

LW104S LoRaWAN Solar Water Quality Residual Chlorine Sensor User Manual



Table of Contents

Table of Contents	2
1. Overview	3
2. Technical Parameters	3
2.2 Product List	4
3. Configuration and Installation	5
3.1 LW104S Interface Description	5
3.2 LW104S Parameter Configuration Instructions	6
3.3 LW104S Size	12
3.4 Residual Chlorine Transmitter Size and Installation	13
4. Protocol Description	15
4.1 Data Format	15
4.2 Upward Data	15
4.3 Downward data	16
4.4 Precautions and Maintenance	16

1. Overview

LoRaWAN solar water quality residual chlorine sensor, specially designed for water quality monitoring. It adopts advanced electrochemical principles to accurately measure residual chlorine concentration, with a range of 0.00mg/L-20.00mg/L and a resolution of 0.01mg/L. Through LoRaWAN low-power wide area network technology, stable data transmission over long distances can be achieved. The residual chlorine sensor probe has an IP68 waterproof rating and is suitable for harsh environments. Unique solar powered design, long-lasting battery life, no wiring troubles, widely used in water quality monitoring scenarios such as drinking water, swimming pools, and sewage.

2. Technical Parameters

Power Supply	Solar Powered + Li-ion Battery
Weight	230g
Working Conditions	Temperature resistance of transmitter components: 0-50 °C PH: 4-9 Flow rate: 30-60L/h
Measuring Range	0-2mg/L,0-10mg/L (default) ,0-20mg/L
Measurement Error	±5%FS
Repeatability Error	±0.05mg/L
Electrode usage cycle	12 months
Pressurization	0.6Mpa
Transmitter Line length	Default 5m (other lengths can be customized)
Frequency	CN470/IN865/EU868/RU864/US915/AU915/ KR920/AS923-1&2&3&4
Mode	OTAA Class A/C
Reporting cycle	30min(Default)
Battery Life	≤5 years

Communication Protocol	LoRaWAN
Equipment information (Reference)	AppEUI: 0000000000000001 DevEUI: aaaa202404150001 AppKey: 00001111222233334444555566667777 MAC Version: LoRaWAN 1.0.3

2.2 Product List

- LW104S LoRaWAN Solar Sensor collector 1 piece
- TYPE-C data cable 1 piece

3. Configuration and Installation

3.1 LW104S Interface Description



1. **TYPE-C Interface:**Used for device serial port configuration.
Note: When using for the first time, a Type-C data cable must be plugged in for booting (connected to a computer or 5VDC). After plugging in Type-C, it will immediately wake up and enter configuration. After configuration, be sure to unplug Type-C, otherwise the device will remain awake and unable to enter sleep mode!!!
It can be shut down through configuration tools.
2. **Transmitter Interface:**Used for connecting integrated ORP Transmitter
1.RD: VCC **2.BK:** GND **3.YL:** RS485A **4.GN:** RS485B

3.2 LW104S Parameter Configuration Instructions

Configuration preparation:

- ◆ USB Type-C data cable
- ◆ Computer (Windows system)
- ◆ Configuration Tool Toolbox

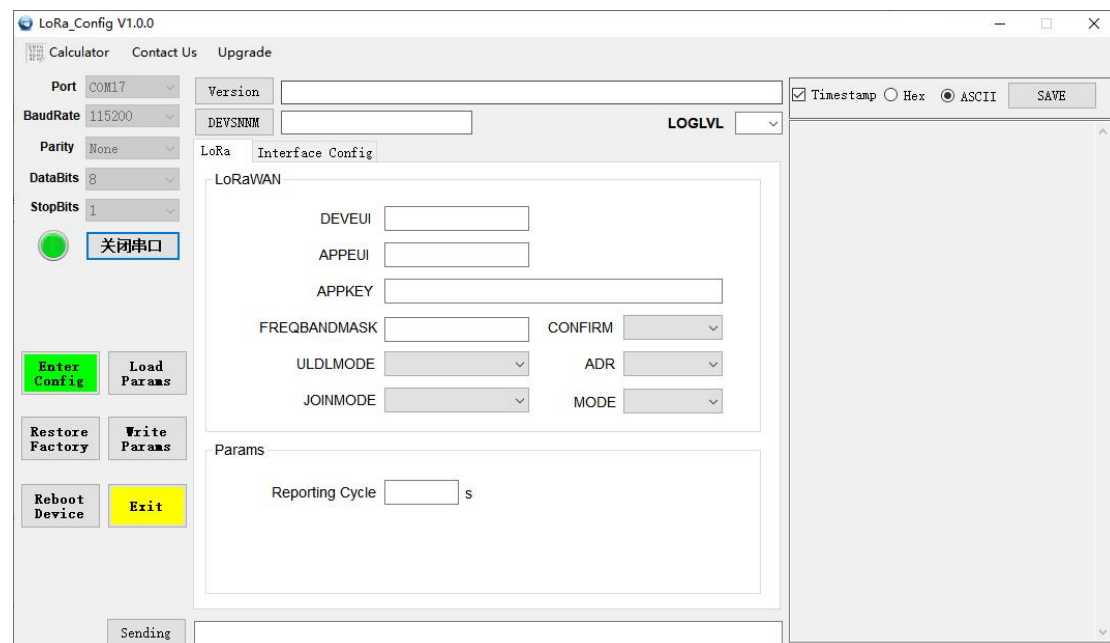
Download: <http://www.zonewu.com/en/Configuration-Tools.html>

1. Install serial port driver program.CH340 USB to serial port .
2. Connect the LW10x to the PC using a USB cable and check if there is a COM port. If not, please recheck the equipment wiring and driver installation.
3. Open the configuration tool LoRa_config  LoRa_config V1.0.0 .open the corresponding COM port .

Port default parameters:

BaudRate	115200bit/s
Parity	None
DataBits	8
StopBits	1

As follows:



4. 1.Enter Config → 2.Load Params → 3.LoRaWAN → 4.Write Params → 5.Reboot Device

LoRa_Config V1.0.0

Calculator Contact Us Upgrade

Port COM17 Version ☒ Timestamp ☐ Hex ☒ ASCII SAVE

BaudRate 115200 DEVSNNM LOGLV

Parity None DataBits 8 StopBits 1

1 Enter Config 2 Load Params

Restore Factory Write Params 4 Params

Reboot Device Exit

5

LoRa Interface Config

LoRaWAN

DEVEUI

APPEUI

APPKEY

FREQBANDMASK CONFIRM

ULDLMODE ADR

JOINMODE MODE

Reporting Cycle s

Sending

LoRa Interface Config

LoRaWAN

DEVEUI BF01240726D00001

APPEUI 331341E186891989

APPKEY 5572404c696e6b4c6f52613230313823

FREQBANDMASK 0002 CONFIRM Close ACK

ULDLMODE Abnormal Freq Mo ADR Close

MODE ClassC

Params

Reporting Cycle 600 s

LoRaWAN Interface:

Item	Describe	Notes
DevEUI	Node's globally unique identifier code	64bit
AppEUI	Node's application identifier code	64bit
AppKey	Assigned to the terminal by the application owner.	128bit

FREQBANDMASK	Set frequency group mask	
ULDLMODE	Set up uplink and downlink same frequency but different frequency	
CONFIRM	Set uplink transmission type	
ADR	Set adaptive speed	
MODE	Set device working mode	

The device will be configured with ternary parameters by default when it leaves the factory:

DevEUI: 8DAFE50110133001

AppEUI: 331341E186891989

AppKey: 5572404c696e6b4c6f52613230313823

NOTE: All sensors are shipped with AppEUI and AppKey default to 331341E186891989 and 5572404c696e6b4c6f52613230313823.

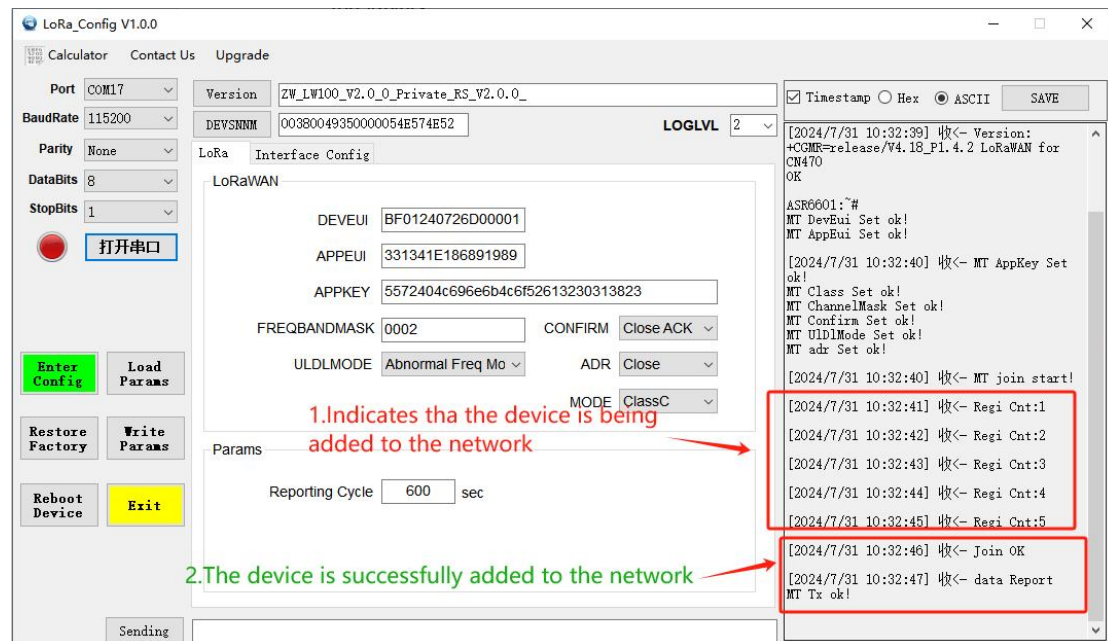
Users can customize according to their own applications

FREQBANDMASK: The frequency group mask for LoRaWAN operation, with 16 bits corresponding to 16 frequency groups. Default is 0001. Users need to configure it according to the actual application region.

Params Interface:

Item	Describe	Notes
Reporting cycle	adjustable range 1-65535, default is 1800s (30min)	

Printing logs of device startup and network connection:



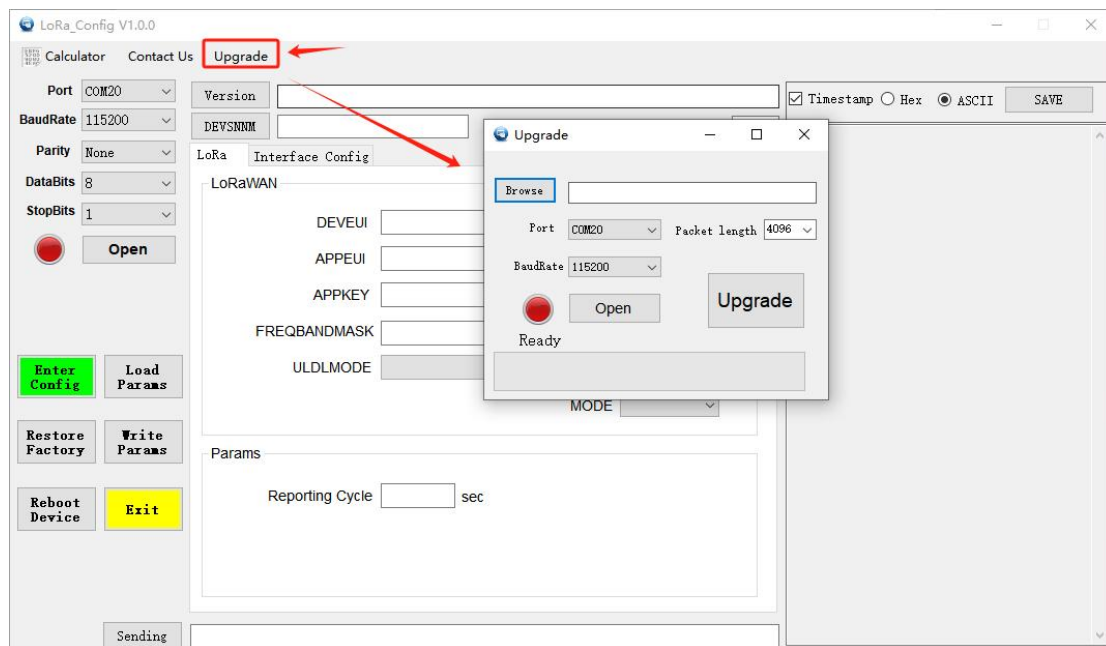
The device is equipped with a built-in LED indicator light, which is located next

to the antenna interface and can be seen as a green light through the casing.

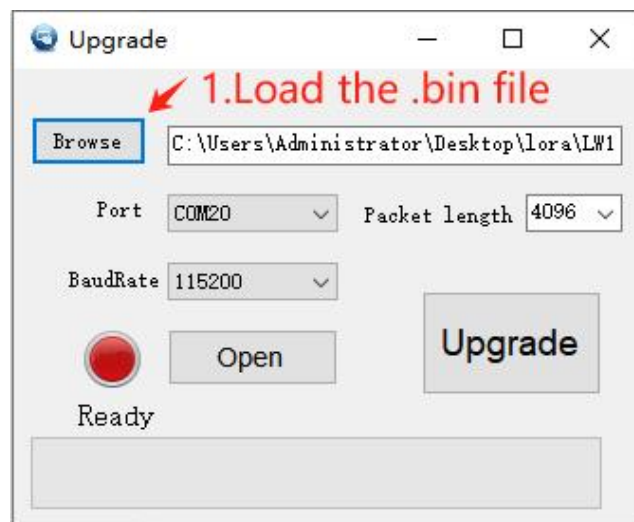
LED	Status	Describe
Green indicator light	Light	Wake up
	Extinguish	Enter sleep mode

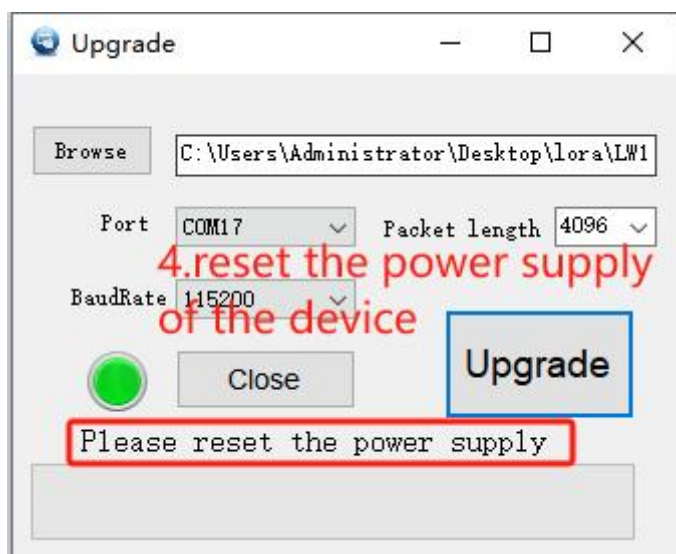
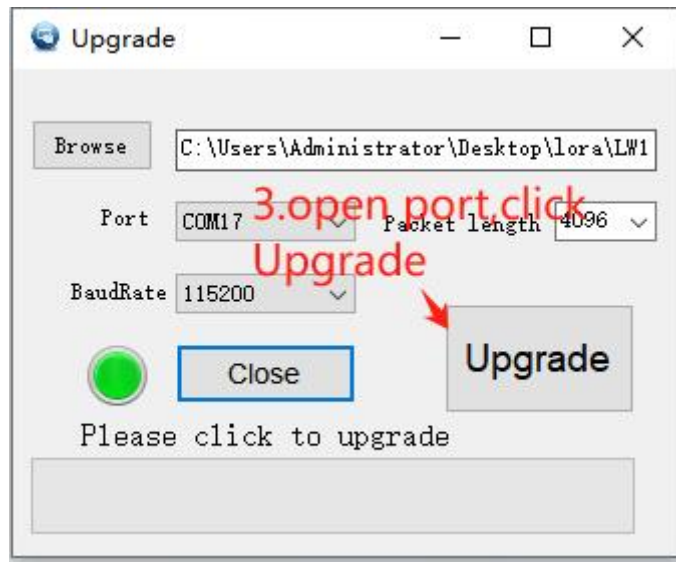
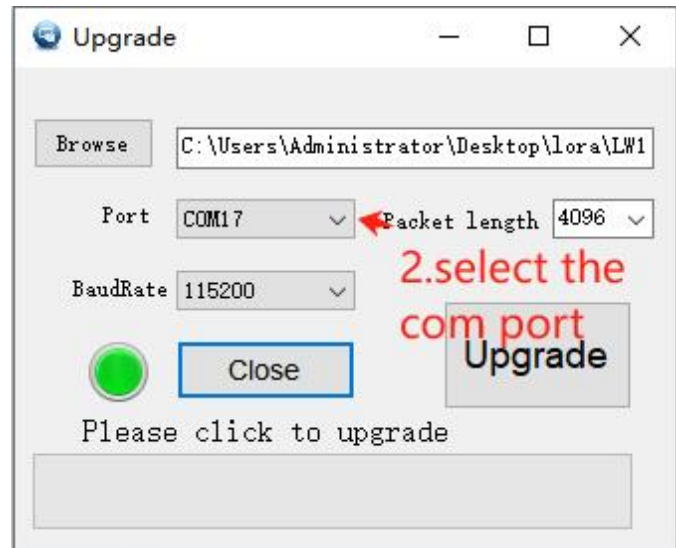
NOTE: Insert Type-c, the device wakes up, and the indicator light lights up.

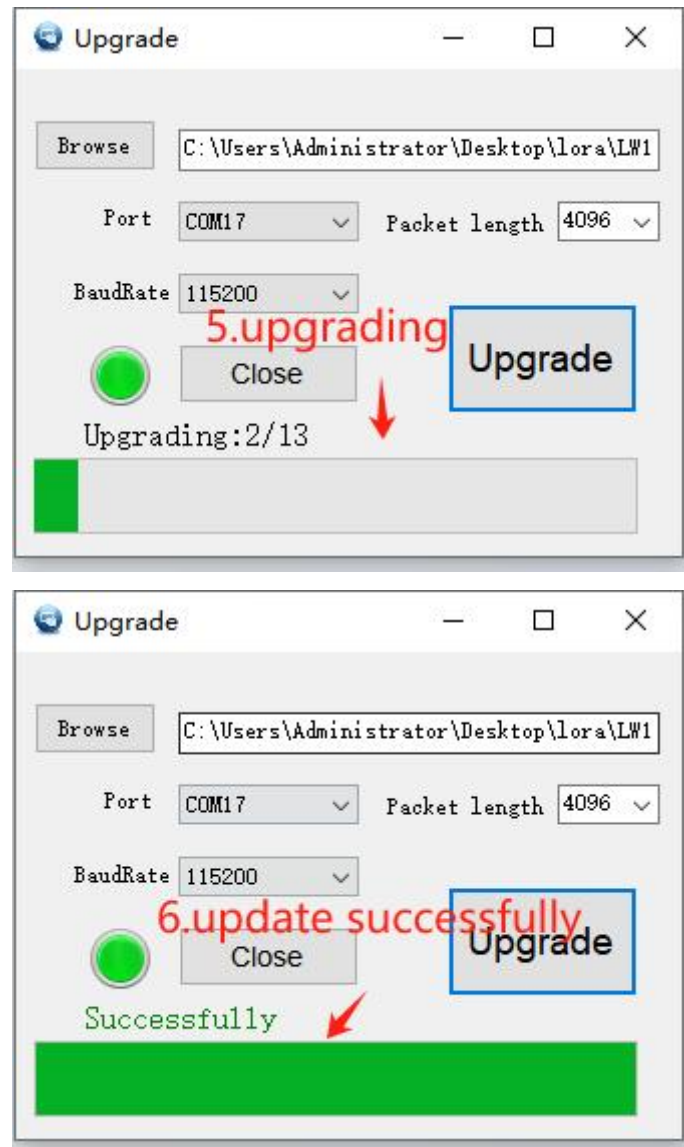
Firmware upgrade:



Click to upgrade → Pop up upgrade window







If there is an upgrade error during the upgrade process, you can close and reopen the upgrade window and follow the instructions to upgrade again.

3.3 LW104S Size



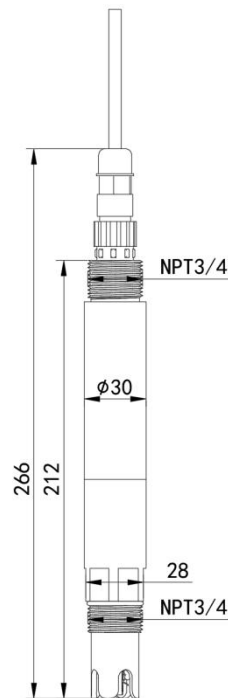
Product size

3.4 Residual Chlorine Transmitter Size and Installation



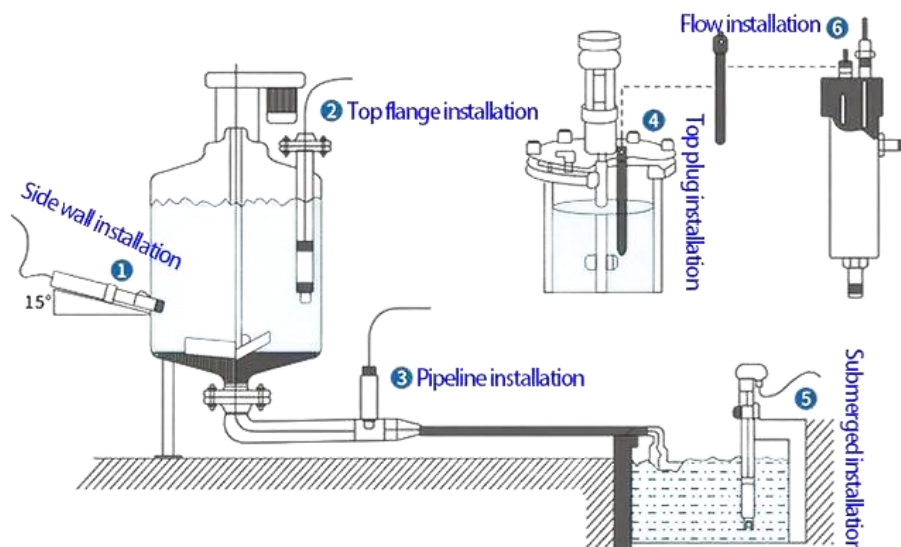
Integrated Residual Chlorine Transmitter Description

3.4.1 Residual Chlorine Transmitter Size



3.4.2 Installation

1. Submerged installation: The lead of the integrated residual chlorine transmitter passes through the waterproof bracket, and the 3/4 thread on the top of the integrated residual chlorine transmitter is connected to the 3/4 thread of the waterproof bracket with a tape.
2. Pipeline installation: Connect to the pipeline through the 3/4 thread at the bottom of the residual chlorine transmitter.



4. Protocol Description

4.1 Data Format

The up/down data of the device is based on hexadecimal format. High position in front, low position in back.

Start Bit	code	length	data		
1 byte	1 byte	1 byte	2 byte	2 byte	2 byte

4.2 Upward Data

The device information is reported once during network access or restart.

Start Bit	code	Data Length	DATA		
			Residual Chlorine	Temperature	Voltage
C4	03	04	0316	0164	0DF8
196	3	4	790	356	3580
Actual Value			7.90mg/L	35.6℃	3.58V

Note: If the received data is FFFF FFFF, it indicates that the sensor is not connected or the sensor is abnormal.

Residual chlorine concentration calculation: 316H
(hexadecimal)=790=>Residual chlorine=7.90 mg/L

Temperature: Used to monitor the internal temperature of the collector.
(hexadecimal)=164=>Temperature=35.6 ℃

4.2.1 Register Address Description

Register address	0001H	0002H	0003H
Parameter	Residual Chlorine	Temperature	Battery Voltage
Unit	-	℃	mV
Range	0-20mg/L	0-80℃	3.3-4.2V
Data Type	uint16	uint16	uint16
Sample Value	/100	/10	/1000
Operate	Read	Read	Read

4.3 Downward data

Support configuring devices through downstream commands. When the downlink command is in confirmation packet mode, the device will immediately send a reply packet after executing the command.

4.3.1 Restart the device

Starting byte (1byte)	Instruction type (1byte)	Trail byte (1byte)
0xFE	01	0xEF

Response:

Starting byte (1byte)	Instruction type (1byte)	Trail byte (1byte)
0xEF	01	0xFE

4.3.2 Set Reporting cycle

Example: The platform sets the reporting cycle to 200s, 200 => 0x00C8(hex)

Starting byte (1byte)	Instruction type (1byte)	Reporting cycle (2byte)	Trail byte (1byte)
0xFE	02	00 C8	0xEF

Message: FE0200C8EF

Response:

Starting byte (1byte)	Instruction type (1byte)	Reporting cycle (2byte)	Trail byte (1byte)
0xEF	02	00 C8	0xFE

Message: EF0200C8FE

4.4 Precautions and Maintenance

◆ The equipment itself generally does not require daily maintenance. In case of obvious malfunctions, please do not open it for self repair and contact us as soon as possible!

◆ After use, please clean the electrode head with clean water and cover it with a protective cover.

◆ If dirt and mineral components are attached to the electrode membrane, the sensitivity may decrease, making it difficult to perform sufficient measurements. Please ensure that the platinum ring is clean.

◆ A good residual chlorine electrode should always keep its platinum sensing

ring clean and bright. If the platinum ring of the electrode becomes rough or covered with pollutants after measurement, please clean it according to the following method: (for reference)

Inorganic contamination: Immerse the electrode in 0.1mol/L dilute hydrochloric acid for 15 minutes, gently wipe the platinum ring of the residual chlorine electrode with a cotton swab, and then clean with tap water.

Organic or oil pollution: Immerse the electrode in tap water with a small amount of detergent, such as dishwashing detergent, to thoroughly clean the sensing surface of the electrode sensor. Gently wipe the platinum ring of the electrode with a cotton swab, then rinse with tap water and clean it. If the platinum ring of the electrode has formed an oxide film, please polish the sensing surface moderately with toothpaste or 1000 grit sandpaper, and then clean it with tap water. The platinum ring is connected to the glass, please handle it carefully when polishing.

◆ The electrode has a service life of about one year, and should be replaced with a new electrode in a timely manner after aging.