

## AUTOMATIC HAND SANITIZER DISPENSER

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### ABSTRACT

Hand sanitization is the most useful way to prevent the spread of disease-causing microorganisms. Traditionally, to sanitize and clean our hands, we are using soaps and manual hand soap dispenser. Nowadays, due to advancement in the technology, we have optimized the health-care equipment. Currently used modern equipment's are very complex and expensive. This research paper proposes the idea of fully automated sensor-based controlled sanitizer dispenser. This research paper advocates radically different approaches: we aim to fully automate the current technique using alternate components for system, thereby reducing the cost of the product. Our designed automated dispenser can be commercially used to develop a good sanitization approach toward a community. The main advantage of this design is that we could design a number of automated dispensers within a small period of time using basic components in a very fewer budget.

### I. INTRODUCTION

This project is based on an infrared (IR) sensor, which detects the presence of hands and consequently activates the motor pump to dispense sanitizer. The circuit is economical, reliable, and can be easily constructed.

- It consists of an IR sensor module (IRI), transistor, SV single- changeover relay, diode, LED, mini submersible DC motor pump, and a few other components.
- When the IR sensor detects a hand, its output goes high. This high output drives relay driver transistor and energizes relay Submersible DC pump gets power supply through NO contacts of the relay. This turns on the DC pump, and hand sanitizers liquid starts to flow out of the small plastic pipe fitted on the bottle.
- When there is no hand or object in front of the IR sensor, its output goes low. This low output cuts off relay driver transistor and de-energizes relay. When the submersible pump disconnects from the power o supply, the DC pump goes off, which stops the flow of hand sanitizers.

#### Components used in this Project BATTERY-

A battery is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supplying power, its positive terminal is the cathode and its negative terminal is the anode. A battery can be defined as an electrochemical device (consisting of one or more electrochemical cells) which can be charged with an electric current and discharged whenever required. Batteries are usually devices that are made up of multiple electrochemical cells that are connected to external inputs and outputs.

Batteries are broadly classified into two categories, namely primary batteries and secondary batteries. Primary batteries can only be charged once. When these batteries are completely discharged, they become useless and must be discarded. On the other hand, secondary batteries are the batteries than can be charged and reused for many charging-discharging cycles.

#### SWITCH -

Switch is used to control an electrical circuit in which the operator manually presses a button to actuate an internal switching mechanism. This switch has two types of connections: normally open (NO) and common (C). The circuit is closed when the switch gets on. The current will pass from the common (C) terminal to the ordinarily open (NO) terminal. When the switch is turned off, the circuit becomes an open circuit, with no current flowing through it. This switch acts as a one-way switch to turn the circuit on and off. When a user presses the switch button, the switch plates are connected. As a result, current begins to flow throughout the circuit. This switch, for example, is commonly used to control the light in the room. When the switch is turned OFF, the circuit is broken, and the light is turned off. Similarly, when the switch is switched on, the light is turned on.

**CONNECTING WIRES -**

A connecting wire allows travels the electric current from one point to another point without resistivity. Resistance of connecting wire should always be near zero.

The conducting wire is a component of a circuit that carries the current in the circuit. It is made out of a current conducting material like copper or tungsten.

The wire is covered by an insulating material like rubber for protection as well as to avoid loss of current. Conducting wires are represented by different colors in a circuit to distinguish their function. Green is for grounding wire, black is for neutral and red usually is for the live wire.

**RELAY MODULE -**

The relay is the device that open or closes the contacts to cause the operation of the other electric control. It detects the undesirable condition with an assigned area and gives the commands to the circuit breaker to disconnect the affected area through ON or OFF.

Every electromechanical relay consists of

1. Electromagnet
2. Mechanically movable contact
3. Switching points and
4. Spring

It works on the principle of an electromagnetic attraction. When the circuit of the relay senses the fault current, it energizes the electromagnetic field which produces the temporary magnetic field. This magnetic field moves the relay armature for opening or closing the connections. The small power relay has only one contacts, and the high power relay has two contacts for opening the switch.

The inner section of the relay is shown in the figure below. It has an iron core which is wound by a control coil. The power supply is given to the coil through the contacts of the load and the control switch. The current flows through the coil produces the magnetic field around it.

**DC WATER PUMP -**

DC water pump is a small electric water pump motor that powered by a 24v, 12v, 5v, 6v, or 3v direct current power supply, solar panel or battery. It uses centrifugal force to pressurize, transfer or circulating water or other liquids. DC pumps use direct current electricity to power a motor, which drives an impeller to move fluid from one place to another. Here’s how a DC pump works: The operator connects the DC pump to a power source and switches it on. Electricity flows through the motor, causing it to turn. The rotating motor drives the impeller, a wheel with blades or vanes that pushes the fluid through the pump.

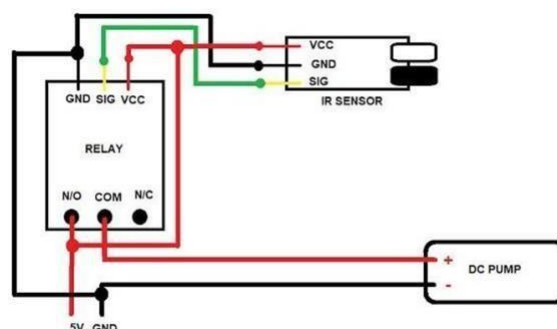
**PIPE -**

In our project, I used a normal water pipe. The pipe connects to the Motor. Circulating liquid sanitizer to the output through the pipe by the pressure of the pump.

**Working Principle:**

The IR proximity sensor is used to detect if a hand is detected under the nozzle. When the IR detects an object, it will give output a high (5V signal) to relay, opening up the relay channel and turning on the DC pump, releasing the sanitizer through nozzle.

The full connection diagram is as follows:



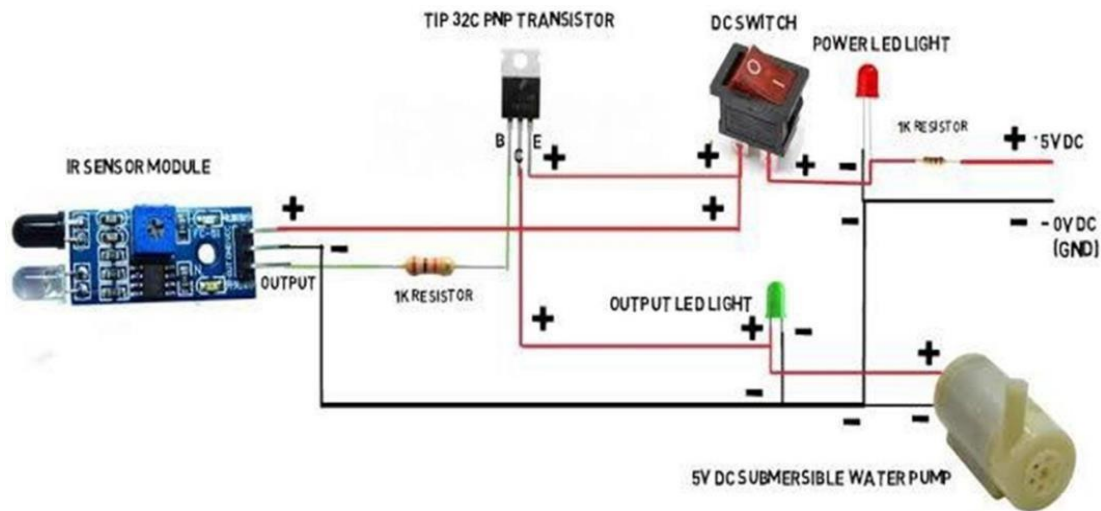
After the above connections are made, the pump with plastic tube attached can be placed inside the plastic jar while the electronic components can be taped on top of the lid of the Jar.

Two holes are made on top of the jar such that plastic pipe and the electrical wires can be brought out of the jar. Make sure all exposed wires are covered with electrical tape so as to avoid short circuits. A nozzle can also be added to the end of the plastic tube connected to the pump, to restrict the flow of the sanitizer.

Once all the connections and set up is ready, the main power can be given and you should see the relay and the IR having their power LEDs glow on.

When powered on, as soon as the IR detects an object, you should be able to hear the pump turning on.

### II. CIRCUIT DIAGRAM



### III. RESULT

A well-executed automatic hand sanitizer dispenser project can have several positive outcomes, including:

1. Improved hygiene: Automatic dispensers eliminate the need for physical contact, reducing the risk of bacterial or viral contamination.
2. Convenience: Users can easily access hand sanitizer without having to touch a manual dispenser or bottle.
3. Cost-effective: Automatic dispensers can help save on sanitizer costs by providing controlled and measured doses.
4. Efficiency: These dispensers can quickly and accurately distribute the desired amount of hand sanitizer.
5. Public health benefits: By promoting hand hygiene, automatic dispensers contribute to the overall well-being of individuals and help in reducing the spread of infections.

Hardware –

Sr.no	Material	Quantity	Costing
1.	Battery	02	100 ₹
2.	Switch Button	02	30 ₹
3.	Connecting Wires	01 set	40 ₹
4.	Relay Module	01	40 ₹
5.	DC Water Pump	01	70 ₹
6.	Transparent Pipe (15-20 cm)	01	50 ₹
7.	Jar	01	25 ₹
8.	Liquid Sanitizer Sachets	01	20 ₹
9.	1/2 Inch Plastic Wall Plugs	02	02 ₹

#### IV. CONCLUSION

The automatic hand sanitizer dispenser device proposed in this paper is ultimately expected to contribute to contactless hand disinfection in public places and virus infection prevention. The automatic hand sanitizer dispenser project aims to address the crucial need for convenient, efficient, and hygienic hand sanitization in various environments. Through meticulous research, design, and implementation, the project seeks to provide a solution that promotes hand hygiene, reduces the spread of infectious diseases, and enhances user experience.

**Key considerations for the project include:**

Understanding user requirements and behaviors to design an intuitive and user-friendly interface. Incorporating robust and reliable components to ensure durability and long-term performance.

Adhering to strict hygiene standards and safety regulations to prevent cross-contamination and ensure user safety.

Implementing energy-efficient and sustainable features to minimize environmental impact and operational costs. Employing adaptive and customizable features to accommodate diverse settings and user preferences.

Integrating feedback mechanisms and maintenance protocols to facilitate ongoing monitoring and upkeep of the dispenser.

By addressing these considerations and leveraging innovative technologies and design principles, the automatic hand sanitizer dispenser project strives to make a significant contribution to public health and hygiene practices. Through collaboration with stakeholders, rigorous testing, and continuous improvement, the project aims to deliver a solution that meets the highest standards of quality, reliability, and effectiveness in promoting hand hygiene worldwide.

#### V. REFERENCES

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