International Journal of Scientific Engineering and Technology (ISSN : 2277-1581)
Volume No.3 Issue No.9, pp : 1129 -1131 1 Sep 2014

Scada Based Power Control System Using PLC

[1]Mrs Bhavna Pancholi, [2]Damor Mehul Manubhai
Department of Electrical,M.S.University,Baroda, India.
Corresponding Email: [1]bhavna.pancholi@gmail.com, [2]mhldmr@yahoo.com

Abstract— ***SCADA is the acronym for "Supervisory Control and Data Acquisition." SCADA systems are widely used in industry for supervisory control and data acquisition of industrial processes. The system is based on PLC and configuration software, and the SCADA power distribution monitoring system is designed. The system uses PLC to collect various intelligent instruments on site and electrical parameters of devices. They will be uploaded to the monitoring system by the switch through the SCADA.***

The objective of this project is to make simple and power saving system which will provide all facility needed by user and they can overcom
e some common problem with this system. Now a day only industries are use the PLC and SCADA system so we are trying to show here commercial buildings can also use this system and save power and get facilities using this system.

In this project we are trying to make one simple model which helps the user to at a very ease. For all we are attempting to make the power management model for the almost comfort and maximum facilities to the user.

1.1 INTRODUCTION

Using powerful technologies, based on experience of qualified personal, SCADA (Supervisory Control And Data Acquisition) applications are created as a main tool for performing management, required by technical reengineering of an industrial company. In modern manufacturing and industrial processes, mining industries, public and private utilities, leisure and security industries, control systems are often needed to connect equipment and systems separated by large distances. These systems are used to send commands, programs and receive monitoring information from these remote locations. SCADA refers to the combination of control systems and data acquisition. In the early days of data acquisition, relay logic was used to control production and plant systems. With the advent of the CPU (Central Process Unit) and other intelligent electronic devices, manufacturers incorporated digital electronics into relay logic equipment. The PLC (Programmable Logic Controller) is still one of the most widely used control systems in industry.

1.2 WHY SCADA?

SCADA provides several unique features that make it a particularly good choice for many control problems. The features are as follows:

- The computer control primary equipment, record an store a very large amount of data from process
- the operator can incorporate real data simulations into the system
- the operator is assist by computer that recommend actions to keep the system safety
- Many types of data can be collected from the RTUs (Remote Terminal Unit), this creates online the image of the system.

1.3 POTENTIAL BENEFITS OF SCADA

The benefits one can expect from adopting a SCADA system for the control of experimental physics facilities can be summarized as follows:

- A rich functionality and extensive development facilities. The amount of effort invested in SCADA product amounts to 50 to 100 p-years!
- The amount of specific development that needs to be performed by the end-user is limited, especially with suitable engineering.
- Reliability and robustness. These systems are used for mission critical industrial processes where reliability and performance are paramount. In addition, specific development is performed within a well-established framework that enhances reliability and robustness.
- Technical support and maintenance by the vendor.

For large collaborations, as using a SCADA system for their controls ensures a common framework not only for the development of the specific applications but also for operating the detectors. Operators experience the same" look and feel" whatever part of the experiment they control. However, this aspect also depends to a significant extent on proper engineering.

1.4 CONFIDENTIALITY

Generally, there are no mechanisms in SCADA to provide confidentiality of communications. If lower level protocols do not provide this confidentiality then SCADA transactions are communicated "in the clear" meaning that intercepted communications may be easily read.

1.5 AUTHENTICATION

Many SCADA systems give little regard to security, often lacking the memory and bandwidth for sophisticated password or authentication systems. As a result there is no mechanism to determine a system user's identity or what that user is authorized to access. This allows for the injection of false requests or replies into the SCADA system.

1.6 PLC INTRODUCTION

A *programmable logic controller* (PLC) is a special form of microprocessor-based controller that uses a programmable memory to store instructions and to implement functions such as logic, sequencing, timing, counting and arithmetic in order to control machines and processes and are designed to be operated by engineers with perhaps a limited knowledge of computers and computing languages. They are not designed so that only computer programmers can set up or change the programs. Thus, the designers of the PLC have pre-programmed it so that the control program can be entered using a simple, rather intuitive, form of language, The term *logic* is used because programming is primarily concerned with implementing logic and switching operations.

1.6.1 What is PLC?

PLC is Programmable Logic Controller.

PLC is Device which control output equipment like motor, cooler, Geyser and lights etc. according to defined condition and received inputs.
PLC System is Combination of Various Component.
1. PLC Modules
2. Input Equipment
3. Output Equipment
4. Communication Equipment
5. Measuring Equipment
6. Feedback Equipment

II. MATERIAL AND METHODOLOGY

2.1 SYSTEM BLOCK DIAGRAM

As shown in figure it's the working model of the system. Different objectives are shown and briefly described below. Using plc and scada how we can power control of the entire system that we can see here.

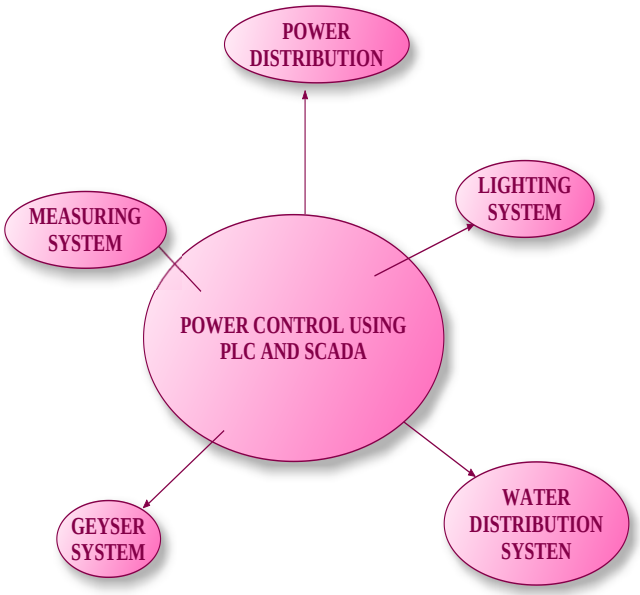


Figure 2.1: Working model of the system

2.2 DESCRIPTION OF DIFFERENT BLOCKS

2.2.1 Power Distribution and DG System

Single Phase Preventer and Proximity Sensor this two are main input Components.
(1) Single Phase Preventer
Single phase Preventer check either the available power is ok or not and if it is ok then it gives
Signal to PLC that power is ok.it checks mainly three things
1) The all three phase are available
2) They are not under voltage
3) They are not over voltage
make sure that overvoltage and under voltage setting is adjustable according to our requirements
1) Proximity Sensor
This Proximity sensor are 24 VDC operated when we put some metal against it, it will show LED Indication in behind side and transfer that voltage Back to PLC. We are using this proxy in Getting the changeover movement is properly done or not. as described in figure.

2.2.2 Water Distribution

Flotty and Motor Contactor are main two Components for Input for the Water Distribution.
1) Flotty
Flotty is a Cold Contact Equipment in which we are giving a 24V contact and When the Flotty is raised through water level it gives a feedback as a 24 V and we are using that for Indicator and Water Level indication to PLC.
2) Motor Contactor
We are Using NO Contact of contactor Block When Block Start We get NO contact of 24 V Which We are giving from PLC and in Star Delta Starter We are using Hold block NO Contact for the signal.

2.2.3 Lighting

For Lighting we are using two components Photo cell and timings from PLC.
1) Photocell
Photocell is devices which sense the sun light and gives a signal of 230 V to PLC when it Get a Proper sunlight, we have mounted two Photocell over the Yagnapurush Powerhouse and getting input for PLC and according to that our areas light starts and stop.
2) Timings
We have provided timings according to our requirements in the PLC according to that the lights get on and off.

2.2.4 Water and Geyser

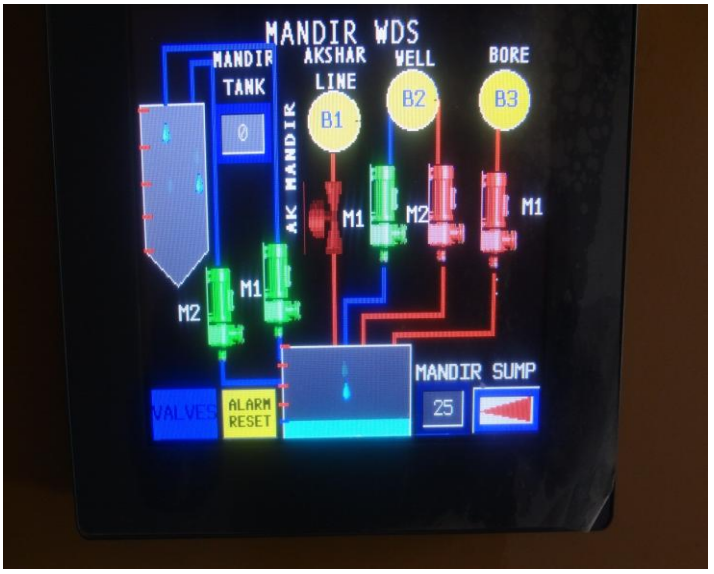
Water and Geyser only based on timings.
We have provided timings according to our requirements in the PLC according to that the Cooler and Geyser gets on and off.

2.2.5 Measuring System

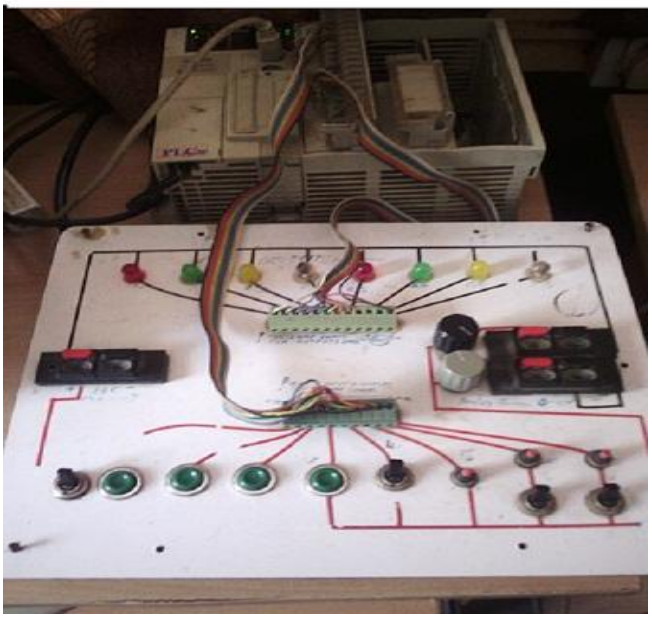
All the voltage, power and current can measure using measuring system. All day record of system we can see using this system

III. Results and Tables

No.	Module	Total	Spare	Damage	used
1	Input	24	0	1	23
2	Output	16	8	0	8



OHT Motor will fill water in the tank till Sump level is 25% and again start when the Overhead Tank Level is less than 100% and thro water till sump level is reach to 25%.



As shown in figure PLC and simulation kit is used for test and results for whole program.

IV. Conclusion

This project is really learning experience for us. We learn step by step approach to design SCADA and PLC based system. How to solve every problem by own is great experience. Our guide introduces us to actual business environment.

We done some experiments with our project and results are quite satisfactory and reliable. Using PLC and SCAD our working model save power and give 24 hour power supply facilities and give conveniences to user. We can easily manage large area using this system and fast maintenance provide.

Improvement in this project will make it less expensive if cost of plc and scada can maintain. This system will really become very good system for commercial building and where more power is used. This system is not only for industries but other users also use and save power using this system.

Acknowledgement

First and foremost extremely thankful to GOD Swami Narayan and my Guru H.D.H Pramukh Swami Maharaj for giving bless for this project.

This project "SCADA based power control system using PLC" is a united effort by team comprising of many people. Initially the project looks very large but as we progressed ahead the expert help I got from various people made it possible to make it working.

I am obliged to Assistant Prof. Mrs Bhavna Pancholi for her continuous support and guidance. Her understanding towards difficulties I faced and the right approach to come out of problems.

I am thankful to my external guide Mr kishor Parmar Active automation system for him guidance and support throughout the year. His support and encouragements made the project into a successfully model with an appealing concept of current system.

I would like to thank Prof.S.K.Joshi, Professor and HOD, Department of electrical engineering, Faculty of technology and engineering, The M S University of Baroda for providing us the necessary facilities. Also I express my gratitude to all staff members of Department of Electrical Engineering.

I am thankful to prolific automation system ltd. Staff they give me good support and give me hardware of PLC kit so I can easily explain my project.

I am thankful to my classmates, friends and my family members for supporting the year to complete the project in time. Mehul Damor

References

i. *W Yunna "Power supply enterprise project management organization-oriented system design",E-Bussines and Government(ICEE),2010Internationalconference*

ii. *Higgins n, Nair N C " Distributed Power System Automation with intelligent control " syastem,Man and cybernetics, Part C, Application and Reviews, IEEE Transactions on Volume 41, Issue:1*

iii. *Noorbakhsh M,"Design and PLC based implementation of supervisory control system" shahid abbaspour Univ. of Techno, Teharan*

iv. *Prof. Anubha Panchal, Ketakee Dagade, Shubhangi Tamhane, Kiran Pawar, Pradnya Ghadge" Automated Water Supply System and Water Theft identification Using PLC and SCADA" Ketakee Dagade et al Int. Journal of Engineering Research and Applications ISSN : 2248-9622, Vol. 4, Issue (Version 6), April 2014, pp.67-69*

v. *Li Guohong ; Wei Xuejie "PLC-based SCADA system for oil storage and application, Electric Information and Control Engineering (ICEICE), 2011 International Conference, ISBN:978-1-4244-8036-4 INSPEC Accession Number:12072086, Conference Location: Wuhan DOI: IEEE*

vi. *Archana, Yadav "PLC & SCADA based automation of filter house, a section of Water Treatment Plant" Emerging Technology Trends in Electronics, Communication and Networking (ET2ECN), 2012 1st International Conference ISBN, Location: Surat, Gujarat, India, IEEE*

vii. *Kaukab Naz "GSM based Power management" Communication in computer and information science, Volume 168, 2011, pp. 449-462*

viii. *Papaginais G K "A PLC based energy consumption system" Power tech 2005 IEEE Rusia,*

ix. *Chen Y G, Coleman Y D, " Design and testing of multioutput 300 kv prototype inducation cell pulsed power supply for DARHT " Pulsed Power Conference, 1995. Digest of Technical Papers. Tenth IEEE International , Volume: 2*

x. *Qunging Yu,Wenhau liu "PLC-IPC based control system for high power cycle pump system in large scale thermal power plant" power system technology 2000,poercon 2012 International Conference volume 3, pp 1522-1524 IEEE*