Gravity Arduino Analog Karbondioksit Sensörü (CO2) - DFRobot

CO2 Sensor (Arduino compatiable) SKU:SEN0159

Contents

[hide]

Introduction

"Greenhouse Effect" is melting the iceberg every minute,. By knowing the exact concentration of CO2, we can do something to reduce the CO2 and to protect our earth. For that reason, a High quality CO2 sensor is designed by DFRobot eningeer . This is the first **CO2 sensor** in opensource hardware market. The output voltage of the module falls as the concentration of the CO2 increases. The potentiometer onboard is designed to set the threshold of voltage. Once the CO2 concentration is high enough (voltage is lower than threshold), a digital signal (ON/OFF) will be released.

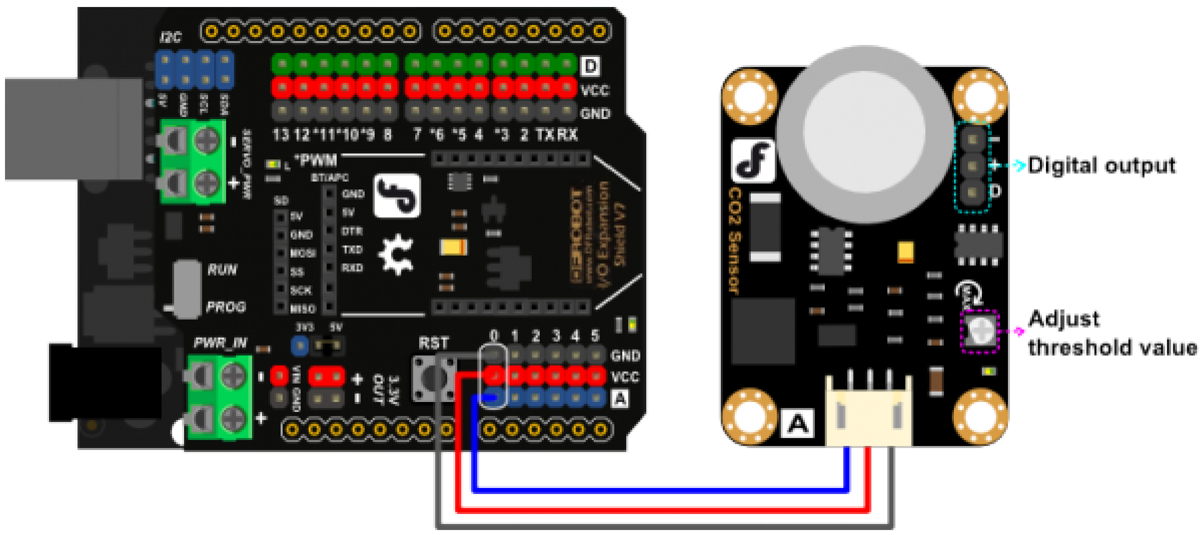
- It has MG-811 gas sensor onboard which is highly sensitive to CO2 and less sensitive to alcohol and CO, Low humidity&temperature dependency. All components have industrial quality which means stability and reproducibility.
- Onboard heating circuit brings the best temperature for sensor to function. 5V power input will be boosted to 6V for heating.
- This sensor has an onboard conditioning circuit for amplifying output signal.

- External power supply (7~12V) is necessary to supply the microcontroller board when you using this CO2 sensor module.
-
- This module is an electrochemical sensor, you need to calibrate it before actual measurement.

Specification

- Operating voltage:5V
- Interface:Analog
- One digital output
- High quality connector
- Immersion gold surface
- Onboard heating circuit
- Size:32x42mm

Connecting Diagram



Tutorial

How to use this module?

It is very easy.

You need to set potentiometer onboard to the threshold value. Just make the red led turn off. With the CO2 concentration is enough high to make the sensor output voltage higher than threshold value,the led will be turned on. If you connect a buzzer to the module(right side), you will hear the alarm.

Calibration

This module is an electrochemistry sensor, you should calibrate it before actual measurement.

You should provide stable power to this module, and the sensor will heating while working. Please put this module into the area where the air is clean. After continuous working about 48 hours, you can measure the output voltage of this module. Then modify the defination in the code with the voltage value(unit:V) divide by 8.5.

```
#define         ZERO_POINT_VOLTAGE           (voltage/8.5)
```

Sample code

```
/*******************Demo for MG-811 Gas Sensor Module
V1.1*****************************
Author:  Tiequan Shao: tiequan.shao@sandboxelectronics.com
         Peng Wei:     peng.wei@sandboxelectronics.com

Lisence: Attribution-NonCommercial-ShareAlike 3.0 Unported (CC BY-NC-SA 3.0)

Note:    This piece of source code is supposed to be used as a demostration ONLY. More
         sophisticated calibration is required for industrial field application.

                                                   Sandbox Electronics    2012-05-31
************************************************************************
*************/

/************************Hardware Related
Macros************************************/
```

```
#define         MG_PIN                       (A0)     //define which analog input channel you
are going to use
#define         BOOL_PIN                       (2)
#define         DC_GAIN                       (8.5)   //define the DC gain of amplifier

/***********************Software Related
Macros************************************/
#define         READ_SAMPLE_INTERVAL         (50)    //define how many samples you are
going to take in normal operation
#define         READ_SAMPLE_TIMES            (5)     //define the time interval(in
milisecond) between each samples in
                                             //normal operation

/**********************Application Related
Macros**********************************/
//These two values differ from sensor to sensor. user should derermine this value.
#define         ZERO_POINT_VOLTAGE           (0.220) //define the output of the sensor in
volts when the concentration of CO2 is 400PPM
#define         REACTION_VOLTGAE            (0.030) //define the voltage drop of the
sensor when move the sensor from air into 1000ppm CO2

/*****************************Globals***********************************************
************/
float           CO2Curve[3]  =
{2.602,ZERO_POINT_VOLTAGE,(REACTION_VOLTGAE/(2.602-3))};
                                             //two points are taken from the curve.
                                             //with these two points, a line is formed which is
                                             //"approximately equivalent" to the original curve.
                                             //data format:{ x, y, slope}; point1: (lg400,
0.324), point2: (lg4000, 0.280)
                                             //slope = ( reaction voltage ) / (log400 –log1000)

void setup()
{
    Serial.begin(9600);                              //UART setup, baudrate = 9600bps
    pinMode(BOOL_PIN, INPUT);                        //set pin to input
    digitalWrite(BOOL_PIN, HIGH);                    //turn on pullup resistors

   Serial.print("MG-811 Demostration\n");
}
```

```
void loop()
{
    int percentage;
    float volts;

    volts = MGRead(MG_PIN);
    Serial.print( "SEN0159:" );
    Serial.print(volts);
    Serial.print( "V           " );

    percentage = MGGetPercentage(volts,CO2Curve);
    Serial.print("CO2:");
    if (percentage == -1) {
        Serial.print( "<400" );
    } else {
        Serial.print(percentage);
    }

    Serial.print( "ppm" );
    Serial.print("\n");

    if (digitalRead(BOOL_PIN) ){
        Serial.print( "=====BOOL is HIGH======" );
    } else {
        Serial.print( "=====BOOL is LOW======" );
    }

    Serial.print("\n");

    delay(500);
}

/******************************  MGRead
*********************************************
Input:   mg_pin - analog channel
Output:  output of SEN-000007
Remarks: This function reads the output of SEN-000007
***********************************************************************
*************/
```

```
float MGRead(int mg_pin)
{
    int i;
    float v=0;

    for (i=0;i<READ_SAMPLE_TIMES;i++) {
        v += analogRead(mg_pin);
        delay(READ_SAMPLE_INTERVAL);
    }
    v = (v/READ_SAMPLE_TIMES) *5/1024 ;
    return v;
}

/*****************************  MQGetPercentage
**********************************
Input:   volts   - SEN-000007 output measured in volts
         pcurve  - pointer to the curve of the target gas
Output:  ppm of the target gas
Remarks: By using the slope and a point of the line. The x(logarithmic value of ppm)
         of the line could be derived if y(MG-811 output) is provided. As it is a
         logarithmic coordinate, power of 10 is used to convert the result to
non-logarithmic
         value.
************************************************************************
*************/
int  MGGetPercentage(float volts, float *pcurve)
{
   if ((volts/DC_GAIN )>=ZERO_POINT_VOLTAGE) {
      return -1;
   } else {
      return pow(10, ((volts/DC_GAIN)-pcurve[1])/pcurve[2]+pcurve[0]);
   }
}
```