

UC-50 & EM-500

Startup Guide



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1. UC-50 Overview

The Pyxis UC-50 is a universal and preconfigured micro-display and data logging terminal that can connect any Pyxis sensor via RS-485. The UC-50 requires no user configuration when connected to Pyxis inline sensors. When Pyxis sensors are landed via RS-485 modbus, the UC-50 allows the user to select the Pyxis sensor through a pre-programmed dropdown menu. Once the user has selected the Pyxis sensor from the menu, the UC-50 immediately recognizes the sensor for live sensor value, color trend charts as well as sensor diagnostics and calibration interface while logging data for USB download. The UC-50 provides RS-485 and 1x 4-20 mA outputs as well as one 24VDC Relay output for connection to additional controllers, PLC or DCS systems.

NOTE This manual uses the Pyxis EM-500 inline algae sensor as an example to describe the UC-50 functions and features.

2. Specification

Item	UC-50
P/N	43007
Power	110/220VAC 50/60 Hz, 0.6A
Display	2.8" Color 320 x 240 Resolution
Output	1 x 4-20 mA / RS-485 Modbus-RTU
Input	1 x 4-20 mA / RS-485 Modbus-RTU
Relay Output	One channel relay output, 24VDC – 10 Watt Maximum
Data Storage	32 M Flash
USB	1 x USB host for data downloading
Dimension	6.3 inch L x 3.9 inch W x 2.6 inch D
Weight	4.6 lbs / 2.1 kg
Operation Temperature	32 – 122 °F (-0 – 50 °C)
Storage Temperature	-4 – 158 °F (-20 – 70 °C)
Humidity	5 – 95% No Condensation
Protection	IP-65
Regulation	CE, RoHS

**As Pyxis technology is continuously updated, this technical parameter may change at any time without notice.*

3. Unpackaging & Sensor Connection

The UC-50 is provided as one item with no loose wiring or power cord. The internal power supply terminal input allows users to install in a hardwired format for safety. For users desiring to power the UC-50 via outlet, a NEMA-5 power supply with plug should be utilized. Each Pyxis Lab sensor is provided with a short flying lead/adaptor cable and bulkhead cable. The flying lead cable should be landed to the UC-50 terminal board and sensor bulkhead cable will attach to the flying lead cable via the provided adapters.



4. Dimension

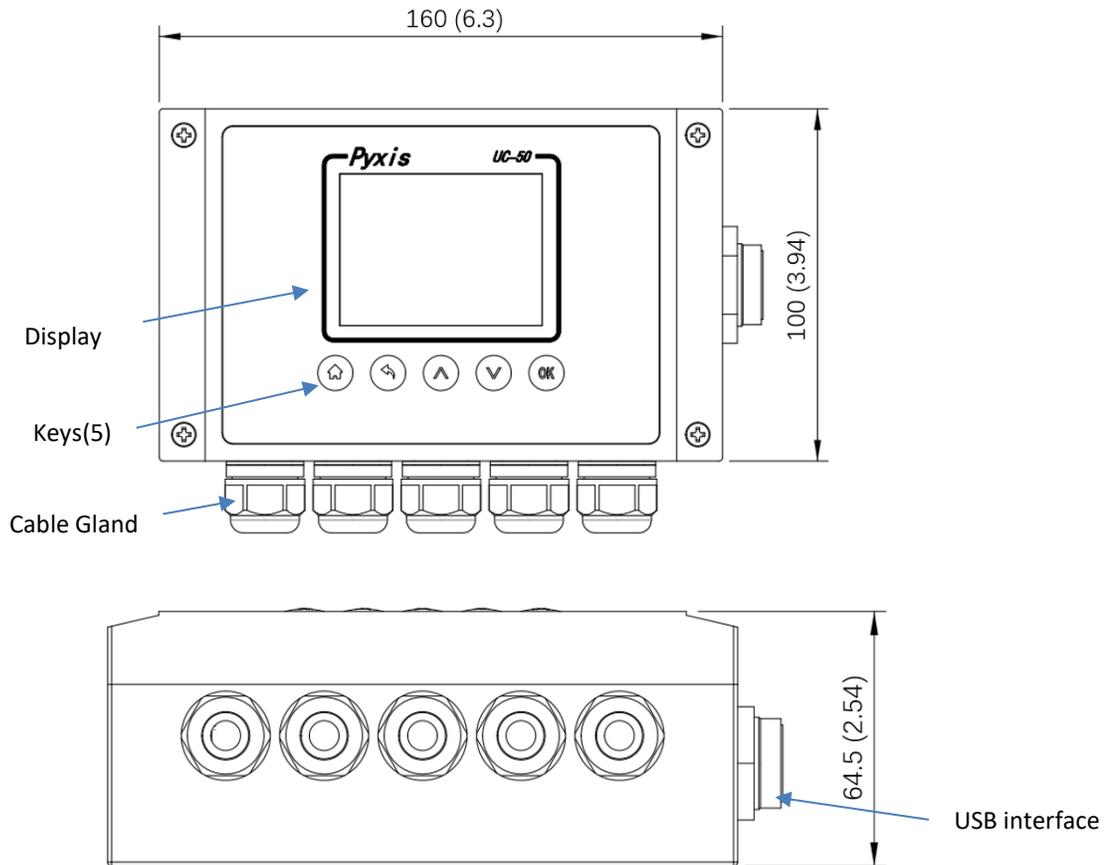


Figure 1. Dimensions, unit: mm(inch)

5. Electrical Connection

5.1 EM-500 wiring

Follow the wiring table below to connect the EM-500 series sensor to the UC-50.

Wire Color	Designation
Red	24 V +
Brown	24V Power Ground
White	1#4-20 mA+ for chlorophyll-a
Green	2#4-20mA+ for Cleanliness
Blue	RS-485 A
Yellow	RS-485 B
Clear	Earth Ground

5.2 UC-50 TERMINAL BOARD WIRING DIAGRAM

Please refer to the wiring terminal diagram below for the UC-50 display/data logger.

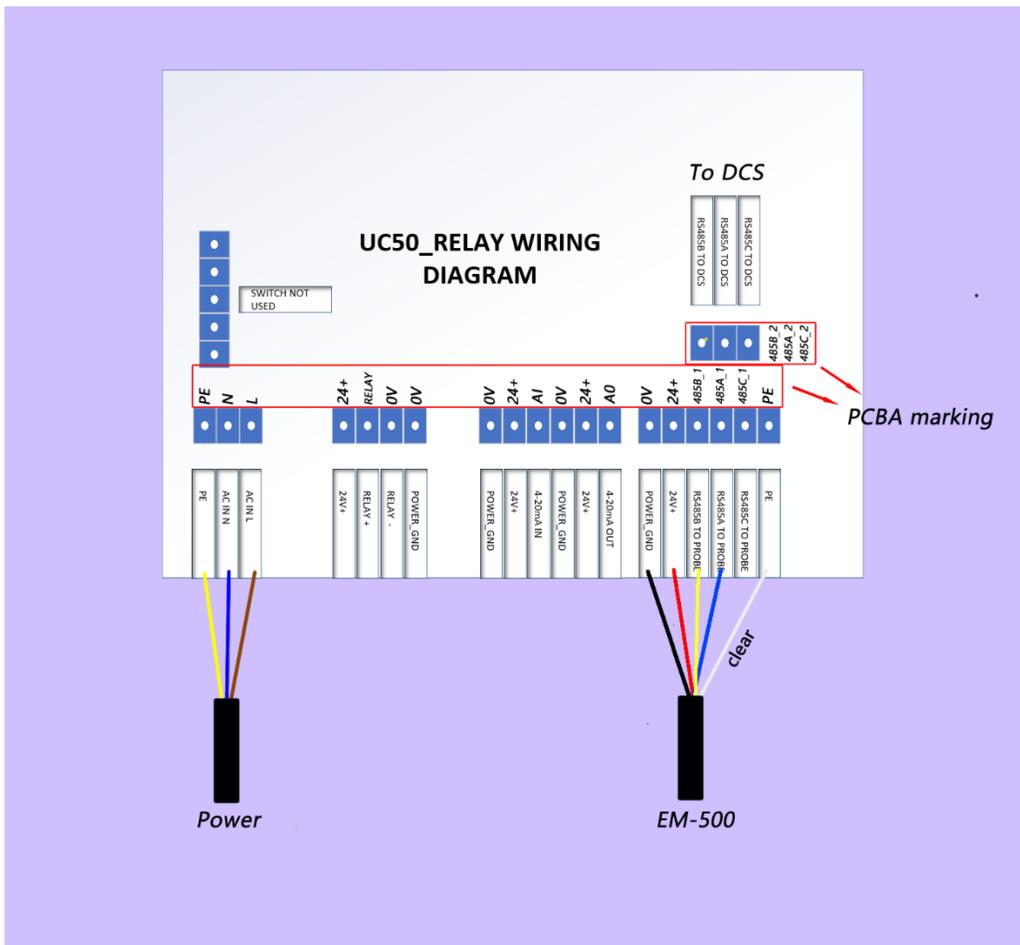


Figure 2. AC-Power Supply and Input/Output Wiring

6. UC-50 Operation

6.1 Main screen

The UC-50 may be configured to connect to EM-500 probe by default when it leaves the Pyxis factory if ordered with the EM-500 sensor. Alternatively, the user may select the sensor name through the menu interface. After the UC-50 is turned on, the main interface of the UC-50 will display the chlorophyll-a value of the tested solution. The green dot in the upper right corner of the UC-50 main interface indicates that the UC-50 is operating normally. If used, the 4-20mA input signal, 4-20mA output signal and relay output states are displayed at the bottom of the UC-50 main interface.

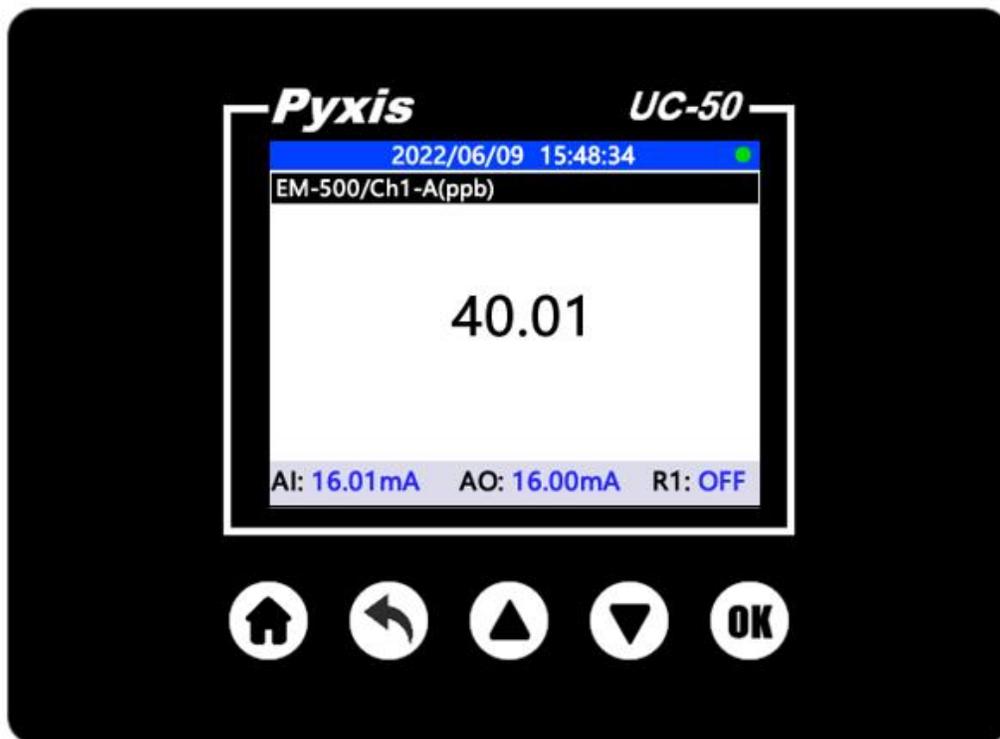


Figure 3. Main Screen

6.2 Button Function

-  **Main key**-Return to the main screen from any interface
-  **Back key**-Return to the last displayed screen or open the setting menu
-  **Up / Down key**-Select different settings or adjust parameters
- OK key** -Confirm to enter a settings page or confirm parameters

6.3 Trend Chart

Main Screen → ▲ or ▼

Measured values will be displayed as a line graph to show the real-time trend. Press ▲ or ▼ to return to the main screen.

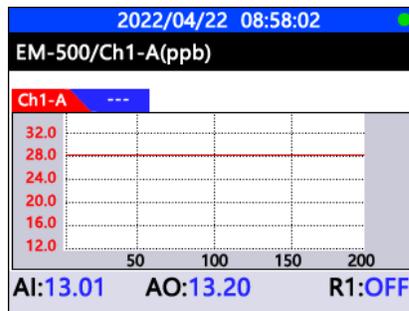


Figure 4. Trend Chart

6.4 Calibration

Main Screen → ← → ▲ or ▼ → **[Probe Calibration]** → **OK**

The EM-500 sensor is calibrated with a live cyanobacteria sample before shipping. The chlorophyll-a concentration in the live algae is measured using the traditional spectrophotometric method. The EM-500 sensor can be calibrated by the user using any water sample with a known chlorophyll-a concentration. Alternatively, the EM-500 sensor can be calibrated against a chemical standard to simulate the chlorophyll-a fluorescent characteristic. Chlorophyll-a by itself is not stable and not suitable to be used as a field calibration solution due to rapid degradation. A simulated/synthetic calibration standard (**Pyxis CHLORO-20**) is recommended to bring the fluorometer back to the factory calibration.

The calibration procedure provided in this manual is based on using the Pyxis chlorophyll-a 20 ppb calibration standard (**P/N: 21041**). This is a synthetic standard simulating a concentration of 20 ppb as in-vivo chlorophyll-a. The user can also use any sample that has a known chlorophyll-a concentration determined by traditional spectrophotometric methods to carry out the calibration as mentioned above.

6.4.1 Zero Calibration

Remove the EM-500 sensor and rinse it thoroughly with deionized water. Place the sensor tip into a beaker containing deionized water and avoid light. Let the EM-500 Series sensor stand for a minimum of 15 minutes. Observe the values being displayed on the **Calibration** screen. Once the chlorophyll-a value is stable, press **Zero Cal** to perform a zero calibration.

If the calibration is successful, the interface will return a message “Zero calibration succeed”. If the calibration fails, press **Zero Cal** again and repeat the process.

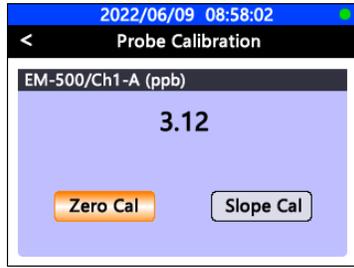


Figure 5. Zero Calibration

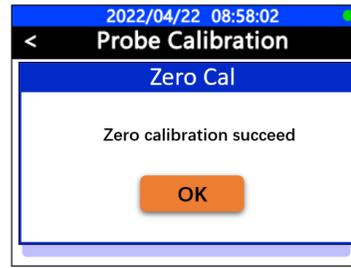


Figure 6. Calibration Success

6.4.2 Slope Calibration

After completing Zero Calibration, place the sensor tip into a beaker containing **20ppb** Calibration Chlorophyll-a Solution (**P/N: 21041**) and avoid light. Let the EM-500 Series sensor stand for a minimum of 15 minutes. Once the chlorophyll-a value is stable, press **Slope Cal** and enter the chlorophyll-a value "20" to perform a slope calibration.

If the calibration is successful, the interface will return a message "Slope calibration succeed". If the calibration fails, press **Slope Cal** again and repeat the process.

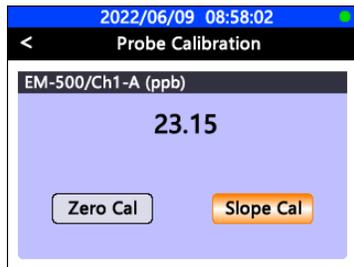


Figure 7. Zero Calibration

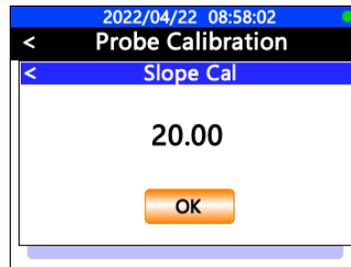


Figure 8. Calibration Success

6.5 View Historical Data & Set Data Storage Period

Main Screen → [Left Arrow] → [Up Arrow] or [Down Arrow] → **[Historical Data]** → **OK** → **[View Historical Data] or [Set Data Storage Period]** → **OK**

UC-50 controller stores measurement data of EM-500 every 60-seconds. This time period may be adjusted if desired by the user. You can browse the data of different time periods with the ▲ and ▼ keys. The data types from left to right are chlorophyll-a values, no sense, no sense and 4-20mA input value.

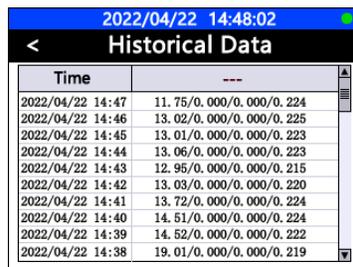


Figure 9. Historical Data

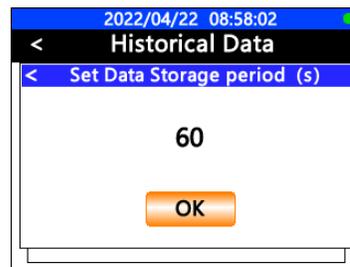


Figure 10. Set Period

6.6 Probe Diagnosis

Main Screen → ↩ → ▲ or ▼ → *[Probe Diagnosis]* → OK

The UC-50 controller supports displaying the diagnostic data of the EM-500 in use. This feature may be used for technical support when communicating with service@pyxis-lab.com.

2022/06/09 08:58:02			
< Probe Diagnosis			
PN:	50501	SN:	210510001
Addr:	19	Ver:	1.2r137
1	274	9	0.00
2	1	10	1.80
3	575	11	0.06
4	914	12	0.04
5	1	13	0
6	1	14	0
7	1	15	0
8	1	16	0

Figure 11. Diagnosis

6.7 Restore Initial Parameters

Main Screen → ↩ → *[ProbeSetting]* → OK → ▼ → *[Restore initial parameters]* → OK

If the abnormal reading of the probe is caused by improper calibration users can restore the probe to the factory parameters by using the **Restore initial parameters** function.

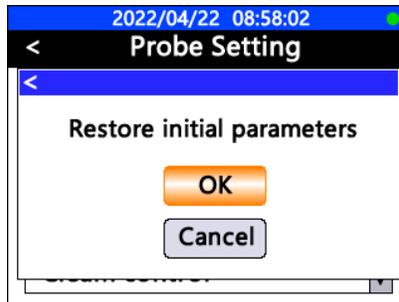


Figure 12. Restore Initial Parameters

6.8 USB Operation

UC-50 has a built-in USB interface to support historical data export and firmware upgrade function. Before accessing USB functions, please make sure USB thumb drive is properly plugged into UC-50 USB interface.

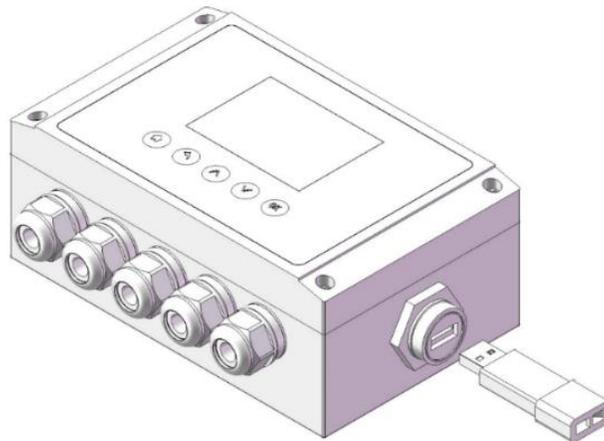


Figure 13. Insert USB Thumb Drive

6.8.1 Export Historical Data

Main Screen → [Left Arrow] → [Up Arrow] or [Down Arrow] → *[USB Settings]* → **OK** → *[Data Export]*
 → **OK**

Further select the historical data date and time range or simply choose All Export to export all historical data. Once data export 100% completed, you can safely unplug the USB thumb drive.



Figure 14. Specify Date & Time Range

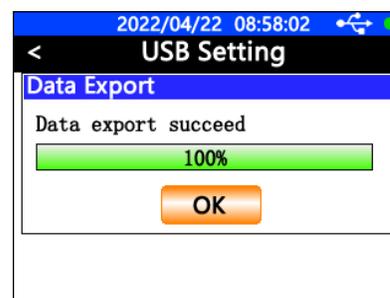


Figure 15. Export Historical Data

6.8.2 Upgrade UC-50 Firmware

Main Screen → ↶ → ▲ or ▼ → *[USB Settings]* → **OK** → *[Program Upgrade]*
 → **OK**

Copy the target UC-50 firmware file (.bin) to the root directory of USB thumb drive, plug the thumb drive to UC-50 USB interface UC-50 will automatically start firmware upgrading procedure and reboot itself once the procedure completed.

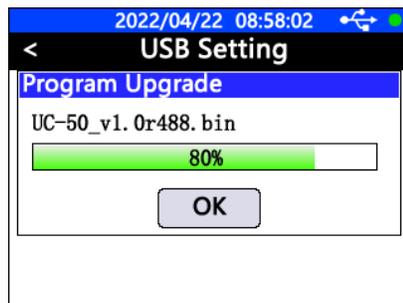


Figure 16. Updating



Figure 17. Jump To App

6.9 Adjusting the Date & Time

Main Screen → ↩ → ▲ or ▼ → **[System Information]** → **OK**

From the **system information screen**, use the ▼ button to highlight the **Time** field (highlighted field is black), then press **OK** for editing (edit mode is blue), press the ▲ or ▼ until the desired value is selected. Once setting, Hit the **OK** Key to confirm the new desired value.

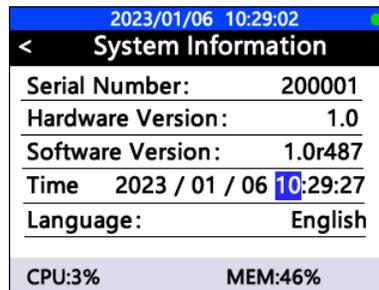


Figure 18. Set Date & Time

6.10 Set Language

Main Screen → ↩ → ▲ or ▼ → **[System Information]** → **OK**

From the **system information screen**, use the ▼ button to highlight the **Language** field (highlighted field is black), then press **Home** ↩ **OK** keys in the same time, a dialog box for language options will display.

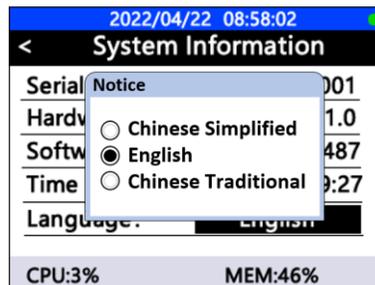


Figure 19. Set Language

7 Cleaning the EM-500

The EM-500 sensor is designed to provide reliable and continuous chlorophyll-a readings even when installed in moderately contaminated industrial cooling waters. Although the optics are compensated for the effects of moderate fouling, heavy fouling will prevent the light from reaching the sensor. This results in low readings and the potential for product under or over feed if the EM-500 sensor is used as part of an automated control system for algaecide dosing. When used to control product dosing, it is suggested that the automation system be configured to provide backup to limit potential product under or over feed situations, for example by limiting pump size or duration, or by alarming if the pumping rate exceeds a desired maximum limit.

The EM-500 sensor is designed to be easily removed, inspected, and cleaned if required. The EM-500 sensor should 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.

Any equipment in contact with industrial cooling systems is subject to many potential foulants and contaminants. Our inline sensor cleaning solutions below have been shown to remove most common foulants and contaminants. A small, soft bristle brush, Q-Tips cotton swab, or soft cloth may be used to safely clean the sensor housing and the quartz optical sensor channel. These components and more come with a Pyxis Lab **Inline Probe Cleaning Solution Kit** (P/N: SER-01) which can be purchased at our online E-Store <https://pyxis-lab.com/product/st-series-probe-cleaning-kit/>



Figure 20. Pyxis Probe Cleaning Solution Kit (P/N: SER-01)

8 Order Details

Order Information

	P/N
UC-50 (<i>UC-50 Display & Data Logging Terminal-Single Channel</i>)	43007
EM-500 (<i>Inline Chlorophyll-a Fluorometer</i>)	50501
CHLORO-20 (<i>Chlorophyll-a 20ppb Calibration Solution 500mL Each</i>)	21041
Tee Assembly 3/4" NPT (<i>1x Tee, O-ring, and Nut</i>)	ST-001

9 Contact Us

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