

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Experiment 3.1

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Semester: 6th

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Subject Name: IOT LAB

Aim:

Interfacing Air Quality Sensor (MQ135), displays data on LCD

Objectives:

- Learn about interfacing.
- Learn about IoT programming.
- Learn about MQ 135 Air Quality Sensor Module

Components Required:

You will need the following components –

- 1 × Arduino Uno R3
- 1 × MQ 135 Air Quality Sensor Module
- 3 × Jumper

About Air Quality Sensor:

MQ-135 sensor belongs to the MQ series that are used to detect different gasses present in the air. The MQ-135 sensor is used to detect gases such as NH₃, NO_x, alcohol, Benzene, smoke, CO₂, etc. steel exoskeleton houses a sensing device within the gas sensor module.

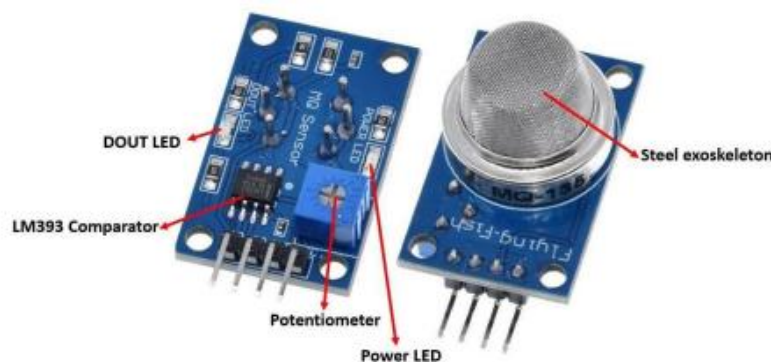


Fig1: MQ-135

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MQ-135 Sensor Pinout:

This sensor has 4 pins:

- 5V: Module power supply – 5 V
- GND: Ground
- DOUT: Digital output
- AOUT: Analog output

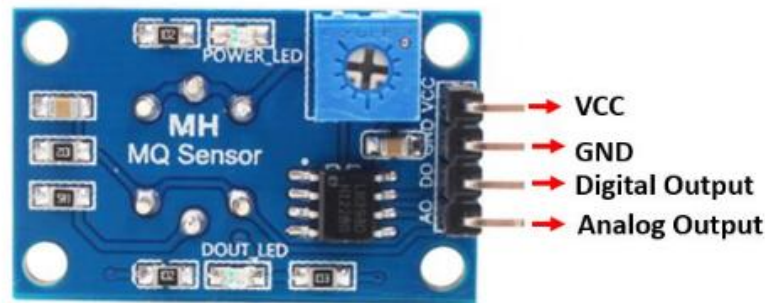


Fig2: MQ-135 pinout

Circuit Diagram:

The MQ-135 sensor module consists of four pins namely VCC, GND, DO, and AO. Below gives a brief description of them.

- Pin Description
- VCC Positive power supply pin that powers up the sensor module.
- GND Reference potential pin.
- AO Analog output pin. It generates a signal proportional to the concentration of gas vapors coming in contact with the sensor.
- DO Digital Output pin. It also produces a digital signal whose limit can be set using the in-built potentiometer.

Follow the following steps to setup the circuit for this experiment:

- Connect MQ-135 sensor's VCC pin with 5V terminal of Arduino UNO. This will power up the sensor.
- Additionally, we will connect the analog pin AO with A0 and DO with Pin 2 of Arduino UNO. Both the devices will be commonly grounded.

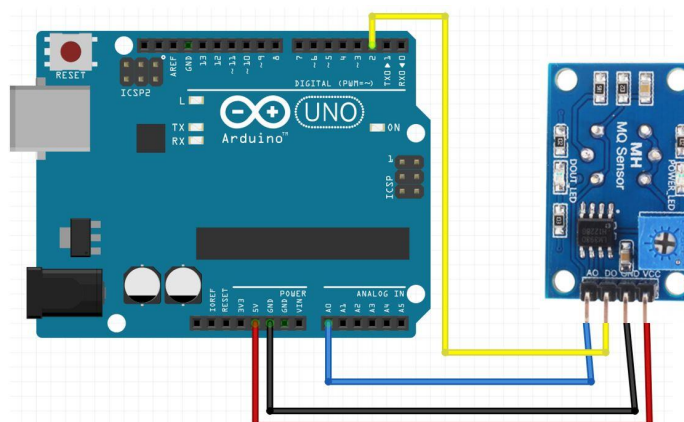


Fig3: Circuit Diagram

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Arduino Code:

```
int sensorValue;
int digitalValue;

void setup() {

    Serial.begin(9600); // sets the serial port to 9600
    pinMode(13, OUTPUT);
    pinMode(2, INPUT);

}

void loop() {

    sensorValue = analogRead(0); // read analog input pin 0
    digitalValue = digitalRead(2);

    if (sensorValue > 400) {
        digitalWrite(13, HIGH);
    }

    else
        digitalWrite(13, LOW);

    Serial.println(sensorValue, DEC); // prints the value read
    Serial.println(digitalValue, DEC);
    delay(1000); // wait 100ms for next reading

}
```

Output:

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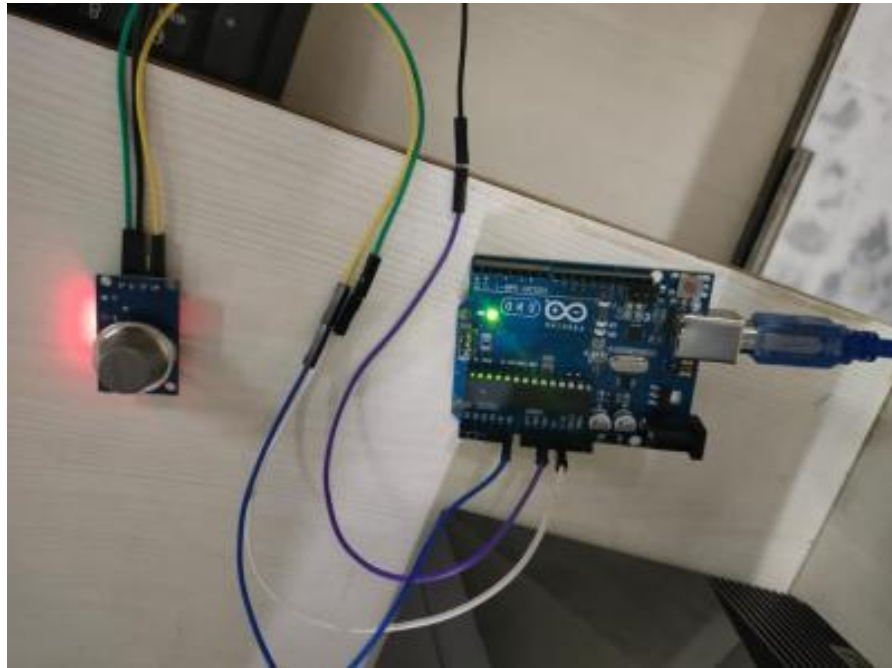


Fig4. MQ-135 setup

Output (Serial Monitor):



Fig5: Output as per serial monitor (Reading marked in yellow is the maximum reading)

Learning outcomes:

- Learnt about MQ-135 Air Quality Sensor.
- Learnt how to interface and applications of Air Quality sensors
- Learnt the basic features of IoT programming