

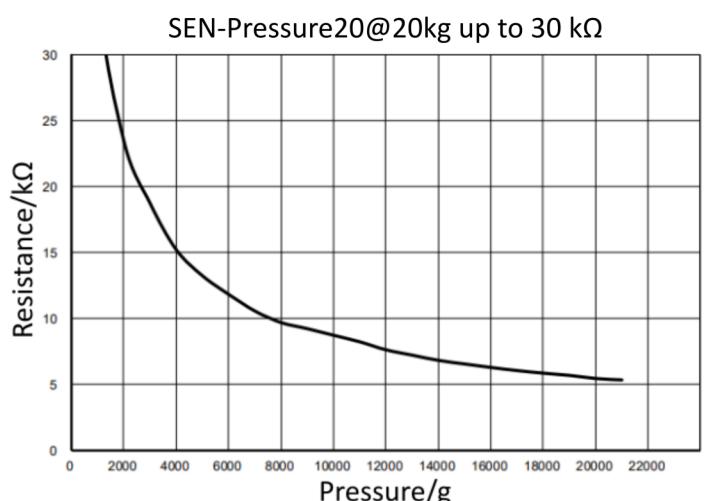
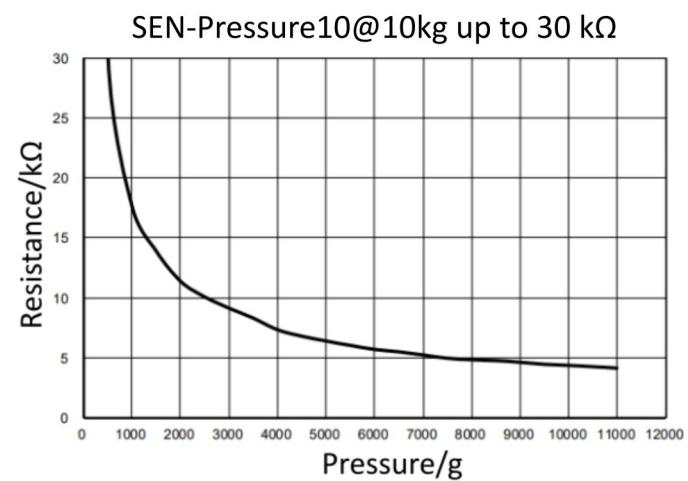
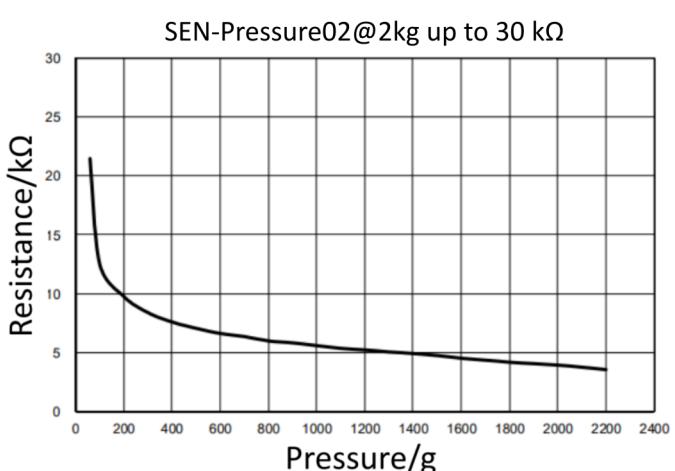
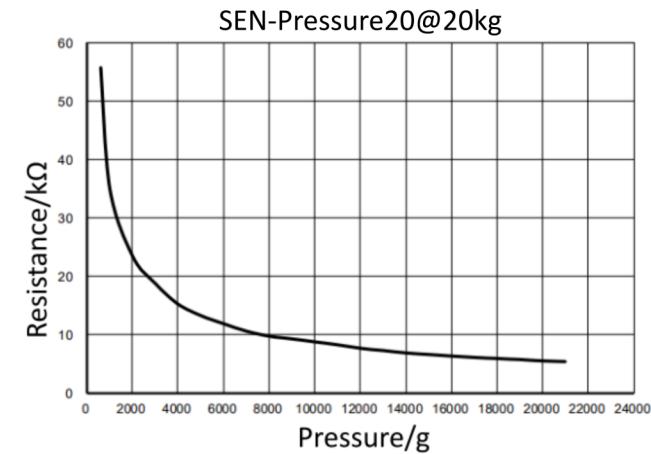
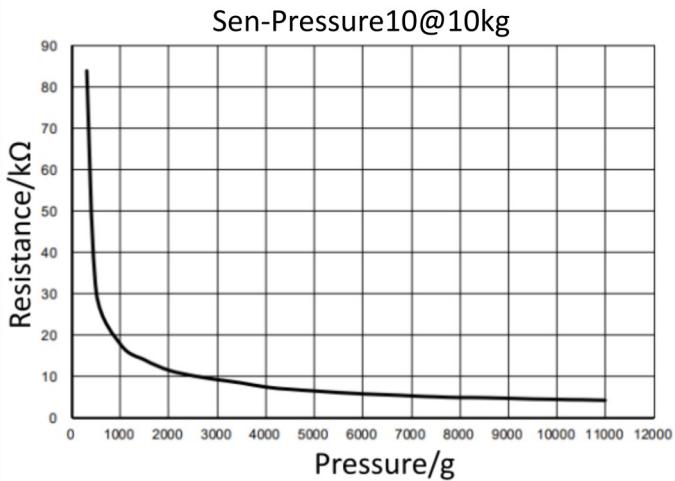
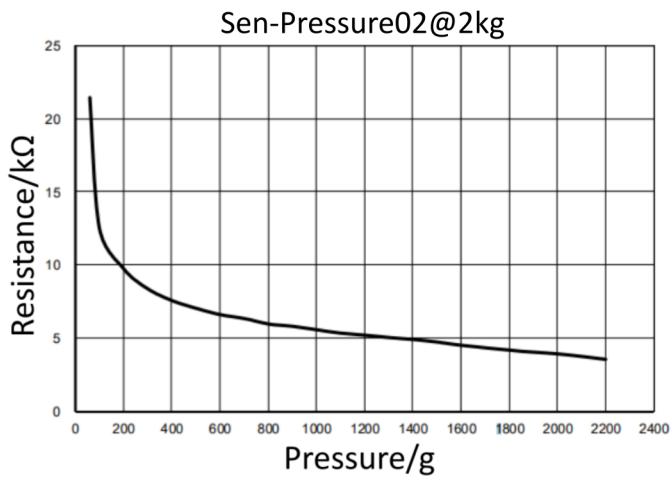
SEN-PRESSURE

Thin Film Pressure Sensor

1. GENERAL INFORMATION

Dear customer,
thank you very much for choosing our product.
In the 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.

2. DIFFERENCES BETWEEN THE 3 DIFFERENT SENSORS



The diagram on the left shows the pressure-resistance relationship for the entire resistance range.

The right diagram is a partial section of the left diagram and shows the pressure-resistance relationship normalized for resistance values up to 30 kΩ.

The actual data should be tested after installation. All data without guarantee!

The following formula is used to calculate the voltage from the measured values:

$$VOUT = \frac{510 \cdot VCC}{RC + 510} \Leftrightarrow RC = \frac{510 \cdot VCC}{VOUT} - 510$$

The above formula is composed of the **supply voltage (VCC)**, the **known resistor value from the above diagram (RC)** and the **known resistance value on the PCB of the sensor (510 kΩ)**.

3. CONTACT SURFACE OF THE SENSOR

Important with this sensor is that you can only measure with a certain part of the sensor. The part which is used here for measuring is outlined in red in the figure below. This part is only **7.5 mm in diameter**.



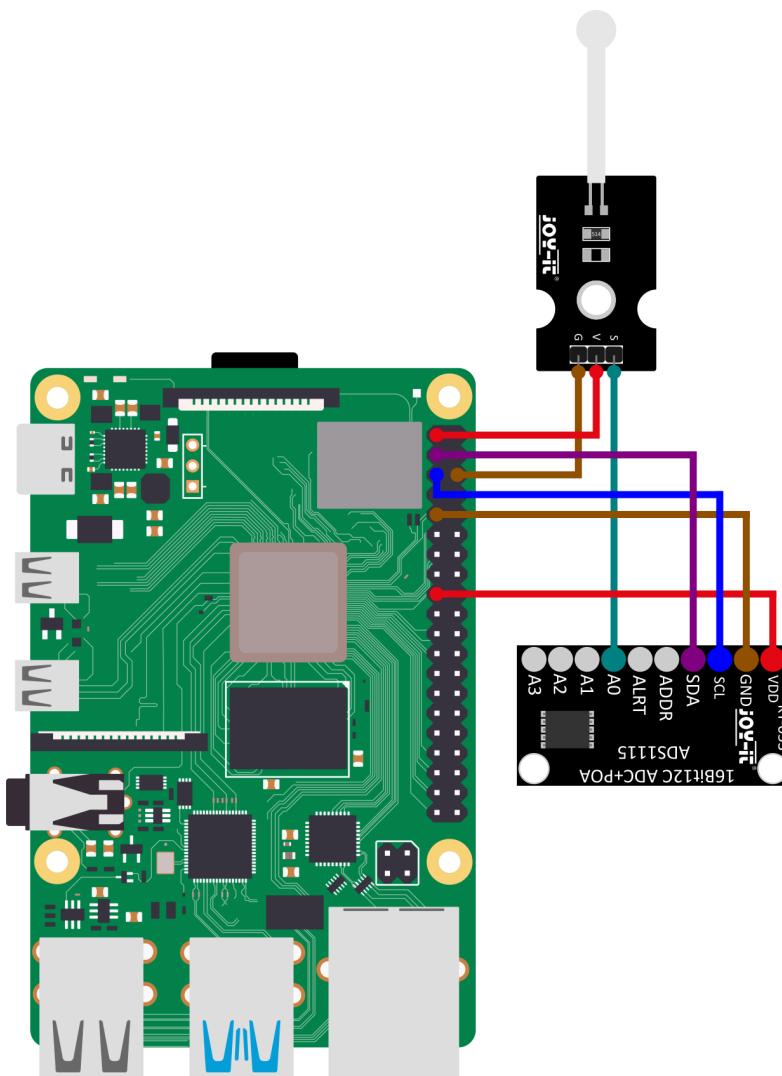
4. CONNECT TO THE RASPBERRY PI



This guide was written under Raspberry Pi OS Bookworm for the Raspberry Pi 4 and 5. It has not been checked with newer operating systems or hardware.

This pressure sensor is an analog sensor.

Since the Raspberry Pi has no analog inputs, you have to use an analog-to-digital converter. In this example we use the ADC [COM-KY053](#) from [Joy-IT](#).



Raspberry Pi	COM-KY053	SEN-Pressure
GND (Pin 9)	GND	G
3V3 (Pin 17)	VDD	V
GPIO3 (Pin 5)	SCL	
GPIO2 (Pin 3)	SDA	
-	A0	S

4.1 CODE EXAMPLE RASPBERRY PI

First you need to enable I2C on your Raspberry Pi. To open the configuration, enter the following command:

```
sudo raspi-config
```

There select **3 Interface Options → I4 I2C** and enable the I2C interface.

You have now successfully activated I2C. The analog-to-digital converter is now accessible under the I2C address 0x48, which is set by default for this sensor. The I2C address will be different if you have already configured it before configuring your Raspberry Pi.

Now install pip3 with the following command:

```
sudo apt-get install python3-pip
```

The next step is to set up the virtual environment. To do this, enter the following commands:

```
mkdir project-name
```

```
cd project-name
```

```
python -m venv --system-site-packages env
```

```
source env/bin/activate
```

We use the [Adafruit CircuitPython ADS1x15](#) library for our code example, which is released under the [MIT license](#). Use the following commands to download and install this library.

```
pip3 install adafruit-circuitpython-ads1x15
```

The code sample we provide can be downloaded [here](#) or you can run the following command in your console.

```
wget https://www.joy-it.net/files/files/Produkte/SEN-Pressure02/SEN-Pressure.zip
```

Now, unpack the file with the following command:

```
unzip SEN-Pressure.zip
```

You can now execute the script with the following command. Be aware that your file path may be differ.

```
python3 SEN-Pressure.py
```

Alternatively, you can copy the code example here and paste it into your Python file.

```
#!/usr/bin/python
# coding=utf-8
import time
import board
import busio
import adafruit_ads1x15.ads1115 as ADS
from adafruit_ads1x15.analog_in import AnalogIn

# Create the I2C bus
i2c = busio.I2C(board.SCL, board.SDA)

# Create the ADC object using the I2C bus
ads = ADS.ADS1115(i2c)

# Create single-ended input on channel0
chan0 = AnalogIn(ads, ADS.P0)

# Define VCC constant
VCC = 3.3

while True:
    # Read voltage from the sensor (VOUT)
    VOUT = chan0.voltage

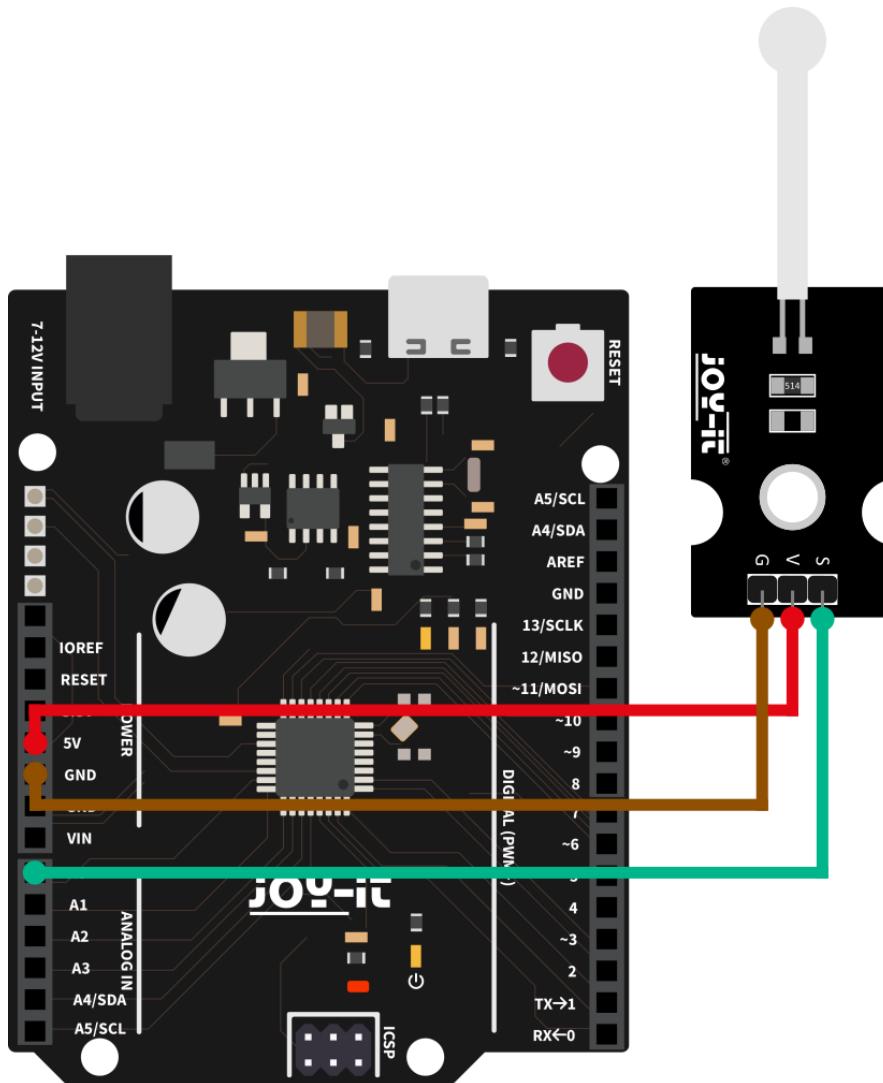
    # Calculate resistance (RC) using the formula  $RC = (510 * VCC / VOUT) - 510$ 
    if VOUT > 0: # Avoid division by zero
        RC = (510 * VCC / VOUT) - 510
    else:
        RC = float('inf') # Set resistance to infinity if VOUT is zero

    # Output both VOUT and RC
    print("VOUT: {:.3f} V RC: {:.3f} kOhm".format(VOUT, RC))

    time.sleep(1)
```

5. CONNECTING TO THE ARDUINO

First connect the module to your Arduino:



Arduino	SEN-Pressure
GND	G
5V	V
Analog Pin A0	S

5.1 CODE EXAMPLE ARDUINO

We provide a code example for use with the Arduino which you can download [here](#).

In the following code example the value of the sensor is read out every 2 seconds and displayed in the serial monitor.

You can transfer this code example with the **Arduino IDE** to your board.

Make sure that the **port** and the **board** are set correctly under **Tools**.

```
int val;
float VCC = 5.0; // Define VCC as 5V
float VOUT;
float RC;

void setup() {
    // Initialize serial communication
    pinMode(A0, INPUT);
    Serial.begin(9600);
}

void loop() {
    // Read the analog value
    val = analogRead(A0);

    // Convert the analog value to voltage (VOUT)
    VOUT = (val / 1023.0) * VCC;

    // Calculate resistance (RC)  $RC = (510 * VCC / VOUT) - 510$ 
    if (VOUT > 0) { // Avoid division by zero
        RC = (510.0 * VCC / VOUT) - 510.0;
    } else {
        RC = -1; // Indicate invalid resistance for VOUT = 0
    }

    // Output VOUT and RC over serial
    Serial.print("VOUT: ");
    Serial.print(VOUT, 3);
    Serial.print(" V RC: ");
    if (RC >= 0) {
        Serial.print(RC, 3);
        Serial.println(" kOhm");
    } else {
        Serial.println("Invalid (VOUT = 0)");
    }

    // Delay for 2 seconds
    delay(2000);
}
```

6. ADDITIONAL INFORMATION

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 fulfills 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 Electronics 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 email 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.

7. 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.

Email: service@joy-it.net

Ticket system: <https://support.joy-it.net>

Telephone: +49 (0)2845 9360-50

For further information please visit our website:

www.joy-it.net