

CO2 Probe User Guide

Product Introduction

The carbon dioxide probe is an industrial-grade probe with high integration. The data is sent from the internal chip of the probe to the computer through the modbus-rs485 interface, and multiple probes can be connected to the bus network to realize real-time monitoring of multiple field environments. In addition, the probe can also be directly connected to the power supply to display the measurement data through the LCD screen. The probe is designed with waterproof and breathable film, with the highest waterproof level up to IP65. It has super stability and anti-interference ability, strong product protection performance and first grade lightning protection, which can be used in agricultural industry and other occasions.



Use Case Scenarios

It is widely used in agricultural greenhouses, intelligent buildings, workshops, warehouses, pharmacies, libraries, museums, laboratories, offices, ventilation ducts and other places where carbon dioxide concentration needs to be monitored.

Features

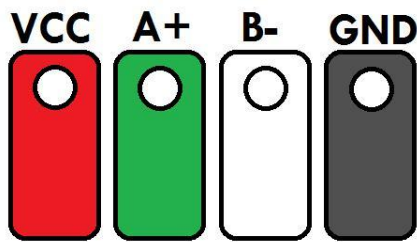
1. RS485 interface, communication distance up to 1200 meters.
2. High precision, wide range, good consistency.
3. Standard audio interface design, easy to plug.
4. Super stability and anti-interference.
5. Standard MODBUS RTU protocol.
6. Able to accurately measure CO2 concentration.
7. The product has strong protective performance and first grade lightning protection.

Product Specifications

| Specifications | |
|------------------------|--|
| Model | UB-CO2-P1 |
| Working Voltage | DC5V |
| Measuring Range | 0~10000ppm |
| Measuring Accuracy | CO2: $\pm (30\text{ppm}+3\%)$ Accuracy(max) 0.1ppm |
| Output Interface | RS485 |
| Communication Protocol | MODBUS RTU |
| Communication Address | 0x61 |
| Baud Rate | 1200 bit/s,2400 bit/s, 4800 bit/s, 9600 bit/s, 19200 bit/s(optional) |
| Standby Current | 20mA |
| Interface Type | Audio Interface |
| Dimensions | 65*46*29mm |
| Cable Length | 3m |

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Wiring Instruction:



Communication Protocol

1. All communication circuits shall follow the master/slave mode. In this way, data can be transferred between one primary station (e.g., PC) and multiple sub-stations. No communication should start from a substation.
2. The information transmission mode is asynchronous, byte format is 1 start bit, 8 data bits, and 1 stop bit, no check.
3. Compliance with MODUBS RTU protocol standards.
4. The default baud rate is 9600 and the address is 0x61.

*** This protocol is a master slave protocol. There is one master station and several slave stations on a bus. The communication parameters between each station must be consistent, including baud rate, data bits, check bit check method and stop bits. The address of each slave station must be different, otherwise the slave station response may conflict.**

| Query Message from Master (Read) | | | | | | | |
|----------------------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-----------|-----------|
| Address | Function Code (Read) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB |
| 0x61 | 0x03 | RegAddr_H | RegAddr_L | Data_H | Data_L | CRC16_L | CRC16_H |

| Response Message from Slave | | | | | | | | | |
|-----------------------------|----------------------|------------|-----------|-----------|-----------|-----------|-----|-----------|-----------|
| Address | Function Code (Read) | Byte Count | Data1 MSB | Data1 LSB | Data2 MSB | Data2 LSB | ... | CRC16 LSB | CRC16 MSB |
| 0x61 | 0x03 | BytesLenth | Data1_H | Data1_L | Data2_H | Data2_L | ... | CRC16_L | CRC16_H |

| Query Message from Master (Write) | | | | | | | |
|-----------------------------------|-----------------------|---------------------|---------------------|--------------------|--------------------|-----------|-----------|
| Address | Function Code (Write) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB |
| 0x61 | 0x06 | RegAddr_H | RegAddr_L | Data_H | Data_L | CRC16_L | CRC16_H |

| Response Message from Slave | | | | | | | |
|-----------------------------|-----------------------|---------------------|---------------------|--------------------|--------------------|-----------|-----------|
| Address | Function Code (Write) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB |
| 0x61 | 0x06 | RegAddr_H | RegAddr_L | Data_H | Data_L | CRC16_L | CRC16_H |

Example:

1. Modify baud rate

| Query Message from Master (Write) | | | | | | | |
|-----------------------------------|--|--|--|--|--|--|--|
|-----------------------------------|--|--|--|--|--|--|--|

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| Address | Function Code (Write) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB |
|-----------------------------|-----------------------|---------------------|---------------------|--------------------|--------------------|-----------|-----------|
| 0x61 | 0x06 | 0x00 | 0x65 | 0x00 | 0x03 | 0xD0 | 0x74 |
| Response Message from Slave | | | | | | | |
| Address | Function Code (Write) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB |
| 0x61 | 0x06 | 0x00 | 0x65 | 0x00 | 0x03 | 0xD0 | 0x74 |

0x0000 : 1200bps, 0x0001 : 2400bps, 0x0002: 4800bps, 0x0003: 9600bps, 0x0004: 19200bps,

2. Read status register

| Query Message from Master (Read) | | | | | | | |
|----------------------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-----------|-----------|
| Address | Function Code (Read) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB |
| 0x61 | 0x03 | 0x00 | 0x27 | 0x00 | 0x01 | 0x3D | 0xA1 |
| Response Message from Slave | | | | | | | |
| Address | Function Code (Read) | Byte Count | Data1 MSB | Data1 LSB | CRC16 LSB | CRC16 MSB | |
| 0x61 | 0x03 | 0x02 | 0x00 | 0x01 | 0x8C | 0xDD | |

00 : Status register not ready; 01: Status register ready.

3. Read version number

| Query Message from Master (Read) | | | | | | | |
|----------------------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-----------|-----------|
| Address | Function Code (Read) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB |
| 0x61 | 0x03 | 0x00 | 0x88 | 0x00 | 0x01 | 0x0D | 0x80 |
| Response Message from Slave | | | | | | | |
| Address | Function Code (Read) | Byte Count | Data1 MSB | Data1 LSB | CRC16 LSB | CRC16 MSB | |
| 0x61 | 0x03 | 0x02 | 0x01 | 0x02 | 0xB8 | 0x1D | |

4. Read data

| Query Message from Master (Read) | | | | | | | | | |
|---|----------------------|---------------------|---------------------|--------------------|--------------------|------------|-------------|-------------|-------------|
| Address | Function Code (Read) | Starting Address Hi | Starting Address Lo | No.of Registers Hi | No.of Registers Lo | CRC16 LSB | CRC16 MSB | | |
| 0x61 | 0x03 | 0x00 | 0x28 | 0x00 | 0x06 | 0x4C | 0x60 | | |
| Response Message from Slave (CO2: 439ppm, Temperature: 27.2°C, Humidity: 48.8%) | | | | | | | | | |
| Address | Function Code (Read) | Byte Count | CO2_Hi MSB | CO2_Hi LSB | CO2_Lo MSB | CO2_Lo LSB | Temp_Hi MSB | Temp_Hi LSB | Temp_Lo MSB |
| 0x61 | 0x03 | 0x0C | 0x43 | 0xDB | 0x8C | 0x2E | 0x41 | 0xD9 | 0xE7 |
| Temp_Lo LSB | Hum_Hi MSB | Hum_Hi LSB | Hum_Lo MSB | Hum_Lo LSB | CRC16 LSB | CRC16 MSB | | | |
| 0x2E | 0x42 | 0x43 | 0x3A | 0x1B | 0x50 | 0x07 | | | |