Smart Rationing By Using PLC Automation

Ankit Chilkalwar[1] ,Shubham Pardikar[2], Akash Kolhe[3],Pranit Dhawale[4] Pranali Bhimgade[5],
Kanchan Dekate[6], Ashvini kale[7], Prof.C.J.Sharma[8]

[1,2,3,4,5,6,7]BE.(Scholar), Department of Electrical Engineering, KDKCE Nagpur, Maharashtra, India
[8]Assistant Professor, Department of Electrical Engineering, KDKCE Nagpur, Maharashtra, India

ABSTRACT

"Now a day's most of the people in India depend on ration items to run their family". Because of the word most the queue outside ration shops increased while issuing items on demand. Through our country is developing throughout technological innovations in various sectors and having a large number of engineers, we aren't thinking of developing technologies for the sale of our own people's day to day life. So, on taking account of that, we are developing a model project to automate the ration shops to eradicate corruption in ration shops, bring the usage of technology in front of all sorts of people and to simplify the ration distribution system and reduce the burden of issuing new ration cards. The overview of this project is to design a system which consist of the system for the automatic entry of products distribution in an SMART card and to distribute products at accurate quantity without human interaction except for loading products.
Keyword: - PLC Module, Relay, Micro-controller, Solenoid Valve, Sensors

I. INTRODUCTION

Automatic Ration Distribution system is explained here is an advanced methodology that can be applied to make ease of the conventional Ration distribution. It is clear that the conventional system follows a completely manual system for billing and distribution of all products except kerosene which is semi- automated. And mostly people suffer due to corruption and time consumption due to a long queue in front of ration shops. Now-a-days, the whole world is getting automated but our government is hiding technology from that hands of poor people. This system not only helps government and people to reduce the burden of ration distribution but also to bring the technology in front of uneducated people, which helps government to made the volunteer their children for studies. ALLEN BRADLEY PLC is used to automate the full ration shop is able to distribute product base on the consumers requirement and the smart ration shop can also identify the person by our smart RFID identification system. so, this could make the system easy to identify, select and distribute ration product. The products have to be loaded in the products compartment which is then connected with a load cell compartment through a stepper motor controlled valve mechanism. The load cell compartment is connected with the outlet through a stepper motor controlled valve mechanism. The ladder logic programming is used to create logic for the whole system to control the mentioned processes.

II. METHODS AND MATERIAL

1. Electrical Components used in rationing system are:

A. Relay

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching Mechanism mechanically, but other operating principles are also used. Relay are used where it is necessary to control a circuit by a low-power signal or where several circuit must be controlled by one signal. The first relays were used in long distance telegraph circuits, repeating the signals coming in from one circuit and retransmitting into another. Relays were used extensively in telephone exchanges and early computers to perform local operations.

B. Solenoid Valve

The type of solenoid valve refers to whether that valve is a 2-way, 3-way or 4-way. A 2-way valve (Figure 1) has two port connections-a pressure or input port (port 1) and an outlet port (port 2). These valves are used to stop the flow of a fluid or start the flow of a fluid in a piping configuration. Usually, a 2-way valve is referred to as a 2/2 valve, which means the valve has two ports and two positions. The positions are: 1) on or energized and 2) off or de-energized Three-way valves are those that have three ports-a pressure or inlet port (port 1), a cylinder port (port 2) and an exhaust port (port 3). A 3-way valve's most common application is for process valve automation. The solenoid valve sends air to a spring return actuator or cylinder, which creates rotational or linear movement to open or close a process valve.

C. MCB

MCBs or **Miniature Circuit Breakers** are electromechanical devices which protect an electrical circuit from an over current. The over current, in an electrical circuit, may result from short circuit, overload or faulty design. An MCB is a better alternative to a Fuse since it does not require replacement once an overload is detected. Unlike fuse, an MCB can be easily reset and thus offers improved operational safety and greater convenience without incurring large operating cost.

A type of relay that can handle the high power required to directly control an electric motor is called a conductor. Sol id state relays control power circuit with no moving parts instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiply operating coils are used to protect electrical circuits from over load or faults; in modern electric power systems this functions are performed by digital instruments still called "protective relays"

D. Potentiometer

The humble potentiometer (or pot, as it is more commonly known) is a simple electro-mechanical transducer. It converts rotary or linear motion from the operator into a change of resistance, and this change is (or can be) used to control anything from the volume of a hi-fi system to the direction of a huge container ship. The pot as we know it was originally known as a rheostat (or rheostat in some texts) - essentially a variable wire wound resistor. The array of different types is now quite astonishing, and it can be very difficult for the beginner (in particular) to work out which type is suitable for a given task. The fact that quite a few different pot types can all be used for the same task makes the job that much harder - freedom of choice is at best confusing when you don't know what the choices actually are, or why you should make them. This article is not about to cover every aspect of pots, but is an introduction to the subject. For anyone wanting to know more, visit manufacturers' web sites, and have a look at the specifications and available types.

Fig1:-POTENTIOMETER

2. Programmable Logic Controller (PLC)

A Programmable controller is a solid state user programmable control system with functions to control logic, sequencing, timing, arithmetic data manipulation and counting capabilities. It can be viewed as an industrial computer that has a central processor unit, memory, input output interface and a programming device. The central processing unit provides the intelligence of the controller. It accepts data, status information from various sensing devices like limit switches, proximity switches, executes the user control program store in the memory and gives appropriate output commands to devices like solenoid valves, switches etc.

Input output interface is the communication link between field devices and the controllers; field devices are wired to the I/O interfaces. Through these interfaces the processor can sense and measure physical quantities regarding a machine or process, such as, proximity, position, motion, level, temperature, pressure, etc.

Based on status sensed, the CPU issues command to output devices such as valves, motors, alarms, etc

Fig-2: PLC

3. Microcontroller

The microcontroller incorporates all the features that are found in microprocessor. The microcontroller has built in ROM, RAM, Input Output ports, Serial Port, timers, interrupts and clock circuit. A microcontroller is an entire compute manufactured on a single chip. Microcontrollers are usually dedicated devices embedded within an application. For example, microcontrollers are used as engine controllers in auto mobiles and as exposure and focus controllers in cameras. In order to serve these applications, they have a high concentration of on-chip facilities such as serial ports, parallel input output ports, timers, counters, interrupt control, analogue-to-digital converters, random access memory, read only memory, etc. The I/O, memory, and on the specifics of the target application. Since microcontrollers are powerful digital processors, the degree of control and programmability they provide significantly enhances the effectiveness of the application.

III. RESULTS AND DISCUSSION

Working of System

First the user gets the smart ration card instead of a traditional ration card for secured ration materials collection. This card used to easily identifies the user's details. Unique serial number is provided to every user Depends upon this serial number user will collect the materials. This process is regularly reducing the user's time wastage; reduce worker's stress; proper maintenance….etc. After verifying the user's details the LCD displays the particular user's quantity details. Then the user selects the goods with the help of the keyboard. With the help of this, the user will pay the amount automatically after the selection of materials. Total amount will display on LCD screen and that will directly deducted from user bank-link-account and then user select Rice or Sugar means commends passed to

motor driver circuit and they control the DC motor. DC motor rotates clockwise to distribute the rice. For distributing sugar, DC motor rotates anti clockwise. If the user selects liquid item means the controller sends commend to relay circuit. At this time relay switch ON and pass commands to the solenoid valve. The valve will be open and distribute the liquid items. Here weight sensor is used for calculating the material's weight exactly and dispense the materials properly. They are primarily executing the correct quantity of materials. This is very useful for distributing the materials correctly. The sensor senses the object and gives the instructions to the controller. Then only the controller distributes the materials. Here liquid level sensor is used for calculating the liquid levels and distributing the liquids accurately. If the liquid level low or high means the buzzer will on automatically. For this kind of process, we reduce the corruption and avoid the fake stock entry. The basic model of smart ration card with authentication. These contain all details regarding users and easily maintain the stock details. This method used to avoid crowd, long waiting period, properly maintain customer details and stock details.

IV. CONCLUSION

The proposed method can provide a safe, secure and efficient way of public distribution system by using this technic PLC based automated ration shop. The government money and people time is saved by this project. Poor people are greatly benefited by this system. As this system is a propose system we can see that by using such a system we can avoid corruption in ration/public distribution system to a large extend. This system has greater scope in future. Low processing speed, long waiting time at ration shop to get material and material theft in ration shop without any acknowledgement to Government and consumer. To overcome above problems, automatic ration shop played important role.

V. REFERENCES

[1]. Ala.Sivaganga Rao, G. ChandraReddy, Nalanda institute of technology(NIT) AP(India)"Smart and secure ration system" international journal of science Technology and management vol. issue No12, Dec-15 (ISSN 2394-1537

[2]. Kashinath wakade, pankaj chidrawar and dineshait wade, "Smart Ration Distribution and

Controlling" International Journal of Scientific and Research Publications, Volume 5, Issue 4, April 2015 1 ISSN 2250-3153

[3]. Jaid Rahul A, Kadam Chetan K, Kokare Aniket S, Deore Minal. An Overview of Automatic Rationing System, International Journal of Informative & Futuristic Research, Volume 2, Issue 6, February 2015.

[4]. Ashwini Lanjudkar , Pooja Mhalaskar , Pallavi Shinde INTELLEGENT GOVERENMENT RATIONING SYSTEM International Journal of Advanced Technology in Engineering and Science www.ijates.com Volume No.03, Issue No. 01, January 2015 ISSN (online): 2348 – 7550.

[5]. A.N. Madur, Sham Nayse, "Automation in Rationing System UsingArm 7," International journal of innovative research in electrical, Electronics, instrumentation and control engineering,vol.1, Issue 4,Jul 2013