Pyxis®

SP-710B Handheld Fluorometer

User Manual

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SP-710B Water Multimeter
User Manual

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Rev. 3.02

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Warranty Information

Confidentiality

The information contained in this manual may be confidential and proprietary and is the property of Pyxis Lab, Inc. Information disclosed herein shall not be used to manufacture, construct, or otherwise reproduce the goods described. Information disclosed herein shall not be disclosed to others or made public in any manner without the express written consent of Pyxis Lab, Inc.

Standard Limited Warranty

Pyxis Lab warrants its products for defects in materials and workmanship. Pyxis Lab will, at its option, repair or replace instrument components that prove to be defective with new or remanufactured components (i.e., equivalent to new). The warranty set forth is exclusive and no other warranty, whether written or oral, is expressed or implied.

Warranty Term

The Pyxis warranty term is thirteen (13) months ex-works. In no event shall the standard limited warranty coverage extend beyond thirteen (13) months from original shipment date.

Warranty Service

Damaged or dysfunctional instruments may be returned to Pyxis for repair or replacement. In some instances, replacement instruments may be available for short duration loan or lease.

Pyxis warrants that any labor services provided shall conform to the reasonable standards of technical competency and performance effective at the time of delivery. All service interventions are to be reviewed and authorized as correct and complete at the completion of the service by a customer representative, or designate. Pyxis warrants these services for 30 days after the authorization and will correct any qualifying deficiency in labor provided that the labor service deficiency is exactly related to the originating event. No other remedy, other than the provision of labor services, may be applicable.

Repair components (parts and materials), but not consumables, provided during a repair, or purchased individually, are warranted for 90 days ex-works for materials and workmanship. In no event will the incorporation of a warranted repair component into an instrument extend the whole instrument's warranty beyond its original term.

Warranty Shipping

A Repair Authorization (RA) Number must be obtained from Pyxis Technical Support before any product can be returned to the factory. Pyxis will pay freight charges to ship replacement or repaired products to the customer. The customer shall pay freight charges for returning products to Pyxis. Any product returned to the factory without an RA number will be returned to the customer. To receive an RMA you can generate a request on our website at https://pyxis-lab.com/request-tech-support/.

Pyxis Technical Support

Contact Pyxis Technical Support at +1 (866) 203-8397, service@pyxis-lab.com, or by filling out a request for support at https://pyxis-lab.com/request-tech-support/.

1 Introduction

The Pyxis SP-710B is a handheld multimeter that measures five key parameters as well as colorimetric Free and Total Chlorine. It is a cuvette-less device. Less than 5 mL water sample is needed to fill the two sample cells for the measurement.

- PTSA (Pyrene Tetrasulfonic acid Tetra Sodium)
- Conductivity
- Fluorescein
- Temperature
- pH
- ORP

1.1 Main Features

The SP-710B includes the following features:

- Breakthrough technology combining PTSA/Fluorescein with conductivity and pH/ORP in a single rugged meter
- PTSA measurement uses custom signal processing algorithms to compensate for sample color and turbidity interference
- Wireless and independent use of pH/ORP module
- Modular pH/ORP module design with extra-large junction capacity providing increased service life
- Replaceable battery in pH/ORP module
- Easy replacement of the pH/ORP module without the need to disassemble the main module
- Customization and firmware upgrades via wireless connection to **uPyxis®** Mobile/Desktop App
- Long battery life with 10,000+ readings
- Self-diagnosis during calibrations

2 Specifications

Table 1. SP-710B Specifications

Item	Specification*
Part Number (P/N)	50352
PTSA Range	0–300 ppb
PTSA Precision	±1% or ±1 ppb
Conductivity Range †	1–15000 µS/cm
Conductivity Resolution	±1% or ±1 µS/cm
Fluorescein Range	0–600 ppb
Fluorescein Resolution	±0.2 ppb (Range: 0–50 ppb) or ±1%
Temperature Range	32–160 °F (0–71 °C)
Temperature Resolution	±0.2 °F (±0.1 °C)
pH Range †	0–14
pH Resolution	±0.01
ORP Range	±1500 mV
ORP Resolution	±1 mV
pH/ORP Module ‡	Wireless and replaceable
Typical Main Module Sensor Life	5 years
Typical pH/ORP Module Sensor Life	1 year
Display	Color LCD, visible under direct sunlight
Main Module Power Supply	4 AA alkaline batteries
pH/ORP Module Power Supply	1 ER14250 lithium thionyl chloride battery
Typical Battery Life	10,000 readings
Dimension (L×W×H)	8.19×3.15×1.77 inch (208×80×45 mm)
Weight§	1.15 lbs (520 g)
Operational Temperature	32–104 °F (0–40 °C)
Storage Temperature	-4–140 °F (-10–50 °C)
Enclosure Rating	IP67
Regulation	CE

* With Pyxis's continuous improvement policy, these specifications are subject to change without notice.
† With Automatic Temperature Compensation (ATC)
‡ Replacement recommended every 9–12 months
§ Batteries excluded

3 Unpacking Instrument

Remove the instrument and accessories from the shipping container and inspect each item for any damage that may have occurred during shipment. It is possible that the pH/ORP cell seal can open in shipment, which may result in pH/ORP Storage Solution on the outer shell of the device. This will not cause any damage. Simply wipe down the device with wet cloth and towel dry. Verify that all items listed on the packing slip are included. If any items are missing or damaged, please contact Pyxis Customer Service at service@pyxis-lab.com. During shipping and storage after production, a sponge wetted with the pH/ORP Storage Solution is placed in the pH/ORP cell seal. This sponge may be removed and discarded. Some pH/ORP Storage Solution may dry and form white crystals in the surrounding areas of the sample cells. Please rinse the sample cells with a water sample before use.

3.1 Standard Accessories

- Quick-Start Guide
- Four (4) AA alkaline batteries
- Pyxis pH/ORP Storage Solution — 70 mL P/N: 63900
- Bluetooth/USB Adapter for Desktop P/N: MA-NEB
- User Manual available online at https://pyxis-lab.com/support/

3.2 Optional Accessories

The following optional accessories can be ordered from Pyxis Customer Service (order@pyxis-lab.com) or Pyxis E-Store at https://pyxis-lab.com/shop/.

Table 2.

Accessory Name	Part Number (P/N)
Replacement pH/ORP Module — Bluetooth	50315
Battery for pH/ORP Module	50778
Pyxis pH/ORP Storage Solution — 70 mL	63900
Pyxis Carrying Case for SP-710B	50725
Pyxis 100 ppb PTSA + 1000 µS/cm (KCl) Combined Standard — 500 mL	21004
Pyxis 200 mV ORP Calibration Standard — 500 mL	57020
Pyxis pH 4-7-10 Calibration Combination Kit — 500 mL ea	57007
Pyxis 1000 µS/cm Conductivity Calibration Standard — 500 mL	57008
Pyxis 50 ppb Fluorescein Calibration Standard — 500 mL	FLUO-50
Pyxis 250 ppb Fluorescein Calibration Standard — 500 mL	FLUO-250
Pyxis 500 ppb Fluorescein Calibration Standard — 500 mL	FLUO-500
Pyxis Handheld Cleaning Kit	SER-02

4 Installation

4.1 Main Module Battery Installation

The main module of the SP-710B is powered by four AA alkaline batteries. Typical battery life is 10,000 measurements or 6 months. When the battery capacity is critically low, the SP-710B displays a ”LOW BATTERY” warning for five seconds and then automatically turns off.

The SP-710B does not turn itself on automatically after the new battery installation. To turn on the SP-710B after new battery installation, press the **OK** key momentarily and release.

The SP-710B has a calendar timer. To prevent the calendar from being reset to the default date and time (01/01/1970, 00:00:00), install the four new batteries within four minutes after the old batteries are removed from the battery compartment. The SP-710B date and time is synchronized automatically when connected with **uPyxis®** Mobile or Desktop App.

The SP-710B battery compartment, shown in Figure 1, is on the back side of the instrument. Batteries are held in place by a cover secured with two Phillips-head screws.

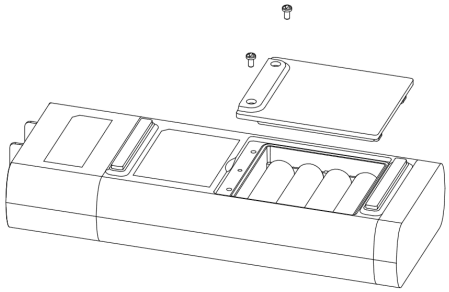

Figure 1. The SP-710B battery compartment

Use the following procedure to install new batteries:

1. Remove the battery compartment cover by loosening the two screws.
2. Remove the old batteries and dispose of them properly.
3. Following the positive and negative terminal signs in the compartment bottom, snap four new AA alkaline batteries firmly into the battery holder.
4. Replace the battery compartment cover and ensure that the sealing O-ring is lying flat on the battery holder.
5. Fasten the two screws.

∗**NOTE**∗ *Failure to properly seat the O-ring may result in water damage to the SP-710B.*

4.2 pH/ORP Module Battery Installation

The new pH/ORP module has a lithium thionyl chloride battery (3.7V-ER14250) installed. When the battery capacity is critically low and the main module displays a LOW BATTERY warning, replace the ER14250 battery. Use the following procedure to install a new battery:

1. Unsnap the pH/ORP module from the top of the main module.
2. Remove the battery compartment cover by using a coin or flat-head screwdriver to turn the cover counterclockwise.
3. Remove the old battery and dispose of it properly.
4. Following the orientation of the battery as shown in Figure 2, put a new ER14250 battery into the compartment.
5. Fasten the compartment cover by turning it clockwise.
6. Snap the pH/ORP module back atop the main module.

∗**NOTE**∗ *Failure to properly fasten the cover may result in battery short-circuit and damage.*

Figure 2. Proper orientation of the ER14250 battery

5 Instrument Overview

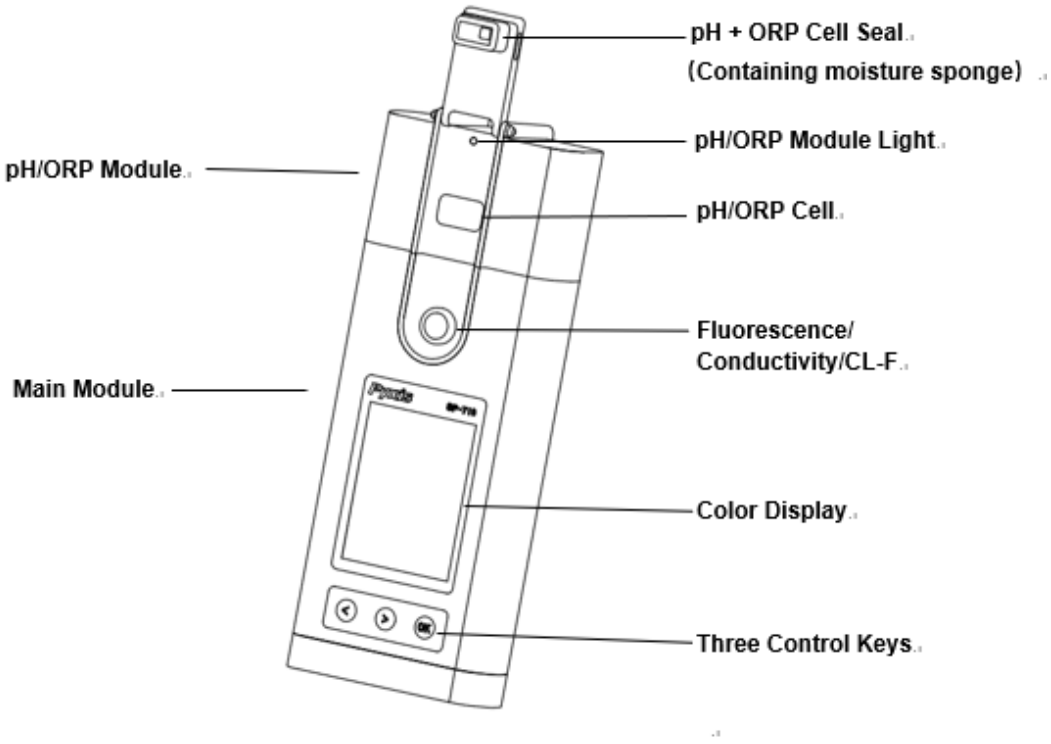

Figure 3.

5.1 pH/ORP Cell Dual-Function Seal

The SP-710B pH/ORP rubber seal serves two purposes:

1. The seal contains a magnet which when opened to flush position will power on the pH/ORP module.
2. When the SP-710B is in storage, the seal maintains a moist environment for the electrodes.

For vigorous field use, it is recommended to utilize a rubber-band to secure the pH/ORP Cell Dual-Function Seal to prevent loss of pH/ORP Storage Solution. The sponge soaked with the pH/ORP Storage Solution in the pH/ORP Cell Dual-Function Seal helps prolong the life of the pH/ORP module. It may be discarded if desired, but pH/ORP Storage Solution must be maintained in the unit cell at all times during non-use. Please fill the pH/ORP cell with 1 mL of Pyxis pH/ORP Storage Solution (P/N: 63900) at all times when not using the pH/ORP cell.

Figure 4. pH/ORP Cell Dual-Function Seal in the open position

5.2 Control Keys

The SP-710B has three control keys, as shown in Figure 3. The left (<), right (>), and ok (OK) keys are used to launch actions indicated on the LCD display directly above the keys. The labels above the keys indicate the function associated with each key and functions can be changed in different operation modes.

∗**NOTE**∗ *The LCD display is not a touch-enabled device.*

5.3 Main Module On/Off

To turn on the SP-710B: Press OK momentarily and release.

To turn off the SP-710B: Press and hold OK for about three seconds. Release OK when the LCD display turns off. The SP-710B turns itself off after 30 seconds without user interaction detected. This is done to conserve battery life.

> ∗**NOTE**∗ *This auto-time off setting may be customized by the user as desired through the* ***uPyxis®*** *Mobile or Desktop App.*

5.4 pH/ORP Module On/Off

The module is turned on by rotating the pH/ORP cell seal to touch the front face of the module as seen in Figure 5. A sealed magnet within the rubber seal will trigger the module power circuit. The pH/ORP module will turn itself off when either commanded by the main module or automatically based on the default or customized idle time limit setting. The purpose for this design is to extend battery life.

If pH/ORP measurement is not needed, the module does not need to be turned on.

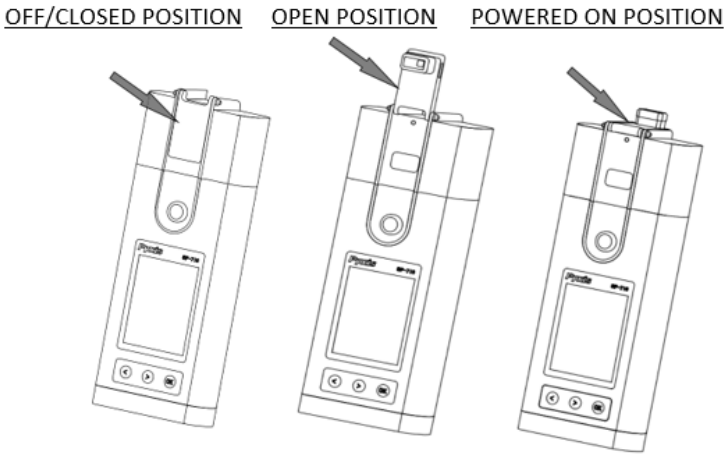

Figure 5.

6 Measurement

6.1 PTSA and Conductivity Measurement

6.1.1 Measurement Procedure

When powered on, the SP-710B will default to the PTSA and conductivity measurement mode. A water sample should be transferred to the main module sample cell using a disposable pipette, or the cell can be filled slowly from a sample bottle.

> ∗**NOTE**∗ *Special care should be taken when pouring the sample into the cell to avoid air bubble entrainment, which can interfere with reading accuracy.*

Before beginning a measurement, use the sample water to rinse the main module cell at least three times. Allow 5–10 seconds for the SP-710B to stabilize. The values will be displayed in **white with a blue background** if a stable value is reached (Figure 6). For a sample with conductivity in the range of 100 to 6000 µS/cm, the measured value should be stabilized in the range of 98–102 to 5940–6060 µS/cm, respectively. For a sample containing 100 ppb PTSA, the measured PTSA should be stabilized within the range of 98–102 ppb.

> ∗**NOTE**∗ *The time required to reach a stable reading may be slightly longer if the water sample temperature is significantly different than the environmental temperature at which the SP-710B had been equilibrated (stored).*

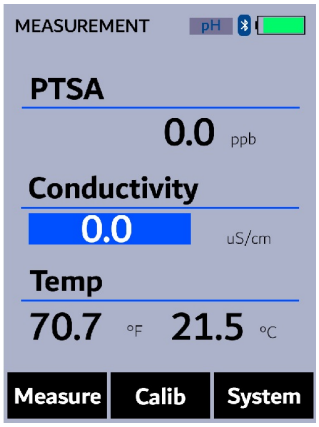

Figure 6.

6.1.2 Temperature Compensation

The displayed conductivity value is automatically compensated to the nominal value at the reference temperature 25 °C using the sample temperature measured. The commonly used linear correction equation is used:

$$Conductivity\ at\ 25\ °C = \frac{Conductivity\ at\ T_{measured}}{1 + 0.02(T_{measured} - 25)} \quad (1)$$

where $T_{measured}$ is the sample temperature in °C.

6.1.3 High Color and Turbidity Warning

The SP-710B has extra channels to measure sample turbidity and color to automatically compensate sample color and turbidity interference. If sample turbidity and color values determined are too high, a PTSA measurement warning will be displayed. In such a case, the user should filter the sample for PTSA measurement.

6.2 Fluorescein Measurement

Follow the steps below to measure Fluorescein:

1. Rinse the main module sample cell three times with the sample. Fill the sample cell with the sample.
2. Power on the SP-710B by pressing (OK). Allow 5–10 seconds for the SP-710B to stabilize.
3. Press **Measure** ((<)) as needed to highlight **Fluorescein** in the selection menu.
4. Press (OK) to launch the **FLUORESCEIN MEASUREMENT** screen (Figure 7).

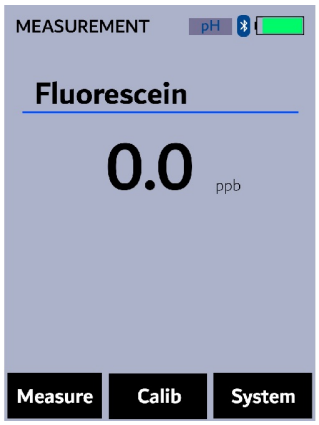

Figure 7.

6.3 Temperature Measurement

The SP-710B has two platinum RTDs located in the main module sample cell and the pH/ORP sample cell. The temperature sensors are individually calibrated in the factory and do not need to be calibrated during use. The temperature values measured are used in the conductivity temperature compensation and in converting the measured cell potential to the pH value at the sample temperature.

6.4 pH/ORP Measurement

6.4.1 Measurement Procedure

Follow the steps below to measure pH and ORP:

1. Rotate the pH/ORP cell seal to touch the front face of the module as seen in Figure 5. This is to power on the module. The indicator light of the module will be green and flashing when powered on. After the module is turned on, the seal can be positioned anywhere desired.

   ∗**NOTE**∗ *If the module battery capacity is low, the indicator light will flash red.*

2. Press **Measure** (<) as needed to highlight **pH/ORP** in the selection menu.

3. Press OK to launch the **pH/ORP MEASUREMENT** screen.

4. The main module of the SP-710B will automatically connect after the pH/ORP module has been powered up.

5. Rinse the pH/ORP sample cell three times with the sample to be tested. Fill the sample cell with the sample.

6. The pH and ORP values will be updated every two seconds on the SP-710B main module display. The values will be displayed in white with a blue background once a stable value is reached (Figure 8).

   ∗**NOTE**∗ *If the pH/ORP module powers off or was not powered on to begin with (see step 1) an instruction message will be promoted on the screen showing how to turn on the pH/ORP module (Figure 9).*

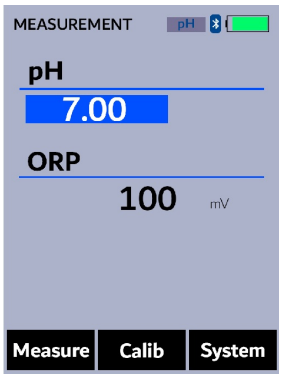

Figure 8.

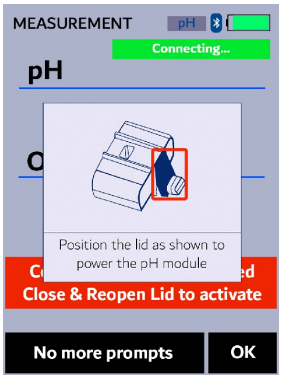

Figure 9.

6.4.2 Erroneous Values

An erroneous pH value could be obtained if the module has been stored dry without the protection of pH/ORP Storage Solution for a long period of time. In this case, please fill the module cell with pH/ORP Storage Solution to wet the electrode and allow it to soak for 30 minutes before use. If the pH/ORP Storage Solution is not available, please use the sample water to hydrate the electrode for at least 30 minutes.

6.4.3 pH Measurement Principle

The SP-710B pH/ORP module uses the standard electrochemical cell for the pH measurement. The cell consists of a glass electrode and an Ag/AgCl reference electrode. Potassium chloride (KCl) electrolyte filling gel is sealed in the Ag/AgCl electrode. The amount of reference electrolyte in the pH/ORP module is significantly larger than that used in a common laboratory pH electrode. This reduces the chance of the filling solution being diluted or contaminated and increases the electrode life.

The pH value is calculated from the measured cell potential (EMF in mV):

$$pH = \frac{EMF}{S(T) + pH_o} \tag{2}$$

$$S(T) = 0.1986(T + 273.15) \tag{3}$$

$S(T)$ in the above equation is the calibration slope, where T is temperature in degrees Celsius. $S(T)$ has a theoretical value of 59.17 mV at 25 °C. pH_o is the calibration intercept. The calibration slope, $S(T)$, at the nominal temperature 25 °C and the intercept, pH_o, are determined in the two-point or three-point calibration procedure. pH_o is determined as well in the singe-point pH 7.00 calibration. The temperature value measured by the pH/ORP module is used in the above equation to calculate the pH value at the sample temperature.

> ∗**NOTE**∗ *The temperature compensation involved in the pH value calculation is quite different from that in the conductivity measurement. The temperature-compensated conductivity value is a would-be value at the reference temperature 25 °C, while the pH value displayed by the SP-710B is the true pH value at the sample temperature.*

6.4.4 ORP Measurement Principle

The SP-710B measures the sample ORP with the platinum electrode and the Ag/AgCl reference electrode in the pH/ORP cell. The pH measurement and the ORP measurement share the same reference electrode. **Reporting an ORP value without specifying the reference scale has no meaning**. The value displayed by the SP-710B depends on the ORP value of the ORP standard used in the calibration. If the ORP value of the standard is referenced to the Standard Hydrogen Electrode (SHE), the ORP value reported by the SP-710B is SHE-based, i.e., in the unit of Eh. If the ORP value of the standard is referenced to the Ag/AgCl (3M KCl) electrode, the ORP value reported by the SP-710B is referenced to the same, commonly noted as (Ag/AgCl, 3M KCl).

The ORP electrode is calibrated using the Zobell's standard using the value of 221 mV at 25 °C before shipping. **The default ORP scale of the SP-710B before a user calibration is the Ag/AgCl (3M KCl)**. If the SP-710B is exposed to an extremely high (> +600 mV) or extremely low (< -200 mV) ORP sample, rinsing the pH/ORP cell excessively when switching to measure a lower or higher redox buffer capacity sample is necessary. The dissolved oxygen in the sample can contribute to the ORP value measured. To measure a sample that has not be equilibrated with the ambient air, a slow and small upward drifting to more positive ORP value is normal. For a typical cooling water sample treated with oxidizing biocides, a ±20 mV accuracy and ±10 mV precision can be expected.

7 Calibration

7.1 PTSA Calibration (Two-Point with Zero)

1. Rinse the main module sample cell three times with DI water. Fill the sample cell with DI water.

   ∗**NOTE**∗ *In emergency, "non-PTSA" water, such as city water, may be used, but re-calibrate using DI water for the zero step as soon as it is available.*

2. Power on the SP-710B by pressing (OK). Allow 5–10 seconds for the SP-710B to stabilize.
3. The unit is actively reading and displaying both PTSA and Conductivity. The values will be very low if DI water is used; conductivity value is not critical but PTSA value should be near zero. A low non-zero value (e.g. 0.2 or 0.4, etc.) is not problematic.
4. Press **Calib** (>) as needed to highlight **PTSA** in the selection menu.
5. Press (OK) to launch the **PTSA CALIBRATION** screen (Figure 10).
6. Press **Zero** (<) to start the zero (blank) calibration.
7. If the calibration succeeds, a checkmark (✔) and instructions for the slope calibration will appear (Figure 11).
8. Rinse the main module sample cell three times with the desired PTSA standard. Fill the sample cell with the desired PTSA standard.
9. Press **Cycle** (<) to cycle between the PTSA standards 100, 200, and 300 ppb (it repeats). Ensure the value selected matches the desired PSTA standard in the sample cell.
10. Press **Slope** (>) to start the slope calibration.
11. If the calibration succeeds, a checkmark (✔), a "Calibration Success" message will appear (Figure 12). Otherwise, a warning message is displayed.
12. Calibration is now complete. Press **Exit** (OK) to return to measurement mode.

    ∗**NOTE**∗ *If **Exit** is pressed before the second checkmark appears, the calibration will not be completed and must be re-done.*

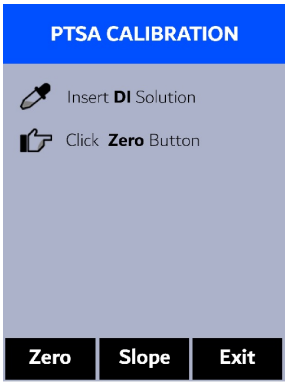

Figure 10.

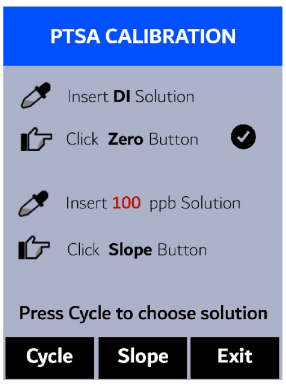

Figure 11.

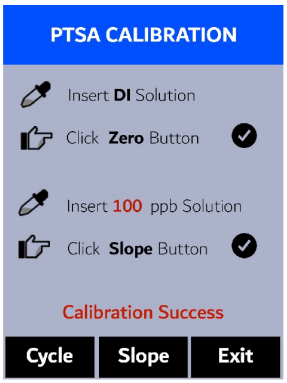

Figure 12.

7.2 Combined PTSA and Conductivity Calibration

The following steps will calibrate both conductivity at 1000 µS/cm and PTSA at 100 ppb using Pyxis 100 ppb PTSA + 1000 µS/cm (KCl) Combined Standard (P/N: 21004):

1. Rinse the main module sample cell three times with the Combined Standard. Fill the sample cell with the Combined Standard.
2. Power on the SP-710B by pressing (OK). Allow 5–10 seconds for the SP-710B to stabilize.
3. Press **Calib** (>) as needed to highlight **Cond** in the selection menu.
4. Press (OK) to launch the **COMBINED CALIBRATION** screen (Figure 13).
5. Press **Calib** ((OK)) to confirm the desired calibration.
6. The display updates as shown in Figure 14 and the user can choose one of three options:
   (a) Press (OK) to start the calibration, **or**
   (b) Press **Cancel** (<) to return to the **COMBINED CALIBRATION** screen, **or**
   (c) Press **Exit** (>) to abandon calibration entirely.
7. Once calibration begins, the SP-710B reads the sample and displays the value in the **Measured** section. A slight variance from the target is acceptable.
8. If successful, a checkmark (✔) will appear next to the conductivity measurement.
9. After a second, another checkmark (✔) will appear next to the PTSA measurement.
10. Finally, the message "Calibration Success" will appear towards the bottom of the display (Figure 15).
11. Calibration is now complete, long press **Calib** ((OK)) to return to measurement mode.

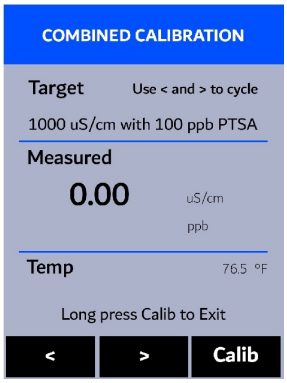

Figure 13.

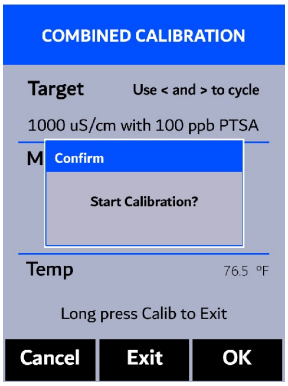

Figure 14.

Figure 15.

7.3 Conductivity Calibration

7.3.1 Conductivity Calibration (500, 1000, 2500, or 5000 µS/cm)

1. Rinse the main module sample cell three times with the desired conductivity standard. Fill the sample cell with the desired conductivity standard.
2. Power on the SP-710B by pressing (OK). Allow 5–10 seconds for the SP-710B to stabilize.
3. Press **Calib** (>) as needed to highlight **Cond** in the selection menu.
4. Press (OK) to launch the **COMBINED CALIBRATION** screen.
5. Press (>) to launch the **CONDUCTIVITY CALIBRATION** screen.
6. Use (<) and (>) to cycle to the desired calibration. The standard conductivity selections are 500, 1000, 2500, or 5000 µS/cm. For other conductivity values, see the **User-Defined Conductivity Calibration** section.

   ∗**NOTE**∗ *To exit the calibration procedure entirely, long press* ***Calib*** *(OK)*
7. Press **Calib** (OK) to confirm the specific conductivity calibration desired.
8. The display updates as shown in Figure 16 and the user can choose one of three options:
   (a) Press (OK) to start the calibration, **or**
   (b) Press **Cancel** (<) to return to the **CONDUCTIVITY CALIBRATION** screen, **or**
   (c) Press **Exit** (>) to abandon calibration entirely.
9. Once calibration begins, the SP-710B reads the sample and displays the value in the **Measured** section. A slight variance from the target is acceptable.
10. The message "Calibration Success" will appear towards the bottom of the display (Figure 17).
11. Calibration is now complete, long press **Calib** (OK) to return to measurement mode.

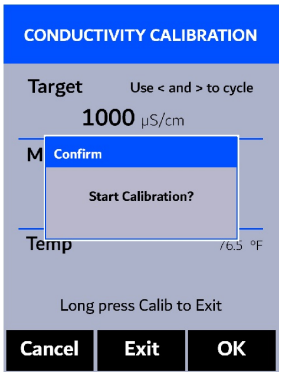

Figure 16.

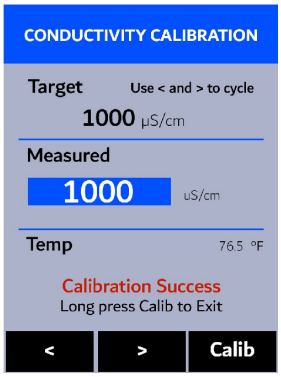

Figure 17.

7.3.2 User-Defined Conductivity Calibration

1. Rinse the main module sample cell three times with the desired conductivity standard. Fill the sample cell with the standard.
2. Power on the SP-710B by pressing (OK). Allow 5–10 seconds for the SP-710B to stabilize.
3. Press **Calib** (>) as needed to highlight **Cond** in the selection menu.
4. Press (OK) to launch the **COMBINED CALIBRATION** screen.
5. Press (<) to launch the **USER DEFINED CALIBRATION** screen (Figure 18).
6. Use **-** (<) and **+** (>) to adjust the target conductivity value as desired. Holding a key down scrolls the values at a faster rate.
7. Press **Set** (OK) to confirm the target conductivity value.

   ∗**NOTE**∗ *To exit the calibration procedure entirely, long press* ***Calib*** *(* OK *)*
8. Press **Calib** (OK) to confirm the specific conductivity calibration desired.
9. The display updates as shown in Figure 19 and the user can choose one of three options:
   (a) Press (OK) to start the calibration, **or**
   (b) Press **Cancel** (<) to return to the **USER DEFINED CALIBRATION** screen, **or**
   (c) Press **Exit** (>) to abandon calibration entirely.
10. Once calibration begins, the SP-710B reads the sample and displays the value in the **Measured** section. A slight variance from the target is acceptable.
11. The message "Calibration Success" will appear towards the bottom of the display (Figure 20).
12. Calibration is now complete, long press **Calib** (OK) to return to measurement mode.

Figure 18.

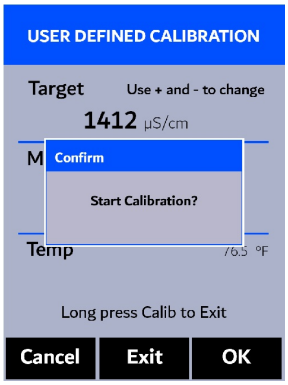

Figure 19.

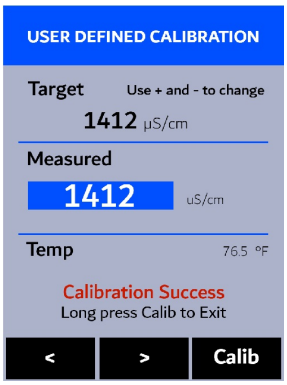

Figure 20.

7.4 Fluorescein Calibration

The SP-710B is designed to provide a flexible calibration procedure. The user can start with the two-point (DI water and 50 ppb Fluorescein) calibration and progressively add a three- and four-point calibration with 250 ppb and 500 ppb Fluorescein, respectively. This allows the user to choose a procedure based on the need of measurement accuracy and the target Fluorescein range.

> ∗**NOTE**∗ *It is highly recommended to complete a full, four-point calibration for the best accuracy across the entire Fluorescein measurement range of the SP-710B (0–600 ppb).*

Follow the steps below to conduct either a two-point, three-point, or four-point Fluorescein calibration:

7.4.1 Two-Point Calibration

1. Rinse the main module sample cell three times with deionized (DI) water. Fill the sample cell with the DI water.
2. Power on the SP-710B by pressing (OK). Allow 5–10 seconds for the SP-710B to stabilize.
3. Press **Calib** ((>)) as needed to highlight **Fluorescein** in the selection menu.
4. Press (OK) to launch the **FLUORESCEIN CALIBRATION** screen (Figure 21).
5. Press **Zero** ((<)) to start the zero (blank) calibration.
6. If the calibration succeeds, a checkmark (✔) and instructions for the 50 ppb slope calibration will appear (Figure 22).
7. Rinse the main module sample cell three times with 50 ppb Fluorescein standard. Fill the sample cell with the standard.
8. Press **Slope** ((<) or (>)) to start 50 ppb slope calibration.
9. If the calibration succeeds, a second checkmark (✔) "Calibration Success" message will appear (Figure 23). Otherwise, a warning message is displayed.
10. After a successful two-point calibration, choose one of two options:
    (a) Press **Continue** ((<) or (>)) to proceed to a three- or four-point calibration, **or**
    (b) Press **Exit** ((OK)) to end the calibration process at a two-point calibration and return to measurement mode.

7.4.2 Three-Point Calibration

11. Rinse the main module sample cell three times with 250 ppb Fluorescein standard. Fill the sample cell with the standard.
12. Press **Slope** (< or >) to start 250 ppb slope calibration.
13. If the calibration succeeds, a second checkmark (✔) "Calibration Success" message will appear (Figure 24). Otherwise, a warning message is displayed.
14. After a successful three-point calibration, choose one of two options:
    (a) Press **Continue** (< or >) to proceed to a four-point calibration, **or**
    (b) Press **Exit** (OK) to end the calibration process at a three-point calibration and return to measurement mode.

7.4.3 Four-Point Calibration

15. Rinse the main module sample cell three times with 500 ppb Fluorescein standard. Fill the sample cell with the standard.
16. Press **Slope** (< or >) to start 500 ppb slope calibration.
17. If the calibration succeeds, a second checkmark (✔) "Calibration Success" message will appear (Figure 25). Otherwise, a warning message is displayed.
18. Calibration is now complete. Press **Exit** (OK) to return to measurement mode.

Figure 21.

Figure 22.

Figure 23.

Figure 24.

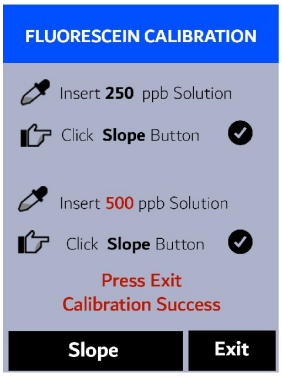

Figure 25.

7.5 pH Calibration

The SP-710B is designed to provide a flexible calibration procedure. The user can start with the one-point pH7 calibration and progressively add a two- and three-point calibration with the pH4 and pH10 buffers. This allows the user to choose a procedure based on the need of measurement accuracy and the target pH range. Follow the steps below to conduct either a one-point, two-point, or three-point pH calibration:

1. Power on the SP-710B by pressing (OK).
2. Rotate the pH/ORP cell seal to touch the front face of the module as seen in Figure 4. This is to power on the module. The indicator light of the module will be green and flashing when powered on. After the module is turned on, the seal can be positioned anywhere desired.

   ∗**NOTE**∗ *If the module battery capacity is low, the indicator light will flash red.*
3. Press **Calib** (>) as needed to highlight **pH** in the selection menu.
4. Press (OK) to launch the **pH CALIBRATION** screen.
5. The main module of the SP-710B will automatically connect after the pH/ORP module has been powered up.

7.5.1 One-Point Calibration

6. Rinse the pH/ORP sample cell three times with the pH7 buffer. Fill the sample cell with the pH7 buffer.
7. Allow 5–10 seconds for the pH measurement to stabilize and the padlock (🔒) to appear.
8. Press **pH7** (< or >) to start a one-point calibration.
9. If the calibration succeeds, a checkmark (✔) and a ”pH7 Calibration success!” message will appear (Figure 26). Otherwise, a warning message is displayed.
10. After a successful one-point calibration, choose one of two options:

    (a) Press **Next** (< or >) to proceed to a two- or three-point calibration, **or**

    (b) Press **Exit** (OK) to end the calibration process at a one-point calibration.

7.5.2 Two-Point Calibration

11. Choose either the pH4 or pH10 buffer for a two-point calibration.
12. Rinse the pH/ORP sample cell three times with the chosen buffer. Fill the sample cell with the chosen buffer.
13. Allow 5–10 seconds for the pH measurement to stabilize and the padlock (🔒) to appear.
14. Press **Calib** (< or >) to start a two-point calibration.
15. If the calibration succeeds, a checkmark (✔) and a ”pH4 Calibration success!” or a ”pH10 Calibration success!” message will appear (Figure 27). Otherwise, a warning message is displayed.
16. After a successful two-point calibration, choose one of two options:
    (a) Press **Next** (< or >) to proceed to a three-point calibration, **or**
    (b) Press **Exit** (OK) to end the calibration process at a two-point calibration.

7.5.3 Three-Point Calibration

17. Use the remaining buffer (either the pH4 or pH10) for a three-point calibration.
18. Rinse the pH/ORP sample cell three times with the remaining buffer. Fill the sample cell with the remaining buffer.
19. Allow 5–10 seconds for the pH measurement to stabilize and the padlock (🔒) to appear.
20. Press **Calib** (< or >) to start a three-point calibration.
21. If the calibration succeeds, a checkmark (✔), a ”pH4 Calibration success!” or a ”pH10 Calibration success!” message, and a ”Completed!” message will appear (Figure 28). Otherwise, a warning message is displayed.
22. After a successful three-point calibration, press **Exit** (< , > , or OK) to return to measurement mode.

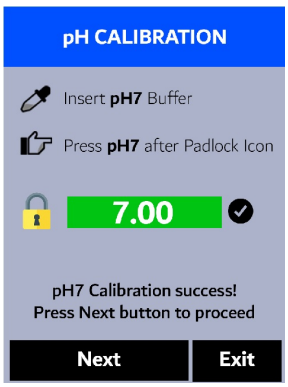

Figure 26.

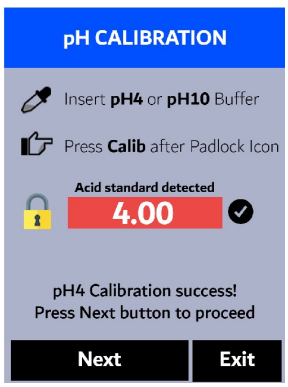

Figure 27.

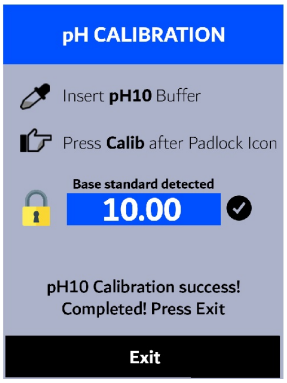

Figure 28.

7.6 ORP Calibration

The ORP scale of the SP-710B depends on the ORP scale of the calibration standard. For example, if the value of 220 mV for the common Zobell's standard at 25 °C is entered in the above calibration, the ORP value reported by the SP-710B after calibration is referenced to the Ag/AgCl(3M KCl) scale. This is because the value of 220 mV is based on the Ag/AgCl(3M KCl) reference electrode. If the value entered in the above calibration is 429 mV, the ORP value reported by the SP-710B is referenced to the SHE, because the value of 429 mV at 25 °C for the Zobell's standard is SHE based.

The values in the following table can be used to convert the Ag/AgCl reference electrode-based ORP value to the SHE-based ORP value. To obtain the SHE-based ORP value, add the number in the table to the corresponding Ag/AgCl reference electrode-based value. To use the table, the temperature of the standard solution measured by the SP-710B must be used.

Table 3.

Temperature °F (°C)*	Ag/AgCl (1M KCl)	Ag/AgCl (3M KCl)	Ag/AgCl (saturation KCl)
68 (20)	+234	+213	+202
77 (25)	+231	+209	+199
86 (30)	+228	+205	+196

* Use the temperature measured by the SP-710B.

Follow the steps below to carry out an ORP calibration:

1. Power on the SP-710B by pressing (OK).
2. Rotate the pH/ORP cell seal to touch the front face of the module as seen in Figure 4. This is to power on the module. The indicator light of the module will be green and flashing when powered on. After the module is turned on, the seal can be positioned anywhere desired.

   ∗**NOTE**∗ *If the module battery capacity is low, the indicator light will flash red.*

3. Press **Calib** (>) as needed to highlight **ORP** in the selection menu.
4. Press (OK) to launch the **ORP CALIBRATION** screen.
5. The main module of the SP-710B will automatically connect after the pH/ORP module has been powered up.
6. Use **+** (<) and **-** (>) to adjust the ORP value to match the ORP standard used (Figure 29).
7. Press **Calib** ((OK)). The message "Calibration Success" will appear on the display (Figure 30).
8. Calibration is now complete. Long press **Calib** ((OK)) to return to measurement mode.

Figure 29.

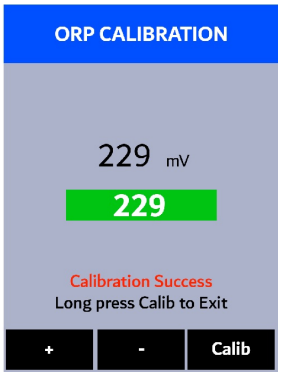

Figure 30.

8 Device Information and Diagnosis

The **DEVICE INFORMATION** screen is launched when **System** (OK) is pressed in the measurement mode. This screen contains the device serial number, software version, and hardware version (Figure 31). The battery life as a percentage and the MAC addresses for main module also shown.

Press **Diagnosis** (<) to launch the **SYSTEM DIAGNOSIS** screen where raw measurement data are displayed (Figure 32). The information has no use for normal operation, but instead is used for device troubleshooting. Provide an image of both the **DEVICE INFORMATION** screen and the **SYSTEM DIAGNOSIS** screen when you contact Pyxis (service@pyxis-lab.com) for troubleshooting your device or call +1 (866) 203-8397.

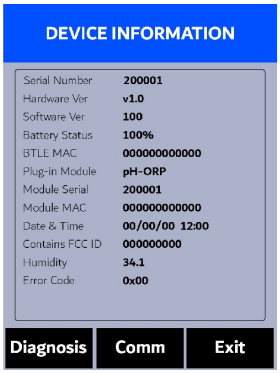

Figure 31.

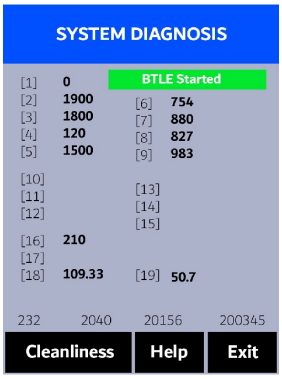

Figure 32.

8.1 Main Module Sample Cell Cleanliness Check

The SP-710B is designed to provide reliable and accurate measurement on PTSA and Fluorescein. Heavy fouling will prevent the light from reaching the sensor, resulting in inaccurate readings. It is suggested that the SP-710B be checked for fouling and cleaned on a monthly basis. Heavily contaminated waters may require more frequent cleanings. Cleaner water sources with less contamination may not require cleaning for several months. The SP-710B is designed to carry out a Cleanliness Check as described below:

1. Power on the SP-710B by pressing (OK).
2. Press **System** ((OK)) to launch the **DEVICE INFORMATION** screen.
3. Press **Diagnosis** ((<)) to launch the **SYSTEM DIAGNOSIS** screen.
4. Allow 5–10 seconds for the message in the top-right corner of the display change from **Starting BTLE...** to **BTLE Started**
5. Press **Cleanliness** ((<)). An instruction prompt appears to ask the user to put DI water into the main module sample cell (Figure 33).
6. Pour DI water into the main module sample cell.
7. Press **Confirm** ((<), (>), or (OK)). The instruction prompt will disappear and the SP-710B displays a countdown toward the bottom of the display.
8. Once the Cleanliness Check is completed a **Clean** message (Figure 34) or **Sample cell fouled** message (Figure 35) will appear towards the bottom of the display.
9. Cleanliness check is now complete. Press **Exit** ((OK)) to return to measurement mode.

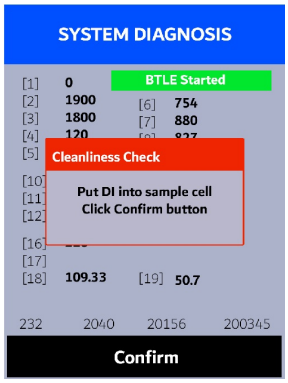

Figure 33.

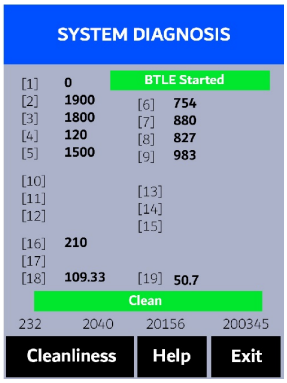

Figure 34.

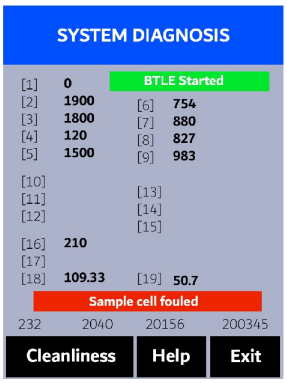

Figure 35.

8.2 Bluetooth Connection to Devices

The SP-710B uses a built-in Bluetooth Low Energy Connection (BTLE) to connect wirelessly to a smart phone via the **uPyxis®** Mobile App, to a computer via the included Bluetooth Adapter (P/N: MA-NEB) and the **uPyxis®** Desktop App, or to nearby Pyxis inline probe with the Pyxis Inline Bluetooth Adapter (P/N: MA-WB) connected between the Pyxis inline probe and controller. To allow the SP-710B to connect via Bluetooth with other devices, follow the steps below:

1. Power on the SP-710B by pressing (OK).
2. Press **System** ((OK)) to launch the **DEVICE INFORMATION** screen.
3. Press **Diagnosis** ((<)) to launch the **SYSTEM DIAGNOSIS** screen.
4. Allow 5–10 seconds for the message in the top-right corner of the display change from **Starting BTLE...** to **BTLE Started** (Figure 32).
5. Choose to connect via one of two options:
   (a) The **uPyxis®** Mobile App (see the **Use with uPyxis® Mobile App** section), or
   (b) The **uPyxis®** Desktop App (see the **Use with uPyxis® Desktop App** section).

8.2.1 Calibrate an ST-500 Series Probe with the SP-710B via Bluetooth

The SP-710B can be used to verify the result of an inline Pyxis ST-500 Series probe by measuring the sample water taken from the inline probe sample line. The SP-710B can then be used to calibrate the inline probes over the Bluetooth connection. To calibrate an inline probe, follow the steps below:

1. Power on the SP-710B by pressing (OK).
2. Press **System** ((OK)) to launch the **DEVICE INFORMATION** screen.
3. Press **Comm** ((>)) to launch the **COMMUNICATION** screen (Figure 36).
4. Press **Scan** ((<)) to begin scanning for Bluetooth devices.
5. Discoverable devices will begin to populate on the display with their name and MAC-Address (Figure 37).
6. If more than one device appears in the **Device list**, press **»** ((>)) to cycle through the devices.
7. If no devices or the incorrect device appear in the **Device list**, press **Scan** ((<)) to re-scan for discoverable devices.
8. Press **Connect** ((OK)) to begin pairing to the selected probe.
9. When the connection is established, the SP-710B displays the latest PTSA measurement from the connected probe (Figure 38).
10. Fill the main module sample cell with the same sample water that the probe is measuring.
11. Press **Read** ((>)) to see PTSA measurement from the SP-710Balong with the probe measurement (Figure 39).
12. Press **Calib** ((OK)) to begin probe PTSA calibration.
13. The SP-710B will take the probe PTSA measurement three times to verify the calibration (Figure 40).

    ∗**NOTE**∗ *It takes about one minute for the probe to approach the calibrated reading and the three verifying readings may not be exactly the same as the value measured by the SP-710B. Press* ***Read*** *((>)) again to take more readings from the probe, if necessary.*

14. If the calibration is successful, a ”Verify calibration - OK” message will appear on the top of the display (Figure 41).
15. Calibration is now complete. Long press **Calib** (OK) to return to measurement mode.

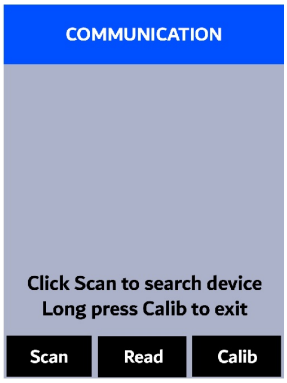

Figure 36.

Figure 37.

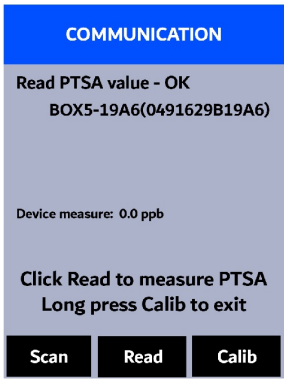

Figure 38.

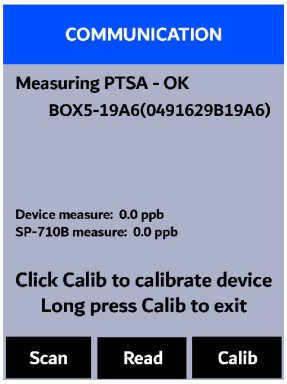

Figure 39.

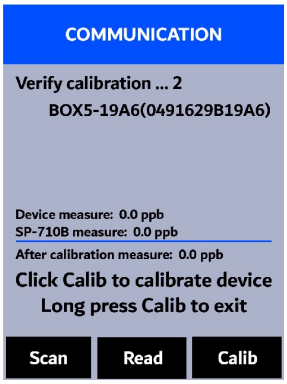

Figure 40.

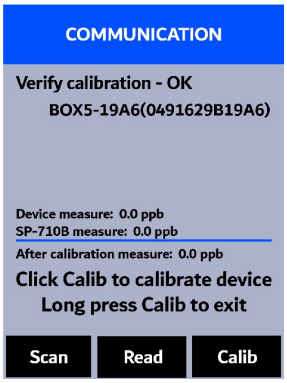

Figure 41.

8.3 Factory Reset

Use the following steps to restore all device parameters to factory default:

1. Power on the SP-710B by pressing (OK).
2. Press **System** ((OK)) to launch the **DEVICE INFORMATION** screen.
3. Press **Diagnosis** ((<)) to launch the **SYSTEM DIAGNOSIS** screen.
4. Allow 5–10 seconds for the message in the top-right corner of the display change from **Starting BTLE...** to **BTLE Started**.
5. Press **Help** ((>)) to launch the **HELP** screen (Figure 42).
6. Press **Factory Reset** ((<) or (>)). The display updates as shown in Figure 43 appear and the user can choose one of three options:
   (a) Press (OK) to start the factory reset, **or**
   (b) Press **Cancel** ((<)) to return to the **HELP** screen, **or**
   (c) Press **Exit** ((>)) to abandon the factory reset entirely.
7. After a successful factory reset, the message "Factory reset done." will appear on the display.
8. Press **Exit** ((OK)) to return to measurement mode.

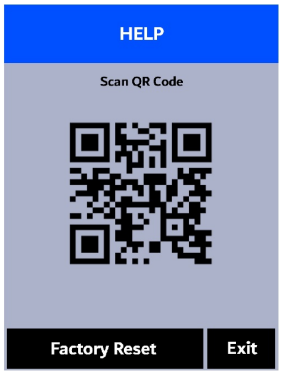

Figure 42.

Figure 43.

9 Use with uPyxis® Mobile App

9.1 Download uPyxis® Mobile App

Download **uPyxis®** Mobile App from **Apple App Store** or **Google Play**.

Figure 44.

9.2 Connecting to uPyxis® Mobile App

Connect the SP-710B to a mobile smart phone according to the following steps:

1. Follow the steps in the **Bluetooth Connection to Devices** section to make the SP-710B discoverable.
2. Open **uPyxis®** Mobile App.
3. On **uPyxis®** Mobile App, pull down to refresh the list of available Pyxis devices.
4. If the connection is successful, the SP-710B and its Serial Number (SN) will be displayed (Figure 45).
5. Press on the **SP-710B image**.

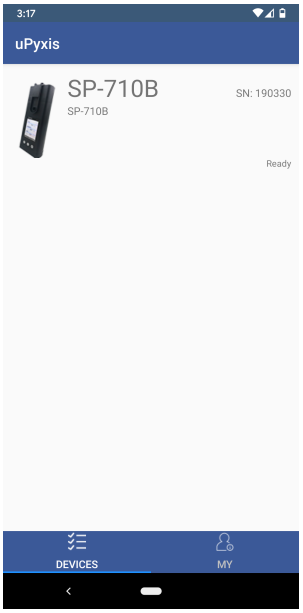

Figure 45.

9.3 System Screen

From the **System** screen, users can change the **Device Name**, find the **Serial Number**, **Hardware Version**, and **Firmware Version**, as well as update the firmware of the SP-710B by pressing **Check Update**. If a firmware update is available, press **Get Firmware**. Once the new firmware is downloaded, press **Upgrade Firmware**.

> ∗**NOTE**∗ *The firmware update process takes some time and will require the SP-710B to stay within range (approximately 10 ft without obstructions) for the entire duration of the update.*

Once the update is complete, the SP-710B will reboot which will disconnect the SP-710B from the **uPyxis®** Mobile App.

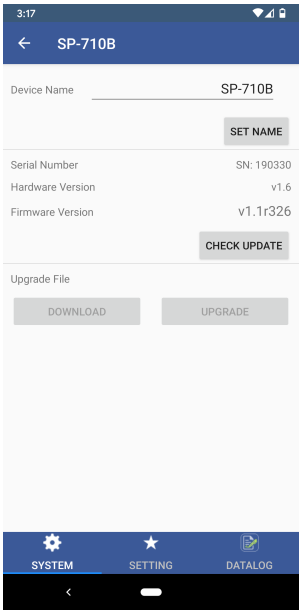

Figure 46.

9.4 Setting Screen

When connected, the **uPyxis®** Mobile App will default to the **Setting** screen. From the **Setting** screen, the user can set the **Power off time** and **Screen off time** in seconds.

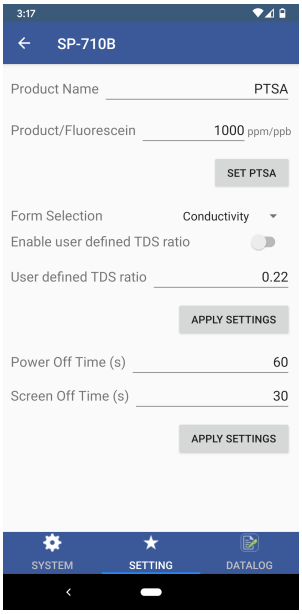

Figure 47.

9.5 Datalog Screen

From the **Datalog** screen, the user can view and export the internal log files of the SP-710B by pressing **Read Datalogs** and selecting the desired datalog (these are separated by month). The SP-710B will then populate any relevant log event from the selected datalog which can be viewed in more detail by pressing **Read Record** or exported as a CSV document by pressing **Export/Share**.

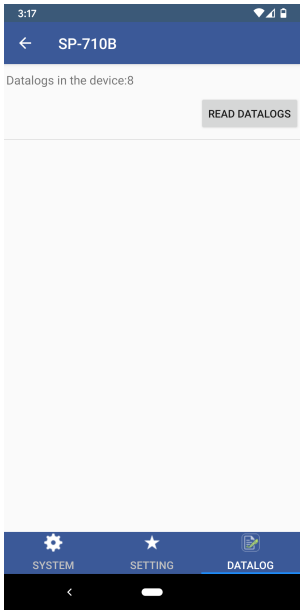

Figure 48.

10 Use with uPyxis® Desktop App

10.1 Install uPyxis® Desktop App

Download the latest version of **uPyxis®** Desktop software package from: https://pyxis-lab.com/upyxis/ this setup package will download and install the Microsoft.Net Framework 4.5 (if not previously installed on the PC), the USB driver for the USB-Bluetooth adapter (MA-NEB), the USB-RS485 adapter (MA-485), and the main **uPyxis®** Desktop application. Double click the **uPyxis.Setup.exe** file to install.

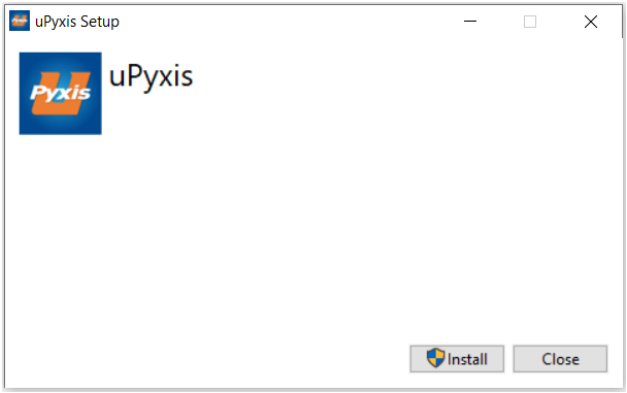

Figure 49.

Click **Install** to start the installation process. Follow the screen instructions to complete the USB driver and uPyxis installation.

10.2 Connecting to uPyxis® Desktop App

Connect the SP-710B to a Windows computer using a Bluetooth/USB adapter (P/N: MA-NEB) according to the following steps:

1. Follow the steps in the **Bluetooth Connection to Devices** section to make the SP-710B discoverable.
2. Plug the Bluetooth/USB adapter into a USB port in the computer.
3. Launch **uPyxis®** Desktop App.
4. On **uPyxis®** Desktop App, click Device → **Connect via USB-Bluetooth** (Figure 50).
5. If the connection is successful, the SP-710B and its Serial Number (SN) will be displayed in the left pane of the **uPyxis®** window.

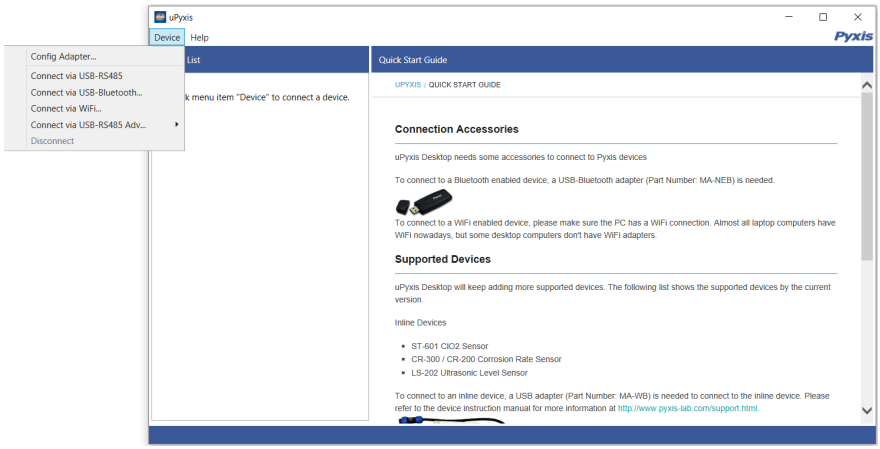

Figure 50.

10.3 System Screen

Once connected to the device, a picture of the device will appear on the top-left corner of the window and the **uPyxis®** Desktop App will default to the **System** screen. From the **System** screen, users can upgrade the firmware by selecting an appropriate firmware file (contact service@pyxis-lab.com for these firmware files) and clicking **Upgrade Firmware**.

> ***NOTE*** *The firmware update process takes some time and will require the SP-710B to stay within range (approximately 10 ft without obstructions) for the entire duration of the update.*

Once the update is complete, the SP-710B will reboot which will disconnect the SP-710B from the **uPyxis®** Mobile App.

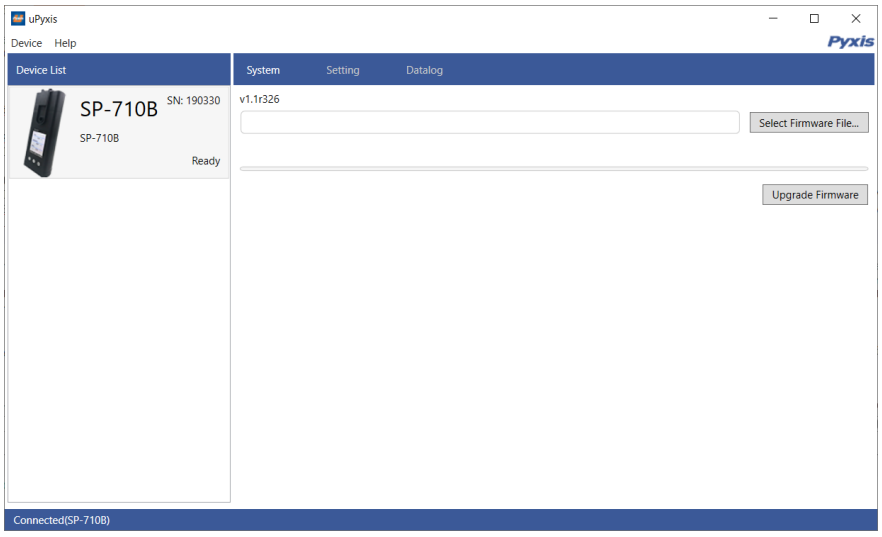

Figure 51.

10.4 Setting Screen

From the **Setting** screen, the user can set the **Power off time** and **Screen off time** in seconds.

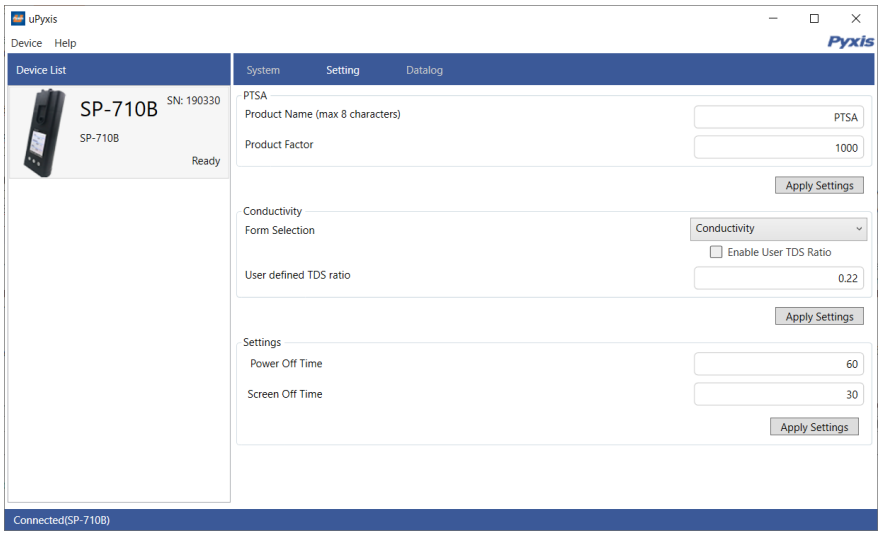

Figure 52.

10.5 Datalog Screen

From the **Datalog** screen, the user can view, delete, and export the internal log files of the SP-710B by clicking **Read Datalog List** and selecting the desired datalog (these are separated by month). The SP-710B will then populate any relevant log event from the selected datalog which can be viewed in more detail by clicking **Read Datalog**, deleted by clicking **Delete**, or exported by clicking **Export as .CSV File**.

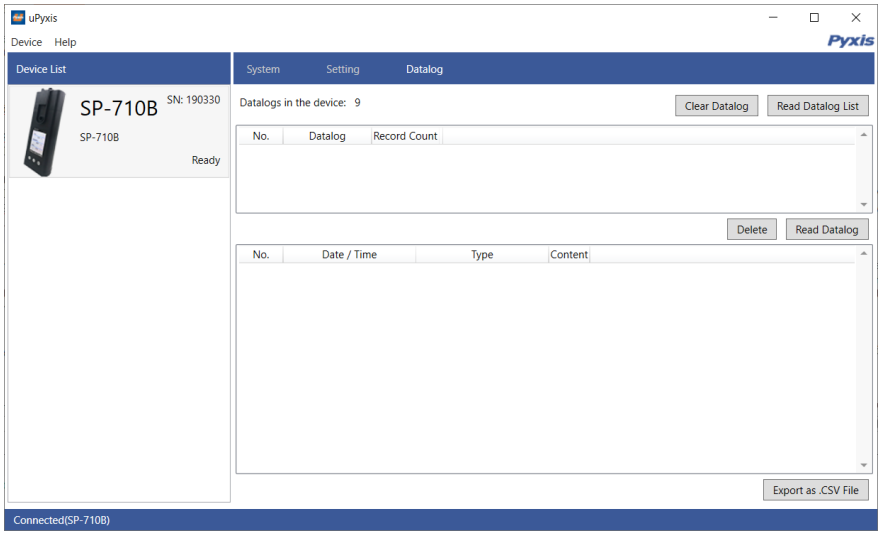

Figure 53.

11 Device Maintenance and Precaution

11.1 Maintenance Best Practices

For greatly increased working life of the SP-710B follow the list of maintenance best practices below:

- Rinse the SP-710B with tap water or DI water after measurement and remove residual water using a paper towel.
- Maintain 1 mL of pH/ORP Storage Solution in the pH/ORP cell at all times when the SP-710B is not being used.
- Close the pH/ORP cell seal firmly to keep the pH/ORP cell wet. Use rubber-band to ensure cell cap remains closed for aggressive handling.
- On a monthly basis, or as needed, conduct a chemical cleaning using Pyxis SER-02 Handheld Cleaning Solution of the main module cell to remove deposition or film development.
- Use a Q-tip to gently clean the inside of the main module cell to remove any deposits that may have attached to the optical and electrode surfaces.
- Completely soak the main module cell for one hour before a measurement if the SP-710B has not been used in more than two weeks.
- Do not expose the SP-710B to an extreme high or low temperature condition such as leaving the SP-710B inside an unattended automobile. The pH electrode can survive a few short exposures to 0 °F (-18 °C) or 140 °F (60 °C), but repeated extreme low and high temperature cycling will damage the pH electrode.

11.2 Methods to Cleaning the SP-710B

A light deposit on quartz glass inside the conductivity cell can be cleaned by a Q-tip. Aged heavy deposition, especially iron oxide deposited, can be removed using a cleaning solution that is capable of removing iron, such as the Pyxis Handheld Device Cleaning Solution Kit (P/N: SER-02) available from Pyxis online E-Store https://pyxis-lab.com/product/handheld-device-cleaning-kit/.

Figure 54. Handheld Device Cleaning Solution Kit

To clean the SP-710B pour cleaning solution into the main module sample cell for 10 minutes. Rinse the sample cell with distilled water and use the Cleanliness Check (see the **Main Module Sample Cell Cleanliness Check** section) to confirm that the SP-710B is clean. Repeat the process as needed until the Cleanliness Check shows **Clean**.

11.3 Storage

When the pH/ORP cell is not in use, fill the cell with 1 mL of Pyxis pH/ORP Storage Solution (P/N: 63900) and ensure the pH/ORP cell seal is closed completely. The pH/ORP cell seal maintains a moist environment for the electrodes. For vigorous field use, it is recommended to utilize a rubber-band to secure the pH/ORP cell seal to prevent loss of pH/ORP Storage Solution.

Do not expose the SP-710B to an extreme high or low temperature condition such as leaving the SP-710B inside an unattended automobile.

> ∗**NOTE**∗ *Repeated extreme low and high temperature cycling will damage the pH electrode.*

11.4 pH/ORP Module Replacement

Figure 55. pH/ORP Module

The pH/ORP module in the SP-710B can be replaced when the original module reaches the end of its working life. Pyxis offers a 6-month warranty on the pH/ORP module. Pyxis recommends replacing the module at a frequency of every 9–12 months as a best practice. Order a replacement pH/ORP module (P/N: 50315) from Pyxis at order@pyxis-lab.com. If the module is turned on for 20 minutes a day, the module battery can last for about a year. The module indicator light will flash red if the module battery is low. Each replacement pH/ORP module will be shipped with a COC (Certificate of Calibration). The COC also includes an assigned Bluetooth MAC-Address for the new module. This MAC-Address will appear as an available device to pair the SP-710B main module to per the instructions below.

11.4.1 Replacement Procedure

Follow the instructions below to install the replacement module:

1. Power off the SP-710B by holding OK.
2. Remove any liquid from both the conductivity/chlorine cell and the old pH/ORP cell.
3. Detach the old pH/ORP module by pulling the module away from the main module.
4. Remove the battery from the old pH/ORP module to prevent it from re-pairing to the SP-710B.
5. Dispose of the old module. If the removed battery still has charge, it can be saved for future use.
6. Attach the new pH/ORP module to the main module as shown in Figure 56.
7. To Bluetooth pair the main module with the new pH/ORP module, continue to the **Bluetooth Pairing** section below.

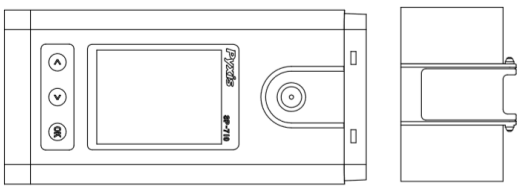

Figure 56.

11.4.2 Bluetooth Pairing

1. Power on the SP-710B by pressing (OK).
2. Press **System** ((OK)) to launch the **DEVICE INFORMATION** screen.
3. Press **Comm** ((>)) to launch the **COMMUNICATION** screen (Figure 57).
4. Press **Scan** ((<)) to begin scanning for Bluetooth devices.
5. Discoverable devices will begin to populate on the display with their name and MAC-Address (Figure 58).

   ∗**NOTE**∗ *To verify pairing to the correct pH/ORP module, the MAC-Address of the pH/ORP module can be found in its provided COC (Certificate of Calibration).*

6. If more than one device appears in the **Device list**, press **»** ((>)) to cycle through the devices.
7. If no devices or the incorrect device appear in the **Device list**, press **Scan** ((<)) to re-scan for discoverable devices.
8. Press **Pair** ((OK)) to begin pairing to the selected device.
9. If pairing is successful, the message ”Pair Success!” will appear in the top-left corner of the display (Figure 59).
10. Bluetooth pairing is complete. Long press **Pair** ((OK)) to return to measurement mode.

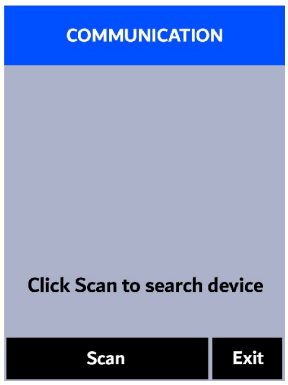

Figure 57.

Figure 58.

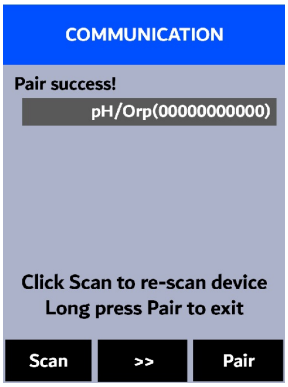

Figure 59.

12 Regulatory Approval

United States

The SP-710B sensor has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in an installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canada

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible.

13 Contact Us

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