

BT8003 Pressure-type Water Level Gauge

(User Manual)



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1. Overview

BT8003 water level transmitter is one kind of pressure water level gauge which is used for measuring water level and temperature. With mixed signal processing technology it overcomes the shortage of the traditional analog circuit modules realizes F S digital linearity correction full temperature digital temperature compensation compensation data stored in nonvolatile memory multiple safety protection system to avoid the products cannot be used due to correction data lost; Circuit part with power and watchdog monitor which improve the reliability of the transmitter.

Rich product line it is widely used in water level and temperature measurement of industrial processesmining hydrology water conservancy geological exploration and other industries.High quality and stability sensing elements

2. Features

Anti-surge electromagnetic interference

Integral measurement of level and temperature

Reverse power protection over voltage protection

FS digital calibration and temperature compensation

RS485 interface and MODBUS-RTU standard protocol

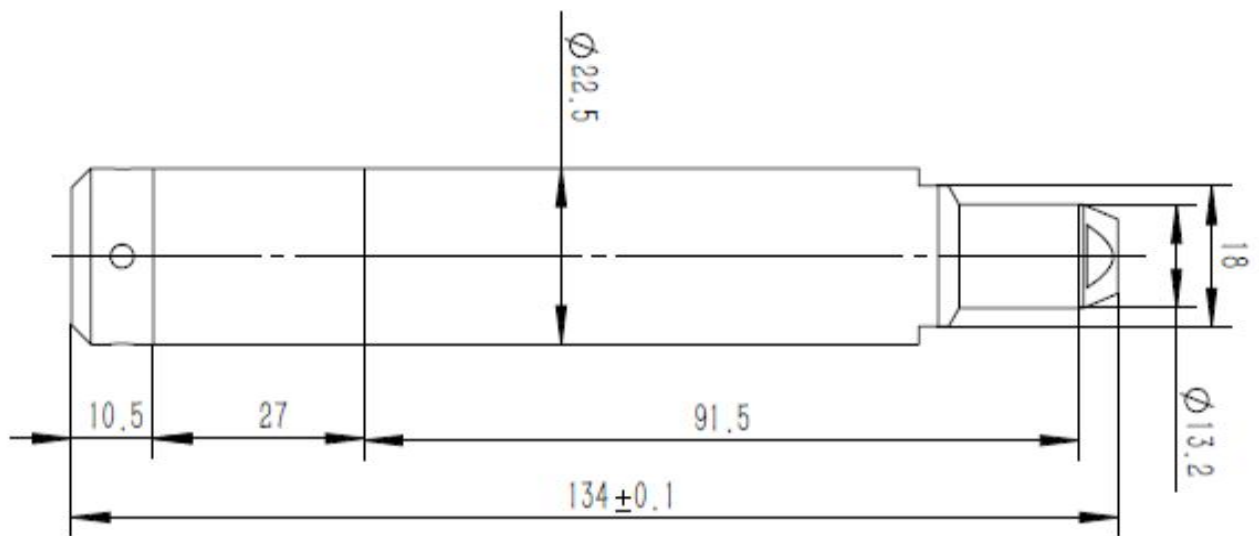
3. Technical Parameters

Main performance specification

Accuracy	$<\pm 0.05\% \text{ F}\cdot\text{S}$
Range	0~10 mH ₂ O...200 mH ₂ O
Long-term stability	$<0.05\% \text{ F}\cdot\text{S}/\text{year}$
Overload capability	2X F·S
Temp. Accuracy	$\pm 0.2\text{ }^{\circ}\text{C}$ (0~70 °C)
Temp. Resolution	0.01°C
Temperature characteristics	
Compensation temp.	0~50°C
Operating temp.	-10~80°C
Drift of temp	Zero: $<0.005\% \text{ F.S}/^{\circ}\text{C}$
	F.S: $<0.005\% \text{ F.S}/^{\circ}\text{C}$
Storage temp.	-40~125°C
Electrical characteristics	
Power Supply	DC3.8~30V (typ.24V)
Power Protection	Anti-reverse connection over voltage protection
Output method	RS485/MODBUS-RTU protocol
	Load capacity: 128nodes
Structural characteristics	
Measuring medium	Compatible with stainless steel and fluoro rubber
Housing material	stainless steel 316L
Cable material	Polyurethane or PVC optional

Cable	Φ7.6mm, with Shielding layer and guide hole length customized
Environmental characteristics	
Protection level	IP68
Insulation	100MΩ@50V

4. Related parameters



5. Operating Instructions

5.1 Power Supply

The external power supply of the instrument can be as low as 5VDC and as high as 30VDC. It has reverse connection protection function and supports intermittent power supply operation.

5.2 Communication Interface

The instrument adopts an industrial-grade RS485 communication interface, working in a half - duplex master - slave mode.

The transmission distance can reach 1200 meters. The supported baud rates are 9600, 19200, 38400, and 57600.

Serial Port Number: The serial port number of the communication serial port, with the default value of COM1. Set it according to the actual serial port number connected to the computer during use.

- ◆ **Baud Rate:** The baud rate of the communication serial port, which can be selected from 9600, 19200, 38400, 57600 (Bit/s), with the default value of 9600.
- ◆ **Parity Bit:** The parity check method of the communication serial port, including no parity, even parity, and odd parity, with the default value of no parity.
- ◆ **Stop Bit:** The stop bit of the communication serial port, which can take values of 1 or 2, with the default value of 1 bit.
- ◆ **Data Bit:** The data bit of the communication serial port is fixed at 8 bits.

The supported communication protocol is the MODBUS - RTU protocol. After the external power supply is turned on, the instrument can be operated by sending commands through computer software or a MODBUS host (such as an RTU device), such as collecting water level and temperature values.

5.3 Fixing

The instrument has an integrated submersible structure with a shielded

air-guiding cable. Since the cable is usually long, steel wires are added to the cable to increase its tensile strength and improve reliability. After the instrument is put into the logging well, the probe is mainly suspended at the wellhead of the logging well through the cable. When fixing, the steel wire should be firmly tightened so that the gravity mainly acts on the steel wire.

When installing at the wellhead, a protective cover should be equipped to protect the side of the cable connector to prevent the air - guiding tube from being blocked (the absolute pressure type has no air - guiding tube), and connect the shielding wire properly.

6. Wiring

6.1 Instrument Wiring

The power supply and communication of the instrument share a four - core cable. The wires are in four colors: red, white, blue, and green. Red and white are the positive and negative of the power supply, and blue and green are the positive and negative of the RS485 signal.

6.2 Connecting to a Computer

The following accessories are required to connect to a computer:

- RS232<->RS485 converter
- USB<->RS232 converter

Or

- USB<->RS485 converter

Connection method: Connect the blue wire of the cable (RS485 - A) to the RS485+ (T+) of the converter; connect the green wire of the cable (RS485 - B) to the RS485- (T-) of the converter; plug the USB cable directly into the USB port of the computer. You can view the corresponding serial port number in the Device Manager and use this serial port number in the computer software.

7. Settings

7.1 Communication Settings

When using the instrument for the first time, pay attention to whether the communication parameters are correct, mainly referring to whether the serial port settings of the computer or the MODBUS host are consistent with those of the instrument. The default serial port parameters of the instrument when leaving the factory are: 9600, 8, n, 1; the default communication address is "1".

Once the communication parameters of the instrument are changed, they take effect immediately (no need to power off). At the same time, the communication parameters of the computer software should also be changed to the same parameters as those of the instrument immediately.

7.2 User Calibration

Users can adjust the water level zero point and density to adapt to the on -

site measurement environment and medium. The instrument has been accurately calibrated before leaving the factory, and generally no adjustment is required. If calibration is needed, please carry it out under the guidance of technical personnel.

8. Data Collection

After connecting to a computer, RTU or other devices, collect data through the 03H function code in the MODBUS - RTU protocol in the software.

9. How to Use the MODBUS Protocol

9.1 For Users Connecting the Instrument through Software or Special Equipment Programming

For detailed instructions on the MODBUS - RTU protocol, register read - write operation commands, and register definitions, please refer to "Communication Protocol for Integrated Water Level and Temperature Recorder V3.1".

9.2 For Users Connecting the Instrument with a Computer

9.2.1 You can use serial port debugging software and refer to the calling method in the "Communication Protocol" to operate the instrument.

9.2.2 You can use the debugging software provided by the instrument manufacturer for simple operations.

9.2.3 Users can develop their own special operation software.