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Coin Based Water Vending Machine Using PLC

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ABSTRACT

Our goal is to create a water vending machine that can run on many coins, unlike the ones that are available now that only use one coin. Since there is a shortage of clean drinking water in India, we will be providing mineral water. The need for freshwater has grown as a result of lifestyle changes and a fast-growing population. It is evident that the cost of water delivery for homes in most rural locations is significantly higher than what is typically charged in urban areas. The issue of drinking water arises throughout the summer. Coin operation is the foundation of our project. When the appropriate coin is inserted, the water vending machine releases water. It can be utilized in public areas including shopping centre, railroad stations, and roadways. People may find it to be quite helpful and comfortable.

Keywords: Coin sensor, solenoid valve, water vending machine, and programmable logic controller (PLC).

I. INTRODUCTION

The need for freshwater has grown as a result of lifestyle changes and a fast-growing population. The problem of drinking water in the summertime is present. And so is the fear for the safety of the drinking water supply in both urban and rural areas. Only 35.63 feet, or less than half, of the reservoir's total water level are present. Our plan is to create a project that revolves around coin operations. It was created especially with villagers in mind. Additionally, it is used at bus and train stations as well as public areas. This system is PLC-based. Coins are the PLC's inputs, and water is its output. PLC was determined to be the most appropriate option after considering the requirements for the water dispensing system and the ease of use of our application. The machine can provide the customer with a wide range of inputs and outputs. This system's primary goal is to provide customers with filtered water while preventing environmental contamination and water waste through the use of a water control valve. We are aware that the final stages of the available water resources have begun. This issue is subtly linked to inadequate and disjointed water management, as well as wasteful usage and distribution of water. The development of the water vending machine will ensure that customers receive water [1]. Current Systems The majority of modern nations have vending machines located in public areas. People can get snacks, cold drinks, coffee, tea, and other beverages from these machines. These items are also provided via vending machines in poorer nations [2].

II. LITERATURE REVIEW

The objective of this project is to put up a digital system that will supply drinking water from a water vending machine. The system's goal is to do research and create a system that can evaluate drinking water quality and safety. The primary controller of the system is a Programmable Logic Controller (PLC). The human world is becoming increasingly intelligent due to the rapid growth of the Internet of Things (IoT) and machine learning. People's lives are made more advanced and easier by smart sensors. We employed many sensors for various applications in this article. This paper presents the results of a survey conducted on water vending machines in eight different sites in Parit Raja. The survey found that consumers are more prepared to pay a premium for drinking water of higher quality due to their greater awareness of the quality of tap water. Does the water meet the necessary standards to be safe for human consumption and free of contaminants? They feel that filtered water quality encompasses that which is commercially available in the market, such as mineral and bottled drinking water, as well as from the drinking water vending machine, which is why they are so confident in the safety and mineral content of this type of drinking water [3].

These days, automated vending machines predominate since they streamline several operations and boost productivity. This work presents the self-service drinking water machine. There are many different inputs and outputs that this machine can provide to the customer. This gadget looks like a vending machine. The device runs on coins. It only accepts currencies, such as Rs. 1, Rs. 2, and Rs. 5, in any sequence, and provides drinking water. Using a water control valve, the main objectives of this system are to stop water waste and environmental damage. In recent years, a large number of vending machines with numerous product possibilities and number selections have been manufactured. Snack, chocolate, food, and glucose water dispensers are just a few of the various varieties of liquid dispensing vending machines that can be categorized. The major objective is to increase the understanding of people who live in places without access to pharmacists about the changing ways that they use water [4].As society has grown, more and more convenient products have appeared in the globe, including vending machines. Thus, this study builds a basic vending machine control system with a PLC as the bottom machine and King View as the upper computer monitoring screen. The basic vending machine computes and shows the amount of money after assuming that the currency has been entered. By using the selection button indication, which gives information about the commodities that can be sold based on the amount of money, the user can independently select the items he wants to buy. Once the user has deposited enough money to buy drinks, they press the button linked to the selected item to start the vending machine [5].

III.METHODOLOGY

A. Components Used Programmable Logic Ontroller

In a factory setting, a solid-state industrial controller that executes discrete sequential logic is called a programmable logic controller. It was first created for mechanical timers, counters, and relays. In a plant, PLCs are utilized to carry out challenging control tasks. The user performs a series of commands into the PLC memory, and the controller executes the program to operate the system in accordance with the proper operational specifications. The National Electrical Manufactures Association (NEMA) currently defines a programmable logic controller as a digital electronics device that stores instructions in a programmable memory and uses it to implement specific functions like logic, counting, sequencing, and arithmetic operations to control machines and processes [6].

Figure1:Programmable Logic Controller (PLC)

B. Coin Sensor

The tool that finds the right coin is called a coin sensor. The coin sensor identifies the coins based on their thickness, diameter, and fall time. A multi-coin selector, CH-926 may accept up to six different coin types simultaneously. Coin selectors of this kind are frequently found in message chairs, vending machines, arcade games, and other self-management systems. To identify coins, CH-926 primarily uses substance, weight, and size. It uses the most recent software design algorithm. As a result, even in the face of environmental changes like temperature and humidity, CH-926 remains remarkably steady and accurate. We recommend. Using various channels to set up different versions of coins in order to maximize accuracy [5].

Figure2:Coin Sensor

C. Solenoid Valve

This is a basic 24 V DC supply valve with an on/off switch. Motors employ this kind of valve. This module uses a PLC to interface between a vending machine and a water output valve. It is "Normally closed" on the switch. When paired with a high-pressure switch, it has automatic flush and shut off, auto power cut-off during filling, and an extended pump duration. When the tank is filled, it cuts off the water supply. Normally, the booster pump in the RO system controls switch with high pressure [7].

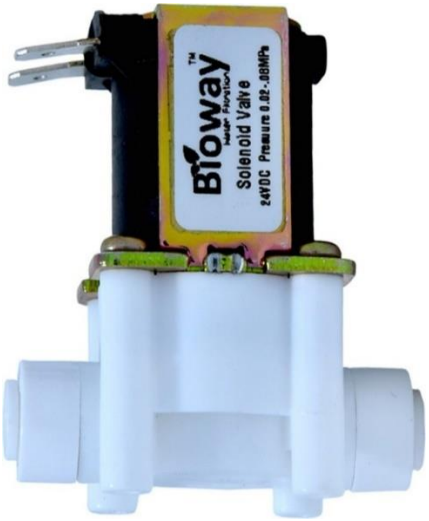

Figure3:Solenoid Valve

D. Relay

A basic electromechanical switch is called a relay. Relays are switching that link or disconnect two circuits, just like regular switches do when we manually close or open a circuit. However, a relay employs an electrical signal in place of a manual process to control an electromagnet, which then connects or disconnects another circuit. It changes the coin sensor's 5 volts to the 24 volts needed by the PLC [8].

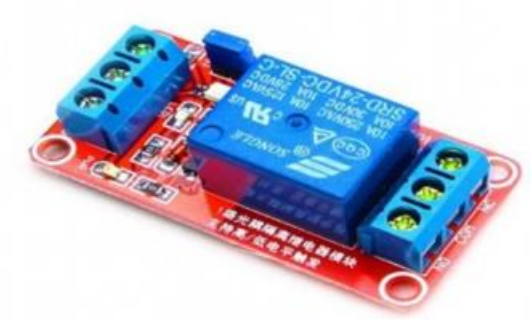

Figure4:Relay

IV. BLOCK DIAGRAM

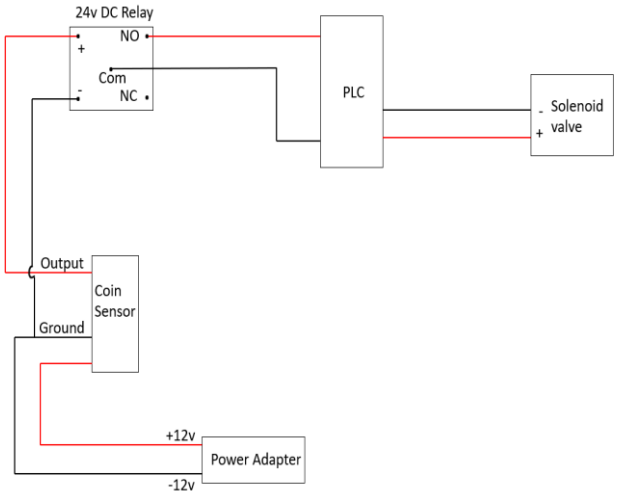

Figure5:Block Diagram

V. FLOW CHART

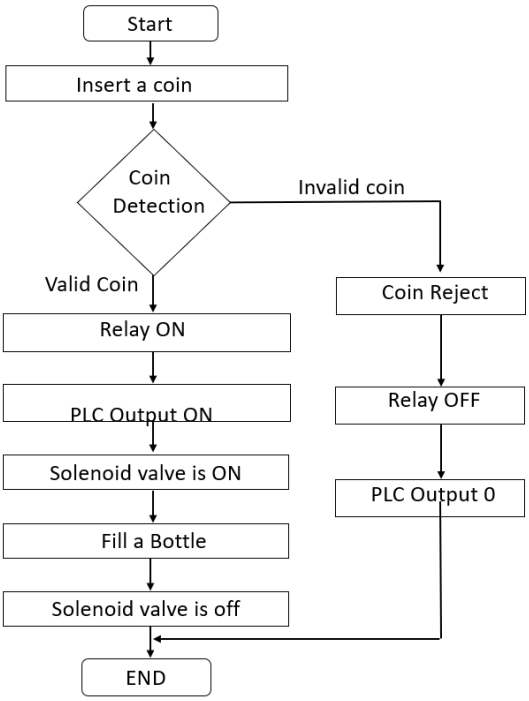

Figure6:Flow Chart

VI. FUTURE SCOPE

Water vending machines appear to have a bright future ahead of them, meeting the increasing need for easily accessible and clean water. To boost water accessibility internationally, advancements could include smart technology integration, sustainable practices, and increased deployment in urban and rural regions [9].

VII. CONCLUSION

The goal of the drinking water vending machine was to research and develop a system for monitoring the water's quality. Create drinking water vending machines that adhere to safety regulations. The automated systems architecture allowed for real-time alerts regarding the drinking water's quality.

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