

APFCL

Chlorine Analyzer Panel



READ THE ENTIRE OPERATING MANUAL PRIOR TO INSTALLATION AND USE.



+1 (714) 893 - 8529



sales@blue-white.com



customerservice@blue-white.com



5300 Business Drive
Huntington Beach, CA 92649

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 injury to the operator or damage to the equipment.

Symbol	Description
	Warning (Risk of electric shock)
	Caution (Refer to the user's guide)
	Ground, Protective Conductor Terminal

Note: When in doubt regarding your electrical installation, contact a licensed electrician.

Table of Contents

1.0 Introduction	5
1.1 What's in the box	5
1.2 Features	6
<hr/>	
2.0 Engineering Specifications	7
2.1 Engineering Specifications	7
2.2 Materials of Construction	8
<hr/>	
3.0 Layout	8
<hr/>	
4.0 Dimensions	9
<hr/>	
5.0 Installation	11
<hr/>	
6.0 Start-up and Operation	13
6.1 Main Screen	13
6.2 Probe Settings	14
6.3 pH Calibration	15
6.4 Chlorine Calibration	19
6.5 Historical Data and Trending	21
6.6 4-20ma Output Setting and Calibration	23
6.7 Restore Factory Parameters and Diagnose Probe	25
6.8 USB Settings (Data Export and Firmware Update)	26
6.9 View Log	28
6.10 Relay Configuration	28
6.11 Alarm Setup	29
6.12 Time and Date Setting	29
6.13 Modbus RTU Slave Station Communication Parameters	30
6.14 Signal Hold Feature	31
<hr/>	
7.0 Maintenance	32
<hr/>	
8.0 Warranty	34
<hr/>	
9.0 Product Information and Replacement Parts	35

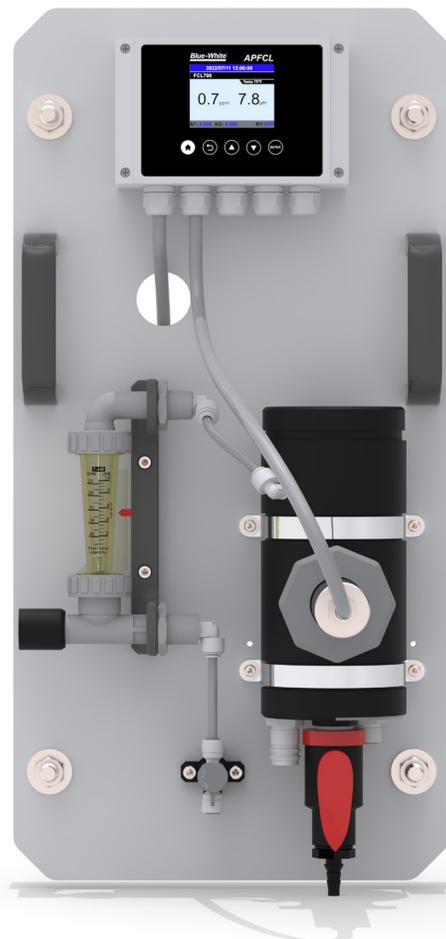
1.0 Introduction

Congratulations on purchasing the APFCL Chlorine Analyzer.

Your APFCL Analyzer is pre-configured and calibrated for use.

1.1 What's in the box

- One APFCL Chlorine / pH / Temperature Panel Assembled and Complete with
 - 110VAC Power Supply Cord
 - TS05 Color display with Sensor pre-wired in RS-485 (RTU).
 - WR05 Dual Sensor Flow Reservoir
 - Chlorine Sensor
 - Inlet Flow meter
 - Isolation Valve
 - Inlet Tubing
 - Outlet Tubing
 - Rear FRP channel strut (2) and hardware
 - Concrete Anchors (4)
 - Electrical Schematics



1.2 System Features

- Turn-Key Monitoring Solution for Clean Water Applications
- Highly Accurate, Real-Time Measurement, Display, and Data-Logging
- Chlorine (Free or Total), pH, and Temperature
- Simple Interactive Display and Data-Logging Terminal
- FCL700 three-parameter composite sensor for residual chlorine, pH and temperature in compliance with USEPA 334.0 guidelines. Advanced sensor PCB offers built-in temperature and pH parameter compensation (up to pH 9.0) algorithms.
- Unique Bare-Gold electrode technology for residual chlorine measurement eliminates membranes and electrode solution replenishment commonly associated with conventional sensors.
- Flow reservoir provides sample calming for dissipation of air-bubbles and settling of suspended solids, foam or other impurities commonly observed in drinking water influent. Allows greater accuracy, and greatly extends the maintenance cycle of the sensor while providing a large buffer capacity to mitigate pressure fluctuations.

2.0 Engineering Specifications

Item	APFCL
Sensor Body Material	304SS
Sensor Name	FCL700
Chlorine Range	0.00-5.00 ppm, 0.00-10.0 ppm (Free or Total)
Precision	+/- 0.01mg/L or 1% of the value w/pH compensation to 9.0
pH Range	0-14
pH Precision	+/- 0.01 pH
Sample Operating Temperature	40 – 104 °F (4 °C – 40 °C)
Sample Inlet Pressure	2 – 30 psi (0.05 – 0.2MPa) (or as needed to provide required flow rate)
Sensor Maximum Pressure	100 psi (6.9 Bar)
Sensor Response Time	T95≤60s – Free Chlorine / T95≤5s - pH
Measurement Interval	Continuous
Installation	WR05 Self-Regulating Flow Reservoir w/Rotameter & Isolation Valve - Included
WR05 Minimum Flow Rate	3.1 g/h (200 mL/minute)
WR05 Maximum Flow Rate	6.2 g/h (400 mL/minute)
WR05 Sample Inlet	1/4 - inch OD
WR05 Sample Outlet	3/4 - inch ID - To Drain
WR05 Sewage Overflow Outlet	3/8 - inch OD - To Drain
Panel Power Supply	110/220VAC 50/60 Hz, 0.6A
Panel Storage Temperature	-4 – 158 °F (-20 – 70 °C)
Panel Operating Temperature	32 – 122 °F (-0 – 50 °C)
TS05 Display	2.8" Color 320 x 240 Resolution
Input	2 x 4-20 mA (pH and Cl) / RS-485 Modbus-RTU (from sensor)
Output	3 x 4-20 mA (2 for passthrough Cl and pH (non-configurable), and 1 configurable for pH, Temp, or Cl) RS-485 Modbus-RTU 1 x Contact Relay
Data Storage	32 M Flash
USB	1 x USB host for data downloading
Relative Humidity	5% - 95% (No Condensation)
Altitude	<6,561 feet (<2,000 Meter)
Dimension (H x W x D)	Panel 24.0" x 12.0" x 15.67" (610H x 305W x 398D mm)
Approximate Weight	~ 11 lbs (5 kg)
Wet Material	UPVC / Polycarbonate
Rating	IP-65 Panel-Display / IP-67 Sensors
Compliance	EPA 334.0 / ISO 7393
Regulation	CE Marked / RoHS
Typical Electrode Service Life	2 years
Electrode Warranty	6 Months
Sensor Body Warranty	13 Months
Shipping Dimensions	29" x 17" x 13" (737H x 432W x 330D mm)

2.1 Materials of Construction

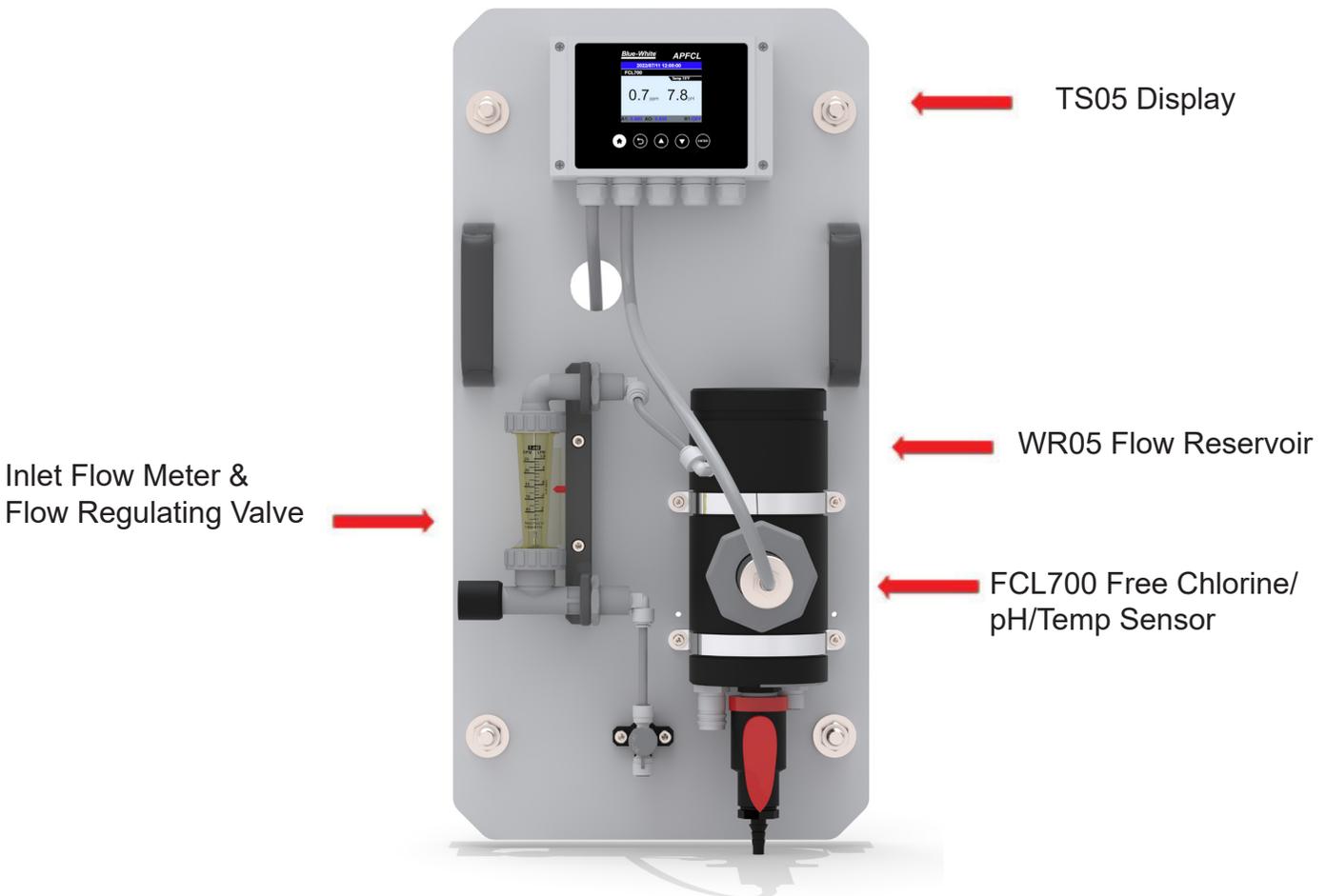
- Mounting Panel - Marine Grade HDPE, Polyethylene
- Mounting Strut Channel - FRP
- Mounting Hardware - Stainless Steel / Galvanized
- Inlet Tubing - PVDF
- Outlet Tubing - 3/4" PVC
- Flow Meter - Polysulfone
- Tubing adapters and valves, Polypropylene

3.0 Layout

The APFCL chlorine analyzer is specifically designed as a 'Turn-Key' monitoring solution for clean water applications including drinking water networks and secondary water supply.

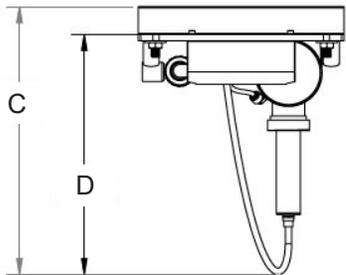
The APFCL offers highly accurate, real-time measurement, display and data-logging of Chlorine (Free or Total), pH and Temperature utilizing proprietary smart sensor technology, coupled with a simple display and data logging terminal.

The APFCL Analyzer Panel is offered in a convenient and easy to integrate panel mounted format for rapid installation and simple maintenance.

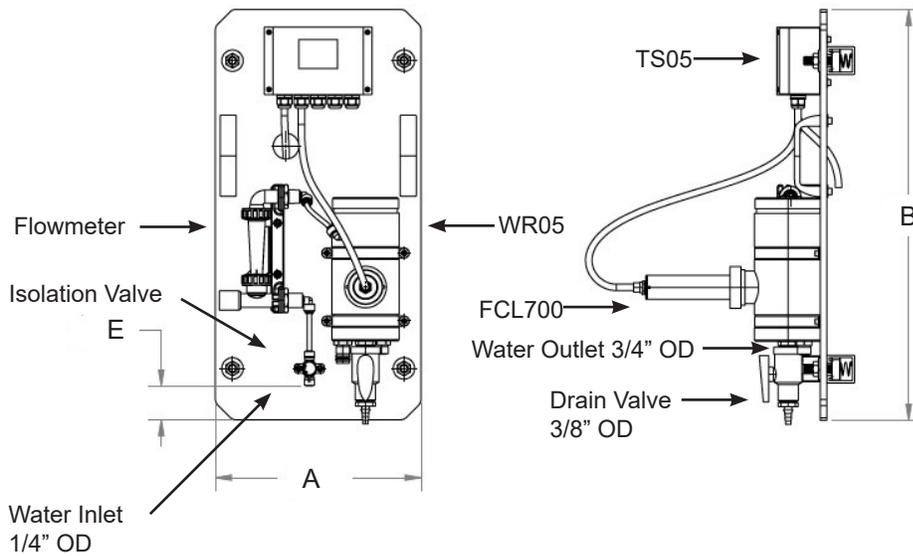


4.0 Dimensions

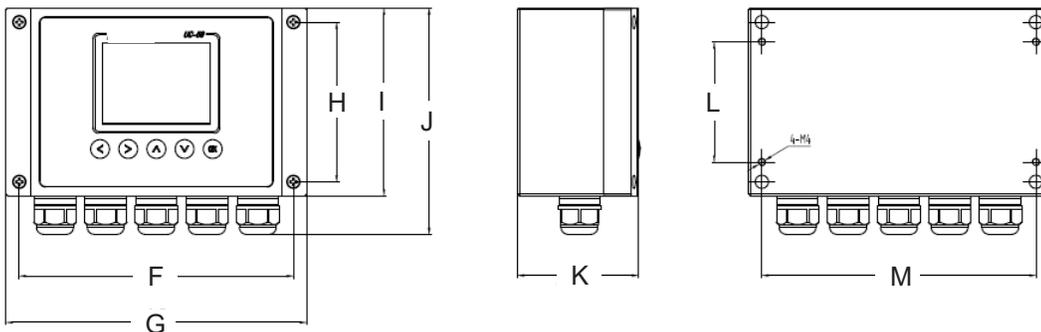
APFCL Series Panel Dimensions



Dim	Inch	cm
A	12.00"	30.5
B	24.00"	61.0
C	15.67"	39.8
D	14.05"	35.7
E	1.98"	5.0

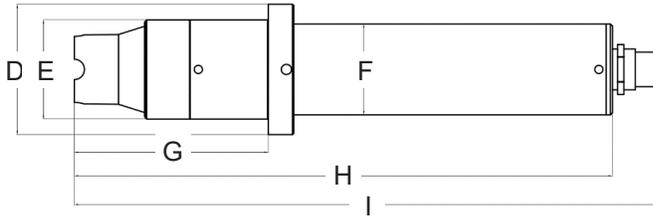


APFCL Series Controller Dimensions

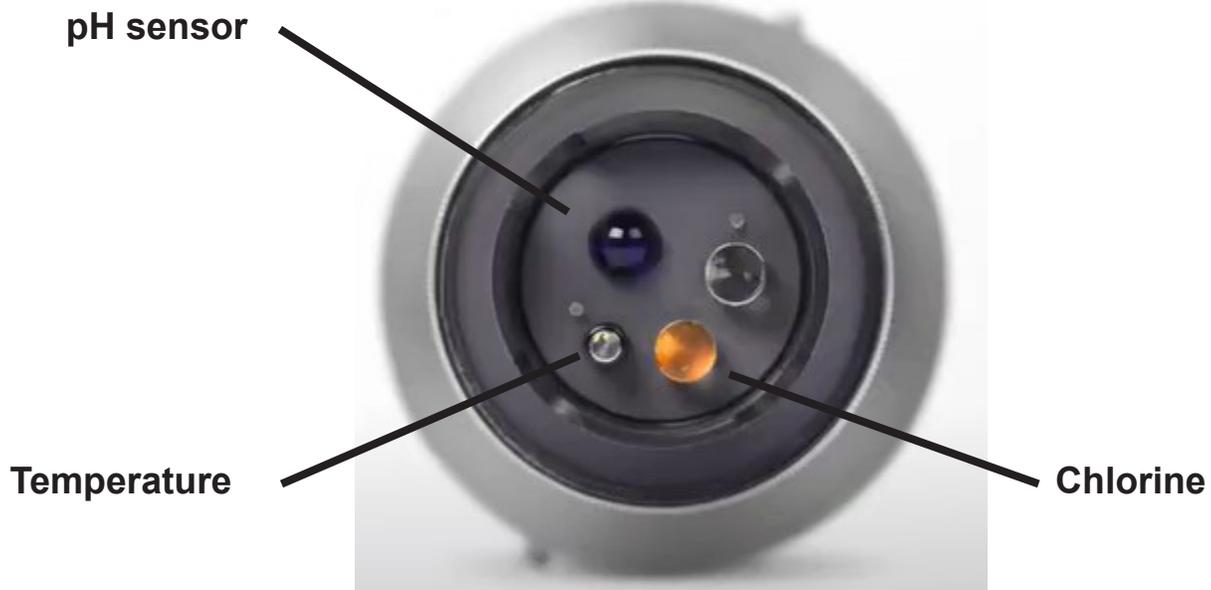


Dim	Inch	cm
F	5.75"	14.6
G	6.3"	16.0
H	3.35"	8.5
I	3.94"	10.0
J	4.92"	12.5
K	2.54"	6.5
L	2.52"	6.4
M	5.75"	14.6

APFCL Sensor Dimensions (FCL700 Chlorine + pH)



Dim	Inch	cm	Dim	Inch	cm
D	2.0"	5.1	G	3.0"	7.6
E	1.53"	3.88	H	8.3"	21.08
F	1.4"	3.56	I	9.0"	22.88



5.0 Installation

5.1 Installation Requirements

Power Supply: 100~240VAC 50/60Hz

Water Supply: Inlet water pressure should be from 7.25 – 30 psi (0.05-0.2MPa) with an inlet feedwater line diameter of ¼-inch O.D. Tubing. The APFCL is provided with an inlet Rotameter and flow regulating valve for sample water inlet flow control and limited pressure regulation. The range of inlet flow for the WR05 should be consistently maintained between 200 and 400 mL per minute.

Drainage: The WR05 outlet tube (¾” Tubing) located on the bottom of the WR05, as well as the weir overflow (⅜-inch O.D. Tubing) located on the top of the WR05, should both be connected to a discharge drain via gravity flow.

Wall Mount Space: The APFCL analyzer panel size is 24” H x 12” W x 16” D in. Please accommodate sufficient space for mounting. The panel is equipped with pre-installed rear unistrut for simple wall mounting.

Wall Mount Weight: Approximately 11 lbs (kg). Please use appropriate mounting hardware.

5.2. Tube connections

Inlet Water: Connect the ¼-inch inlet water tubing to the quick adapter provided. Consistent flow of 200-400mL is required.

Weir Overflow: Connect the ⅜-inch weir overflow tubing to the quick adapter provided. This line must be diverted to drain.

Outlet Line: Connect the ¾” tubing to the outlet drain. This is the sample water outlet flow. This line must be diverted to drain.



DANGER!



Always wear protective clothing, face shield, safety glasses and gloves when working on your Analyzer. Use caution when lifting and mounting equipment. When in doubt, contact factory for assistance.

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.

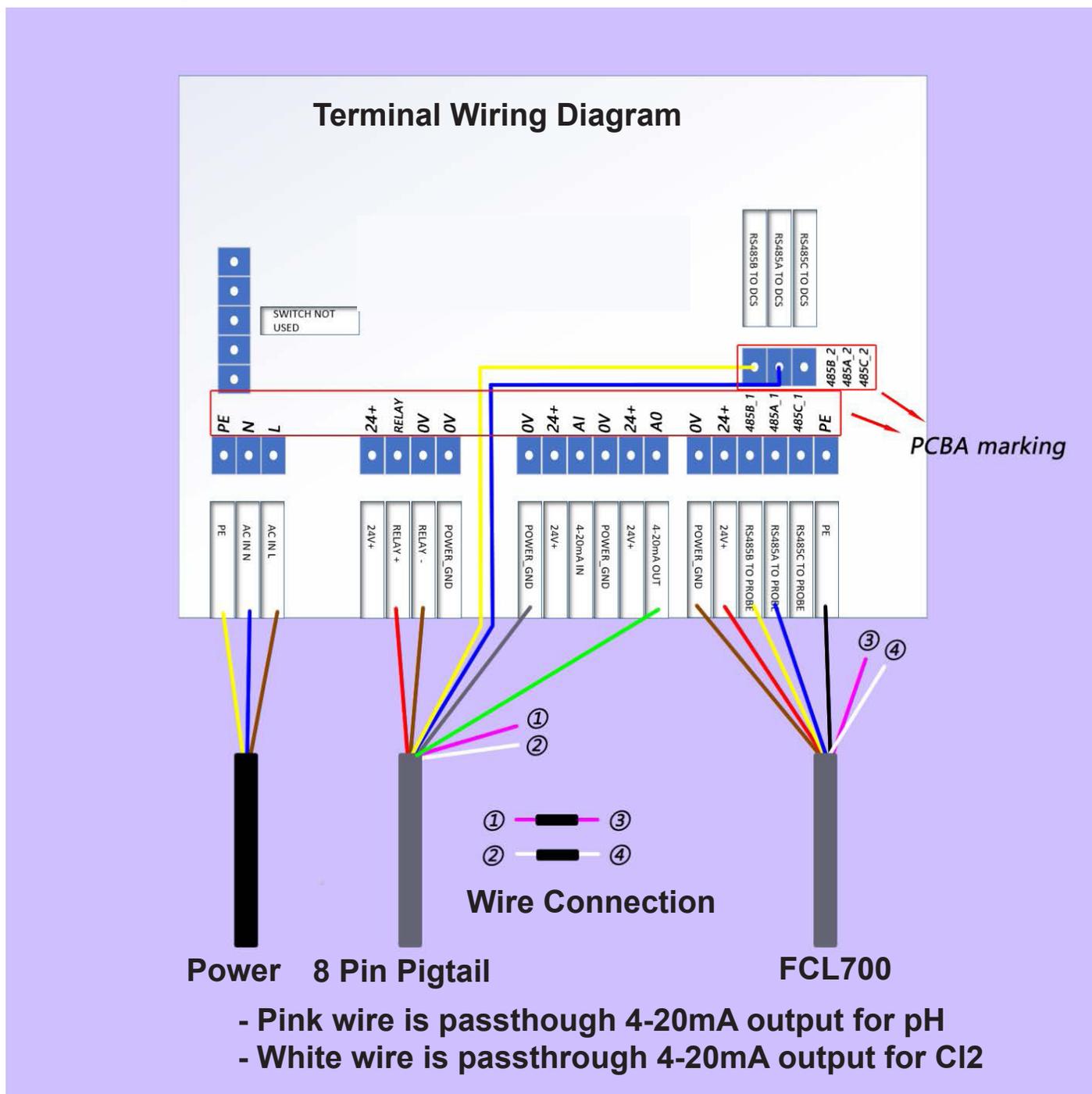
Note: When in doubt regarding your electrical installation, contact a licensed electrician.

5.3 Wiring

The APFCL 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.

Please refer to the wiring terminal diagram below. **NOTE** – the terminal board provides two prewired 8-pin pigtail cables with adapters. The input cable offers a male adapter for direct connection to the FCL700 sensor. This cable is to be terminated to the sensor only.

The output pigtail offers a female adapter. This 8-pin output enables **2x 4-20mA signal passthrough** and **1x RS-485 passthrough** of the sensor, as well as **1x 4-20mA USER-DEFINED output** from the TS05 and **1x 24-VDC (10Watt) Relay output** to pass onto another device. Output wiring details can be found in the next page of this manual



Output Wiring Detail

As mentioned in the previous section, the internal terminal board is prewired with two 8-pin cable pigtail cables. The input cable (male adapter) is to be terminated to the FCL700 sensor. The output cable (female adapter) is to be terminated to the loose flying lead cable provided with the panel and allows 2x 4-20mA output signals (pH and Chlorine) and 1x RS-485 signal of the sensor to be PASSED- THROUGH to another receiving device in addition to 1x 4-20mA USER DEFINED output from the TS05 (referred to as AOut in TS05 dropdown list). Additionally, the prewired 8-pin output cable offers a 24VDC (10Watt) relay for operation of alarm, light, buzzer or other device based on the user relay settings chosen.

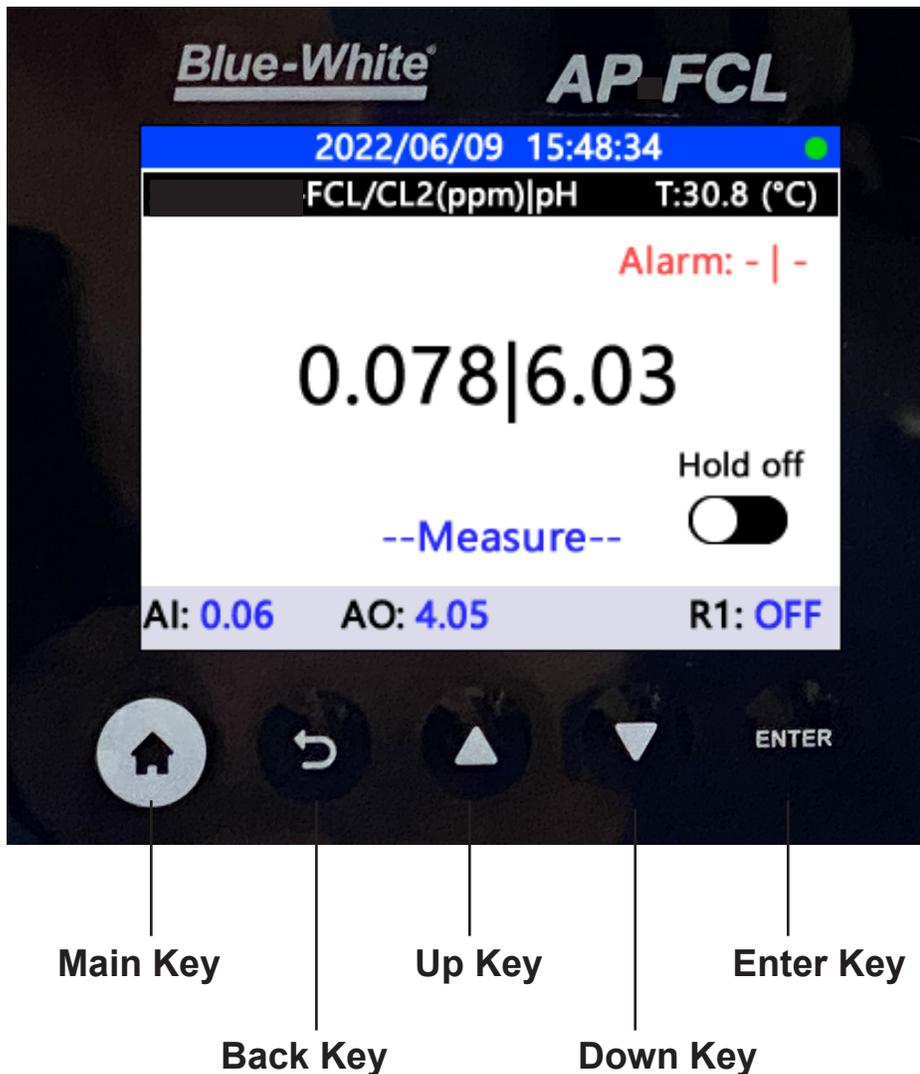
The flying lead section of the loose shipped output cable may then be landed to the input terminal of "ANOTHER DEVICE". This passthrough of the 2x 4-20mA signals and 1x RS-485 signal directly from the sensor (pH + Cl), as well as the 1x user defined TS05 4-20mA output and 1x 24VDC Relay for use as desired. Please refer to the wiring table below for proper wiring of 8-pin output cable provided with each TS05.

Output Wire Color	Designation
Red	Relay +
Brown	Relay -
Blue	485A
Yellow	485B
Pink	4-20ma+ for pH
Gray	4-20ma -
White	4-20ma+ for Cl2
Green	4-20ma+ from TC05 (user defined)

FCL700 Sensor Signal Pass-Through from TC05		
Unit of measure	4mA Value	20mA Value
pH	0.00 pH	14.00 pH
Cl	0.00 ppm	5.00 ppm
Analog Output	User Defined	User Defined

6.0 Start-Up and Operation

6.1 Main Screen



Main key - Return to the main screen from any interface.

Back key - Return to the last displayed screen.

Up key - Select different settings or adjust parameters / toggle between digital readout and graphic readout on main screen.

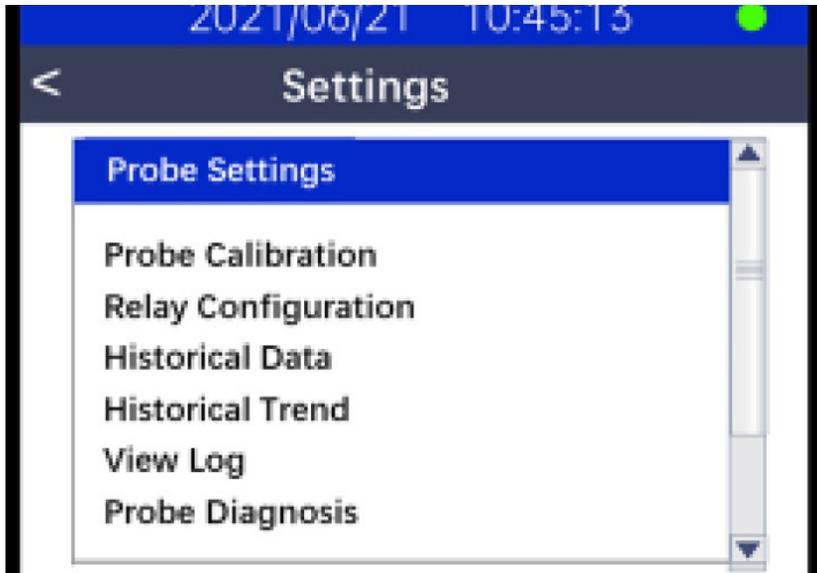
Down Key - Select different settings or adjust parameters.

Enter key - Confirm to enter a setting page or confirm parameters.

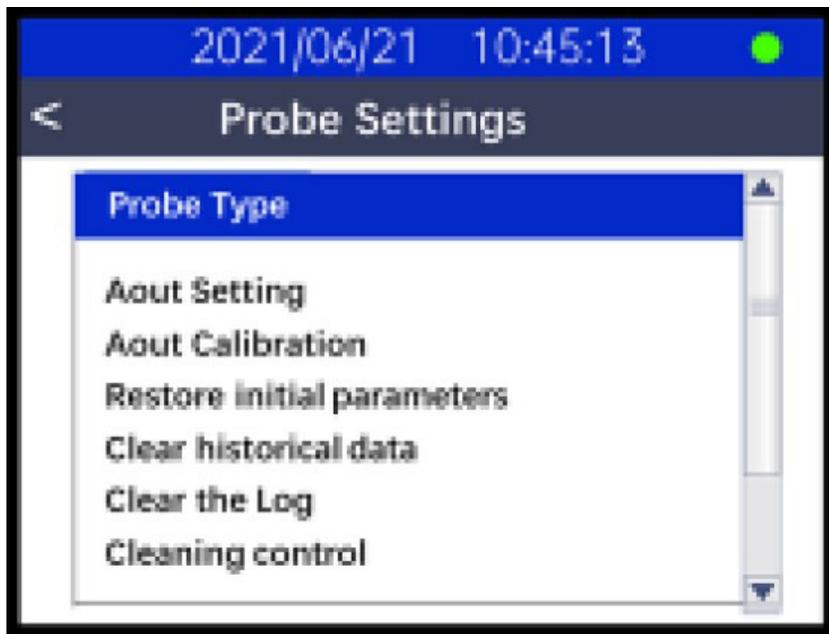
The TS05 display is connected via PS-485 Modbus (RTU) to the FCL700 probe at the factory for testing. (The FCL700 may be shipped/packaged separately in the box to eliminate damage during shipping.) After the TS05 is turned on, the main interface will display the chlorine residual, pH value, and temperature of the tested solution. The green dot indicates that the communication between the TS05 and the probe is normal. If used, the 4-20ma input signal, 4-20ma output signal and relay output status are displayed at the bottom of the main screen.

6.2 Probe Settings

Click the back key on the main interface to get to the Settings interface. All probe related settings and panel settings can be selected on this page. If you need to connect a new probe, please select Probe Settings and then click the Enter key button to enter the probe setting page.



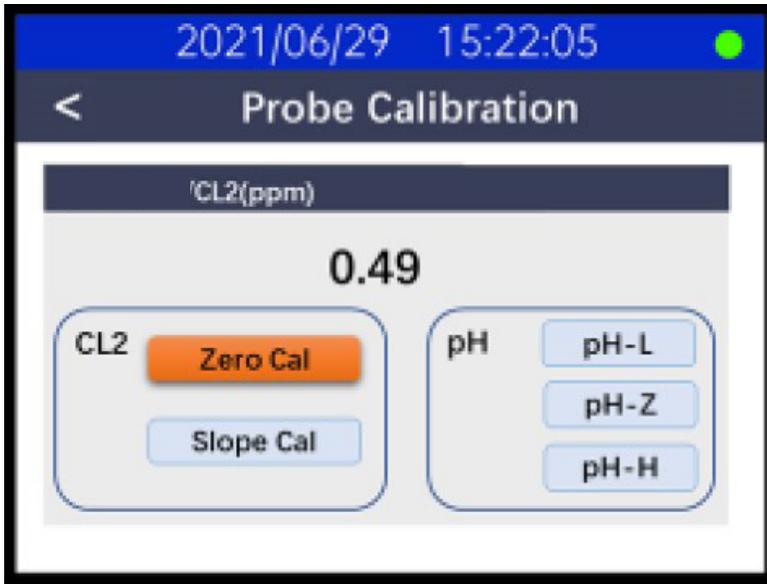
Select the probe setting to enter the desired Probe Type setting interface. The TS05 supports manual selection of the probe type or automatic identification of the probe type. Use the Up/Down arrows to select the probe type. Select FCL700.



6.3 pH Calibration

After selecting the probe, the probe can be calibrated for CL2 and pH.

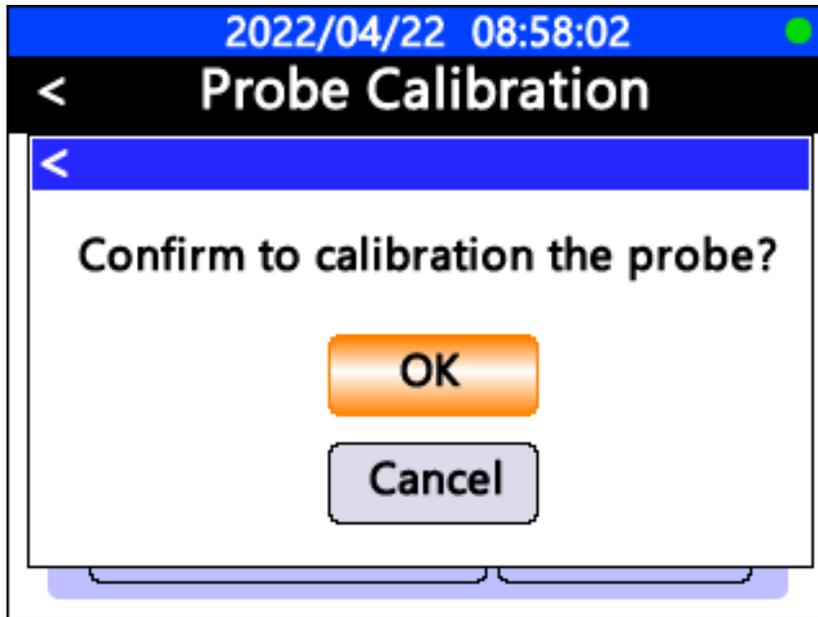
To calibrate pH, chose one of the pH calibration methods. pH-L, pH-Z, or pH-H.



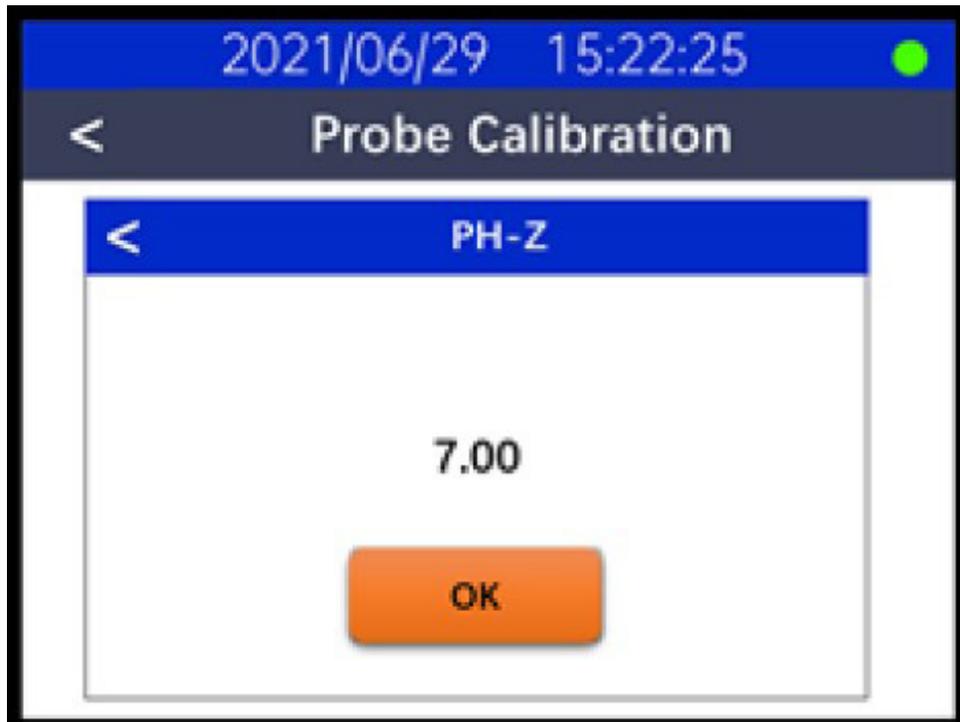
PH-L calibration. Remove and place the FCL700 probe in the pH 4.0 standard solution, measure for 1 minute and wait for the measurement result to stabilize. Click the Enter button to start the PH-L calibration.



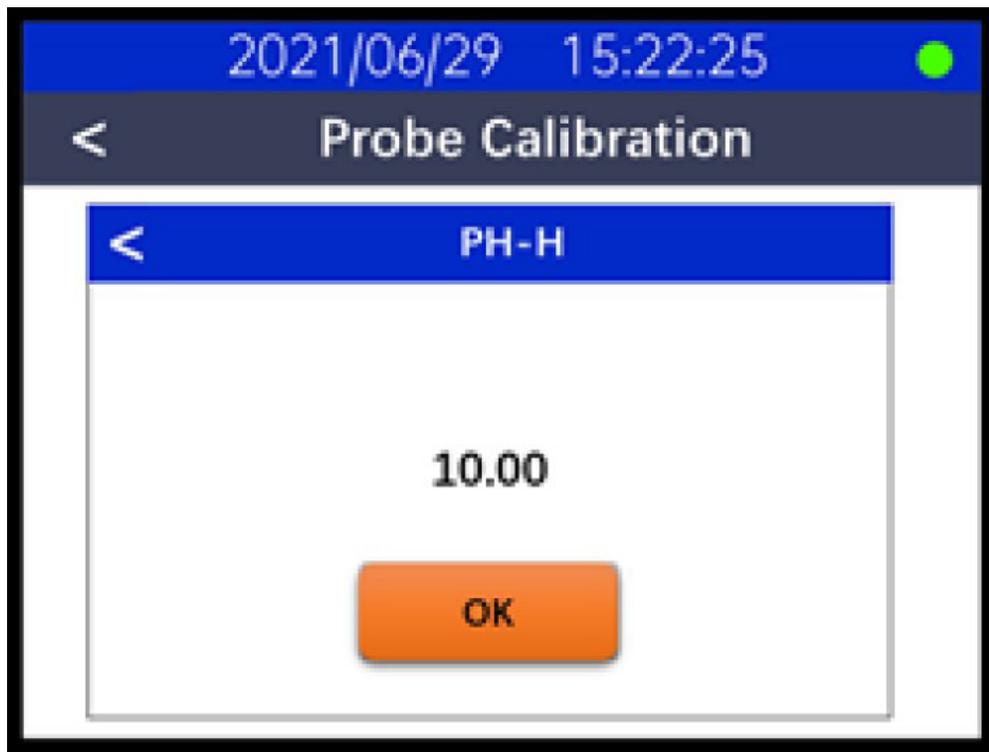
Select the Enter button on the probe confirmation page. The controller will then perform a calibration for the probe, and will wait for the calibration result. The probe calibration result will be automatically displayed on the calibration interface.



PH-Z (mid) calibration. Remove and place the FCL700 probe in the pH 7.0 standard solution, measure for 1 minute and wait for the measurement result to stabilize. Click the Enter button to start the PH-Z calibration.

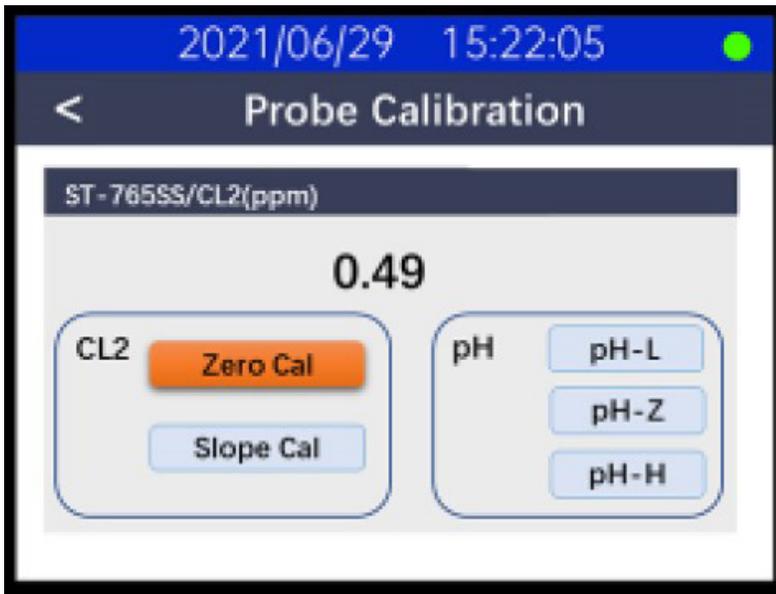


PH-H calibration. Remove and place the FCL700 probe in the pH 10.0 standard solution, measure for 1 minute and wait for the measurement result to stabilize. Click the Enter button to start the PH-H calibration.

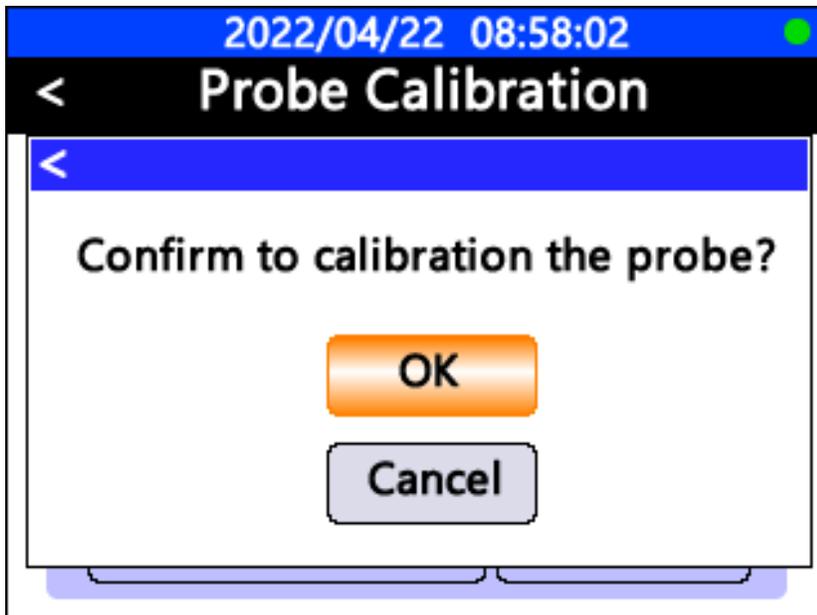


6.4 Chlorine Calibration

Select the Probe Calibration setting to enter the FCL700 probe calibration interface. On the Probe Calibration screen, select between Zero Cal and Slope Cal.

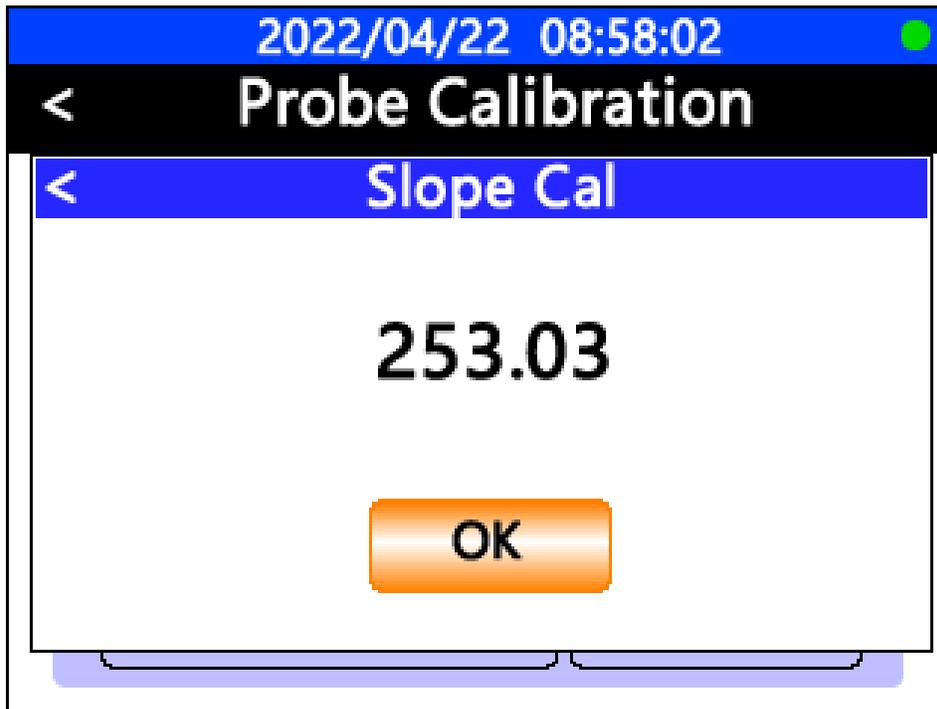


Zero Calibration. Select Zero Cal from the Probe Calibration screen. Put the probe into the Zero standard solution. After the probe is stable for at least 10 minutes, click the Enter button to start calibration.

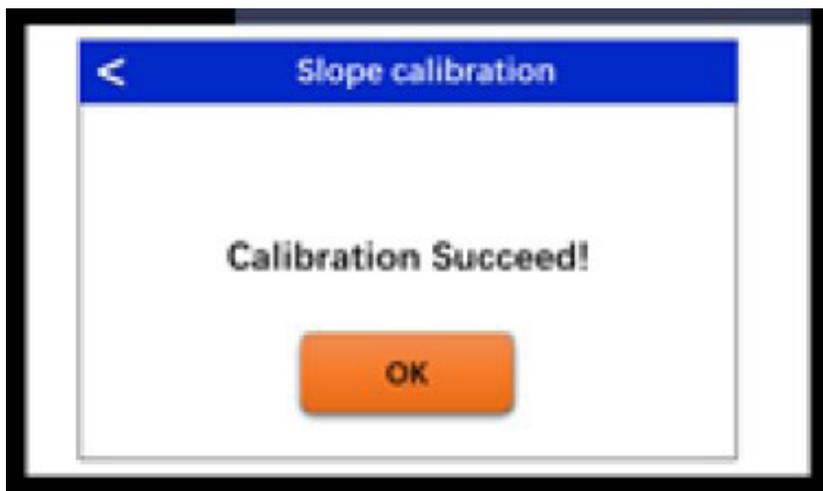


Select the Enter button on the probe confirmation page. The controller will then perform a calibration for the probe, and will wait for the calibration result. The probe calibration result will be automatically displayed on the calibration interface.

Slope Calibration. Select Slope Cal from the Probe Calibration screen. While the sensor is exposed to active flow of 200-400 ml/minute in the WR05 flow reservoir, enter the free chlorine concentration determined by the DPD method of the sample and ensure the probe reading has been stable for at least 10 minutes. Click the Enter button to start the calibration.

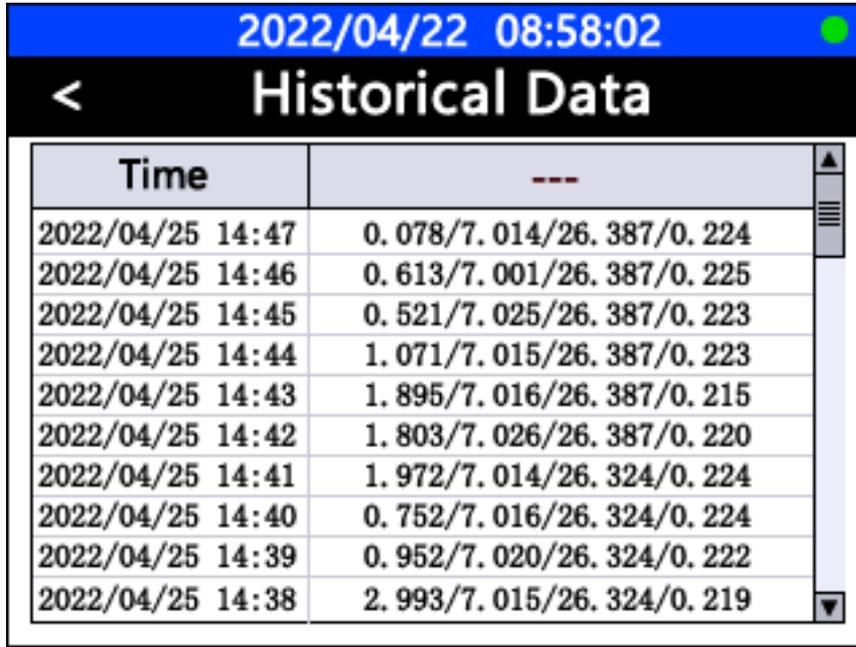


Select the Enter button on the probe confirmation page. The controller will then perform a calibration for the probe, and will wait for the calibration result. The probe calibration result will be automatically displayed on the calibration interface.



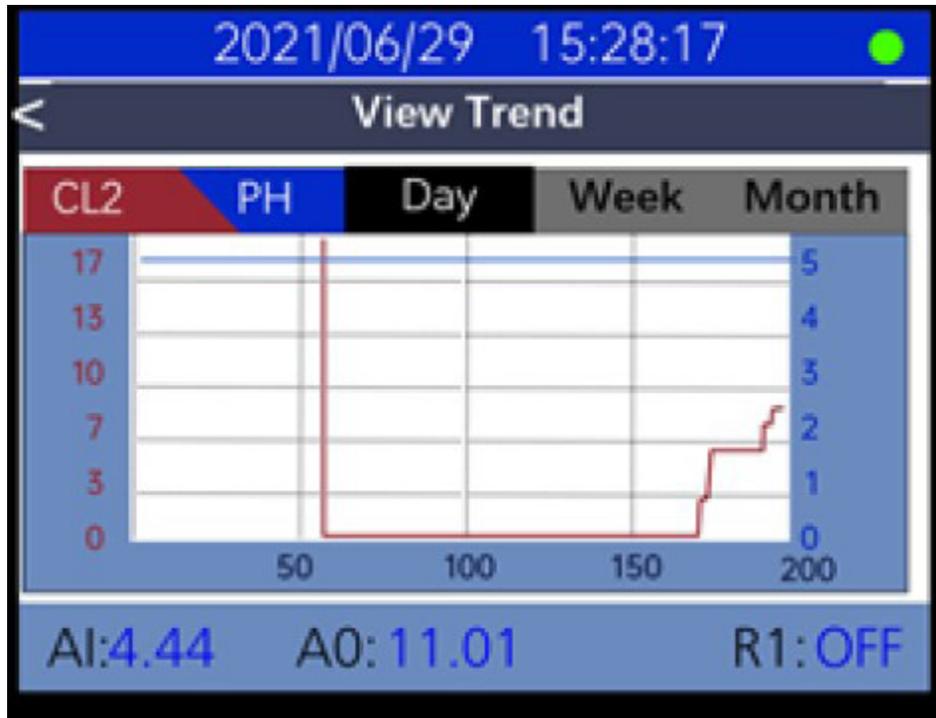
6.5 Historical Data and Trending

Select Historical Data on the setting interface. You can view stored historical measurements of the FCL probe. The TS05 controller stores measurements every 1 minute. This time may be adjusted if desired. Browse the data by using the Up and Down keys.



Time	---
2022/04/25 14:47	0.078/7.014/26.387/0.224
2022/04/25 14:46	0.613/7.001/26.387/0.225
2022/04/25 14:45	0.521/7.025/26.387/0.223
2022/04/25 14:44	1.071/7.015/26.387/0.223
2022/04/25 14:43	1.895/7.016/26.387/0.215
2022/04/25 14:42	1.803/7.026/26.387/0.220
2022/04/25 14:41	1.972/7.014/26.324/0.224
2022/04/25 14:40	0.752/7.016/26.324/0.224
2022/04/25 14:39	0.952/7.020/26.324/0.222
2022/04/25 14:38	2.993/7.015/26.324/0.219

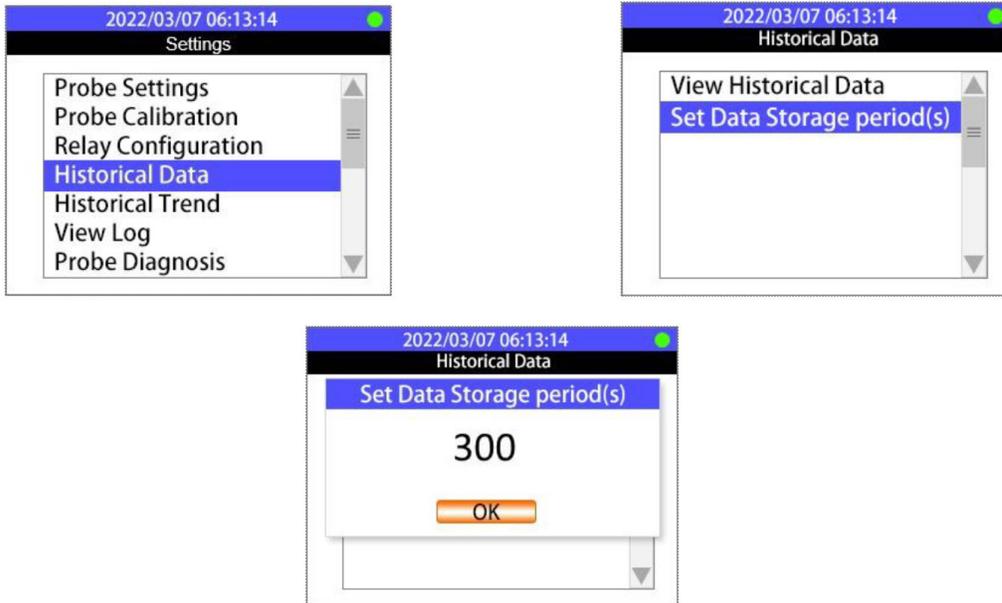
Select the Historical Trend on the setting interface to view historical data in the form of a trend graph. Use the Up and down keys to select between “Day”, “Week”, and “Month”.



Adjust Historical Data Interval

By default, TS05 will save sensor value every 60 seconds to its internal data storage, if an application requires 3 months historical data export, it will generate over 10,000 lines of historical data if the historical data interval is set to 60 seconds.

However, APFCL allows customer to adjust historical data interval to 1) reduce historical data file size, or 2) capture high resolution data if sensor values change rapidly.



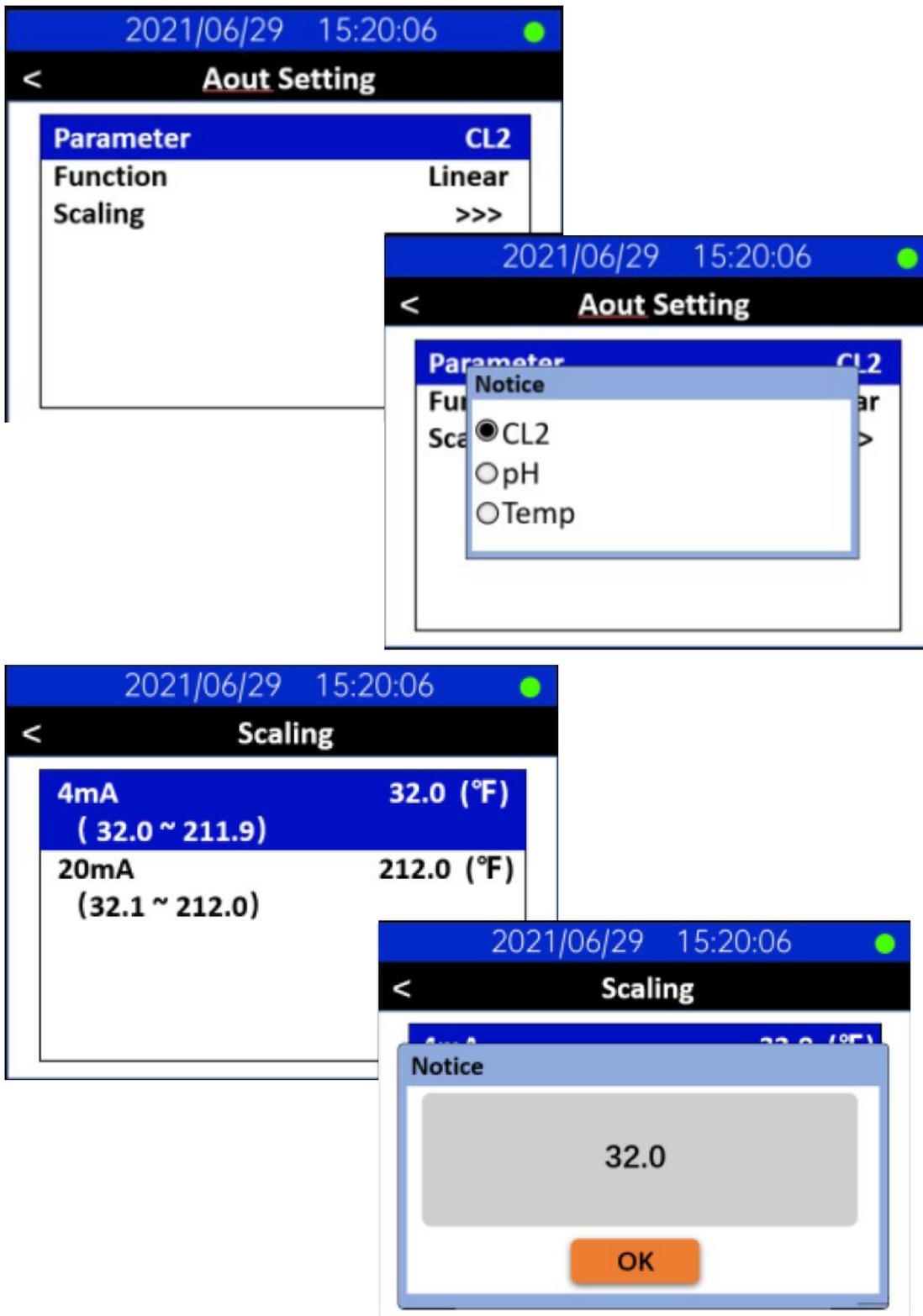
Adjust Historical Trend Scale

Select the Setup Trend from the Historical Trend page to modify the maximum and minimum value of the Y-axis of the curve. Select the Y-axis range according to the actual measurement application so that the historical curve can be accurately displayed. Use the Up and Down keys to modify.



6.6. 4-20ma Output Setting and Calibration

The TS05 controller can be programmed to output through a 4-20ma signal. The TS05 supports one extra 4-20mA output of any sensor measurement. The default parameter is Temperature, but this can be changed to CL or pH. To program the output signal from the main interface screen, select Probe Settings and then select Aout Setting. Use the Up and Down keys, and the enter key to modify the settings.



Aout Calibration

To calibrate the 4-20ma signal, select the Aout Calibration. Use the Up and Down keys, and the enter key to enter the actual values. Select Cal to confirm.

2022/04/22 08:58:02

< Aout Calibration

Current (mA)

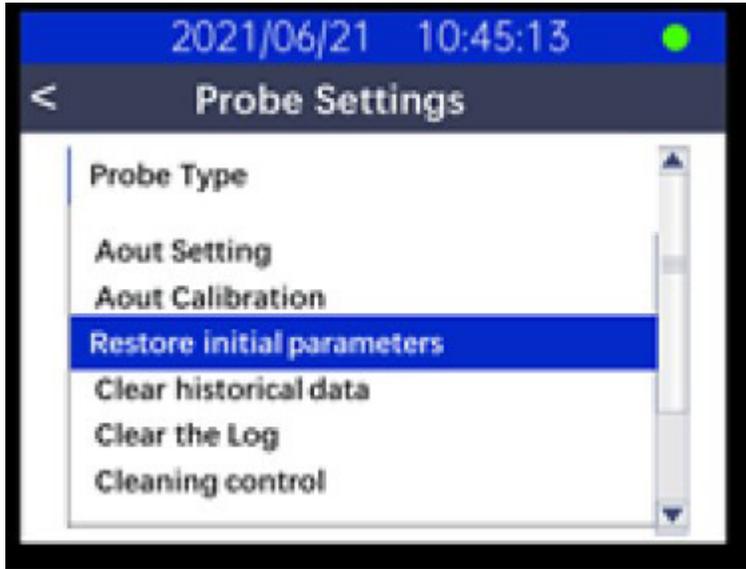
	Calibrate value	Actual value
Min	4.00	4.00
Max	18.00	18.00

OUT 4.0 12 18

Cal

6.7 Restore Factory Parameters and Diagnose Probe

If abnormal reading of the probe is caused by improper calibration, you can select Restore initial parameters function on the probe setting interface. This will restore the initial parameters of the probe from the factory.



Probe Diagnosis. The TS05 controller supports displaying the original diagnostic data of the FCL700 probe. Select Probe Diagnosis from initial interface screen. To help troubleshooting possible issues with the probe, please save these images when the probe is respectively placed in a clean water (tap water), in chlorine or pH standard solutions. These images can be sent to technical support

The screenshot shows a mobile application interface titled 'Probe Diagnosis'. At the top, the date and time are '2022/04/22 08:58:02'. Below the title bar, the following information is displayed:

PN: 53607 **SN:** 202222
Addr: 2 **Ver:** 3.0r100

1	1.00	9	-0.02
2	1.00	10	-1500.00
3	-0.04	11	1500.00
4	1.00	12	-0.0292
5	28.58	13	0
6	0	14	0
7	14	15	0
8	1.00	16	0

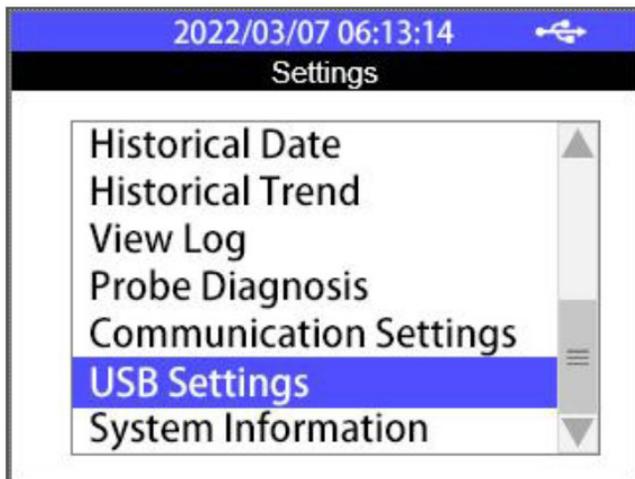
6.8 USB Settings (Data Export and Firmware Update)

USB Function For Historical Data Upload And Frequency

TS05 has a built-in USB interface to support historical data export and firmware upgrade function. Before accessing USB functions, please make sure USB thumb drive is properly plugged into TS-05 USB interface. For data download and upload, a USB device with a storage capacity between 8 and 64MB *Megabytes* is recommended.

Export UC-50 Historical Data

Select USB Settings from the Settings screen. In the USB settings screen, historical data can be downloaded to a USB thumb driver by selecting Data Export function. Make sure a USB thumb drive is plugged into TS-05 before exporting historical data.

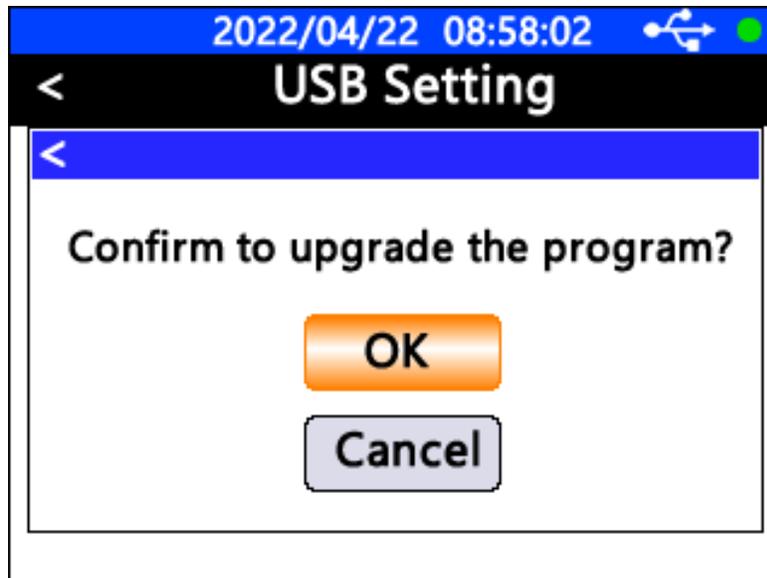


Further select the historical data date and time range or simply choose All Export to export all historical data. Once data export 100% completed, you can safely unplug the USB thumb drive.



Upgrade APFCL Firmware

Copy the target firmware file (.bin) to the root directory of USB thumb drive, plug the thumb drive to APFCL USB interface, select USB Settings in Settings page and select Program Upgrade function in USB Settings page. The APFCL will automatically start firmware upgrading procedure and reboot itself once the procedure completed



6.9 View Log

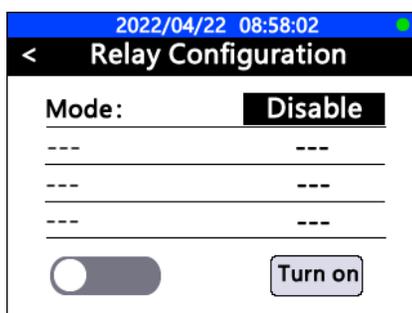
The APFCL has the capability of logging any actions, calibrations, changes, and alarms on the View Log. From the Settings page, select View Log. Use Up and Down keys to view recent activity.



Time	Log
2022/04/22 14:46	Clear data
2022/04/22 14:40	Turn on
2022/04/22 14:00	Relay ON
2022/04/22 13:20	Analog output calibration
2022/04/22 13:28	Sensor selection

6.10 Relay Configuration

Output Relay can be configured and activated from **Relay Configuration**. From the Settings page, select Relay Configuration. On the Relay Configuration page, you can “Turn On” the relay. You are able to set parameters for “Manual”, “Alarm HL”, “Alarm LL”, and “Time” related outputs. Proceed and reboot itself once the procedure completed



2022/04/22 08:58:02

< Relay Configuration

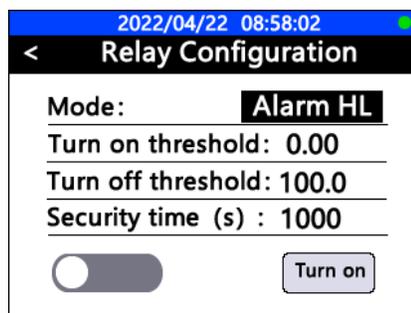
Mode: **Disable**

--- ---

--- ---

--- ---

Turn on



2022/04/22 08:58:02

< Relay Configuration

Mode: **Alarm HL**

Turn on threshold: 0.00

Turn off threshold: 100.0

Security time (s) : 1000

Turn on



2022/04/22 08:58:02

< Relay Configuration

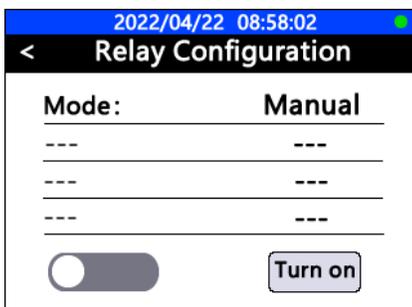
Mode: **Alarm LL**

Turn on threshold: 100.0

Turn off threshold: 0.0

Security time (s) : 1000

Turn on



2022/04/22 08:58:02

< Relay Configuration

Mode: **Manual**

--- ---

--- ---

--- ---

Turn on



2022/04/22 08:58:02

< Relay Configuration

Mode: **Time**

Period (hr) : 24

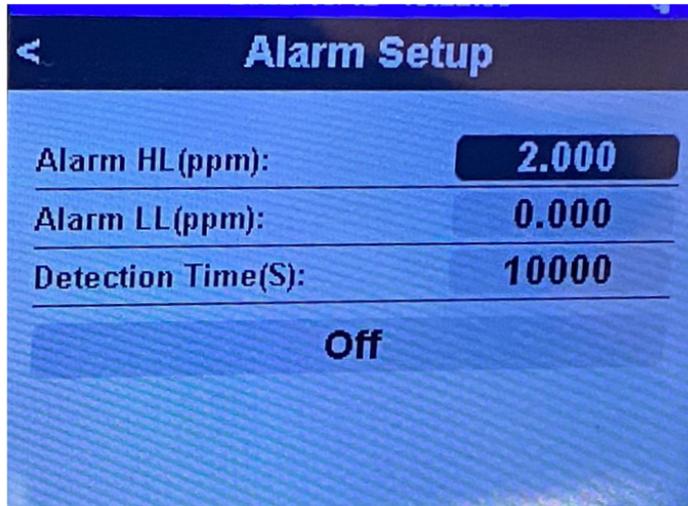
Hold time (min) : 60

--- ---

Turn on

6.11 Alarm Settings

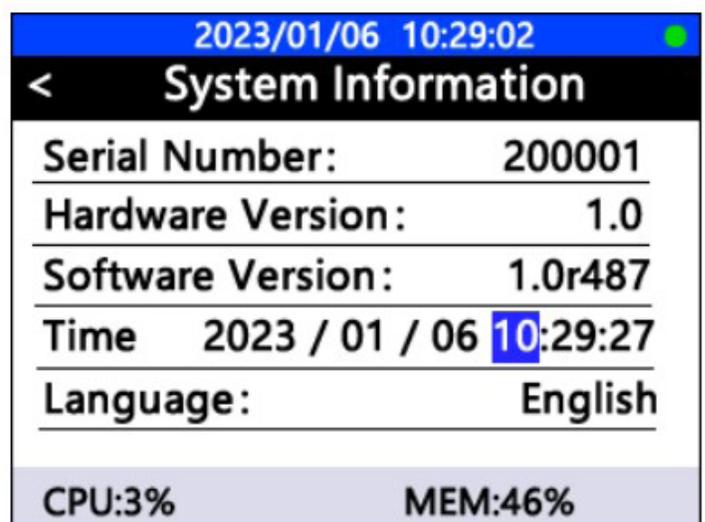
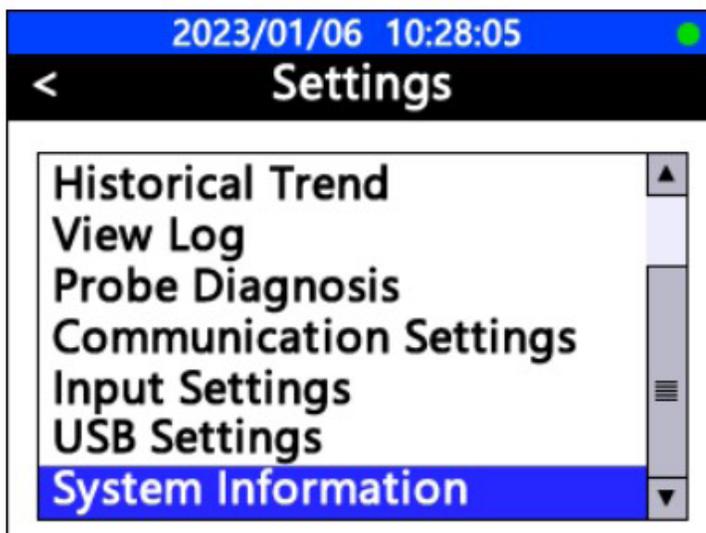
The APFCL has the capability of programming alarms for High Level and Low Level Chlorine readings. From the Settings page, select Probe Settings, then use the Down key to highlight the Alarm Setup and press Enter.



6.12 Time and Date Setting

To adjust Time and Date:

- Press the "Main" Key
- Then use "Up" / "Down" keys until "System Information" is highlighted.
- Press "OK" and then toggle down to the desired parameter.
- Press "OK" when on the desired parameter. The highlight will turn Blue.
- Use "Up" and "Down" keys to get to desired value.
- Press "OK" to confirm new desired value.
- Press "Main" key to go back to main screen.



6.13 Modbus RTU Slave Station Communication Parameters

TS05 Default Communication Parameters	
Device Address	20
Baud Rate	9600
Word Length	8
Parity	None
Stop bits	1

TS05 Default Communication Parameters - (Writeable)			
Register Address	Type	Byte Order	Register Definition
42001	Unsigned int 16	AB	Device Address
42003	Unsigned int 16	AB	Parity 0 = None Parity 1 = Odd Parity 2 = Even
42004-42005	Unsigned int 16	CDAB	Baud Rate

TS05 Register Address of Measured Parameters - (Read Only)			
Register address	Type	Byte Order	Register Definition
46001-46002	float	CDAB	Cl
46003-46004	float	CDAB	pH
46005-46006	float	CDAB	Temperature
46007-46008	float	CDAB	4-20mA input

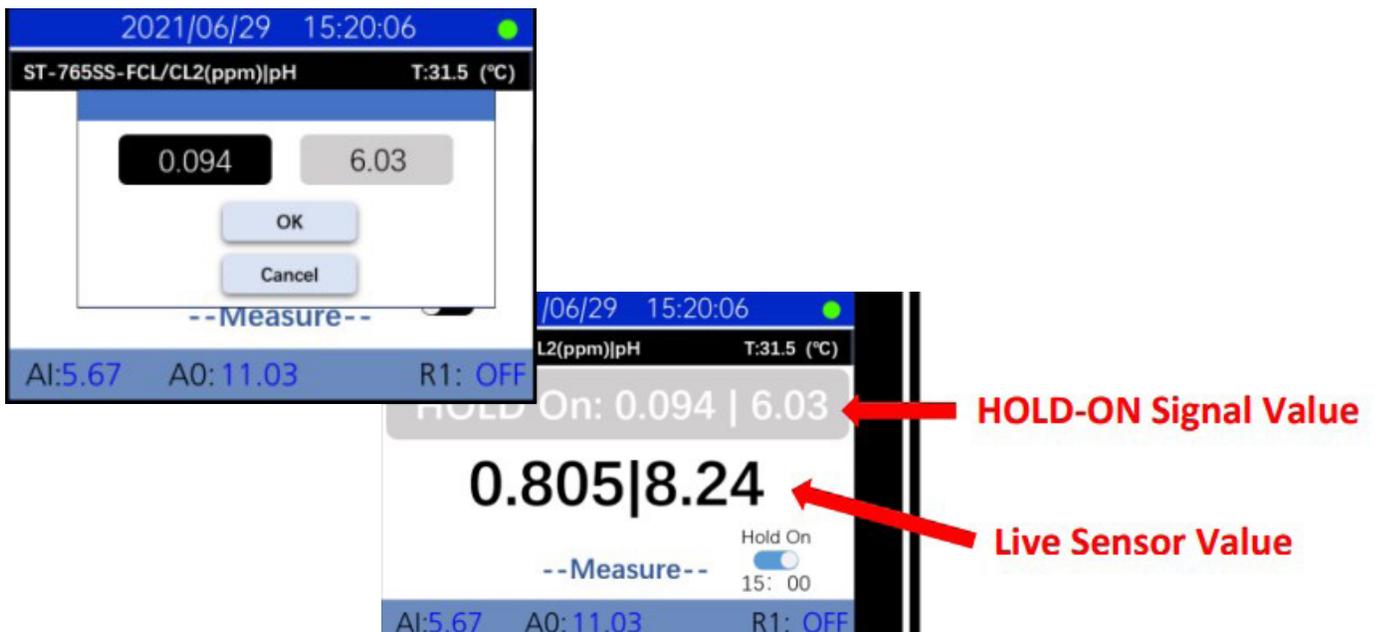
NOTE: If the base address is 1, such as the PLC system, access directly according to the register address. If the base address is 0 system, the register address is reduced by 1 after access.

6.14 Signal Hold Feature

The signal HOLD - ON/OFF feature is a function used to set and maintain the sensor output signal data at a constant value during periods when the sensor is not stable and/or fluctuating significantly due to maintenance and calibration. Maintaining a user set output signal from the panel allows the sensor to be removed and/or maintained while preventing out of compliance network alarms possibly interrupting process operation. When activated, the HOLD feature allows the user to set and retain the output signal for both sensor parameters for a period of 15 minutes, after which the unit returns to normal operation and live reading output value.



Long press OK button for 3 seconds on the main interface to open the HOLD - ON/OFF page. The cursor shows black is the selection mode, and blue is the editing mode. Click the OK key to enter the editing mode, and the up/down keys can be used to adjust the value of the setting item. Once set where desired, click the OK button to start the HOLD-ON function.



7.0 Maintenance

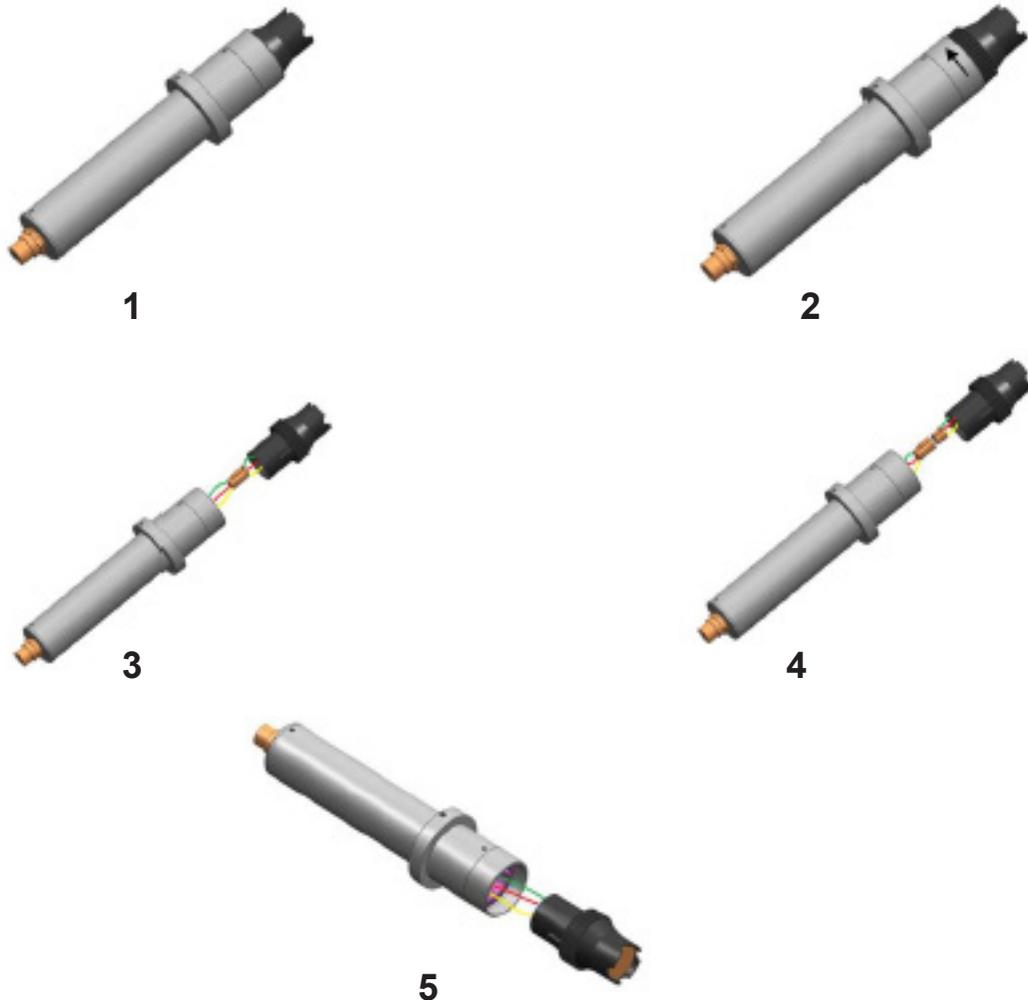
7.1 Sensor Cleaning and Maintenance

Most cleaning of the APFCL is facilitated by removing the sensor, rinsing it with tap or DI water and gently wiping the sensor head with a soft cloth or Q-tips, then re-rinse. For a highly fouled sensor, soak the lower half of the sensor in sensor cleaning solution for 10-15 minutes. Gently rub the sensor electrode head with the provided Q-tips. If the surface is not entirely clean, continue to soak the sensor for an additional time until clean. Rinse the sensor with distilled water.

7.2 Replacing pH/CL2 Electrode Head

The pH/CL2 electrode head of FCL700 Probe can be replaced when the original electrode head reaches its working life. Order a replacement electrode head (P/N EC700) from Blue-White and follow instructions as below.

1. Turn off the sensor if it is powered on.
2. Make sure there is no water on the sensor.
3. Hold the FCL700 main body with one hand and use the other hand to twist the stainless-steel locking ring counter-clockwise until the front end of the black electrode is completely unscrewed, as shown in Figure 2.
4. Pull out the electrode head as shown in Figure 3.
5. Loosen the electrode plug connector, and remove the electrode head, as show in Figure 4.
6. To assemble the new electrode head, connect the plug, then insert the new electrode head into the main sensor housing and ensure that the two protrusions on the electrode head are aligned with the notches in the sensor main housing.
7. Then twist the stainless-steel lock ring of FCL700 in a clockwise direction until the threads of the electrode head completely enter the FCL700 housing as shown in Figure 1.



8.0 WARRANTY

8.1 LIMITED WARRANTY

Your new AP Analyzer is a quality product and is warranted for 13 months from date of purchase (proof of purchase is required). Electrodes are warranted for 6 months. The unit will be repaired or replaced at our discretion. Failure must have occurred due to defect in material or workmanship and not as a result of operation of the product other than in normal operation as defined in the manual. Warranty status is determined by the serial label and the sales invoice or receipt. The serial label must be on the unit and legible. The warranty status of the unit will be verified by Blue-White or a factory authorized service center.

8.2 WHAT IS NOT COVERED

- Wear items.
- Unit removal, or re-installation, and any related labor charge.
- Freight to the factory, or service center.
- Units that have been tampered with, or in pieces.
- Damage to the unit that results from misuse, carelessness such as chemical spills on the enclosure, abuse, lack of maintenance, or alteration which is out of our control.
- Units damaged by faulty wiring, power surges or acts of nature.

8.3 PROCEDURE FOR IN WARRANTY REPAIR

Contact the factory to obtain a RMA (Return Material Authorization) number. Carefully pack the unit to be repaired. Please enclose a brief description of the problem as well as the original invoice or sales receipt, or copy showing the date of purchase. Prepay all shipping costs. COD shipments will not be accepted. Warranty service must be performed by the factory or an authorized service center. Damage caused by improper packaging is the responsibility of the sender. When In-Warranty repair or replacement is completed, the factory pays for return shipping to the dealer or customer.

8.4 PRODUCT USE WARNING

Blue-White products are manufactured to meet the highest quality standards in the industry. Each product instruction manual includes a description of the associated product warranty and provides the user with important safety information. Purchasers, installers, and operators of Blue-White products should take the time to inform themselves about the safe operation of these products. In addition, Customers are expected to do their own due diligence regarding which products and materials are best suited for their intended applications. Blue-White is pleased to assist in this effort but does not guarantee the suitability of any particular product for any specific application as Blue-White does not have the same degree of familiarity with the application that the customer/end user has. While Blue-White will honor all of its product warranties according to their terms and conditions, Blue-White shall only be obligated to repair or replace its defective parts or products in accordance with the associated product warranties. BLUE-WHITE SHALL NOT BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE WHETHER DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF OR RELATED TO THE FAILURE OF ANY OF ITS PARTS OR PRODUCTS OR OF THEIR NONSUITABILITY FOR A GIVEN PURPOSE OR APPLICATION.

17.5 CHEMICAL RESISTANCE WARNING

Blue-White offers a wide variety of wetted parts. Purchasers, installers, and operators of Blue-White products must be well informed and aware of the precautions to be taken when injecting or measuring various chemicals, especially those considered to be irritants, contaminants or hazardous. Customers are expected to do their own due diligence regarding which products and materials are best suited for their applications, particularly as it may relate to the potential effects of certain chemicals on Blue-White products and the potential for adverse chemical interactions. Blue-White tests its products with water only. The chemical resistance information included in this instruction manual was supplied to Blue-White by reputable sources, but Blue-White is not able to vouch for the accuracy or completeness thereof. While Blue-White will honor all of its product warranties according to their terms and conditions, Blue-White shall only be obligated to repair or replace its defective parts or products in accordance with the associated product warranties. BLUE-WHITE SHALL NOT BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF OR RELATED TO THE USE OF CHEMICALS IN CONNECTION WITH ANY BLUE-WHITE PRODUCTS.

9.0 Product Information

APFCL Analyzer Panel

Model Number

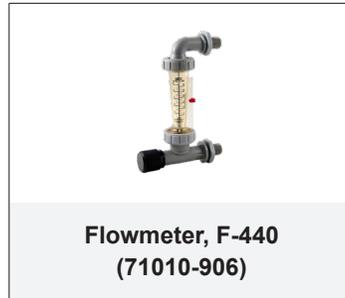
APFCL Chlorine Analyzer Panel (Chlorine, pH, Temperature)

Includes: TS05 5" Touchscreen Display, WR-05 Flow Reservoir, FCL700 Chlorine/pH/Temperature Sensor, Assembled Panel with Flowmeter, 110VAC Power Cord.

- Power Requirement 110/220VAC / 50-60 Hz, 0.6 A

- CE, RoHS, EPA-334.0 and ISO-7393

Replacement Parts and Accessories



Sensor Cleaning Solution (90008-988)

AP-MA1.5-CR 1.5 meter Short Cable - 8Pin x Flying leads (90008-954)

pH Calibration Combo Pack (4, 7, 10 pH) (90008-983)



Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. The WEEE marking applies only to countries within the European Union (EU) and Norway. Appliances are labeled in accordance with European Directive 2002/96/EC.

Contact your local waste recovery agency for a *Designated Collection Facility* in your area.

Blue-White[®]