Project Name: Automatic Indication of Ro Filter Membrane Condition Using Arduino.

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1. Overview

TDS (Total Dissolved Solids) indicates how many **milligrams** of **soluble solids** are dissolved in one liter of water. In general, the higher the TDS value, the more soluble solids are dissolved in water, and the less clean the water is.

Therefore, the TDS value can be used as one **reference point** for reflecting

the **cleanliness of the water**. This can be applied to domestic water, hydroponic and other fields of **water quality testing** and **monitoring**.

So, in this project, we will **interface Gravity Analog TDS Sensor with Arduino Microcontroller** and read the value in 16x2 **LCD Display**. Since TDS Value depends upon the **temperature**. So will also add **DS18B20 Waterproof Temperature Sensor** to measure Water Temperature. The measured temperature is used with TDS Sensor to compensate for the reading with high **calibration** and high **accuracy**. The code, circuit diagram, and all other procedure is given below.

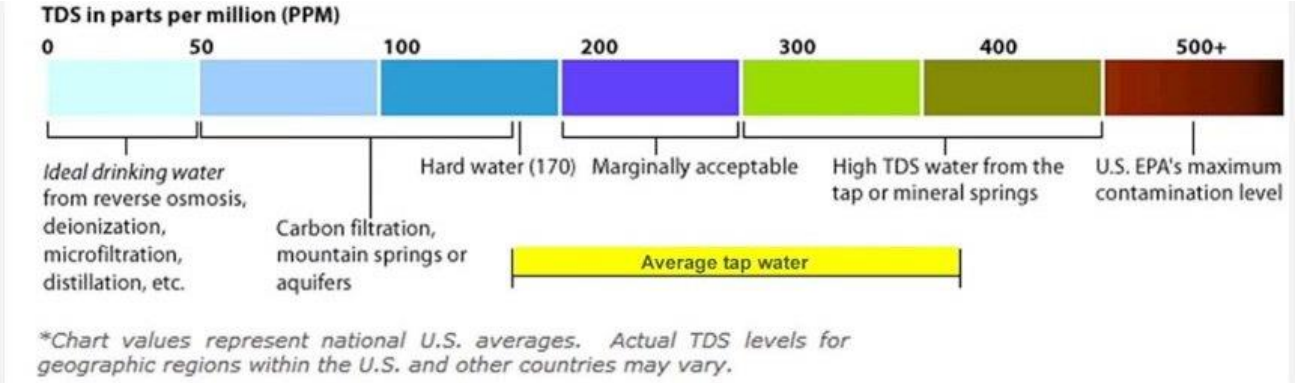
In order to know more about **water quality**, you can add **Ph Sensor**, **Turbidity Sensor** & **DO Sensor** to this circuit as well.

2. Components

1. Arduino UNO
2. TDS Sensor
3. DS18B20 Sensor(DS18B20 One-Wire Waterproof Temperature Sensor)
4. LCD Display
5. Potentiometer(10k)
6. Resistor(4.7)
7. Jumper wire
8. Bread board

What is “TDS”?

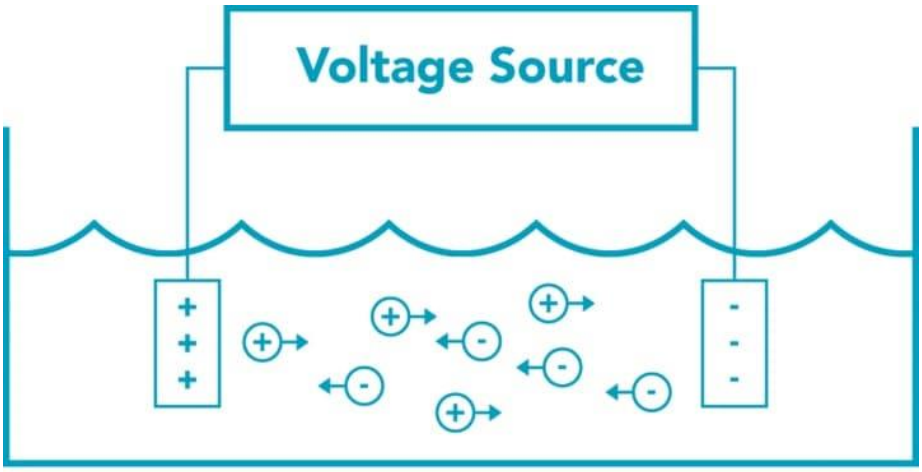
TDS is an abbreviation for **Total Dissolved Solids** in a liquid, including organic and inorganic substances in a molecular, ionic, or micro-granular suspended form. TDS is generally expressed in **parts per million (ppm)** or as **milligrams per liter (mg/L)**. TDS is directly related to the **quality of water** i.e., the lower a TDS figure, the purer the water. As an example, reverse **osmosis purified water** will have a TDS between 0 and 10, whereas tap water will vary between 20 and 300, depending on where you live in the world.



The materials that constitute dissolved solids in water include materials such as **minerals, salts, anionic** and **cationic substances**. They can also include pollutants such as **heavy metals**, and other substances such as **organic materials** that may have leaked into your water supply system.

What is a TDS meter and how does it work?

A **TDS meter** is basically an **electrical charge (EC)** meter whereby two electrodes equally spaced apart are inserted into water and used to measure charge. The result is interpreted by the **TDS meter** and converted into a ppm figure.



If the water contains no soluble materials and is pure, it will not conduct a charge and will, therefore, have a 0 ppm figure. Conversely, if the water is full of dissolved materials, it will conduct a charge, with the resulting ppm figure being proportional to the number of dissolved solids. This is because all dissolved solids have an **electrical charge**, which allows conduction of electrical charge between the **electrodes**.

What can a TDS meter be used for?

As well as measuring the TDS of our drinking water supplies, a TDS meter can be used for measuring:

1. Fish tanks and aquariums

Fish require a specific TDS and pH similar to the natural environment in which they live. Freshwater fish require less than 400ppm, with some other freshwater fish requiring less. Saltwater fish require TDS readings of between 5000 and 50000ppm.

2. Hydroponics

A TDS meter is a useful aid for quickly measuring the nutrient concentration of a hydroponic solution.

3. Pools and spas

A low TDS reading can help prevent maintenance issues, skin irritation, and algal blooms.

4. Colloidal silver : There are many consumers of colloidal silver today using a TDS meter to measure their colloidal silver concentration in parts per million (ppm). The TDS meter gives a relatively accurate measurement.

Gravity Analog TDS Sensor

Gravity Analog TDS Sensor is an **Arduino-compatible TDS sensor/Meter** Kit for measuring TDS value of the water. It can be applied to domestic water, hydroponic and other fields of water quality testing. This product supports **3.3 ~ 5.5V** wide voltage input, and **0 ~ 2.3V** analog voltage output, which makes it compatible with 5V or 3.3V control systems or boards.

The excitation source is an **AC signal**, which can effectively prevent the probe from **polarization** and prolong the life of the probe, meanwhile, it can help increase the stability of the output signal. The **TDS probe** is waterproof, it can be immersed in water for long time measurement.

Specification

1. Input Voltage: *3.3 ~ 5.5V*

2. Output Voltage: *0 ~ 2.3V*

3. Working Current: *3 ~ 6mA*

4. TDS Measurement Range: *0 ~ 1000ppm*

5. TDS Measurement Accuracy: ± *10% FS (25 ℃)*

6. TDS probe with Number of Needle: *2*

Attention & Things to Remember

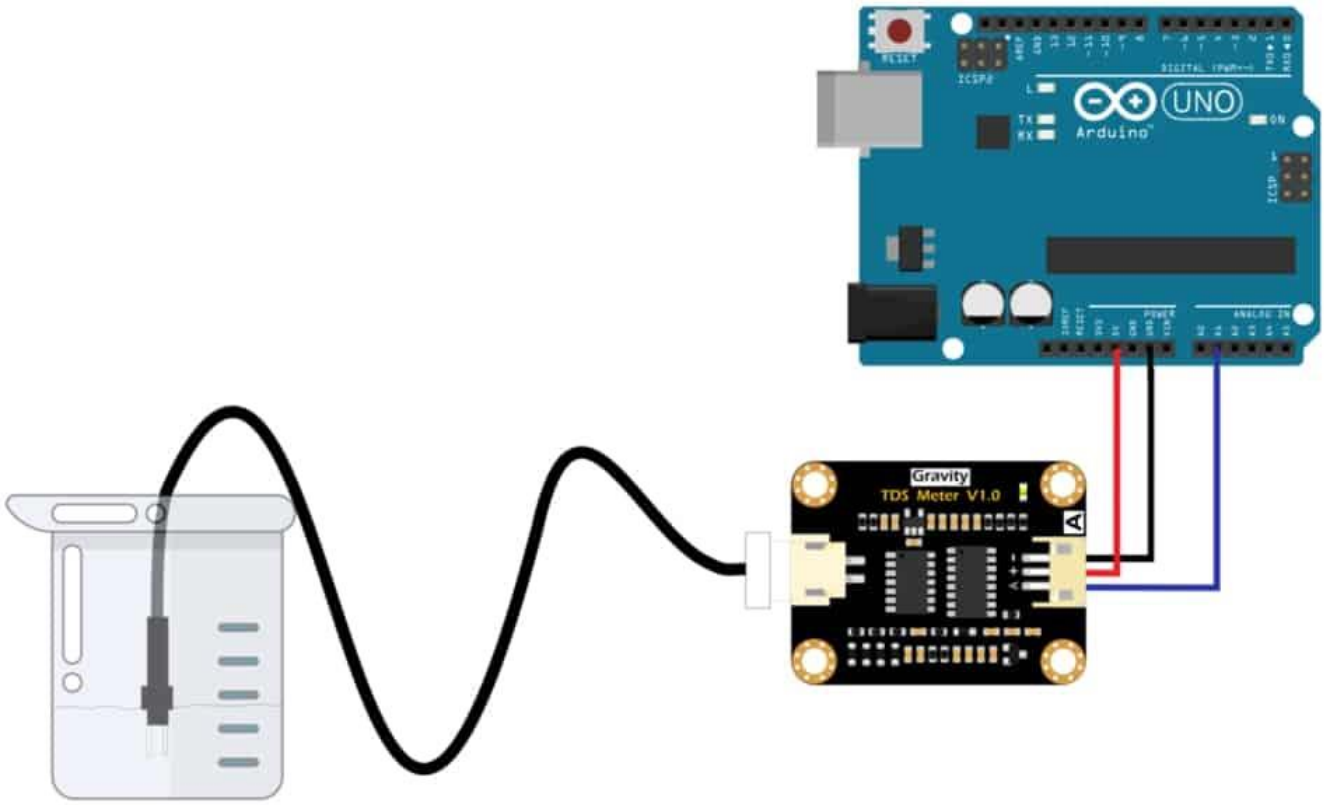
The probe can not to be used in water above **55 degrees centigrade**.

The probe can not be too close to the edge of the container, otherwise, it will affect the reading.

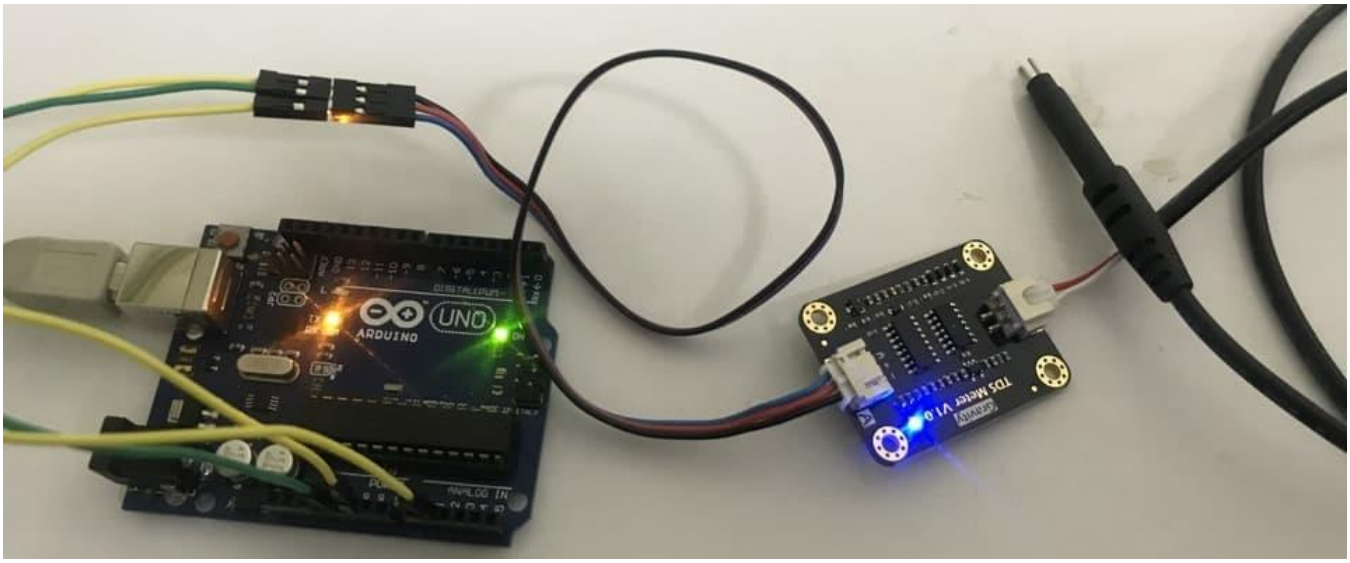
The head and the cable of the probe are waterproof, but the connector and the signal transmitter board are not waterproof.

Interfacing Gravity Analog TDS Sensor with Arduino

Now let us learn how to **interface TDS Sensor with Arduino**. The circuit diagram is given below.



The **connection of TDS Sensor with Arduino** is fairly simple. Connect the VCC to Arduino 5V & GND to GND. Connect its Analog pin to any analog pin of Arduino. In my case, I used Analog pin A1 of Arduino.



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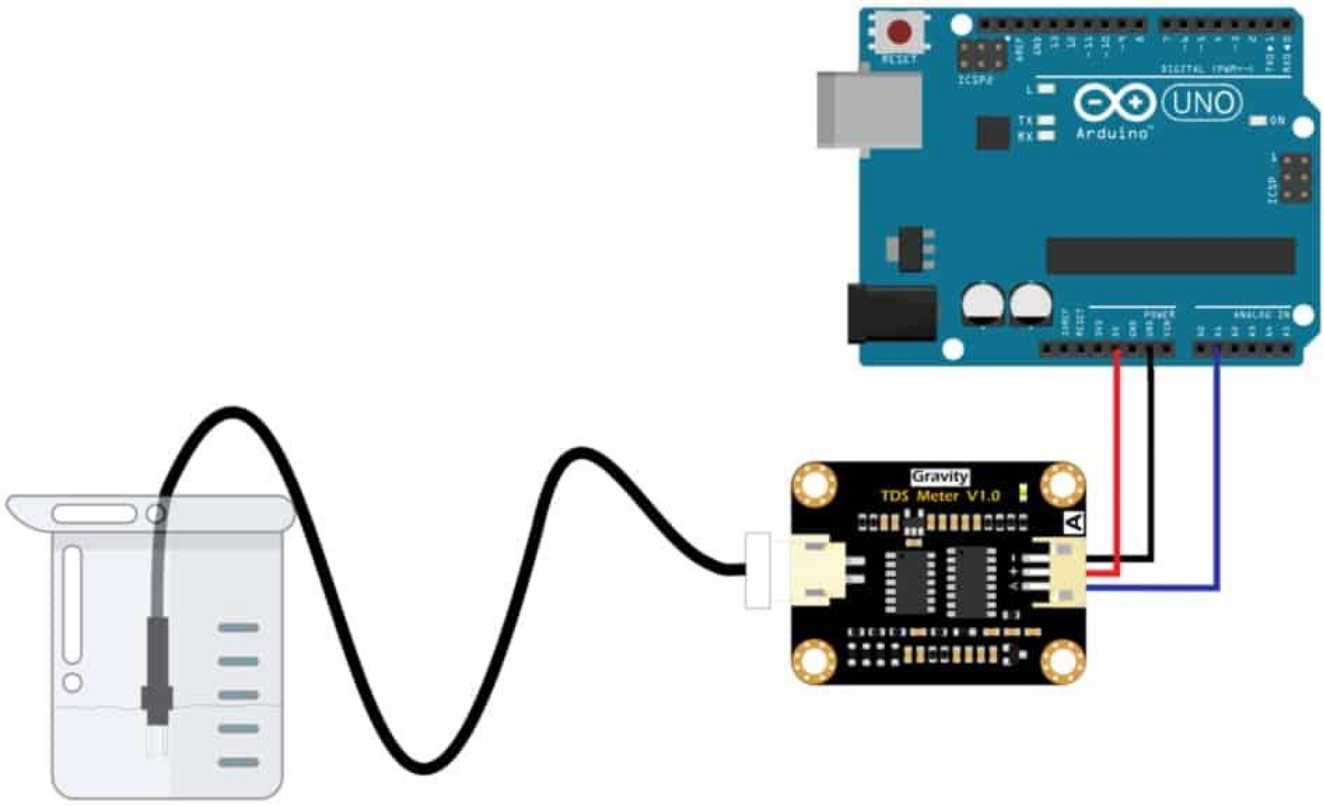

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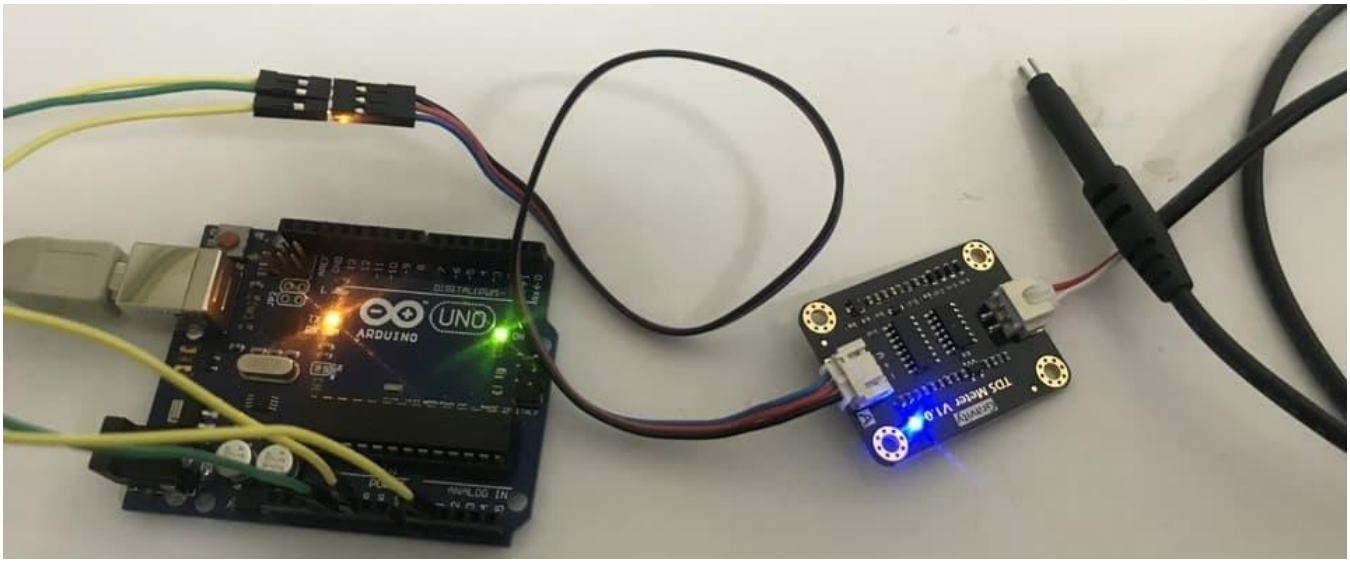

**********CODE UPLOADED IN SEPARATE FILE**********