

IK-765 Series

Oxidizer + pH Inline Analyzers

for Drinking & Clean Water

Startup Guide



Pyxis Lab Inc.

October 2021

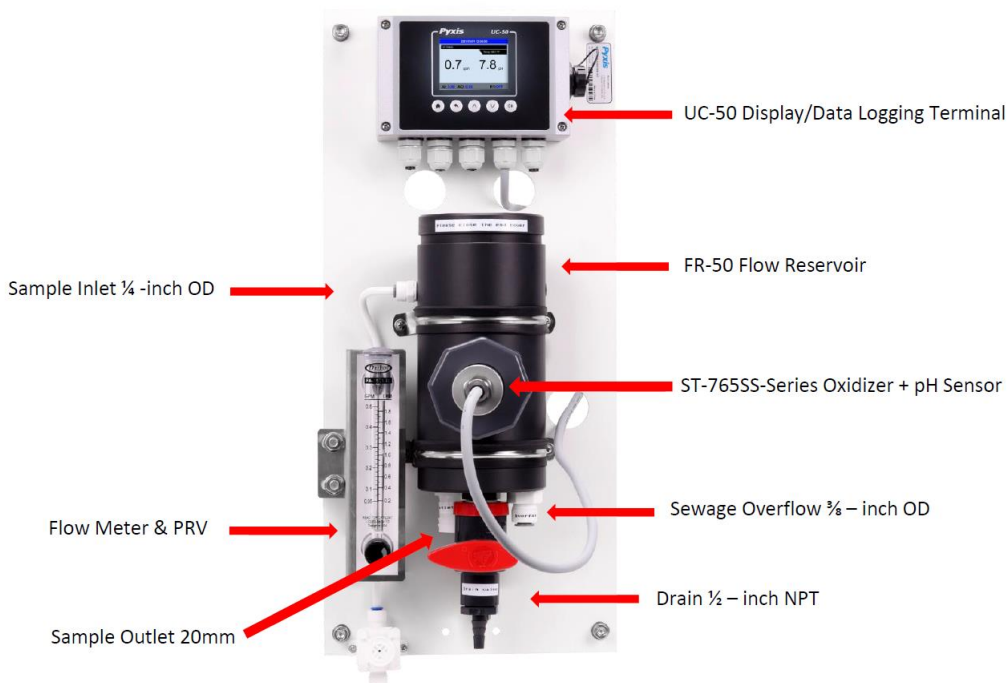
Product Description

The IK-765 series are dual-parameter inline water analyzers specifically designed as a 'Turn-Key' monitoring solution for clean water applications including drinking water networks, secondary water supply and decorative/swimming water applications. The IK-765 series offers highly accurate, real-time measurement, display and data-logging of Free Chlorine, pH and Temperature utilizing proprietary Pyxis Lab smart sensor technology, coupled with a Pyxis UC-50 micro display and data logging terminal. The IK-765 series is offered in a convenient and easy to integrate panel mounted format for rapid installation and simple maintenance.

The IK-765 series analyzer is offered in two sensor formats depending on the desired oxidant being measured. The panel design is equipped with the propriety Pyxis ST-765SS Series smart sensors based on application needs. The ST-765SS series sensors measure Free Chlorine or Chlorine Dioxide, pH and temperature of the sample water. This Pyxis sensor design is membrane-free and based on unique principles and incorporates Pyxis' advanced technology in the field of bare-gold electrochemical detection. The ST-765SS-FLC (Free Chlorine + pH) and ST-765SS-CLO (Chlorine Dioxide + pH) sensors measure the oxidant level and pH simultaneously while performing temperature and pH compensation for the measurement of oxidant based on conditions present in the application of use. Each IK-765 panel is also provided with the FR-50 Flow Reservoir and UC-50 micro display/data logging terminal prewired to the ST-765SS series sensor of in RS-485 modbus format with fully integrated sensor diagnostics and calibration interface. This unique platform with internal sensor compensation results in a highly accurate oxidizer measurement consistent with DPD wet chemistry methodology as high as pH 9.0 and meets EPA-334.0 and ISO-7393 compliance.

System Layout & Installation

The IK-765 series analyzer requires a small installation footprint, offers simple operation and maintenance and is specifically designed for use in domestic and drinking water applications. The analyzer may also be integrated with the optional Pyxis CloudLink™ 4G remote gateway, which can upload on-site analyzer data to a cloud server in real time and allow for additional sensor/device inputs for cloud access. Contact Pyxis Lab for details on CloudLink™ and Pyxis Cloud™. Stable inlet sample flow should be regulated via the Flow Meter and PRV provided with consistent flow of 200-400mL/minute.



Typical Applications

- Drinking Water / Domestic Water / Secondary Water Supply
- Sanitary Water
- Decorative Water / Domestic Water
- Food & Beverage Process Water
- RO Feedwater



Features

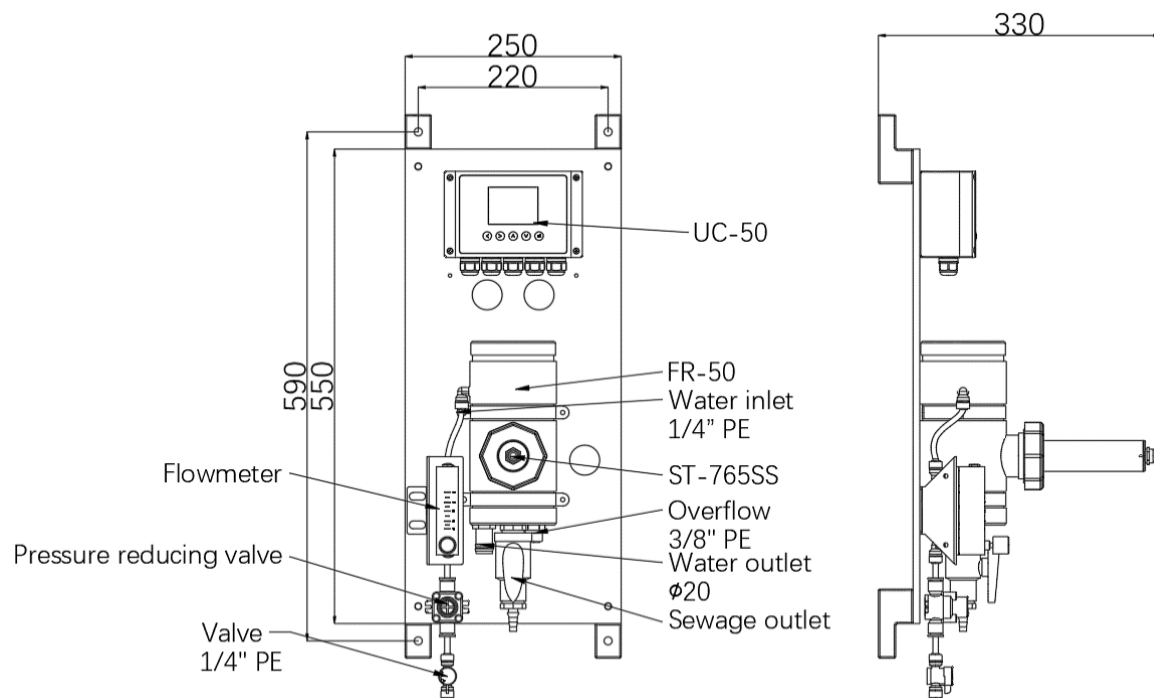
- Pyxis Lab's advanced research and development sensor technologies to achieve highly accurate and stable measurement of Free Chlorine or Chlorine Dioxide, pH and Temperature.
- Pyxis ST-765SS-FCL (Free Chlorine + pH/Temperature) and ST-765SS-CLO (Chlorine Dioxide + pH/Temperature) are three-parameter composite sensors used for the measurement residual free chlorine or chlorine dioxide, pH and temperature in compliance with USEPA 334.0 and ISO-7393 guidelines. The sensors advanced PCB offers built-in temperature and pH parameter compensation (up to pH 9.0) algorithms eliminating the need for a supplemental pH sensor and controller. Unique Bare-Gold electrode technology for residual chlorine measurement eliminates membranes and electrode solution replenishment commonly associated with conventional sensors. The ST-765SS Series has a uniquely designed flat bubble pH electrode design for reduced fouling potential. Reduce your maintenance and cost versus colorimetric chlorine measurement or conventional electrochemical sensors by utilizing Pyxis replaceable Electrode Head (EH-765) for this sensor allowing for years of reliable service. The ST-765SS Series may be calibrated in-situ after cleaning via DPD Free Chlorine or Chlorine Dioxide wet chemistry test measurement of active sample.
- Pyxis FR-50 Single-Sensor flow reservoir provides sample calming for dissipation of air-bubbles and settling of suspended solids, foam or other impurities commonly observed in drinking water influent. This unique flow reservoir design results in the highest level of oxidizer resolution on the market and greatly extends the maintenance cycle of the sensor while providing a large buffer capacity to mitigate pressure fluctuations. The minimum inlet pressure of FR-50 flow reservoir is only 7.5 psi (0.05mpa) making it highly suitable for the end of pipe networks and secondary supply influent sampling. One FR-50 is provided with the purchase of each ST-765SS Series sensor and comes equipped with inlet PRV and Rotameter for the recommended flow range of 200-400 mL/minute. The FR-50 outlet flow and sewer overflow lines should be diverted to drain or the inlet of the pretreatment system for those desiring NSF compliance.
- Simple sensor removal and replacement. The ST-765SS Series sensors are connected to the display/data logger via RS-485 modbus (RTU) allowing for integrated sensor calibration interface and diagnostics within the display screen.
- Convenient and simple to install Back-Panel (IK-765) for rapid and easy installation. Truly a plumb and power to go platform with intense factory setup, testing and sensor calibration prior to shipment.
- UC-50 micro display/data logger interface with sensor calibration integrated. Display/data logger offers 1x 4-20mA I/O as well as RS-485 with remote diagnosis and parameter adjustment. Pyxis CloudLink™ 4G Gateway available as an optional accessory.

Specifications

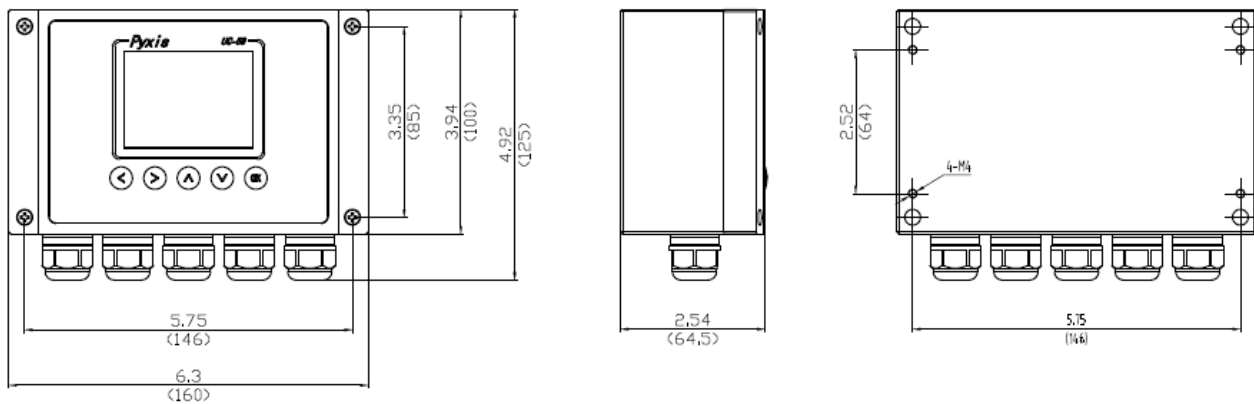
Item	IK-765SS-FCL	IK-765SS-CLO
P/N	42082	42085
Sensor Body Material	304SS	304SS
Sensor Name	ST-765SS-FCL	ST-765SS-CLO
Oxidizer Range	0.00-5.00 ppm FCl ₂ (auto-range)	0.00-5.00 ppm ClO ₂ (auto-range)
Oxidizer Precision	± 0.01mg/L or 1% of the value w/pH compensation up to 9.0	
pH Range	0-14	
pH Precision	± 0.01 pH	
Sample Operating Temperature	4 °C – 40 °C (40 – 104 °F)	
Sample Inlet Pressure	7.25 – 30 psi (0.05 – 0.2MPa)	
Sensor Maximum Pressure	100 psi (6.9 Bar)	
Sensor Response Time	T95≤60s – Free Chlorine or ClO ₂ / T95≤5s - pH	
Measurement Interval	Continuous	
Installation	FR-50 Self-Regulating Flow Reservoir w/Rotameter & PRV - Included	
FR-50 Minimum Flow Rate	200 mL/minute	
FR-50 Maximum Flow Rate	400 mL/minute	
FR-50 Sample Inlet	1/4 - inch OD	
FR-50 Sample Outlet	20mm - To Drain	
FR-50 Sewage Overflow Outlet	3/8 – inch OD To Drain	
Panel Power Supply	110/220VAC 50/60 Hz, 0.6A	
Panel Storage Temperature	-4 – 158 °F (-20 – 70 °C)	
Panel Operating Temperature	32 – 122 °F (-0 – 50 °C)	
UC-50 Display	2.8" Color 320 x 240 Resolution	
Input	1 x 4-20 mA / RS-485 Modbus-RTU	
Output	1 x 4-20 mA / RS-485 Modbus-RTU / 1 x Contact Relay	
Data Storage	32 M Flash	
USB	1 x USB host for data downloading	
Relative Humidity	5% - 95% (No Condensation)	
Altitude	<6,561 feet (<2,000 Meter)	
Dimension (H x W x D)	Panel (IK-765SS) 590H x 250W x 330D mm	
Approximate Weight	Panel (IK-765SS) ~ 5 kg	
Wet Material	UPVC / Polycarbonate	
Rating	IP-65 Panel-Display / IP-67 Sensors	
Compliance	EPA 334.0 / ISO 7393	
Regulation	CE Marked / RoHS	
Typical Electrode Service Life	2 years	
Electrode Warranty	6 Months	
Sensor Body Warranty	13 Months	

**NOTE* - Pyxis Lab is consistently updating technologies, as such, specifications may change without notice.
 Technical specifications on the ST-765SS Series sensors can also be found in their respective Operation Manuals.
 Contact info@pyxis-lab.com for details or www.pyxis-lab.com.*

IK-765SS Series Panel Dimensions (mm)

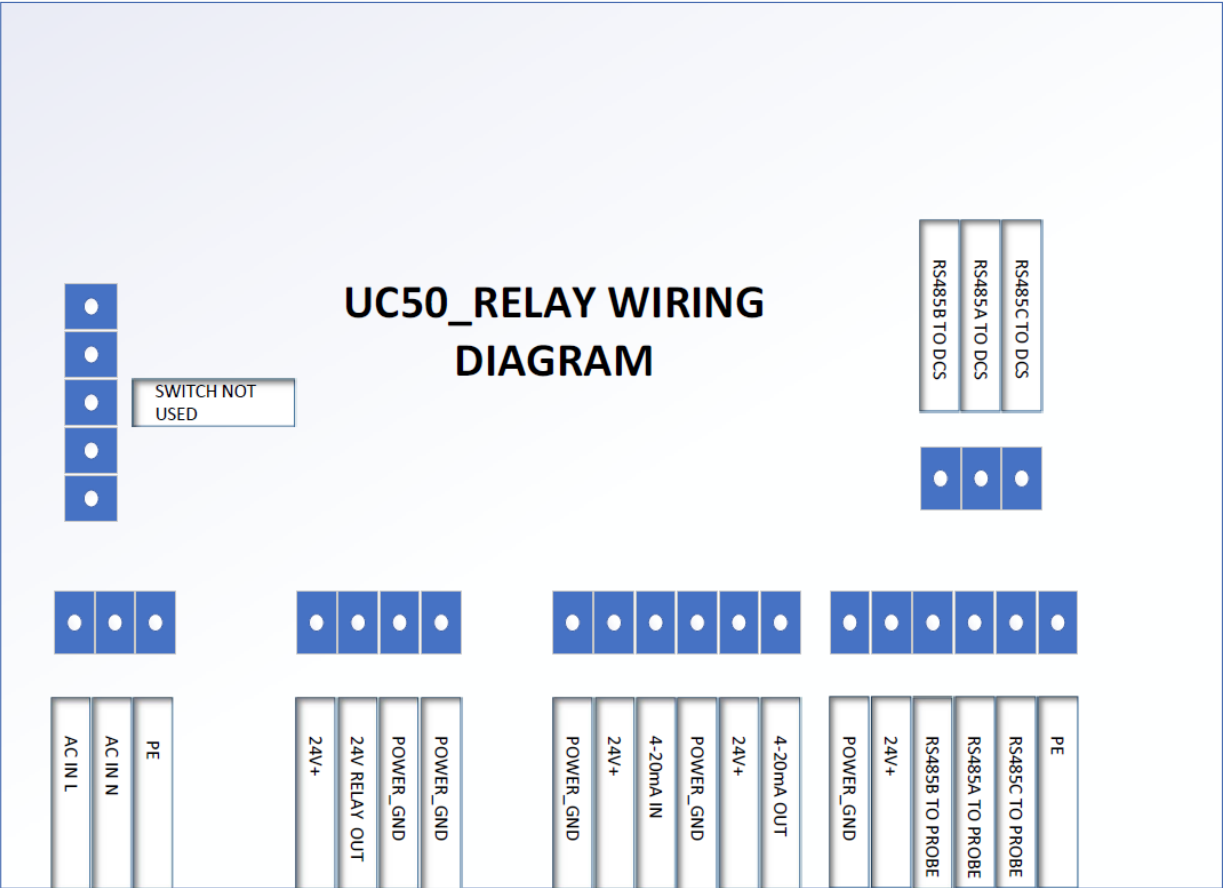


IK-765SS Series UC-50 Display/Data Logger Dimensions (mm)



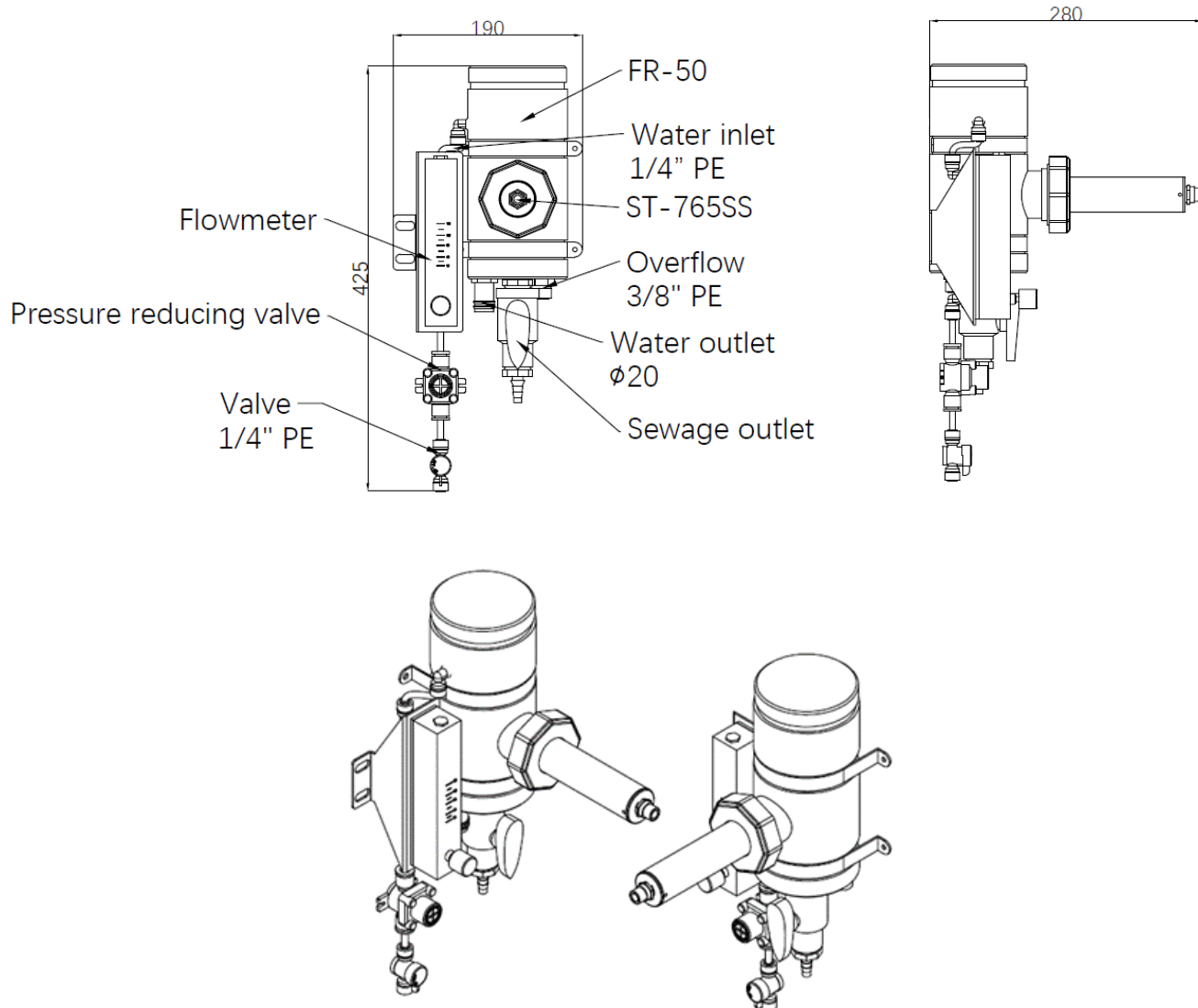
UC-50 TERMINAL BOARD WIRING DIAGRAM

Wire the 4-20mA or RS-485 outputs according to the wiring information shown in the figure below.

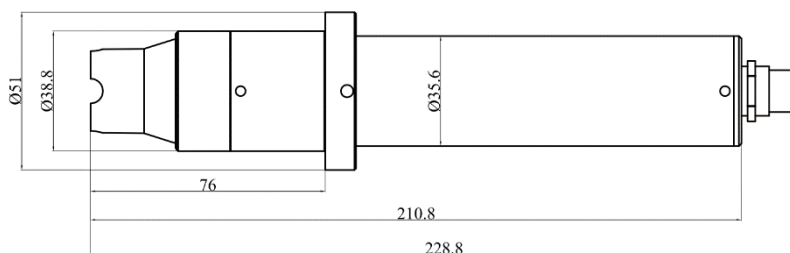


UC-50 - AC-Power Supply and Input/Output Wiring

IK-765SS Series FR-50 – Flow Reservoir Dimensions (mm)



ST-765SS Series Sensor Dimensions (mm)



ST-765SS-Series Oxidizer + pH Sensor

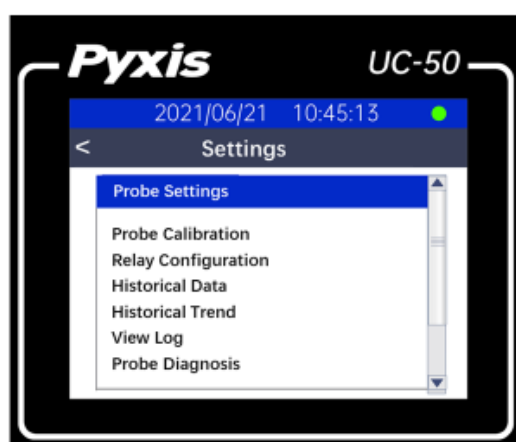
START-UP PROCEDURE



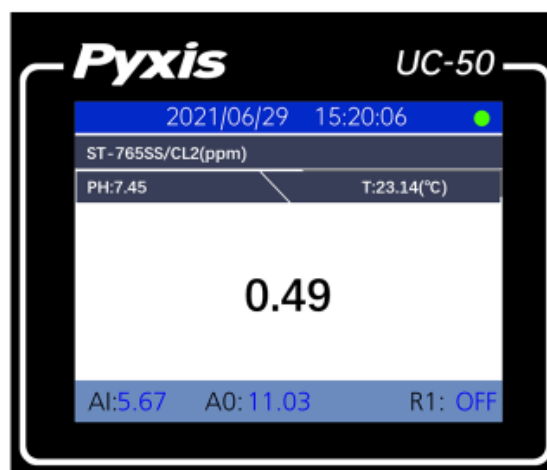
Main key Up key OK key
Back key Down key

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

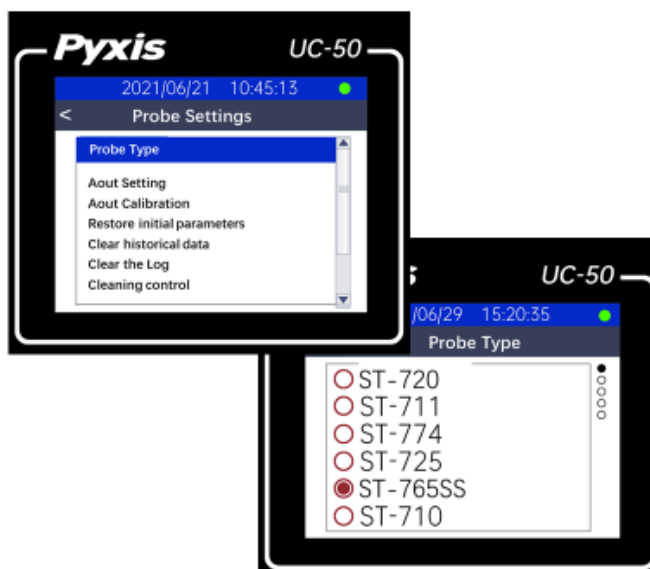
Click the back key on the main interface, UC-50 will display the setting interface. All probe-related settings and UC-50 settings can be selected on this page. If you need to connect a new probe, please select the **Probe Settings** and then click the ok key button to enter the probe setting page



The UC-50 display of the IK-765 panel is connected via RS-485 Modbus (RTU) to the ST-765SS Series probe when it leaves the Pyxis factory. After the UC-50 is turned on, the main interface of the UC-50 will display the **residual chlorine or chlorine dioxide concentration, pH value, and temperature** of the tested solution. The green dot in the upper right corner of the UC-50 main interface indicates that the communication between the UC-50 and ST-765SS probe is normal. If used, the 4-20mA input signal, 4-20mA output signal and relay output status are displayed at the bottom of the UC 50 main interface.

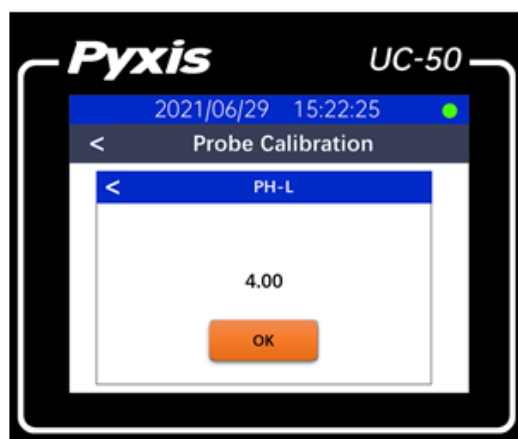


Select the probe setting to enter the desired Pyxis **Probe Type** setting interface. UC-50 controller supports manual selection of the probe type or automatic identification of the probe type. Please use the up/down keys to select the correct probe type or select automatic identification.

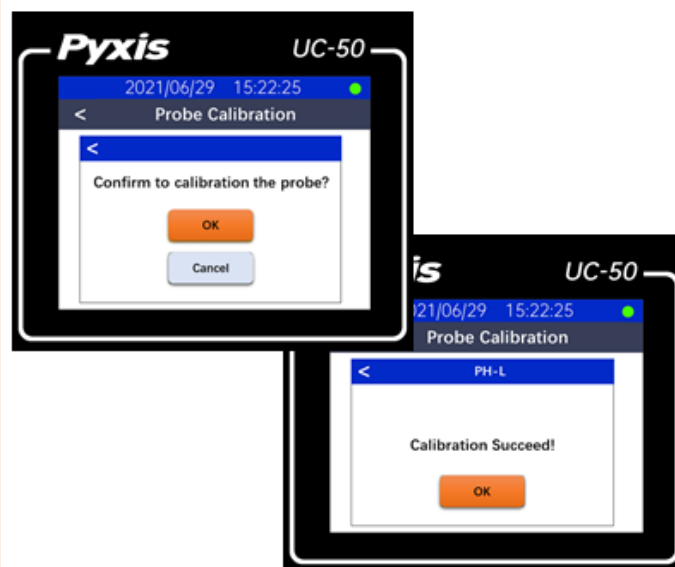


pH LOW - CALIBRATION PROCEDURE

PH-L calibration should be selected on the **Probe Calibration** page. Remove and place the ST-765SS Series probe in the pH 4.0 standard solution, measure for 1 minute and wait for the measurement result to stabilize, click the **OK** button to start the PH-L calibration.

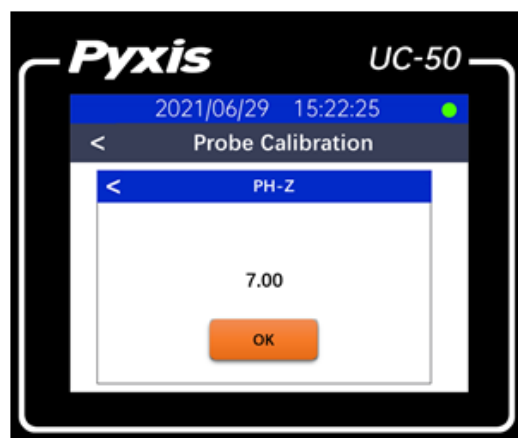


Select the **OK** button on the probe calibration confirmation page. The UC-50 controller sends the **PH-L calibration** command to the ST-765SS probe and waits for the probe calibration result. The probe calibration result will be automatically displayed on the calibration interface.

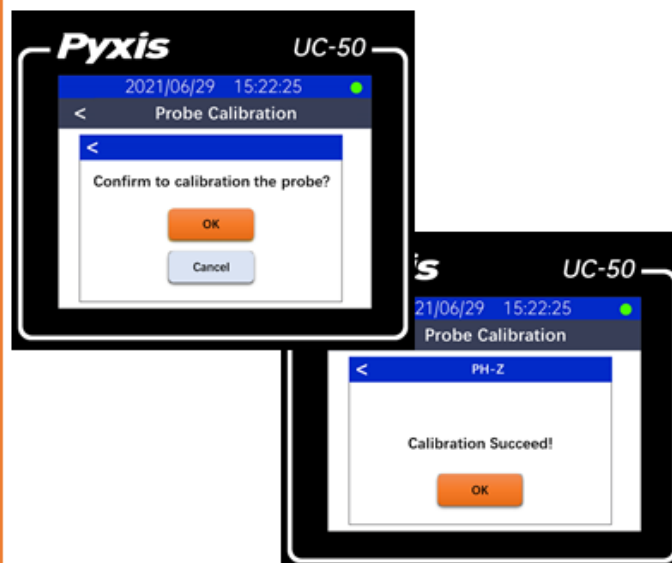


pH MID (Z) - CALIBRATION PROCEDURE

PH-Z (7) calibration should be selected on the **Probe Calibration** page. Place the probe in the pH 7.0 standard solution, measure for 1 minute and wait for the measurement result to stabilize, click the **OK** button to start the PH-Z calibration.

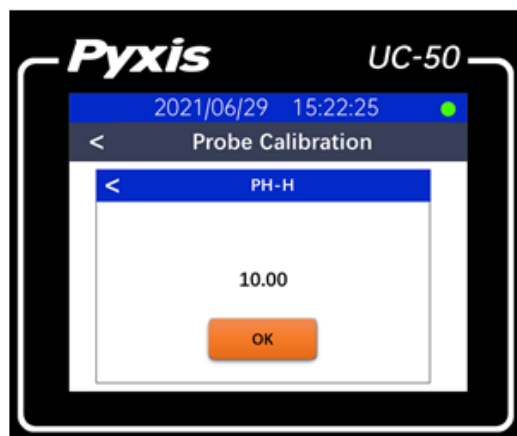


Select the **OK** button on the probe calibration confirmation page. The UC-50 controller sends the **PH-Z calibration** command to the ST-765SS probe and waits for the probe calibration result. The probe calibration result will be automatically displayed on the calibration interface.

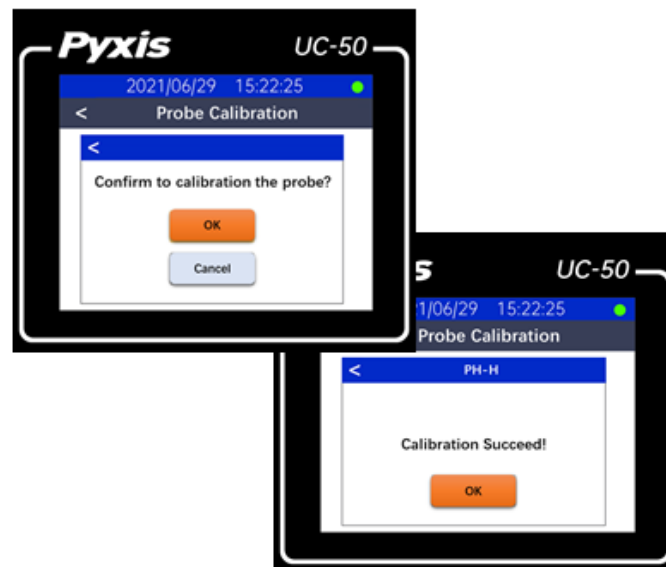


pH HIGH - CALIBRATION PROCEDURE

PH-H calibration should be selected on the **Probe Calibration** page. Place the probe in the pH 10.0 standard solution, measure for 1 minute and wait for the measurement result to stabilize, click the **OK** button to start the PH-H calibration.

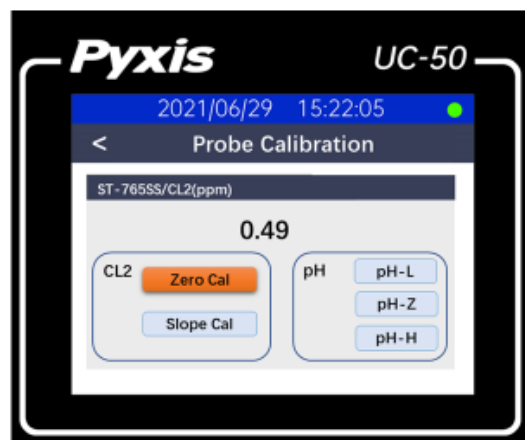


Select the **OK** button on the probe calibration confirmation page. The UC-50 controller sends the **PH-H calibration** command to the ST-765SS probe and waits for the probe calibration result. The probe calibration result will be automatically displayed on the calibration interface.

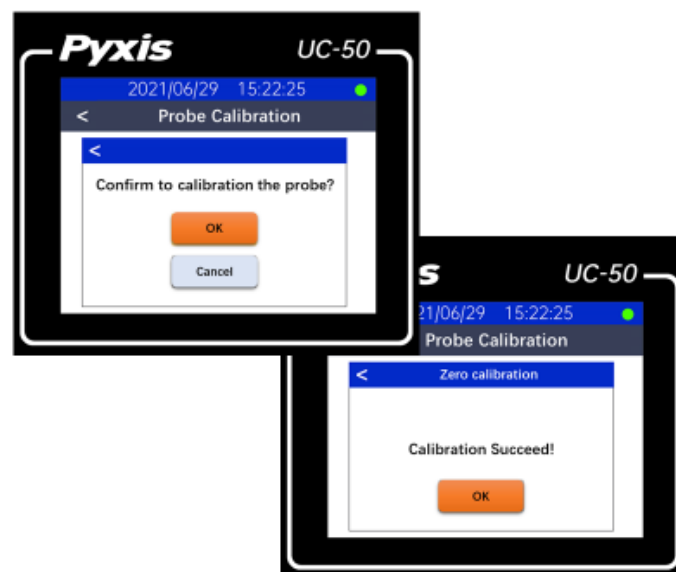


ZERO OXIDIZER - CALIBRATION PROCEDURE

Select the **Probe calibration** in the setting interface to enter the ST-765SS probe calibration interface as shown in the figure below. Use the up and down keys to select 5 calibration types. **Zero calibration** is selected on the **Probe Calibration** page, first put the probe into the zero-oxidizer standard solution (Pyxis P/N 20022) or 100us/cm Conductivity Standard is also acceptable for zero standard solution. After the probe reading is stable for at least 10 minutes, click the OK button to start the zero calibration.

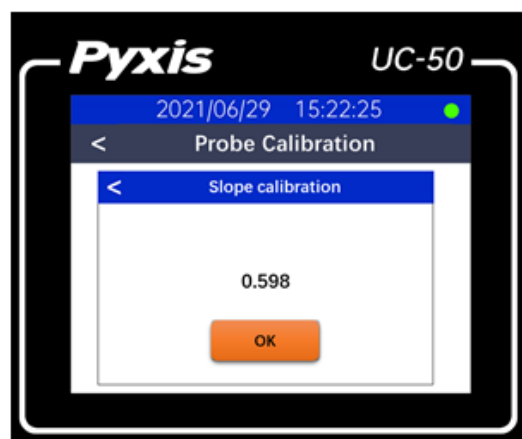


Select the **OK** button on the probe calibration confirmation page. The UC-50 controller sends the **Zero calibration** command to the ST-765SS probe and waits for the probe calibration result. The probe calibration result will be automatically displayed on the calibration interface.



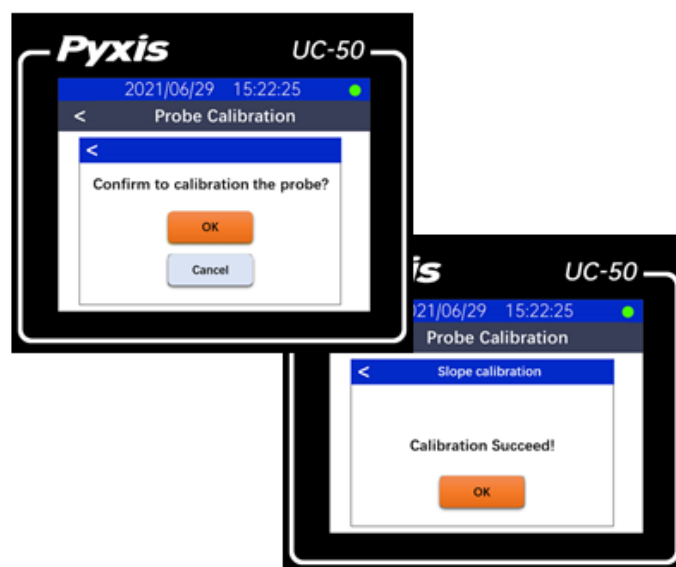
SLOPE OXIDIZER - CALIBRATION PROCEDURE

Slope calibration should be selected on the **Probe Calibration** page. While the sensor is exposed to active flow of 200-400 mL/minute in the FR-50 flow reservoir, enter the free chlorine or chlorine dioxide concentration determined by the DPD method of the sample and ensure that probe reading has been stable for at least 10 minutes before calibration. Click the OK button to start the slope calibration.



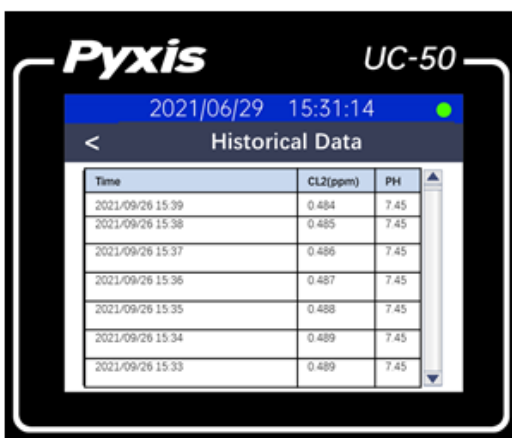
NOTE: The ST-765SS Series must be slope calibrated in the FR-50 flow reservoir provided with the sensor and have consistent flow.

Select the **OK** button on the probe calibration confirmation page. The UC-50 controller sends the **Slope calibration** command to the ST-765SS probe and waits for the probe calibration result. The probe calibration result will be automatically displayed on the calibration interface.

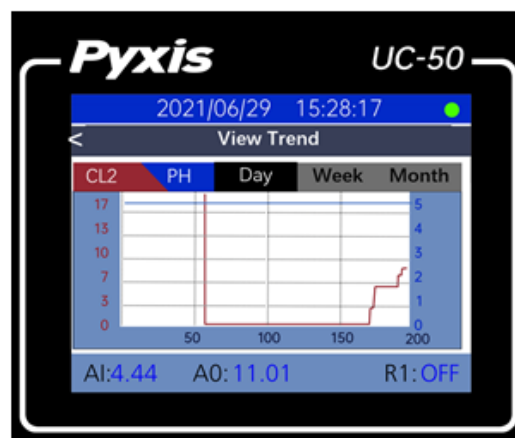


HISTORICAL DATA & TRENDING

Select **Historical Data** on the setting interface of the UC-50 controller. You can view the stored historical measurement data of ST-765SS. UC-50 controller stores measurement data of ST-765SS every 1 minute. This time period may be adjusted if desired. You can browse the data of different time periods with the up and down keys.

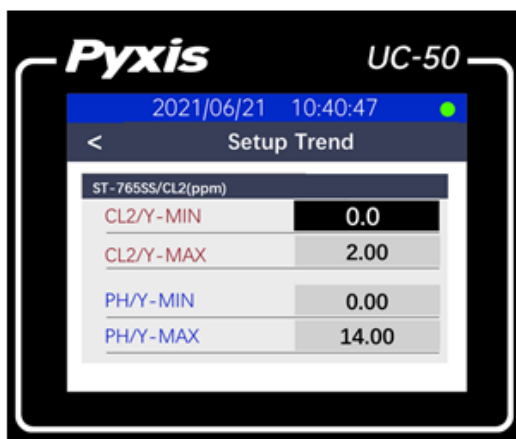


Select the **Historical Trend** on the setting interface of the UC-50 controller. You can view the historical measurement data saved by the UC-50 controller in the form of a trend graph. Use the up and down keys and the confirm key to select to view the data of the last day, week or month.

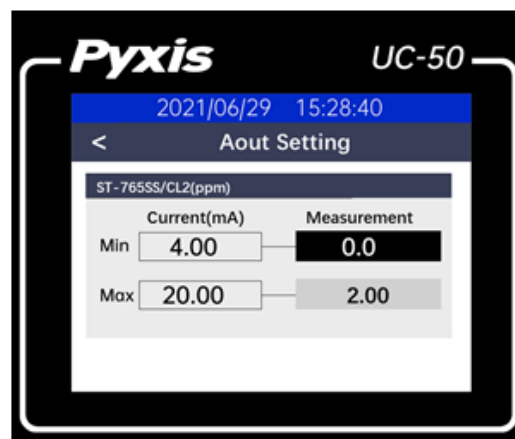


TREND SCALE and 4-20mA OUTPUT SETUP

Select the **Setup Trend** on the historical trend interface to modify the maximum and minimum values of the Y-axis of the curve. Please set the appropriate Y-axis range according to the actual measurement application so that the historical curve can be accurately displayed. Use the up and down keys and confirm keys to modify.

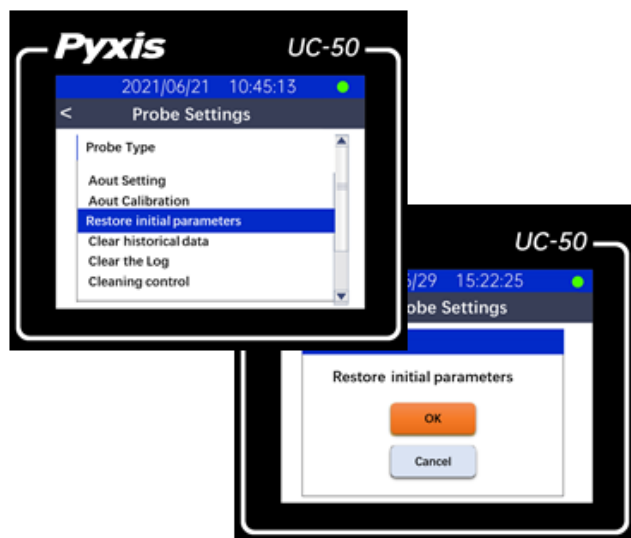


The UC-50 controller allows users to output the measured value of ST-765SS through a 4-20mA analog signal. The corresponding relationship of 4-20mA analog signal output can be set in the **Aout Setting** interface of the UC-50 controller. Use the up and down keys and confirm keys to modify.

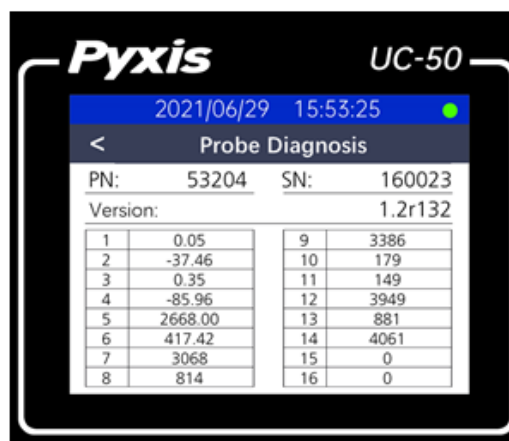


RESTORING FACTORY PARAMETERS & PROBE DIAGNOSIS

If the abnormal reading of the probe is caused by improper calibration, you can select the **Restore initial parameters** function in the probe setting interface of the UC-50 controller to restore the ST-765SS probe to the factory parameters.



The UC-50 controller supports displaying the original diagnostic data of the ST-765SS. To help troubleshooting possible issues with the probe, please save images of these data when the probe is respectively placed in a clean water (tap water), in a free chlorine/chlorine dioxide or pH standard solutions. Email the images to service@pyxis-lab.com for technical support. Selecting the **Probe Diagnosis** in the setting interface of UC-50 controller will display the internal original diagnosis data interface.



SENSOR CLEANING & MAINTENANCE

Most cleaning of the ST-765SS is facilitated by removing the sensor, rinsing it with tap or DI water and gently wiping the sensor head with a soft cloth or Q-tips, then re-rinse. For a highly fouled sensor, soak the lower half of the sensor in 100 mL Pyxis inline sensor cleaning solution for 10-15 minutes. Gently rub the sensor electrode head with the provided Q-tips. If the surface is not entirely clean, continue to soak the sensor for an additional time until clean. Rinse the sensor with distilled water. Pyxis Lab Inline Sensor Cleaning Solution can be purchased at our online Estore/Catalog at <https://pyxis-lab.com/product/probe-cleaning-kit/>



ST-Series Probe Cleaning Kit (P/N SER-01)

COMMON SENSOR TROUBLESHOOTING

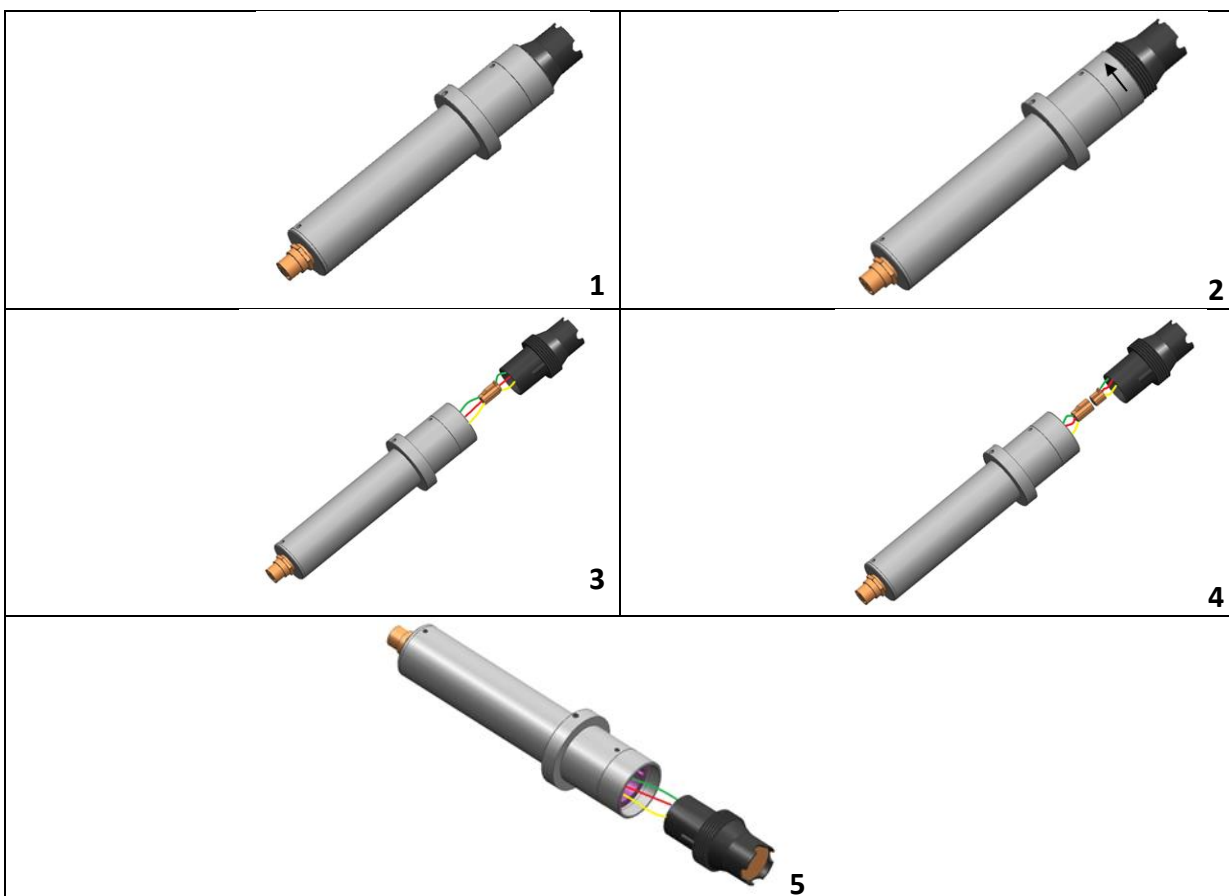
If the ST-765SS sensor output signal is not stable and fluctuates significantly, make an additional solution ground connection—connect the black ground wire to a conductor that contacts the sample water electrically such as a brass pipe adjacent to the ST-765SS.

REPLACING pH / OXIDIZER ELECTRODE HEAD

The pH/oxidizer electrode head of ST-765SS Series can be replaced when the original electrode head reaches its working life.

Order a replacement electrode head EH-765 (P/N 53061) from Pyxis and follow instructions as below.

1. Turn off the sensor if it is powered on.
2. Make sure there is no water on the sensor.
3. Hold the ST-765SS main body with one hand and use the other hand to twist the stainless-steel locking ring counter-clockwise until the front end of the black electrode is completely unscrewed, as shown in *Figure 2*.
4. Pull out the electrode head as shown in *Figure 3*.
5. Loosen the electrode plug connector, and remove the electrode head, as show in *Figure 4*.
6. To assemble the new electrode head, connect the plug, then insert the new electrode head into the main sensor housing and ensure that the two protrusions on the electrode head are aligned with the notches in the sensor main housing.
7. Then twist the stainless-steel lock ring of ST-765SS in a clockwise direction until the threads of the electrode head completely enter the ST-765SS housing as shown in *Figure 1*.



Replacing EH-765 pH and Oxidizer Electrode Head

Order Information

IK-765SS-FCL (<i>Free Chlorine + pH + Temperature Analyzer</i>)	P/N 42082
IK-765SS-CLO (<i>Chlorine Dioxide + pH + Temperature Analyzer</i>)	42085

Optional / Replacement Accessories Information

ST-765SS-FCL (<i>Free Chlorine + pH + Temperature Sensor w/Internal Compensation</i>)	P/N 53607
ST-765SS-CLO (<i>Chlorine Dioxide + pH + Temperature Sensor w/Internal Compensation</i>)	53608
EH-765 (<i>Replacement Electrode Head for ST-765SS-Series Sensors</i>)	53061
FR-50 (<i>Replacement FR-50 Flow Reservoir w/Rotameter & PRV</i>)	50700-A01
UC-50 Display + Data Logging Terminal (<i>Replacement</i>)	43007
SP-200 OxiPocket™ (<i>Pocket All-Oxidizing Disinfectants Colorimeter & Fluorometer</i>)	50802
Pyxis pH Calibration Combo Pack (<i>4-7-10 Calibration Solution 3-Pack-500mL each</i>)	57007
Zero Oxidizer Calibration Standard Solution (<i>500mL Bottle</i>)	20022
ST-SERIES PROBE CLEANING KIT	SER-01