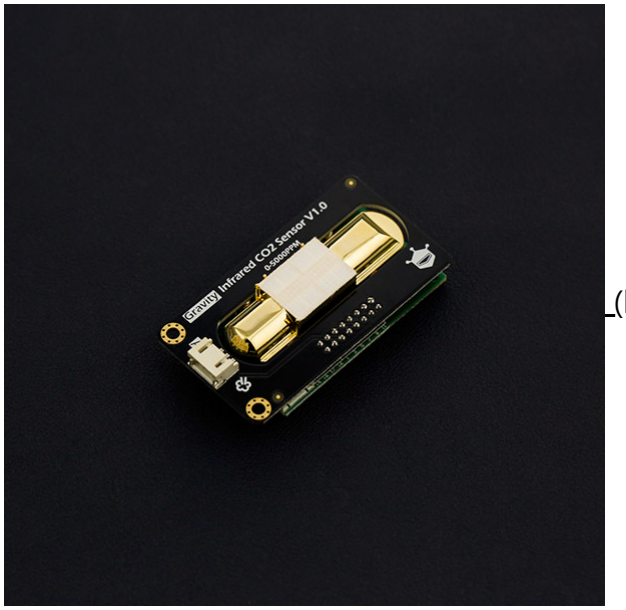


(https://www.dfrobot.com/product-1549.html)

Introduction

DFRobot released its latest high-precision analog infrared CO2 sensor. The effective measuring range is from 0 to 5000ppm. This sensor is based on non-dispersive infrared (NDIR (https://en.wikipedia.org/wiki/Nondispersive_infrared_sensor)) technology and has good selectivity and oxygen-free dependency. Additionally, its service life is up to 5 years! It integrates temperature compensation and supports DAC output. Most importantly, the product is easy to use and is compatible with all types of microcontrollers with ADC function. In addition, this product is a high-performance sensor that combines technology of mature infrared absorption gas detection with precision optical circuit design, as well as sophisticated circuit design. It has characteristics such as high sensitivity, high resolution, low power consumption, fast response, anti-water vapor interference, no poisoning, high stability and long life. This sensor is directly compatible with the DFRobot Arduino IO expansion board thanks to its external DFRobot Gravity interface. This characterizes the simplicity of use of the sensor since it is plug and play and does not need additional wiring. This product could be widely used in HVAC, indoor air quality monitoring, industrial process and security protection monitoring, agriculture and animal husbandry production process monitoring.

Feature

- Waterproof and anti-corrosion
- High sensitivity
- Low power consumption
- Excellent stability

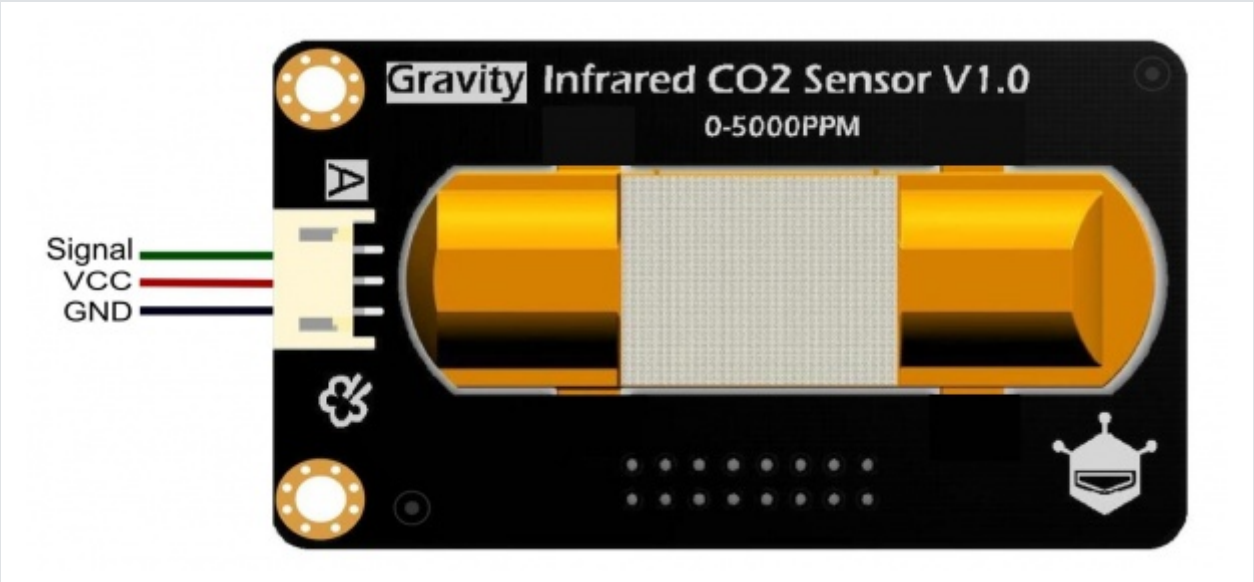
- Temperature compensation
- Excellent linear output
- High cycle life

- Anti-water vapor interference
- No poisoning

Specification

- Gas Detection: Carbon Dioxide (CO2)
- Operating Voltage: 4.5 ~ 5.5V DC
- Average Current: <60mA @ 5V
- Peak Current: 150mA @ 5V
- Output Signal: Analog output (0.4 ~ 2V)
- Measuring Range: 0 ~ 5000ppm
- Accuracy: ± (50ppm 3% reading)
- Preheating Time: 3min
- Response Time: 120s
- Operating Temperature: 0 ~ 50 ℃
- Operating Humidity: 0 ~ 95% RH (no condensation)
- Service Life: >5 years
- Size: 37mm * 69mm

Board Overview



Num	Label	Description
1	Signal	Analog Output (0.4~2V)

Num	Label	Description
2	VCC	VCC (4.5~5.5V)
3	GND	GND

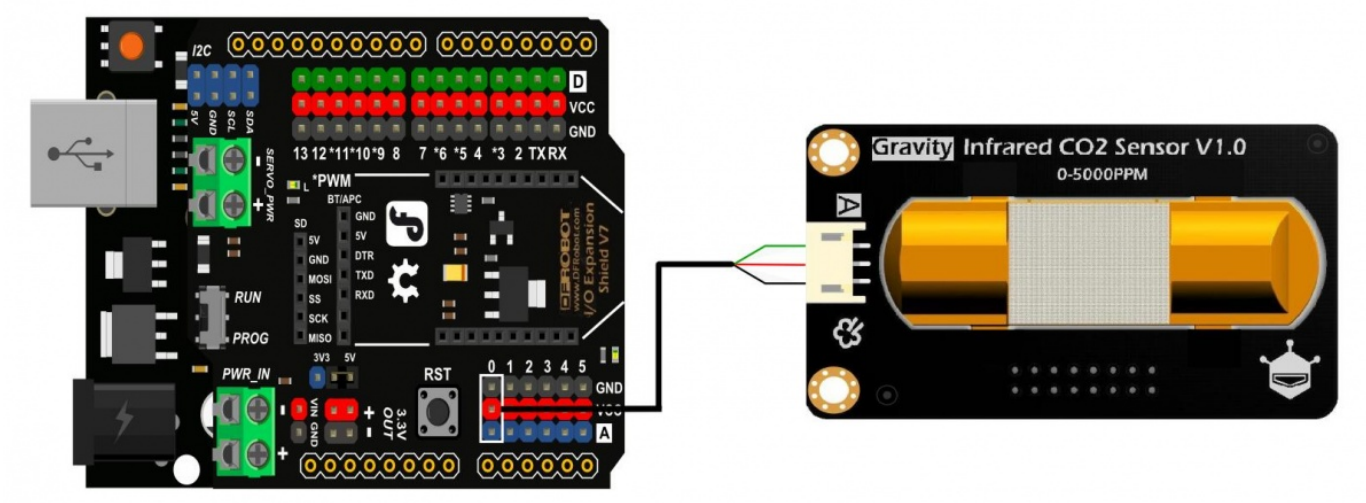
Tutorial

In this tutorial, we'll show you how to use DFRobot Infrared Sensor within 5 minutes.

Requirements

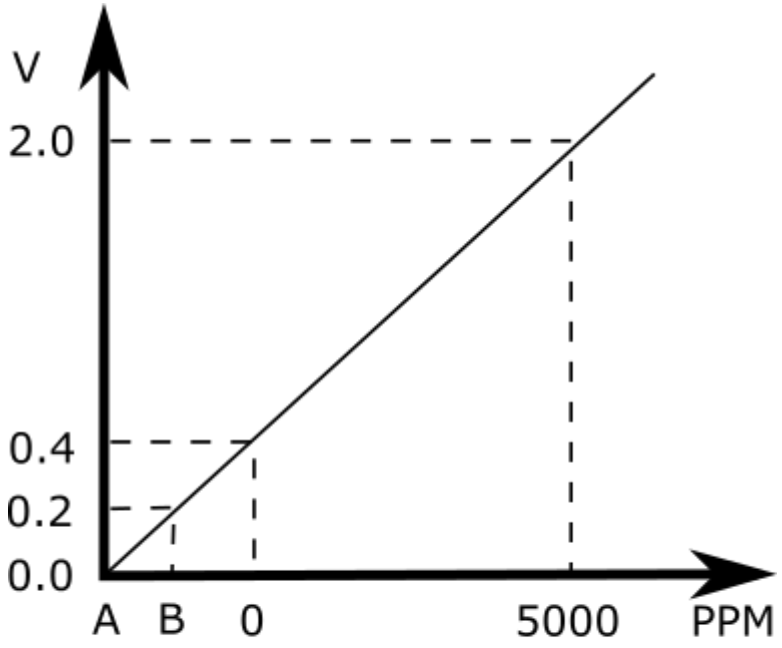
- **Hardware**
  - DFRduino UNO (https://www.dfrobot.com/product-838.html) x 1
  - DFRobot Gravity: Infrared CO2 Sensor (https://www.dfrobot.com/product-1549.html)
  - Gravity: IO Expansion Shield for Arduino V7.1 (https://www.dfrobot.com/product-1009.html)
- **Software**
  - Arduino IDE Click to Download Arduino IDE from Arduino® (https://www.arduino.cc/en/Main/Software)

Connection Diagram



Data Analysis

When the IR CO2 sensor get 5V power supply, it will output 0.4~~2V analog value, corresponding to 0~~5000 ppm; And when the sensor finds faults during the self-checking process, it will output 0V.



A: Fault

B: Preheat

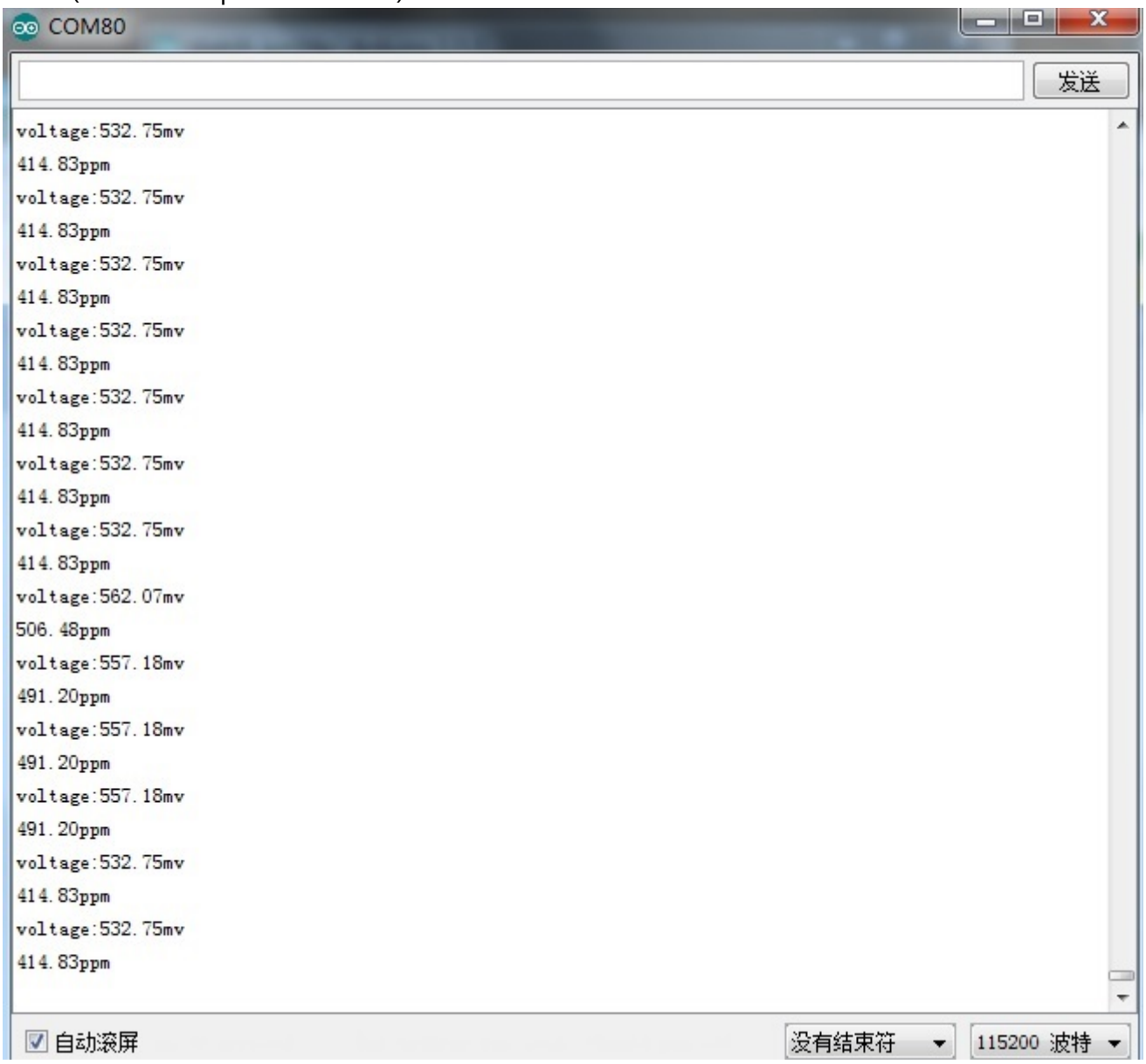
Sample Code

```
/*************************************************
 * Infrared CO2 Sensor0-5000ppm
 * ***********************************************
 * This example The sensors detect CO2
 *
 * @author lg.gang(lg.gang@qq.com)
 * @version  V1.0
 * @date  2016-7-6
 *
 * GNU Lesser General Public License.
 * See <http://www.gnu.org/licenses/> for details.
 * All above must be included in any redistribution
 * ***********************************************/
int sensorIn = A0;

void setup(){
  Serial.begin(9600);
  // Set the default voltage of the reference voltage
  analogReference(DEFAULT);
}

void loop(){
  //Read voltage
  int sensorValue = analogRead(sensorIn);

  // The analog signal is converted to a voltage
  float voltage = sensorValue*(5000/1024.0);
  if(voltage == 0)
  {
    Serial.println("Fault");
  }
  else if(voltage < 400)
  {
    Serial.println("preheating");
  }
  else
  {
    int voltage_diference=voltage-400;
    float concentration=voltage_diference*50.0/16.0;
    // Print Voltage
    Serial.print("voltage:");
    Serial.print(voltage);
    Serial.println("mv");
    //Print CO2 concentration
    Serial.print(concentration);
    Serial.println("ppm");
  }
  delay(100);
```

```
}
```

Expected Results

Open your IDE serial monitor and wait for 3 minutes (preheat process), then you'll see the finial data. (Indoor Temperature: 30℃)



FAQ

Q. Can I use the CO2 sensor with 3.3V microcontroller?

A. Yes, but you need to power the C02 sensor with 5V power supply seperately, and change the conversion formula * *float voltage = sensorValue*\(3300/1024.0)**

Q. How do I calibrate?

A. The sensor should be calibrated regularly. The cycle time should be no more than 6 months. Manual calibration of zero point is to calibrate the sensor's HD pin input low level (0V) to calibrate the zero point, and the low level shall last more than 7 seconds.The

(0V) to calibrate the zero point, and the low level shall last more than 7 seconds.The calibration of zero point is 400 ppm, Please ensure that the sensor is stable for more than 20 minutes at 400ppm.

Q. How do I calibrate?

For any questions, advice or cool ideas to share, please visit the DFRobot Forum (https://www.dfrobot.com/forum/).

More Documents

Shopping from <**Gravity: Analog Infrared CO2 Sensor For Arduino** (https://www.dfrobot.com/product-1549.html) or **DFRobot Distributor**. (https://www.dfrobot.com/index.php?route=information/distributorslogo)

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