Grove - Infrared Reflective Sensor User Manual

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Wiki:http://www.seeedstudio.com/wiki/Grove_-_Infrared_Reflective_Sensor

Bazaar: http://www.seeedstudio.com/depot/Grove-Infrared-Reflective-Sensor-p-1230.html?cPath=25_31

Document Revision History

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1.0	Sep 22, 2015	Jiankai.li	Create file

Document Revision History

Contents

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Under the supervision of Seeed Technology Inc., this manual has been compiled and published which covered the latest product description and specification. The content of this manual is subject to change without notice.

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1. Introduction

The reflectivity of infrared light varies with the color and distance of the reflecting surface. According to this principle, Grove - Infrared Reflective Sensor utilizes a RPR220 reflective photosensor module to detect color and distance. When a light-colored object approaches,the signal intensity received by infrared reflective sensor increases and the indicator LED on board turns red. When a dark-colored object approaches, the intensity decreases and the LED turns off. This sensor is a basic and widely used part in applications such as line-following cars, rotary speed detection, auto data logging on utility meters or other situations where color or distance contrast is sharp.
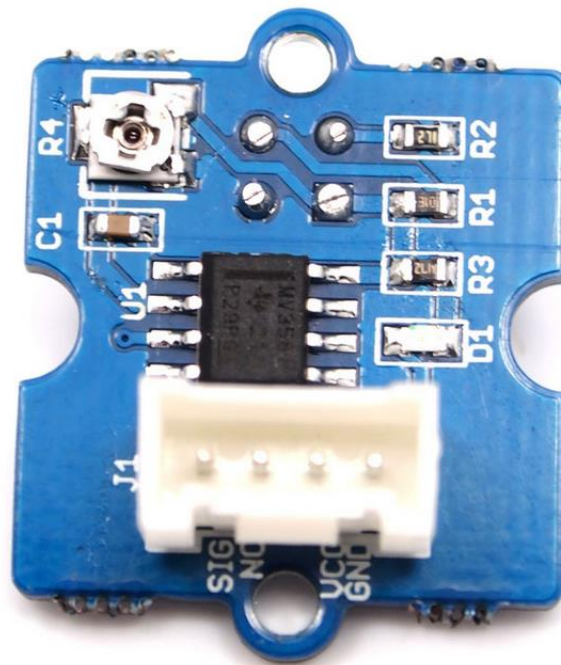
2. Specification

- Voltage：4.5-5.5V

- Current：14.69 - 15.35 mA

- Effective Distance ：4-15 mm

- Detectable Length(black line) ：1 mm
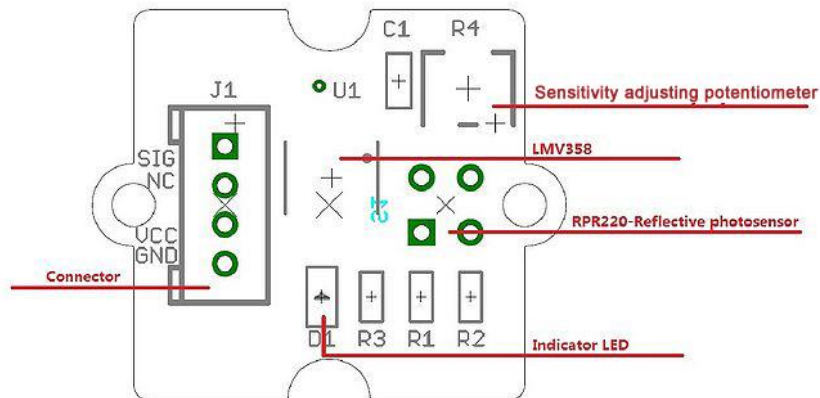
- **RPR220-Reflective photosensor**: High resolution Infrared Reflective sensor.

- **LMV358**: Rail-to-Rail Operational Amplifier.

- **Indicator LED**: The LED will turn on when the received infrared light intensity exceeds a preset level.

- **Sensitivity adjusting potentiometer** : adjust the light threshold of the sensor.

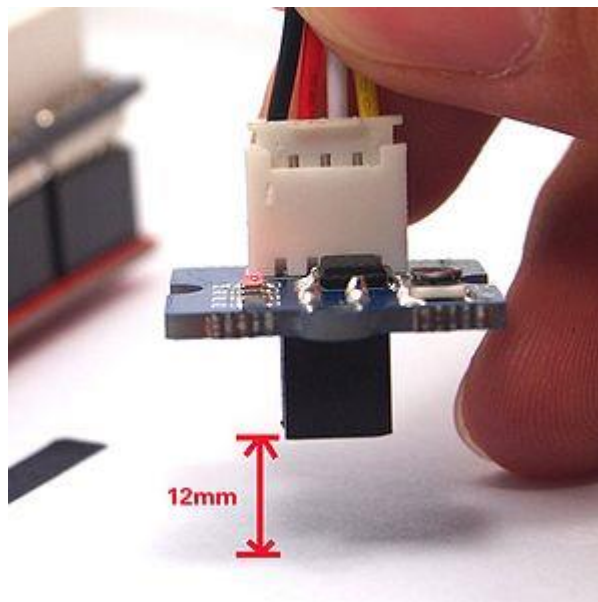# 3. Usage

3.1 With Arduino

Let's test the functions of Infrared Reflective Sensor with the following examples.
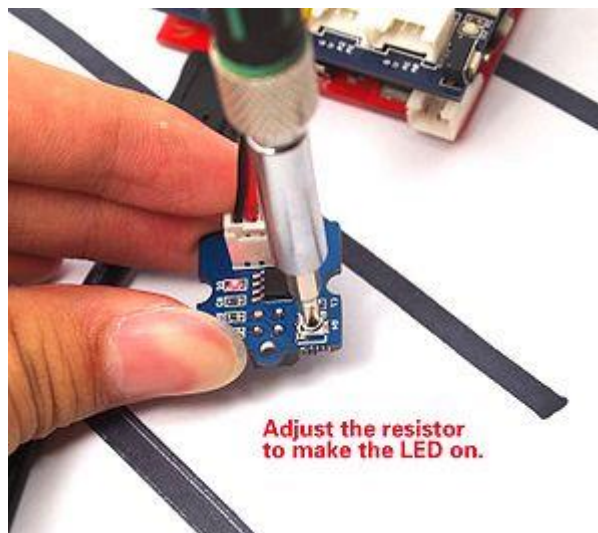
3.1.1 Demo 1: Line Following

This sensor can be used to help a robot car follow a black line on white background or vice versa.

Calibration

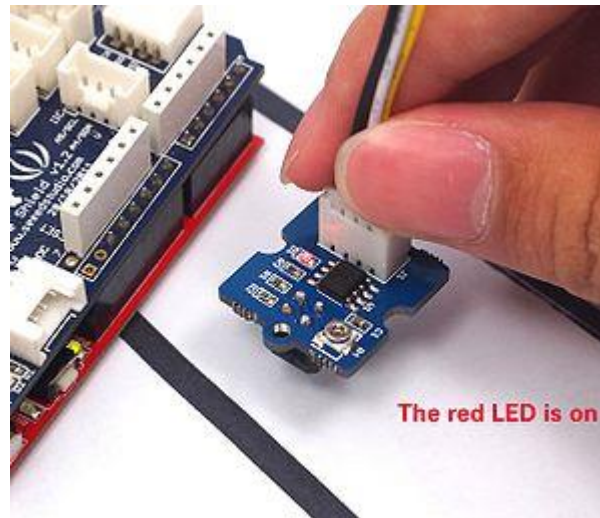Hold the sensor 12mm or other height you need above the background.

Then adjust the potentiometer with a crosshead screwdriver until the indicator LED turns on.

After that, keep the distance and move the sensor horizontally above the black line. if the indicator
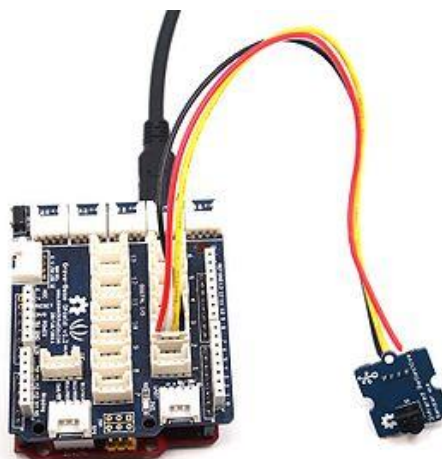
LED goes off, job done.

The red LED is on

The LED is shut.

If the LED remains on, adjust the potentiometer again until it's off.
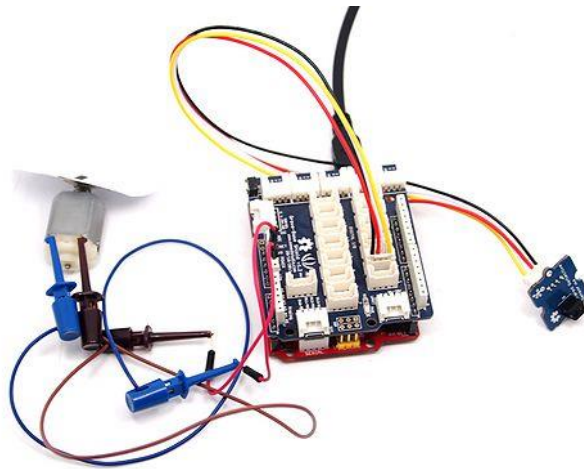
3.1.2   Demo 2: Rotary Speed Detection

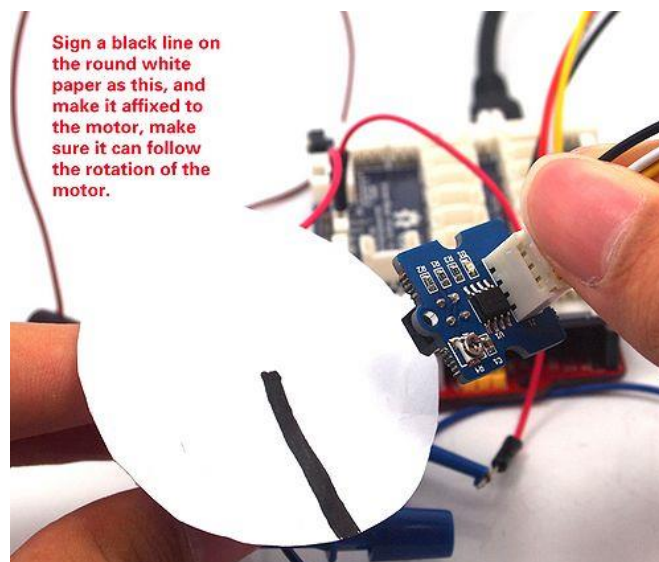Let's detect the speed of a motor via this example.

1. Connect the Infrared Reflective Sensor onto the D2 port of Grove - Base Shield like this.

2. Run up a motor

Note: Add a white plate with a black line marked onto the motor so that the sensor can get one signal when the plate rotates a round.


3. Download the library: Arduino timer1 library and unzip it into the libraries file of Arduino IDE by the path: ..\arduino-1.0.1\libraries.

4. Upload the demo code to your Arduino/Seeeduino.

```
#include <TimerOne.h>
unsigned int counter=0;
void blink()
{
  counter++;
}
void timerIsr()
```

```
{
  Timer1.detachInterrupt();  //disable the timer1
  Serial.print("The speed of the motor: ");
  Serial.print(counter,DEC);
  Serial.println("round/s");
  counter=0;
  Timer1.attachInterrupt( timerIsr );  //enable the timer1
}
void setup()
{
  Serial.begin(9600);
  Timer1.initialize(1000000); // set a timer of length 1sec
  attachInterrupt(0, blink, RISING);  //INT0
  Timer1.attachInterrupt( timerIsr ); // attach the service routine here
}
void loop()
{
  ;  //do nothing
}
```

5. Open the Serial Monitor to read the data.
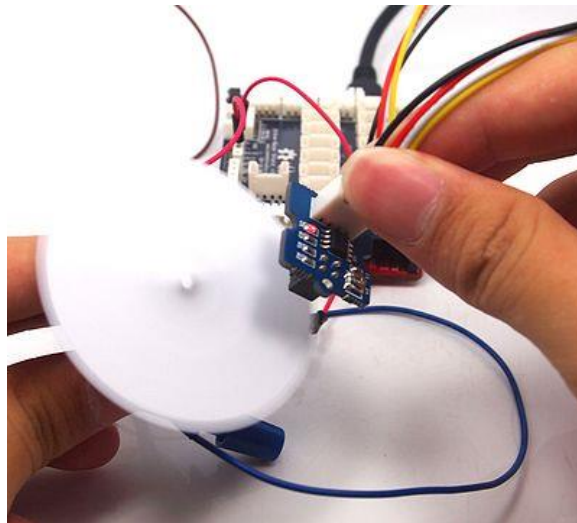
```
The speed of the motor: 0round/s
The speed of the motor: 76round/s
The speed of the motor: 84round/s
The speed of the motor: 83round/s
The speed of the motor: 85round/s
The speed of the motor: 85round/s
The speed of the motor: 85round/s
The speed of the motor: 85round/s
The speed of the motor: 85round/s
The speed of the motor: 85round/s
```

3.1.3   With Raspberry Pi

1. You should have got a raspberry pi and a grovepi or grovepi+.

2. You should have completed configuring the development enviroment, otherwise follow here.

3. Connection.

- Plug the sensor to grovepi socket D4 by using a grove cable.

4. Navigate to the demos' directory:

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

- To see the code

```
nano grove_infrared_reflective_sensor.py    # "Ctrl+x" to exit #
import time
import grovepi



# Connect the Grove Infrared Reflective Sensor to digital port D4
# SIG,NC,VCC,GND
sensor = 4

grovepi.pinMode(sensor,"INPUT")

while True:
    try:
        # Sensor returns HIGH on a black surface and LOW on a white surface
        if grovepi.digitalRead(sensor) == 1:
            print "black surface detected"
        else:
```

```
        print "white surface detected"


    time.sleep(.5)


except IOError:
    print "Error"
```

5.Run the demo.

```
sudo python grove_infrared_reflective_sensor.py
```

4. Resources

- [Grove-Infrared Reflective Sensor Eagle Files](#)

- [Arduino Timer1 Library](#)

- [RPR220 Datasheet](#)

- [Infrared Reflective Sensor Source Files](#)

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