sensor body.
    - While you are screwing the membrane cap on the sensor body, some electrolyte may escape.
21. Rinse any residual electrolyte from the outside of the sensor body with clean water (DI, RO or distilled).
22. Fill the protective / hydration cap with enough clean water to soak the sponge inside (preferably DI, RO, or distilled water).
23. Place the protective / hydration cap onto the DO sensor all the way to the cap stop.
24. Let the sensor stabilize for 2-4 hours with the protective / hydration cap installed before using the PTBT5 again.

VI. REPLACING OR REINSTALLING THE DO SENSOR

- Only remove/replace the DO sensor in a CLEAN and DRY environment.
- **ALWAYS** Replace the sensor dry and fill with electrolyte after installation.

TO REMOVE THE DO SENSOR

1. Remove the protective / hydration cap from your ULTRAPEN by wiggling it side to side while gently pulling it off the ULTRAPEN.
   - **CAUTION!** Do NOT twist the cap.

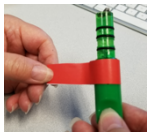
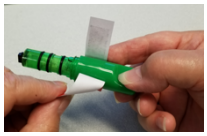


2. Remove the membrane cap assembly by turning it in a counter-clockwise direction.
3. Empty the electrolyte well of ALL electrolyte solution.
4. Rinse the sensor end and surrounding area with clean water (preferably DI, RO, or distilled water) and dry thoroughly.
5. Make sure your hands are clean and dry. Moisture will damage the electronics.
6. Unscrew the battery cap and remove the battery tray.
   - There is a pressure relief tube running from the battery compartment to the sensor compartment, which allows pressure equalization in the sensor area.
7. Grasp the sensor body and gently pull the sensor out of the PTBT5 body.
   - **CAUTION!** Make sure you avoid contaminating the PCBA and connector at the back of the sensor assembly or the inside of the PTBT5 body.

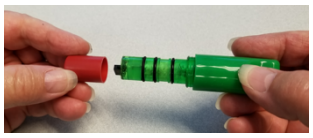
TO INSERT / REINSERT THE DO SENSOR

- **NOTES:**
  - The O-rings of the sensor are pre-greased for ease of insertion. Carefully remove any packaging from the shaft before installation and handle the sensor by the protective / hydration cap to avoid migration of the grease to the membrane.
  - **Skip steps 1 and 2 if reinstalling the current sensor.**

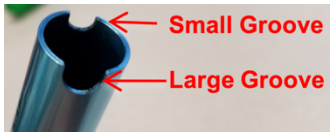
1. Holding the new sensor, remove the warning label from around the protective / hydration cap.

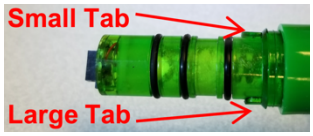



2. Remove the connector cap from the connector end of the sensor and inspect to ensure 3 O-rings are on the sensor body.



3. Align the large and small alignment tabs on the sensor with the large and small grooves on the ULTRAPEN.
   - It will only go in one way.
   - **WARNING!** Damage WILL occur to the connectors inside your ULTRAPEN if you attempt to install the sensor incorrectly.





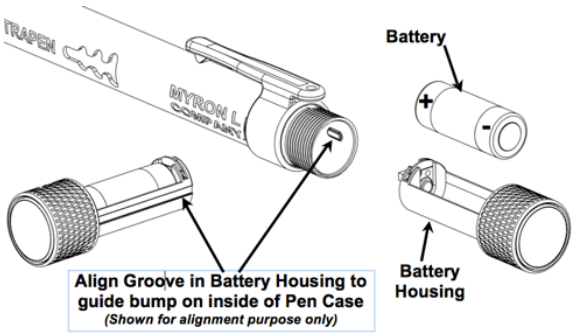
4. While maintaining alignment, gently apply pressure to insert the sensor into the ULTRAPEN.
   - You may need to apply a slight twisting motion to start each O-ring, ensuring all 3 O-rings on sensor slide evenly into ULTRAPEN.
   - **CAUTION!** A damaged O-ring will allow solution to leak into the instrument. Press sensor STRAIGHT into the ULTRAPEN until it is securely in place.

5. Replace the battery tray by aligning the guide bump in the side of the enclosure with the groove in the battery tray, then sliding the tray into the case until it is fully seated.
   - The groove in the case corresponds to a guide bump inside the enclosure that guides the tray back into the correct position.
6. Re-insert the battery cap into the PTBT5 body and tighten the cap in a clockwise direction. Do not over tighten.

VII. BATTERY REPLACEMENT

When PTBT5 charge level falls below 25% immediately replace the battery with a new N type battery.

1. In a **CLEAN, DRY** place unscrew the battery cap in a counter-clockwise motion.
2. Slide the cap and battery housing out of the PTBT5.
3. Remove the depleted battery from its housing.
4. Insert a new battery into the battery housing oriented with the negative end touching the spring.
5. Align the groove along the battery housing with the guide bump inside the PTBT5 case and slide the battery housing back in.
6. Screw the battery cap back on in a clockwise direction. Do not over tighten.



TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Remedy
Ultrapen stays in Standby mode (LED flashes once every 5 seconds) and does not react when an App button is tapped, such as the CAL or MEASURE button.	Timing error between the PTBTX2 App command string and the ULTRAPENX2.	1. Close the PTBTX2 App. 2. Make sure the Ultrapen is ON and in Standby mode. 3. Reopen the PTBTX2 App. 4. The App will open to the Measurement screen and automatically refresh the connection to the connected / paired Ultrapen. 5. Once the Connection is refreshed, a message will appear on the display stating the Ultrapen is ready. 6. Restart the original operation.
Ultrapen goes into Standby mode before completing an operation, such as a measurement or calibration point.	Timing error between the PTBTX2 App command string and the ULTRAPENX2.	
The Ultrapen cannot be paired to the App because it will not appear on the Connect / Disconnect screen, but device's Bluetooth is ON.	There is a connection error between the mobile device and the PTBT5.	1. Close the PTBTX2 App. 2. Make sure the Ultrapen is ON and in Standby mode. 3. Check the status of the mobile device's Bluetooth feature. • If it is OFF, turn it ON. • If it is ON, turn it OFF, then back ON. 4. Wait for 10 seconds while the mobile device rescans for nearby Bluetooth devices. 5. Reopen the PTBTX2 App. 6. Tap the CONNECT / DISCONNECT button. 7. Swipe down on the Ultrapen list. 8. The Ultrapen should appear on the list.
	The battery of the mobile device is low.	1. Plug the mobile device into a charger. 2. Retry the connection process.
	The battery of the PTBT5 is low.	1. Replace the battery in the PTBT5. 2. Retry the connection process.
App thinks the Ultrapen is "offline" but the Ultrapen is awake and operating (LED is flashing ON / OFF once every 5 seconds.)	Communication error between the App and the Ultrapen.	1. Close the PTBTX2 App. 2. Wait for the Ultrapen to complete its operation and go into Standby mode (LED Ffminutes depending on which operation it was performing. 3. Wait an additional 2 minutes for the Ultrapen's Standby mode to expire and for it to turn OFF. 4. Turn the Ultrapen ON and place it in Standby mode. 5. Reopen the App. 6. The App will open to the Measurement screen and automatically refresh the connection to the connected / caired Ultrapen. 7. Once the connection is refreshed, a message will appear on the display stating the Ultrapen is ready. 8. Restart the original operation.
I'm trying to add a GPS location but the App keeps showing me the name of an already existing location.	You are too close to the already programmed location.	1. Move the GPS Services switch on the LOCATION settings screen to OFF. 2. Add the new location as a non-GPS location.
I'm trying to select a non-GPS Location but it won't work.	The App's GPS Services switch on the LOCATION settings screen is set to ON.	Move the GPS Services switch on the LOCATION settings screen to OFF.
Measurement readings are not as expected.	Sensor was not properly submerged in solution during measurement.	Repeat measurement and ensure sensor is submerged in solution prior to LED flashing quickly.
	Sensor needs cleaning.	Clean sensor (see MAINTENANCE section).
	Membrane is damaged.	Replace membrane (see MAINTENANCE section).
	Sensor is damaged.	If cleaning sensor does not correct error, replace sensor (see MAINTENANCE section).
Measurement screen displays "Out of Range".	Possible sensor damage.	1. Perform a measurement on a known, good sample of prepared reference solution. 2. If the result is still the "Out of Range" message, replace the sensor (see MAINTENANCE section).
Error message during calibration.	Sensor was not properly submerged in solution during calibration.	Repeat calibration and ensure sensor is submerged in solution prior to LED flashing quickly.
	Improper calibration solution.	Verify you are using the proper calibration solution.
	Sensor needs cleaning.	Clean sensor (see MAINTENANCE section).
	Membrane is damaged.	Replace membrane cap assembly (see MAINTENANCE section).
	Sensor is damaged.	If cleaning sensor does not correct error, replace sensor (see MAINTENANCE section).

SPECIFICATIONS

	DO Concentration	DO Saturation	Temperature
Ranges	0-20 ppm	0-200%	0-71˚C / 32-160˚F
Accuracy[1]	±0.2 ppm or ±2% of the reading, whichever is greater (up to 40˚C)	0.0% to ≤ 100.0%: ± 20 counts; >100%: ± 2% of the reading.	± 0.1°C
Resolution	0.01 ppm	0.1%	0.1°C/F
Altitude Adjustment: -2,000 ft. to 15,000 ft. in increments of 100 ft.			
Salinity Adjustment: 0 - 50 ppt in increments of 1 ppt			
Time to Reading Stabilization: 10 - 180 seconds			
Water Saturated **AIR** or Air Saturated **WATER** or **ZERO** DO *(with DOSOL Calibration Solution)*			
Operating / Storage Temperature: 0-55ºC / 32-131ºF			
Power Consumption: Active Mode: 30 - 140 mA, Standby Mode: 2 µA			
Temperature Compensation for Membrane Permeability: Automatic			
Physical Dimensions: 17.15 cm L x 1.59 cm D or 6.75 in. L x .625 in. D			
Weight: 54 g or 1.94 oz.			
Case Material: Anodized Aircraft Aluminum with Protective Coating			
Battery Type: N type, Alkaline 1.5 V			
Water Resistance: IP67 and NEMA 6			
Mobile Device System Requirements: The PTBTX2 App requires a mobile device running either iOS 10.0 or later; or Android 7.0 or later.			
EN61236-1: 2006 - Annex A: 2008; Electrostatic discharge to case of instrument may cause PTBT5 to spontaneously power ON. In this case, the PTBT5 will power OFF after several seconds. CE			
FCC ID: T7VPAN17: The Bluetooth transceiver device meets the requirements for modular transmitter approval as detailed in FCC Public Notice DA00-1407.			
Canada (IC), license: IC: 216Q-PAN17: The Bluetooth transceiver device meets the requirements for modular transmitter approval as detailed in RSS-GEN			
⚠ **WARNING!** These products can expose you to chemicals including Di(2-ethylhexyl)phthalate (DEHP), which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov			
[1] Accuracy after Temperature Controlled, Full Calibration.			

ACCESSORIES

STANDARD SOLUTIONS:
The ULTRAPENX2™ PTBT5 can be calibrated in Air or Water, or with 0 ppm Dissolved Oxygen Solution.

Order Models:

- **DOSOL** 0 ppm Dissolved Oxygen Calibration Solution.

REPLACEMENT AND CONSUMABLE ITEMS:
The ULTRAPENX2 ™ PTBT5 features user replaceable sensor membranes and electrolyte.

Order Models:

- **DOM5** DO Membrane Caps 5pk.
- **DOSRE** DO Sensor Replenishment Electrolyte 2 oz.
- **DORS** DO Replenishment Syringe w/Tip.
- **DOM5K** DO Membrane Caps 5pk, Replenishment Electrolyte 2 oz., Syringe w/Tip Kit, and Instruction Sheet.
- **RPT5** Full PTBT5 Do Sensor Assembly with 3 DO Membrane Caps (does not include electrolyte solution).

MYRON L® WARRANTY
The PTBT5, excluding the sensor and battery, has a one (1) year limited warranty. The DO sensor has a 6-month limited warranty.

MYRON L® COMPANY
2450 Impala Drive
Carlsbad, CA 92010-7226
USA

Tel: +1-760-438-2021
Fax: +1-760-931-9189

E-Mail: info@myronl.com
techquestions@myronl.com

www.myronl.com
Designed, Engineered and Assembled in the USA.