PROJECT WORK 2

Gas leak alarm system

Give your next Arduino project a nose for gases by including the MQ2 gas sensor module. It is a versatile sensor that can detect gas/smoke concentrations in the air.

The MQ2 Gas Sensor Module is an excellent choice for building an indoor air quality monitoring system, a breathalyser, or an early fire detection system

Required Component:

- Arduino UNO board
- MQ2 gas/smoke sensor module
- Buzzer
- LED
- Connecting Cable
- Connecting Wires

MQ2 Gas Sensor

The MQ2 sensor is one of the most widely used in the MQ sensor series. It is a **MOS (Metal Oxide Semiconductor) sensor**. Metal oxide sensors are also known as **Chemiresistors** because sensing is based on the change in resistance of the sensing material when exposed to gases.

It can detect LPG, smoke, alcohol, propane, hydrogen, methane and carbon monoxide concentrations ranging from 200 to 10000 ppm. The MQ2 gas sensor operates on **5V DC.** It contains a sensing material whose resistance changes when

it comes in contact with the gas. This change in the value of resistance is used for the detection of gas.

What does the concentration of 1 ppm mean?

Parts-per-million, or ppm for short, is the most commonly used unit for measuring gas concentration. ppm is simply the ratio of one gas to another. For example, 500 ppm of carbon monoxide means that if you could count a million gas molecules, 500 would be carbon monoxide and the remaining 999500 would be other gases.

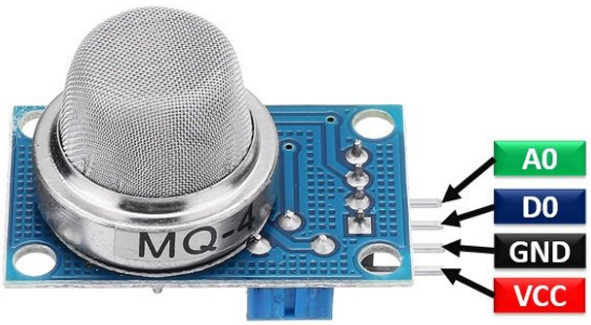
- ➢ Note that the MQ2 gas sensor detects multiple gases, but cannot identify them!
- ➢ The MQ2 is a **heater-driven sensor**. It is therefore covered with two layers of fine stainless steel mesh known as an "**anti-explosion network**". It ensures that the heater element inside the sensor does not cause an explosion because we are sensing flammable gases.

- ➢ The detection is based on the change of resistors of the sensing material, when the gas comes in contact with these materials. The greater the concentration of smoke/gas, the higher is the output voltage and vice versa.
- ➢ The sensor detects the change and sends it to the arduino board through the analog pin.

Technical Specifications:

Operating voltage	5V
Load resistance	20 KΩ
Heater resistance	33Ω ± 5%
Heating consumption	<800mw
Sensing Resistance	10 KΩ – 60 KΩ
Concentration Range	200 – 10000 ppm
Preheat TimeOver	24 hour

MQ2 Gas Sensor Module Pinout



VCC supplies power to the module. Connect it to the 5V output of your Arduino.

GND is the ground pin.

D0 indicates the presence of combustible gases. D0 becomes LOW when the gas concentration exceeds the threshold value (as set by the potentiometer), and HIGH otherwise.

A0 produces an analog output voltage proportional to gas concentration, so a higher concentration results in a higher voltage and a lower concentration results in a lower voltage.

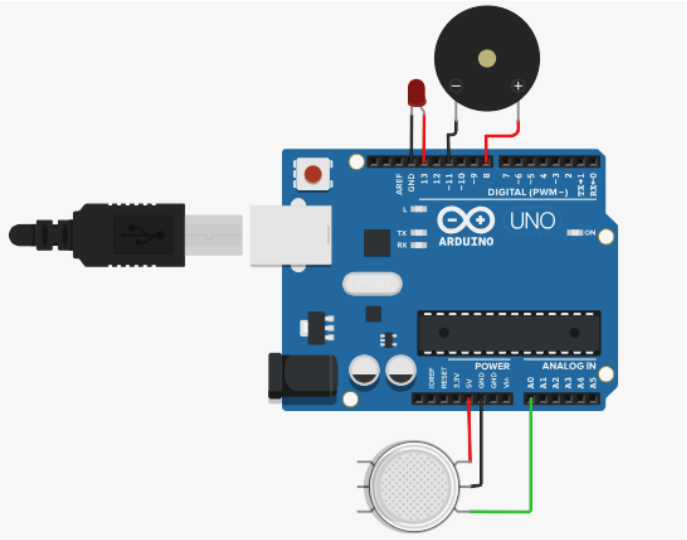
STEPS:

- Connect MQ2 Sensor to the arduino

  Vcc - +5v

  GND - GND

  AO - A0



CODE FOR SENSOR CHECK:

```
void setup() {
  // put your setup code here, to run once:
Serial.begin(9600);
}

void loop() {
  // put your main code here, to run repeatedly:
int sensorValue = analogRead(A0);
Serial.println(sensorValue);
delay(1000);
}
```

- Connect Buzzer and LED to the arduino
- Check the sensor values on arduino IDE
- The value obtained on the serial monitor will be low because there is no smoke/gas. When it detects gas, the value increases.

PROJECT CODE

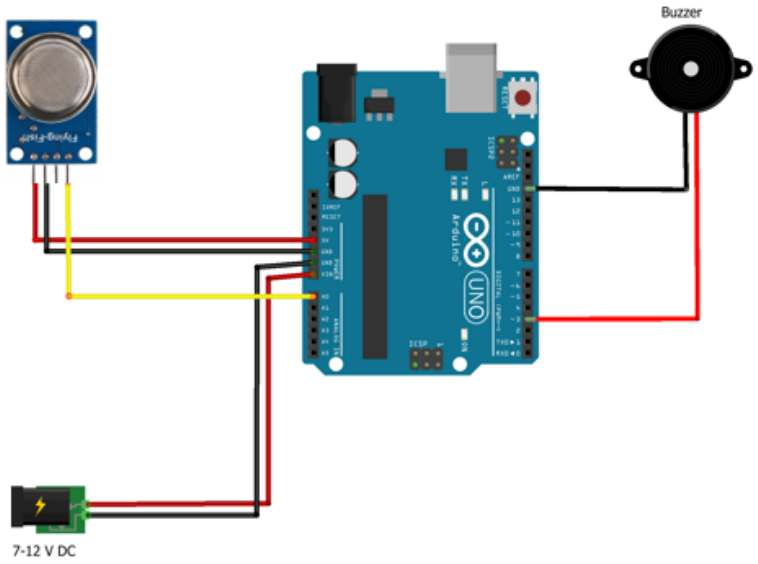
```
//#define BUZZER_PIN 3
#define LED_PIN 13

void setup() {
  // put your setup code here, to run once:
  pinMode(8, OUTPUT);
  pinMode(11, OUTPUT);
  pinMode(LED_PIN, OUTPUT);
  Serial.begin(9600);
}


void loop() {
  // put your main code here, to run repeatedly:
int sensorValue = analogRead(A0);
if(sensorValue >200)
{
  digitalWrite(8, HIGH);
  digitalWrite(11, LOW);
  digitalWrite(LED_PIN, HIGH);
  Serial.print(sensorValue);
  Serial.println("   GAS DETECTED");
  delay(1000);

}
else
{
  analogWrite(8, LOW);
  analogWrite(11, LOW);
  digitalWrite(LED_PIN, LOW);
  Serial.print(sensorValue);
  Serial.println("   NULL");
  delay(1000);
}
//delay(1000);
}
```

ADDITIONAL



Alternate code:

```
#define BUZZER_PIN 3

void setup() {
  // put your setup code here, to run once:
  pinMode(BUZZER_PIN, OUTPUT);

}

void loop() {
  // put your main code here, to run repeatedly:
int sensorValue = analogRead(A0);
if(sensorValue >200)
{
  analogWrite(BUZZER_PIN, 50);
}
else
{
  analogWrite(BUZZER_PIN, 0);
}
delay(1000);
}
```

- Upload the code and disconnect it from the pc/laptop.
- Provide 7-12v supply through Vin.

If using a digital pin use DO pin and connect it on the digital pin (2) on the arduino. If there is gas/smoke the value will be 0, that is low, otherwise it will be 1.

```
#define BUZZER_PIN 3

void setup() {
  // put your setup code here, to run once:
  pinMode(BUZZER_PIN, OUTPUT);

}

void loop() {
  // put your main code here, to run repeatedly:
int sensorValue = analogRead(2);
if(sensorValue == LOW )
{
  analogWrite(BUZZER_PIN, 50);
}
else
{
  analogWrite(BUZZER_PIN, 0);
}
delay(1000);
}
```