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AUTOMATION OF FLUID TANK USING PLC

Shaikh Sohail Mohiyodin[1] , Yashwant Sonale[2],Wathore Kiran[3], Manish Maurya[4]

Asst.Prof. Everest college of Engineering, Aurangabad, Maharashtra, India[1]
Student .Everest college of Engineering, Aurangabad, Maharashtra, India[234]
s.sohailmohiyodin@gmail.com[1]

Abstract: **A programmable logic controller is an effective tool for the automation of the electro mechanical process. It makes the use of the ladder logic. Various limitations such as wastage & inclusion of large no of labours are minimized. Switch & level sensor are used as main sensor & PLC is used as the controller. System is classified in three modules i.e. sensing, decision making & implementation. The PLC also communicates status of the entire system through Human Machine Interface (HMI). Four sensors are used to detect the level of water. According to the output of the sensor PLC take decision to operate. The ultimate decision of PLC is implemented by using through a relay switch. Automation of the water tank is achieved using the pressure switch as a level sensor.**

Keywords: PLC; Water Tank, Solenoid Valves, Ladder Logic

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I INTRODUCTION

Water is commonly used for agricultural use, industry & domestic appliances. Efficient & monitoring of the water is a constraint for water management system. The most common method is to simply start the water pump & run it till the tank gets fully filled. In order to ensure the safety in production effectively & timely control of liquid level is required. Water level control is equipment used to control the water level. Water level is controlled using various components like PLC, sensor, motors & valves

PLC is used for multiple inputs & multiple outputs, high temperature range, immune to noise, electrical vibrations. The sensor senses the liquid level & sends a signal to PLC. A control signal is produced by the PLC which drives an input to the motor. When liquid level is below predetermined value then PLC sends a start signal to the motor. When liquid level is above predetermined value then PLC sends a stop signal to the motor. It also prevents the dry run of the pump motor [1].

II LITERATURE REVIEW

COMPONENTS OF THE PLC AUTOMATION SYSTEM

(a) Level Sensor

Inductive proximity sensors are used as sensor to detect the water level in the tank. The sensor detects the magnetic loss due to eddy currents generated on conductive surface by external magnetic field.AC magnetic field is generated on an object are detected. When the object enters the electromagnetic field which appears at the active face of the switch, the field gets reduced & this switch turns ON & OFF. The main advantage is it can sense objects without touching it.

Programmable Logic Controller(PLC)

It is the main unit of the control system. It operates on the ladder logic which is already predefined.

Relay & Motor

It is a switch which is controlled electrically. Electro magnet relays are preferred. DC output of the PLC is converted to appropriate signal for the input to the motor by Relay.

Human Machine Interface (HMI)

It is interface through which user interacts with the system. The status of the system is communicated to user by GUI [3].

III ADVANTAGES

(a) No need to climb the stair case again & again to check the water level in the tank

(b) No need to go for manually switching of the water pump as it is done automatically by the relays attached to water pump it reduces the manpower

(c) It consists of display screen which shows the current status of tanks water level indication.

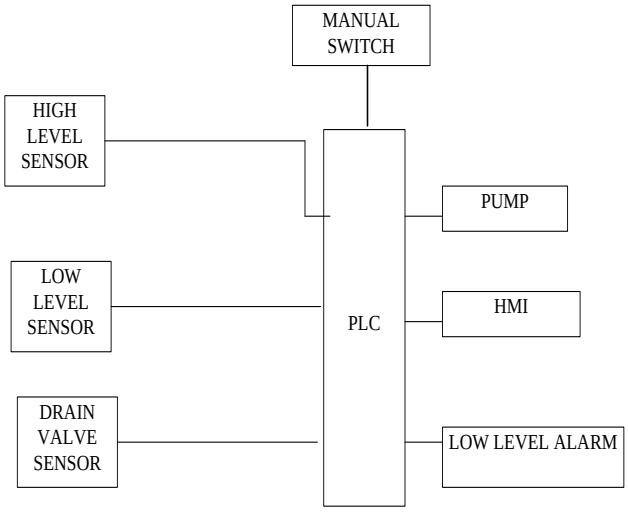

Figure 1 Block Diagram of the PLC System

III CONCLUSION

A brief review on the automation of the water tank by PLC was elaborated. The different components of system were also elaborated. Its advantages & components description was also elaborated.

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