

Grove - Water Level Sensor



The Grove Water Level Sensor is a very accurate sensor that can be helpful in water level sensing applications. It is completely waterproof and uses capacitive pads to detect water levels up to 10cm.

We used capacitive pads on the PCB of the module and did conformal coating over the PCB to make the sensor protect against

moisture, dust, chemicals and high temperatures. We believe that this technique will allow you to make accurate water level measurements ($\pm 5\text{mm}$ accuracy) easily.



[<https://www.seeedstudio.com/Grove-Water-Level-Sensor-10CM-p-4443.html>]

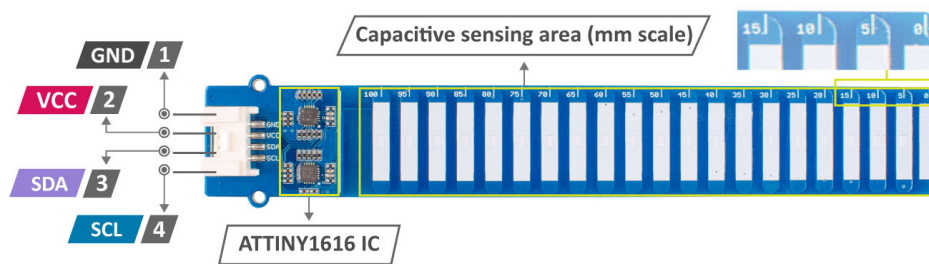
Feature

- Easy to use (Use Grove Connector without soldering)
- Based on capacitive sensing
- Waterproof
- Conformal Coating
- Corrosion Resistant
- Detect up to 10cm water levels
- I2C Interface

Specification

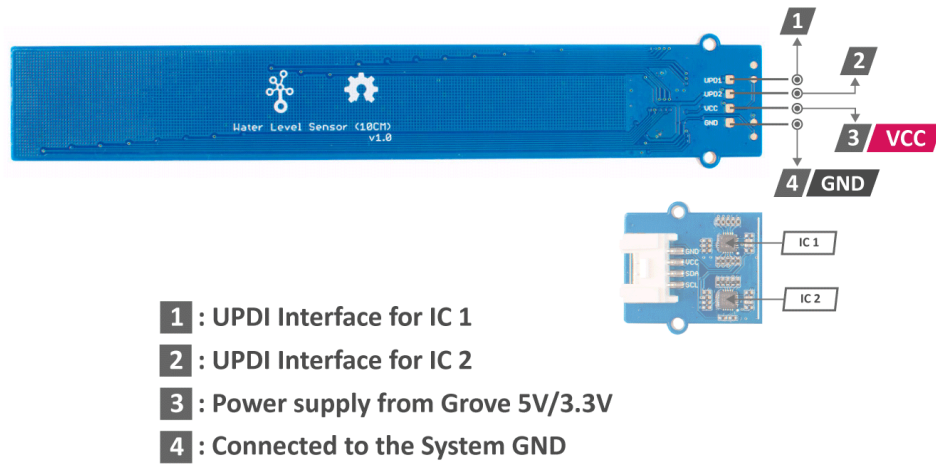
Parameter	Value
Input voltage	3.3V / 5V
Measurement Accuracy	±5mm
Working Temperature Range	-40°C to 105°C
I2C Addresses	0x78 and 0x77
Interface	I2C
Dimensions	20mm x 133mm

Hardware Overview





- 1** : Connected to the system GND
- 2** : Power supply from Grove 5V/3.3V
- 3** : I2C Serial Data
- 4** : I2C Serial Clock

[<https://files.seeedstudio.com/wiki/Grove-Water-Level-Sensor/img/Grove-Water-Level-Sensor-pinout-1.jpg>]



[<https://files.seeedstudio.com/wiki/Grove-Water-Level-Sensor/img/Grove-Water-Level-Sensor-UPDI.png>]

Platforms Supported

Arduino	Raspberry Pi		
			

Getting Started

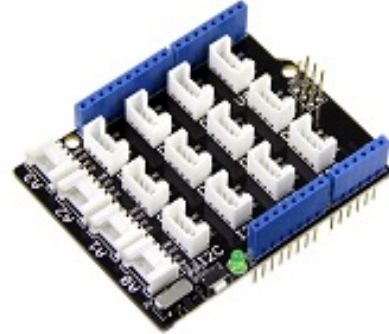
Play With Arduino

Materials required

Seeeduino V4.2



Base Shield



Get ONE Now

[<https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html>]

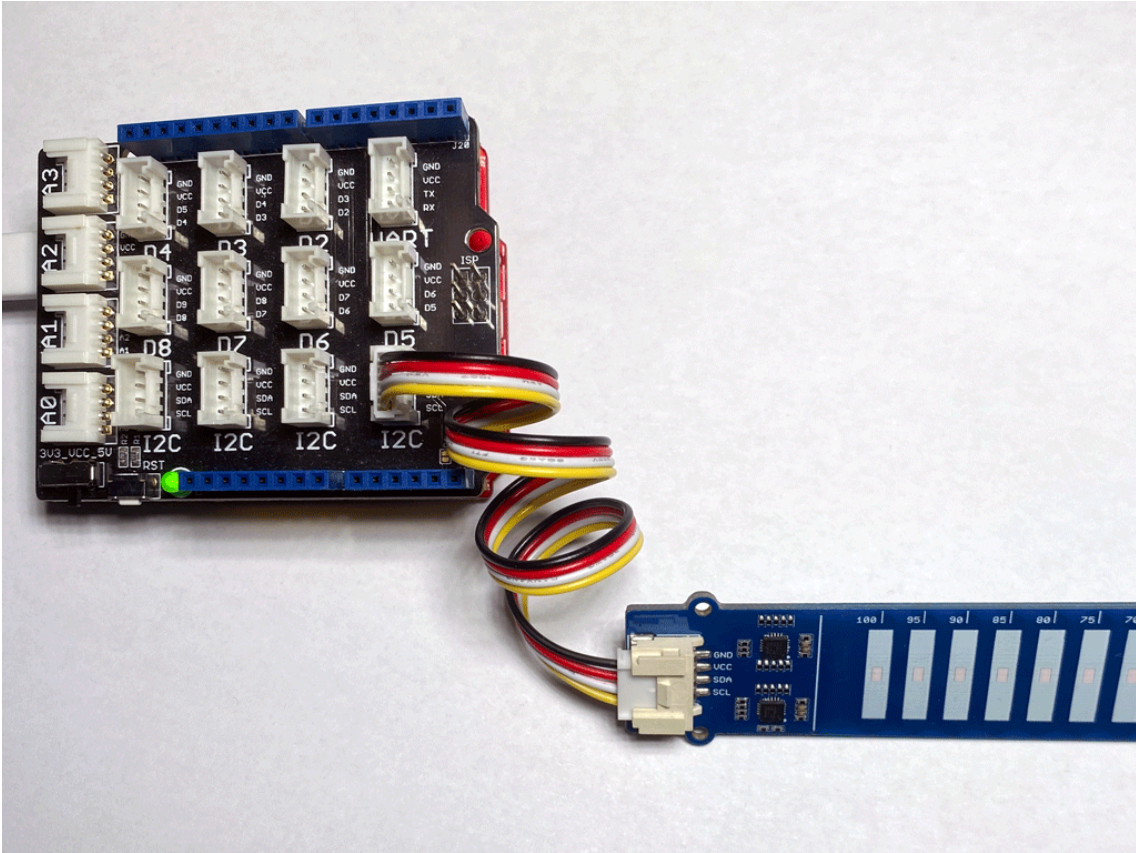
Get ONE Now

[<https://www.seeedstudio.com/Base-Shield-V2-p-1378.html>]

In addition, you can consider our new [Seeeduino Lotus M0+](https://www.seeedstudio.com/Seeeduino-Lotus-Cortex-M0-p-2896.html) [<https://www.seeedstudio.com/Seeeduino-Lotus-Cortex-M0-p-2896.html>], which is equivalent to the combination of Seeeduino V4.2 and Baseshield.

Hardware Connection

- **Step 1.** Plug Grove - Water Level Sensor to **I2C** port of Grove - Base Shield.
- **Step 2.** Plug Grove - Base Shield into Seeeduino.
- **Step 3.** Connect Seeeduino to a PC via a USB cable.



Software



Attention

If this is the first time you work with Arduino, we strongly recommend you to see [Getting Started with Arduino](https://wiki.seeedstudio.com/Getting_Started_with_Arduino/) [https://wiki.seeedstudio.com/Getting_Started_with_Arduino/] before the start.

- **Step 1.** Open the Arduino IDE and create a new file, then copy the following code into the new file.

```
1  #include <Wire.h>
2
3  #ifdef ARDUINO_SAMD_VARIANT_COMPLIANCE
4  #define SERIAL SerialUSB
5  #else
6  #define SERIAL Serial
```



```
7  #endif
8
9  unsigned char low_data[8] = {0};
10 unsigned char high_data[12] = {0};
11
12
13 #define NO_TOUCH      0xFE
14 #define THRESHOLD     100
15 #define ATTINY1_HIGH_ADDR  0x78
16 #define ATTINY2_LOW_ADDR  0x77
17
18 void getHigh12SectionValue(void)
19 {
20     memset(high_data, 0, sizeof(high_data));
21     Wire.requestFrom(ATTINY1_HIGH_ADDR, 12);
22     while (12 != Wire.available());
23
24     for (int i = 0; i < 12; i++) {
25         high_data[i] = Wire.read();
26     }
27     delay(10);
28 }
29
30 void getLow8SectionValue(void)
31 {
32     memset(low_data, 0, sizeof(low_data));
33     Wire.requestFrom(ATTINY2_LOW_ADDR, 8);
34     while (8 != Wire.available());
35
36     for (int i = 0; i < 8 ; i++) {
37         low_data[i] = Wire.read(); // receive a byte as cha
38     }
39     delay(10);
40 }
41
42 void check()
43 {
44     int sensorvalue_min = 250;
45     int sensorvalue_max = 255;
46     int low_count = 0;
47     int high_count = 0;
```

```
48  while (1)
49  {
50      uint32_t touch_val = 0;
51      uint8_t trig_section = 0;
52      low_count = 0;
53      high_count = 0;
54      getLow8SectionValue();
55      getHigh12SectionValue();
56
57      Serial.println("low 8 sections value = ");
58      for (int i = 0; i < 8; i++)
59      {
60          Serial.print(low_data[i]);
61          Serial.print(".");
62          if (low_data[i] >= sensorvalue_min && low_data[i]
63              {
64                  low_count++;
65              }
66          if (low_count == 8)
67          {
68              Serial.print("      ");
69              Serial.print("PASS");
70          }
71      }
72      Serial.println(" ");
73      Serial.println(" ");
74      Serial.println("high 12 sections value = ");
75      for (int i = 0; i < 12; i++)
76      {
77          Serial.print(high_data[i]);
78          Serial.print(".");
79
80          if (high_data[i] >= sensorvalue_min && high_data[
81              {
82                  high_count++;
83              }
84          if (high_count == 12)
85          {
86              Serial.print("      ");
87              Serial.print("PASS");
88          }
```



```
89     }
90
91     Serial.println(" ");
92     Serial.println(" ");
93
94     for (int i = 0 ; i < 8; i++) {
95         if (low_data[i] > THRESHOLD) {
96             touch_val |= 1 << i;
97
98         }
99     }
100    for (int i = 0 ; i < 12; i++) {
101        if (high_data[i] > THRESHOLD) {
102            touch_val |= (uint32_t)1 << (8 + i);
103        }
104    }
105
106    while (touch_val & 0x01)
107    {
108        trig_section++;
109        touch_val >>= 1;
110    }
111    SERIAL.print("water level = ");
112    SERIAL.print(trig_section * 5);
113    SERIAL.println("% ");
114    SERIAL.println(" ");
115    SERIAL.println("*****");
116    delay(1000);
117 }
118 }
119
120 void setup() {
121     SERIAL.begin(115200);
122     Wire.begin();
123 }
124
125 void loop()
126 {
127     check();
128 }
```

- **Step 3.** Upload the demo. If you do not know how to upload the code, please check [How to upload code](https://wiki.seeedstudio.com/Upload_Code/) [https://wiki.seeedstudio.com/Upload_Code/].
- **Step 4.** Open the **Serial Monitor** of Arduino IDE by click **Tool->Serial Monitor**. Or tap the `Ctrl + Shift + M` key at the same time. Set the baud rate to **115200**.
- **Step 5.** The result should be like this when the sensor is in water:

The screenshot shows the Serial Monitor window for the device /dev/cu.usbmodem14101. The output text is as follows:

```

low 8 sections value =
89.98.252.252.252.252.35.37.

high 12 sections value =
20.0.0.0.0.0.0.0.0.0.0.0.0.0.

water level = 0%

*****
low 8 sections value =
145.160.32.252.252.252.36.

high 12 sections value =
24.0.0.0.0.0.0.0.0.0.0.0.0.

water level = 10%

*****

```

The bottom of the window shows the following controls: Autoscroll, Show timestamp, No line ending (dropdown), 115200 baud (dropdown), and Clear output (button).

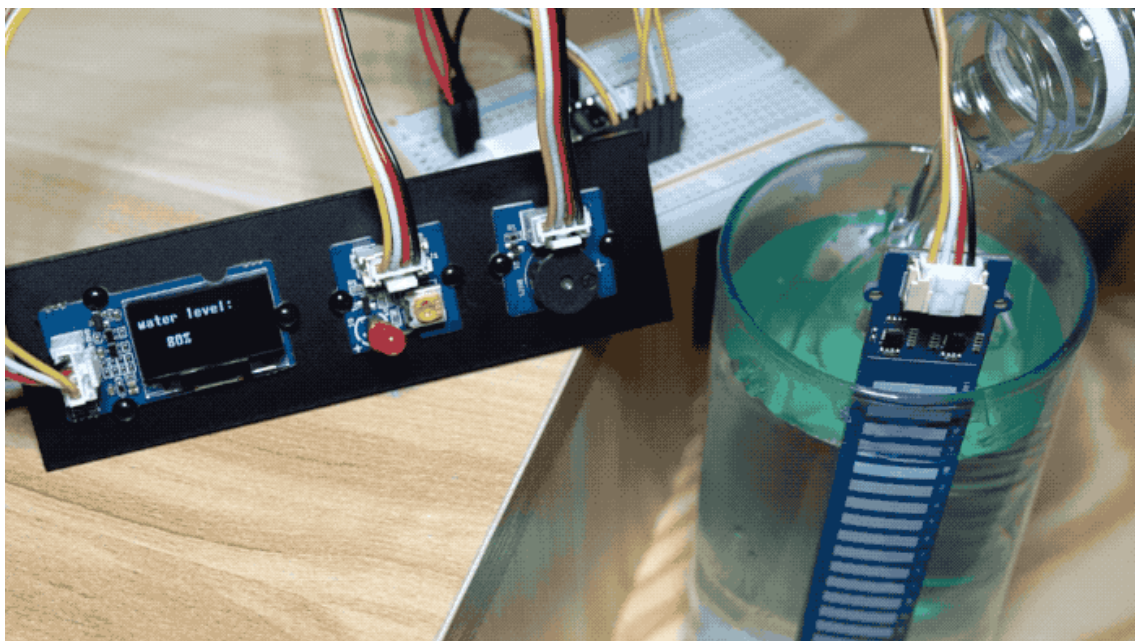
FAQ

Q1# Useful Applications?

A1: Here provides a simple application using the **Grove - Water Level Sensor** with **Buzzer** and **LED module** for water level detecting.

Please check the [full code](#)

[https://files.seeedstudio.com/wiki/Grove-Water-Level-Sensor/water-level-sensor-demo.ino] [here](#).



Schematic Online Viewer



Resources

- **[ZIP]** [Grove - Water Level Sensor \(10CM\) Schematic file](https://files.seeedstudio.com/wiki/Grove-Water-Level-Sensor/res/Grove%20-%20Water%20Level%20Sensor%20(10CM)_SCH%26PCB.zip)
[https://files.seeedstudio.com/wiki/Grove-Water-Level-Sensor/res/Grove%20-%20Water%20Level%20Sensor%20(10CM)_SCH%26PCB.zip]
- **[PDF]** [ATtiny1616-1617-Automotive-Data-Sheet](https://files.seeedstudio.com/wiki/Grove-Water-Level-Sensor/res/ATtiny1616-1617-Automotive-Data-Sheet.pdf)
[https://files.seeedstudio.com/wiki/Grove-Water-Level-Sensor/res/ATtiny1616-1617-Automotive-Data-Sheet.pdf]

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