

AUTOMATIC WATER LEVEL INDICATOR

**A PROJECT SUBMITTED
TO**



**Department of physics
Shree H.N.Shukla College of Science
Rajkot**



By:-

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March, 2021

A
PROJECT REPORT ON THE MODEL OF
“AUTOMATIC WATER LEVEL
INDICATOR ”

In Partial fulfillment for the award of the degree
Of
BACHELOR OF SCIENCE
IN
PHYSICS

Submitted by
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Certificate

Exam No.....

THIS IS TO CERTIFY THAT **MAHETA PARTH P.** A STUDENT OF **T.Y.B.Sc. PHYSICS** HAS SATISFACTORILY PREPARED INDIVIDUAL WORKING MODEL ON "**AUTOMATIC WATER LEVEL INDICATOR**" AS PER THE SAURASHTRA UNIVERSITY SYLLABUS DURING THE ^{Vth} & ^{VIth} SEM OF THE ACADEMIC YEAR 2020 – 2021.

PROJECT INCHARGE

HEAD OF THE DEPARTMENT

DATE:-

SHREE H.N.SHUKLA COLLEGE OF SCIENCE

RAJKOT

Name & Signature of Examiner

DECLARATION

I here by declare that the working model entitled “**AUTOMATIC WATER LEVEL INDICATOR**” submitted to **Department Of Physics, Shree H. N. Shukla College Of Science – Rajkot** during the course of B.Sc.(Physics) semester Vth& VIth, is prepared by me to demonstrate the underlying principle of **PHYSICS**. This project has not been submitted to any other examination.

Place: Rajkot

Signature of the student

Date:

Name of the student

MAHETA PARTH

Acknowledgement

It is a great opportunity for a B.Sc. (Physics) student to prepare working model “**AUTOMATIC WATER LEVEL INDICATOR**” to know about the fundamental as the recent technological aspects of the physics.

First of all, I am very much thankful to Saurashtra University and Department of physics to include this kind of subject in B.Sc. Physics syllabus in which students can acquire more knowledge regarding the selected topic of preparing working model by doing necessary reference work.

I am very much thankful to **Ms. Bhumika R. Nimavat** for keen interest as well as giving me her valuable time and co-operation to develop this working model report by providing valuable guidance.

At last I want to thank all those who helped me directly or indirectly during my project progress report.

MAHETA PARTH

CHAPTER NO-1

INTRODUCTION

1.1 INTRODUCTION:-

The project “automatic water level control with an automatic pump control system” is design to monitor the level of liquid in the tank. The system has an automatic pumping system attached to it so as to refill the tank once the liquid gets to the lower threshold, while offing the pump once the liquid gets to the higher threshold. Sustainability of available water resource in many reason of the word is now a dominant issue. This problem is quietly related to poor water allocation, inefficient use, and lack of adequate and integrated water management. Water is commonly used for agriculture, industry, and domestic consumption.

Therefore, efficient use and water monitoring are potential constraint for home or office water management system. Moreover, the common method of level control for home appliance is simply to start the feed pump at a low level and allow it to run until a higher water level is reached in the water tank. This water level control, controls monitor and maintain the water level in the overhead tank and ensures the continuous flow of water round the clock without the stress of going to switch the pump ON or OFF thereby saving time, energy, water, and 13 prevent the pump from overworking Besides this, liquid level control systems are widely used for monitoring of liquid levels in reservoirs, silos. Proper monitoring is needed to ensure water sustainability is actually being reached with disbursement linked to sensing and automation, such programmatic approach entails microcontroller based automated water level sensing and controlling or using 555 timer IC.

Water tank overflow is a common problem which leads to the wastage of water. Though there are many solutions to it like ball valves which automatically stop the water flow once the tank gets full. But being an electronics enthusiastic wouldn't you like an electronic solution for it? So here is a simple and handy DIY that will guide you to

make a circuit which will detect the water level and will raise an alarm upon getting the water tank full or a preset level.

This simple transistor based water level indicator circuit is very useful to indicate the water levels in a tank. Whenever tank gets filled, we get alerts on particular levels. Here we have created 4 levels (low, medium, high and full), we can create alarms for more levels. We have added 3 LEDs to indicate initial three levels (A, B, C), and one Buzzer to indicate FULL level (D). When tanks gets filled completely we get beep sound from Buzzer.

Water Level Indicator Alarm. Water tank overflow is a common problem which leads to the wastage of water. ... This simple transistor based water level indicator circuit is very useful to indicate the water levels in a tank.

Today I am going to talk about a very useful project that I had taken up. It is called the Water Level Indicator. Nowadays everybody has overhead tank at their homes. But everyone who has a water tank above knows the kind of problems that they face. Firstly there is no system to track the water in the tank. Then there come a secondary problem that is when their water pump is started they have no idea when it gets filled up and sometimes there are situation where the pump keeps on *pumping water to the tank* and the water starts *spilling out from the tank*. There is *wastage of energy* as well as *wastage of water*.

Water level indicator used to express the level of water in water tank and boiler etc. different types of water level indicator are available in market like mechanical and electronics. They can apply as their order & condition to the industries and domestic zones. This circuit not only indicates the amount of water present in the tank but also gives an indication when the tank is full. As the water continues to fill the tank, the LEDs light up gradually.

1.2 NEED OF WATER LEVEL INDICATOR:-

- Overflow problems.
- To prevent wastage of energy.
- To prevent wastage of water.
- Observation.
- Attention.
- Automatic switch off.

There are 3 LED available to indicate the different level of water in water glass. This circuit expresses the level through the lighting of LED. This kind of circuit is not used more because of its silent features. Generally we used buzzer type circuit.

The buzzer type circuit we also shown in this project with the image there are some few changes in buzzer circuit in compare of above circuit.

Right now in the market different type of circuit are available with excellent quality.

Here our aim to demonstrate the simple model which you can make at your home and for your science far.

CHAPTER NO-2

CIRCUIT DESCRIPTION AND COMPONENTS REQUIRED

2.1 CIRCUIT DIAGRAM:-

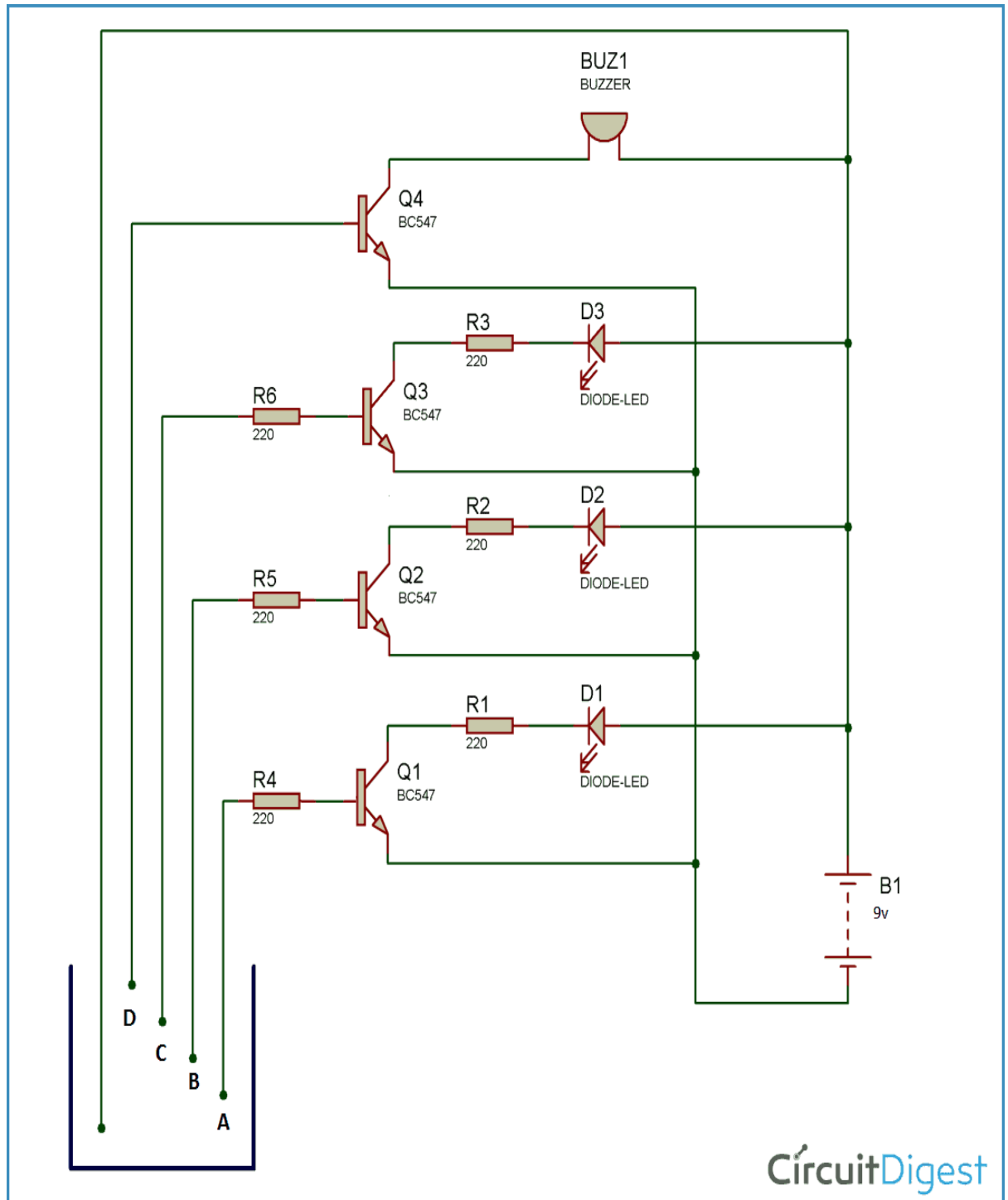


FIG 2.1 – CIRCUIT DIAGRAM OF WATER LEVEL INDICATON

This circuit consists of 4 sensing probes which are dipped in water to sense the level of water. The probe A is connected as common to other three, which should be at the bottom most part of the water tank, also it act as a reference level. The probes B,C and D are set as minimum, middle and maximum level respectively. The circuit is assembled on a general PCB and encloses it in a casing and mounts it inside home with the indicator LED's pointing out of the box. A short length three, 18 SWG copper wires can be used as sensing probes and for common sensor Probe A, a bare copper wire can be used.

When water in the tank touches the probe A and B both, a small current flows from A to B through water and to the base of transistor T1 via a 220K Ω resistor. As a result the transistor conducts causing the LED1 to glow and immediately the pump will start functioning and the buzzer starts sounding. Similarly, when water touches sensor C, LED2 glow and indicates that the tank is half- filled and still the pump works and it gives the information about the level of water in the tank. Finally, when the water touches sensor D, LED3 glows and indicates the tank is completely filled and immediately the pump stops functioning and the buzzer connected will stop.

We can consider this whole circuit as 4 small circuits, each one for indicating/alarms, when a particular level (A,B,C,D) of water have been reached.

When water level reaches to point A, circuit with RED LED & transistor Q1 gets completed and RED LED glows. Similarly when water level reaches to point B, circuit with YELLOW LED and transistor Q2 gets completed and Yellow LED glows, same goes with point C. And finally when tank gets full (Point D), circuit with buzzer gets completed and buzzer starts beeping.

2.2 COMPONENTS REQUIRED:-

- Breadboard
- 4 - BC547 transistors
- 6 - 220 ohm resistors
- 3 - Colour led
- 1 - Buzzer
- 5 - 9v battery + battery clip
- Glass
 - **Bread board**

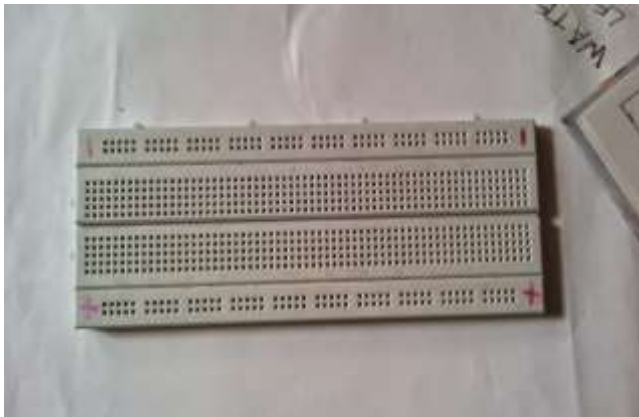


FIG-2.2 BREADBOARD

Bread board is temporary circuit arrangement device it is mostly used to check first the circuit it works or not.

- **Three LED**



FIG-2.3 LED

There are three different colors LED shown in figure, Yellow, Green and Red and the water level depend on their color form.

Yellow LED indicate the low level, Green LED indicate the medium level and the Red LED indicate the high level of water in water tank.

- **Battery**



FIG-2.4 BATTERY

This is 9V battery is used in this circuit and the other side is battery connector it use to connect the circuit to the battery

- **Jumper wire**



FIG-2.5 JUMPER WIRE

Jumper wire is copper laminated aluminum wire is used to join the component like transistor, resister, capacitor, and etc.

- **Transistor**



FIG 2.6 TRANSISTOR

A transistor is a semiconductor device, commonly used as an amplifier or an electrically control switch. The transistor is the fundamental building block of the circuitry in computers, cellular phones, and all other modern electronics because of its fast response and accuracy, the transistor is used in a wide variety of digital and analog functions, including amplification, switching, voltage regulation, signal modulation and oscillators. Transistors may be packaged individually or as part of an integrated circuit, some with over a billion transistors in a very small area. They are contain to electronics and there are two main types, NPN and PNP These are three transistor (A1015) is used in this circuit to high the signal.

The letter refers to the layer of semiconductor material used to make the transistor, must transistors used today are NPN because this is the easiest type to make from silicon. This page is mostly about NPN transistors the lead are labeled based (B) collector (C) and emitter (E) these terms refer to the internal operation of a transistor but they are not much in understanding how a transistor is used

- **Resister**



FIG-2.7 RESISTER

These are 6 resisters shown in figure first 3 resisters are (470Ω) and other three resisters are (240Ω).

- **Water glass**



This is water glass is used as little water tank. As shown in figure there are 4 different colors wire inserted in the glass. First Black wire used for the ground level to complete the circuit and other there are used for the different level like low, medium and high. This level can be decided as your requirement.

CHAPTER NO-3

ADVANTAGES AND DISADVANTAGES

3.1 ADVANTAGES:-

- The water level indicators are low cost in the market
- Any person can identify the water level easily by hearing the beep sound
- By using this we can control the water level safely and easily

The information in the article is about the water level alarm circuit using 555timer. I hope by reading this article you have gained some basic knowledge about the water level indicator and if you have any queries regarding this article or about the engineering projects, please don't hesitate to comment in the below section. Here is a question for you, what are the functions of the water level alarm circuit.

A water level controller is a device that manages water levels on a variety of systems such as water tanks, pumps and swimming pools. The basic function of a water level controller is to regulate water flow and optimize system performance. These devices have four main advantages.

1. *Saves Power*

Using a water level controller saves power. This is because water levels are controlled automatically, which limits the amount of electricity used. As a result, less water and power are used to regulate a water supply. In an age where energy conservation is of utmost importance, using one of these devices is very beneficial.

2. *Saves Money*

Since a water level controller conserves power, it saves money, as well. Basically, water regulation is optimized through these devices, which means that wasted electricity and wasted water is kept at a minimum. That saves a substantial amount of money over time.

3. *Works Automatically*

Another big advantage is that these devices can work on their own. Thanks to timer switches, there is no need to operate them manually. This means that the frustrations involved with monitoring something like a water tank is minimized, and the water levels will be where they should be.

4. *Maximizes Water*

Additionally, water usage can be maximized with a water level controller. Often, water pumps get more use during the middle of the day. A water level controller is helpful because it automatically provides more water during the middle of the day and less water at night. As a result, water remains at its appropriate level at all times.

3.2 DISADVANTAGES:-

- The disadvantages are that it is difficult to install and can be quite expensive as well.
- There are no real disadvantages to water level controllers.
- They save electricity, require little maintenance and are affordable. They also keep waste to a minimum.

CHAPTER NO-4

APPLICATIONS

APPLICATIONS:-

- The water level indicator is used in Hotels, Home apartments, commercial complex, and in factories.
- The pumps used in the water level indicator are single phase motor, submersible motor, and in three phase motor.
- By using the two motors, two sumps, two overhead tanks we cannot control by a single circuit.
- Automatically the pump will switch ON/OFF when the water level in the tank is empty and full.
- We can also measure the fuel level in motor vehicles.
- The liquid level containers are huge in the companies.

CHAPTER NO-5

CONCLUSION AND REFERENCES

CONCLUSION:-

This paper was intended to design a simple and low cost water level indicator. This is not only for water tank but also used for oil level and chemical lab. To design this system, we used transis- tor as a platform and local materials for low cost. We tried to de- sign a system in such a way that its components will be able to prevent the wastage of water. The whole system operates auto- matically. So it does not need any expert person to operate it. It is not so expensive. This design has much more scope for future research and development. Though it is a project, we hope some modification in this project will lead to a reasonable diversity of usage.

REFERENCES:-

- 1) <http://electronicsforu.com/electronics-projects/hardware-diy/water-level-indicator>
- 2) <http://www.edgefxkits.com/blog/simple-water-level-alarm-circuit/>
- 3) <http://www.instructables.com/id/Water-Level-Indicator-with-Alarm/>
- 4) <https://circuitdigest.com/electronic-circuits/water-level-indicator-alarm-circuit>
- 5) [http://www.answers.com/Q/What are the advantages of numeric water level indicator using LED#slide=1](http://www.answers.com/Q/What+are+the+advantages+of+numeric+water+level+indicator+using+LED#slide=1)