BUILDING MANAGEMENT SYSTEM USING PLC AND SCADA

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ABSTRACT

Automation in buildings began long before recorded time, with the help of microprocessors. The use of dedicated software for safety and control applications began with the technological advancement in the field of PLC. With the advent of newer technologies, situations have turned around a lot and the need to view the live Process in a system, within a control has become essential. The technological advancements over the last decades have led to the combined use of PLC with SCADA. The Controlling unit in building management system automation is a PLC. Every device in an installation is connected to the PLC. When a user wants to interact with a system an operator terminal, which is attached to a cabinet where the PLC is installed, is used. With this solution the user needs to be in front of the cabinet to interact with the system.

A good automation has a several advantage to the human being. Nowadays,

KEYWORDS: Programmble logic controller (PLC) Supervisory Control and Data Acquisition (SCADA) Central processing unit (CPU), Programming unit (Software).

INTRODUCTION

At in attendance India is down more than 66,000 Crore rupees every year due to poor transmission and circulation system. If we could save 1% out of it will be a good profit to the power sector and also nature can be retained for some extent. Power generation in India we believe coal the busy lifestyle of the average countrymen has left little time for even basic activities. This fast paced lifestyle demands efficient handling of everyday situations. Automation can cause an impact to this fast paced lifestyle in very efficient way. Need for less manpower, and accurate processes are the features of a good automation. Everyone wants comfort and efficient life, addition of facility for higher power generation index approx 70% of the total power produced. Thermal power plants will be the major contributors in the power sectors for at least another few years. After few years the word coal will be in the paper only. This can extend by conservation. So essentially with less economy. In a building all the facility or services through the security (mankind) not possible everywhere. So removing the problems and the security facility in efficient the great news is there. Converting all the security in the automation is to entry in new life style proposing this having several advantages to the human beings. Present no one have the time; they want to finish their work as possible as. The machine facility has changed our life style, almost all the work has replace human to devices or machine.

Conservation of energy will be possible only when we conserve coal forever. To conservative coal, losses must be reduced, utility factors must be improved, a proper distribution monitoring system must be developed.

In the comfort way of human life styles in the buildingthere are many system has automated, with increase the almostall the facility to throughout all the machine with less economics introduces. Car parking facility, light control, water control proposedhere. Almost everywhere the parking problem is a big issuein the urban state. In this the parking facility has introduced, byautomated. Light control also the big issue, Less Consumption ofthe energy in the overall building as external light by automatedhas introduces. Keeping in the mind internal facility has alsoautomated, controlling water in buildings should be necessary.Keeping all the things in the mind all the system are introduces.
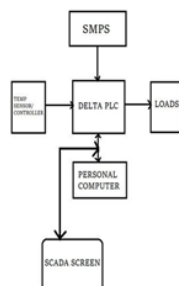
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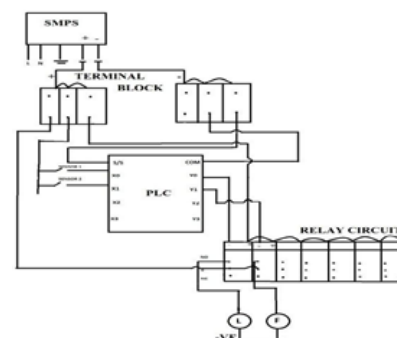

FIG. 2.1 BMS BLOCK DIAGRAM   **FIG. 3.1 WIRING DIAGRAM**

Switched mode power supply has an input voltage of about 230 v/ AC , it converts it into an output of 24v/ DC. SMPS only supplies a rated voltage. It contains bridge rectifier and step down transformer. Programmable logic controller (PLC) is control system using electronic operations. Delta's DVP series programmable logic controllers offer high-speed, stable and highly reliable applications in all kinds of industrial automation machines. In addition to fast logic operation, bountiful instructions and multiple function cards, the commercial DVP-PLC also supports various communication protocols, connecting Delta's AC motor drive, servo, and human machine interface and temperature controller through the industrial network in to a complete "Delta Solution" for all users.we used proximity sensor as input and output an showing loads for example (24v fan and 24v distillation light).we used personal computer to implement the programs required for DELTA PLC using WPL software.we used SCADA screen directly indicate and control the input and output in single screen.

CIRCUIT DESCRIPTION

Ladder logic is a programming language that represents a program by a graphical diagram based on the circuit diagrams of relay-based logic hardware.

In PLC there are two types of wiring depending upon the PLC program they are Sourcing and Sinking.

Input wiring: In plc the input wiring will either undergo sourcing or sinking..

Output wiring: In plc the output wiring consist of relay or transistor. The relay coil undergoes either sourcing or sinking so that it can be connected.

There are two types of transistors NPN transistor and PNP transistor. In NPN transistor the common is negative so the type of wiring used is sinking. In PNP transistor the common is negative so the type of wiring used is sourcing. Proximity sensor is used to detect metal targets approaching the sensor .Here we use this sensor as an assumption but we need to detect humans. Multiple input and output lines are connected together to give an input to PLC. Relay card can be used in several ways Stand alone cord, addressed by switches or open collector output or remote control through RS232.Since the card can be addressed by using RS232 commands you may write custom applications in any programming language on any platform. The relay card connected to 24v fan and 24v distillation light.

Features: Separate relay on/off test with moment or toggle function. Address selection up to 255 cords can be selected.

RESULT AND SIMULATION

In this chapter, the ladder program is designed by using PLC to create programs required for building management system to control everything automatically. The software used here is Delta WPL Software (PLC ladder programming). The Delta software is used to design coding and SCADA is used to control and analyze the program. In building management system there are totally two inputs and three outputs. Here we use proximity sensors and RTD as input, which sense persons entering the room. In order to show the output we require two lights and a fan. The ladder program is entered with a proper condition which is given below,When a person enters the room proximity sensor switches and hence any one of the light and fan turns ON.

      FIG. 4.1 Delta WPL soft screen 1   **FIG. 4.2 Delta WPL soft screen 2**

Each rung of ladder language typically has one coil at the far right. Some manufacturers may allow more than one output coil on a rung.

( ) - Regular coil. It is energized whenever its rung is closed.

(\\) - "Not" coil. It is energized whenever its rung is open.

[ ] - Regular contact. It is closed whenever its corresponding coil or an input which controls it is energized.

[\\\] - "Not" contact. It is open whenever its corresponding coil or an input which controls it is energized.

The ladder program is entered with a proper condition which is given below, When a person enters the room proximity sensor switches and hence any one of the light and fan turns ON.
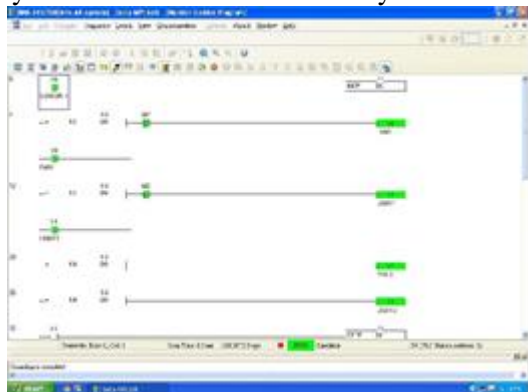

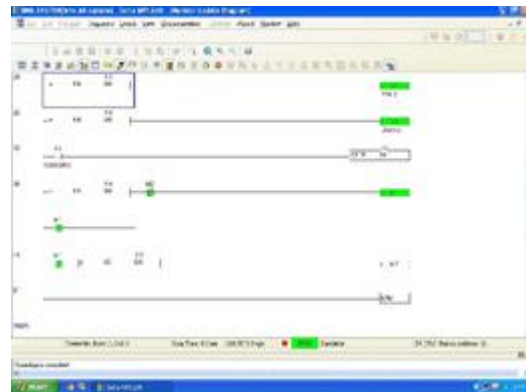FIG. 4.3 Delta WPL soft output 1   FIG. 4.4 Delta WPL soft output 2

After that when fifth person enters the room another sensor switches and hence another light and fan turns ON. In a similar way when the fourth person gets out of the room sensor turns off and therefore output turns off. After that when there is no one in room every device turns off.

CONCLUSION

There are various technologies available nowadays that can help reduce energy consumption and cost of existing buildings The project "Building Management System using PLC AND SCADA" has the both advantages of SCADA & PLC. PLC is used for automation and SCADA for control and monitoring. This project ensures less Maintenance and reduces risk factor and also increases the efficiency. Occupants can install a BMS to automate building functions such as maintaining the temperature which can obviously reduce the cost of operating the building.BMS have already been implemented in the world, such as Federal Ministry of Finance Building in Berlin, Beijing Bank Headquarters Office Building, Yang and Yamazaki Environment and energy building (Y2E2), etc. However other smart technologies have been to develop for huge energy saving and carbon neutral building.Now a day's PLC and SCADA plays the important role in Industrial automation devices. In our project we had utilized the Application of PLC and SCADA effectively.

ADVANTAGES

- Reduce Energy cost
- Reduce Maintenance cost
- Easy to handling
- Reduce Human power
- Easy to correct errors

APPLICATION

- Industries like car manufacturing, Chemical industries etc.
- Buildings like Malls,Hospitals
- Power plants like Thermal power plant,Nuclear power plant etc.

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