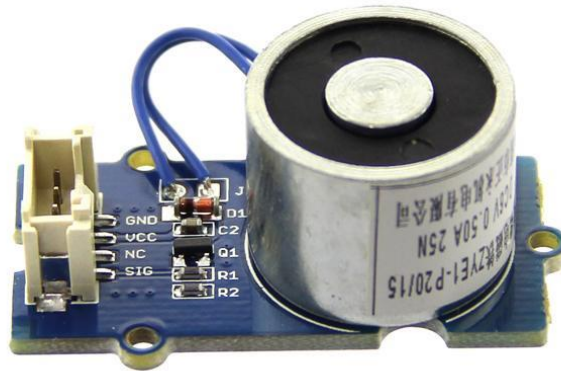# Grove - Electromagnet



An electromagnet is a type of magnet in which the magnetic field is produced by electric current. An electric current flowing in a wire creates a magnetic field around the wire, due to Ampere's law(see drawing below). To concentrate the magnetic field, in an electromagnet the wire is wound into a coil with many turns of wire lying side by side. The magnetic field of all the turns of wire passes through the center of the coil, creating a strong magnetic field there. Grove - Electromagnet can suck 1KG weight and hold on. It is easy to use, to learn electromagnet principle.

## Features

- Grove shape
- 1KG peak suction
- Low standby current

## Specifications

| Item | Value |
|---|---|
| Working Voltage | DC 5V |
| Working Current | 400mA |
| Standby Current | 200uA |
| Load Weight | 1KG |

Tip
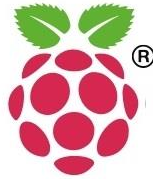More details about Grove modules please refer to Grove System

## Platforms Supported

| Arduino | Raspberry | BeagleBone | Wio | LinkIt |
|---------|-----------|------------|-----|--------|



Caution

The platforms mentioned above as supported is/are an indication of the module's hardware or theoritical compatibility. We only provide software library or code examples for Arduino platform in most cases. It is not possible to provide software library / demo code for all possible MCU platforms. Hence, users have to write their own software library.

## Getting Started

Note

If this is the first time you work with Arduino, we firmly recommend you to see Getting Started with Arduino before the start.

## Play With Arduino

Hardware

- Step 1. Prepare the below stuffs:

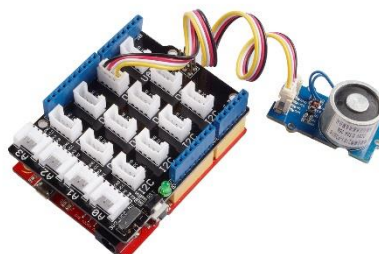| Seeeduino | Base Shield | Grove Electromagnet |
|-----------|-------------|---------------------|



- Step 2. Connect Grove-Electromagnet to port D2 of Grove-Base Shield.
- Step 3. Plug Grove - Base Shield into Seeeduino.
- Step 4. Connect Seeeduino to PC via a USB cable.

If we don't have Grove Base Shield, We also can directly connect Grove-Electromagnet to Seeeduino as below.

| Seeeduino | Grove-Ultrasonic Ranger |
|-----------|-------------------------|
| 5V | Red |
| GND | Black |
| | |
| Not Connected | White |
| D2 | Yellow |

## Software

- Step 1. **Please copy below code to Arduio IDE and upload to arduino. If you do not know how to upload the code, please check** how to upload code.

```
/*
   Turns on an Electromagnet on for one second, then off for one second, repeatedly.
   This example code is in the public domain.
*/

int Electromagnet = 0;
int LED = 13;

// the setup routine runs once when you press reset:
void setup() {
    // initialize the digital pin as an output.
    pinMode(Electromagnet, OUTPUT);
    pinMode(LED, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
    digitalWrite(Electromagnet, HIGH);  // turn the Electromagnet on (HIGH is the voltage level)
    digitalWrite(LED, HIGH);            // turn the LED on (HIGH is the voltage level)
    delay(1000);                        // wait for a second
    digitalWrite(Electromagnet, LOW);   // turn the Electromagnet off by making the voltage LOW
    digitalWrite(LED, LOW);             // turn the LED off by making the voltage LOW
    delay(1000);                        // wait for a second
}
```

- Step 2. **Grove-Electromagnet worked.**

## Hardware

- Step 1. **Prepare the below stuffs:**

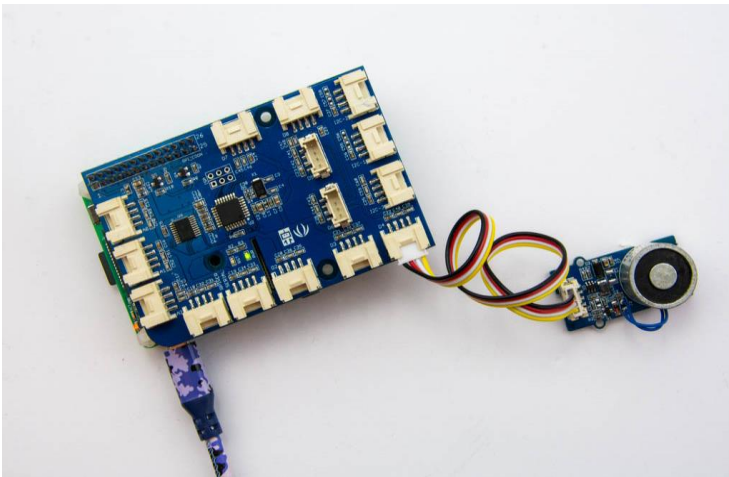**Raspberry pi**                    **GrovePi_Plus**                    **Grove-Electromagnet**

- Step 2. **Plug the GrovePi_Plus into Raspberry.**
- Step 3. **Connect Grove-Electromagnet to** D4 **port of GrovePi_Plus.**
- Step 4. **Connect the Raspberry to PC through USB cable.**

## Software

- Step 1. **Follow** Setting Software **to configure the development environment.**
- Step 2. **Follow** Updating the Firmware **to update the newest firmware of GrovePi.**

Tip
In this wiki we use the path ~/GrovePi/ instead of /home/pi/Desktop/GrovePi, you need to make sure Step 2 and Step 3 use the same path.
Note
We firmly suggest you to update the firmware, or for some sensors you may get errors.

- Step 3. **Git clone the Github repository.**

```
1cd ~
2git clone https://github.com/DexterInd/GrovePi.git
```

- Step 4. **Navigate to the demos' directory:**

```
1cd yourpath/GrovePi/Software/Python/
```

Here is the grove_electromagnet.py code.

```
1    import time
2    import grovepi
3
4    # The electromagnet can hold a 1KG weight
5
6    # Connect the Grove Electromagnet to digital port D4
7    # SIG,NC,VCC,GND
8    electromagnet = 4
9
10   grovepi.pinMode(electromagnet,"OUTPUT")
11   time.sleep(1)
12
13   while True:
14       try:
15           # Switch on electromagnet
16           grovepi.digitalWrite(electromagnet,1)
17           print "on"
18           time.sleep(2)
19
20           # Switch off electromagnet
21           grovepi.digitalWrite(electromagnet,0)
22           print "off"
23           time.sleep(2)
24
25       except KeyboardInterrupt:
26           grovepi.digitalWrite(electromagnet,0)
27           break
28       except IOError:
29           print "Error"
```

5.Run the demo.

```
1    sudo python grove_electromagnet.py
```

## Resources

- [Eagle]Grove Electromagnet v1.0 SCH PCB.zip
- [Datasheet]Datasheet ZYE1-P20-15 PDF

## Tech Support

Please submit any technical issue into our forum.