

HSCD Series

Carbon Dioxide Sensor

Honeywell HSCD series carbon dioxide (CO₂) sensors include two types: indoor installation and duct installation. They are mainly used for detecting carbon dioxide concentration in air of indoor and duct.

Features

- Use high-precision single/dual-wavelength NDIR sensors.
- Optional display function, LCD digital display shows clearly.
- CO₂ sensing component module can be replaced on site.
- Multiple software and hardware protection design ensures high stability.
- CO₂ sensors can be manually calibrated on site.
- The air duct type adopts a screw-free clamshell snap-on design, making wiring and commissioning easy.
- Integrated RS485 matching resistor to facilitate on-site commissioning (Modbus models only).
- RS485 isolation design can isolate high voltage and enhance immunity to ground loops and common-mode signal interference (Modbus models only).

Order Information and Technical Specification

| SKU | Installation | Sensing component | Output signal or Protocol | Display |
|-----------|--------------|------------------------|---------------------------|---------|
| HSCD-R1U | Room | Single wavelength NDIR | 0-10V/2-10V//4-20mA | NO |
| HSCD-R1UL | Room | Single wavelength NDIR | 0-10V/2-10V//4-20mA | YES |
| HSCD-R2U | Room | Dual wavelength NDIR | 0-10V/2-10V//4-20mA | NO |
| HSCD-R2UL | Room | Dual wavelength NDIR | 0-10V/2-10V//4-20mA | YES |
| HSCD-R2M | Room | Dual wavelength NDIR | Modbus RTU | NO |
| HSCD-R2ML | Room | Dual wavelength NDIR | Modbus RTU | YES |
| HSCD-D1U | Duct | Single wavelength NDIR | 0-10V/2-10V//4-20mA | NO |
| HSCD-D1UL | Duct | Single wavelength NDIR | 0-10V/2-10V//4-20mA | YES |
| HSCD-D2U | Duct | Dual wavelength NDIR | 0-10V/2-10V//4-20mA | NO |
| HSCD-D2UL | Duct | Dual wavelength NDIR | 0-10V/2-10V//4-20mA | YES |
| HSCD-D2M | Duct | Dual wavelength NDIR | Modbus RTU | NO |
| HSCD-D2ML | Duct | Dual wavelength NDIR | Modbus RTU | YES |



Basic Parameters

| | |
|--|--|
| CO ₂ Measurement principle | Single Wavelength NDIR: Single Wavelength non-dispersive infrared Dual Wavelength NDIR: Dual Wavelength non-dispersive infrared |
| Sensor Accuracy* (@ 25°C) | Single Wavelength NDIR: ±40PPM ±3% of measuring value Dual Wavelength NDIR: ±30PPM ±3% of measuring value |
| Repeatability | ±20PPM ± 1% of measuring value |
| Temperature Dependence | ± 2.5 PPM / K (Dual Wavelength NDIR) |
| Display Resolution | 1 PPM |
| Responding Time (T63) | A. Sensing Module Responding Time: Single Wavelength NDIR: ≤30S Dual Wavelength NDIR: ≤20S B. Whole Unit Responding Time (Typically): Room Installation Type Single Wavelength NDIR: ≤75S Dual Wavelength NDIR: ≤45S Duct Installation type (air flowrate=4 m/s) Single Wavelength NDIR: ≤60S Dual Wavelength NDIR: ≤50S |
| Warm-up Time | Single Wavelength NDIR: ≤ 60 S Dual Wavelength NDIR: ≤ 120 S |
| Power Supply | 19.2~35VDC SELV; 24VAC ± 20% 50/60Hz Class 2 |
| Power Consumption | ≤ 3VA |
| Analog Output Load | 0-10V / 2-10V : Min 5 KΩ 4-20mA: Max 500 Ω |
| Analog Output Resolution | 0-10V / 2-10V : 10mV 4-20mA: 0.02mA |
| Analog Output Conversion Accuracy | 0-10V / 2-10V : ± (20mV+2% Output Value) 4-20mA: ± (0.3mA+2% Output Value) |
| Measuring Range | 0 to 9999 PPM |
| Measurement Range with Guaranteed Accuracy | 400 to 2000 PPM |
| Analog Output Range | 0 to 2000 PPM |
| Number of connected Modbus RTU devices | A maximum of 64 devices can be connected to a single network segment |
| Operation Environment | Single Wavelength NDIR: 0 °C to 50 °C , 0 to 85 %RH (Non-condensing) Dual Wavelength NDIR: 0°C to 50 °C , 0 to 95 %RH (Non-condensing) |
| Storage Environment | Single Wavelength NDIR: -20 °C to 50 °C , 0 to 85 %RH (Non-condensing) Dual Wavelength NDIR: -20 °C to 50 °C , 0 to 95 %RH (Non-condensing) |
| Protection Standard (GB4208/IEC60529) | Duct Installation type: IP65/NEMA 4; IP20 for probe Room Installation Type: IP30 |
| Sensor Coverage Area* | 100m ² (Typically) for indoor installation models starting with HSCD-R. |
| Automatic Self-Calibration Function | Available (On by default) |
| Calibration-free Service Life | 10 Years (ACS function enabled) |
| Housing Materials | PC (UL94-V0) |
| Electromagnetic compatibility (Applications) | EN IEC 61326-1:2021 For use in residential, commercial and light-industrial environments. |
| Certification | CE (EN IEC 61326-1:2021); EU RoHS (with reference to RoHS Directive (EU) 2015/865 amending 2011/65/EU) |

* Guidelines for the placement of CO₂ are based on the reasonable delay for gas to get from the source to the sensor. The coverage area of any CO₂ Sensor does not extend beyond any obstruction that impedes the natural circulation of air. This includes walls, stairs, elevators, shelving with solid fill, tool chests, etc. If there is any conflict between the above statement and local laws and regulations, local laws and regulations shall prevail.

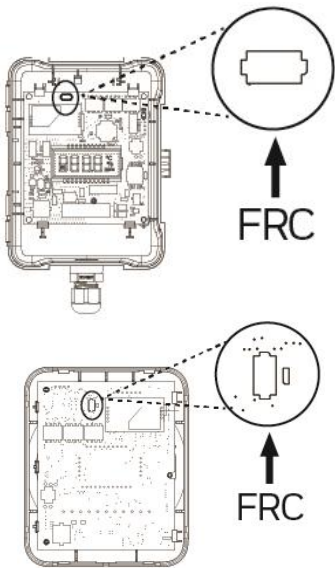
Note:

1. The carbon dioxide sensor is an optical sensor based on the infrared detection principle, so the accuracy of the sensor will deviate under continuous vibration.
2. The carbon dioxide sensor is a precision device. After handling, transportation and installation, the sensing accuracy may deviate. It will return to normal after being powered on for at least 7 days.

Function & Setting

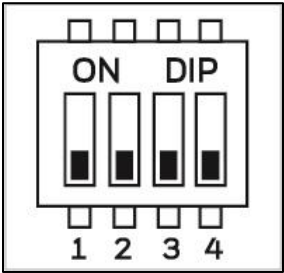
1. User manual forced re-calibration (FRC) operation

- 1) Power on the Sensor product and place it in an outdoor atmospheric environment or a 400PPM carbon dioxide standard gas environment. The product needs to be covered to avoid sunlight and strong winds;
- 2) Anti-static measures need to be taken, long press the button (FRC) on the PCB board for 4 seconds;
- 3) For products without an LCD version, the LED will flash slowly, on for 2 seconds and off for 2 seconds (indicating that it is being calibrated); for products with an LCD version, "CALI" will be displayed as shown on the right.
- 4) The stability of the ambient carbon dioxide concentration must be maintained during the calibration process. The calibration ends automatically after 11 minutes and the product returns to normal operation.



2. DIP setting

A. Analog output type

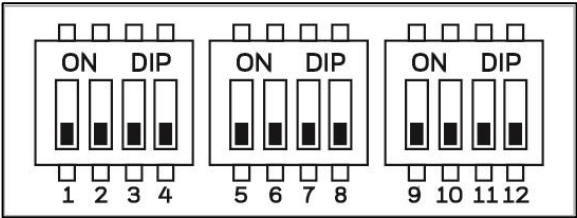


| | | | |
|----------|----------------------------------|--|----------------------|
| DIP No. | No. 1 | | No.2 & No.3 |
| Function | Automatic Self-Calibration (ASC) | | Analog output option |

| | | |
|----------------------------------|------------------|---------|
| Set status of ASC: DIP NO.1 | | |
| DIP Position | | |
| Automatic Self-Calibration (ASC) | Enable (Default) | Disable |

| | | | |
|---|------------------|-------|-------|
| Select analog output signal type: DIP No.2 and No.3 | | | |
| DIPs position | | | |
| Analog output | 4-20mA (Default) | 0-10V | 2-10V |

B . Modbus Communication Type

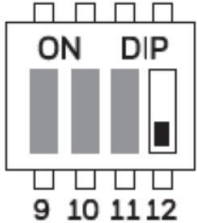
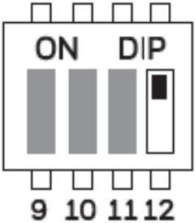


| | | | | | |
|----------|-------|------------------|----------------|----------|-------------------------|
| DIP No. | No. 1 | No.2 & No.3 | No.4 to No.10 | No.11 | No.12 |
| Function | ASC | Modbus Baud Rate | Modbus Address | Reserved | RS485 Terminal Resistor |

| | | |
|----------------------------------|------------------|---------|
| Set the mode of ASC: DIP NO.1 | | |
| DIP Position | | |
| Automatic Self-Calibration (ASC) | Enable (Default) | Disable |

| | | | | |
|---|----------------|------|-------|-------|
| Set Modbus baud rate: DIP No.2 and No.3 | | | | |
| DIPs Position | | | | |
| Baud rate | 9600 (Default) | 4800 | 19200 | 38400 |

| | |
|---------------------------------------|---|
| Set Modbus address: DIP No.4 to No.10 | |
| DIPs Position | |
| How to set Modbus address | <p>1. DIPs No.4 to No.10 represent 1, 2, 4, 8, 16, 32 and 64 respectively.</p> <p>2. DIPs up to indicate selected number</p> <p>3. The sum of the selected numbers is the Modbus address code.</p> <p>As shown in the picture above: DIP No.8 and No.9 are selected, 16+32=48, so the address code setting value is 48.</p> |

| Set the mode of RS485 terminal resistor: DIP No.12 | | |
|--|---|---|
| DIP Position |  |  |
| Mode | Enable (Default) | Disable |

Modbus RTU Protocol

Register Address Information

| ID | ID function | Function | Qty. | Readable (R) /Writable (W) | Data Type |
|------|-------------------|---|------|----------------------------|-----------|
| 0x01 | Gas Concentration | Current gas concentration Unit: PPM | 1 | R | short |
| 0x02 | Reserved | | 1 | R | short |
| 0x03 | Reserved | | 1 | R | short |
| 0x04 | ASC Status | ASC status, 0-Disable; 1-Enable | 1 | R | short |
| 0x05 | FRC Target Value | FRC Target Value Unit: PPM 400ppm) | 1 | R/W | short |
| | | Modify FRC Value by writing to this ID (Rang is 400 to 1000ppm) | | | |
| 0x06 | Reserved | | 1 | R | short |
| 0x07 | Reserved | | 1 | R | short |
| 0x08 | Reserved | | 1 | R | short |
| 0x09 | Error Code | 0=Normal; 1=Sensor Error; 2=System Error | 1 | R | short |

Function Code Information

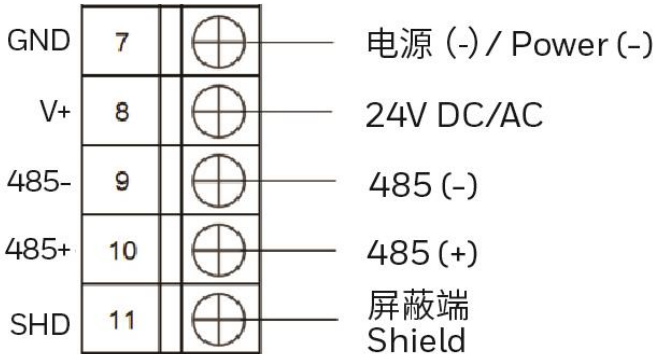
| Code | Function | Error Code | Exception Code |
|------|--------------------------|------------|----------------|
| 0x03 | Read holding register | 0x83 | 01 or 02 or 03 |
| 0x06 | Write single register | 0x86 | 01 or 02 or 03 |
| 0x10 | Write Multiple Registers | 0x90 | 01 or 02 or 03 |

Wiring diagrams and instructions

0-10V/2-10/4-20mA Analog Output Type



Modbus Communication Type



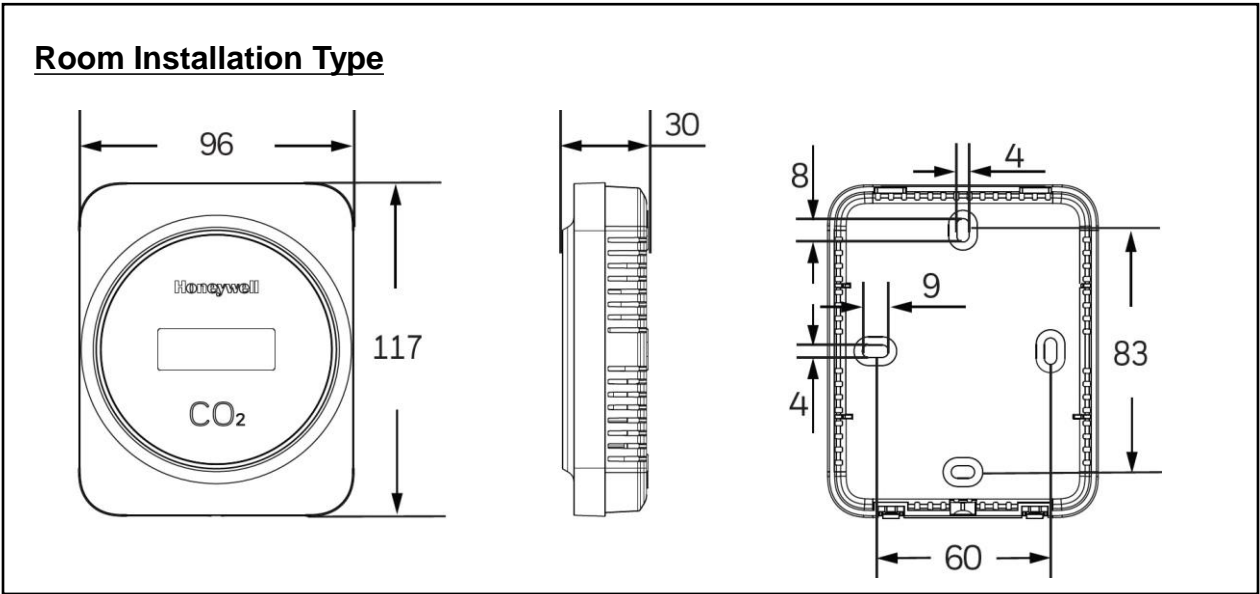
Tips:

- 1. The terminals support AWG15 to AWG22 line types.
- 2. The maximum lengths of different conductors are as follows.

| Line Type | AWG15 | AWG16 | AWG17 | AWG18 | AWG20 | AWG22 |
|------------|------------|------------|------------|------------|------------|-----------|
| Max length | 300 Meters | 300 Meters | 150 Meters | 150 Meters | 150 Meters | 50 Meters |

- 3. RS485 wiring requires a shielded cable with a maximum allowable length of 1200 meters.

Dimension (mm)



Dimension (mm)

Duct Installation Type

