Quick-Start Guide

VWQS-PH01 Verge pH Sensor

Verge pH Sensor

The Verge pH sensor is for detecting how acidic of basic a liquid is. It has Modbus output. The device is suitable for urban sewage treatment plants, drinking water, chemical industry, printing and dyeing, papermaking, pharmaceutical, electroplating, and environmental protection. It has high impedance and enhanced stability. It is small, its power consumption is low, and it is economical with high performance. It has IP68 rating, long life, and high reliability.

It has high-quality low-noise cable.

It is simple to calibrate and is part of the Verge Sonde system, allowing for periodic automatic sensor cleaning. Sensor could be utilized alone or part of Sonde.

Specifications

Parameter	pH
Units	pH
Range	0-14
Resolution	0.01
Accuracy	+-0.2%
Protocol	RS485 Modbus
Temperature Limits	+5 to 45 degC
Voltage supply	8-24 VDC
Housing Materials	Acetal
Cable Materials	Rubber
Cable Length	5m
Modbus Address (Adjustable)	14(DEC)
Wire colours	Red: V+, Black: V-, Yellow or White: Modbus A, Green: Modbus B

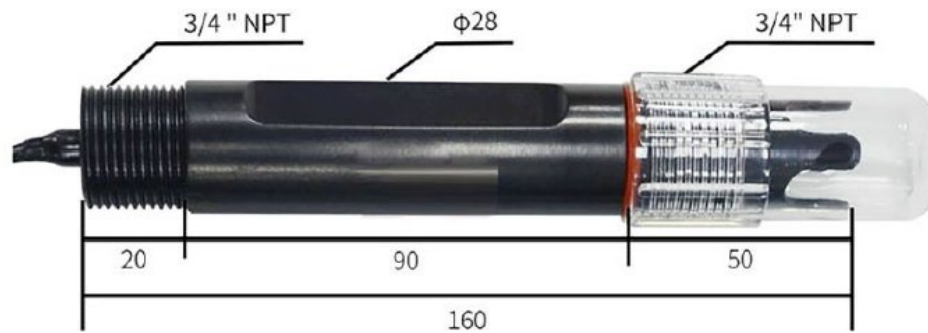**Modbus details**

Waketime – needs to be equal to setting of the sensor with the longest waketime.

```
                "waketime": 5000
        },
        "serial": {
                "log_en": true,
                "parity": "8N1",
                "baud": "9600",
                "type": "RS485",
                "device_type": "MODBUS_RTU",
                "mb": {
                        "r1": {
                                "addr": 16,
                                "byte_order": "DCBA",
                                "data_type": "UINT16",
                                "funct": "HOLDING_REG",
                                "name": "pH",
                                "offset": 0.000,
                                "reg": 0,
                                "scaling": 0.010,
                                "units": "pH"
                        }
                }
        },
```

Sensor Size

Data conversion method

1. For the RS485 output

Standard Modbus-RTU protocol, baud rate: 9600; check digit: none; data bit: 8; stop bit: 1

(1) Modify the address, for example: change the address of the transmitter with address 1 to 2, host → slave

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 the transmitter receives correctly, return the following data, slave → host

Original address	Function code	Data length	Reserved 1	new address	CRC16 low	CRC16 high
0X01	0X06	0X02	0X00	0X02	0X39	0X49

Remark: If you forget the original address of the sensor, you can use the broadcast address 0XFE instead. When using 0XFE,

the host can only be connected to one slave, and the return address is still

the original address, which can be used as the address query method.

(2). Query data

Query the data of the transmitter (address 1) (PH value), host → slave

Address	Function code	Start register address high	Start register address low	Register length high	Register length low	CRC16 low	CRC16 high
0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

If the transmitter receives correctly, return the following data, slave → host

Address	Function code	Data length	Register 0 data high	Register 0 data low	CRC16 low	CRC16 high
0X01	0X03	0X02	0X02	0XAE	0x38	0X98
			PH Value			

Data representation method:

Data representation: Convert data to decimal ÷100 The above data

indicates that the pH value is 6.86

2. Calibration method

(1) Three-point calibration

The pH sensor has been rigorously calibrated at the factory, so the user does not have to perform a second calibration. If the sensor has an error due to electrodes or other reasons, the calibration can be performed by the following method.

After connecting the wires according to the wiring diagram, the calibration steps are as follows:

➢ Put the electrode into the following PH standard calibration solution, and then send the instruction to the sensor:

➢ PH=9.18 electrode calibration instruction FE 06 00 5A 00 0A 3D D1, If success return the same.

➢ PH=6.86 electrode calibration instruction FE 06 00 5B 00 0B AD D1, If success return the same.

➢ PH=4.00 electrode calibration instruction FE 06 00 5C 00 0C 5D D2, If success return the same. After the above three steps are completed, the calibration is successful. The advantage of the three- point calibration compared to the two-point calibration is that the electrodes are separately calibrated in the acid and alkali parts to achieve accurate calibration of the full scale, making the measurement data more accurate.

(2) PH value offset calibration

Data description	Data length	Register address	Type of data	Read and write type	Note
PH offset value	1	0X0009	Integer	Read/Write	Numerical accumulation, 0X0000: Restore to the initial value

For example, add 0.1 to the sensors address 01 to the present value, send the following instruction

Address	Function code	Register data high	Register data low	PH offset value		CRC16 low	CRC16 high
0X01	0X06	0X00	0X09	00	0A	0XD9	0XCF

If success, feedback: 01 06 00 09 00 0A D9 CF.

Installation method

Please pay attention that, do not put the electrode directly into the HCL.

Use an electrode mounting bracket or a flow cup.

Be sure to use a raw material tape (3/4 thread) for waterproof sealing before installation to prevent HCL from entering the PH electrode, causing the PH electrode cable to be shorted.

Instructions

1. Sampling: According to the sampling requirements, take a representative water sample.
2. Determine the pH of the water sample: first rinse the electrode with distilled water, then rinse with water sample, then immerse the electrode in the sample, carefully shake the test cup or stir to accelerate the electrode balance, let stand, and record the pH when the reading is stable value.
3. If it is not convenient to sample, the electrode can also be placed in the solution to be tested, and the output data can be read. After a minute, the electrode should be taken out and cleaned.

Precautions for use

1. To ensure that the electrode is correctly measured on the pipeline, the data gap between the measuring cells should be avoided to cause data misalignment.
2. Please check whether the packaging is intact, and check whether the product model is consistent with the selection.
3. Do not electrify the wiring, the wiring is completed, and the power can be turned on after checking.
4. Do not arbitrarily change the components or wires that have been soldered at the time of shipment.