NHN01
NHN Transmitter User Manual
(Type 485)

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1. product description

This product is a device for measuring NHN concentration [compound nitrogen in the form of free ammonia (NH3) and ammonium ions (NH4+)] in water. It can automatically perform temperature and pH compensation, and it is suitable for high-precision measurement in various environments. It can be directly installed and installed, which is more economical, environmentally friendly, convenient and fast than traditional NHN analyzers.

1.1 Features

- NHN measurement range is 0-100ppm with a resolution of 0.01ppm.
- With automatic PH, the temperature compensation accuracy is higher, and the applicable environment is wider.
- On-line equipment, no reagents, no pollution, more economical and environmentally friendly.
- One-piece shell, 3/4 thread design, easy to install.
- RS485 communication interface: ModBus RTU communication protocol can be easily connected to the computer for monitoring and communication.
- ModBus communication address can be set, baud rate can be modified.
- The equipment can be powered by wide voltage DC 10~30V.

1.2 Equipment technical parameters

powered by	DC 10~30V
Power consumption	0.3W
Communication Interface	RS485; standard ModBus-RTU protocol; communication baud rate: 2400, 4800, 9600 can be set; the default is 4800
NHN Concentration measurement range	0-100ppm, resolution 0.01ppm
PH Measuring	0-14PH
Temperature measurement range	-20-80℃
NHN Measurement	±1ppm
PH Measurement error	±0.15PH

Temperature measurement error	±0.2℃
repeatability error	1%
Response time	<30s
Applicable temperature of	0~50℃
Equipment pressure	0.2Mpa
Equipment cable length	Default 5m (10m, 15m, 20m can be customized)
sensor life cycle	1 year

1.3 product model

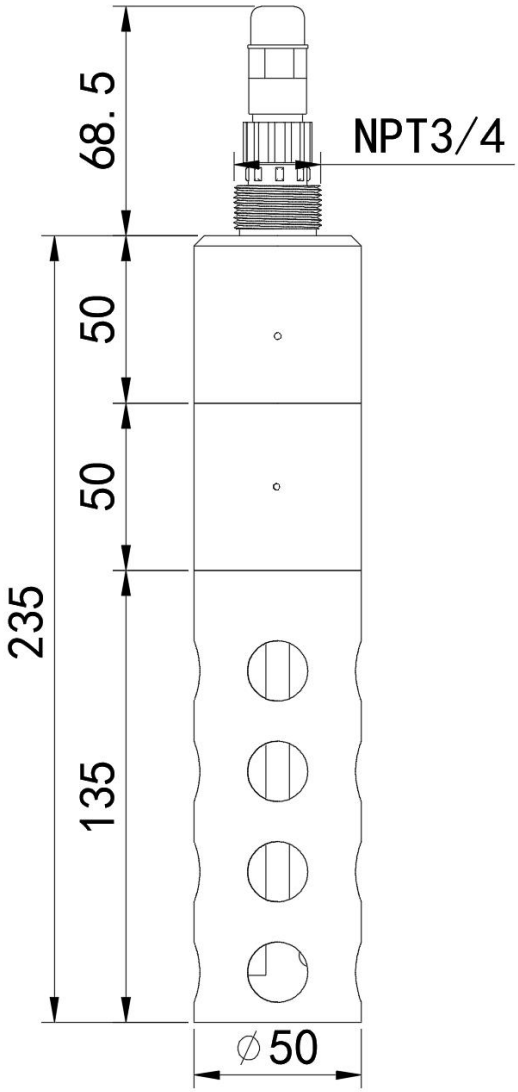
NHN01-				NHN sensor
	N01-			RS485（Modbus-RTU protocol）
		3-		One-piece housing
			100P	Range is 100ppm

1.4 Product List

◆NHN01sensor 1 pcs

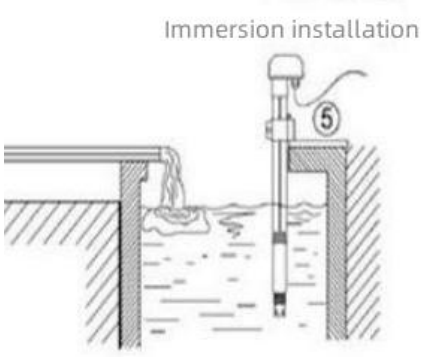
◆Certificate, Warranty Card, etc.

1.5 Equipment size



1.6 device installation

Submerged installation: the lead wire of the NHN transmitter goes out from the waterproof bracket, and the 3/4 thread on the top of the NHN transmitter is connected with the 3/4 thread of the waterproof bracket with a raw material tape.



2. Equipment Instructions

2.1 Wiring Instructions

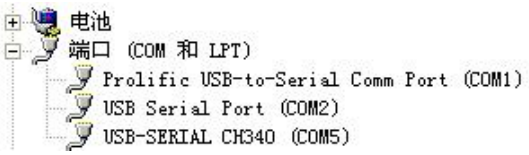
	instruction	instruction
power supply	Brown	V+（10~30V DC）
	black	V-
communi cation	yellow	485-A
	blue	485-B

2.2 Parameter configuration description

Open the data package, select "Debugging Software"---"485 Parameter Configuration Software"，turn up 

just open。

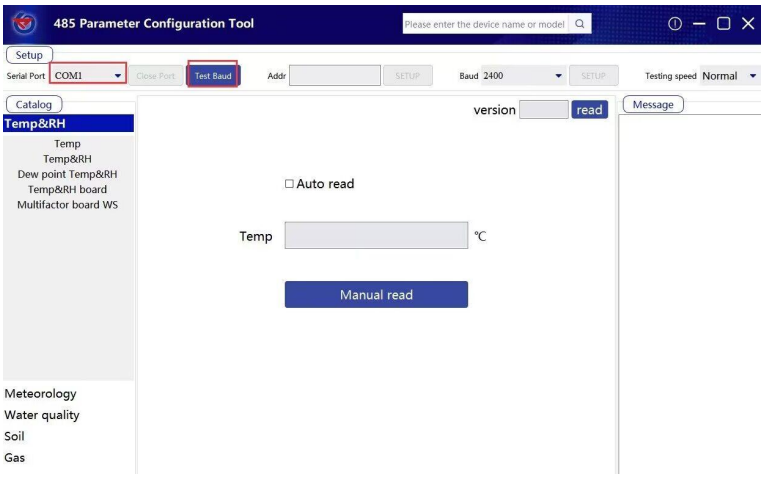
1) Select the correct COM port (check the COM port in "My Computer - Properties - Device Manager - Port"), the following figure lists the driver names of several different 485 converters.



2) Connect only one device and power it on, click the test baud rate of the software, the software will test the baud rate and address of the current device, the default baud rate is 4800bit/s, and the default address is 0x01.

3) Modify the address and baud rate according to the needs of use, and at the same time, you can query the current functional status of the device.

4) If the test is unsuccessful, please re-check the equipment wiring and 485 driver installation.



2.3 ModBus Communication and register details

2.3.1 Device Communication Basic Parameters

coding	8 bit binary
data bits	8 bits
parity bit	none
stop bit	1 person
error checking	CRC (Redundant Cyclic Code)
baud rate	2400bit/s, 4800bit/s, 9600 bit/s can be set, the factory default is 4800bit/s

2.3.2 Data Frame Format Definition

Adopt Modbus-RTU communication protocol, the format is as follows:

Initial structure ≥4 bytes of time

Address code = 1 byte

function code = 1 byte

data area = N bytes

Error check = 16-bit CRC code

Time to end structure ≥ 4 bytes

Address code: It is the address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: the function instruction of the command sent by the host.

Data area: The data area is the specific communication data, pay attention to the high byte of the 16bits data first! CRC code: two-byte check code.

2.3.3 register address

register address	operate	type of data	instruction
0000H	0x03/0x04	16-bit unsigned integer	NHN concentration value (100 times the actual value)
0001H	0x03/0x04	16-bit unsigned integer	PH value (100 times the actual value)
0002H	0x03/0x04	16-bit signed integer	Temperature (10 times the actual value)
0050H	0x03/0x04/0x06	16-bit signed integer	Temperature offset value (100 times the actual value)
0051H	0x03/0x04/0x06	16-bit signed integer	PH offset value (100 times the actual value)
0052H	0x03/0x04/0x06	16-bit signed integer	NHN offset value (10 times the actual value)
07D0H	0x03/0x04/0x06	16-bit unsigned integer	1~254 (factory default 1)
07D1H	0x03/0x04/0x06	16-bit unsigned integer	0 means 2400 1 for 4800 2 for 9600

2.3.4 Communication protocol example and explanation

Example 1: Read the current NHN concentration value of the device whose address is 01

Send frame:

address code	function code	register address	Number of registers	Check code low	Check code high
01	03	0000	0001	84	0A

Response frame: (for example, read the NHN concentration value of 33.17ppm)

address code	function code	number of valid bytes	register content	Check code low	Check code high
01	03	02	0CF5	7D	03

Calculation of residual chlorine concentration: 0CF5H (hexadecimal)=3317 =>NHN=33.17

Example 2: Perform numerical correction on the deviation value of the current residual chlorine value of the device with address 01

Send frame: (If the current device output NHN value is 33.17, increase the value by 7.25, enlarge it ten times to 725=>02D5 (sixteen-bit signed number), write 02D5 to the register content)

address code	function code	register address	register content	Check code low	Check code high
01	06	0052	02D5	E8	E4

Response frame: (according to the MODBUS standard, the response is a mirrored message of the delivered frame)

address code	function code	register address	Number of registers	Check code low	Check code high
01	06	0052	02D5	E8	E4

2.3.5 Sensor calibration

If you need to calibrate the sensor, you can use the 0x10 function code to write parameters to the 0x1200 and 0x1201 registers for NHN concentration calibration, and use the 0x10 function code to write parameters to the 0x1100 and 0x1101 registers for PH calibration.

The NHN of this equipment adopts two-point calibration, and two known NHN standard solutions need to be prepared. When calibrating the first point, write 0x0001 to the 0x1200 register, and write 100 times the standard liquid NHN concentration of the first point to the 0x1201 register; when calibrating the second point, write 0x0002 to the 0x1200 register, and write the second to the 0x1201 register. Spot 100 times the NHN concentration of the standard solution. Calibration is complete.

Example: Select 10ppm NHN standard solution to calibrate the first point.

Delivery frame: 10*100=1000 is converted to 16 hexadecimal as 0x03E8

address code	function code	register address	Number of registers	number of bytes	register content	Check code low	Check code high
01	10	1200	0002	04	0001 03E8	76	71

Reply frame:

address code	function code	register address	Number of registers	Check code low	Check code high
01	10	1200	0002	44	B0

Then select 100ppm NHN standard solution to calibrate the second point.

Delivery frame: 100*100=10000 is converted to 16 hexadecimal as 0x2710

address co	function code	register address	Number of registers	number of bytes	register content	Check code low	Check code high

de							
01	10	1200	0002	04	0002 2710	9C	F3

Reply frame:

address code	function code	register address	Number of registers	Check code low	Check code high
01	10	1200	0002	44	B0

The pH of this equipment is calibrated at two points, and two known pH standard solutions need to be prepared. When calibrating the first point, write 0x0003 to the 0x1100 register, and write 100 times the standard PH value of the first point to the 0x1101 register; when calibrating the second point, write 0x0004 to the 0x1100 register, and write the second point to the 0x1101 register 100 times the standard pH. Calibration is complete.

Example: Select the PH standard solution of 4.01 and calibrate the first point.

Delivery frame: 4.01*100=401 converted to 16 hexadecimal is 0x0191

address code	function code	register address	register length	length in bytes	register content	Check code low	Check code high
01	10	1100	0002	04	0003 0191	03	C3

Response frame: (according to the MODBUS standard, the response is a mirrored message of the delivered frame)

address code	function code	register address	register length	Check code low	Check code high
01	10	1100	0002	44	F4

Then select the PH standard solution of 9.18, and calibrate the second point.

Delivery frame: 9.18*100=918 converted to 16 hexadecimal is 0x0396

address code	function code	register address	register length	length in bytes	register content	Check code low	Check code high
01	10	1100	0002	04	0004 0396	F2	A0

Response frame: (according to the MODBUS standard, the response is a delivery frame)

address code	function code	register address	register length	Check code low	Check code high
01	10	1100	0002	44	F4

3. Precautions and maintenance

◆ The equipment itself generally does not require daily maintenance. When there is an obvious failure, please do not open it to repair it yourself, and contact us as soon as possible!

◆ Before using the equipment, it is necessary to detect whether there are air bubbles at the front end of the NHN transmitter. If there are no air bubbles, it is used normally. If there are air bubbles, the sensor needs to be shaken down to remove the air bubbles.

◆ The NHN transmitter that has not been used for a long time needs to be soaked and activated before the measurement. (First perform low-concentration activation, soak in 10ppm standard solution for at least 12 hours, and then take 100ppm solution for high-concentration soaking and soak the sensor for 1-2 hours). After activation, be sure to fully clean the sensor before testing, immerse the front end of the sensor in deionized water for 5 minutes and agitate the aqueous solution. For more thorough cleaning, please replace the clean deionized water several times and clean it again to prevent measurement errors.

◆ NHN transmitters that have not been used for a short time should be soaked in deionized water before measurement to prevent measurement errors.

◆ After using the sensor, please rinse the sensor head with clean water and cover the protective cover.

◆Do not use the NHN transmitter in a highly corrosive liquid environment to avoid irreversible damage to the sensor.