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Ammonium Ion Selective Sensor

Operation Manual



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Chapter 1 Specification

Specification	CS6714AD
Power supply	9~36VDC
Size	Diameter: 34mm* Length: 210mm
Weight	0.6KG (including 10m cable)
Material	Main: PP
	Cable: PVC
Waterproof Grade	IP68/NEMA6P
Scope of Measurement	0.1-1000mg/L (Customizable)
	Temperature: 0-50°C
Display Accuracy	Measurement value: $\pm 2.5\%$
	Temperature : $\pm 0.5^{\circ}\text{C}$
Output	MODBUS RS485
Storage Temperature	From 0 to 45°C
Pressure Range	$\leq 0.3\text{Mpa}$
Calibration	Calibration of standard fluids and Alignment
Length of Cable	10m cable, can extended to 100m
Warranty	Vulnerable parts

Table 1: Technical specifications for ammonium ion sensor

Description: Product specifications are subject to change without prior notice.

Chapter 2 Product Description

An electrochemical sensor for determining the activity or concentration of ions in a solution using a membrane potential. When it is in contact with a solution containing the measured ion, a membrane potential directly related to the activity of the ion is generated at the phase interface between its sensitive membrane and the solution. ion selective electrodes are one-half batteries (except gas-sensitive electrodes) that must be composed of complete electrochemical cells with appropriate reference electrodes. In general, the electric potential of the internal and external reference electrode and the liquid connection potential remain unchanged, and the change of the electromotive force of the battery completely reflects the change of the membrane potential of the ion selective electrode, so it can be directly used as an indicator electrode for measuring the activity of a particular ion in the solution. the parameters characterizing the basic characteristics of ion-selective electrodes are selectivity, measured dynamic range, response speed, accuracy, stability, and lifetime. The sensitive film of ion selective electrode is a kind of selective penetration film, and the penetration of different ions is only relatively selective.

This product is widely used in the freshwater aquaculture industry.

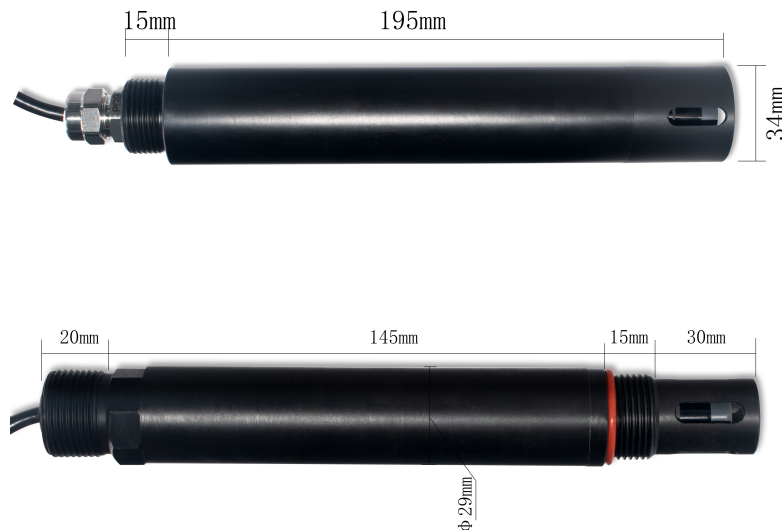


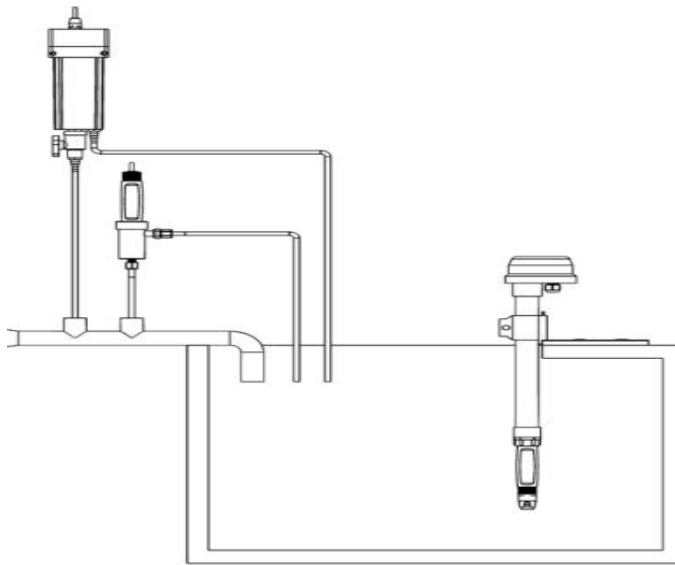
Figure 1 Image of ammonium ion Sensor

Chapter 3 Installation

3.1 Sensor Installation

The specific installation steps are as follows:

Note: The plexiglass protection cap needs to be unscrewed before use to be able to measure.



Installation diagram of ammonium ion sensor

3.2 Sensor Connections

The sensor is properly connected according to the following wire core definition:

Core number	1	2	3	4
Sensor wire	Blue	Yellow	Red	Green
Signal	+9-36VDC	AGND	RS485 A	RS485 B

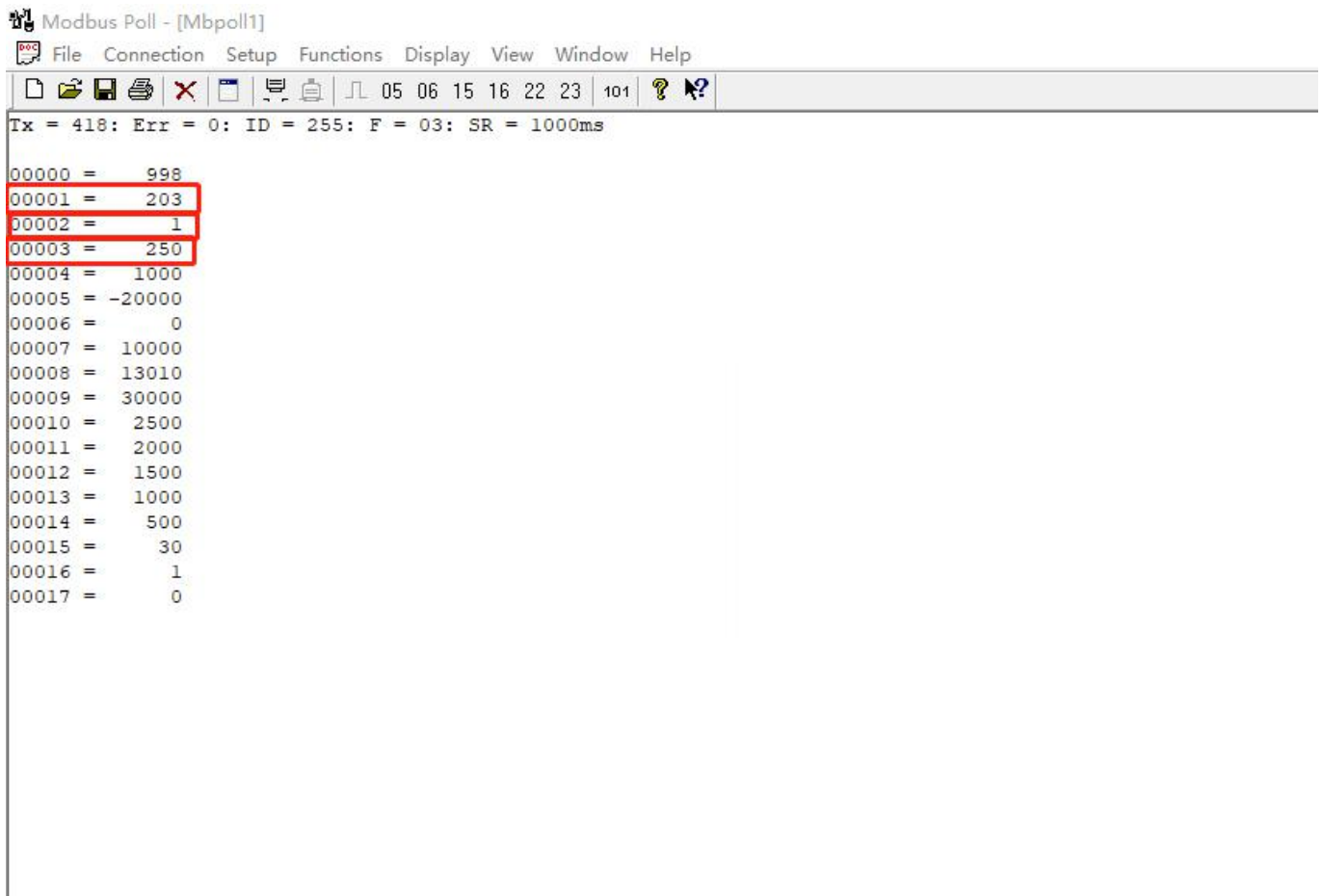
Chapter 4 Communications Agreements

The sensor is equipped with MODBUS RS485 communication function, communication wiring please refer to this specification 3.2. A specific MODBUS-RTU table is shown in the table below.

Communication configuration: 9600 N 8 1 Postal address: 1 Can be modified by broadcasting address 255 Communication protocol: MODBUS RTU 03-Reading 06-Input							
Definition	Address	Title	Default	Decimal point	Range	limitation	Description
Measurement Value	0	mV	-	1	-20000~20000	Read-only	
	1	Ion	-	0	0-10000	Read-only	
	2	Decimal point of Ion	-	0	0-2	Read-only	
	3	Temperature	-	0		Read-only	
The user calibration	4	Resistance temperature	-	0		Write-only	
	5	Calibration point 1	-20000	0	0.01	Read & Write	Calibration point default value annotation: For example: The corresponding concentration value formula of calibration point -20000 is as follows : $-20000/10000=Lg$ (concentration 0.01), The formula of concentration value corresponding to calibration point 0 is as follows : $0/10000=Lg$ (concentration 1) The formula of concentration value corresponding to 10000 calibration point is as follows : $10000/10000=Lg$ (concentration 10)
	6	Calibration point 2	0	0	1	Read & Write	
	7	Calibration point 3	10000	0	10	Read & Write	
	8	Calibration point 4	20000	0	100	Read & Write	
	9	Calibration point 5	30000	0	1000	Read & Write	
	10	Voltage 1	-3000	1		Read & Write	
	11	Voltage 2	-2500	1		Read & Write	
	12	Voltage 3	-2000	1		Read & Write	
	13	Voltage 4	-1500	1		Read & Write	
	14	Voltage 5	-500	1		Read & Write	
User Settings	15	Buffer coefficient	30	0	0-50	Read & Write	
	16	Correspondence address	1	0	1-254	Read & Write	Broadcast address 255
	17	Temperature state	0	0	0: Automatic 1: Artificial	Read & Write	
	18	Artificial temperature	250	1		Read & Write	
	19	Temperature correction	0	1		Read & Write	
	20	Linear compensation	1000	3		Read & Write	
	21	Dynamic correction	0	It will change with the decimal point of the ion		Read & Write	
Standard liquid calibration query	22	The factory voltage 1	-3000				
	23	The factory voltage 2	-2500				
	24	The factory voltage 3	-2000				
	25	The factory voltage 4	-1500				
	26	The factory voltage 5	-500				
Restore the factory	200	Restore the factory	0	0	1: The factory restore	Write-only	
Factory Version	109	Factory	1			Read & Write	
	110	Manufacturing month of electrode	610			Read & Write	
	111	Manufacturing year of electrode	2018			Read & Write	

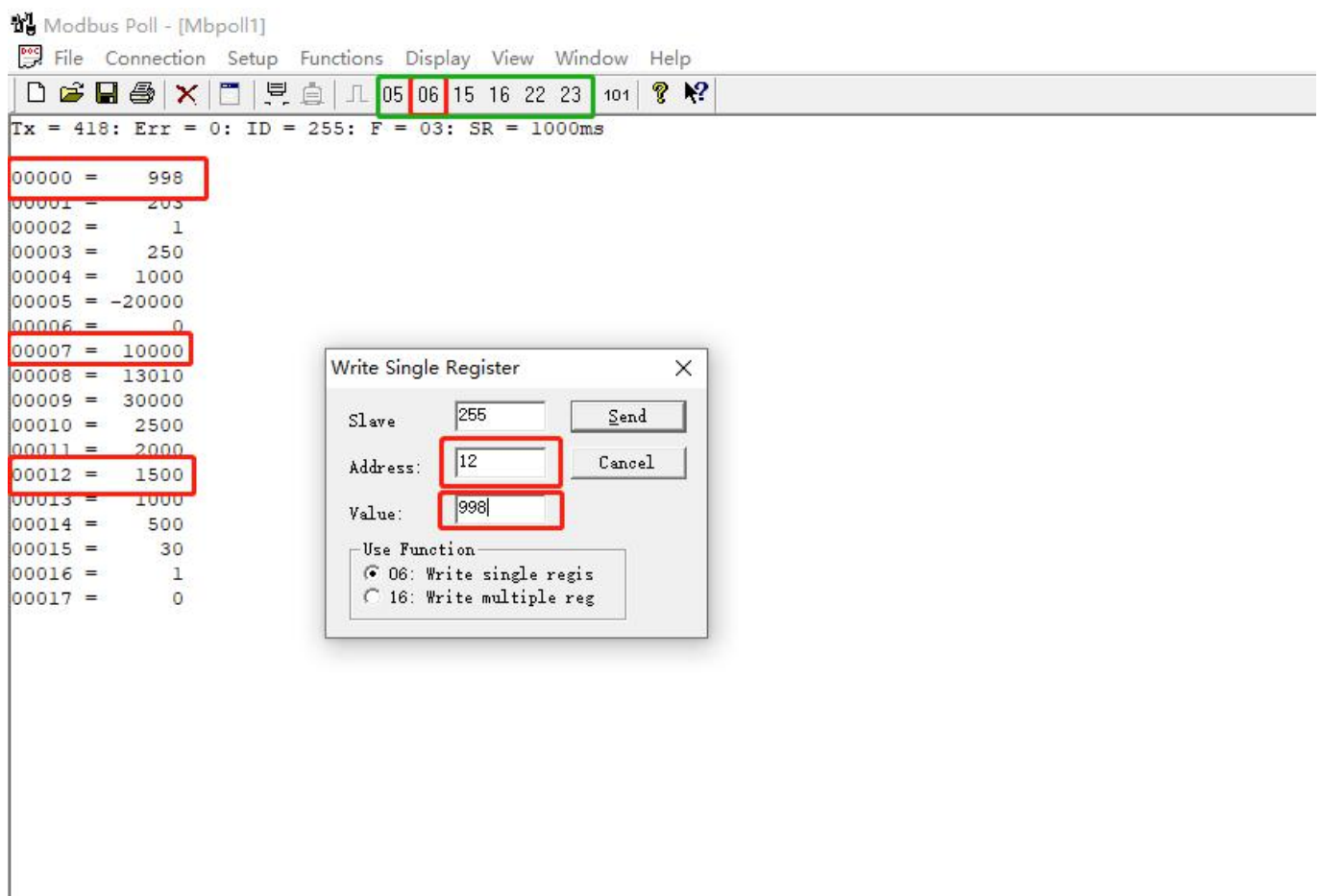
Chapter 5 Calibration Steps of Sensor

Digital ammonium ion sensor reading signal: Put the digital ammonium ion sensor into the standard liquid, connect it to the computer through RS485, and get the value as shown below: After the voltage value displayed at "00" is stable, observe the value displayed at "01-03". "01" represents the ion value, "02" represents the decimal number of the current ion value, and "03" represents the temperature value. As shown in the figure below, the position of "01" is displayed as "203", the position of "02" is displayed as "1" and the position of "03" is displayed as "250", so it can be known that the current digital ammonium ion sensor is placed in the standard liquid with the temperature of 25°C and the concentration of 20mg/L!

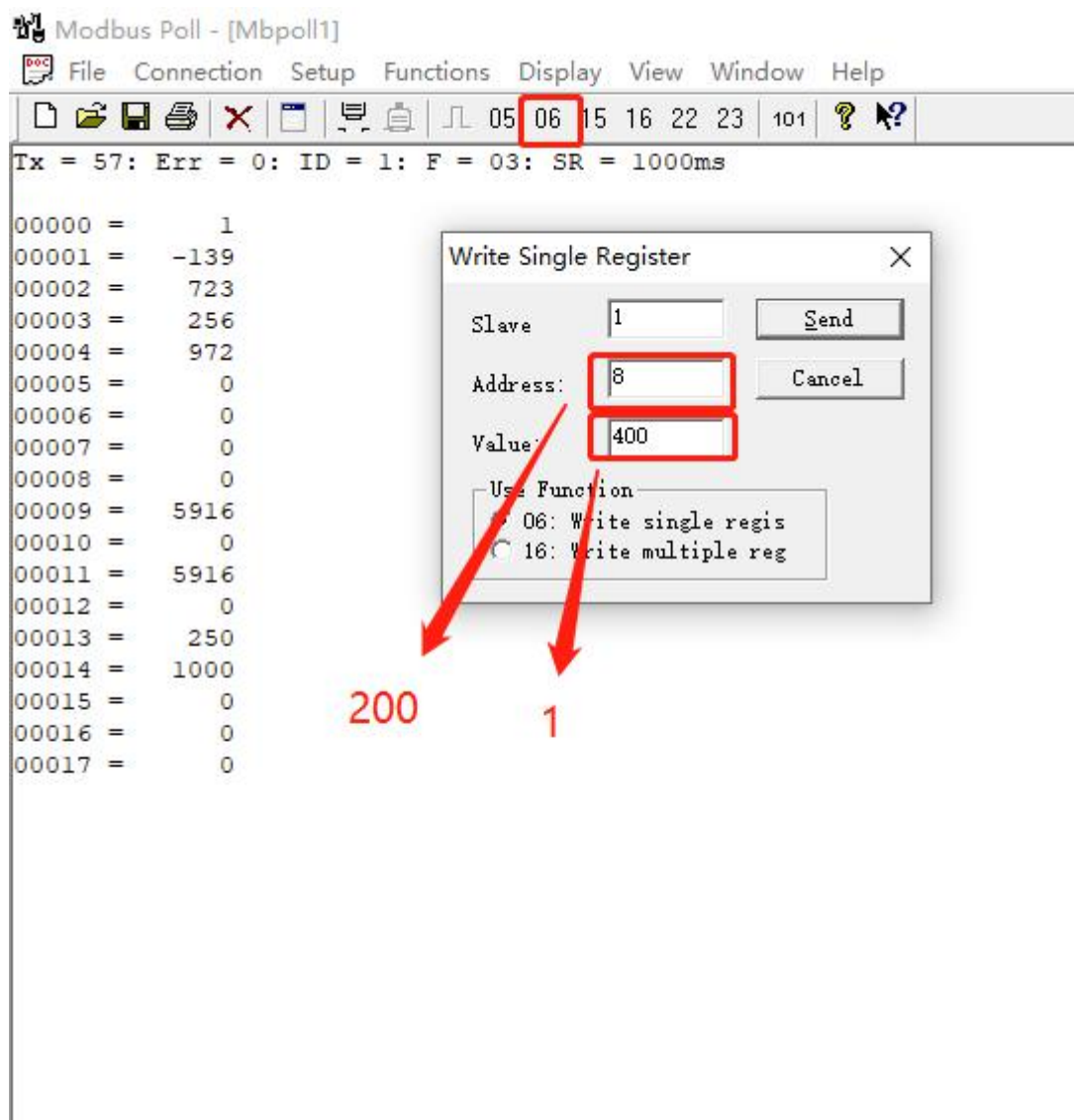


```
Modbus Poll - [Mbpoll1]
File Connection Setup Functions Display View Window Help
Tx = 418: Err = 0: ID = 255: F = 03: SR = 1000ms
00000 = 998
00001 = 203
00002 = 1
00003 = 250
00004 = 1000
00005 = -20000
00006 = 0
00007 = 10000
00008 = 13010
00009 = 30000
00010 = 2500
00011 = 2000
00012 = 1500
00013 = 1000
00014 = 500
00015 = 30
00016 = 1
00017 = 0
```

"Calibration point 4", put the digital ammonium ion sensor into the standard liquid of "100mg/L", select "06" function code and input "12" in the line of "Address" after the voltage value displayed at the position of "00" remains stable. Input "998" in the "Value" line (input voltage Value at the position of "00"), click "Send", "Response OK" will pop up, then the calibration of "Calibration point 4" is completed!



If there is an error in the calibration of the digital ammonium ion sensor during the calibration process, select the function code "06", enter "200" in the "Address" line, enter "1" in the "Value" line, click "Send", a pop-up window will display "Response OK", then the digital ammonium ion sensor will be restored to factory Settings, please recalibrate it!



Chapter 6 Maintenance

In order to obtain the best measurement effect, the sensor needs to be maintained and maintained regularly. Maintenance and maintenance mainly include sensor cleaning, check sensor damage, and regular calibration.

When measuring, it should be washed in distilled water (or deionized water) and dried with filter paper to prevent impurities from being brought into the liquid under test. The electrode and liquid complex should be completely immersed in the liquid under test.

Check that the terminal is dry, if there is contamination, please wipe with anhydrous alcohol, dry after use.

It is recommended that the user regularly clean the electrode and adjust with the instrument.

When you use the above method to maintain and maintain the electrode can not be corrected and normal measurement, indicating that the electrode can no longer restore the response, please replace the electrode.

1000mg/L ammonium (NH_4^+) standard solution:

	Basic raw materials	Requirements
A	Ammonium chloride [NH_4Cl] (GR)	3.8178g
B	Distilled water	Appropriate amount
Configuration method: Accurately weigh 3.8178g Ammonium chloride in a clean beaker, add a proper amount of distilled water to it, after it is completely dissolved, transfer to 1000 ml volumetric flask, that is ,1000 mg/L ammonium (NH_4^+) standard solution.		



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