ORP Sensor

Model:ORP485

Operation Manual

V1.05



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Catalogue

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PART 1. PRODUCT DESCRIPTION

1-1 SPECIFICATION

ORP Specification		Other Specification	
Measuring range	-2000~2000mV Slope reading 70~130% Zero potential -50~50mV	Link above	3/4" NPT
		Link below	M42
		Housing Material	PP, acid and alkali Resistance / food grade/ zero dissolution
Accuracy	±5mV	Electrode material	glass
Resolution	0.1mV	Dimension	ø45*L214mm
Electrode withstand voltage	Max. 50 Psig	Weight	≤340g
Operating temperature	0~60°C	Power	Auto-cleaning:12VDC or 24VDC(optional) Non auto cleaning:9~36VDC
Response time	T90 3 seconds	Power consumption	Auto-cleaning:1.6w Non auto-cleaning:0.8w
Communication	RS-485Modbus RTU Web Browser direct reading (192.168.1.80)	Ingress Protection Rating	IP68
Safety certification	CE、FCC		

※The default RS485 transmission rate is 9600 bps, and the default station number is 55

PART 2.Wiring method

Line Color	Function	Line Color	Function
Red	DC 12~24V	Black	GND
White	RS485 : D+(A)	Green	RS485 : D-(B)
Yellow	Auto Cleaning pump (V+)	Blue	Auto Cleaning pump (V-)

PART 3.EQUIPMENT OPERATING INSTRUCTIONS

3-1 CONNECTION METHOD

Search for the Wifi signal on your phone, find the Wifi name WQS_ORP_XXXXX, and connect to the device, where XXXXX is the device serial number. After connecting, open the "Chrome browser" and enter "192.168.1.80" to enter the device screen, as shown in Figure 1



(Figure 1 .Sensor Home Page)

3-2 CALIBRATION METHOD

Click on the value on the screen to enter the calibration mode, as shown in Figure 2. At this time, the Modbus communication value will keep the concentration value when you click on the calibration. Therefore, it is recommended to click on the calibration before taking out the sensor, and then it is in the calibration mode. Select "Standard Solution Calibration" or "Gain and Offset" according to your needs as shown in Figure 3.



(Figure 2 calibration mode)



(Figure 3『Standard Solution Calibration』or『Gain and Offset』)

3-3 AUTO CLEANING SETTINGS

Click Settings at the bottom of the homepage to enter the automatic cleaning setting page, as shown in Figure 4. You can set the required self-cleaning cycle according to the usage mode.

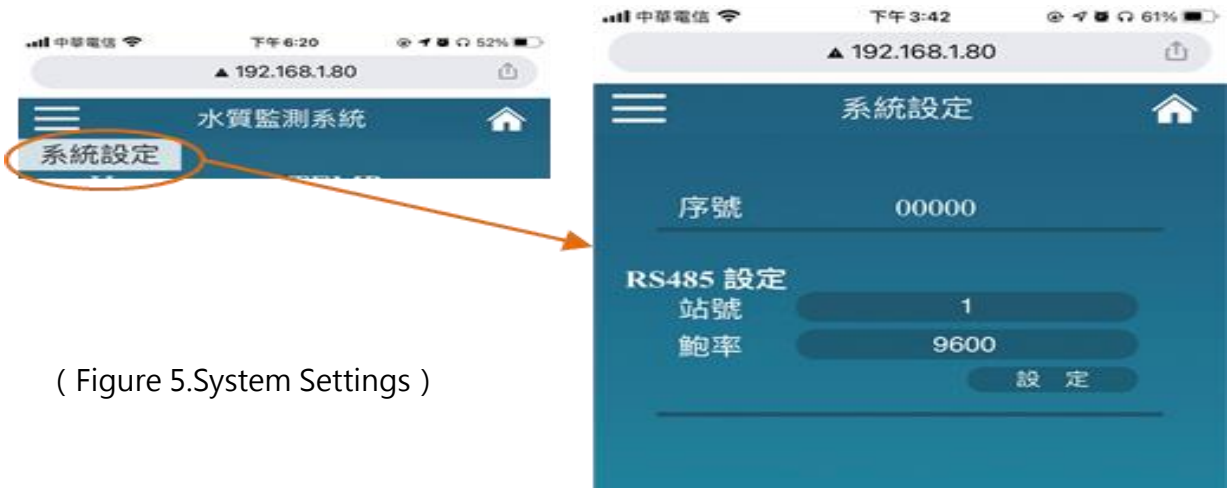




(Figure 4. Auto cleaning settings)

3-4 SYSTEM SETTINGS

Click the menu in the upper left corner to enter "System Settings", where you can directly perform RS485 related settings, as shown in Figure 5.



(Figure 5.System Settings)

PART 4.MODBUS TABLE

Function 3 to Read/Function 6 to write				
Setting Value	**Item**	**Type**	**R/W**	**Remarks**
400001	ORP instant value	INT16	R	Value/10
400002	Temp. instant value	INT16	R	Value/10
400011	Temp. instant value	INT16	R	Value/10
400014	Current electrode potential (Float low bit)	FLOAT	R	Unit：mV
400015	Current electrode potential (Float high bit)	FLOAT	R	Unit：mV
400022	RS485 station number	INT16	R/W	Can be set: 1 ~ 254
400023	RS485 transmission rate	INT16	R/W	B2400 = 0, B4800 = 1, B9600 = 2, B19200 = 3, B38400 = 4, B57600 = 5, B115200 = 6
400031	ORP instant value (Float low bit)	FLOAT	R	
400032	ORP instant value (Float high bit)	FLOAT	R	
400033	Temp. instant value (Float low bit)	FLOAT	R	
400034	Temp. instant value (Float high bit)	FLOAT	R	
400049	Sensor status	INT16	R	0: Value reading / 1: Automatic cleaning 2: Value keeping / 3: Calibrating
400050	Electrode Slope	INT16	R	Value/10
400051	Temp.Slope	INT16	R	Value/10

Function (04H)				
Setting Value	**Item**	**Type**	**R/W**	**Remarks**
300001	instant value	INT16	R	Value/10
300002	Temp. instant value	INT16	R	Value/10
300011	Temp. instant value	INT16	R	Value/10
300014	Current electrode potential (Float low bit)	FLOAT	R	Uint：mV
300015	Current electrode potential (Float high bit)	FLOAT	R	Uint：mV
300031	ORP instant value (Float low bit)	FLOAT	R	
300032	ORP instant value (Float high bit)	FLOAT	R	
300033	Temp. instant value (Float low bit)	FLOAT	R	
300034	Temp. instant value (Float high bit)	FLOAT	R	

Function 1 to Read/Function 5 to write				
Setting Value	**Item**	**Type**	**R/W**	**Remarks**
000001	Automatic cleaning switch	On / off	R/W	

※The firmware version is v1.04 or above, which complies with the above Modbus table.

PART 5.MODBUS BYTE FORMAT DESCRIPTION

5.1 INT16 READS INSTANT VALUE (Function03)

Protocol format description								
	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	Address	0x03	0x00	0x00	0x00	0x01	CRC0	CRC1
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	Address	0x03	Number of data *2		ByteH	ByteL	CRC0	CRC1

Communication Examples

	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	0x37	0x03	0x00	0x00	0x00	0x01	0x81	0x9C
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	0x37	0x03	0x02		0x02	0xC6	0x3D	0x72

Convert the sensor data bit 0x02C6 (hexadecimal) to decimal format to 710. According to the two decimal places, it is 710/100=7.1, and the pH is 7.1.

5.2 Float READS INSTANT VALUE (Function03)

Protocol format description								
	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	Address	0x03	0x00	0x00	0x00	0x02	CRC0	CRC1
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	Address	0x03	Number of data *2		WordL	WordH	CRC0	CRC1

Communication Examples

	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	0x37	0x03	0x00	0x1E	0x00	0x02	0xA1	0x9B
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	0x37	0x03	0x04		0x38	0xAC	0x40	0xE3	0x46	0x94

Rearrange the sensor data bit 0x38AC40E3 value so that the data bytes are exchanged so that the value is high byte first and low byte second 0x40E338AC. Then directly convert it to Float to 7.10, and the pH is 7.10.

Please refer to the online conversion tool:https://gregstoll.com/~gregstoll/floattohex/

5.3 INT16 READS INSTANT VALUE (Function04)

Protocol format description								
	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	Address	0x04	0x00	0x00	0x00	0x01	CRC0	CRC1
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	Address	0x04	Number of data *2		ByteH	ByteL	CRC0	CRC1

Communication Examples

	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	0x37	0x04	0x00	0x00	0x00	0x01	0x34	0x5C
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	0x37	0x04	0x02		0x02	0xC6	0x3C	0x06

Convert the sensor data bit 0x02C6 (hexadecimal) to decimal format to 710. According to the two decimal places, it is 710/100=7.1, and the pH is 7.1.

5.4 Float READS INSTANT VALUE (Function04)

Protocol format description								
	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	Address	0x04	0x00	0x00	0x00	0x02	CRC0	CRC1
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	Address	0x04	Number of data *2		WordL	WordH	CRC0	CRC1

Communication Examples

	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	0x37	0x04	0x00	0x1E	0x00	0x02	0x14	0x5B
	Equipment station number	Function	Data bytes		Sensor data			16 CRC code
Reply from machine	0x37	0x04	0x04		0x38	0x62	0x40	0xE3	0x24	0x70

Rearrange the sensor data bit 0x386240E3 value so that the data bytes are exchanged so that the value is high byte first and low byte last 0x40E33862, and then directly converted to Float to 7.10, and the pH is 7.10.

Please refer to the online conversion tool:https://gregstoll.com/~gregstoll/floattohex/

5.5 PERFORM AUTO CLEANING (Function05)

Protocol format description								
	Equipment station number	Function	Starting address		Number of data (Word)	16 CRC code	Equipment station number	
Host command	Address	0x05	0x00	0x00	0xFF	0x00	CRC0	CRC1
	Equipment station number	Function	Data bytes		Sensor data		16 CRC code	
Reply from machine	Address	0x05	Number of data *2		ByteH	ByteL	CRC0	CRC1

Communication Examples

	Equipment station number	Function	Address		Control bit	Complement	16 CRC code	
Host command	0x37	0x05	0x00	0x00	0xFF	0x00	0x89	0xAC
	Equipment station number	Function	Address		Control bit	Complement	16 CRC code	
Reply from machine	0x37	0x05	0x00	0x00	0xFF	0x00	0x89	0xF9

Writing 0xFF to the control bit starts automatic cleaning.

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