

Arduino Projects

Arduino Water Flow Sensor to Measure Flow Rate & Volume



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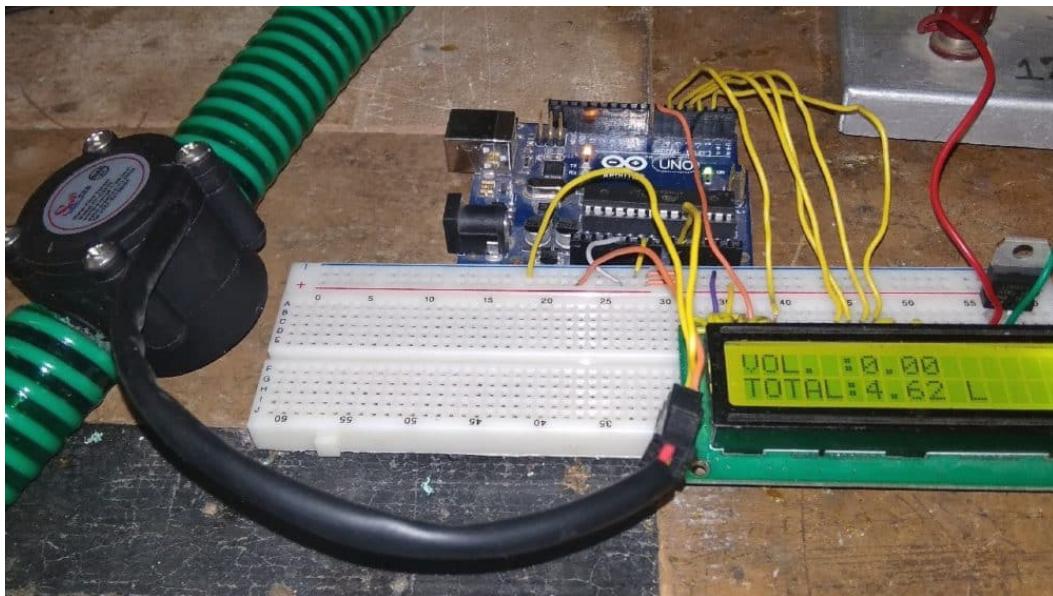


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Introduction:

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 the 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.

Check the advance version of this Project to monitor Water Flow Rate & Volume Remotely: [IoT Water Flow Meter using ESP8266](#)

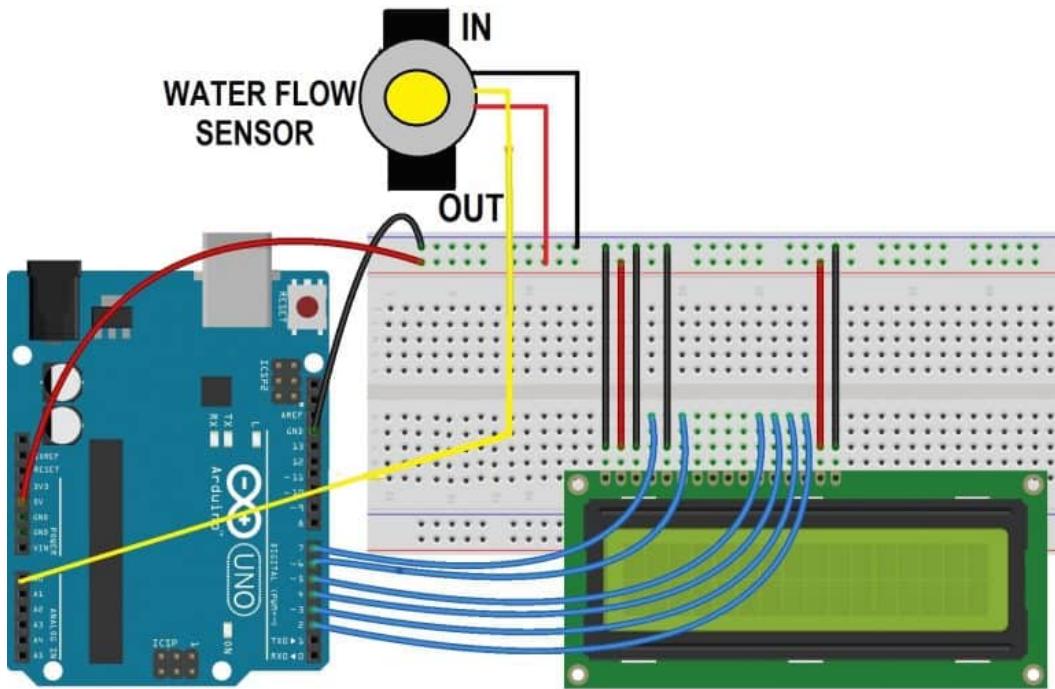
Water Flow Sensor for Flow Rate & Volume Measurement using Arduino:

Bill of Materials

S.N.	COMPONENTS NAME	DESCRIPTION	QUANTITY	
1	Arduino Board	Arduino UNO R3 Development Board	1	https://amzn.to/3LqfXWz

S.N.	COMPONENTS NAME	DESCRIPTION	QUANTITY	
2	Water Flow Sensor	YFS201 Hall Effect Water Flow Sensor	1	https://amzn.to/3LqfJyD
3	LCD Display	JHD162A 16x2 LCD Display	1	https://amzn.to/3LqfJyD
4	Potentiometer	10K	1	https://amzn.to/3LqfJyD
5	Water Pipe		1	https://amzn.to/3LqfJyD
6	Connecting Wires	Jumper Wires	20	https://amzn.to/3LqfJyD
7	Breadboard	-	1	https://amzn.to/3LqfJyD

Circuit Diagram:



Connect the LCD pin 1, 3, 5, 16 to GND & 2, 15 to 5V VCC. And then connect LCD pins 4,6,11,12,13,14 to Arduino digital pins D7, D6, D5, D4, D3, D2.

Connect YFS201 Hall Effect Water Flow Sensor VCC pins to 5V Power supply & GND to GND. Since it's an analog sensor, so connect its analog pin to A0 of Arduino as shown in the figure above.

YFS201 Hall Effect Water Flow Sensor:

Introduction:

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.

[Check the YF-S201 Hall Effect Water Flow Meter / Sensor Datasheet](#)



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 the **water flow rate**. 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's great for basic measurement tasks!

Features of Flow Sensor:

Model: YF-S201

Sensor Type: Hall effect

Working Voltage: 5 to 18V DC (min tested working voltage 4.5V)

Max current draw: 15mA @ 5V

Output Type: 5V TTL

Working Flow Rate: 1 to 30 Liters/Minute

Working Temperature range: -25 to +80°C

Working Humidity Range: 35%-80% RH

Accuracy: ±10%

Maximum water pressure: 2.0 MPa

Output duty cycle: 50% +-10%

Output rise time: 0.04us

Output fall time: 0.18us

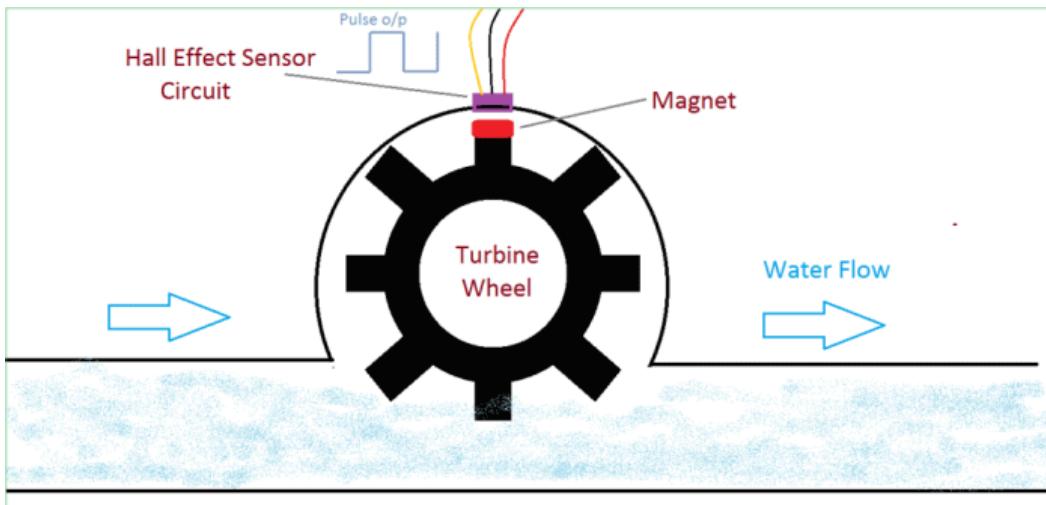
Flow rate pulse characteristics: Frequency (Hz) = 7.5 * Flow rate (L/min)

Pulses per Liter: 450

Durability: minimum 300,000 cycles

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 Litre using a simple conversion formula

Source Code/Program:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(7, 6, 5, 4, 3, 2);
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);  
}
```

Video Preview & Demonstration:

Water Flow Rate & Volume Measurement using Water Flow Sensor & Arduino

Watch this video [on YouTube](#).

Check the advance version of this Project to monitor Water Flow Rate & Volume Remotely: [IoT Water Flow Meter using ESP8266](#)

32 Comments

ADITYA[July 18, 2018 at 5:02 PM](#)

FROM WHERE THE ELECTRICITY SUPPLY IS THERE

Loading...

[Reply](#)**Alex Newton**[July 28, 2018 at 9:54 AM](#)

Use any 5 volt supply to 5v point on arduino

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[Reply](#)**lutfy**[August 9, 2018 at 7:35 PM](#)

can be explained the function of the variable time, frequency, water, total and ls?

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[Reply](#)**Pragnesh**[September 11, 2018 at 6:54 PM](#)

Dear sir water flow rate project practically very nice and I was making. Sir plz halp me for example- totaliser 100 ltr showing display then I power off then restart time why totalizer 0.00 showing? Any option shaving plz help me

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[Reply](#)

Anup[October 28, 2018 at 9:00 PM](#)

I tried this with an alternate flow meter, could not get it to work.
Seems to be some discrepancies between the flow meter spec' vs your
text.

Where did you get the Frequency = 1000000/Time

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[Reply](#)

Sudhir[May 9, 2019 at 5:18 PM](#)

1 sec = 10000000 microseconds

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[Reply](#)

wexler[November 21, 2018 at 1:56 AM](#)

Hi

I want to build this device, and I would like to ensure that the count
is not lost if the power is lost.

I want to write to EEPROM when the Arduino detects power down – I'm
not sure it is ok... because EEPROM cycle use is limited.

Could you help me?

Loading...

[Reply](#)

Kakaire[December 4, 2018 at 9:09 PM](#)

Nice tutorial. It has some of the features that i want to include in my project. I need some advice from you.

Here i go

So i want to develop a water utility system where people can go to fetch water and insert their cards with some credit on them and when they do so, the system first accepts the payment before it dispenses the water equivalent to the credit paid. Any advice in terms of what hardware i need to accomplish that?

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[Reply](#)

Alex Newton[December 4, 2018 at 10:13 PM](#)

Use RFID System and a keypad.

Rfid for access controlling and keypad for selecting amount/volume of water that is to be drawn.

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[Reply](#)

Debraj[February 12, 2019 at 2:24 PM](#)

How to use keyboard for entering the value and how to use relay for controlling the water flow ...Please help.

Loading...

**athena**

December 30, 2018 at 4:28 PM

i want to convert the measured amount of water into its equivalent cost. Can you help me with the codes?

Loading...

Reply

**Alex Newton**

December 30, 2018 at 6:02 PM

total cost = total volume of water/unit cost of 1 litre water

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Reply

**Haysar Lelis**

January 24, 2019 at 2:22 AM

Hi Alex, great work ... well done! thanks for it.

I have one question, I'm using a mechanical Water flow ...

(<https://wtmeters.com/docProdotti/P-0000021.pdf>) and sometimes I have a TIME value negative ... Could you help me? Because I think this situation is not normal.

Regards

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Reply

Ganesh J G[February 24, 2019 at 12:39 PM](#)

Hi

I saw your video and Arduino program.thanks for the information. I have a question regarding using 2 halleffect water flow sensors at a time for measuring the flow rate of hot and cold water flowing through 2 different pipelines. Here only A0 used. For this we need to use A1 too.Also if I don't need to display the total amount ,what changes are to be made in the program.need to display H.W F/R and C.W F/R

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[Reply](#)

Alex Newton[February 24, 2019 at 12:43 PM](#)

In the programming section Remove the line that displays total amount. And to display flow rate sensed by analog pin A1, add the line similar to that of A0. You just need good programming skill.

Loading...

[Reply](#)

 **Ganesh J G**

February 24, 2019 at 12:49 PM

Hi, thanks for the video and program. Please help me with a program for using 2 Hall effect water flow sensors for measuring water flow rate through 2 different pipelines. Here we used only A0. But for this we need to A0 and A1, right? instead of total flow we need to show H.W F/R and C.W F/R

Hot and cold water flow rate

Regards

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Reply

GANESH J G

February 24, 2019 at 2:25 PM

```
LiquidCrystal lcd(7, 6, 5, 4, 3, 2);
int W;
int X;
int Y;
int Z;
float TIME = 0;
float TIME2 = 0;
float FREQUENCY = 0;
float FREQUENCY2 = 0;
float WATER = 0;
float WATER2 = 0;
float LS = 0;
float LS2 = 0;
const int input1 = A0;
const int input2 = A1;
void setup()
{
    Serial.begin(9600);
    lcd.begin(16, 2);
    lcd.clear();
    lcd.setCursor(0, 0);
    lcd.print(" HEAT EXCHANGER");
    lcd.setCursor(0, 1);
    lcd.print("Water Flow Meter");
    delay(2000);
    pinMode(input1, INPUT);
    pinMode(input2, INPUT);
}
void loop()
{
    W = pulseIn(input1, HIGH);
    X = pulseIn(input1, LOW);
    TIME = W + X;
    FREQUENCY = 1000000 / TIME;
    WATER = FREQUENCY / 7.5;
    LS = WATER / 60;
    if (FREQUENCY >= 0)
    {
        if (isinf(FREQUENCY))
        {
            lcd.clear();
            lcd.setCursor(0, 0);
            lcd.print("Hw F/R :0.00 L/M");
        }
    }
}
```

```
lcd.setCursor(0, 1);
lcd.print("Cw F/R :0.00 L/M");
}
{
Y = pulseIn(input2, HIGH);
Z = pulseIn(input2, LOW);
TIME2 = Y + Z;
FREQUENCY2 = 1000000 / TIME2;
WATER2 = FREQUENCY2 / 7.5;
LS2 = WATER2 / 60;
Serial.println(FREQUENCY);
lcd.clear();
lcd.setCursor(0, 0);
lcd.print("Hw F/R:");
lcd.print(WATER);
lcd.print("L/M");
lcd.setCursor(0, 1);
lcd.print("Cw F/R:");
lcd.print(WATER2);
lcd.print("L/M");
}
if (isinf(FREQUENCY2))
{
Serial.println(FREQUENCY2);
lcd.clear();
lcd.setCursor(0, 0);
lcd.print("Hw F/R :0.00 L/M");
lcd.setCursor(0, 1);
lcd.print("Cw F/R :0.00 L/M");
}
}
delay(1000);
}
```

Correct or not?

waiting or reply

need help

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Reply

**amin**

March 6, 2019 at 3:13 PM

where you make the circuit diagram ?

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Reply

**basit ali**

June 18, 2019 at 12:08 AM

Hi

I have tried your code using the sensor. but it is not showing me exact reading. there is massive error. on pouring 350 milliliter. it shows as large as total vilumv of 23 liters..

can you please help me with this.??

Loading...

Reply

**Elaya**

December 26, 2019 at 11:44 AM

I think the formula is wrong.

LS (liters per second) needs to be = $(\text{Freq} \times 60) / 7.5$

the one configured here is

$\text{LS} = \text{Freq} / (60 \times 7.5)$

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Reply

**Talip**

January 2, 2020 at 12:37 PM

what this TTL?

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Aswin k raj[August 11, 2019 at 2:50 PM](#)

I want to set a water meter with consumption of water can be informed via sms by sending an sms from an office number

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[Reply](#)

benjamin granil[September 17, 2019 at 4:26 PM](#)

How to Program arduino uno with LCD for velocity and Discharge of water

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[Reply](#)

benjamin granil[September 17, 2019 at 4:27 PM](#)

Please Help me proram arduino uno with LCD to find the velocity and Discharge of water

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[Reply](#)

Akhil[September 26, 2019 at 10:38 AM](#)

why we are using 7.5 and 1000000 values in the code ?

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[Reply](#)

subhash

October 12, 2019 at 6:29 PM

Hello sir can i get a code that helps the flow sensor to read the flow of pressure passing through the valve (i mean like if the valve is completely open the sensor will detect full pressure and give out a reading of 100% likewise if its half open the sensor will detect from the pressure and give out a reading for 50% also respectively for 75% and 25%.

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Reply

John Joseph M. Bautista

December 10, 2019 at 10:05 PM

Pls do a video about this flow sensor with a button and solve what is the problem with the given combination. I am currently using this device for my thesis and i needed to combine these two! pls help!!

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Reply

PJ

January 10, 2020 at 7:16 PM

Hi sir, how do I switch the code, instead of using lcd i'm just gonna use my laptop as a temporary monitor

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Reply

the zombie killer Good Man[February 24, 2020 at 1:07 PM](#)

hello,

i need the flowrate to start counting minimum flow to detect approximately 2l / h

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[Reply](#)

Vishal Gautam[January 26, 2021 at 6:41 PM](#)

Sir please provide a flow chart and block diagram

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[Reply](#)

omkar joshi[December 9, 2021 at 10:49 AM](#)

nothing is show on lcd is play

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[Reply](#)

aylin[February 14, 2022 at 10:10 PM](#)

hi, thanks for useful tutorials

Although you mentioned the sensor is an analog sensor in this tutorial, it's been considered as digital sensor in IoT water flow sensor tutorial.

I'm wondering what the reason is.

thanks

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[Reply](#)

