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Auto Power Supply Control Change Over From Different Sources

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ABSTRACT: The project is designed to automatically supply continuous power to a load through one of the four sources of supply that are: Solar, Thermal, Inverter, Hydro and Wind when any one of them become unavailable. Four switches are used for four respective sources. These are connected to a ArduinoATmega328p that provides input signals to it. Whenever a switch pressed it shows the absence of that particular source. A relay driver is used that receives Arduino generated output and switches that particular relay to provide continuous power supply. A lamp is used as a load for demonstration purpose which draws supply from main. When main fails to supply power, automatically next available source is used say inverter. If inverter fails, then the next source is used and so on. An LCD also used to display which source is being currently used for power supply. Therefore, this project provides an effective solution to provide an alternate power supply during frequent power cuts. In this project we use four switches to demonstrate the respective failure of the power supply. When any of the switches pressed, it shows the absence of the particular source, switches are connected to Arduino as input signals. The output of the Arduino is given to the relay driver IC, which switches appropriate relay to maintain uninterrupted power supply to the load. The output shall be observed using a lamp during power supply from mains initially. On failure of the main supply (which is actuated by pressing the appropriate switch) the load gets supply from the next available source, say inverter. If the inverter also fails, it switches over to the next available source and so on. The current status as to which source supplies the load is also displayed on LCD.

I.INTRODUCTION

Electricity is most needed in our day to day life. Now a day's electrical energy is generated by the conventional sources like coal, diesel, nuclear etc. and soon they will be exhausted and then we will need other alternatives to generate electricity. But we can extend the life of fossil fuels by managing our demands and using other sources to fulfill our need of electricity. There are many nonconventional energy sources like solar, wind etc. These non-conventional energy sources are costlier than the conventional sources so, completely replacing the use of conventional sources is not the best option. Not only we need to use both of the sources of electricity, we also need to prioritize the selection of sources prudently. The project is based on the idea that power demands will always increase and we need uninterrupted power supply. Since every source of electricity has its limitation as far as their availability is concerned. Microprocessor based programming is used to shift between different

II.EXISTINGSYSTEM

In the existing system, if the under voltage detected, the source change from main bus to DG set having the capacity of 750 kVA. Then the DG set compensates the under voltage. It takes 48 seconds to compensate the under voltage. For this while, DC oil pump and DC seal oil pump supplied with DC source of 1395 Ah. If the undervoltage occurs in slow transfer, it will cause a severe damage to the system. So, we have to ensure fast transfer (FT) to avoid such huge damage and loss. C.Nagarajan et al [6-8] has developed the DG set compensates the under voltage.

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III.PROPOSED SYSTEM

For a very long time, power outages, power interrupts and also unexpected routine power line maintenance is one of the major problems faced in industries, hospitals, offices, and homes whole over the world. For that case, this project provides an automatic operation of electrical power distribution systems; the rapid and reliable transfer of the system from one power source to another during specific events such as power outages, power interrupts, routine power line maintenance, to achieve the reliability of such systems [1-2].Electrical power supply is one of the primary essential needs of human life today, that is to say, without electrical power supply, most human works become stand still, postponed and even cancelled since most human actions are dependent on the electrical power supply. Furthermore, the need for power supply through access to electricity by the masses of the population of any country, both developed and developing countries is very important to the development of the economy of that particular country. In other words, the power sector plays an essential role in the socio-economic development of any country [3].Therefore, this project provides a practical solution to provide an alternative power supply or uninterrupted power supply in automated mode to the load during frequent power cuts or in cases where power cuts or power outages cannot be avoided.

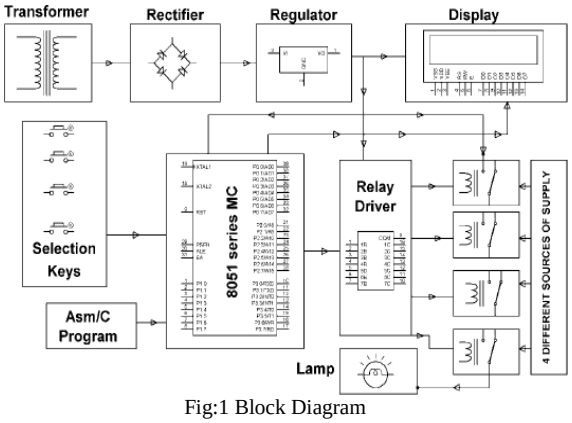

Fig:1 Block Diagram

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.

Fig:2 Controller

The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it- yourself kits. The project's board designs use a variety of microprocessors and controllers. These systems provide sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ("shields") and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. The microcontrollers are mainly programmed using a dialect of features from the programming languages C and C++.

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In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project. The Arduino project started in 2005 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy,[2] aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common

Fig:3 Experimental Model

examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors. The name Arduino comes from a bar in Ivrea, where some of the founders of the project used to meet. The bar was named after Arduino of Ivrea, who was the margrave of the March of Ivrea and King of Italy from 1002 to 10.

Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. Although the internal construction of the IC is somewhat different from that described for discrete voltage regulator circuits, the external operation is much the same. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage.A power supply can be built using a transformer connected to the ac supply line to step the ac voltage to desired amplitude, then rectifying that ac voltage, filtering with a capacitor and RC filter, if desired, and finally regulating the dc voltage using an IC regulator. The regulators can be selected for operation with load currents from hundreds of milli amperes to tens of amperes, corresponding to power ratings from mill watts to tens of watts.

A transformer is a static (or stationary) piece of which electric power in one circuit is transformed into electric power of the same frequency in another circuit. It can raise or lower the voltage in a circuit but with a corresponding decrease or increase in current. It works with the principle of mutual induction. In our project we are using step down transformer for providing a necessary supply for the electronic circuits. In our project we are using a 15-0- 15 center tapped transformer.

The DC level obtained from a sinusoidal input can be improved 100% using a process called full-wave rectification. It uses 4 diodes in a bridge configuration. From the basic bridge configuration we see that two diodes (say D2 & D3) are conducting while the other two diodes (D1 & D4) are in “off” state during the period t =0 to T/2. Accordingly for he negative of the input the conducting diodes are D1 & D4. Thus the polarity across the load is the same.

The filter circuit used here is the capacitor filter circuit where a capacitor is connected at the rectifier output, and a DC is obtained across it. The filtered waveform is essentially a DC voltage with negligible ripples, which is ultimately fed to the load.

IV.CONCLUSION

This project of Automatic Power Supply From Four Different Sources (Solar, Mains,Wind, and Thermal) USING A ARDUINO UNO is used to handle power supply from mains, solar, wind and thermal most effectively. The outline of the project is the selection of supply from mains, solar, wind and thermal automatically using microcontroller concept. The significance of this project lies in the various and wide places of applications such as; schools, hospitals, and most especially manufacturing industries and mining industries where continuous supply power is vital.

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