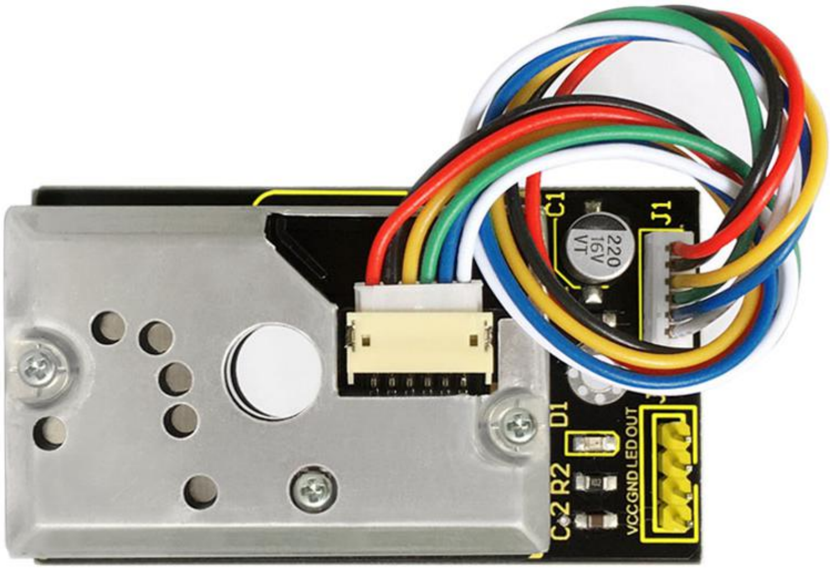
KS0196 keyestudio PM2.5 Shield



1. Introduction

Dust Sensor based on Sharp optics works well in detecting very delicate particle, like cigarette smoke, is a commonly used system of air purifier.

This device contains IR LED and photoeletric transistor. Arranging them with across corners can detect the reflected light of dust in the air. It has a ultra-low power consumption(Max at 20mA, Typical at 11mA), and can be equipped with sensors up to 7VDC. Analog voltage is proportional to measured concentration of dust, and sensitivity is 0.5V/0.1mg/m3.

2. Technological Parameters

Power Voltage: 5-7V

Working Temperature: -10 to 65 ℃

Current Consumption: Max 20mA

Detecting Value of Minimum Particle: 0.8μ

Sensitivity: 0.5V/(0.1mg/m3)

Voltage of Cleaning Air: 0.9V(Typical)

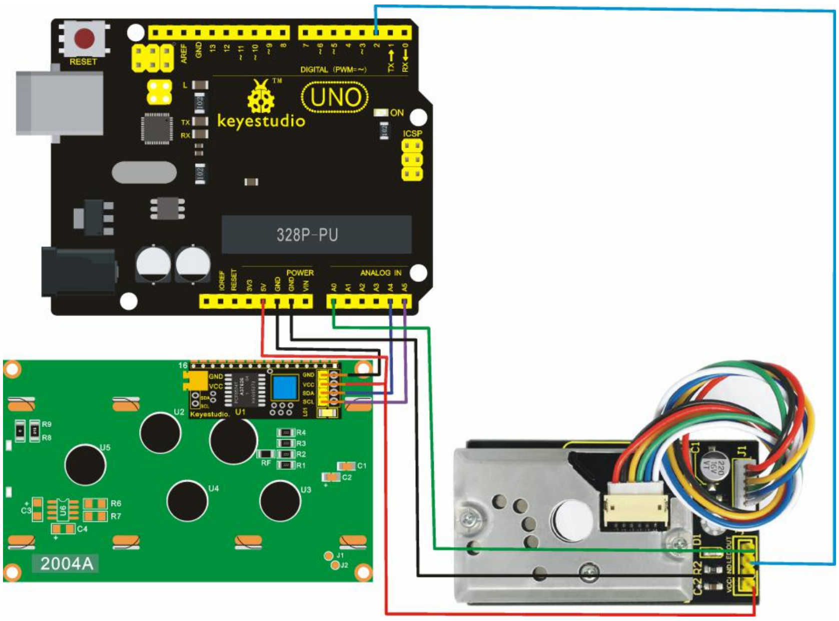
Storage Temperature: -20~80℃

Service Life: 5 Years

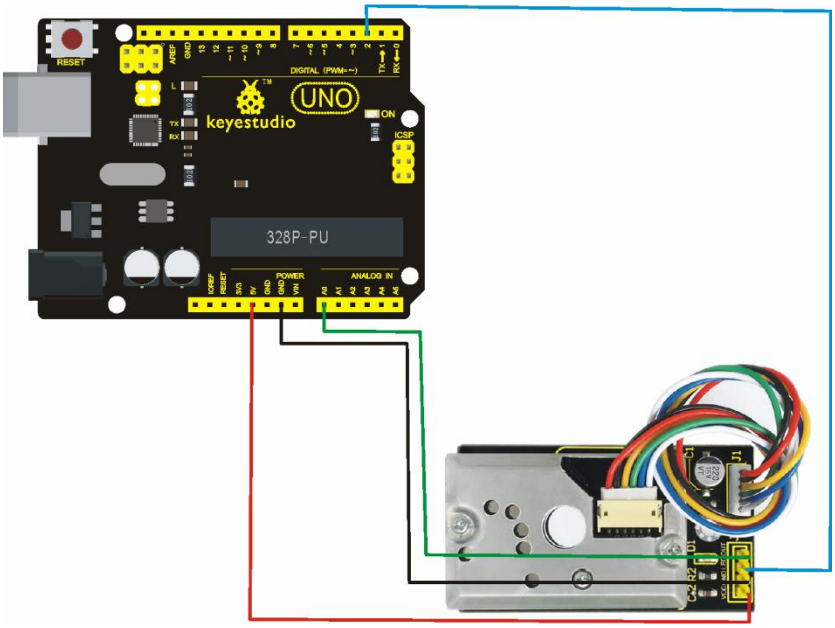
Size:62mm×32mm×20mm

3. Connection Diagram

Project 1:



Project 2:



4. Codes

Project 1: The following are sample codes showed by official; when using, just modify a little according to the below codes.

```
********************************************************************************
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27,20,4);  // set the LCD address to 0x27 for a 16 chars
and 2 line display
int measurePin = 0; //Connect dust sensor to Arduino A0 pin
int ledPower = 2;   //Connect 3 led driver pins of dust sensor to Arduino D2
int samplingTime = 280;
int deltaTime = 40;
int sleepTime = 9680;
float voMeasured = 0;
float calcVoltage = 0;
float dustDensity = 0;
void setup(){
  lcd.init();                      // initialize the lcd
  lcd.init();
  // Print a message to the LCD.
  lcd.backlight();
  lcd.setCursor(0,0);
  lcd.print("Raw Signal Value: ");
  lcd.setCursor(0,2);
  lcd.print("Voltage:");
  lcd.setCursor(0,3);
  lcd.print("Dust Density:");
  pinMode(ledPower,OUTPUT);
}
void loop(){
  digitalWrite(ledPower,LOW); // power on the LED
  delayMicroseconds(samplingTime);
  voMeasured = analogRead(measurePin); // read the dust value
  delayMicroseconds(deltaTime);
  digitalWrite(ledPower,HIGH); // turn the LED off
  delayMicroseconds(sleepTime);
  // 0 - 5V mapped to 0 - 1023 integer values
  // recover voltage
  calcVoltage = voMeasured * (5.0 / 1024.0);
  // linear eqaution taken from http://www.howmuchsnow.com/arduino/airquality/
  // Chris Nafis (c) 2012
  dustDensity = 0.17 * calcVoltage - 0.1;
  lcd.setCursor(1,1);
  lcd.print(voMeasured);
  lcd.setCursor(9,2);
  lcd.print(calcVoltage);
  lcd.setCursor(14,3);
  lcd.print(dustDensity);
  delay(1000);
}
```

****

Project 2: Now, use testing codes.

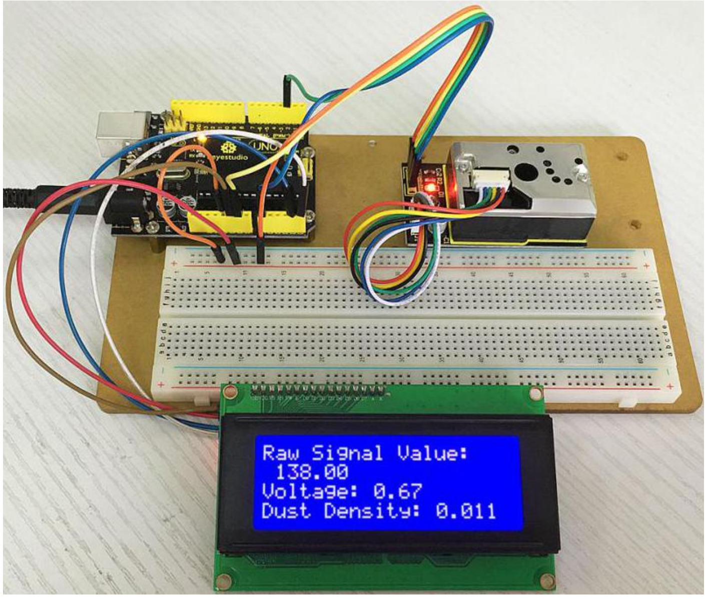
****

```
int dustPin=0;
float dustVal=0;
int ledPower=2;
int delayTime=280;
int delayTime2=40;
float offTime=9680;

void setup(){
Serial.begin(9600);
pinMode(ledPower,OUTPUT);
pinMode(dustPin, INPUT);
}

void loop(){
// ledPower is any digital pin on the arduino connected to Pin 2 on the sensor
digitalWrite(ledPower,LOW);
delayMicroseconds(delayTime);
dustVal=analogRead(dustPin);
delayMicroseconds(delayTime2);
digitalWrite(ledPower,HIGH);
delayMicroseconds(offTime);

delay(1000);
if (dustVal>36.455)
Serial.println((float(dustVal/1024)-0.0356)*120000*0.035);
}
```

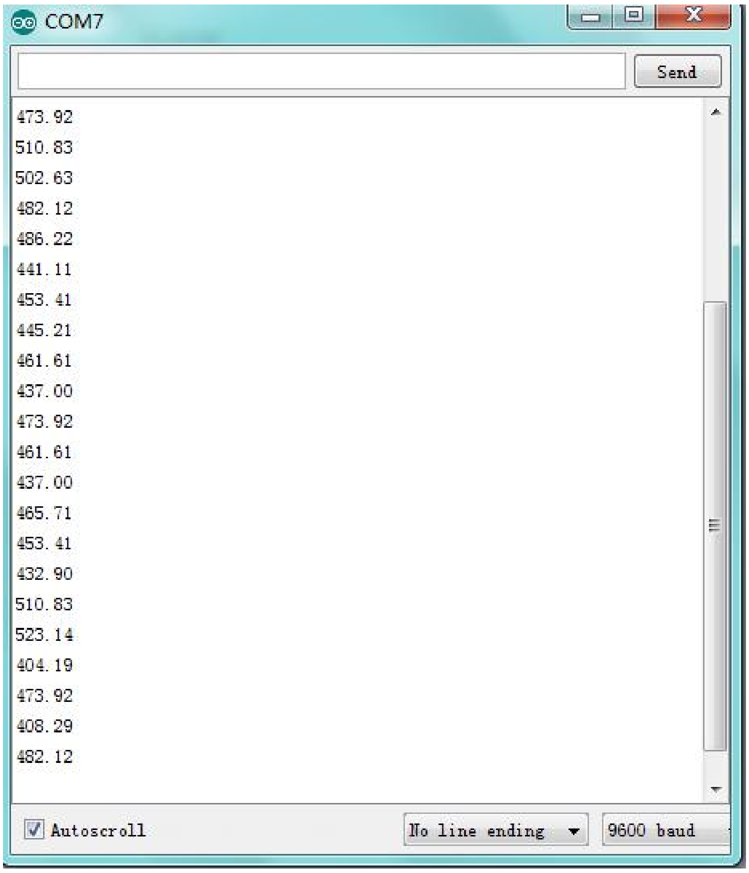
****

5. Result

Result of Project 1 shown as below.



Result of Project 2: Open serial monitor, displaying as the following figure.



```
473.92
510.83
502.63
482.12
486.22
441.11
453.41
445.21
461.61
437.00
473.92
461.61
437.00
465.71
453.41
432.90
510.83
523.14
404.19
473.92
408.29
482.12
```

☑ Autoscroll   No line ending   9600 baud

Data compared to air quality:

3000 + = Very Bad

1050-3000 = Bad

300-1050 = Ordinary

150-300 = Good

75-150 = Very Good

0-75 = Tiptop