DDG-GY Digital Inductive Conductivity Sensor User Manual

Digital conductivity sensor has all the functions of measuring and digitizing conductivity and various salinity, acid and alkali concentrations. It overcomes many difficulties of the previous sensors and integrates the signal processing circuit into an embedded MCU ASIC, which enables the sensor to be calibrated before leaving the factory, and the calibration value is permanently stored i

n the probe. With temperature compensation function, the temperature is also directly digital output.

1.Communication serial port：RS485 ；

2.working power supply:+12Vdc

3.wire list：

Red: Power +12Vdc

Black: Serial port A

White: Serial port B

Blue wire: GND(cable shielding layer)

4.Probe temperature：

0~50°C；

5.range：2、20、...2000ms/cm

Resolution:range/2000

Temperature: 0.1°C;

Conductivity, concentration :(full range) ±0.1%;

6. Maximum flow rate: 3m/s

7. Digital filtering function: The duration of digital filtering can be set: 0~32 minutes

8. Temperature compensation range: 0-100°C, compensation coefficient can be set online

9.Communication Protocol: Standard MODBUS RTU RTU protocol

. After receiving the request and sending command from the host computer (upper computer), the sensor sends a packet once, the data refresh cycle is 100ms, and the baud rate is 9600

.Initial default address：255； reference temperature：25°C，The initial default temperature complement coefficient：2%/°C serial port setup：9600-8-N-1

Input register: read-only, base address 0, function code 0x04

Offset 0x00: Temperature

Offset 0x08: Conductivity value without temperature compensation

Offset 0x0a: Salinity

Offset 0x0c: The conductivity value after temperature compensation

Offset 0x0e: HCL (25<N<40, otherwise N=0)

Offset 0x10: NAOH (20<N<40, otherwise N=0)

Offset 0x12: KOH (0<N<30, otherwise N=0)

Offset 0x14: H2SO4 (0-25%)

Offset 0x16: H2SO4 (35-85%)

Offset 0x18: H2SO4 (92-100%)

Offset 0x1A: HCL (0-20%)

Offset 0x1c: NAOH (0-18%)

Offset 0x1e: HNO3 (0-25%)

Offset 0x24: H2SO4（85%<N<92%, otherwise N=0）

Hold register: read/write only, base address 2000, function code 0x03,0x06

Offset 0x00: working mode (read and write, user mode (0x01), factory mode (0x00)), enter 0x1234,0x5678, or enter decimal 4660,22136 to switch)

Offset 0x01: Temperature-complement coefficient (read and write, temperature-complement coefficient X100, for example, 2%, enter 200 or 0xC8)

Offset 0x02: Reference temperature (read/write, input temperature, e.g. 25℃ input 25 or 0x19)

Offset 0x03: Temperature calibration (write only, enter temperature X10, for example 25.0℃ enter 250 or 0xFA)

Offset 0x04: Probe calibration 0(write only, enter 0000, other values invalid)

Offset 0x05: Probe calibration gain (write only, enter standard value)

Offset 0x06: Configure modbus address (read and write, enter address code)

Offset 0x07: Reset probe (write only, enter 0000, other values invalid)

Offset 0x08: Range (user mode read-only, factory mode read-write)

Offset 0x0c: Set the smoothing amount (read and write, from 0 to 32 minutes)

Examples of MODBUS data reading and writing are as follows:

Example 1: Probe address is 0xff, read mode, temperature compensation, need to read two consecutive registers, start reading from the register whose register address is 2000

Host computer sends: 0xff, 0x03, 0x07, 0xD0, 0x00, 0x02, 0xD1, 0x58

Data meaning: address | function code | register address high byte | register address low byte | high byte of the number of registers read | low byte of the number of registers read | check 1 | check 2

Probe response: 0xff, 0x03, 0x04, 0x00, 0x00, 0x00, 0xC8, 0xE4, 0x6A

Data meaning: address | function code | number of data bytes returned | register 1 high byte | register 1 low byte | register 2 high byte | register 2 low byte | check 1 | check 2

Indicates that the mode is 0x0000, and temperature compensation 0x00c8 is 2%

Example 2: The probe address is 0xff, reading the temperature value, it means that 4 bytes are needed for floating point, and 2 registers need to be read. Start reading from the register whose register address is 0

Host computer sends: 0xff, 0x04, 0x00, 0x00, 0x00, 0x02, 0x64, 0x15

Data meaning: address | function code | register address high byte | register address low byte | high byte of the number of registers read | low byte of the number of registers read | check 1 | check 2

Probe response: 0xff, 0x04, 0x04, 0x41, 0xBA, 0x66, 0x66, 0x7A, 0x18

Data meaning: Address | Function code | Number of returned data bytes | Register 1 high byte | Register 1 low byte | Register 2 high byte | Register 2 low byte | Check 1 | Check 2

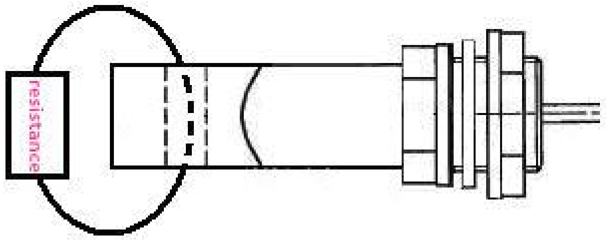
Among them, the four bytes of 0x41, 0xBA, 0x66, and 0x66 form a floating point number, which means floating point 23.299999

Calibration and debugging of potentiometer mode:

Each electrodeless sensor has a unique zero point and measurement range. Therefore, after the on-site installation, the first time the sensor is calibrated, zero point calibration is required. Zero point calibration provides the best measurement accuracy. Calibrate the measurement range of the sensor through different methods, so as to maintain the best measurement accuracy periodically. Over time, certain processes such as viscous suspensions may clog the sensor ring holes, which can cause slight measurement errors. The length of calibration time and the rate of measurement drift can change accordingly with each use and its special conditions.

When calibrating, the probe should be placed in the air at 25℃±2℃, and make sure that the sensor is dry and clean:

1. Zero adjustment: After connecting the wires according to the wiring table, power on, and adjust the potentiometer in the middle to make the output value: 0±0.1mV. (See the offset 0x02 in the debugging window)
2. Adjust the gain: Pass a 100Ω (for example, when the range is 200mS) precision resistor in the ring hole of the sensor, then close the head and tail (see the detection diagram), turn the potentiometer on the side to make the output The value is: 427.0±1.0mV (seen at offset 0x02 in the debug window)



Schematic Diagram

3. Repeat steps 1 and 2 again, and it is complete (note: when performing step 1, the resistance of the threading should be opened).

Precautions for use

1. Wrong wiring, especially the wrong power connection, will cause the sensor to be completely destroyed!
2. The threaded port and above (including cables) must be completely isolated from the measured solution (although there is glue!). After long-term immersion (dripping) in the liquid, the sensor will be destroyed!
3. There is a filter capacitor in the heat shrink tube at the end of the cable (to prevent power fluctuation and interference), please do not cut it!
4. In order to ensure the accuracy of the sensor measurement, it is recommended to reserve a 20mm space around the sensor to avoid other materials close to the sensing area. Different spatial distances, the proportional coefficient will change, and the parameters should be balanced and compensated.

5. When installing, the sensing area is facing upwards or tilted upwards, which can avoid occasional air bubbles (or filter out by software filtering); suspend the sensor in the solution to prevent contact with the container (such as simply placing it randomly) Into the container will cause measurement error), and the probe should be kept still during the measurement;

6. The working temperature of the built-in signal processing sensor is 0~50℃, and the working temperature of the external signal processing sensor is 0~100℃.

7. If the power is turned off after a long time, the conductance value will drift slightly within 5~15 minutes.

8. When installing, do not try to tighten the connection by twisting the "ring" end of the sensor, which will cause the sensor housing to break.

9. When wiring, do not pass the probe cable through any pipe with AC or DC power. Electrical signals may interfere with sensor signals.

10. Since there may be a considerable temperature difference between the inside of the probe and the liquid being detected, it is clearly recommended: in working conditions that require accurate measurement or fast frequency response, do not use the temperature sensor built into the probe as the temperature sensing element of the liquid being detected!