Automated Water Distribution System Using PLC And SCADA

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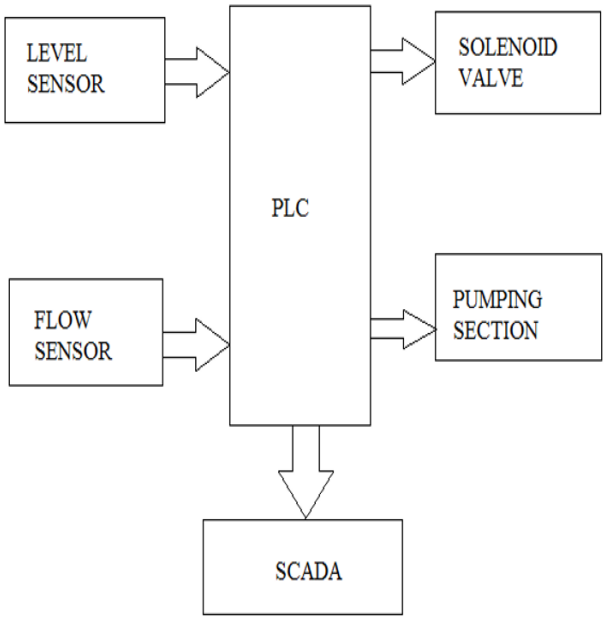
Abstract- *This proposed automated water distribution system is used to distribute the water equally to all street pipe lines . So that everyone will get the equal amount of water. The set point is fixed for each pipe line. The water from the storage tank is measured with the help of level sensor. Flow sensor measures the flow rate of the water. Solenoid valve is used to open and close the valve automatically. If the flow rate reaches its set point, Solenoid will be turned OFF and it will be turned ON after 24 hours later. This system consists of PLC and SCADA. PLC is used for controlling 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 RS-232 cable. PLC gives the signal to the solenoid valve according to the set point written in the program.*

Keywords- Flow sensor, Level sensor, PLC, SCADA, Solenoid valve

I. INTRODUCTION

This project explores the SCADA technology and its use for developing automation for monitoring purpose of water distribution for an entire city. Earlier the monitoring of the process was done by human these caused error. To reduce this error, automation is developed using PLC and SCADA. The present system leads to unnecessary loss of water and due to improper handling water is not properly distributed to the end users. The automation control reduces manual interface and proper work of opening and closing of control valves are carriedout by the electric actuators. 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. the list of water supply is not secure.



BLOCK DIAGRAM

II. PREVIOUS WORK

The water wastage is due to many reasons such as human laziness, operator fault etc. There is also problem of indiscretion of water supply i.e.The 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 and 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.

III. METHODOLOGY

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 below 80%) in the tank the pump will be turned on. If the water level once attains its 80% the overall system is started.

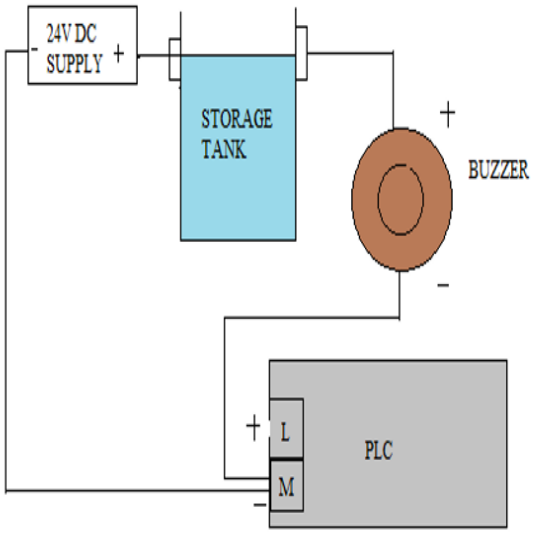


Fig.No.2 Level Measurement.

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 RS232 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.No.3 2W-025-08(G1/4) Solenoid valve

Flow sensor is used to measure the flow rate of the water. YF-S201 type of flow sensor is used (Shown in figure 4). Flow sensor contains pin wheel in its. Pinwheel contains 6 teeth. The pulse output is comes from the pin wheel sensor. If the teeth rotate at one time, it will give the pulse output according to the specification of the flow sensor. From the pulse output easily measure the amount of water passed through the pipe. The pulse is converted to voltage with the help of Hall Effect sensor. Flow sensor output is in the range of 5V DC. So it is necessary to give signal conditioning. Optocoupler is used to amplifying signal.

Fig.No.4 YF-S201 Flow sensor

IV. PROPOSED SYSTEM

The overall distribution process is monitored in PC. Pumping section is connected to PLC. If the water level below the set point the pump is automatically ON with the help of PLC. Checking the level in storage tank is the first process. If the level attains the set point overall system is started. The water is flow through the pump when themain solenoid valve opens. The flow rate is measured with the help of pulse output from the flow sensor. The people can get water until the set point reaches. Once the water usage attains the set point the particular solenoid valve is automatically close.

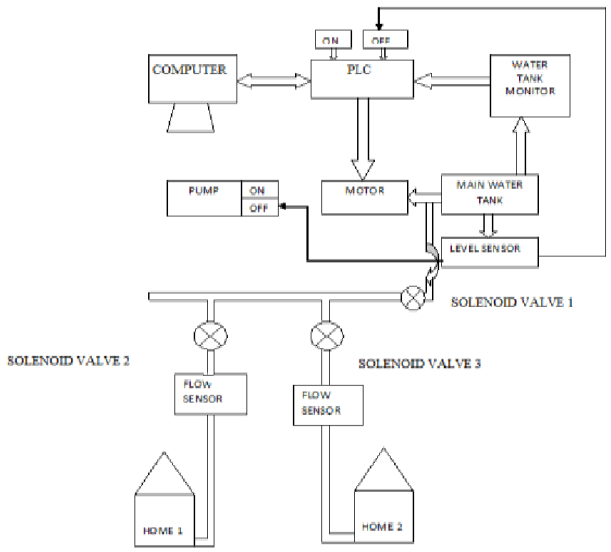


Fig.No.5 Proposed System

V. PUMPING SECTION

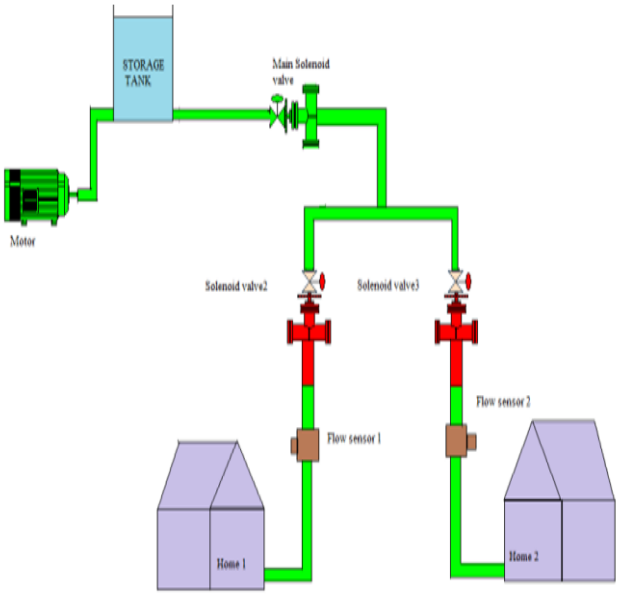


Fig.No.6 Pumping Section

Once the main solenoid valve gets opened, the water flow through the pump. Thewater level in the storage tank gets decreased. We can measure the water levelusing the sensor attached to the storage tank. When the water decreased below 80% the pump is on.

VI. WIRING DIAGRAM

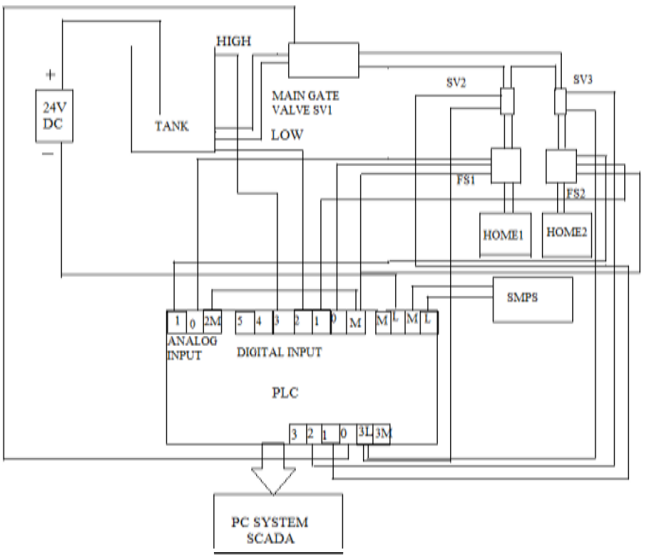


Fig no. 6 Wiring Diagram

VII. CONCLUSION

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 equal share of water. This system is excellent and cost effective to prevent the drinking water from the theft.

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