Pyxis®

IK-73X Plus Series Turbidity Analyzer

Turbidity Analyzer with Automatic Brushing Reservoir

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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.

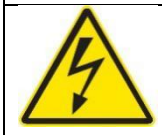
Warning
Indicates a potentially or very dangerous situation that, if not avoided, may cause serious personal injury or death.

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.

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1. Specifications

Item	IK-739-PLUS	IK-739-PLUS-G	IK-736-PLUS	IK-736-PLUS-G
P/N	12001	12002	12003	12004
4G Gateway	Not Included	Included	Not Included	Included
Turbidity Source / Wavelength	LED / Warm White			
Turbidity Dual Range	0.000 - 40.00 NTU		0.000 – 1,000 NTU	
Turbidity Flow Cell With Brushing	Included			
Measurement Accuracy	0.001NTU or ± 1% Full Scale			
Minimum Resolution	0.002 NTU			
Response Time	4s after immersion - Turbidity			
Compliance	EPA-180.1			
Measurement Interval	Continuous Measurement			
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; 3A Fuse; 75 W			
Output	2 x 4-20 mA / RS-485 Modbus - RTU / Modbus TCP			
Input	2 x 4-20 mA / RS-485 Modbus - RTU			
USB	1 x USB host, for data downloading and screen upgrade			
Internet	RJ-45 socket, Modbus-TCP			
Panel Operational Temperature	40 – 113°F (4-45 °C)			
Storage Temperature	Instrument: -4 – 131oF (-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)			
Sample Water Flow Rate	100 – 2,000mL / Minute			
FS-100 Method of Measure	Ultrasonic Flow Detection			
FS-100 Rated Flow Range	0 – 3,000 mL/min			
FS-100 Resolution/Max Error	1mL/min or ±2% of the value			
FS-100 Display	1.44” Color 128 x128 Resolution			
Sample Line Size	½-inch NPT			
Rating	IP-65 Panel-Display / IP-67 Sensors			
Regulation	CE / RoHS			
Relative Humidity	20% - 90% (No Condensation)			
Altitude	<6,561 feet (<2,000 Meter)			
Dimensions (HxWxD)	Panel (IK-73X9-PLUS) 750H x 450W x 243D mm			
Approximate Product Weight	IK-73X-PLUS Series ~ 15 kg			

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

2. Part Numbers & Ordering Details

Please find a table below outlining ordering details and part numbers for the IK-73X-PLUS Series of analyzers and replacement-spart parts.

Order Information	P/N
IK-739-PLUS *(Auto Brushing Turbidity Analyzer 0.000 – 40.000 NTU)*	12001
IK-736-PLUS *(Auto Brushing Turbidity Analyzer 0.000 – 1000 NTU)*	12003
IK-739-PLUS-G *(Auto Brushing Turbidity Analyzer 0.000 – 40.000 NTU with Gateway)*	12002
IK-736-PLUS-G *(Auto Brushing Turbidity Analyzer 0.000 – 1000 NTU with Gateway)*	12004
FT-100-PLUS *(Replacement FT-100-PLUS Auto-Brushing Flow Assembly Replacement)*	16005
FTP-100-1 *(Replacement Brush & Seal Assembly Kit for FT-100-PLUS)*	28698
LT-739 *(Replacement Inline Turbidity Sensor 0.000 – 40.000 NTU White Light USEPA)*	53221
LT-736 *(Replacement Inline Turbidity Sensor 0.000 – 1,000 NTU White Light USEPA)*	53215
UC-100A *(Replacement Display & Data Logging Terminal)*	43054
FS-100 *(Replacement Ultrasonic Flowmeter with Display 0-3000mL/Minute)*	54200
Flow Regulating Motorized Valve w/4-20mA Control *(Replacement)*	21972
L-CAL *(Portable Liquid Formazin Calibration Kit for All LT-73X Series Sensors)*	53247
Pyxis Turbidity Calibration Std – 10.0 NTU *(500mL)*	57010-4
Pyxis Turbidity Calibration Std – 30.0 NTU *(500mL)*	57010-8
Pyxis Turbidity Calibration Std – 500 NTU *(500mL)*	57010-2

3. Unpackaging

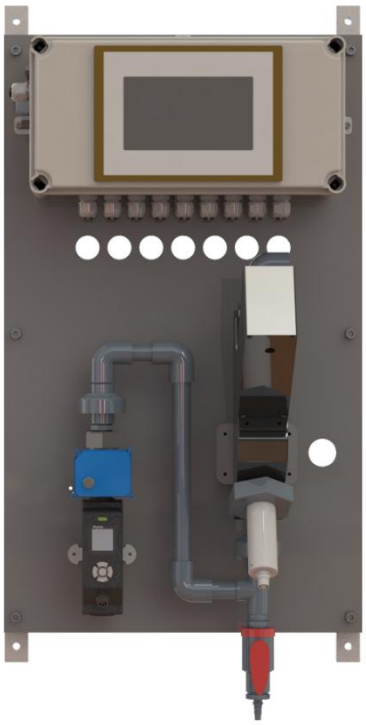
The package includes the following items:

One IK-73X-PLUS Series Water Analyzer Panel Assembled and Complete with Power Supply Cord

- UC-100A Touch Screen Display/Data Logger with Pyxis Sensors Prewired in RS-485 (RTU)
- LT-739 (Warm White Light) Ultra-Low Turbidity Sensor (0-40NTU) on IK-739-PLUS Model
- LT-736 (Warm White Light) Ultra-Low Turbidity Sensor (0-1,000NTU) on IK-736-PLUS Model
- FT-100-PLUS Auto-Brushing Flow Reservoir
- FS-100 Ultrasonic Flow Sensor with Motorized Valve

4. System Layout and Features

The IK-73X-PLUS series offers highly accurate, auto-brushing, real-time measurement, display and data-logging of Ultra-Low Turbidity and sample flow, utilizing proprietary Pyxis Lab smart sensor technology, coupled with a Pyxis touch screen display and data logging terminal. The IK-739-PLUS measures a range of 0.000 – 40.00 NTU while the IK-736-PLUS measures a range of 0.000 – 1000 NTU. The IK-73X-PLUS series is offered in a convenient and easy to integrate panel mounted format for rapid installation and simple maintenance.



IK-73X-PLUS Series Features

- Pyxis Lab's advanced research and development sensor technologies to achieve highly accurate and stable measurement of Turbidity.
- Pyxis LT-739 and LT-736 ultra-low resolution turbidity sensors offer a detection light source using warm white LED in 90-degree surface scatter format in accordance with USEPA 180.1 wavelength standards. The turbidity sensor is mounted in the unique Pyxis FT-100-PLUS auto-brushing flow reservoir with motorized mechanical cleaning of the sensor optical lense enabling the highest resolution possible of 0.002NTU with unmatched stability. The LT-739 and LT-736 both offer simple calibration via the Pyxis L-CAL Portable Turbidity Calibration Kit as outlined in this manual.
- The IK-73X-PLUS series also offers the FS-100 ultrasonic flow sensor and motor valve control module providing precise measurement and control of the incoming water sample flow based on user defined setpoint without the challenges commonly associated with mechanical flow measurement in dirty water applications.
- All Pyxis sensors are connected to the UC-100A display/data logger via RS-485 modbus (RTU) allowing for integrated sensor calibration interface and diagnostics within the display touch screen. Display/data logger offers 2 x 4-20mA output, 2 x 4-20mA input as well as RS-485 and TCP-IP with remote diagnosis and parameter adjustment.
- Convenient and simple to install Back-Panel (IK-73X-PLUS Series) for rapid and easy installation. Truly a plumb and power to go platform with intense factory setup, testing and sensor calibration prior to shipment.

5. Dimension and Mounting

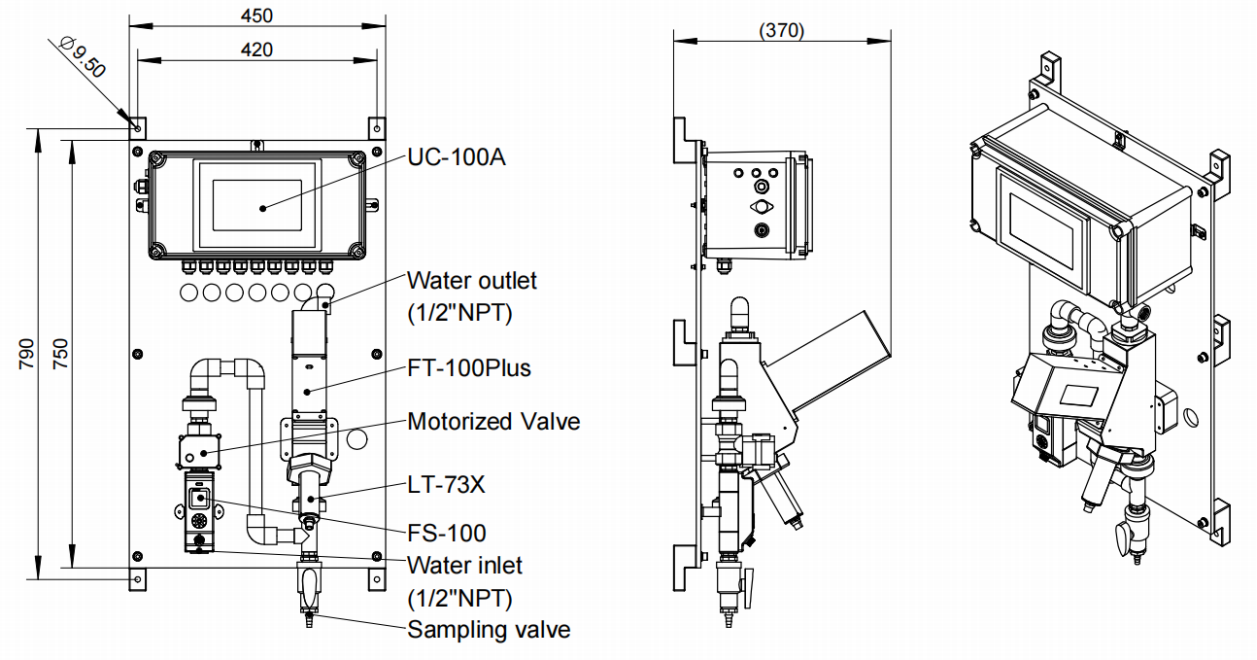


Figure 1 - IK-73X-PLUS (Auto-Brushing Turbidity)

UC-100A Display/Data Logger Dimensions (mm)

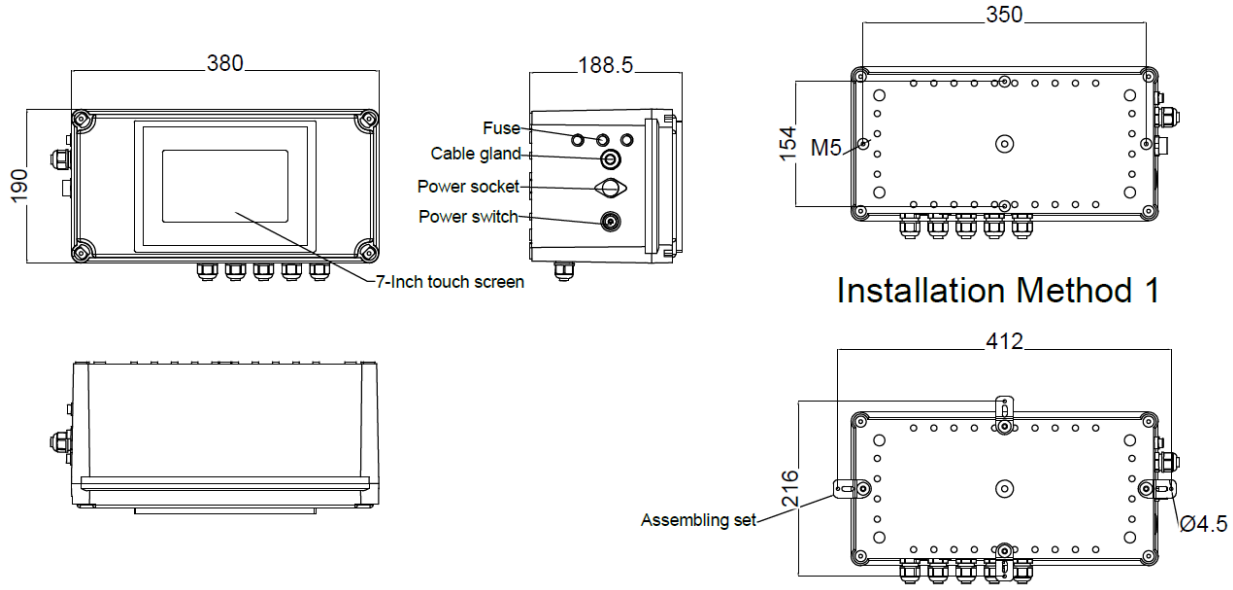


Figure. 2-UC-100A

Sensor Diagrams (mm)

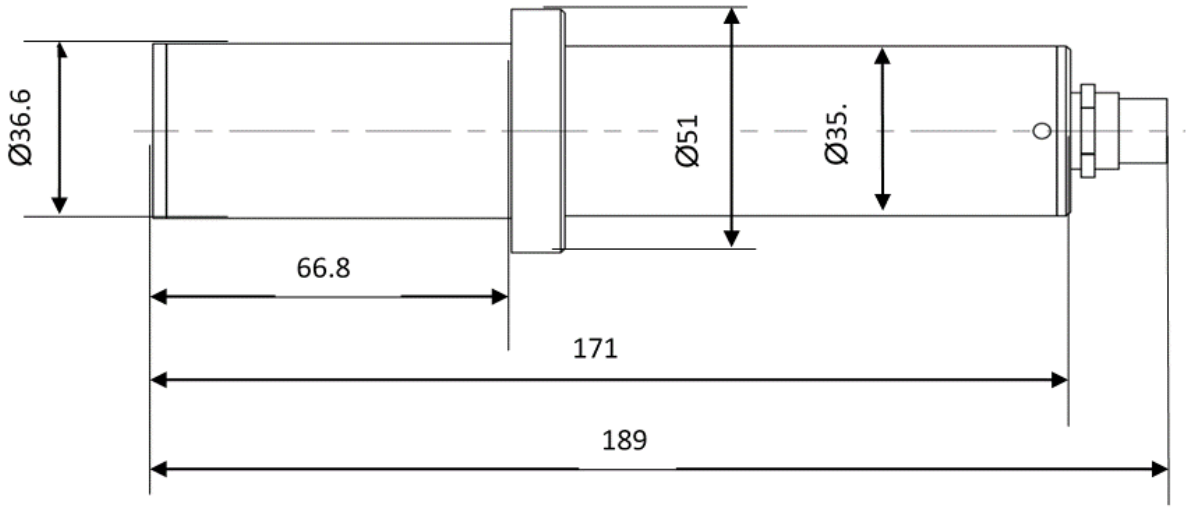


Figure. 3-LT-739 / LT-736 Turbidity Sensor

6. Installation

6.1. Installation Requirements

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

Water Supply: Inlet water pressure should be from 7.25 – 30 psi (0.05-0.2MPa). The FT-100-PLUS brushing flow reservoir will come equipped with inlet feedwater line adapter of ¼-inch OD tubing connected to ½-inch FNPT inlet.

Drainage: Outlet pipe diameter is ½-inch NPT and should be connected to a discharge drain via gravity flow.

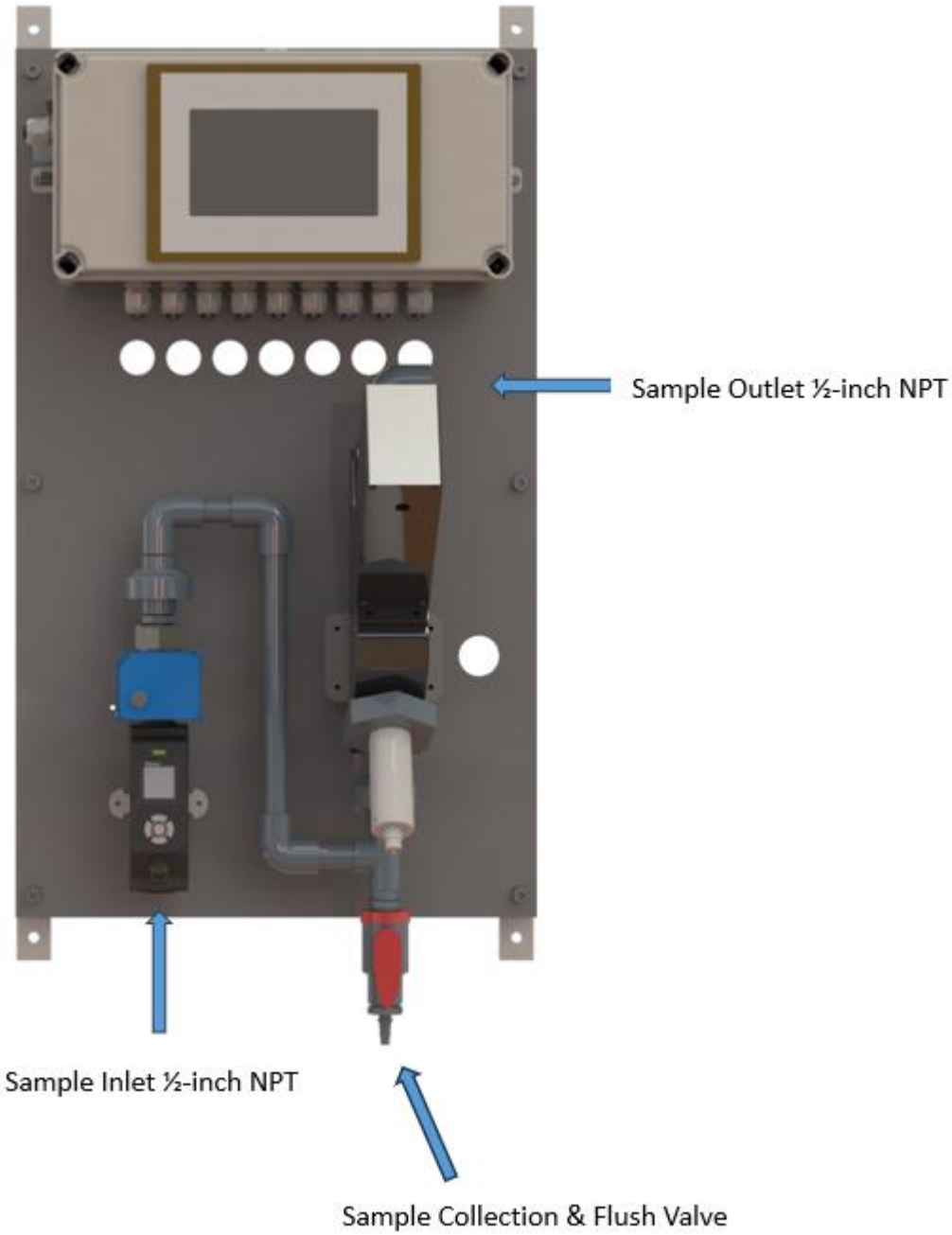
Wall Mount Space: The IK-73X-PLUS series analyzer panel size is roughly 750H x 450W x 243D (mm) in dimension. Please accommodate sufficient space for mounting.

Wall Mount Weight: Approximately 15kg. Please use appropriate mounting hardware.

6.2. Tube Connection

Inlet Water: Connect the ½-inch NPT

Outlet Water: Connect the ½-inch NPT



6.3. Terminal Wiring

The IK-739-PLUS and IK-736-PLUS analyzers have 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. **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.

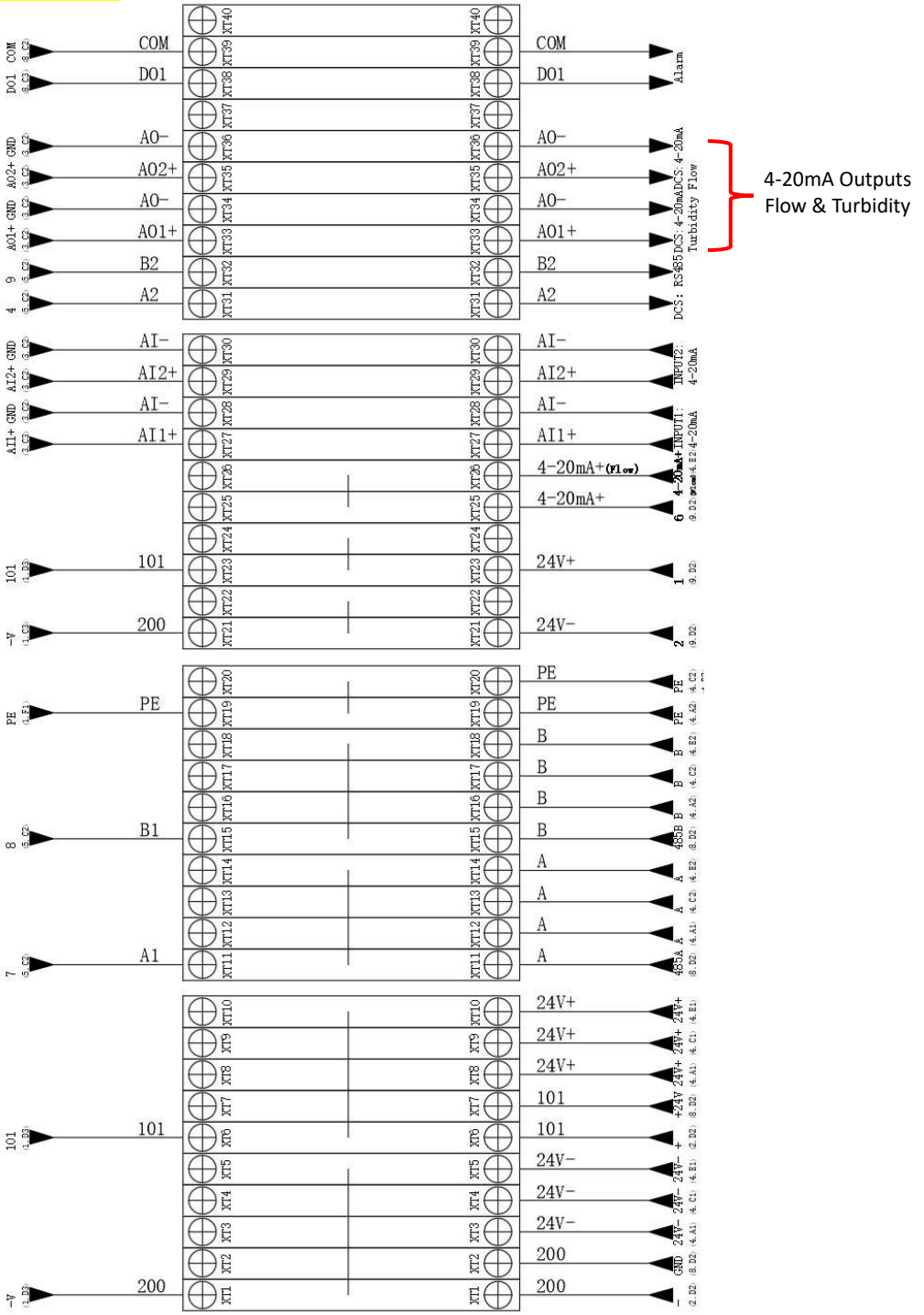


Figure 4 - Terminal Wiring Diagram

7. FS-100 Flow Control Module Overview & Use

The Flow Control Module is a stand-alone water flow measurement and control solution, a unique platform that provides accurate flow measurement and regulation. The Flow Control Module of this analyzer is equipped with the Pyxis FS-100 ultrasonic flow meter with display and motorized regulating valve providing a simple user programmable interface measurement and control range of up to 3,000mL/min.

7.1. FS-100 Key Function

Enter Key

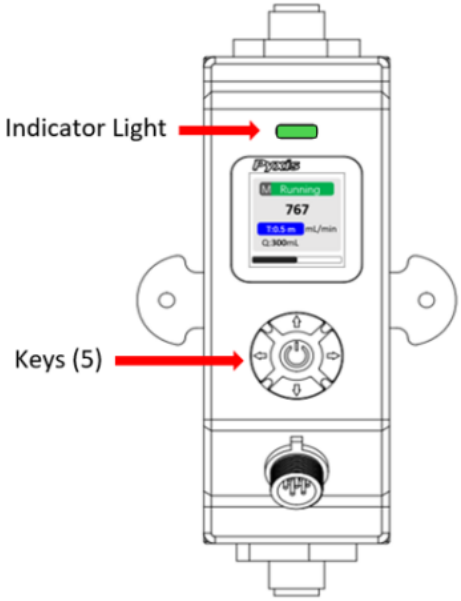
- Main screen → Setting Menu.
- Confirms and saves the input values.

◀ ▶ Left / Right Key

- Main screen → Trend Chart.
- Move the cursor to the left or right.
- Turn pages on the screen.

▲▼ Up / Down Key

- To increase or decrease a displayed number value.
- Jump up and down in the operating menu.



LED Status Indicator

The status LED is used for a quick visualization of the flowmeter status.

LED Behavior	Status
Green	Normal Running
Red	Alarm Information

7.2. FS-100 Main Screen

Main Screen Description

NO.	Description
1	Flow Detection Mode (1)
2	Working Status (same color as LED status indicator)
3	Flow Rate Value
4	Timer (2) (unit: auto range)
5	Unit of measured flow value
6	Accumulated Flow Value (unit: auto range)

(1) **R** = Average Flow Rate Mode

M = Instantaneous Flow Rate Mode

C = Flow Rate Control Mode ***NOTE*** *For C-Mode refer to Section 7.4 for programming details.*

(2) The **Timer** feature is enabled when the FS-100 is powered on and can be set by pressing the▼ key.

- **Pause or Restart the Timer:** Press ▼ key momentarily and release.
- **Reset the Timer:** Press and hold ▼ key for about two seconds

7.3. FS-100 Flow Trend Chart

From the main screen, Press ◀ or ▶ to the trend chart display. Flow values will be displayed as a line graph to show the real-time trend. Press ◀ or ▶ to return to the main screen.

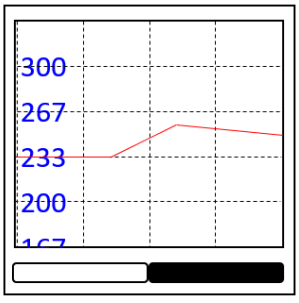


Figure. 5 - FS-100 Flow Trend Chart

7.4. FS-100 - Setting the C-Mode for the Sample Flow Control

The Oxipanel PLUS series are programmed to use the Flow Rate Control (C) mode by default, which does not need to be changed by the customer. If a change to measure only is desired (with no control) users may follow the steps below to adjust the FS-100 functional settings.

Press ◀ or ▶ in the setting menu and select ***[Pattern]***. The following operating modes are available:

- **Flow Rate (R) =** Display the average flow rate
- **Flow Meter (M) =** Display the instantaneous flow rate
- **Flow Control (C) =** Set a desired constant flow rate

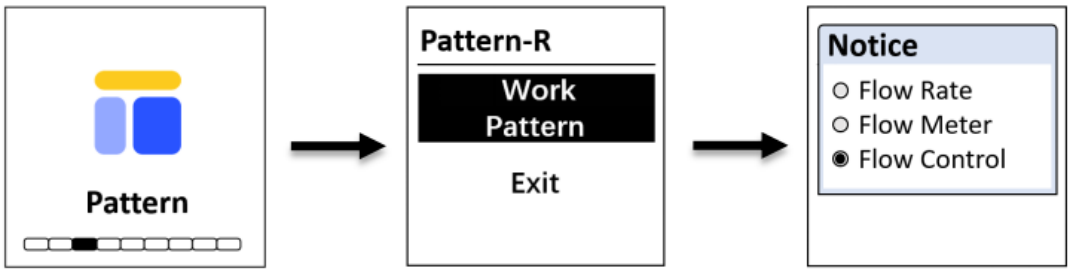


Figure. 6 - Operating Mode

When Flow Control Mode (C) is selected, a user defined flow rate setpoint must be entered (Figures 6 & 7). The FS-100 will automically control the regulating valve according to the preset flow rate with an internally calculated PID algorithm.

NOTE *The IK-73x-PLUS can be operated within the recommended flow rates of 100-2,000 mL/min. See Specifications Section 1.0*

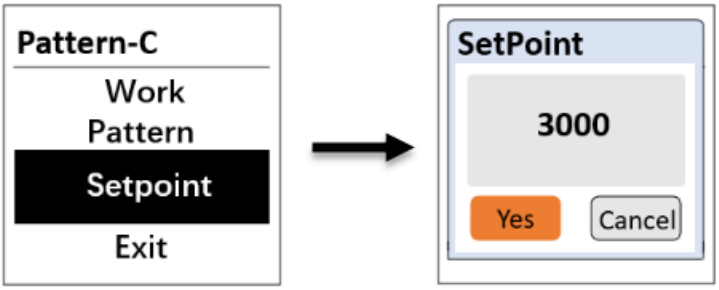


Figure. 7 - Flow Control (C) Operating Mode with User Defined Setpoint

NOTE *If the actual flow rate does not reach the preset flow rate for a duration time of longer than two minutes, the main screen and LED indicator will display* ***RED*** *alarm status .*

7.5. FS-100 Modbus Communication Settings

Press ◀ or ▶ in the setting menu and select ***[Com]*** to modify communication parameters (Figure 7).
The following communication settings are pre-programmed into the FS-100 for direct communication with the OxiPanel PLUS display interface. ***IMPORTANT NOTE*** *These values should NOT BE ALTERED, otherwise flow control failure will occur.*

- **Modbus Address** = *95*
- **Baud Rate** = *9600*
- **Parity =** *Even*

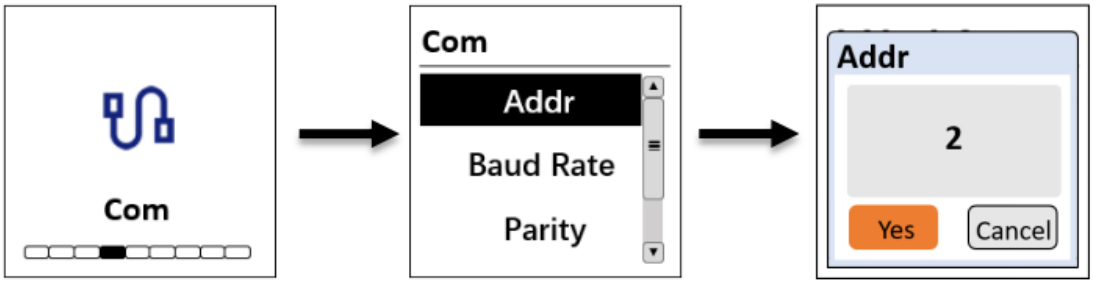


Figure. 8 - Communication Settings

7.6. FS-100 Factory Reset

If the user wants to restore all device settings to factory default parameters, Navigate to ***[Info]*** screen , press and hold ⏻ key for about two seconds, the FS-100 will reboot itself.

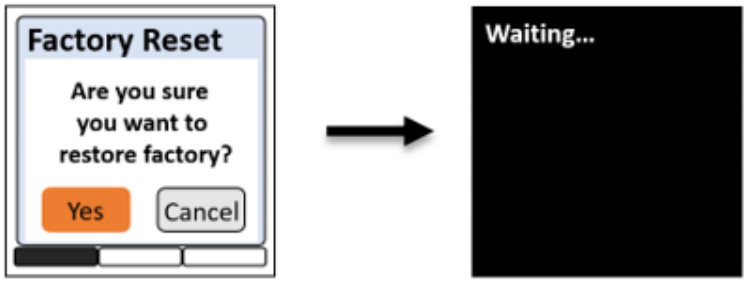


Figure. 9 - Factory Reset

7.7. FS-100 Device Information & Diagnosis

Press ◀ or ▶ in the setting menu and select ***[Info].*** This screen contains the device name, serial number, software version, and hardware version. Provide an image of both the **DEVICE INFORMATION** screen and the **DIAGNOSIS** screen when you contact Pyxis (service@pyxis-lab.com) for troubleshooting your device or call +1 (866) 203-8397 ext 2.

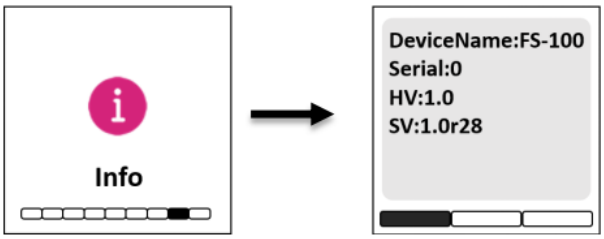


Figure. 10 - Device Information

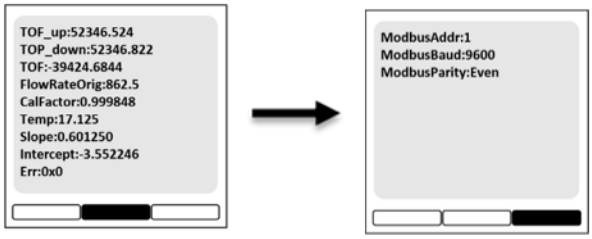


Figure. 9A - Diagnosis

Press ◀ or ▶ to turn the page. This screen information has no use for normal operation, but instead is used for device troubleshooting. Provide an image of both the **DEVICE INFORMATION** screen and the **DIAGNOSIS** screen when you contact Pyxis (service@pyxis-lab.com) for troubleshooting your device or call +1 (866) 203-8397 ext 2.

8. Touch Screen Operation

8.1. Main Screen

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

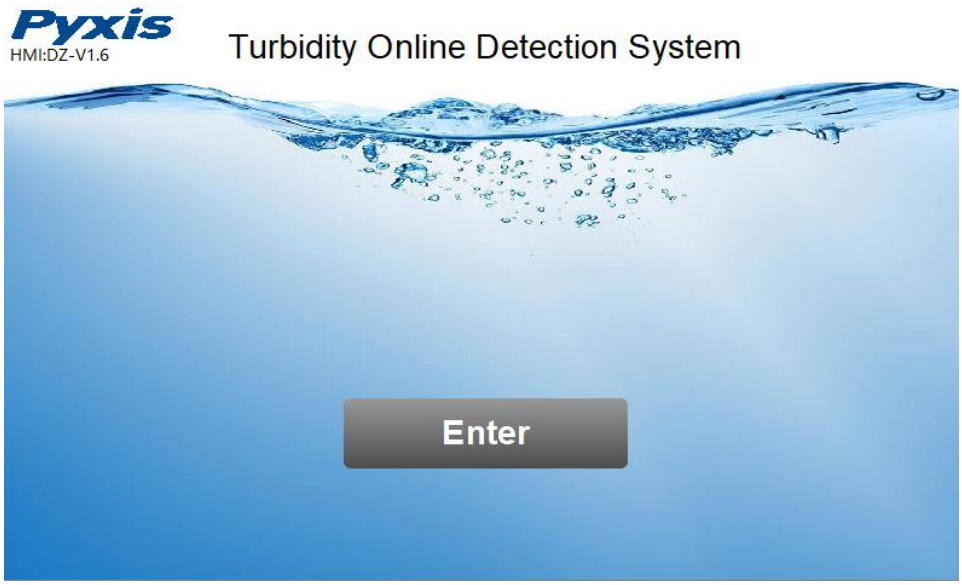


Figure 11 - Main Screen

8.2. User Login

After powering on the system, log in with the user name 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.

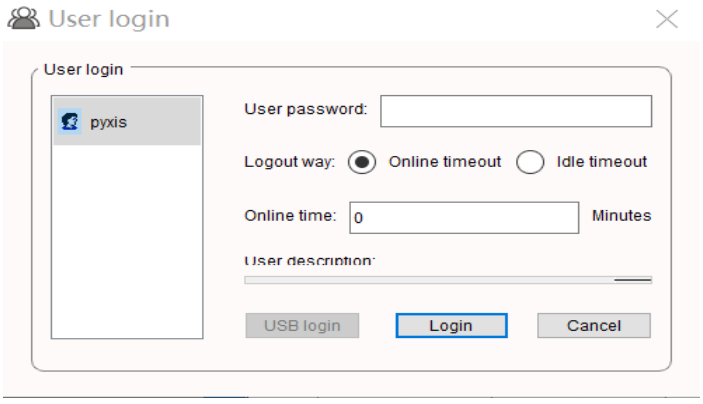


Figure 12 - User Login Screen

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.

8.3. 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.

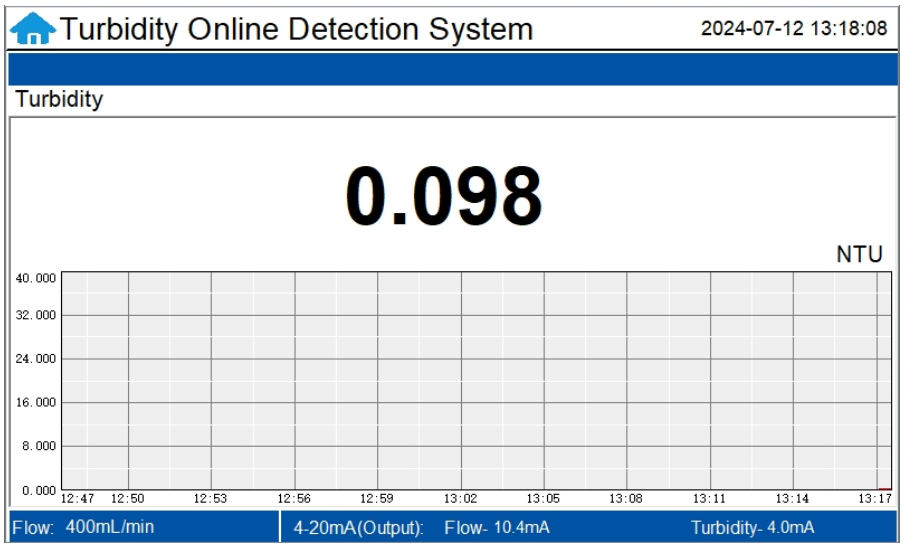


Figure 13 - Real-time Monitoring Screen

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 outter area of the screen to save and exit the setting screen after modifications are made. **NOTE** the upper value should correspond with the turbidity sensors range and typical application conditions.

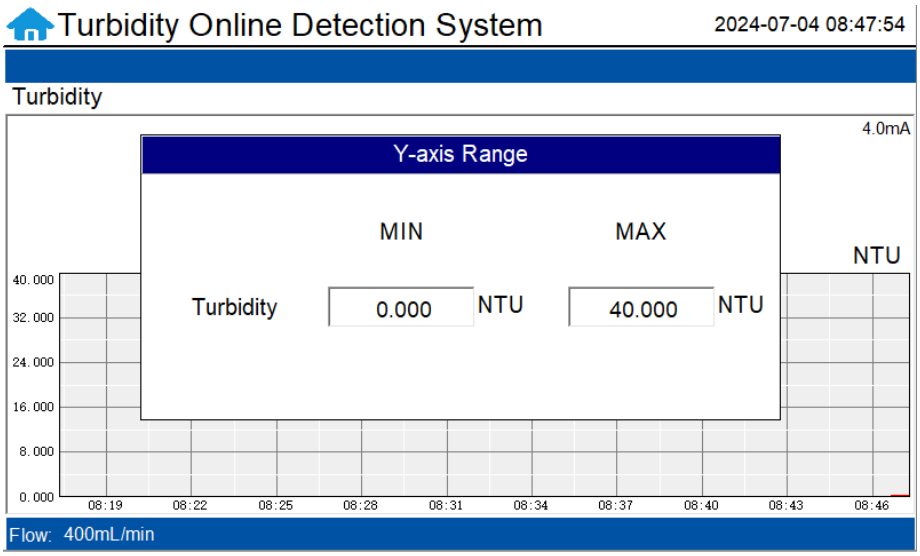


Figure 14 – Display Curve Range Setting

8.4. 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.

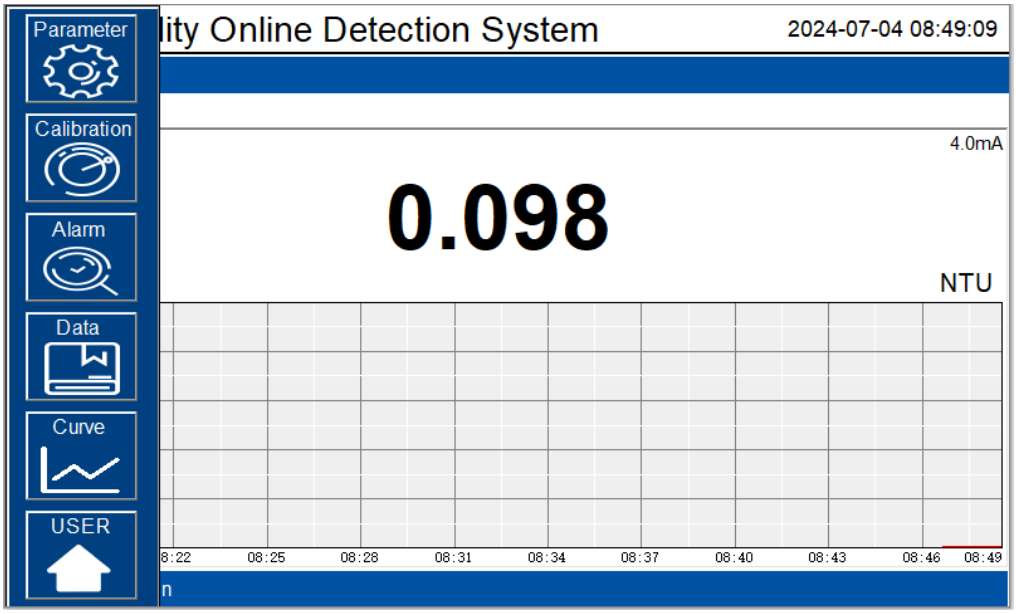


Figure. 15-Menu Bar

8.5. 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.

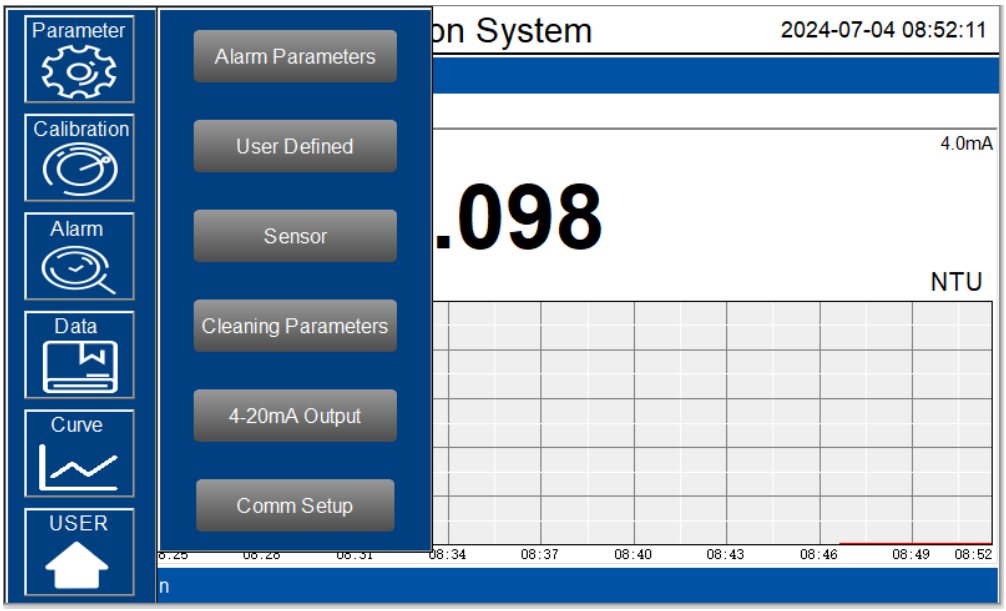


Figure 16 - Parameter Settings

8.5.1. Alarm Parameter Setting

When the online user has the right to operate, upper and lower alarm limits can be set. Click "Alarm Parameter " to enter the interface of alarm parameter setting. Here you can set the alarm upper limit and lower limit of each sensor.

When "Control Selection" is selected as manual, you can click "ON" to output the signal.

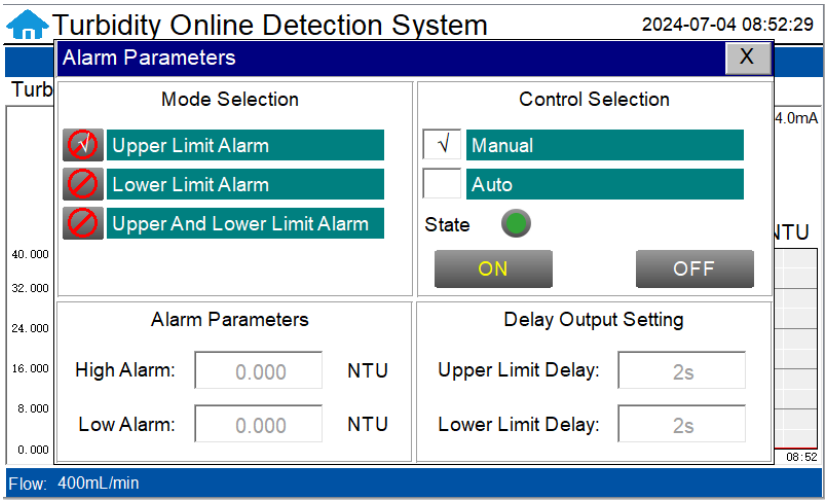


Figure. 17 Alarm Parameter Setting

When "Control Selection" is selected auto, the device will alarm and signal output according to the parameters set below. It should be noted that when you select "upper limit alarm" or "lower limit alarm", only the upper limit or lower limit will alarm. Only by selecting "Upper limit and lower limit alarm", there will be both upper limit and lower limit alarm.

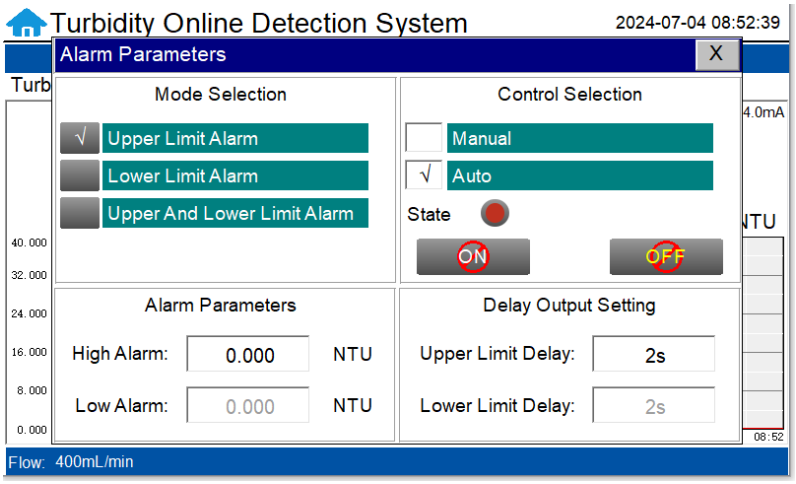


Figure. 18 Upper Limit Alarm

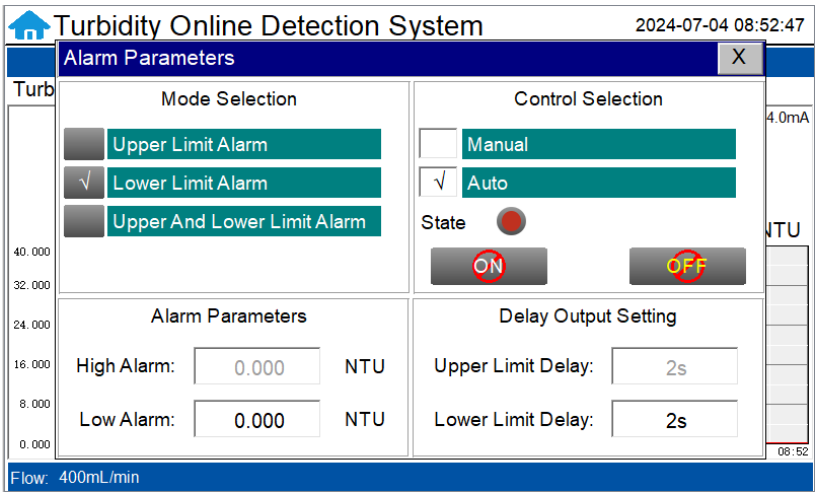


Figure. 19 Lower Limit Alarm

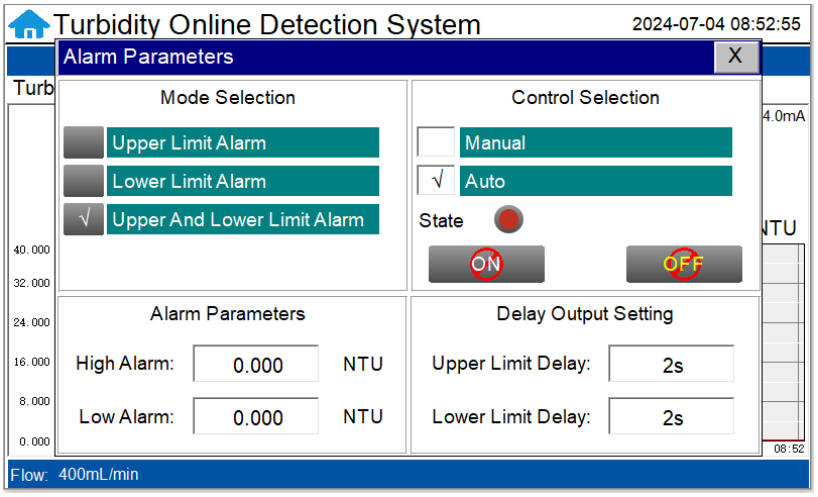


Figure. 20 Upper and Lower Limit Alarm

8.5.2. User Defined Settings

The “User Defined” setting function allows users to assign a customized name, unit of measure

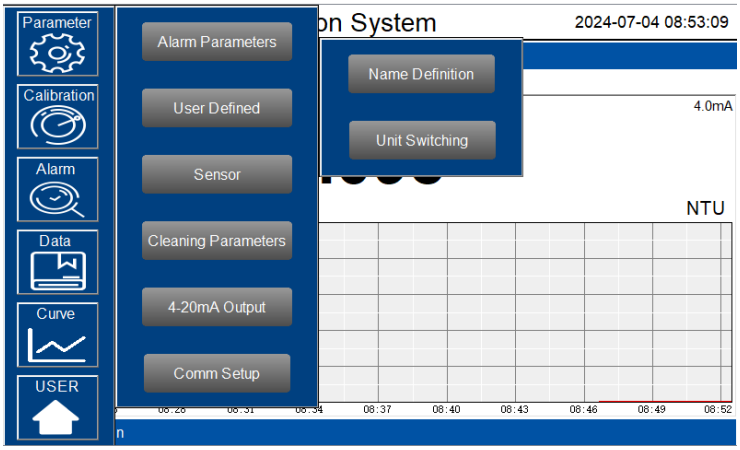


Figure. 21 User Defined

Parameter Name Definition Adjustment

Click the orange dialog box to customize the sensor name. Here users can also change the unit of measure for temperature display.

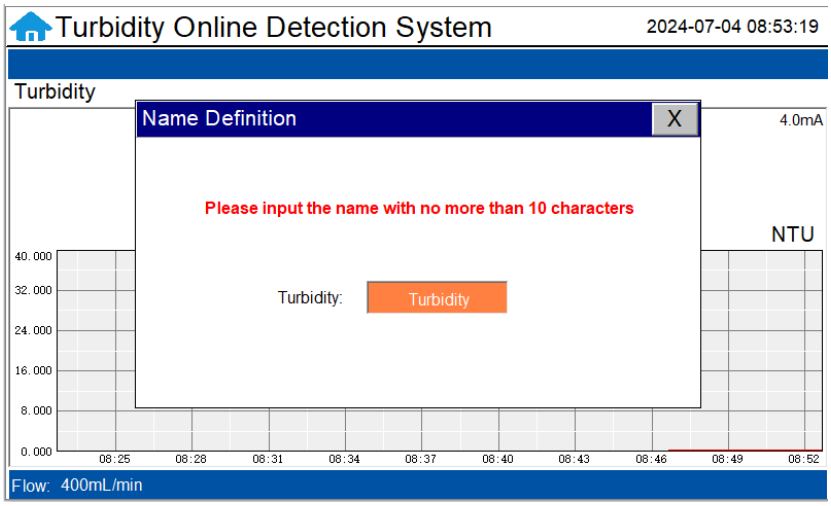


Figure 22 - Name Definition

Flow Sensor Unit of Measure Switching

Users can change the unit of temperature and flow rate in "**Unit Switching**".

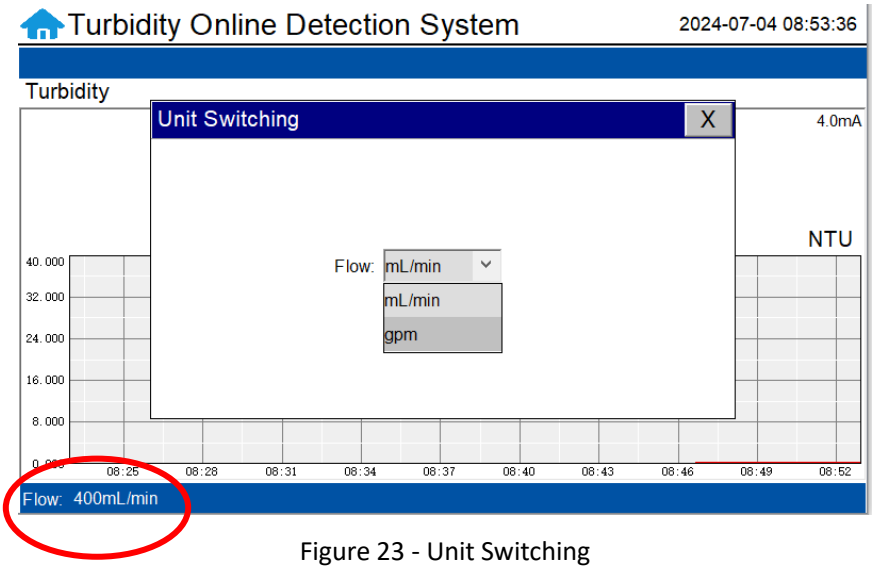


Figure 23 - Unit Switching

8.5.3. Sensor

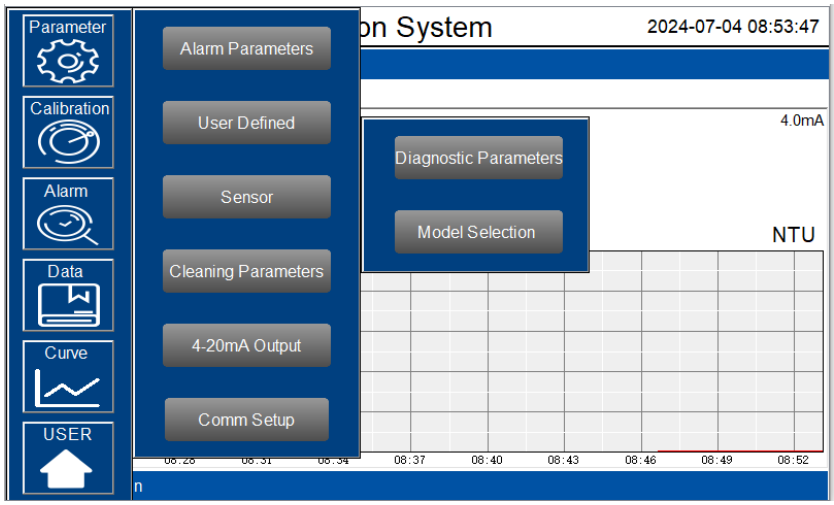


Figure. 24-Sensor

Diagnostic Parameters

Click “Diagnosis Parameters” to enter 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 take 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. These images may be sent to service@pyxis-lab.com for troubleshooting support.

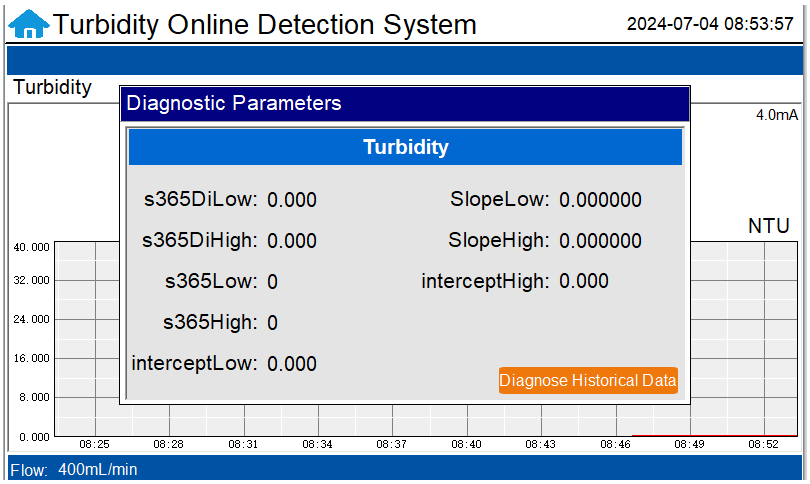


Figure 25 - Diagnostic Parameters

Click on “Diagnostic History Data” in the lower right corner to access to view previous diagnostic parameters. Data can also be exported and made available for support from the Pyxis Lab Service Department.

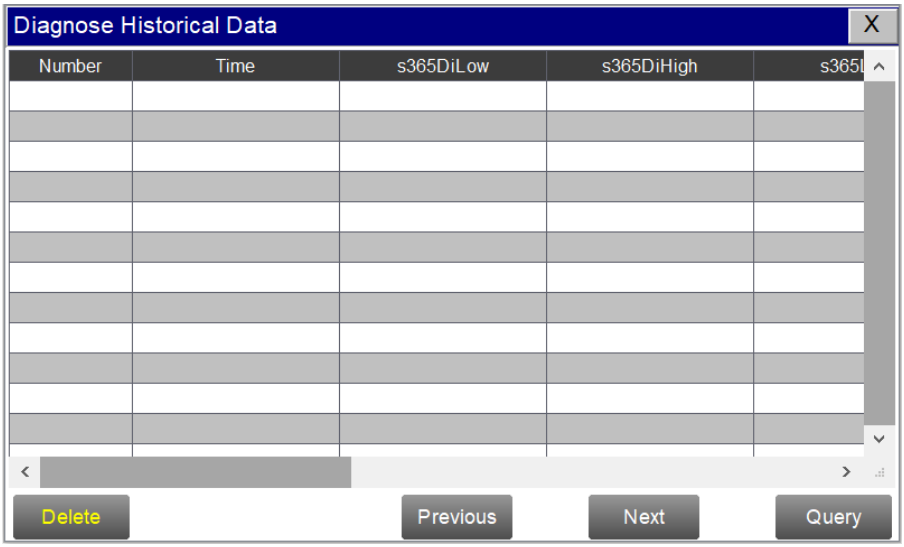


Figure 26 - Diagnostic History Data

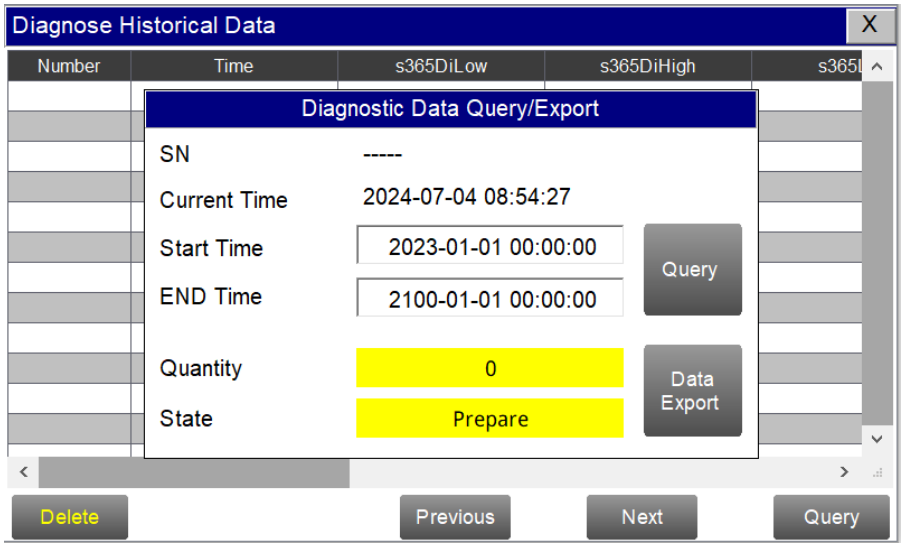


Figure 27 - Diagnostic History Data Query

Model Selection Based on Turbidity Sensor Used

The corresponding sensor model will be selected in the factory, if the sensor is replaced, please select the new sensor model in this interface and follow the prompts to operate step by step.

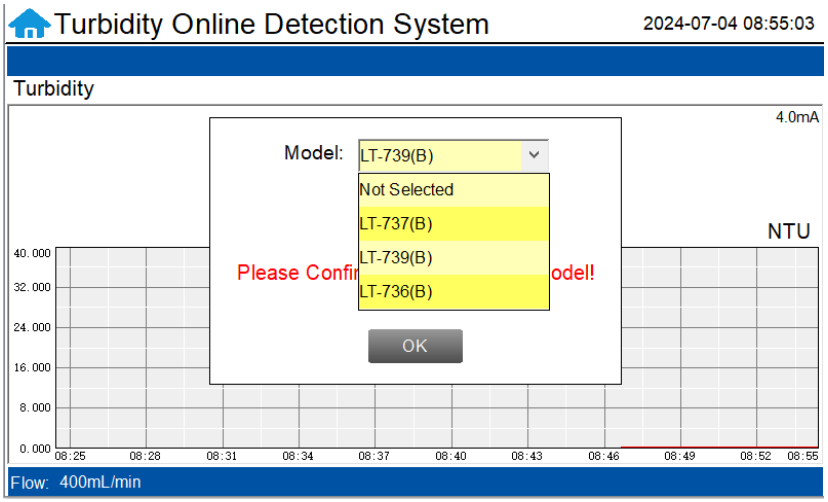


Figure. 28 - Model Selection

8.5.4. Automatic Brush Cleaning Parameter Settings

The IK-73X-PLUS offers an auto-brushing flow reservoir for the LT-739 and LT-736 turbidity sensors. When entering the cleaning control parameter setting interface for the first time, a notice screen will appear to ensure the panel has the auto-brushing assembly in place (FT-100-PLUS). After confirming that the cleaning control module is installed, click Enable to enter the parameter setting interface.

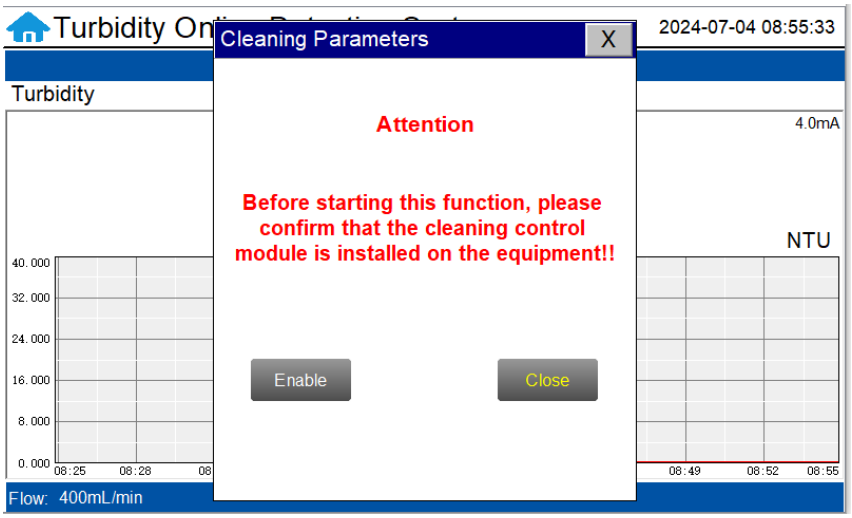


Figure 29 - Cleaning Module Confirmation Interface

On the parameter setting interface, users can program the automatic cleaning cycle frequency (minutes) and brush rotation cycles per cleaning. ***IMPORTANT NOTE*** *- A setting of 1 for Time will result in 30 brush rotations* (Example. If you desire the clean the sensor with 30 brush rotations you would set the Brush Rotations Per Cleaning to 1) Brush operation in either AUTO or MANUAL mode can be set.

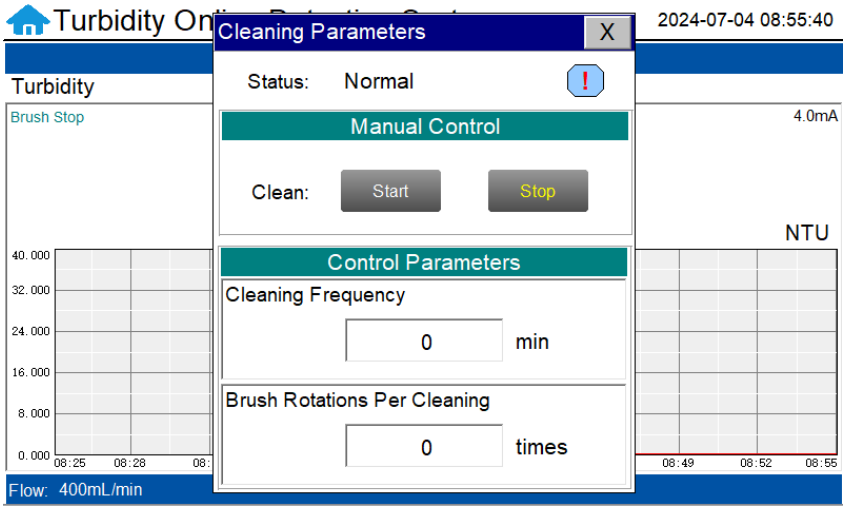


Figure 30 - Cleaning Parameters Setting

8.5.5. 4-20mA Output Parameters Setting

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 or range of application use. Default 4-20mA output values are provided in Figure. ***NOTE*** The closer the value is set to the measurement value the more precise the data. It is recommended to set according to the range of the sensor and application needs.

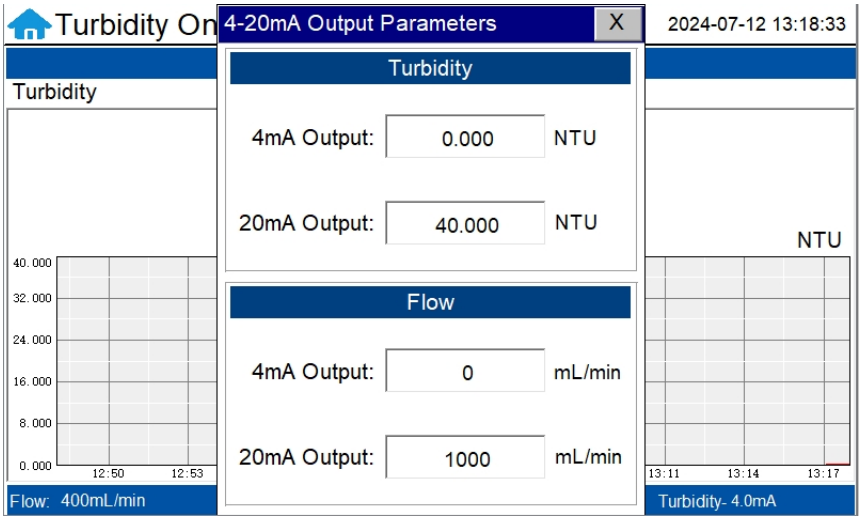


Figure 31 - 4-20mA Output Setting

8.5.6. Communication Setting

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.

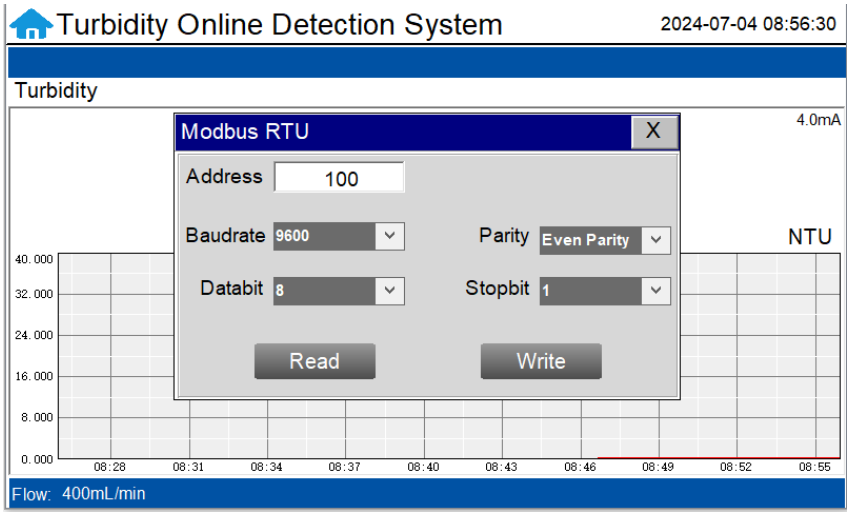


Figure 32 - Modbus RTU

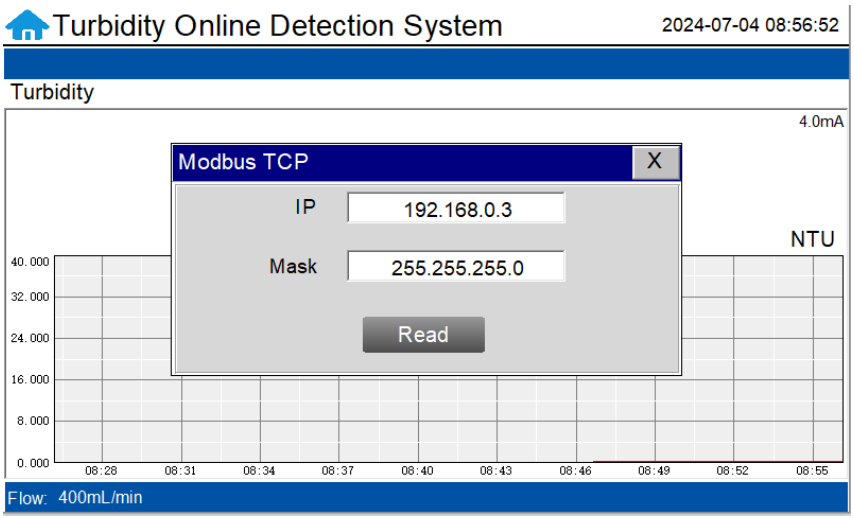


Figure 33 - Modbus TCP

8.6. Calibration

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

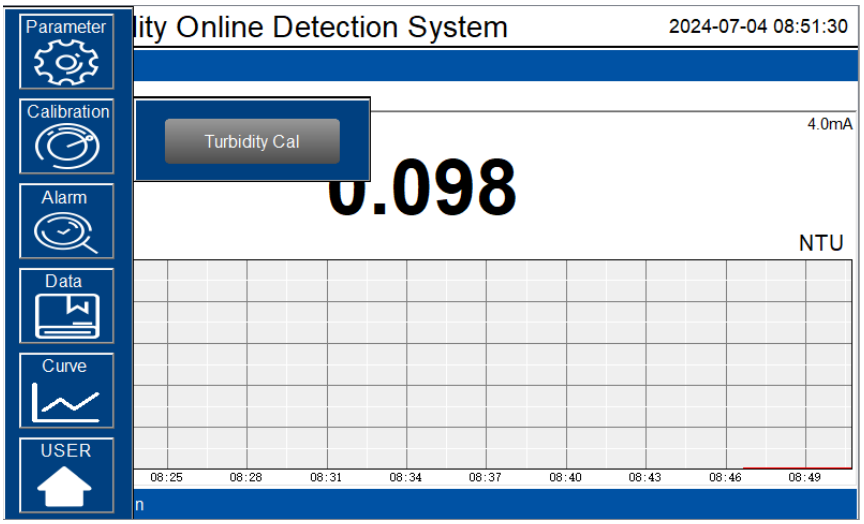


Figure 34 - Sensor Calibration

The LT-739 and LT-736 Ultra Low Turbidity Sensors are rigorously calibrated at the Pyxis Lab factory. If the sensor is kept clean, the user will not need to calibrate the sensor for one year of operation. However, the user may calibrate the sensor as desired. ***NOTE*** Pyxis recommends the sensor be calibrated to the application range of its use only. Example – for ultralow turbidity applications, the user ONLY needs to calibrate the sensor for Low-Range and Mid and High range calibration is not necessary. If the potential measurement range covers the full span of sensor range, all points (low/mid/high) calibration are suggested.

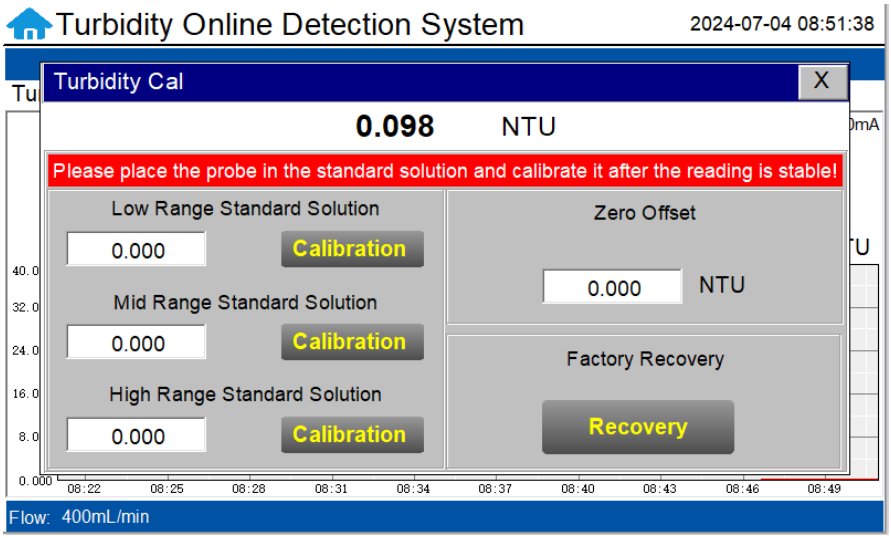


Figure 35 - Turbidity Calibration Screen

Low-Range Calibration Procedure DI Water in the Pyxis L-CAL Portable Turbidity Calibration Kit:

Isolate the panel and drain the piping and inline Tee assemblies. Remove the LT-739 /LT-736 sensor from the FT-100 flow tee. Triple rinse the LT-739 / LT-736 sensor surface, the FT-100 flow tee internals and the L-CAL Portable Turbidity Calibration Kit (P/N 53247) vessel with Deionized water. Insert the cleaned LT-739 / LT-736 turbidity sensor into the L-CAL calibration vessel and positon the L-CAL vessel vertically (with the sensor inserted in a horizontal position to the ground as shown in the step-by-step images). Remove the top cap and fill the L-CAL vessel with 500mL of bubble free deionized water. After the displayed turbidity data is stable, enter "0.05" for the low-range calibration value and click on "Low Range Calibration", a dialog box will pop up to confirm whether to perform this operation. Click "OK", if the calibration is successful, the dialog box will show "Calibration successful". ***NOTE*** Because there is no global standard for zero turbidity in the industry, Pyxis recommends 0.05 NTU as a target for Low-Point Calibration while using Bubble-Free DI Water.

Mid-Range Calibration using the L-CAL Portable Turbidity Calibration Kit:

If a mid-range calibration is not required, the user does not need to perform a mid-range calibration of the LT-739 or LT-736 sensor. If a mid calibration is required, proceed by rinsing the L-CAL vessel with Deionized water and refill with 500mL of known turbidity standard solution between 5NTU and 10NTU for LT-739 mid-range calibration and between and between 5NTU and 50NTU for LT-736 mid-range calibration. After the displayed data is stable, enter the medium turbidity standard solution value and click on "Mid Range Calibration", a dialog box will pop up to confirm whether to perform this operation. Click "OK", if the calibration is successful, the dialog box will show "Calibration successful".

High-Range Calibration using the L-CAL Portable Turbidity Calibration Kit:

If a high-range calibration is not required, the user does not need to perform a high-range calibration of the LT-739 or LT-736 sensor. If a high calibration is required, proceed by rinsing the L-CAL vessel with deionized water and refill with known turbidity standard solution between 20NTU and 40NTU for LT-739 high-range calibration and 500NTU and 1,000NTU for LT-736 high-range calibration. After the displayed data is stable, enter the high turbidity standard solution value and click on "High Range Calibration", a dialog box will pop up to confirm whether to perform this operation. Click "OK", if the calibration is successful, the dialog box will show "Calibration successful".

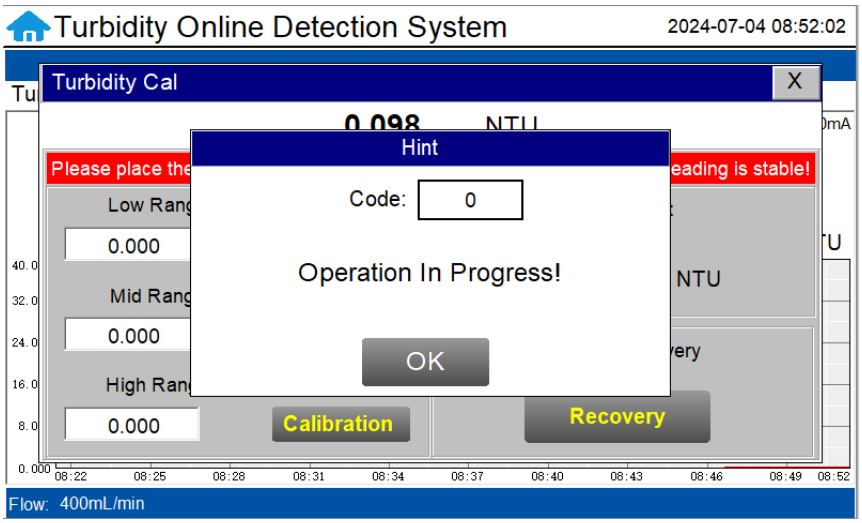


Figure 36 - Awaiting execution Screen of Turbidity Calibration

Troubleshooting Calibration Failed Messages

If you receive a "Calibration Fails" message during the calibration steps above, the following items should be checked:

1) Ensure your source of Deionized water is not contaminated with turbidity
2) Ensure your turbidity calibration standard solutions have not been contaminated
3) Ensure the LT-73X series sensor distillate end is not contaminated with debris or other substances

LT-739 / LT-736 Calibration using L-CAL Portable Turbidity Calibration Kit

Pyxis Lab has developed L-CAL as a portable and reusable liquid-state turbidity calibration kit for rapid calibration of the all LT-73X Series inline ultra-low turbidity sensors. The L-CAL calibration kit allows users to calibrate all LT-73X Series ultra-low turbidity sensors using smaller volumes of Formazin turbidity calibration standards providing an affordable and reusable solution for long term sensor reliability. The unique design of the L-CAL liquid calibration kit allows the LT-73X sensor to be easily inserted and calibrated with the sensor in a horizontal position, allowing air bubbles to be evacuated through the integrated air-vent line ensuring superior accuracy of the sensor calibration. The L-CAL has an easy to remove lid allowing users to fill and empty the calibration kit with DI water for vessel/sensor cleaning and Formazin calibration standards for sensor calibration.

L-CAL Liquid Turbidity Calibration Kit (P/N 53247)

Turbidity Calibration Principals & Considerations

The precision, resolution and the low detection limit of the LT-73X Series sensors are not affected by the calibration method, regardless of using certified Formazin standards and the L-CAL kit. The calibration only affects the turbidity sensor accuracy. The nature of turbidity measurement makes an absolute turbidity value not easily obtainable for any sensor manufacturer although proper standards and methods are followed. For example, turbidity values greater than 1.0 NTU measured on real-world samples with different sensors, even from the single manufacturer, could differ significantly. For ultra-low turbidity (less than 0.3 NTU) measurement using the same methods (ISO-7027 or EPA-180.1), it is likely that the values from different sensors can agree within 0.05 NTU. As such, the user should choose a calibration method and remain with the same calibration method for consistency.

L-CAL Specifications

Item	**L-CAL Portable Liquid Formazin Calibration Kit**	
P/N	53247	
Sensor Name	LT-739 / LT-739B	LT-736 / LT-736B
Calibration	**Recommended Calibration Standard Solution Range**	
Low-Range (0.05NTU Recommended for Calibration)	Bubble Free DI Water or Standard <2.0 NTU	
Mid-Range	5 – 10 NTU	5 – 50 NTU
High-Range	20 – 40 NTU	500 – 1,000 NTU

Pyxis Turbidity Calibration Standard	**Pyxis P/N**
Pyxis 10 NTU Formazine Turbidity Calibration Std (500mL Bottle)	57010-4
Pyxis 30 NTU Formazine Turbidity Calibration Std (500mL Bottle)	57010-8
Pyxis 500 NTU Formazine Turbidity Calibration Std (500mL Bottle)	57010-2
Pyxis 1,000 NTU Formazine Turbidity Calibration Std (500mL Bottle)	57010-3

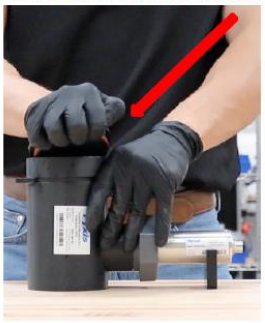
L-CAL Portable Liquid Formazin Calibration Kit Use Method

After removing the LT-73X sensor, gently wipe off the flat distal end with a soft cloth to ensure it is clean. The LT-73X Sensor should then be calibrated using the L-CAL portable liquid calibration kit using the following steps, and wirelessly calibrated via the uPyxis Mobile or Desktop APP. Please refer to LT-73X Series Operation Manual for details.

Insert LT-73X Sensor

Tighten Sensor Nut

Position Vertically and Remove Lid



Preclean by adding DI-Water (200mL)

Insert Lid

Gently Shake Then Empty Contents

Add Calibration Standard (500mL)

Insert Lid and Remove Air Bubble Vent Line Cap

FOLLOW CALIBRATION STEPS

NOTE *Sensor Brace Included with L-CAL Kit for Stability*

WATCH PROCEDURE VIDEO https://www.youtube.com/watch?v=1MuJM5Q5VB4

8.7. Recovering Data

Click the restore button in the calibration interface of each sensor to restore the data of the turbidity sensor. If a user error is made during calibration and other operations, you may restore the factory settings of the sensor through the restore function.

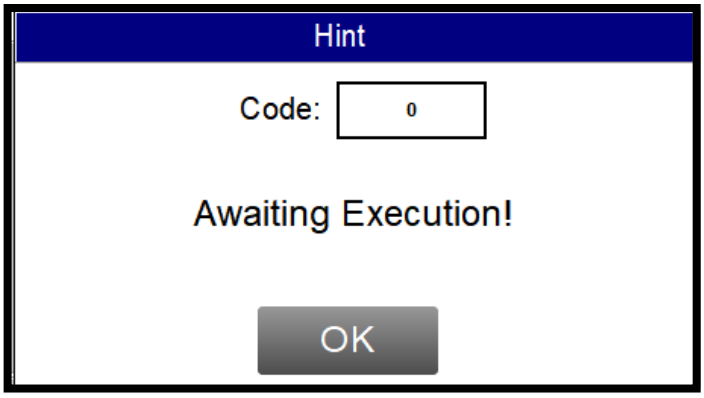


Figure 37 - Data Recovery Screen

8.8. Alarm View

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

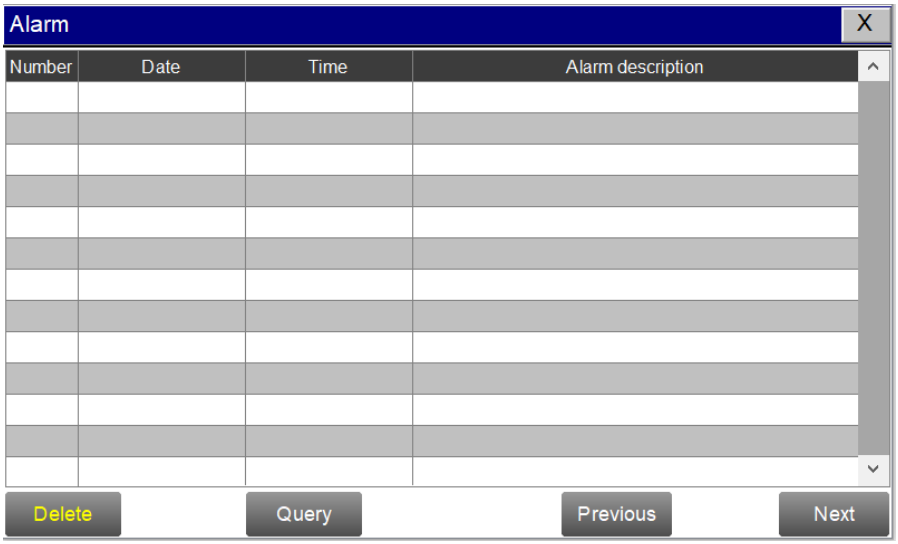


Figure 38 - Alarm View

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.

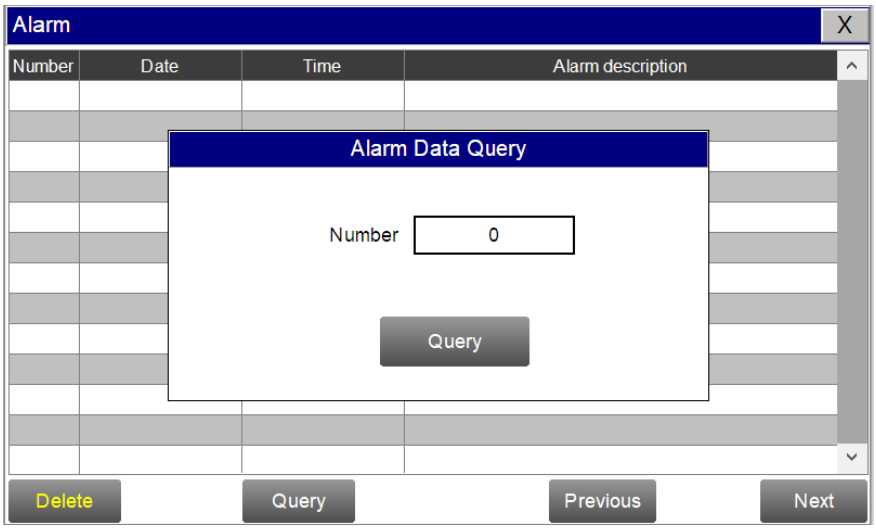


Figure 39 - Alarm Data Query Screen

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.

8.9. Historical Data

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

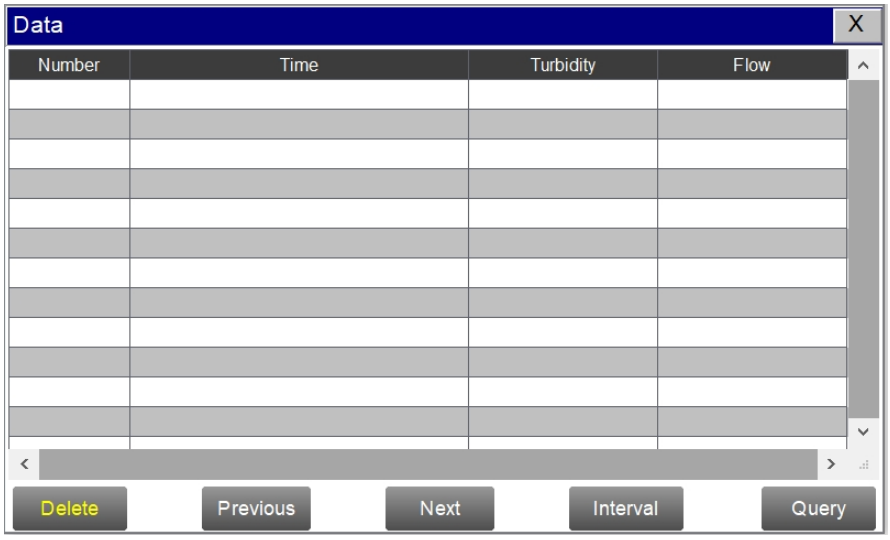


Figure 40 - Historical Data Screen

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.

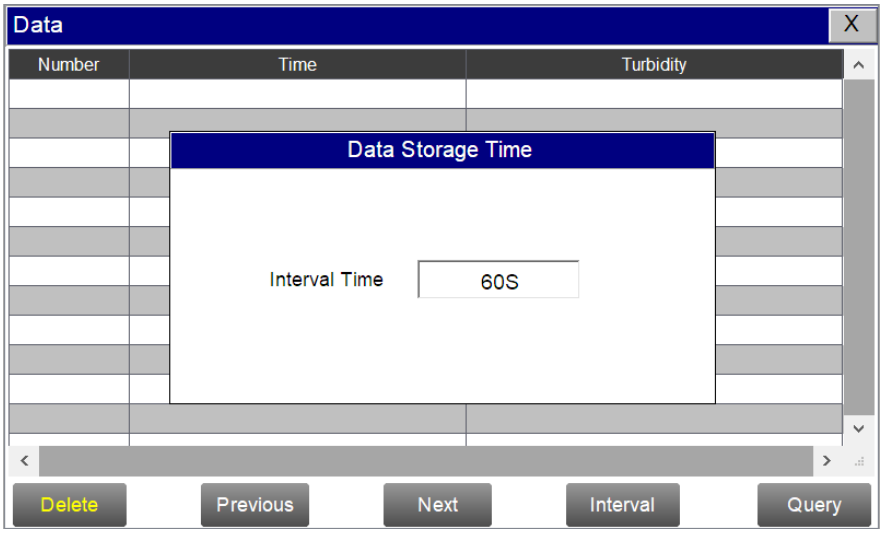


Figure 41 - Data Storage Cycle Time Setting

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.

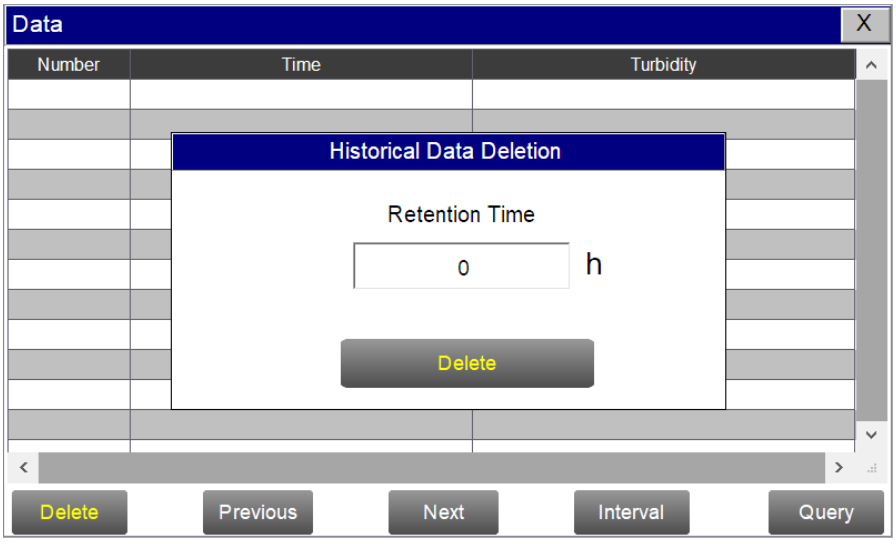


Figure 42 - History Data Deletion Screen

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.

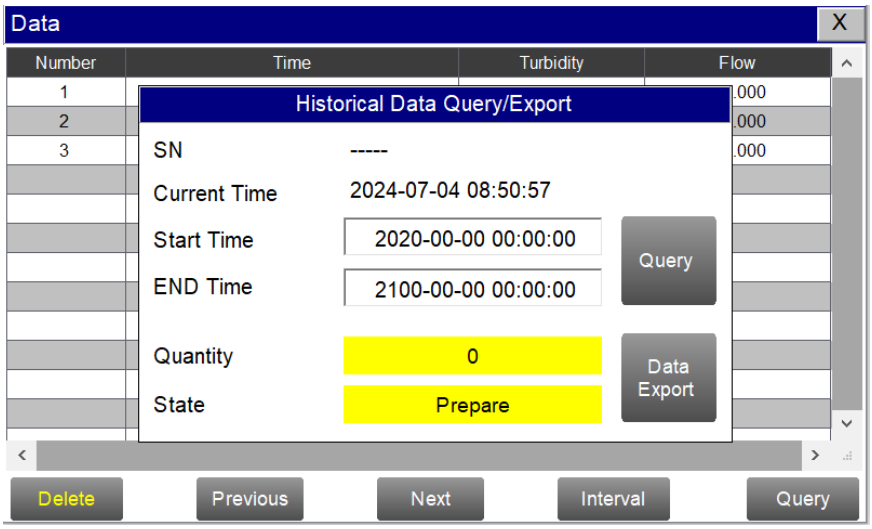


Figure 43 - Historical Data Query and Export Screen

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.

If a USB Download Alarm appears please refer to the following table for description of the problem.

Table. 1-USB Download Alarm Description

Alarm	Description
-1001	Progress or control data object type is incorrect
-1004	Group object name does not exist or the group object does not have the save property
-1020	The start time of the export is greater than the end time
-1021	USB flash drive is not inserted
-1022	Only one export task is allowed at the same time
-1023	The number of records read is 0
-1024	File operation failed
-1025	Export path is empty
-1026	Export path is not legal
-1027	Incorrect time format
-1028	Unsupported export mode

8.10. Historical Data Curves

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.

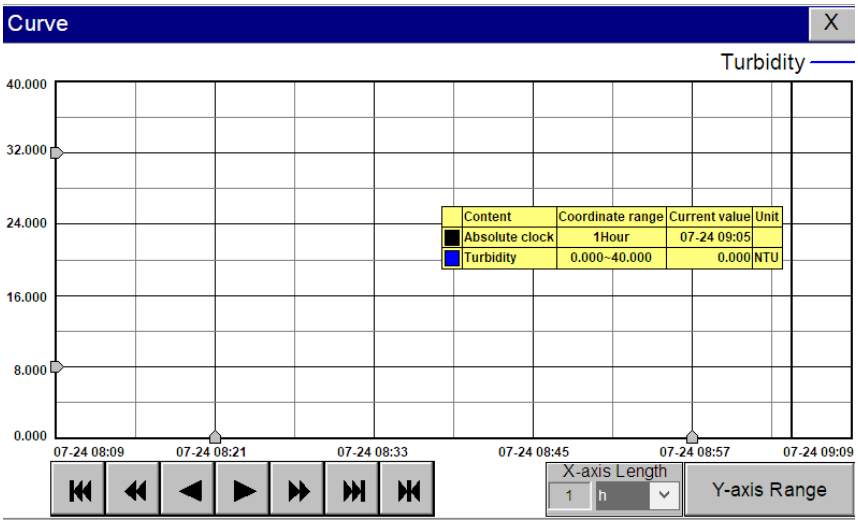


Figure 44 - History Curve Screen

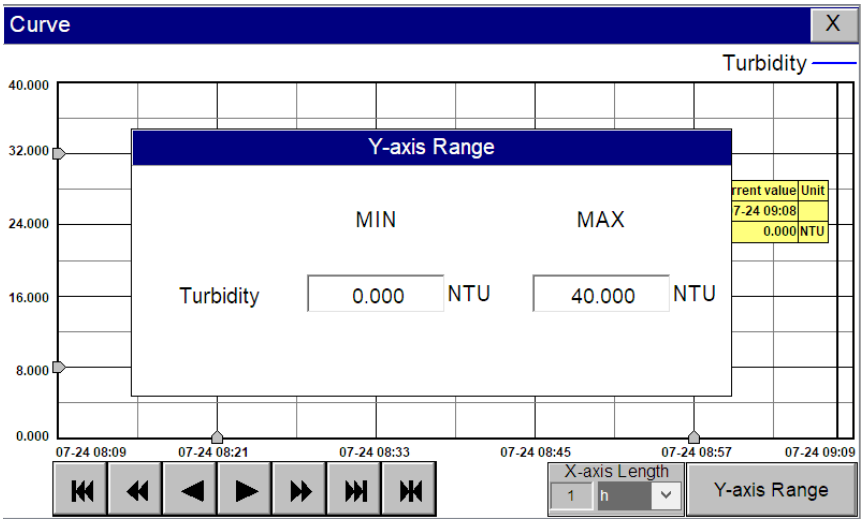


Figure 45 - Y-axis Range Setting

- 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 46 - Button Function Review

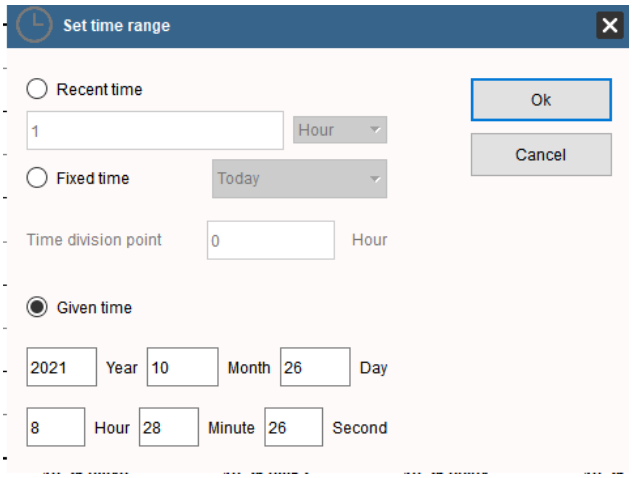


Figure 47 - Time Setting Screen

8.11. User Management

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

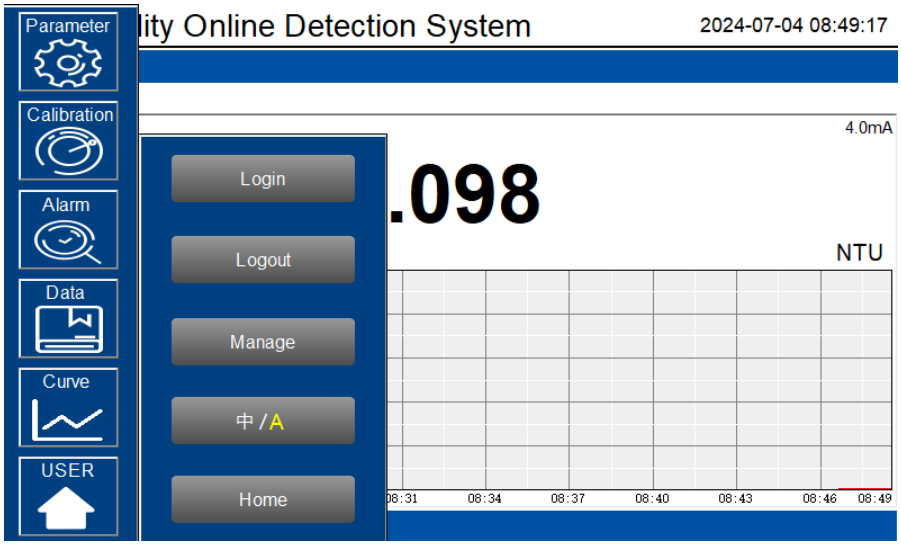


Figure 48 - User Management

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.

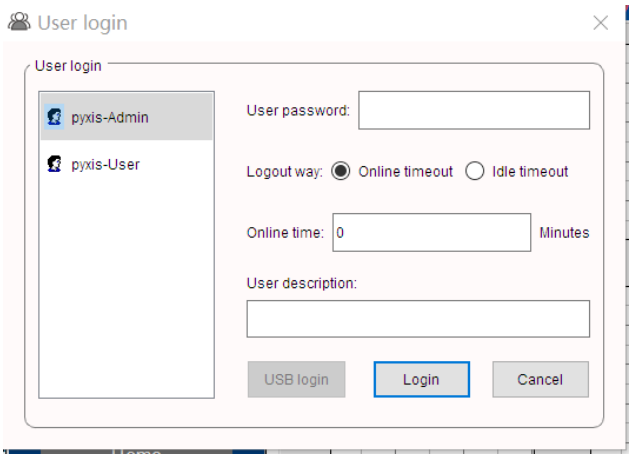


Figure 49 - User Management Screen

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.

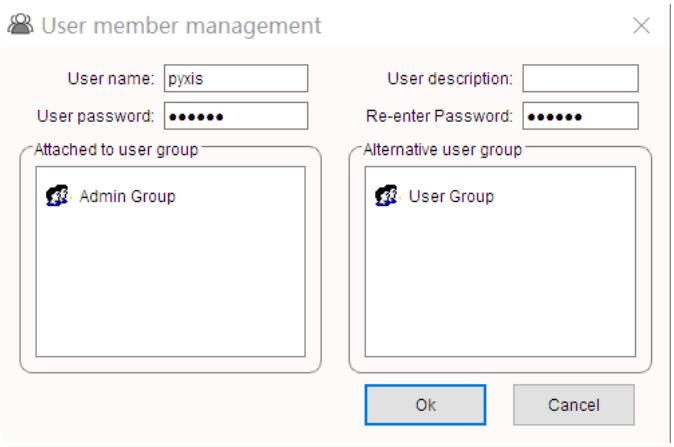


Figure 50 - Modifying the User Screen

9. Modbus Communication & Recommended Maintenance

9.1. Modbus Correspondence Address

Number	Definition	Address	Format	Mode	Unit	Note
1	Turbidity	1	float	Read Only	NTU	Data Format: ABCD
2	Sample Flow	3	float	Read Only	mL/min	
3	Abnormal communication of turbidity sensor	5	uint	Read Only		0: Normal 1: Alarm
4	Abnormal communication of flow module	6	uint	Read Only		0: Normal 1: Alarm
5	Turbidity upper limit alarm	7	uint	Read Only		0: Normal 1: Alarm
6	Turbidity lower limit alarm	8	uint	Read Only		0: Normal 1: Alarm
7	Abnormal communication of 4-20mA output module	9	uint	Read Only		0: Normal 1: Alarm
8	Abnormal communication of cleaning module	10	uint	Read Only		0: Normal 1: Alarm
9	Abnormal brush	11	uint	Read Only		0: Normal 1: Alarm
10	Abnormal communication of Relay module	12	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 (configurable)；Port: 502						
Station Number：1						

Table 2 - Modbus Correspondence Address

9.2. Suggested Maintenance

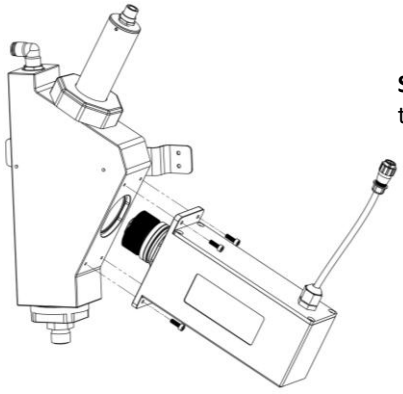
After the analyzer is installed by a qualified technician, it can begin to monitor water quality. The IK-73X-PLUS series inline detection system is designed to be simple to operate, but still requires some regular maintenance. Actual system maintenance may vary depending on the installation conditions 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 IK-73X-PLUS Series Sensor	Monthly or Cleaned As Needed
Cleaning of FT-100-PLUS Flow Reservoir	Monthly or Cleaned As Needed
Replacement of FT-100-PLUS Brush Head	Annually or As Needed
Turbidity Calibration *(Low Point Only For Pure Water)*	Every 6 Months or As Desired

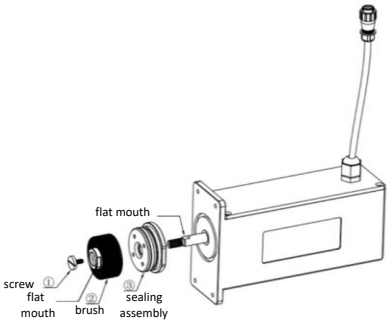
Table 4 - Maintenance Intervals

10. **Replacing the FT-100-PLUS Brush & Seal Assembly**

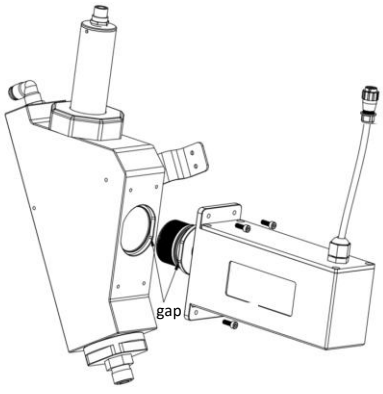
The IK-739-PLUS and IK-736-PLUS panels come equipped with FT-100-PLUS automatic brush assembly for inline sensor cleaning and air bubble removal. Replacement of the FTP-100-1 brush and seal assembly (Pyxis P/N 28698) should be conducted annually or as needed by following the process steps below. Contact Pyxis Lab for pricing details.



STEP 1: Remove the 4 screws(M4), separate the flow-reservoir from the motor box.



STEP 2: Remove the shaft tip screw then rotate the brush head and remove the sealing assembly. Then replace with a new sealing assembly and brush head kit then reinstall and tighten the shaft screw.



STEP 3: Reinstall the motor-box parts shown and tighten the screws snuggly.

Figure. 51-Replacing FT-100-PLUS Brush & Seal Assembly

11. Contact Us

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