

# **iNH-306 Online Ammonia Nitrogen Sensor User Manual**



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## User Notes

- Before use please read this description, and save it for reference.
- Please follow this manual procedures and precautions.
- Upon receipt of the instrument, carefully open the package, whether viewing instruments and accessories due to shipping damage, if any damage is found, immediately notify the manufacturers and distributors, and retain the packaging material for return processing.
- When the instrument malfunction, do not repair itself, please contact the manufacturer directly for service.

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## I .Application environment description

iHN-306 integrally Online ammonia sensor is a PVC-based film forming the ammonium ion-selective electrode, the ammonium ion content of the test for the water, with temperature compensation to ensure that the test be fast, simple, accurate and economical. The present specification details the contents of the technical parameters of the ammonia sensor, maintenance and use of communication protocols.

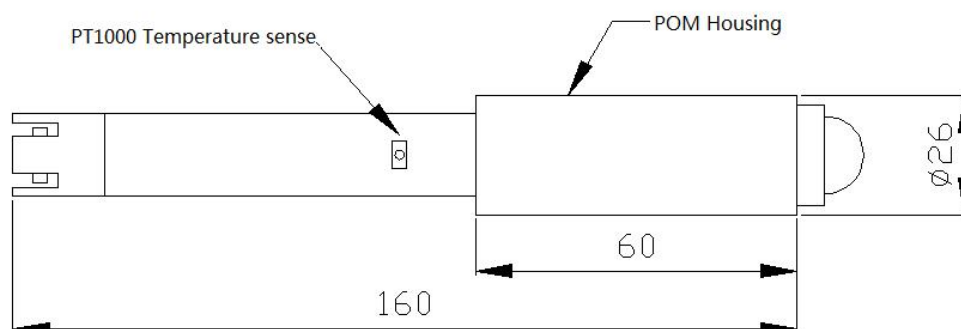
- Signal output: RS-485bus, Modbus / RTU protocol
- Easy connection to a third-party equipment PLC, DCS, industrial control computer, universal controller, paperless recording instruments and a touch panel.
- The patented ammonium ion probe, the internal reference solution oozes extremely slowly from the microporous salt bridge at a pressure of at least 100 KPa (1 Bar). Such a reference system is very stable and has a longer electrode life than conventional industrial electrodes.
- Easy installation: Submerged installation .
- IP68 protection class.

## II .Technical performance and specifications

### 1. Technical parameter

<b>model</b>	iNH-306
<b>Measuring range</b>	0~10.00mg/L (0~100.00mg/L)
<b>Resolution</b>	0.1mg / L
<b>Accuracy</b>	±10% or ±1mg/L, ±0.5°C
<b>Operating temperature</b>	0 ~ 40 °C
<b>Working pressure</b>	<0.1MPa
<b>pH range of the medium</b>	4 ~ 10 pH
<b>Temperature compensation</b>	Automatic temperature compensation (Pt100)
<b>Power supply</b>	12 ~ 24VDC
<b>Signal output</b>	RS-485bus, Modbus / RTU protocol
<b>Wetted</b>	PVC and POM
<b>Mounting</b>	Immersion installation
<b>Cable length</b>	5m, Other lengths can be customized
<b>Calibration methods</b>	Two-point calibration
<b>Power</b>	0.1W@12V
<b>Protection class</b>	IP68

## 2. Dimensions



Note: the joint of the sensor is M16-5 waterproof joint.

## III. Installation and electrical connection

### 1. Installation

Note: Not mounted upside down or horizontal when the sensor is mounted, is inclined at least 15 degrees above the installation.

### 2. Electrical connections

The cable is 4 - core double - stranded shielding wire, the line order definition:

- Red line - the power supply line (12 ~ 24VDC)
- Black line - ground (GND)
- Blue line -485A
- White line -485B

After completing the wiring, should be carefully examined to avoid incorrect connection before applying power.

Cable specification: Considering that the cable is immersed in water (including sea water) for a long time or exposed to the air, all the wiring points are required to do waterproof treatment, the user cable should has certain corrosion resistance.

## IV. Care and maintenance

### 1. Use and maintenance

a) Washed with distilled water (or deionized water) electrode, blotted dry, do not dry. The electrode is placed on the electrode support. Before use, the end of the electrode immersed in distilled water (or deionized water) for 10 minutes, then immersed in a dilute solution of ammonium ions for 2 hours.

b) To keep dry before using the electrode, the electrode sensing elements should be set into the protective flask. Before testing, the electrode should be soaked for 24 hours in the activation solution. If stored overnight or longer, then washed with deionized water head electrode, and wiped dry, then placed in their original packaging.

c) Check whether the terminal at the drying and, if contaminated, wipe with ethanol, drying after use. Avoid long-term immersion in distilled water or protein solution, and to prevent contact with the silicone oil. Use longer electrodes, it may become translucent or PVC film with sediment, this time can be distilled (or deionized water) rinse. When the electrodes use a longer time, measurement error, with the instruments to be calibrated, it is corrected.

d) When the electrodes are maintenance and repair in the above manner can not be calibrated and measured, indicating that the electrode has expired, replace the electrode.

**The main interfering ions in the table below:**

May interfere with the ion concentration of 10% error at different concentrations of ammonium ion

Interferences (moles/liter)	10 <sup>-4</sup> M Ammonium	10 <sup>-3</sup> M Ammonium	10 <sup>-2</sup> M Ammonium
H <sup>+</sup>	< 2	< 1	< 1
Li <sup>+</sup>	0.2	0.5	0.5
Na <sup>+</sup>	0.005	0.08	0.8
K <sup>+</sup>	7*10 <sup>-5</sup>	6*10 <sup>-4</sup>	6*10 <sup>-3</sup>
Cs <sup>+</sup>	0.003	0.05	0.5
Mg <sup>3+</sup>	> 0.5	> 1	> 1
Ca <sup>2+</sup>	> 0.2	> 1	> 1
Sr <sup>2+</sup>	> 0.2	> 1	> 1
Ba <sup>2+</sup>	> 0.1	> 0.5	> 0.5
Zn <sup>2+</sup>	0.001	0.01	0.1
N <sub>2</sub> H <sub>5</sub> <sup>+</sup>	> 0.1	> 0.1	>0.1
Bu <sub>4</sub> N <sup>+</sup>	1*10 <sup>-5</sup>	1*10 <sup>-4</sup>	1*10 <sup>-3</sup>

## 2. Calibration of the sensors

**Note: Sensor has been calibrated at the factory, if not exceeding the measurement error should not be arbitrarily calibrated.**

a) Zero calibration

The sensor in the zero filled with the standard solution vial, wait 5 minutes, to see whether the displayed value within an error range, if not need to be the zero calibration value to stabilize. Refer to Appendix calibration instructions.

b) Slope calibration

The slope of the sensor filled with the standard solution into the vial, wait 5 minutes, to see whether the displayed value within an error range, if not need to be performed after the slope of

the calibration value to stabilize. See Appendix calibration instructions.

## V. Quality and Service

### 1. Quality assurance

- Quality inspection departments have standardized inspection procedures, with advanced detection equipment and instruments, and in strict accordance with the test procedures for products that do 72 hours aging test, stability test, not a substandard products factory.

- Ship direct return on the failure rate of 2% of the batches of products, all costs borne by the supplier. Consider the standard reference product descriptions provided by the supplier.

- Ensure supply quantity and delivery speed.

### 2. Accessories and Spare Parts

This product includes:

- Sensor 1
- Manual 1
- Certificate 1
- 1mg / L and 10mg / L of each calibration solution 100 mL
- 100mL activation solution before use

### 3. Service commitment

The company provides sales starting from the date of this machine within one year guarantee, but does not include damage caused by improper use, if necessary repairs or adjustments, please return, but the freight to be conceited, to be determined to avoid a return of good packaging when shipping damaged in transit, the company will damage the free repair of the instrument.

## Appendix data communications

### 1. Data Format

Modbus communication default data format: 9600, n, 8,1 (9600bps baud, 1 start bit, 8 data bits, no parity, 1 stop bit).

Baud rate and other parameters can be customized.

### 2. Information frame format

a) Read data instruction frame

06	03	xx xx	xx xx	xx xx
Address	FC	Register start address	Number of registers	CRC check code (low bytes in front)

b) Read data response frame

06	03	xx	xx xx	xx xx
Address	FC	Number of bytes	Response data	CRC check code (low bytes in front)

c) Write data instruction frame

06	06	xx xx	xx xx	xx xx
Address	FC	Register address	Read-in data	CRC check code (low bytes in front)

d) Data response frame

06	06	xx xx	xx xx	xx xx
Address	FC	Register address	Read-in data	CRC check code (low bytes in front)

### 3. Register Address

Register Address	Name	Explanation	Register number	interview method
40001 (0x0000)	Ammonium ion temperature measurement	4-byte integers, respectively, an ammonium ion measured value, the measured value of decimal places, the temperature value, the temperature value of decimal places.	4 (8 bytes)	Read
44097 (0x1000)	Zero calibration	Calibration was carried out in 1mg/L standard solution, and the written data was the value of x100 concentration of the standard solution used.The	1 (2 bytes)	Write / Read



		data read out is the mV value x100 corresponding to the zero calibration value.		
44101 (0x1004)	Slope calibration	Calibration was carried out in 10mg/L standard solution, and the written data was the value of x100 concentration of the standard solution used. The data read out is the mV value x100 corresponding to the slope calibration value	1 (2 bytes)	Write / Read
44113 (0x1010)	Temperature Calibration	In the calibration solution, the actual temperature value of the write data X10; read data to the offset temperature calibration x10.	1 (2 bytes)	Write / Read
48195 (0x2002)	Sensor address	The default is 6, the write data range 1-127.	1 (2 bytes)	Write / Read
48225 (0x2020)	Reset Sensor	Restore Defaults calibration value, the write data is 0. Note: resetting the sensor to be calibrated again before use.	1 (2 bytes)	Write

#### 4. Command Example

##### a) Data read instruction:

Action: Get ammonia measurement probe and temperature; ammonia units is mg / L; temperature is °C.

Request frame: 06 03 00 00 00 04 45 BE

Response frame: 06 03 08 00 55 00 02 01 18 00 01 B3 5D

Reading example:

Ammonia values	Temperature values
00 55 00 02	01 18 00 01

Such as: Ammonia value: 00 55 Hexadecimal value of ammonia readings, 00 02 Represents ammonia with a decimal value, the value is converted to decimal 0.85 .

Temperature: 01 18 Hexadecimal values of temperature readings, 00 01 Represents a temperature

value with a decimal, the decimal value is converted into 28.0.

b) Calibration instructions:

**Zero calibration**

Action: Set the calibration value of ammonia nitrogen zero of the sensor. Calibration in 1mg/L standard solution.

Request frame: 06 06 10 00 00 64 8D 56

Response frame: 06 06 10 00 00 64 8D 56

**Slope calibration**

Action: Set the calibration value of ammonia nitrogen slope of the sensor. Calibration in 1mg/L standard solution.

Request frame: 06 06 10 04 03 E8 CD C2

Response frame: 06 06 10 04 03 E8 CD C2

c) A sensor ID address

Action: Set the Modbus device address electrodes.

Change device address 06 to 01, as follows:

Request frame: 06 06 20 02 00 01 E3 BD

Response frame: 06 06 20 02 00 01 E3 BD

## 5. Error response

If the sensor can not execute PC commands correctly, the format information is returned as follows:

Definition	Address	Function code	Code	CRC check
Data	ADDR	COM + 80H	xx	CRC 16
Number of bytes	1	1	1	2

a) CODE: 01 - Function code error

03 - Data error

b) COM: Function code received