Pyxis®

www.pyxis-lab.com

EM-400 Chloropyll-A Handheld
User Manual

Pyxis Lab® Inc.
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EM-400 Handheld In-vivo Chlorophyll-a Analyzer User Manual

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Contents

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 disclosed herein. The 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 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

Item	Specification
P/N	50508
Measurement Range	0 to 50 ppb
Excitation Wavelength	470 nm
Emission Wavelength	650 nm
Wavelength Accuracy	±1 nm
Precision	0.1 ppb
Accuracy	±1% or ±0.1 ppb
Calibration Solution Point	0, 10, 20, 50 ppb
Battery	4 AA alkaline batteries for main module
Typical Battery Life	3200 readings (480mAh battery)
Display	320x240 TFT-LCD, visible under direct sunlight
Dimension	L170.W80.H45 (mm)
Weight	400g (without battery)
Temperature Range	40 to 106° F (4 to 41° C)
Humidity	85% at 106° F (41° C)
Environmental	IP67, dustproof and waterproof
Regulation	CE / RoHS

1.2 Pyxis EM-400 Major Features

The Pyxis EM-400 analyzer measures the concentration of chlorophyll-a of a water sample. Main features include:

- The EM-400 is pre-calibrated for measuring chlorophyll-a in the range of 0 to 50 ppb. The chlorophyll-a measurement is automatically compensated for sample color and turbidity interference.
- Chlorophyll-a can be calibrated with using three secondary standards (10, 20,50ppb) and the sample water through a user-friendly menu-driven procedure.
- No sample cuvette is required and as such variations associated with the cuvette are eliminated.
- Large color graphic screen that can be read in direct sunlight.

1.3 Unpacking 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

MA-NEB USB Adapter

- Quick-Start Instruction Guide
- 4 AA alkaline batteries
- Bluetooth USB adapter (P/N: MA-NEB)
- Full instrument manual is available from https://pyxis-lab.com/support-2/

1.5 Optional Accessories

Item	P/N	Specification
Pyxis Handheld Cleaning Kit	SER-02	Pyxis Handheld Sample Well Cleaning Solution Kit – 500mL
Chloro-10	21066	Chlorophyll-a 10 ppb Calibration Std – 500mL
Chloro-20	21041	Chlorophyll-a 20ppb Calibration Std – 500mL
Chloro-50	21067	Chlorophyll-a 50ppb Calibration Std – 500mL
MA-700	50725	Pyxis Handheld Hard Carry Case

1.6 Structure Description

The structure description is shown in *Figure **1***.

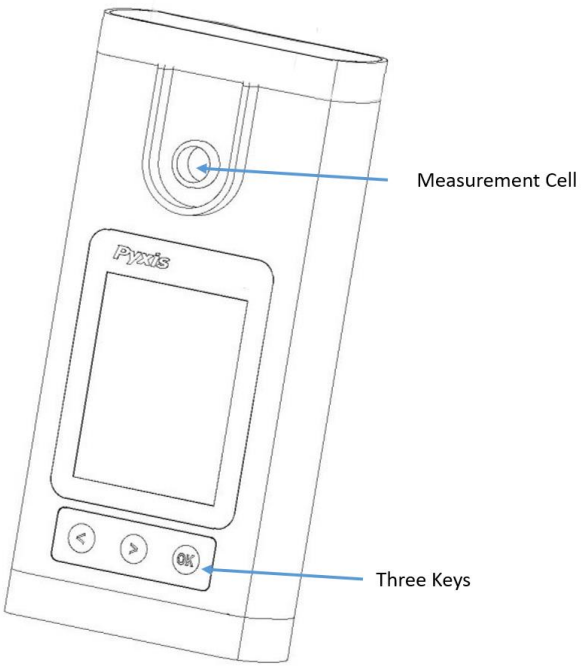

Figure 1 EM-400 Structure Description

2 Start Pyxis EM-400

2.1 Battery Installation

The EM-400 is powered by 4 AA alkaline batteries. Do not use rechargeable nickel cadmium (NiCad) or lithium batteries. The 4 AA alkaline batteries will last sufficient for about 3000 measurements. When the battery capacity is critically low, the EM-400 will display a LOW BATTERY warning for 5 seconds and then automatically turn off.

Replace the battery to resume operation of the EM-400 after the battery warning. The EM-400 will automatically turn on in the measurement mode after new battery installation.

The EM-400 battery compartment, shown in *Figure **2***, is on the back side of the instrument.

Install battery as follows:

1. Remove the battery compartment cover by loosening two screws.

2. Make sure that the smaller circular terminal (positive) of the battery is aligned with the hexagonal socket (positive) of the battery holder and 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. To prevent the EM-400 from accidently being turned on due to vibration, please firmly tighten the two screws.

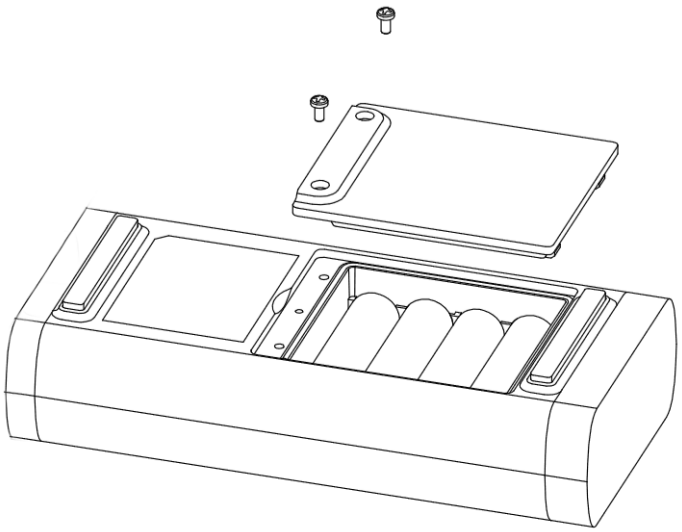

Figure 2 Battery Installation

2.2 Description of the Control Keys

The EM-400 has three keys as shown in *Figure **3***. The left (<), right (>) and OK keys are used to launch an action indicated on the screen directly above the keys. Please note that the screen is not a touch screen. The labels above the keys indicate the function associated with the keys and can change according to the screen modes.

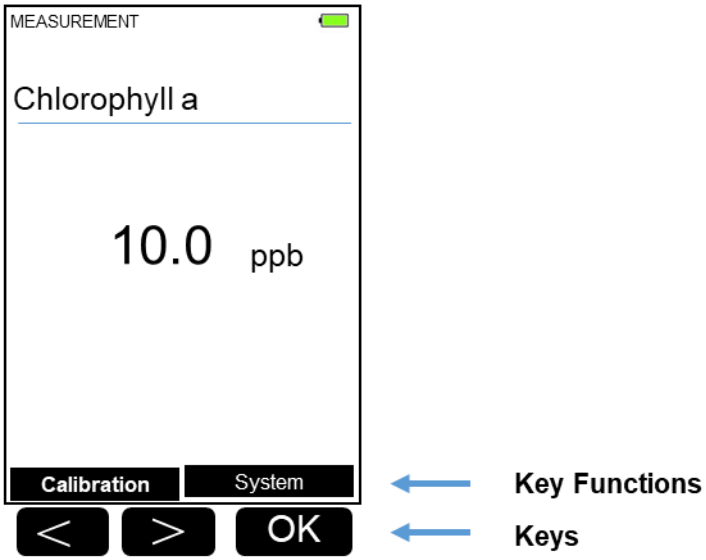

Figure 3 Keys & Associated Functions

2.3 Turning On/Off Pyxis EM-400

To turn on the EM-400, press OK momentarily and release.

To turn off the EM-400, press and hold the OK key. Release the OK key when the LCD display turns off (after about 3 seconds). The EM-400 will turn itself off after 60 seconds without user interaction through the keys.

3 Chlorophyll-a Measurement

3.1 Measurement

When powered on, the EM-400 will be in the measurement (read) mode (see *Figure **3***).

The water sample can be transferred to the measurement cell using a pipette or filled directly from a sample bottle or sample valve.

Allow 5 seconds for the EM-400 to reach a stable chlorophyll-a reading. For a sample containing 10 ppb chlorophyll-a, the measured chlorophyll-a should be stabilized within the range of 9.8 to 10.2 ppb.

The EM-400 does not need to be turned off between measurements of two samples. Rinsing the measurement cell several times between samples is recommended.

3.2 High Color and Turbidity Warning

The EM-400 has extra channels to measure sample turbidity and color which are used to automatically compensate for any interference caused by these contaminants as high as 40-60NTU. If the sample turbidity and color values determined are too high, a measurement warning will be displayed. In such a case, the user should pre-filter the sample for a chlorophyll-a measurement within the compensation capability of the EM-400.

4 Calibration

The EM-400 chlorophyll-a measurement can be calibrated. To calibrate chlorophyll-a measurement requires the 10, 20ppb or 50 ppb chlorophyll-a standard solution from Pyxis Lab or the sample water.

Chlorophyll-a Calibration (2 Point with Zero)

1) Rinse sample cell with DI water. Fill sample cell with DI water.
   NOTE *In an emergency, "non-chlorophyll-a" 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 short press of OK key. Allow 5-10 seconds for meter to stabilize.
3) A screen similar to *Figure **4*** will appear. The unit is actively reading and displaying the chlorophyll-a residual in the sample. The values will be very low if DI water is used; chlorophyll-a value should be near zero. A low non-zero value (e.g. 0.1 or 0.2, etc.) is normal and not problematic.

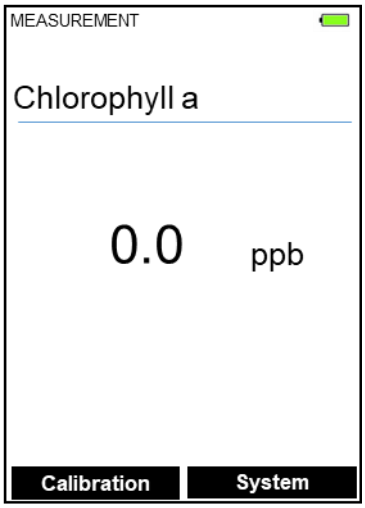

Figure 4

4) Press Calibration labeled key (<).
5) *Figure* , the first screen of the chlorophyll-a (alone) calibration will appear.

Figure 5

6) Press Zero labeled key (<) to set the zero point.

7) After a successful zero calibration 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 chlorophyll-a calibration solution selection is displayed in red. The default is 20 ppb.

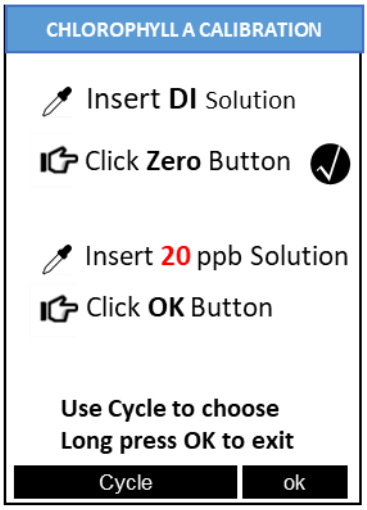

Figure 6

8) Rinse the sample cell out thoroughly (twice at least) with the desired chlorophyll-a standard and ensuring the measurement sample cell is nearly full.

9) If the 20ppb chlorophyll-a default is not the desired chlorophyll-a for calibration, press the Cycle labeled key (<) to cycle between the chlorophyll-a standards 10-20 -50ppb (repeating). The value in red will update as the setting is changed. If the displayed Target numeric value is not that desired, click the ok key and use the - and + labeled keys (< or >) to adjust the value to that which is desired based on the calibration standard being used. Ensure the value selected matches the standard actually utilized. (see *Figure*) .

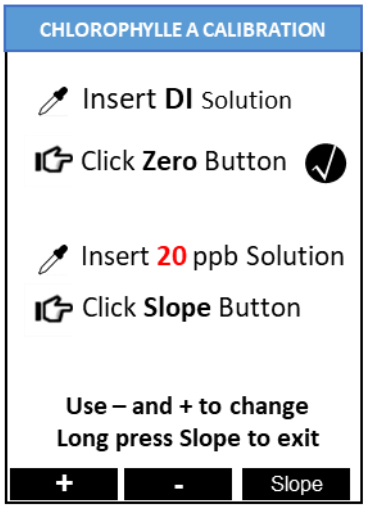

Figure 7

4) Press the Slope labeled key (>) to set the slope of the standard desired and complete chlorophyll-a calibration.

5) If calibration is successful, the screen will update with a second checkmark for the Slope setting as in *Figure* and the message Calibration Succeed will appear.

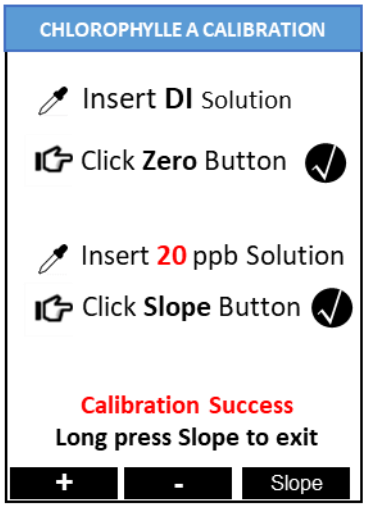

Figure 8

10) Long press the slope labeled key (OK) to return to the main measurement screen. The screen will be similar to *Figure* . Slight variance in the chlorophyll-a value displayed vs the calibrated value is not problematic. If Exit is done before the second checkmark appears, the calibration will not be completed and must be re-done.

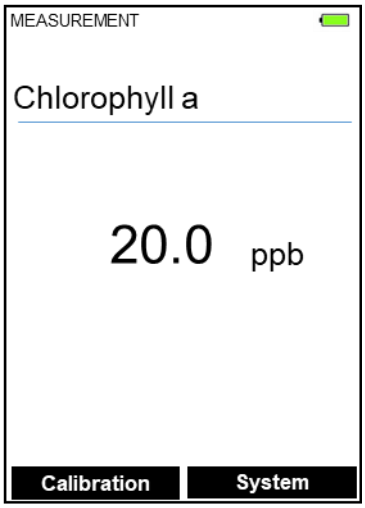

Figure 9

Quick Tips

1) If the 20-ppb chlorophyll-a concentration (the default) is the desired calibration and it is what has been added to the measurement cell for the slope (step 8), then the key presses from the beginning, including the power on, are: OK, <, <, {refill with chlorophyll-a standard}, ok, ok, then after completion, long press the slope 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 chlorophyll-a standard before the next key press of either “Cycle” (<) to change chlorophyll-a setting or “Slope” (ok) to execute the final part of the calibration. Users may alter the auto-time-off feature of the EM-400 device by using the uPyxis Mobile APP.

See instructional video on customized Pyxis handheld device settings at
https://www.youtube.com/watch?v=ulE8OkwmeNQ

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 seconds in a calibration mode), and after another 20 seconds without key activity the unit 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 proceeding.

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

5) After a successful calibration, the unit does not automatically return to the measurement mode.

5 Device Information and Diagnosis

The device information is shown when the System 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*). 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*). 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.

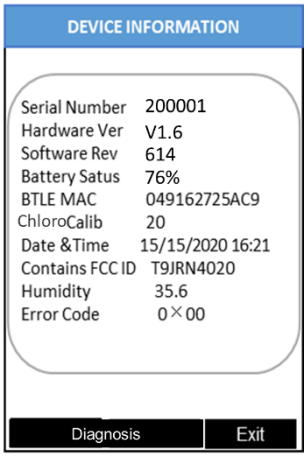

Figure 10

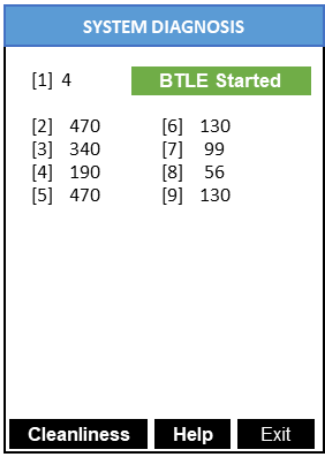

Figure 11

6 Bluetooth Connection

To turn on the Bluetooth EM-400 wireless function, press **System**, and then press **Diagnosis.** The Pyxis EM-400 can be connected to a smart phone/device or a computer via the built-in Bluetooth Low Energy Connection (BTLE). The uPyxis© Mobile app for smartphone is available for free download to both Apple and Samsung devices per QR codes below.

A laptop with uPyxis© Desktop app can use the Bluetooth Adapter (MA-NEB) included with the EM-400 as a standard accessory to connect to the EM-400 for parameter configuration, firmware upgrade, and other tasks. The Pyxis uPyxis software can be downloaded from

uPyxis® App | Mobile Monitoring, Calibration & Configuration | Pyxis Lab® (pyxis-lab.com)

7 EM-400 Cleaning

The EM-400 is designed to provide reliable and accurate measurement on chlorophyll-a. Heavy fouling will prevent the light from reaching the sensor, resulting in inaccurate readings. It is suggested that the EM-400 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.

7.1 Cleanliness Check

EM-400 is designed to do the Cleanliness Check as described below:

1. Press **System** (the **OK** key) to launch Device Information page (as shown in *Figure*)
2. Press **Diagnosis** (the **<** key) to switch to System Diagnosis page (as shown in *Figure*)
3. Press **Cleanliness Check** (the **<** key). An instruction prompt appears to ask USER to put DI water into the measurement cell (as shown in *Figure*)
4. Put DI water into the measurement cell
5. Press **Confirm** (the **<, >** or **OK** key). The instruction prompt will disappear and EM-400 begins to check if fouling
6. Checking result will be displayed in Diagnosis page as shown in *Figure* and *Figure*
7. If sample cell is fouled, proceed to cleaning procedure in section 7.2.

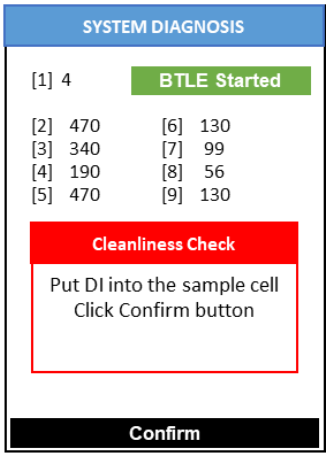

Figure 12

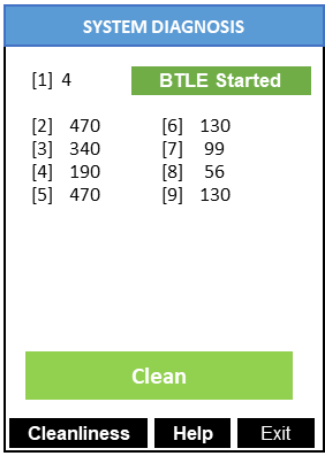

Figure 13

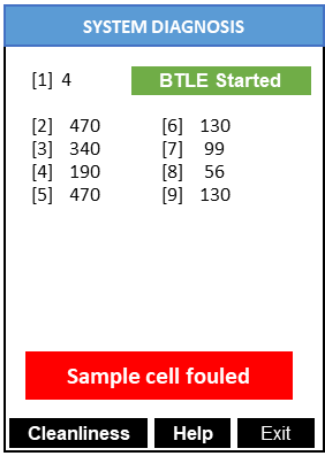

Figure 14

7.2 Cleaning Procedure

A light deposit on the quartz glass inside the measurement cell can be cleaned by a Q-Tip. Aged heavy deposition, especially iron oxide deposited should be removed using a cleaning solution capable of removing inorganic deposits.

We recommend the Pyxis Handheld Device Cleaning Kit (P/N : SER-02) available from Pyxis online Estore/Catalog https://www.pyxis-lab.com/product/handheld-cleaning-kit/

Pour the cleaning solution into the sample cell and allow to soak for 10-30 minutes (depending on severity of foulant) and gently clean with Q-Tip/Brush provided in the Pyxis Handheld Device Cleaning Kit. Rinse the measurement cell with distilled water and then do the cleanliness check as described above to confirm the sample cell is clean. If the sample cell cleanliness check indicates the unit is still dirty, repeat the above process until the diagnosis indicates sample cell is properly cleaned.

Figure 15 Pyxis Handheld Device Cleaning Kit (P/N : SER-02)

8 REGULATORY APPROVAL

United States

The EM-400 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 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 distance 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

9 Contact us

Contact us if you have questions about the use or maintenance of the EM-400 Water Multimeter:

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Pyxis DATASHEET

Cleaning Kit For Pyxis Handheld Devices

The Pyxis Handheld Devices from Pyxis Lab have proven to be an industry leader in accurately detecting PTSA fluorescent tracer in cooling and process water applications while compensating for color and turbidity. We've found that our cleaning solution also helps ensure the accuracy of your pH, Conductivity, & Free Chlorine readings if your one of our multifunctional handheld devices. Pyxis recommends a minimum cleaning frequency of once per month be maintained dependent on application needs and foulant level. High stress applications with excessive suspended solids and corrosion/scale by-product can result in the need to increase the frequency of cleaning your handheld device. For field use, Pyxis has developed a custom field cleaning kit for all your Pyxis handheld devices specifically designed to target a wide variety or inorganic deposits and foulants commonly experienced in cooling water applications.

YouTube

https://www.youtube.com/watch?v=OJDnCOjw7-M

Product Details

- Custom Blend of Organic Acid/Reducing Agent & Surfactant
- Targets Inorganic Fouling & Deposition within your Handheld devices
- Will Not Damage your Handheld Devices
- 250 mL Bottle = Sufficient For 25 Cleanings
- Probe Cleaning Procedure Provided on Bottle
- Q-Tips & Pipe Brush Cleaner Included

Procedure

- Soak your handheld device in 10 mL of cleaning kit solution & allow to soak for 30 minutes
- Then use cotton swab or pipe cleaner to gently remove excessive deposit after soaking
- Rinse with DI water then check for flashing blue light inside your handheld device
- If surface is not entirely clean soak the device for an additional 30 minutes then repeat check

Ordering Information

Handheld Device Field Cleaning Kit P/N: SER-02

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