

Automatic Plant Irrigation System

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ABSTRACT

As India is agricultural based country and the rate at which the natural resources are depleting is a threat for the future. Hence a mechanism is in need of smart and efficient way yielding good growth of the crop. The aim of our project is to devise a mechanism which measures the pH level and moisture content present in the soil and automatically takes the decision of watering plants as their required soil conditions.^[2] The device is based on 8015 micro-controller, a soil moisture sensor and pH detector. Once installed it requires very less human involvement. The usage of this device can help to prevent wastage of water and help to grow the plants healthier. When the micro-controller receives the signal detecting the pH and moisture level it will supply the required alkalinity and water to that particular field, till the sensors are deactivated again. In case, when the micro-controller receives more than one signal for water requirement then that signal will be prioritized which is first received and irrigate accordingly.^[1]

Keywords: Soil moisture sensor, pH detector, Micro-controller, Alkalinity.

I.INTRODUCTION

The soils acidity determines the growth and health of the crop, thus correcting the soil's pH is very important for good yield. The soil's pH level is mostly affected by the presence or absence of salts from underlying parent rocks, minerals, and the purity of rain water in soil, fertilizers and other organic materials introduced in the soil earlier.^[3] The soil is said to be neutral soil if it has pH of 7, whereas acidic soil has pH level of 6.9 or below. Whereas alkalinity starts at 7.1 and rises to 14. Most of the soil samples has a pH range spanning from 4 to 8 and acidic soil being the most common of all. But the suitable pH range for most of the plants is 6.5, but not for all thus making it difficult. This is where our device will come in handy. It will automatically detect the pH content of the soil as well as the moisture present in the soil and maintain the required pH and moisture for the particular crop accordingly.^[4]

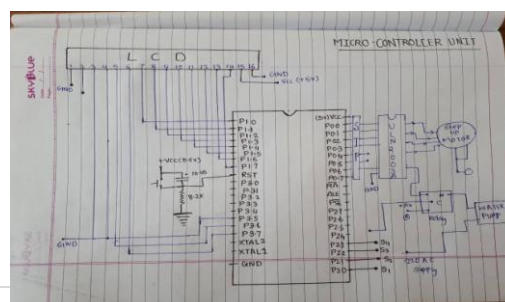
II.COMPONENTS

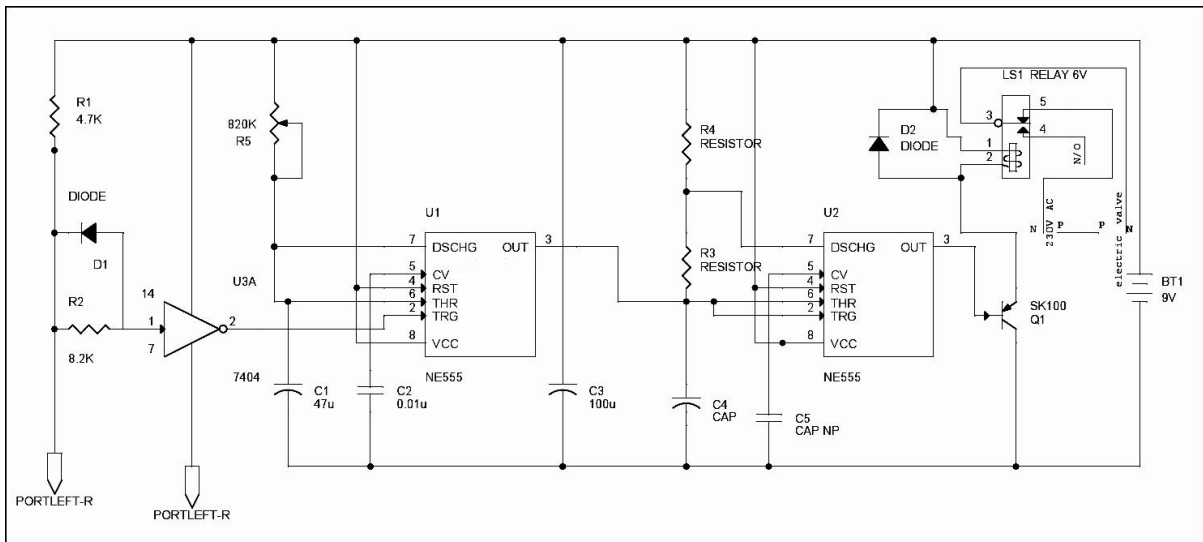
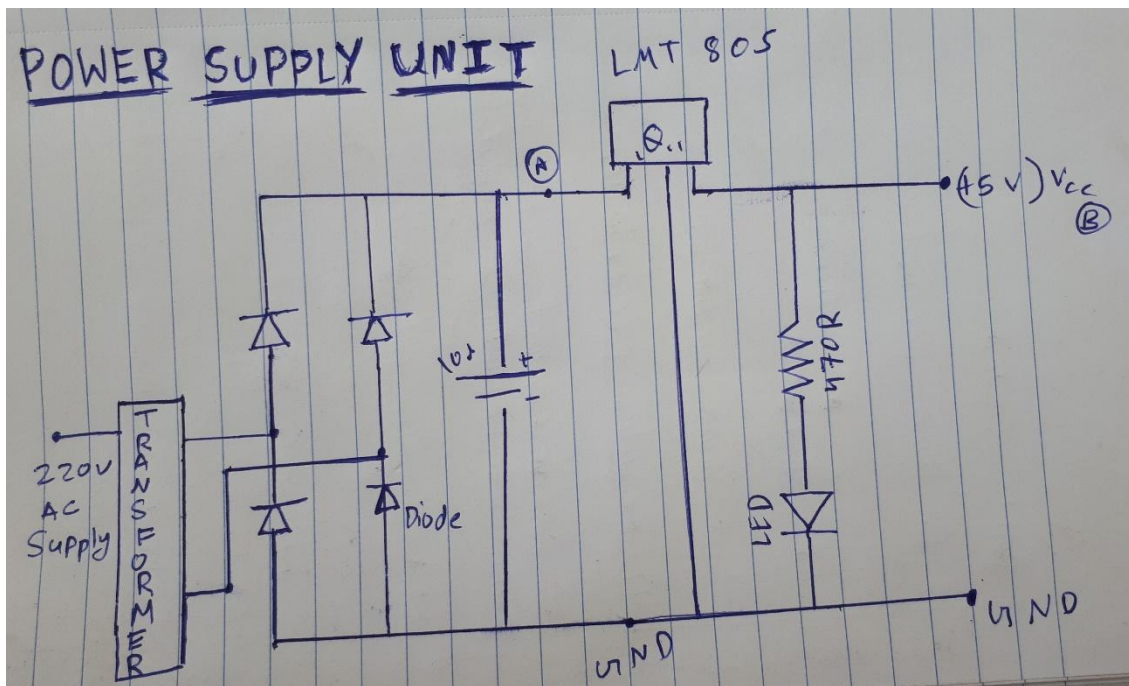
- Step down transformer

- Voltage regulator (IC 7805)
- Op-amp (LM741)
- Crystal oscillator (11.0592 M Hz)
- Diodes
- Stepper motor
- pH
- Capacitors
- Micro-controller (AT89S52)
- Relay
- LCD
- Resistors
- LED
- Water pump
- ULN
- Switches
- Power cables and ribbon wires

III.PROCESS OF WORKING

The overall project is divided into three sections sensor unit, microcontroller unit and motor driver unit. The sensor unit consist of moisture and pH detector. It senses the soil condition, comparing the required voltage with the reference voltage i.e. 5V, if the required voltage is less than the reference voltage, the sensor will send the high signal (logic 1). This signal will go to the micro controller, which is the brain of the device, and turn on the motor driver unit. This will turn on the motor and water will be pumped to the field. When the soil gets the required amount of pH and moisture the required voltage will become greater than the reference voltage. Thus sending low signal (logic 0) to the micro-controller and motor will stop pumping water to the field. All the process, condition of soil (its pH and moisture content) are displayed in the LCD screen. [2]





IV.CONCLUSION

Farmers in the present days face a major problem of irrigating their fields regularly, as the climatic conditions change the soil's nutrients and pH levels change drastically, hence making it difficult for the farmers to have a proper idea about when to pump water to the fields. Here is where the "Automated Plant Irrigator" will help farmers water their crops according to the perfect conditions required. This automated device will senses the soil moisture and pH and automatically pumps the water with proper alkalinity when the power is ON.^{[2] [3]}

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