

UC-50 & ST-500 Series 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 drop-down menu. Once the user has selected the Pyxis sensor from the menu, the UC-50 immediately recognizes the sensor for live sensor value, data (PTSA) trend charts as well as sensor diagnostics and calibration interface while logging data for USB download. The ST-500 offers 4-20mA output signal directly from the sensor itself. This signal is not utilized by the UC-50 and users may connect to the sensor 4-20mA output for connection to in house controller, PLC or DCS network. The UC-50 also provides RS-485 and 1x 4-20 mA (user defined) output as well as one 24VDC Relay output for use.

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

2. Specifications

UC-50 Display & Data Logging Terminal

Item	UC-50	UC-50A
P/N	43007	77065
Power	110/220 VAC 50/60 Hz, 0.6A	24 VDC
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, UKCA	

NOTE Specifications are subject to change without notice.

ST-500 Series Inline PTSA Sensor

Item	ST-500	ST-500RO	ST-500SS-T
P/N	50661	50669	51152
PTSA Output Scale <i>4-20mA Set At Factory</i>	0-200ppb	0-40ppb	0-200ppb
PTSA Maximum Range <i>4-20mA Adjusted via uPyxis</i>	0-300ppb	0-40ppb	0-300ppb
PTSA Precision/Accuracy	+/- 1 ppb	+/- 0.2 ppb	+/- 1 ppb
Excitation/Emission	LED 365/410nm		
Power Supply	22 – 26V DC, Power Consumption – 1W		
Outputs	Isolated 4 – 20 mA Analog Outputs & Isolated RS-485 Digital Output -7Pin		
Installation	ST-001 Inline Tee CPVC (included with ST-500) ¾-inch FNPT Socket & Thread	ST-009 Inline Tee Stainless (sold separately) ¾-inch FNPT Thread	
Weight	170 g (0.37lbs)	1,148 g (2.5lbs)	
Operational Pressure	100 psi (6.9 Bar)	290 psi (20 Bar)	
Operating Temperature	4 °C – 49 °C (40 – 120 °F)		
Storage Temperature	-20 °C – 60 °C (-4 – 140 °F)		
Material	CPVC	304 Stainless Steel	
Rating	IP67, Fully Dustproof & Waterproof		
Regulation	CE / RoHS / UKCA		
Dimension (L x W x H)	Length 6.8 inch (172.7 mm), body diameter 1.44 Inch (36.6 mm)		
Cable Length	1.5 meter 7-pin Bulkhead w Adapter/ 1.5 meter 7-pin Flying Lead w/ Adapter		

NOTE Specifications are subject to change without notice.

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 hard-wired 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 ST-500 series sensor is provided with a 5ft-flying lead/adaptor cable (PN: MA-1100) 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.



3. Dimension

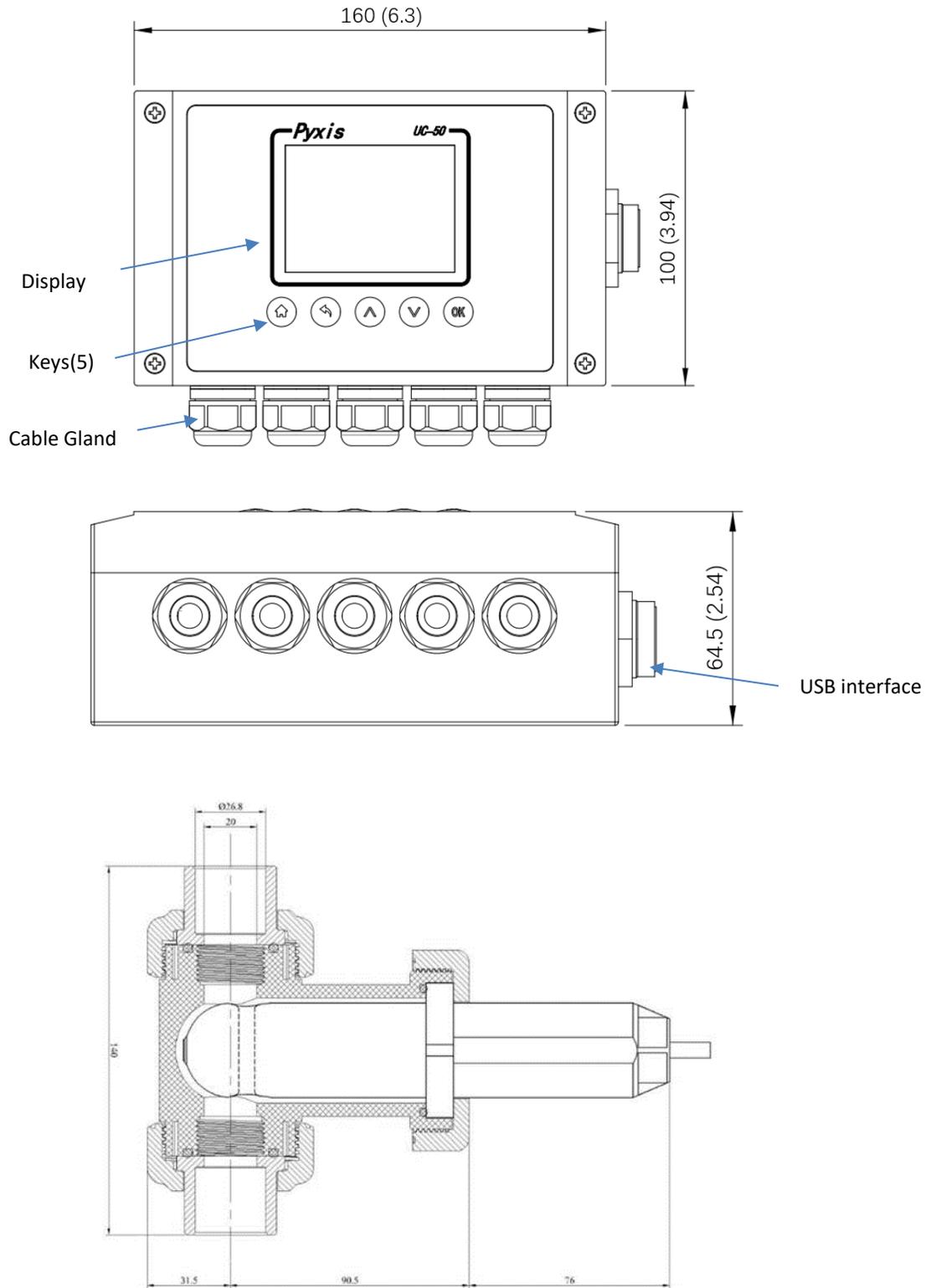


Figure 1. UC-50 & ST-500 Dimensions, unit: mm(inch)

4. Electrical Connection

5.1 ST-500 wiring

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

Wire Color	Designation
Red	24 V +
Brown	24V Power Ground
White	4-20 mA+ for PTSA
Green*	4-20 mA -
Blue	RS-485 A
Yellow	RS-485 B
Clear	Earth Ground

NOTE The negative 24V power terminal (power ground) and the negative 4–20mA terminal on the ST-500 Series sensors are internally connected. It is unnecessary to connect the 4–20mA negative wire (Green) to the 4–20mA negative terminal in the controller.

5.2 UC-50 TERMINAL BOARD WIRING DIAGRAM

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

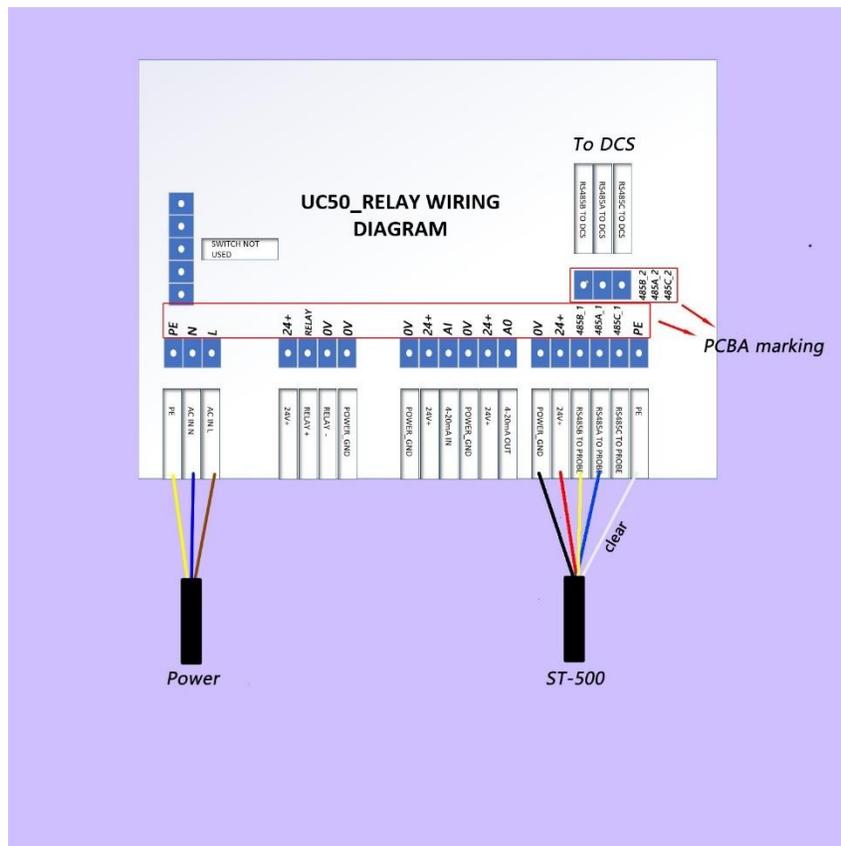


Figure 2. AC-Power Supply and Input/Output Wiring

5. UC-50 Operation

6.1 Main screen

The UC-50 may be configured to connect to ST-500 probe by default when it leaves the Pyxis factory if ordered with the ST-500 sensor. Alternatively, the user may select the sensor name through the menu interface (refer to [Section 6.3](#)). After the UC-50 is turned on, the main interface of the UC-50 will display the PTSA 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.

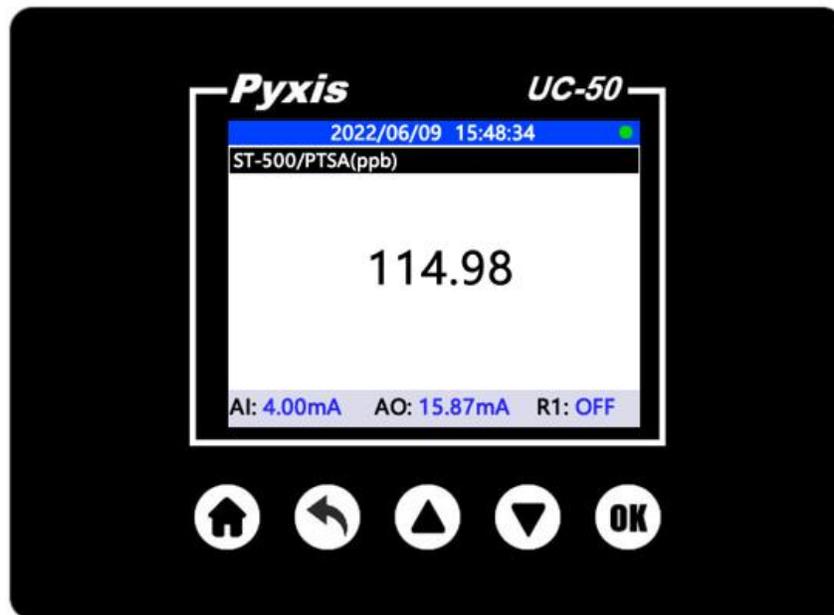


Figure 3. Main Screen

6.2 Button Function

- Home** 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 Matching Probe Type

Main Screen → **←** → **[Probe Settings]** → **OK** → **[Probe Type]** → **OK**

UC-50 controller supports manual selection of the probe type or automatic identification of the probe type. Please use the up/down keys to select the correct probe type or select [Auto Discover](#).

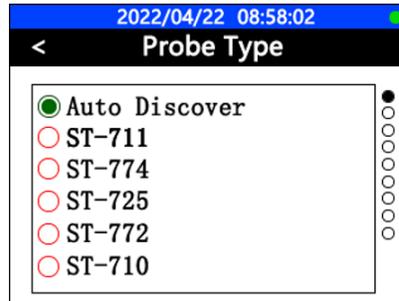


Figure 4. Select Probe

If user select [Auto Discover](#), UC-50 will automatically jump to the ST-500 option (shown in Figure 5). Press **OK** key and Select [Clear Historical Data](#) (shown in Figure 6), probe matching complete. Back to the Main Screen and check whether the probe connection status is successful.

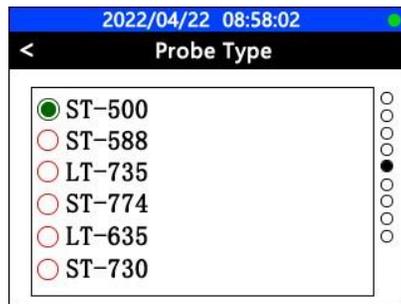


Figure 5. Select Probe

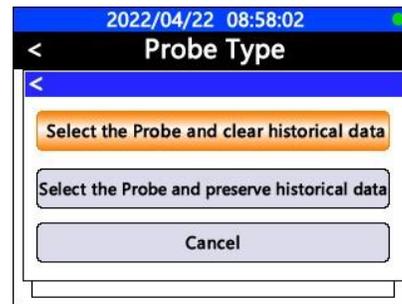


Figure 6. Clear Historical Data

6.4 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.

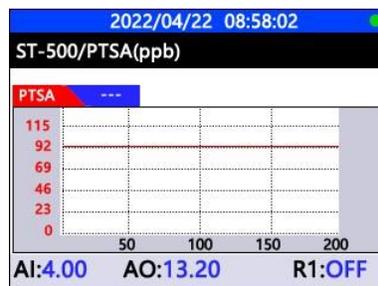


Figure 7. Trend Chart

6.5 PTSA Calibration

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

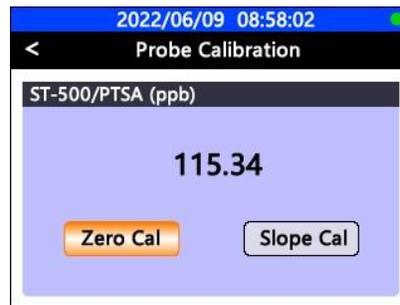


Figure 8. Calibration Screen

The ST-500 sensor can be calibrated in a two-point (zero + slope) procedure using a deionized (DI) water and a Pyxis 100ppb PTSA calibration standard solution (P/N 21001). Higher concentration calibration standard may also be used if desired based on the application need. The calibration solution can also be the sample water itself. The concentration of PTSA in the sample water can be determined by using a Pyxis SP-380 (P/N: 50208), or similar offline fluorometer or calculated from the concentration of any measurable species in the sample water such as polymer, phosphate, or molybdate.

IMPORTANT NOTE *Direct sunlight or indoor light on the ST-500 sensor should be avoided during calibration although it is not necessary to completely shield the ST-500 sensor from the ambient light during both the zero point and slope calibrations.*

6.5.1 Single Point (In-Situ) PTSA Calibration

Users can conduct an in-situ (in-line) slope calibration of PTSA while the sensor is in operation. Users can tap **Slope Cal** and enter the handheld measured PTSA value (0-300 ppb), then click **OK** key. If the calibration is successful, the interface will return a message "PTSA calibration succeed". If the calibration fails, press **Slope Cal** again and repeat the process.

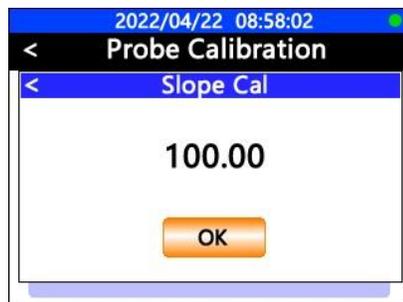


Figure 9. Slope Calibration In-Situ

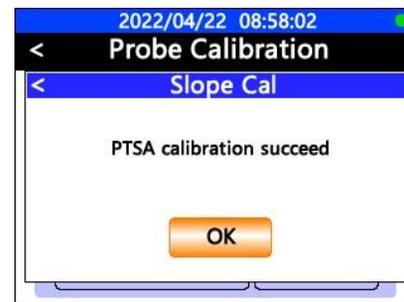


Figure 10. Slope Calibration Success

6.5.2 Two-Point (Breaker) PTSA Calibration

Two-point PTSA calibration for the ST-500 requires the following depending on the sensor in use. ([see the Order Details Section 8](#)). ***NOTE***: *For best results, the ST-500 sensor should be calibrated in a completely light-proof environment by covering the beaker with a towel.*

ST-500 (0-300ppb measurement capability)

Zero Calibration = Use DI Water

Slope Calibration = User Pyxis 100ppb or 200ppb PTSA Calibration Standard (see below)

- **PTSA-100** (P/N 21001)
- **PTSA-200** (P/N 21000)

Place the sensor into a beaker containing deionized (DI) water and cover the beaker with a towel to shield from direct light. Then tap **Zero Cal** in the calibration screen. Please allow sufficient time (a few minutes) for the sensor to stabilize before performing the calibration.

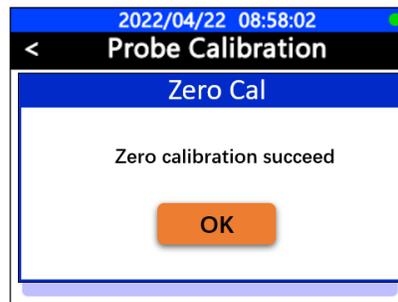


Figure 11. Zero Calibration Success

After completing the zero calibration, place the sensor into PTSA-100 or PTSA-200 calibration standard solution (based on the application range) and cover the beaker with a towel to shield from direct light. Then tap **Slope Cal** in the calibration screen. Enter the PTSA concentration of the calibration standard being used as shown in *Figure 12*. If the calibration is successful, the interface will return a message "PTSA calibration succeed". If the calibration fails, press **Slope Cal** again and repeat the process.

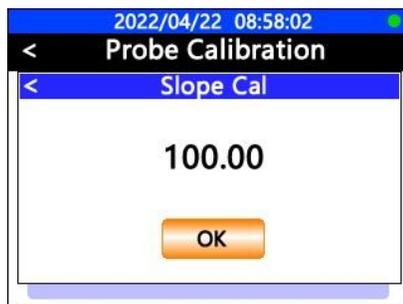


Figure 12. Slope Calibration in breaker

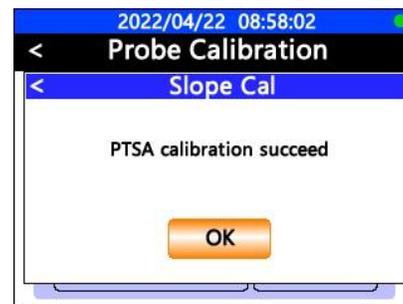


Figure 13. Calibration Success

6.6 View Historical Data & Set Data Storage Period

Main Screen → ↶ → ▲ or ▼ → **[Historical Data]** → **OK** → **[View Historical Data]** or **[Set Data Storage Period]** → **OK**

UC-50 controller stores measurement data of ST-500 every 60-seconds by default. To reduce the amount of data during download, the data log frequency may be adjusted if desired by the user. Users can browse the data of different time periods with the ▲ and ▼ keys.

Time	---
2022/04/22 14:47	11.75/0.000/0.000/0.224
2022/04/22 14:46	13.02/0.000/0.000/0.225
2022/04/22 14:45	13.01/0.000/0.000/0.223
2022/04/22 14:44	13.06/0.000/0.000/0.223
2022/04/22 14:43	12.95/0.000/0.000/0.215
2022/04/22 14:42	13.03/0.000/0.000/0.220
2022/04/22 14:41	13.72/0.000/0.000/0.224
2022/04/22 14:40	14.51/0.000/0.000/0.224
2022/04/22 14:39	14.52/0.000/0.000/0.222
2022/04/22 14:38	19.01/0.000/0.000/0.219

Figure 14. Historical Data

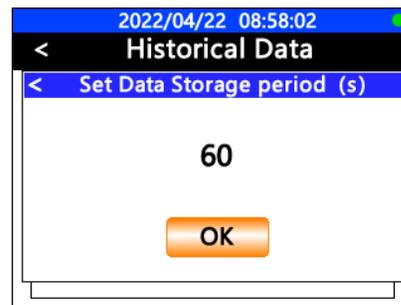


Figure 15. Set Data Storage Period

6.7 Probe Diagnosis

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

The UC-50 controller supports displaying the diagnostic data of the ST-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:	50661	SN:	210510001
Addr:	247	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 16. Diagnosis

6.8 Restore Factory (Initial) Parameters

Main Screen → ↶ → [ProbeSetting] → OK → ▼ → [Restore Initial Parameters]
→ OK

If an 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.

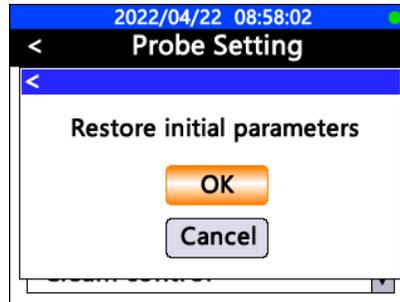


Figure 17. Restore Initial Parameters

6.9 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.

IMPORTANT NOTE It is important to use a USB disk containing no files and with FAT-32 format and data storage of 32-64mB.

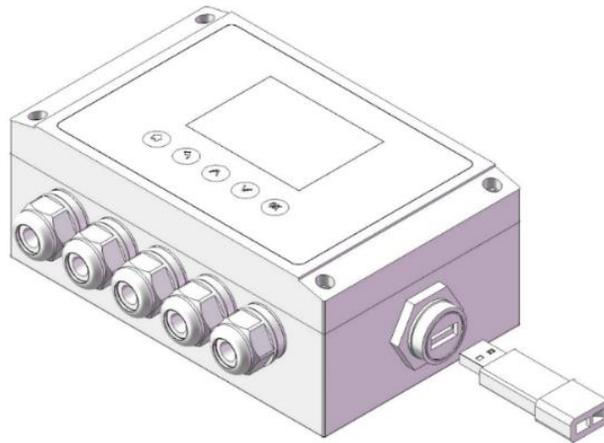


Figure 18. Insert USB Thumb Drive

6.9.1 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 19. Specify Date & Time Range



Figure 20. Export Historical Data

6.9.2 Upgrading the 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 an empty 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.

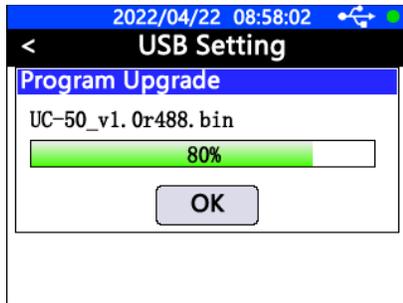


Figure 21. Updating

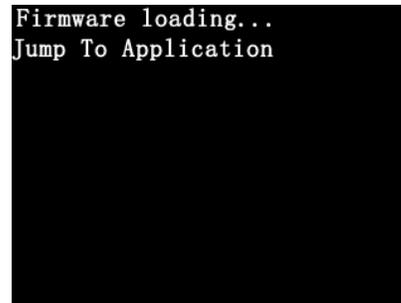


Figure 22. Jump To App

6.10 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 set, hit the **OK** Key to confirm the new desired value.

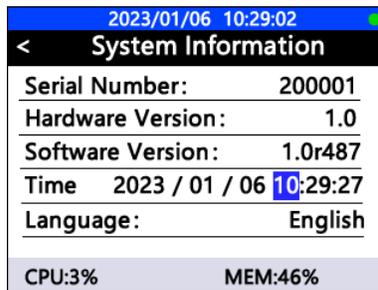


Figure 23. Set Date & Time

6.11 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 24. Set Language

6. Methods to Cleaning the ST-500 Sensor

Any equipment in contact with industrial cooling or process systems is subject to potential foulants and contaminants. Our inline sensor cleaning solution below has been shown to remove the most common inorganic 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 25. Pyxis Probe Cleaning Solution Kit (P/N: SER-01)

To clean the ST-500 sensor, soak the lower half of the sensor in 100 mL inline sensor cleaning solution for 10 minutes. Rinse the ST-500 sensor with distilled water and then check for the flashing blue light inside the sensor's quartz tube (optical channel). If the surface is not entirely clean, continue to soak the ST-500 sensor for an additional time. Use the small, soft bristle brush and Q-Tips cotton swabs as necessary to remove any remaining contaminants in the ST-500 sensor quartz tube.

7. Order Details

Optional/Replacement Item	P/N
UC-50 (Replacement UC-50 Display/Data Logging Terminal)	43007
ST-500 (Replacement ST-500 inline PTSA Sensor CPVC)	50661
ST-001 Stainless Steel Inline Tee Assembly <i>($\frac{3}{8}$-inch FNPT Stainless Steel)</i>	50704
PTSA-100 <i>(PTSA Calibration Standard 100ppb/ 500ml)</i>	21001
PTSA-200 <i>(PTSA Calibration Standard 200ppb/ 500ml)</i>	21000
Pyxis Probe Cleaning Kit <i>(Includes Sensor Cleaner 500mL + Accessories)</i>	SER-01
SP-380 PTSA Handheld Fluorometer <i>(PTSA 0-300ppb)</i>	50208
MA-C10 <i>(10' Extension Cable for 7Pin Pyxis Sensors)</i>	50738
MA-C50 <i>(50' Extension Cable for 7Pin Pyxis Sensors)</i>	50705

9. Contact Us

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