

Visvesvaraya Technological University

Belagavi



A mini project report on

AUTOMATIC WATER PUMP SWITCHING WITH IRRIGATION SYSTEM

Submitted by

M HARI ROHITH	USN:1NH21EC407
MOHAMMAD SHARUHK M S	USN:1NH21EC408
NOOR E MUJASSIM	USN:1NH21EC410
PREM KUMAR N	USN:1NH21EC412

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Certified that the Mini project entitled "Anti sleep detection goggles" is carried out by Mr. MHari Rohith bearing USN: 1NH21EC407, Mr. Mohammad Sharuhk M S bearing USN: 1NH21EC408, Mr. Noor E Mujassim bearing USN: 1NH21EC410, and Mr. Prem Kumar N bearing USN: 1NH21EC412, bonafide students of NHCE, Bengaluru in partial fulfillment for the award of Bachelor of Engineering in Electronics and Communication of the Visvesvaraya Technological University, Belagavi during the year 2021-22. It is certified that all corrections and suggestions indicated for the Internal Assessment have been incorporated in the report deposited in the department library. The mini-project report has been approved as it satisfies the academic requirements in respect of the mini-project work prescribed for the said degree.

Signature of the guide

Dr. Ashok K

Senior Assistant Professor

Department of ECE

NHCE, Bengaluru

Signature of the HOD

Dr. Aravinda K

Professor & HOD

Department of ECE

NHCE, Bengaluru

External Viva

Name of the examiners

1. Bhawna Choksi

2. VINAY R

Signature with date

1.

2.

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M HARI ROHITH	USN:1NH21EC407
MOHAMMAD SHARUHK M S	USN:1NH21EC408
NOOR E MUJASSIM	USN:1NH21EC410
PREM KUMAR N	USN:1NH21EC412

ABSTRACT

We forget to switch off the motor when we are busy or while doing Some working or sleeping. However, when we forget to switch off The motor plenty of water is wasted and flows through the drainage Or sewage tank. Where nowadays there is shortage of water in many Areas. Nowadays many products are arrived in the market for automatic Water controller tank.

In other hand many try to maintain the roof top gardening as a break Time work in the evening but something they forgot to water the plant So to overcome or to maintain time for their work many devices present in the Market to help busy people to water the plant with their automatic water dispenser Which automatically work when plants required water.

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CHAPTER-1

INTRODUCTION

In the project, we have explained how to build automatic water pump switching with irrigation system, using 555 timer, relays and sensors by mainly focusing on the purpose of conservative use of water source and agricultural domains.

Water is one of the main resources to be preserved and saved for the future. We use an overhead tank in houses and agricultural fields to store water but, we sometimes forget to turn the motor pump ON/OFF which results to waste of water, so the proposed system of electronics switches the pump ON/OFF automatically as the water level reaches the limit of the storage tank.

Here we are using power supply to run the motor one supply is 240V for the motor to pull the water from the base tank to overhead tank with 12V dc is enough of to run the circuit.

We have added a simple roof top gardening circuit with automatic water dispenser when soil requires water. In this soil takes the water when it required or when soil get dried for that just an 9v battery is enough to power up the circuit.

They are compatible in size can adjust in small area and this circuit is inexpensive.

CHAPTER-2

LITERATURE SURVEY

Title of the paper	Author & Year of Publication	Outcome	Limitation
Designing of Water level indicator	Abishek saini, shikar rana and mohith Published in the year 2017	Indication of water was deducted and stopped flow water from external source	Was not applicable for long term usage and regular had maintenance

Table no 2.1 literature survey

Different experiment were conducted with many ideas are performed to control the water pump motor with proper circuit and roof to gardening. There are many ways to control for this experiment. But both are deals with different circuit and required different voltage.

Where the other part of the circuit will be fit near the base tank, this circuit is fully automatic where it only depends on the water level of both the tank.

Where the remaining part circuit is fixed near the plant and overhead tank.

So both the circuit is small and adjusts to the temperature

CHAPTER-3

PROBLEM STATEMENT

- Maintenance is more needs and requires regular checkup for the water levels in the tank or the storage.
- In case of ground water usage excess water source is provided during monsoon season which goes wasted because of un-proper management system.
- In agriculture, growing crops require high manpower and easy access to water source is required, and switching on\off the pump delays the work of a farmer for a day. And also, during monsoon, crops get spoiled due excess water.

PROBLEM OBJECTIVE

- Our proposed system manages sustainment usage of water source in timely manners and helps to prevent wastage with help of control valves.
- Automatic switching is available to reduce the work of the farmer
- A soil\moisture sensor is used to know when water needs to be drained the tank and supplied to the crops.

CHAPTER-4

PROJECT DESCRIPTON

In this project we have used an IC 555, soil moisture sensor, relay, battery, pot meter, and some passive components.

The circuit diagram of the project is given below:-

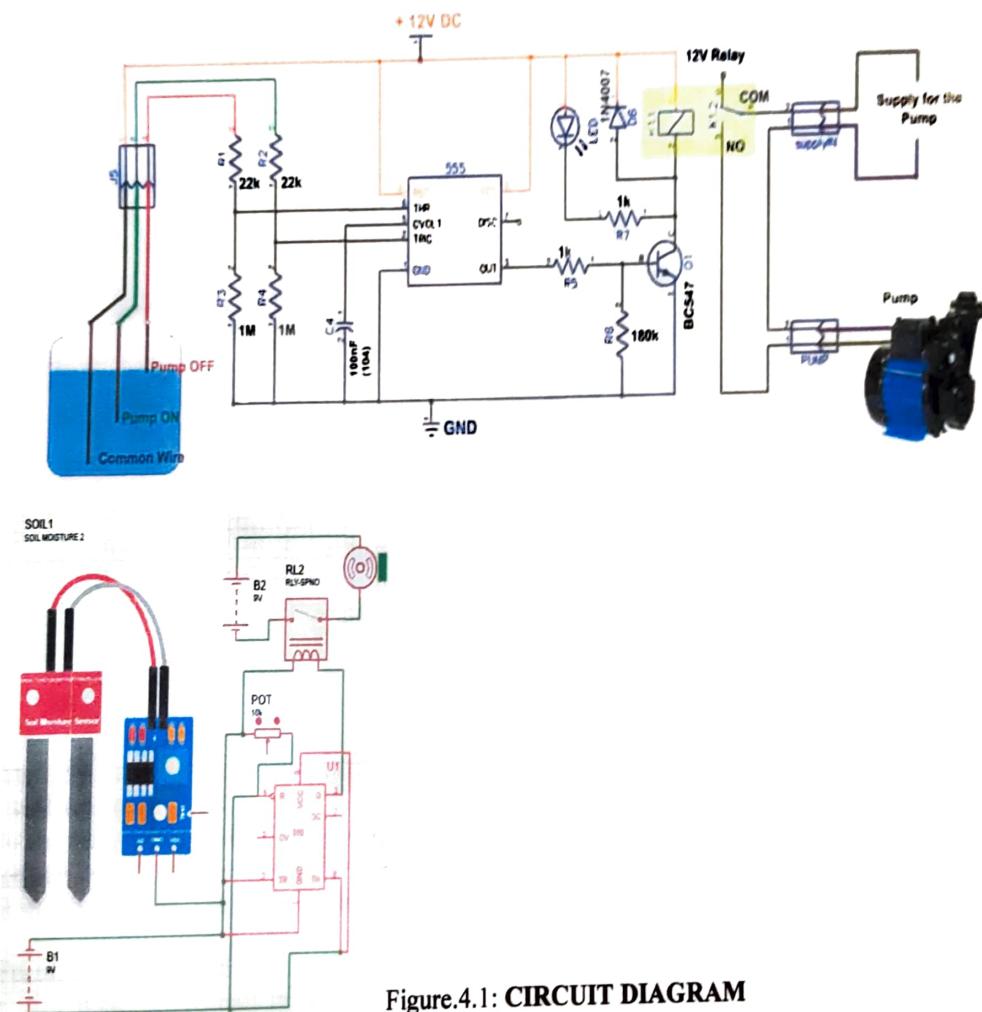


Figure.4.1: CIRCUIT DIAGRAM

The components used in the circuit are:

- i. IC-555
- ii. 5V Relay
- iii. Dc water pump motor
- iv. Transistor
- v. Soil moisture sensor
- vi. Battery (9v)
- vii. Resistor
- viii. Capacitor
- ix. Diode
- x. Led

IC 555

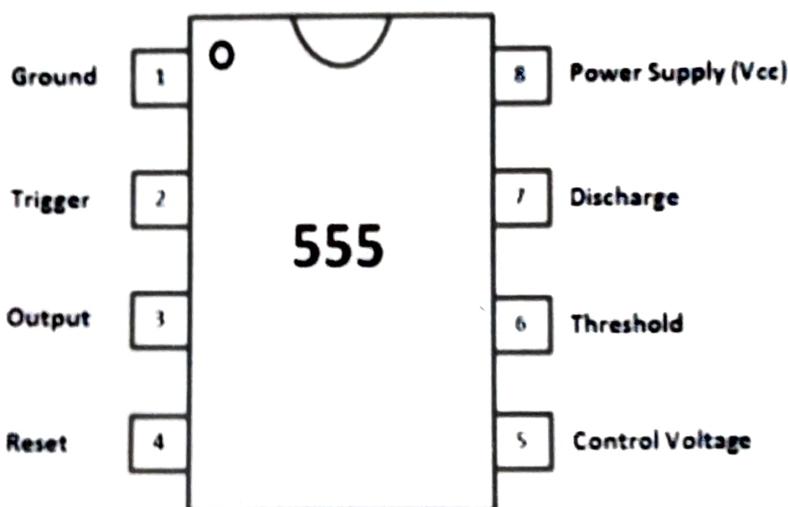


Figure 4.2 IC-555

The 555 timer IC is an integrated circuit used in a variety of timer, pulse generation, and oscillator applications.

In the monostable mode of operation, the circuit generates only a single pulse when the timer gets an indication from the input of the push button.

It was designed by Hans Camenzind in 1971.

Features of IC NE555

- It can be operated in +5V and can withstand up to +18V.
- Trigger voltage is 1.6 when operating at +5V.

Applications

- Can be used in timers, missing pulse detection, bounce-free switches, etc
- Used for measuring specific time intervals.

4.3 RELAY

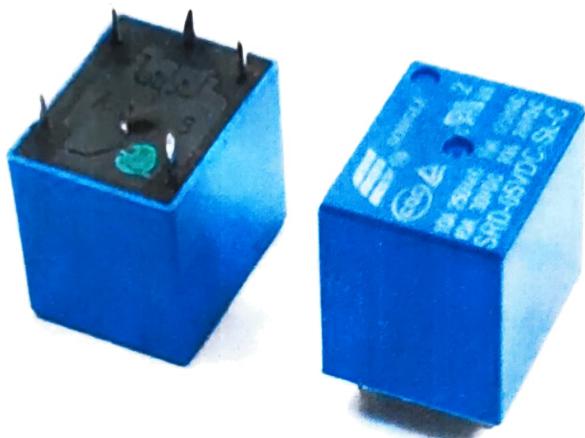


Figure 4.3 RELAY

- A 12v relay is an automatic switch that is used in automatic control circuit.
- Which control high current using low current signal.
- The input range for this relay is 0 to 12v.
- The main functions of the relay are "it controls the electrical circuit by opening and closing contacts in another circuit"
- They are used to protect the electrical system and minimize the damage to the equipment which is present in the system due to over voltage.
- They used to control high voltage circuit with a low voltage signal in some the application.
- Most of the times relays are worked on dc power supply.

SOIL MOISTURE SENSOR

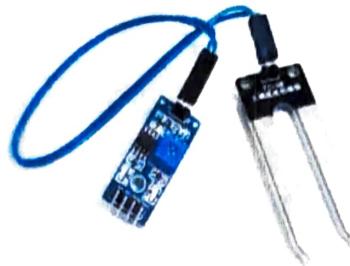


FIGURE 4.4 SOIL MOISTURE SENSOR

This soil moisture sensor used to check the volumetric water content of the soil.

The main utility of this sensor is to gauge the water content in the soil.

The working operation are very simple in this, just we have to insert the soil moisture sensor in the soil for the further operation.

SPECIFICATION:

- It required only 5v to run the sensor.
- Required amount of the current in this sensor is <20mA.
- Interfacing is analog in nature.

APPLICATION:

- Where it delivers results immediately.
- Offers accurate result.
- Where it can sense the water moisture range 0 to 200 cb.

DC WATER PUMP MOTOR



FIGURE 4.5 DC WATER PUMP MOTOR

This motor uses direct current battery to move water in a variety of ways.

The main circulation of water pumps to pressurize, transport and circulate liquids.

It produces less pressure compared to AC motor.

SPECIFICATION:

- The operating voltage required to run the motor is 12v.
- Operating current range is 130 to 220 mA.
- The flow rate is 80 to 120.

Application:

- They are used mainly in irrigation system activity.
- They are used in chemical movement.
- The main purpose of the motor to flow the liquid from one location to another location with less amount of voltage.

RESISTOR



FIGURE 4.6 RESISTORS

Resistors are electronic components that have a specific and constant resistance. It limits the flow of electrons in the circuit. It's a passive element that can only consume power but not generate power.

The resistance is measured in ohms.

CAPACITORS



FIGURE 4.7 CAPACITORS

It is a device that stores electrical energy in an electric field. It is also a passive electronic component with two terminals. The effect of a capacitor is known as capacitance.

The capacitance is measured in Farads.

DIODES



FIGURE 4.8 DIODES

It is a two-terminal electronic component that conducts current primarily in one direction.

TRANSISTOR

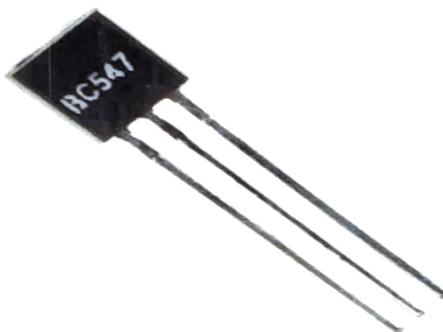


FIGURE 4.9 TRANSISTORS

- Transistors consist of three layers, or terminals, of a semiconductor material.
- In which each of them can carry current in them.
- Where BC547 mainly used for current amplifier, quick response.
- Therefore we can control the speed of the motor using this motor.

LED



FIGURE 4.10 LED

Led is light emitting diode is semiconductor device, which emits light when current passes through it.

Led lights are usually used for various application including -art lighting, outdoor lighting.

BATTERY



FIGURE 4.11 BATTERY

- We have used 9v battery to power up the one part of the circuit.
- We have used 12v and 220v power supply to run the circuit.

CHAPTER 5

WORKING

When overhead tank is empty the signal is passed through the water resistance wire to the IC-555 then passes the signal to motor via relay to pick up the motor voltage and its speed. Where 220v is used to run the motor and it is controlled by relay to produce required amount of voltage to the water pump motor. Then it dispenses the water from the ground tank to the forehead tank. It stops when the limits is reached in the forehead tank.

Here it is indicated in three levels via wires:

0 – Low Level

1 – Medium Level

2 – Maximum Level

- This level indicates the water storage in the tank.
- Where the forehead tank work as a main source for the remaining part of the circuit.
- As we mentioned we are adding additional circuit with this. That circuit is soil moisture sensor.
- Where the main working or operation of soil moisture sensor which sensor gauge of water in the Soil.

When there is required of water for the soil then sensor sense that and send signal to the IC where IC work as a main source between sensor and motor. When water is required IC sends the signal to the motor and relay generates required voltage to the motor to run.

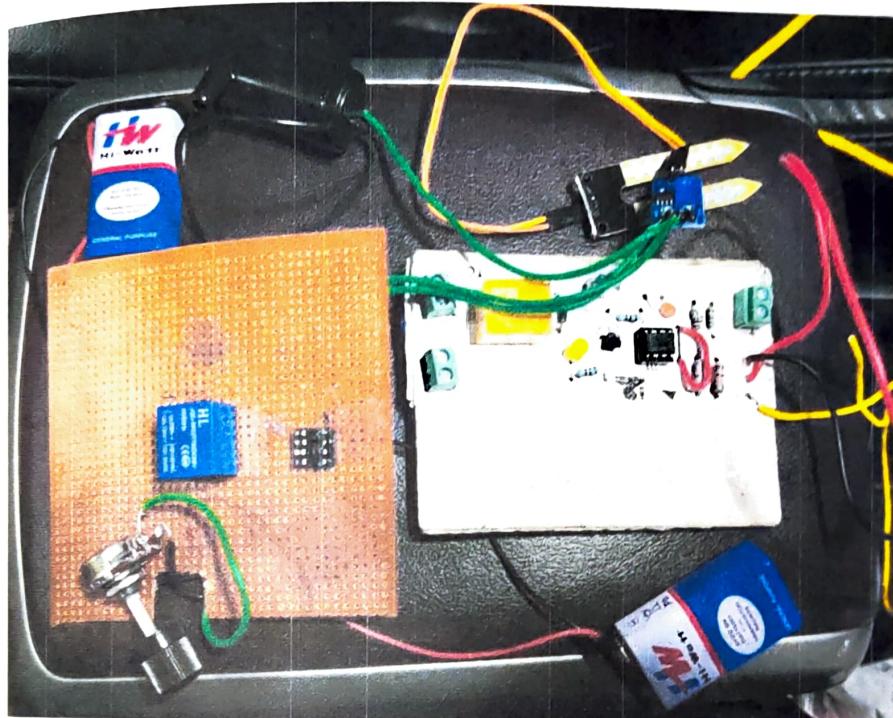
Then water is dispensed from forehead tank to plants.

CHAPTER 6

RESULT

The project was completed as planned. The main purpose of this project was to control the water flow when motor got turned on and to water the plants when the required water this process is done automatically.

The device is working as per our objectives.



CHAPTER 7

ADVANTAGES

- Water level controller controls the water and save energy accordingly.
- Then by this circuit it turns on automatically when it required.
- This means less water and less energy are used in this process of controlling the water flows.
- Where reduced tension of the human when they remember to water the plant.
- Plants are watered when they required.
- It reduces cutoff of water and nutrients.

APPLICATION

- This circuit helps us in saving energy
- It helps to be hydrate in sunning days to store nutrients.
- There is no human interface in between.
- It is fully automatic
- This system applicable in agriculture fields in purpose of water to the crops for proper growth.

CHAPTER 8

CONCULSION

We conclude that we are combining two circuits to recreate as a circuit with useful ideas and with less space for the circuit\product used. So, the main purpose is to stop the overflow of the water and to save energy as well. Many people forget to water their favorite plant or no time to water the plant so this helps them both the ways for user use it.

This system can be used in small agriculture fields from growing crops.

It can be used in many apartments for nourishing nature and parks facilities in their surroundings.

FUTURE SCOPE

- It can be used in mini or small agriculture like growing vegetables, species etc.,
- Whereas many people can use this system in their homes for wellness for the nature.

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