

# Automatic Water Distribution and Leakage Detection Using PLC and SCADA

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**Abstract** - The main aim of studying this paper is to give a particular amount of water for a particular period of a time by opening and closing a solenoid valve. This operation is done with the help of PLC ladder. In this case by knowing the position of water present in the tank with help of high and low level sensors we give supply. Here Flow Transmitter is used for measuring the amount of water flow through pipe. Output of a Flow Transmitter is in pulses converting it into voltage by Hall Effect & is given to the plc. Output of PLC given to the solenoid valve is 24v DC. By this output we operate solenoid valve and measured water given to the consumer.

No labor is require, so less human error in system. If this project is successfully implemented in society then large amount of water is easily saved and leakage detection is possible.

**Key Words:** Solenoid Valve, Flow Sensor, Flow Transmitter, PLC and SCADA

## 1. INTRODUCTION

The water wastage is due to many reasons such as wastage of water, human laziness, operator fault etc. 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 for opening the valve that person require going that particular place. Once the time is over the person will go again to that place and closed the valve immediately. This operation needs human power it also takes a lot of time doing this operation. Also the people may take extra water for their personal use with the help of motor. Also in this case there is illegal connection present in system. Due to this problem many people not receive sufficient water for their use. Water is a basic and important need of human life. Also in this case water theft is occurring, so it is prevented only when any person inform that regarding office.

## 2. Literature Survey:-

Firstly we have studied existing system operation. For this project we have taken the reference of IEEE paper Automation Of Water Distribution Plant (IJREAT International Journal of Research in Engineering & Advanced Technology, Volume 2, Issue 1, Feb-Mar, 2014). This paper gave idea about automatic water Distribution using PLC & SCADA . We also referred "IJEEE , volume 07, Issue 01, Jan-June 2015 which gave us idea to prevent leakage of water in system

**A. Existing Technology:** - In existing system there are lots of disadvantage like laziness of man power, wastage of water, leakages in system, partiality in water distribution system. Hence, there is a need to develop the system to overcome such problems.

**B. Need for PLC:** - In this system PLC plays a very important role and is used for operating a solenoid valve. It also operates flow sensor and flow transmitter. All this operation is done through ladder diagram.

## OBJECTIVE OF OUR SYSTEM

1. Large amount of water is saved.
2. There is a no human error.
3. Theft is easily detected.
4. To be prepared for future water crisis.
5. To use data coming from each house for further water management

## 3. Block Diagram:-

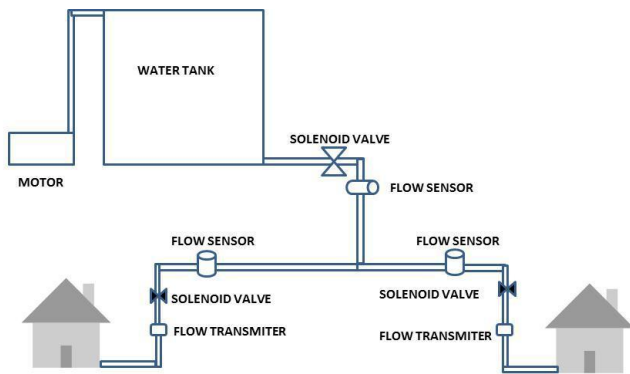


Fig. 1 Block diagram of Automatic Water distribution and Leakage Detection

**Solenoid valve:-**

Solenoid valve are connected to the Output of PLC. Output voltage of the PLC is 24v DC which can be easily operated by Ladder of PLC. This is connected to the PLC by RS232 cable. Two way Solenoid valve is used in this case because two way valves is less expensive than three way & four way valve.

Advantages of Solenoid Valves:-

1. More reliable.
2. Long life.
3. Safety switching.
4. Fast switching.



Fig.2 Solenoid valve

**Flow Transmitter:-**

Flow Transmitter is used to measure the amount of water flow through pipe and transferring that data to a central database for billing, troubleshooting and analyzing. This system saves time and gives actual water used by consumer. This timely information coupled with analysis can help both utility providers and customer's better control, production of electric energy, gas usage and water consumption.

Advantages of flow transmitter over Ordinary Meters:

1. Automatically reads the water flow which informs the operator.

2. Traditional meters, must be read and inspected visually each month.
3. Hourly reading is easily given.



Fig. 3 Flow Transmitter

**Flow sensor:-**

Flow sensors are used to measure flow rate of water. In our system we have implemented flow sensor for detecting leakage in the system. It is easily done by comparing pressure between two flow sensors. Flow sensor contains pin wheel & pin wheel contains six teeth. The pulse output comes from the pin wheel sensor. If teeth rotate once it gives pulse output accordingly to specification of the flow sensor. From the pulse output we can 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 5vDC .



**Conclusion**

By using PLC and SCADA it is possible to distribute water and it is also possible to detect leakage in the water distribution system.

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