LW105 LoRaWAN Integral Turbidity Transmitter User Manual

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1. Overview

The LoRa water quality turbidity sensor is a basic digital turbidity transmitter for conventional water quality monitoring; Adopting the mature 90 ° scattered light principle from abroad, and adopting the design method of infrared LED light source and fiber optic transmission optical path; Built in filtering algorithm with strong resistance to external light interference. Built in temperature transmitter with automatic temperature compensation function, suitable for long-term online monitoring of environmental use. Supports LoRa TDMA networking and standard LoRaWAN protocol.

2. Technical Parameters

Power Supply	ER26500 Li-SOCl2 8500 mAh battery,3.6V
Weight	200g
Operating Emperature	0~40℃
Measuring Range	0.00~50.00NTU 0.0~200.0NTU 0.0~1000.0NTU(Default) 0~4000NTU
Measurement Error	±5%FS（25℃）
Resolution Ratio	0.01PH
Temperature measurement range	0~40℃,Resolution Ratio:0.1℃ (When manually compensating for temperature, it is set to 25 ℃ by default.)
Electrode usage cycle	Normal use for 2 years
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

Reporting cycle	60min(Default)
Battery Life	≤3 years （Depending on the reporting cycle） Note: Due to the high power consumption of EC sensor, it is not recommended to use short cycle data reporting.
Communication Protocol	LoRaWAN,LoRa TDMA Networking
Equipment information (Reference)	AppEUI：0000000000000001 DevEUI：aaaa202404150001 AppKey：00001111222233334444555566667777

2.1 Product List

- LW105 LoRaWAN Terminal 1 piece
- TYPE-C data cable 1 piece
- Turbidity Transmitter 1piece(individual packing)

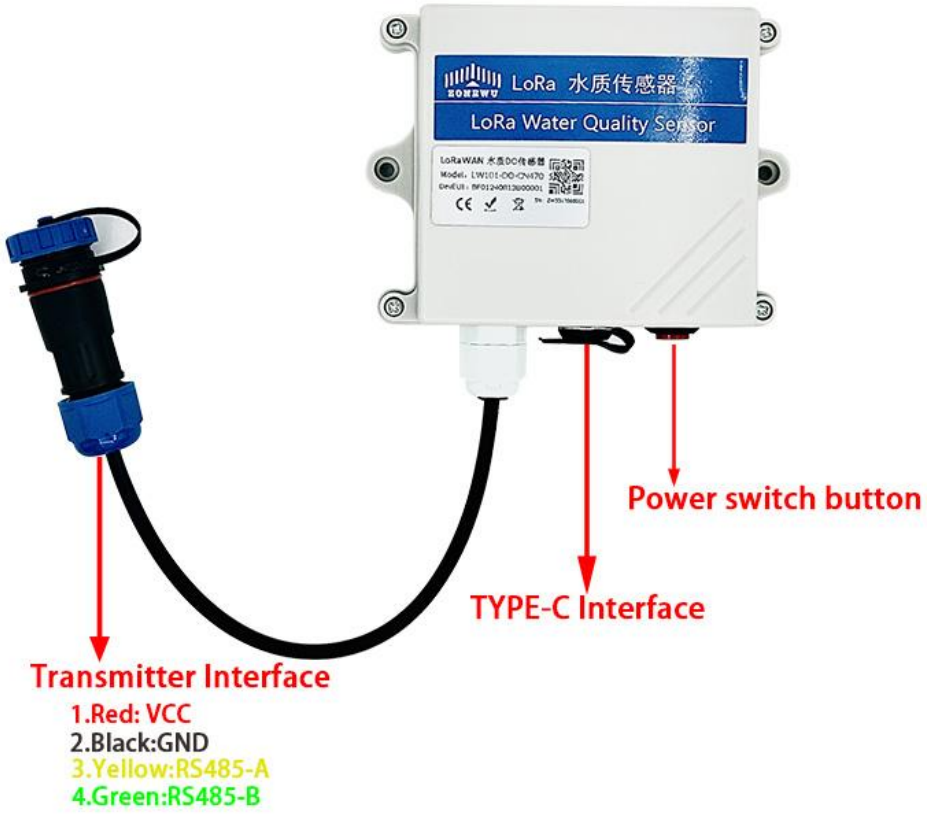
2.2 Common Knowledge of Turbidity

Due to the fact that the suspended and colloidal particles that make up turbidity are mostly charged, they will not settle without chemical treatment.
According to the different uses of water, there are different requirements for turbidity:

- The turbidity of drinking water for daily use shall not exceed 1NTU;
- The turbidity of the supplementary water for circulating cooling water treatment is required to be between 2-5NTU;
- The turbidity of the influent (raw water) treated with desalinated water should be less than 3NTU;
- The manufacturing of artificial fibers requires a water turbidity of less than 0.3NTU.
- In nature, the turbidity of river water generally ranges from tens of NTU to hundreds of NTU.

3. Configuration and Installation

3.1 LW105 Interface Description



1. **Power Switch Interface：** Power switch, press to turn on.

2. **TYPE-C Interface:**Used for device serial port configuration.
   Note: When powered by the battery, the device will immediately wake up after inserting Type-C and enter configuration. After configuration, be sure to unplug Type-C, otherwise the device will remain awake and cannot enter sleep mode!!!

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

3.2 LW105 Parameter Configuration Instructions

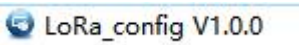
Configuration preparation:

- 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.

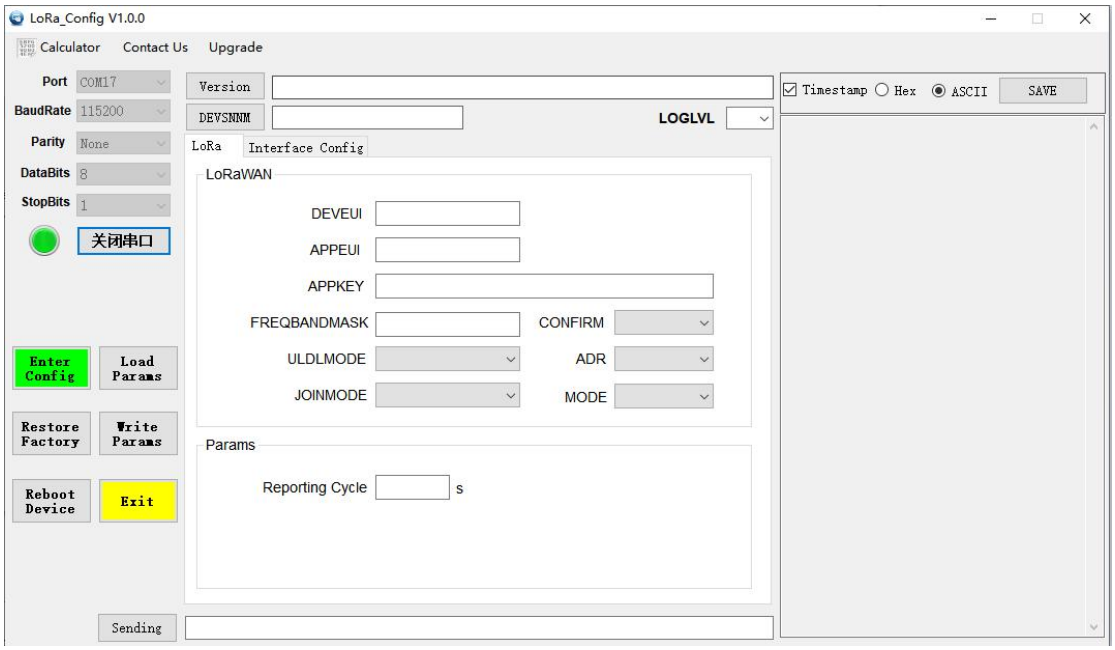
3. Open the configuration tool LoRa_config 

.open the corresponding COM port .

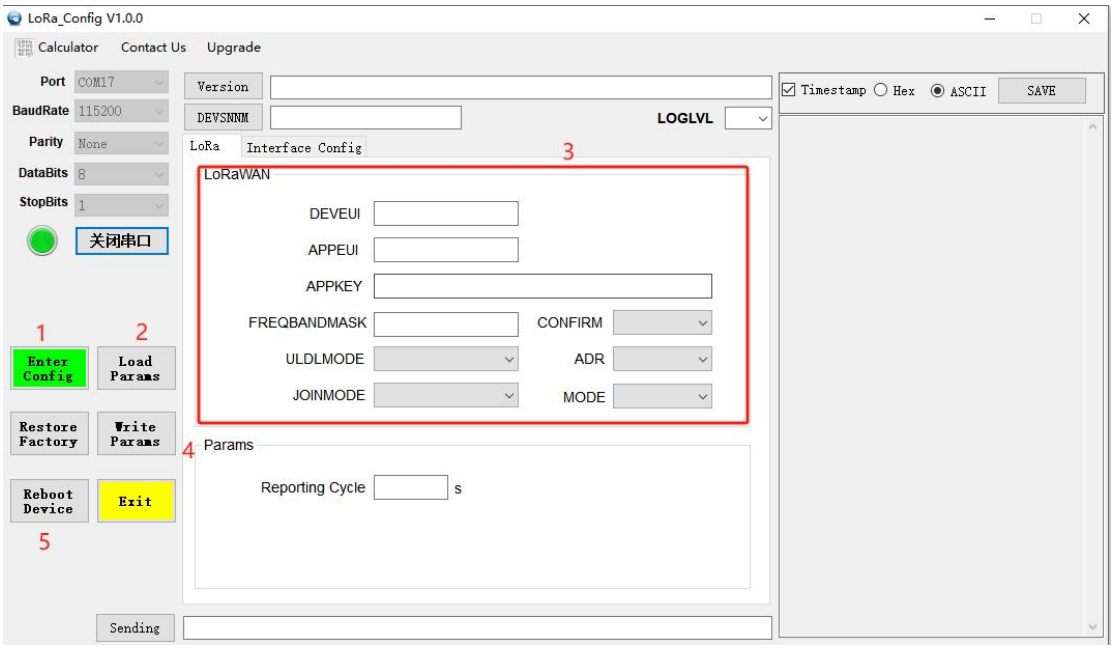
Port default parameters:

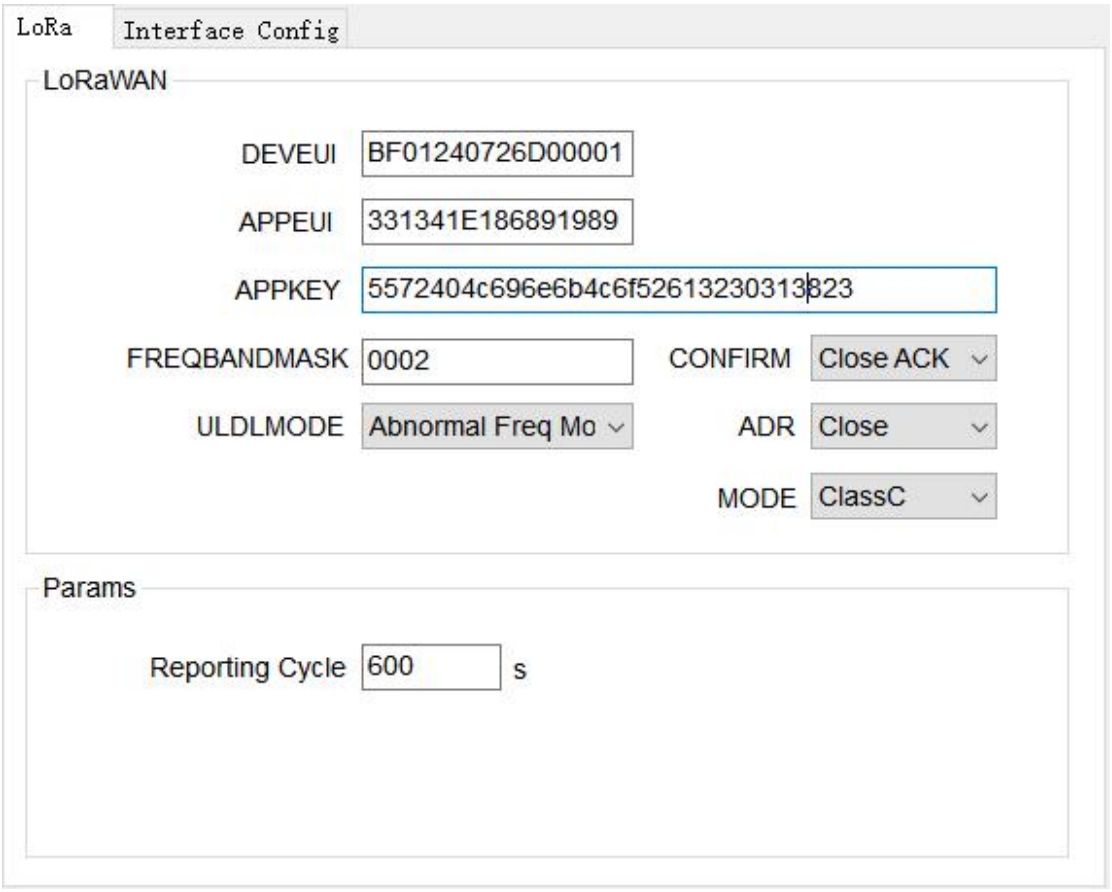
BaudRate	115200bit/s
Parity	None
DataBits	8
StopBits	1

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

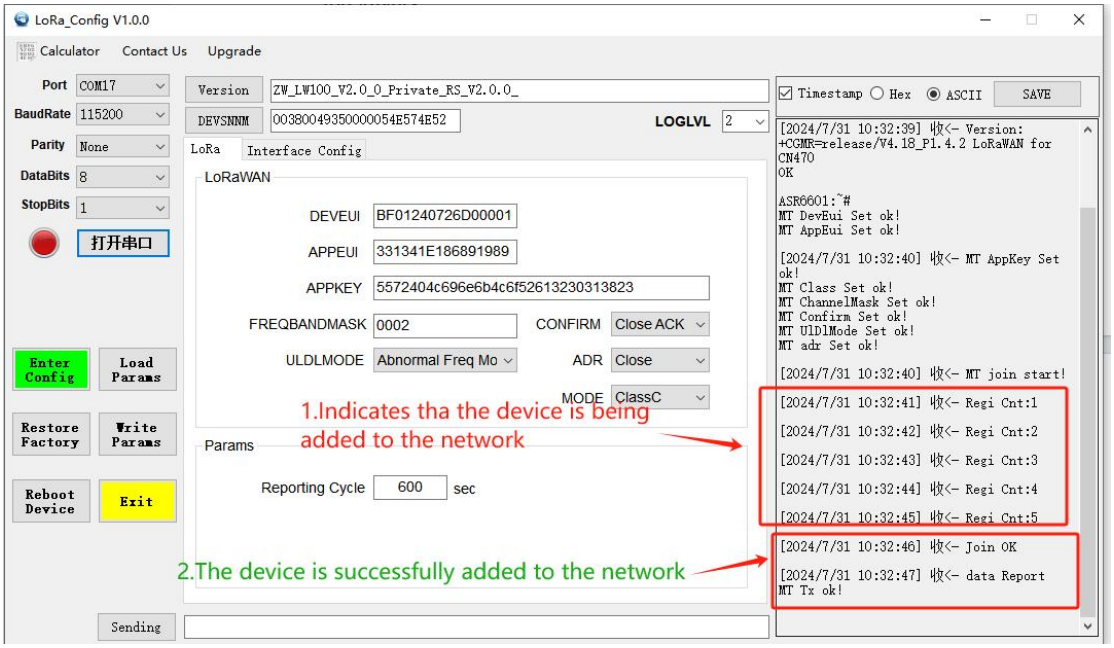
FREQBANDMASK	Set frequency group mask	
ULDLMODE	Set up uplink and downlink same frequency but different frequency	
CONFIRM	Set uplink transmission type	
ADR	Set adaptive speed	
MODE	Set device working mode	

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 3600s (60min)	

Printing logs of device startup and network connection：



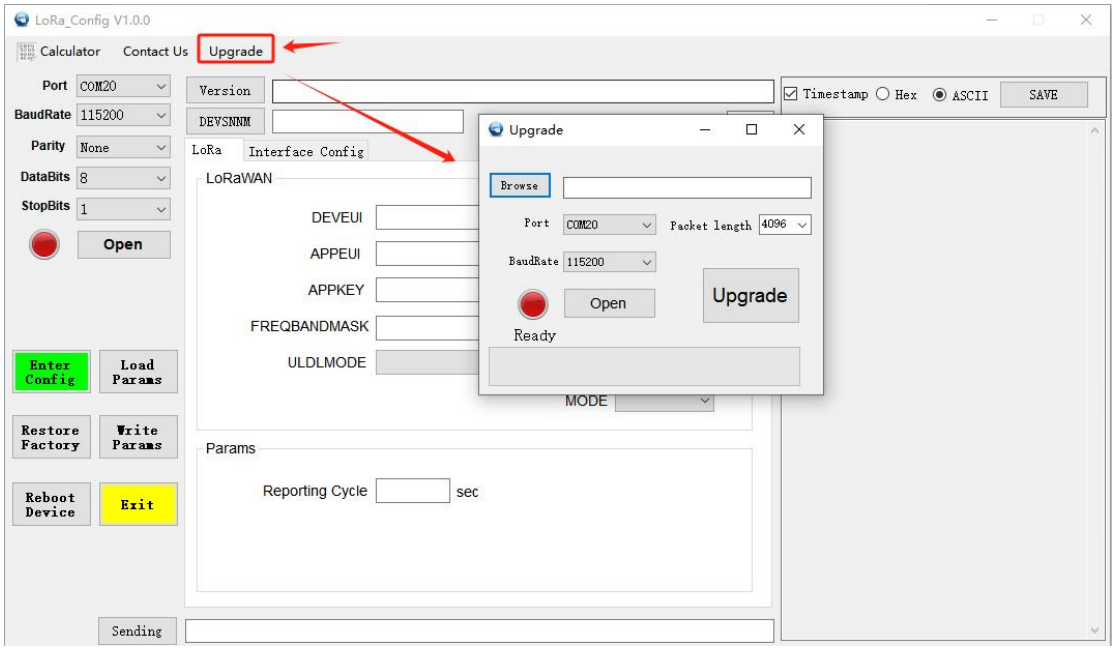
The device is equipped with a built-in LED indicator light, which is located next

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

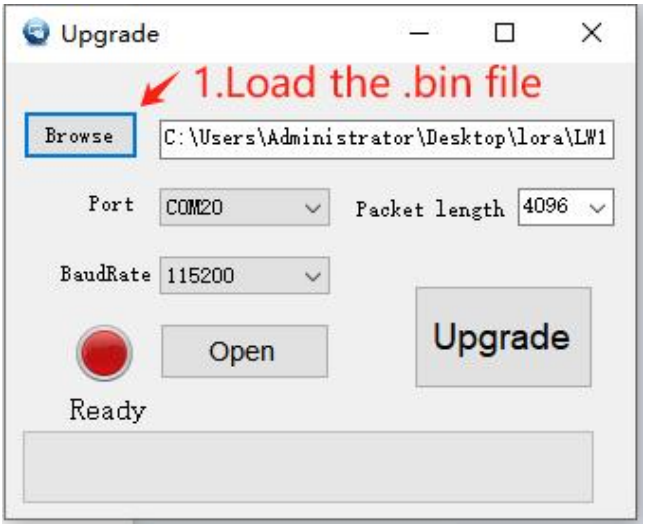
LED	Status	Describe
Green indicator light	Light	Wake up
	Extinguish	Enter sleep mode

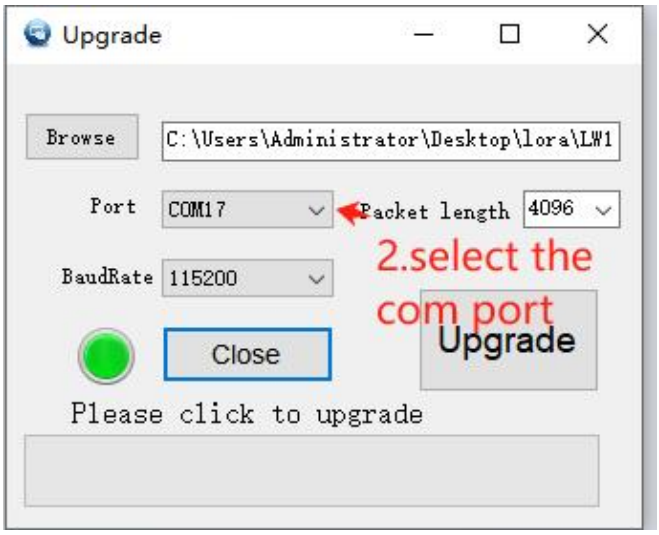
NOTE:Insert Type-c, the device wakes up, and the indicator light lights up.

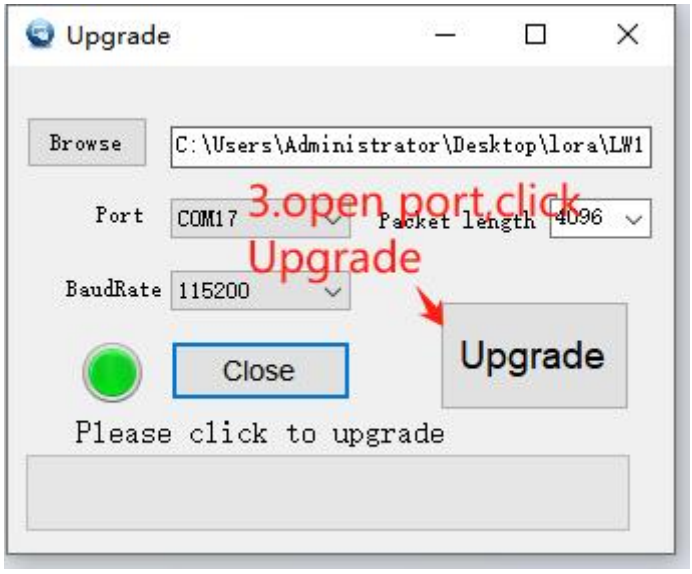
Firmware upgrade:

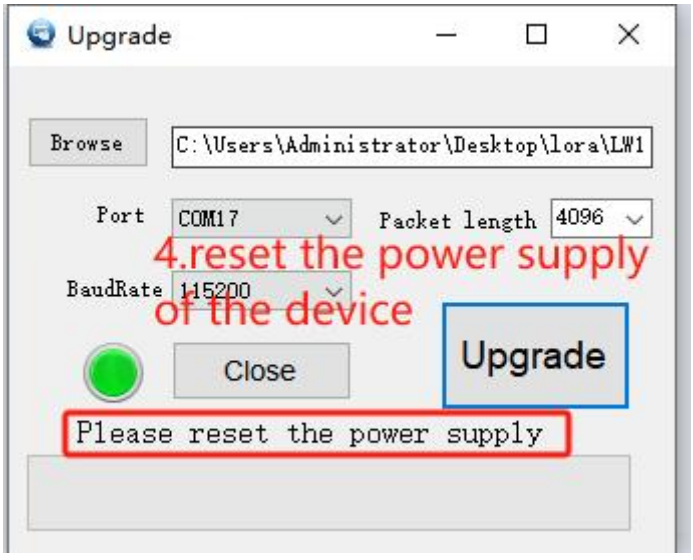


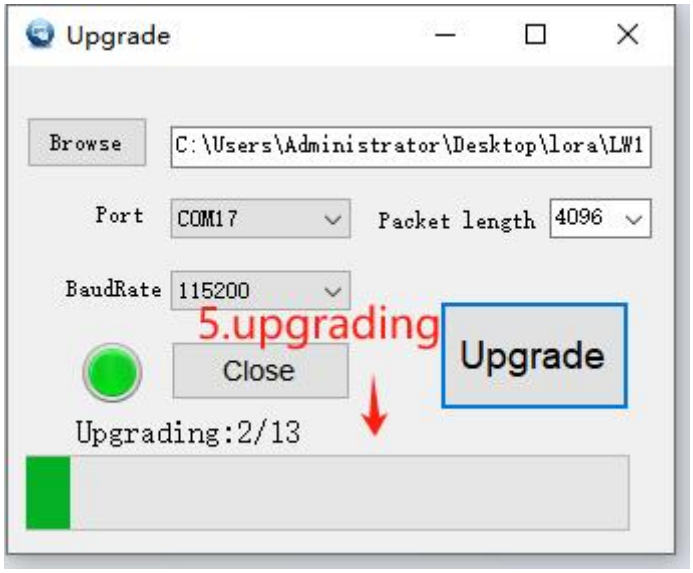
Click to upgrade → Pop up upgrade window

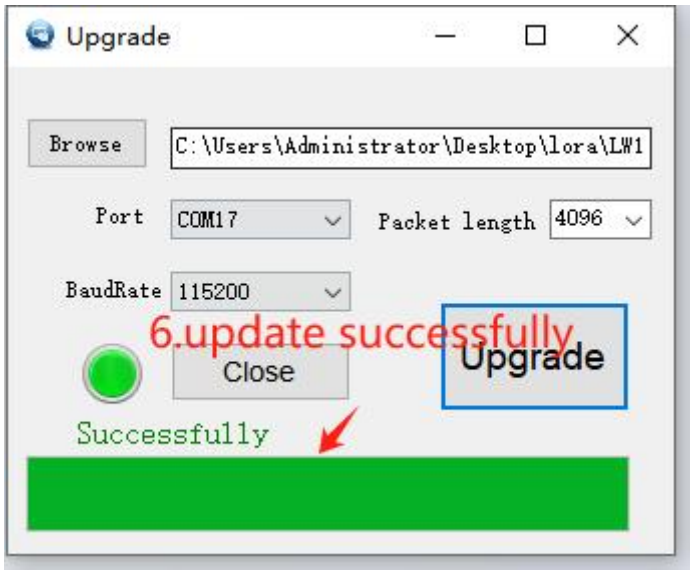



Upgrade
Browse
C:\Users\Administrator\Desktop\lora\LW1
Port
COM17
Packet length
4096
2.select the com port
BaudRate
115200
Close
Upgrade
Please click to upgrade


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

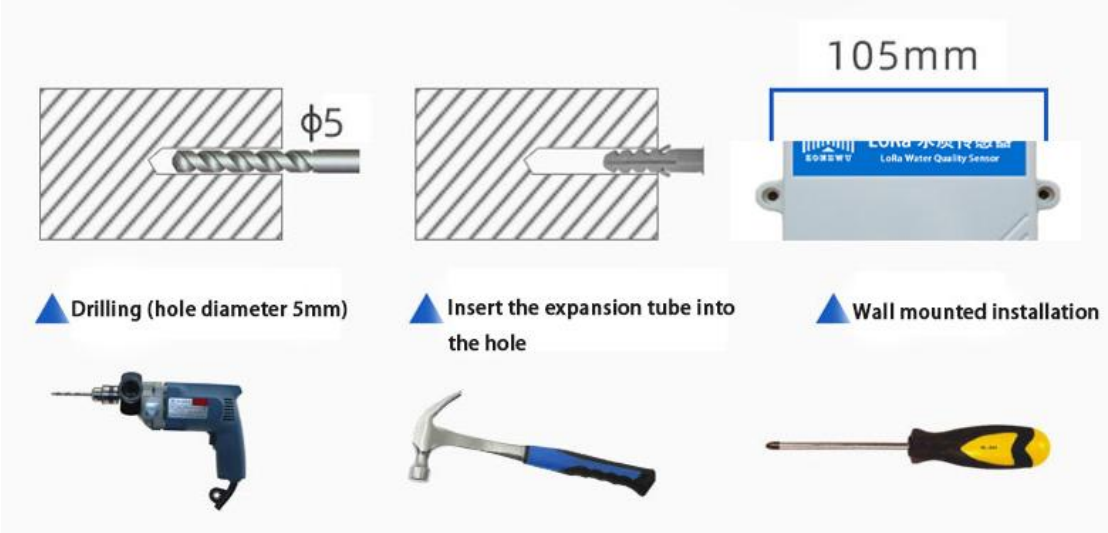




If there is an upgrade error during the upgrade process, you can close and reopen the upgrade window and follow the instructions to upgrade again.

3.3 LW105 Size and Installation

Product size

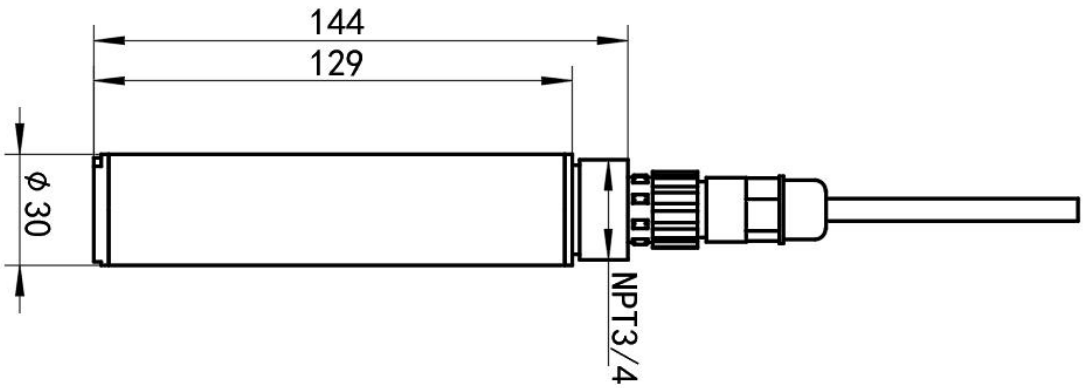


Installation instructions

3.4 Turbidity Transmitter Size and Installation

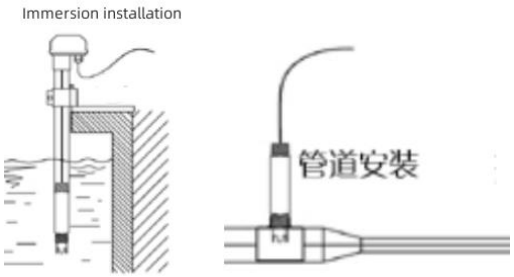
Integrated Turbidity Transmitter Description

3.4.1 Turbidity Transmitter Size



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	2 byte	2 byte	2 byte

4.2 Upward Data

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

0103060D2E00DB0DF8					
Sensor address	**Instruction type**	**Data Length**	**DATA**		
			Turbidity	**Temp**	**Voltage**
01	03	06	0D2E	00DB	0DF8
1	3	6	337.4NTU	21.9℃	3.58V

Note: If the received data is FFFF FFFF, 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	Turbidity	Temperature	Battery Voltage
Unit	NTU	℃	mV
Range	0-1000	0~40	2-3.6V
Data Type	uint16	int16	uint16
Sample Value	/10	/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

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 Turbidity Calibration

The Turbidity transmitter can be calibrated separately using the ModBusRTU protocol for communication calibration.
After the transmitter stabilizes in a zero turbidity environment, write 0x0001 to the 0x1010 register and 0x0000 to the 0x1011 register.
When calibrating the full-scale point, the standard turbidity solution with the upper limit of the range should be selected, and 0x0002 should be written to 0x1010 and 0x0001 should be written to 0x1011.

Example:

Slave Address	Function Code	Register Address	Register Length	byte length	Register content	CRC Low	CRC Hi
0x01	0x10	0x10 0x10	0x00 0x02	0x04	0x00 0x02 0x00 0x01	0x5f	0x63

Response：

Slave Address	Function Code	Register Address	Register Length	CRC Low	CRC Hi
0x01	0x10	0x10 0x10	0x00 0x02	0x44	0xcd

Default port configuration:

BaudRate	4800bit/s
Parity	None
DataBits	8
StopBits	1

Wiring instructions:

1.RD：VCC **2.BK**：GND **3.YL**：RS485A **4.BU**：RS485B

VCC:10-24VDC

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!

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

◆ Regularly clean the attachments of the transmitter measurement probe according to the usage environment, as attachments may cause measurement errors; Avoid scratching the light guide part of the probe during cleaning. (It is recommended to clean once every 30 days)

◆It is recommended to clean the outer surface of the transmitter with water flow. If there are still dirt residues, please wipe them with a soft damp cloth.

◆The equipment should be calibrated before each use, 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).