WATER ATM MACHINE USING PLC AND SCADA

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Abstract – *This proposed automated water distribution system is used to distribute the required amount of water from ATM machine. We provide ID & PASSWORD to each user then user will enter the required amount of water, So it will help for billing in future. The water from storage tank is measured with the help of level sensor. This system consists of PLC and SCADA. PLC is used to control the distribution of water. SCADA is one of the emerging technologies which are used for complete monitoring. The overall system is connected to PLC with the help of Ethernet cable. PLC gives the signal to the solenoid valve according to the level from water storage tank.*

Key Words: PLC, SCADA, Solenoid valve, Magnetic float type level sensor.

1. INTRODUCTION :

Water is very important for every living organism. But the availability of drinking water on earth is very less as compared to population on earth. When it comes to access to clean drinking water the statistics are stark. Every 21 seconds a child dies from a water-borne illness. Some 783 million people around the world still lack access to clean water and are vulnerable to water borne diseases, including diarrhea, the leading cause of illness and death. Improved access to sanitation and clean drinking water could reduce diarrheal diseases by nearly 90 percent, saving lives and lifting the burden they place on the health budgets of developing countries. Providing drinking water via a piped grid especially to remote rural locations is costly and often not an option in many developing countries.

To overcome the above problem of drinking water we are designed the concept of WATER ATM to provide clean drinking water at any remote area or any city. This ATM system is operating on PLC and SCADA/HMI technology.

By using water ATM concept the wastage of water will reduce and every people can get sufficient drinking water.

Following system is designed in this project

1.Automatic water filtration system

2. Drinking Water ATM for Rural areas

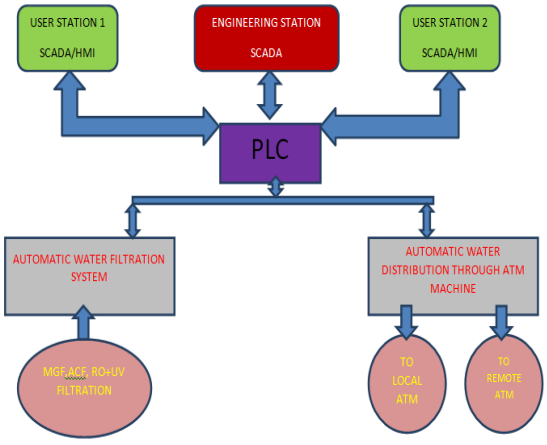

Fig 1. Block Diagram

2. PREVIOUS WORK :

The water wastage is due to many reasons such as wastage of water, human laziness, operator fault etc. There is also problem of indiscretion of water supply i.e. he list of water supply is not secure. Now-a-days, water storage and distribution system, controlling

temperature, pressure and for every stage for measuring and analyzing. We can't able to identify the robbery in urban drinking water supply. Water flow control is impossible ant not controlling. The water supply systems are part of the urban structure which must assure the continuity of the water distribution, the water quality control and the displaying. In existing system, urban water is supplied to the home with the help of some human power. The person to take the charge will go to the place and then open the valve to that exact area. Once the time is over the person will go again to that place and close the valve immediately. This type of operation needs human power. This is excess of time and to go to that place and comeback often. Also the people may take extra water for their personal use with the help of motor. Due to this many people will not receive sufficient water for their use. Water is the basic and important needs of the human life.The water theft prevented only when any public inform the officials about the theft.

3. METHODOLOGY:

3.1 Level Sensor

Fig 2.Magnetic Float type level sensor

Level sensor is used to sense the amount of water level present in the storage tank. 24V DC supply is given to the water. The buzzer indicator is connected to the level sensor. It will then connect to the PLC. It is shown in the below figure 2. If the water capacity reaches 80 percentages in the storage tank the buzzer will give the alarm signal. The pump will be turned off with the help of PLC. Once the water is not sufficient (if it below80%) in the tank the pump will be turned on. If the water level once attains its 80% the overall system is started.

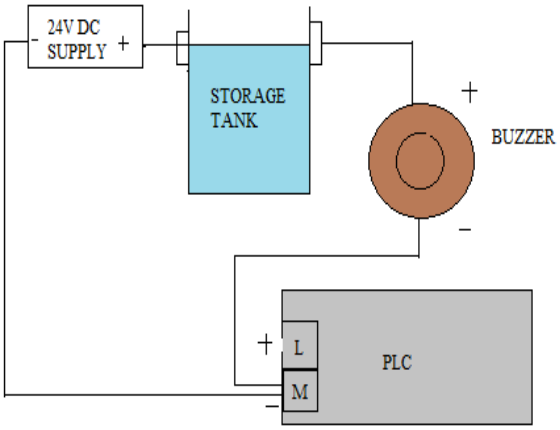

Fig 3. Level Measurement

3.2 Solenoid valve

Solenoid valve is a two port valve. It will be used to turn on and off condition. In this project three solenoid valves are used. 230V supply is given to the main solenoid valve. PLC output is connected to the solenoid valve with the help of Ethernet cable.The output from the PLC in the range of 24V DC. So it is necessary to give switch function using relay to on and off the solenoid valve. If the water level in the storage tank is reached the 80%, main solenoid valve is automatically turned on. The set point is fixed for solenoid valve2 and solenoid valve3. If anyone one of its valve or both the valve attains the set point the solenoid valve is turned off. The valve will be turned on after 24 hours later. 2W-025-08(G1/4 (Shown in Figure.No3) normally closed solenoid valve is used to control the flow rate.

Fig 4. Solenoid valve

3.3 Relay Panel

Fig 5. Relay Panel

Relay panel is used to connect PLC and field components.It is acts as switch (normally open normally close).The output of PLC is given to the input of the relay and output of the relay is connected field component like as motor,pump,valves etc. There is one common contact which is connected to the output of SMPS(24Vdc).

3.4 PLC

Fig 6. PLC

PLC is Programmable Logic Controller is solid state device which continuously scans inputs and as a preloaded program it continuously gives output to field instrument.

PLC Features:-

1. Handle large number of I/O.
2. Higher efficiency
3. Remote I/O handling
4. Working on various communication protocols.
5. Easy for handling and installation.

3.5 SCADA

The data acquired from the remote site panels RTU pole mounted to avoid vandalism, from the pumping stations PLCs and the water reservoirs are transmitted to the dispatching unit computer installed in the water distribution company's headquarter. The computer software system integrates an SCADA application program specifically developed for water distribution management. The dispatching unit SCADA system elaborates daily, monthly, yearly diagrams, tables and reports related to the operator requested parameters. The system stores the acquired data in a specific database for later use analysis and retrieving.

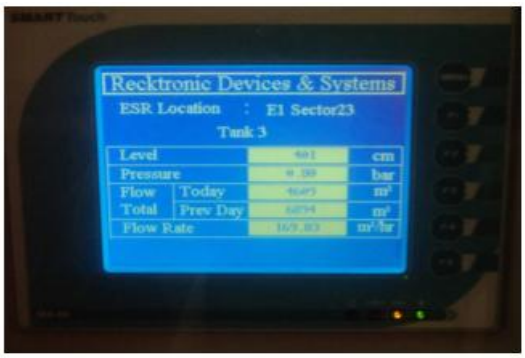

Fig 7. SCADA Visualization

4. CONCLUSIONS

The automation of water distribution system eliminates water wastage. Automation system provides continuous water flow according to the set point. This project is automatic so it reduces lots of man power. The automation implemented in water distribution system ensures to avoid wastage of water and reduces time. And also we can completely avoid the water theft in the pipelines. So that people could get required amount of water. This system is excellent and cost effective to prevent the drinking water from the theft.

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