GSM BASED PLC AUTOMNATION CONTROLLED WATER PLANT

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Abstract:

Water levels are measured in a variety of applications, and are often measured manually, which can be time-consuming and labour intensive. The availability of water in space and time under conditions of ever increasing pressures has caused the designing of modern water management techniques. Achieving effective and efficient management of water are the key to human survival and the development has emerged as the global concern. Rapid advances in Automation and Electronic technologies have made available a variety of inexpensive sensing, monitoring, and control capabilities.

Index Terms— GSM module, PLC, Relay, Microcontroller, Float Sensor

INTRODUCTION

Water is a limited resource and is essential for agriculture, industry and for creature's existence on earth including human beings. Lots of people don't realize the true importance of drinking enough water every day. More water are wasted by many uncontrolled way. This problem is quietly related to poor water allocation, inefficient use, and lack of adequate and integrated water management. Therefore, efficient use and water monitoring are potential constraint for home or office water management system.

Tank Water Level Monitoring and control system, is used to avoid overflowing and intimate level of water in the tank. Water level controlling system implementation makes potential significance in home applications. The existing automated method of level detection is described and that can be used to make a device on/off. Moreover, the common method of level control for home appliance is simply to start the feed pump at a low level and allow it to run until a higher water level is reached in the water tank. This is not properly supported for adequate controlling system. Besides this, liquid level control systems are widely used for monitoring of liquid levels, reservoirs, silos, and dams etc. Hence, a monitoring system to monitor the tank water level has to be developed and eventually able to alert the person in-charge or technician on the current status of the tank. The system consists of water level detector circuitry integrated with GSM module and Micrologic1000 PLC. Upon reaching the critical water level in the tank, an SMS is sent through GSM module to the technician and the motor is turned OFF.

PLANT METHODLOGY

A new technique is proposed to continuously monitor the water level of water systems such as water tanks. The user can send the message to the system to know the water level details of the tank. This

can also be used to control the working of pump automatically by turning OFF the pump when the critical level of water in tank is reached and send the message to the user that the water in the tank is full. This is designed to monitor the water level with the help of Float sensor and GSM technology.

Figure-GSM module and Microcontroller Hardware

To monitor the level of water in water tank whenever required and to control the working of pump operation automatically when the water has reached the critical level the motor will be turned OFF.

CIRCUIT DIADRAM:
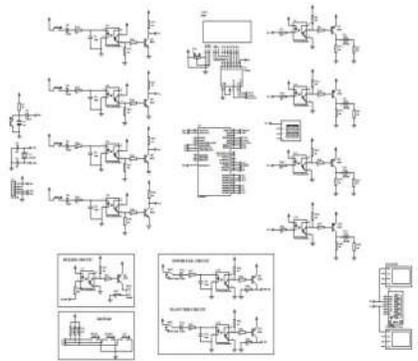
Figure-Circuit diagram of Microcontroller board

MICROCONTROLLER AND PLC

❖ AB MICROLOGIC1000 PLC:-
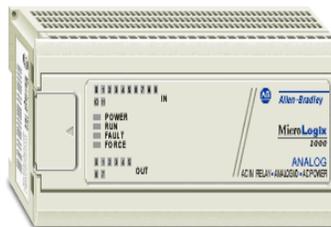
The Allen–BradleyMicroLogix1000 programmable controller is a packaged controller containing a power supply, input circuits, output circuits, and a processor. The controller is available in 10 I/O, 16 I/O and 32 I/O configurations, as well as an analog version with 20 discrete I/O and 5 analog I/O.

❖ MICROCHIP PIC16F877A

Microcontroller can be termed as a single on chip computer which includes number of peripherals like RAM, EEPROM, Timers etc., required to perform some predefined task. Microchip PIC is an 8-bit microcontroller belonging to the family of Reduced Instruction Set Computer (RISC). PIC16F877A is 40pin IC.

BLOCK DIAGRAM
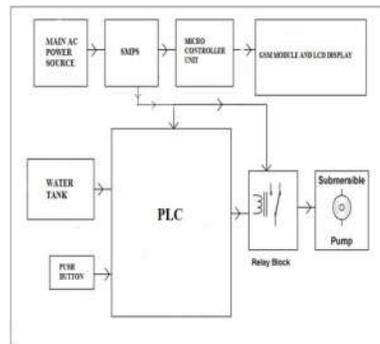
Fig.1:Block diagram of the water plant

RS LOGIX LADDER

The RSLogix™ family of IEC-1131-compliant ladder logic programming packages helps you maximize performance, save project development time, and improve productivity. This family of products has been developed to operate on Microsoft Windows® operating systems.

1. Easy-to-use editing features.
2. Common look-and-feel
3. Powerful, time-saving features and functionality
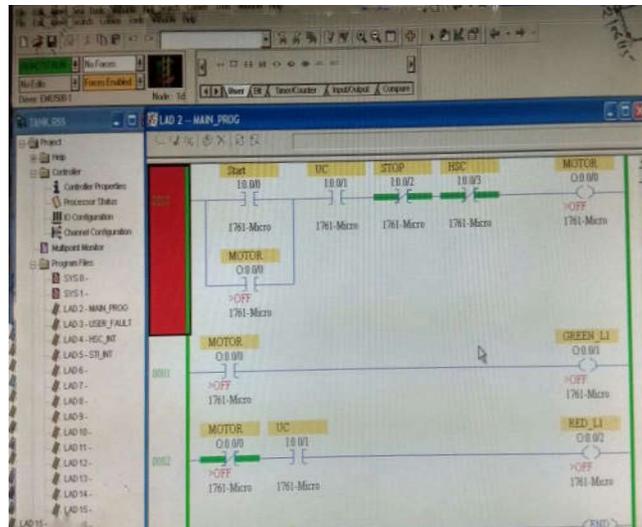
Figure-RSLOGIX LADDER PROGRAMMIN

GSM (SIM300) MODEM:-
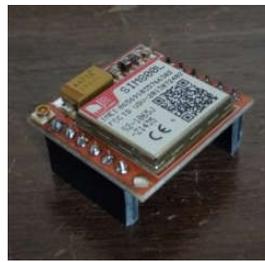
GSM/GPRS module is used to establish communication between a Microcontroller and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, TTL logic, etc) for Microcontroller. The MODEM is the soul of such modules.

RESULT ANALYSIS

The water plant control using GSM Module and PLC project has been successfully tested multiple times for all the possible situations and requirements within its scope. The whole apparatus has been assembled on a single board consisting of various blocks such as the microcontroller section,the LCD section, the GSM section, the supply section, the control section and the probe water indicator section.

CONCLUSIONS & FUTURE SCOPE

Automatic water plant control system employs the use of different technologies in its design, development, and implementation. The system used microcontroller to automate the process of water pumping in an over-head tank storage system and has the ability to detect the level of water in a tank,

switch on/off the pump accordingly, give message to owner by using GSM and display the status on an LCD screen. It can also be operated manually with the user sending and receiving the messages according to the current status. This project has successfully provided an improvement on existing water level controllers by its use of calibrated circuit to indicate the water level.

The advantages of this system includes reduction in wastage of power, reduction in wastage of water and increase in the pump set life due to efficient use of the equipments involved.

The future scope of this project is that by using solar panels we can provide supply to the sensor circuit and then we can monitor the water level during power cut events also.

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