

Touchless Sanitizer Dispenser

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Abstract: *The main aim to develop “TOUCHLESS SANITIZER DISPENSER” is to reduce spread of corona virus. Initial point of contact with germs is often from the hand. Our designed touchless sanitizer dispenser can be commercially used to develop a good sanitization approach toward a community. When compared to liquid soap or solid soap, they is very necessary of water to wash off since it is vaporizes and we can instantly apply to hands. In project an Arduino microcontroller as the main control, A human will hand detect by infrared sensor, and a solenoid valve as an actuator that will activate the automatic dispense without touching.*

Keywords: Touchless sanitizer, Solenoid valve, Relay, Arduino, Micro controller, Sanitizer dispenser

I. INTRODUCTION

The Demand for hand sanitizers has surged because the Corona Virus poor out And unfold round the world. The gel hand sanitizers square measure usually employed by Squirting the sanitizer liquid once one presses a pump with one's hand. It causes many people to come back into contact with the pump handle, that raises the danger of Viral transmission. Pressing the pump handle is boring, and plenty of go by Without disinfecting their hands. Moreover, all and sundry presses the pump handle Separately, creating it troublesome to predict the quantity of use and to manage refills and replacement. For this reason, the particular use of hand sanitizers is attenuate, which not serving to stop the unfold of the virus. Many hand sanitizers on market are mechanically tense. Because Sanitizer containers and pump devices ar designed to be appropriate solely between Products created by a similar manufacturer, shoppers should additionally repurchase The instrumentation for the liquid if they replace the hand sanitizer. It's not economical And it's a negative influence on the setting by increasing waste emissions. Moreover, some users suppose that it's a trouble to shop for a hand sanitizer-containing Device compatible once more, in order that they pour different hand sanitizers into antecedently used Containers and utilise them. [1]. However, sanitizers that come back directly into contact with the physical structure are classified as medicines or non-medical merchandise, and They are safest to use in actual containers.

1.1 Objectives

The touchless sanitizer dispenser device projected during this project is ultimately Expected to contribute to contactless hand medical care publicly places and virus Infection interference. In addition, it's economical and eco-friendly by Decreasing waste emission. The INFRARED device of the sanitizer dispenser Detects the infrared energy that's emit once hands square measure placed within the proximity of the sensor.

II. LITERATURE REVIEW

The paper says concerning emergence of the novel Coronavirus (SARS-CoV-2), Which has caused sudden challenges to health of the individuals of this world, the Paper conjointly aims at reducing the transmission rate of the illness. Within the absence of Availability of immunogen or effective antiviral medication, hand hygiene may be a mainstay of Efforts to stop the unfold of severe acute metastasis syndrome corona virus [2](SARS- CoV-2), the virus that causes COVID-19. Within the hand sanitizer study, the Researchers evaluated the effectiveness of various concentrations of 2 2 and 2 changed hand sanitizer formulations on COVID-19 virus. The WHO recommends 2 formulas: eightieth ethyl alcohol, 1.45% glycerine and zero.125%Hydrogen peroxide and seventy fifth 2-propanol, 1.45% glycerin and zero.125% element Peroxide. However, these formulas did not meet the effectiveness needs

Of European Norm 1500. So, the changed versions utilized in this study was.[2] 80%Ethanol,0.725% glycerine and zero.125%hydrogen peroxide and. Seventy fifth 2-propanol,0.725% glycerine and zero.125% peroxide. It's been found that WHO Formulation had plague reduction issue of \geq three.8, whereas the changed versions Had a discount issue of \geq five.9. This paper showed the effectiveness of the Alcohol-based hand sanitizers, that reduced infection rates by walloping half-hour. The paper conjointly explains concerning the virus structure and the way it's totally different from thatOf the microorganism structure, which suggests that virus has single stranded or double Stranded polymer ordeoxyribonucleic acid encapsulated in 'capsid' and virus will replicate solely in Presence of a number and delineate as 'living entities'. The paper conjointly offers Complete comparison between hand sanitizers and soap, foam vs gel and it says That high concentration of alcohol will cut back the number of virus particle giftIn the hand and therefore proves the effectiveness of alcohol-based hand sanitizer.

III. HARDWARE SOFTWARE REQUIREMENTS

3.1 Hardware Requirements

- ARDUINO UNO
- IR SENSOR
- SOLENOID VALVE
- POWER SUPPLY
- LED

3.2 Software Requirements

- ARDUINO IDE

3.3 Arduino Uno

Arduino could be a paradigm platform (open-source) supported associate degree easy-to-use Hardware and software package. It consists of a printed circuit, which might be programmed (referred to as a microcontroller) and a ready-made software package referred to as Arduino IDE(Integrated Development Environment), that is employed to jot down and transfer the Computer code to the physical board

The key features are:

- Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.
- User can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
- Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board where the user can simply and use a USB cable.
- Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.
- Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

3.4 Adjustable IR Sensor

The E18-D80NK digital proximity device uses associate infrared semiconductor diode and Receiver to see the presence of associate object inside a particular distance. These Make nice obstacle detectors and might even be used as associate optical gate or in Positioning applications were stopping at bound distance is required. Mounting. This device is kind of simple – it's a long-threaded body giving a substantial Adjustment. [3]The device outputs an easy digital signal. The output is HIGH byDefault – however once associate object is detected it's force LOW. The detection distancelS adjustable between 3-80cm employing a tiny multi flip potentiometer on the highest of the device Additionally to the digital output, there's conjointly alittle semiconductor diode on theBack of the device that illuminates once associate object is detected.To use this device, connect the Brown wire to 5VDC, Blue to Ground, andA 10K Ohm resistance between Brown and Black. The Black wire can currently sit at5VDC unless associate object is within the detection vary.



Fig:1

Specification of IR Sensor

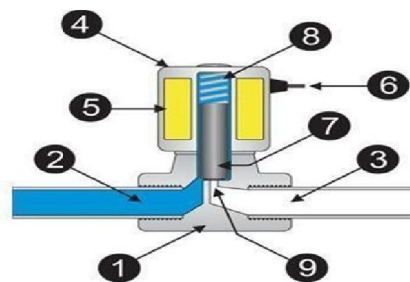
- Power Supply: 5VDC
- Supply current DC <25mA
- Maximum load current 100mA (Open-collector NPN pulldown output)
- Response time <2ms
- Diameter: 17MM
- Pointing angle: ≤ 15 °, effective from 3-80CM Adjustable
- Detection of objects: transparent or opaque
- Working environment temperature: -25°C+55°C
- Case Material: Plastic
- Lead Length: 22CM

Power Supply

The AC voltage, generally 220V rms, is connected to an electrical device, which steps that ac voltage right down to the extent of the required dc output. A diode rectifier then provides a full-wave corrected voltage that's at first filtered by an electrolytic capacitor filter to supply a dc voltage. This ensuing dc voltage sometimes has some ripple or ac voltage variation. A regulator circuit removes the ripples and conjointly remains a similar dc price even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is typically obtained by using a voltage regulator IC unit.

Solenoid Valve

A coil valve, otherwise called an electrically-operated valve, is an automatic valve that serves the aim of removing the necessity for an engineer to operate a valve manually. [3] Solenoids operate by using an electric current to create a magnetic force that moves a plunger to alter the



Parts of Solenoid Valve

- 1) Valve body
- 2) Inlet port
- 3) Outlet port
- 4) Coil / Solenoid
- 5) Coil winding
- 6) Lead wires
- 7) Plunger or piston
- 8) Spring
- 9) Orifice

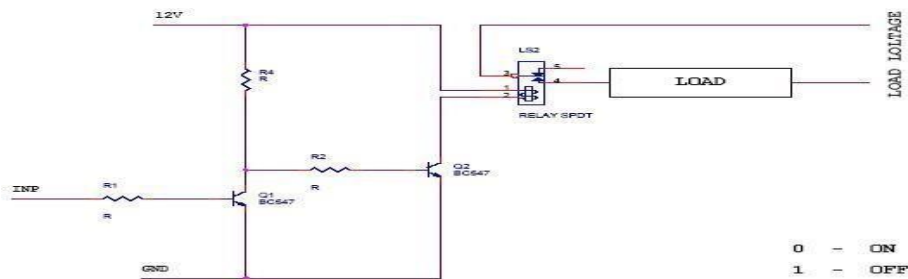
Fig 2:

State of a valve from hospitable closed, or vice-versa. If the coil valve is ‘normally closed’, once the coil is energized, the valve gets raised open by the Electromagnetic force created by the coil. Forced-lift valves area unit employed in high applications wherever neither of the on top of valve sorts will subsume the higher-pressure processes like forty BarPlus. This valve uses a way larger and better power coil to open or shut and The seat of the valve is directly connected to the lowest of the piston/plunger Assembly eliminating the necessity for a diaphragm.

Relay

A relay is an electrical switch that opens and closes under the control of another electrical circuit. It was invented by Joseph Henry in 1835. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered to be, in a broad sense, a form of an electrical amplifier

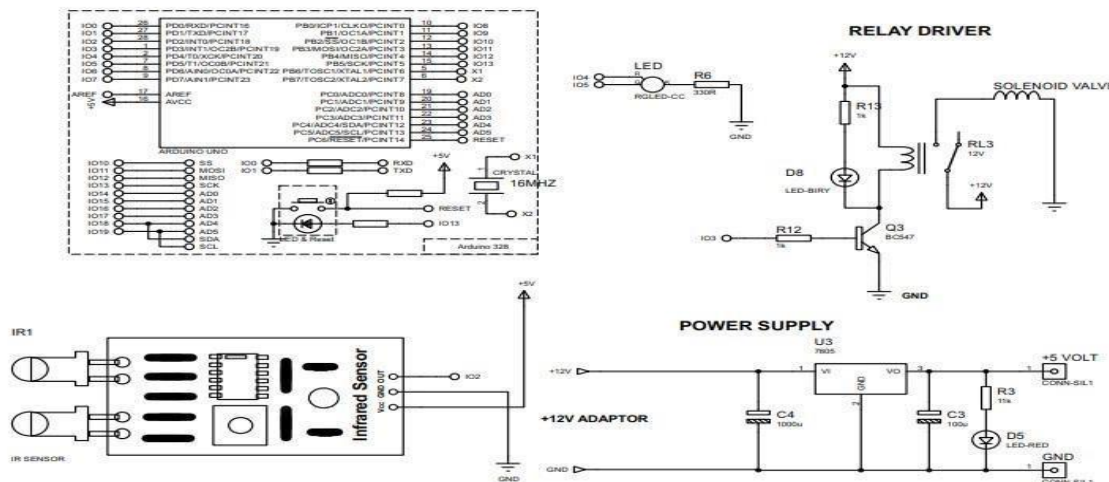
RELAY CIRCUIT - SPST



If the coil is energized with DC, a diode is frequently installed across the coil, to dissipate the energy from the collapsing magnetic field at deactivation, which would otherwise generate a spike of voltage and might cause damage to circuit components. Some automotive relays already include that diode inside the relay case [4].

Relays are usually SPDT or DPDT but they can have many more sets of switch contacts, for example relays with 4 sets of changeover contacts are readily available. Most relays are designed for PCB mounting but you can solder wires directly to the pins providing you take care to avoid melting the plastic case of the relay. The animated picture shows a working relay with its coil and switch contacts. You can see a lever on the left being attracted by magnetism when the coil is switched on. This lever moves the switch contacts. There is one set of contacts (SPDT) in the foreground and another behind them, making the relay DPDT.

CIRCUIT DIAGRAM



III. RESULTS AND DISCUSSION

The success rate of the Touchless Sanitizer Dispenser tool is in the form of testing. In the above project, Arduino is used as a Microcontroller for calculating the distance between the sensor and the hand placed below it. If the distance is within 5cm to 7cm, then the Solenoid value run for 100ms through a relay and pump out few ml of liquid alcohol based hand sanitizer and also senses the distance for every 1000ms (1 Second). Components like Solenoid valve, Relay, Arduino microcontroller were tested. Testing is done by testing the Infrared Sensor by placing hands at a certain distance, namely 2cm, 5cm, and 7 cm. The test was carried out by 10 people with 10 detections for each person and the distance between the hands and the sensor.

THE SUCCESS RATE FOR SANITIZER DISPENSER

NO OF PERSON	THE SUCCESS RATE FOR SANITIZER DISPENSER		
	7CM	5CM	2CM
PERSON 1	100%	100%	0
PERSON 2	100%	100%	0
PERSON 3	100%	100%	0
PERSON 4	100%	99%	0
PERSON 5	100%	100%	0
PERSON 6	100%	100%	0
PERSON 7	100%	100%	0
PERSON 8	100%	99%	0
PERSON 9	100%	100%	0
PERSON 10	100%	100%	0

Based on Table, it shows that the Touchless Sanitizer Dispenser sensor will work properly when the hand is at a distance of 7 cm. The successful discharge rate of hand sanitizer reaches 100%. The success rate of Touchless Sanitizer Dispenser with a hand distance of 5 cm from the sensor reaches 99%. When the hand reaches the sensor of 2cm distance, there are chances for the Touchless Sanitizer Dispenser to not work.

IV. CONCLUSION

The automatic sanitizers dispenser usually operates by squirting sanitizer liquid when one presses a pump with one’s hand. Some hand sanitizers on the market are automatically pumped. However, sanitizer containers and pump devices are designed to be compatible only between products produced by the same manufacturer.

To address this problem, designed an automatic sanitizer dispenser that is compatible with various containers. With the proposed device, it is possible to avoid many people coming into contact with the pump handle, thus preventing fomite viral transmission and making the use of hand sanitizer much more convenient. Moreover, the system squirts a certain amount of hand sanitizer at all times, making it easy to manage refills and replacement. Furthermore, it can operate compatibly with various designs of sanitizer containers, so consumers do not need repurchase a container for the liquid if they replace the hand sanitizer. Thus, it is economical and eco-friendly by decreasing waste emissions. The automatic sanitizer dispenser device proposed by this paper is ultimately expected to contribute to contactless hand disinfection in public places and virus infection prevention.

REFERENCES

- [1]. AUTOMATIC HAND SANITIZER <https://www.iceet.com/automatic-handsanitizer-dispenser/>
- [2]. Review on Automatic Sanitizer Dispensing Machine – IJERT <https://www.ijert.org/review-on-automatic-sanitizer-dispensing-machine>
- [3]. Infrared Proximity Switch - E18-D80NK - BC Robotics <https://bc-robotics.com/shop/infrared-proximity-switch-e18-d80nk/>
- [4]. Solenoid Valves Introduction – Wermac https://www.wermac.org/valves/valves_solenoid.html
- [5]. Relay controller Dreamstime.com <https://www.dreamstime.com/>
- [6]. Embedded system https://en.wikibooks.org/wiki/Embedded_Systems/C_Programming.

PICTURE OF PROJECT
OUTER BODY OF THE TOUCHLESS SANITIZER DISPENSER



INNER BODY OF THE TOUCHLESS SANITIZER DISPENSER

