Automation for Flow Sensing in Ro plant and Database Management

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Abstract: - In chemical plants there are many critical process likely to measure flow of liquid and addition of another product get final output of liquid product. There are many mistakes can happen by human intervention so these kind of design requires more precise automation. Here proposed system is required by RO purification plant for measurement of water flow and addition of solvent for purification purpose. We are adding facility that have create database of all these process. Water solvent using flow sensor intends to add the solvent as per industrial requirement in to water. In purifier industry within water solvent is required to add for making its TDS count low, but when this process completed by manually there will be mistakes. So in this paper the process is atomized with the help of embedded system. The system can operate automatically to stop and measure the flow of water. The addition of solvent also takes place in system. The plant capacity also measured and if its limit exceeds SMS will be sent to plant manager. So the proposed system will helpful for RO plant. Automation and Database management system is very useful for recovery of system used in RO plant also useful in preventing system from damage. The proposed project is designed for RO purification plant. As well as we will use this project in other chemical industries and petroleum plants and for boilers in sugar factory. Effective flow management begins with timing and regulating in chemical application in a way that will satisfy the need of the liquid consumption. The system reduces human efforts, time and we can check the output easily on mobile.

Key Words:--- 8051Microcontroller, Flow sensor, solenoid valve, GSM,automation etc.

I. INTRODUCTION

In chemical plant there are many critical processes likely to measure flow of liquid and addition of another product to get final output of liquid product. There are many mistakes can happen by human intervention. So this kind of design requires more precise automation. Here proposed system is required by RO purification plant for

Measurement of water flow and addition of solvent for purification purpose. We are added facility that have create database of process. Water solvent adding flow sensor intends to add the solvent as per industrial requirement in to water. This project is specially designed as per the industrial requirement, this is the sponsored project. In purifier industry within water solvent is required to add for making its TDS count low, but when this process completed by manually there will be mistakes. In purifier industry in 1000ml water they need to add 50ml solvent. For getting accurate output we proposed this project. In this project we use the flow sensor using that flow sensor we will measure actual flow and add the 50ml solvent in to the water after measurement there are to valves are used one is for water and one is for solvent, relays are used for controlling these two valves, as well as here GSM module is used which gives the information after the solvent get added into the water through the SMS to operator.

Controlling of the whole process will done using microcontroller 89S52. Here all record of the whole process will be stored in computer, for that design we use the visual basic software.

II. MICROCONTROLLER

Microcontroller AT89S52 is supposed to use in the proposed system for the interfacing of the keyboard. The feature and its pin description are description is given as below.

Figure2.1 microcontroller kit

Features:
- ♦ Compatible with MCS-51 Products.
- ♦ 4 Kbytes of In-System Reprogrammable Flash Memory. Endurance 1000 Write/Erase Cycles.
- ♦ Fully Static Operation: 0 Hz To 24 MHz hree-Level Program Memory Lock.
- ♦ 128 X 8-Bit Internal RAM.
- ♦ 32 Programmable I/O Lines.

♦ Two 16-Bit Timer/Counters.
♦ Six Interrupt Sources.
♦ Programmable Serial Channel.
♦ Low Power Idle And Power Down Modes.

The AT89S52 is a low power, high performance CMOS 8-bit microcomputer with 4 Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufacture using Atmel's high density nonvolatile memory technology and is compatible with industry standard MCS-51 instruction set and pin-out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on monolithic chip, the Atmel AT89S52 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded controlapplications.

III. LIQUID FLOW SENSOR

Measure liquid/water flow for your solar, computer cooling, or gardening project using this handy basic flow sensor. This sensor sits in line with your water line, and uses a pinwheel sensor to measure how much liquid has moved through it. The pinwheel has a little magnet attached, and there's a Hall Effect magnetic sensor on the other side of the plastic tube that can measure how many spins the pinwheel has made through the made through the plastic wall. This method allows the sensor to stay safe and dry. Water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flow through the rotor, rotorroll. Is a speed change with different rate of flow. The hall-effect sensor outputs the corresponding pulse signal. The sensor comes with three wires red (524VDC power), black (ground) andyellow (Hall effect pulse is approximately 2.25 milliliters. Note this isn't a precision sensor, and the pulse rate dose vary a bit depending on the flow rate, fluid pressure and sensor orientation.it will need careful vary a bit depending on the flow rate, fluid pressure and sensor orientation. It will need careful calibration if better than 10% precision is required. However, it's great for basic measurement tasks.
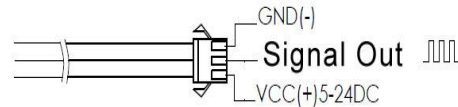

Figure 3.1flow sensor

Figure 3.2sensor Measurement

3.1 Electrical specification
♦ Working voltage :5 to 24 VDC
♦ Max current draw : 15 mA @5v
♦ Working flow rate : 1 to 30 liter/minute
♦ Working temperature rang :-25 to 80 degree c
♦ Working humidity rang :35%-80%RH
♦ Maximum water pressure :2.0 MPa
♦ Output duty cycle : 50%+-10%
♦ Output rise time : 0.04us
♦ Output fall time : 0.18us
♦ Liquid temperature<120degree c
♦ Flow rate pulse characteristics : frequency (HZ)=7.5*flow rate(L/min)
♦ Pulses per liter :450
♦ Durability : minimum 300,000 cycles
♦ Weight 43 g

3.2 Mechanical specification
♦ ½" nominal pipe connections,0.78" outer diameter, ½" of threal
♦ Size :2.5" x 1.4" x 1.4 "

IV. SOLENOID VALVE

A solenoid valve is an electromechanically operated valve. The valve is controlled by an electric current through a solenoid; in the case of two port valve the flow is switched between the two outlet ports. Multiple solenoid valves can be placed together on a manifold.

Solenoid valve are the most frequently used controlled element in fluidics.

Figure 4.1 solenoid valve

V. GSM MODULE

GSM module is basically a modem which accepts a SIM card and works in the GSM network provided by the operator just like a mobile phone. The GSM module can be controlled by a computer or a microcontroller to do different tasks in the network such as calling, sending messages, accepting messages, sending fax etc.

It is suitable for SMS, voice as well as data transfer application in M2M interface. The onboard Regulated Power Supply allows you to connect wide range unregulated power supply. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. Using this modem you can make audio calls, SMS, read SMS, attend the incoming calls and internet etc through simple AT commands.

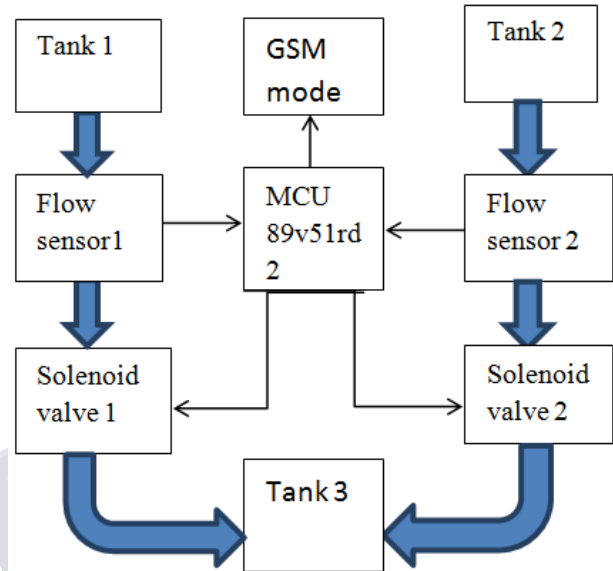*Figure 5.1GSM module*

VI. PROPOSED WORK
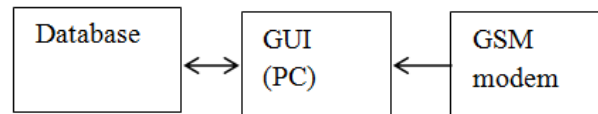

Figure 6.1Block diagram(Transmitter)

Figure 6.2 Block diagram (receiver)

VII. CONCLUSIONS

The proposed project is designed for RO purification plant. This system can measure actual flow of water and add solvent in water automatically by the operation of valves. The whole system is controlled by controller. The use of controller can handle this critical event and generate database via GSM module. In this project we are going to design and manage liquid flow as well as addition of other chemical product which is required in process. Here flow meters are used to measure the flow of liquid and valve is used to add other chemical product in it. The calculated output of flow meter and added quantity of product is sent to customer's mobile and pc via GSM system. The system reduces human efforts, time and we can check the output easily on mobile.

REFERENCE

1) Muhammad Ali Mazidi And Janice Gillispemazidi, The8051 Microcontroller And Embedded System, I/O Port Programming
2) Industrial Automation And Process Control-Jon Stenerson
3) The Implementation Of Industrial Automation System(Francescobasil,Senior Member,IEEE,Pasquale Chiacchio,Senimember,IEEE,And Diego Gerbasio)
4) Collaborative Control For Industrial Automation WithSensors(JimingChen,Member,IEEE,Xianghui Cao,StudentMember,IEEE,Pengcheng,Yang Xiao,Senior Member,IEEE, And Applications(IJCSEA)VOL.3,NO.3, JUNE2013
5) DESIGN AND DEVELOPMENT OF AUTOMATIC WATER FLOW METER Rai Sood, Manjit,Hemant Lenka