To the reader:

The information contained in this manual (and its associated documentation) was as complete and true as possible at the time it was printed. If your experience in using this product differs from what the documentation describes, you may have documentation that is out-of-date. In this case, contact your B&X Company representative immediately to remedy the problem.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. B&X Company reserves the right to make improvements and changes in the hardware and software that comprise the product described here.

Thank you.

Table of contents

1. Specifications

Transmitter specifications

Measurements
The FILTR550 has one sensor channel.

Power requirements
220 VAC, 50/60 Hz

Construction
Enclosure: complete import-material
Weight: 2 kg
Temperature range for continuous operation:
-20 to 55°C

User connections
4–20 mA outputs,
Two alarm relays, 2 A @ 220 VAC.; user–configurable output;
One purge timer relay, 2 A @ 220 VAC.; user–configurable time
DA24V power output, in order to provide for the power of purging pump

Sensor specifications

Performance
Note: performance may vary according to particle and media characteristics.
Accuracy: ±1%FS
Repeatability: ± 1%
Resolution: 0.01 %

Construction

Sensor body: 316 stainless steel
Cable length: 10 m (33 ft) standard.

Process conditions

Temperature: 0 to 80°C
Flow velocity: 3 m/s (10 f/s) maximum; 0.3 m/s (1 f/s) minimum
Pressure: 10 bar (150 psi) maximum

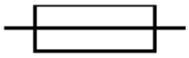
Purge specifications

Purge air pressure: minimum: 0.7 bar; maximum: 3.4bar
Purge control: user–supplied pneumatic solenoid valve controlled by a FILTR550 or a timer
Purge connection: polypropylene tubing 6.35 mm (1/4”)with reusable stainless steel fitting

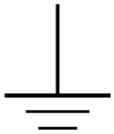
Safety information

All electrical and plumbing connections should comply with national and local codes and regulations.
The following symbols appear in this manual or on the instrument itself.

Caution



Fuse location and / or rating



Grounding terminal

Maintenance

The system should be inspected periodically for soundness of the electrical connections and environmental protection. Actions should be taken to remedy inadequate conditions.

Service and repair

There are no user–serviceable parts in either the transmitter or sensor. Only our personnel or their authorized representative(s) should attempt repair of the system and only components expressly approved by the manufacturer should be used. Any attempt to repair the instrument in contradiction of these guidelines may result in damage to the instrument and injury to the person making the repair. It will also void the warranty and may compromise the safe operation, electrical integrity or CE compliance of the instrument.
If you have difficulty with the installation, commissioning or operation of this instrument, contact the entity from which you purchased it. If this is not possible or has unsatisfactory results, contact the Customer Service department of the manufacturer.
B&X Company +86-0411-84502105

Options and accessories

Many of the items mentioned in this manual, such as ball valves, degassing chambers, junction boxes and quick–release brackets, are available from your B&X Company representative. Other items may need to be supplied by you. These items are noted as such where they appear.

2. Mounting the transmitter

Use the following criteria when choosing a location for the transmitter:

- Shield the transmitter from direct sunlight.
- Isolate the transmitter from excessive vibration.
- If possible, mount the transmitter slightly above eye level. This will allow an unrestricted view of the front panel displays and controls.
- Reserve enough space so that the transmitter can be opened fully and is accessible for maintenance. See Fig. 2.1 for dimensions.

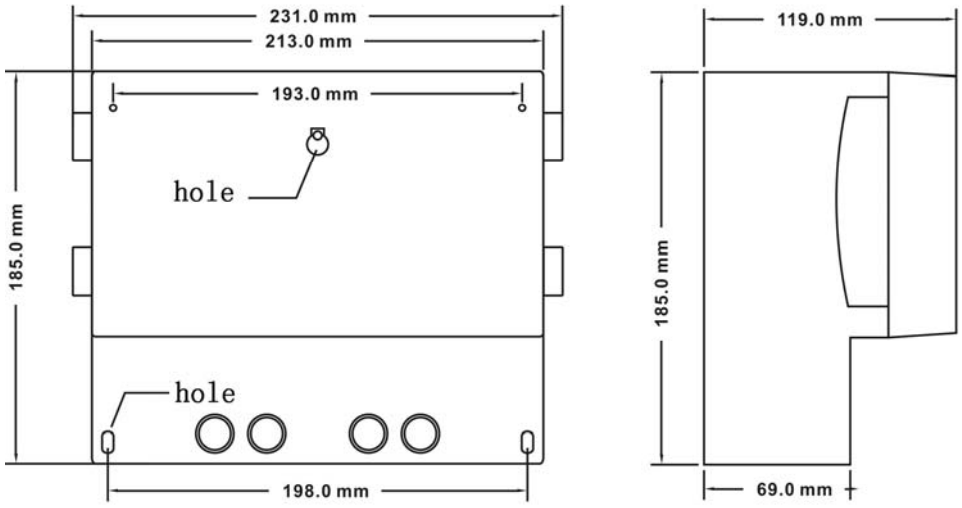


Fig. 2.1 Dimensions of Transmitter

3. Sensor installation

3.1 Location criteria

General

Use the following criteria to select a location for the sensor(s):

- Install the sensor in a location that gives a representative measurement of the process.
- Install the sensor in an accessible area. It may be necessary to clean the sensor periodically.
- Avoid installing the sensor where air bubbles are present—they can cause a noisy signal. This may be unavoidable in some applications, such as centrates and filtrates. In such cases, install the sensor in a degassing chamber.
- Install the sensor where you can conveniently take representative process samples. The maximum recommended distance between the sample point and the sensor is 1.5 m (5 ft). Sampling is necessary during and after calibration to compare the instrument readings to lab analysis values. Incorrect sampling is a common cause of measurement errors.
- Install the sensor where the process is well–mixed and not stagnant. This is usually the same location as the sampling site.
- If debris is present, the sensor should be installed after a grinder or comminutor.
- Sensor tips should face away from the flow.

Immersion sensors

Immersion sensors should be immersed a minimum of 300 mm (12 in) or to the depth at which samples are normally taken.

Insertion sensors

Refer to Fig. 3.1.

- Insertion sensors should be mounted in an upflow pipe section. If this is not possible, installation at 45° to 90° from the bottom center of a horizontal pipe is recommended. Do not install the sensor in a downflow pipe, or at the top or bottom of a horizontal pipe.
- Sensors should be installed at least 1.5 m (5 ft) downstream of pumps, valves or pipe elbows.
- Provide clearance for removal of the sensor as indicated in Fig. 3.1.
- If rags, string or plastic is anticipated, mount after a grinder.
- Install a sample line, hose and drain within 1.5 m (5 ft) downstream of the sensor. Minimum recommended sample line size is 25 mm (1 in).
- Minimum recommended process line size is 100 mm (4 in).

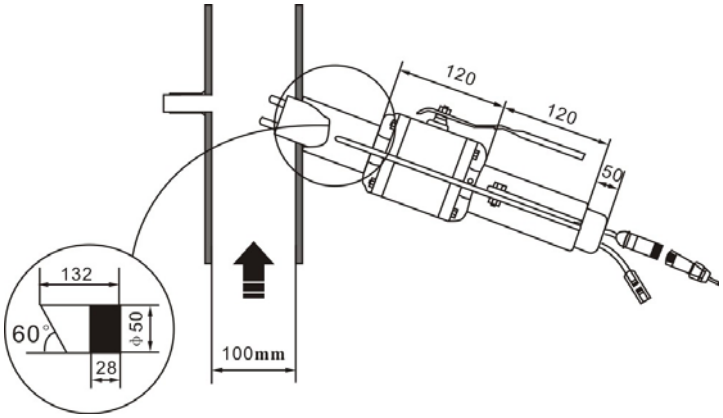


Fig. 3.1 Mounting stud installation for ball valve assembly

3.2 Mounting stud

Refer to Fig. 3.2.

1. Unscrew the mounting stud from the ball valve assembly.
2. Stop the process flow, drain and clean the process line and (if possible) remove the appropriate pipe section.
3. Contour the mounting stud and sample line to match the inside diameter of the process pipe wall.
4. Cut holes in the pipe and weld the mounting stud and the sample line to the process line. If the stainless steel stud cannot be welded to the pipe due to incompatible pipe composition, it is recommended that a stainless steel flanged pipe section be fabricated to take the place of the original pipe.
5. Installation of a user–supplied sample line, valve and hose is highly recommended for taking representative process samples.
6. Reinstall the pipe section, if you removed it.
7. Using pipe tape or thread sealant, screw the ball valve onto the mounting stud.
8. Screw the 1/4” pressure relief valve onto the 1/4” nipple of the ball valve assembly.
9. Close the sample line, pressure relief valve and ball valve and start the process flow.

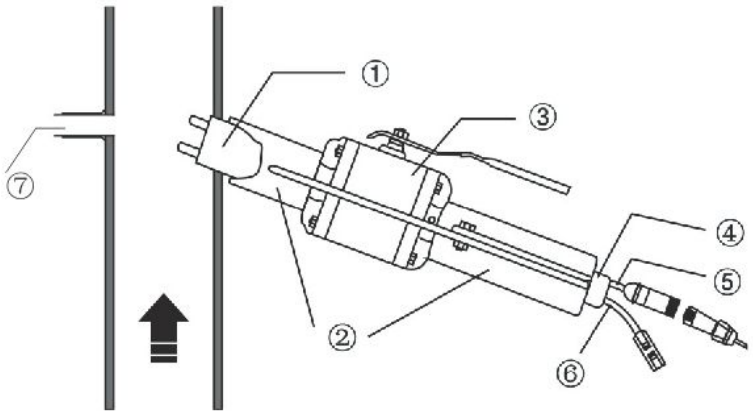


Fig. 3.2 Ball valve installation

1 Sensor tip
2 Mounting stud
3 Safety handle (2)

4 Sensor tube
5 1/4 inch purge connection
6 Interconnect cable
7 Sample line
(user–supplied)

3.3 Flow orientation

Insertion sensors and, if applicable, immersion sensors, should be oriented to the process flow so that the two dark–colored optical fingers (detectors) are parallel with the flow. See Fig. 3.3. To orient insertion sensors:

1. Remove the sensor if it is in the ball valve.
2. Determine the direction of the process flow and mark it on the pipe for reference in Step 4.
3. Loosen the two setscrews on either side of the rotating collar (see Fig. 3.3).
4. Orient the sensor to match the sensor tip orientation in Fig. 7.
5. While maintaining proper tip orientation, rotate the sensor flange until it is aligned with the ball valve flange (see Fig. 3.3).
6. With the sensor and ball valve flanges aligned, tighten the setscrews. When the setscrews are properly seated in the countersunk holes of the sensor body, the sensor flange should be tight.

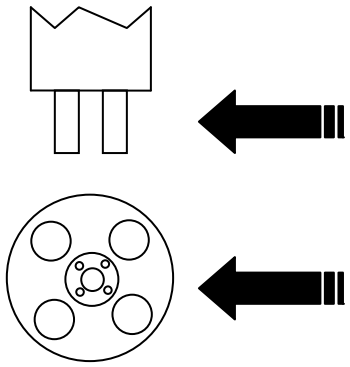


Fig. 3.3 Sensor tip orientation

3.4 Insertion sensors

The ball valve assembly has two internal o–ring seal which prevent the process from escaping past the sensor. A light coating of silicone grease on the sensor body will prevent these o–rings from being damaged. Always make sure the sensor is in the fully retracted position before opening or closing the ball valve assembly to prevent damage to the optical fingers.

1. Verify the sensor orientation is correct. Refer to Fig. 7 if necessary.
2. Apply a light coating of silicone grease to the sensor body. Do not apply grease to the measuring surfaces.
3. Refer to Fig. 6. Remove the two hinge clips from the sensor flange pins.
4. Open the pressure relief valve. Insert the sensor into the ball valve until the holes in the toggle bars can be slipped onto the pins on the sensor flange. Do not hit the ball of the valve with the optical fingers.
5. Lock the safety handle toggle bars in place by replacing the hinge clips. Close the pressure relief

valve.

6. Open the ball valve completely. Slowly insert the sensor by pushing forward on the handles.
7. Install and tighten the two safety bolts. Connect the interconnect cable to the sensor.

3.5 Immersion sensors

1. Sensors are supplied with male pipe threads, by which the sensor can be screwed to a length of pipe, then attached to a handrail.
2. The pipe, couplings and pipe elbow are user supplied. It is necessary to install an elbow at the top of the pipe to provide a 90° bend in the pipe, to keep out rain.
3. A typical installation using optional quick–release mounting brackets is shown in Fig. 3.4. The cable is routed through the pipe and connected to the transmitter.
4. If you will be using the purge capability, connect a suitable length of tubing and route it through the pipe.
5. An optional junction box is recommended for applications that require a cable longer than the standard length.

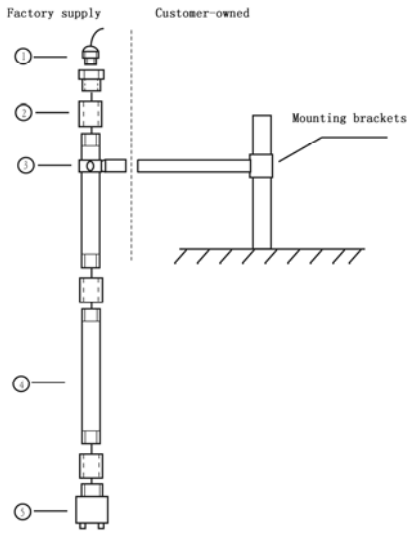


Fig. 3.4 Immersion sensor installation

1 Waterproof Terminals	2 Connecting pipe hoop	3 Fasteners
4 One inch pipe	5 Immersion sensor	6 Connectors

3.6 Purge connections

Sensors are shipped with the purge connection capped. If you will not be using the purge, you must leave the cap on. RD sensors require pressurized air to purge the sensor tip of excess sludge. The FILTR550 relay output S4 can be configured for switching a user–supplied solenoid valve to control purge air to the sensor. If air is not available, a 3/4 HP, oil–less electric compressor with a 11.4 liter (3 gallon) tank mounted near the sensor will suffice. Fig. 3.5 shows a typical purge system diagram. Add a check valve, if necessary, between the solenoid valve and the sensor to prevent process media from backing up into the purge line.

1. Sensors are shipped with the purge connection capped.

2. Uncap and connect the air supply (remove insertion sensors from the process line prior to uncapping).
3. The minimum recommended air pressure is 0.7 bar (10 psi); the maximum recommended pressure is 2.0 bar (30 psi). For insertion sensors, minimum and maximum pressures given are above maximum process line pressure.
4. Any unused purge connection must be capped.
5. Connect AC main power to one side of the S4 terminal. Connect one side of the solenoid coil to the other S4 terminal. Connect the other side of the solenoid coil to AC main neutral. The S4 relay is rated for 2 A @ 250 VAC or 0.5 A @ 100 VDC.
6. Refer to section 4 for relay connection instructions.

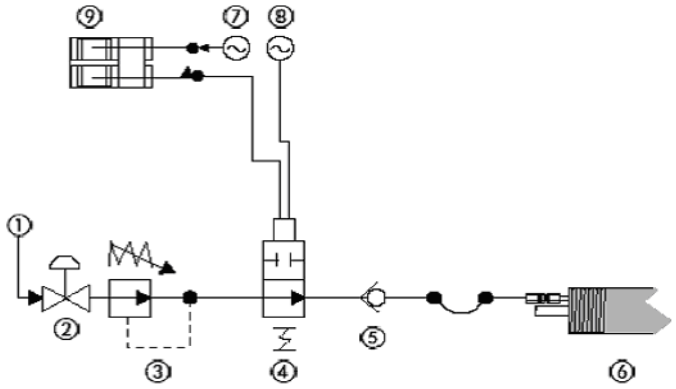


Fig. 3.5 Air purge system (user–supplied)

1 Air supply
2 Shut–off valve
3 Pressure regulator
4 Solenoid valve
5 Check valve (if required)
6 RD sensor
7 AC live
8 AC neutral
9 Transmitter relay terminal block

Transmitter configuration

Timing of the purge operation is controlled by the purge timer (S4) that is used with the user–configured purge relay to control the solenoid valve. See section 4 for relay configuration instructions.

3.7. Connections

3.7.1 Electrical connection considerations.

In order to ensure safety, electrical connection requests by professionals to complete. Static electricity can damage the instrument due to the internal electronic devices, resulting in performance degradation or damage to equipment. Manufacturers proposed the following measures to prevent static electricity damage to equipment are:

- in contact with any instrument electronic components (such as on a printed circuit board and its components) before moving the body to release static electricity. This can be by touching a grounded metal surface instrument chassis, or a metal conduit or pipe to be achieved;
- To reduce the static electricity gathered to avoid excessive movement. Static-sensitive components to be placed on an antistatic container or packaging for the transport;
- the body to release static electricity from the user and maintain the static can be released, please wear a grounding wire connected to the elbow section of electrostatic trap;
- If possible, use antistatic floor pads or the workbench pads.

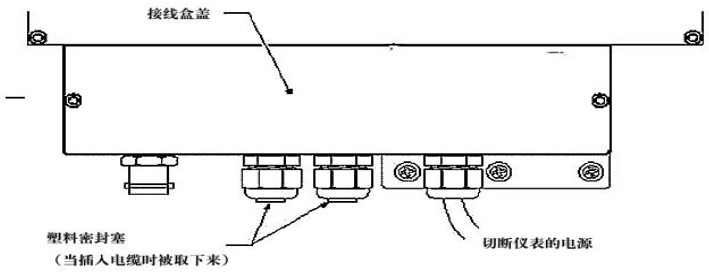


Fig. 3.6

3.7.2 AC connections

The power supply accepts 220VAC ± 10%, (50/60Hz) without changes in configuration. Maximum power consumption is 25 VA. See Fig. for connection locations.

- Connect power according to the diagram on the wiring guide plate.
- The terminal block for power connections can be lifted from its header for easier installation.
- Use a three core mains supply cord (2 core + PE) rated for the maximum equipment current. Wiring shall be rated at 80°C (176°F) or higher. All electrical connections shall comply with national and local electrical codes. An isolating switch or circuit breaker shall be installed within easy reach of the operator and shall be marked as the disconnecting device for the equipment. The supply shall be fitted with an overcurrent protection device rated at 20 Amp maximum. Work should be performed only by qualified personnel.

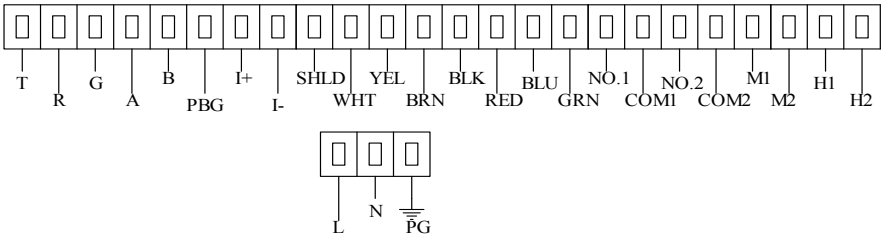


Fig. 3.7 Terminals showing

Function of the various terminals as shown in Table 3-1:

Table 3-1

NO.	Terminal	Function	Remark
（1）	T	232TXD	232output
（2）	R	232RXD	
（3）	G	GND	
（4）	A	485 output	485 output
（5）	B	485 output	
（6）	PBG	485 output GND	
（7）	I+	4~20mA output +	Concentration Output
（8）	I-	4~20mA output -	
（9）	SHLD	Shield line	sensor shield line
（10）	WHT	Single line	sensor white line
(11)	YEL	Signal line	sensor yellow line
（12）	BRN	Signal line	sensor brown line
(13)	BLK	Signal line	sensor black line
（14）	RED	Signal line	sensor red line
(15)	BLU	Signal line	sensor blue line
（16）	GRN	Signal line	sensor green line
（17）	NO1	Relay 1	Relay output1
（18）	COM1	Relay 1	
（19）	NO2	Relay 2	Relay output 2
（20）	COM2	Relay 2	
（21）	M1	Relay 3	Auto-purge （Optional）
（22）	M2	Relay 3	
（23）	H1	Relay 4	Manual-purging（Optional）
（24）	H2	Relay 4	
（25）	220V	AC input N	AC220V
（26）	220V	AC input L	
（27）	PG	AC input GND	Ground

3.7.3 Other information

- Replace the wiring guide plate before closing the transmitter. The transmitter must be screwed shut to protect the interior components of the enclosure.

4. Operation

4.1 Menu rules

The FILTR550 user–interface consists of a display screen and five keys.
The MODE key (MODE) will enter the setup mode. Display the setup menus.
The Set key (SET) is valid after entering setup mode. Display the menu interface, click here to select a menu to enter. In a variety of menu settings interface, you can click here to save the data and return menu interface.
The Run key (RUN) is valid after entering setup mode. Click here to exit setting mode, then enter the measurement mode.
The two keys "▲"and "▼" are valid after entering setup mode. While displaying the menu screen, Click button can be up / down scroll menu to change the selected location. While displaying parameter settings screen, click button to increase / decrease parameter values, and continuously click here can quickly increase / decrease parameter value.

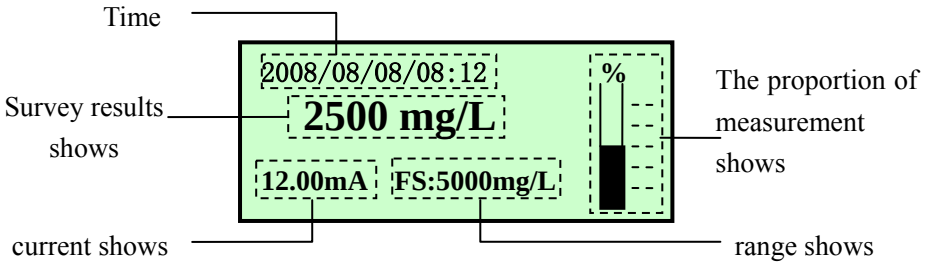


Fig. 4.1 The Menu Interface

4.2 The overall structure of the menu

By pressing the MODE button on the transmitter of FILTR550 and entering the correct password, it will be able to enter the menu interface. The menu is a single-level menus. Functions and related parameters such as shown in Table 4-1, detailed settings please refer to "4.4 Menu details."

Table 4-1 Menu List

NO.	Menu	Parameters Set	Range	Initial Value
1	Password Settings	Set password to enter the menu	0~1000	0000
2	Unit Settings	Set display units	g/L or mg/L	mg/L
3	The small-signal cutting	Set the value of the small-signal cutting	0.00~ Full Scale	5mg/L
4	Range Settings	Set full-scale concentrations	0~9999mg/L 0~25g/L	5g/L
5	4mA Calibration	Calibrate 4mA output current value	0~2000	1000
6	20mA Calibration	Calibrate 20mA output current value	0~2000	1000
7	Fault Current Settings	Set Fault Alarm current value	4~24mA	21.0mA
8	Filter coefficients	Set the filter coefficients measured values	0~100	50

	Settings			
9	Relay Ⅰ Opening Settings	Set opening concentration of the relay Ⅰ	0~ Full Scale	90%FS
10	Relay Ⅰ Shutdown Settings	Set shutdown concentration of the relay Ⅰ	0~ Full Scale	85%FS
11	Relay Ⅱ Opening Settings	Set opening concentration of the relay Ⅱ	0~ Full Scale	25%FS
12	Relay Ⅱ Shutdown Settings	Set shutdown concentration of the relay Ⅱ	0~ Full Scale	30%FS
13	Time Settings	Set Real Time Clock Time	Current Time	
14	Tendency line sampling interval	Set the tendency line the time interval	1~59 minutes	30 minutes
15	Historical Tendency line shows	Display the trend line of historical data		
16	Purge time Settings	Set the purge time		20hours
17	Zero Calibration	Zero signal values		
18	Zero Concentration Correction	Enter actual concentration of sample while the zero value calibrated	0.00~ Full Scale	
19	The first point calibration	The first calibration signal value		
20	The first concentration correction	Enter actual concentration of sample while the first value calibrated	0.00~ Full Scale	
21	The second point calibration	The second calibration signal value		
22	The second concentration correction	Enter actual concentration of sample while the second value calibrated	0.00~ Full Scale	
23	Calibration Points Settings	Set Calibration Points	2~3	2

4.3 Conventional workflow

After completing the FILTR550 installation, the operator can set the parameters in accordance with the following order. About other menus, you can use the default factory settings and you can also set the parameters based on actual conditions.

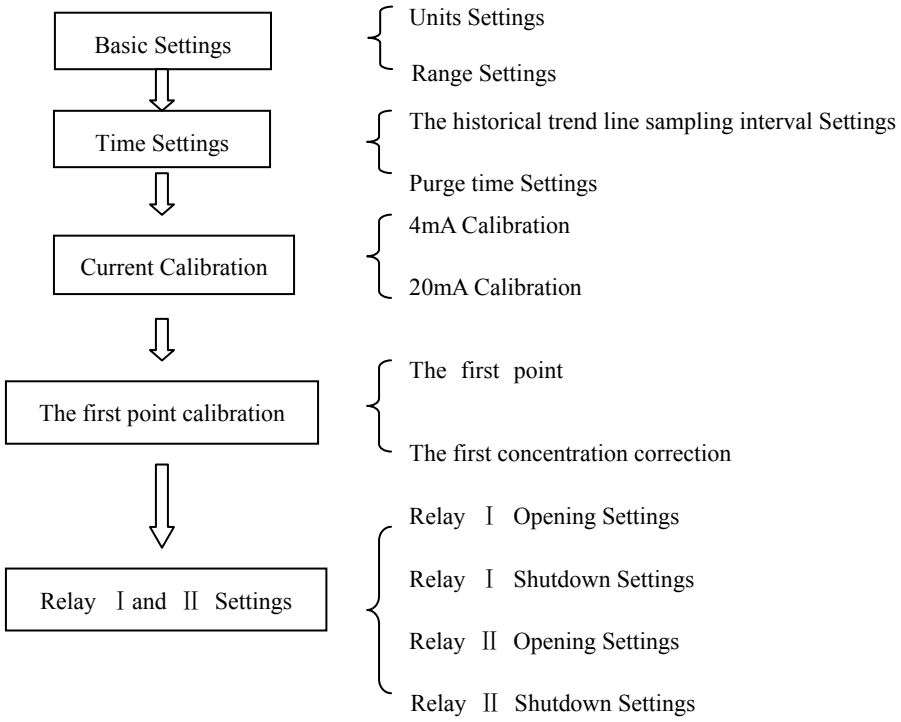


Fig.4.2 General Settings Flowchart

4.4 Menu details

4.4.1 Menu

While instrument working normally, you can press the "MODE" key to enter the menu mode. At this time, LCD display the interface, as shown in Figure 4.3, prompts the user to enter the password.

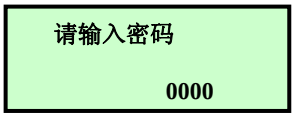


Fig.4.3 Password Input Interface

Through the "▼" and the "▲" button, you can change the password displayed on the LCD screen, that is, enter the password. When the entering password is the password which set by the user (default password is 0000, and the password range is 0000 ~ 1000), press "SET" key to enter the menu. The menu interface as shown in Figure 4-4. The interface on the left of the cursor "*" is used to indicate the currently selected menu. Press the "SET" key to enter the menu, and then press the "▼" and the "▲" can be to change the cursor position. When you enter your password wrong, the LCD screen will display "ERROR" message and automatically return to the measurement mode in 1 second.

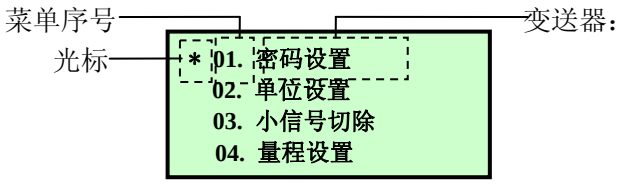


Fig.4.4 Menu interface

4.4.2 Password Settings

Instrument password setting is to ensure that the instrument is always operated by professionals, avoiding consequences because of mistakes which is operated by the operator who has not the permission. Method of setting password: First, press the "MODE" button, enter the password (default password is 0000) and press "SET" key; after entering the menu interface, through pressing the "▼" and the "▲" key to move the cursor to the "Password Settings" Menu Department; press the "SET" button to enter the password shown in Figure 4-5 to set interface, through pressing the "▼" and the "▲" key to enter the new password. The new password input range is 0000 ~ 1000; press the "SET" button again to save and return to the menu interface.

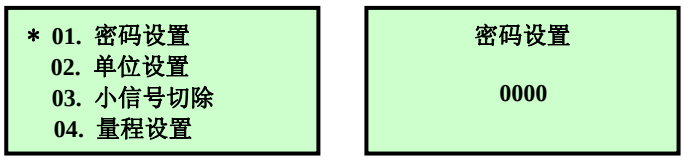


Fig.4.5 Password Settings Interface

4.4.3 Units Settings

FILTR550 provides two kinds of display units: mg/L and g/L. You may select one of the other available unit. Factory default setting is mg/L, The user can select the appropriate units. Method of setting up units is similar to password setting.

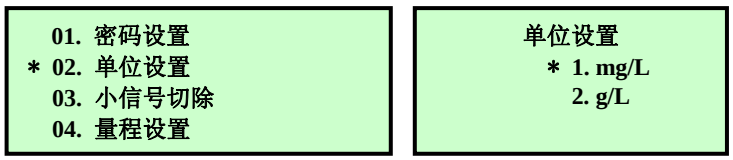


Fig.4.6 Unit Settings Interface

4.4.4 The small-signal cutting

When the measured value is less than a fixed value, user can use the function of the small-signal cutting, the output shows zero, 4 ~ 20mA output is 4mA. It can avoid the instable output value caused by measurement of the medium which have a small fluctuation or caused by other interference fluctuations in measured. For example, the set is 5mg/L, then when the measured value is 5mg/L, it displays 0mg/L, while the output current value is 4mA. Method of small-signal cutting is similar to the way of password settings.

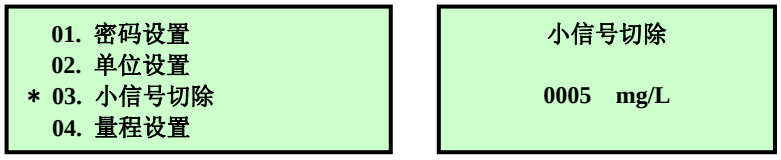


Fig.4.7 “The small-signal cutting” Settings Interface

4.4.5 Range Settings

The user can set the range of FILTR550 according with actual needs, and corresponding to full-scale current output is 20mA. Method of the range settings is similar to the way of password settings.

Note: In the unit mg/L, range units of the range setting interface display is mg/L, range can be set to the range of 0 ~ 9999mg/L; in units g/L, range units of the range setting interface display is g/L, range can be set to the range of 0 ~ 25.00g/L.

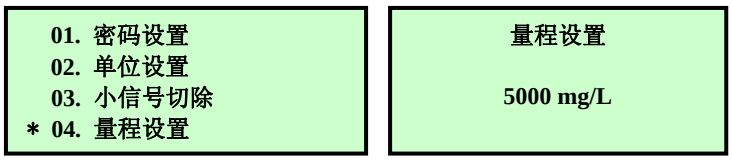


Fig.4.8 Range Settings Interface

4.4.6 4mA and 20mA Calibration

In the factory, 4 ~ 20mA current output of the transmitter have be set. Transmitter 4mA output corresponds to the minimum concentration, and 20mA output corresponding to the maximum concentration (full-scale). The linear change of concentration values correspond to 4 ~ 20mA current change. Before the use of 4 ~ 20mA output signal, the user needs to correct the output depending on the actual output at the scene.

Current calibration needs two people. One person observed current value in the terminal, the other adjusted the calibration value at the scene. Enter the "4mA calibration" interface, as shown in Figure 4-9, press "▼" and the "▲" button to change the output values on the screen until the terminal output current is 4mA. Press the "SET" button to save and return to the menu interface.

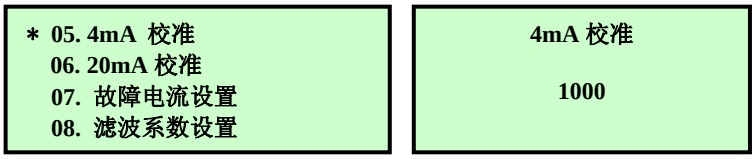


Fig.4.9 4~20mA Calibration Interface

4.4.7 Fault Current Settings

Fault current setting is that when FILTR550 measurement signal is abnormal, which includes that the measurement range exceed the scope, communication is failure between the transmitter and sensor, the output current value is too small when measuring the signal. Factory default is set to 21mA. Method of entering "fault current settings" is same to the way of entering the "Password Settings" interface. Enter the "fault current settings" setting interface as shown in Figure 4-10, and enter the fault current through the "▼" and the "▲" key, press the "SET" button to save and return to the menu interface.

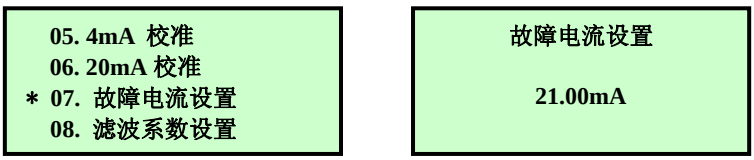


Fig.4.10 Fault Current Settings Interface

4.4.8 Filter coefficients Settings

Filter coefficients settings is designed to ensure a more stable signal, and some short-term fluctuations will not be a result that measured data display will not be instability changes. Filter coefficients is bigger, the measurement time is longer, and measuring the signal value is more stable. Usually if the value is 50, it will be able to meet the requirements. If the media fluctuation is large, it can be increased in the value. Factory default setting is 50. Method of entering the "filter coefficients set" is same to the way of entering the "Password Settings" interface. Enter the " Filter coefficients settings " setting interface as shown in Figure 4-11. In the "filter coefficients settings " interface, through the "▼" and the "▲" key to enter the filter coefficient.

Press the "SET" button to save and return to the menu interface. Filter coefficients input range is 001 ~ 100.

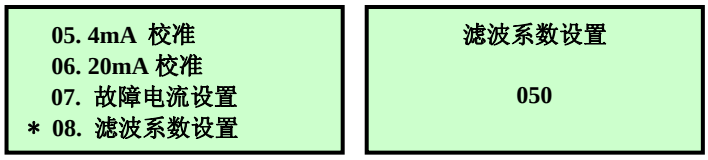


Fig.4.11 Filter coefficients Settings Interface

4.4.9 Relay Settings

Transmitter has two relay control outputs, respectively which used to output control for the upper and lower limits. Specific actions as follows: When the measured value is greater than opening value of relay Ⅰ, the relay opening, when measured value is less than shutdown value of relay Ⅰ, relay Ⅰ is turn-off. When the measured value below the opening value of relay Ⅱ, relay Ⅱ is opened. When the measured value is greater than the shutdown value of relay Ⅱ, relay Ⅱ is closed. Factory default setting is that when relay Ⅰ value is greater than 90% FS, it is opened, and when it is less than 85% FS ,it is turn-off; when relay Ⅱ value is less than 25% FS, it is opened, and when it is more than 30% FS , it is turn-off.

Method of entering "an open relay settings" interface is same to the way of entering the "Password Settings" interface, the enter as shown in Figure 4-12, in the " relay settings" interface, through pressing the "▼" and the "▲" button to enter an open relay the concentration of the corresponding value, and press the "SET" button to save and return to the menu interface. Open relay Ⅰ concentration of the input range is 0 ~ 9999mg / L or 0 ~ 25g / L.

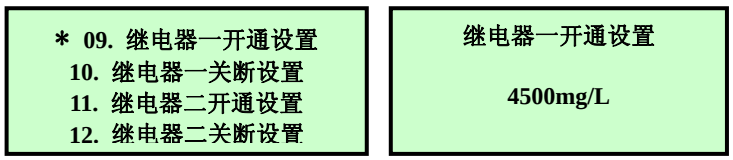


Fig.4.12 Relay Ⅰ Opening Settings Interface

Using the same operation to be completed to set off relay Ⅰ shutdown settings, and relay Ⅱ Opening and shutdown Setting.

4.4.10 Time Settings

The time setting is used to set the system time which the transmitter displays. Method of entering "Time Settings" is the same to the way of entering the "Password Settings" interface, enter as shown in Figure 4-13. In the "Time Settings" interface, the time format is: year / month / day / time: minutes. You can adjust the current cursor "*" where the value of items thought "▼" and the "▲" button, such as when the cursor in the "2008" , you can press "▼" and the "▲" to adjust the time of the year. Press "SET" key to save the current settings and move the cursor position, every time pressing "SET" button the cursor shift to the right one,

If the current cursor in the "2008", press "SET" button once, then the cursor is shifted to the right a value of "08 (months)", at this time the user can adjust the time of the month. When the cursor is in minute item, press "SET" button to save data and exit the time setting interface.

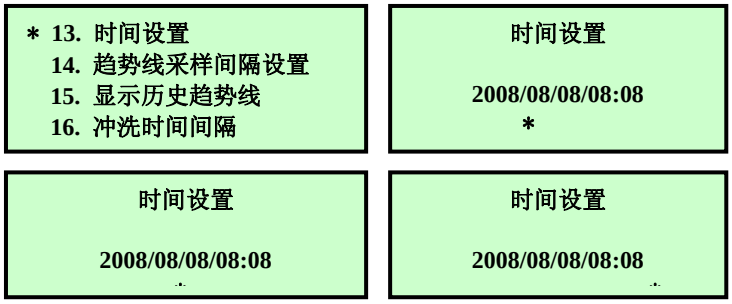


Fig.4.13 Time Settings Interface

4.4.11 Tendency line sampling interval and Historical Tendency line shows

By setting the trend line sampling interval, it can be set to recording the time interval (sampling time interval), and the value of setting the range is 1 to 59 minutes. Factory default is 30 minutes, and the sampling points which the transmitter record is 192. Such as the sampling interval is 30 minutes, you can record 96 hours the concentration trends. Users can set the sampling time interval.

Note: After the power closed, the historical trend line can not be saved!

Method of entering the "Tendency line sampling interval" interface is the same to the way of entering the "Password Settings" interface, enter as shown in Figure 4-14 the " Tendency line sampling interval " interface, through pressing the "▼" and the "▲" button to enter the trend line sampling interval, then press the "SET" button to save and return to the menu interface.

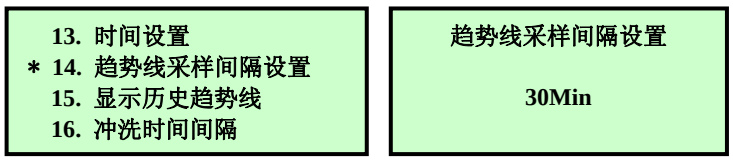


Fig.4.14 Tendency line sampling interval Settings Interface

Method of entering " Historical Tendency line shows " interface is the same to the way of entering the "trend line sampling interval settings" interface, at this time, display interface as shown in Figure 4-15:

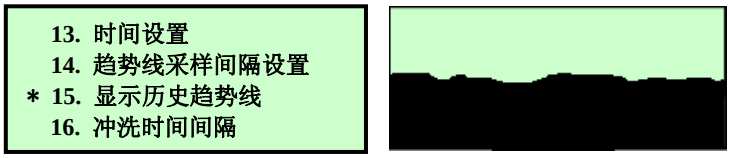


Fig.4.15 Historical Tendency line shows Settings Interface

4.4.12 Purge time Settings

FILTR550 has a self-cleaning time control relay. Method of entering "Purge time Settings" interface is the same to the way of entering the "Password Settings" interface, enter as shown in Figure 4-16 the " Purge time Settings " interface, through pressing the "▼" and the "▲" button to enter washing time interval, and press the "SET" button to save and return to the menu interface. Flush time interval is 1 minute each time.

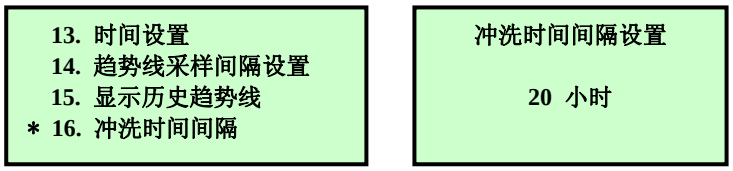


Fig.4.16 Purge time Settings Interface

4.4.13 Zero Calibration and Concentration Correction

As FILTR550 measure the concentration of suspended matter by measuring the infrared light transmittance, for the same kind of medium infrared light attenuation, coefficient remains unchanged, but in different materials in the infrared light attenuation coefficient it is not necessarily the same. So that users need to calibrate instrument in actual, actually it is to determine the attenuation coefficient. Instrument calibration needs to calibrate two points regularly, namely zero (zero calibration value, zero concentration value) and the first point (first point calibration value, the first point concentration). By analyzing the zero concentration and the first point concentration value and calibration value, instrument can get attenuation coefficient of the infrared light in the medium.

While zero calibrating, sensor placed into clean water, preferably with a dark container, to avoid direct sunlight. To wait until the instrument displaying relatively stable value (wait a few minutes approximately), enter zero as shown in Figure 4-17 Calibration of interface. 1780 is the calibration value which had deal with, and directly proportional to the concentration; the greater calibration value, the greater concentration. Generally speaking, the calibration value in clear water should be between 1500 and 2500; if there is clear difference, please make sure that operation is correct, whether there is direct sunlight and so on; If correctly, press the SET to determine, at this time instrument has recorded the value in clean water. If misoperation happening, please press RUN to exit the menu.

Note: The misuse may lead that devices can not work properly!

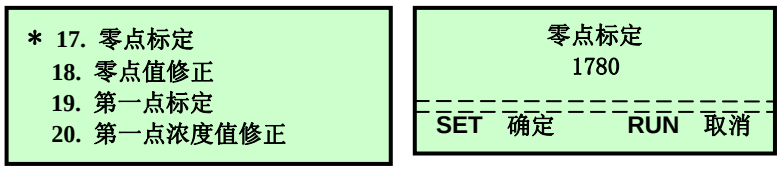


Fig.4.17 Zero Calibration Settings Interface

If the concentration value is not zero in clean water, you will need an amendment to the zero concentration, in the “Zero Concentration Correction” interface, as shown in Figure 4-18. "Zero Calibration (1780)", The value in brackets is the signals value while zero-standard 1780 recording. Through press the "▼" and the "▲" key to enter the concentration value of zero, then press the "SET" button to save and return to the menu interface.

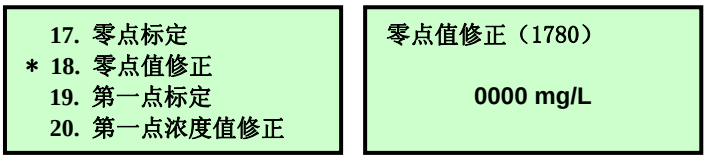


Fig.4.18 Zero Correction Settings Interface

4.4.14 The first point calibration and The first concentration correction

The first point calibration and zero point calibration are used to ensure the attenuation coefficient of the infrared light in the measured medium. Instrument works normally in the measured medium. Observing the instrument, when shows the value is stable within a few minutes, get the sample at shun flow direction behind the sensor within one meter, at the same time to enter as shown in Figure 4-19 " the first point calibration" interface, in the figure, "2500" is the first point of the calibration value which measured by the instrument automatically. The first point calibration value should be greater than zero calibration value, otherwise, please click "RUN" key to exit the calibration menu and re-calibrate the first point. To confirm correct calibration value press "SET" button to save the data and return the menu interface,

You can also press "▼" and the "▲" key to adjust the first point calibration value, and press the "SET" button to save and return to the menu interface.

Note: When the user calibrate the first point, you had better to operate with other people, one people sample, another people immediate different to the first point calibration interface, and record the first point calibration value.

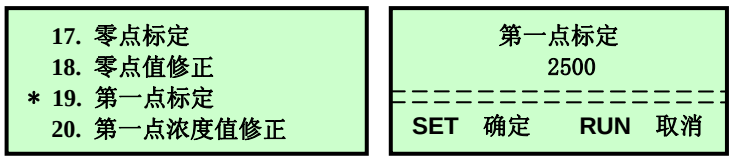


Fig.4.19 The first point calibration Settings Interface

Then test the concentration of sampling media. As shown in Figure 4-20 to enter the "The first point concentration correction" interface, through pressing the "▼" and the "▲" key to enter the the first point of concentration, and press the "SET" button to save and return to the menu interface.

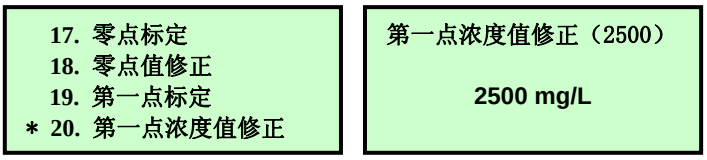


Fig.4.20 The first concentration correction Settings Interface

4.4.15 The second point calibration and The second concentration correction

The second point calibration is the same to the way of the first point calibration, so this is no longer introduced.

Note: The value of the first point calibration measurement is the best to select intermediate values of measurement point, can not be too close to zero, and also do not close to full-scale. The second point calibration can not be the same as the first point calibration value.

4.4.16 Calibration Points Settings

Calibration Points setting is used to set up effective calibration points of the instrument. Enter in Figure 4-21 as shown in the "calibration points setting " interface, through pressing the "▼" and the "▲" key to enter calibration points, and press the "SET" button to save and return to the menu interface. Range of calibration points is 2 ~ 3, the factory default setting is 2.

Note: In normal circumstances, two calibration points have been able to meet the requirements (for users it is only need to ascertain the first point, zero point has been calibrated before the factory), if it is large changes in dielectric particles, please use the three-point calibration!

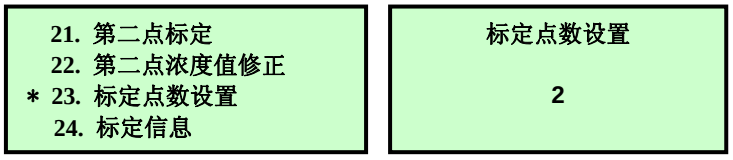
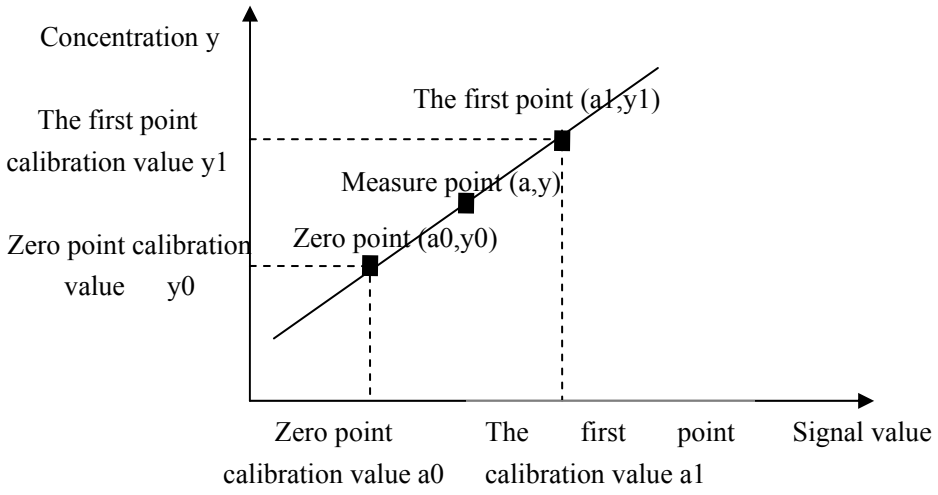


Fig.4.21 Calibration Points Setting Interface

5. Calibration

FILTR550 works by measuring the infrared light transmittance in the medium to measure the concentration of suspended matter the medium, for the same kind of medium infrared light attenuation coefficient of the same, a different transmission rate (decay rate) correspond to different concentrations. However, for different media such as sludge, slurry, infrared light attenuation coefficient is not necessarily the same, so that users need to use in actual instrument calibration, indeed, is to determine the attenuation coefficient. In a sense, calibration is directly related to the accuracy of the measurement instrument, improper calibration will cause instrument does not work or measurements are not accurate. Therefore, accurate calibration is a key instrument to work.

Normal calibration needs to calibrate two points, namely zero (zero calibration value, zero concentration value) and the first point (first point calibration value, the first point concentration value), as shown in Figure 5-1, instrument by analyzing the concentration of zero and the first point of value can be calculated with the calibration values of infrared light in the medium attenuation coefficient, that is, the slope of the straight line in Figure 5-1.



After calibrating, the concentration of measurement point values is based on the following formula:

$$Y = (a-a0) * (y1-y0) / (a1-a0) + y0$$

Y: measuring point concentration

a: measuring point signal value

a0: Zero calibration value

a1: the signal value of the first point calibration

y0: Zero concentration

y1: The first point concentration

For example, zero calibration value is 3200, zero calibration concentration is 0mg/L, the first point calibration value is 4200, calibration concentration is 3000mg/L, then when the measurement signal value is 3700, displayed the concentration is 1500mg/L. When measured signal is 5200, the displayed concentration is 6000mg/L.

The calibration values of different units is in dependent of each other, no affect each other, that is, under different units (mg/L and g/L), a0, a1, y0, y1 is independent of each other. No matter which unit, zero calibration value is lower than any calibration value. After calibrating, calibration

information can be viewed to confirm. After measurements calibrating, if there is no obvious difference, it does not need to re-calibration.

If the range is very large, and when it is great changes in the medium, you can adopt the second point calibration.

In normal circumstances, zero calibration has been calibrated at the factory, users do not need to re-calibrate zero calibration.

5.1 Zero calibration

Zero calibration has been calibrated at the factory, so the user only needs to re-calibrate when using a longer time. Zero calibration steps are as follows:

1) Make the sensor clean, avoid that sensors affect the water's quality, and to ensure the sending beam and receiving window do not be obstructed by debris;
2) Place the sensor in a container filled with clean water, and it is best to use dark containers, to avoid direct sunlight;
3) When the instrument works normally in period of time, and the instrument shows stable, press "MODE" button and enter the password, then press "SET" key to enter the menu;
4) Through pressing the "▼" and the "▲" button to control the cursor "*" to "17. Zero calibration", and press "SET" button to enter "Zero calibration" interface;
5) Observe the calibration value in "Zero calibration" interface. Generally the calibration value in clear water should be between 1500 and 2500. If there is clear difference, make sure that operation is correct, whether there is direct sunlight, the sensor is clean and so on. If operation is correct, press the "SET" to determine, instrument have recorded the value in clean water at this time. If operation is not correct, please press RUN to exit the menu.

Note: When selecting dissimilar measurement units, because of the different data mechanisms processed by instrument, the calibration value is not necessarily the same.

6) Generally speaking, the concentration value of zero calibration need not be modified. If need to change, press "▼" and the "▲" button to control the cursor "*" to "18. Zero correction", press "SET" key to enter " Zero correction "interface, and through pressing the" ▼ "and the" ▲ "key to enter the zero concentration, then click " SET "button to save data and exit the" zero correction "interface.
7) Enter "Calibration Information" interface, check whether the zero calibration is the same to the calibration just calibrated. If they meet, the zero calibration is completed; if they do not meet , please check the Step 1 ~ 6, and whether the operation is errors, and whether after each calibration, press the "SET" button to save the data and re-calibrate instrument or connect to the manufacturer.

5.2 The first point calibration

If you require high accuracy measurement results, the user need to first point calibration; if the user only need to use the relative values to control, and have lower requirement on the absolute concentration, so you can directly use the factory settings. Steps of the first point calibration is as follows:

1) Please clean the sensor to ensure the sending beam and receiving window does not be obstruct- ed by debris;

2) Please place sensors on the right location of working, and waiting for a period of time. When the instrument showing stable, press "MODE" button and enter the password, then press "SET" button to enter the menu, through pressing the "▼" and the "▲" to control the cursor keys "*"to"19. The first point calibration";
3) Press "SET" button to enter " the first point calibration" interface and observe whether the first point of the calibration value is normal (whether it is higher than zero calibration value or obvious data errors). If the calibration value is normal, click "SET" button to save the data, and if the calibration value is not normal, please click "RUN" key to exit the menu and start again from Step 1 “the first point calibration”;
4) While carrying out Step 3, take the measured medium (water) samples in shun flow direction, along the back of the sensor within one meter;
5) Testing the samples, and then get the concentration of measured medium value;
6) Enter the "first point of concentration of correction" interface, and enter to the media concentration value which is analyzed by user, Press "SET" button to save the data. For example, laboratory test results is the 1200mg/L. In the "first point of the concentration of correction" interface, through pressing the "▼" and the "▲" key to adjust the value of the concentration to 1200mg/L, then press the SET.
7) Enter "Calibration Information" interface, check whether the first point calibration and calibration is met. If they meet, the first point calibration has completed. if they do not meet, please check the Step 1 ~ 6 if operation is errors, whether press the "SET" button to save the data after each calibration, and re-calibrate instrument or connect to the manufacturer.

5.3 The second point calibration

The second point calibration is not used usually. if when the range is very large, and medium is great changes, the second point calibration have be used.

The operation of the second point calibration is the same to the first point, so this description is no longer introduced. It is noteworthy that to the menu's NO.23 "calibration points settings", modify the calibration points to "3", and factory default value is: "2."

6. Service

6.1 Transmitter Service

According to requirements that the transmitter used, installation location and the work situation are more complicated, in order to work properly, transmitter maintenance personnel need to carry out regular maintenance, please note the following:

- Transmitter installed in the outdoor please check the transmitter installed box if there is leakage;
- Check transmitter work environment, if the temperature exceeds the scope of the transmitter, which can work stability, please take corresponding measures, otherwise the transmitter may be damaged or reduce the service life;
- Transmitter shell is a plastic shell, do not scratch with a hard object, use a soft cloth and mild detergent to clean shell, be careful not to let moisture into the internal transmitter;
- Check whether it is normal display data transmitter;
- Check the wiring on the transmitter terminals is strong, note that before the demolition of wiring cover 220V AC power disconnected.

6.2 Sensors Service

In order to obtain the best measurement results, the sensor need regular maintenance, maintenance please note the following:

- The four windows on sensors need be cleaned, please self-purge time interval is set for 2 ~ 20 hours depending on the scene. If you do not have self-purge device, maintenance personnel cleaning sensor based on experience from time to time to ensure that four windows of sensors are clean;
- Check the sensor cable, the normal working hours cables should not be taut, or wires inside the cable tends to break, the sensor does not work;
- Check whether the sensor housing or other reasons due to corrosion damage;
- Check whether the sensor self-purge holes are blocked

6.3 Self-Purge Service

In the work environment, self-purge device is essential. Self- purge device maintenance to note the following:

Check whether wires of the self- purge devices is solid and reliable;

Check whether air pipes of the self- purge devices are blocked;

Check whether the pump inlet is blocked or masking.