EMPA Series Multi-parameter Water Quality Analyzer User Manual

Version: 1.0

Product Overview

This user manual for the online EMPA multi-parameter water quality analyzer installation, use and maintenance of the content of the instructions, while introducing the product's basic measurement principles, instrument composition and characteristics, for water quality analysis instruments with the operation and control of the relevant knowledge of the technical staff to provide a reference for the use of the instrument.

If you need further information, please contact our technical service department.

Warranty and Maintenance

No free warranty service will be provided beyond the warranty period or if the following failures occur during the warranty period, failures include, but are not limited to:

- installation, operation or use not performed in accordance with this manual
- improper use of the product
- Failure to maintain the product in accordance with the Company's instructed methods
- repairing products with parts not supplied by us
- unauthorized modification or disassembly of the product

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1 Instrument Description

1.1 Mainframe

The EMPA is an instrument for monitoring a wide range of water quality parameters.The MPA-6S mainframe can be fitted with up to six sensors to obtain data on water quality parameters. The sensors use electrochemical, optical and physical detection principles to measure the corresponding parameters. The host interface is a dedicated interface, one for optical sensors, one for dissolved oxygen sensors, one for conductivity sensors, and three for electrochemical sensors.The EMPA host can read the sensor data or perform parameter setting and calibration operations for the sensors, and at the same time, it can store the data in the host according to the user's settings or transfer it to the data acquisition platform, or directly transfer the data to a PC or a mobile phone. The data can be stored in the host computer or transferred to the data acquisition platform, or transferred to PC or cell phone directly according to the user's settings. The host can realize data communication through wired transmission or Bluetooth wireless transmission.

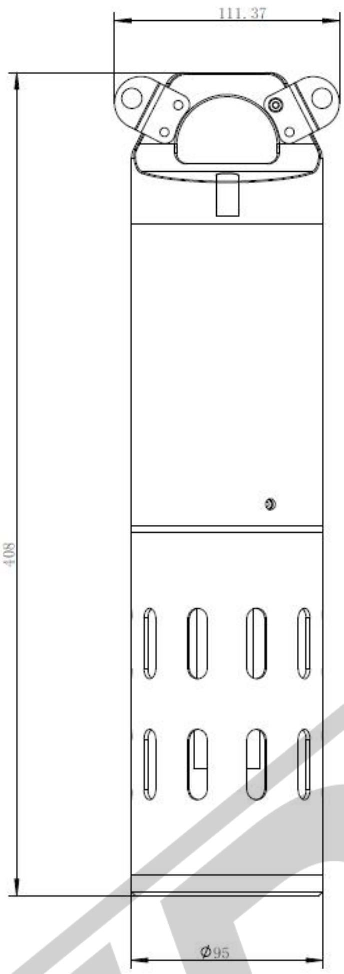


Figure 1-1 EMPA-6S Mainframe

Technical parameters

Model	EMPA-6S
Sensor Interface	1* optical sensor interface 1* Dissolved Oxygen Sensor Interface 1* conductivity sensor interface 3* electrochemical sensor interface
means of communication	RS485(Modbus RTU)
Operating Temperature	-5℃ - 60℃

supply voltage	(9-26) V DC
protection class	IP68
MTBF	≥1440 h/session
power consumption	Normal operation power consumption:1.5W Sleeping power consumption:0.1W
Material	stainless steel/titanium alloy, POM
Weight	POM material 2kg, stainless steel material 5kg
Overall dimensions	408mm × φ95mm

1.2 Main Features

- Digitized miniature sensors can be combined in any way.
- Automatic cleaning of cleaning brushes, greatly reducing the maintenance workload.
- Stainless steel, titanium alloy housing options, IP68 waterproof rating, applicable to a variety of working conditions.
- RS485 signal output, standard Modbus protocol, easy to integrate and network.

1.3 Sensors

EMPA multi-parameter water quality analyzer can realize on-line monitoring of more than ten parameters, including temperature, pH, ORP, conductivity, dissolved oxygen, turbidity, chlorophyll, blue-green algae, potassium ions, ammonium ions, nitrate ions, chloride ions, fluoride ions and so on.

1.3.1 Turbidity sensors

Turbidity is an indirect measurement of the concentration of suspended solids in water. Turbidity sensors measure the concentration of suspended solids in water by emitting infrared light into the solution to be measured and measuring the scattering of the light on particles in the water. Turbidity is both an important indicator of water quality and a fundamental indicator of environmental change. Suspended solids in nature come from a wide range of uncertain sources (e.g., silt, dirt, sand, algae, organic matter), but all particles affect the propagation of light and produce a turbidity signal.

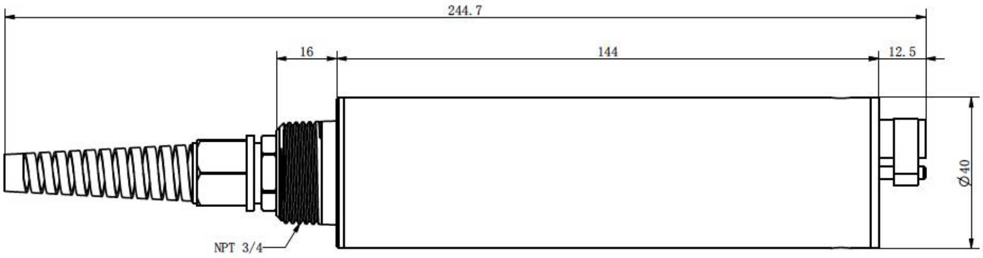


Figure 1-8 Turbidity Sensor

- Turbidity sensor technical specifications

Model	OSA-Turb
Measurement parameters	Turbidity (NTU), Temperature (° C)
Range	Turbidity: (0~100)NTU, (0~500)NTU, (0~2000)NTU, (0~4000)NTU Temperature:(0~50)° C
Measurement accuracy	Turbidity:≤±1% of reading
Repeatability	Turbidity:≤1% of reading
Resolution	Turbidity:0.01 NTU
Cleaning systems	Automatic cleaning of cleaning brushes (optional)
supply voltage	(9-36) VDC、1.1W
means of communication	RS485
protection class	IP68, 60 meters underwater
Temperature range	(0~50) ℃
Overall dimensions	160 mm × φ40mm
Material	Stainless steel (316L), POM

1.3.2 Chlorophyll sensors

The chlorophyll sensor has a dual or single wavelength light source excitation and measures chlorophyll and turbidity at the same time. The chlorophyll molecules fluoresce under blue light and the chlorophyll concentration can be calculated.

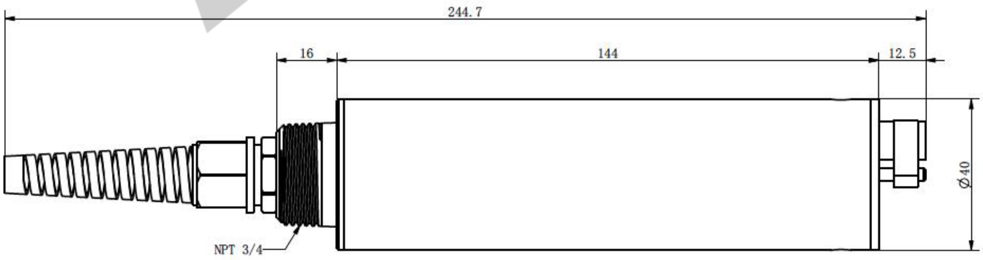


Figure 1-8 Turbidity Sensor

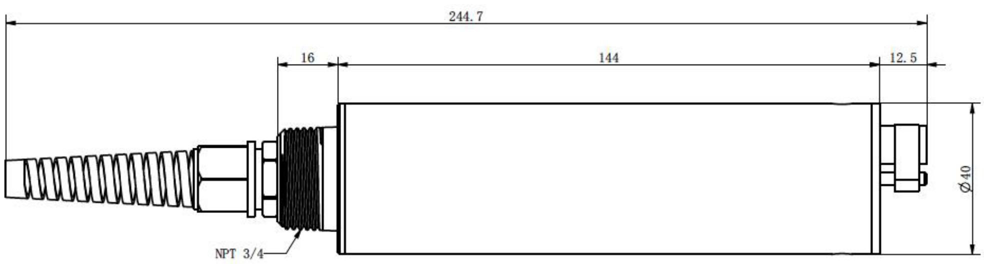
- Chlorophyll sensor specifications

Model	OSA-ChlA	OSA-ChlA Pro
Measurement parameters	chlorophyll a, temperature	chlorophyll a, turbidity, temperature
Measurement methods	Chlorophyll a: fluorescence, turbidity: infrared scattering	
Range	Chlorophyll a: (0~50/500) μg/L Turbidity:(0~100/500/2000/4000)NTU Temperature:(0~60)° C	
Accuracy	Chlorophyll a: ≤±3%, Turbidity: ≤±2%	
Repeatability	Chlorophyll a:≤2%, Turbidity: ≤1%.	
Resolution	Chlorophyll a: 0.01μg/L, Turbidity: 0.01NTU	
Detection limit	Chlorophyll a: 0.05μg/L, Turbidity: 0.05NTU	
Response time	≤10s	
Zero/measurement drift (24h)	≤±3%F.S.	
calibration cycle	6 months	
Temperature range	(0～60)℃	
protection class	IP68	
Cleaning method	Mechanical brushes for automatic cleaning	
means of communication	RS485 (ModbusRTU), maximum baud rate 115200bps	
power supply/power consumption	(12/24)VDC/<0.5W (in non-purge mode)	
Material	Titanium, stainless steel, POM	
Weight	0.5kg	
Overall dimensions	160mm×Φ40mm	

1.3.3 Blue-green algae sensors

The blue-green algae sensor has a dual-wavelength or single-wavelength light source for simultaneous measurement of blue-green algae and turbidity. The concentration of cyanobacteria can be calculated from the fluorescence of phycocyanin in cyanobacteria under orange light irradiation.

Figure 1-8 Turbidity Sensor



- technical specifications for blue-green algae sensors

Model	OSA-Cyano	OSA-Cyano Pro
Measurement parameters	Algae density, temperature	Algae density, turbidity, temperature
Measurement methods	Algae density: fluorescence, turbidity: infrared scattering	
Range	Algae density: (0~200000/2000000) Cells/mL Turbidity:(0~100/500/2000/4000)NTU Temperature:(0~60)° C	
Accuracy	Algae density: ≤±3%, turbidity: ≤±2%.	
Repeatability	Algae density: ≤2%, turbidity: ≤1%.	
Resolution	Algae density: 1Cells/mL, turbidity: 0.01NTU	
Detection limit	Algae density: 200 Cells/mL, turbidity: 0.05 NTU	
Response time	≤10s	
Zero/measurement drift (24h)	≤±3%F.S.	
calibration cycle	6 months	
Temperature range	(0～60)℃	
protection class	IP68	
Cleaning method	Mechanical brushes for automatic cleaning	
Material	Titanium, stainless steel, POM	
Overall dimensions	160mm× Φ40mm	

1.3.4 Total algae sensors

The Total Algae Sensor has a dual or triple wavelength light source excitation and measures chlorophyll, blue-green algae and turbidity simultaneously. Chlorophyll molecules fluoresce under blue light and the chlorophyll concentration can be calculated. Phycocyanin in blue-green algae fluoresces under orange light and the concentration of blue-green algae can be calculated.

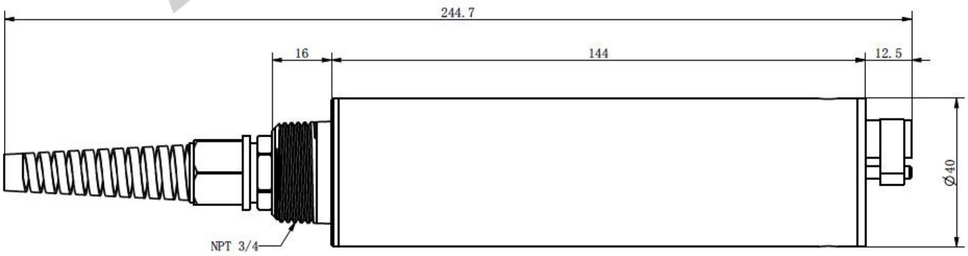


Figure 1-9 Total Algae Sensor

- technical specifications for total algae sensors

Model	OSA-TA	OSA-TA Pro
Measurement parameters	Chlorophyll a, algal density, Temperature	Chlorophyll a, algal density, turbidity, temperature
Measurement methods	Chlorophyll a/algal density: fluorescence, turbidity: infrared scattering	
Range	Chlorophyll a: (0~50/500) μg/L Algae density: (0~200000/2000000) Cells/mL Turbidity:(0~100/500/2000/4000)NTU Temperature:(0~60)° C	
Accuracy	Chlorophyll a/algae density: ≤±3%, turbidity: ≤±2%.	
Repeatability	Chlorophyll a/algae density: ≤2%, turbidity: ≤1%.	
Resolution	Chlorophyll a:0.01μg/L, algal density:1Cells/mL, Turbidity: 0.01 NTU	
Detection limit	Chlorophyll a:0.05μg/L, Algae density:200 Cells/mL, Turbidity: 0.05 NTU	
Response time	≤10s	
Zero/measurement drift (24h)	≤±3%F.S.	
calibration cycle	6 months	
Temperature range	(0～60)℃	
protection class	IP68	
Cleaning method	Mechanical brushes for automatic cleaning	
Material	Titanium, stainless steel, POM	
Overall dimensions	160mm×Φ40mm	

1.3.5 Dissolved oxygen

EMPA's optical DO sensors are based on the principle of fluorescence quenching, in which a fluorescent material fixed on a glass sheet emits blue light of a specific wavelength, and the fluorescent material emits fluorescence. The fluorescence is longest in the absence of oxygen and shorter in the presence of oxygen on the sensor diaphragm. For measurement accuracy and stability, the duration of fluorescence is determined by emitting a red light into the fluorescent material as a reference during the measurement cycle.

The relationship between oxygen concentration and fluorescence duration is inversely proportional and can be quantified by the Stern-Volmer formula. The relationship is as follows:

$$((Tzero/T) - 1) \text{ versus } O_2 \text{ partial pressure}$$

This is not a strict straight line (especially at high oxygen pressures) and the data is analyzed by polynomial non-linear regression. This nonlinear characteristic does not change significantly over time and does not affect the accuracy of the sensor over a long period of time.

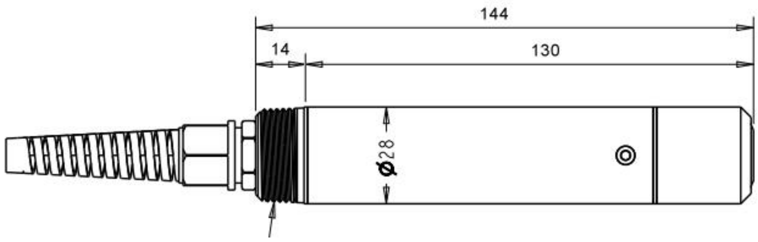


Figure 1-6 Dissolved Oxygen Sensor

- Dissolved Oxygen Sensor Technical Specifications

Measurement parameters	Dissolved oxygen
Range	Dissolved Oxygen:(0~20)mg/L or(0~200)%
Accuracy	±0.3mg/L
Repeatability	±0.3mg/L
Resolution	0.01mg/L
Response time	≤60s
Temperature range	(0～50)℃
Zero drift (24h)	±0.3mg/L
Range drift (24h)	±0.3mg/L
power consumption	0.55W (5V@110mA)

1.3.6 conductivity/temperature

EMPA's conductivity (including temperature) sensor is mounted on the main unit and provides fast temperature response and accurate temperature data as well as conductivity data. At the same time, the conductivity data can be used to calculate salinity and TDS.

The conductivity sensor uses four graphite electrodes to measure the conductivity of a solution. Two electrodes are used to measure the current and the other two electrodes measure the voltage, which is calculated to obtain the conductivity value. The conductivity value is calculated by multiplying the conductivity value by an electrode constant in 1/cm to convert it to a conductivity value in millisiemens per centimeter (mSi/cm).

temperature compensation

EMPA sensors are equipped with an internal temperature sensor. However, the measured value of this temperature sensor will not be recorded and displayed for sensor compensation, and the temperature value of these temperature sensors is calibrated to the temperature sensor on the conductivity sensor.

Figure 1-4 Bull's-eye conductivity electrode

- Conductivity Sensor Technical Specifications

Measurement parameters	conductivity, TDS, salinity, temperature
electrode type	Quadrupole graphite electrodes, thermistors
Range	Conductivity:(0~200mS/cm)
Accuracy	≤±1%
Repeatability	≤1%
Response time	≤20s
Resolution	Conductivity:0.01μS/cm
Temperature range	(0～50)℃
Zero drift (24h)	≤±1%F.S.
Range drift (24h)	≤±1%F.S.
temperature accuracy	±0.2℃
Temperature resolution	0.001℃
power consumption	0.1W（5V@20mA)

1.3.7 pH/ORP sensors

EMPA's pH sensors are used to measure the acidity or alkalinity of a body of water; EMPA's ORP sensors are used to measure the redox potential of a body of water, which is a non-chemical measurement of a quantity where the measured potential is the combined reaction of all dissolved substances in the medium.

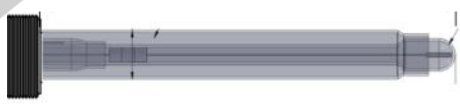


Figure 1-7 pH/ORP Sensor

- pH/ORP sensor technical specifications

Measurement parameters	pH	ORP
Electrodes	glass electrodes	Platinum electrodes
Range	0～14	(-2000～+2000) mV
Accuracy	≤±0.1pH	≤±20mV
Repeatability	≤±0.1pH	≤±20mV
Resolution	0.01pH	0.1mV
Response time	≤10s	≤10s
Temperature range	(0～50)℃	
Drift	≤±0.1pH	≤±20mV

1.3.8 ion-selective sensors

EMPA's ion sensors are used to measure the concentration of various ions in the water column including ammonia, nitrate, chloride, potassium and fluoride ions.

- Ion Sensor Sensor Specifications

Measurement parameters	ammonia nitrogen	Nitrogen	Chloride ions	Potassium ions	Fluoride ions
Range	(0～1000) mg/L	(0～1000) mg/L	(0～20000) mg/L	(0～1000) mg/L	(0～1000) mg/L
Accuracy	≤±3%				
Repeatability	≤2%				
Resolution	0.01mg/L				
Response time	≤60s				
Temperature range	(0～50)℃				
Drift	≤±3%F.S.				

2 operation

2.1 Mainframe Wiring

2.1.1 One-piece cable wiring

One-piece cable, the cable is connected with the main unit and can not be disassembled, the cable length can be customized according to the customer's needs. The specific wiring definition is shown in the table below.

Cable Color	Gray	Yellow	Blue	Black	Red	Brown
wiring definitions	485-A	485-B	485-COM	/	12/24VDC	GND

2.1.2 Waterproof plug wiring

The waterproof plug cable is a customized cable, and the connector part at the end of the main unit can be wet plugged and unplugged. Specific wiring definitions are shown in the table below.

connector serial number	1	2	3	4	5
Cable Color	Blue	Brown	Red	Black	White
wiring definitions	485-B	GND	12/24VDC	485-COM	485-A

3 Calibration

3.1 Basic Calibration Process

EMPA's sensors (except for temperature) require periodic calibration to ensure the accuracy of their measurements. The calibration procedure is essentially the same, except that some specific parameters require minor adjustments.

For accurate results, rinse the calibration cup with water and then with a small amount of the calibration standard for the sensor to be calibrated. Pour off the rinsed calibration solution and refill the calibration cup with the unused standard. Fill the calibration cup with a volume of at least 600mL of calibration standard to ensure that the sensor is submerged. Please take care to avoid cross-contamination between different standard solutions.

Wash and dry the calibration cup and sensor before adding or replacing the standard solution.

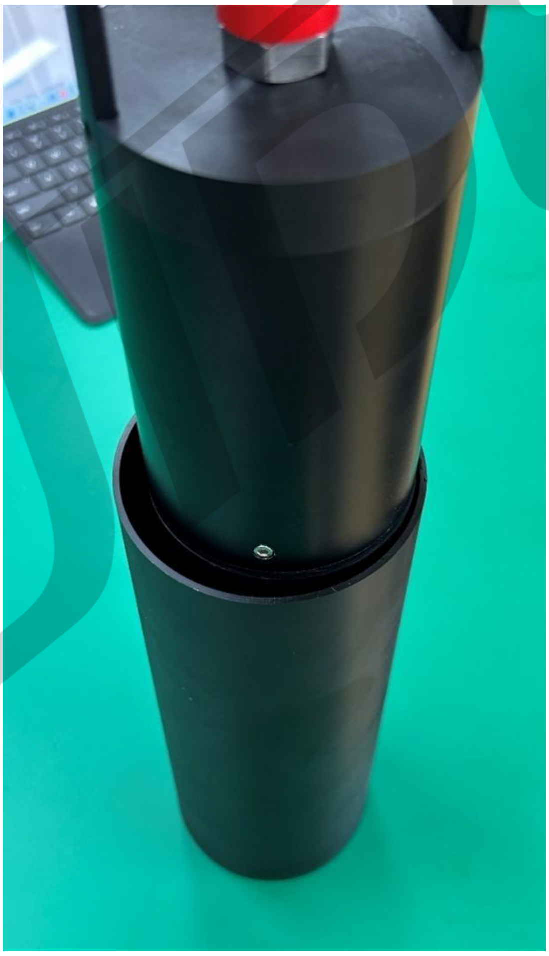


Figure 4-1 Calibration

For the basic calibration procedure of the software, please refer to "3.3.4 Sensor Calibration".

3.2 Calibration Depth

Note: This calibration option is only available when your multiparameter mainframe is fitted with an integrated depth sensor. Make sure that the depth sensor module is in air and not submerged in any container.

In the Sensor Calibration menu, select Depth, default 1-point calibration, observe the signal value, stabilize, click OK, and then click the Calibrate button below to complete the calibration operation. This will zero out the differential value of the sensor according to the current atmospheric pressure.

For best depth measurement performance, the user should ensure that the main unit is pointing in the same direction during the measurement. The main unit should be stationary and always in the same position during calibration.

3.3 Calibration of Conductivity

Before calibrating the conductivity, the conductivity electrode needs to be cleaned. The calibration operation can be selected from conductivity, 25 degree compensated conductivity or salinity.

First, pour a conductivity standard solution into the calibration cup. Select the appropriate standard solution for the monitoring environment you are using. For stability reasons, we recommend that you use a standard solution greater than 1 mS/cm. After pouring the standard solution into the calibration cup, carefully immerse the multiparameter instrument in the solution, making sure that the level of the standard solution is above the temperature sensor on the conductivity electrode. Gently rotate and/or move the main unit up and down to ensure that air bubbles can be removed from the electrodes. Ensure that the electrode has been left in the standard solution for 3-5 minutes to equilibrate the temperature before proceeding with the software.

In the Sensor Calibration menu, three calibration options can be selected: conductivity -25, conductivity, and salinity. Calibrating any of these options will automatically calibrate the other two parameters. We recommend using the Conductivity-25 option, enter the value of the standard solution used, and click OK after the signal value has stabilized. Click on the Calibrate button below to complete the calibration.

- If the real-time data is unstable and fluctuates greatly, air bubbles attached to the electrodes can be removed by rotating and/or moving the main unit up and down or by repositioning the main unit into the calibration cup.

3.4 Calibration of Dissolved Oxygen

Dissolved oxygen can be calibrated with either a one-point calibration or a two-point calibration. One-point calibration is for saturated oxygen. The two-point calibration is for zero and saturated oxygen. Saturated oxygen standard solutions can be prepared in two ways, i.e. "wet saturated air" or "air saturated with water".

Wet saturated air: Place the sensor in a beaker and add water to the beaker until the surface of the water is about 5mm from the surface of the dissolved oxygen sensor membrane, then stop. Allow to stabilize for about 10 minutes, then calibration can be performed.

Air saturated water: add 500mL of pure water to the beaker, use the air pump to inflate the water, at this time the sensor into the water, observe the sensor value changes, about 30 minutes later, the data will be stabilized, at this time you can carry out calibration operations.

Note: During the calibration operation, there is no need to modify the original signal value, the sensor will automatically calculate the calibration saturation oxygen value based on the temperature and the original signal value.

3.5 Calibration PH

For pH calibration, we recommend using two-point calibration as much as possible to ensure better accuracy. Most of the ambient water we use has a pH between 7 and 10, so we recommend that you use a buffer of pH 6.86 and pH 9.18 or a buffer of pH 7 and pH 10.

Pour the correct amount of pH 7 buffer into the calibration cup and carefully submerge the sensor in the solution. Wait 3-5 minutes for the temperature to equilibrate before proceeding with the calibration operation.

For the next buffer calibration, wash and dry the calibration cup before adding the second buffer to the calibration cup.

Note: The actual pH value of the pH buffer varies with temperature. When calibrating, pay attention to the current temperature and refer to the pH table of the buffer to set the standard value. For example, pH 7 buffer is 7.00 at 25˚C and 7.02 at 20˚C.

pH buffers as a function of temperature

Temperature/°C	pH=4.00	pH=6.86	pH=7.00	pH=9.18	pH=10.01
10	4.00	6.92	7.06	9.33	10.18
15	4.00	6.90	7.04	9.28	10.12
20	4.00	6.88	7.02	9.23	10.06
25	4.00	6.86	7.00	9.18	10.01
30	4.01	6.85	6.99	9.14	9.97
35	4.02	6.84	6.98	9.10	9.93
40	4.03	6.84	6.97	9.07	9.89
45	4.04	6.83	6.97	9.04	9.86
50	4.06	6.83	6.96	9.02	9.83

3.6 Calibration of Turbidity

Turbidity sensors can be calibrated in three ways: one-point calibration, two-point calibration and three-point calibration. Before calibration, make sure that the sensor and the calibration cup are clean and dry.

As an example of two-point calibration:

Pour 0 NTU standard solution (clean deionized or distilled water) into the calibration cup. Allow to stabilize for 3-5 minutes and confirm the first calibration point.

Then wipe the sensor and calibration cup dry.

Pour 100 NTU of standard solution into the calibration cup. After 3-5 minutes of stabilization, confirm the second calibration point. The second calibration point can be set according to site conditions.

Three-point calibration

When the turbidity of water samples in the field varies over a wide range, we can choose to carry out a three-point calibration of the turbidity sensor in order to obtain a high degree of accuracy over a wide range. As with the two-point calibration procedure, the first standard must be 0 NTU, the second point selects 20% of the range value, and the third point selects the range value.

3.7 Calibration of Total Algae

Chlorophyll calibration is generally a two-point calibration, one standard must be pure water (0 μg/L), and the other standard is a known chlorophyll concentration of water samples or fluorescent equivalents. The concentration of the water sample is obtained by laboratory analytical methods; for the fluorescence equivalent, Rhodamine WT is recommended; in the initial use, we can analyze the concentration of the water sample by laboratory analytical methods and establish a proportional relationship between the concentration of the water sample and the concentration of the sensor measured by the Rhodamine WT, and then use the Rhodamine WT to calibrate the sensor later on.

For specific calibration procedures, refer to Calibration of Turbidity Sensors.

The calibration method and procedure for blue-green algae can be referred to the calibration operation of the chlorophyll sensor.

Rhodamine WT Standard Solution - Preparation and Use

WARNING: Make sure you have read all safety instructions and MSDS documents provided by the manufacturer before handling.

Prepare a 500ug/L rhodamine WT solution that can be used for chlorophyll sensor calibration as follows:

1. Rhodamine WT is usually purchased as a solution and the concentration may vary somewhat. The Rhodamine WT we use is from the supplier shown below, and we recommend that you purchase the dye in this form whenever possible. This solution contains approximately 20% Rhodamine WT (200 g/L).

Keystone Aniline Corporation, 2501W. Fulton Street, Chicago, IL 60612 (Telephone: 312-666-2015) under the name KEYACID RHODAMINE WT (Part # 70301027). 20 %Rhodamine WT （200 g/L）.

2. Accurately measure and quantitatively transfer 0.5mL of Rhodamine WT solution into a 1000mL volumetric flask and fill the flask to the mark with pure water (distilled or deionized). After mixing well, the solution contains 100 mg of rhodamine WT per 1000 mL of water. transfer the solution to a glass vial for future use.

3. Accurately measure 5.0mL of the above prepared solution into a 1000mL volumetric flask and fill the flask to the mark with purified water. The solution was mixed well and the concentration of the prepared solution was 500ug/L (the concentrate was diluted 200:1). Based on the analysis of our experimental data, it was concluded

that the fluorescence signals of 500ug/L rhodamine WT solution were basically the same as those of 100ug/L chlorophyll a. The fluorescence signals of 500ug/L rhodamine WT solution and the fluorescence signals of 100ug/L chlorophyll a were basically the same. Therefore, during the calibration, this concentration of rhodamine WT solution was used, and the standard value was entered as 100ug/L. Other concentrations were also prepared according to this ratio.

4. Concentrated standard solutions must be stored in dark-colored glass bottles in a refrigerator to prevent decomposition. Diluted standard solutions prepared as described above must be used within 24 hours of preparation. If the Rhodamine WT Standard Solution is required at a later date, simply remove the concentrated dye solution and return it to room temperature before dilution. Concentrates stored at low temperatures are more stable than dilutions stored at room temperature.

5. Refer to the above for the preparation of the blue-green algae standard solution. According to our experimental data analysis, the fluorescence signal of 100ug/L rhodamine WT is basically the same as that of 50cells/uL of blue-green algae, and other concentrations were prepared according to this ratio.

6. The proportionality of the fluorescence signals of chlorophyll a and blue-green algae to rhodamine WT are different in different regions, and laboratory analysis is required to confirm the proportionality before preparing the reagents as described above.

4 Maintenance

4.1 Storage

Multi-parameter analyzers need to be stored properly when not in use. If the instrument is used on a regular basis, it is stored during the intervals, which I call short-term storage. If the instrument is not to be used for a long period of time, such as when it is not available for use during the winter months or in other cases, we call this long-term storage

4.1.1 Short-term storage

For short-term storage, the user should keep the sensor moist, but not submerged in water, which can cause the sensor to drift. Fill the bottom of the calibration cup with approximately 2cm of water (deionized, distilled, tap or ambient) or use a damp sponge placed in the bottom of the calibration cup

Plugs need to be installed on the unused ports of the main unit. The external interface on the top of the mainframe should be installed with the socket plugs provided at the time of shipment to prevent the socket from being exposed for a long period of time, resulting in corrosion of the pins.

Note: Clean the main unit and sensor before storing.

4.1.2 Long-term storage

Clean the main unit and sensor before storing. Store the whole unit away from light and dry. Optical sensors (turbidity, total algae), dissolved oxygen sensors, and conductivity sensors require no special treatment.

The main thing to do when storing a pH sensor or ORP sensor is to protect the electrode. The front of the electrode is inserted into the protective holster supplied with the sensor, which is filled with pH4 buffer.

4.2 Depth Sensor Maintenance

The depth sensor is located inside the main unit and is connected to a body of water through several open holes, which allow the user to clean the depth sensor by injecting water into the holes with a syringe. The user can inject water into the holes with a syringe to clean the depth sensor. Injecting water into one hole and draining it through the other holes is a continuous rinsing process until the water comes out clean.

CAUTION: Do not use a hard object to reach into the hole to clean it, as this may damage the surface of the sensor and cause it to fail.

4.3 Optical Sensor Maintenance

The turbidity and total algae sensors are very low maintenance. The front optical window is regularly inspected by the user and wiped clean with a non-woven cloth or paper towel when necessary.

Note:Do not scratch the optical window with hard objects.

4.4 Conductivity Sensor Maintenance

Conductivity sensors mainly need to maintain the electrode sensing part. Among them, the flat electrode, focus on cleaning the front end, use non-woven cloth or paper towel to wipe clean, you can see the 4 electrode sensing dots. Bull's eye electrode, focus on cleaning the center gap.

4.5 Dissolved Oxygen Sensor Maintenance

Dissolved oxygen sensors require the use of fluorescent caps. The membrane cap has a typical service life of 12 months and should be replaced periodically during use, otherwise the measurement accuracy will be affected.

Users should check the sensor regularly and wipe the surface of the cap with a non-woven cloth or paper towel to clean it.

4.6 PH Sensor Maintenance

In the process of using the pH sensor, the electrolyte in the electrode needs to be consumed. The service life of the electrode is related to the working environment, usually about 1 year, in the actual use of the process, the electrode needs to be replaced regularly. In the process of daily use, the electrode surface will be attached to the pollutants, the user should use water, paper towels to scrub the electrode surface. Be careful not to use hard objects to scratch, glass bulb is fragile, need to pay attention to protect.

Replacement of pH electrode