IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)
e-ISSN: 2278-2834,p- ISSN: 2278-8735,
PP 33-36
www.iosrjournals.org

PLC Based Irrigation System

Prof.S.S.Punde[1], Vise Mayur Arjun[2], Sanap Machindra Baban[3], Kamble Amit Shankar[4]

[1](*Asst. Prof, Electronics and Telecommunication, Loknete Gopinathji Munde Institute of Engineering and Research, India)*
[2,3,4](*Student, Electronics and Telecommunication, Loknete Gopinathji Munde Institute of Engineering and Research, India)*

Abstract: *Most of the water used by man goes to irrigation. A major part of this water is used to irrigate small plots where it is not feasible to implement full-scale Evapotranspiration based irrigation controllers. During the growth season crop water needs do not remain constant and varies depending on the canopy, growth stage and climate conditions such as temperature, wind, relative humidity and solar radiation. Thus, it is necessary to find. An economic irrigation controller that can adapt the daily water application to the plant needs. The dramatic development of Programmable Logic Controllers, PLCs, and their rather affordable price has made it possible to use them as stand-alone irrigation controllers. In this project a PLC is used to adapt the daily irrigation amount to actual etc. This equation only requires temperature values to calculate Evapotranspiration. Once is calculated, then the PLC manages the irrigation according to the characteristics of the field, the irrigation equipment and the growth stage of the crop.*

Keywords: *PLC, Irrigation, Automation, Soil moisture, Water saving, temperature control*

I. Introduction

Water is becoming a precious resource. Municipalities use thousands of cubic meters of purified water to maintain the parks and green areas in cities and towns. They rely on controllers with a fixed schedule to operate the irrigation systems. These controllers are usually programmed to satisfy the peak water need, and end up wasting a lot of water on cooler or clouded days. Farmers with drip and sprinkler systems also use fixed schedule irrigation programmers and thus end up wasting large amounts of water in cooler days and at the beginning of the growing season when the crop water needs are minimum. The purpose of this work is to develop autonomous irrigation systems that use a single climate criterion to adapt daily irrigation depths to plant needs. Criteria such as temperature, total radiation and total wind can be measured directly by PLCs which then adapt the irrigation schedule to the observed conditions, leading to a reasonable saving in the amount of irrigation water. Thus, this work intends to develop a cost-effective irrigation controller that is adaptive to daily climate conditions, without the need for expensive sensors and costly weather-stations. It must also be reliable and easily deployable in order to work under harsh outdoor conditions without the need for supervision or regular monitoring. [1]

Water availability is a critical variable for virtually every economic activity, including agriculture and industry, the energy sector and public use. Irrigation process has been converted as a complex process because of less manpower is available for low paid jobs like these and also time and over exploitation of energy made this problem as bulk. With respect to the simpler types of irrigation controllers that involves specific run-times and days and sometimes the controller executes the same schedule regardless of the season or weather conditions. From time to time a technician may manually adjust the watering schedule, but such adjustments are usually only made a few times during the year, and are based upon the technicians. These changes to the watering schedule are typically insufficient to achieve efficient watering. So automation of irrigation system is needed to overtake these problems which apply water to the landscape based on the water requirements of the plants. Many types of irrigation controllers have been developed for automatically controlling application of water to landscapes. [3]

II. System Implementation

In this system we used three sensors first two are the transistors & metal electrode (dry sensor) and third is temperature sensor (LM35). Each sensor is operated on 5V DC power supply. Transistor and metal electrode sensor is use to detect the moisture and water level of the soil. It monitors the moisture and water level ratio and send the signal to PLC to ON/OFF water motor and sprinkler motor. A temperature sensor (LM35) and comparator we placed this sensor in polyhouse and green house to maintain the temperature range. You can set a

particular temperature range if temperature is increases above settable value sensor will detect and send the signal to PLC to ON/OFF to dc fan.

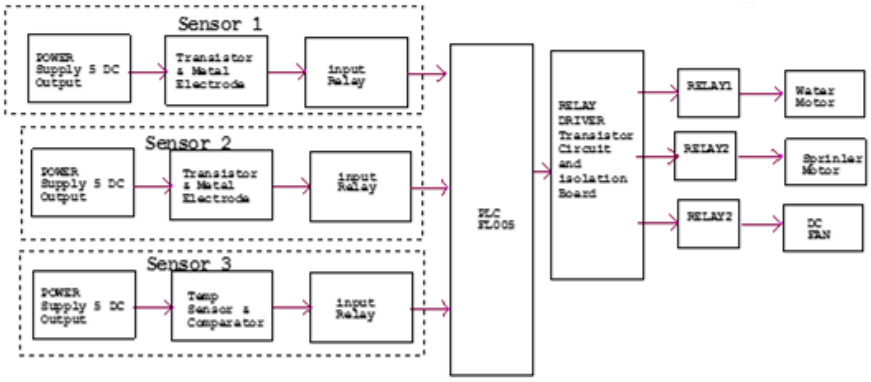

Fig No 1: Block Diagram Of PLC Based irrigation system

III. Figures And Tables

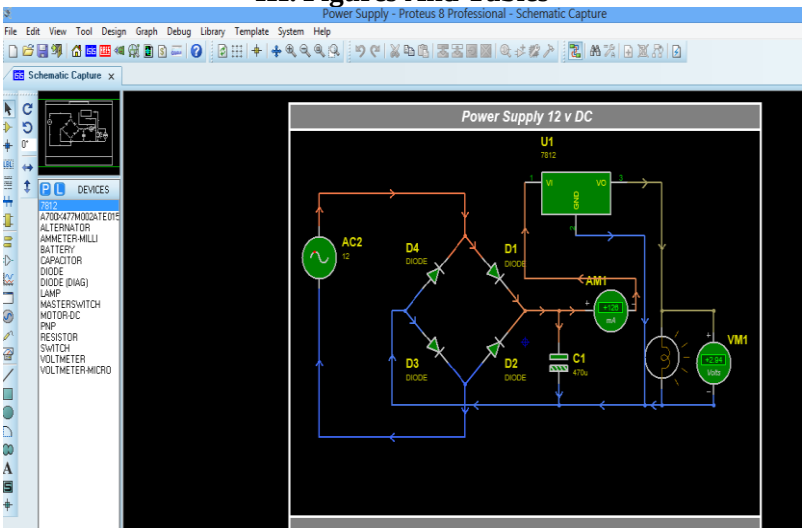

Fig No 2: Power Supply Simulation

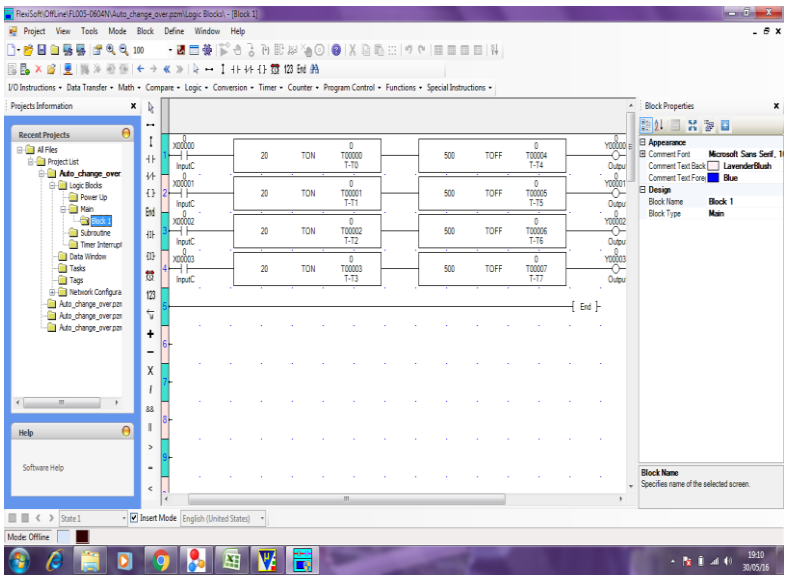

Fig No 3: LDR Main Program FL005-0604N

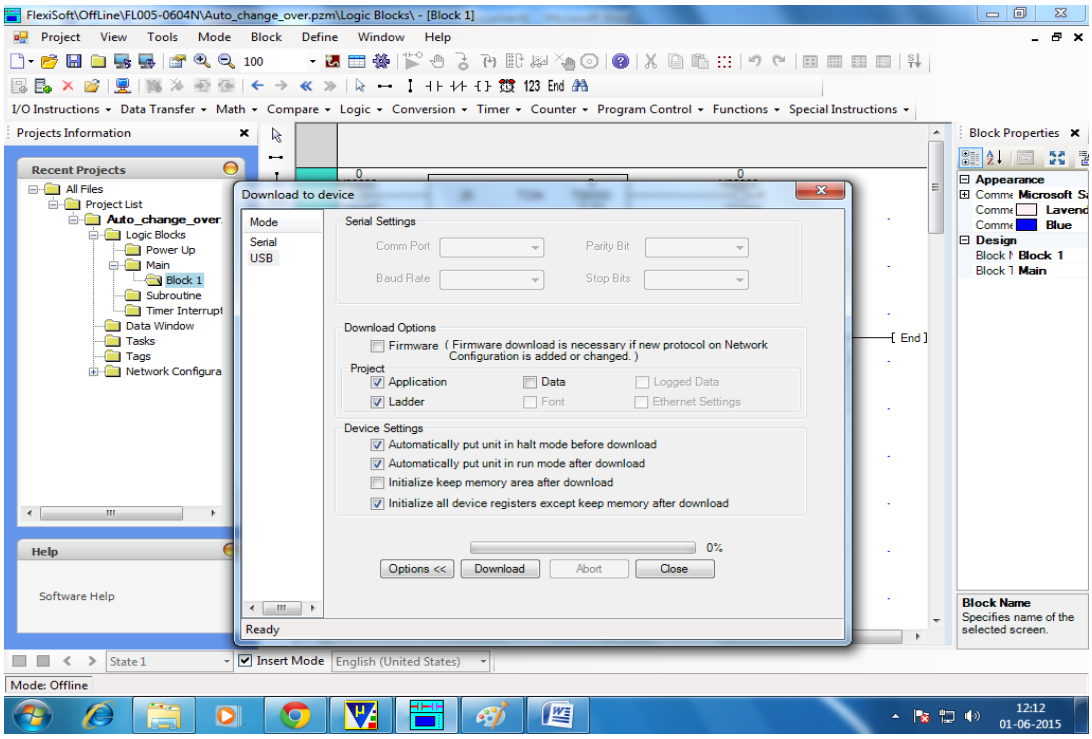

Fig No 4:-FL005-0604N Download Screen

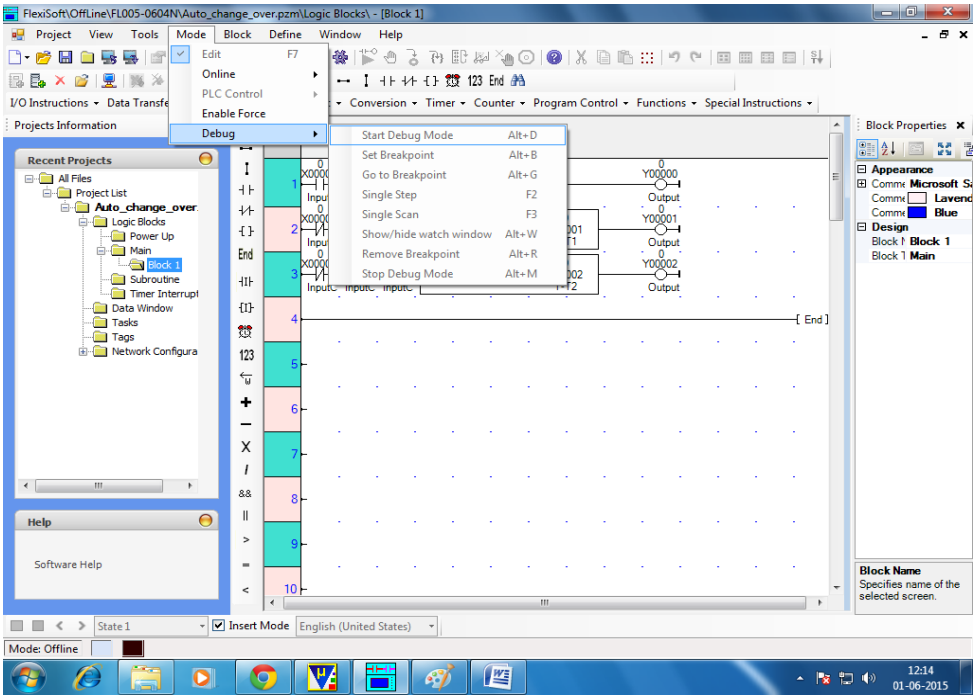

Fig No 5:-FL005-0604N Debug Screen

IV. Conclusion

The operation of PLC is independent of environmental changes such as change in temperature, humidity, wind, rain etc. The system will be capable of detecting the moisture level and accordingly it will control the water pump or sprinkler. This system will improve overall use of water resources .And it will also improve quality of the crop. It will be help full to save water at the same time the system consume minimum power. PLC FL005 has built in real time clock. So it can be programmed according to the user's requirements. The respective software is windows based.

Acknowledgements

We are thankful to our principal Prof. Dr. A. K. Dwivedi for his constant encouragement valuable guidance and support, also we are thankful to head of the department Prof. P.S. Sonawane for her co-operation, support and continuous guidance and special thanks to our project co-ordinator and guide Prof. S.S. Punde

References

[1] "Drip irrigation using a PLC based adaptive irrigation system,"shahidian,S ,Serrlheiro,R.(2009), weseas transactions on environment& development, vloume 5 page no.(209-218)

[2] " Automated agricultural process using PLC and ZIGBEE" A. Dhivya, J.Infanta and K.Chakrapani , school of computing, SASTRA university,page no.(1-8)

[3] "Water irrigation system using controller" Chetna V. Maheshwari, DipalSindha International Journal of Advanced technology in engineering and science,volume no.2,page no(240-249).

Examples follow:

Journal Papers:

[1] M Ozaki, Y. Adachi, Y. Iwahori, and N. Ishii, Application of fuzzy theory to writer recognition of Chinese characters, *International Journal of Modelling and Simulation, 18(2),* 1998, 112-116. (8) *Note that the journal title, volume number and issue number are set in italics.*

Books:

[2] R.E. Moore, *Interval analysis* (Englewood Cliffs, NJ: Prentice-Hall, 1966). (8)*Note that the title of the book is in lower case letters and italicized. There is no comma following the title. Place of publication and publisher are given.*

[3]

Chapters in Books:

[4] P.O. Bishop, Neurophysiology of binocular vision, in J.Houseman (Ed.), *Handbook of physiology*, 4 (New York: Springer-Verlag, 1970) 342-366. (8) *Note that the place of publication, publisher, and year of publication are enclosed in brackets. Editor of book is listed before book title.*

Theses:

[5] D.S. Chan, *Theory and implementation of multidimensional discrete systems for signal processing*, doctoral diss., Massachusetts Institute of Technology, Cambridge, MA, 1978. (8) *Note that thesis title is set in italics and the university that granted the degree is listed along with location information*

Proceedings Papers:

[6] W.J. Book, Modelling design and control of flexible manipulator arms: A tutorial review, *Proc. 29th IEEE Conf. on Decision and Control*, San Francisco, CA, 1990, 500-506 (8)