

Split-type ammonia transmitter

WE-T233 User Manual



Hainan Shidian Technology Co., Ltd. U-WES-T233-CN1

Preface

- This manual is a user manual covering the product's various functions, wiring methods, and operating procedures.

- Please read this manual carefully before operation, use this product correctly, and avoid unnecessary losses caused by incorrect operation.

- After reading, please keep it securely in a convenient place for easy access at any time for reference when using it.

Note

- If there are any changes to the content of this manual due to feature upgrades, please refer to the newly released documentation.

- We strive to ensure the accuracy of this manual. If you find any errors, please contact us.

- Please use this product in accordance with its characteristics and comply with national and regional laws and regulations.

- The content of this manual is strictly prohibited from being reproduced or copied.

● The final right of interpretation of this manual belongs to the Company.

Version

U-WES-T233-CN1 First Edition December 2025

Check the packaging contents

After opening the box, please confirm the packaging contents before starting operations. If you find any errors in the model or quantity, or if there is physical damage to the appearance, please contact our company.

Product packaging contents are listed in the standard configuration list.

Product standard configuration list

Serial number	Name	Quantity	Note
1	Ammonia Transmitter	1	
2	Manual	1	
3	Antenna	1	

4	Certificate of Conformity	1	
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Note: Customized products may differ slightly from standard products; please refer to the order for the final order.

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1. Product Overview

1.1. Product Introduction

The WE-T233 ammonia gas concentration monitoring transmitter offers multiple transmission methods: LoRa, 4G, NB-IOT, and RS485, with power supply options covering battery power and DC24V power. This transmitter uses highly stable digital sensors to ensure precise real-time monitoring and scientific calculation of ammonia gas concentration values on site. Through communication technologies such as LoRa, 4G, NB, and RS485, long-distance data transmission is achieved. By integrating Shidian Technology's industrial edge computing gateway products, data was smoothly uploaded to the Shidian Technology equipment management platform, ensuring real-time collection, precise analysis and calculation, secure storage, and intuitive display of on-site ammonia gas concentration values,

providing solid technical support and data assurance for related work.

The transmitter body and probe are designed separately, making it suitable for monitoring air quality in residential community garbage stations, waste incineration stations, public toilets, sewers, and other residential and industrial environments. It meets the requirements for online ammonia gas concentration measurement in most industrial applications.

1.2. Measurement principle

The ammonia transmitter uses an ammonia sensor, based on a constant potential electrolysis method. During operation, a constant electrode potential guides ammonia gas to undergo catalytic oxidation on the working electrode surface, linearly converting gas concentration information into microcurrent signals, which are then processed by circuits into usable standard signal outputs.

An ammonia transmitter generally consists of an ammonia sensor and a transmitter, connected by cables. When the ammonia

sensor collects the concentration value of the ammonia gas on site, it is transmitted to the transmitter via cable.

1.3. Product features

- A mobile app allows monitoring of the meter anytime, anywhere.
- Four communication methods to choose from.
- Selection of battery and external power supply methods.
- The main unit features a fully sealed waterproof design, with an IP67 protection rating.
- High-gain antenna with multiple verification mechanisms to ensure it is always online.
- Supports high-definition LCD displays, combined with LED indicators and buttons, allowing real-time on-site viewing of ammonia gas concentration values, alarm information, battery level reminders, and more.

2. Technical specifications

表1 Technical specifications

Input	
Measure variables	Ammonia gas NH_3
Measurement range	0~99.99ppm
Performance parameters	
Accuracy	± 0.1 ppm or $\pm 10\%$ test value, whichever is higher
Resolution	0.01ppm
Overload	200ppm (Prolonged overload can damage the sensor)
Probe lifespan	2 years (in the air)
Signal transmission	
LoRa	Supports the 410.125~490.125MHz frequency band Maximum transmission power of 22dbm, maximum -147dbm reception sensitivity, and signal coverage capability at open sight distances of 5KM Antenna interface type: SMA female connector

4G	Three years of data usage (100M/month) Supports MQTT, HTTP, and WES cloud service protocols LTE FDD B1/3/5/8 LTE TDD B34/38/39/40/41 (full band) Rate (Mbps) LTE FDD: 10.3 (DL) / 5.1 (UL) LTE TDD: 9.1(DL)/3.1(UL) Antenna interface type: SMA female connector				
NB	Five-year flow rate (300M/year) LTE Cat NB2: B3/B5/B8 Rate (kbps): Single-Tone: 25.5 (DL) / 16.7 (UL) Multi-Tpne: 127(DL)/158.5(UL)				
RS485	Communication protocol: Compatible with WES-IO (fixed 9600bps) and Modbus protocol Baud rates: 4800, 9600, 19200, 34800, 57600, 115200 Data bits: 7-bit, 8-bit Stop bits: 1bit, 1.5bit, 2bit Check bits: None, Odd, Even				
	Sequence	Red	Black	Yellow	Green
	definition	DC12~24V+	DC12~24V-	485A	485B
Sampling	Can be set for 1 min~18 hours				

cycle	
Reporting Cycle	Can be set in 10s~18h
Electrical specifications	
Power supply	19,000mAh lithium battery 9~30DC, typical 24V
Battery life	Subject to specific operating conditions and reporting cycles. Collection cycle is 600 seconds, reporting cycle is 1800 seconds LoRa: 2.8 years 4G: 1.31 years NB: 2.38 years
Environmental conditions	
Work environment	Transmitter main unit: Temperature: (-20~70) ° C, Relative humidity: 5%RH~95%RH (non-condensing) Transmitter Probe: Temperature: (-20~50) ° C, Relative humidity: 15%RH~90%RH (non-condensing)
Storage temperature	Main transmitter: (-40~85)° C Transmitter probe: (0~35)° C
Protection rating	Transmitter main unit: IP67

3. Product structure and dimensions

3.1. External dimensions

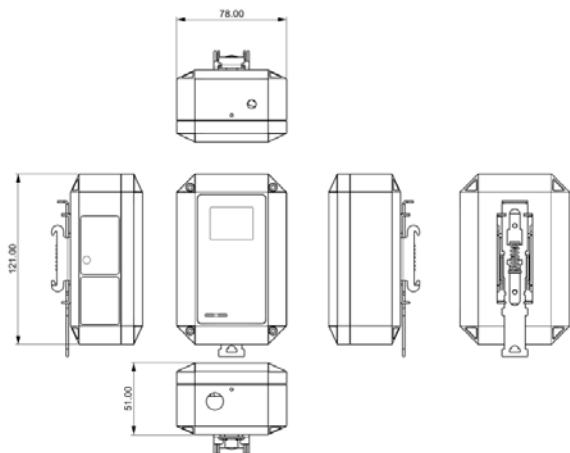


图1 Product dimensions and dimensions

3.2. Connecting cables

Cable length: 1.5m; other lengths require customization.

3.3. Material

Main unit casing material: ABS/PC

Probe housing material: aluminum alloy

Cable sheath material: PVC or polyurethane PU

4. Installation and Use

4.1. Inspection upon arrival

After the product arrives, users should first check the packaging quality; the packaging box should be intact and undamaged, with clear labeling. If the packaging is obviously damaged, contact the storage and transportation department promptly to clarify the issue and responsibility, and notify our company. If there are no issues such as damaged packaging, you can open the box and remove the product to check its integrity.

4.2. Installation and usage precautions

(1) The sensor should avoid contact with organic solvents (including silicone rubber and other adhesives), coatings, chemicals, oils, and high-concentration gases.

(2) All electrochemical sensors should not be fully encapsulated in resin materials or immersed in an oxygen-free environment, as this will damage sensor performance.

(3) All electrochemical sensors should not be used for extended periods in environments containing corrosive gases, as corrosive gases can damage the sensors.

(4) Zero point measurement of gases must be conducted in clean air.

(5) During sensor testing and application, vertical air intake from the front must be avoided.

(6) The air intake surface of the sensor must not be blocked or contaminated.

(7) Sensors should not be excessively impacted or shaken.

(8) It is prohibited to use hot melt adhesives or sealants with curing temperatures above 80° C to encapsulate sensors.

(9) Prohibition of prolonged storage and use in high-concentration alkaline gases.

(10) Do not use if the casing is damaged or deformed to prevent damage caused by electrolyte leakage.

(11) The thread specifications for process installation joints must match the product.

(12) During installation and use, wear and tear, punctures, or scratches of wires should be strictly avoided. If the above issues exist on site, protective measures should be taken for the conductors.

4.3. Installation diagram

In the direction shown in the diagram, install the accessories on the back of the transmitter, fix it with two screws, and the transmitter can be directly clipped onto the 35mm rail.

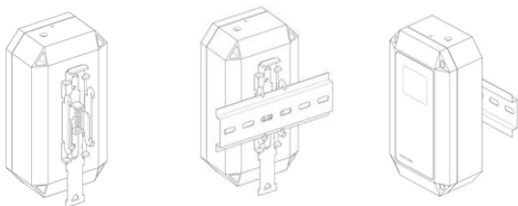


图2 Installation diagram

You can also install a fixing clip, as shown below. Push the spring upward to snap the card in, making it easier to fix it with screws or cable ties.

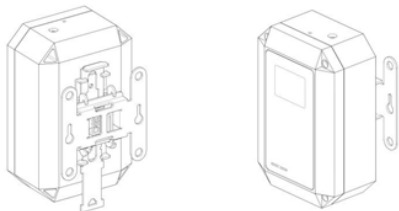


图3 Installation diagram

5. Operation

5.1. Display and operation units



图4 Panel diagram

5.1.1. Interface description

表2 Interface description

Serial number	Explanation
1	System time
2	Bluetooth: After the phone and device connect via Bluetooth successfully, a Bluetooth icon will be displayed
3	Upside signal
4	Battery level
5	Measurement units
6	Ammonia concentration measurements
7	Countdown to recognition: After the device recognizes it, a 600-second countdown begins
8	Alarm information

5.1.2. Key Instructions

One operation button on the left side of the main unit.

表3 Key definition

Operation	Explanation
Click	1. Turn on the screen and backlight 2. Switch page

Operation	Explanation
	3. List line breaks, option switching 4. Change the parameter value by 1
Double tap	1. Enter the parameter modification subinterface 2. Confirm the options
Three strikes	1. Identification devices 2. Enter the parameter settings interface
Press and hold	Press and hold for 5~6 seconds; the system light will flash white. Release the button and the device will restart.

5.1.3. Indicator light explanation

Communication indicator light: green flashing, indicating normal communication

System indicator lights:

A green flash means the device is functioning normally

Orange flashing indicates a device alarm

Red flashing indicates equipment failure

5.1.4. Alarm and fault information

表4 Alarm code

Status code	Problem location
1	Board temperature

Status code	Problem location
2	Battery
3	Bluetooth
4	Uplink network
5	Display
6	Sensors
7	Others

For example: the status code shown in the figure shows 6, indicating the sensor alarm, indicating the current ammonia gas concentration value triggered by the alarm threshold.

5.2. On-site operation

5.2.1. Device button operation

Instructions: Press a button to light up the screen and display monitoring values and other information; Press the button again to light up the background light, then press again to display the QR code. In the QR code interface, triple-click the button to enter the parameter settings interface.

Parameter Settings: After entering the parameter settings interface, you can configure parameters such as device address (Address) and LORA network (Net, Channel). In the Settings

interface, click a key to perform a list line break, as shown below. Double-click the key to enter the parameter settings interface.



图5 Parameter interface

After entering a parameter modification interface, as shown below, the first row represents parameter values,  meaning saving and  returning to the previous level; Press a button, and the action flag cycles between four options. When the action flag is on a particular option, the background of that option turns dark.



图6 Parameter subinterface schematic

Parameter modification example: move the operation flag to

the first row and double-click the key, as shown below. When a triangle appears, click the key once, and the value increases by 1, repeating the cycle from 0 to 9. Once the value is set, double-click the key and the triangle disappears. Move the operation icon to  the location, double-click the key to save the settings. Move the operation flag to  the location, double-click the key to return to the Settings interface.

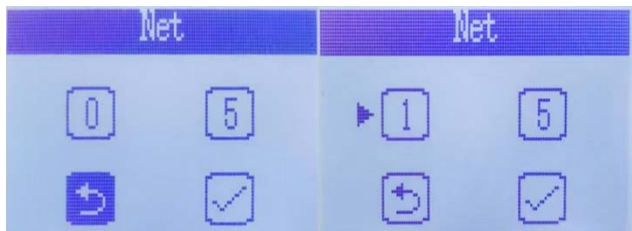


图7 Operation diagram

Calibration operation: Enter the Calibration page to calibrate the sensor. Calibration should be prepared in an environment where ammonia concentration is zero.

Zero point calibration: Place the sensor in an environment where the ammonia concentration is zero. After 3~5 minutes of stable readings, perform zero point calibration. After entering the parameter settings interface, go to the calibration sub-interface,

select Zero Calib with the cursor, double-click the button, and wait for the interface to display OK.



图8 Calibration subinterface

Calibration instructions: Only the sensor is not used on time; calibration is unnecessary unless necessary.

5.2.2. Page parameter description

表5 Parameter list

Page	Parameter name	Value range	Note
Setting	Address	LoRa: 1-64 RS485: 1-99	Device address
	Net	1-99	LoRa Network ID (LoRa version only)
	Channel	0-83	LoRa Network Channel (LoRa version only)

	Baudrate	/	Baud rate (RS485 version only)
	Calibration	/	Calibration
	Exit	/	Withdraw
Address	/	LoRa: 1-64 RS485: 1-99	Device address can be changed
Net	/	1-99	Device LoRa network ID can be modified
Channel	/	0-83	Device LoRa network channels can be modified
Baudrate	/	4800 9600 19200 38400 57600 115200	Device RS485 communication baud rate can be adjusted
Calibration	Zero Calib	/	Zero point calibration

5.3. Equipment is on the cloud

This product can be bound to devices via the "Shidian Equipment Assistant Mini Program" or the web to achieve remote monitoring, abnormal alarms, data reports, and other functions.

5.3.1. Device cloud platform

(1) Mini Program

Search for the mini program "Shidian Equipment Assistant" on WeChat to add the mini program.

(2) Web End

Web address: <https://www.west-iot.com/wessass>

5.3.2. Add equipment

Step 1: Enter the Mini Program project device management interface

Click Project -- Select Project -- Click  -- Click Device Management.



图9 Enter the project equipment management interface

Step 2: Add the device

Click the + icon in the upper right corner of the device management page, select the product, choose the addition method, add manually, scan the QR code to add, or scan the QR code to add.

Scan the QR code to add:



图10 Scan the device QR code to add

Manual addition:



图11 Add manually

Bluetooth Add-on:



图12 Bluetooth added

5.3.3. Device cloud platform and mini program usage guide

Once the device is successfully added, you can view the device in the project. Detailed operation guides for cloud platforms and mini programs can be found in the mini program documentation center.

5.4. Local Bluetooth configuration for the device

Step 1: Enter the mini program and search for devices via Bluetooth

Click -- Click Search for Device. Once you find the

device you want to connect to, you can click to stop searching.

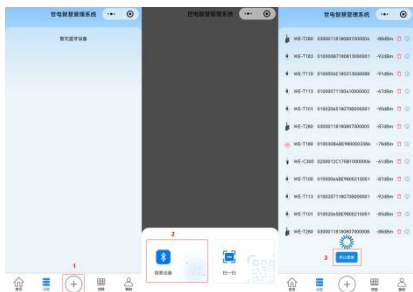


图13 Bluetooth search devices

Step 2: Connect the device via Bluetooth

Click the device name to connect the device.



图14 Bluetooth connection devices

Step 3: Operate the equipment

After successfully connecting a device, you can view device status data in the status section, modify device attributes in configuration, and restart, identify, and upgrade the device during operation and maintenance.

5.5. Precautions for use

This product features threshold instant reporting: during the reporting week, if any abnormal data collection occurs (exceeding the set threshold, it must be set in advance), the data set will be reported immediately (device collection cycle defaults to 50 seconds, reporting cycle defaults to 5 minutes, both adjustable).

6. Fault analysis and troubleshooting

The table below lists possible issues with ammonia transmitters and their solutions. If your problem is not listed or the solution cannot address your problem, please contact our company.

表6 Common fault analysis and troubleshooting

Fault phenomena	Cause analysis	Methods to eliminate them
The instrument panel shows no display	Battery capacity is low	Replace with a new battery
Abnormal collected values	The probe connection is disconnected	Check whether the on-site host and probe are properly connected
Data cannot be received	4G/NB networks can be used to check the instrument status through indicator lights. If the	(1) Install the SIM card correctly, (2) Contact your network provider to set up the network, or check the local 4G network signal strength.

	network is not successfully reinstated, check: Check whether the SIM card is correctly installed and if it is in a wireless service area.	
	LoRa network was not connected	Check whether the supporting gateway is connected Whether the parameters of LoRa and the gateway are consistent
The card cannot be read	Card not inserted properly / card unpaid / card bound	Reinsert Check your card bill renewal Unbind the card
The platform has no data	General programs have bugs	Check the procedure

7. Warranty and after-sales service

Our company promises customers that if there are any product quality issues during the warranty period, we provide an unconditional 'Three Guarantees' service for products with quality issues, including free repair, replacement, or return. All non-customized products are guaranteed to be returned or exchanged within 7 days (excluding damaged products). For customized products, the warranty as stipulated in the contract prevails.

Disclaimer

During the warranty period, the following reasons for product failures are not covered by the Three Guarantees service:

- (1) Improper use by the customer causing product malfunctions.
- (2) The customer disassembles, repairs, or modifies the product themselves, resulting in product malfunctions.

Appendix: Data Communication

1. Data format

The default data format for Modbus communication is:
115200, n, 8, 1 (baud rate 115200bps, 1 start bit, 8 data bits, no
checksum, 1 stop bit).

2. InformationFrame Format (xx represents one byte)

a) Read data instruction frames

01 04 xx xx xx xx xx xx

Address Function code Register starting address Number of
registers CRC check code (lowest byte first)

b) Read data response frames

01 04 xx xx..... xx xx xx

Address Function Code Byte Count Response Data CRC Check
Code (lowest byte first)

c) Write data instruction frames

01 06 xx xx xx xx xx xx

Address Function Code Register Address Write Data CRC Check

Code (Low Byte First)

d) Write data response frames

01 06 xx xx xx xx xx xx

Address Function Code Register Address Write Data CRC Check

Code (Low Byte First)

e) Write multiple data instruction frames

01 10 xx xx xx xx xx xx... xx xx

xx

Address Function Code Start Register Address Number of
Registers Byte Count Write Data CRC Check Code (lowest byte
first)

f) Write multiple data response frames

01 10 xx xx xx xx xx xx

Address Function Code Initial Register Address Number of
Registers CRC Checksum (lowest byte first)

3. Register address

表7 Input register

Input		
Address	Explanation	Note
0x0000	PID is 16 bits high	
0x0001	PID is 16 bits lower	
0x0002	SN byte1 byte2	
0x0003	SN byte3 byte4	
0x0004	SN byte5 byte6	
0x0005	SN byte7 byte8	
0x0006	SN byte9 byte10	
0x0007	Software versions: byte3, byte2	
0x0008	Software versions: byte1 byte0	
0x0009	Hardware version	
Reserve		
0x0010	Equipment status	0 Normal 1. Call the police 2. Error

0x0011	The alarm code is 16 digits high	uint32
0x0012	The alarm code is 16 digits lower	
0x0013	Fault code height is 16 bits	uint32
0x0014	Fault code is 16 bits lower	
0x0015	Board temperature	int16 The data step size is 0.1
0x0016	Currently, ammonia levels are 16 places higher	float
0x0017	Currently, ammonia levels are 16 units low	

表8 Register retention

Holding		
Addresses	Explanation	Note
0x0000	Device ID	1-64 The initial default value is 1
0x0001	RS485 baud rate settings	0:4800bps 1:9600bps 2:19200bps 3:38400bps 4:57600bps 5:115200bps The default is 5:115200bps
0x0002	System time is high	
0x0003	System time is at a low point	
0x0004	Sampling cycle	

0x0005	Sensor zero-proofing enabled	When set to 1, enable sensor zero correction
Reserve		
0x0010	Ammonia has a high threshold and high level	float ppm, default 100
0x0011	Ammonia has a high threshold and a low threshold	
0x0012	Ammonia has a low threshold and high levels	float ppm, default 50
0x0013	Ammonia has a low threshold and a low threshold	
0x0014	Ammonia has high limits	float ppm, default 999.9

0x0015	Ammonia has high limits and low limits	
0x0016	Ammonia low limit is high	float ppm, default 0
0x0017	Ammonia low limit is low	
0x0018	Ammonia units	0: ppm The default is 0:ppm After modification, only the on-screen display value is converted

4. Command examples

a) Measurement instructions:

Request frame: 01 04 00 16 00 02 90 0F

Response frame: 01 04 04 42 05 51 EC C3 E0

Sample reading: 42 05 51 EC, which is 33.33 ppm

b) Set threshold instructions:

For example, the high ammonia threshold is 20 ppm, and the low threshold is 10 ppm:

Request frame: 01 10 00 10 00 04 08 41 A0 00 00 41 20 00
00 07 85

Response frame: 01 10 00 10 00 04 C0 0F

c) Enable sensor zero calibration:

Note: Do not use unless necessary; only use when there is a deviation in the collection.

Request frame: 01 06 00 05 00 01 58 0B

Response frame: 01 06 00 05 00 01 58 0B

5. Definition of alarm codes and fault codes

a) Alarm code:

For example, if the alarm code is 0x0001 0000,

That is, bin 0001 0000 0000 0000 0000, bit16 ammonia concentration above high threshold alarm

Bit0	Bit1	Bit4	Bit5	Bit16	Bit17
------	------	------	------	-------	-------

Panel tempera ture alarm	Batter y level below the low batter y thresh old	Lo w sign al or no alar m	The device is in recognit ion mode	Ammoni a concentra tion above high threshold alarm	Ammoni a concentra tion above low threshold alarm
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b) Fault code:

For example, if the fault code is 0x0010 0000,

That is, bin 0010 0000 0000 0000 0000, bit17 sensor connection abnormality

Bit0	Bit1	Bit3	Bit17	Bit18	Bit19
Abnor mal board temper	Abno rmal batter y or	Commun ication module abnormal	Sensor connec tion abnor	Ammon ia concent ration	Ammon ia concent ration is

ature or hardwa re failure	hardw are failur e	ities or hardware failures	mality	exceeds the upper limit	below the lower limit
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Appendix: Model Selection and Ordering

WE-T233 product selection parameter table	
Parameter	Selection code and specification
Communication methods	LR: LoRa
	RS: RS485
	4G: 4G/Cat1
	NB: NB
A. Accuracy	N/A
R range range	N/A
P Power Supply Method	P0: Battery-powered
	P1: 9~30VDC power supply
Sensor	N/A
Note: Customizable power supply mode	

Example:

WE-T233-LR-P0

LoRa ammonia transmitter, battery-powered



For more inquiries, please scan
the QR code