# Overview

A Hall Effect sensor is used to detect the presence of electromagnetic fields. Electricity carried through a conductor will produce a magnetic field that varies with current, and a Hall sensor can be used to measure the current without interrupting the circuit. Typically, the sensor is integrated with a wound core or permanent magnet that surrounds the conductor to be measured.

# Step 1: Connect It

Use the following wiring diagram to connect the sensor to your Raspberry Pi



**Important Notes:**

* The wire colors do not matter. Just use whatever is available at your station.
* **Make sure that you are plugging the wires into the correct location on both the Pi and the Sensor (especially the power and ground)**
* The wires move around a lot, so make sure they are firmly in place when you are testing

# Step 2: Code It

We have provided you with a Python code template that can run this sensor/device. The code is located at:

**/home/pi/Documents/rpi-iot-demos/hall\_effect.py**

Use the Geany editor to open this file (NOTE: this will be slow, so be patient). Once it is open, take some time to read the code to see how it works.

Once you are ready, do the following:

1. Find the function called SensorChanged().
   1. This function is called whenever a magnetic presence is detected or disappears
   2. The current sensor reading is stored in sensorReading
2. Modify this function so that it prints a message to the screen whenever the magnetic field changes

def SensorChanged(sensorReading):

if sensorReading == 0:

print("Hall Effect 0")

elif sensorReading == 1:

print("Hall Effect 1")

# Step 3: Run / Test It

1. To run the script, open a Linux console and navigate to the folder with your code
   1. Helpful Linux Commands:  
      **ls** lists the contents of the directory  
      **cd <folder\_name>** opens a folder (don’t type the < > characters)  
      **cd ..** exits the folder you are currently in  
      **cd ~** takes you back to your home folder
2. Run the python program by typing the following:

**python3 hall\_effect.py**

1. Try placing a magnet near your sensor to see what happens.
   1. If it doesn’t work, make sure that your wiring is correct and that you see lights on the sensor / device
   2. Can you modify the program so that it prints the correct message when a magnet comes close and goes away?
2. **To exit the program, press Ctrl-C in the terminal**

# Step 4: Make It Control Something

To make your program send MQTT messages, modify your main program to look like the following:

# --------------------------------------------

# Main Program Starts Here

# --------------------------------------------

if \_\_name\_\_ == '\_\_main\_\_':

comm.connect()

setup()

try:

print("Program Running. Waiting for a Magnet ")

loop()

except KeyboardInterrupt:

destroy()

Now, go to the SensorChanged() function you modified earlier. You can use the comm.send function to send a message when a magnet is near.

comm.send("CHANNEL NAME GOES HERE", "MESSAGE GOES HERE")