



Puttisopon School  
Chiang Mai Primary Education Service Area Office 1  
Northern English Medium Instruction Programmes  
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# SCIENCE PROJECT

## WATER LEVEL CONTROLLER SYSTEM

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## Introduction

Many households and small farms rely on water tanks as an essential means of storing water for daily use and agricultural activities. However, manually checking and controlling water levels can be inconvenient and inefficient, often leading to problems such as water overflow, unnecessary water waste, and increased effort in monitoring the system. To address these issues, this project presents a low-cost automatic water level controller that is capable of managing water levels efficiently without the need for human intervention.

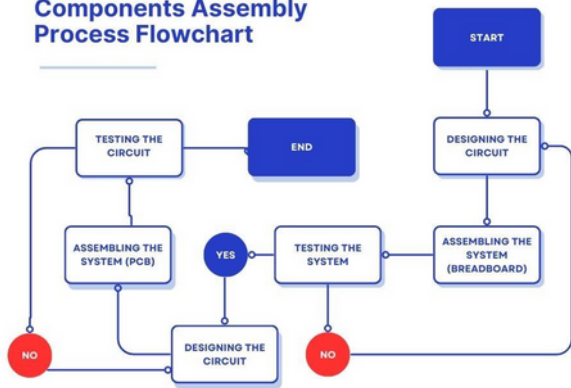
## Objectives

- To design and build a low-cost automatic water level controller
- To reduce water wastage and overflow
- To create a system that is simple, safe, and easy to use

## Hypothesis

A simple sensor and relay-based circuit can efficiently and reliably control water levels in tanks at low cost.

### Components Assembly Process Flowchart

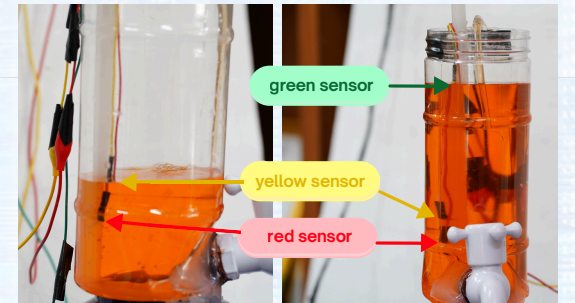


## Water Level Sensor Design

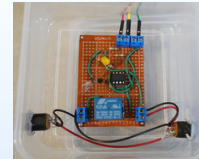
Three jumper wires act as water level sensors:

ColorFunction

- Red Low level → Pump ON
- Yellow Medium level indicator
- Green High level → Pump OFF



## Results



- ✓ Accurate water detection ( $\pm 2$  cm)
- ✓ Instant relay response (0 sec delay)
- ✓ Stable operation with different pumps

Tested Pumps:

- 12V DC, 4 L/min, 4.2 W
- 12V DC, 800 L/hour, 19 W

Performance with a 12VDC 19W 800L/HOUR submersible water pump.

Findings	Calibration	Remarks
Accuracy of water detection	Detects at $\pm 2$ cm	No missed detection
Response time of the relay	0 seconds delay	Consistent
Efficiency of pump control	0 seconds delay	Efficient

Performance with a 12 VDC 4L/MIN 4.2 watts submersible water pump.

Findings	Calibration	Remarks
Accuracy of water detection	Detects at $\pm 2$ cm	No missed detection
Response time of the relay	0 seconds delay	Consistent
Efficiency of pump control	0 seconds delay	Efficient

## Conclusion

The project successfully developed a low-cost, reliable, and easy-to-use automatic water level controller.

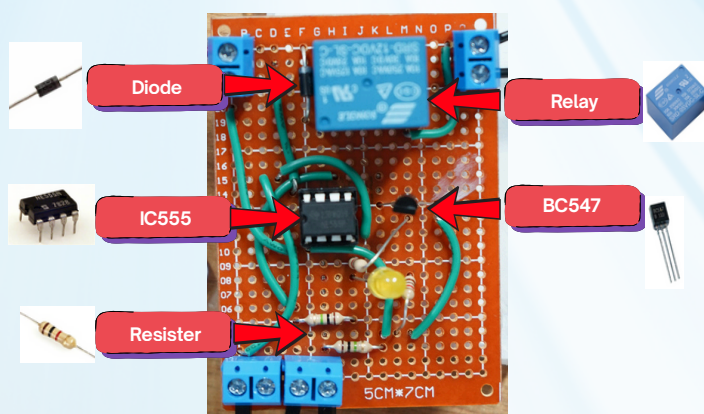
It effectively prevents overflow and dry running, making it suitable for household and small-scale applications.

## Applications

- Household water tanks
- Small irrigation systems
- DIY automation learning projects



## Main Components



## System Concept



Input → Process → Output

- Input:
  - Water level (Low / Medium / High)
- Process:
  - Jumper-wire water sensors
  - IC 555 signal processing
  - BC547 transistor & relay switching
- Output:
  - Pump ON at low water level
  - Pump OFF at high water level



## References

Instructables - Water Level Controller [Water Level Controller : 4 Steps - Instructables](#)  
 Electronics Hub - Water Level Controller Circuit [Simple Water Level Indicator with Alarm \(3 Tested Circuits\)](#)  
 Datasheets:  
 Datasheet for IC 555 Timer (e.g., Texas Instruments) [LM555 Timer datasheet \(Rev. D\)](#)  
 Datasheet for BC547 Transistor (e.g., On Semiconductor) [BC547 Datasheet\(PDF\) - Fairchild Semiconductor](#)  
 Datasheet for 12DCV SPDT Relay [JQC-3FF SPDT 12V 5A PCB Relay Datasheet](#)