Pneumatic Water Gauge Sensor

User Manual

RD-RWG-01

1.Description

The pressure transmitter uses a high-performance pressure-sensitive chip that combines advanced circuit processing and temperature compensation techniques to convert pressure into a linear current or voltage signal. The product is small in size, easy to install, and is insulated by a stainless steel case. It is suitable for measuring gases such as gas and liquid compatible with the material of the contact part. It can be used to measure gauge pressure, negative pressure and absolute pressure.

2.Application

This product is widely used in water plants, oil refineries, sewage treatment plants, building materials, light industry, machinery and other industrial fields to achieve the measurement of liquid, gas and steam pressure.

3.Features

➢ Reverse polarity and current limit protection

➢ Laser resistance temperature compensation

➢ Programmable adjustment

➢ Anti-vibration, anti-shock, anti-radio frequency electromagnetic interference

➢ Strong overload and anti-interference ability, economical and practical

4.Main Technique

➢ Measuring range:0~10meters（-0.1~0~60Mpa)

➢ Measuring accuracy:0.2%

➢ Output signal: RS485

➢ Overload capability：＜1.5 times the range

➢ Temperature drift：0.03% FS/℃

➢ Power supply：12-36VDC typical 24V

➢ Medium temperature：-20~75℃

➢ Ambient temperature：-30~80℃

➢ Measuring medium: gas or liquid that does not corrode stainless steel

5.Electrical wiring diagram
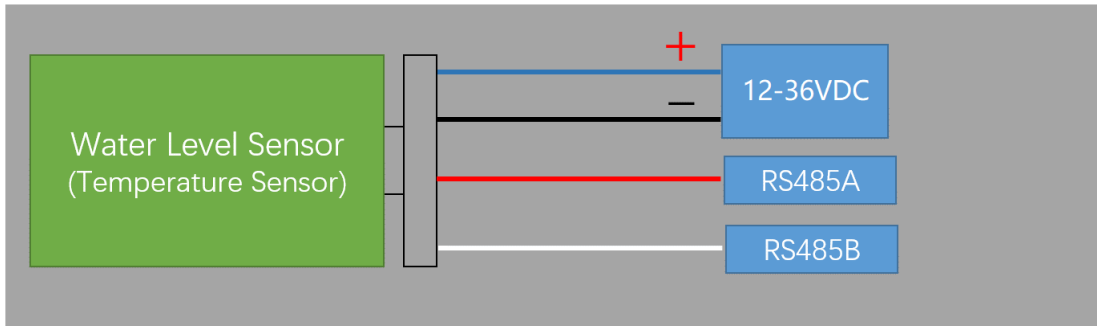
6.MODBUS Communication Protocol

1. Overview

This protocol complies with the MODBUS communication protocol and adopts the subset RTU method in the MODBUS protocol. RS485 half-duplex working mode.

2. Serial data format

Serial port settings: no parity, 8 bits of data, 1 stop bit.

Example: 9600, N, 8, 1 Meaning: 9600bps, no parity, 8 data bits, 1 stop.

The serial port baud rate supported by this transmitter is:

1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Polynomial of CRC check: 0xA001.

The data in the data communication process is all processed according to the double-byte signed integer data. If the data identifies the floating point number, the write needs to read the decimal point to determine the size of the data.

3. Communication format

(1). Read water level

First , Read output value

Address	Function code	Data start address (H)	Data start address (L)	Number of data (H)	Number of data (L)	CRC16 (L)	CRC16 (H)
0X01	0X03	0X00	0X04	0X00	0X01	0XC5	0XCB

Data returned:

Address	Function Code	Data length	Return data High byte (H)	Return data Low byte (L)	CRC16(L)	CRC16(H)
0X01	0X03	0X02	0X00	0X0A	0X38	0X43

Second need read decimal

Send instruction:

Address	Function code	Data start address (H)	Data start address (L)	Number of data (H)	Number of data (L)	CRC16 (L)	CRC16 (H)
0X01	0X03	0X00	0X03	0X00	0X01	0X74	0X0A

Return:

Address	Function Code	Data length	Return data High byte (H)	Return data Low byte (L)	CRC16(L)	CRC16(H)
0X01	0X03	0X02	0X00	0X03	0XF8	0X45

0003 means three decimal

So the water level is 000A(Hexadecimal)=10 (Decimal)/1000 =0.01 meter.

(2) Modify the sensor address, modify the address from 01 to 02

A. Send read command format:

Original address	Function code	Reserved 1	Reserved 2	Reserved 3	new address	CRC16 low	CRC16 high
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

If success, it will return : 01 06 00 00 00 02 08 0B

Please pay attention that, when change the address, need make the save for the new address:

For example, after change the address as 02, need send the instruction:

Changed address	Function code	Reserved 1	Reserved 2	Reserved 3	Reserved 4	CRC16 low	CRC16 high
0X02	0X06	0X00	0X0F	0X00	0X00	0XB9	0XFA

If save success, it will return : 02 06 00 0F 00 00 B9 FA

(3). Error and abnormal command response return data format:

Address	Function code	Exception code	CRC16 Low byte (L)	CRC16 High byte (H)
0x01	0x80 + function code	0x01：(Illegal function) 0x02：(Illegal data address) 0x03：(Illegal data)		

(4). Function code and data address list

Read data function code: 0x03 (corresponding to the data address list)					
Function code	Data start address	Number of data	Data bytes	Data range	Instruction meaning
0x03	0x0000	1	2	1-255	Read slave address
0x03	0x0001	1	2	0-1200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	Read baud rate
0x03	0x0002	1	2	0- Mpa 1- Kpa 2- Pa 3- Bar 4- Mbar 5- kg/cm^2 6- psi 7- mh^{2}o 8- mmh^{2}o	Primary variable unit
0x03	0x0003	1	2	0-#### 1-###.# 2-##.## 3-#.###	The decimal point represents 0-3 decimal points respectively
0x03	0x0004	1	2	-32768-32767	Measurement output value
0x03	0x0005	1	2	-32768-32767	Transmitter range zero point
0x03	0x0006	1	2	-32768-32767	Transmitter range full point
0x03	0x000c	1	2	-32768-32767	Zero offset value, the factory is generally 0
Write data function code: 0x06 (corresponding to the data address list)					
Function code	Data start address	Number of data	Data byte	Data range	Instruction meaning
0x06	0x0000	No	2	1-255	Rewrite slave address
0x06	0x0001	No	2	0-1200 1-2400 2-4800	Modify the baud rate

Function code	Data start address	Number of data	Data byte	data range	Instruction meaning
				3-9600 4-19200 5-38400 6-57600 7-115200	
0x06	0x000c	No	2	-32768-32767	Zero offset value. Primary variable output value = calibration measurement value + zero offset value
Save and restore factory command list					
Function code	Data start address	Number of data	Data byte	data range	Instruction meaning
0x06	0x000F	No	2	0- 0- Save to user area 1- 1- Save to the factory area	
0X06	0x0010	No	2	1- Return to factory parameters	

4. Examples of commonly used commands: (example data are hexadecimal, transmitter address is 1)

(1). Read the main variable data:

A. Send command: 01 03 00 04 00 01 C5 CB

B. Return data: 01 03 02 00 0A 38 43 (0x000A is the value of the main variable read)

(2). Read the number of decimal places:

A. Send command: 01 03 00 03 00 01 74 0A

B. Return data: 01 03 02 00 03 F8 45 (0x0003 is the number of decimal places)

(3). Read the transmitter address:

A. Send command: 01 03 00 00 00 01 84 0A

B. Return data: 01 03 02 00 01 79 84 (0x0001 is to read the transmitter address)

(4). Read the baud rate of the transmitter:

A. Send command: 01 03 00 01 00 01 D5 CA

B. Return data: 01 03 02 00 03 F8 45 (0x0003 is to read the baud rate of the transmitter, and the data

description list shows that the baud rate is 9600)

(5). Modify the transmitter address: (the original address of the transmitter is 0x01, modified to 0x02)

A. Send command: 01 06 00 00 00 02 08 0B

B. Return data: 01 06 00 00 00 02 08 0B (0x0002 is the modified transmitter address)

(6). Modify the baud rate of the transmitter: (the original baud rate of the transmitter is 9600, modified to

4800)

A. Send command: 01 06 00 01 00 02 59 CB

B. Return data: 01 06 00 01 00 02 59 CB (0x0002 is to modify the baud rate of the transmitter, the baud

rate is 4800 through the data description list)

Note: Send the save to user area command after modifying the command, otherwise the modified data

will be lost because it is not saved after the transmitter is powered off.

(7) The save to user area command is as follows: the save command code after the address is changed

from 1 to 2

A. Send command: 02 06 00 0F 00 00 B9 C9

B. Return data: 02 06 00 0F 00 00 B9 C9 (0x000F is the saving function code, 0x0000 means saving to

the user area)

5. Matters needing attention:

(1). When the baud rate is modified, the transmitter will reply to the modified data with the baud rate sent

by the host. After the reply, the baud rate of the transmitter will become the modified target value.

(2). When modifying the address, the data is also returned to the address before the modification, and

the transmitter address will be automatically modified after the reply.

(3). Save and reply factory commands will return the original value, indicating that the transmitter has

accepted the command from the host.

(4). When restoring factory data, pay attention to that the parameters saved by the factory may be inconsistent with those saved by the user, so the address, baud rate, and calibration data may be inconsistent, so you must search for the transmitter again after restoring the factory parameters.

(5). There are only 3 data that the user allows to modify, which are address, baud rate, and zero offset value.

(6). General users are not allowed to modify the calibration data of the transmitter. If you need to calibrate and modify, please contact our company to obtain the transmitter calibration software. Sending the command to modify the calibration data by the user will cause the transmitter to output an abnormal code. If you need to modify the calibration data, please use our company's calibration software.

(7). This protocol stipulates that the data is communicated with plastic data. For example, the main variable data is 6.000MPa, three decimal places, and the read data is 6000. Then you must perform calculations based on the position of the decimal point to get 6.000. For example, if the decimal point is 3, it means 6000/10 (3), which is 6000 divided by 10 to the third power, and the data is 6.000.

7.Precautions

1.When the baud rate is modified, the transmitter will reply to the modified data with the baud rate sent by the host. After the reply, the baud rate of the transmitter will become the modified target value.

2. When modifying the address, the data is also returned to the address before the modification, and the transmitter address will be automatically modified after the reply.

3. Save and reply factory commands will return the original value, indicating that the transmitter has accepted the command from the host.

4. When restoring factory data, pay attention to the fact that the parameters saved by the factory may be inconsistent with those saved by the user, so the address, baud rate and calibration data may be

inconsistent, so you must search for the transmitter again after restoring the factory parameters.

5. There are only 3 data that the user allows to modify, which are address, address, baud rate, and zero

offset value.

6. General users are not allowed to modify the calibration data of the transmitter. If you need to calibrate

and modify, please contact our company to obtain the transmitter calibration software. Sending the

command to modify the calibration data by the user will cause the transmitter to output an abnormal code.

If you need to modify the calibration data, please use our company's calibration software.

7. This agreement stipulates that the data is communicated with plastic data. For example, the main

variable data is 6.000MPa, three decimal places, and the read data is 6000. Then you must perform

calculations based on the position of the decimal point to get 6.000. For example, if the decimal point is 3,

it means 6000/10 (3), which is 6000 divided by 10 to the third power, and the data is 6.000.

https://hondetec.en.alibaba.com/