

LW105 LoRaWAN Integral Turbidity Transmitter User Manual



第1页



Table of Contents

Table of Contents
1. Overview
2. Technical Parameters
2.1 Product List
2.2 Common Knowledge of Turbidity 4
3. Configuration and Installation
3.1 LW105 Interface Description
3.2 LW105 Parameter Configuration Instructions
3.3 LW105 Size and Installation
3.4 Turbidity Transmitter Size and Installation13
4. Protocol Description
4.1 Data Format
4.2 Upward Data
4.3 Downward data16
4.4 Precautions and Maintenance



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.

Power Supply	ER26500 Li-SOCI2 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°C)
Resolution Ratio	0.01PH
Temperature measurement range	0~40°C,Resolution Ratio:0.1°C (When manually compensating for temperature, it is set to 25 °C 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

2. Technical Parameters

Website: <u>http://www.zonewu.com</u> E-mail: <u>qui@zonewu.com</u>



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					
	AppEUI: 000000000000000000000000000000000000					
Equipment information (Reference)	DevEUI: aaaa202404150001					
	AppKey: 000011112222333344445555666667777					

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

第 5 页



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 SLoRa_config V1.0.0 .open the corresponding COM port .

Port default parameters:

BaudRate	115200bit/s
Parity	None
DataBits	8
StopBits	1

As follows:

CoRa_Co	onfig V1.0.0									×
Calcula TEN Calcula	ator Contact	Us Upgrade								
Port	com17 ~	Version					🗹 Timestamp (Hex 🖲 ASCII	SAVE	
BaudRate	115200 🗠	DEVSNNM				LOGLVL	~			
Parity	None v	LoRa In	terface Config							
DataBits	8 ~	LoRaWA	N							
StopBits	1 ~		DEVEUI							
	关闭串口		APPEUI							
			APPKEY							
		FF	REQBANDMASK		CONFIRM	~				
Enter	Load	1	ULDLMODE	~	ADR	~				
CONT 15	T di das	-	JOINMODE	~	MODE	~				
Restore Factory	e Vrite Params	Params								
Reboot Device	Exit		Reporting Cycle	s						
	Sending	1								

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



LoRa_Confi	ig V1.0.0							1944		×
Calculato	r Contact	Us <mark>Upg</mark> r	ade							
Port CO	M17 ~	Versio	n				Timestamp () Hex	() ASCIT	SAVE	
BaudRate 11	5200 ~	DEVSNN	IM			LOGLVL		0		
Parity No	ne v	LoRa	Interface Config		3		-			Ŷ
DataBits 8	~	LoRa	WAN							
StopBits 1	~		DEVEUI							
	关闭串口		APPEUI							
			APPKEY							
1	2		FREQBANDMASK		CONFIRM	~				
Enter Config	Load Parans		ULDLMODE	~	ADR	~				
			JOINMODE	~	MODE	~				
Restore Factory	Vrite Parans	4 Parar	ns							
Reboot Device	Exit		Reporting Cycle	S						
5										
	Sending									Ų

LoR	aWAN				
	DEVEUI	BF01240726D00001			
	APPEUI	331341E186891989			
	APPKEY	5572404c696e6b4c6f	52613230313	823	
	FREQBANDMASK	0002	CONFIRM	Close ACK	~
	ULDLMODE	Abnormal Freq Mo ~	ADR	Close	~
			MODE	ClassC	~
Para	ams				
	Reporting Cycle	600 s			

LoRaWAN Interface:

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



FREQBANDMASK	Set frequency group mask		
	Set up uplink and downlink same frequency but		
ULDLMODE	different frequency		
CONFIRM	IRM 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				
Reporting cycle	adjustable range 1-65535, default is 3600s (60min)				

Printing logs of device startup and network connection:

Port	сом17 ~	Version	ZW_LW100_V2.0_0_Private_RS_V2.0.0_						
audRate	115200 ~	DEVSNNM	00380049350000	054E574E52		LOGLVL	2 ~	[2024/7/31 10:32:39] 收<- Version:	
Parity N	None ~	LoRa Ir	nterface Config					+CGMR=release/V4.18_P1.4.2 LoRaWAN for CN470 OK	
StopBits	。 1 打开串口	LURAWA	DEVEUI APPEUI APPKEY	BF01240726D00001 331341E186891989 5572404c696e6b4c6]] jf5261323031	3823		ASR6601:"# MT DevEui Set ok! MT AppEui Set ok! [2024/7/31 10:32:40] 收<- MT AppKey Set ok! MT Class Set ok!	
Enter Config	Load Parans	F	REQBANDMASK	0002 Abnormal Freq Mo v		Close ACK ~ Close ~		MI Confirmesmass Set Ox! MT Confirm Set ok! MT UD1Mode Set ok! MT adr Set ok! [2024/7/31 10:32:40] 收公- MT join start!	
Restore Factory	♥ rite Parans	Params	1.Indica added	ates tha the d to the networ	evice is b	classC ~	-	[2024/7/31 10:32:41] 收<- Regi Cnt:1 [2024/7/31 10:32:42] 收<- Regi Cnt:2 [2024/7/31 10:32:43] 收<- Regi Cnt:3	
Reboot Device	Exit		Reporting Cycle	600 sec			l	[2024/7/31 10:32:44] 收<- Regi Cnt:4 [2024/7/31 10:32:45] 收<- Regi Cnt:5 [2024/7/31 10:32:46] 收<- Join OK	
		2.The de	evice is succ	cessfully adde	d to the	network -		[2024/7/31 10:32:47] 收<- data Report MT Tx ok!	

The device is equipped with a built-in LED indicator light, which is located next Website: <u>http://www.zonewu.com</u> E-mail: <u>gui@zonewu.com</u>



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

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

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

Firmware upgrade:

Port	сом20 ~	Version		🖂 Timestamp 🔿 Hex 💿 ASCII	SAVE
BaudRate	115200 ~	DEVSNNM		Upgrade – 🗆 X	~
Parity	None ~	LoRa Ir	nterface Config		
DataBits	8 ~	LoRaWA	AN	Browse	
StopBits	1 ~		DEVEUI	Port COM20 V Packet length 4096 V	
•	Open	F	APPEUI APPKEY	BaudRate 115200 V Open Upgrade Ready	
Enter Config	Load Parans			MODE V	
Restore Factory	e Vrite Parans	Params			
Reboot Device	Exit		Reporting Cycle	sec	
	Sending				v

Click to upgrade \rightarrow Pop up upgrade window

rowse	C:\Users\Admini	strator	\Desktop\	lora\I
Port	C0M20 ~	Packet	length	4096
BaudRate	115200 ~	r		
	Open		Upgra	ade
Ready			-	



opgrade		_3		×
Browse C:\Vsers\Adm	inistrator	·\Desk	top\lor:	a\LW1
Port COM17	🗸 🛹 acke	t ler	gth 409	6 🗸
BaudRate 115200	✓ 2.1	sele	ect th	ie
Close		υ	port	ə
Please click to	ungrade	5		- 20
		22		
Upgrade	1	_8		X
			1000	
100 100	1.1.5	r\Des	ktop\lom	a\LW1
Browse C:\Users\Adm	inistrato			
Browse C:\Users\Adm	inistrato	ort	click	
Browse C:\Users\Adm Port COM17 3.01	onistrato	o <mark>rt</mark>		96 🗸
Port COM17 3.01	ven per	<mark>qrt</mark>		96 🗸
Browse C:\Vsers\Adm Port COM17 3.01 BaudRate 115200	grade	orit,	<mark>click</mark>	96 🗸
Browse C:\Users\Adm Port COM17 3.01 BaudRate 115200	oen p grade	orit,	<u>çlick</u>	96 ~
Browse C:\Vsers\Adm Port COM17 3.01 BaudRate 115200 Close			pgrad	96 ~
Browse C: \Users\Adm Port COM17 3.01 BaudRate 115200 Close		ort. U	pgrad	96 ~
Browse C:\Users\Adm Port COM17 3.01 BaudRate 115200 Close Please click to			<mark>çlick</mark> pgrad	96 ~
Browse C:\Users\Adm Port COM17 3.01 BaudRate 115200 Close Please click to	upgrade		ograd	96 ~

_	T			
Browse	C:\Users\Administ	rator\Des	ktop\lor	∙a\LW
Port	4.reset the	Packet ler	ngth 409 r sup	96 Indo
BaudRat	of the devic	ce 🗖		
	Close	U	ograd	е
	se reset the po	wer sup	ply	





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



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	Data	DATA					
	type	Length	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	°C	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	Instruction type	Trail byte
(1byte)	(1byte)	(1byte)
0xFE	01	0xEF

Response:

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

4.3.2 Set Reporting cycle

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

Response:

Starting byte	Instruction	Reporting	Trail byte
(1byte)	type(1byte)	cycle(2byte)	(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:



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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).