

Register setting

Register name	ADD	type of data	Length (byte)	read	explanation
Indication	R0	unsigned	1	R	
4ma value	R2	unsigned	1	R	
20ma value	R3	unsigned	1	R	
range	R4	unsigned	1	R	
Proportionality coefficient	R5	unsigned	1	R	(1 decimal)
increments	R6	signed	1	R	
Slave address	R8	unsigned	1	R	Range is 1-127
Baud rate	R9	unsigned	1	R	1200 2400 4800 9600 19200 38400 57600
Function call	R10	unsigned	1	W	See continued table for details.
Parameter 1	R11	unsigned	1	W	See continued table for details.
Parameter 2	R12	unsigned	1	W	See continued table for details.

5 MODBUS Instruction Format

This sensor is compatible with 0x03, 0x06, 0x10 function codes of MODBUS protocol.

0x03 command format

definition	ADD	Function code	Starting address	Number of register	CRC Check
Data	ADDR	0x03	Rstart	Rnum	CRC 16
bytes	1	1	2	2	2

0x03 return format:

definition	ADD	Function code	Number of data	data	CRC Check
data	ADDR	0x03	Rnum*2	Data	CRC 16
bytes	1	1	1	Rnum*2	2

0x06 command format

definition	ADD	Function code	ADD of register	data	CRC Check
data	ADDR	0x06	Raddr	Data	CRC 16
bytes	1	1	2	2	2

0x06 return format (same as command):

definition	ADD	Function code	ADD of register	data	CRC Check
data	ADDR	0x06	Raddr	Data	CRC 16
bytes	1	1	2	2	2

0x10 command format:

definition	ADD	Function code	Starting ADD	Number of register	Number of data	data	CRC check
data	ADDR	0x10	0x000A	0x0003	0x06	data	CRC 16
bytes	1	1	2	2	1	6	2

0x10 return format:

definition	ADD	Function code	Starting ADD	Number of register	CRC Check
data	ADDR	0x10	0x000A	0x0003	CRC 16
bytes	1	1	2	2	2

6 Data reading

This sensor data is read using the 0x03 function code of the MODBUS protocol.

For example, read TSS value

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

Return: 01 03 02 1A CC B3 71

Data part is: 1A CC

TSS value: 0x1ACC convert to decimal is 6860, convert to the corresponding value based on the resolution of the sensor. If resolution is 0.01, then value is 68.6; if resolution is 1, the value is 6860.

7 Parameter adjustment

- (1) Parameter adjustment of the sensor is using the 0x06 or 0x10 function code of the MODBUS protocol.
- (2) Use 0x06 function code to adjust parameters can be divided into 3 steps
 - 1) Write parameter 1 to the R11 register
 - 2) Write parameter 2 to the R12 register
 - 3) Write the function number to the R10 register
- (3) Using 0x10 function code, you need to write the function number, parameter 1, parameter 2 to the three registers starting from R10.(Equivalent to step-by-step writing)
- (4) When the function call is successful, the R10, R11, and R12 registers are reset to 0. If the function call fails or the parameters are incorrect, the R12 register will display -1.

Function call parameter list

Function	parameter1	parameter2	Function number
Zero calibration	Standard liquid value	1	1
Slope calibration	Standard liquid value	2	1
Correction calibration	Correction calibration value	Correct calibration point number(3-5)	1
Change the 4-20ma output range	4mA output representative value	20mA output representative value	3
Change range	Range value	Arbitrary value	4
Change correction factor	Proportionality coefficient	Incremental value	5
Change slave address	New slave number	Arbitrary value	7
Change baud rate	New baud rate	Arbitrary value	8
reset	Passcode: 20034	Arbitrary value	11

For example's calibration (use 0x10 function code)

Zero calibration: standard liquid is 10mg/L, sensor's resolution is 0.01 ,
 $10 \times 100 = 1000$, converted to hexadecimal 0x03E8, therefore, function code is
 0x0001, parameter 1 is 0x03E8, parameter 2 is 0x0001

Data part is 00 01 03 E8 00 01

Send command: 01 10 00 0A 00 03 06 00 01 03 E8 00 01 BA D0

Return: 01 10 00 0A 00 03 A0 0A

Slope calibration: standard liquid 200mg/L, sensor's resolution is 0.01,
 $200 \times 100 = 20000$, converted to hexadecimal 0x4E20, therefore, function

code is 0x0001, parameter 1 is 0x4E20, parameter 2 is 0x0002

Data part: 00 01 4E 20 00 02

Send command: 01 10 00 0A 00 03 06 00 01 4E 20 00 02 6C 43

Return: 01 10 00 0A 00 03 A0 0A