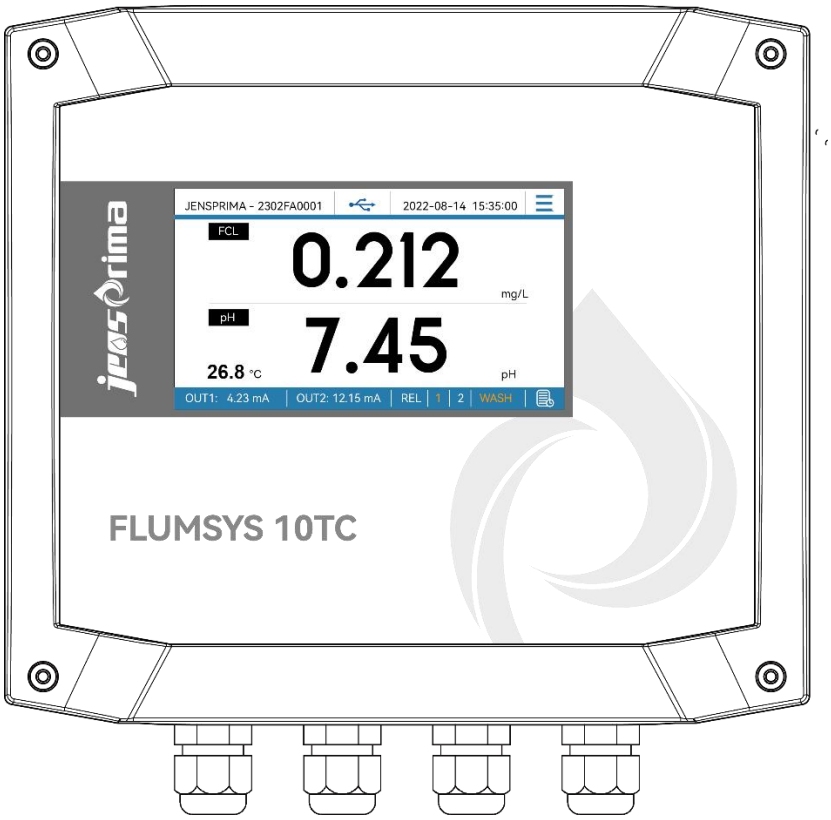
Operation Manual

Flumsys 10TC-F1P1-A

220VAC version



WALL MOUNTING

JENSPRIMA INSTRUMENTS

Content

Safety Precautions

√ This manual describes the hazards that may occur in the use of the instrument and provides safety instructions to reduce the risks.
√ In operation, please follow the safety instructions in this manual strictly, as non-compliance may cause personal injury to the operator.
√ Before using the instrument, please read this instruction manual completely.

√ Please make sure that all users of the instrument read this instruction manual at all times.
√ Please be sure to hand over this instruction manual to a third party together with the instrument.

Operator Qualifications

The installation and commissioning of this instrument requires technical knowledge of electrical engineering and related areas. Therefore, installation and commissioning must be carried out by specialized technicians or under the guidance and supervision of specialized technicians.

Legal Requirements

√ During the installation and use of this instrument, please strictly observe the safety precautionary rules of your region and country, the relevant electrical equipment installation and operation procedures, and environmental protection regulations.
√ During the installation and commissioning of the instrument, please strictly observe the laws and regulations of your region and country.

Electrodes/Sensors

Please use the electrodes manufactured by JENSPRIMA. If the equipment is damaged during the warranty period due to the use of electrodes other than those manufactured by us, JENSPRIMA will not provide any warranty for the equipment.

Changes and Upgrades

Only technicians authorized by JENSPRIMA may make changes and upgrades to the instrument, and JENSPRIMA will not be liable for any damage to the instrument caused by changes and upgrades made to the instrument by persons not authorized by JENSPRIMA.

Sign & Symbol

This marking indicates the possibility of personal injury to the operator.

This symbol indicates that it is used to remind or guide the operator.

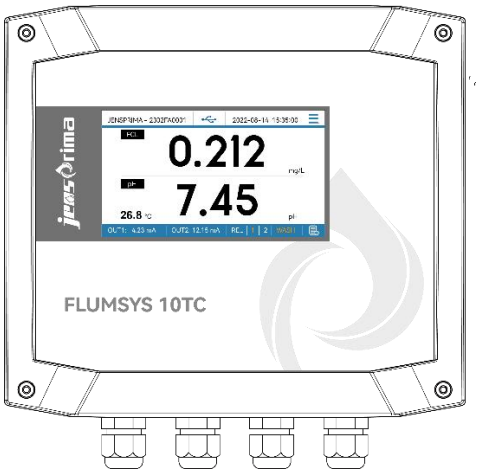
Product Descriptions

General Information

Flumsys 10TC dual-channel controller is designed for measuring a range of water quality parameters relevant to the water treatment industry. It can simultaneously measure two parameters (free chlorine and pH) with automatic pH and temperature compensation. It features a 4.3-inch color LCD display with touch screen operation for straightforward setup. The Flumsys 10TC incorporates data storage capabilities with USB export support. It provides three programmable relays and two groups of 4-20mA outputs for controlling auxiliary equipment, and comes standard with Modbus RTU (RS485) communication.

Application

Disinfection processes, drinking water, pharmaceuticals/beverages, swimming pools



Scope of Supply

1. Flumsys 10TC-F1P1-A Controller
2. innoSens 710 Free Chlorine Electrode(sold separately)
3. innoSens 125T pH/T Electrode(sold separately)
4. PA-711 Flow Cell(sold separately)
5. Instruction Manual

Features

- 110-240VAC power supply, touch screen design
- The large backlit LCD displays the measurement values, temperature and relay status
- Chinese/English menu, easy to operate
- Password protection to prevent unauthorized operations
- New calibration step prompts to help reduce operator errors
- 2 x programmable Hi/Lo relay output
- Programmable auto-cleaning relay output
- 2 x Isolated 4-20mA output
- RS485 Modbus RTU communication
- Data storage function, support USB disk to export

Product Descriptions

Technical Specifications

Flumsys 10TC-F1P1-A Controller:

Parameters	Free chlorine/pH
Measurement Range	Free chlorine: 0~2.000mg/l, 0~20.00mg/l (ppm) (Automatic pH and temperature compensation) pH: 0-14pH
Resolution	Free chlorine: 0.001mg/l / 0.01mg/l pH: 0.01pH
Accuracy	Free chlorine: ±2% F.S. pH: ±0.01pH
pH Temp.Compensation Method	Pt 1000
Temp. Compensation Range	0~60.0 °C
Operating Temp.	0~60.0 °C
Display	4.3-inch color LCD touchscreen display
Analog Output 1	Isolated 4-20mA output, free chlorine measurement value can be set, Max. loads 500Ω
Analog Output 2	Isolated 4-20mA output, free chlorine measurement value can be set, Max. loads 500Ω
Communications	RS485 Modbus RTU
Alarm Output	2 sets of ON/OFF contacts, independently configurable high/low alarm points with hysteresis settings, 5A/250VAC, 5A/30VDC
Wash relay	Cleaning interval: 1-9999min, Cleaning time: 1-999s

Language	English/Chinese
Password	Setup Password: 0022 Calibration Password: 0011
Power	100-240VAC,50/60Hz;
Data Storage	200,000 data entries stored, supports USB export
Protection	IP65
Installation Method	Wall-mounted
Size	200 x 180 x 90mm
Weight	0.85Kg

Product Descriptions

innoSens 710 Free Chlorine Sensor

Measurement Range	0-2.000 / 0-200.00ppm（mg/L）
Operating Temp.	0~60℃
Max. Pressure	3bar
Material	Glass
Thread	PG13.5
Cable	3m
Application	For free chlorine detection in water

Recommended for use with the PA-711 flow cell

innoSens 125T pH/T Sensor

Measurement Range	0-14pH
Work Temp.	0~60℃
Max. Pressure	3bar
Material	Glass
Thread	PG13.5
Cable	5m
Application	For pH/temperature detection in water

PA-711 Flow Cell

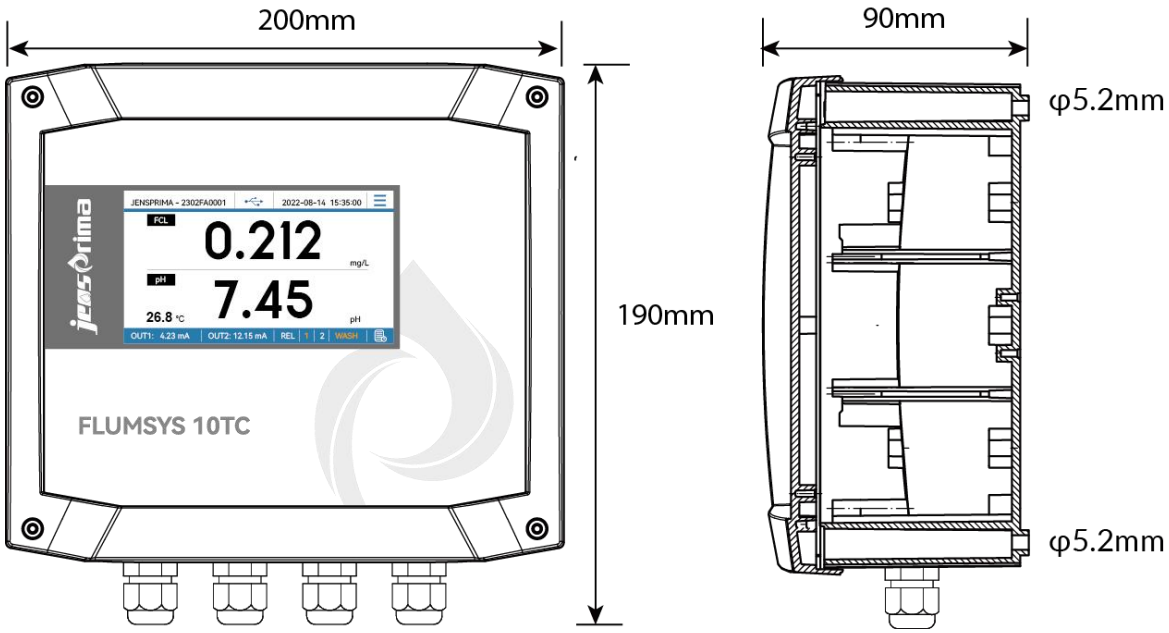
Recommended Flow rate	10-30L/min
Size	91x165x40mm
Material	Acrylic
Water inlet connection	6mm Hose
Outlet Connection	8mm Hose

Recommended for use with the PA-711 flow cell

Instrument Installation

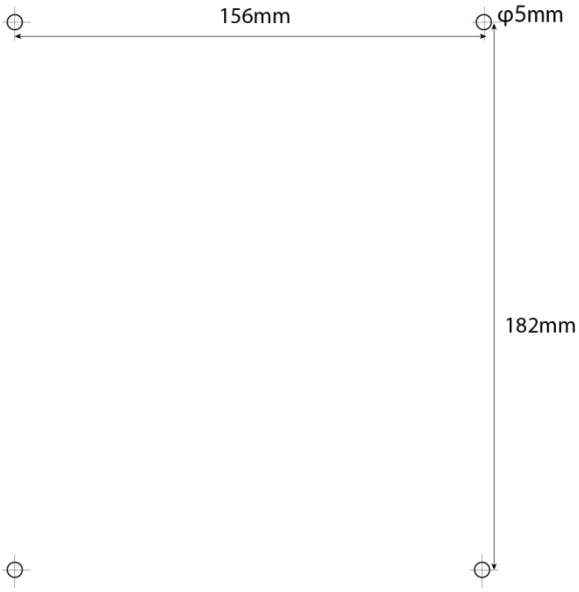
Please install the instrument indoors in an environment free of corrosive gases.

Controller Dimension Drawing



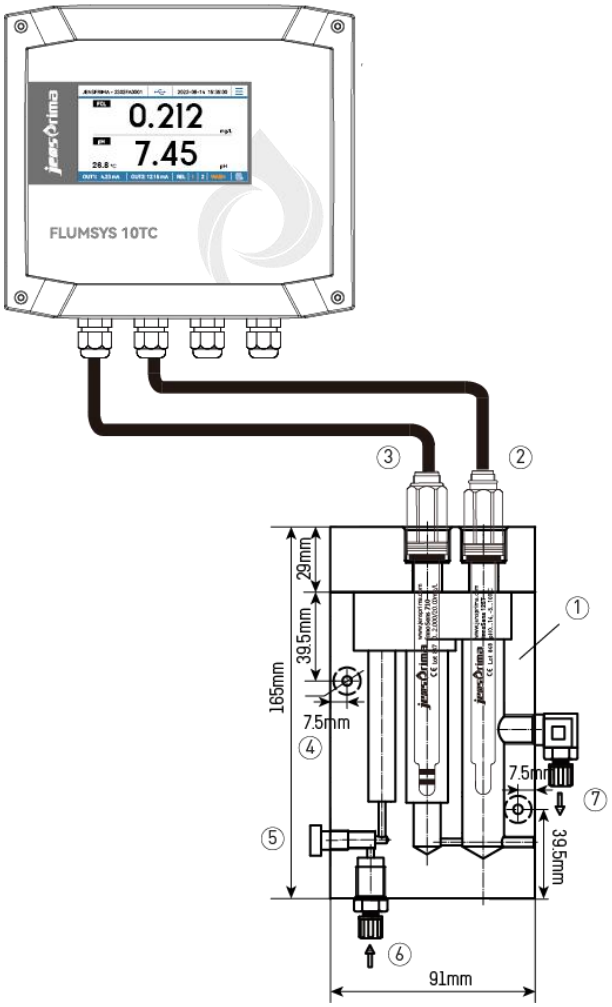
Install Controller

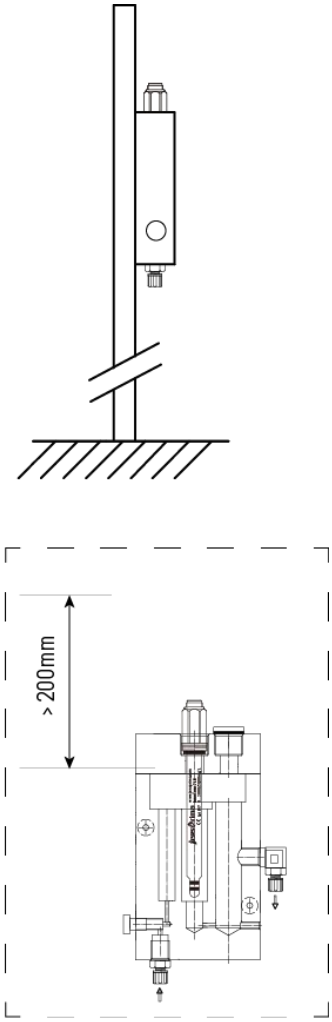
The Flumsys 10TC Controller is designed for wall mounting, with a random hook fixed behind the controller, as shown in the diagram below (M4 Screws).



Instrument Installation

System Installation Diagram





① **PA-711 Flow Cell**

② **innoSens 125T pH/T Electrode**

③ **innoSens 710 Free Chlorine Electrode**

④ **Circulation Channel Mounting Hole**

⑤ **Flow Cell Flow Control Valve**

⑥ **Water Inlet (6mm Hose)**

⑦ **Flow cell Outlet Hose (8mm Hose)**

Instrument Installation

Installation Requirements

Flumsys 10TC-F1P1-A Controller

Install as close as possible to the water sample monitoring point to ensure measurement accuracy.

innoSens 710 Free Chlorine Sensor

Only when water sample is continuously flowing through the flow cell,should the electrode be inserted into the electrode port of the PA-711 flow cell, ensuring the innoSens 710 remains fully submerged in the water sample. If the flow cell is lacking of water for an extended long period, the electrode must be removed and securely placed back into its original protection cover. The protection cover must contain sufficient protection solution.

	**innoSens 710 free chlorine electrode should be installed in the center hole of the PA-711 flow cell. Refer to the installation diagram for proper electrode installation. Incorrect installation may result in inaccurate readings.**

innoSens 125T pH/T Sensor

Only when water sample is continuously flowing through the flow cell should the electrode be inserted into the electrode port of the PA-711 flow cell, ensuring the innoSens 125T remains fully submerged in the water sample. If the flow cell is lacking of water for an extended long period, the electrode must be removed and securely placed back into its original protection cover. The protection cover must contain sufficient protection solution.

	**innoSens 125T pH/T Electrode should be installed in the center hole of the PA-711 flow cell. Refer to the installation diagram for proper electrode installation. Incorrect installation may result in inaccurate readings.**

PA-711 Flow Cell

The flow cell should be installed near the Flumsys 10TC controller. Secure the PA-711 to the mounting plate with bolts, then mount the plate onto the bracket or a vertical wall surface. Connect the inlet and outlet hoses to their respective fittings according to the flow cell schematic. The drain pipe must discharge vertically downward without back pressure.

Excessive pressure or poor drainage may cause overflow at the connection above the flow cell.

Inlet Water Requirements:

Inlet Water Pressure: 0.2 - 1 bar

Inlet Water Flow Rate: 10 - 30 L/h

Inlet Water Temperature: 0 - 50° C

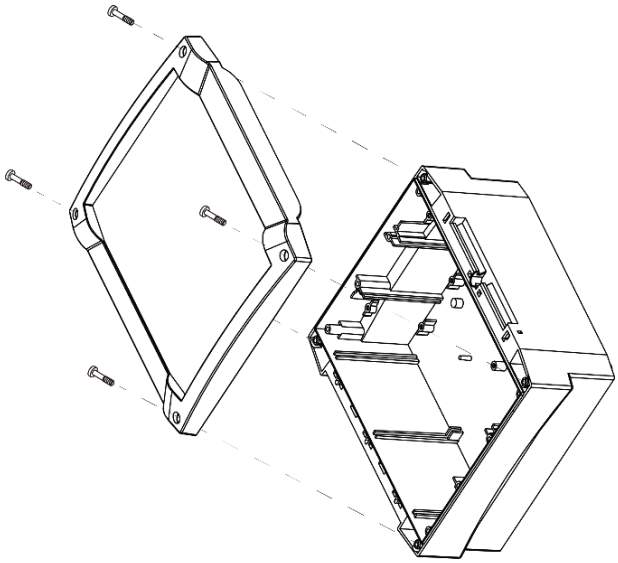
	**Note: If the inlet water contains large suspended particles, be sure to install a filter upstream of the inlet pipe to prevent clogging of the flow cell.** **Adjust the inlet valve of the PA-711 flow cell until water slightly overflows from the top cell while no significant accumulation is observed in the drain pipe.** **Once the inlet valve is adjusted, avoid changing it to maintain a relatively stable water sample flow rate.**

Electrical Connection

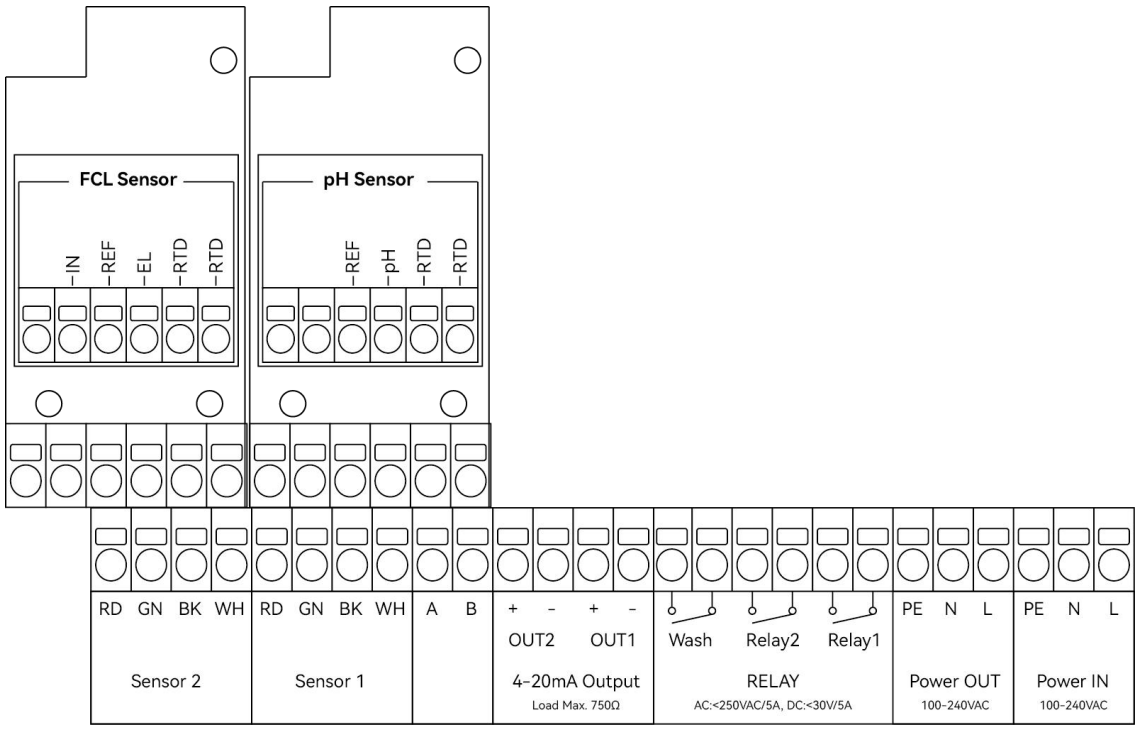
DANGER: Electrical connections must be made by a trained professional technician.

Note: Be sure to disconnect the power before connecting any wires, otherwise incorrect wiring may easily cause damage to the Instrument.

The connection terminals of the controller are located at the backside of the instrument and only trained professionals can open the cover for wiring the power supply, relay and signal output. The electrical connection can be made by unscrewing the four screws of the front cover with a screwdriver.



The Flumsys 10TC-F1P1-A controller power supply on 220VAC. Before making electrical connections, it is important to confirm the type of instruments power supply ordered, as incorrect power connections may cause damage to the instruments.



Electrical Connection

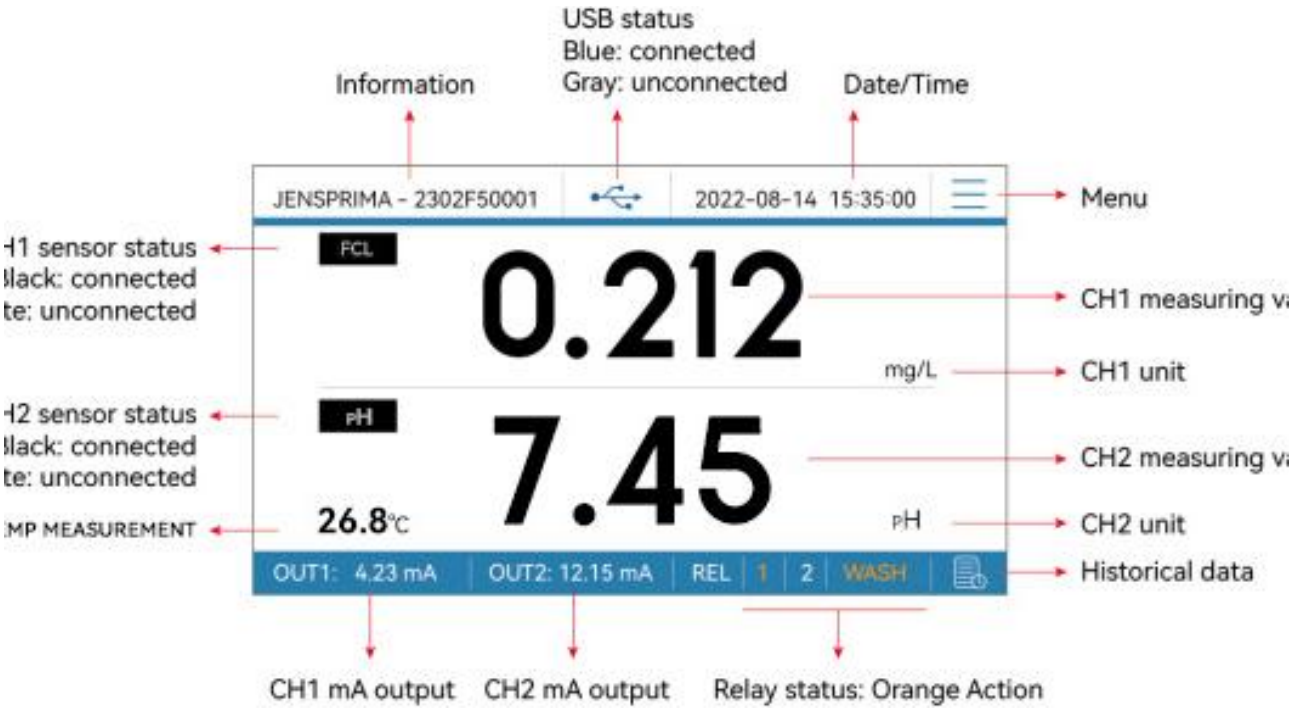
Terminal Descriptions

Function	Terminal	Name	Descriptions
Power Supply	**L**	220VAC live wire	220VAC **AC power**
	N	220VAC neutral wire	
	PE	Ground	
Output power	**L**	220VAC live wire	220VAC AC power
	N	220VAC neutral wire	
	PE	Ground	
Relay Output	**Relay 1**	Relay 1	Normally open
	Relay 2	Relay 2	Normally open
	Relay 3 （Wash）	Relay 3 （Wash relay)	Normally open
4-20mAOutput	**OUT1 +**	CH1 4-20mA+	Free Chlorine 4-20mA Output
	OUT1 -	CH1 4-20mA-	
	OUT2+	CH2 4-20mA+	pH 4-20mA Output
	OUT2-	CH2 4-20mA-	
RS485 Output	**A**	RS485 A	Modbus RTU protocol
	B	RS485 B	
FCL Digital Module	**IN**	Cable Identification: IN	Free Chlorine Electrode
	REF	Cable Identification: REF	
	EL	Cable Identification: EL	
	RTD		
	RTD		
pH Digital Module	**REF**	Cable Identification: REF	pH Electrode
	pH	Cable Identification: pH	
	RTD	Cable Identification: RTD	Temperature Electrode
	RTD	Cable Identification: RTD	

Display

Front View of The Controller

The Flumsys 10TC-T4 controller is equipped with a 4.3-inch color LCD touchscreen. It can be operated by touching the screen with a fingernail or stylus (operating with a bare finger may not work).



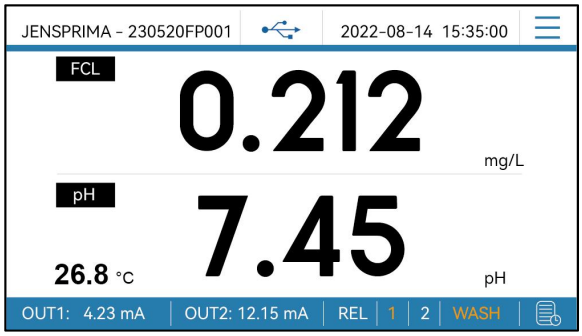
Product Information	Click here to view product information (model, serial number, production date, and measurement parameters).
USB Drive Status	Check whether a USB drive is connected: Blue: USB drive is inserted Gray: No USB drive is inserted
Date/Time	Current date and time
Menu Button	In the measurement interface, clicking this key will enter the password input screen.
History Data	In the measurement interface, clicking this button will access historical data, allowing you to view, export, and delete historical records.
Relay Status	Current relay status can be viewed: Orange: Closed White: Normally

	open
Output Current	Can view the output current of the current channel.
Sensor Communication Status	Check if the sensor is connected: Black background: Connected White background: Not connected

	**Setup Password: 0022, Calibration Password: 0011** **Press the “ < ” key in the upper left corner at any time to return to the previous menu. Press the “ ⌂ ” key in the upper right corner to return to the measurement interface.**

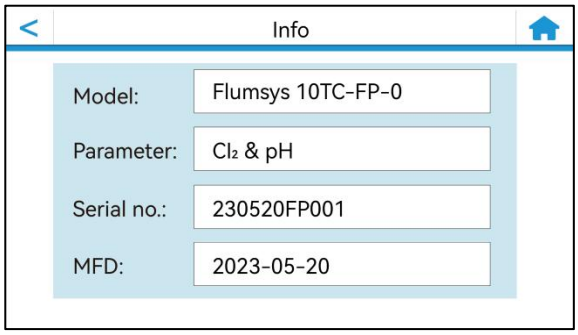
Menu Tree

Product Information



Measurement Interface

Click "JENSPRIMA" in the upper-left corner of the screen to view product information.



Product Information

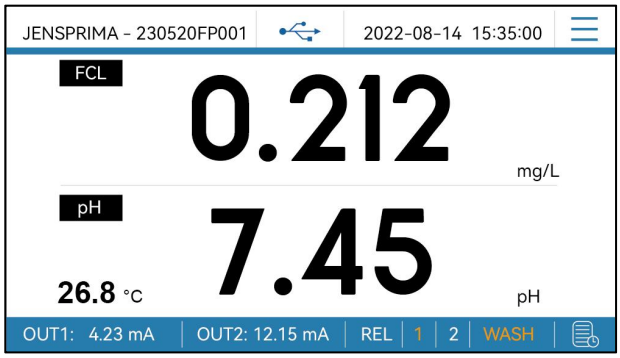
Model: Flumsys 10TC-F1P1-A

Measurement Parameters: Free Chlorine & pH

Serial Number: 230520FP001

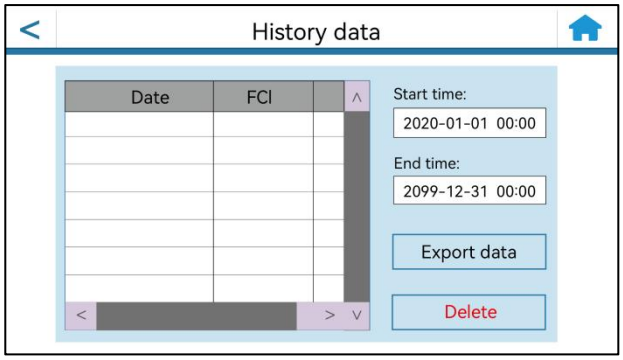
Date of Manufacture: 2023-5-20

History Data



Measurement Interface

Click the " " icon in the bottom-right corner to access the history data interface.



History Data

Export Data: Insert a USB drive and click "Export Data" to save history data to the USB drive (Excel format).

Delete Data: Click "Delete Data" and enter the password 0022 to remove history data. After deletion, you need to re-enter the "History Data" interface for the data to refresh.

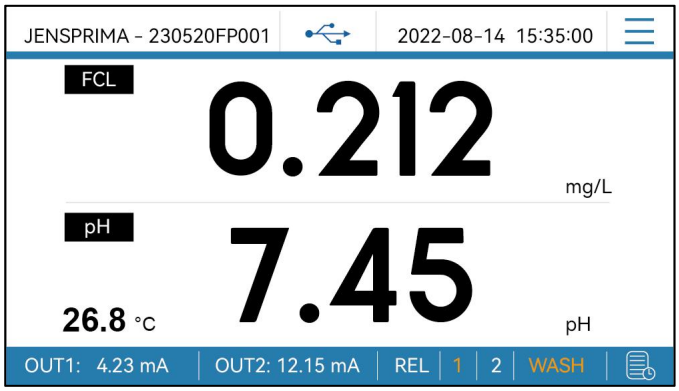
When the storage interval is set to OFF, history data is not stored.

Menu Tree

One-level Menu	Two-level Menu	Note
Setup Menu		
1.0 General Settings	1.1 Language	Chinese/English
	1.2 Date/Time	Set the current date and time
	1.3 Data Storage	Set History Data Storage Interval
	1.4 Display Channel	Set measurement channels
	1.5 Restore factory settings	Restore factory settings
2.0 Analytical System	2.1 CH 1	CH 1(Free Chlorine) Parameter Settings
	2.2 CH 2	CH 2（pH）Parameter Settings
3.0 Output	3.1 Analog current 1	Channel 1 (Free Chlorine) 4-20mA Output Settings
	3.2 Analog current 2	Channel 2 (pH) 4-20mA Output Settings
	3.3 Relay 1	Relay 1 Setting
	3.4 Relay 2	Relay 2 Setting
	3.5 Relay 3	Relay 3 (Auto-Clean) Settings
4.0 Communication		RS485 Serial Port Parameter Settings
5.0 Diagnosis		Diagnostic Relay/Analog Current Function
Calibration Menu		
1.0 Free Chlorine Calibration	1.1 Zero Calibration	Zero Calibration for Free Chlorine
	1.2 Slope Calibration	Free Chlorine Slope Calibration
	1.3 Restore Factory Calibration	Reset free chlorine to factory calibration
2.0 pH Calibration	2.1 Automatic Calibration	pH Automatic Calibration
	2.2 On-site Calibration	pH On-site Calibration
	2.3 Restore Factory Calibration	pH Restore Factory Calibration

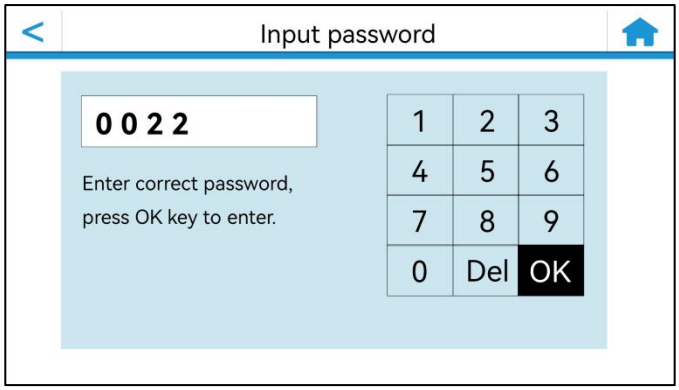
Setup Mode

Enter The Setup Menu



Measurement Interface

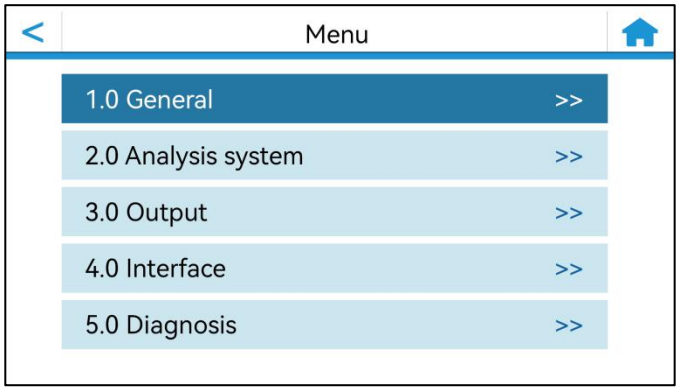
Press the " ☰ " key in the upper-left corner to enter the password input screen.



Enter Password

0022: Setup Menu

0011: Calibration Menu



Setup Menu

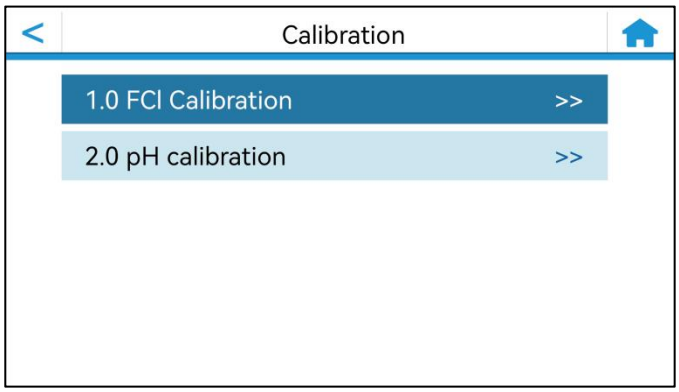
1.0 General Settings

2.0 Analysis System

3.0 Output

4.0 Interface

5.0 Diagnostics

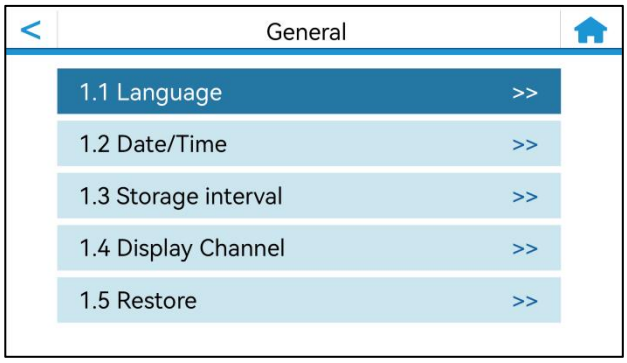


Calibration Menu

1.0 Free Chlorine Calibration

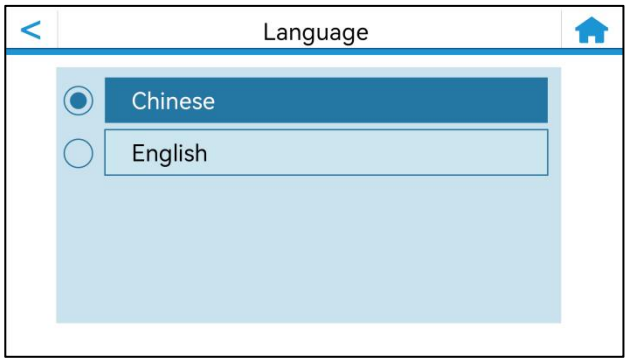
2.0 pH Calibration

1.0 General Settings



1.0 General Settings

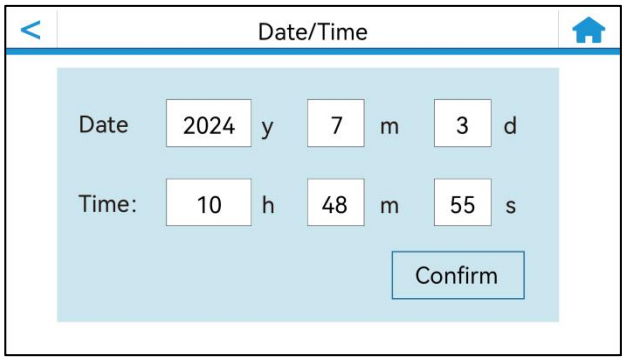
Select the corresponding menu and click it to enter.



1.1 Language

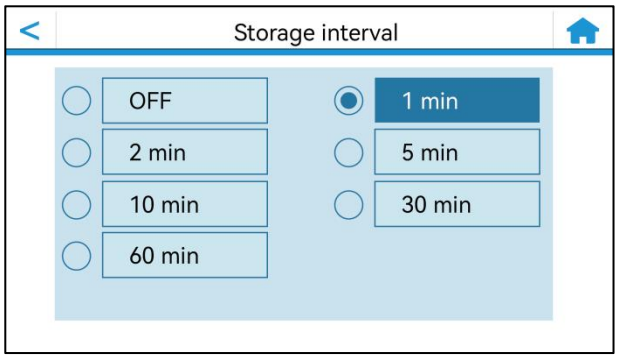
Chinese

English



1.2 Date/Time

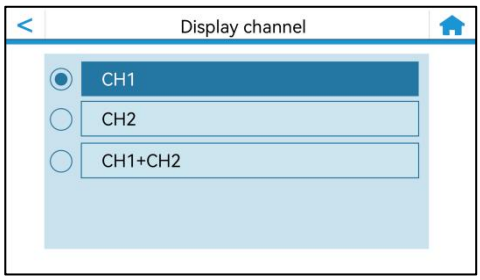
Current date and time can be set



1.3 Storage Interval

OFF/1min/2min/5min/10min/30min/60min

Default：OFF



1.4 Display Channel

CH1： CH 1 Display (Free Chlorine)

CH2：CH 2 Display (pH and temperature)

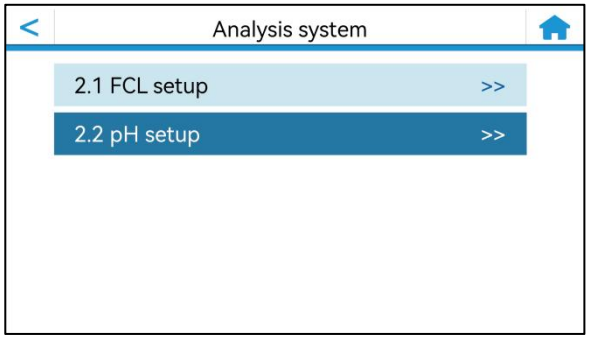
CH1 + CH2：Display CH 1 and CH 2

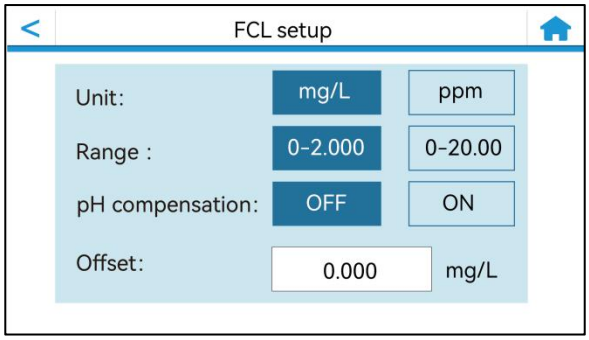
1.5 Restore Factory Settings

Select the “OK” button to restore factory settings.

Select “Cancel” to return to the previous menu.

2.0 Analysis System





2.0 Analysis System

2.1 Free Chlorine Setup

2.2 pH Setup

Select the corresponding menu and click it to enter.

2.1 FCL Setup

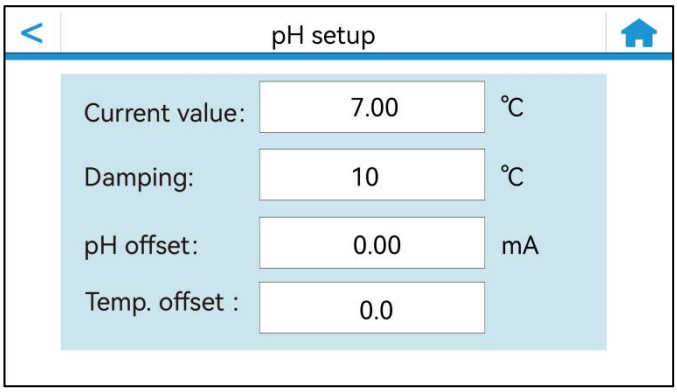
Measurement Unit: mg/L, ppm (optional)

Measurement Range: 0-2.000, 0-20.00 (optional)

pH Compensation: OFF, ON (optional)

Offset: -1.000 to 1.000 (adjustable)

pH Compensation: Select OFF for free chlorine, default compensation at pH 7 and 25° C; select ON for free chlorine, automatic real-time pH and temperature compensation.



2.2 pH Setting

Current measurement value:：7.00pH

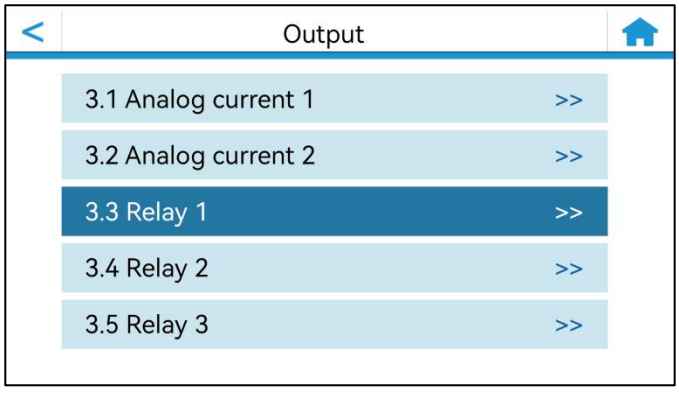
Damping coefficient: Default 10, 0-50 optional

pH offset: Default 0.00, adjustable from -1.00 to 1.00pH

Temperature offset: Default 0.0, adjustable from -5.0 to 5.0℃

The higher the damping coefficient, the more stable the pH measurement. The offset value can be used to correct the measurement value.

3.0 Output



3.0 Output

3.1 Analog Current 1

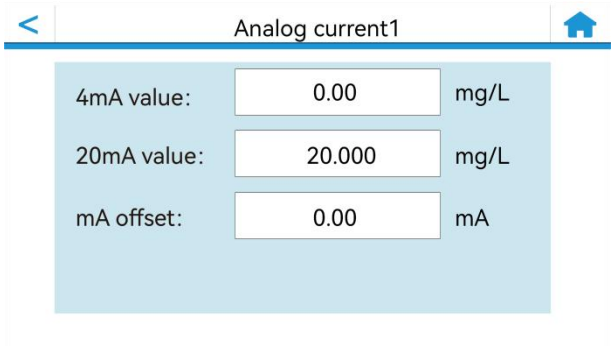
3.2 Analog Current 2

3.3 Relay 1

3.4 Relay 2

3.5 Relay 3

Select the corresponding menu and click to enter.

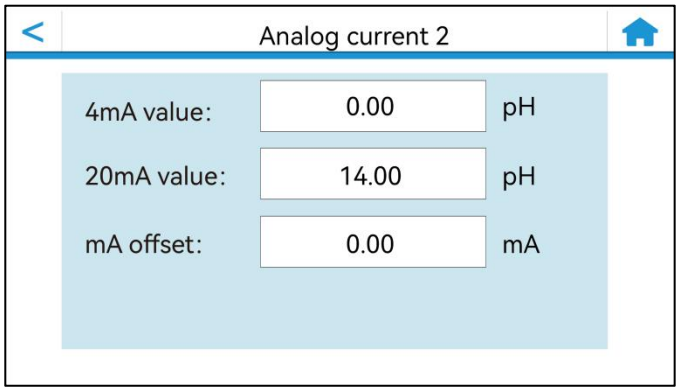


3.1 Analog Current 1

4mA setpoint: 0.000 - 19.000 Adjustable

20mA setpoint：1.000-20.00 Adjustable

mA Offset：-1.00-1.00 Adjustable

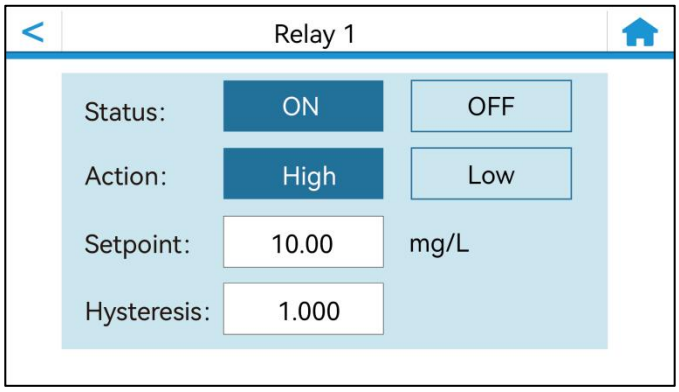


3.2 Analog Current 2

4mA setpoint：0.00-13.00 Adjustable

20mA setpoin：1.00-14.00 Adjustable

mA Offset：-1.00-1.00 Adjustable



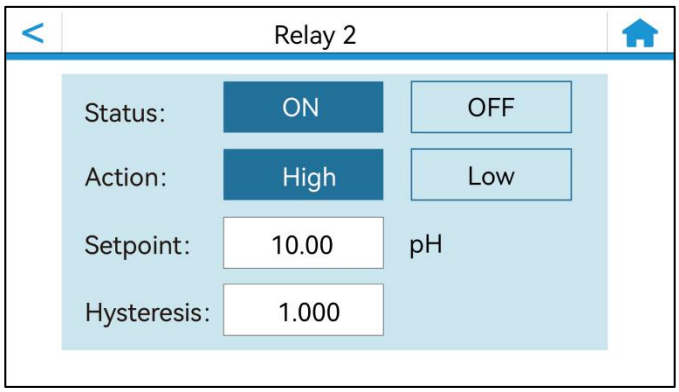
3.3 Relay 1 (Free Chlorine)

Operating Status: ON/OFF

Action Mode: High alarm or low alarm optional

Alarm Point：Default10.00，0-20.00 Adjustable

Hysteresis: 0-2.000 Adjustable



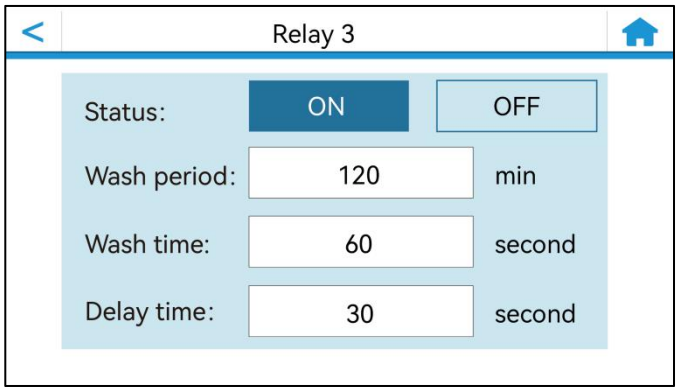
3.4 Relay 2（pH）

Operating Status: ON/OFF

Action Mode: High alarm or low alarm optional

Alarm Point：Default10.00，0-14.00 Adjustable

Hysteresis: 0-2.000 Adjustable



3.5 Relay 3 (Wash Relay)

Operating Status: ON/OFF

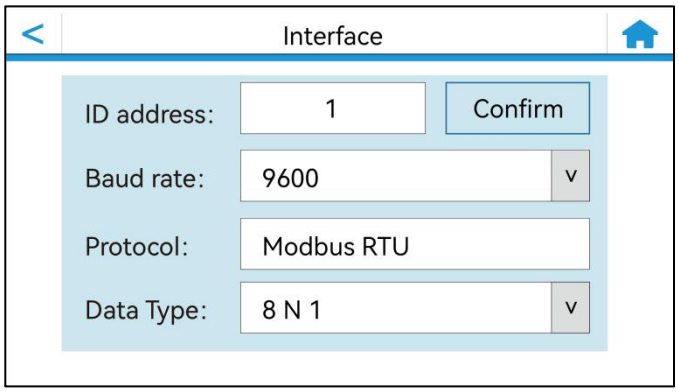
Wash Cycle：60-9999min Adjustable

Wash Duration：1-999s Adjustable

Stabilization Delay：0-9999s Adjustable

Stabilization delay refers to the duration time during which the measured value remains unchanged after wishing is completed.

4.0 Interface



4.0 Interface

ID Address: 1-250

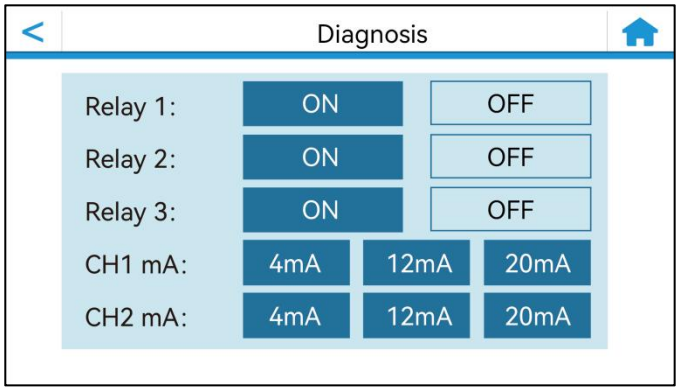
Baud Rate: 9600 (fixed)

Data Type: 8N1

Protocol: Modbus RTU

After modifying the device address, power off and restart the instrument.

5.0 Diagnosis



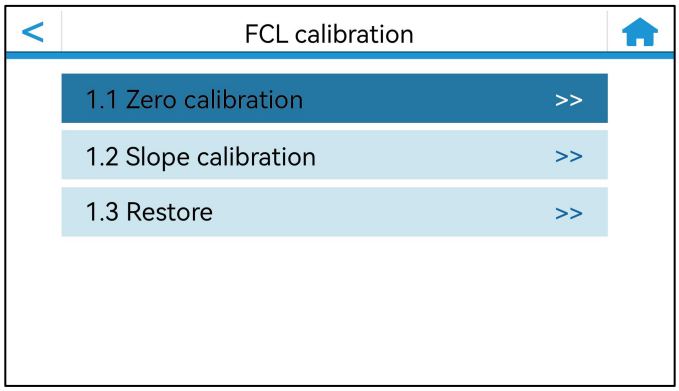
5.0 Diagnosis

Test ON/OFF of Relay 1, Relay 2, and Relay 3.

Forced output of Analog current 1 and Analog current 2

4mA、12mA、20mA

1.0 Free Chlorine Calibration

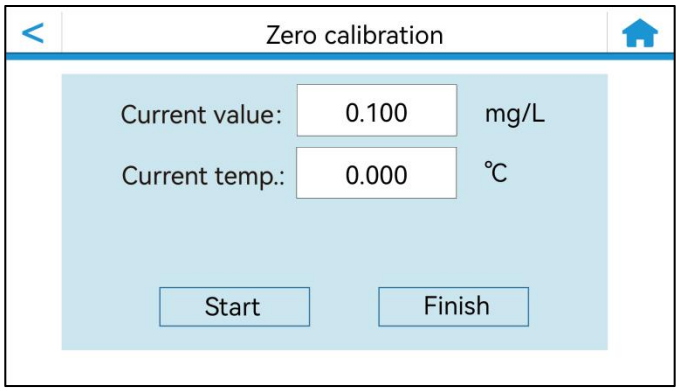


1.0 Free Chlorine Calibration

1.1 Zero Calibration

1.2 Slope Calibration

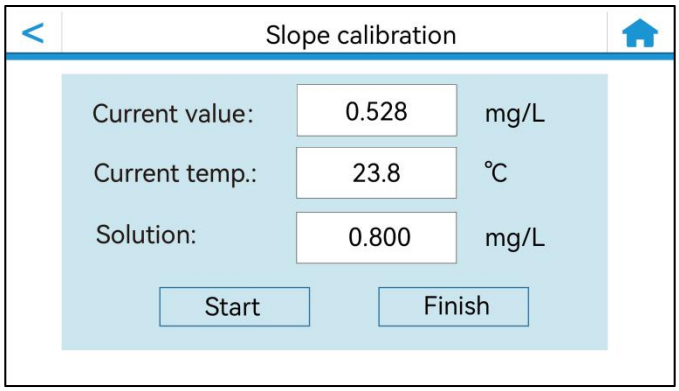
1.3 Restore factory settings



1.1 Zero Calibration

Display the current measurement value and the current temperature value

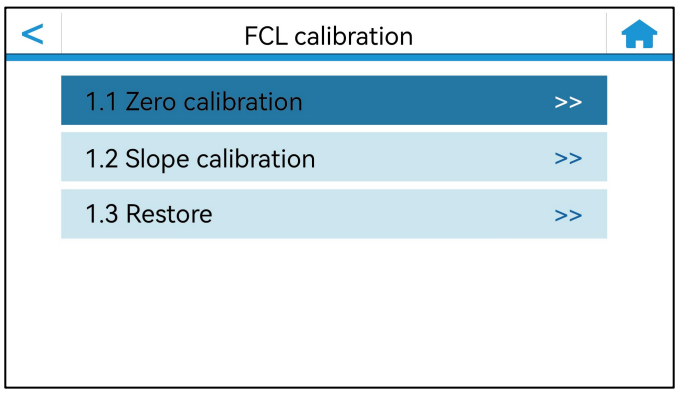
Place the electrode in deionized water or in the air, then click the “Start Calibration” button to begin calibration. The “Zero Calibration in Progress” message will appear. Once the reading stabilizes, click the “Complete Calibration” button.



1.2 Slope Calibration

Display the current measurement value and the current temperature value

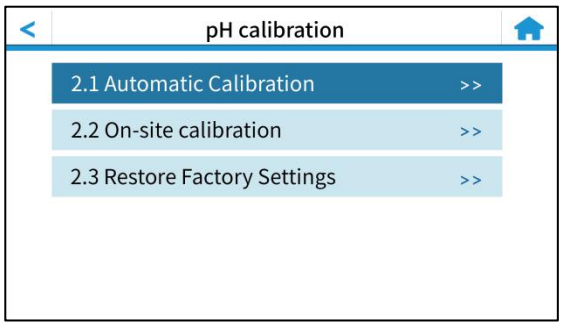
Place the electrode into the flow cell, enter the free chlorine value of the standard solution (obtainable via the laboratory DPD method), click the “Start Calibration” button, and once the current measurement value stabilizes, click the “Complete Calibration” button.



1.3 Restore factory settings

Select the Factory Calibration Reset menu, then click the menu to reset the residual chlorine factory calibration.

2.0 pH Calibration

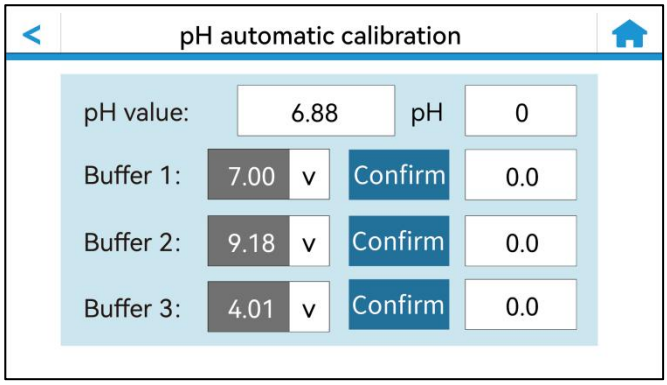


2.0 pH Calibration

2.1 Automatic Calibration

2.2 On-site Calibration

2.3 Restore Factory Settings



2.1 Automatic Calibration

Current measurement value: 6.88 pH

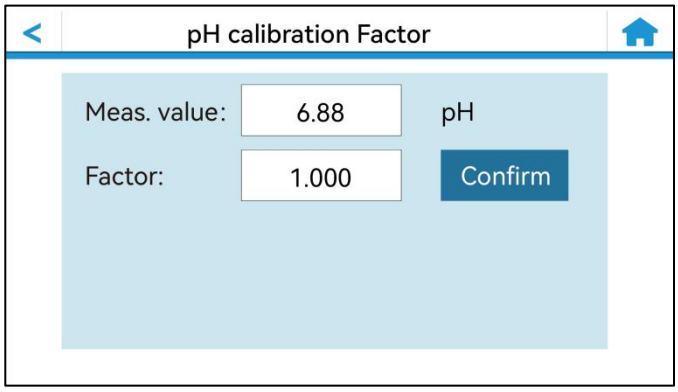
Calibration status: 0,1,2

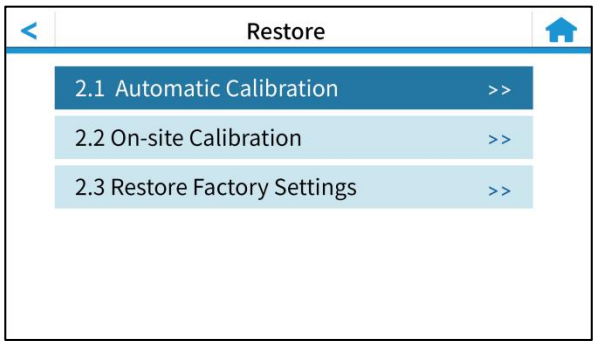
Buffer 1：7.00/6.86 Optional

Buffer 2：9.18/10.00 Optional

Buffer 3：4.00/4.01 Optional

Automatic recognition of standard solutions; press Confirm to calibrate. When uncalibrated, the calibration result displays 8888888.8. Upon successful calibration, the calibration status displays the number of calibration points completed.





2.2 On-site Calibration

1、Laboratory standard instruments measure the pH of water samples and record the laboratory's measured values.

2、**Calibration Factor = Laboratory Measurement / Current Measurement**

3、Enter the calibration factor and click the “Confirm” button.

2.3 Restore Factory Settings

Select the Factory Calibration Reset menu, then click the menu to restore the pH factory calibration.

Maintenance

innoSens 710 Free Chlorine Sensor

The reliability of the instrument depends on the reliability of the electrodes, which must be calibrated and cleaned regularly according to field conditions.

Wash steps:

a. Remove the electrode from the flow cell;

b. Immerse the double platinum rings in a 5% dilute HCL solution for 30 seconds, then wipe the platinum ring with a soft cloth to maintain its surface brightness;

c. Remove the electrode and rinse thoroughly with tap water;

d. Reinstall the electrode into the flow cell.

The free chlorine calibration procedure can be found on the free chlorine calibration page.

When encountering a long-term water outage

- Turn off the water sample;
- Turn off the power supply;
- Unplug the electrode cable and store the electrode in the dedicated protection solution. Never store the electrode in a dry environment or in pure water.
- Store the glass electrode with the glass end facing downward in a frost-free indoor location.

Maintenance

innoSens 125T pH/T Sensor

During operation, pH electrodes may experience contamination and blockage at the reference junction interface, as well as surface contamination and coverage of the sensing glass membrane, all of which can lead to measurement errors.

Regular Electrode Calibration

- Periodic calibration: Corrects both types of errors generated during electrode use to ensure measurement accuracy.
- Calibration Interval: Calibration requirements vary depending on the application; for general industrial wastewater, calibration is recommended every 7 to 15 days.
- Calibration solution: Use qualified buffer solutions, ensuring the buffer solutions have not expired.

Regular electrode cleaning

It is recommended to periodically clean the electrodes based on the on-site water quality. Remove the electrodes from the medium, wipe them with a clean, damp paper towel, and rinse with clean water. If the electrodes are heavily soiled, clean them using a cleaning agent.

- Regular cleaning: Maintain the cleanliness of the reference electrode's permeation interface; keep the sensing glass membrane clean.
- Cleaning cycle: Cleaning cycles vary depending on operating conditions.
- Cleaning agents: Water, 3 – 5% dilute hydrochloric acid, 3 – 5% sodium hydroxide, etc.

Regular Electrode Maintenance

When electrodes are used in harsh conditions such as strong acids, strong alkalis, or high temperatures, the ionic equilibrium on the glass membrane surface is disrupted, leading to measurement drift or measurement errors.

- Regular maintenance: Helps restore the electrode's ionic balance and ensure accurate temperature measurement; extends the electrode's service life.
- Maintenance cycle: Typically aligns with the regular cleaning schedule.
- Preservative: 3 mol/L KCl solution.

When encountering a long-term water outage

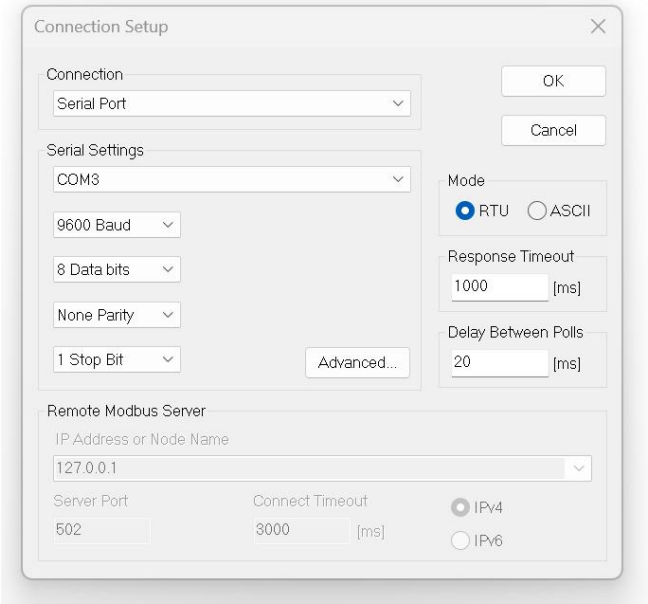
- Turn off the water sample;
- Turn off the power;
- Disconnect the electrode cable and store the electrode in the dedicated storage solution. Never store the electrode in a dry environment or in pure water.
- Store the glass electrode with the electrode tip facing downward in a frost-free indoor location.

Communication Protocol（RS485）

The instrument uses the standard Modbus-RTU protocol with a fixed serial communication baud rate of 9600.

Serial Port Parameters:

Baud Rate: 9600 Parity: None Data Bits: 8 Stop Bits: 1



Function Code:

Function 03：Parameters reading

Floating-point byte order：3412

Communication Notes:

Register Address	Address	Read/Write	Data Type	Instruction
CH1 Meas value	0	OR	Float	Residual Chlorine Measurement Value
CH2 Meas value	2	OR	Float	pH Measurement Value
CH2 Temp meas value	4	OR	Float	Temperature measurement value
CH1 Analog current	6	OR	Float	Residual Chlorine 4-20mA Current Value
CH2 Analog current	8	OR	Float	pH 4-20mA Current Value

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