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Automatic Phase Selector

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Abstract

The utilization of electricity in every country shows the economic growth of country. So the continuity of supply is main factor to growth of country by using different alternative energy sources like solar, wind, diesel generation etc. Now today's residential and industrial supply mainly uses solar, DG, Utility supplies etc. so for switching between these phases required to utilizes available supply unit in proper manner. Automatic phase selector is a switching mechanism between phases on the basis of priority given to the phases by using Microcontroller.

Keywords: *Transformer, Bridge Rectifier, TRIAC, Microcontroller, PV panel, Inverter etc.*

INTRODUCTION

Most companies, industrial, commercial and even domestic are dependent on public power supply which has erratic supply such as phase failure, phase imbalances, etc. If all the three phases available, there is need for automatic phase change during phase failure in any of three phases in order to safe guard consumer appliances [1]. In most of the cases, many manufacturing companies whether they are domestic or industrial employ single phase equipment for its operation. Hence there is need for automatic phase switching system.

Industries require three phases power to run their machinery. Some of them require

continuous \ uninterrupted power to maintain their data. We introduce auto phase selector unit for those equipment whose supply is single phase. The single phase supply is selected automatically from three phases supply.

Auto Phase Selector introduces an automatic solution to overcome power fluctuation \ phase interruption by selecting next most healthy available phase to feed the equipment.

The project is designed to provide uninterrupted AC mains supply i.e., 230 volt to a single phase load. This is achieved by automatic changeover of the load from the missing phase to the next available phase in a 3 phase system. It is often noticed that power interruption in distribution system is about 70% for single phase faults while other two phases are in normal condition. Thus, in any commercial or domestic power supply system where 3 phase is available, it is advisable to have an automatic changeover system for uninterrupted power to critical loads in the event of missing phase.

BLOCK DIAGRAM

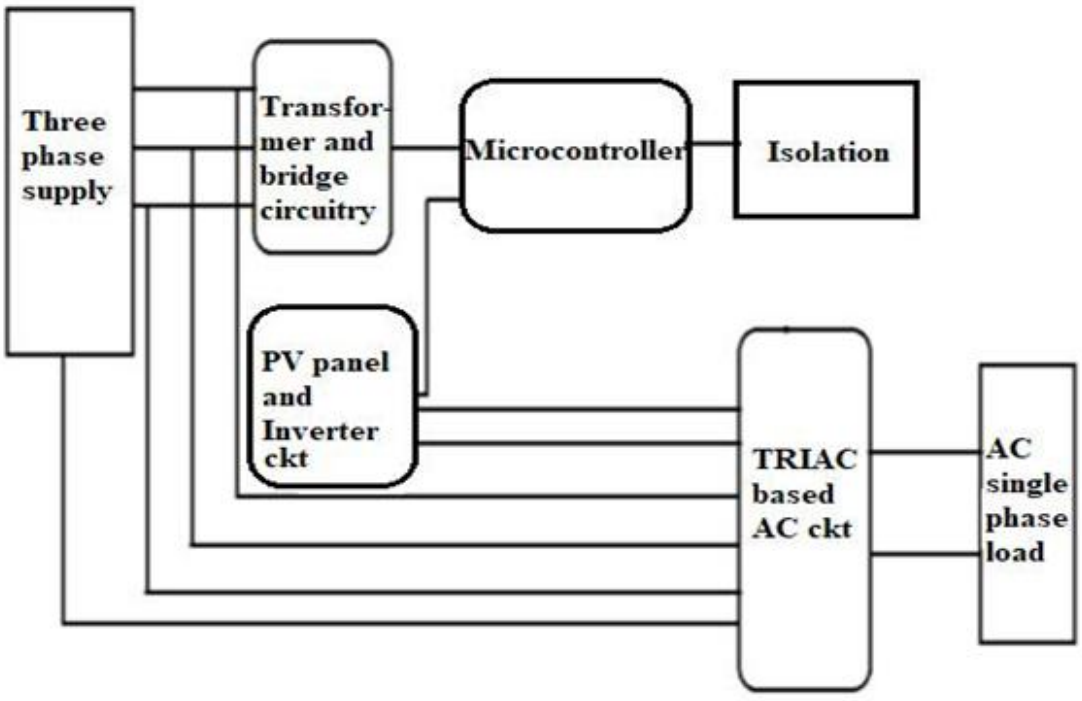

Fig -1: Block diagram of automatic phase selector

As shown in fig.1 blockdiagram of automatic phase selector for single phase application from three phase AC supply.

Basic configuration:

Some of the basic elements of a Automatic phase selector configurations:

- Transformer
- Bridge Rectifier
- Microcontroller
- TRIAC
- PV/DG Unit

Transformer:

Transformer is the main equipment used for step down the input voltage supply. here four number of transformers used connected in each phase of 3 phase incoming line and remaining one connected to PV/DG supply as a backup supply, rating of transformer is 230V to 9V.

Bridge Rectifier:

Bridge rectifier circuitry is used to convert input 9V AC supply from transformer into 5V DC supply which is required For Microcontroller operation.

Microcontroller:

Microcontroller is the main unit of model to control the all the operations of unit as per programming done within it.

TRIAC:

TRIAC is used for general AC switching operations.

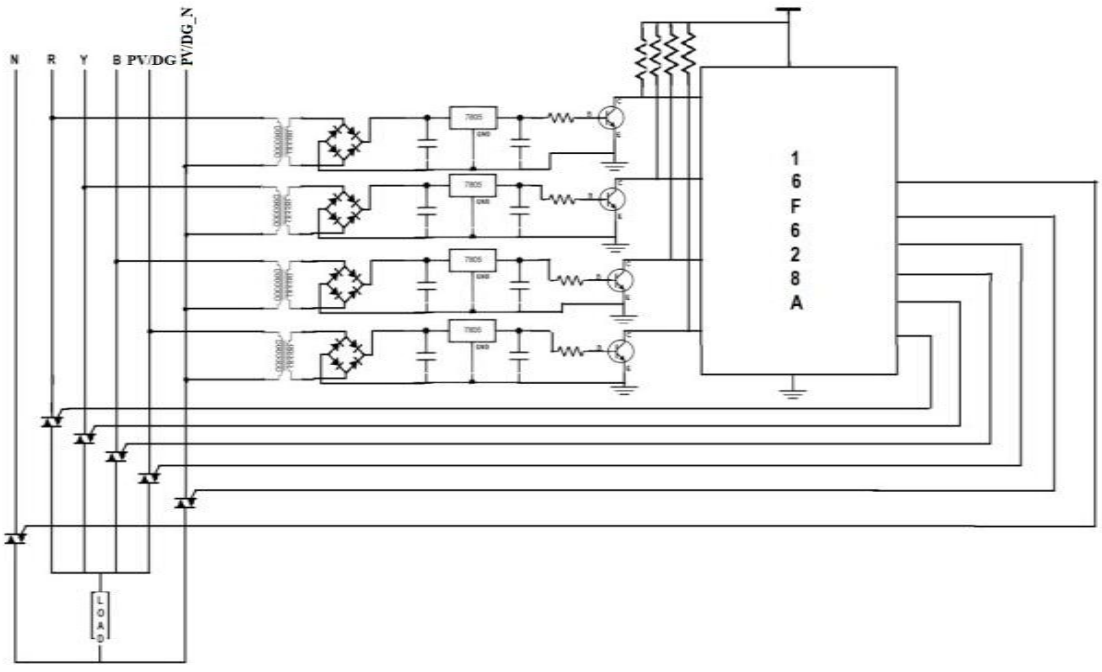

Fig2: Circuit configuration

Control Method:

Table 1: shows the control operation of module with a simple Truth table.

R	Y	B	PV	Output Phase
1	1	1	1	PV
1	1	1	0	R
0	1	1	0	Y
0	0	1	0	B
1	0	1	1	PV
1	0	1	0	R
1	1	0	0	R
1	1	0	1	PV
1	0	0	0	R
0	1	0	0	Y
0	0	1	0	B
0	0	0	1	PV

In above table the operation of module shows by a simple truth table.

1: Means phase live

0: Means phase goes off

The operation of module is based on priority basis means first priority is to PV supply so that if solar power available then load always shifted on solar power and after that priority given to utility supply sequentially by first R then after that on Y and B phase. For this purpose programming is done according to priority basis.

CONCLUSION

The power supply available from utility continuously causes disturbances which is not reliable, so due to this problem people uses alternatives ways for continuity of supply and to reduce utility power supply by using solar power for automatic phase switching. This desired output results from automatic phase selector. Automatic phase selector selects active live phase and makes fast switching.

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