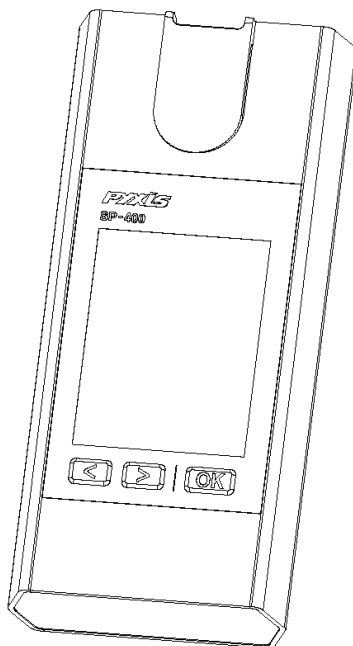




**SP-360 Handheld Fluorometer -  
Fluorescein  
Operation Manual**

Rev. A

Firmware version 1.xx



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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 the Technical Support (service@pyxis-lab.com) 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.

# **1 General Description**

## **1.1 Specification**

Fluorescein	
Measurement Range	0 to 600 ppb
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
Others	
Battery	9V alkaline battery
Typical Battery Life	3200 readings(480mAh battery)
Display	320x240 TFT-LCD, visible under direct sunlight
Dimension	L160 W74 H33 (mm)
Weight	310g (without battery)
Temperature Range	40 to 106 °F (4 to 41 °C)
Humidity	85% at 106 °F (41 °C)
Environmental	IP67, dustproof and waterproof

## 1.2 Pyxis SP-360 Major Features

The Pyxis SP-360 analyzer simultaneously measures the concentration of fluorescent tracer fluorescein of a water sample. Main features include:

- Pyxis SP-360 is pre-calibrated for measuring fluorescein in the range of 0 to 600 ppb.
- 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](mailto:service@pyxis-lab.com).

## 1.4 Standard Accessories

- Quick Instruction Guild
- 9V alkaline battery
- Full instrument manual is available from [www.pyxis-lab.com](http://www.pyxis-lab.com)

## 1.5 Optional Accessories

- Carrying case for SP-360
- 50 ppb fluorescein standard in a 500 ml brown plastic bottle
- 250 ppb fluorescein standard in a 500 ml brown plastic bottle
- 500 ppb fluorescein standard in a 500 ml brown plastic bottle

## 1.6 Light Shield Cover

The light shield cover is shown in Figure 1. It should be in the closed position during fluorescein measurement.

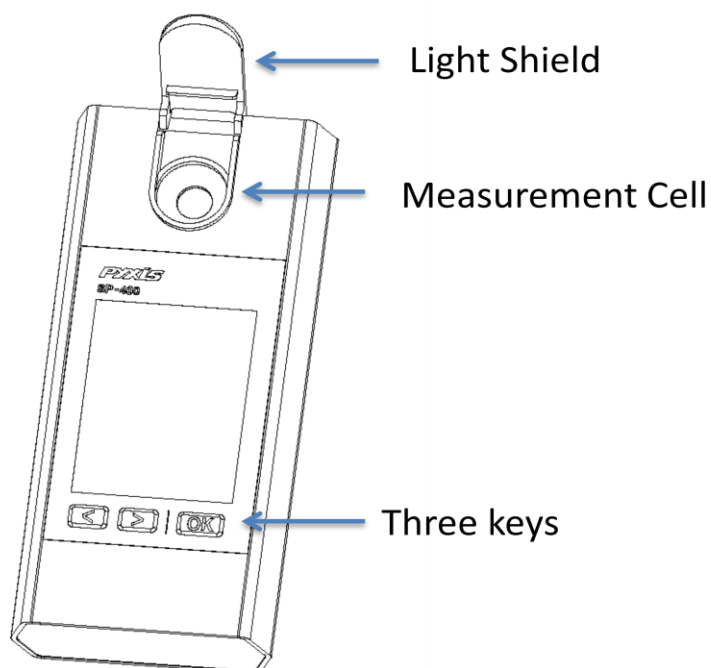


Figure 1 Light Shield in the Open Position

## 2 Start Pyxis SP-360

### 2.1 Battery Installation

Pyxis SP-360 is powered by a 9V alkaline battery. Do not use rechargeable nickel cadmium (NiCad) batteries or any 9V lithium battery. A typical 9V battery lasts for two months and enables about 3000 measurements. When the battery capacity is low,

Pyxis SP-360 will prompt a LOW BATTERY warning for 5 seconds and turn off automatically. Replace the battery to resume operation of Pyxis SP-360 after the battery warning. After new battery installation, Pyxis SP-360 will be automatically turned on to the measurement mode.

The Pyxis SP-360 battery compartment, shown in Figure 2, is on the back side of the instrument. Install batteries as followings:

1. Remove the battery compartment cover by loosening four screws.
2. Make sure that the smaller circular terminal (positive) of the battery is aligned with the hexagonal socket (positive) of the battery holder, the hexagonal socket (negative) of the battery with the circular terminal of the holder. Snap the battery firmly into the battery holder.
3. Replace the battery compartment cover, making sure that the sealing O-ring is lying flat on the battery holder and tighten the four screws.

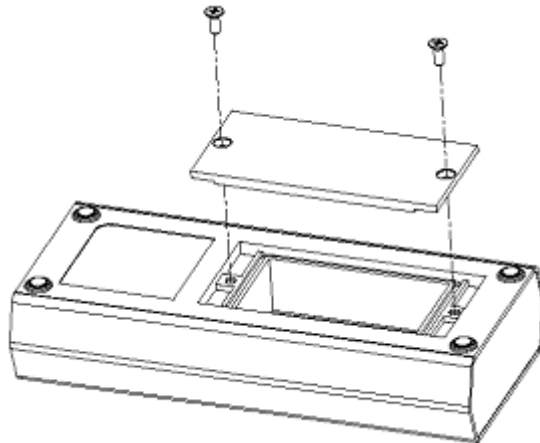


Figure 2 Install Battery

## 2.2 Description of the Navigational Control Keys

The Pyxis SP-360 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.

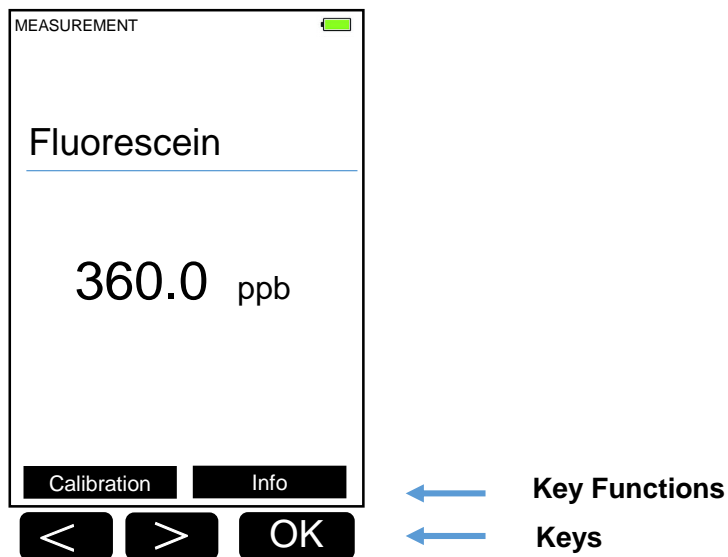


Figure 3 Keys and the associated functions in the Measurement Mode

## 2.3 Turning On/Off Pyxis SP-360

To turn on SP-360, press and hold on the OK key for 3 seconds, and release the OK key when the LCD is lit.

To turn off SP-360, press and hold on the OK key for 3 seconds, and release the OK key when the LCD is off. SP-360 will turn itself off after 60 seconds without user interaction through the keys.

## 3 Fluorescein Measurement

When turned on, SP-360 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-360 can directly take a water sample from a faucet or sample valve port. The light shield needs to be in the closed position in order to measure fluorescein.

Allow a few seconds for SP-360 to reach a stable fluorescein readings. For a sample containing 50.0 ppb fluorescein, the measured fluorescein should be stabilized within the range of 49 to 51 ppb.

SP-360 does not need to be turned off between measurements of two samples. Rinsing the measurement cell a few times is recommended.



## 4 Fluorescein Calibration

SP-360 fluorescein measurement can be calibrated separately. To calibrate fluorescein measurement requires the 50 ppb, 250 ppb and 500 ppb fluorescein standard solution.

- 1) Rinse sample cell with DI water and with it near full, close the light shield. In emergency, “non-fluorescein” 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 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 4, the first screen of the fluorescein (alone) calibration, appears.

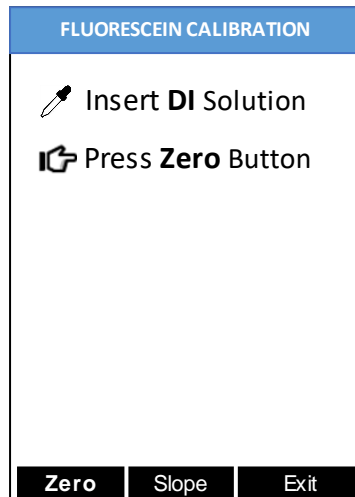


Figure 4

- 4) Press Zero labeled key (<) to set the zero point.
- 5) 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 5. The Cycle command replaces Zero on the black bar and the possible fluorescein selection is displayed in red. The default is 50 ppb.

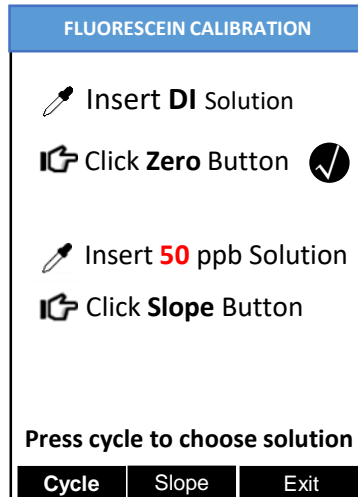


Figure 5

- 6) Rinse the sample cell out thoroughly (twice) with the 50 ppb fluorescein standard and with the measurement cell near full, close the light shield. (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.)
- 7) Press the Slope labeled key (>) to set the slope of the standard desired and complete low-range fluorescein calibration.
- 8) If calibration is successful, the screen will update with a second checkmark for the Slope setting as in Fig. 6, and the message Calibration Succeed will appear.

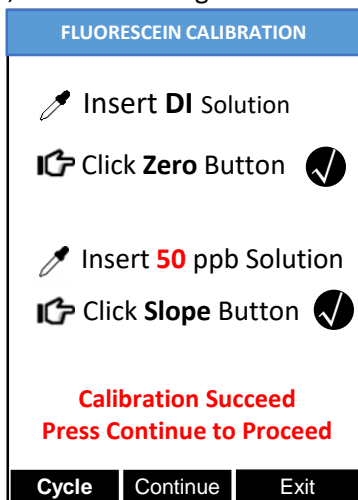


Figure 6

- 9) 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 7. 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. 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.

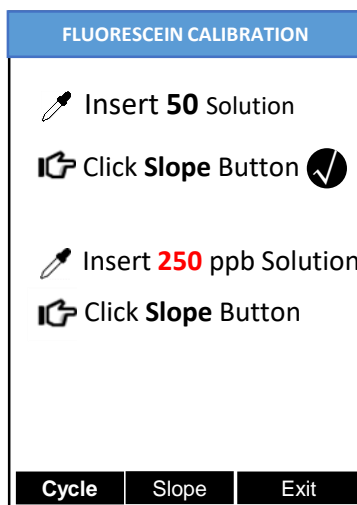


Figure 7

- 10) Rinse the sample cell out thoroughly (twice) with the 250 ppb fluorescein standard and with the measurement cell near full, close the light shield. (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.)
- 11) Press the Slope labeled key (>) to set the slope of the standard desired and complete middle-range fluorescein calibration.
- 12) If calibration is successful, the screen will update with a third checkmark for the Slope setting as in Fig. 8, and the message Calibration Succeed will appear.

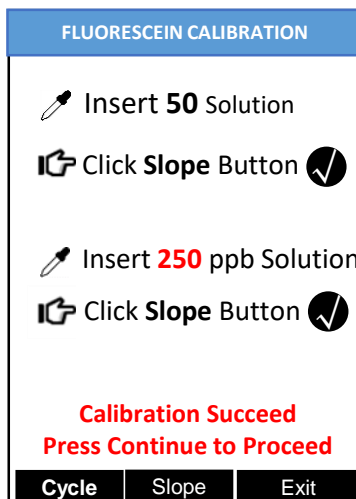


Figure 8

- 13) 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 9. 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.

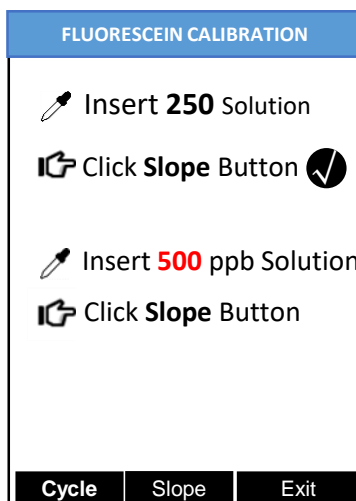


Figure 9

- 14) Rinse the sample cell out thoroughly (twice) with the 500 ppb fluorescein standard and with the measurement cell near full, close the light shield. (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.)
- 15) Press the Slope labeled key (>) to set the slope of the standard desired and complete high-range fluorescein calibration.
- 16) If calibration is successful, the screen will update with a fourth checkmark for the Slope setting as in Fig. 10, and the message Calibration Succeed will appear.

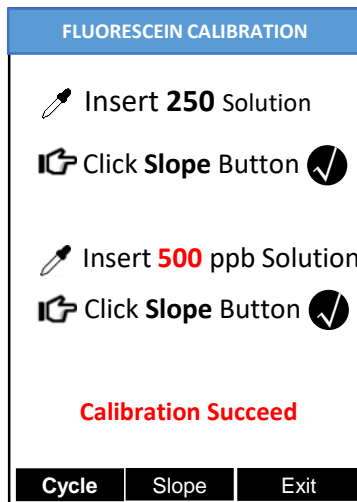


Figure 10

- 17) 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

- FLUORESC EIN standard}, >, then after completion, Exit 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 (and close the light shield), 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 with the next sample before closing light shield (it's smart to include rinsing the inside surface of the light shield.)
  - 4) Always rinse the unit with clean water after use and dry by clean tissue or paper towel. Be gentle handling the open light shield.

## 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 11). 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 12). 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](mailto:service@pyxis-lab.com)) for troubleshooting your device.

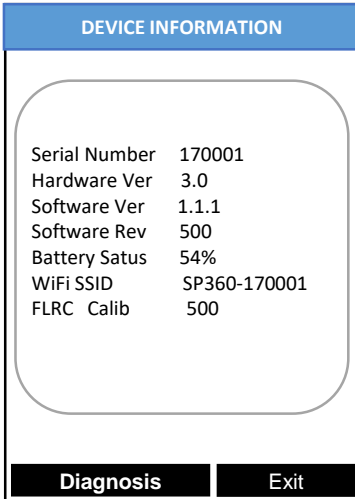


Figure 11

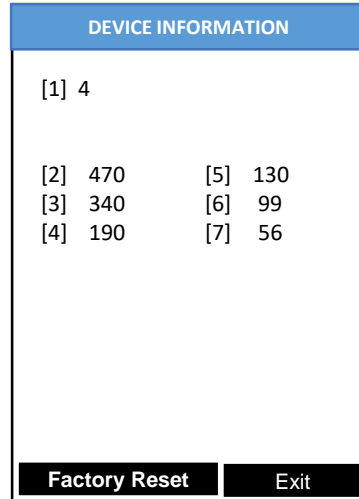


Figure 12

## 6 Wireless Connection

Pyxis SP-360 can be connected to a smart phone or a computer via WIFI or Bluetooth for upgrading the device software. SP-360 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-360 wireless functions, please contact Pyxis Lab Inc. ([service@pyxis-lab.com](mailto:service@pyxis-lab.com))