**Wat betreft de installaties van de PI's:**

- sd kaart erin steken
- scherm, keyboard en muis aansluiten
- hdmi kabel aansluiten op scherm
- dan pas power kabel erin
- raspbian selecteren
- installeren

Eens de PI klaar is Terminal openen en de volgende zaken erin copy/pasten:

```
sudo apt-get install git

sudo apt-get update

sudo apt-get install build-essential python-dev

git clone https://github.com/adafruit/Adafruit_Python_DHT.git

cd Adafruit_Python_DHT/

sudo python setup.py install

NOG EENS

git clone https://github.com/bastienwirtz/Adafruit_Python_BMP.git

cd Adafruit_Python_BMP/
```

sudo python setup.py install

DAN

sudo nano /boot/config.txt

in het venster:

#dtparam=i2c_arm=on

DE # wegdoen tot er staat
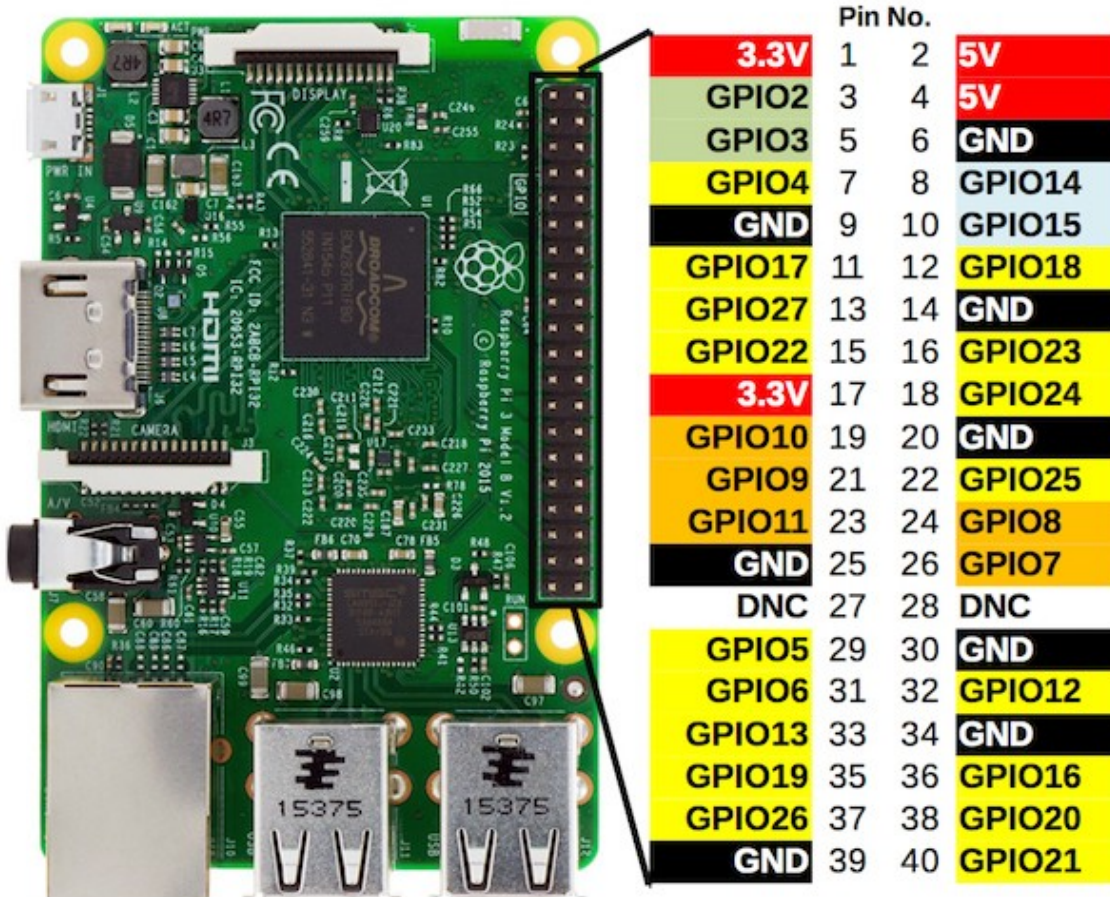
dtparam=i2c_arm=on

DAN

ctrl X -> Y -> Enter

als laatste in terminal

sudo apt-get install python-smbus i2c-tools -y

PI GPIO

# Sensors used in the workshop.

*1. Per module a Python script is explained and demonstrated for further development or to be used as is. Used materials: sensors, cables (jumpers), raspberry pi 3 & its accessories.*
*2. In Python (coding language) we explore ways to store/save the gathered data and output it in a graph or list.*

**1. KY-015, temperature & humidity sensor**
The advantage of this sensor is the combination of temperature measurement and humidity measurement in a compact design - the disadvantage is the low sampling rate of the measurement, so that only every 2 seconds a new measurement result is available - this sensor is suited for long-term measurements.
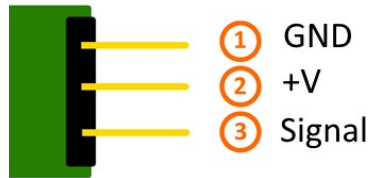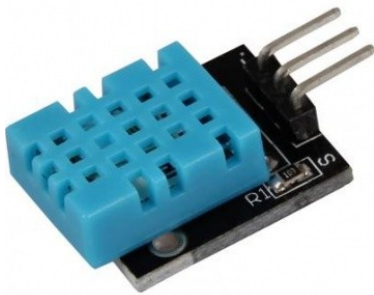


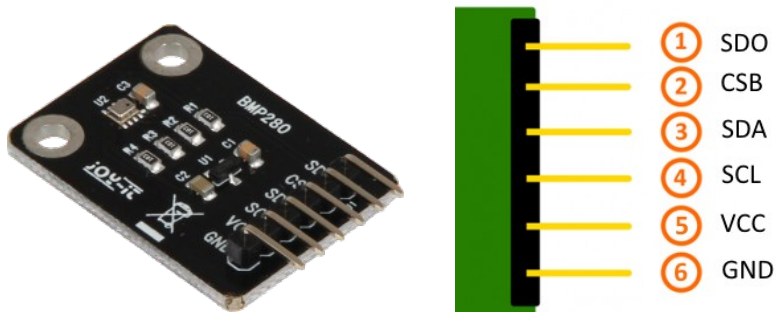| | | | |
|---|---|---|---|
| GND | = | GND | [Pin 06] |
| +V | = | 3,3V | [Pin 01] |
| Signal | = | GPIO23 | [Pin 16] |
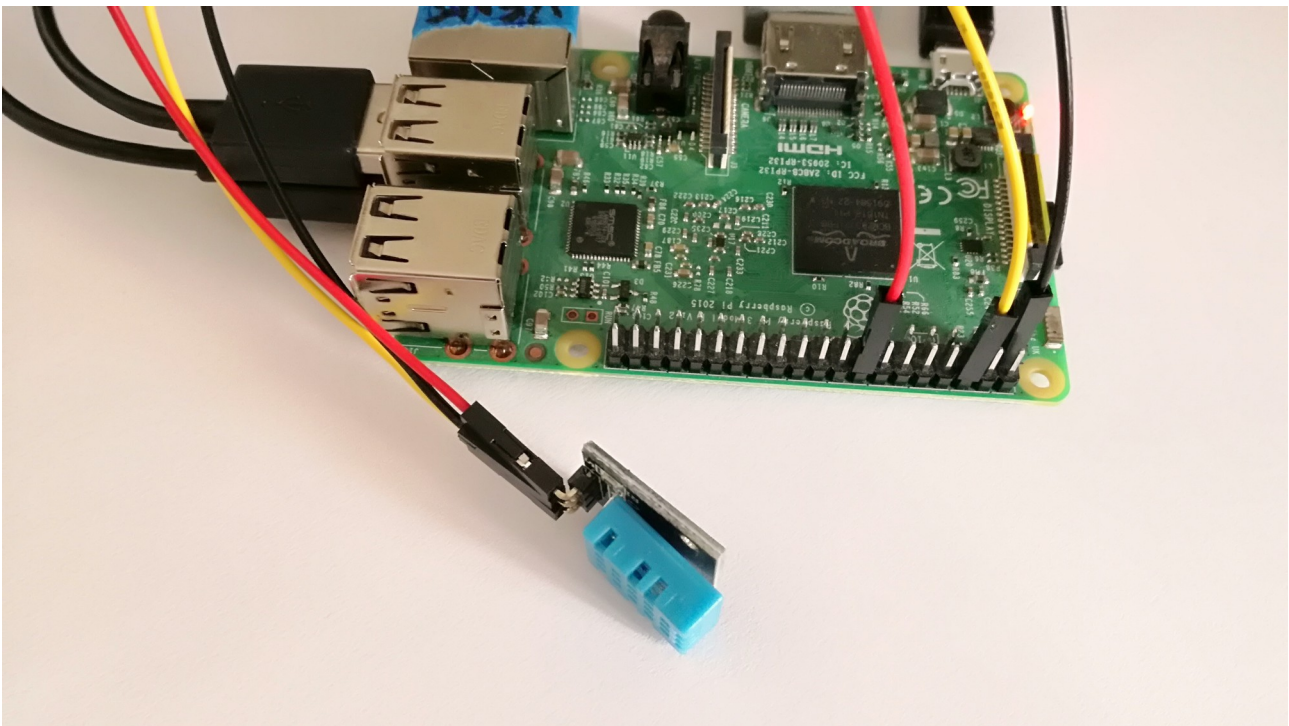


Raspberry PI and connected sensor
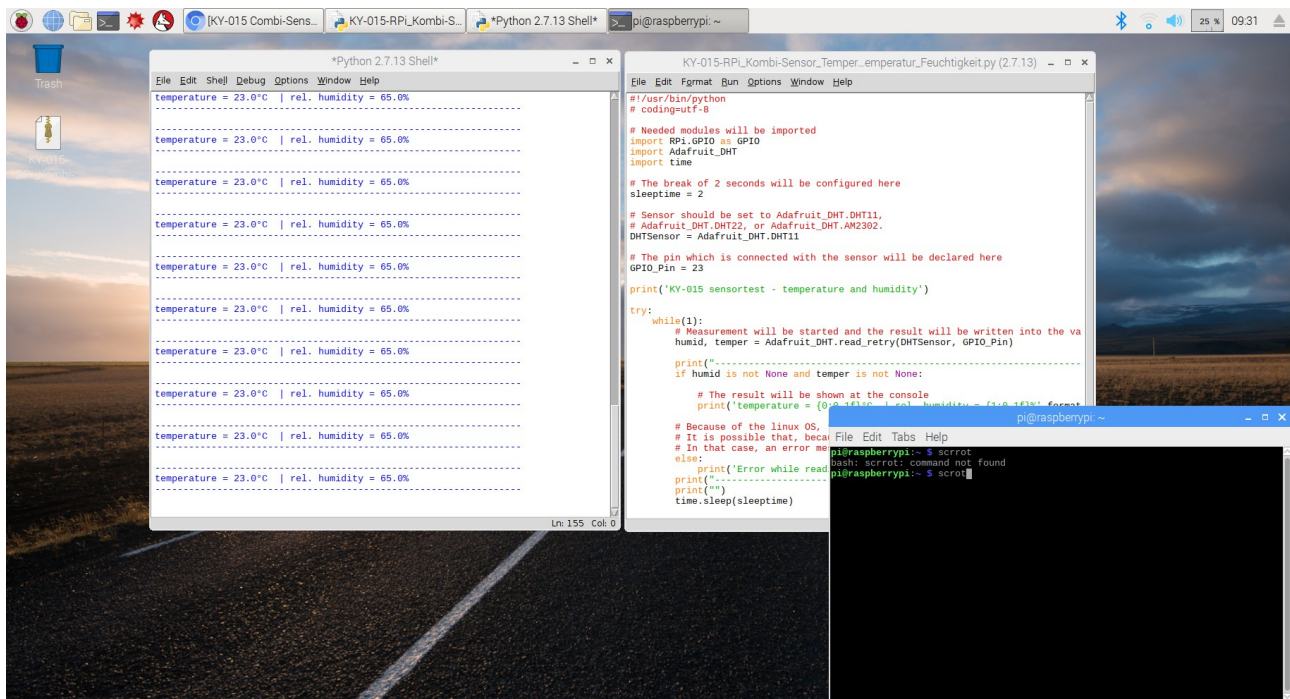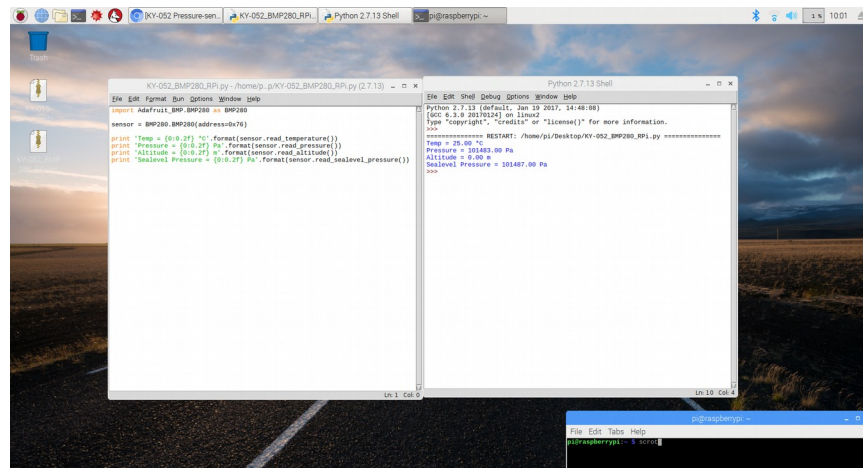
Python code & its output

## 2. [KY-052 air pressure & altitude sensor](#)



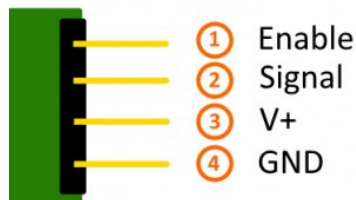SDO  =  3.3V             [Pin 01]
CSB  =  3.3V             [Pin 01]
SDA  =  GPIO02 / SCA  [Pin 03]
SCL  =  GPIO03 / SCL   [Pin 05]
VCC  =  3,3V             [Pin 01]
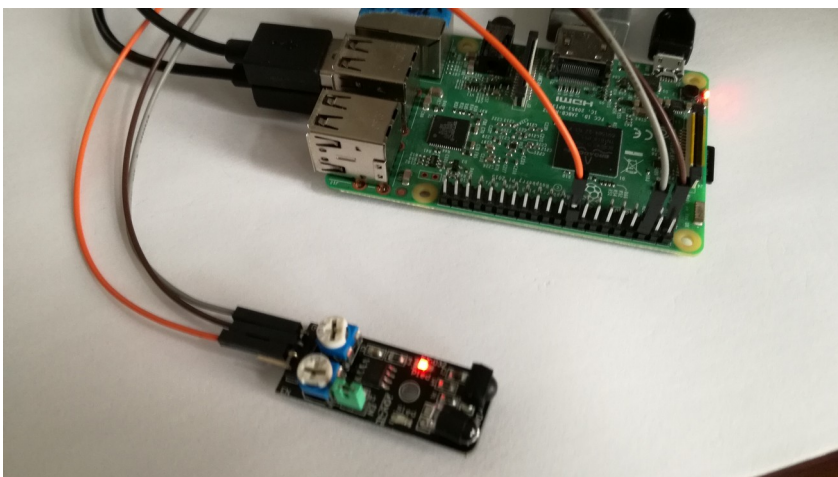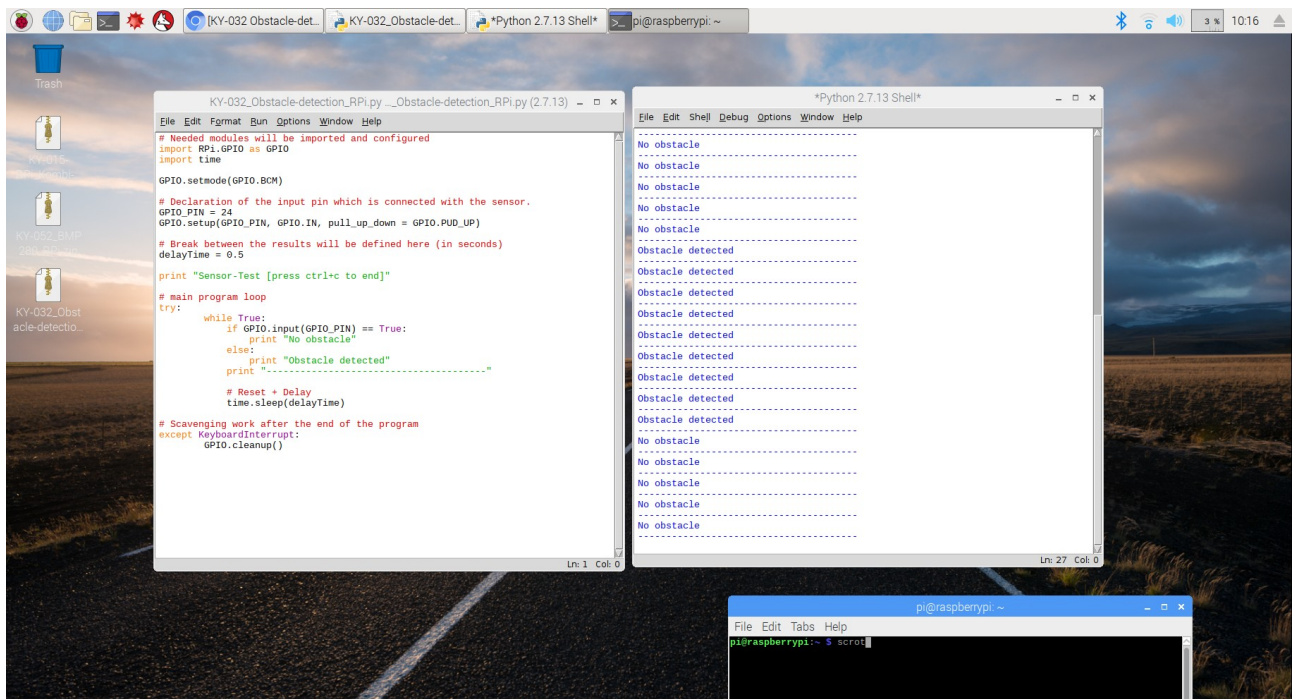GND  =  Masse           [Pin 06]

## 3. KY-032 Obstacle detection

If the emitted infrared light strikes an obstacle, this is reflected and detected by the photo diode. The distance to be detected can be adjusted with the two regulators on the sensors (blue knobs).





| | | |
|---|---|---|
| Sensor Enable | = | [N.C. (Steckbrücke gesteckt)] |
| Sensor Signal | = | [Pin 10] |
| Sensor +V | = | [Pin 5V] |
| Sensor GND | = | [Pin GND] |

## 4. [KY-033 tracking sensor](#)

The sensor module detects whether there is a light-reflecting or light-absorbing surface in front of the sensor. The sensitivity (resulting minimum distance) of the sensor can be regulated with the controller (white/blue knob on sensor).
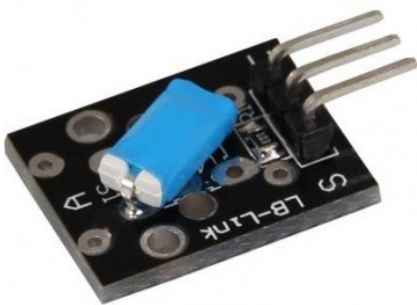




Signal = GPIO24 [Pin 18]
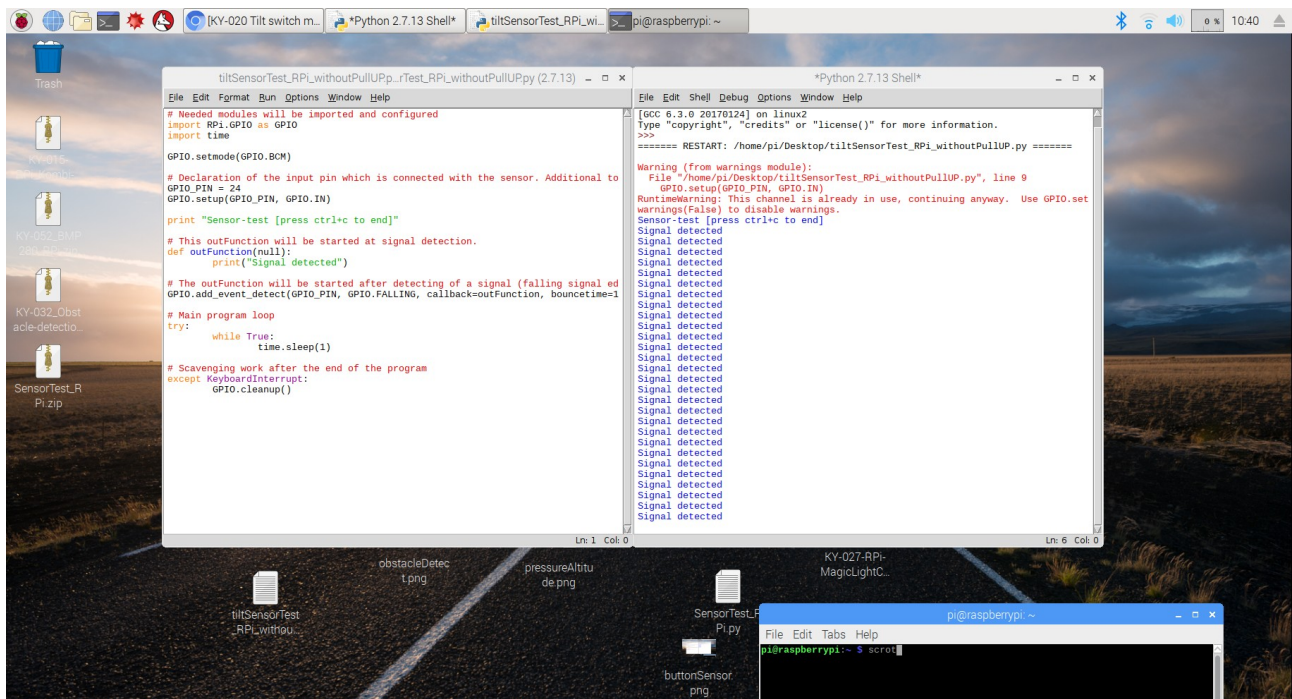+V = 3,3V [Pin 1]
GND = Masse [Pin 6]
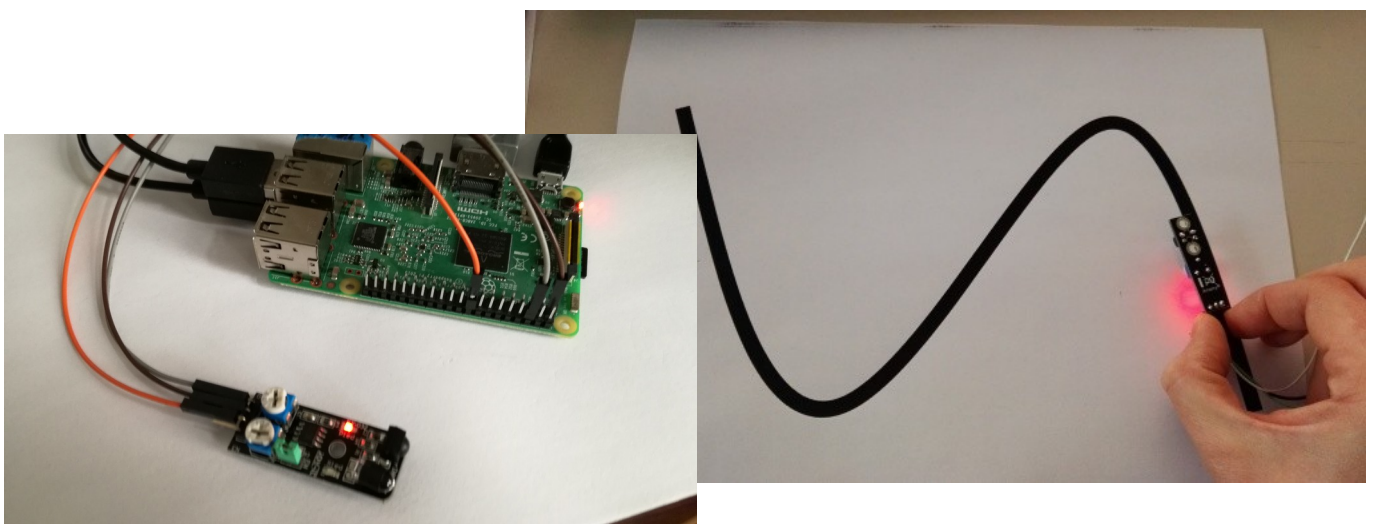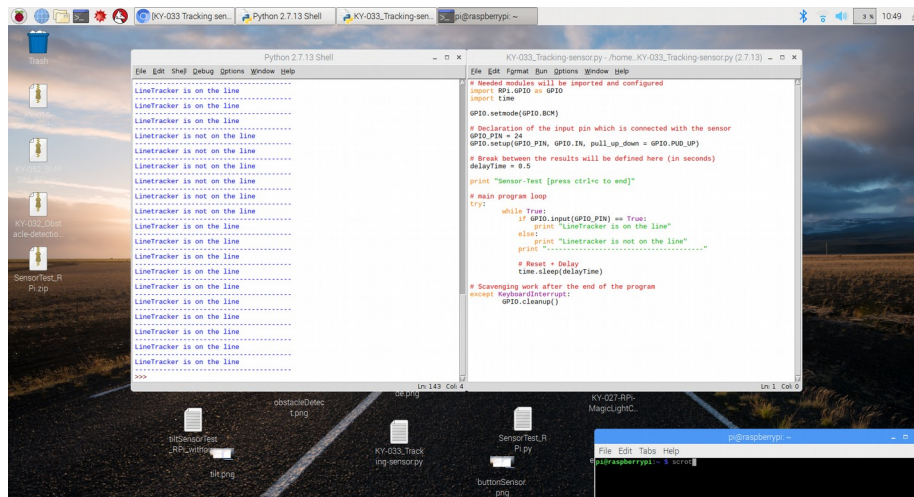
## 5. [KY-020 tilt sensor](#)
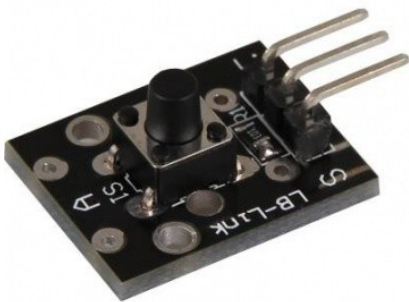
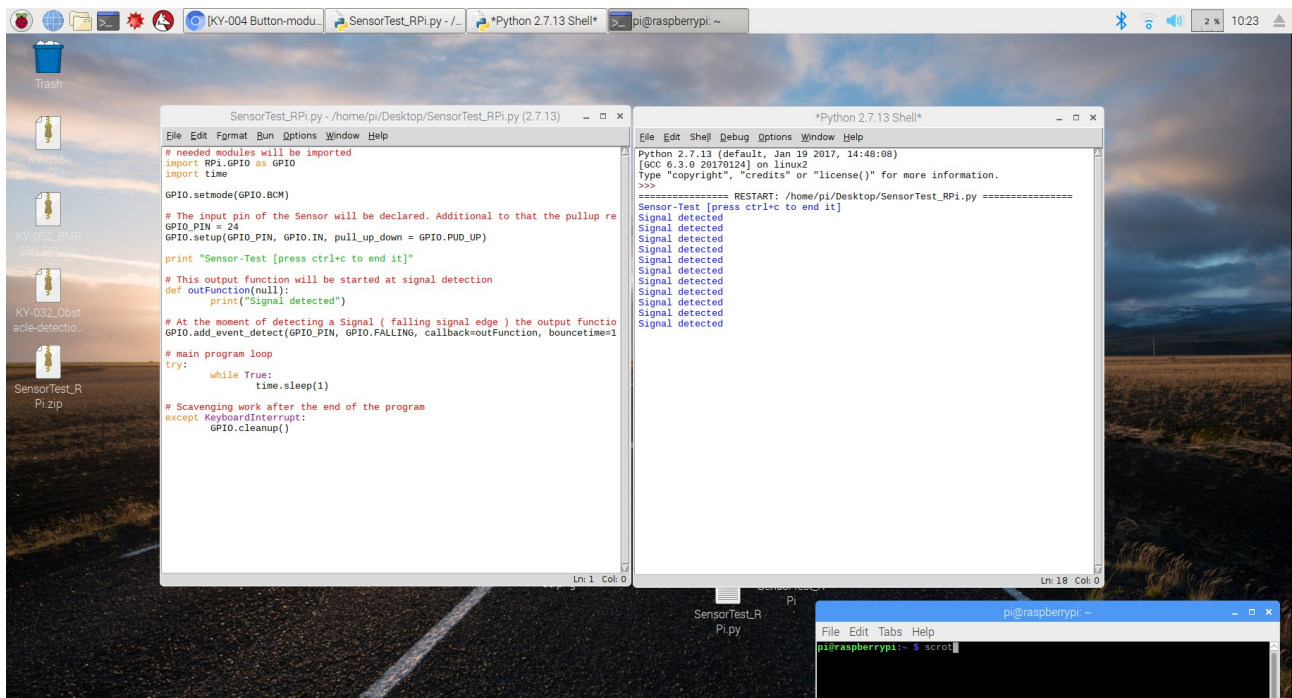Tilt sensors allow you to detect orientation or inclination. Like on your phone.



Signal  =  GPIO24  [Pin 18]
+V       =  3,3V       [Pin 1]
GND    =  Masse     [Pin 6]
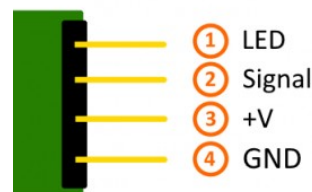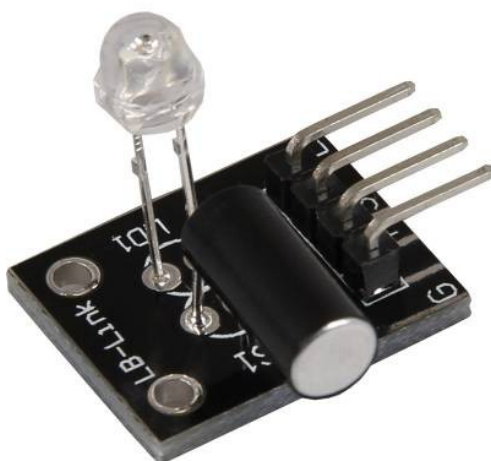
## 6. [KY-004 simple push button](#)





| | | |
|---|---|---|
| LED + | = | [Pin 13] |
| LED - | = | [Pin GND] |
| Sensor Signal | = | [Pin 10] |
| Sensor +V | = | [Pin 5V] |
| Sensor - | = | [Pin GND] |

## 7. KY-027 vibration sensor

The LED is switched on or off in case of vibration. The signal when the LED is on is given to a signal output. Depending on the input voltage, series resistors are required.





| | | | |
|---|---|---|---|
| LED | = | GPIO24 | [Pin 18] |
| Signal | = | GPIO23 | [Pin 16] |
| +V | = | 3,3V | [Pin 1] |
| GND | = | GND | [Pin 6] |