

## Water Level Indicator with Automation of Door

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### **Abstract**

Automatic water level controller for dam is designed to monitor the level of water in a tank. It displays the level of water and when it is at the lowest level; a sensor is activated automatically to refill the tank. When the tank is filled to its maximum capacity, the sensor is automatically de-energized. Several circuits are put together to ensure proper working of this design, and the block diagram includes the supply unit, the 555 timer unit, the sensor unit, the display i.e. L.E.D unit and the pump drives unit. The power unit is responsible for turning on the entire circuit. Some components are used to set up power unit and they include; a step down transformer, a bridge rectifier circuit, a smoothening capacitor and a voltage regulator IC. The 555 timer Ic controls virtually all the actions carried out in this design. (555 timer IC) is used in the design. The sensor unit is responsible for sensing the level of water and transfer the current position of water to the microprocessor. The display i.e. L.E.D unit in the circuit is use to physically show the current position of water in the tank.

**Key words:**-Detection, Automation, Controlling, Time saving, Effortless.

### **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 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 timers IC.

### **Literature Review:-**

An automatic water level control detects the water level in the tank and also ensures continuous water flow round the timer because of its automatic, is made up of 555 timer Ic with 8 pins. The level measurement consist of determining the distance from the upper surface of a liquid in a reservoir or vessel or any arbitrarily chosen mark located above or below this surface by itself the level is not an independent physical quantities describing the state of a substance through direct and indirect level, some examples of direct level measurement are dipstick, capacitor type ,liquid level radiation type liquid level measurement .for instance the dipstick, it is very simple the OFF the pumping machine when the water in the tank has reach its maximum level. Electronics circuit has undergone tremendous changes since the invention of a triode by LEE DE FOREST in 1907. In those days the active component likes resistors, inductors and capacitors etc. Of the circuit were separated and distinct unite connected by soldered lead with the invention of a transistor in 1984 by W.H Brattain and Ibadan, the electronic circuit became considerably reduced in size.

It was due to the fact that transistors were not only cheaper, more reliable and less power consumption but was much smaller in size than an electronic tube. To take advantage of small transistors size, the passive component too were reduce in size there by making the entire circuit very small development of printed circuit board(PCB) further reduce the size of electronics equipment by eliminating bulky wiring and tie point. In the early 1960s a new field of micro-electronics was born primarily to meet the requirement of the military which was to reduce the size of it electronics equipment to approximately one tenth of it then existing volume. The drive extreme reduction in the size of electronic circuit has lead to the development of micro-electronics circuit called integrated circuit (ICS) which are so small than their actual construction is done by technicians using high powered microscopes. An integrated circuit is a complete circuit in which both the active and passive component are fabricated in on a tiny single chip of silicon, Active component are those which have the ability to produce gain example are transistors and field effect transistors (FET). An integrated circuit sometimes called a chip or microchip is a semi-conductor wafer on which thousand of millions of tiny transistors, capacitors are fabricated, An IC can be either analog digital depending on its intended application.

### **Methodology: -**

There are many methods of designing an automatic water level control with sensing device but all these methodologies does not require human assistance. In this project an automatic water level control for both with switching device is designed using electronic control to refill the water without human intervention. The system design was carefully arranged to refill the water tank any time water get low to a certain level finally the system automatically shut down the water sensor by putting the electronic sensor when the tank is full. The approach used in this work is the modular design approach the overall design was broken into function block diagrams. Where each block in the diagram represents a section of the circuit that carries out a specific function. The system was designed using functional blocks as shown in the block diagram bellow in this method the circuit is designed to display 3 different level using sensors to monitor the inflow of water in the tank. However these displays i.e. L.E.D can be increased and decrease depending upon the level resolution required. This can be done by increasing or decreasing the number of level detector and associated component. Diodes full-wave rectifier are used to power the system through a power supply.

Rectifier output is filtered using capacitor C respectively the final design schematic circuit diagram of the method is shown below in the figure,

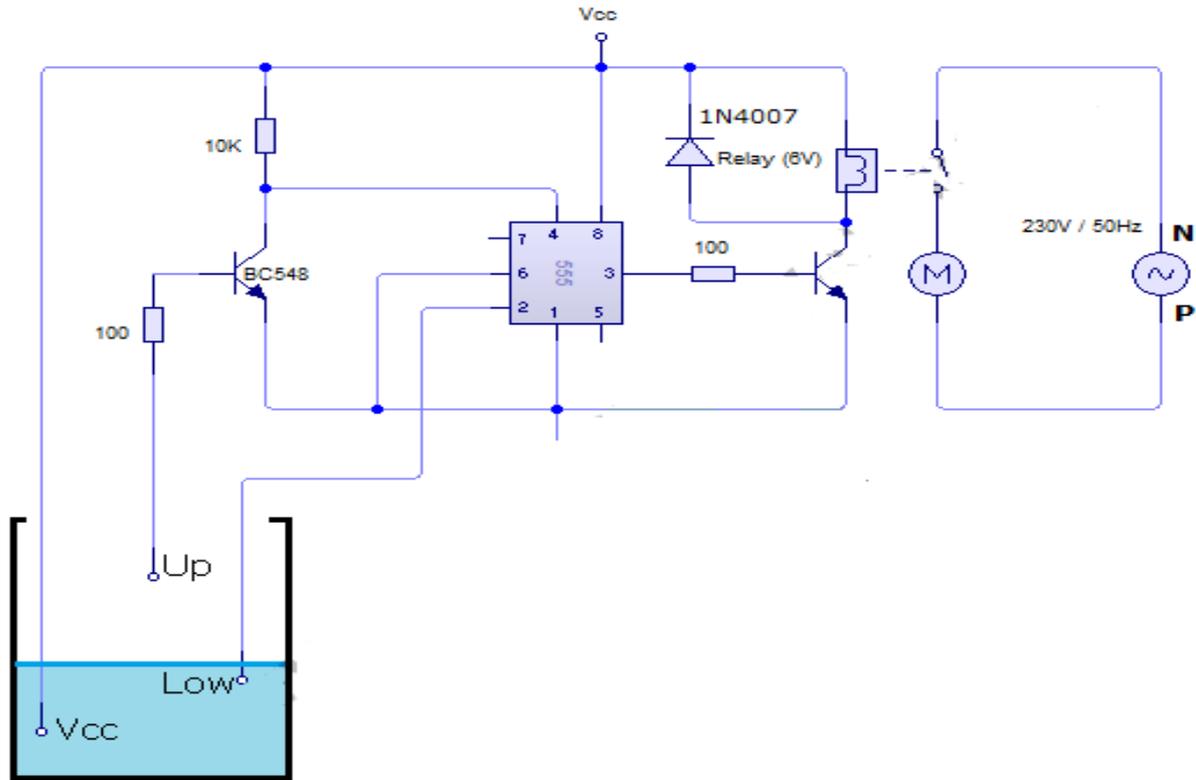


Fig: Water Level Indicator with 555 timer.

We know the property of 555 timer IC, i.e. its output goes HIGH when voltage at the second pin(trigger pin) is less than  $1/3 V_{cc}$ .

Also we can reset back the IC by applying a LOW voltage at the 4<sup>th</sup> pin (Reset pin).

In this project sensors are dipped in water tank. Let us define two water levels- Bottom (Low) level and Top (Up) level. One of the wire or probe is from  $V_{cc}$ . The probe from bottom level is connected to the trigger (2nd) pin of 555 IC. So the voltage at 2nd pin is  $V_{cc}$  when it is covered by water.

When water level goes down, the 2nd pin gets disconnected(untouched) from water i.e. voltage at the trigger pin becomes less than  $V_{cc}$ . While the water level rises, the top level probe is covered by water and the transistor becomes ON. Its collector voltage goes to  $V_{cc}$ .

The low voltage at the fourth pin resets the IC. So the output of 555 becomes 0 volt. Hence the motor will turn off automatically.

For simple demonstration of this project we can use a DC motor directly at the output of 555 with relay. Rating of relay is chosen according to the load (motor). 32A relay is best suited for domestic & large applications.

### ProjectDevelopment:-

A grounding probe is connected at the base of the container so as to ground the liquid content of the container. The ports of 555 timer IC where the individual sensors would be attached is pulled up to  $V_{CC}$  (+5v) putting the port to

logic 1. As the liquid level rises, it first touches the first probe placed out level 1, the probe becomes a rounded and since the probe was connected to the base of a transistor which is active low, the transistor is activated and thus switches. The +5v supply on its emitter to its collector which in turn activates the transistor connected to it. This transistor switches the ground attached to its emitter to its collector and thus the ports of the 555 timer IC where the collector is connected is now grounded. Therefore ports transitions are seen by the 555 timer whenever a particular level is attained by the liquid.

Also it requires less man power & it is controlled from anywhere. It is also important in remote areas where less interaction of humans.

**Observation: -**

In this project are we observed that when water level rises above certain limit then sensors are activated & the motor is switched ON automatically at that time dam gate will be open. When gate is open at certain limit then motor is automatically OFF. When the water comes to the dead zone at that time the motor will be runs at reverse direction automatically. When the gate is completely closed then the motor will be automatically switched OFF. In this way the water level and water flow will be controlled.

**Conclusion:-**

- 1) It is used for remote areas where the manual metering is difficult
- 2) The L.E.D.s are connected in the circuit are brighten-up when water level is increased.
- 3) It is most efficient method for sensing & controlling the water.

Thus by using this simple arrangement we can save wastage of water and electricity. It is very important for us to control the use of natural source of energy. By using this circuit we can solve our purpose very easily.