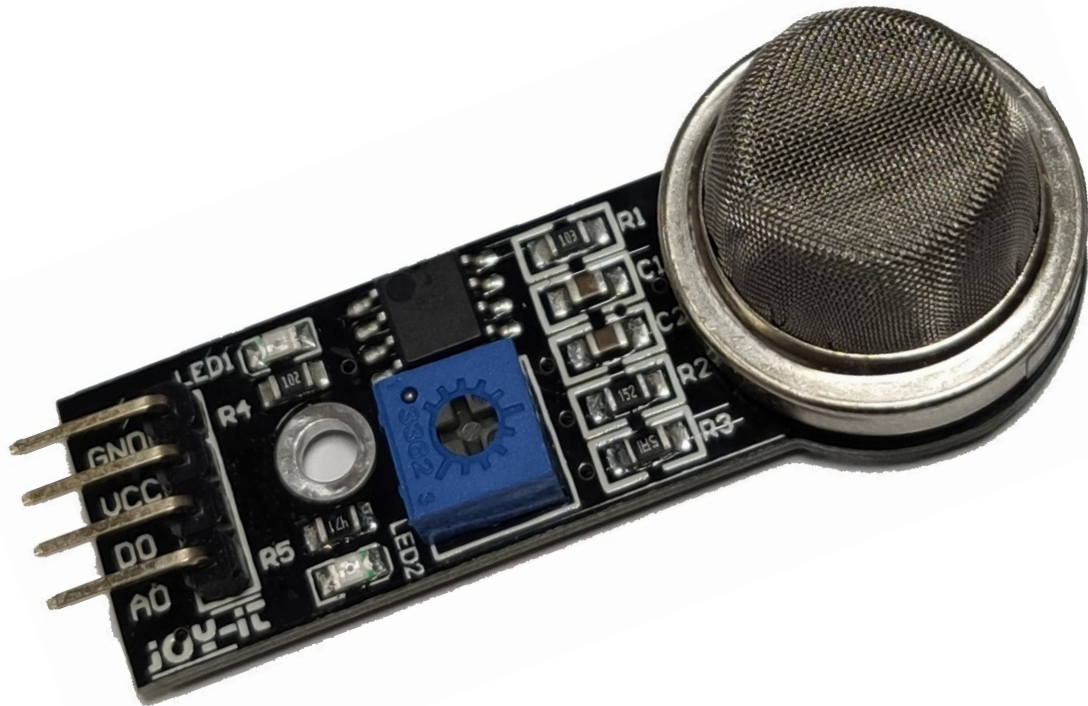# ANALOG NATURAL GAS AND METHANE SENSOR

SEN-MQ4



## 1. GENERAL INFORMATION

Dear costumer,
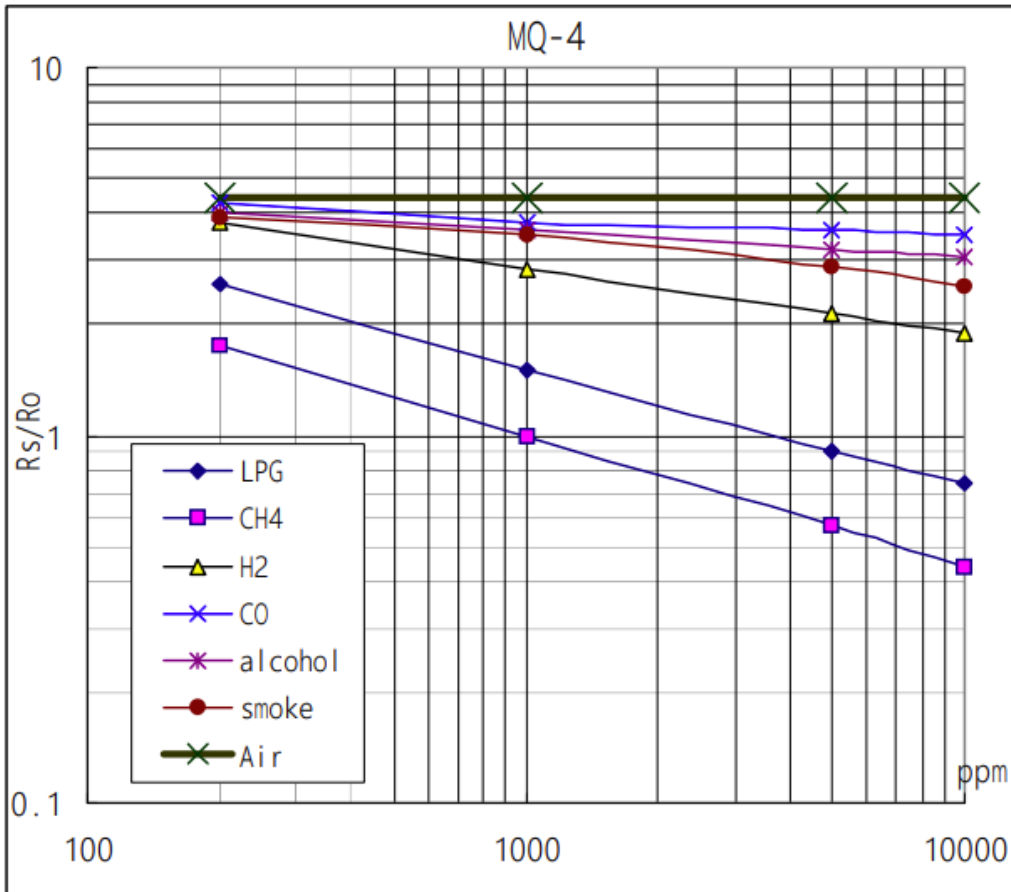
thank you very much for choosing our product.

In following, we will introduce you to what to observe while starting up and using this product.

Should you encounter any unexpected problems during use, please do not hesitate to contact us.
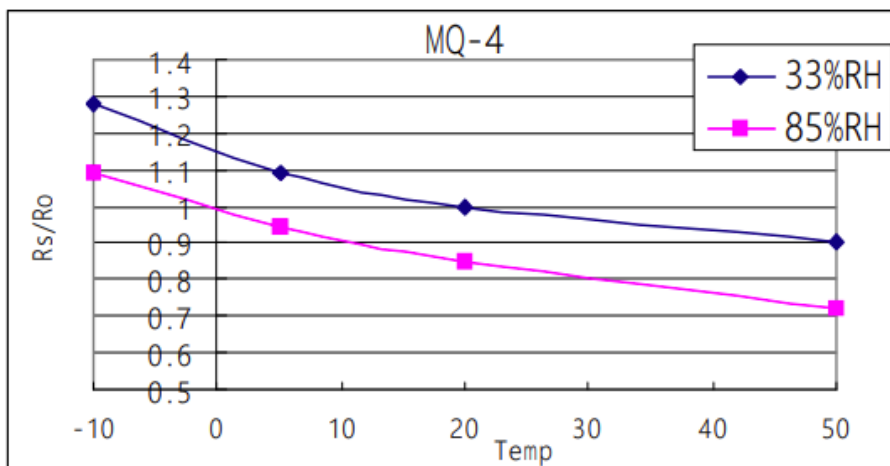
⚠ **Please note that the sensor requires a warm-up phase to provide accurate readings.**

**MQ-4**



This shows the typical sensitivity characteristics of the MQ-4. Rs means resistance of the sensor in different gases, Ro means resistance of sensor in 1000ppm Methane



Correlation between sensor resistance and the ambient temperature and air humidity

The resistance of the sensor can be calculated with the following formula:

$$Rs=(V_C/V_{RL}-1)\times R_L$$
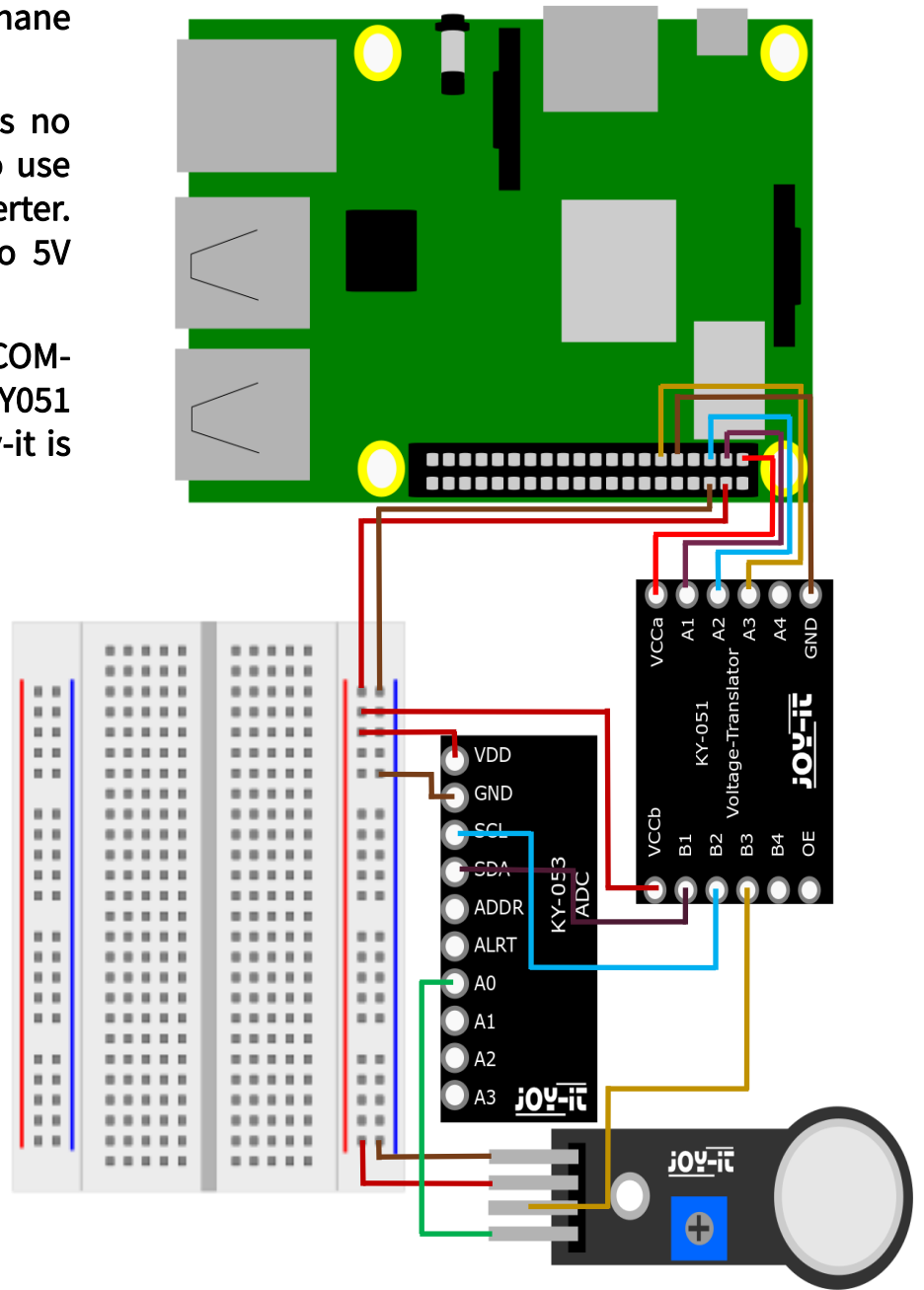
VC= Supply voltage; VRL= voltage analog pin;

Wiring:

This natural gas and methane sensor is an analog sensor.

Since the Raspberry Pi has no analog inputs, you have to use an analog-to-digital converter. You will also need a 3V to 5V voltage translator.

In this example the ADC COM-KY053 and the Com-KY051 voltage translator from Joy-it is used.

| Raspberry Pi | V. Translator | ADC | MQ4 |
|---|---|---|---|
| GND (Pin 6, 14, 9...) | GND | GND | GND (Pin 1) |
| 5V (Pin 2, 4) | VCCb | VDD | VCC (Pin2) |
| 3V (Pin 1, 17) | VCCa | - | - |
| BCM17 (Pin 11) | A3 | - | - |
| - | B3 | - | D0 (Pin 3) |
| - | | A0 | Signal (Pin 4) |
| SCL (Pin 5) | A2 | - | - |
| SDA (Pin 3) | A1 | - | - |
| - | B2 | SCL | - |
| - | B1 | SDA | - |

## Installation:

To be able to use the ADC, you must first enable I2C.
Enter the following command:

```
sudo raspi-config
```

Navigate to **Interfacing Options** -> **I2C** and enable the I2C interface.

You must also install the Python library of the ADC.
Enter the following commands:

```
sudo apt-get update
sudo apt-get install python3-pip
sudo pip3 install adafruit-circuitpython-ads1x15
```
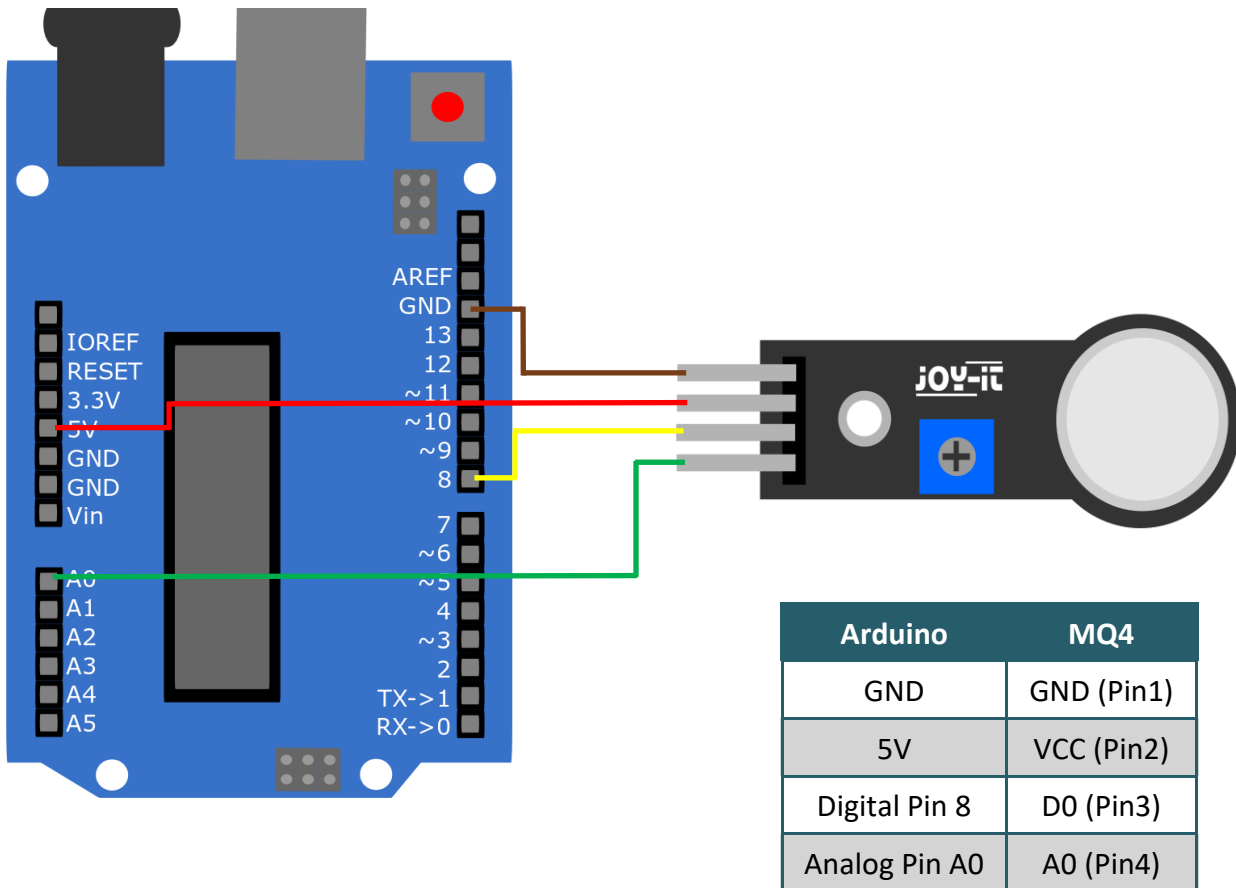
## Code example:

The D0 pin of the sensor is automatically set to LOW when the limit value is reached.

With the blue potentiometer on the board, you can set the limit value.

In the following code example, the sensor resistance is read out every 5 seconds and output in the console.

```python
from time import sleep
import board
import busio
import adafruit_ads1x15.ads1115 as ADS
from adafruit_ads1x15.analog_in import AnalogIn
import RPi.GPIO as GPIO
GPIO.setmode(GPIO.BCM)
GPIO.setup(17, GPIO.IN)
# Create the I2C bus
i2c = busio.I2C(board.SCL, board.SDA)
# Create the ADC object using the I2C bus
ads = ADS.ADS1115(i2c)
ads.gain = 2/3
# Create single-ended input on channels
chan0 = AnalogIn(ads, ADS.P0)
VC= 5.0
RL=1500
try:
  while True:
    if GPIO.input(17) == GPIO.LOW:
        print("Warnung: Grenzwert ueberschritten!!!")
    VRL=chan0.voltage
    RS=(VC / VRL - 1) * RL
    print("RS = " + str(RS))
    sleep(2.5)
except KeyboardInterrupt:
  GPIO.cleanup()
```

**Wiring:**



| Arduino | MQ4 |
|---------|-----|
| GND | GND (Pin1) |
| 5V | VCC (Pin2) |
| Digital Pin 8 | D0 (Pin3) |
| Analog Pin A0 | A0 (Pin4) |

**Code example:**

The D0 pin of the sensor is automatically set to LOW when the limit value is reached.

With the blue potentiometer on the board, you can set the limit value.

In the following code example, the sensor resistance is read out every 5 seconds and displayed on the serial monitor.

Before uploading, make sure that you have set the correct board and port in your Arduino IDE.

```
float VC = 5.0;
int RL = 1500;

void setup() {
  Serial.begin(9600);
  pinMode(A0, INPUT);
  pinMode(8, INPUT);
}
void loop() {
  if (digitalRead(8) == LOW) {
    Serial.println("Warnung: Grenzwert überschritten!!!");
  }
  float ADCval = analogRead(A0);
  float VRL = (5.0 / 1023) * ADCval;
  float RS = (VC / VRL - 1) * RL;
  Serial.print("RS = ");
  Serial.println(RS);
  delay(5000);
}
```

Our information and take-back obligations according to the Electrical and Electronic Equipment Act (ElektroG)

**Symbol on electrical and electronic equipment:**

This crossed-out dustbin means that electrical and electronic appliances do not belong in the household waste. You must return the old appliances to a collection point.
Before handing over waste batteries and accumulators that are not enclosed by waste equipment must be separated from it.

**Return options:**
As an end user, you can return your old device (which essentially fulfils the same function as the new device purchased from us) free of charge for disposal when you purchase a new device.
Small appliances with no external dimensions greater than 25 cm can be disposed of in normal household quantities independently of the purchase of a new appliance.

**Possibility of return at our company location during opening hours:**
Simac GmbH, Pascalstr. 8, D-47506 Neukirchen-Vluyn, Germany

**Possibility of return in your area:**
We will send you a parcel stamp with which you can return the device to us free of charge. Please contact us by e-mail at Service@joy-it.net or by telephone.

**Information on packaging:**
If you do not have suitable packaging material or do not wish to use your own, please contact us and we will send you suitable packaging.

## 6. SUPPORT

If there are still any issues pending or problems arising after your purchase, we will support you by e-mail, telephone and with our ticket support system.

E-Mail: service@joy-it.net

Ticket system: http://support.joy-it.net

Telephone: +49 (0)2845 98469-66 (10-17 o'clock)

For further information please visit our website:

www.joy-it.net