



# Automatic Control of Power Sources Using PLC

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**Abstract**— The power conversion system is basically used to effectively transfer power to a given load in building an automated application. the integration of the most important power supply with the solar power supply and the diesel generator power supply is a key element in the design of the power supply control gadget. This purpose introduces a real-time model design and the use of a deceptive automated gadget for the distribution of bulk power to the load applied by Programmable Logic Control (percent), Coal Crisis is one of India's largest power generation companies with the lowest level of coal production as the economy grows and fuels the demand for electricity. Frequent exhaustion does not work well and MSEB electricity bill also operates on an economical budget. Environment The impact of the sun is not working in winter and the rainy season due to lack of solar radiation and wind turbine not working in summer due to low winds.

**Keywords**— *Automatic, Solar Power, Diesel Generator, Power Supply, Programmable Logic Controller, Grid Supply, Solar Plates, Wind turbine, Battery.*

## I. INTRODUCTION

Failure of power or end of a major problem regarding the continuity of supply industries, factories with strong failures are not green. The construction of a motor vehicle replacement system is being extensively completed to reduce the problems with manual replacement and the conditions required on pure change. This paper provides the structure

and construction of a car switch device using%, as a p.c switch function always returns power supply with usage help a copy of the generator repository when the mains deliver. This allows you to reduce the take-up time required to change performance. in this world of automated growth% has affected our thoughts. Control, monitoring, integration system and modern generation p.c can be a very raw device to automate. As p.c it can produce a rough type after which it has the ability to withstand any vibration, temperature, humidity and noise. In the industry a lot of sensible and important people are controlled with p.c. Percentage automation has one advantage over its pure programming language and which can be understood without difficulty in the human way. Percentage management and control are not required knowledge, as a regular employee and can do without difficulty failing to tighten or extinguish the problem system in terms of continued industrial delivery, factories with strong failures often do not work well. The design of the car switch gadget is done directly reducing the hassle of manual switching in line with the challenges in easy change. This paper introduces the design and creation of the automotive switcher application percentage, because the switch function is completed using% automatically returns power is delivered with the help of a backup copy while the main pipelines deliver. This helps to reduce time required to change performance. in this world of automated growth% has affected us thoughts. By control, monitoring, device

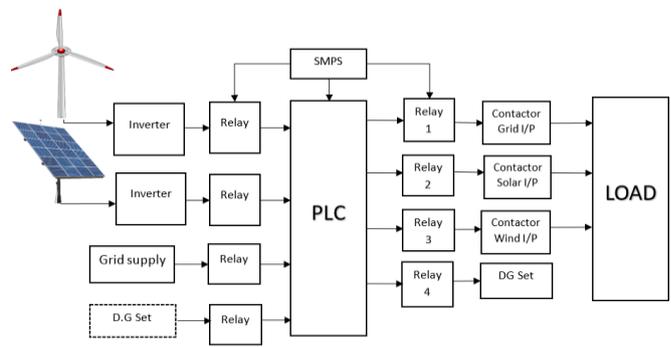
integration and the latest percentage of technology can be very raw automation tool. As% has strong production for this reason it has the ability to withstand any situation such as vibration, temperature, humidity and noise. In the industry high-level real and important responsibilities managed by%. Percentage automation has one advantage over its smooth layout language that can be understood without difficulty with the help of staff. Dealing with percentage control is there is no need for information, as the average employee can work hard Encourage.

**A. System Design.**

This automated power supply control system works on the automatic operation of switching load on load another source available without wasting time or extinguishing the load. Here's a demonstration aims to use the keys of choice to turn off any source of supply. In this program, PLC microcontroller which is the most important part of this system always, keep hearing the whole available resources. If any source is turned off with select keys then PLC switches load on another supply source by providing a signal to the transmission driver and then the relay driver switching in the appropriate upload. All work is done by PLC in a few seconds and this has changed the time can be changed during the configuration of the PLC microcontroller. Here 3 loads are used connected in line with the load and 3 sources of goods are also connected in line these loading cables. These upload slides include generally open and close and active contacts by relay driver. We tested this program by connecting the Led light to the exit side as load if any disturbance occurs during the turn on the light flashes but here no blinking occurs during the conversion means no disturbance to provide power to the exit side.

**B. Block Daigram.**

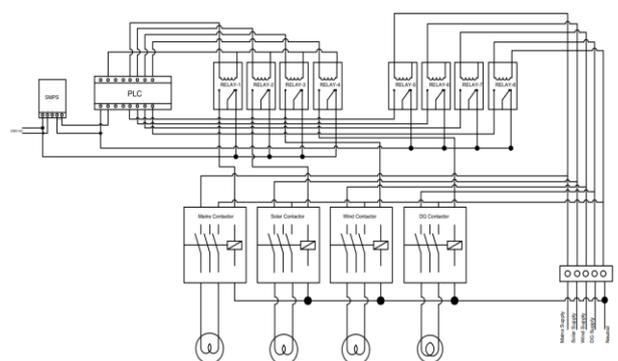
In this project we explain the construction and working or hardware implementation with the block diagram of the whole Automatic control system. Because of this way we easily go for the hardware implementation of system. With the help of block diagram & Ladder diagram we easily conclude requirement of the components for the project of Automatic power control system and also we predict the cost of these components which are used to build this system.



**C. Description of block diagram**

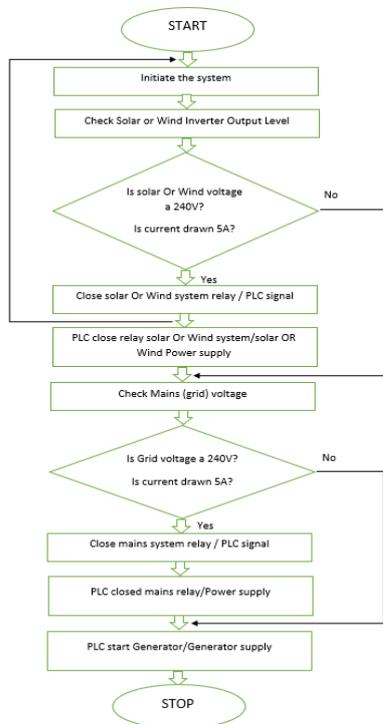
This auto power supply control system works on the principle of auto function for switch over the load to other available source without wasting any time or switch off the load. Here for the demonstration purposes, we have used the selection keys for switch off any source of supply. In this system, the PLC microcontroller which is very essential component of this system always, keep sensing the whole available sources. When any source is switched off through the selection keys then the PLC shifted the load to the other supply source by giving the signal to the relay driver then the relay driver switched on the appropriate load relay. The whole function is done by the PLC is micro seconds and this shifted time can be changed during the programming of PLC microcontroller. Here 3 load relays are used which are connected in parallel with load and 3 sources of supplies are also connected in parallel with these load relays. These load relays consist of NORMALLY OPEN and close contacts and are operated through the relay driver. We have checked this system by connecting the Led lamp at output side as a load when any interruption is taking place during the shifted time then the lamp is blinking but here there is no any blinking take place during the shifted time means there is no any interruption in supplying the power at output side.

**D. Circuit Daigram.**



To construct a solar panel, one requires several solar cells made of doped silicon as has been discussed before. These cells are connected in series to add up the resultant current. This gives strips of clustered cells called a module. A single module could be constructed into a solar panel or combined with others in cases where a large panel is required.

### E. Flow Chart



### Proposed System

#### Hardware

- ✧ Solar Plate
- ✧ PLC
- ✧ SMPS
- ✧ Relay
- ✧ Contractor
- ✧ Inverter

#### Solar Plate

A standard solar panel consists of a layer of silicon cells, a metal frame, a glass casing and various wiring to allow current to flow from the silicon cells. Silicon (atomic 14 on the periodic table) is a nonmetal with conductive properties that allow it to absorb and convert sunlight into electricity. When light interacts with a silicon cell, it causes electrons to be set into motion, which initiates a flow of electric current. This is known as the “photovoltaic effect,” and it describes the general functionality of solar panel technology

#### PROGRAMMABLE LOGIC CONTROLLER:

(PLC) is an industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices. Almost any production line, machine function, or process can be greatly enhanced using this type of control system. However, the biggest benefit in using a PLC is the ability to change and replicate the operation or process while collecting and communicating vital information. Another advantage of a PLC system is that it is modular. That is, you can mix and match the types of Input and Output devices to best suit your application.

#### SMPS:

A switched-mode power supply (SMPS) is an electronic circuit that converts power using switching devices that are turned on and off at high frequencies, and storage components such as inductors or capacitors to supply power when the switching device is in its non-conduction state.

Switching power supplies have high efficiency and are widely used in a variety of electronic equipment, including computers and other sensitive equipment requiring stable and efficient power supply. A switched-mode power supply is also known as a switch-mode power supply or switching-mode power supply.

#### Relays

are electric switches that use electromagnetism to convert small electrical stimuli into larger currents. These conversions occur when electrical inputs activate electromagnets to either form or break existing circuits

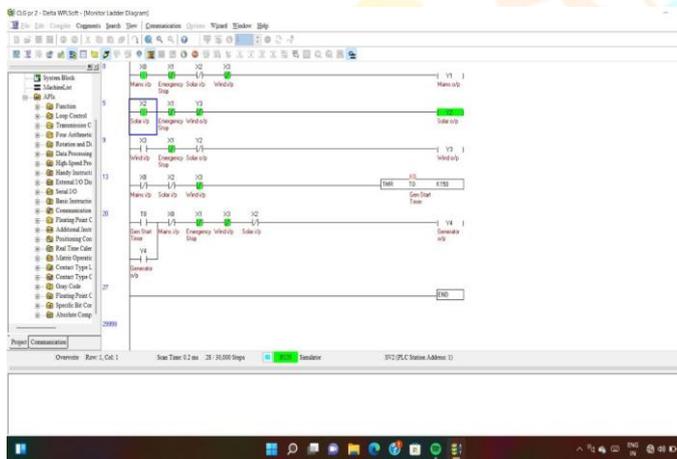
A switch is a component that opens (turn off) & close (turn on) an electrical circuit. whereas, a **relay is an electrical switch that control (switch on & off) a high voltage circuit using a low voltage source.** A relay completely isolates the low voltage circuit from the high voltage circuit.

## Contactor

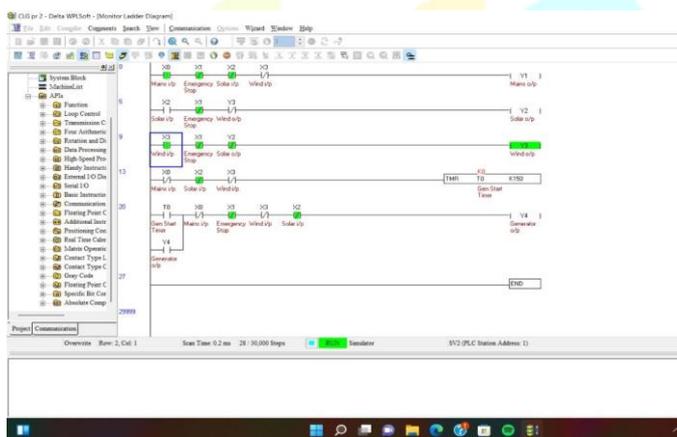
A contactor is an electrical device which is used for switching an electrical circuit on or off. It is considered to be a special type of relay. However, the basic difference between the relay and contactor is that the contactor is used in applications with higher current carrying capacity, whereas the relay is used for lower current applications. Contactors can be field mounted easily and are compact in size. Generally, these electrical devices feature multiple contacts. These contacts are in most cases normally open and provide operating power to the load when the contactor coil is energized. Contactors are most commonly used for controlling electric motors.

## Simulation result:

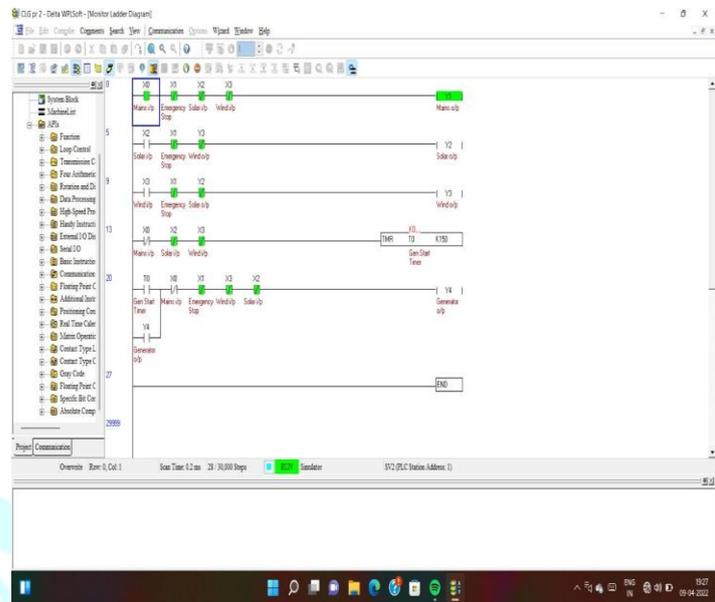
### Case:1



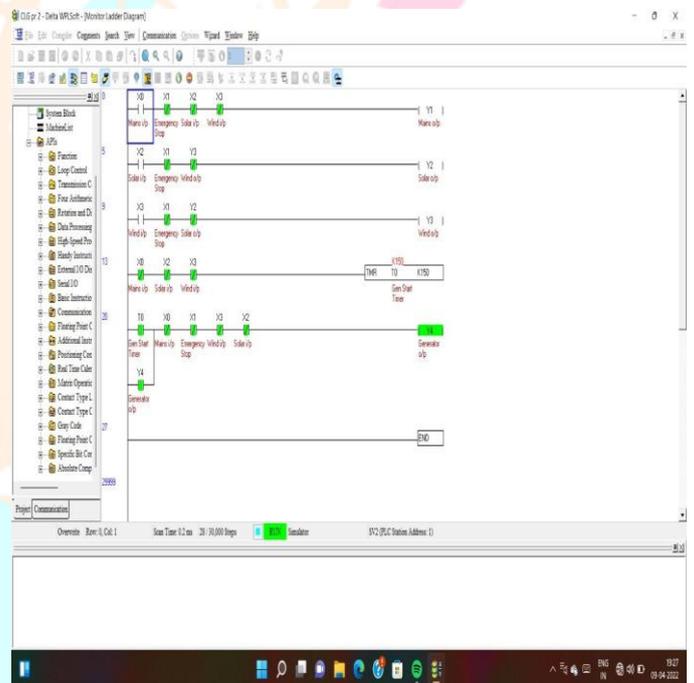
### Case 2:



### Case :3



### Case :4



## Simulation Result :

Case 1	Wind On	Solar Off	Grid Off	Gen Off
Case 2	Wind Off	Solar On	Grid Off	Gen Off
Case 3	Wind Off	Solar Off	Grid On	Gen Off
Case 4	Wind Off	Solar Off	Grid Off	Gen On

## Conclusions:

This project implements the real time prototype design and implementation of automatic control system for Solar, Wind ,Mains & Diesel Generator power distribution to the load

using Programmable Logic Controller(PLC).PLC is programmed using ladder diagram for intelligent switching of solar, wind, mains and diesel generator power supply units.It was found from the results of real time prototype hardware interfacing module that during switching control operations it provides uninterrupted electricity supply to given load.

The demand of energy worldwide grows rapidly, because energy generation is low but energy consumption is on a high rate. Electricity companies cannot satisfy the demand and must use nonconventional energy system. Use of renewable energy along with the non-conventional sources not only increases the reliability of the system but also allows higher power demands to be fed. Prioritizing the various available sources makes the selection and utilization economic. The priorities may be decided according to the availability of source, usage cost, its effects on the operation of other equipment (noise due to generators, smokes etc). The selection algorithm can be coded into an PLC which will automatically shift between different sources using relays through the relay driver. The project involves four different sources with different parameters to PLC to judge the selection of best available source to use. This work is use to provide a continuous power to the load through any of the sources from which we are operating the device i.e. main line, generator, inverter and solar automatically in the absence of any of the source. The complete operation is based on the PLC. This work is a low-cost, reliable, efficient system. The work can be further enhanced by using other sources like wind power also and then taking into consideration for using the best possible power source whose tariff remains lowest at that moment.

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