

Auto Phase Selector

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Abstract: This project is work on 3-phase supply. It is a auto-phase selector and phase changer. It is a provide turn on phase on the AC supply and other phase goes to the faulty condition in the system. The circuit is senses the three phase supply. It is a one phase is damage but output supply is continuously provided. It is a improve the continuity of power supply. In the circuit microcontroller, LCD, phase selector, transformer, electricity, relay are used.

Keywords: Phase Selector.

I. INTRODUCTION

Here we introduce the unit of auto phase selector. Whose select the active phase after the faulty condition. In industries machinery required three phase. But lighting load runs on single phase supply.

We can operate this in the both mode auto and manual. In manual mode we can select phase as we want and in auto mode phase selected automatically when faulty condition take place in phase. Auto phase selector is a device which is based on microcontroller and it select active phase from failed phase and maintain the continuity of the supply.

1.1 Objective

The objective of the auto phase selector is to ensure that there is continued commercial power supplied to the site at all time so as to ensure that the Base Transceiver Station (BTS) run on commercial power unit all available phase are either out of electrical tolerance or completely off. This system is microcontroller based system.

II. BLOCK DIAGRAM

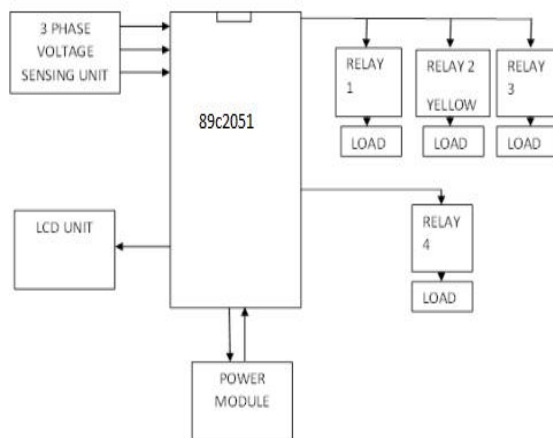


Fig.1 Block Diagram

2.1 Block Diagram Explanation

A. Three Phase Voltage Sensing Unit

As the name implies, this three phase voltage sensing unit sense the three phases from the public utility power supply unit. In other words, this represents the input unit of the system because the three phase ac power supply enters the circuit through this point. It consists mainly of the power supply and the sensing unit. It is at this stage that the three

phase supply voltage is converted from ac to dc before it is filtered.

The power supply stage consist of the three phase diode rectifier + Zener regulator and current limiting resistor that steps the voltage down 240V to 9V, the half wave rectifier which converts the 9V ac from the diode rectifier + Zener regulator output to 9V dc and the filter contains the electrolytic capacitor is used to filter the 9V pulsating dc to a pure 9V dc.

B. Processing Unit

The processing unit comprises of the ATMEL 89c2051 microcontroller unit which houses the programmed logic. The programmed logic in MCU operates by sensing the three different phase reduced filtered dc voltage (non pulsating dc) obtained with the help of voltage divider and processes the information.

C. LCD Display Unit

The LCD display unit displays the state of the resultant phase voltage switching and digital selection of the system. It comprises of a Liquid Crystal Display unit [LCD], 16 x 2 module which is interfaced with the microcontroller used to display the selected healthiest available phase to feed the load as it is processed.

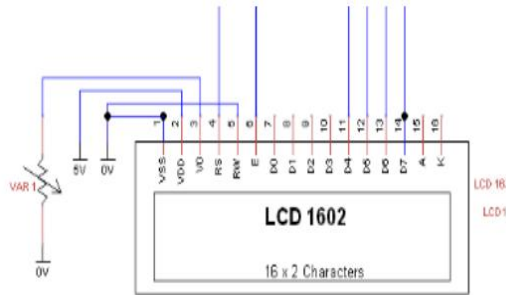


Fig. 2 LCD display

D. Switching Unit

This unit consist of drivers and actuators. The drivers are made up of transistors which operate to drive the relay. The switching units is in charge of the make and break contact of every electrical system. Relay as the active component and resistors, diode at the passive component. The incoming phase from the public utility supply are the connected to the respective relay terminals and the single phase output the load is also interface with the relay output.

E. ATMEL 89c2051 Microcontroller

A microcontroller is a small computer and microcontroller is a small and low-cost microcontroller. A microcontroller is a compact integrated circuit designed to govern a specific operation in an embedded system



Fig. 3 Microcontroller ATMEL 89c2051

F. Relay

Relays are switches that open and close circuits electromechanically or electronically. Relay are work on the one electrical circuit is open and another electrical circuit is closed.

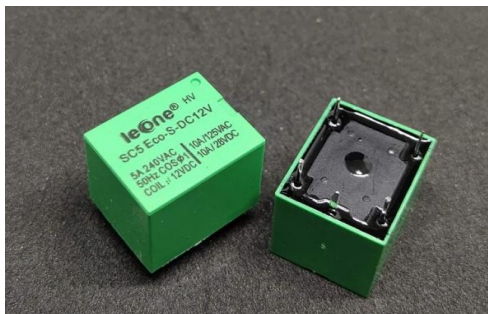


Fig.4 Relay SC5 Eco-S-DC12v

2.2 Circuit Diagram

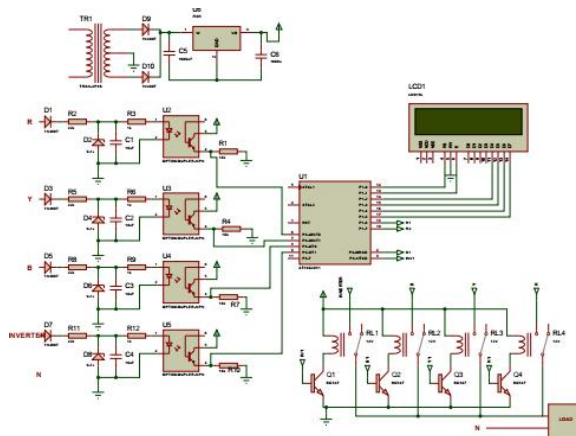


Fig. 5 Circuit diagram of auto-phase selector

A. Explanation of Circuit Diagram

The Automatic Phase Selector and Changeover circuit consist of three phase supply which are connected to each phase from the public utility supply. These phase voltage from 240V ac to 9V ac converted using half bridge rectifier circuit as shown circuit diagram, series current limit resistor of 22K connected and 9V Zener diode used to regulate the voltage to 9V. the pulsating voltage from rectifier is dc pulsating voltage is filtered with the presence of an electrolytic capacitor into a pure 9V dc. The 9V dc is further applied to trigger the optocoupler. When AC mains present the optocoupler switches to ON the results that output gets from upto is zero volt this is fed to microcontroller port pins. The AT89C2051 Microcontroller Unit for onward comparison and processing. The programmed logic resident in the ROM of the Micro controller unit does all the processing of the dc voltage and passes the signal for the phase with the healthiest available phase (most stable, safe and available).

A relay is used for switching the load and it is drive from BC547 CE based transistor as shown.

Advantages

1. Improve overall efficiency of power system in residential area.
2. Maintain continuity of power supply.
3. No manual error.
4. Reduced circuit size.

Application

- This project is used in
 - halls
 - libraries

- Operation unit
- Govt. office

III. RESULT

Which is given further to the voltage regulator and is also provided to 12v. Relay which work on DC supply. The operation start with converting the 230v, 50Hz, ac supply to 12v, 50Hz with using stepdown transformer. Than diodes are using to converting AC to DC supply. A filter capacitor is used to pure DC.

IV. CONCLUSION

This project will improve on the efficiency of power supply on the system. And continues provided flow of power. It is a economically viable and affordable when compared to its functions.

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