

## Department of Electrical and Electronics Engineering

### 19EEL38Mini Project -I

Report on

## AUTOMATIC PLANT WATERING SYSTEM

*Submitted by*

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Under the Guidance of

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Dissertation submitted in partial fulfillment of the requirements

For the award of the degree of

**BACHELOR OF ENGINEERING**

**in**

**ELECTRICAL AND ELECTRONICS ENGINEERING**

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**

“Jnana Sangama”, Belgaum – 590018, Karnataka, India



**2021-2022**

## BONAFIDE CERTIFICATE

This is to certify that the project report entitled, “**Automatic plant watering system**” is a bonafide record of work of the following candidates who carried out the Mini Project work under my supervision during 2021-2022:

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## ELECTRICAL AND ELECTRONICS ENGINEERING

of New Horizon College of Engineering, Bengaluru of Visvesvaraya Technological University, Belgaum during the odd semester, academic year 2020-21 .

It is certified that all the corrections / suggestions indicated for Internal Assessment have been incorporated in the report deposited in the department library. The project report has been approved as it satisfies the academic requirements in respect of project phase I work prescribed for said Degree.

<b>Signature of the project Guide</b>	<b>Signature of the Head of the Department</b>	<b>Signature of the Principal</b>
Ms. Deepa V Bolonavar	Dr. M. Mahesh	Dr. Manjunatha

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(Internal Examiner)

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(External Examiner)

## ACKNOWLEDGEMENT

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Date: 24.02.2022

Place: Bengaluru

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## DECLARATION

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We **Kamalesh Badola-1NH20EE048, Kushal Naik K-1NH20EE056, Lava Kumar M N-1NH20EE057** students of New Horizon College of Engineering hereby declare that, this project work entitled “**Automatic Plant Watering System**” is an original and bonafide work carried out at New Horizon College of Engineering in partial fulfillment of Bachelor of Engineering in Electrical and Electronics Engineering of Visveshvaraya Technological University, Belgaum.

We also declare that, to the best of our knowledge and belief, the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion by any student.

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# **PLAGARISM REPORT**

## **ABSTRACT**

We are designing an automatic plant watering system using a 555 timer IC.

This circuit's function is to water the plants automatically if you forget to water them or are away from home.

Plants, as we all know, require special attention and care; they become spoilt or die if they are not watered on a regular basis. Everyone has a busy life and occasionally forgets to water their plants, therefore this circuit comes in helpful in these occasions. With the relay switch linked to the circuit's output, you may attach a water pump.

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## **AIM**

To design an Automatic Plant Watering System using 555 Timer IC.

## **OBJECTIVE**

The automated plant watering system estimates and measures the current plant before supplying the necessary amount of water. It's about conserving water and keeping plants healthy at the same time.

# **CHAPTER 1**

## **INTRODUCTION**

We all know that plants are very beneficial to all human beings in many aspects. Plants helps in keeping the environment healthy by cleaning air naturally and producing oxygen. Many people love to have plants in their backyard. But due to civilization and insufficiency of place many people used to grow plants under mold or dirt, pot, and placed on the windowsill. This plant are dependent on conventional breeding – watering, and provide the right amount of sun to sustain life and growth. In busy schedule of day to day life, many time people forget to water their plants and due to this plant suffers many disorders and ultimately die.

In addition, the world's biggest problem in modem society is the shortage of water resources, agriculture is a demanding job to consume large amounts of water. It is very essential to utilize the water resources in proper way.

Thus, a system is required, to handle this task automatically. Automated plant watering system estimate and measure the existing plant and then supplies desired amount of water needed by that plant. It is minimizing the excess water use as well as keeping plants healthy.

## **CHAPTER 2**

### **PROBLEM STATEMENT**

In our daily life many individuals regularly neglect to water their plants and hence it becomes trying for them to keep their plants sound and alive. Likewise it is really difficult for ranchers to keep up with their fields and oversee watering of plants during deficiency of water. In view of the above foundation, we believed that it is important to carry out the automated system.

## **CHAPTER 3**

### **3.1 COMPONENTS REQUIRED**

- IC 555 timer
- VARIABLE RESISTOR (10K)
- SOIL SENSOR
- DC WATER PUMP (9V)
- RELAY (5V)
- BATTERY-2 (9V)
- BREAD BOARD
- CONNECTING WIRES

## 3.2 COMPONENTS DESCRIPTION

### 1. 555 TIMER IC

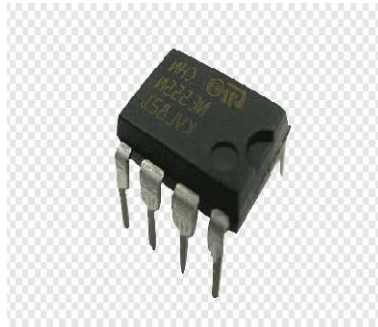


Fig no 1.1

The working voltage of this circuit is 9 to 12 V DC. The circuit is partitioned into two segments, the main segment has a dampness circuit worked in it and the other segment has a clock circuit worked around a 555 clock IC.

For the location of the dampness, we have utilized two tests, these can be embedded in the dirt of your plants. The tests will recognize the water substance in the dirt of the plants, in the event that enough water is available in the dirt, the transfer will be in the off state. Whenever the water content is not exactly the expected level then the dirt will become dry this will actuate the circuit and the 555 clock IC will convey a high message to the transfer for a current time frame so any siphon associated with the hand-off will be turned on.

Right now of the actuation of the transfer can be changed by changing the 10k variable resistor. The awareness of the tests relies upon the 10K variable resistor, you can change this variable resistor to turn the transfer and siphon on at the ideal dryness of the dirt.

## 2. VARIABLE RESISTOR (10K)



Fig no.1.2

Variable resistors are generally utilized in electric circuits to change the worth of flow or voltage, since the opposition of variable resistors can be set to a specific worth. Variable resistors permit you to change the worth of voltage by changing the opposition and keeping current steady.

Right now of the actuation of the transfer can be changed by changing the 10k variable resistor. The awareness of the tests relies upon the 10K variable resistor, you can change this variable resistor to turn the transfer and siphon on at the ideal dryness of the dirt.

## 3. SOIL SENSOR

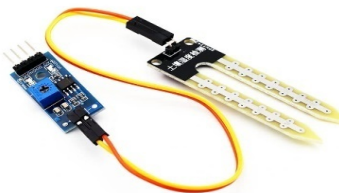


Fig no.1.3

Soil dampness sensors measure the water content in the dirt and can be utilized to gauge how much put away water in the dirt skyline. Soil dampness sensors don't gauge water in the dirt straightforwardly. All things being equal, they measure changes in some other soil property that is connected with water content in an anticipated manner. Every sensor producer utilizes various advances to gauge soil dampness content.

The central benefit of utilizing a dirt dampness profiling test is the end of the expense of various single-direct sensors and the need toward unearth and cover them at the suitable

profundities. To introduce most profiling tests, either plastic or PVC access tubes should be embedded before the sensor can be. This plan forces vulnerabilities now and again, there will in general be a special stream between the entrance tube and the sensor.

#### **4. DC WATER PUMP (9V)**



Fig no.1.4

The functioning standard of a water siphon essentially relies on the positive uprooting rule as well as motor energy to push the water. These siphons use AC power in any case DC power for stimulating the engine of the water pump.

The functioning standard of a water siphon essentially relies on the positive uprooting rule as well as motor energy to push the water. These siphons use AC power in any case DC power for stimulating the engine of the water pump.

#### **5. RELAY (5V)**

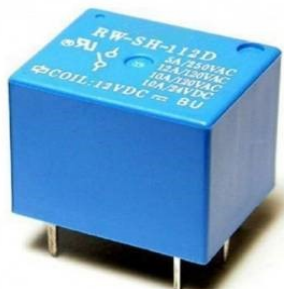


Fig no.1.5

At the point when the sensor circuit detects the state of soil, it contrasts it and the reference voltage 5v. This interaction is finished by a 555 clock.

At the point when the dirt condition is not exactly the reference voltage, i.e., 5v, then, at that point, the dirt is considered as dry and right away the 555 clock conveys the rationale message 1 to the microcontroller.

The microcontroller then turns on the engine driver circuit and prompts the engine to pump water to the plants. Whenever the dirt condition is more prominent than the reference voltage, the dirt becomes dry. Then, at that point, the clock conveys the rationale message 0 to the microcontroller, this switches off the engine driver circuit and prompts engine to pump water to the fields

## 6. BATTERY-2 (9V)



Fig no.1.6

A 9-volt basic battery is appraised at 1 ampere-hour, and that implies this battery can consistently supply one ampere of current for 1 hour before it arrives at the voltage edge and is thought of as drained.



## 7. BREADBOARD

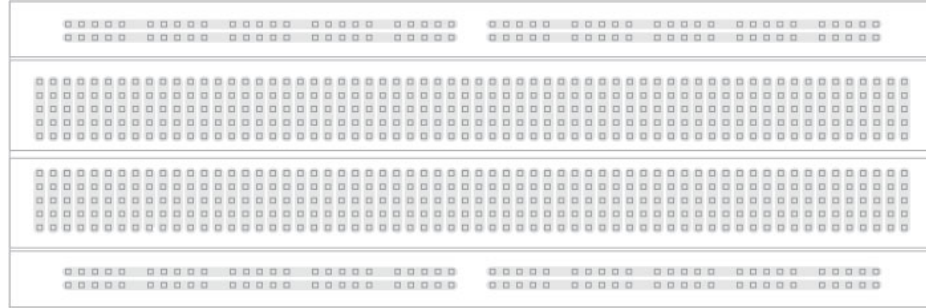


Fig no.1.7

Bread board is a board like device which has different pins on it for interfacing the parts with one another part . It is exceptionally simple to utilize on the grounds that one simply needs to interface the pins in breadboard opening and it even simple to utilize.

The primary feature is that no fastening is required along these lines, it very well may be reused however many times as you want. Most electronic parts in electronic circuits can be interconnected by embedding their terminals into the openings and afterward making associations through wires any place required.

## 8. CONNECTING WIRES

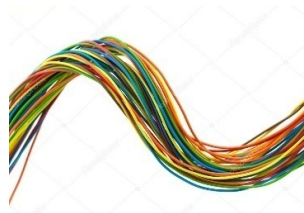


Fig no.1.8

Electrical wire is a spine of our general public. There is wire in houses to turn on lights, heat the oven, and even chat on the telephone. Wire is utilized to permit current to move starting with one spot then onto the next. deeply. An electrical separator is a material whose inside electric charges don't stream openly and, in this way, doesn't direct an electric flow. Protection exists since contacting an uncovered wire could permit current to course through an individual's body (terrible) or into another wire unexpectedly.

## CHAPTER 4

### 4.1 CONSTRUCTION

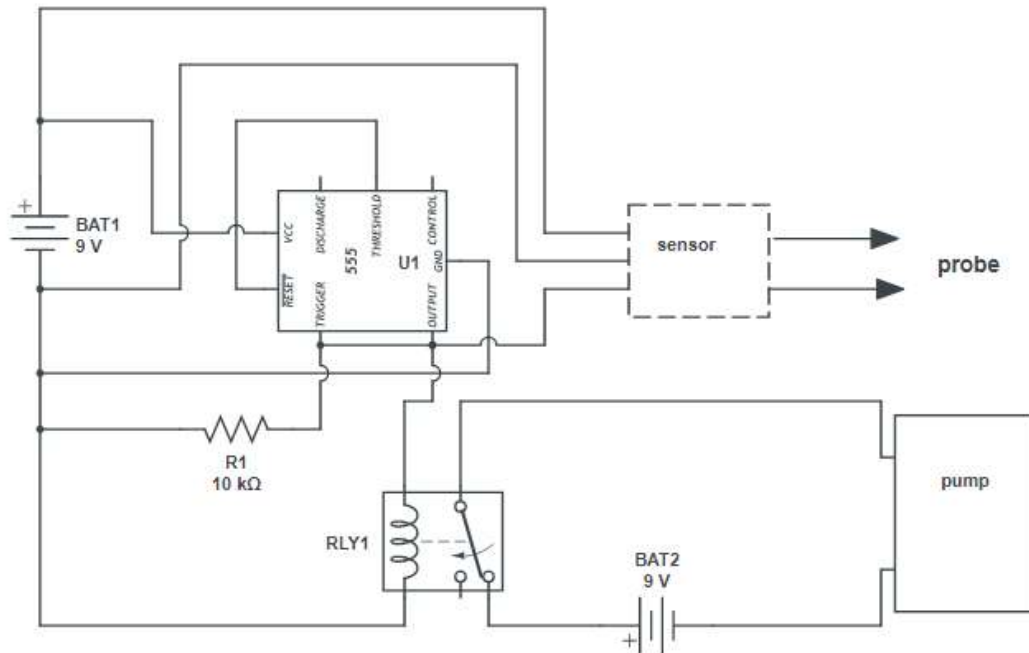


Fig no.1.9

- First, all the electrical components are connected together, and all the connection are made as per the above circuit diagram.
- The power is supplied to the circuit through two 9v batteries.
- IC 555 timer Pin 1 is grounded that is connected to negative terminal of the battery1 and Pin 8 (+VCC) is connected to positive terminal of Battery1.
- Pin 4 (reset) and pin 6 (threshold) is shorted.
- Pin 2 (Trigger) is connected to one terminal of 10k ohms variable resistor and other end terminal is connected to negative terminal of battery1 .
- Pin 3 (Output) is connected to coil terminal of relay and other coil terminal of relay is connected to negative terminal of battery1.

- Positive terminal of DC pump is connected to common terminal of relay.
- Negative terminal of DC pump is connected to negative terminal of battery2.
- Normally-close (NO) terminal of relay is connected to positive terminal of battery2.
- VCC Pin of soil sensor is connected to the positive terminal of the battery1.
- GND pin of soil sensor is connected to the negative terminal of the battery1.
- Digital output (DO) pin of soil sensor is connected to the 555 timer pin 2(Trigger).
- Soil probe is connected to the sensor which will be inserted in the soil.
- All the connections are checked again for no fault.
- The circuit is ready and will be in working condition.

## 4.2 WORKING

In this project automatic plant watering system we are using IC 555 timer, two 9v battery , soil sensor , 5pin Relay , 10k variable resistor , DC water pump , bread board and connecting wires.

This circuit's operational voltage ranges from 9V to 12V DC. The circuit is separated into two parts, including one which has a moisture circuit and the second of that which contains a timer circuit based on a 555 timer IC.

We utilize this basic reasoning to make the circuit operate and water the plants: when the soil is dry, it has high resistance, and when the soil is wet, it has low resistance. We utilized two probes to monitor moisture, which may be placed into the soil of your plants. These probes can only operate when the soil resistance is low, and they cannot work when the soil resistance is high.

The probes will monitor the water content of the plants' soil; if there is enough water in the soil, the relay will be turned off. When the water content in the soil falls below the specified level, the circuit is activated, and the 555 timer IC sends a high signal to the relay for a certain amount of time, causing the pump attached to the relay to turn on. The sensitivity of the probes is determined by the 10K variable resistor; you may set this variable resistor to turn on the relay and pump when the soil is dry enough.

### 4.3 BLOCK DIAGRAM

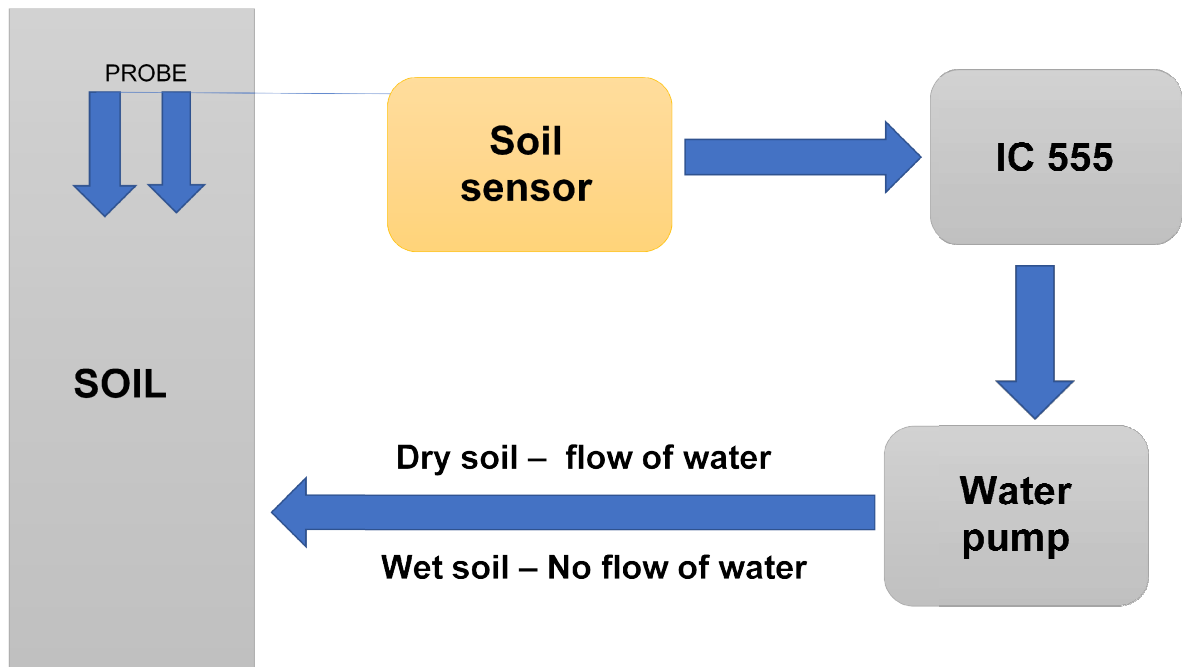


Fig no.1.10

## 4.4 HARDWARE PICTURE

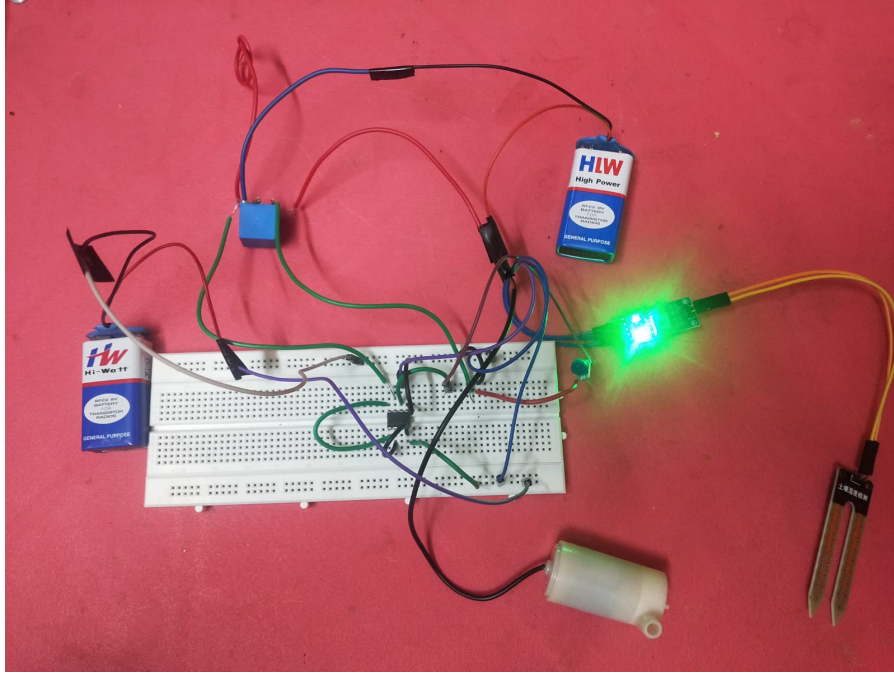


Fig no.1.11

## **CHAPTER 5**

### **RESULT**

It was observed that the suggested approach regulates the moisture content of cultivated land soil. If the soil is dry, the motor begins pumping water and stops when the moisture level of the soil is maintained as necessary.

## **CHAPTER 6**

### **ADVANTAGES**

Advantages of Automatic Plant Watering System : -

- The most significant benefit of this technique is that it conserves water in emergency circumstances. When the plant requires water, it can deliver the appropriate amount.
- Water may be directed to the exact location where it is required.
- A power system with an automatic shutdown can assist the pump in avoiding being overwatered.
- Gardeners may save time by using an automated plant watering system.
- It has the potential to safeguard the soil ecology.
- SAVES TIME: Your system will water everything for you.
- WATER SAVING: An automated system consumes less water than hand watering.
- MONEY SAVINGS: Your water expenses will be cheaper, and your plants will survive longer.
- REST EASY: peace of mind in terms of quality, value, and performance.



## **CHAPTER 7**

### **DISADVANTAGES / LIMITATIONS**

- The method cannot be utilised with water with a high iron concentration because the emitters become blocked.
- System maintenance is essential to keep it running.
- Water leaks can be caused by insects and rats chewing on pipes.

## **CHAPTER 8**

### **APPLICATIONS**

The applications of Automatic Plant watering System are:

- It may be used to calculate the amount of moisture lost in the soil as a result of evaporation or a shortage of water.
- Water is saved by eliminating needless water waste using an automatic plant watering system.
- When the owner is away, it tends after the plant.

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