

PLC And SCADA Based Load Security System

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Abstract - Now days there are various electronic equipments available for remote operation of power distribution system control. However, the main disadvantage of these systems is that they can be Operated only from short ranges and also less reliable. Thus, to overcome the above drawbacks, we are using SCADA system. "PLC and SCADA Based Power Distribution Monitoring" the name itself says that the electrical parameters (voltage, current and power factor) can be monitored in Computer (PC) by using SCADA Software. In this paper the PLC works as a mediator between L.T. power distribution and PC at second level. PLC will collect data related to electrical power and build a link with the consumer side i.e. the Windows OS based PC then it gives the continuous power monitoring according to the used load on SCADA. [1]

Keywords - Programmable Logic controller (PLC), RS-232 Port, Voltage Controller, supervisory control and data acquisition system (SCADA), Relay Card, Load(Lamp), Potentiometer, SMPS

I. INTRODUCTION

Automation is basically the delegation of human control function to technical equipment. It uses controlled systems such as computers, PLCs, Microcontrollers to control machinery and processes to reduce the necessity of human involvement and mental requirements. Different types of controllers can be used to operate and control the equipment such as machinery, processes in factories, heat treating ovens, load control of industry, boilers, and other applications with minimal or reduced human intervention. Most of the automation has been existing in industries from decades. But the shift for automation in home and apartments has popped in very recently. One can employ this kind of a system which enables an individual to supervise devices such as Lighting, Heating and ventilation, water pumping, gardening system, Overhead water flow control remotely or from any centralized location. Automatic systems are being preferred over manual system because they reduce individual's effort. Similarly talking about industry automation, by use of PLCs everything seems to be more accurate, reliable and more efficient than the existing controllers. RS VIEW32 SCADA software is a powerful SCADA for industrial automation, process control and supervisory monitoring.

PLC has following programming languages.

- Ladder Diagram (LD)
- Sequential Function Charts (SFC)
- Function Block Diagram (FBD)
- Structured Text (ST)
- Instruction List (IL)

From above languages we are using ladder language for our project because it is much easier than all other languages.

In this project we are using relay board for supply to load and PLC for controlling the load of particular system. SCADA is used for visualization and automatic control. [2]

II. SYSTEM OVERVIEW

In this project PLC and PC are connected with rs-232 port. By help of this port programming of PLC is done .SMPS is used for converting 230v to 24v. Cause PLC is work on 24v. Then the programming of controlling the load is done. Load is connected via relay card and controlled by programming. We can change working of project by make changes in controlling programming.

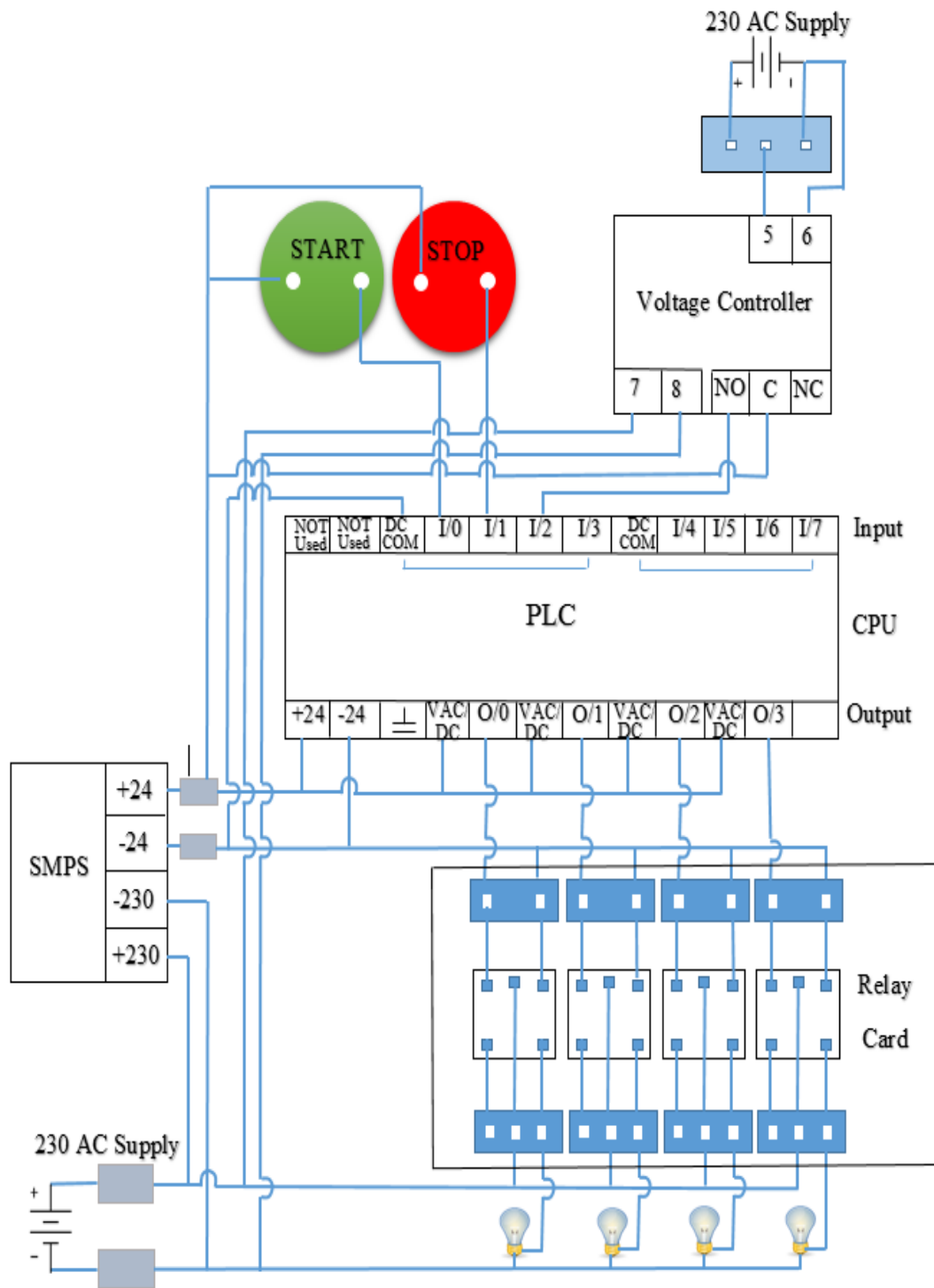


Figure 1. Block diagram of Load Security System

III. HARDWARE

1. MicroLogix 1100 Programmable Logic Controller. 2. Voltage Controller

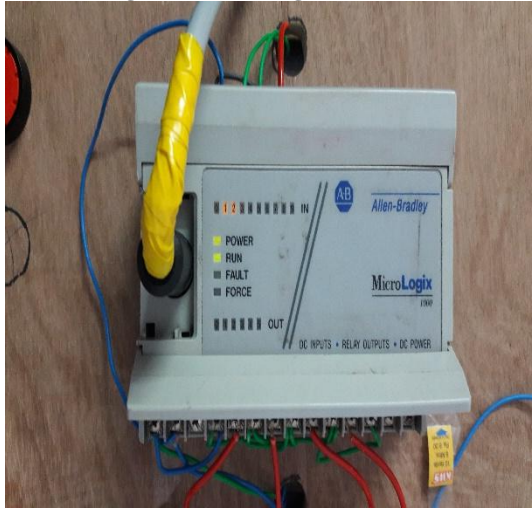


Figure 2: MicroLogix 1100 PLC Figure 3: Voltage Controller

IV. IMPLEMENTATION & RESULTS

The supply is given to SMPS for converting the 230v to 24v. then 24v is given at input terminal of PLC. PLC has main three parts.

1. Input
2. C.P.U
3. Output

Programmer of PLC is stored into C.P.U all the PLC have the ratio of input and output is 60% and 40%. 2 push button and Voltage Controller is connected at input terminal of PLC. Relay card and loads are connected at output terminal of PLC.

When we start the system the load is connected through relay (24V DC) card. as load (230 V A C) increase and reach at Set point of Voltage Controller. Voltage Controller gives signal to PLC and PLC is cut the load with the help of programming.

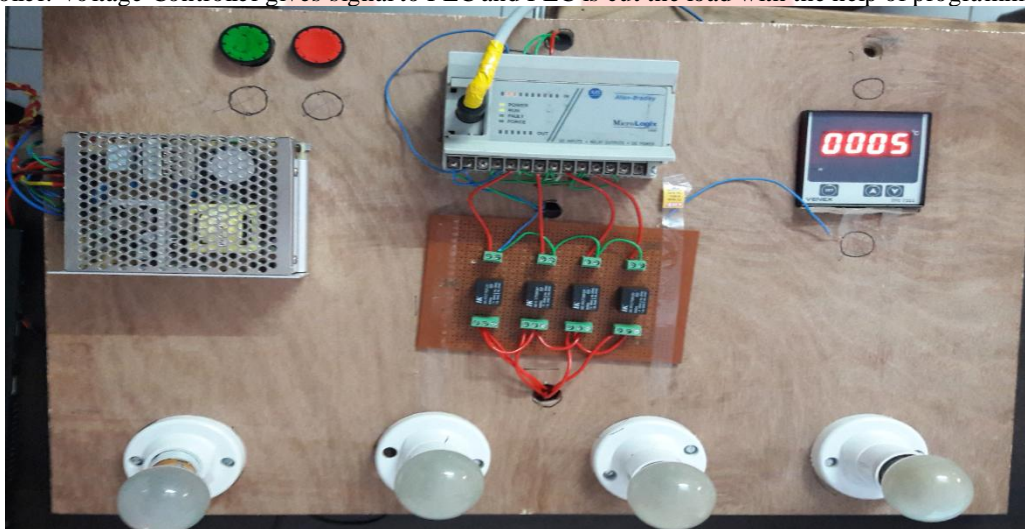


Figure 4: Project Hardware

V. PROGRAMMING

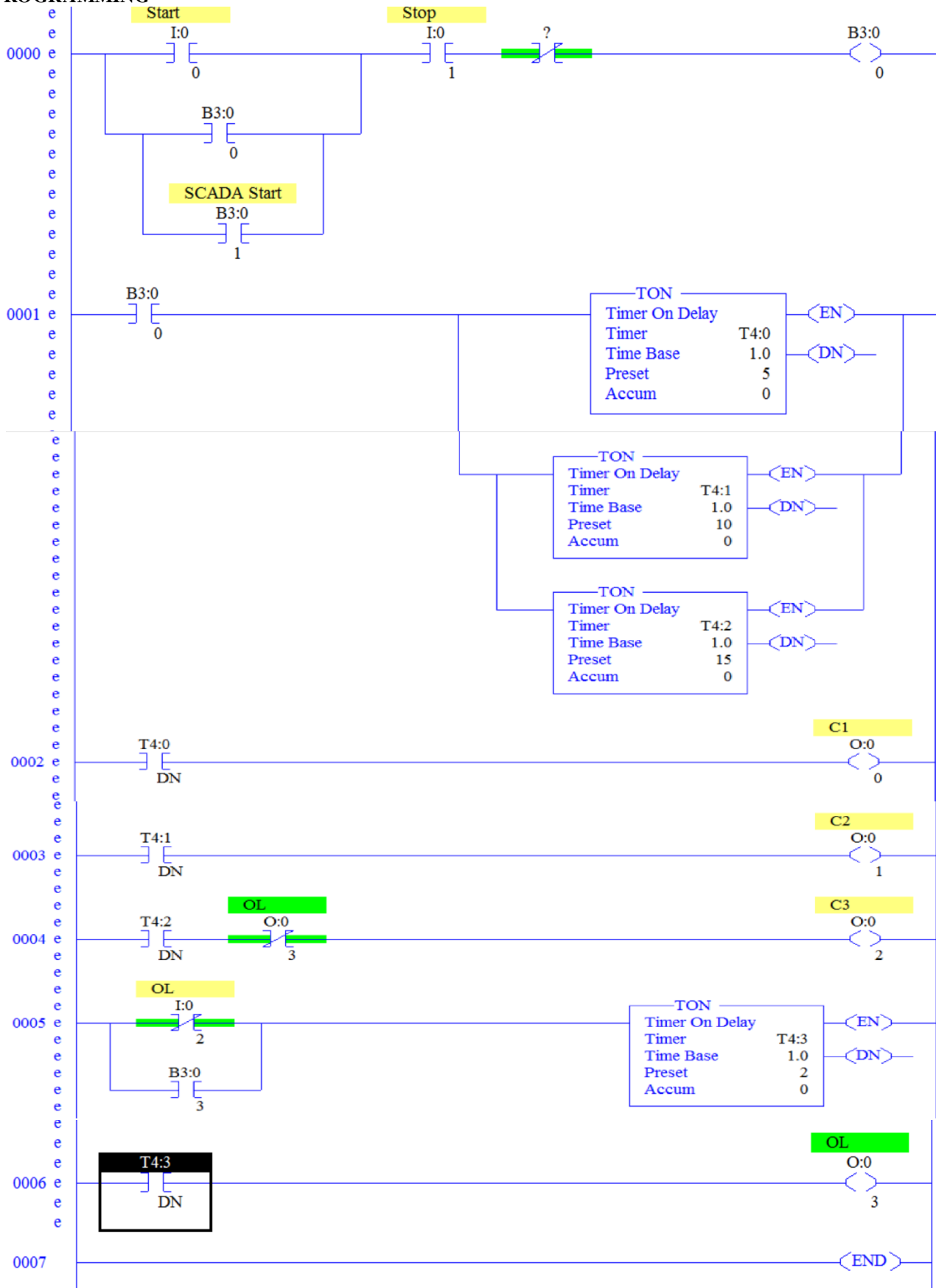


Figure 4:PLC Programming

VI. CONCLUSION

PLC and SCADA System is used for monitoring the various electrical parameters (voltage, current, power factor etc.) By using these parameters, we can easily control any load in our system to improve system operation, system reliability, etc. alternatively, SCADA and PLC communication system make it possible to integrate protection control and monitoring electrical parameter for maximum benefit.

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