A REPORT

"PLC Based Agriculture Irrigation System"

Submitted in partial fulfillment of the requirements for special assignment

Of

2ICOE51 PROGRAMMABLE LOGIC CONTROLLER

By

Kirti Rawal

INSTRUMENTATION AND CONTROL ENGINEERING

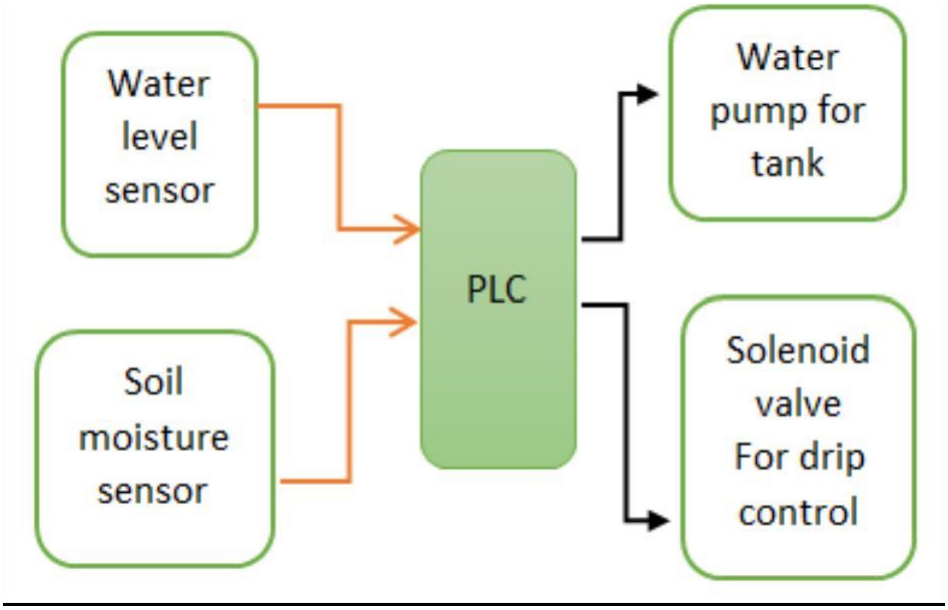
INSTITUTE OF TECHNOLOGY NIRMA UNIVERSITY

Ahmedabad

Abstract:-

While thinking of farming the very first thing comes into mind is management, let it be of seed sowing, irrigation and soil health till post harvesting activities. Farming will not be a profitable business unless it will be management smart. After successful implementation of farm mechanization, researchers are now working on farm automation. There are lot of problems are faced by farmers especially in India irrigation infrastructure is not so strong that it will fulfil agricultural need. Due to natural causes rainfall has been decreased and density of rainfall is effected, here comes importance of smart irrigation management. In this paper an attempt is made to address this issue by implementing sensor and actuator network controlled by LC. Due to monitoring and controlling of farm irrigation using smart sensor, crop yield will be improved as exact

watering requirements will be fulfilled without any error & waste of fertilizers will be eliminated by supply fertilizers through water channel.



PLC (Programmable Logic Controller)

Overall structure of automated irrigation depends on Programmable Logic Circuit (PLC). The main aim of PLC is to read input from sensor and generate output according to the logic created in the program. It is easy to add & substract input/output modules or communication modules, without any hardware modifications. So it would be easy for farmer to change the number of solenoid valves or pumps and the system easily though input and output connections are limited, but are not limited because Xbee & Zigbee systems are there to integrate more number of inputs without making system complicated. Indraworks engineering is the platform for PLC project planning and configuring. The software used in PLC is called the Indralogic. It is the complete development environment in PLC.

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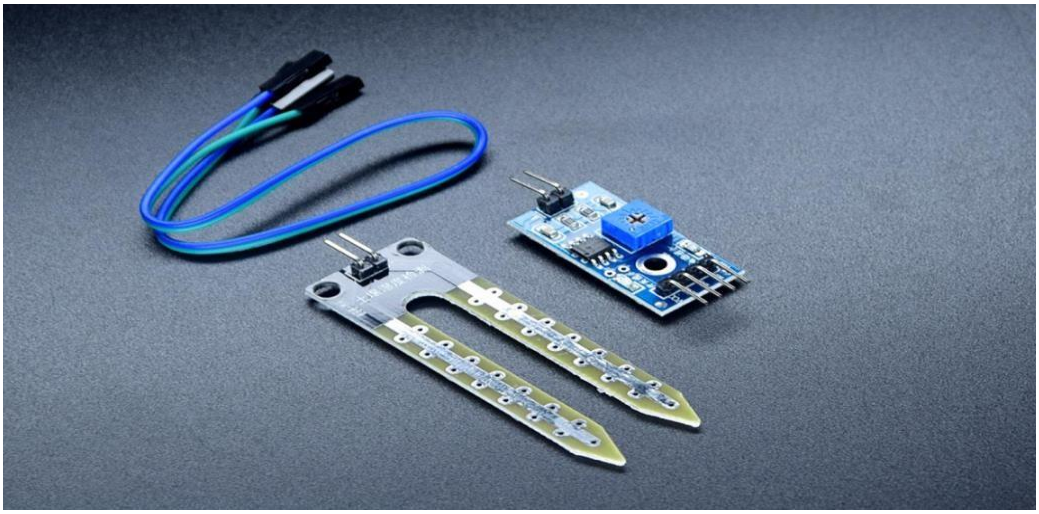
* MOISTURE SENSOR



Moisture sensors measure the water content in the soil. A soil moisture sensor probes are made up of multiple soil moisture sensors. That sensors includes,

1) Utilize the moderate properties of the water for neutrons.

2) Electrical resistance to the soil.

3) In this automated irrigation system, we will use the moisture sensor which can be inserted into the soil, in order to measure the moisture content of the soil.

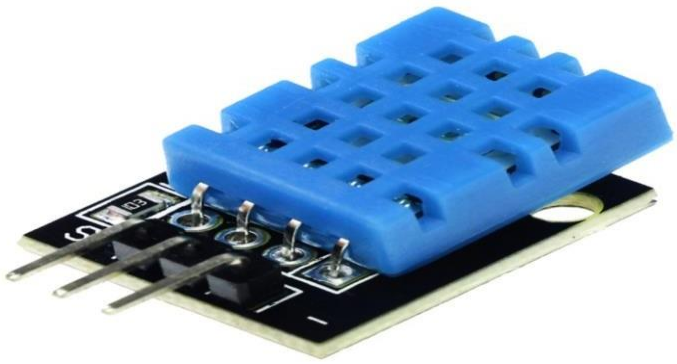
The electrical conductivity of the soil is measured using two metal conductors in the soil except that dissolved salts greatly alert the water conductivity and confound the measurements. In our project we will use a little bit inefficient but cheap method by measuring the voltage between the conductors in the soil conductors.

When the potential difference between these two wires is low that means that there is less amount of water is present for the plants and when potential difference is more than that means water is lacking in plants.

We can set the voltage level at which the water will be given to the plant. For the plant that does not need so much of water we can set the voltage level to a high value. And for the plant which is sensitive to dryness and require water timely we can also set the lover values of voltage difference between the wires of conductors in the soil.

When water comes between the two conductors than the voltage difference between the two wires reduces and when water does not come in contact of both wires then the potential difference between the two wires increased as compared to previous conditions.

Humidity sensor



It is used to measure amount of vapour in the air i.e. Humidity, relative temperature is also calculated because change in temperature causes change in humidity [4]. Changes occur before and after irrigation. It helps in notifying the user about present condition of field. Humidity sensors work by observing different changes in temperature or electrical currents in the air and send signal to PLC accordingly. DHT11 digital temperature and humidity sensor comes 04 pins inline packaging is used for study. Some salient features of this sensor are long-term stability, fast response, Low cost, long distance signal transmission, relative humidity and temperature measurement and strong anti-interference ability. It is smaller in size and power consumption is low. The signal transmission is up to 20 meter.

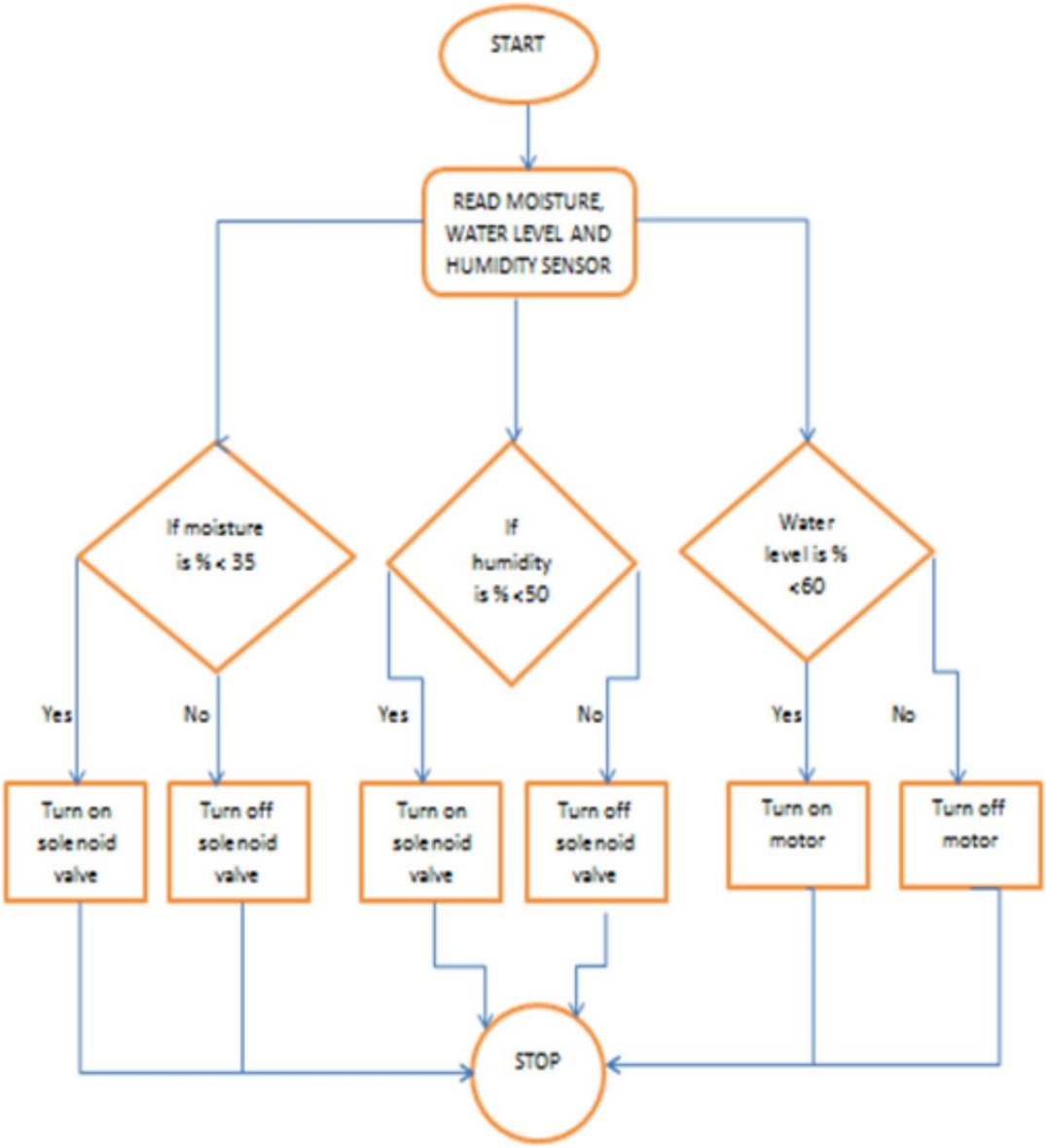
*WATER LEVEL SENSOR

Overhead tank is used to supply water throughout the field. It senses two levels such as high level and low level of the water. When it senses water at low level it transfer the signal to PLC interface circuit, this sends signal to 12v relay, the output generated by this relay is fed as input to plc.PLC generates an output and 24v relay turns on the motor as soon as PLC interface circuit detects the water in overhead tank at high level the motor is turned off because, of this reasons the water is also utilized hence, it also helps the wastage of water.

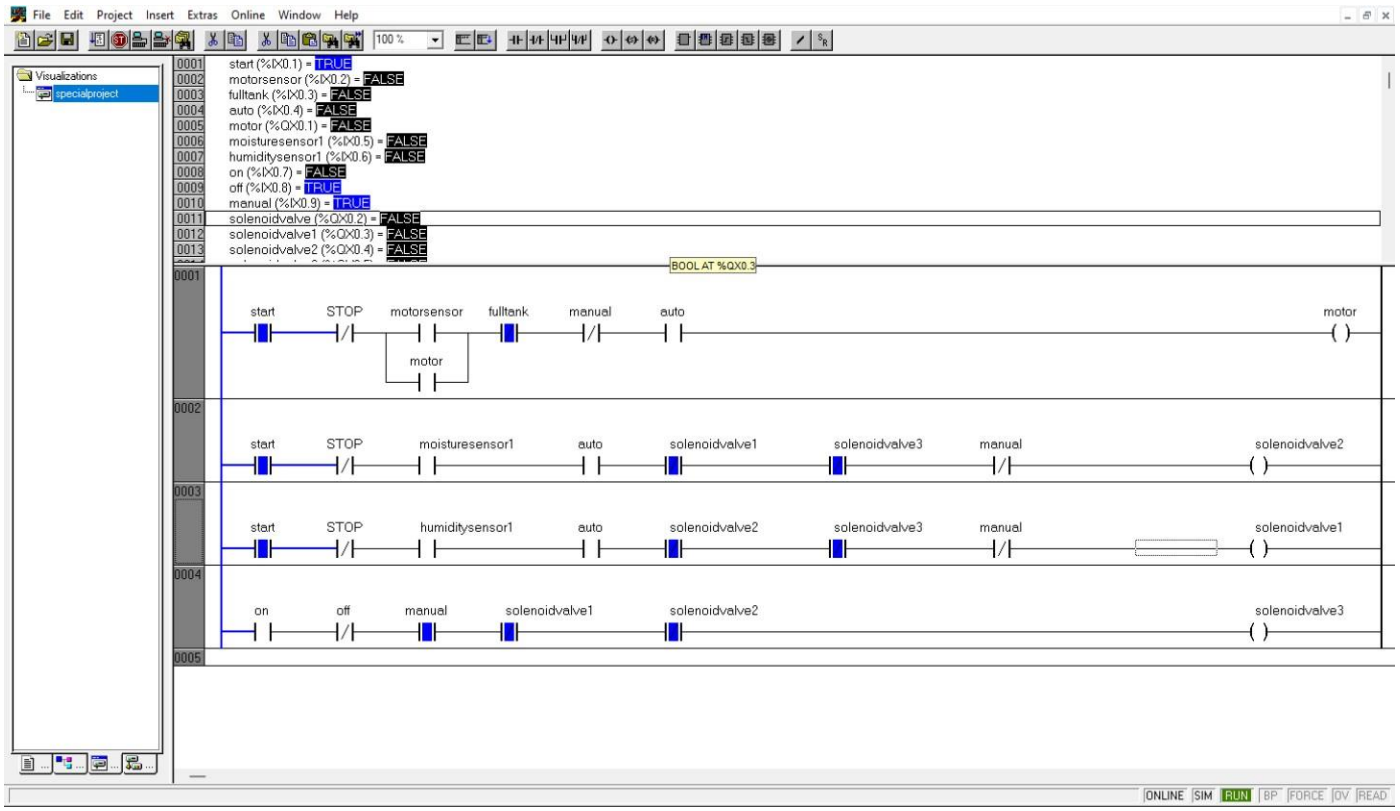
***WATER PUMP**

The water pump is commonly used to supply the water for a particular land area. It can be electronically controlled by the PLC interfacing circuits. It can be triggered ON/OFF by sending the signal to the plc interfacing circuits. This process of supplying the water is communally called as pumping. Among many varieties of water pumping we can use small water Pumping technique.

The pumping of water of the water is a basic and fundamental practical technique, far more practical than scooping it up with one hand or in bucket. This is true whether the water is drawn from a source or used for irrigation for evacuating water from an undesirable location. All other processes depend either from water descending from higher elevation or some pressurized plumbing system is required for supplying the water to the land area.

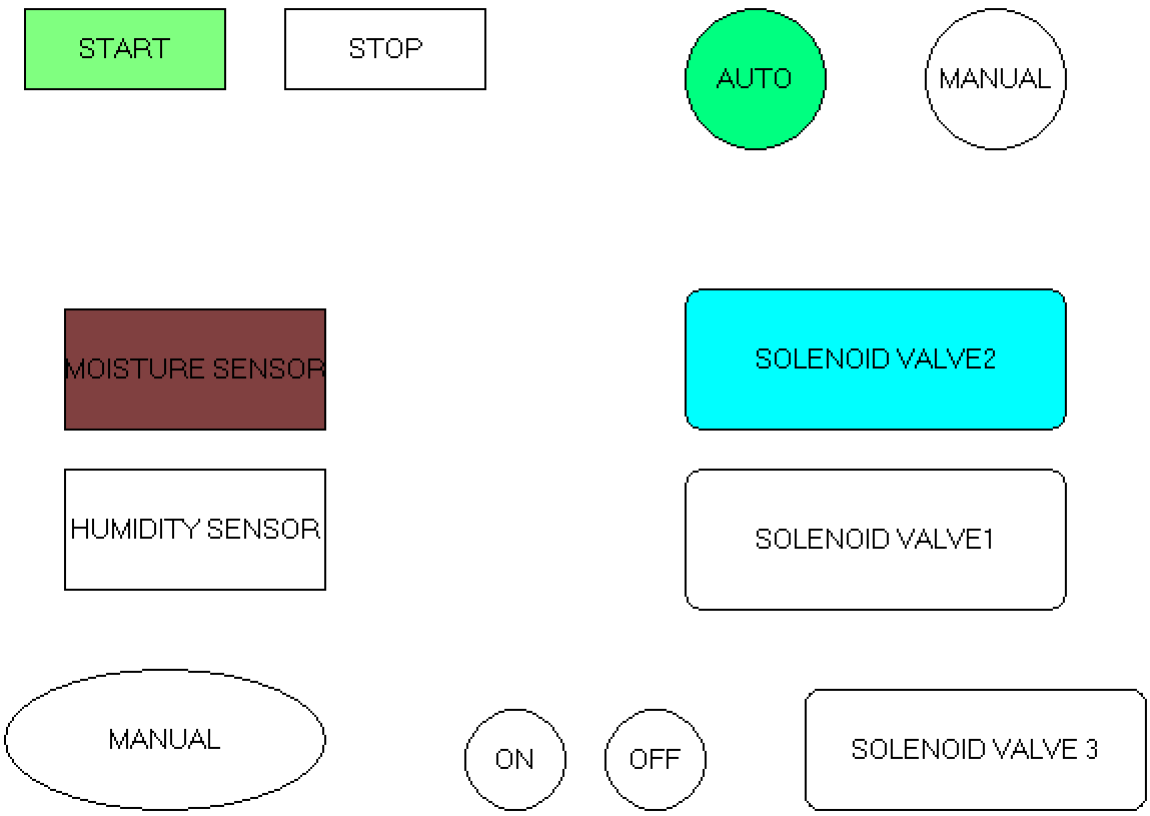


LADDER LOGIC :-

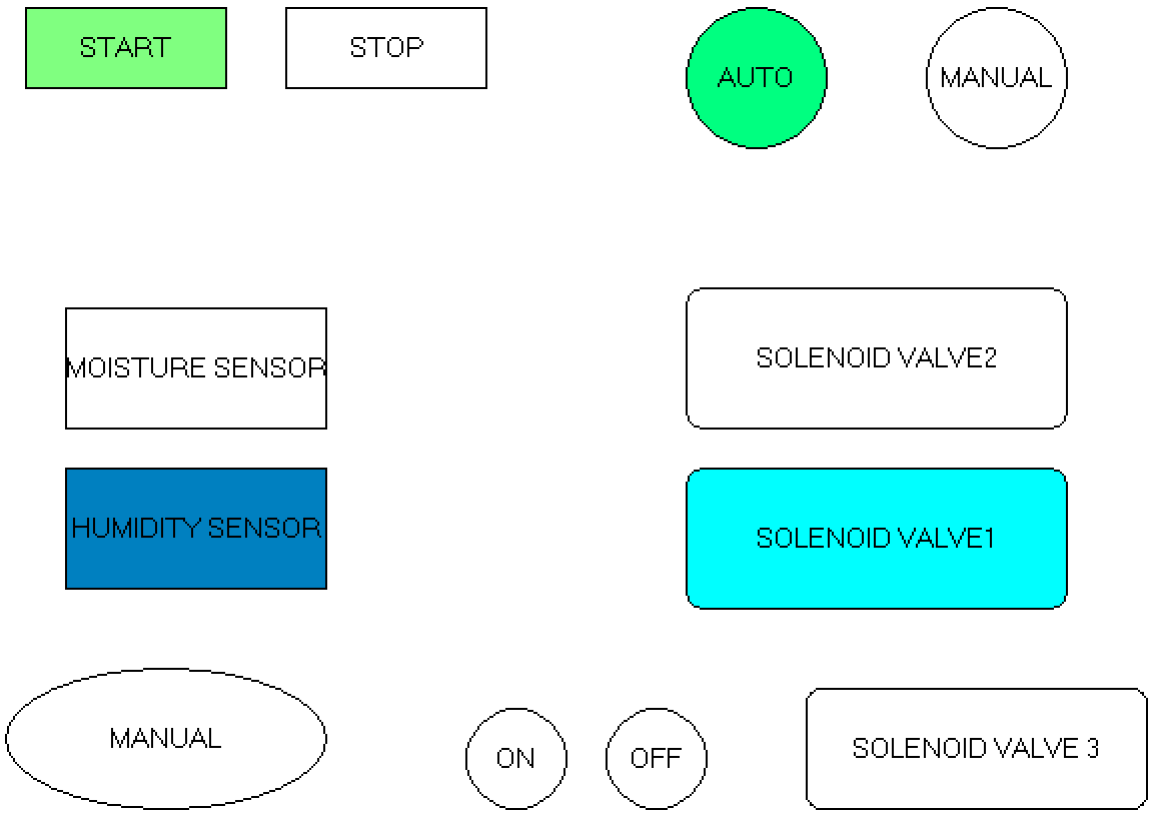


RESULTS :-

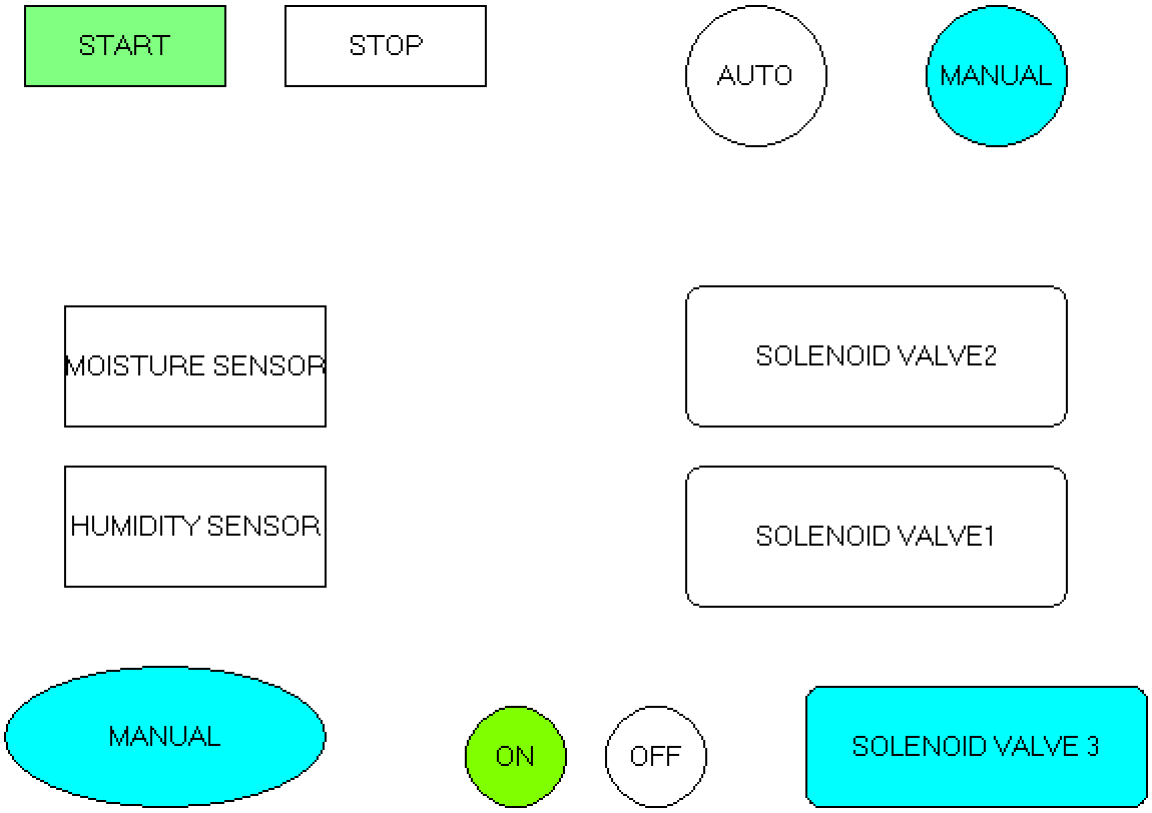
WE PUSH THE START BUTTON AND THEN SET THE SYSTEM IN AUTO MODE IF MOISTURE SENSOR SENSES THAT SOIL MOISTURE IS BELOW 35 % IT ACTIVATE SOLENOID VALVE 2 AND WATER IS FEEDED TILL THE MOISTURE REACHES 35% THEN THE SENSOR DEACTIVATES AND WATER SUPPLY STOP.



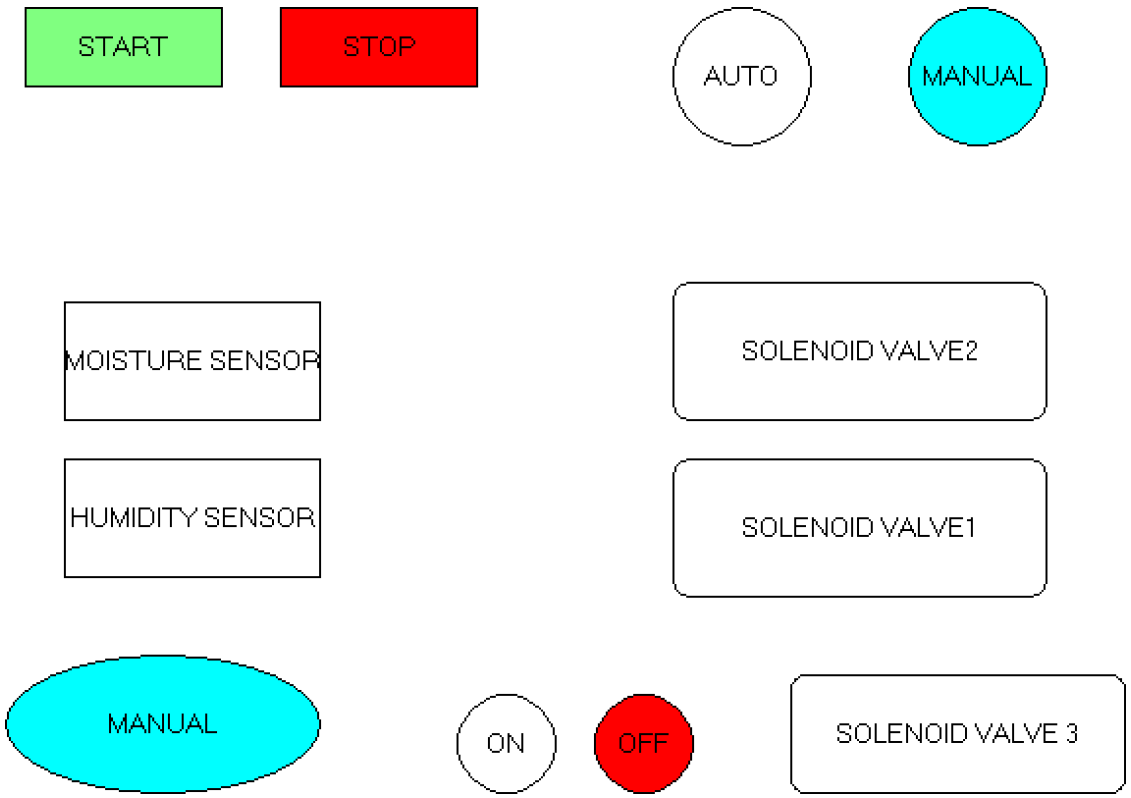
WHEN THE SYSTEM IS IN AUTO MODE IF HUMIDITY SENSOR SENSES THAT SOIL MOISTURE IS BELOW 50% IT ACTIVATES SOLENOID VALVE 1 AND WATER IS FEEDED TILL THE HUMIDITY REACHES 50% THEN THE SENSOR DEACTIVATES AND WATER SUPPLY STOP.



IN THIS SYSTEM ALSO HAS MANUAL MODE,MANUAL MODE ACTIVATES SOLENOID VALVE 3 AND DEACTIVATE AUTO SYSTEM AND OTHER VALVES.



AND LAST WE PUSH THE STOP BUTTON AND SYSTEM WILL STOP.


START
STOP
AUTO
MANUAL
MOISTURE SENSOR
HUMIDITY SENSOR
SOLENOID VALVE2
SOLENOID VALVE1
MANUAL
ON
OFF
SOLENOID VALVE 3

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