

## DETERMINATION OF THE AMOUNT OF WORKING GAS IN THE APARTMENT USING THE GAS ANALYZER SENSOR MQ-2

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### ANNOTATION

The article explains the advantages of the MQ-2 gas analyzer sensor over other sensors, the availability of access for smart homes, and the fact that it is made of highly sensitive semiconductor materials.

**Keywords:** Feature, working principle, connection diagram, arduino UNO programming code

The MQ-2 gas sensor allows you to determine the concentration of gases such as hydrogen, smoke and flammable hydrocarbon gases (methane, propane, butane). This sensor belongs to the family of MQ sensors. These sensors are now widely used due to their low cost and ease of use. The sensor has analog and digital output. When the limit of the known gas concentration set by the timer resistance is exceeded, a signal is sent to the digital output. The sensor is easy to connect, has high sensitivity and fast response time.



**Pic 1. MQ-2 gas control sensor**

The sensor is a small board with a sensitive gas analyzer (detector) on the front and 4 feet on the back to connect the sensor, power and output signal indicators and a potentiometer.

MQ-2 sensors are used in smart home systems, gas or smoke detection systems in industrial or private enterprises, automotive ventilation filters.

Properties;

- Voltage - 5V;
- Power consumption - 180mA;
- Sensitivity level - 300-10000 ppm;
- Normal gas measurement of the sensor - isobutane, 1000 ppm;
- Response time - less than 10 seconds;
- Operating temperature -10 to +50 ° C;
- Working humidity - RH not more than 95%;

- interface: analog and digital;

## WORKING PRINCIPLE

The principle of operation of the sensor is based on a sensitive detector made of a mixture of aluminum and tin oxides, in which a chemical reaction occurs due to heating. Therefore, the gas analyzer heats up significantly during operation. As a result of the chemical reaction, the resistance of the element changes and a signal is transmitted. Depending on the sensitivity of the element to certain gases, the efficiency of their detection is achieved. Gas concentration is measured in parts per million (ppm). This represents the amount of gas in the air in parts per million. Thus, 1ppm corresponds to a concentration of 0.0001%. To obtain the exact value of the measured gas concentration, it is necessary to perform a complex non-linear voltage conversion at the analog output of the sensor in accordance with the conversion tables in the technical specifications of the sensor, taking into account the ambient temperature. Using a potentiometer, you can change the digital output sensitivity limit of the sensor. Note that the sensitivity limit is not the same for different gases. The indicators on the sensor inform us that the sensitivity limit for the connected power supply and digital output has been exceeded.

## CONNECTION

You can connect the sensor to an Arduino board or directly to the relay module. In the first case, the sensorA0 analog output is used, which is connected to the analog input on the Arduino card. If there is a relay, the digital output of the sensor is used.



Pic 2. Microprocessor control side of MQ-2 sensor

The connection of the MQ-2 sensor to the Arduino Uno is shown in the following figure:



Pic 3. Connecting the MQ-2 sensor to an Arduino Uno Arduino UNO programming code

The following is an example of a source code to test a sensor on an Arduino device. The code displays information that the analog input exceeds the current ADC value and the limit value for the port monitor. When setting the #PudinPin A0 code, you can set the Arduino pin number to which the analog output of the sensor is connected. You can set the limit value for the gas concentration in the air yourself.

```
int led = 13;
int sensor = 2;
int state = LOW;

int val = 0;

#define smokePin A0
int sensorThres = 350;
void setup() {
  Serial.begin(9600);
}
void loop() {
  int analogSensor = analogRead(smokePin);
  Serial.print (analogSensor);
  if (analogSensor > sensorThres) {
    Serial.println(" Gaz!");
  }
  else {
    Serial.println(" normal");
  }
  delay(500); //
}
```



## REFERENCES

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