WATER LEVEL CONTROL SYSTEM USING PLC AND SCADA

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Abstract: Automatic Water levels are a widely used application of Industrial Engineering all over the planet. Therefore devise control systems for these plants is a must in our modern automated industrial world as different systems has been devised yet their technology became obsolete by time**.**

On the other hand complicated and over rated control systems are not convenient to use with these types of plant life especially for isolated areas. so, coming up with a monitoring system to observe and control a Low-level, Mid-level, and High-level of Water tank is a convenient solution with computer based software.The Water tank can be monitored using a PC enhanced with industrial automation software like INTOUCH® and a PLC to build up a SCADA system for the water tank t. This work illustrates the structure and the installation of a flexible and low cost SCADA system.An usual PC with the proper interface and software operates the system. The system is installed to a lab scale water plant which is designed and build. The system has proved the suitability of PC based SCADA systems over the conventional control systems.

INTRODUCTION:

Our project is aimed at automating the water level control process. Here we are using a Supervisory Control And Data Acquisition System(SCADA) and Programmable Logic Controller (PLC) for automating the process. The controller type is OMRON , using the software. There are about three sensors being used in this process CX program software and its output being given to relay. Electromagnetic relay type of 12v is connected to the controller and its output is connected with PLC. Program for the process is given in ladder logic. The controller controls the process according to the program, in this process the reverse osmosis process is controlled automatically and eliminates the requirement of man power**.**

AUTOMATION:

Automation or industrial automation is the use of computers to control industrial machinery and processes, replacing human being operator. It is a step behind mechanization where human operators are provided with machinery to help them in their jobs. The most detectable part of automation can be said to be industrial robotics. Some compensation are repeatability,

Tighter quality control, and waste reduction, combination with business system, increased output and reduction of labors. Some disadvantages are high initial costs and increased dependence on maintenance.

PROGRAMMABLE LOGIC CONTROLLER (PLC):

The programmable controller is an industrial control system designed for a shop environment that can be programmed and maintained by shop personnel to increase the efficiency of manufacturing operation.
The basic function of the programmable controller is to provide output commands to a machine or a process that are based on some combinations of input conditions received from the machine, the process or other conditions.

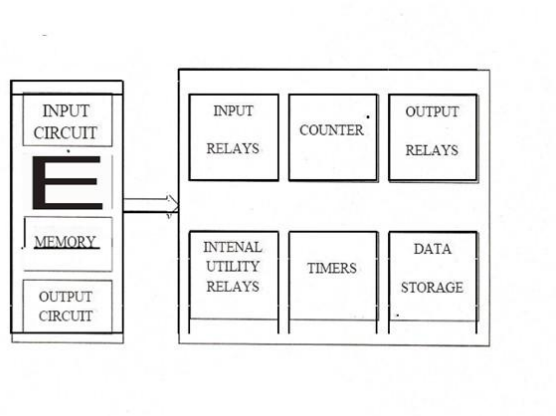


DIAGRAM OF PLC

SCADA (Supervisory Control And Data Acquisition):

An industrial measurement and control system consisting of a central host or master (usually called a master place, master workstation unit or MTU); one or more field data gathering and control units or remotes (usually called remote station, remote terminal unit, or RTU's); and a collection of standard and/or custom software used to monitor and control remotely located field data elements.modern SCADA systems exhibit predominantly open-loop control characteristics and utilize predominantly long distance communications, although some essentials of closed-loop control and/or short distance communications may also be present.Systems like to SCADA systems are usually seen in factories,treatment undergrowth etc. These are time and again referred to as Distributed Control Systems (DCS). They have similar functions to SCADA systems, but the field data assembly or manage units are usually located within a more limited area. Communications may be via a local area network (LAN), and will normally be reliable and high speed. A DCS system usually employs major amounts of closed loop control. SCADA system on the other hand usually coverlarger geographic area, and rely on a range of Communications systems that is normally less dependable than a LAN. Closed loop control in this condition is less popular.So what is SCADA? It is used to monitor and control plant or tools. The control may be regular, or initiated by operator commands. The data acquisition is able firstly by the RTU's scanning the field inputs connected to the RTU (it may be also called a PLC - programmable logic controller). This is habitually at a fast rate.The central host will scan the RTU's (usually at a slower rate.) The data is process to detect alarm setting, and if an alarm is present, it will be display on special alarm lists.

Transformer:

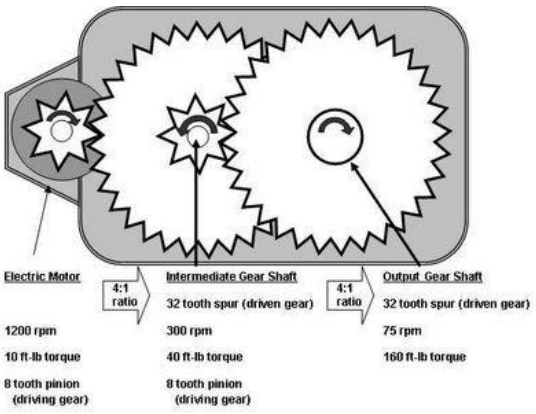
This item is about the electrical device. For the media and toy license, see Transformers. For new uses, see Transformer

(Laminated core transformer showing edge of laminations at top of Photo A transformer is a static electrical device that transfers energy by inductive

coupling between its winding circuits. A changeable current in the *primary* winding creates a varying magnetic flux in the transformer's core and thus a varying magnetic flux through the *secondary* winding. This changeable magnetic flux induces a varying electromotive force (EMF), or "voltage", in the secondary winding. Transformers range in size from thumbnail-sized units hidden in microphones to units weighing hundreds of tons used in the power grid. A wide range of transformer design are used in electronic and electric power applications. Transformers are important for the transmission, supply, and utilization of electric power.

Gear motor:

Gear motors are complete motive force systems consisting of an electric motor and a reduction gear train integrated into one easy-tomount and -configure package. Gear motors are complete motive force systems consisting of an electric motor and are reduction gear train integrated into one easy-to-mount and -configure package. They can be large enough to lift a building or small enough to drive a tiny clock.



Pump:

A **pump** is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical act. Pumps can be classified into three main groups according to the method they use to move the Fluid direct raise, displacement, and gravity pumps, Pumps operate by some mechanism (typically reciprocating or rotary), and use energy to perform mechanical work by moving the fluid. Pumps work via many energy sources, including guide process, electricity, engines, or wind power.

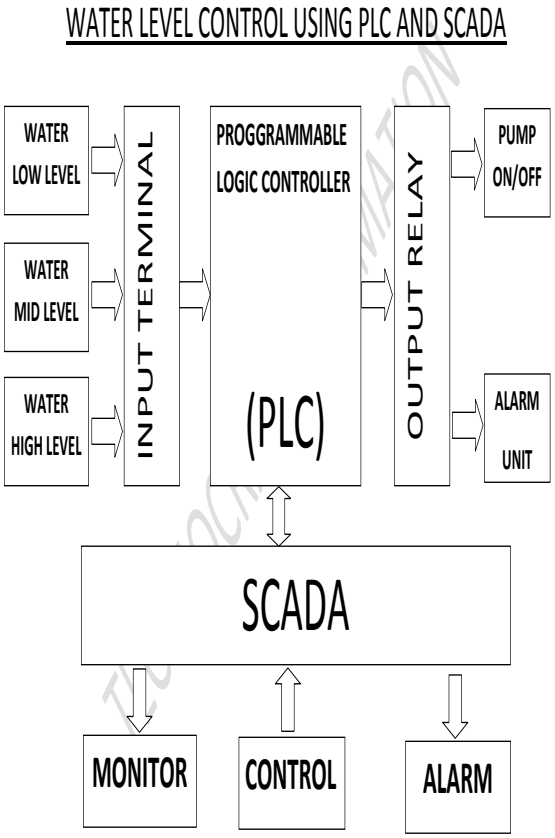
Control valve:

Control valves are valves used to control conditions for example flow, pressure, temperature, and liquid level by fully or partially opening or closing in response to signals received from controllers that compare a "Setpoint" to a "process variable "whose value is provided by sensors that monitor changes in such situation. The opening or closing of control valves is usually done automatically by electrical, hydraulic or pneumatic actuators .Positioners are used to control the opening or closing of the actuator derived from electric, or pneumatic signals. These control signals ,traditionally based on 3-15psi (0.2-1.0bar), more common now are 4-20mA signals for manufacturing, 0-10V for HVAC systems, and the introduction of "Smart" systems, HART, Fieldbus organization, and Profibus being the more common protocols.

Proposed system:

1. Water level of tank is controlled using plc and scada
2. Automation used to reduce human effort
3. Computer based monitoring system
4. Plc and scada with pc used for the control processing.

Block diagram:



Advantage:

1. Reducesshuman Efort
2. High accuracy
3. Save water and time
4. Reduces cost

Conclusion:

Hence the project proposed by us to save of water, increase accuracy, realaibilty etc . By this project we are decreasing the over head on the system Use of plc and scada reduces human interfarance, better out is recoverd from the system. Over from the system is decrease.

Refernce:

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3. Ge imagination at work
4. Gas turbine efficiency. www.gtefficiency.com
5. Sensor technology