EC Sense
Easy Gas Sensors

DS4 Smart Gas Sensor Module

AQS Protocol

UART Interface

1. Product Overview and Configuration Parameters

1.1 Product Overview

The DS4 Smart Gas Sensor utilizes UART (TTL) half-duplex interface communication with the following communication parameters:

Baud Rate	Data Bits	Start Bit	Stop Bit	Parity Bit	Read/Write Data Interval
9600	8 Bits	1 Bit	1 Bit	None	>=200ms

2. Instruction Table

Function Description	Instruction (ASCII)	Instruction (HEX)	DS4 Reply Message Example (ASCII)	Explanation of Reply Data Example
Read Type, Concentration and Unit	A	0x41	:VOC,0.300ppm,29026	VOC------Sensor type 0.300----Concentration value ppm------Unit 29026----Modbus crc
Read Concentration and Unit	C	0x43	:0.100ppm,54316	0.100-----Concentration value ppm-------Unit 54316-----Modbus crc
Read Full Scale Range	R	0x52	:200,59247	200--------Range 59247-----Modbus crc
Read Sensor Gas Type	G	0x47	:VOC,60599	VOC-------Sensor Gas Type 60599-----Modbus crc
Zero Point Calibration	Z	0x5A	:Z-OK,21210	Z-OK------Zero Point Calibration Successful 21210-----Modbus crc
Target Point Calibration	D:XXXX.XXX	0x44 0x3A 0xnn 0xnn 0xnn 0xnn 0x2E 0xnn 0xnn 0xnn	:D-OK,64216	D-OK------Concentration Calibration Successful 64216----Modbus crc Note: Please strictly adhere to the specified format when sending.
Enable User Calibration	U	0x55	:U-OK,1755	U-OK------Enable User Calibration 1755------Modbus crc
Disable User Calibration	F	0x46	:F-OK,33560	F-OK------Disable User Calibration 33560----Modbus crc
Entry Sleep	S	0x53	:entry sleep	entry sleep
Exit Sleep		0xFF 0xFF 0x57	:wake_up	wake_up
Read User Code	B	0x42	:44444444444444444444 44444444444,25045	44444444444444444444444444444444-----Agent Code 25045----Modbus crc
Write User Code	Agent:XXXXX XXXX		:XXXXXXXXX	XXXXXXXXX---------Agent Code Note:Max agent code length is 33 byte

CRC Calculation Example:

":VOC,0.300ppm,29026"

Valid Data: ":VOC,0.300ppm,"

Hex Data: 0x3A,0x56,0x4F,0x43,0x2C,0x30,0x2E,0x33,0x30,0x30,0x70,0x70,0x6D,0x2C

The value obtained by calculating the Modbus CRC for hexadecimal data: 0x71,0x62

The decimal value of the MODBUS-CRC is: 0x7162 = 29026

The complete data is: ":VOC,0.300ppm,29026"

CRC-16/Modbus Calculation Method:

Calculation Method:x16+x15+x2+1

C Language Calculation Function:

uint16_t get_modbus_crc(uint8_t *buffer, uint16_t len)

```c
{
    uint16_t wcrc = 0XFFFF;
    uint8_t temp;
    uint16_t i = 0, j = 0;
    for (i = 0; i < len; i++)
    {
        temp = *buffer & 0X00FF;
        buffer++;
        wcrc ^= temp;
        for (j = 0; j < 8; j++)
        {
            if (wcrc & 0X0001)
            {
                wcrc >>= 1;
                wcrc ^= 0XA001;
            }
            else
            {
                wcrc >>= 1
            }
        }
    }
    return wcrc;
}
```

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