SP-395T

Tolytriazole Tracing Handheld



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SP-395T TolyTriazole Tracing Handheld User Manual

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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 SP-395T handheld fluorometer is patented to Pyxis Lab Inc. and not offered anywhere else in the world. This device utilized UV light fluorescence to detect TolyTriazole (TTA) content in water. The results are instantaneous and with proper application understanding, results are highly reliable. It is important to note that this technology is not wet chemistry testing for azole content and variations may be observed depending on the quality of the water sample. In certain waters the background of other organic matter may cause a false positive reading of azole due to UV fluorescence. In consistent makeup water quality with little organic loading (ie. city water makeup) and systems with no known organic contamination (ie. hydrocarbon etc..) this technology is very accurate in comparison to wet chemistry methods. The SP-395T does not differentiate between azole species or reacted versus unreacted azole. The device measures the total UV fluorescence value of the azole and offers the final value as ppm TolyTriazole (TTA). It is incumbent for the user to identify the correlation to exact wet chemistry values and potential background interference should be accounted for by checking untreated makeup for UV fluorescence signal and removing that from the final value measured. The SP-395T will not work in waters containing Nitrite treatment as Nitrite absorbs UV light and will result in a false high value. With these application limitations clearly understood, the SP-395T is commonly used for rapid azole validation, dramatically reducing service time enabling water treaters to adjust their programs accordingly. It is important to note however, that there are some applications (surface makeup water systems or high organic loading/contaminated systems) where this technology is not ideal due to a high degree of interference. The user needs to understand the dynamics of their system and evaluate its use accordingly.

1.1 Main Features

The Pyxis SP-395T is an ultraviolet fluorometer. It measures TolyTriazole (TTA) in a water sample and includes the following features:

- Sample acidification is not required. TTA measurement is independent of sample pH in the range of 6 to 10.
- Extra color and turbidity parameters measured are used for automatic compensation to eliminate interference.
- No sample cuvette is needed and variations associated with the cuvette are eliminated.
- Large color graphic screen that can be read in direct sunlight.

2 Specifications

Table 1. SP-395T Specifications

Item	Specification*
Part Number (P/N)	50209
TTA Range	0.1–10.0 ppm
TTA Precision	0.1 ppm
TTA Accuracy	±0.1 ppm
Temperature Range	40–106 °F (0–41 °C)
Display	320×240 TFT-LCD, visible under direct sunlight
Power Supply	4 AA alkaline batteries
Typical Battery Life	10,000 readings
Dimension (L × W × H)	6.30 × 2.91 × 1.30 inch (160 × 74 × 33 mm)
Weight †	0.68 lbs (310 g)
Enclosure Rating	IP67

* With Pyxis's continuous improvement policy, these specifications are subject to change without notice.
† 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. 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@pyxislab.com.

3.1 Standard Accessories

- Quick-Start Guide
- Four (4) AA alkaline batteries
- Bluetooth/USB Adapter for Desktop P/N: MA-NEB
- 3 mL Transfer Pipet
- 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)
Pyxis Carrying Case for SP-395T	50725
Pyxis 1.0 ppm TTA Calibration Standard — 500 mL	57015
Pyxis 2.0 ppm TTA Calibration Standard — 500 mL	57016
Pyxis Handheld Cleaning Kit	SER-02

4 Installation

4.1 Battery Installation

The SP-395T is powered by four alkaline batteries. Typical battery life lasts for 10,000 measurements or 10 months. When the battery capacity is critically low, the SP-395T will display a ”LOW BATTERY” warning for 5 seconds and then automatically turn off.

∗**NOTE**∗ *Do not use rechargeable nickel cadmium (NiCad) or lithium batteries.*

Replace the batteries to resume operation of the SP-395T after the battery warning. The SP-395T will automatically turn on in the measurement mode after new batteries are installation.

The SP-395T 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.

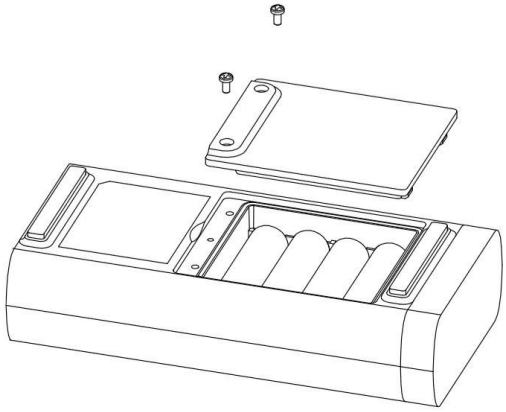


Figure 1. The SP-395T battery compartment

Install batteries using the following steps:

1. Remove the battery compartment cover by loosening the two screws.
2. Remove 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-395T.*

5 Instrument Overview



Figure 2.

5.1 Control Keys

The SP-395T has three control keys, as shown in Figure 2. 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.

5.2 Main Module On/Off

To turn on the SP-395T: Press OK momentarily and release.

To turn off the SP-395T: Press and hold OK for about three seconds. Release OK when the LCD display turns off. The SP-395T turns itself off after 60 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.*

6 Measurement

6.1 TTA Measurement

When powered on, the SP-395T will default to the TTA measurement mode. A water sample should be transferred to the 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. It is recommended to use the 3 mL Transfer Pipet to best avoid air bubbles.*

Before beginning a measurement, use the sample water to rinse the sample cell at least three times. Allow 5–10 seconds for the SP-395T to stabilize. The values will be displayed in **white with a blue background** if a stable value is reached (Figure 3).

> ∗**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-395T had been equilibrated (stored).*

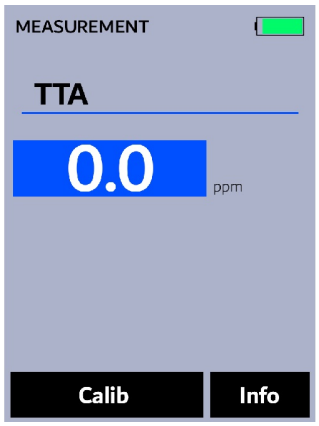


Figure 3.

To convert the reading value to Halogenated Azole (HRA), you may multiply your TTA value reading by a factor of 0.75:

$$ppm\ \mathrm{HRA} = 0.75 \times ppm\ \mathrm{TTA} \tag{1}$$

6.2 High Color and Turbidity Warning

The SP-395T 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 warning will be displayed. In such a case, the user should filter the sample for TTA measurement.

7 Calibration

TTA calibration for the SP-395T requires deionized (DI) water and a standard solution. TTA calibration uses either the 1 ppm or 2 ppm TTA standard solution (see the **Optional Accessories** section).

7.1 TTA Calibration

1. Rinse the sample cell three times with DI water. Fill the sample cell with DI water.
2. Power on the SP-395T by pressing (<). Allow 5–10 seconds for the SP-395T to stabilize.
3. Press **Calib** ((<) or (>)) to launch the **TTA CALIBRATION** screen (Figure 4).
4. Press **Zero** ((<)) to start the zero (blank) calibration.
5. If the calibration succeeds, a checkmark (✔) and instructions for the slope calibration will appear (Figure 5).
6. Rinse the sample cell three times with the desired TTA standard. Fill the sample cell with the desired TTA standard.
7. Press **Cycle** ((<)) to cycle between the TTA standards 1, 2, and 5 ppm (it repeats). Ensure the value selected matches the desired TTA standard in the sample cell.
8. Press **Slope** ((>)) to start the slope calibration.
9. If the calibration succeeds, a checkmark (✔), a "Calibration Success" message will appear (Figure 6). Otherwise, a warning message is displayed.
10. 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 4.



Figure 5.

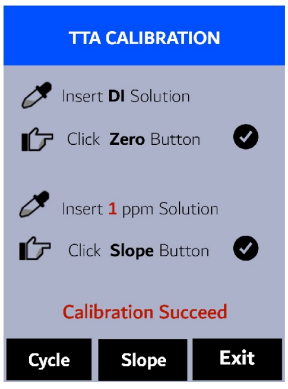


Figure 6.

8 Device Information and Diagnosis

The **DEVICE INFORMATION** screen is launched when **Info** (OK) is pressed in the measurement mode. This screen contains the device serial number, software version, and hardware version (Figure 7). 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 8). 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.

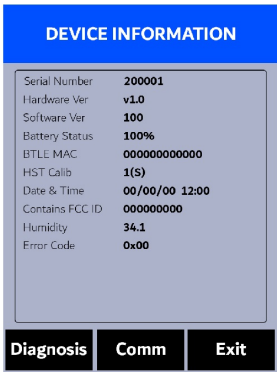


Figure 7.

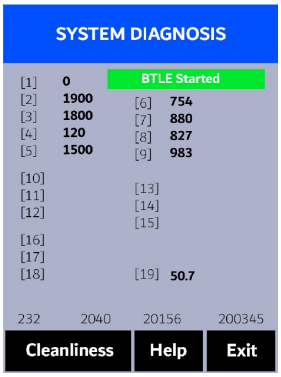


Figure 8.

8.1 Sample Cell Cleanliness Check

The SP-395T is designed to provide reliable and accurate measurement on TTA. Heavy fouling will prevent the light from reaching the sensor, resulting in inaccurate readings. It is suggested that the SP-395T 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-395T is designed to carry out a Cleanliness Check as described below:

1. Power on the SP-395T by pressing (OK).
2. Press **Info** ((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 sample cell (Figure 9).
6. Pour DI water into the main module sample cell.
7. Press **Confirm** ((<), (>), or (OK)). The instruction prompt will disappear and the SP-395T displays a countdown toward the bottom of the display.
8. Once the Cleanliness Check is completed a **Clean** message (Figure 10) or **Sample cell fouled** message (Figure 11) will appear towards the bottom of the display.
9. Cleanliness check is now complete. Press **Exit** ((OK)) to return to measurement mode.

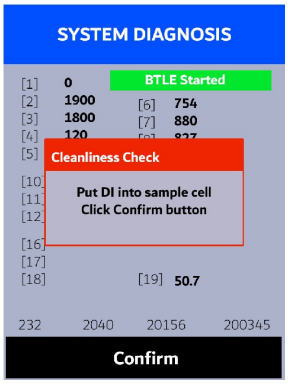


Figure 9.

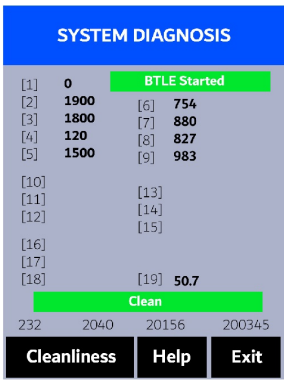


Figure 10.

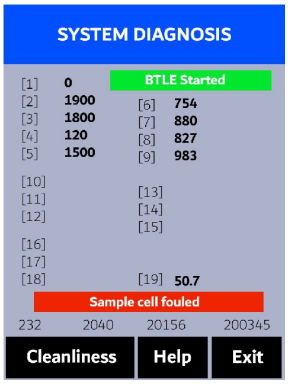


Figure 11.

8.2 Bluetooth Connection to Devices

The SP-395T uses a built-in Bluetooth Low Energy Connection (BTLE) to connect wirelessly to a smart phone via the **uPyxis®** Mobile App or to a computer via the included Bluetooth Adapter (P/N: MA-NEB) and the **uPyxis®** Desktop App. To allow the SP-395T to connect via Bluetooth with other devices follow the steps below:

1. Power on the SP-395T by pressing (OK).
2. Press **Info** ((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 8).
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).

8.3 Factory Reset

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

1. Power on the SP-395T by pressing (OK).
2. Press **Info** ((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 12).
6. Press **Factory Reset** ((<) or (>)). The display updates as shown in Figure 13 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.

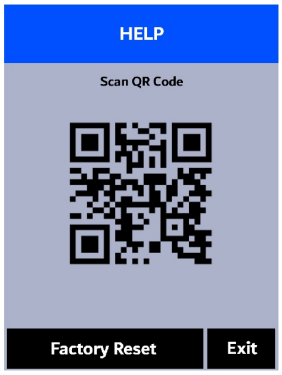


Figure 12.



Figure 13.

9 Use with uPyxis® Mobile App

9.1 Download uPyxis® Mobile App

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



Figure 14.

9.2 Connecting to uPyxis® Mobile App

Connect the SP-395T 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-395T 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-395T and its Serial Number (SN) will be displayed (Figure 15).
5. Press on the **SP-395T image**.

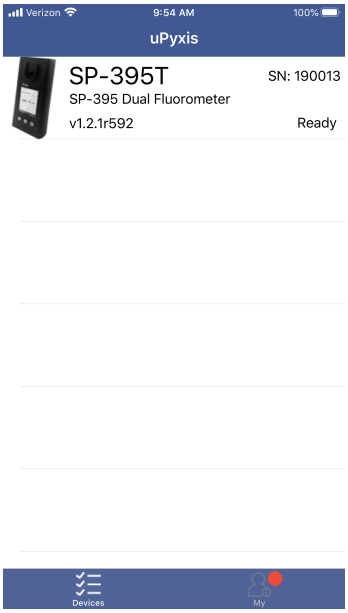


Figure 15.

9.3 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.

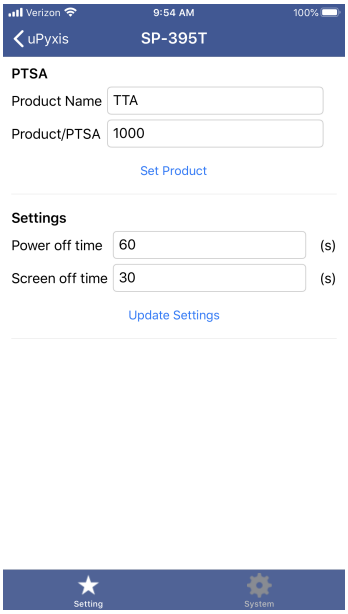


Figure 16.

9.4 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-395T 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-395T to stay within range (approximately 10 ft without obstructions) for the entire duration of the update.*

Once the update is complete, the SP-395T will reboot which will disconnect the SP-395T from the **uPyxis®** Mobile App.

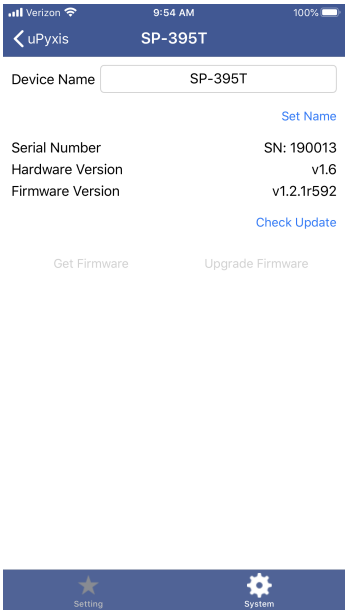


Figure 17.

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.

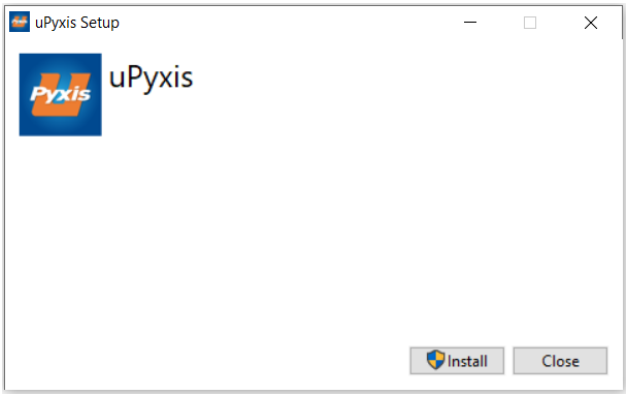


Figure 18.

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-395T 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-395T 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 19).
5. If the connection is successful, the SP-395T and its Serial Number (SN) will be displayed in the left pane of the **uPyxis®** window.

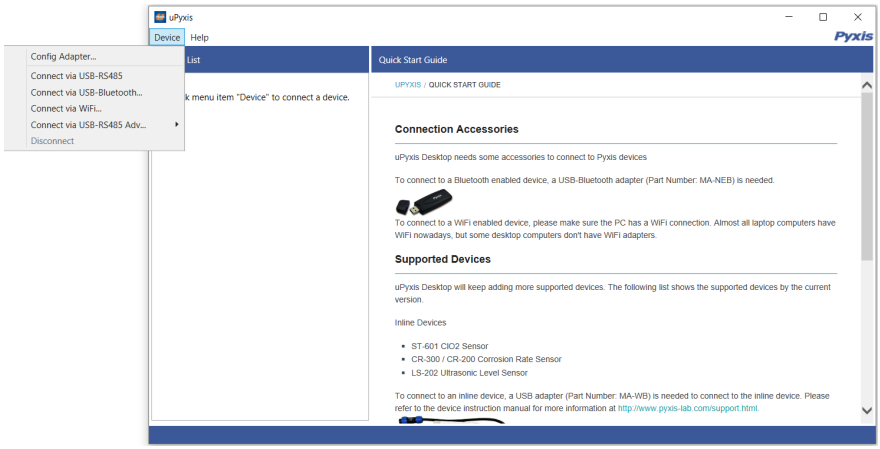


Figure 19.

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-395T to stay within range (approximately 10 ft without obstructions) for the entire duration of the update.*

Once the update is complete, the SP-395T will reboot which will disconnect the SP-395T from the **uPyxis®** Mobile App.

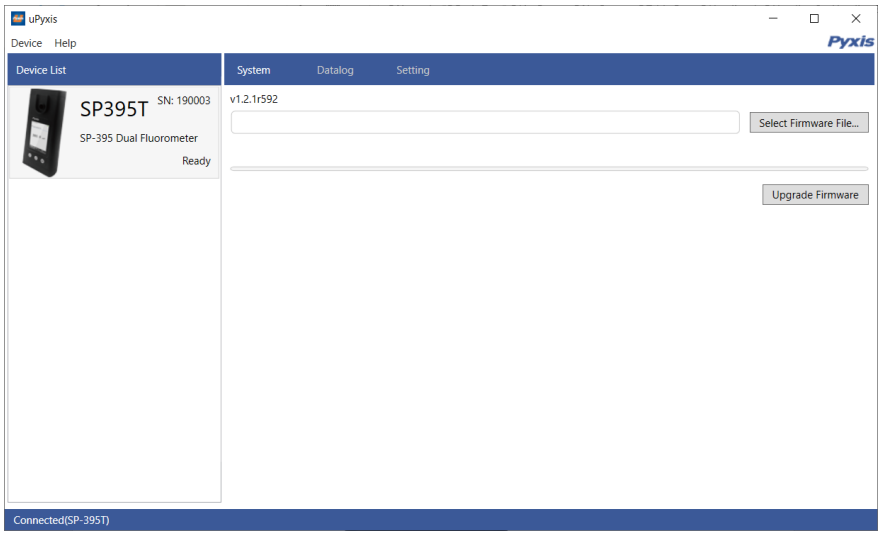


Figure 20.

10.4 Datalog Screen

From the **Datalog** screen, the user can view, delete, and export the internal log files of the SP-395T by clicking **Read Datalog List** and selecting the desired datalog (these are separated by month). The SP-395T 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**.

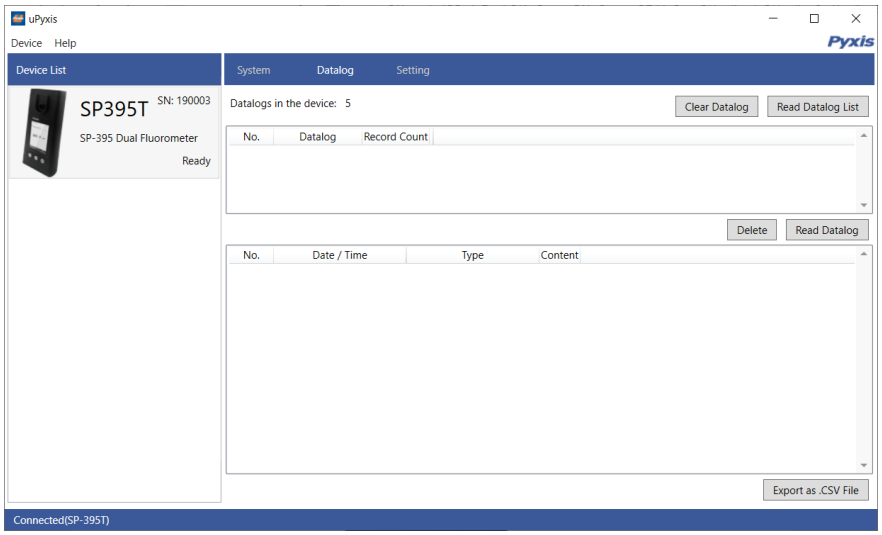


Figure 21.

10.5 Setting Screen

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

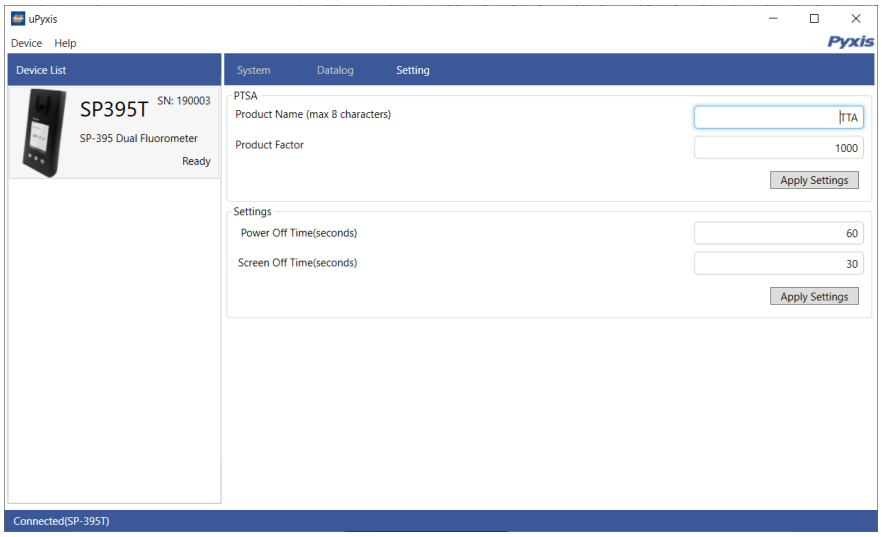


Figure 22.

11 Device Maintenance and Precaution

11.1 Maintenance Best Practices and Quick Tips

For greatly increased working life and ease of use of the SP-395T follow the list of maintenance best practices and quick tips below:

- Rinse the sample cell at least three times with the desired solution before turning on.
- After a successful calibration, the unit does not automatically return to the measurement mode. If Exit is held down too long the unit will power down rather than returning to the measurement mode.
- After returning to measurement mode after calibration, rinse several times with the first sample. The unit will continue to read the sample values without any further key presses if it has not powered off. If there are no key presses for 20 seconds the screen will darken, and after another 20 seconds without key activity will power down. The press of any key while the screen is dark will reset the timer and the screen will re-light. (This press will not step along the calibration process; the next press needed will still be required in the sequence).
- Always rinse the unit with clean water after use and dry by clean tissue or paper towel.

11.2 Methods to Cleaning the SP-395T

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 23. Handheld Device Cleaning Solution Kit

To clean the SP-395T pour cleaning solution into the sample cell for 10 minutes. Rinse the sample cell with distilled water and use the Cleanliness Check (see the **Sample Cell Cleanliness Check** section) to confirm that the SP-395T is clean. Repeat the process as needed until the Cleanliness Check shows **Clean**.

11.3 Storage

Do not expose the SP-395T to an extreme high or low temperature condition such as leaving the SP-395T inside an unattended automobile.

12 Contact Us

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