RK500-16 Communication Protocol（MODBUS-RTU）

1.Communication parameters(factory default):

Baud rate: 9600bps, Data bits:8,Stop bit:1,Check bit:no,Address:0x16

2.Examples for read data

Host Scan Order：

Slave id	Function code	Address_H	Address_L	Quantity_H	Quantity_L	CRC_L	CRC_H
0x16	0x03	0x00	0x00	0x00	0x02	0xC7	0x2C

Sensor Response

Slave id	Function code	Number of bytes	Chlorophylls	CRC_L	CRC_H
0x16	0x03	0x04	0x412428F5	0x3D	0x9D

NO_3^-:0x412428F5 >>10.26ppm

3.Examples for modify the address(After the restart to take effect)

Host Scan Order(change 16H to 02H)：

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x16	0x06	0x00	0x14	0x00	0x02	0x4B	0x28

Sensor Response

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x16	0x06	0x00	0x14	0x00	0x02	0x4B	0x28

4.Register description

<table>
<tr><th>Register name</th><th>Function code</th><th>Register address</th><th>Data type</th><th>Data length（byte）</th><th>R/W</th><th colspan="2">Remark</th></tr>
<tr><td>NO_3^-</td><td>0x03</td><td>0x0000</td><td>Floating point</td><td>4</td><td>R</td><td colspan="2">ppm</td></tr>
<tr><td>mV</td><td>0x03</td><td>0x0002</td><td>Floating point</td><td>4</td><td>R</td><td colspan="2">mV</td></tr>
<tr><td>Baud rate</td><td>0x03</td><td>0x0012</td><td>Floating point</td><td>4</td><td>R</td><td colspan="2">2400-38400</td></tr>
<tr><td rowspan="7">Baud rate</td><td rowspan="7">0x06</td><td rowspan="7">0x0012</td><td rowspan="7">Unsigned integer</td><td rowspan="7">2</td><td rowspan="7">W</td><td>Baud rate</td><td>Value</td></tr>
<tr><td>2400</td><td>0x0960</td></tr>
<tr><td>4800</td><td>0x12C0</td></tr>
<tr><td>9600</td><td>0x2580</td></tr>
<tr><td>19200</td><td>0x4B00</td></tr>
<tr><td>38400</td><td>0x9600</td></tr>
<tr><td>57600</td><td>0xE100</td></tr>
<tr><td>Sensor address</td><td>0x03</td><td>0x0014</td><td>Floating point</td><td>4</td><td>R</td><td colspan="2">1-127</td></tr>
<tr><td>Sensor address</td><td>0x06</td><td>0x0014</td><td>Unsigned integer</td><td>2</td><td>W</td><td colspan="2">0-0x7F</td></tr>
</table>

5. Calibration

5.1 One-point calibration (Taking 0.2ppm standard solution as an example)

Slave id	Function code	Address	Length	byte	value	CRC_L	CRC_H
0x0D	0x10	0x0050	0x0002	0x04	0x3E4CCCCD	0x91	0x69

5.2 Two-point calibration

1. Low point calibration

First, send 0D 03 00 02 00 02 6507 to read the mV value in the current solution.After the mV value stabilizes, record the current mV value.

Taking 10ppm of standard solution and a mV value of 30.2 as an example, send the following command:

Slave id	Function code	Address	Length	byte	value	mV	CRC_L	CRC_H
0x0D	0x10	0x0028	0x0004	0x08	0x41200000	0x41F1999A	0x91	0xD5

2.High point calibration

First, send 0D 03 00 02 00 02 6507 to read the mV value in the current solution.After the mV value stabilizes, record the current mV value.

Taking 50ppm of standard solution and a mV value of 60.3 as an example, send the following command:

Slave id	Function code	Address	Length	byte	value	mV	CRC_L	CRC_H
0x0D	0x10	0x002C	0x0004	0x08	0x42480000	0x42713334	0xC6	0xB6

NOTE:

1. The value of the high point calibration solution should be greater than that of the low point calibration

2.When calibrating, the sensor should be washed with deionized water and drained of water before being put into the calibration solution

3.If the mV values of the high and low points are close or equal, it indicates that the sensor may be damaged or has reached its service life