

1. *What is the problem and why do you need IoT?*

I need to irrigate autonomously and remotely my plant when I am not at home.

I will provide a tank full of water near the plant.

The sensor I will use are a level sensor for measuring how much water is still in the tank , and a soil moisture sensor, to measure if the plant need water or not.

The actuator is a small water pump and a valve , in case we need to control the flux of another liquid as for example liquid fertilizer.

This is the list of sensors and actuators used in this work :

[Modulo sensore livello acqua pioggia liquido water level sensor shield \(arduino-compatibile\): Amazon.it: Elettronica](#)



[iHaospace Capacitive Soil Moisture Sensor Corrosion Resistant for Arduino Moisture Detection: Amazon.it: Elettronica](#)



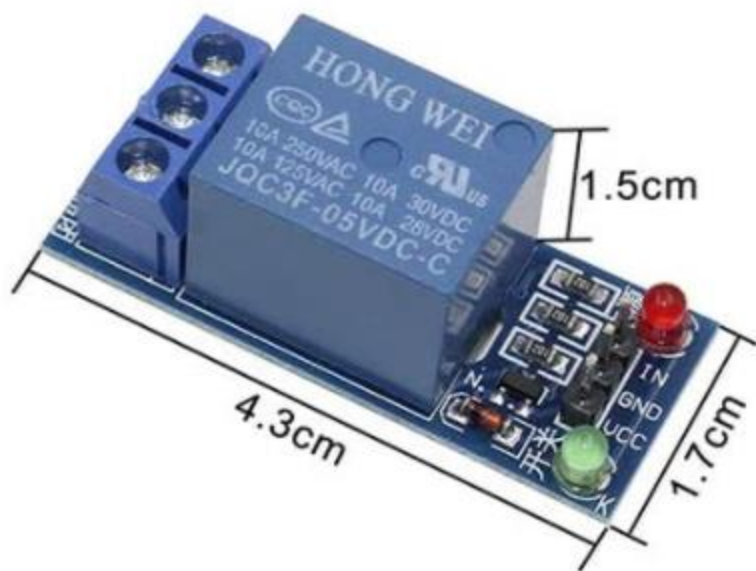
[Hanone Pompa Acqua Micro sommergibile e anfibia Pompa Acqua 3/4. Anfio Anfio Beige 5V:](#)
[Amazon.it: Casa e cucina](#)



[ILS - Due bit tre vie Elettrovalvola valvola controllo elettronico Piccolo scarico valvola sfiato DC 5V](#)
[DC6V: Amazon.it: Elettronica](#)



<https://www.amazon.it/sourcing-map-grilletto-Arduino-Lampone/dp/B07MMLZQJT>



1 meter of tube



For the sake of simplicity and for demonstration purposes the periodicity of the sensor measurements is 3 seconds. The pump can be activated when the soil moisture measured value is behind a given threshold.

2. What data are collected and by which sensors?

For the calibration of the soil moisture sensor please read this documents <https://makersportal.com/blog/2020/5/26/capacitive-soil-moisture-calibration-with-arduino> , <https://www.electronicclinic.com/capacitive-soil-moisture-sensor-arduino-circuit-diagram-and-programming/> , <https://thecavepearlproject.org/2020/10/27/hacking-a-capacitive-soil-moisture-sensor-for-frequency-output/> , https://media.digikey.com/pdf/Data%20Sheets/DFRobot%20PDFs/SEN0193_Web.pdf

I have not found a detailed datasheet with the accuracy of the sensors. The unit of measurement is $\text{cm}^3 \text{cm}^{-3}$ as far as concern the soil moisture sensor.

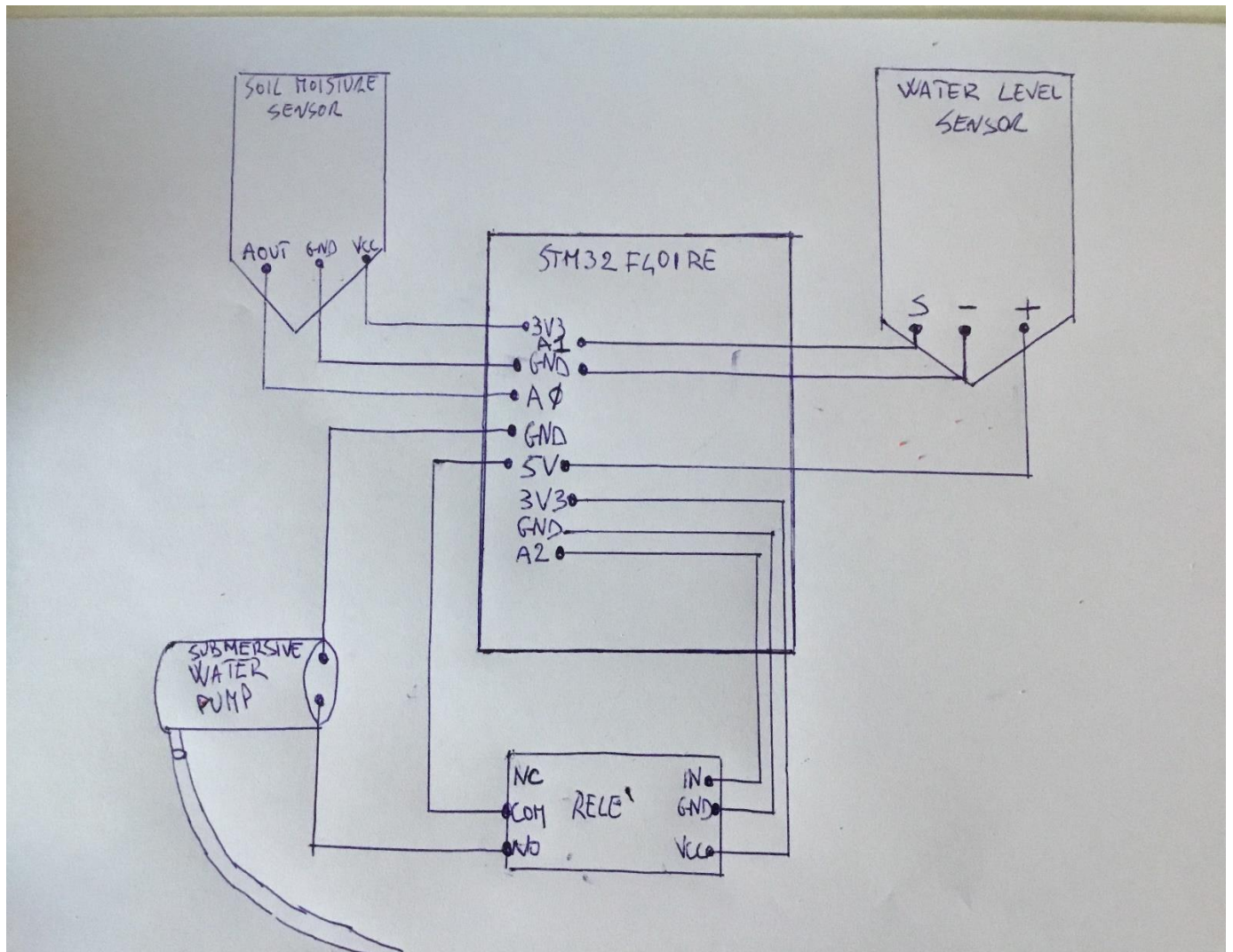
As far as concerns the water level sensor it is valid the following conversion table :

- ④ Immerse the sensor into the water deeply. The table below shows the relationship between the output voltage from the AOUT pin and the liquid level.

| Liquid level | Output voltage |
|--------------|----------------|
| 0cm | 0v |
| 0.5cm | 1.3v |
| 1cm | 1.53v |
| 1.5cm | 1.62v |
| 2cm | 1.69v |
| 2.5cm | 1.74v |
| 3cm | 1.77v |
| 3.5cm | 1.81v |
| 4cm | 1.84v |
| 4.5cm | 1.86v |
| 4.8cm | 1.88v |

I have not found a clear datasheet for this sensor, too.

3. What are the connected components, the protocols to connect them and the overall IoT architecture?



- Provide a network diagram that includes all the devices and identifies the network and communication protocols used to interconnect them.
- Identify the software components that make up your system both at IoT device level and at cloud level.
- Provide a high-level architecture diagram that depicts the interdependencies of your software components.

