Pyxis®

SFA-765SS-TCL Chlorine Analyzer

"True & Virtual" Total Chlorine + pH Analyzer

Pyxis Lab® Inc.
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Tomball, TX 77375
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USER MANUAL

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.

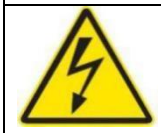
Warning
Indicates a potentially or very dangerous situation that, if not avoided, may cause serious personal injury or death.

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.

Catalog

Pyxis

1. Specifications

Item	SFA-765SS-TCL
P/N	12009
Sensor Body Material	304SS
Sensor Name	ST-765SS-TCL
Oxidizer Range	0.00-5.00 ppm Total (Combined) Chlorine
Oxidizer Modes of Measurement	'True' Total Chlorine Mode – with Iodide Feed 'Virtual' Total Chlorine Mode – without Iodide Feed
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 Response Time	T95≤60s – Oxidizer / T95≤5s - pH
Measurement Interval	Continuous
Installation	ST-001 (CPVC) Flow Cell w/PRV-Rotameter-Hall Effect Flow Meter Included
Sample Flow Rate	200 mL/minute
Sample Inlet / Outlet	¼-inch OD Inlet / ⅜ - inch OD Outlet
Chemical Reagent Dosed	Pyxis TCL-EC Reagent (0.1 % Potassium Iodide/Acetic Acid Solution)
Chemical Reagent Container	5-gallon pail
Chemical Dosing Pump	Peristaltic – Preset 0.2mL/Minute
Chemical Dosing Control	On/Off Dosing on Inlet Flow Meter (1-Pail/65 Days Continuous Operation)
Panel Power Supply	96-260VAC / 50-60 Hz; 200 W
Panel Storage Temperature	-4 – 158 °F (-20 – 70 °C)
Panel Operating Temperature	32 – 122 °F (-0 – 50 °C)
UC-80 Display	4.3-inch LCD Color 480 x 272 Pixel Resolution / Resistive Touch
UC-80 Input	RS-485 Modbus – RTU
UC-80 Output	2 x 4-20 mA / RS-485 Modbus-RTU / Modbus-TCP
UC-80 Data Storage	Built-In 128MB of Ram for Storing up to 1-Million Data/Event Records
UC-80 USB	1 x USB host, for data downloading and screen upgrade
UC-80 Relative Humidity	20% - 90% (No Condensation)
UC-80 Altitude	<6,561 feet (<2,000 Meter)
Panel Dimension (H x W x D)	Panel (SFA-765SS-TCL) 590H x 300W x 325D mm
Panel Approximate Weight	Panel (SFA-765SS-TCL) ~ 10 kg
Panel Wet Material	UPVC / Polycarbonate
Rating	IP-65 Panel-Display / IP-67 Sensors
Selectivity	Potassium Iodide/Acetic Acid Injection – Total (Combined) Chorine
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 .

2. Unpackaging

The package includes the following items:

- One SFA-765SS-TCL Drinking Water Panel Assembled and Complete with Power Supply Cord
- UC-80 touch Screen Display/Data Logger with Pyxis Sensors Prewired in RS-485 (RTU)
- ST-765SS-TCL- Residual Chlorine / pH / Temperature Sensor with Rotameter and Inline Flow Sensor
- Peristaltic Chemical Reagent Pump

3. System Layout and Features

The SFA-765SS-TCL is a multi-parameter inline water analyzer specifically designed as a 'Turn-Key' monitoring solution for clean water applications including drinking water networks, bottled water production, secondary water supply and decorative or domestic water applications. The SFA-765SS-TCL series offers highly accurate, real-time measurement, display and data-logging of 'True or Virtual' Total Chlorine, pH and Temperature utilizing proprietary Pyxis Lab smart sensor technology, coupled with a Pyxis touch screen display and data logging terminal. The SFA- 765SS-TCL series is offered in a convenient and easy to integrate panel mounted format for rapid installation and simple maintenance. This unique platform results in a highly accurate total (combined) chlorine measurement consistent with DPD wet chemistry methodology as high as pH 9.0+ and is EPA-334.0 and ISO- 7393 compliant.

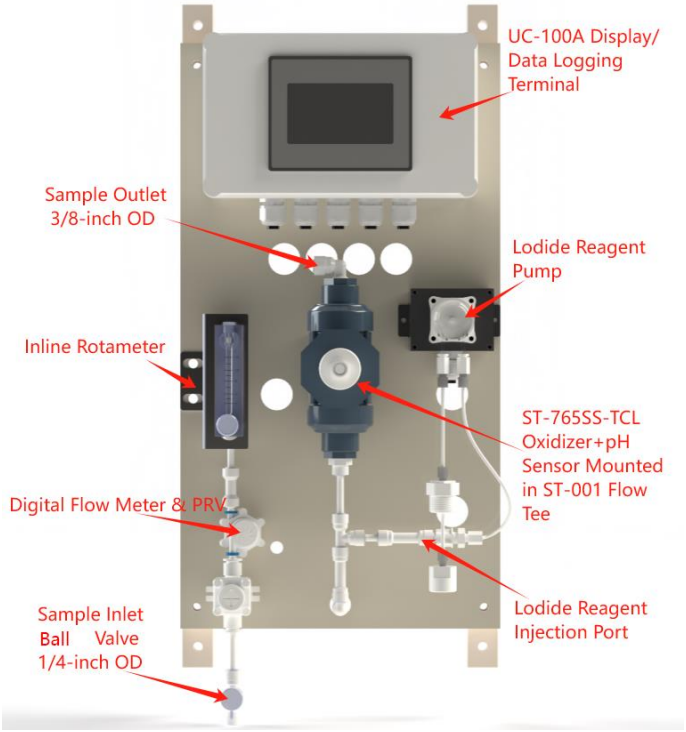


Figure. 1 - SFA-765SS-TCL

SFA-765SS-TCL Features

- Pyxis Lab's advanced research and development sensor technologies to achieve highly accurate and stable measurement of total (combined) chlorine, pH and Temperature.

- Pyxis ST-765SS-TCL is a three-parameter composite sensor used for the measurement of total residual chlorine, pH and temperature in compliance with USEPA 334.0 and ISO-7393 guidelines. Installed downstream of flow controller potassium iodide/acetic acid reagent injection, the sensor reading will be as true total (combined) chlorine. 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 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 or similar residual chlorine wet chemistry test measurement of active sample.

- Pyxis ST-001 Single-Sensor inline CPVC flow cell is provided as the sensor installation point on the SFA-765SS-TCL panel and is situation downstream of the flow control potassium iodide/acetic acid reagent injection point. The panel incorporates a pre-mounted peristaltic metering pump directly controlled by the UC-80 display data logger in direct proportion to inlet flow to activated based on application need. The Pyxis potassium iodide/acetic acid (TCL-EC) reagent is specifically formulated to convert chlorine species to a 'combined' state for measurement of 'True' total (combined) chlorine consistent with USEPA methodology. This reagent is offered in 5-gallon pail sufficient inventory for approximately 60-days of continuous operation. The SFA-765SS-TCL analyzer may also be operated without the addition of Iodide reagent allowing the sensor to provide measurement in 'Virtual' total chlorine mode. The inlet to the panel is ¼-inch OD and is equipped with inlet PRV, Rotameter and digital Hall Effect flow meter for precise control and recording of the recommended flow range of 200-400 mL/minute. The outlet ⅜-inch OD flow 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-TCL sensor is connected to the UC-80 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 (SFA-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-80 touch screen display/data logger interface with sensor calibration integrated. Display/data logger offers 2x 4-20mA, RS-485 and TCP output with remote diagnosis and parameter adjustment. Pyxis PowerCloud™ 4G Gateway available as an optional accessory.

4. Dimension and Mounting

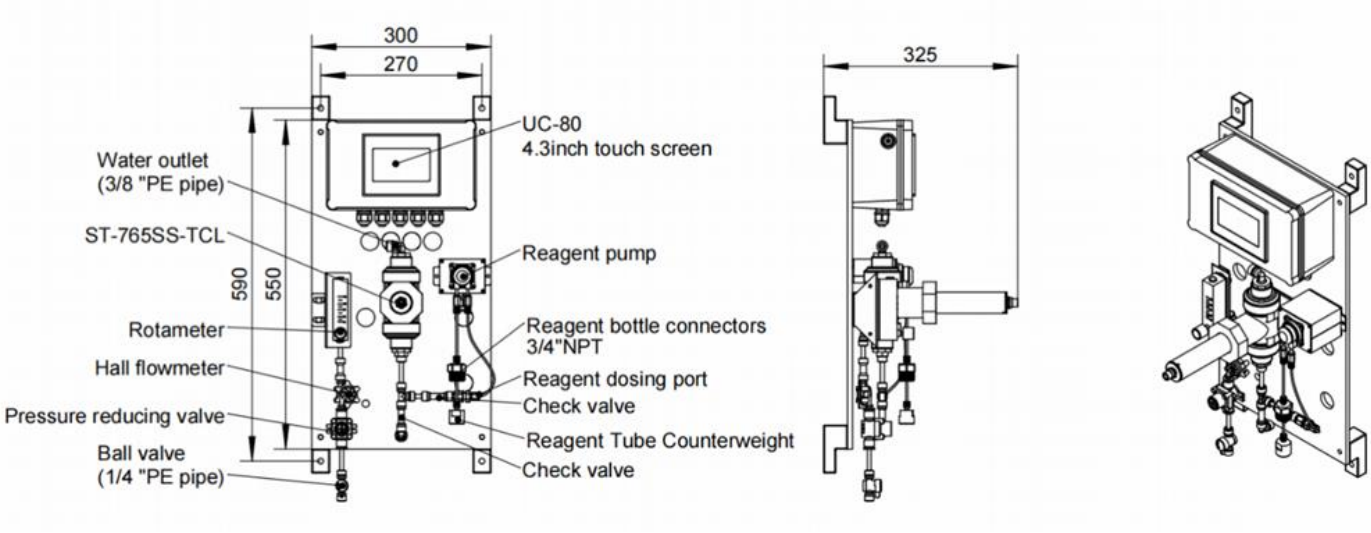


Figure. 2 - SFA-7655S-TCL

5. Installation

5.1. Installation Requirements

Power Supply: 100~240V AC 50/60Hz

Water Supply: The inlet water pressure should be from 7.25 - 30 psi (0.05-0.2MPa) with an inlet feedwater line diameter of 1/4-inch O.D. Tubing. ***NOTE*:** *User should manually adjust the rotameter so that the float of the rotameter is flush with 200 ml keeping the inlet water flow at* ***200 ml/min.*** *The premounted Hall-Effect flow meter also provides a real-time display of sample water flow to the panel on the interface screen. Minor adjustments to the rotameter may be necessary to set flow based on the Hall Effect flow meter.*

Drainage: Outlet pipe diameter is 3/8-inch O.D. should be connected to a discharge drain via gravity flow.

Wall Mount Space: The SFA-7655S-TCL analyzer panel size is roughly 550H x 300W x 325D (mm) in dimension. Please accommodate sufficient space for mounting.

Wall Mount Weight: Approximately 10kg. Please use appropriate mounting hardware.

5.2. Tubing Connection

1. **Water Inlet:** Connect the inlet water ¼-inch OD tubing to the quick adapter provided.
2. **Water Outlet:** Connect the outlet water ¾-inch OD tubing to the quick adapter provided.
3. **Reagent Import:** The dosing tube has been connected to the reagent dosing pump. Insert the dosing tube pump suction line into the on-site reagent (Pyxis TCL-EC) 5-gallon container. ***NOTE*** *If the dosing tube is not long enough, you can use the black dosing tube in the accessories bag provided with the SFA- 76555-TCL panel.*

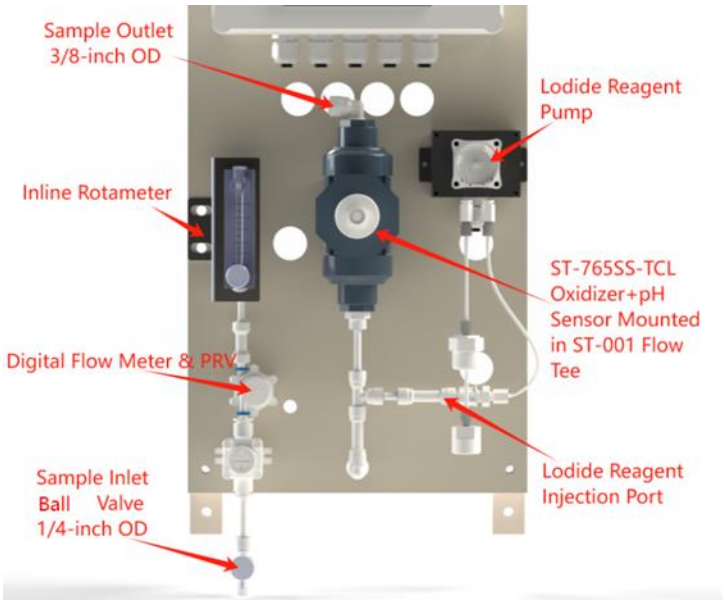


Figure. 3 - Water inlet and outlet diagram

5.3. Terminal Wiring

The SFA-765SS-TCL analyzer has universal AC power supply equipment allowing users simply to plug the power supply into a 100~240V AC 50/60Hz power outlet for normal operation.

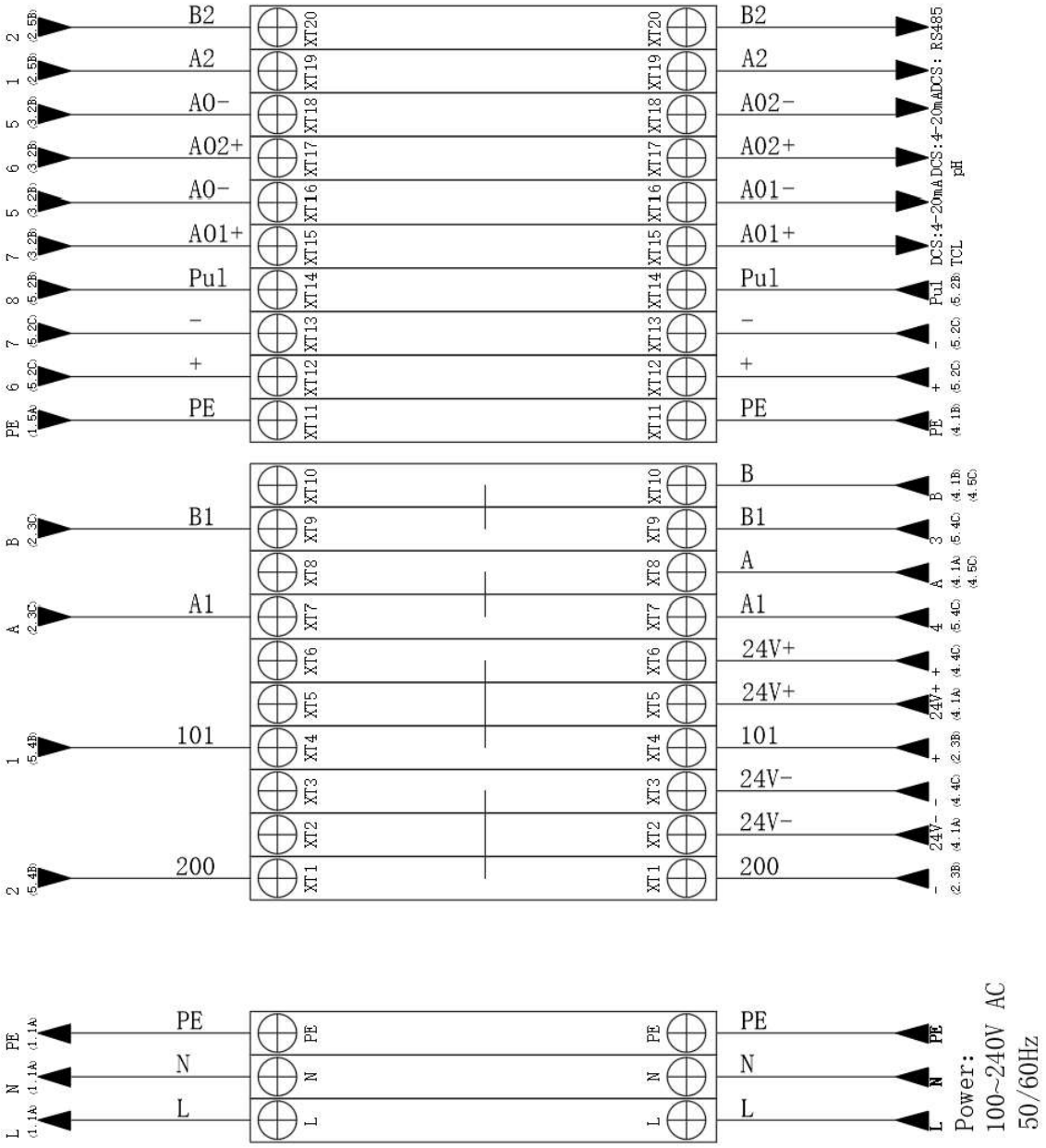


Figure. 4 - Terminal Wiring Diagram

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.

6. Touch Screen Operation

6.1. Main Screen

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

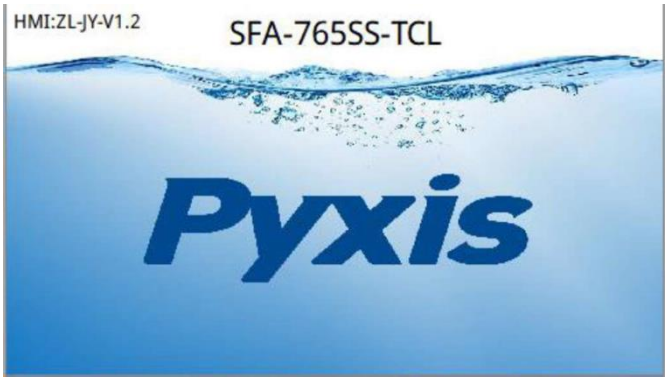


Figure. 5 - Main Screen

6.2. 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.

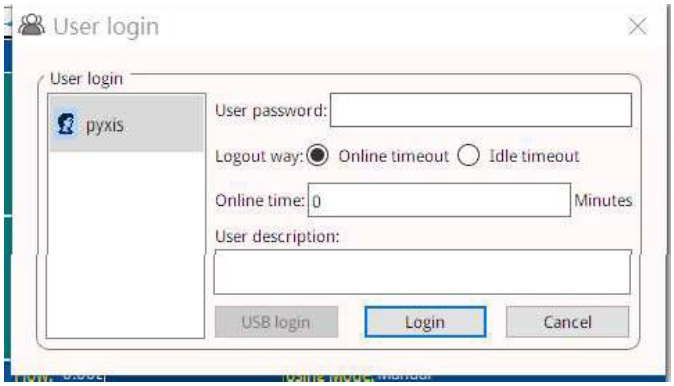


Figure. 6 - User Login Screen

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.

6.3. 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. See a functional overview of each section of this screen highlighted below.

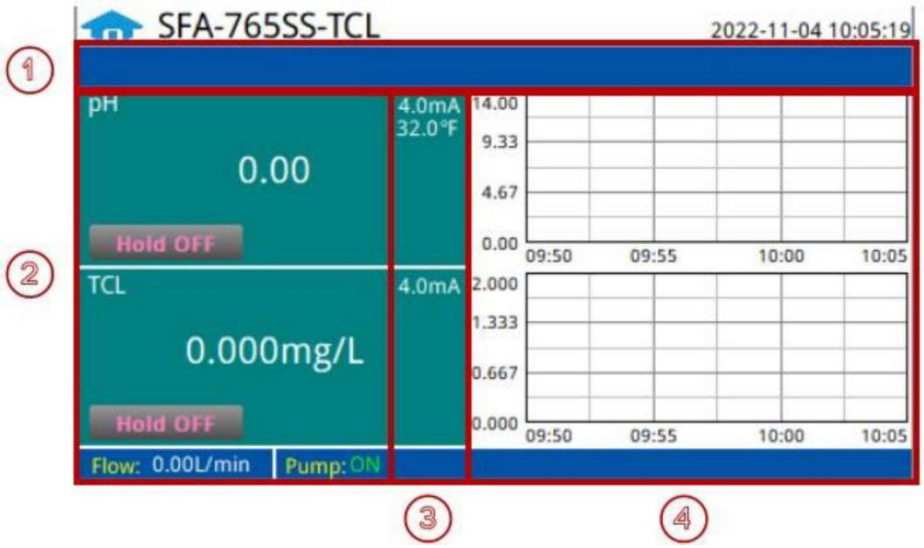


Figure. 7 - Real-time monitoring screen

Section Number	Functional Overview
1	The blue area will scroll any alarm information in real time until the alarm is cleared.
2	Real-time display of current sensor measurement value, and "Hold ON" functions.
3	Real-time display of 4-20mA signal value of current sensor
4	Historical data is recorded as a live curve, with the horizontal coordinate being the time and the vertical coordinate being the measured value. The bottom will display the control mode of the dosing pump.

Table 1 - Main Interface Functional Overview

Press and hold the curve area for 2 seconds and then let go, the Y-axis curve range setting dialog box will appear. Users may change the display value range of Y-axis for each measurement index curve. Click the outer area of the screen to save and exit the setting screen after modifications are made.

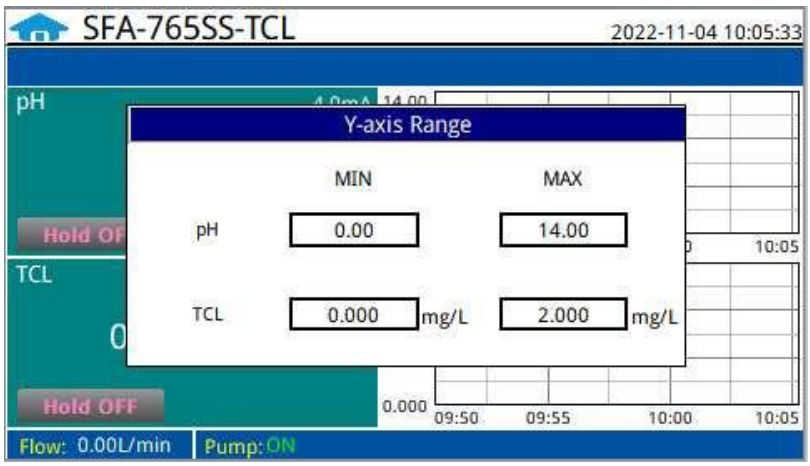


Figure. 8 - Curve Range Setting

6.4. Explanation and use of the HOLD Feature

The US-80 has an integrated HOLD feature for all 4-20mA, Modbus RTU and Modbus TCP output parameters from the sensor that would be connected to an onsite DCS network. The purpose for this feature is to allow the user to enter a signal value HOLD on the designated parameter during periods of sensor maintenance or removal. This feature prevents network system alarms from operational shutdown during sensor maintenance or replacement.

Click the"**Hold OFF**" button on the main interface to enter the HOLD setting interface.

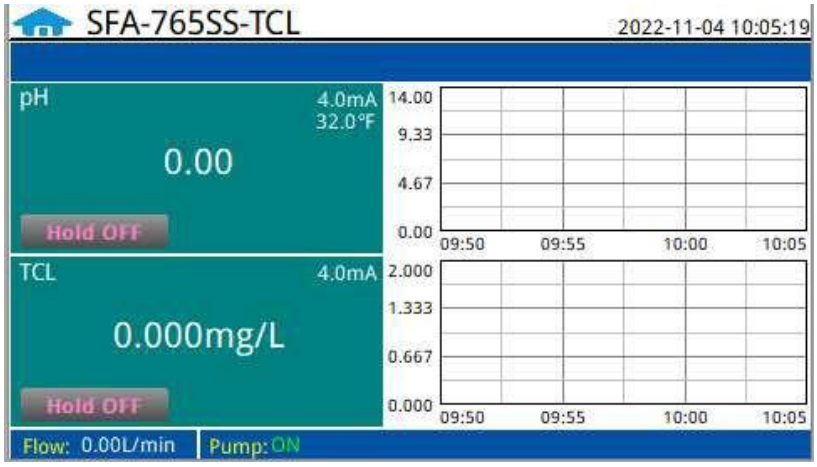


Figure. 9 - Main Interface

In the pop-up box, enter the parameter value and click **"Confirm"** to open the**"Hold ON"** function. The main interface will display the entered value for 15 minutes, after which it will resume displaying the real-time value read by the sensor.

When the " **Hold ON** " function is activated by the user, the sensor may be maintained, calibrated or removed and the Modbus TCP output will continue to retain the user entered value for a period of 15 minutes, ensuring network alarm and process will not be interrupted due to the sudden disappearance of the 'normal' value. The 'actual' live sensor reading along with the user entered hold value reading will both be displayed during this period.

Clicking **"Cancel"** will turn off this function, the main interface will immediately display the real-time value read by the sensor, and the main interface button will be displayed as **"Hold OFF"**.

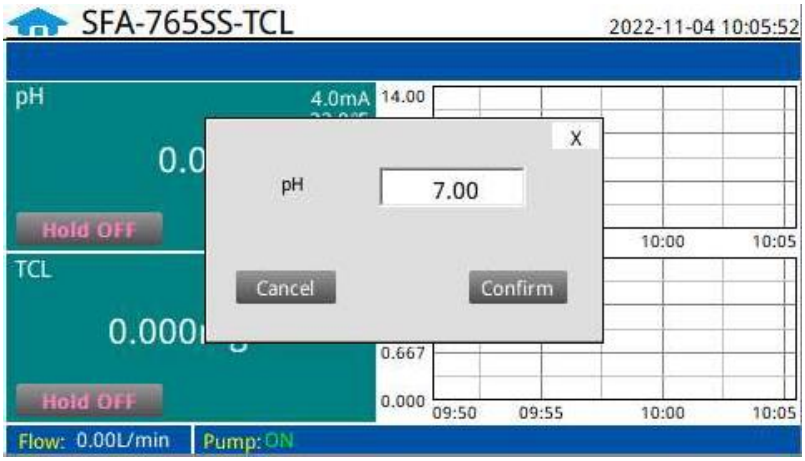


Figure. 10 - Hold Feature - pH Value Entry by User

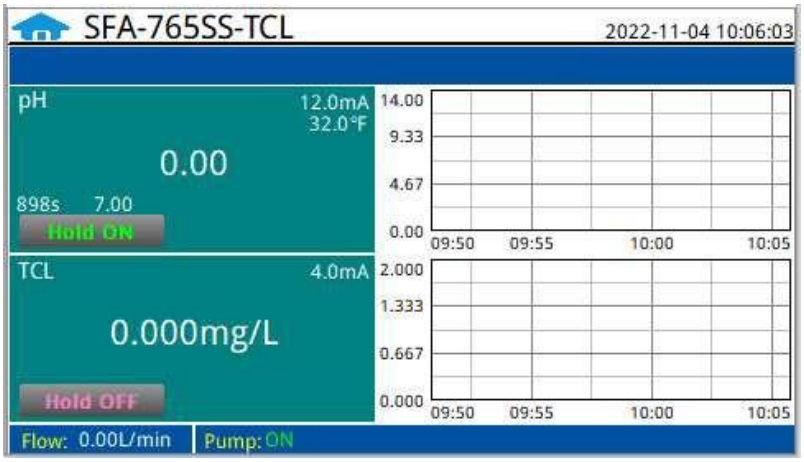


Figure. 11 - Hold ON interface

6.5. Explanation and use of the CHLORINE CHALLENGE Feature

The SFA-7655S-TCL inline residual chlorine+ pH sensor contains sophisticated averaging algorithms which allow for a 'smoothing' of the recorded chlorine residual. As the residual chlorine concentration in the water sample changes, this averaging software takes several minutes for the sensor reading to stabilize to the final concentration eliminating any potential "noise' which may be present. For applications where the SFA-7655S-TCL is being utilized to verify the presence of a 0ppm chlorine residual, users may desire to conduct a system "challenge" with water containing chlorine to validate system performance and accuracy. The SFA-7655S-TCL and other Pyxis panels have been equipped with the **CHLORINE CHALLENGE** for this specific purpose. By manually toggling the CHLORINE CHALLENGE button to **Challenge ON** the sensor data averaging feature is bypassed for a period of 600 seconds (10 Minutes), to speed up the sensor measurement frequency and the chlorine value stabilization more rapidly. This feature will automatically turn off at the 600 second mark and return to normal operation with the residual averaging firmware reactivated and will show a display of **Challenge OFF** . ***NOTE*** *When in the "Challenge ON" state, calibration and range change operations cannot be performed.*

Figure. 12 - Chlorine Challenge OFF Status

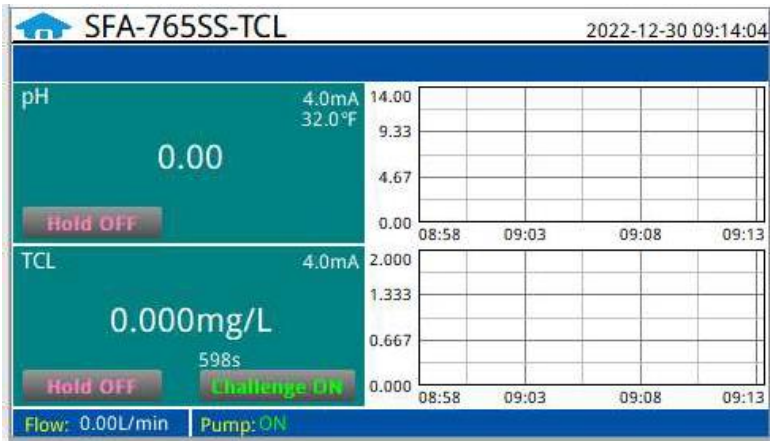


Figure. 13 - Chlorine Challenge ON Status

6.6. 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. 14 - Menu Bar

6.7. Configurable Parameters

Click the "Parameter" button in the menu bar. Here you can select to enter "Alarm Parameters" and "4- 20mA Output" setting interface etc.

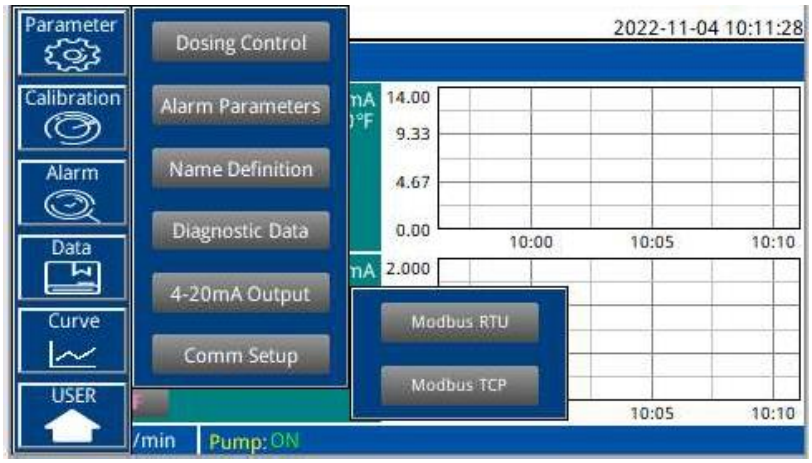


Figure. 15 - Parameter Settings

6.7.1.Reagent Pump Parameters

In the reagent pump control interface, the reagent pump can be turned **ON** or **OFF**. While in the ON position, the reagent pump will administer a preset volume of Pyxis TCL-EC (Potassium Iodide/Acetic Acid Solution) upstream of the ST-765S5-TCL sensor. This chemistry provides an instantaneous reaction to convert all residual chlorine species to "True Total" or "Combined" Chlorine. When the Iodide reagent is turned to the OFF position, the residual chlorine is as “Virtual Total” Chlorine.

NOTE *There is NO-NEED for users to alter or adjust chemical reagent dosage pump settings. It is recommended to replace the chemical reagent pump tubing (P/N – 44023) at a minimum of once per year or more frequently as needed. Please refer to Sections 8.2 and 8.3 of this manual for details.*

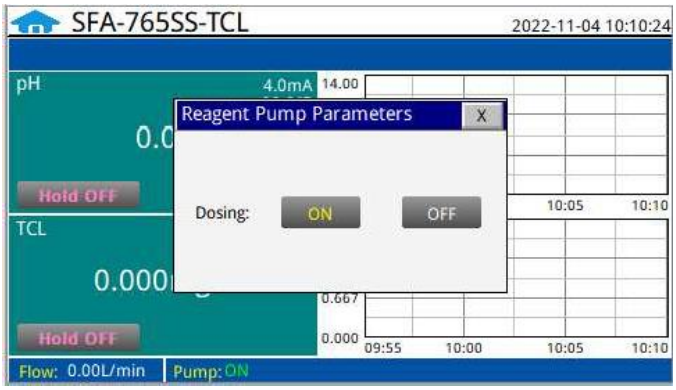


Figure. 16 - Reagent Pump Parameters

6.7.2.Alarm Parameters Setting

Users can set the upper and lower alarm limits. Click "Alarm Parameters" to enter the alarm parameter settings. When the measured sensor value is lower than the set lower limit (the XX lower limit alarm) or when the measured value is higher than the set upper limit (the XX upper limit alarm), the corresponding sensor alarm will be displayed on the real-time monitoring screen. The user can also choose to turn the alarm display on or off at the top right of the corresponding parameter list.

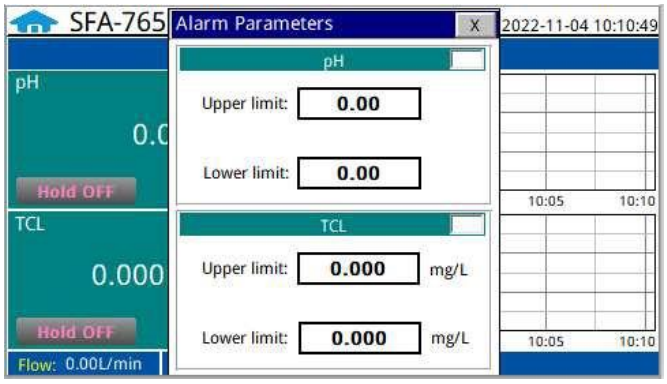


Figure. 17 - Alarm Parameter Setting

6.7.3.Name Definition.

Click the orange dialog box to customize the sensor name.

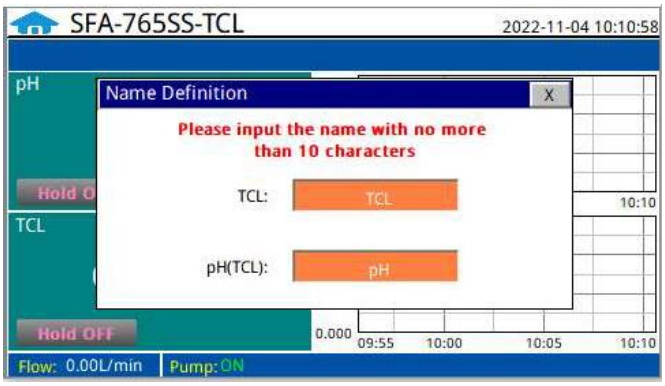


Figure. 18 - Name Definition

6.7.4 Diagnostic Parameters

Click "Diagnosis Parameters" to the diagnosis page. In the diagnosis page, the raw data measured by the probe is displayed. To help troubleshoot possible issues with the probe, please save an image of this data when the probe is placed in clean water (tap water or deionized water), in a standard, and in the sample that the probe is intended for. These images may be sent to service@pyxis-lab.com for troubleshooting support.

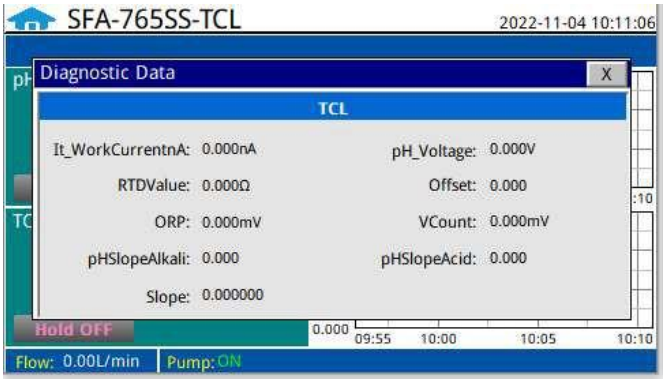


Figure. 19 - Diagnostic Parameters

6.7.5. 4-20mA Output Parameters

Click "4-20mA Output " to enter the 4-20mA output parameter setting interface. The 4mA and 20mA output values should corresponds to the lower and upper limits of the sensor range. ***NOTE*** *The closer the value is set to the measurement value the more accurate the data. It is recommended to set according to the range of the sensor.*

Figure. 20 - 4-20mA Output Setting

6.7.6. Communication Setting

If the site needs to use a DCS to read device information, just connect the master station device to the controller through the terminal (See Section 5.3 for terminal board wiring in **RTU)** and read the data according to the parameter register table (See Section 7.0 for address table).

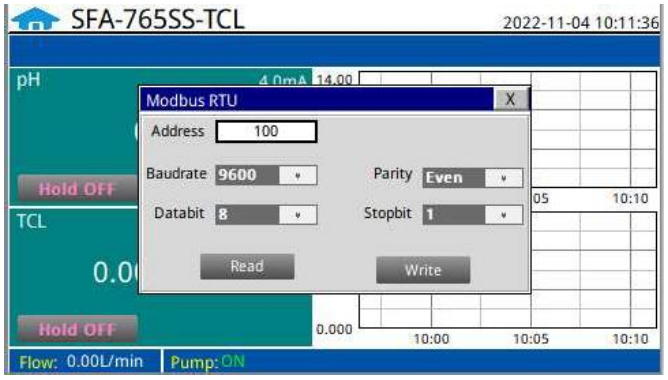


Figure. 21 - Modbus RTU

It is also possible to connect based on Modbus TCP and Ethernet address. The Ethernet port is located on the backside of the HMI Touch Screen Display. (See Section 7.0 for address table).

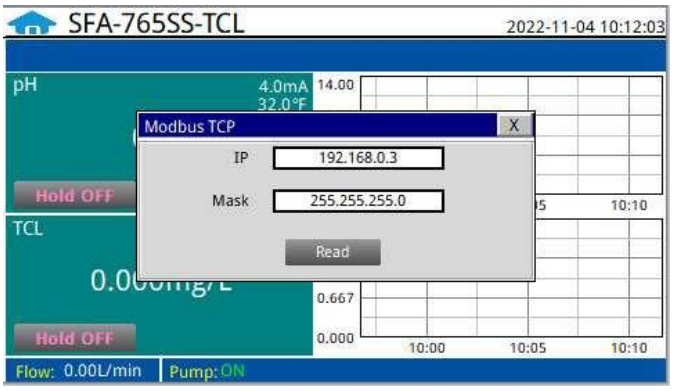


Figure. 22 - Modbus TCP

6.8. Calibration

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

Figure. 23 - Sensor Calibration

6.8.1 pH Calibration

The pH function is thoroughly calibrated at the Pyxis Lab factory. After checking with a pH standard buffer solution, 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-TCL sensor as desired.

Figure. 24 - pH Calibration of ST-765SS-FCL

Single Point pH Calibration

Remove the ST-765SS-TCL sensor and rinse 3x with DI water. 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. 25 - pH Calibration Prompt

Two Point pH Calibration

Remove the ST-765SS-TCL sensor and rinse 3x with DI water. 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=l0 buffer solution can be selected for the second point calibration if desired.

Figure. 26 – pH Calibration Value input

Three Point pH Calibration

Remove the ST-765SS-TCL sensor and rinse 3x with DI water. 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 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=l0 for alkali calibration. Clean the beaker 3x with deionized water. Fill the beaker with pH=l0 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.

6.8.2.Chlorine Calibration

The chlorine measurement module of the ST-765SS-TCL sensor is thoroughly calibrated at the Pyxis Lab factory. To calibrate, 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 Total Chlorine Calibration

Use a portable or laboratory colorimeter (i.e.. Pyxis SP-200 / SP-800) to test the active (flowing) water sample in the flow reservoir. DPD methodology is recommended. Once you have tested and confirmed the total chlorine concentration value in the active (flowing) flow reservoir, enter the test result value of the portable or laboratory colorimeter in the TCL Calibration Screen in the High Standard Solution Box. Once entered, click "High Cal" for High Point 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".

Figure. 27 - Total Chlorine Calibration of ST-765SS-TCL

Figure. 28 - Awaiting execution Screen of Total Chlorine Calibration

The chlorine measurement module of the ST-765SS-TCL sensor is thoroughly calibrated at the Pyxis Lab factory.

Two Point Total Chlorine 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. This is especially true in dichlorination applications using Sodium Sulfite as the chlorine scavenger.*

Zero (Blank) Calibration Procedure:

If a zero calibration is still desired of the ST-765SS-TCL sensor, close the water inlet valve and clean the flow reservoir with deionized water 2-3 times. Then fill the flow reservoir with the known zero calibration solution. After filling with the Zero Chlorine Calibration Standard Solution (PN / 21022) -or- you may also use 100uS/cm Conductivity Standard Solution for this step. Wait for the ST-765SS-TCL sensor chlorine display value to stabilize on the touch-screen display. Sensor stabilization should occur within 15-minutes. Click "Zero Calibration" and a dialog box will pop up confirm whether your 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 blank-calibrated to the known zero calibration solution.

Slope Calibration Procedure:

Use a portable or laboratory colorimeter to test the active (flowing) water sample in the flow reservoir. Once you have tested and confirmed the chlorine concentration value in the active (flowing) flow reservoir, enter the test result value of the portable or laboratory colorimeter in TCL Calibration Screen and click "High Point 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* To restore Factory Settings & Calibration, click the RECOVERY button in the calibration interface of the sensor. This may be required if a user error is made during calibration steps or other operations.

6.9. Alarm View

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

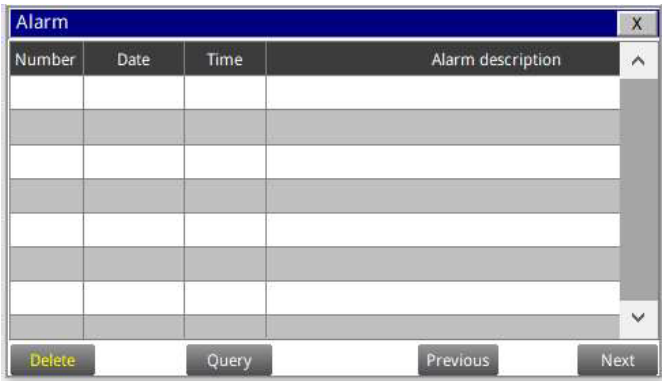


Figure. 26 – Alarm View

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.

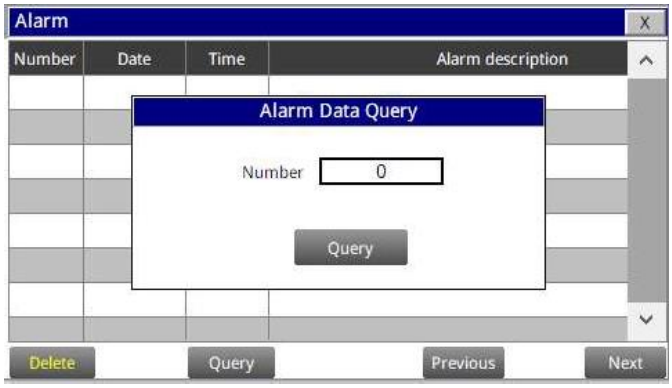


Figure. 30 - Alarm Data Query Screen

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.

6.10. Historical Data

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

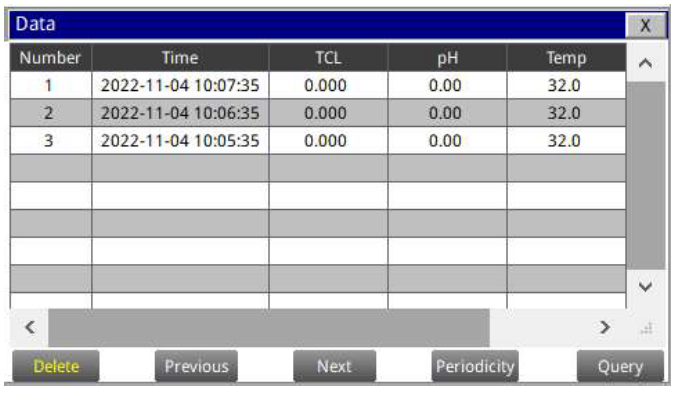


Figure. 31 - Historical Data Screen

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.

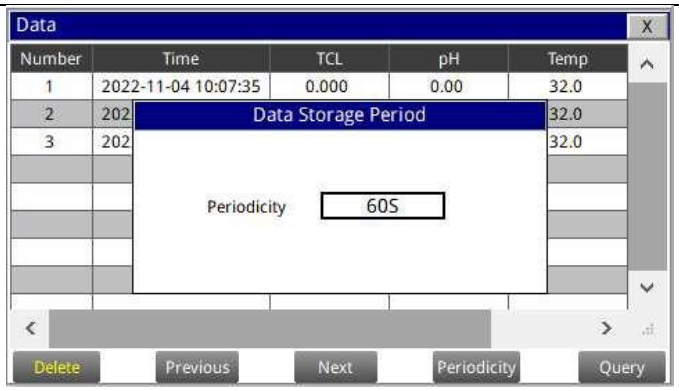


Figure. 32 - Data Storage Cycle Time Setting

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.

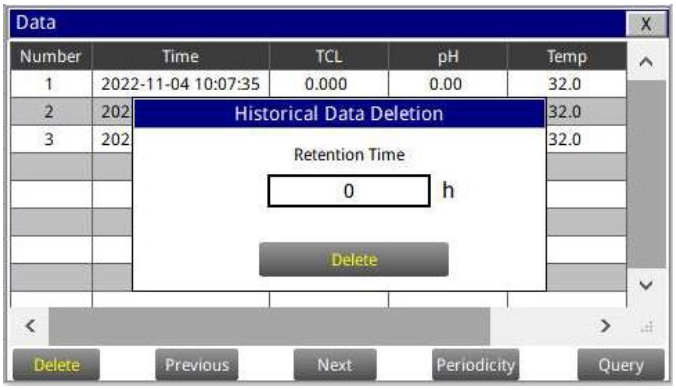


Figure. 33 - History Data Deletion Screen

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.

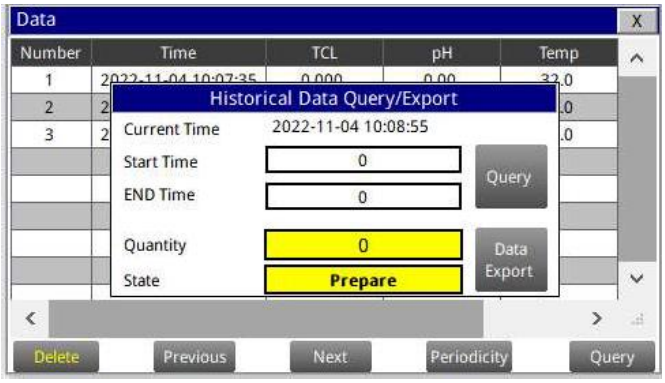


Figure. 34 - Historical Data Query and Export Screen

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.

6.11. Historical Curve

Click the "Historical 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.

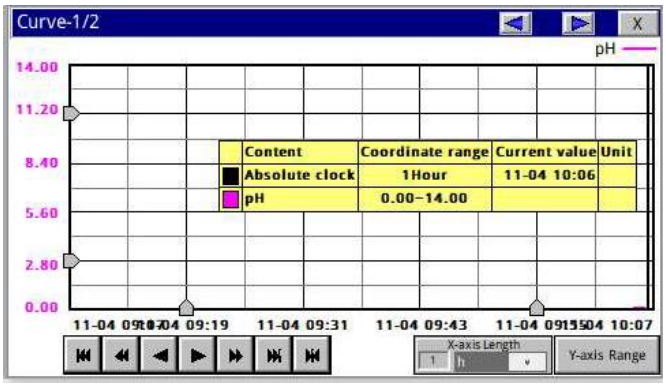


Figure. 35 - History Curve Screen 1-2

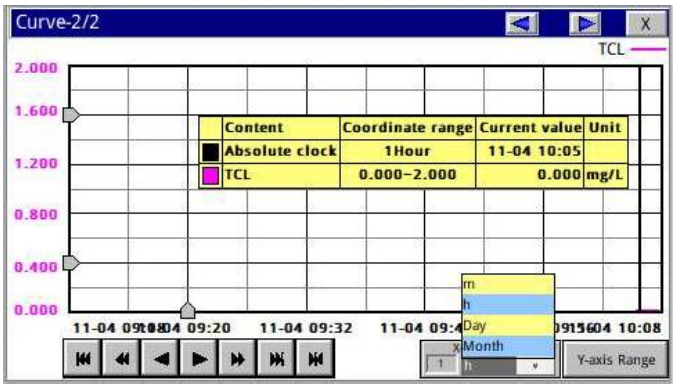


Figure. 36 - History Curve Screen 2-2

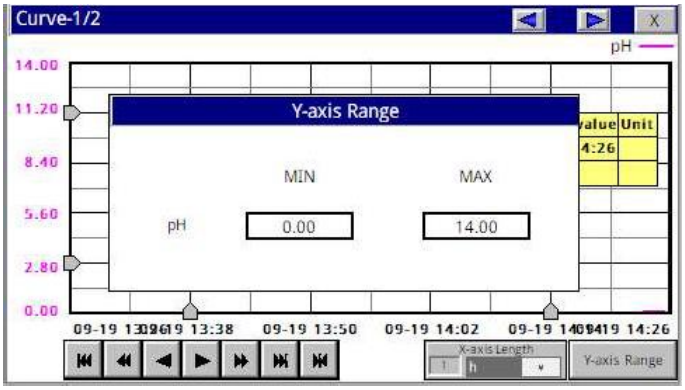


Figure. 37 - Y-axis Range Setting 1-2

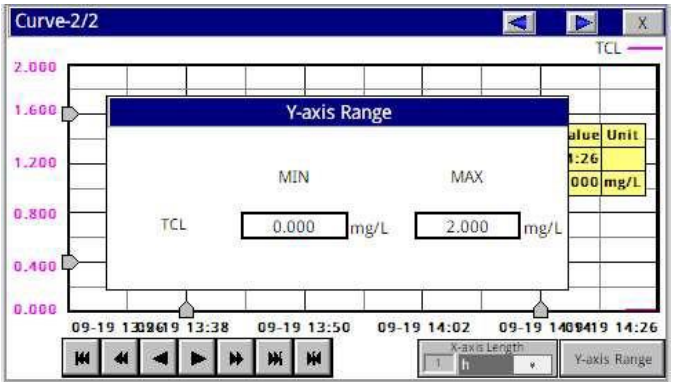


Figure. 38 - Y-axis Range Setting 2-2

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. 39 - Button Function Review

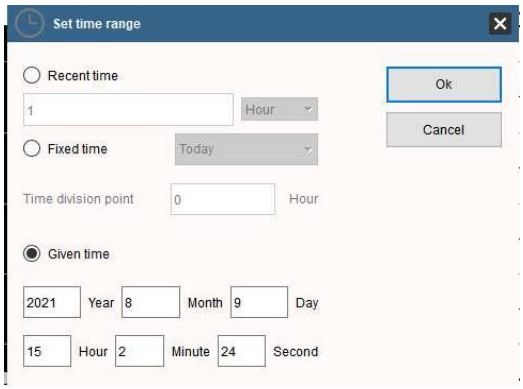


Figure. 40 - Time Setting Screen

6.12. User Management

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

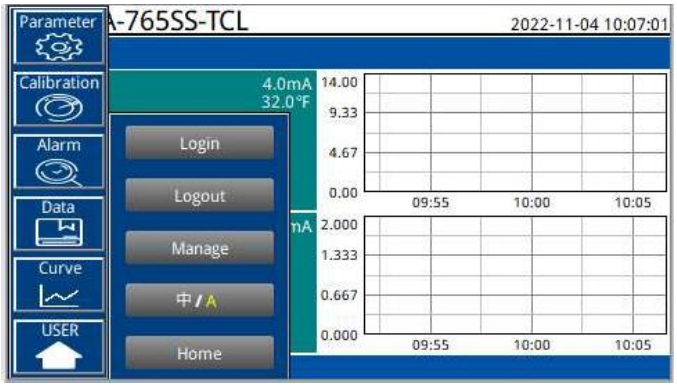


Figure. 41 - User Management

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 username and password and select the user group they belong to. Only users in the administrator group can set parameters such as calibration.

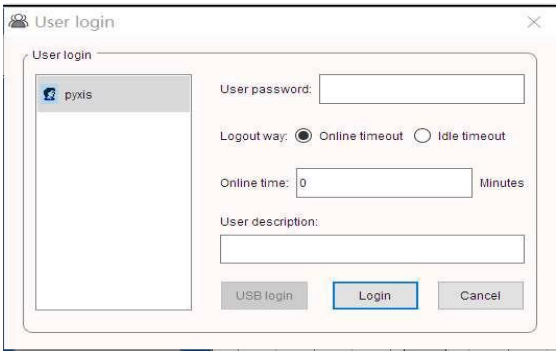


Figure. 42 - Modifying the User Screen

Modify Password: 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.*

7. Daily Maintenance

7.1. Correspondence Address

Serial Number	Definition	Address	Format	Mode	Unit	Note
1	TCL	1	float	read only	mg/L	Data format ABCD
2	pH	3	float	read only		Data format ABCD
3	Temp	5	float	read only	°F	Data format ABCD
4	Flow	7	float	read only	L/min	Data format ABCD
5	TCL lower limit alarm	9	uint	read only		0: normal 1: Alarm
6	TCL upper limit alarm	10	uint	read only		0: normal 1: Alarm
7	pH lower limit alarm	11	uint	read only		0: normal 1: Alarm
8	pH upper limit alarm	12	uint	read only		0: normal 1: Alarm
9	TCL sensor communication is abnormal	13	uint	read only		0: normal 1: Alarm
10	The communication of the medicine pump is abnormal	14	uint	read only		0: normal 1: Alarm
11	The communication of the analog module is abnormal	15	uint	read only		0: normal 1: Alarm
12	The communication of the traffic collection module is abnormal.	16	uint	read only		0: normal 1: Alarm
Communication protocol: standard Modbus-RTU						
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 (can be set); port: 502						
Station number: 1						

Table 2 - Correspondence Address

7.2. Operation and Maintenance

After the analyzer is installed by a qualified technician, it can begin to monitor water quality. The SFA-765S5-TCL 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 guideline. Little operator intervention is required during normal operation.

Required Services	Recommended Frequency
Cleaning SFA-7655S-TCL Inlet Water Filter	Monthly or Cleaned As Needed
Sensor Photoelectric Pole	Monthly
pH Calibration	Every 6 Months
Chlorine Calibration	Every 6 Months
Replace the reagent pumping tube	Every 6-12 Months or As Needed

Table 3 - Maintenance Intervals

7.3. Instrument Alarms and Descriptions

Please refer to the instrument alarms and descriptions table when troubleshooting the SFA-765S5-TCL inline inspection system 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
pH / Chlorine Sensor Communication Abnormalities	pH/ Chlorine Sensor without Communication	No pH and Chlorine Measurements	Check the connection between the sensor and the circuit board. If the problem persists, contact Pyxis.
pH Upper Limit Alarm	pH 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.
pH Lower Limit Alarm	pH below the Alarm Setting	Information Only	
Chlorine Upper Limit Alarm	Chlorine above the Alarm Setting	Information Only	
Chlorine Lower Limit Alarm	Chlorine below the Alarm Setting	Information Only	
pH/Chlorine Calibration Failure Code 2		Calibration Failure	Check whether the water flow is normal, whether the sensor is clean, whether the standard liquid is contaminated
pH/Chlorine Calibration Failure Code 3	Standard Solution Value out of Range	Calibration Failure	
pH/Chlorine Calibration Failure Code 5	Wrong Data Type for the Liquid Value	Calibration Failure	

Table 4 - Common Alarms

8. Replacement Maintenance

8.1. Replacing pH and Oxidizer Electrode Head

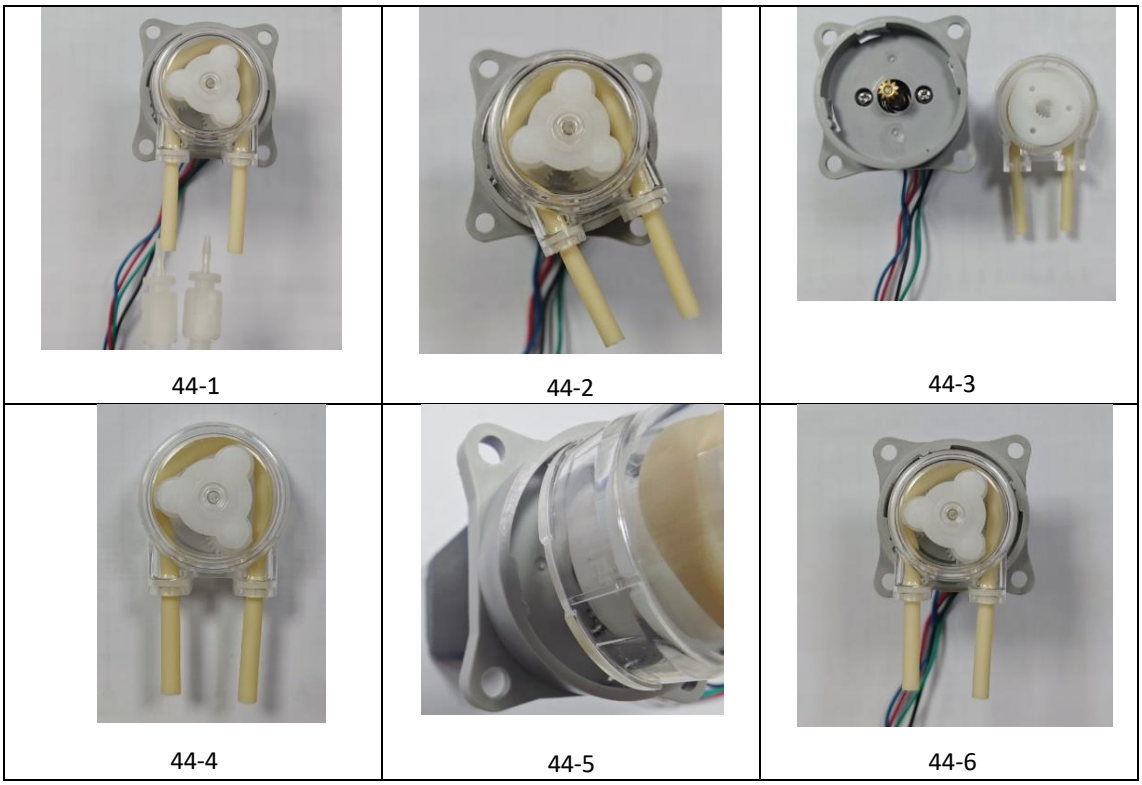
The EH-765 electrode head (P/N: 53061) of the ST-765SS Series sensors can be replaced when the original electrode heads have reached the end of their working life. The typical working life of the electrode can be as long as 2-years under normal operating conditions. Please refer to the following steps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

1. 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 43-2. ***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 43-3.
4. Gently loosen the electrode plug connector and remove the electrode head, as show in Figure 43-4.
5. To install the new electrode head, please use the mounting hook to securely plug in the wiring connector, as shown in Figure 43-5. ***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 43-5.**
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 43-6. 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 43-1.

Figure. 43 - Replacing EH-765 pH and Oxidizer Electrode Head

8.1. Type Two Pump Head Replacement Procedure

1. Disconnect pump tubing from connector, as shown in Figure 44-1.
2. Rotate the pump head counterclockwise until it cannot be rotated, as shown in Figure 44-2.
3. Remove pump head, as shown in Figure 44-3.
4. Obtain new pump head, as shown in Figure 44-4.
5. Align the center hole of the new pump head with the gear, and the protrusion of the new pump head with the groove on the base, then insert it, as shown in Figure 44-5.
6. Rotate the new pump head clockwise until the protrusion on the pump head engages with the base groove, as shown in Figure 44-6.



44-1 44-2 44-3

44-4 44-5 44-6

Figure. 44 - Replacing the Reagent Pumping Tube 2

8.2. Replacing the Reagent Pump with NEW Design (Serial #240011 and after)

The SFA-765SS-TCL now comes equipped with an improved reagent pump technology upgrade that is more convenient to maintain and perform tubing change. The change is in design only and the replacement reagent pump part number remains unchanged at P/N 22006. All SFA-765SS-TCL analyzers with **Serial # - 240010** and prior were equipped with an older version of the black dosing pump which will eventually require replacement. Typical pump life span is 1-2 years. Please replace the old pump style with the new pump style according to the procedures outlined in this document.

1. First, power off the analyzer, and then disconnect the cable of the dosing pump, as shown in Figure 1.
2. Remove the connector on the dosing pump from the pump tubing as shown in Figure 2.
3. Remove the mounting screws of the pump allowing the dosing pump to be removed, as shown in Figure 3.
4. Install the new dosing pump with the mounting screws to the original position, as shown in Figure 4.
5. Reinstall the tubing connector removed in step 2 onto the new dosing pump in the same direction as the original one, as shown in Figure 5
6. Connect the original cable to the new dosing pump and the new dosing pump is installed, as in Figure 6.

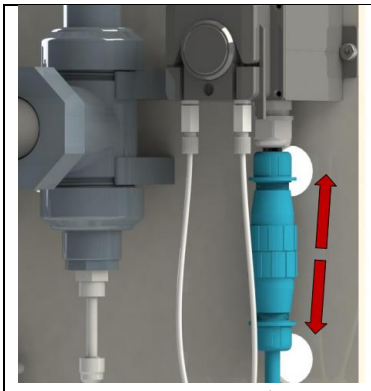


Figure. 1

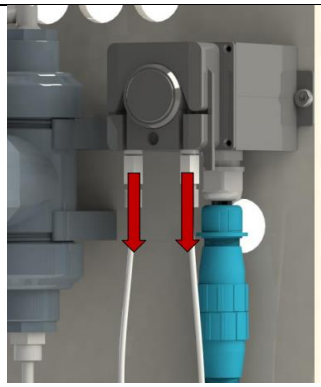


Figure. 2

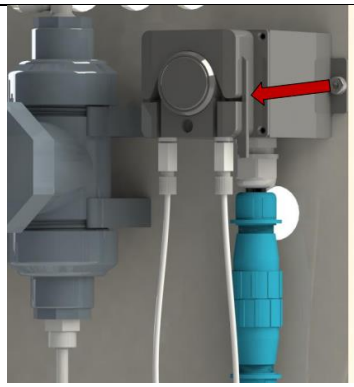


Figure. 3

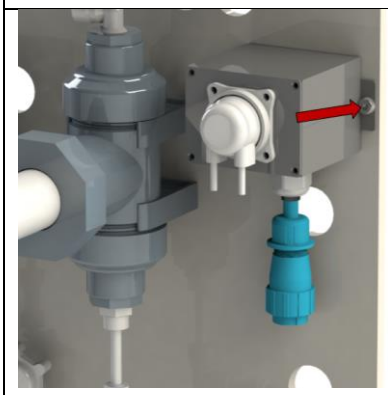


Figure. 4

Figure. 5

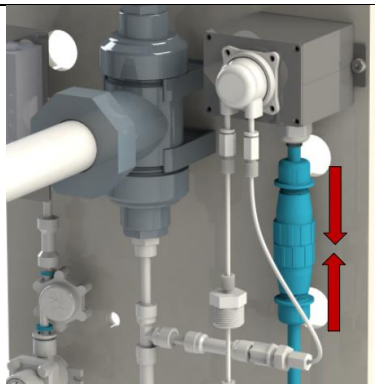


Figure. 6

After the new dosing pump is installed, you need to set the controller according to the following steps.
Click **"Parameter"** to open the menu, then select **"Diagnostic Data"**

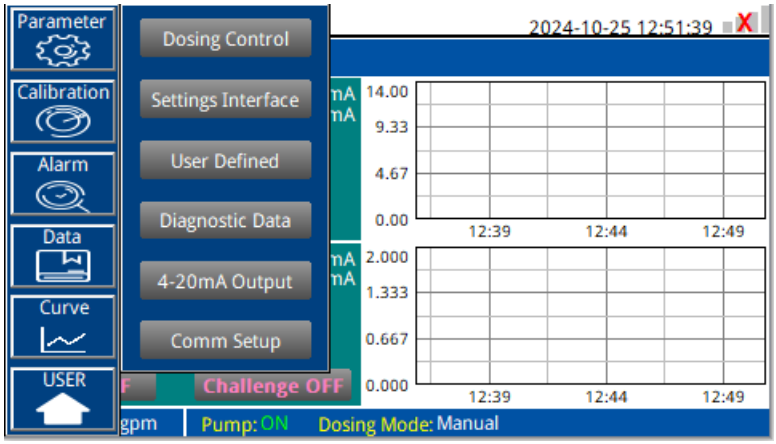


Figure. 7

Click **"Admin"** and type **"pyxis"** in the popup window and click **"Confirm"**.

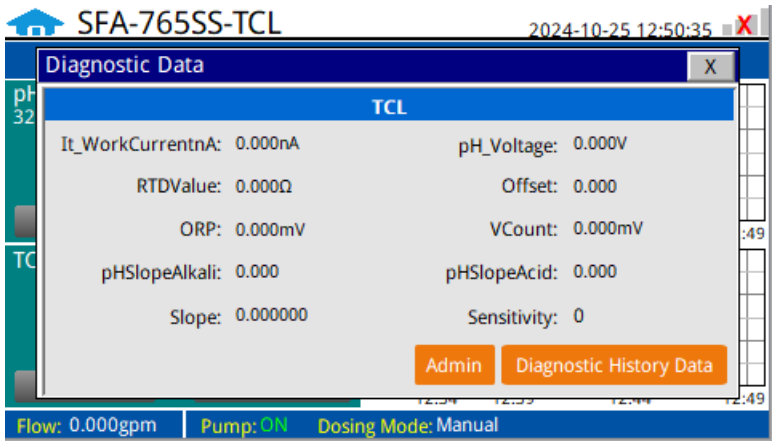


Figure. 8

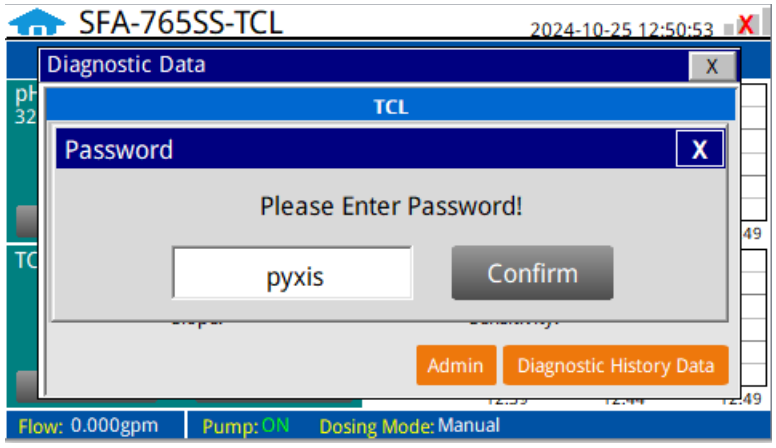


Figure. 9

If your device version cannot enter Admin from Diagnostic Data, **you can press and hold the title of the home screen** for 5 seconds, as shown in the red box in Figure 10

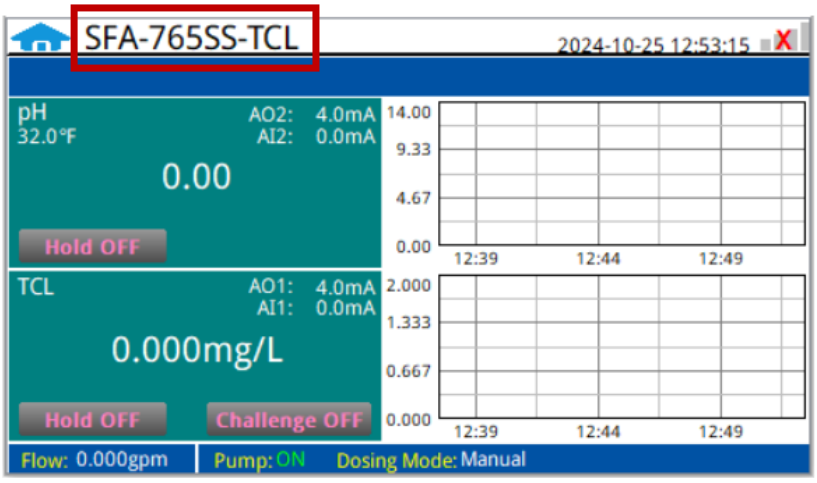


Figure. 10

On the admin page, select **“Dosing Pump Control“** then in the lower right corner enter **30** in the box below **"Dosing Pump Current"**. As shown in Figure 12

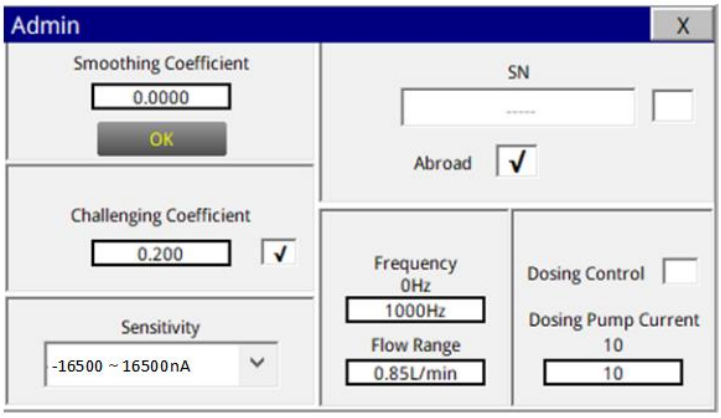


Figure. 11

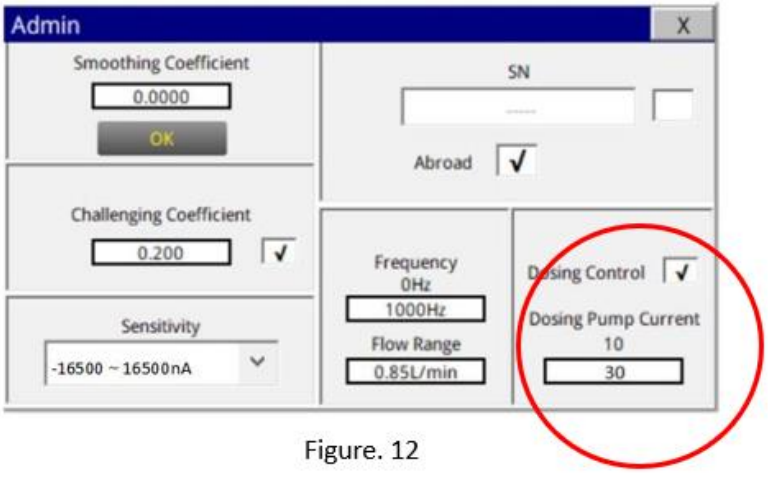


Figure. 12

After the setting is complete, close the Admin interface, enter the **"Parameter"** menu again, and click **"Dosing Control"**.

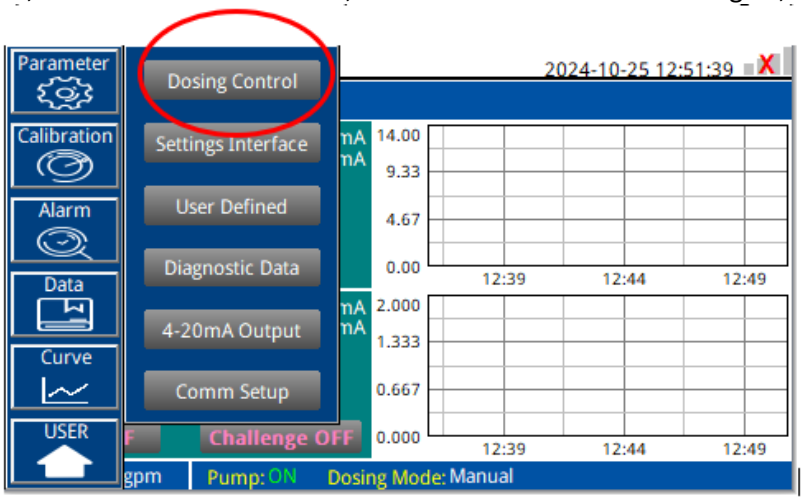


Figure. 13

Enter **"608"** in the input box next to **"Speed Setting"**.

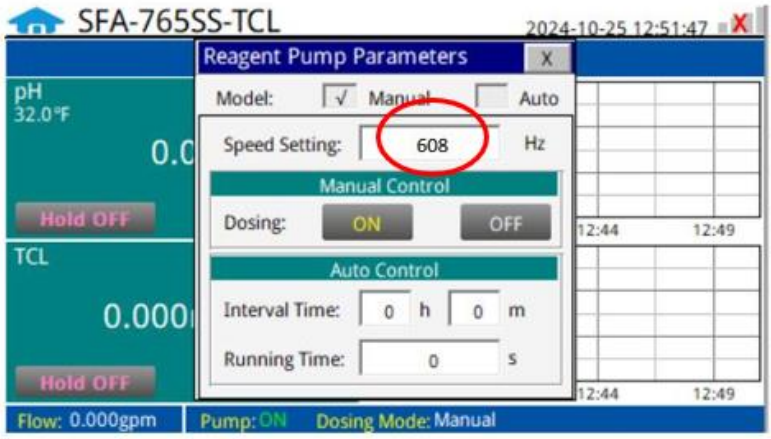


Figure. 14

IMPORTANT NOTE

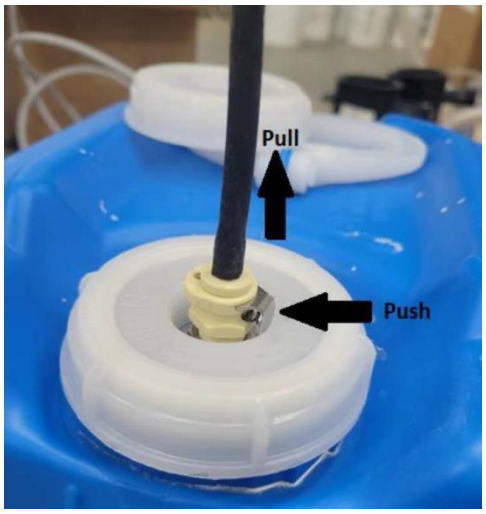
After the Settings are complete, be sure to re-enter the Admin screen and **DELETE Dosing Control**, as shown in Figure 11.

8.3. Replacing the Reagent Container

The reagent is required for proper measurement for the ST-765SS-SFA. The 5-gallon reagent carboy should last up to 2 months with normal operation and should be replaced when empty per instructions below.

1. Disconnect the tubing by depressing the metal pin and pulling the plastic tubing out.
2. Remove the screw cap with tubing from empty carboy.
3. Place the new carboy into position.
4. Remove the screw cap from the new carboy.
5. Using the tool, screw the screw cap with tubing
6. Connect the tubing by pushing the plastic tubing into the slot.
7. Run the reagent pump to prime the suction tubing with reagent. Time to prime may vary on length.

8.4. Step 1



8.4 Step 2

8.4 Step 5

8.4 Step 6

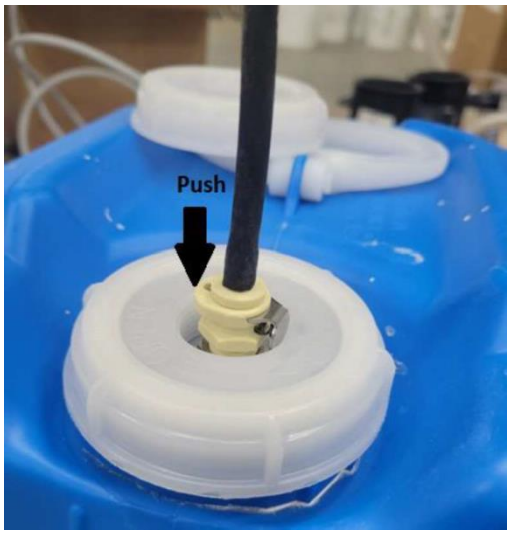
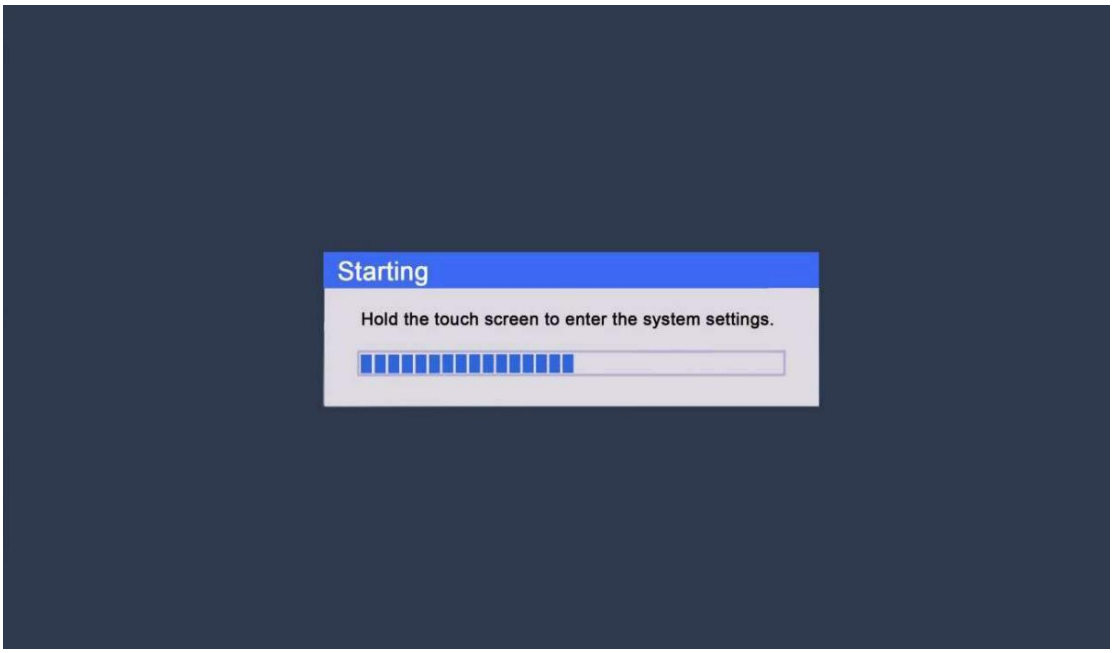


Figure. 45 - Replacing the Reagent Carboy

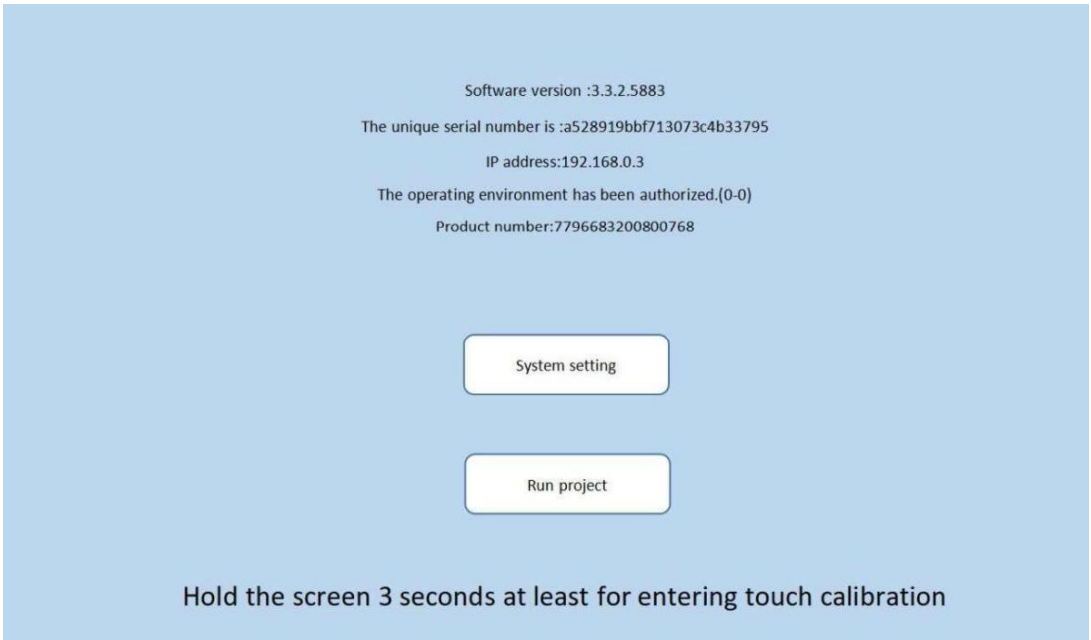
9. UC-80 & UC-100 Series

9.1 Setting the Date and Time

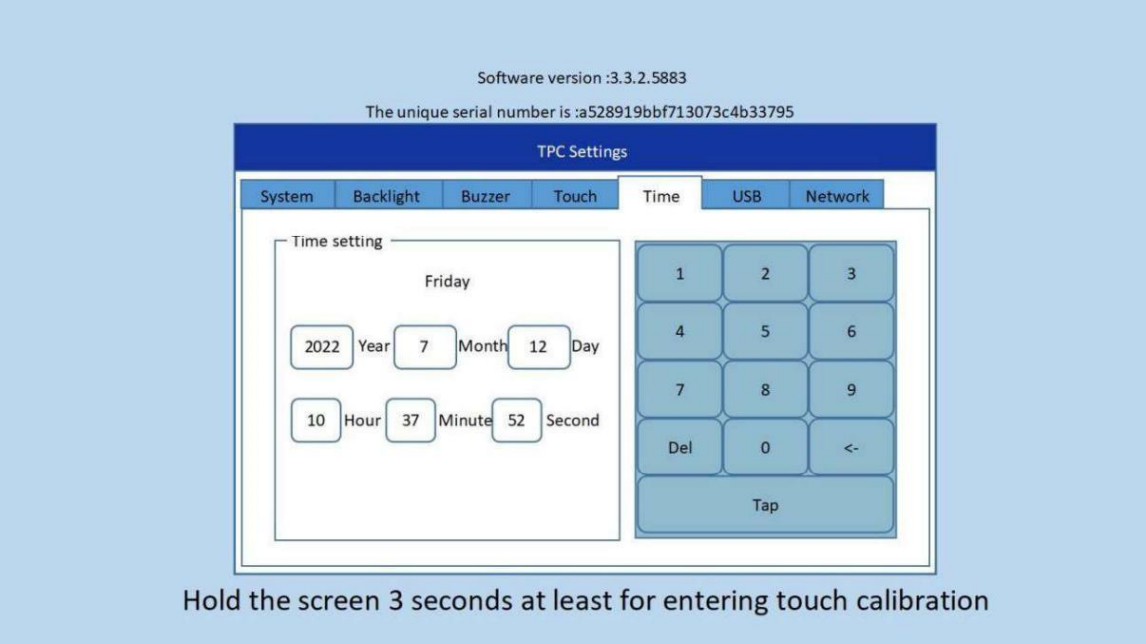
1) When the device is powered on again, when the following screen appears on the screen, tap the screen immediately



2) Enter the system interface, as shown in the figure below, click the button "System setting"



3) Enter the setting interface, select the time parameters, as shown in the figure below, and modify the time. After the modification is completed, click the "OK" button to confirm. After closing the setting interface, click "Run project" to enter the program running interface.

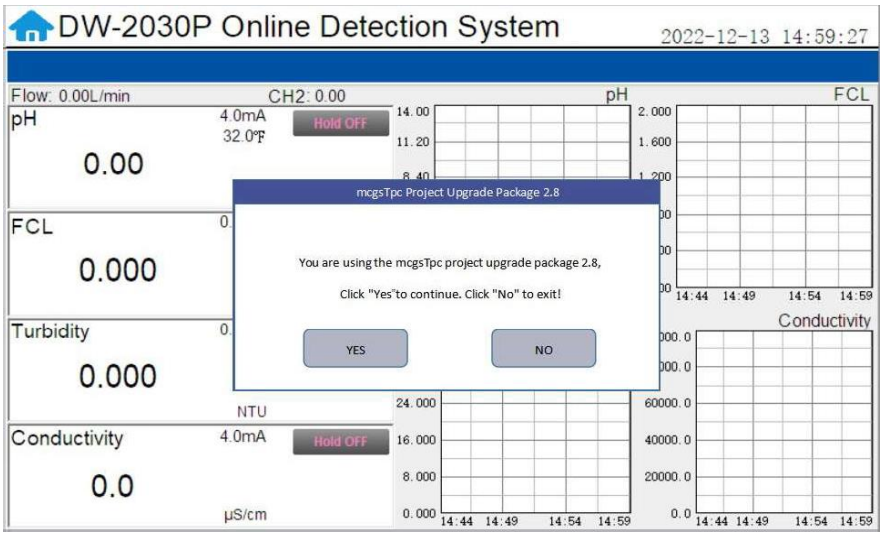


9.2 Firmware Update Procedure

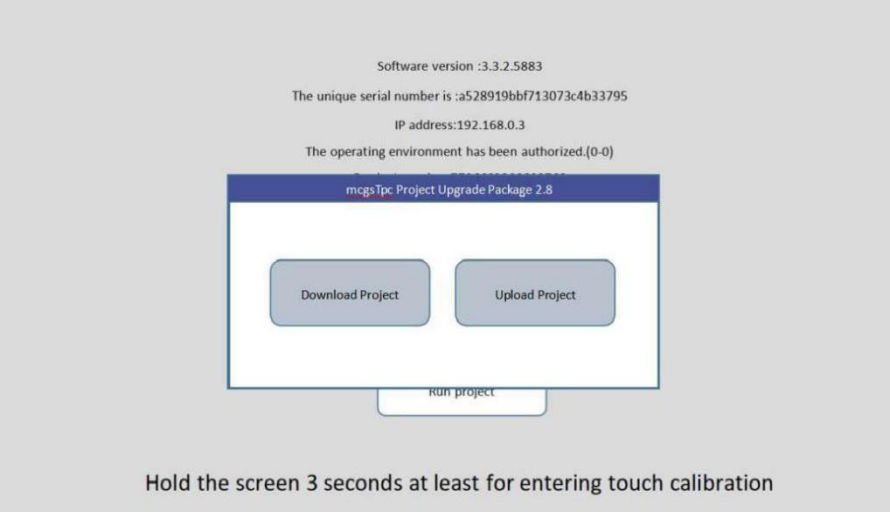
1) Decompress the program update package, copy the "**tpcbackup**" file and save it to a USB flash drive in "FAT32" format. ***NOTE*** *You need to copy the entire folder to the root directory of the USB flash drive.*

2) Insert the USB flash drive into the USB1 port on the rear of the touch screen.

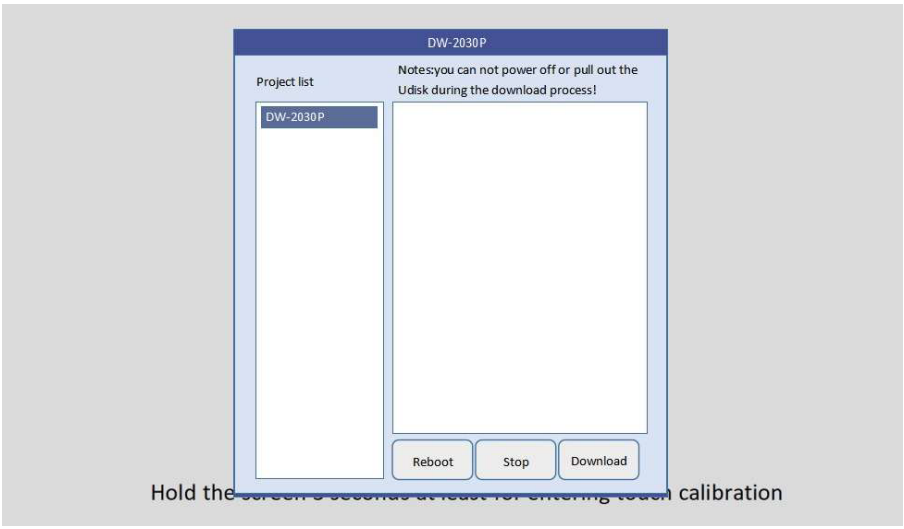
3) After inserting the USB flash drive, the touch screen will pop up. Click "**YES**" and wait for the screen to jump, as shown below.



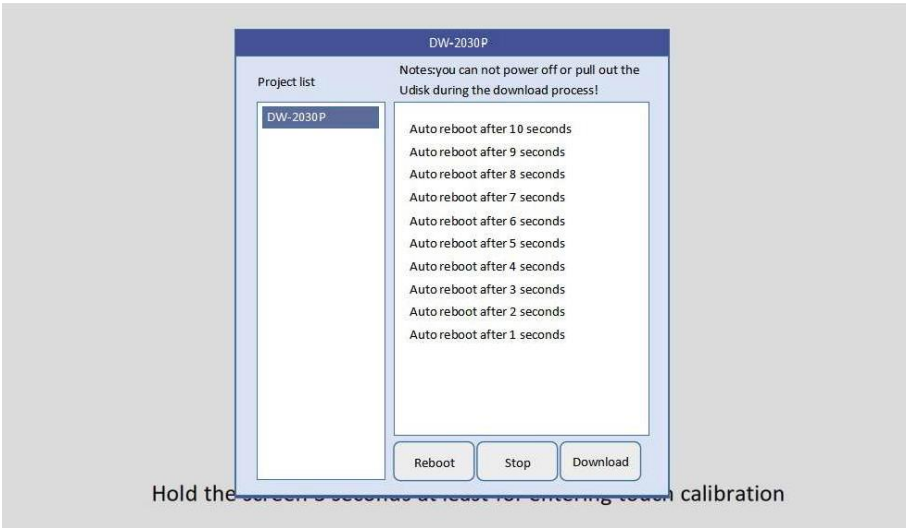
4) In the new pop-up box, click "**Download Project**", as shown below.



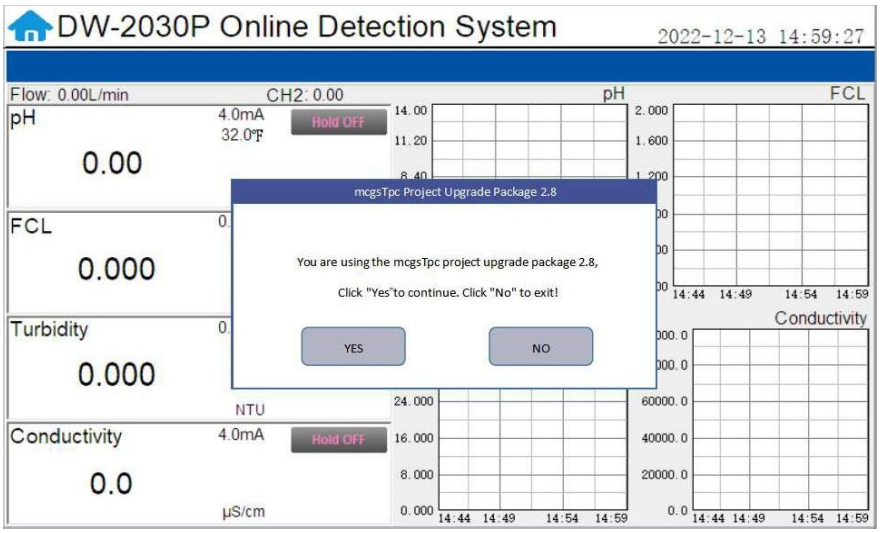
5) In the new pop-up box, select the program name on the left and click "**Download**". The touch screen will start to download the program. See figure below



6) When the rewind is over, the touch screen will restart, and the screen will turn black during the restart. At this time, you can pull out the USB disk, as shown in Figure 4



7) If the update screen appears again after restart, please click "**NO**" and pull out the USB disk, as shown in Figure 5



10. Order Information

Order Information	P/N
SFA-7655S-TCL *(Total Chlorine+ pH+ Temperature Analyzer)*	12009
TCL-EC Reagent *(Pyxis Potassium Iodide/Acetic Acid Reagent for Total Chlorine - 5 Gallon Pail)*	13001

Optional / Replacement Accessories Information	P/N
ST-7655S-TCL *(Residual Chlorine+ pH+ Temperature Sensor w/ internal Compensation-Sensor Only)*	53616
EH-765 *(Replacement Electrode Head for ST-765SS-Series Sensors)*	53061
ST-001 *(Replacement ST-001 Flow Tee)*	50704
Hall Effect Digital Flow Meter *(1/4-inch OD)*	16008
SFA-Reagent Feed Pump *(Replacement Peristaltic 0.2ml/Hour / ¼-inch OD)*	22006
SFA-Reagent Pumping Tube Kit *(Replacement Pumping Tube)*	44023
UC-80 Display+ Data Logging Terminal *(Replacement)*	14003

11. Contact Pyxis Lab

info@pyxis-lab.com for general inquiries
service@pyxis-lab.com for technical service and support
order@pyxis-lab.com for order and pricing inquires
1-866-203-8397 Phone USA for all needs