RS-ZD-N01-*

Turbidity transmitter User Manual

Document version：V1.8

Catalog

1. Product instruction

RS-ZD-N01-*-* is a basic conventional water quality monitoring digital turbidity transmitter.It adopts the mature 90° scattered light principle abroad, uses infrared LED light source and optical fiber to guide the light path design method; adds internal filter The chip design has strong anti-interference ability from outside light. Built-in temperature transmitter, can automatically temperature compensation, suitable for online long-term monitoring of the environment.

1.1 Function Features

- Turbidity measurement range 0~50NTU;0~200NTU；0~1000NTU;0~4000NTU.
- Waterproofing grade IP68.
- Scattered light principle,strong resistance to external light interference, automatic temperature compensation, suitable for long-term online detection environment.
- RS485 communication interface: MODBUS RTU communication protocol can help easily connected to the computer for monitoring and communication.
- The ModBus communication address can be set and the baud rate can be modified.
- The equipment adopts wide voltage power supply, DC 10~30V can be used.

1.2 Technical parameter

Measuring range	0.00~50.00NTU;0.0~200.0NTU；0.0~1000.0NTU ;0~4000NTU
Measuring error	±5%FS（25℃）；±0.5℃
Resolution	0.00~50.00NTU range：0.01NTU； 0.0~200.0NTU range：0.1NTU； 0.0~1000.0NTU range：0.1NTU； 0~4000NTU range：1NTU; Temperature：0.1℃
Response time	≤30sec
Working condition	0~40℃
Power supply	DC 10~30V
Power consumption	0.2W
Communication interface	RS485；Standard MODBUS-RTU protocol；communication baud rate,default 4800（1200、2400、4800、9600、19200、38400、57600、115200 can be set）
Measure principle	90° scattered light principle
Service life	2 years for normal use

Waterproof class	IP68
Cable length	Default 5m
Shell material	Corrosion-resistant plastics

1.3 Product model

RS-					Company code
	ZD-				Turbidity transmitter
		N01-			RS485（Modbus-RTU protocol）
			1-		plastic shell
			1S-		stainless steel shell
				50	range 0-50NTU
				200	range 0-200NTU
				1000	range 0-1000NTU
				4000	range 0-4000NTU

1.4 Product list

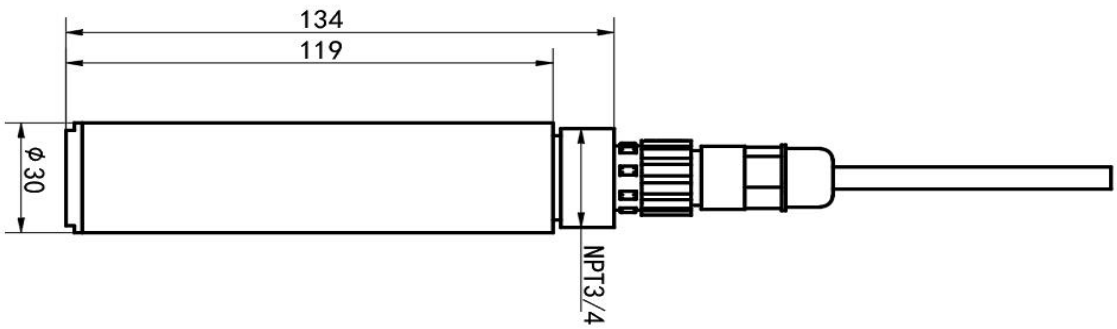
◆Turbidity transmitter 1pc

◆5m cable

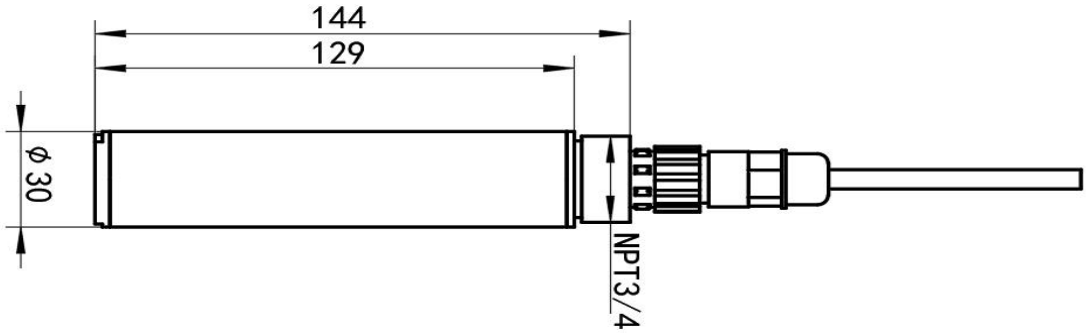
◆Certificate, warranty card, etc

1.5 Device dimension

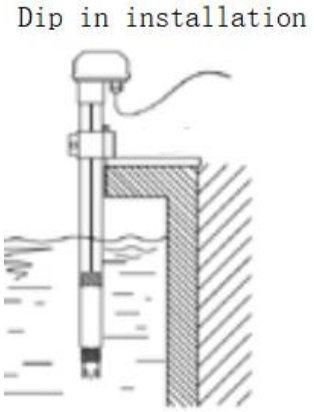
-1 dimension：



-1S dimension：



1.6 Device installation



With NPT3/4 thread, can be used with our waterproof pipe. Route cables out of the pipe and screw the device into the waterproof pipe thread.

Note: The transmitter is installed in an area with slow water flow and no bubbles; the transmitter is installed at a distance of 5cm from the surrounding wall,and there is no any obstacle within 7cm below the sensor.

2. Device operating instruction

2.1 Wiring instruction

The default outgoing cable is a bare four-core cable.

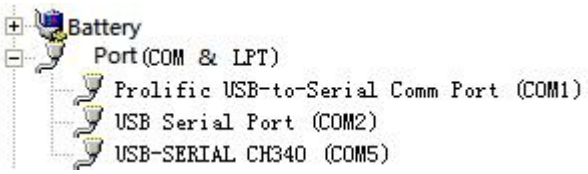
	Cable color	Instruction
Power	Brown	Power supply positive（10~30V DC）
	Black	Power supply negtive
Communi cation	Yellow	485-A
	Bule	485-B

2.2 Parameter configuration description

Open the data package and select "Debugging Software" -- "485 Parameter Configuration Software"， find out 

and open it.

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



2）Connect one device separately and power it on. Click on the software's test baud rate, and 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 usage needs.You can also querying the current functional status of the device simultaneously.

4） If the test is not successful, please recheck the equipment wiring and 485 driver installation.

2.3 Calibration instruction

Put the device into standard turbidity solution which turbidity is 0NTU(deionized water, if there is no high requirements,can be calibrated in dark clean air), after the value is stable, send the zero calibration instructions.

Then put the device into the standard turbidity solution which corresponding range value

is maximum. After the value is stable,send the full scale point calibration instruction the full scale point calibration command to complete the turbidity calibration.

Note: During calibration, no bubbles should be attached to the optical window of the transmitter, and the distance between the transmitter and the bottom of the container should be more than 7cm.

2.4 ModBus communication and register detailed

2.4.1 Device communication basic parameter

Encode	8-bit binary
Data bit	8 bit
Parity check	-
Stop bit	1 位
Error check	CRC（cyclic Redundant codes）
Baud rate	Ex-factory fault:4800bit/s

2.4.2 Data frame format definition

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

Initial structure ≥ 4 bytes in time

Address code=1 byte

Function code=1 byte

Data area=N bytes

Error check=16 bit CRC code

End structure ≥ 4 bytes in time

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

Function code: The instruction function indication issued by the host

Data area: The data area is specific communication data, please note that the high byte of 16bits data comes first!

CRC code: A two byte check code.

2.4.3 Register address

Register address	Support function code	Instruction
0x0000	0x03/0x04	Turbidity value (NTU; 16-bit unsigned integer, the actual value is enlarge 10 times; 50NTU range is 100 times larger than the actual value)
0x0001	0x03/0x04	Temperature (℃; 16 bit signed integer, actual value enlarge 10 times)
0x0050	0x03/0x04/0x06/0x10	Turbidity deviation value (16-bit unsigned integer, the actual value is enlarge 10 times; 50NTU range is 100 times larger than the actual value)
0x0051	0x03/0x04/0x06/0x10	Temperature deviation value (16 bit signed integer, actual value enlarge 10 times)
0x1010/0x1011	0x10	Turbidity calibration (Using 2-point calibration, write 0x0001 to 0x1010 and 0x000 to 0x1011, calibrate zero; Write 0x0002 to 0x1010, 0x001 to 0x1011, calibrate the full scale point)
0x07D0	0x03/0x04/0x06/0x10	1~254（16 bit unsigned integer, factory default value:1）
0x07D1	0x03/0x04/0x06/0x10	0 stand for 2400 1 stand for 4800 2 stand for 9600 3 stand for 19200 4 stand for 38400 5 stand for 57600 6 stand for 115200 7 stand for 1200

2.4.4 Communication protocol examples and explanations

Example 1: Current turbidity and temperature of the device whose read address is 01

Send frame：

Address code	Function code	Register address	Register contents	Check code low bit	Check code high bit
0x01	0x03	0x00 0x00	0x00 0x02	0xc4	0x0b

Response frame:

Address code	Function code	Effective byte	Register contents	Check code low bit	Check code high bit
0x01	0x03	0x04	0x0d 0x2e 0x00 0xdb	0xd8	0xcd

The hexadecimal 0d2e converted to decimal is 3374,so the turbidity value is 3374/10=337.4NTU

The hexadecimal 00db conversion to decimal is 219, so the temperature is 219/10=21.9℃

Example 2: turbidity deviation value setting

Send frame : Write the deviation value of -10NTU into the device, write the value to -100, and convert to the hexadecimal value is 0xff9c

Address code	Function code	Register address	Register contents	Check code low bit	Check code high bit
0x01	0x06	0x00 0x50	0xff 0x9c	0xc8	0x42

Response frame:（It is the mirror message of the send frame per the MODBUS standard response）

Address code	Function code	Register address	Register contents	Check code low bit	Check code high bit
0x01	0x06	0x00 0x50	0xff 0x9c	0xc8	0x42

Example 3: Turbidity calibration

After the value is stable in the 0 turbidity environment, writes 0x0001to the 0x1010 register, and writes 0x0000 to the 0x1011 register.

When calibrating the full scale point,should select the standard turbidity liquid at the upper scale limit, write 0x0002 to 0x1010 and 0x1011 to 0x0001.

Address code	Function code	Register address	Register length	Bit length	Register content	Check code low bit	Check code high bit

0x01	0x10	0x10 0x10	0x00 0x02	0x04	0x00 0x02 0x00 0x01	0x5f	0x63

Response frame:（It is the mirror message of the send frame per the MODBUS standard response）

Address code	Function code	Register address	Register length	Check code low bit	Check code high bit
0x01	0x10	0x10 0x10	0x00 0x02	0x44	0xcd

3. Matters need attention and Maintenance

◆ If there is any obvious failure of the equipment, please do not open and repair it, contact us as soon as possible for solutions.

◆ Before measuring, remove the black rubber cover.

◆ Cleaning the transmitter measuring probe attachment timely per the working environment, which will lead to measurement errors.Avoid scratches on the light guide part of the probe when cleaning. (Recommended cleaning cycle:every 30 days)

◆ Suggest to clean the outer surface of the transmitter with flow water. If there is still dirt residue, wipe it with a soft wet cloth.

◆ The equipment should be calibrated before use every time.And suggest to calibrate it every 3 months for long-term use.The calibration frequency should be adjusted appropriately according to different application conditions (the usage occasions' dirt degree, the deposition of chemical substances, etc.).

4. Contact information

Shandong Renke Control Technology Co., Ltd
Headquarters address:whole floor, 11th Floor, East Block, Building 8, Shuntai Plaza, High-tech Zone, Jinan City, Shandong Province

Marketing Center: Whole Floor, 10th Floor, East Block, Building 8, Shuntai Plaza, High-tech Zone, Jinan City, Shandong Province
Zip code: 250101
Phone: 400-085-5807
Fax: (86)0531-67805165

website：www.renkeer.com

Cloud platform address：en.0531yun.com

5. Document history

V1.0 Document establishment

V1.1 Change the selection table, installation instructions, calibration mode instruction

V1.2 New added calibration frequency content into the matters need attention

V1.3 New added the related content information of baud rate

V1.4 New added model

V1.5 Remove the protective cap during measuring for matters to attention and maintenance.

V1.6 Modify the wiring instruction

V1.7 Change the shell type

V1.8 Modify the size drawing, change the error unit