LW101 LoRaWAN Integral DO Transmitter User Manual

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1. Overview

The LoRa water quality DO sensor is a device that uses fluorescence measurement principles to measure the concentration of dissolved oxygen in a solution. It does not consume oxygen and does not require electrolytes. Built in temperature transmitter with automatic temperature compensation function. The calibration function provides a simpler and more convenient calibration method. The use of imported high-quality fluorescent films can be widely applied in industries such as water treatment, aquaculture, and environmental monitoring. Supports LoRa TDMA networking and standard LoRaWAN protocol.

2. Technical Parameters

Power Supply	DC12/24V
Weight	150g
Operating Emperature	0~40℃
Measuring Principle	Fluorescence
Measuring Range	0~20mg/L (0~200% saturation)
Measurement Error	±3%FS；±0.5℃（25℃
Resolution Ratio	0.01mg/L；0.1%；0.1℃
Fluorescent Film Lifespan	Normal use for 1 year
LDO	Fluorescence dissolved oxygen transmitter (freshwater version)
LDOS	Fluorescence dissolved oxygen transmitter (seawater version)
Pressurization	0.6Mpa
DO 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	External power supply:10min(Default reporting cycle)
Communication Protocol	LoRaWAN,LoRa TDMA Networking
Equipment information (Reference)	AppEUI：0000000000000001 DevEUI：aaaa202404150001 AppKey：00001111222233334444555566667777

2.2 Product List

- LW101 LoRaWAN Terminal 1 piece
- TYPE-C data cable 1 piece
- Dissolved Oxygen transmitter 1piece(individual packing)

3. Configuration and Installation

3.1 LW101 Interface Description

1. **DC Power Interface:**DC5.5 * 2.1 female socket, power supply interface, DC10-28V.

2. **TYPE-C Interface:**Used for device serial port configuration.

3. **Transmitter Interface:**Used for connecting integrated DO Transmitters
   1.RD：VCC **2.BK**：GND **3.YL**：RS485A **4.GN**：RS485B

3.2 LW101 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 .

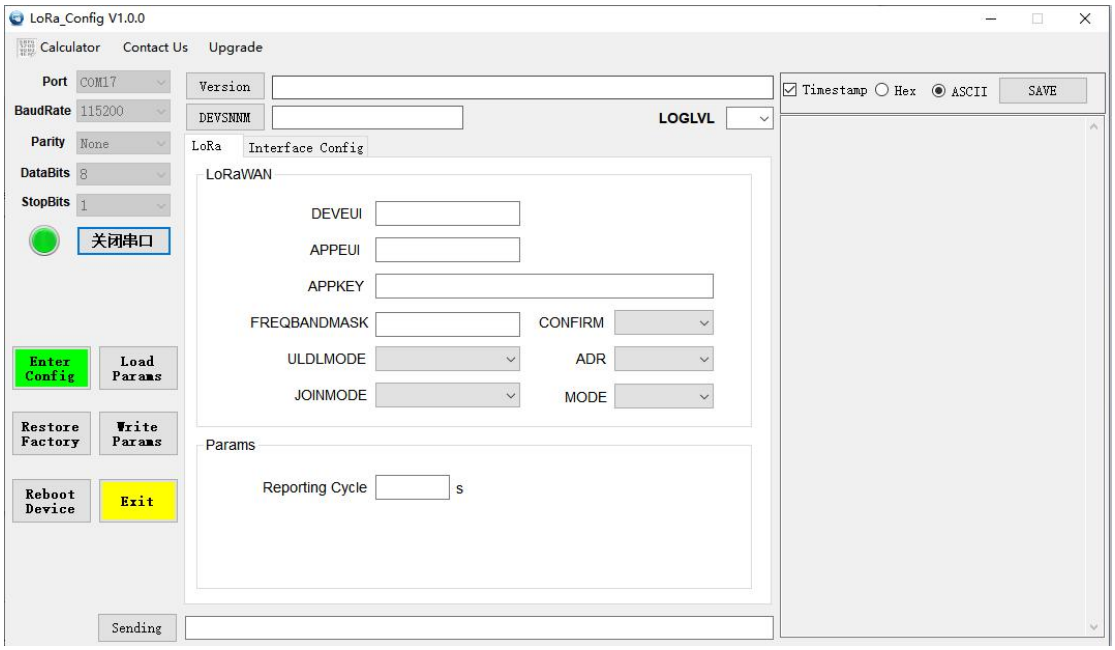
2. Connect the LW101 to the PC using a USB cable and check if there is a COM port. If not, please recheck the equipment wiring and driver installation.

3. Open the configuration tool LoRa_config LoRa_config V1.0.0 .open the corresponding COM port .

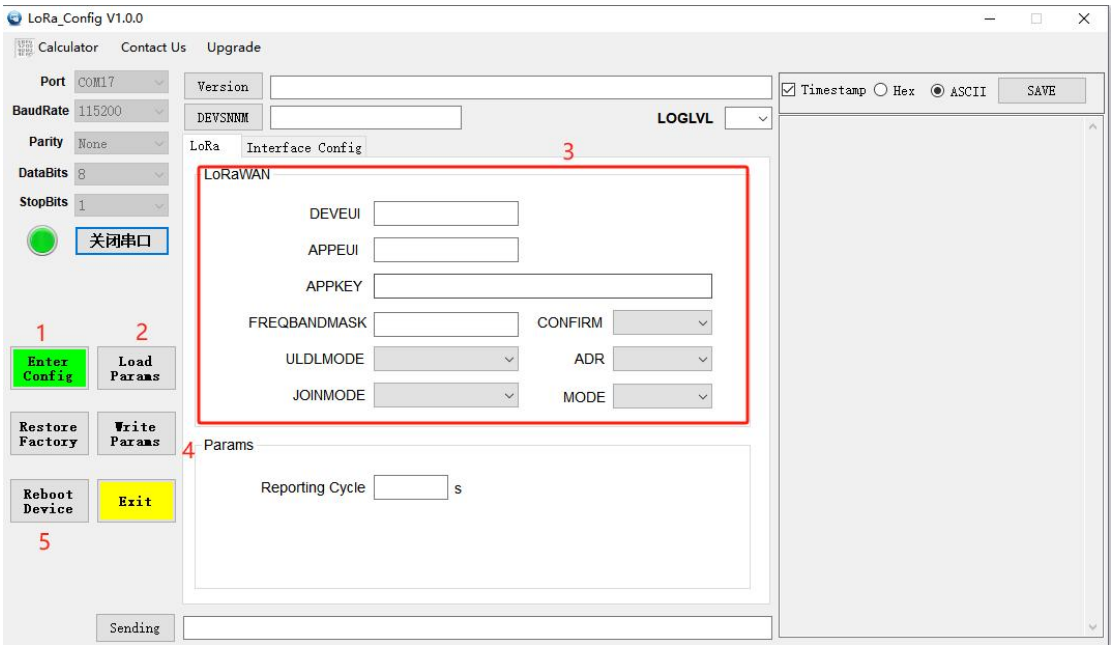
Port default parameters:

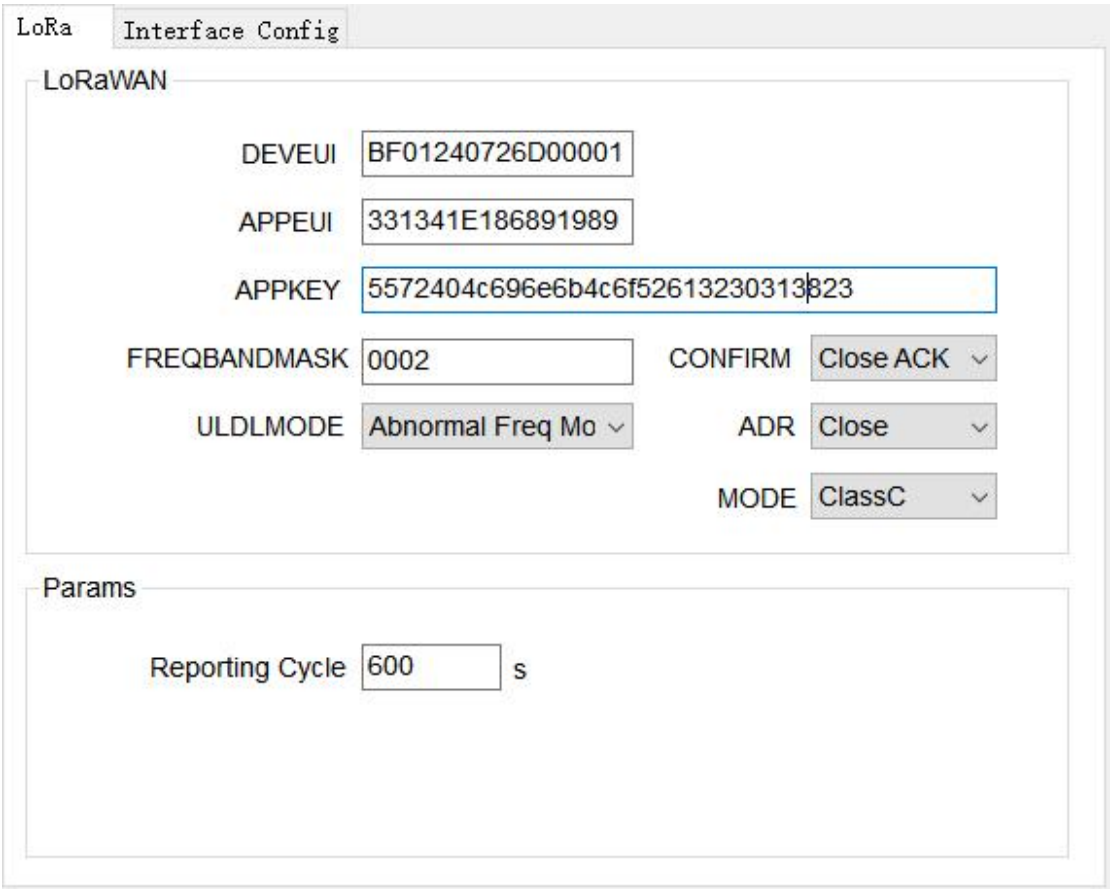
BaudRate	115200bit/s
Parity	None
DataBits	8
StopBits	1

As follows:



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





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

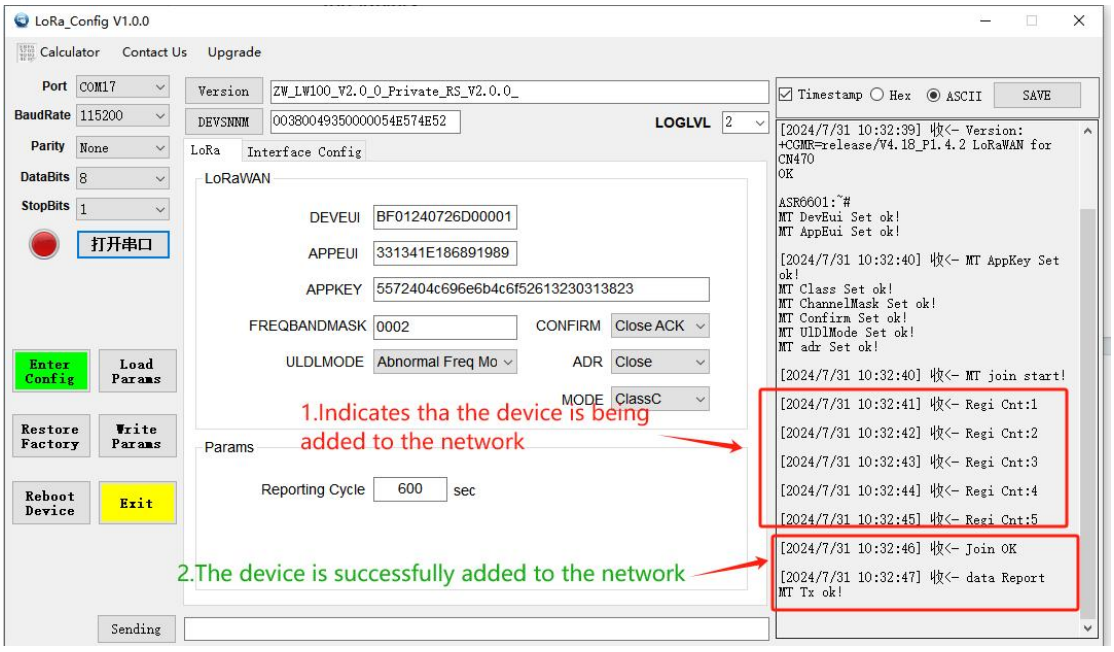
FREQBANDMASK	Set frequency group mask	
ULDLMODE	Set up uplink and downlink same frequency but different frequency	
CONFIRM	Set uplink transmission type	
ADR	Set adaptive speed	
MODE	Set device working mode	

The device will be configured with ternary parameters by default when it leaves the factory:
DevEUI: BF01240726D00001
AppEUI: 331341E186891989
AppKey: 5572404c696e6b4c6f52613230313823
NOTE:All sensors are shipped with AppEUI and AppKey default to **331341E186891989** and **5572404c696e6b4c6f526132330313823**.
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 300s (5min)	

Printing logs of device startup and network connection：

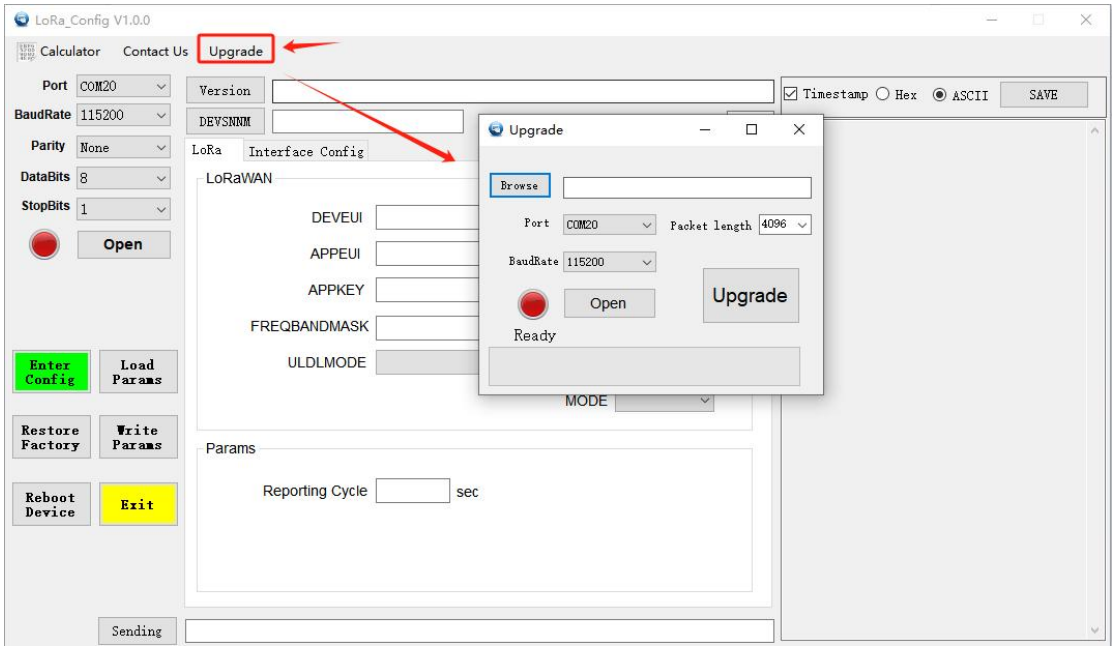


The device is equipped with a built-in LED indicator light, which is located next

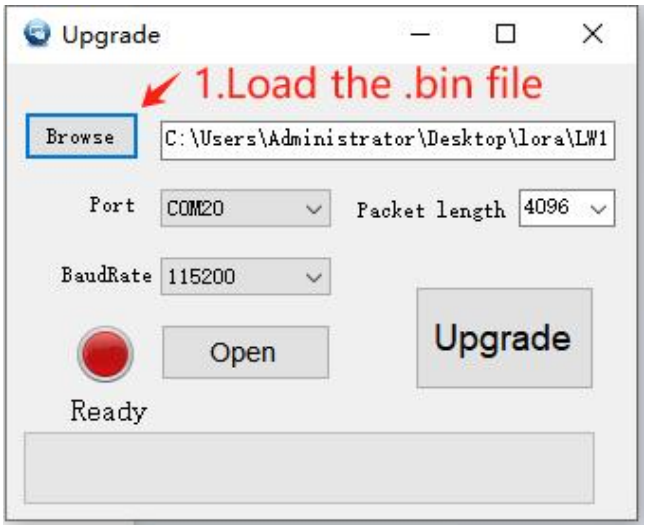
to the antenna interface and can be seen as a green light through the casing.

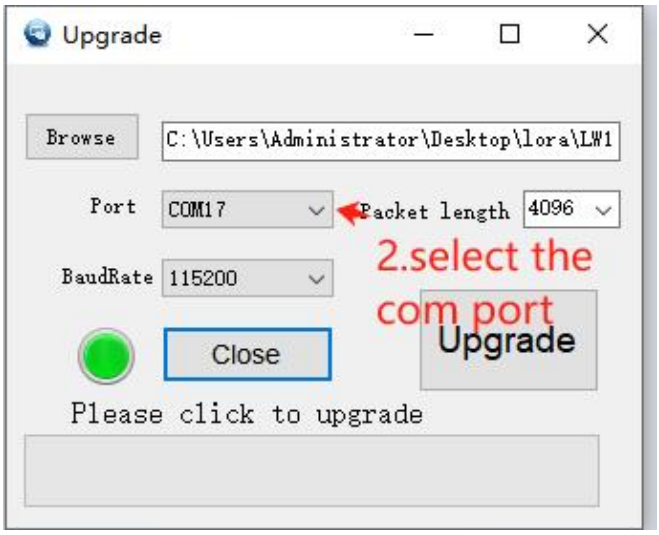
LED	Status	Describe
Green indicator light	Flicker	Add to the network
	Light	Successfully added to the network

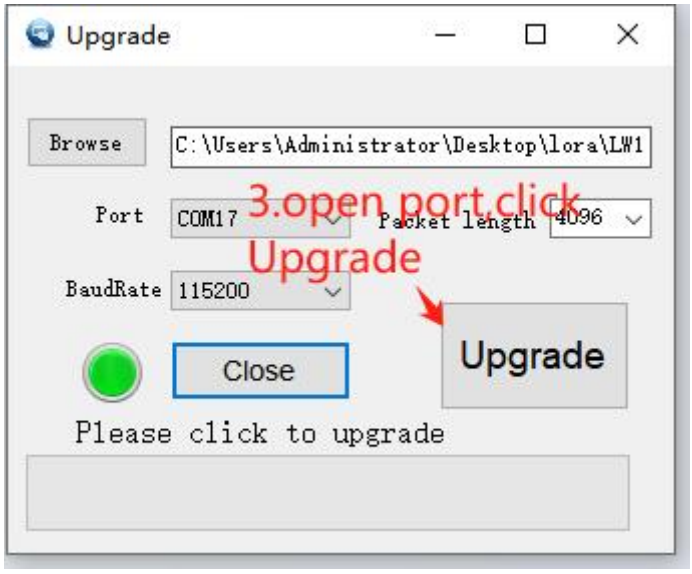
Firmware upgrade:

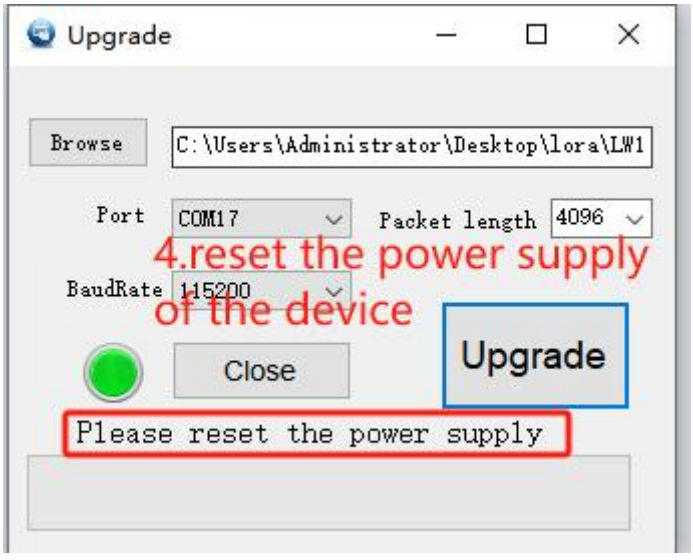


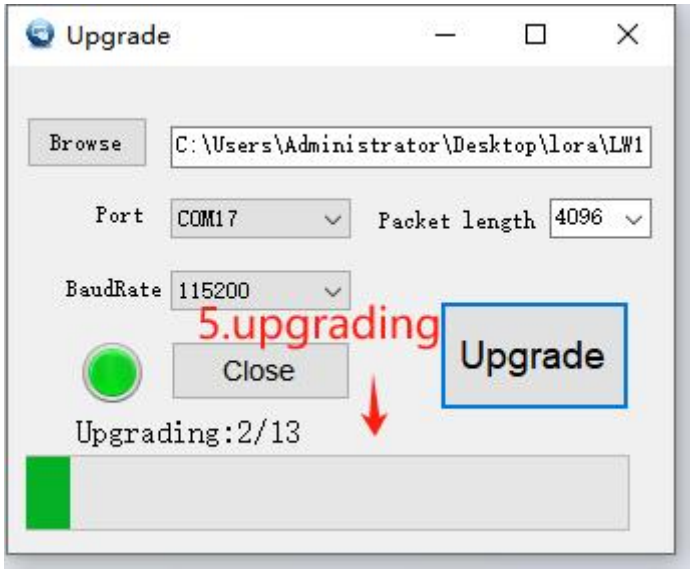
Click to upgrade → Pop up upgrade window

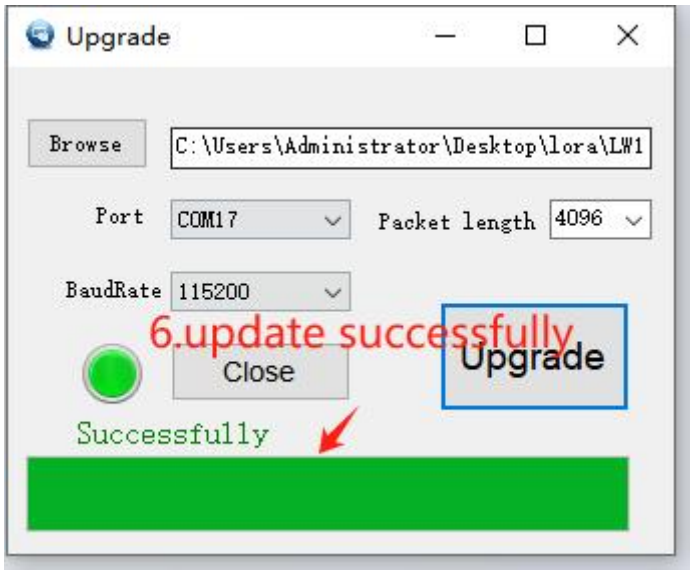



Upgrade
Browse
C:\Users\Administrator\Desktop\lora\LW1
Port
COM17
Packet length
4096
2.select the com port
BaudRate
115200
Close
Upgrade
Please click to upgrade


Upgrade
Browse
C:\Users\Administrator\Desktop\lora\LW1
3.open port,click Upgrade
Port
COM17
Packet length
4096
BaudRate
115200
Close
Upgrade
Please click to upgrade


Upgrade
Browse
C:\Users\Administrator\Desktop\lora\LW1
Port
COM17
Packet length
4096
4.reset the power supply of the device
BaudRate
115200
Close
Upgrade
Please reset the power supply

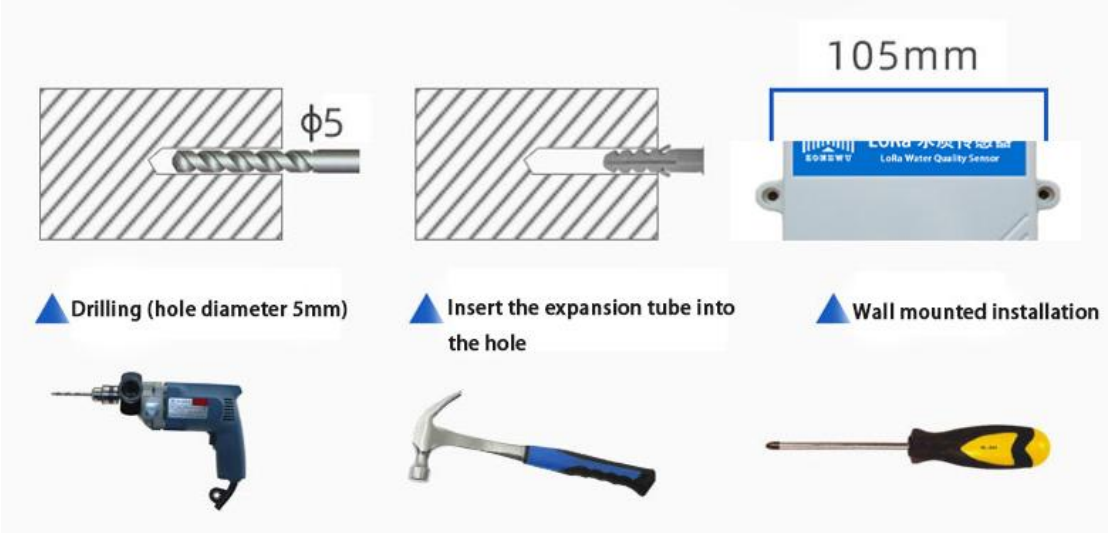




If there is an upgrade error during the upgrade process, you can close and reopen the upgrade window and follow the instructions to upgrade again.

3.3 LW101 Size and Installation

Product size

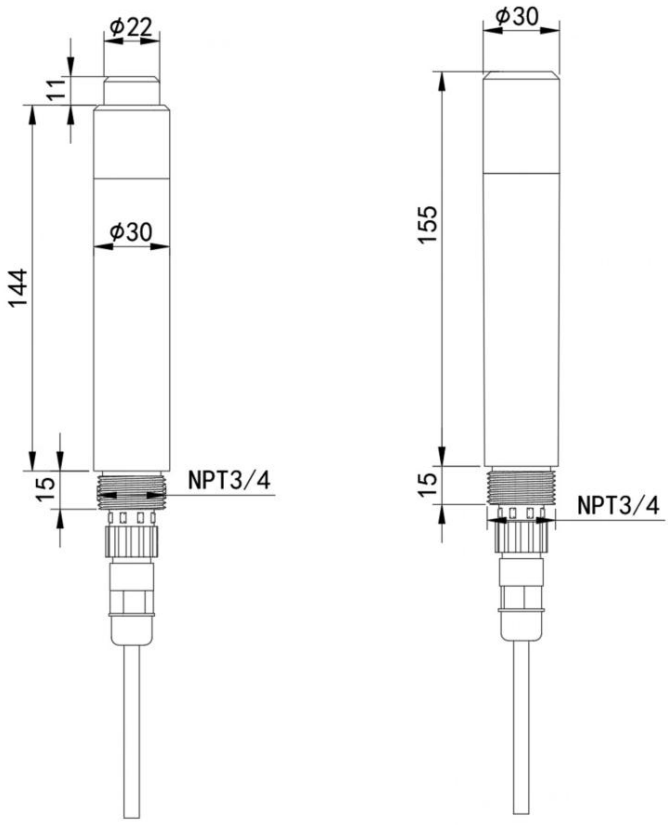


Installation instructions

3.4 DO Transmitter Size and Installation

Integrated DO Transmitter Description

3.4.1 DO Transmitter Size



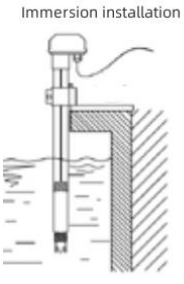
LDO LDOS

3.4.2 Installation

The sensor should be immersed below the liquid level for fixed installation. During installation and use, avoid collision or scratching of the surface of the fluorescent film head. The fluorescent film head should be avoided from being attached by sediment at the bottom of the water. The rubber protective cover should be removed during use.

Submerged installation:

Equipped with NPT3/4 thread, it can be used in conjunction with our waterproof pipes. The cable is threaded out of the pipe and the device is screwed into the waterproof pipe thread.



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.

address	code	length	data		
1 byte	1 byte	1 byte	4 byte	4 byte	4 byte

4.2 Upward Data

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

01030C3F6AEB5240E248B041E585C5					
Sensor address	Instruction type	Data Length	DATA		
			DO saturation	DO concentration	Temp
01	03	0C	3F6A EB52	40E2 48B0	41E5 85C5
1	3	12	91.8%	7.07mg/L	28.7℃

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

4.2.1 Register Address Description

Register address	0001H	0002H	0003H
Parameter	DO saturation	DO concentration	Temperature
Unit	%	mg/L	℃
Range	0~200	0~20	0~40
Data Type	Float	Float	Float
Sample Value	/1	/10	/1
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

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

Response：

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

4.3.3 Zero point calibration

Starting byte（1byte）	Instruction type（1byte）	Standard value（2byte）	Trail byte（1byte）
0xFE	03	X	0xEF

Response：

Starting byte（1byte）	Instruction type（1byte）	Standard value（2byte）	Trail byte（1byte）
0xEF	03	X	0xFE

Example:
After the sensor stabilizes in anaerobic water, write 0x0001

Item	Starting byte	Instruction type	Standard value	Trail byte
Send	FE	03	0001	EF
Receive	EF	03	0001	FE

Note: After reporting the response, there will be another data report.

The calibration process takes about 15 seconds, please do not turn off the power during the calibration process. Do not remove the DO Transmitter from the calibration solution.

4.3.4 Write Atmospheric Pressure

Starting byte（1byte）	Instruction type（1byte）	Standard value（2byte）	Trail byte（1byte）
0xFE	04	X	0xEF

Response：

Starting byte（1byte）	Instruction type（1byte）	Standard value（2byte）	Trail byte（1byte）
0xEF	04	X	0xFE

Example:

Write atmospheric pressure of 101.35kPa to the sensor.Convert 10135 to hexadecimal to 2797

Item	Starting byte	Instruction type	Standard value	Trail byte
Send	FE	04	2797	EF
Receive	EF	04	2797	FE

4.4 Precautions for use

◆When the equipment shows obvious malfunctions, please do not open it for self repair and contact us as soon as possible!

◆The fluorescent film on the front end of the device should avoid collision or scratching, as any damage will result in a decrease in measurement accuracy or even render it unusable.

◆ Avoid using in organic solvents and avoid cleaning the fluorescent cap with organic solvents.

◆During equipment installation, try to avoid cables being too tight or subjected to stress.

◆Equipment cleaning:

For the external surface of the equipment; You can clean it with tap water and wipe it with a damp soft cloth. For stubborn dirt, you can add some household detergent to tap water to clean it;

For the outer surface of the fluorescent cap; Rinse the dirt on the sensor light window with clean water; If wiping is necessary, gently wipe with a soft cloth and do not rub hard to prevent damage to the fluorescent film, which may result in inaccurate measurement

settings and inability to measure.

If dust or water vapor enters the fluorescent cap: unscrew the fluorescent cap and rinse the inner surface of the fluorescent cap and the optical glass window of the device with tap water. If there is oily dirt, it can be cleaned with tap water mixed with household detergent. Then rinse the detergent clean, dry all cleaned surfaces with a lint free soft cloth, and place it in a dry place to completely evaporate the moisture.

It is recommended to clean it every 30 days.

◆Before measurement, the black rubber protective cover should be removed.

◆When storing for a long time, the sponge inside the protective cover should be filled with water and excess water should be squeezed out to ensure that the fluorescent film is moist. The temperature should be kept above 0 ℃ to prevent the fluorescent film from freezing and being damaged; If stored dry, the lowest temperature can reach -10 ℃. When using, the equipment needs to be soaked in water for 48 hours to restore the response of the fluorescent film.

◆ It is recommended to replace the fluorescent film once a year.

◆The equipment should be calibrated before each measurement, and it is recommended to calibrate it every 3 months for long-term use. The calibration frequency should be adjusted appropriately according to different application conditions (such as the degree of dirt and chemical deposition in the application site).