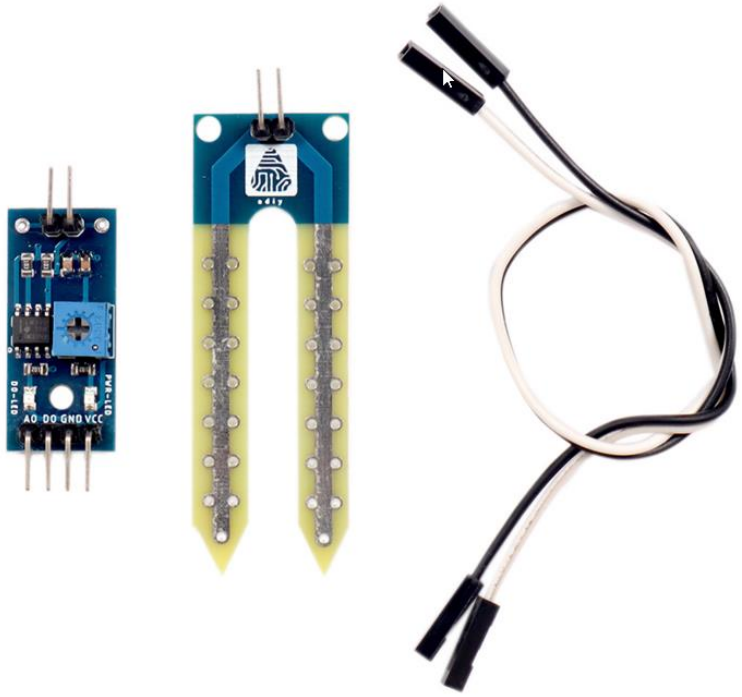
Soil Moisture Sensor Module



Description:

This **soil moisture sensor module** is used to detect the moisture of the soil. It measures the volumetric content of water inside the soil and gives us the moisture level as output. The module has both digital and analog outputs and a potentiometer to adjust the threshold level.

Features and Specifications:

- Operating Voltage: 3.3V to 5V DC
- Operating Current: 15mA
- Output Digital - 0V to 5V, Adjustable trigger level from preset
- Output Analog - 0V to 5V based on infrared radiation from fire flame falling on the sensor
- LEDs indicating output and power
- LM393 based design
- Easy to use with Microcontrollers or even with normal Digital/Analog IC
- Small, cheap and easily available

Hardware Overview:

A typical soil moisture sensor consists of two parts:

The Probe

The sensor includes a fork-shaped probe with two exposed conductors that is inserted into the soil or wherever the moisture content is to be measured.

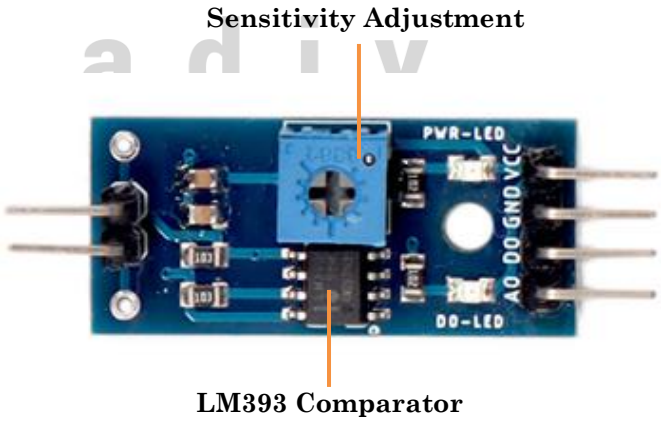
As previously stated, it acts as a variable resistor, with resistance varying according to soil moisture.

The Module

In addition, the sensor includes an electronic module that connects the probe to the Arduino.

The module generates an output voltage based on the resistance of the probe, which is available at an Analog Output (AO) pin.

The same signal is fed to an LM393 High Precision Comparator, which digitizes it and makes it available at a Digital Output (DO) pin.



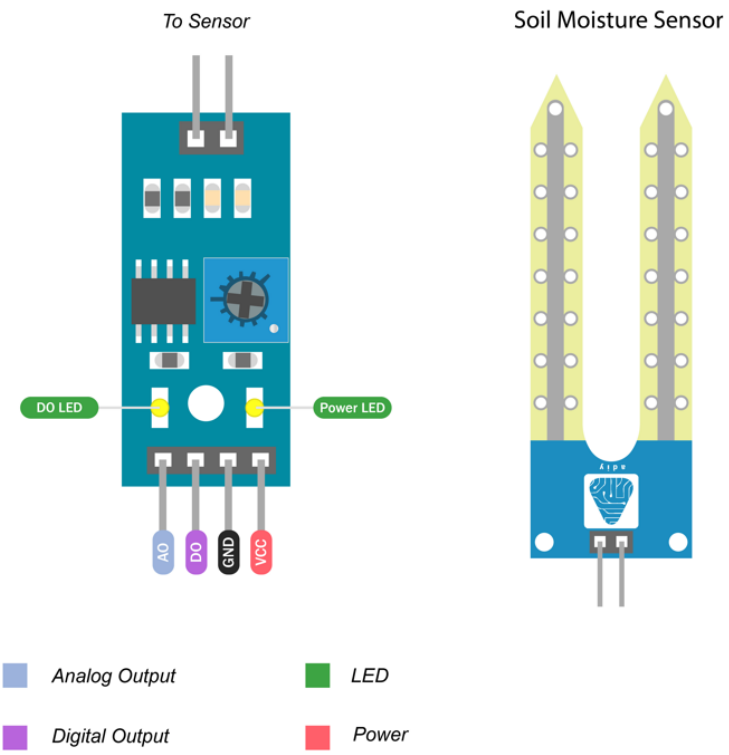
The module includes a potentiometer for adjusting the sensitivity of the digital output (DO).

You can use it to set a threshold, so that when the soil moisture level exceeds the threshold, the module outputs LOW otherwise HIGH.

This setup is very useful for triggering an action when a certain threshold is reached. For example, if the moisture level in the soil exceeds a certain threshold, you can activate a relay to start watering the plant.

The module also includes two LEDs. The Power LED illuminates when the module is turned on, and the Status LED illuminates when the soil moisture level exceeds the threshold value.

Pin Configuration:



VCC: supplies power to the sensor. It is recommended that the sensor be powered from 3.3V to 5V. Please keep in mind that the analog output will vary depending on the voltage supplied to the sensor.

GND: is the ground pin.

AO: Analog Output generates analog output voltage proportional to the soil moisture level, so a higher level results in a higher voltage and a lower level results in a lower voltage.

DO: Digital Output indicates whether the soil moisture level is within the limit. D0 becomes LOW when the moisture level exceeds the threshold value (as set by the potentiometer), and HIGH otherwise.

Application:

- Gardening
- Irrigation Systems
- Used in Controlled Environments