YF-S201B Water Flow Sensor

The Water Flow sensor measures the rate of a liquid flowing through it. The YF-S201 water flow sensor consists of a plastic valve body, flow rotor and Hall Effect sensor. It is usually used at the inlet end to detect the amount of flow. When liquid flows through the sensor, a magnetic rotor will rotate and the rate of rotation will vary with the rate of flow. The Hall Effect sensor will then output a pulse width signal. Connect it to a microcontroller and you can monitor multiple devices such as your coffee maker, sprinkler or anything else, and control the water flow rate to suit your needs!

SKU: SSR1024

Brief Data:

- Operating Voltage: 3.5~12Vdc.
- Inner Diameter: Ø11mm
- Outside Diameter: Ø20mm
- Proof Water Pressure: <1.75 MPa.
- Water Flow Range: 1-30 L/min.
- Operating Current: 15 mA @ 5V.
- Accuracy: ±5% (2~30L/min).
- The Output Pulse High Level: >4.7 VDC @ 5V.
- The Output Pulse Low Level: <0.5 VDC @ 5V.
- Output Pulse Duty Ratio: 50% ± 10%.
- Water-flow Formula: 1L = 450 square waves.
- Working Humidity Range: 25% ~ 95% RH.
- Dimension: 62x36x35 mm.
- Weight: 52g.

Introduction:

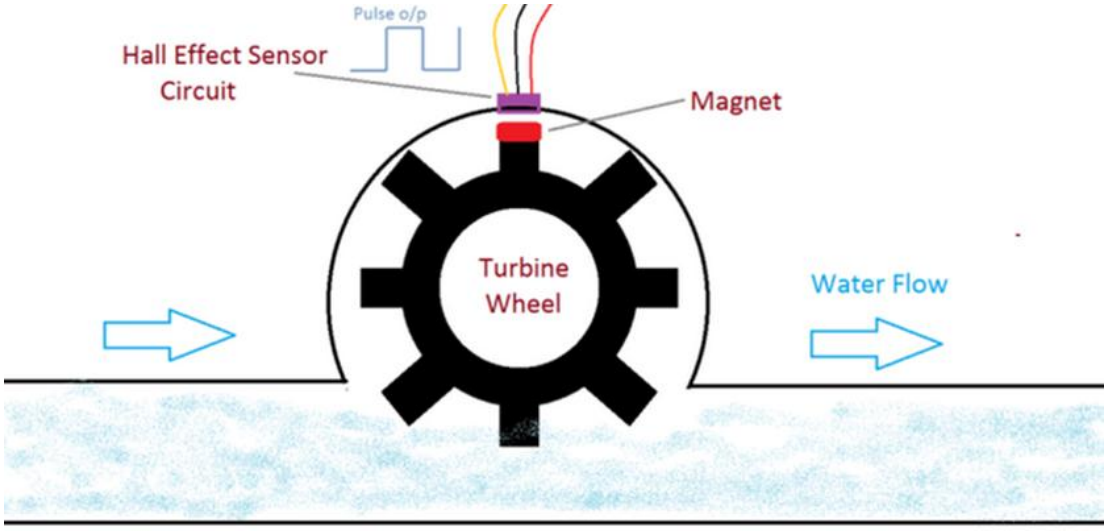
In this project we will interface YFS201 Hall Effect Water Flow Sensor with Arduino for measuring flow rate and volume of water or any other liquid. This is a very wonderful project that can be used in industry or at home or at water flow measurement application in water tap, tunnel, river etc. Water Flow Sensor for Flow Rate & Volume Measurement using Arduino code along with circuit diagram is explained below.

This project can be used to measure liquid flowing through a pipe or container, or to create a control system based on the water flow rate or quantity. For example, you could use this while gardening to measure the amount of water used to water your plants, to prevent wastage. This sensor sits in line with your water line and contains a pinwheel sensor to measure how much liquid has moved through it. There's an integrated magnetic Hall Effect sensor that outputs an electrical pulse with every revolution. The Hall Effect sensor is sealed from the water pipe and allows the sensor to stay safe and dry.

The sensor comes with three wires: red (5-24VDC power), black (ground) and yellow (Hall Effect pulse output). By counting the pulses from the output of the sensor, you can easily calculate water flow. Each pulse is approximately 2.25 milliliters. Note this isn't a precision sensor, and the pulse rate does vary a bit depending on the flow rate, fluid pressure and sensor orientation. It will need careful calibration if better than 10% precision is required. However, it is great tool for basic measurement tasks!

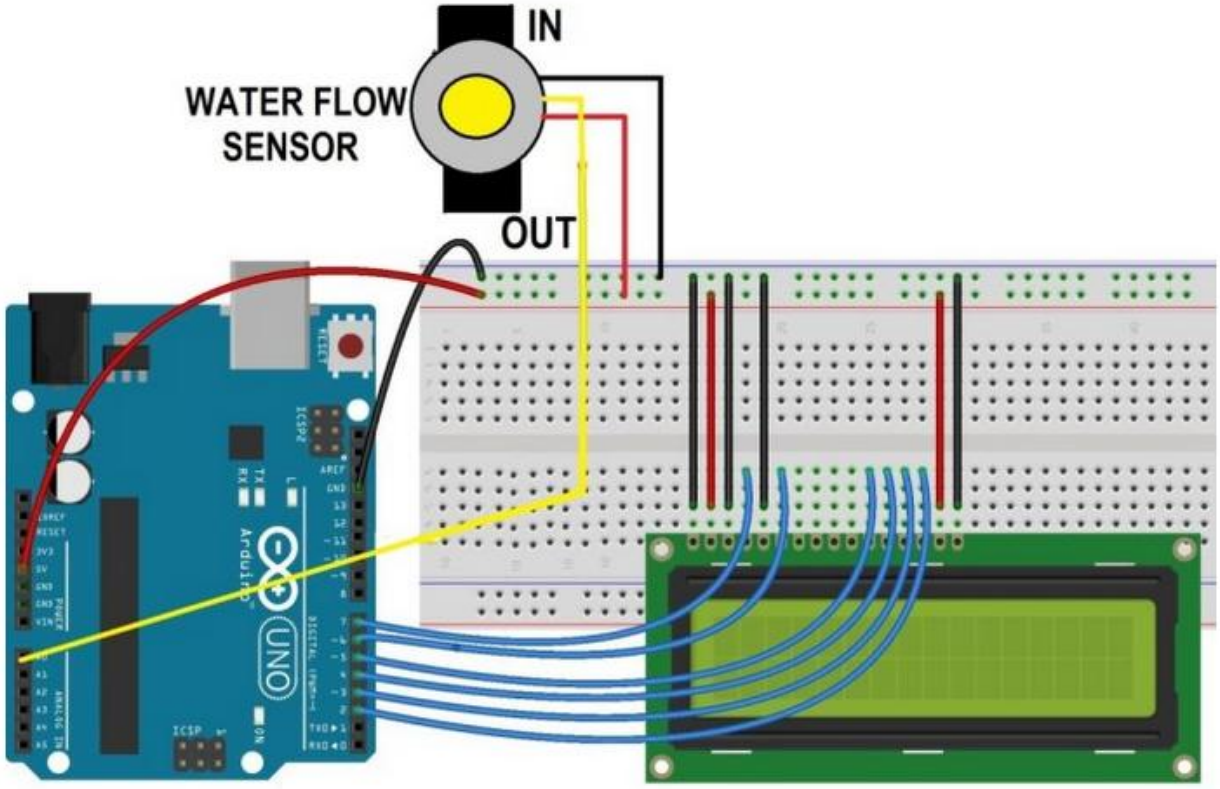
Working of YFS201 Hall Effect Water Flow Sensor:

The Water Flow Sensor for Flow Rate & Volume Measurement using Arduino works on the principle of the Hall Effect. According to the Hall Effect, a voltage difference is induced in a conductor transverse to the electric current and the magnetic field perpendicular to it. Here, the Hall Effect is utilized in the flow meter using a small fan/propeller-shaped rotor, which is placed in the path of the liquid flowing.



The liquid pushes against the fins of the rotor, causing it to rotate. The shaft of the rotor is connected to a Hall Effect sensor. It is an arrangement of a current flowing coil and a magnet connected to the shaft of the rotor, thus a voltage/pulse is induced as this rotor rotates. In this flow meter, for every liter of liquid passing through it per minute, it outputs about 4.5 pulses. This is due to the changing magnetic field caused by the magnet attached to the rotor shaft. We measure the number of pulses using an Arduino and then calculate the flow rate in liters per hour (L/hr) and total volume in Liter using a simple conversion formula.

Circuit Diagram:



YF-S201B Pin	Arduino Pin
Red Wire - 3.5~12Vdc	+5V
Yellow Wire - Data Out	A0
Black Wire - Ground	Ground

Arduino Sketch:

Copy and pasted the below Arduino sketch to IDE and upload to Aduino Uno board:

```
/*====================================================================

//  Author      : Handson Technology
//  Project     : Arduino Uno
//  Description : YF-S201B Water Flow Sensor with LCD Display
//  Source-Code : Water_flow.ino
//====================================================================
*/

//Include the library code:
#include <LiquidCrystal.h>

//Initialize the library with the numbers of the interface pins
//LiquidCrystal(rs, enable, d4, d5, d6, d7)
LiquidCrystal lcd(8, 9, 4, 5, 6, 7);

int X;
int Y;
float TIME = 0;
float FREQUENCY = 0;
float WATER = 0;
```

```
float TOTAL = 0;
float LS = 0;
const int input = A0;

void setup()
{
  Serial.begin(9600);
  lcd.begin(16, 2);
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("Water Flow Meter");
  lcd.setCursor(0,1);
  lcd.print("****************");
  delay(2000);
  pinMode(input,INPUT);
}

void loop()
{
  X = pulseIn(input, HIGH);
  Y = pulseIn(input, LOW);
  TIME = X + Y;
  FREQUENCY = 1000000/TIME;
  WATER = FREQUENCY/7.5;
  LS = WATER/60;

  if(FREQUENCY >= 0)

  {
  if(isinf(FREQUENCY))
  {
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("VOL. :0.00");
    lcd.setCursor(0,1);
    lcd.print("TOTAL:");
    lcd.print( TOTAL);
    lcd.print(" L");
  }
  else
  {
    TOTAL = TOTAL + LS;
    Serial.println(FREQUENCY);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("VOL.: ");
    lcd.print(WATER);
    lcd.print(" L/M");
    lcd.setCursor(0,1);
    lcd.print("TOTAL:");
    lcd.print( TOTAL);
    lcd.print(" L");
  }
  }
  delay(1000);
}
```

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