Microprocessor based water level controller

Microprocessor:

The processor is the portion of a computer system that carries out the instructions of a computer program and is the primary element carrying out the computer's function. The form, design and implementation of CPU's have changed but their fundamental operation remains the same. The microprocessor contains all the central processing unit (CPU) functions and is the ' engine' that goes into motion when you turn your computer on. The microprocessor is designed to perform arithmetic and logic operations that make use of small number holding areas called registers. The diagram of microprocessor is given as under:

Also microprocessor is a multipurpose, programmable, clock-driven, register based electronic device that reads binary instructions from a storage device called memory, accepts binary data as input and processes data according to those instructions and provides as output. A microprocessor incorporates most or all of the functions of a central processing unit (CPU) on a single integrated circuit (IC). The first microprocessors emerged in the early 1970s and were used for electronic calculators, using binary-coded decimal arithmetic on 4-bit words. Other embedded uses of 4- and 8-bit microprocessors, such as terminals, printers, various kinds of automation etc, followed rather quickly. Affordable 8-bit microprocessors with 16-bit addressing also led to the first general purpose microcomputers in the mid-1970s. The most reliable circuit is water level Controller circuit which takes the task of indicating and Controlling the water level in the overhead water tanks. The LED Bar graph is used for displaying the water level. The water level is sensed with the help of copper probes. The probes which have to be

monitored are inserted into the water tank. This water-level Controller circuit is configured around the well-known 8 bit Microprocessor 8085. It continuously monitors the overhead water level and display it and also switch ‘ off” the motor when the tank fills and it will automatically switch On the Motor when the water level is low.

The Microprocessor will also indicate the water level over the LED display.

All the input and output functions are done through the Programmable Peripheral Interface IC 8255.

Product Categories for water level controller:

- Liquid Level Switches
- Liquid Level Sensors
- Level Sensors
- Level controllers
- Water Quality testing instruments
- Level Guages
- Ph controlllers

Introduction to Water Level Controller: In most houses, water is first stored in an underground tank (UGT) and from there it is pumped up to the overhead tank (OHT) located on the roof. People generally switch on the pump when their taps go dry and switch off the pump when the overhead tank starts overflowing. This results in the unnecessary wastage and sometimes non-availability of water in the case of emergency. The simple circuit presented here makes this system automatic, i. e. it switches on the pump when the

water level in the overhead tank goes low and switches it off as soon as the water level reaches a pre-determined level. It also prevents ‘ dry run’ of the pump in case the level in the underground tank goes below the suction level. In the figure, the common probes connecting the underground tank and the overhead tank to +9V supply are marked ‘ C’. The other probe in underground tank, which is slightly above the ‘ dry run’ level, is marked ‘ S’. The low-level and high-level probes in the overhead tank are marked ‘ L’ and ‘ H’, respectively. When there is enough water in the underground tank, probes C and S are connected through water. As a result, transistor T1 gets forward biased and starts conducting.

This, in turn, switches transistor T2 on. Initially, when the overhead tank is empty, transistors T3 and T5 are in cut-off state and hence pnp transistors T4 and T6 get forward biased via resistors R5 and R6, respectively. As all series-connected transistors T2, T4, and T6 are forward biased, they conduct to energise relay RL1 (which is also connected in series with transistors T2, T4, and T6). Thus the supply to the pump motor gets completed via the lower set of relay contacts (assuming that switch S2 is on) and the pump starts filling the overhead tank. Once the relay has energised, transistor T6 is bypassed via the upper set of contacts of the relay. As soon as the water level touches probe L in the overhead tank, transistor T5 gets forward biased and starts conducting. This, in turn, reverse biases transistor T6, which then cuts off. But since transistor T6 is bypassed through the relay contacts, the pump continues to run. The level of water continues to rise. When the water level touches probe H, transistor T3 gets forward biased and starts conducting. This causes reverse biasing of transistor T4 and it gets cut off.

As a result, the relay de-energises and the pump stops. Transistors T4 and T6 will be turned on again only when the water level drops below the position of L probe. Presets VR1, VR2, and VR3 are to be adjusted in such a way that transistors T1, T3, and T5 are turned on when the water level touches probe pairs C-S, C-H, and C-L, respectively. Resistor R4 ensures that transistor T2 is ‘ off’ in the absence of any base voltage. Similarly, resistors R5 and R6 ensure that transistors T4 and T6 are ‘ on’ in the absence of any base voltage. Switches S1 and S2 can be used to switch on and switch off, respectively, the pump manually. You can make and install probes on your own as per the requirement and facilities available. However, we are describing here how the probes were made for this prototype. The author used a piece of non-metallic conduit pipe (generally used for domestic wiring) slightly longer than the depth of the overhead tank. The common wire C goes up to the end of the pipe through the conduit. The wire for probes L and H goes along with the conduit from the outside and enters the conduit through two small holes bored into it as shown in Fig. 2. Care has to be taken to ensure that probes H and L do not touch wire C directly. Insulation of wires is to be removed from the points shown. The same arrangement can be followed for the underground tank also. To avoid any false triggering due to interference, a shielded wire may be used.

The Water Level Controller System is an Electronic Equipment which when electrically connected to the starter of any given Pump-set motor will control the operation of the pumpset depending upon the water level in the Source and Destination Storage Tanks.

Advanced Automatic “ WATER LEVEL CONTROLLER” unit Manufactured by M. V. Instruments is a Microprocessor based Electronic Device. This system when electrically connected to an Pumpset starter, performs the following functions automatically:

- Switches ON the Pump set when Water level drops below pre-set level (i. e. T2 level) in Overhead Tank.
- Switches OFF the Pump set when Water level in Overhead Tank becomes full (i. e. T1 level).
- Switches OFF the Pump set when Water level is low in Sump/Well/Borewell (i. e. S2 level).
- Switches ON the Pump set when there is sufficient water in the Sump/ Well / Borewell (i. e. S1 level).
- Switches OFF the Pump set when there is a Dry run (i. e. when Water is not being pumped into Overhead Tank due to any reason).
- Low Voltage and High Voltage Protection for the Pump set is incorporated.
- The system has Surge Voltage/Current Protection for the Pump set.
- All these functions are automatically performed. Manual interference is absolutely not required.
- Manual operation is also possible if and when required by operating the switch in Manual Position.

Paragon Water Filters use a unique 5-Stage filtration system that combines the cleaning capabilities of Activated Carbon with the new technology of KDF-55:

- The first stage consists of a micron filter locked into place, preventing water from forming paths or “ channels” along the sides of the unit. Once the first micron filter has removed any large particles, the water goes through a series of chambers – FIVE STAGES IN ALL.
- The media filtration process begins with KDF-55, which uses an electrochemical process to reduce Chlorine and improve taste and odor.
- Water passes through progressively finer micron filters as it travels through the unit, to assure removal of particles and to separate the media so that they operate at maximum effectiveness.
- The final chamber contains the highest quality Granular Activated Carbon. Water tastes best when aerated with carbon, so this final stage assures that you water is as refreshing as it is clear.

Principle: The Autonics Water Level Modulating controlsystem is a single element Electro-pneumaticcontrol with a pneumatic Positioner and PID/Fuzzysystem. The system comprises a Transmitter, converter module, float chamber, a feedline-modulating control valve and an electronic microprocessor based PID/FUZZY controller.

Pid & Fuzzy Level Controller:

Description:

The Autonic Water Level Modulating control system is a single element Electro-pneumatic control with apositioner and PID auto tuning system.

i) A Level Transmitter with double-float chamber is mounted on the boiler shell, fitted with a coil which can be make according to the requirement.

ii) A flanged mount fully stainless steel Control valve, fitted with a positioner and pneumatic actuator, which is mounted in the boiler feedline.

iii) A microprocessor-based PID/FUZZY Level controller is mounted on the control panel.

iv) An electronic Converter module is also mounted on the control panel.

Operation:

A positive change of water level in the boiler alters the level transmitter inductance value of coil causing an imbalance in the system. This signal is transmitted through the electronic control box and connected to PID controller. Then the microprocessor-based PID level controller transmitted anelectrical signal to the pneumatic positioner to position and adjusts the position of control valve. A additional low/high water level alarm or burner cut out contact are also provided in the microprocessor-based level controller with the adjustable setting position.

Installation note:

The water connection from the boiler to the float chamber should be, as short as possible and the level transmitter float chamber should be mounted close to gauge glasses. If required our technical staff will advice on individual installations.

Important notice:

Electronic level module and level controller must not be subjected to either vibration or excessive temperature. It is therefore recommended that they be not mounted directly on to the boiler shell.

Specifications :

Control valve :

The V control valve has many different inserts for precision throttling control. The inserts are pinnedto the END CAPS, and are used in conjunction with any of our standard seats. They are designed tochange the flow characteristics of the valve and are offered in different shapes to meet a variety ofmodulating application. For very low Cv applications, a specially designed " Soft" V insert incorporateboth the flow element and the ball seal into one component, and maintains continuous contact with theball. This arrangement provides excellent low end accuracy (EQ%) and repeatability.

Automatic Water Level Modulating Control System:

Operating Principle:

Transmitter: Detect the water levels in the drum and send signal to the digital controller.

Digital controller – With the signal given by the Transmitter and the controller will show the level on the meter (Process value) and it requite a Set Value to control the level. The signal converted and it sends to control valve to give an indication.

Control Valve – The control valve work depend on the signal given by controller and after done the job it send a feed back signal to controller for

confirmation. The valve open is depending on supply air with the signal given by controller and the Positioner then adjustment opening of valve will be make.

OTHER:

The MC9200 Series Cooling Tower Controller is a microprocessor based

controller of recirculating cooling water systems. The MC9200 accurately controls the level of dissolved solids based on µS/cm, and depending on model selection, control conductivity and pH.

The cooling tower controllers feature:

- One user selectable chemical feed timer and up to two 28-day event timers
- Lockable viewing window
- Two point calibration
- Dry contact water meter input capability
- Alarm powered & dry contact relays
- Optional 4-20mA output capability
- Alarm LED, relay or optional callback status
- 2×16 alphanumeric display
- Convenient keypad menu access, display contrast adjustment and HOA access control
- Self charging capacitor to maintain time and history for up to two weeks in the event of a power loss to controller
- Relay, general alarm, flow alarm and power status LED’s

- DIN connections for conductivity sensor and I/O
- Prewired incoming power and relay output connections on specified models (receptacle cords)
- Modular flow assembly with flow switch, quick release sensors and sample port mounted on the polyethylene panel
- Optional remote communications capability via direct serial line or modem connection

Features:

1 Chemical Feed Timer

Two Point Calibration

DIN connections for I/O

Full 24 months warranty

Ph Control Made Easy:

The CHEMTROL 240 is a microprocessor-based digital controller designed to maintain the pH level in water treatment applications.

Standard Features:-

- All Functions on Front Panel
- Adjustable Setpoint
- Adjustable Alarms
- Proportional Feed
- Overfeed Safety Timer
- Waterproof Cabinet
- Easy to install

- Simple to use
- 5-year Electronics Warranty

Toll-Free Technical Support

The bright LCD display shows pH readings, calibration adjustments and alarm limits. The five LED lights indicate the operating mode (OFF, Manual or Auto), feed status, out-of-range alarms and overfeed alarms. The front panel controls include setpoint, calibration, low and high alarm limits, safety timer limit and proportional feed adjustment. Feed control is either ON/OFF or Proportional. The Proportional Feed feature is particularly useful to avoid overfeeding in small bodies of water. It reduces the feed cycle time progressively as the sensor reading gets closer to the setpoint.

General

The controller shall provide microprocessor based control of recirculating cooling water systems. Accurately control the level of dissolved solids based on ⌐S/cm, and depending on model selection, control conductivity and pH.

Controller shall also provide:

One user selectable chemical feed timer and up to two 28-day event timers.

a. Lockable viewing window.

b. Two point calibration.

c. Dry contact water meter input capability.

d. Alarm powered and dry contact relays.

e. Optional 4-20mA output capability.

f. Alarm LED, relay and optional remote callback status.

g. 2 x 16 alphanumeric display.

h. Convenient keypad menu access, display contrast

2. Adjustment and HOA relay control.

a. Self charging capacitor to maintain time and history for

3. Up to two weeks in the event of a power loss to controller.

a. Relay, general alarm, flow alarm and power status LED’s.

b. DIN connections for conductivity sensor and I/O.

c. Prewired incoming power and relay output connections

4. On specified models (receptacle cords).

a. Modular flow assembly with flow switch, quick release

5. Sensors and sample port mounted on a polyethylene panel.

a. Optional remote communications capability via direct

6. Serial line or modem connection.

a. A full 24 months warranty.

Control Functions

All continuously monitored sensor input functions (conductivity, pH) will provide user definable set points for maintaining a specific value within the system. Each set point will have a user definable differential as the control band, programmable high and low alarm points and user defined limit timer for pH.

Chemical Feed Timer

The chemical feed timer shall be user selectable as any one of the following:

- Percent – User will be able to select a percent " ON" time of a user defined " cycle" time.
- Limit – Timer will run as controller bleeds until a user programmed " limit" time is met or the bleed is satisfied.
- Percent of Post-Bleed – Timer will run for a user defined percentage of the bleed time after bleed is satisfied.
- Pulse Timer – Timer initiated from dry contacting head water meter. User can define timer run time, water meter input and contact accumulation before timer initiation.

Remote Communications:

The controller shall have the optional capability of serial communications using PULSAworks software. The serial communications can occur either by direct RS232 port, or remotely via an optional internal modem. PULSAworks allows the user to access real-time system values and remotely change operating parameters. The user may download data history files and save files to disk. History files may be viewed and printed in table or graph form, the graph form can be user customized. The optional internal modem allows

the controller to perform alarm call back for alarm condition notification to a pager or computer running. There are other various types of water level controllers in which some of them are as under:

IC 8255.

Digital Water Level Recorder

The standard virtual make water level recorder consists of a weatherproof enclosure which contains the data logger, level sensor and power supply, and comes complete with a solar panel and data shuttle. The system is powered by rechargeable sealed maintenance free batteries with integral 12V/10W solar panel, which will easily keep the batteries charged throughout the year. Unattended recording of Water level with maximum and minimum level, Standard program and user-friendly software . Data retrieval by Data shuttle to your Computer, Suitable for mounting in a variety of locations, Memory range more than 8250 data sets extendable up to more than 16500.

Digital Water Level Recorder (Pressure Type)

This is a Micro controller based Automatic Water Level Recorder reflect state of the art in micro controller based instrumentation design. The Water Level sensor can be attached with this data logger for the collection of real time data automatically. The micro controller has its internal memory along with an additional 128K EEprom, a real time clock with an LCD (16 X 2) to display the instrument status. Piezo-resistive silicon strain gauge, bounded to 316 SS diaphragm, and integral cable contain a vent tube for Barometric pressure compensation. Comes with three ranges 10 meter, 35 meter & 100 meter

Ground Water Monitoring System:

The new SEBA Data Logger type MDS Dipper-3(T3) is the consequential further development of the well proven MDS Dipper for continuous registration in ground and surface water, with special focus to the operation data security. A watch-dog-function, integrated in the MDS-DipperT3 supervises continuously the microprocessor activities and so it provides a high operation security. Undefined system conditions are recognized immediately and eliminated by the Watch-dog function. High accurate, robust ceramic pressure measuring cell for different measuring ranges (i. e. 1 bar, 2 bar, etc.) and Temperature sensor for 0…25°C or 0…50°C. The MDS Dipper-3(T3) is equipped with a Flash-memory (Flash-RAM). The acquired measuring data are stored in a ring memory organization. Due to the described double data storage, you have access to the complete measured data in the archive data backup, even in case of breakdown of the power supply

- Measuring system for the observation of groundwater
- measuring sites, pumping tests, construction areas,
- Surface water levels
- Made of stainless steel
- High data security due to additional flash-memory
- Watch-dog-function for high operation security
- Maintenance-free, battery life time > 10 years, exchangeable battery
- Installation in tubes from 1” diameter
- Optional connection via Bluetooth at Extra Cost