

Design and Construction of Three Phase Automatic Power Changeover Switch Using Microcontroller

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Abstract

Power failure or outage in general does not promote development to public and private sectors. This paper presents the design and construction of an automatic power change-over switch that switches Power supply from main supply to another standby supply and it does this automatically using microcontroller (Pic16f877A) this device eliminates the challenge of a manual change-over system. A voltage sensing circuits, relay, LCD, were all coordinated using a pic16f877A microcontroller. Also the advanced in this paper is prevention of single phasing.

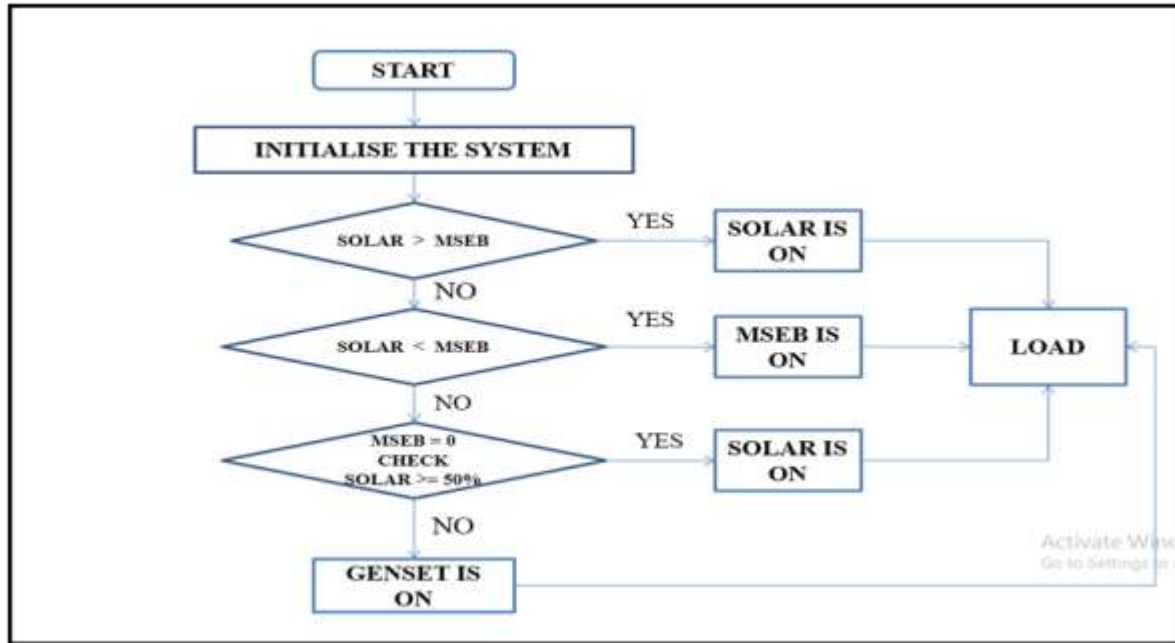
Keywords :- Microcontroller, Relays, LCD, Voltage sensor, Change-over, Standby supply.

Introduction :-

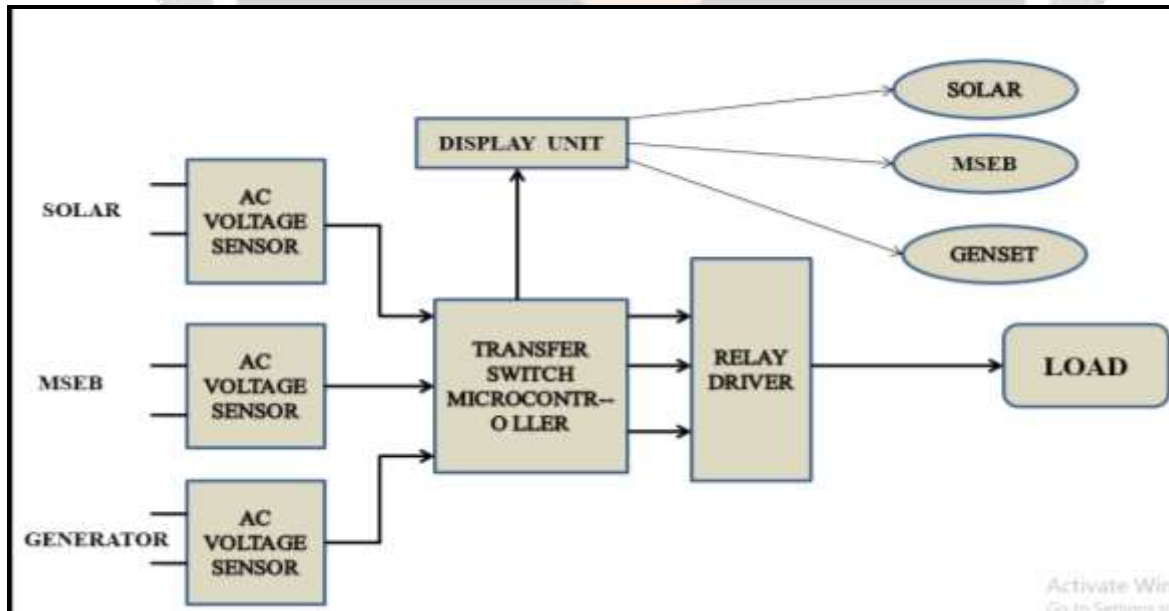
The power change-over switch is a device that detects when the electrical energy from the mains power supply is cut off and subsequently switching on the power generator. Basically it is aimed at switching on a more convenient power supply to the load. Since it switches on power to the load, precautions has to be taken while choosing the type of change-over switch, of power generator to supply electrical energy that would power their homes whenever the supply from the electricity company is cut off. A power change-over switch enables this transfer.

Power change-over switches can be operated manually in order words whenever there is power failure, an individual can shift a handheld lever that would open contact on the main power supply line and close contact on the power generator line. This process consumes time and puts such an operator at risk of electrical hazards.

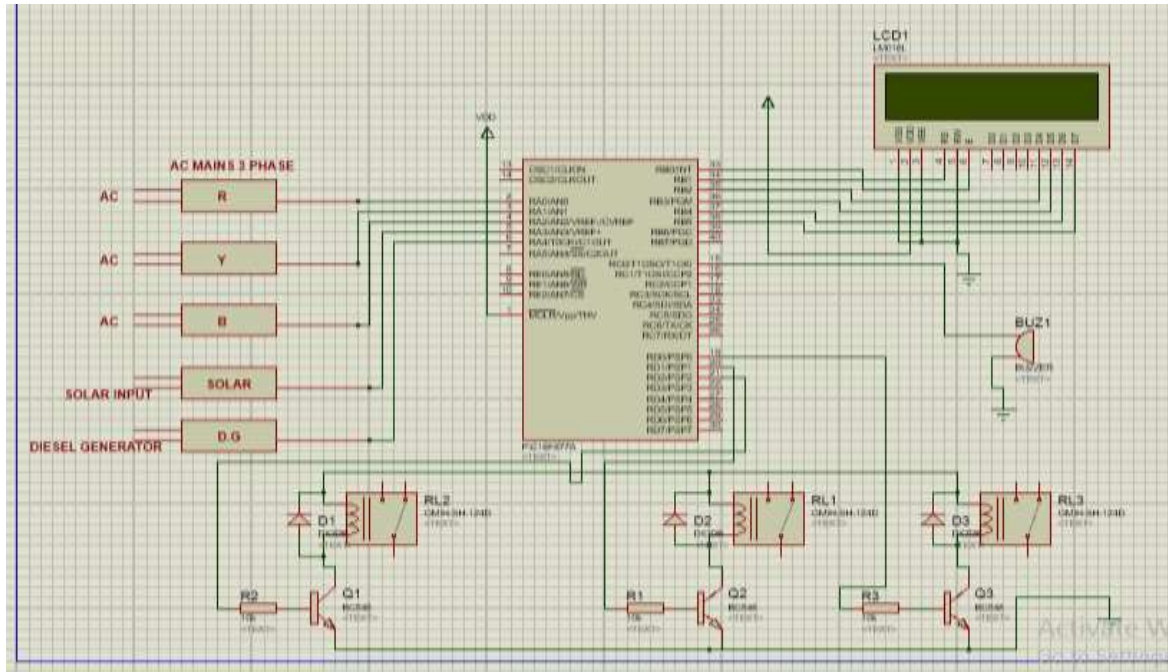
Flow-chart :



Block Diagram :



Circuit diagram and Mode of operations :



Hardware Components :-

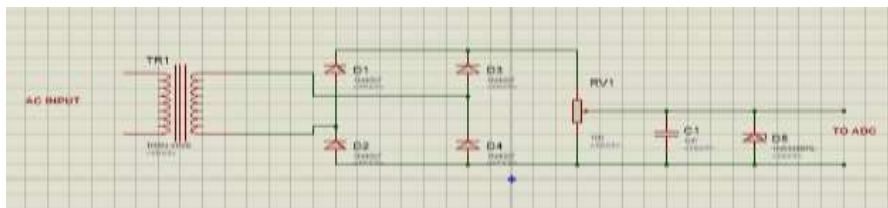
1. PIC 16f877A-

The pic16f877A microcontroller is one of the latest product from microchip. It has normally five input/output ports. It has fourteen ADC,10-bits resolutions channels for analogue to digital conversion. The PORTA is used for interfacing the analog voltage signal which is sense by voltage signal. The PORT B is used for LCD display. PORT C.0 is use to switch the buzzer PORT D is used for triggering the relay.

2. Relay :-

This is electromechanical switch used to transfer control between the power sources that is the mains power supply and the power generators . The SPDT relay has five terminals.

3. Voltage sensor :-



Voltage sensor measures AC voltage levels. They receive voltage inputs and provides output as analog voltage signals analog current levels.

4. IN4007:-

This anti spiking diode was connected in an opposite direction to the relay power pins, so as to always short out the back emf that may flow back to the transistor and hence cause damage.

5. PCB:-

A printed circuit board(PCB) of the unit was prepared so as to enable mass production, PAD2PAD software was used to design the pcb before it was pointed on the board and later etched, drilled and ready to use.

Reference:-

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