

SP-380 Handheld Dual Fluorometer PTSA and Fluorescein Operational Manual



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Confidentiality

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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 in the course of 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.

Shipping

A Repair Authorization Number (RA) must be obtained from by Pyxis Technical Support by filling out a request at <https://pyxis-lab.com/request-tech-support/> or by contacting us at service@pyxis-lab.com before any product can be returned to the factory. Pyxis will pay shipping charges to ship replacement or repaired products back to the customer. The customer shall pay shipping charges for returning products to Pyxis. Any product returned to the factory without an RA number will be returned to the customer.

1. General Description

1.1. Specification

PTSA	
Measurement Range	0 to 300 ppb
Excitation Wavelength	365 nm LED
Emission Wavelength	410 nm
Wavelength Accuracy	± 1 nm
Resolution	1 ppb
Accuracy	± 1% or ± 1 ppb
Calibration Solution Point	0, 100, and 200 ppb
Fluorescein	
Measurement Range	0 to 600
Excitation Wavelength	470 nm LED
Emission Wavelength	520 nm
Wavelength Accuracy	± 1 nm
Resolution	0.1 ppb
Accuracy	± 1% or ± 1 ppb
Calibration Solution Point	0, 50, 250, and 500 ppb
Temperature	
Measurement Range	32-160 °F
Resolution	0.1 °F
Accuracy	± 1% of Reading
Compensation Method	Automatic to 25 °C
Others	
Battery	4- AA Alkaline Batteries
Typical Battery Life	10,000 Readings
Display	320 x 240 TFT-LCD, Visible Under Direct Sunlight
Dimension	L160 x W74 x H33 (mm)
Weight	310g (Without Battery)
Temperature Range	40 to 160 °F (4 to 41 °C)
Humidity	85% at 106 °F (41 °C)
Environmental	IP67, Dustproof and Waterproof

1.2. Pyxis SP-380 Major Features

The Pyxis SP-380 analyzer simultaneously measures the concentration of fluorescent tracer PTSA and the concentration of fluorescent tracer fluorescein of a water sample.

Main features include:

- Pyxis SP-380 is pre-calibrated for measuring PTSA (pyrenetetrasulfonic acid) in the range of 0 to 300 ppb. The fluorescence PTSA measurement is automatically compensated for sample color and turbidity interference.
- Large color graphic screen that can be read on direct sunlight.

1.3. Unpackaging the Instrument

Remove the instrument and accessories from the shipping container and inspect each item for any damage that may have occurred during shipping. 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.

1.4. Standard Accessories

- Quick Instruction Guild
- 4- AA alkaline batteries

1.5. Optional Accessories

- **MA-700** - Carrying case for SP-380
- **PTSA-100** - 100 ppb PTSA standard in a 500 ml brown plastic bottle
- **FLUO-50** - 50 ppb fluorescein standard in a 500 ml brown plastic bottle



Figure 1

2. Starting SP-380

2.1. Battery Installation

Pyxis SP-380 is powered by a 4- AA alkaline batteries. Do not use rechargeable nickel cadmium (NiCad) batteries or any lithium batteries. Typically, batteries last for ten months and enable about 10,000 measurements. When the battery capacity is low, the Pyxis SP-380 will prompt a LOW BATTERY warning for 5 seconds and turn off automatically. Replace the batteries to resume operation of Pyxis SP-380 after the battery warning. After new battery installation, Pyxis SP-380 will be automatically turned on to the measurement mode.

The Pyxis SP-380 battery compartment, shown in Figure 2, is on the back side of the instrument. Install batteries as followings:

1. Remove the batter compartment cover by loosening the two screws.
2. Remove old batteries and dispose of 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, making sure that the sealing O-ring is lying flat on the battery holder. NOTE: Failure to properly seat the O-ring may result in water damage to the meter.
5. Fasten the two screws.

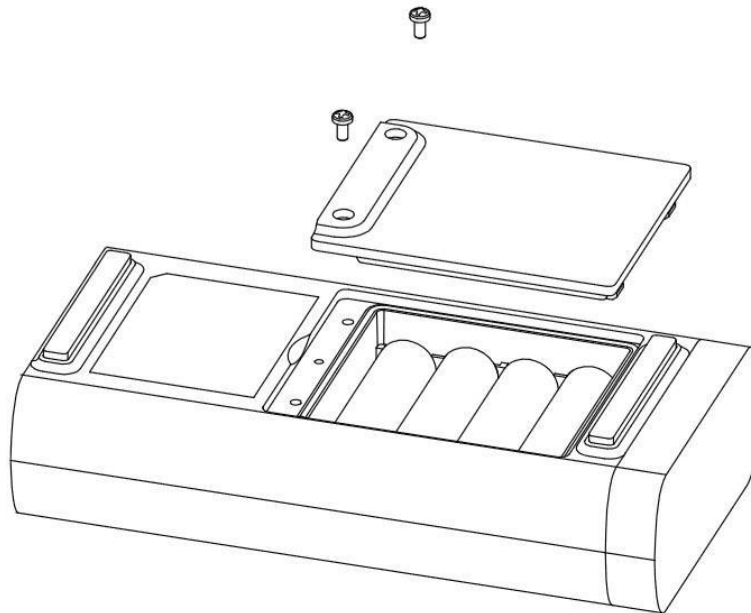


Figure 2 Battery Install

2.2. Description of the Control Keys

The Pyxis SP-380 has three keys as shown in Figure 3. The left (<), right (>) and **OK** keys are used to launch an action indicated on the screen right above the keys. The action associated with each key could be different in different operation modes.

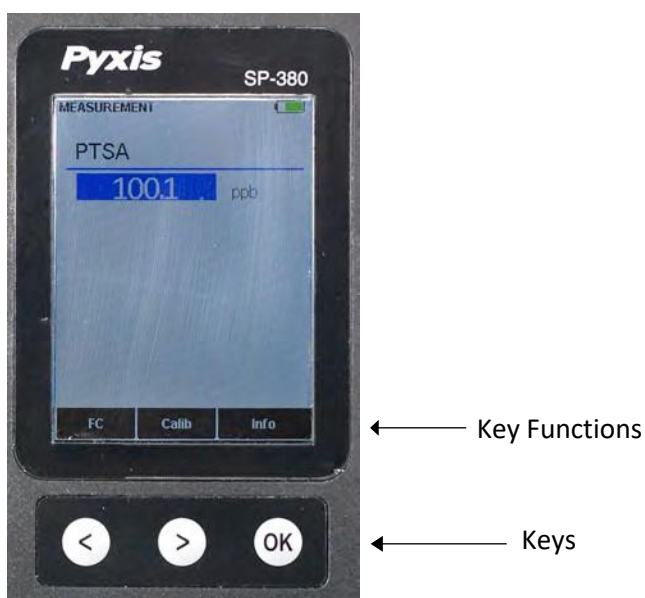


Figure 3 Keys and Functions

2.3. Turning On/Off SP-380

To turn on SP-380, press and hold on the **OK** key for 3 seconds, and release the **OK** key when the LCD is lit.

To turn off SP-380, press and hold on the **OK** key for 3 seconds, and release the **OK** key when the LCD is off. SP-380 will turn itself off after 60 seconds without user interaction through the keys.

3. PTSA and Fluorescein Measurement

When turned on, SP-380 will be in the measurement mode as shown in Figure 3. The water sample can be transferred to the measurement cell with using a pipette. SP-380 can also directly take a water sample from a faucet or sample valve port.

Allow a few seconds for SP-380 to reach a stable PTSA and fluorescein readings. For a sample containing 100 ppb PTSA, the measured PTSA should be stabilized within the range of 98 to 102 ppb. For a sample containing 10.0 ppb fluorescein, the measured fluorescein should be stabilized within the range of 9.8 to 10.2 ppb.

SP-380 does not need to be turned off between measurements of two samples. Rinsing the measurement cell a few times is recommended.

4. Calibration

SP-380 fluorescence PTSA measurement and fluorescein measurement can be calibrated separately. To calibrate PTSA measurement requires the 100 ppb or 200 ppb PTSA standard solution. A standard with fluorescein value 50 ppb can be used to calibrate fluorescein. We recommend ONLY Pyxis calibration standards be used with Pyxis devices to guarantee accuracy.

4.1. PTSA Calibration Process

1. Rinse sample cell three times and then fill the sample cup with DI water. In emergency, “non-PTSA” water, such as city water, may be used, but re-calibrate using DI water for the zero set step as soon as it is available.
2. Power on by a press of **OK** key. Allow 5-10 seconds for meter to stabilize.
3. A Screen similar to Figure 4 appears. The unit is actively reading and displaying both PTSA and fluorescein. The values will be very low if DI water is used; PTSA and fluorescein should be near zero. A low non-zero value (e.g. 0.2 or 0.4, etc.) is not problematic.



Figure 4

4. Press **Calib** (>) to start PTSA calibration.
5. Figure 5, the first screen of the PTSA (alone) calibration, appears.



Figure 5

6. Press **Zero** labeled key (<) to set the zero point.
7. After successful zero set, a checkmark symbol will appear next to “**Press Zero Button**” to confirm success. The screen will also update to show the Slope steps, as in Figure 6. The Cycle command replaces Zero on the black bar and the possible PTSA selection is displayed in red. The default is 100 ppb.



Figure 6

8. Rinse the sample cell out thoroughly (twice) with the desired PTSA standard and with the measurement cell near full. (If the screen darkens, promptly press any key to re-set the timer for auto shutdown. The key pressed does not perform its activity, only re-sets timer. The screen then re-lights.)
9. If the 100 ppb PTSA default is not the desired PTSA for calibration, press the **Cycle** labeled key (<) to cycle between the PTSA standards 100-200-300 ppb (it repeats). The value in red will update as the setting is changed. If the default of 100 is desired then the use of **Cycle** (<) is not required. Ensure the value selected matches the standard actually present.
10. Press the **Slope** labeled key (>) to set the slope of the standard desired and complete PTSA calibration.
11. If calibration is successful, the screen will update with a second checkmark for the Slope setting as in Fig. 7, and the message Calibration Succeed will appear.



Figure 7

12. Press the **Exit** labeled key (**OK**) to return to the basic read screen. The screen will be similar to Fig. 3. Slight variance in the PTSA value is not problematic. If Exit is done before the second checkmark appears, the calibration will not be completed and must be re-done. After a successful calibration, the unit does not automatically return to the read (Measurement) mode. If Exit is held down too long the unit will power down rather than returning to the read mode.

Quick Tips

- If the 100 ppb PTSA concentration (the default) is the desired calibration and it is what has been added to the measurement cell for the slope (step 9), then the key presses from the beginning, including the power on, are: **OK**, **<**, **<**, {refill with PTSA standard}, **>**, then after completion, Exit to return to Measurement Mode.
- If screen darkens, the timer will shortly power down the meter. A press on any key will reset the timer and not perform any activity other than timer restart. The next key press needed must still be done after this timer re-set press. The timer is set to help maximize battery life. After the key press to set the zero point, there is 40 seconds to rinse and refill the measurement cell with PTSA standard, before the next key press of either “**Cycle**” (**<**) to change PTSA setting or “**Slope**” (**>**) to execute the final part of the calibration.

- After returning to read 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 (40 sec. in a calibration mode), and after another 20 seconds without key activity will power down. If you have multiple samples a quick press on OK or the other keys will keep the timer going, giving you time to add the next one. To ensure accurate results and avoid sample carry-over/contamination, rinse at least twice with the next sample.
- Always rinse the unit with clean water after use and dry by clean tissue or paper towel.

4.2. Fluorescence Calibration Process

1. Triple rinse and fill the sample cell with DI water. In emergency, “non- fluorescein” water, such as city water, may be used, but recalibrate using DI water for the zero step as soon as it is available.
2. Power on by a press of OK key. Allow 5-10 seconds for meter to stabilize.
3. A Screen similar to Figure 3 appears. The unit is actively reading and displaying fluorescein. The value will be very low if DI water is used; fluorescein should be near zero. A low non-zero value (e.g. 0.1 or 0.2, etc.) is not problematic.
4. Press **Calibration** labeled key (<).
5. Figure 8, the first screen of the fluorescein (alone) calibration, appears.



Figure 8

6. Press **Zero** labeled key (<) to set the zero point.
7. After successful zero set, a checkmark symbol will appear next to “**Click Zero Button**” to confirm success. The screen will also update to show the Slope steps, as in Figure 9. The Cycle command replaces Zero on the black bar and the possible fluorescein selection is displayed in red. The default is 50 ppb.



Figure 9

8. Rinse the sample cell out thoroughly (twice) with the 50 ppb fluorescein standard and with the measurement cell near full. (If the screen darkens, promptly press any key to re-set the timer for auto shutdown. The key pressed does not perform its activity, only re-sets timer. The screen then relights.)
9. Press the **Slope** labeled Key (>) to set the slope of the standard desired and complete low-range fluorescein calibration.
10. If calibration is successful, the screen will update with a second checkmark for the Slope setting as in figure 10, and the message **Click continue to start mid-range calibration**.



Figure 10

11. Press the **Continue** labeled key (>) to continue middle range fluorescein calibration, the screen will also update to show the second Slope step, as in Figure 11. The possible fluorescein selection is displayed in red. The default is 250 ppb. If middle range and high range fluorescein calibration are not required, press the **Exit** labeled key (**OK**) any keys to exit to return to the basic read screen. The screen will be similar to Fig. 3. Slight variance in the fluorescein value is not problematic. If Exit is done before the second checkmark appears, the low range calibration will not be completed and must be re-done. After a successful calibration, the unit does not automatically return to the read (Measurement) mode. If Exit is held down too long the unit will power down rather than returning to the read mode.



Figure 11

12. Rinse the sample cell out thoroughly (twice) with the 250 ppb fluorescein standard and with the measurement cell near full. (If the screen darkens, promptly press any key to re-set the timer for auto shutdown. The key pressed does not perform its activity, only re-sets timer. The screen then re-lights.)
13. Press the **Slope** labeled key (>) to set the slope of the standard desired and complete middle-range fluorescein calibration.
14. If calibration is successful, the screen will update with a third checkmark for the Slope setting as in Fig. 12, and the message Calibration Succeed will appear.



Figure 12

15. Press the **Continue** labeled key (>) to continue high range fluorescein calibration, the screen will also update to show the third Slope step, as in Figure 13. The possible fluorescein selection is displayed in red. The default is 500 ppb. If high range fluorescein calibration is not required, press the **Exit** labeled key (OK) any keys to exit return to the basic read screen. The screen will be similar to Fig. 3. Slight variance in the fluorescein value is not problematic. If Exit is done before the third checkmark appears, the middle range calibration will not be completed and must be re-done. After a successful calibration, the unit does not automatically return to the read (Measurement) mode. If Exit is held down too long the unit will power down rather than returning to the read mode.



Figure 13

16. Rinse the sample cell out thoroughly (twice) with the 500 ppb fluorescein standard and with the measurement cell near full. (If the screen darkens, promptly press any key to re-set the timer for auto shutdown. The key pressed does not perform its activity, only re-sets timer. The screen then re-lights.)
17. Press the **Slope** labeled key (>) to set the slope of the standard desired and complete high-range fluorescein calibration.
18. If calibration is successful, the screen will update with a fourth check mark for the Slope setting as in Fig. 14, and the message Calibration Succeed will appear.



Figure 14

19. Press the **Exit** labeled key (**OK**) any keys to exit return to the basic read screen. The screen will be similar to Fig. 3. Slight variance in the fluorescein value is not problematic. If Exit is done before the fourth checkmark appears, the high range calibration will not be completed and must be re-done. After a successful calibration, the unit does not automatically return to the read (Measurement) mode. If Exit is held down too long the unit will power down rather than returning to the read mode.

Quick Tips

1. If the 50 ppb fluorescein concentration (the default) is the desired calibration and it is what has been added to the measurement cell for the slope (step 9), then the key presses from the beginning, including the power on, are: **OK**, **<**, **<**, {refill with FLUORESCHEIN standard}, **>**, then after completion, press Exit key to return to Measurement Mode.
2. If screen darkens, the timer will shortly power down the meter. Any key press will reset the timer, but this press does not perform any activity other than timer restart. The next key press needed must still be done after this timer re-set press. The timer is set to help maximize battery life. After the key press to set the zero point, there is 40 seconds to rinse and refill the measurement cell with fluorescein standard, before the next key press of either "**Cycle**" (**<**) to change fluorescein setting or "**Slope**" (**>**) to execute the final part of the calibration.

3. After returning to read 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 (40 sec. in a calibration mode), and after another 20 seconds without key activity will power down. If you have multiple samples a quick press on OK or the other keys will keep the timer going, giving you time to add the next one. To ensure accurate results and avoid sample carry-over/contamination, rinse at least twice.

4. Always rinse the unit with clean water after use and dry by clean tissue or paper towel.

5. Device Information and Diagnosis

The device information is shown when the Info labeled OK key in the measurement mode is pressed momentarily (Figure 3). The screen contains the device serial number, software version, and hardware version (Figure 15). The battery life as a percentage and the standard that were used in the last calibration are also shown.

Press the diagnosis labeled key to switch to the diagnosis screen where raw measurement data are displayed (Figure 16). The information has no use for normal operation. Please provide an image of both the device information screen and the diagnosis screen when you contact Pyxis (service@pyxis-lab.com) for troubleshooting your device.



Figure 15

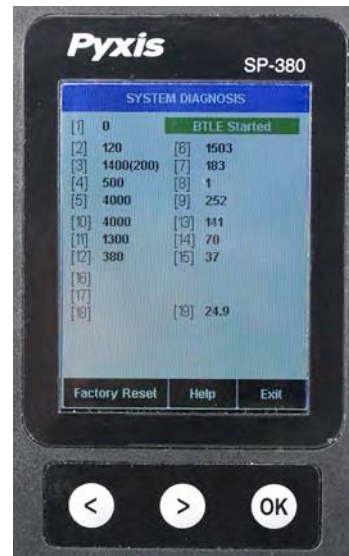


Figure 16

6. Wireless Connection

Pyxis SP-380 can be connected to a smart phone or a computer via WIFI or Bluetooth for upgrading the device software. SP-380 can be wirelessly paired with other Pyxis devices for exchanging data. In the normal operation modes, the wireless function is turned off. If you want to explore the SP-380 wireless functions, please contact Pyxis Lab Inc. (service@pyxis-lab.com)

7. How to Clean SP-38

Soak the sampling cup of the SP-380 meter with handheld cleaning solution for 30 minutes. Rinse the SP-380 sampling cup with distilled water, wipe down sampling cup with Q-tip, rinse with distilled water once again, and then check for the flashing blue light inside the sampling cup of the SP-380 meter. If the surface is not entirely clean, continue to soak the SP-380, meter sampling cup for an additional 30 minutes. Pyxis Lab Handheld Cleaning Solution can be purchased at our online Estore/Catalog: <https://pyxis-lab.com/product/handheld-device-cleaning-kit/>.

Video on how to clean handheld meters: <https://www.youtube.com/watch?v=OJDnCOjw7-M>.

