Automation in Tissue Culture Industry

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Abstract—The project is to do automation in tissue culture industries. The main purpose of this project is doing work on polyhouse automation, autoclave automation and making two AC's ON-OFF each after 12hours delay .All automation work is mainly based on 89C51 microcontroller. The requirement is that to maintain the 70% humidity with outsource exhoust fan and water sprinkler. Autoclave machine is used for empty bottle sterilization and also for chemical filled bottle sterilization with 15lbs and 10lbs pressure for time 10 minutes and 20 minutes respectively. Making autoclave automatic with respect to time and pressure on the basis of weight of respective empty and chemically filled bottles.

Keywords— Auto clave machine, Microcontroller, humidity, pressure and polyhouse automation.

I. INTRODUCTION

All At this point in time, the world's pollution problem has led to unpredictable weather conditions all over the world. With these ever changing weather conditions, it is expected that the number of polyhouses will significantly increase in the near future, thus leading to a great demand for automated polyhouse monitoring systems .The main goal is to build a miniature polyhouse which is equipped with an automatic monitoring system. This monitoring system will constantly monitor the conditions in the polyhouse to ensure that it remains at preset temperature, light humidity conditions. If these conditions differ from the preset levels, the monitoring system will automatically turn on certain devices to return the polyhouse to the required condition. Automatically control the crop Growing environment within the walls so that any type of plants can be grown all year round. Eliminates the risk of the polyhouse not being kept at crop specified conditions due to human error. Minimizes the labor costs crop involved in maintaining a playhouse. Customer will be able to define their crop preferred polyhouse conditions and have the system function as specified. This will be a "plug and play" product. Ease of Use

II. LITERATURE REVIEW OF EXISTING METHODS

1) Humidity control

a) PLC based

i).Detect temperatures from 40°Cto 125°C. Maintain a temperature of about 10°C to about 40°C

ii).Detect humidity between 5% RH and 95% RH. Maintain a humidity of about 40% to 80%RH.

iii) Detect sunlight and artificial light. Turn on artificial lighting in the event that there is insufficient light. Overall design:

For our Automated Polyhouse Monitoring System, we are implement 3 types of sensors. The sensors to be used are photodiodes, a temperature sensor and a Humidity sensor. We are building miniature polyhouse and determine the appropriate positions to place the sensors. A series of tests will be done to make sure that all the sensors are working accordingly. These sensors will be connected to a PLC which will function as the main control unit. The sensors will send signals to the plc and the plc will translate the signals and determine if the input is within the preset range. For instance, if the preset temperature range is from 20°C to 25°C, the plc will make sure that the polyhouse temperature is within this range. If the temperature exceeds the maximum value, the plc will then turn on the fan. If the temperature drops below the minimum value, the bulb will turn on. As for the photodiode, if the polyhouse is exposed to insufficient light, it will send a signal to the plc. The plc will then process the signal and turn on the artificial light in the polyhouse. As for the humidity sensor, it will detect a change in humidity levels of soil and send a signal to the plc. If the humidity level is not within the required range, the water supply will be turned on or off.

Now why only PLC?

We use PLC because it is capable of handling large no of inputs without need of human interfacing. Once it is correctly programmed the operator doesn't have to bother about the process.

- Cost effective for controlling complex systems.
- Flexible and can be reapplied to control other Systems quickly and easily.
- Computational abilities allow more sophisticated control.
- Trouble shooting aids make programming easier and reduce downtime.

b) Manufacturers of PLC

In our system the PLC program is going to control the valve i.e. is amount of acid or base is to be adding into treated water. It also controls the positions of all the levels of the different tanks in the process. This will help to control the system smoothly.

c) Microcontroller based

•Poly House is a climate regulated environment to increase QUALITY&PRODUCTION of corp.

•Microcontroller based system is a economical option to achieve above requirements.

Manuscript Received on May 07, 2015.

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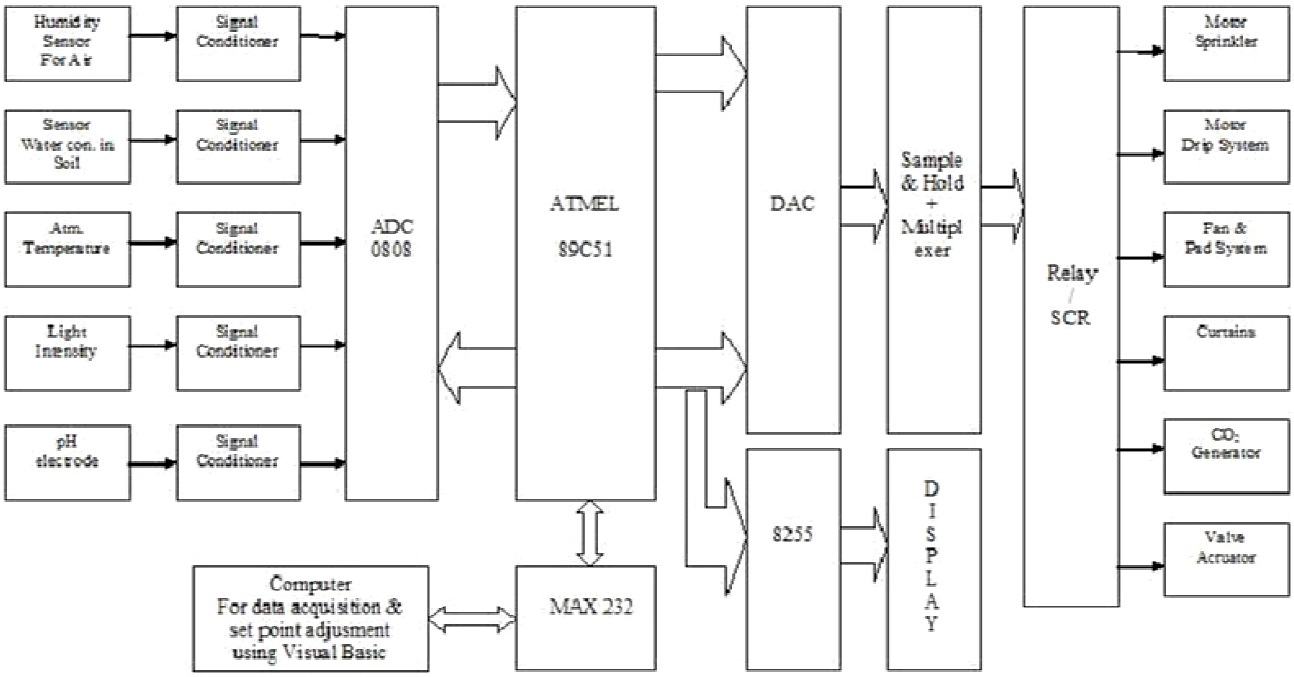

Fig. 1: Block diagram of purposed system in

•Manually Controlled System or Semi Automatic Controlled System requires a lot of attention and care.

•Microcontroller based Control System is the solution to come over this problem and to maximize returns.

d) Basic Requirements of Polyhouse

•Starting and closing of Micro Irrigation System.

•Application of Liquid Fertilizer or Water Soluble Fertilizer (N:P:K) and other Nutrients to the plant.

•Operation of Misting System as required.

•Opening and closing of ventilators and side wall roll up curtains as needed.

Operation of cooling pad and fan.

•Climate Control, Temperature, Humidity, Heat Radiation, Control PH

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar.

e) Block Diagram

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE and SI do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

Units

Use either SI or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive”. Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly

2) Pressure Controller

Temperature, pressure, flow, and level are the four most common process variables. Similar to temperature, pressure is another key process variable because pressure provides a critical condition for boiling, chemical reaction, distillation, extrusion, vacuuming, and air conditioning. Poor pressure control can cause major safety, quality, and productivity problems. Overly high pressure inside a sealed vessel can cause an explosion. Therefore, it is highly desirable to keep pressure in good control and maintained within its safety limits. Why Pressure Control Can Be Difficult. The many reasons why a pressure loop is difficult to control are listed and described in the following table (1)

Reason	Example	Control Headache
Nonlinear	Natural gas pipeline. Pressure of a fluidize-bed boiler. Gas mixing plant.	A PID or model-based controller may work well in its linear range and fail in its nonlinear range.
Multivariable control	Multiple gas lines may draw gas from a master line. When the load changes, they will interact with each other.	A multivariable process cannot be effectively controlled by using SISO controllers due to interactions among the variables.

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Large load changes	Steam generators in co-generation plants have to deal with large steam load changes due to demand changes.	Load changes can cause major disturbances to pressure.
Large and varying time-delays	Pressure in municipal gas grids or a product powder transport system has large and varying time delays.	PID cannot effectively control a process with large and varying time delays.
High-speed and open-loop oscillating	The pressure field and Mach speed value of an ultra-sonic wind-tunnel used in the aerospace industry is open-loop oscillating.	Due to the poor frequency domain behavior of this process, tying to control an open-loop oscillating loop can be a nightmare.
Nonlinear and high-speed	Vacuum vessels used in thin film or material deposition.	It is desirable to reach the vacuum state but the process is nonlinear.

Table 1: Reasons why a pressure loop is difficult

3) Timer

a) Solid state timer

This invention relates to solid state timing devices and more particularly to an integrated circuit digital timer capable of initiating functions over a substantial period of time. Important features of the invention include the provision of a timing device which requires little power, is of small physical size and weight, and which will operate reliably in severe environments. The present invention provides an electrical timer which overcomes these and other disadvantages through the utilization of integrated circuit components which are of relatively small size and weight and which will operate on a minimum of power for extended periods of time. The basic timer construction takes the form of an integrated circuit low frequency oscillator which supplies pulses to a utilization device through a frequency divider in the form of a solid state counting chain of integrated circuit flip-flops. In one embodiment, the divider output is passed through a logic circuit to actuate the detonator of an explosive charge, such as a land mine. In a second embodiment, the output of the divider is supplied to a ring counter to produce extended periods of delay with a minimum of energy drain. It is therefore one object of the present invention to provide an improved electronic timing device.

1) Another object of the present invention is to provide an improved solid state timer for initiating events after a substantial predetermined period of time.

2) Another object of the present invention is to provide a solid state timer in which the solid state components require a minimum of energy to operate.

3) Another object of the present invention is to provide a solid state timer made up

primarily of integrated circuit components.

4) Another object of the present invention is to provide a timer comprising an oscillator and counting chain connected to a magnetic core ring counter.

5) Another object of the present invention is to provide a self-destruct delay circuit for explosive charges, such as are used in land mines.

b) Programmed timer

1. A programmed timer comprising, in combination, a clock, a source of electrical power, an appliance connection point, a plurality of normally open time interval switches disposed in a circular pattern, continuously rotating switch closing means including an electrically energizable contact arm driven by the clock for sequentially engaging each of the interval switches in sequence and maintaining contact therewith to define a fractional time segment of an operational cycle corresponding to one revolution of the rotating means, a plurality of manually operable selector switches each being associated with an individual one of said time interval switches and capable of conduction only during the fractional time segment defined by said one switch and being disposed on a common panel, circuit means connecting said source through each of said associated time increment switches and selector switches to said appliance connection point, means for generating an audible alarm, time-setting means for triggering said alarm at a predetermined time in a 24 hour interval cycle, and shutoff means for silencing said alarm.

2. A programmed timer as defined in claim 1 having switch means for selectively energizing and deenergizing said appliance connection point independently of said time interval switches;

3. A programmed timer as defined in claim 1 in which the rotating switch closing means completes one revolution during a 24 hour interval cycle, and 48 individual time increment switches and associated manually operable selector switches are disposed on said panel to provide 48 individually selectable half-hour time segment intervals.

4. Apparatus as defined in claim 1 having a radio connected to said appliance connection point and having circuit selection means for alternately selecting operation of

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said radio and said alarm means in response to actuation of said 24 hour cycle switch.

5. A programmed timer according to claim 1 further including manually actuable means for generating said audible alarm independently of said clock and said selector switches, whereby said timer can at a given time be used as a signaling device.

III. PROPOSED WORK

Above we seen various existing methods for the automation in tissue culture industries by studying these methods we are on conclusion that the basic and main processor for all the project is 89C51 microcontroller .As we seen above humidity maintaining is on the basis of microcontroller and that method only we are going to prefer .For pressure above existing methods are not feasible for our project here we going to generate our own method for controlling pressure on bottles weight parameter. Already we are using microcontroller that's why here we prefer above existing timer that is programmable
timer.

a) Block Diagram

IV. ALGORITHM

Step 1: Take input to the controller that is tempreture sensor to sence the atmospherical tempreture .If tempreture is very much then start exhaust fan and when tempreture is under controll then start the water sprinkler to maintain humidity .

Step 2: Humidity will controlled up to 70% based on sprinkler & exhaust fan.

Step 3: Use programmable timer to the second input port which will be with 12hr delay

Step 4:- For plant preservations, it required 24 hr AC power supply. There we have to control both AC with 12 hr delay.

Step 5: Use weight sensor to sence the weight of bottels that we are keeping into the autoclave

Step 6 :-. Here it is automate the autoclave with respect to the weight of the empty bottles and chemically filled bottles with 15lbs and 10lbs respectively and also time limit which is 20 minutes and 10 minutes respectively

Student No	Source of information	Target	Guidelines for review
01	Online Literature	Two websites	www.jain irrigation.com www.biospectrum.com
02	Field experts	Two experts	Mr.Shrikant Burje . Mr.Navnath Waghmare .

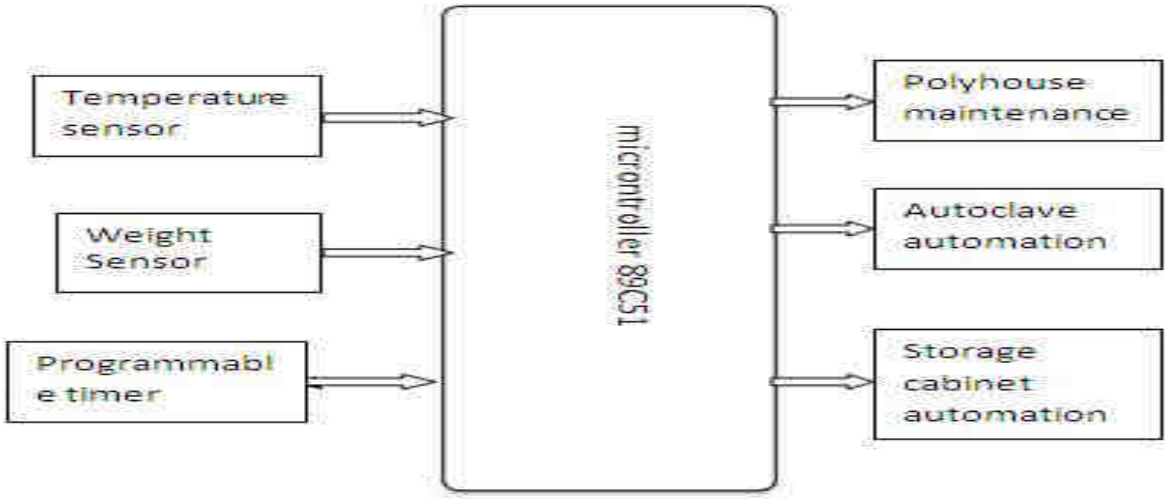

Fig. 2: Block diagram of Proposed Work

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Polyhouse Automation	Humidity	We are going to use microcontroller as main basic component and for maintaining humidity 70% we uuse tempreture sensor and other external equipmets are exhoust fan and water sprinkler
Autoclve automation	Pressure	Here we are going generate our own method for autoclve pressure maintaining.Here we have to maintain pressure and time on the basis of weight of empty bottels And chemically filled bottle.
Maintaining tempreture of culter storage cabinate	Timer	As we are using microcontroller as a main component that's why we are using programmable timer which is one of the existing type of timer

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