Pyxis

UC-100S

With

ST-765SS-FCL – Inline Free-Chlorine Sensor

CR-300 – Inline Corrosion Sensor

FR-300P – Self-Brushing Flow Reservoir for Pyxis Inline Sensors

Pyxis Lab Inc.

September 2024

Related Statements

The manufacturer shall not be liable for direct, indirect, special, incidental or consequential damages resulting from any deficiency or omission in this manual. The manufacturer reserves the right to make changes to this manual and the products described in it at any time without notice or liability. Revised versions can be found on the manufacturer's website.

Safety Information

Please read this manual completely before unpacking, installing and operating this equipment. In particular, pay attention to all dangers, warnings and precautions, otherwise, it may cause serious personal injury to the operator or damage to the equipment.

Use of Danger Information

Danger
Indicates a potentially or urgent dangerous situation that, if not avoided, will cause death or serious injury.

Warning
Indicates a potentially or very dangerous situation that, if not avoided, may cause serious personal injury or death.

Warning
Indicates a potentially dangerous situation that may cause a certain degree of personal injury.

Attention
Indicates conditions that if not avoided, will cause damage to the instrument. This is information that needs special emphasis.

Warning Label

Please read all labels and marks attached to the instrument. Failure to follow the instructions on these safety labels may result in personal injury or damage to the instrument.

	If this symbol appears in the instrument, it means refer to the operation and/or safety information in the instruction manual.
	If there is this mark on the instrument housing or insulator, it means there is a risk of electric shock or death from electric shock.
	Static electricity can damage the delicate internal electronic components, resulting in reduced performance or eventual failure of the instrument.
	Electrical equipment marked with this symbol cannot be disposed of through the European public waste system after August 12, 2005. In order to comply with European regional and national regulations (EU Directive 2002 / 98 / EC), European electrical equipment users must now return abandoned or expired equipment to the manufacturer for disposal without any cost.

Pyxis

Catalog

Pyxis

Specifications

Items	UC-100S
P/N	43047
Compliance	EPA-180.1/334.0
Display	7-inch LCD Color Industrial Capacitive Touch Screen
Storage Capacity	Built-In 4GB of Ram for Storing up to 1-Million Data/Event Records
Power Requirement	96-260VAC / 50-60 Hz; 10A Fuse; 75 W
Input	RS-485 Modbus - RTU
Output	6 x 4-20 mA / RS-485 Modbus - RTU / Modbus TCP
USB	1 x USB host, for data downloading and screen upgrade
Internet	RJ-45 socket, Modbus-TCP
Panel Operational	40 – 113°F (4-45 °C)
Storage Temperature	Instrument: -4 – 131°F (-20 – 55°C) / Sensors 32 – 122°F (0 – 50°C)
Sample Water Temperature	40 – 104°F (4-40°C)
Sample Water Pressure	7.25 – 30 psi (0.05 – 0.2Mpa)
Rating	IP-65 Panel-Display / IP-67 Sensors
Regulation	CE / RoHS
Relative Humidity	20% - 90% (No Condensation)
Altitude	<6,561 feet (<2,000 Meter)
Approximate Product Weight	~ 10 kg

Items	ST-765SS-FCL
P/N	53607
Sensor Body Material	304SS
Oxidizer Range	0.00-5.00 ppm FCl2 / CLO2 (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
Power Supply	22 – 26VDC, Power Consumption 2W
Storage Temperature	-7 °C – 60 °C (20 – 140 °F)
Outputs	Dual Isolated 4 – 20 mA Analog Outputs + Isolated RS-485 Digital Output
Dimension (L x D)	Length 8.3 inch (210.8 mm), body diameter 1.4 Inch (35.6 mm)
Weight	530 g (1.16lbs)
Maximum Sensor Pressure	100 psi (6.9 Bar) – Sensor Only
Operating Temperature	4 °C – 49 °C (40 – 120 °F)
Wet Material	UPVC
Rating	IP67, Fully Dustproof & Waterproof
Selectivity	Non-Selective, cross sensitive to other oxidizing species
Compliance	EPA 334.0 / ISO 7393
Regulation	CE Marked / RoHS
Cables Included	MA-4.9CR Cable (8-Pin Adapters – 4.9ft) MA-1.5CR Cable (8 Pin Adapter / Flying Leads – 1.5ft)
Typical Electrode Service Life	2 Years
Electrode Warranty	6 Months
Sensor Body Warranty	13 Months

FR-300-PLUS	
Item	**FR-300-PLUS**
P/N	50700-A44
Sample Inlet Pressure	7.25 – 30 psi (0.05 – 0.2MPa)
Installation	FR-300-PLUS Self-Brushing Flow Reservoir for DIRTY Water Applications
FR-300-PLUS Suggested Flow Rate	200 – 800 mL/minute
FR-300-PLUS Sample Inlet /Outlet	1/2- inch FNPT
FR-300-PLUS Operation	24VDC/2.5W Powered Constant ON Mode for Relay Control and RS-485
FR-300-PLUS Rotational Speed	200 RPM – Motorized Brush Preset for Constant Operation

Items	CR-300
P/N	51007
Power Supply	24VDC, 2W
Output	4-20 mA & RS-485 (Dual Outputs)
Data Storage	N/A
Dimensions (L x D)	11.1-inch (281.5 mm) L 0.9 in (23.0 mm) D Lower 1.7 in (43.0 mm) D Upper
Weight	687 g
Cable Length	5 ft. (1.5 m) (Extension Cables Available)
General Corrosion Range (4-20mA Output)	0.001–10.000 (MPY Default Based on Metallurgy Selected in uPyxis)
Max General Corrosion Range (4-20mA Output)	0.001–995 (MPY Customizable Via uPyxis)
Localized Corrosion Range (4-20mA Output)	0.001–100 (Index Customizable Via uPyxis)
Max Localized Corrosion Range (4-20mA Output)	0.001–100 (Index Customizable Via uPyxis)
Conductivity Compensation	10 - 10,000 µS/cm
Sample Temperature	-20 - 50°C
Reading Interval	3 to 1440 Minutes (>3 Minutes Required for Localized Corrosion Data)
Resolution	0.001 MPY
Alloy Factor	0 – 3 (Adjustable Default Assigned via uPyxis on Metallurgy UNS Code)
Installation	1-inch MNPT
Enclosure Material	304 stainless steel
Working Pressure	Up to 100 psi (7 bar)
Temperature	Working: -10 - 50 °C Storage: -20 - 70 °C
Protection	IP65
Regulation	CE / RoHS / UKCA

NOTE *- Pyxis Lab is consistently updating technologies, as such, specifications may change without notice.*

UC-100S Controller Features

The UC-100S controller integrates a touch screen display/data logger interface for sensor calibration. The display/data logger provides 6 x 4-20mA Outlets, as well as RS-485 and TCP-IP. The sensors are all connected to the display/data logger via RS-485 modbus (RTU), allowing in the monitor touch screen Integrated sensor calibration interface and diagnostics

2. Dimension and Mounting

3.1. Dimension

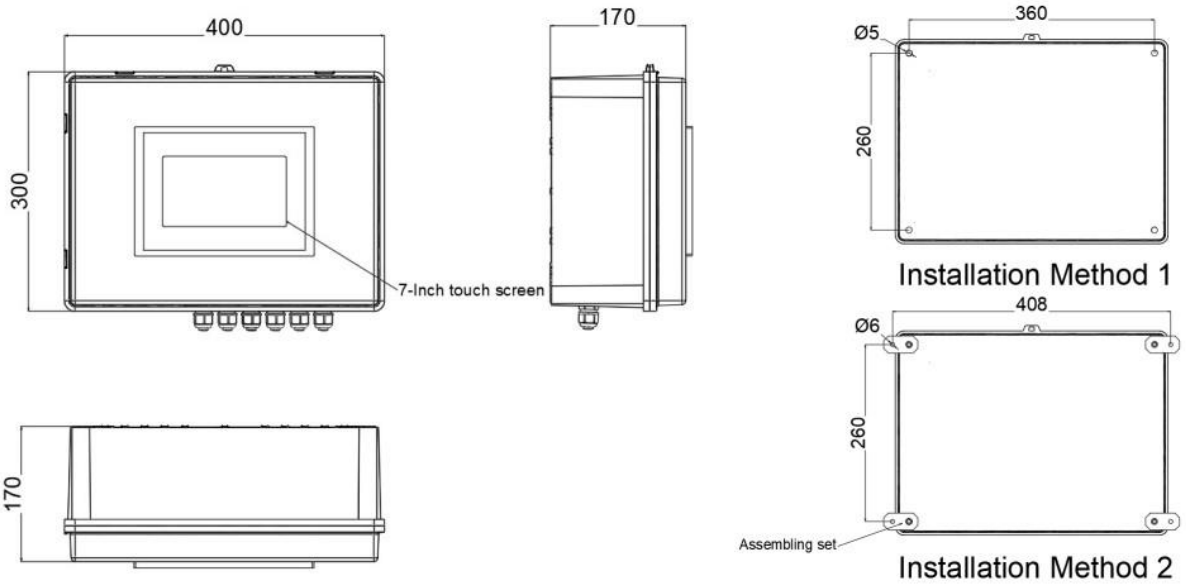


Figure. 1 - UC-100S controller size and installation size

3.2. Terminal Wiring

Before use, you need to connect the power cable to the controller terminal according to the wiring diagram.

XT1 to L
XT2 to N
XT3 to PE.

Warning

⚠ The process of electrical connection to contact the 220V single-phase power supply, should be operated by personnel with an electrician's license. Failure to operate according to the electrical code of practice may result in electric shock injury or even death.

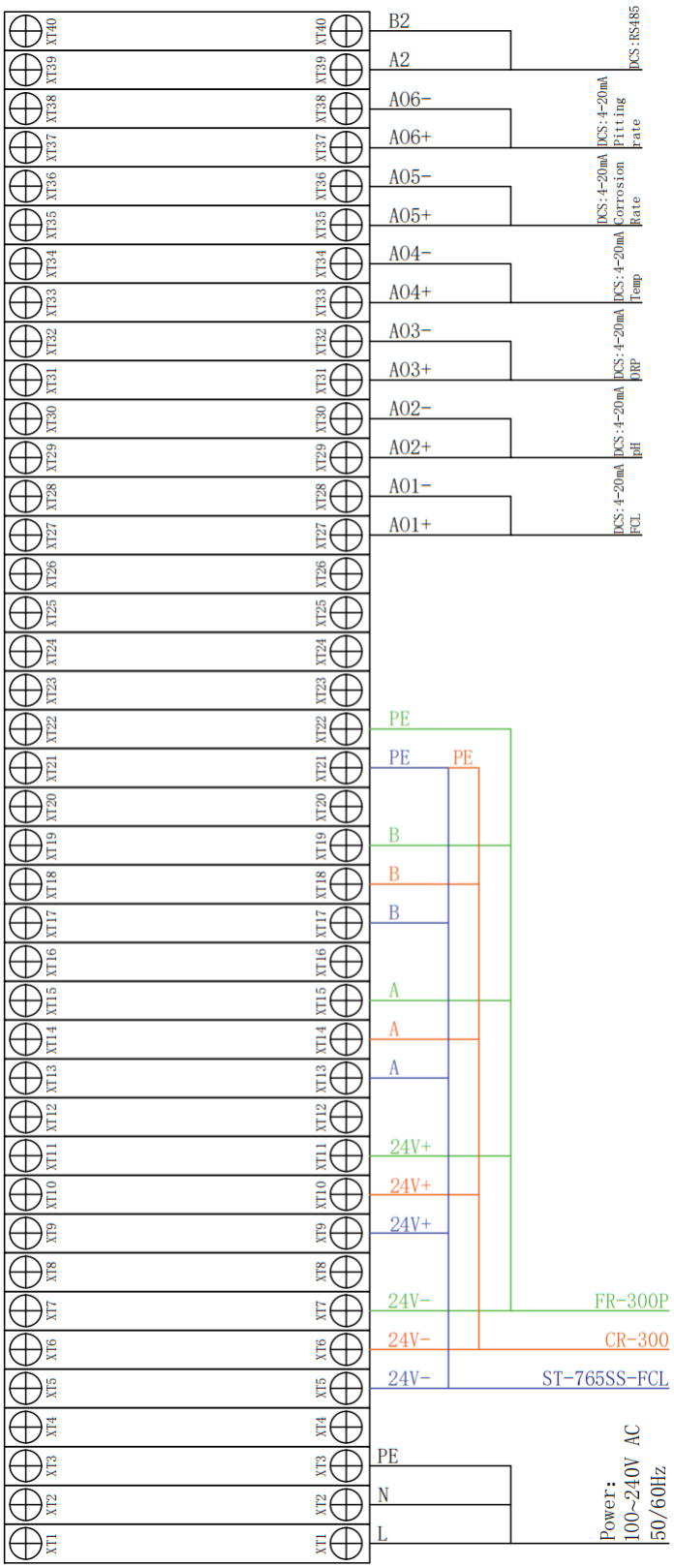


Figure. 2 - Terminal Wiring Diagram

Touch Screen Operation

4.1. Main Screen

After the system is powered on an initial screen allows the user to log into the system.

4.

Figure. 3 - Main Screen

4.2. User Login

After powering on the system, log in with the username and password to be able to change system settings. Click the "**User Login**" button, select the user "**pyxis**", enter the password: "**888888**" in the user password field. A new user can be added via "User Management" in interface of the menu.

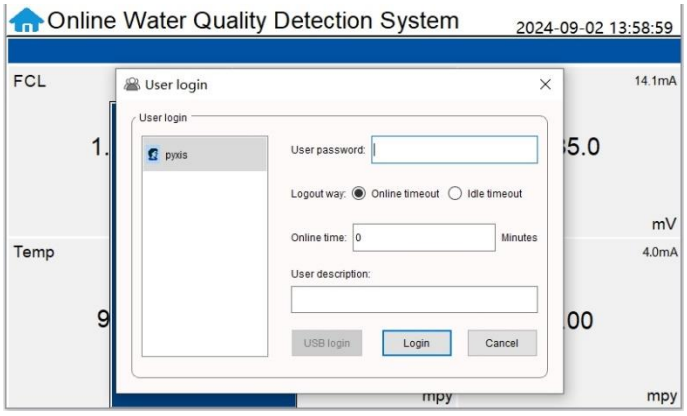


Figure. 4 - User Login Screen

If you do not need a password, or want to change the user, you can enter the system and manage in the "**User Management**" screen of the menu.

4.3. Real-Time Monitoring

Click the "Enter System" button on the main interface to enter the real-time monitoring screen of the system. The data detected by the Pyxis sensors will be displayed in real-time.

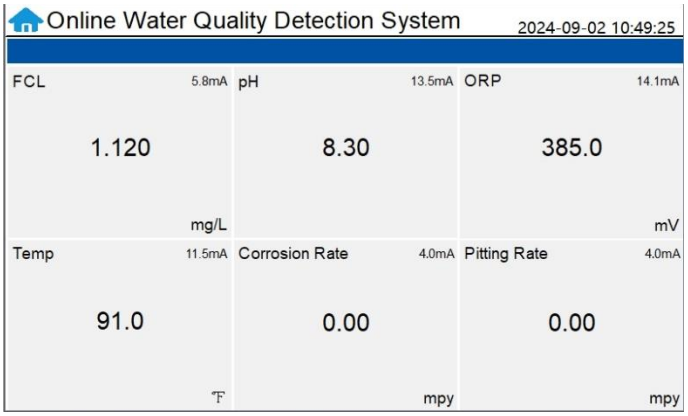


Figure. 5 - Real-time Monitoring Screen

4.4. Menu Bar

Click the button in the upper left corner of the screen to enter the system's menu interface, where the user can select to enter the desired operation interface.

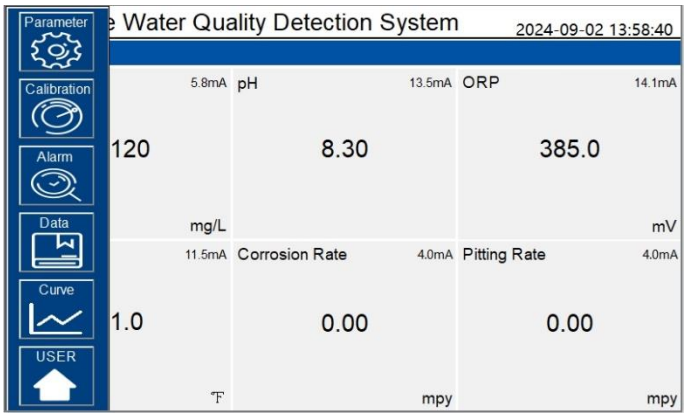


Figure. 6 - Menu Bar

4.5. Configurable Parameters

Click the "Parameter" button in the menu bar. Here you can select to enter " Settings interface " and " User Defined " setting interface etc.

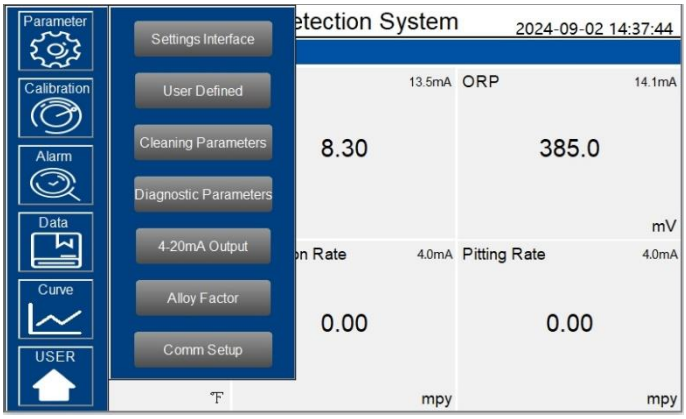


Figure. 7 - Parameter Settings

4.5.1. Settings interface

Click the "Settings interface". Here you can select to enter " Alarm Parameters " and " Sensor Parameters " setting interface.

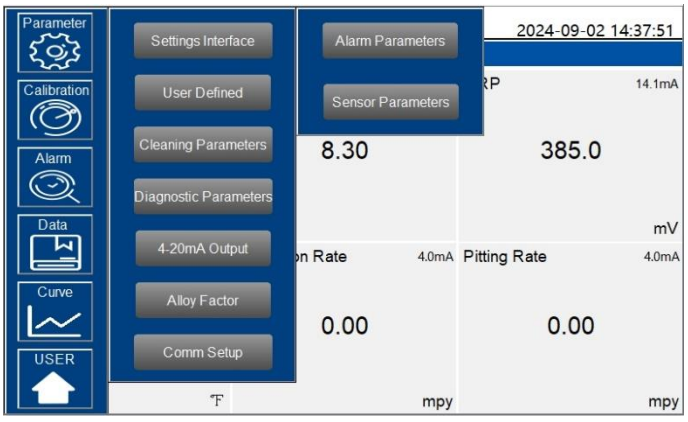


Figure. 8 – Settings Interfaces

Alarm Parameters

When the online user has the right to operate the instrument, the upper and lower limits of alarm can be set. Click "**Alarm Parameters**" to enter the interface of setting alarm parameters. When the measured value is lower than the set lower limit, the "**** lower limit alarm" of the corresponding sensor will be displayed in the real-time monitoring screen; when the measured value is higher than the set upper limit, the "**** upper limit alarm" of the corresponding sensor will be displayed in the real-time monitoring screen. Users can also choose to turn on or off the alarm display function at the top of the corresponding parameter

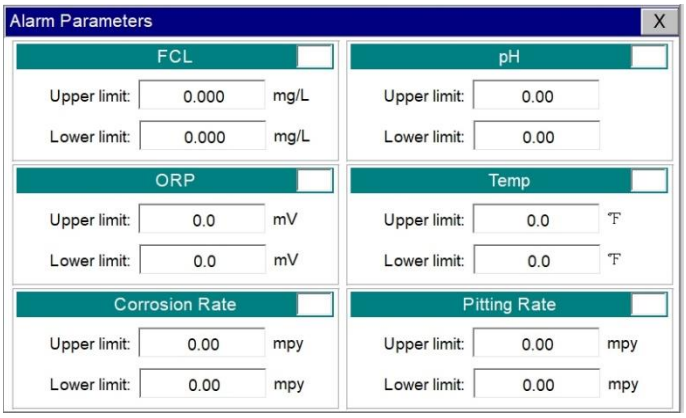


Figure. 9 - Alarm Parameter Settings

Sensor Parameters

Usually the oxidant concentration (e.g., free chlorine) is a very small signal, which is easily subject to external interference. The ST-765SS Series sensors adopt a continuous smoothing and averaging algorithm to filter out these minor interferences. A suitable smoothing factor setting can allows users to obtain a high-quality measurement and suitable dynamic response based on the application needs. The smoothing factor setting regulates the speed of sensors response. The higher the smoothing factor value, the faster the sensor response and the lower the interference and noise suppression enabling a more rapid response to any changes of the real value. The lower the smoothing factor value, the slower the sensor response and the better the interference and noise suppression, but the slower the response to the real value change.

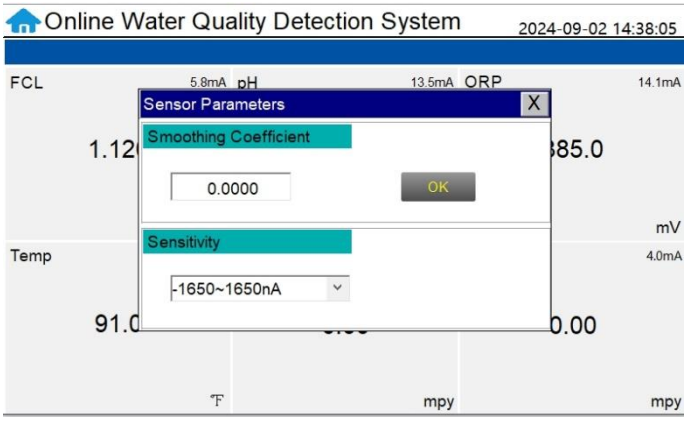


Figure. 10 - Smoothing Coefficient

Pyxis Lab uses the term "T90" when the measured value of the sensor reaches 90% of the true value to describe the speed of the sensor response in seconds. The default smoothing factor of ST-765SS Series sensor is 0.0024 (T90≈4 minutes). The available setting range of the smoothing factor is 0.001 to 0.9. The following table outlines the comparison between the smoothing factor and T90 for the ST-765SS Series sensor and should be used if considering an adjustment to the smoothing factor settings.

Smoothing Factor	T90 (Seconds)
0.1	5.5
0.09	6
0.08	7
0.07	8
0.06	9.25
0.05	11.25
0.04	14
0.03	19
0.02	28.5
0.01	57.25
0.009	63.75
0.008	71.75
0.007	82
0.006	97.5
0.005	114.75
0.004	143.5
0.003	191.5
0.002	287.5

$$T_{90} \approx 0.538 * Smooth\_factor^{-1.013}$$

NOTE *The smoothing coefficient is not available when the sensor is in calibration mode.*

4.5.2. User Definition

Click the "User Definition". Here you can select to enter " Name Definition " and " Unit Switching " setting interface.

Figure. 11 - User Definition Setting

Click "Name Definition" to enter the Name Definition parameter setting interface. Users can set the parameter name according to their own situation. **Note**: Please input the name with no more than 15 characters!

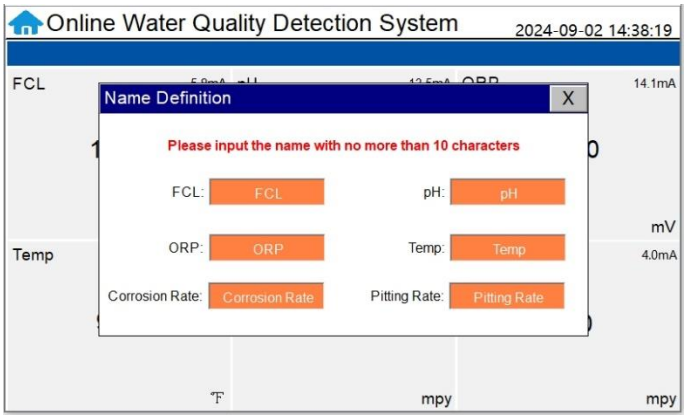


Figure. 12 - Name Definition setting

Click " Unit Switching " to enter the Name Definition parameter setting interface. The user can set the unit of temperature in this interface.

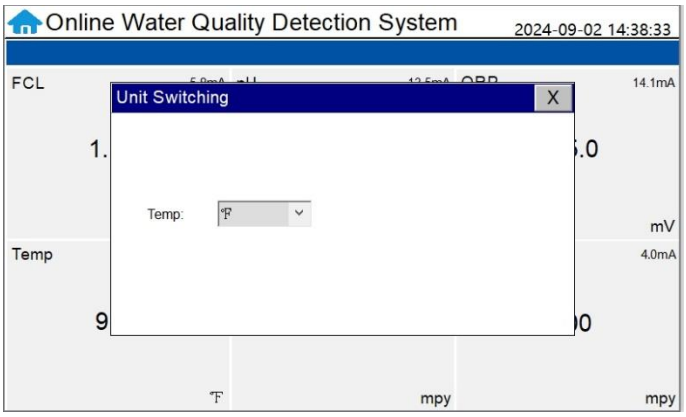


Figure. 13 – Unit Switching Setting

4.5.3. Cleaning Parameters

Click " Cleaning Parameters" to enter the Name Definition parameter setting interface. Users can set the FR-300P brush's working status and speed. When users click "start", a confirmation pop-up will appear. After confirming the enable, the FR-300P's brushes will work at the set speed.

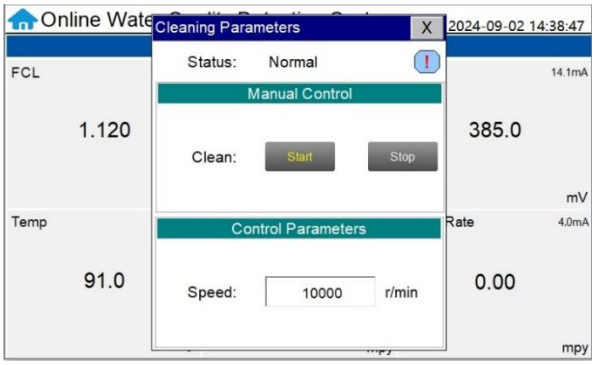


Figure. 14 – Cleaning Parameters

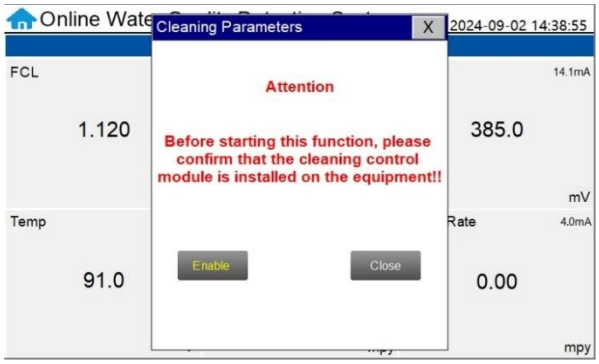


Figure. 15 – Cleaning Parameters

4.5.4. Diagnostic Parameters

Click “Diagnosis Parameters” to the diagnosis page. In the diagnosis page, the raw data measured by the probe is displayed. To help troubleshooting possible issues with the probe, please save an image of this data when the probe is placed in a clean water (tap water or deionized water), in a standard, and in the sample that the probe is intended for.

After clicking Diagnostic Historical Data, the interface will pop up the password input window.

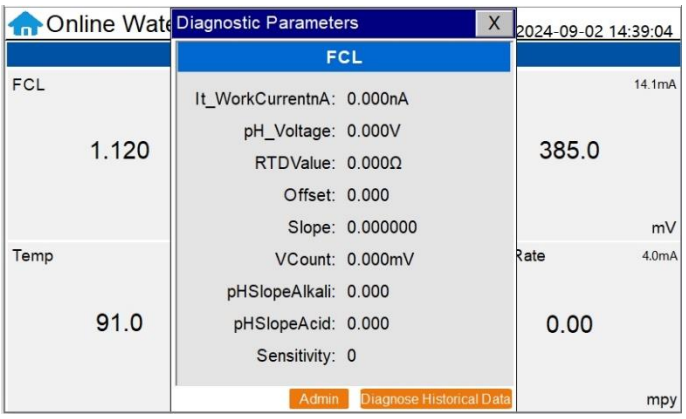


Figure. 16 - Diagnostic Parameters Interface

If the user enters an incorrect password, the window will indicate that the password error. Instead, the interface will jump to the diagnostic history data interface.

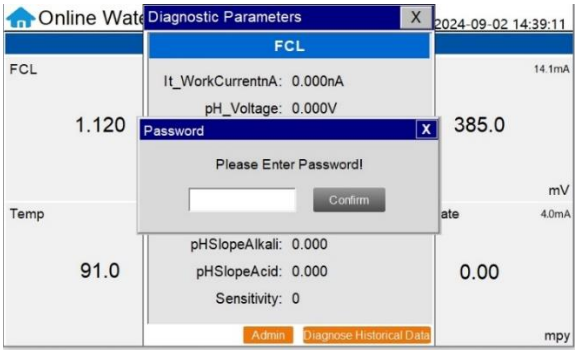


Figure. 17 - Password Input Interface

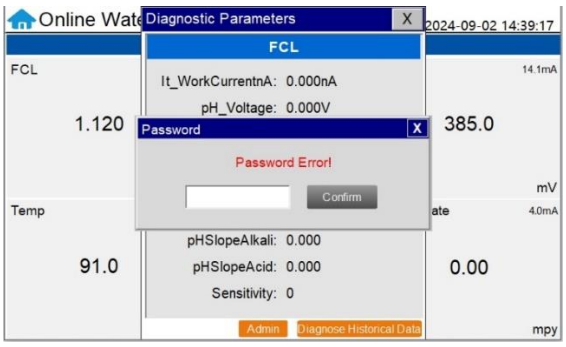


Figure. 18 - Password Error

Users can query historical data and export data after a set period of time.

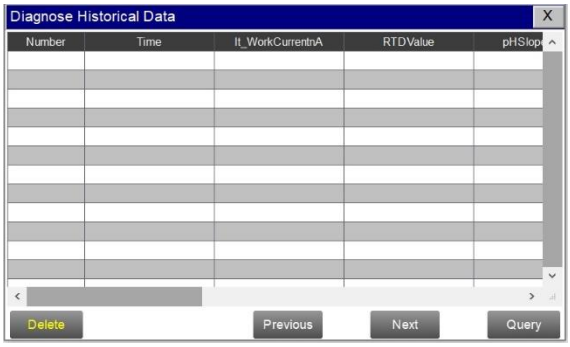


Figure. 19 - Diagnostic Historical Data

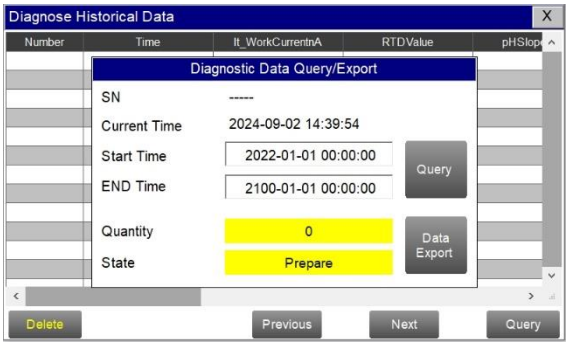


Figure. 20 - Diagnostic Data Query/Export

4.5.5. 4-20mA Output Parameter Setup

Click "4-20mA parameter" to enter the 4-20mA parameter setting interface. The 4mA output value corresponds to the lower limit of the sensor range value, and the 20mA output value corresponds to the upper limit of the range value. The closer the value setting is to the measured value, the more accurate it is recommended to set according to the sensor range.

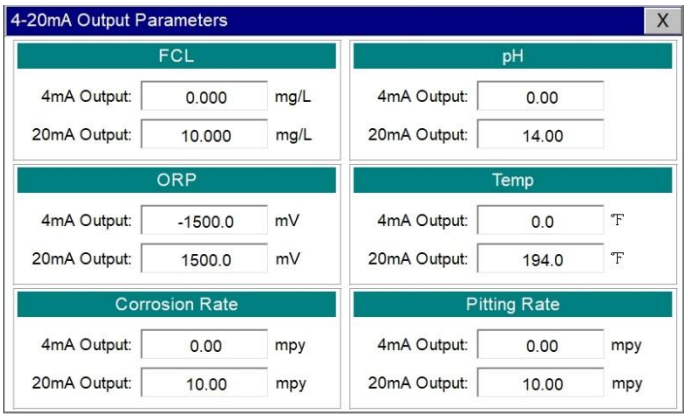


Figure. 21 - 4-20mA Setting

4.5.6. Alloy Factor

The default 4-20 mA current outputs for mild steel are scaled as:

4 mA = 0 MPY or 0 localized corrosion index
20 mA = 10 MPY (general corrosion)
20 mA = 100 MPY (localized corrosion)

The sensor is configured to measure the corrosion of mild steel by default.

For measuring the corrosion rate of steel, the user just needs to scale 20 mA = 10 MPY in the controller.

Click "**Alloy Factor**" to enter the Alloy Factor selection interface. Select the model in the table in the lower left corner, click the "**Load**" button next to the corresponding sensor at the top, and the writing of the value means success. If there is no corresponding model in the table, you can manually enter it at the bottom right and add it to the table.

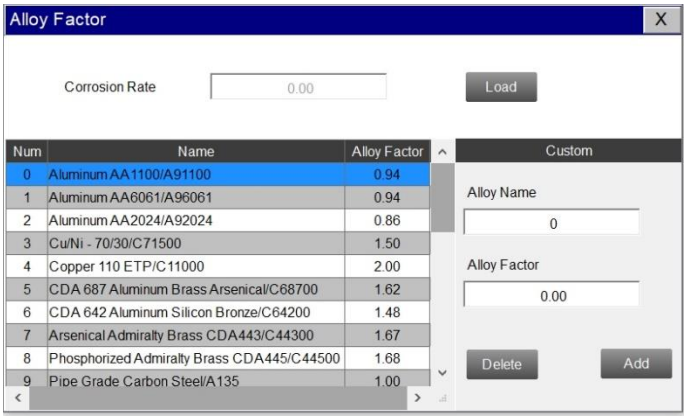


Figure. 22 Alloy Factor

Once an alternative metal has been selected via the Alloy Factor/Metallurgy drop down list, the user may refer to the metallurgy table below for appropriate analog output programming of alternative metals.

Common Designation	UNS	Alloy Factor	Default 4–20mA General Corrosion Scale (MPY)	Default 4–20mA Localized Corrosion Scale (Index)
Aluminum AA1100	A91100	0.94	0–10	0–100
Aluminum AA6061	A96061	0.94	0–10	0–100
Aluminum AA2024	A92024	0.86	0–10	0–100
Cu/Ni - 70/30	C71500	1.50	0–1	0–10
Copper 110 ETP	C11000	2.00	0–1	0–10
CDA 687 Aluminum Brass Arsenical	C68700	1.62	0–1	0–10
CDA 642 Aluminum Silicon Bronze	C64200	1.48	0–1	0–10
Arsenical Admiralty Brass CDA443	C44300	1.67	0–1	0–10
Phosphorized Admiralty Brass CD445	C44500	1.68	0–1	0–10
Pipe Grade Carbon Steel	A135	1.00	0–10	0–100
Mild Steel C1010	G10100	1.00	0–10	0–100
Mild Steel C1015	G10150	1.00	0–10	0–100
Mild Steel C1018-C1020	G10180	1.00	0–10	0–100
Mild Steel C1080	G10800	1.00	0–10	0–100
Stainless Steel 304	S30400	0.89	0–0.5	0–10
Stainless Steel 304L	S30403	0.89	0–0.5	0–10
Stainless Steel 316	S31600	0.90	0–0.5	0–10
Stainless Steel 316L	S31603	0.90	0–0.5	0–10
Duplex Stainless 2205 - F51	S31803	0.90	0–0.5	0–10
Duplex Stainless 2507 - F53	S32750	0.90	0–0.5	0–10
Common Lead	L50045	2.57	0–0.5	0–1

Figure. 23 Metallurgy Selection Reference List with Proper 4-20mA Output Scaling

4.5.7. Modbus Communication Setup

Click the "Comm Setup" button in the menu bar. Here you can select to enter " Modbus RTU " and " Modbus TCP " setting interface.

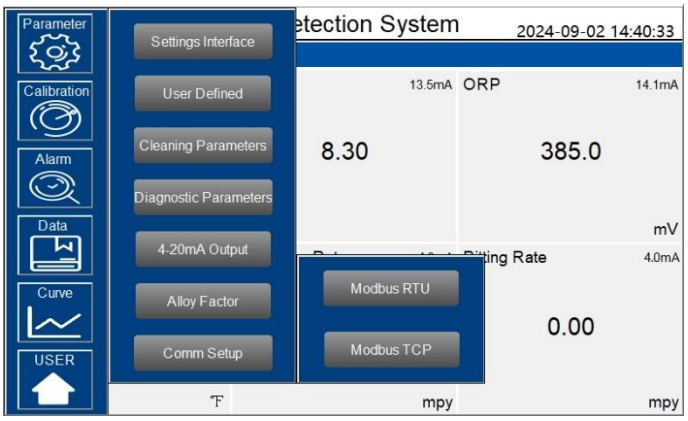


Figure. 24 - Communication Setup

Communication parameters generally do not need to be changed. If the communication station number and other parameters need to be changed on site, they can be changed on this interface.

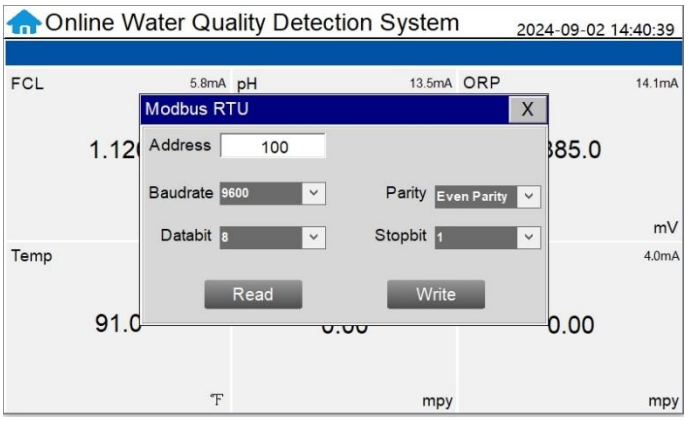


Figure. 25 - Modbus RTU

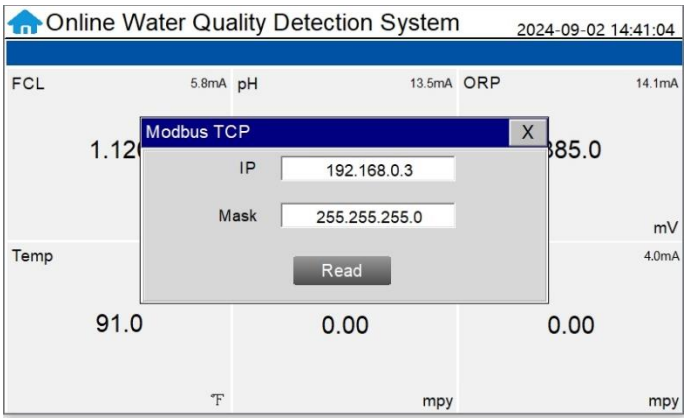


Figure. 26 - Modbus TCP

4.6. Calibration

Click on the "Calibration" button in the menu bar and select the sensor to be calibrated.

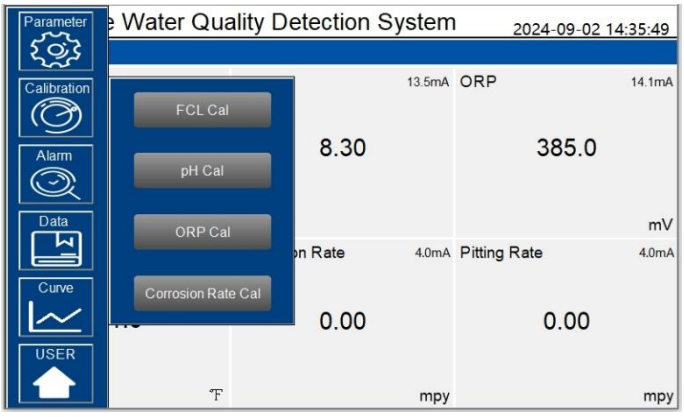


Figure. 27 - Sensor Calibration

4.6.1. FCL Calibration

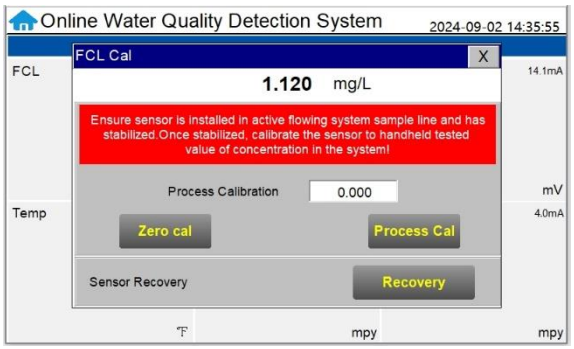
The oxidizer measurement module of the ST-765SS sensor is thoroughly calibrated at the Pyxis Lab factory according to the specific oxidant being measured.

To calibrate the sensor, the user can perform a Single-Point or Two-Point calibration according to the requirements of the application. (USEPA-334.0 / ISO-7393 compliant methodology).

Single Point FCL Calibration (In-Situ)

Use a portable or laboratory colorimeter (ie. Pyxis OxiPocket SP-200, Pyxis SP-800 or similar) to test the oxidizer concentratoin value of the active (flowing) water sample in the OxiPanel PLUS flow reservoir. DPD methodology is recommended. Once you have tested and confirmed the oxidizer concentration value in the active (flowing) flow reservoir, enter the test result value of the colorimeter into the calibration screen in the **Process Calibration**. Please note, the label name of oxidizer being measured will be displayed in the upper left corner of this screen based on the model of OxiPanel PLUS and ST-765SS sensor format (ie. FCL for Free Chlorine) Once the measured oxidizer value has been entered, click **"Process Calibration"**. A dialog box will pop up to confirm whether to perform this operation. If the calibration operation is confirmed, click **"OK"**, and if the calibration is successful, the dialog box will show **"Calibration Success"**.

NOTE *Click the Recovery button in the calibration interface of the sensor to restore the factory calibration settings if a user error is made during calibration and other operations. This will restore the factory settings of the sensor through this function.*



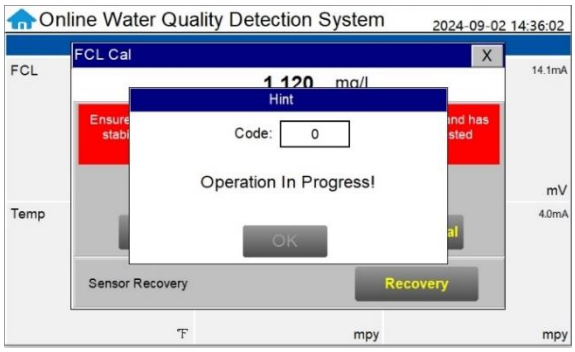


Figure. 28 – Free Chlorine Calibration of ST-765SS-FCL Figure. 29 – In Progress Screen of Free Chlorine Calibration

Two Point FCL Calibration

NOTE *Under normal operational use of the ST765SS Series sensor, Pyxis Lab does not suggest a Zero-Point calibration by the user and the preprogrammed factory zero should remain unaltered. Only Slope calibration is recommended as a standard practice.*

Zero-Point Calibration Procedure:

If a zero calibration is necessary, close the water inlet valve and remove the ST-765SS sensor and rinse 3x with DI water ensuring there is no debris or fouling of the sensor electrode head. Submerge the sensor into a beaker filled with Pyxis Zero Oxidizer Calibration Solution (P/N:21022) or with 100µS/cm Conductivity Standard Solution. Either will work. Wait for the ST-765SS sensor oxidizer value to stabilize on the touch-screen display. Sensor stabilization should occur within few minutes. Click **"Zero Calibration"** and a dialog box will pop up to confirm whether you desire to perform this operation. Click **"OK"** to confirm the calibration operation. If the calibration is successful, the dialog box will show **"Calibration Success"**. The sensor is now zero-calibrated to the known zero calibration solution.

Slope-Point Calibration Procedure:

After successful zero calibration, insert the ST-765SS-FCL sensor back into the FR-300-PLUS and open the sample water supply valve allowing the sensor to read and stabilize after a few minutes of observation. Use a portable or laboratory colorimeter (ie. Pyxis OxiPocket SP-200, Pyxis SP-800 or similar) to test the oxidizer concentration value of the active (flowing) water sample in the OxiPanel PLUS flow reservoir. DPD methodology is recommended. Once you have tested and confirmed the oxidizer concentration value in the active (flowing) flow reservoir, enter the test result value of the colorimeter into the calibration screen in the **Process Calibration**. Please note, the label name of oxidizer being measured will be displayed in the upper left corner of this screen based on the model of OxiPanel PLUS and ST-765SS sensor format (ie. FCL for Free Chlorine) Once the measured oxidizer value has been entered, click **"Process Calibration"**. A dialog box will pop up to confirm whether to perform this operation. If the calibration operation is confirmed, click **"OK"**, and if the calibration is successful, the dialog box will show **"Calibration Success"**.

NOTE *Click the Recovery button in the calibration interface of the sensor to restore the factory calibration settings if a user error is made during calibration and other operations. This will restore the factory settings of the sensor through this function.*

4.6.2. pH Calibration

The pH function is thoroughly calibrated at the Pyxis Lab factory prior to shipment. After removing the sensor and checking it with a pH standard buffer solution in a beaker, if the sensor value has shifted, then the user may choose from single-point, two-point or three-point calibration to re-calibrate the pH portion of the ST-765SS sensor as desired. Pyxis Combo pH 4-7-10 Calibration Standard Kit (P/N:57007) or similar is suggested.

NOTE *Click the Recovery button in the calibration interface of the sensor to restore the factory calibration settings if a user error is made during calibration and other operations. This will restore the factory settings of the sensor through this function.*

Single Point pH Calibration

Remove the ST-765SS sensor and rinse 3x with DI water ensuring there is no debris or fouling of the sensor electrode head. Submerge the sensor into a beaker with pH=7 buffer solution. Click **"pH7 calibration"**. A dialog box will pop up to confirm whether to perform this operation, click **"OK"** if the calibration operation is confirmed, if the calibration is successful the dialog box will show **"Calibration Success"**.

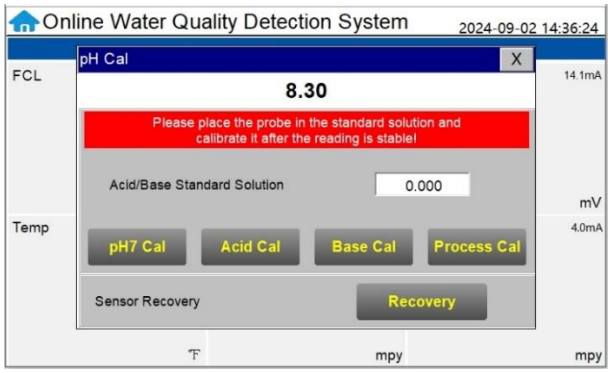


Figure. 30 - pH Calibration

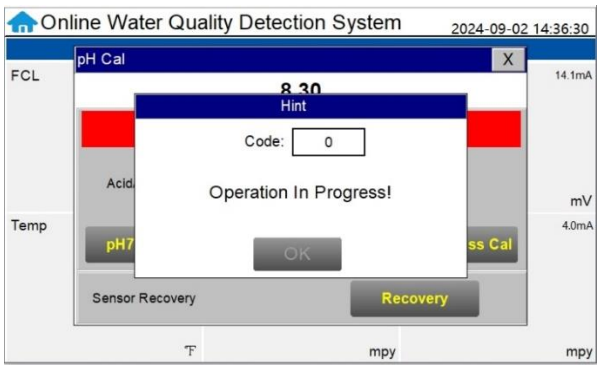


Figure. 31 - pH Calibration Prompt

A **Process Calibration** can be used if the pH calibration standard is not readily available for high, mid, and low calibration, or if there is a fixed deviation between the actual water sample and the true value after the user has done the calibration test. The pH process calibration is actually a correction (-0.5 to 0.5 pH units) made to the true pH value as measured by the sensor. Anything outside this range will require a formal calibration using pH calibration standard solution.

Two Point pH Calibration

Remove the ST-765SS sensor and rinse 3x with DI water ensuring there is no debris or fouling of the sensor electrode head. Submerge the sensor into a beaker with pH=7 buffer solution. Click **"pH7 calibration"**. A dialog box will pop up to confirm whether to perform this operation, click **"OK"** if the calibration operation is confirmed, if the calibration is successful the dialog box will show **"Calibration Success"**.

After pH7 is successfully calibrated, you can choose Acid Calibration or Alkali Calibration for the second calibration point. If you choose Acid Calibration, clean beaker 3x with deionized water. Fill the beaker with pH=4 buffer solution. Enter the value 4 in the calibration value dialog box, and click **"Acid Calibration"**, then a dialog box will pop up to confirm whether to perform this operation. Click **"OK"** if the calibration operation is confirmed and the dialog box will show **"Calibration Successful"** if the calibration is successful. Similarly a pH=10 buffer solution can be selected for the second point calibration if desired.

Three Point pH Calibration

Remove the ST-765SS sensor and rinse 3x with DI water ensuring there is no debris or fouling of the sensor electrode head. Submerge the sensor into a beaker with pH=7 buffer solution. Click **"pH7 calibration"**. A dialog box will pop up to confirm whether to perform this operation, click **"OK"** if the calibration operation is confirmed, if the calibration is successful the dialog box will show **"Calibration Success"**.

After pH7 is successfully calibrated, you can choose Acid Calibration or Alkali Calibration for the second calibration point. If you choose Acid Calibration, rinse the beaker 3x with deionized water. Fill the beaker with pH=4 buffer solution. Enter the value 4 in the calibration value dialog box, and click **"Acid Calibration"**, then a dialog box will pop up to confirm whether to perform this operation. Click **"OK"** if the calibration operation is confirmed and the dialog box will show **"Calibration Successful"** if the calibration is successful.

After successful Acid Calibration, select pH=10 for Alkali Calibration. Rinse the beaker 3x with deionized water. Fill the beaker with pH=10 buffer solution. Enter the value 10 in the calibration value dialog box, and click **"Alkali Calibration"**, then a dialog box will pop up to confirm whether to perform this operation. Click **"OK"** if the calibration operation is confirmed and the dialog box will show **"Calibration Successful"** if the calibration is successful. The three-point calibration is completed.

4.6.3. ORP Calibration

Close the water inlet valve and remove the ST-765SS sensor and rinse 3x with DI water ensuring there is no debris or fouling of the sensor electrode head. Submerge the sensor into a beaker filled with Pyxis ORP-200 Calibration Standard Solution (P/N: 57020) or similar. Enter the known concentration of the ORP standard solution in the calibration screen and click **"Calibrate"**. A dialog box will pop up to confirm whether to perform this operation. If the calibration operation is confirmed, click **"OK"**. If the calibration is successful, the dialog box will display **"Calibration Successful"**.

NOTE *Click the Recovery button in the calibration interface of the sensor to restore the factory calibration settings if a user error is made during calibration and other operations. This will restore the factory settings of the sensor through this function.*

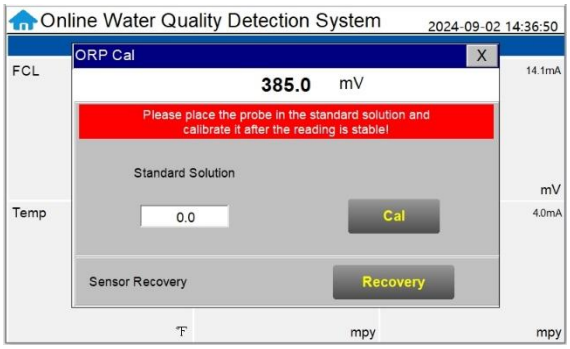


Figure. 32 - ORP Calibration

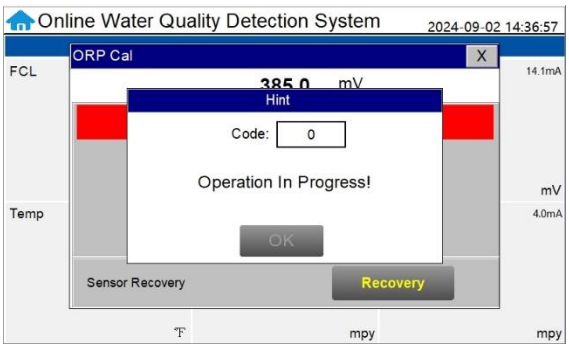


Figure. 33 - Awaiting Execution Screen

4.6.4. Corrosion Rate Calibration

The general corrsion rate calibration screen prompts the user to place the probe into a **"standard solution"**. Please note that this term references the Pyxis Calibration-Check Caps that are provided with each CR-300 sensor. Two Calibration Check-Caps are provided with each CR-300 sensor, one for Steel and one for Copper. These caps produce a voltage equivalent to a generalized corrosion value in MPY (Mils Per Year), as outlined below.

Pyxis Calibration Check-Cap Specifications		
Calibration Check-Cap Metallurgy	**Units of Measure**	**Corrosion Rate Output**
Steel Calibration Check-Cap	MPY (mils/Year)	2.0
Copper Calibration Check-Cap	MPY (mils/Year)	0.1

With the proper metallurgy electrodes installed onto the CR-300, insert the sensors electrodes into the two holes of the Pyxis Calibration-Check Cap designed for the metal being measured. This is referenced as **"Standard Solution"** in the calibration interface of the Pyxis UC-80 display/data logging terminal.

Figure. 34 Installing the Calibration Check-Caps onto CR-300 with Electrodes

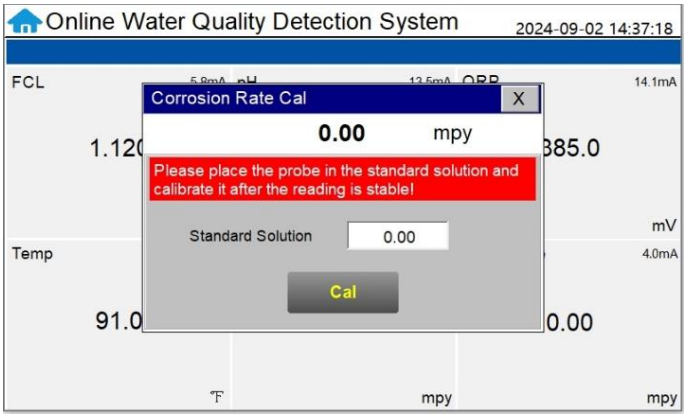


Figure. 35 Calibration Interface

Insert the sensor into the calibration check cap, or standard solution of known concentration. Enter the concentration in **"Standard Solution"** and wait at least 15 minutes. After the value is stable, click the **"Cal"** button to start the calibration. When the following prompt box is displayed and the calibration is successful.

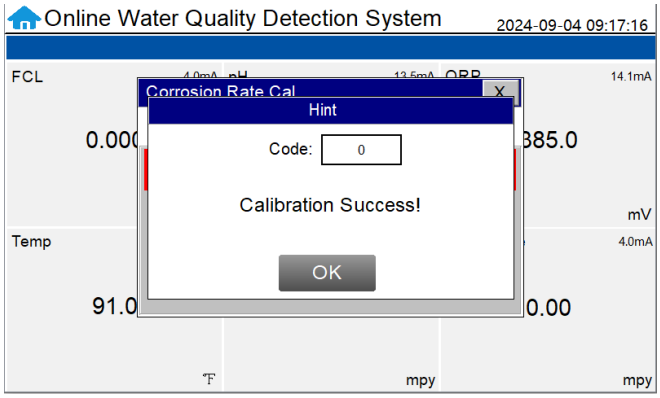


Figure. 36 Calibration Success

4.6.5. Recovering Data

If a user error is made during calibration and other operations, you may restore the factory settings of the sensor through the restore function.

4.7. Alarm

Click the "Alarm " button on the main screen to enter the alarm view screen.

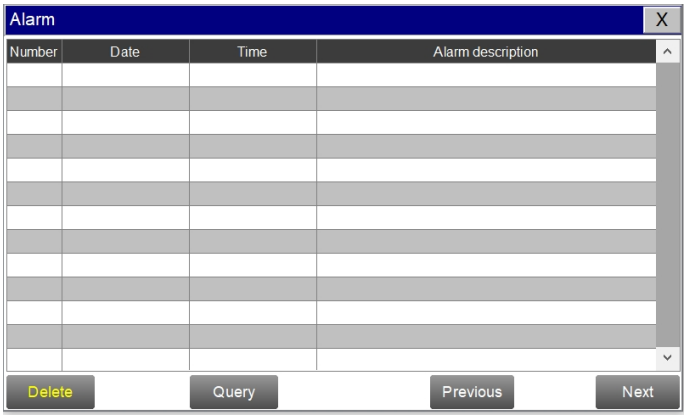


Figure. 37 - Alarm View

In this screen users can browse all logged alarms. Drag the right scroll bar up and down to view the history of alarms. Click "Previous" and "Next" to advance to the next page. Click “Query” then enter the alarm number in the pop-up box to query that alarm.

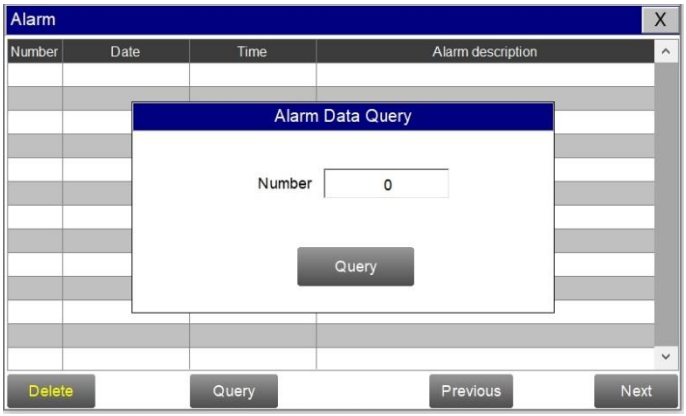


Figure. 38 - Alarm Data Query Screen

The Delete button in the lower left corner will delete all alarm records. After clicking delete, you must exit the screen and reenter before the historical data within the data report will be cleared.

4.8. Data

Click the "Data" button in the menu bar. Here you can select to enter " Historical Data " and " Cal Log " setting interface.

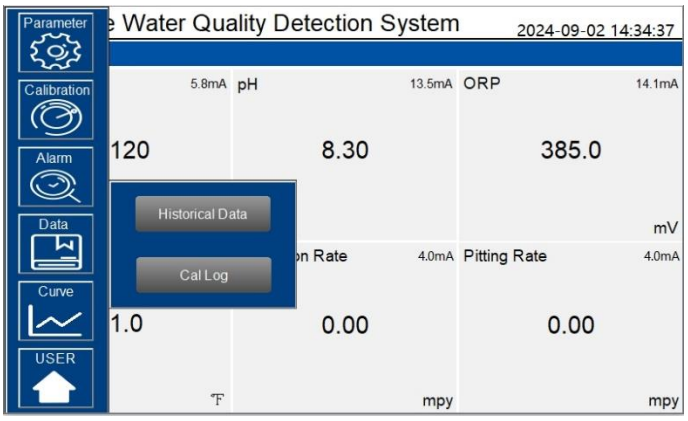


Figure. 39 – Data

4.8.1. Historical Data

Click the "Historical Data" button in the menu bar to enter the data report interface.

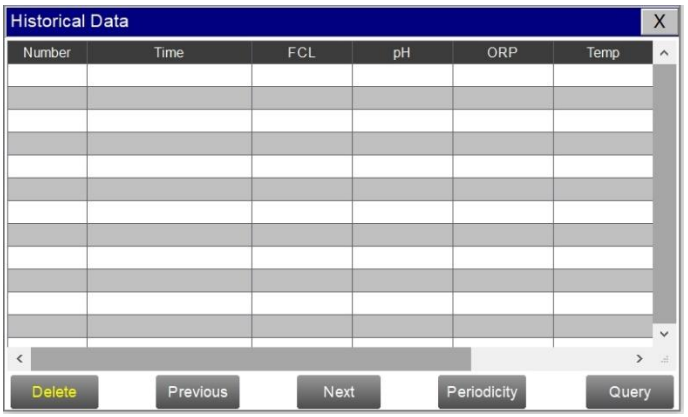


Figure. 40 - Historical Data Screen

In the data report, the user can view the stored data of all parameters. The system records sensor readings every 4 seconds by default but this can be edited by the user if desired. Drag the scroll bar on the right to slide up or down or click "Previous" and "Next" to view historical data records. The data record can save up to 100,000 data entries. New data will overwrite the previously saved data after recording 100,000 data entries. The user can click the “Periodicity” button to change the data recording time interval.

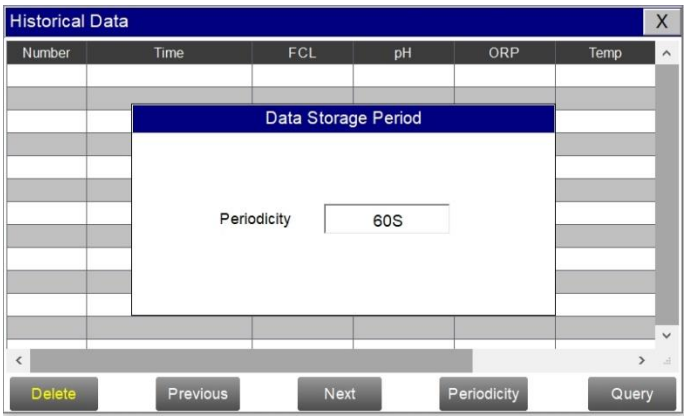


Figure. 41 - Data Storage Cycle Time Setting

Click “Delete” in the lower left corner. After entering the retention time, click the “Delete” button to clear all historical data within the retention time range.

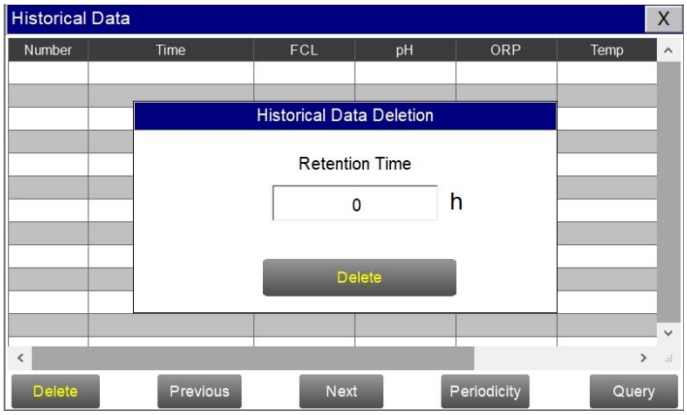


Figure. 42 - History Data Deletion Screen

Click the “Query”button in the lower right corner, enter the start time and end time and then click the “Query” button. Note that the start time and end time must be filled in exactly and completely according to the system time format.

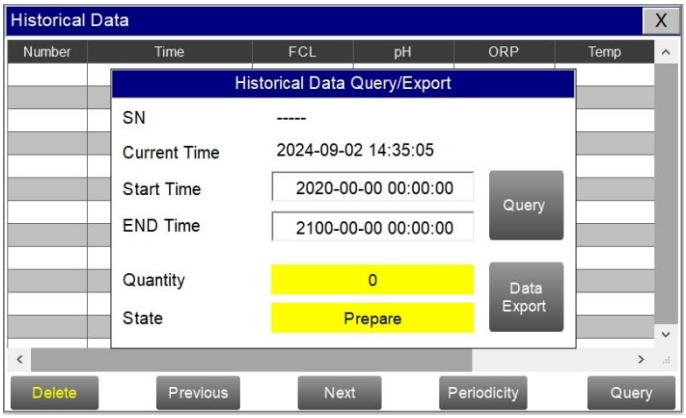


Figure. 43 - Historical Data Query and Export Screen

Insert a USB disk behind the display screen and enter the time range of the data to be exported in the query area. Click on the "Data Export" to download the data to the USB disk. The data quantity will be shown as a positive number if data export is successful. If the data export was not successful, please check whether the time format is correct.

4.8.2. Cal Log

The calibration log can be viewed in the calibration log interface, and when the export operation is performed, the diagnostic parameters, historical data, and calibration log will be exported simultaneously.

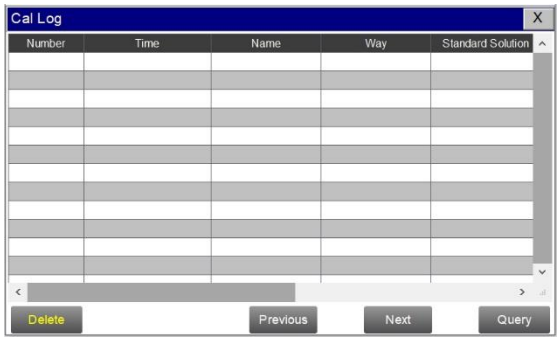


Figure. 44 - Calibration Log

Figure. 45 - Calibration Log Query/Export

4.9. Curves

Click the "Curve" button in the menu bar to enter the trend curve interface. You can click the buttons below the X-axis to browse and view the values in a different time range. Click on Y-axis Range to change the minimum and maximum Y-axis values for a proper range.

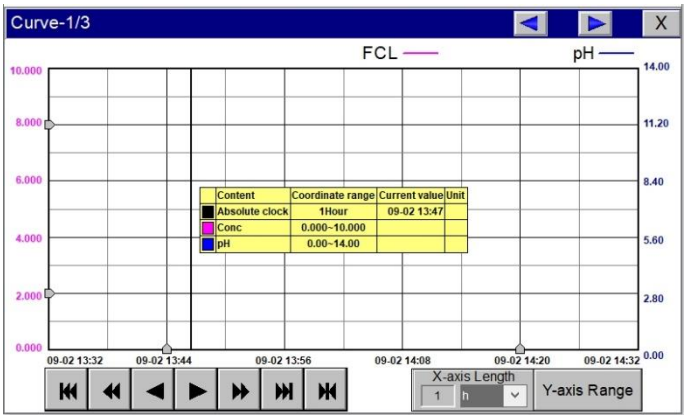


Figure. 46 - History Curve Screen

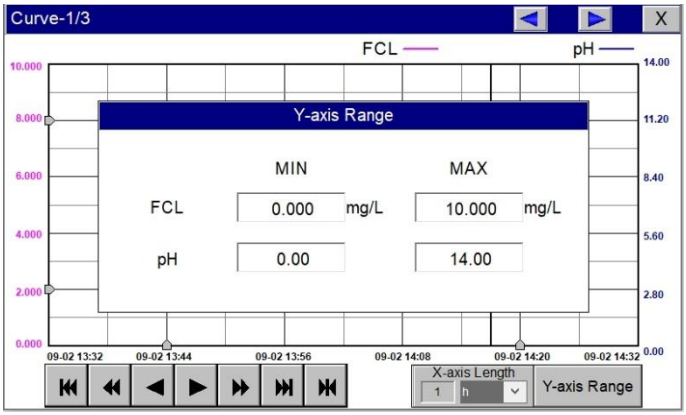


Figure. 47 - Y-axis Range Setting

The curve will scroll back (to the left of the X-axis) one page
The curve will scroll back (to the left of the X-axis) half the page of the curve
The curve will scroll backward (to the left of the X-axis) to a position where the main line is drawn
The curve will scroll forward (to the right of the X-axis) to a position where the main line is drawn
The curve will scroll forward (to the right of the X-axis) half the page of the curve
The curve will scroll forward (to the right of the X-axis) one page
A dialog box will pop up to reset the starting time of the curve

Figure. 48 - Button Function Review

4.10. User Management

Click the "User" button on the menu bar and then you can select "Login", "Logout" and "Manage" operations.

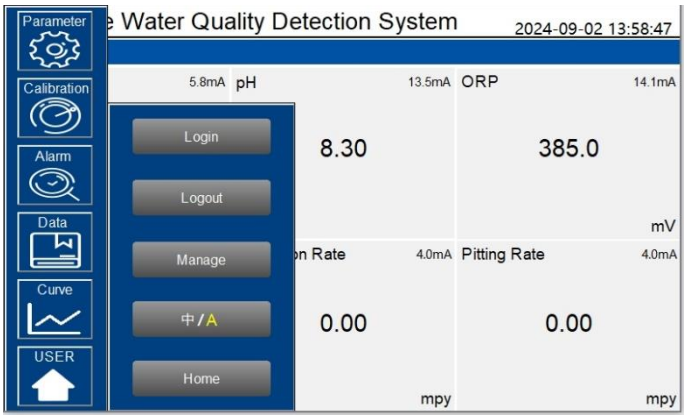


Figure. 49 – User Management

Logout enables the user to log out of the logged-in state and only view the real-time readings, but cannot perform operations such as parameter settings. Click “Manage” to enter the user management interface, where you can add users, change passwords and other operations. Users can set their own user name and password and select the user group they belong to. Only users in the administrator group can set parameters such as calibration.

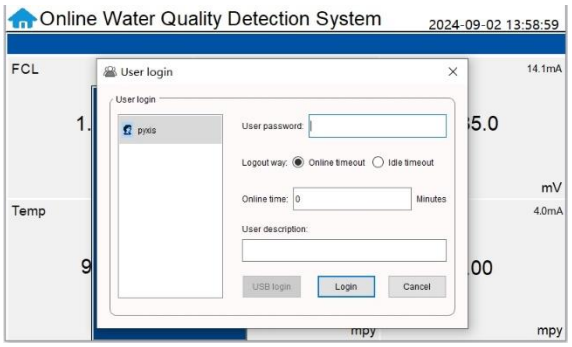


Figure. 50 - User Management Screen

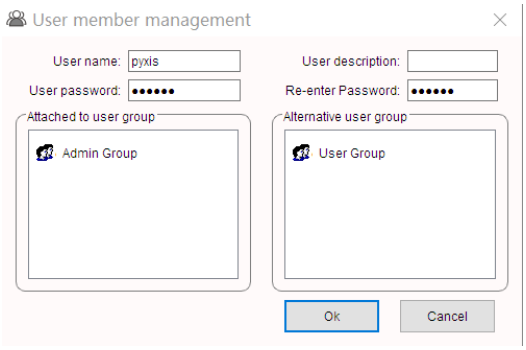


Figure. 51 - Modifying the User Screen

ModifyPassword: Select the user you want to change, then click Modify User button, enter the user's own password in the User Password column and Confirm Password column, and click Confirm to modify successfully. ***NOTE*** *If you do not want to set the password, you can delete the password and save it.*

Daily Maintenance

5.1. Modbus Correspondence Address

Number	Definition	Address	Format	Mode	Unit	Note
1	Conc	1	float	Read Only	mg/L	Data format: ABCD
2	pH	3	float	Read Only		
3	ORP	5	float	Read Only	mV	
4	Temp	7	float	Read Only	℃/℉	
5	Corrosion_Rate	9	float	Read Only	mpy	
6	Pitting_Rate	11	float	Read Only	mpy	
7	FCL Upper Limit Alarm	13	uint	Read Only		0=Normal 1=Alarm
8	FCL Lower Limit Alarm	14	uint	Read Only		
9	PH Upper Limit Alarm	15	uint	Read Only		
10	PH Lower Limit Alarm	16	uint	Read Only		
11	ORP Upper Limit Alarm	17	uint	Read Only		
12	ORP Lower Limit Alarm	18	uint	Read Only		
13	Temp Upper Limit Alarm	19	uint	Read Only		
14	Temp Lower Limit Alarm	20	uint	Read Only		
15	Corrosion rate Upper Limit Alarm	21	uint	Read Only		
16	Corrosion rate Lower Limit Alarm	22	uint	Read Only		
17	Pitting rate Upper Limit Alarm	23	uint	Read Only		
18	Pitting rate Lower Limit Alarm	24	uint	Read Only		
19	Abnormal communication of FCL	25	uint	Read Only		
20	Abnormal communication of	26	uint	Read Only		
21	Abnormal communication of PLC	27	uint	Read Only		
22	Abnormal communication of FR-300	28	uint	Read Only		
23	Brush_malfunction	29	uint	Read Only		
Communication Protocol: Standard Modbus-RTU						Communication parameters and station number can be modified via parameter
Communication Parameters: Baud Rate - 9600 / Data Bit - 8 / Stop Bit -1 / Parity Bit - Even						
Station Number: 100						
Communication Protocol: Standard Modbus-TCP						
Communication Parameters: IP: 192.168.0.3 (configurable); port: 502						
Station Number: 1						

Table. 1 - Correspondence Address

5.2. Operation and Maintenance

After the analyzer is installed by a qualified technician, it can begin to monitor water quality. The equipment inline detection system is designed to be simple to operate, but still requires some regular maintenance. Actual system maintenance may vary depending on the installation conditions and usage. Please refer to the table below as a general recommended maintenance schedule guidelin. Little operator intervention is required during normal operation.

Required Services	Recommended Frequency
Cleaning Inlet Water Filter Screen	Monthly or Cleaned As Needed
Cleaning of Flow Reservoir & Electrode Head	Monthly or Cleaned As Needed
pH Calibration	Every 6 Months or As Needed
Oxidizer Calibration	Every 6 Months or As Needed
ORP Calibration	Every 6 Months or As Needed
FR-300-PLUS Brush Replacement	Every 1-2 Years or As Needed
EH-765 Electrode Head Replacement	Every 1-2 Years or As Needed

Table. 2 - Maintenance Intervals

5.3. Instrument Alarms and Descriptions

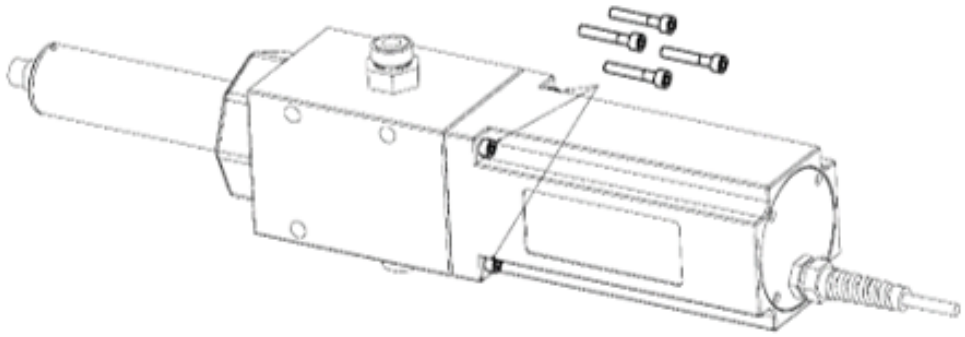
Please refer to the instrument alarms and descriptions table when troubleshooting the UC-100S issues an alarm or indicates abnormal measurement data.

Alarms	Description	Symptoms	Solutions/Recommendations
PLC Communication Abnormalities	PLC without Communication		Check if the wiring inside the PLC and control box is loose
Bleach Sensor Communication Abnormalities	Bleach Sensor without Communication	No Bleach Measurements	Check the connection between the sensor and the circuit board. If the problem persists, contact Pyxis.
Bleach Upper Limit Alarm	Bleach above the Alarm Setting	Information Only	Compare with manual measurement readings. Check and clean line valves. Check that water flow is normal. Check that the sensor is clean.
Bleach Lower Limit Alarm	Bleach below the Alarm Setting	Information Only	

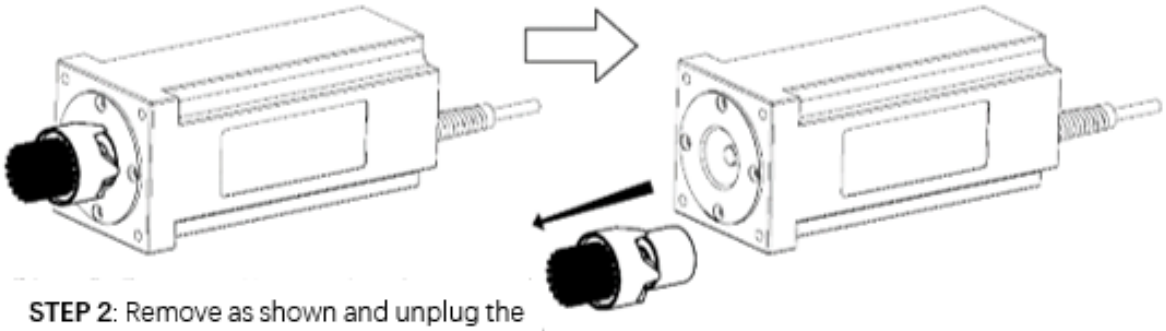
Table. 3 - Common Alarms

5.4. Replacing the FR-300-PLUS Brush Assembly

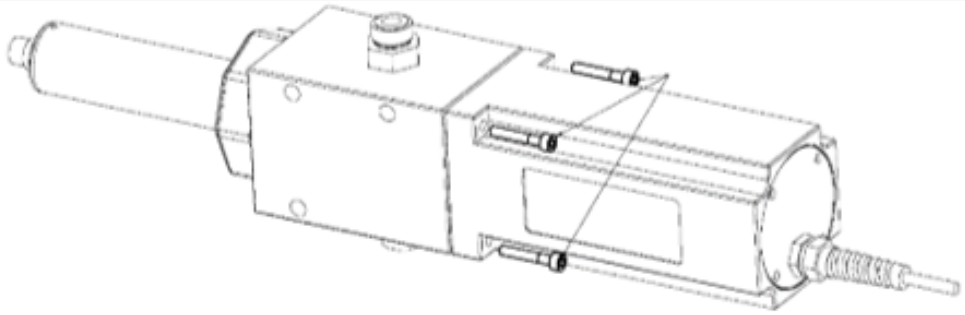
Under normal application use, the FR-300-PLUS brush replacement should be done every 2-years. This may vary depending on application and water quality. Please refer to the following process steps for replacement of the FR-300-01 (P/N : 50700-A49) brush assembly.



STEP 1: Remove the 4 screws (M5)



STEP 2: Remove as shown and unplug the FR-300-01 in the direction indicated then replace it with a new FR-300-01



STEP 3: Reinstall the parts shown and tighten the screws snuggly. Do NOT forget to re-install the seals prior to tightening

5.5. Replacing pH and Oxidizer Electrode Head

The EH-765 electrode head (P/N: 53061) of the ST-765SS Series sensors can be replaced when the original electrode heads have reached the end of their working life. The typical working life of the electrode can be as long as 2-years under normal operating conditions. Please refer to the following steps to replace the electrode head of your sensor.

1. Place sensor power in Flow Interlock Manual Mode and then Power OFF the sensor (see Section 9.7.1) remove and make sure there is no water on the sensor.
2. Hold the sensor main body with one hand and use the other hand to twist the locking ring counterclockwise until the front end of the black electrode is completely unscrewed, as shown in Figure 67-2. ***NOTE* The sensor electrode head should be oriented towards the ground to avoid residual water getting into the sensor.**
3. Thoroughly wipe the electrode head with a dust-free cloth or paper-towel then pull out the electrode head as shown in Figure 67-3.
4. Gently loosen the electrode plug connector and remove the electrode head, as show in Figure 67-4.
5. To install the new electrode head, please use the mounting hook to securely plug in the wiring connector, as shown in Figure 67-5. ***NOTE* Before connecting the electrode head, please make sure that the new electrode head gasket is properly installed at the base of the electrode head thread to ensure a watertight seal, as shown in Figure 67-5.**
6. Then reconnect, insert the new electrode head into the main sensor housing and ensure that the two alignment protrusions on the electrode head are aligned with the notches in the sensor body housing, as shown in Figure 67-6. Then twist the lock ring of sensor in a clockwise direction until the threads of the electrode head completely enter the sensor housing as shown in Figure 67-1. ***NOTE* Be sure to return your sensor operation to Flow Interlock Auto Mode (Section 9.7.1)**

Figure. 52- Replacing EH-765 pH and Oxidizer Electrode Head

5.6. Sensor Cleaning with Pyxis Probe Cleaning Kit

In the event of heavy inorganic deposition of any Pyxis sensors, users may conduct an off line chemical cleaning using the Pyxis Probe Cleaning Kit (P/N: SER-01). Remove the sensor and inspect the internal components of the tee assembly. If necessary flush the tee assembly thoroughly with clean water until adequately clean. Fill the provided beaker and soak the lower half of the sensor in 100 mL of Pyxis Probe Cleaning Solution for 10-15 minutes. Gently wipe the sensor electrode head with the provided Q-tips. If an optical sensor (i.e. ST-600), use the provided pipe cleaning brushes to gently brush the inner surfaces of the optical channel itself. If the surfaces ar not entirely clean, continue to soak the sensor for an additional time until clean. Rinse the sensor with distilled water. Pyxis Lab Probe Cleaning Kit can be purchased at our online Estore/Catalog at https://www.pyxis-lab.com/product/inline-sensor-cleaning-kit/

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