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Automatic Load Balancing and Phase Balancing By PLC and SCADA

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ABSTRACT

How important balance is in electricity? In united state electricity mainly travels as AC power. It required three separate wires (i.e R,Y,B) and neutral wire to transmit and distribute the electricity and for grounding protection the additional wire is used. Each of the live wires called as phase as it enters our home, business, residential, commercial, and industrial purpose. There is causes of short circuit is overcurrent, overvoltage, phase difference, fluctuation in supply voltage, imbalanced load. Due to this causes electrical equipments and whole electrical system will be damage. For all this reasons the phase balance and load balance are important in electricity.

Smart electrical grids requires now a days. Large interest in electrical load distribution balancing problem. This problem is are not having a solution for large scale system, where the number of single phase consumer connected to three phase system in very large scale in electrical distribution system. This system are required new control technique for automatic phase change, when load on any one phase increases.

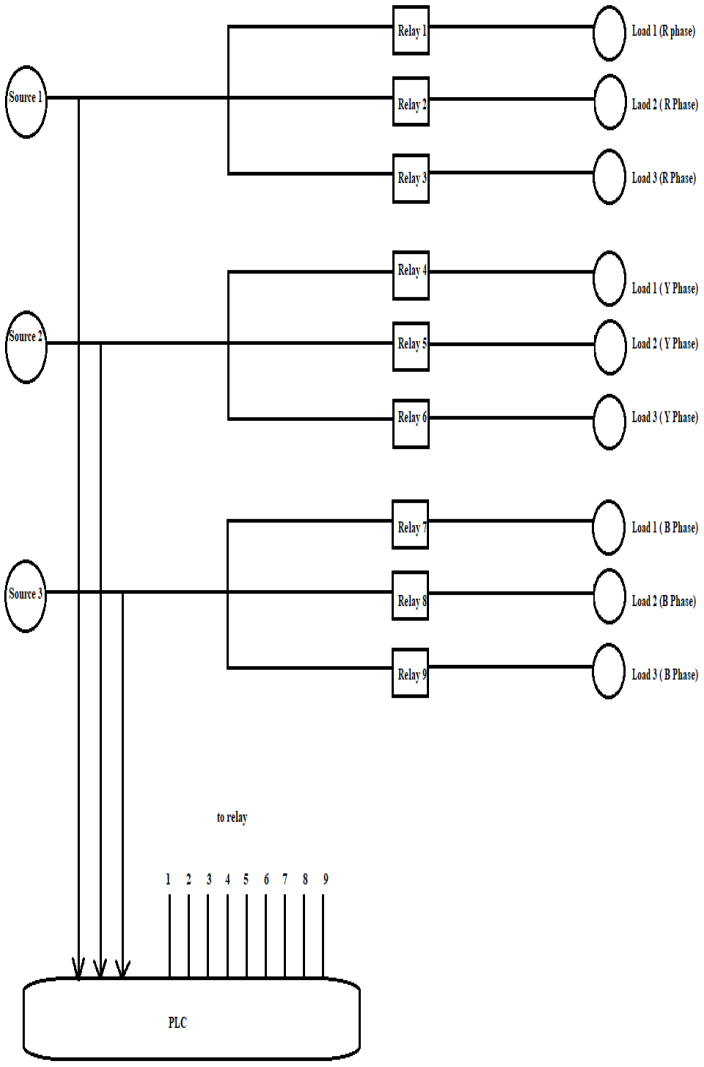
I INTRODUCTION

Most domestic supply is at house, semi industrial, industrial and commercial premises are supplied from single phase AC with a single phase and neutral wire. This project explain automatic load balancing or phase balancing by plc.

Demand of electricity increases day by day due to requirement of consumers.As population increases demand of electricity increases. In nature the inductive load is more. This affect on generation plan because of inductive load the reactive power is consume. Load balancing is the process of balancing electricity supply on the grids to the electrical loads by adjusting the load or phase. In this project we are designing a system which is capable of sharing load or phase among several installed sources. It means according to increased load on phase it automatically shift the load supply from other phase. All this system is automated by using PLC (programmable

logic controller). We will program the PLC according to our requirement that will be capable of automatic shifting the supply and will operate them.

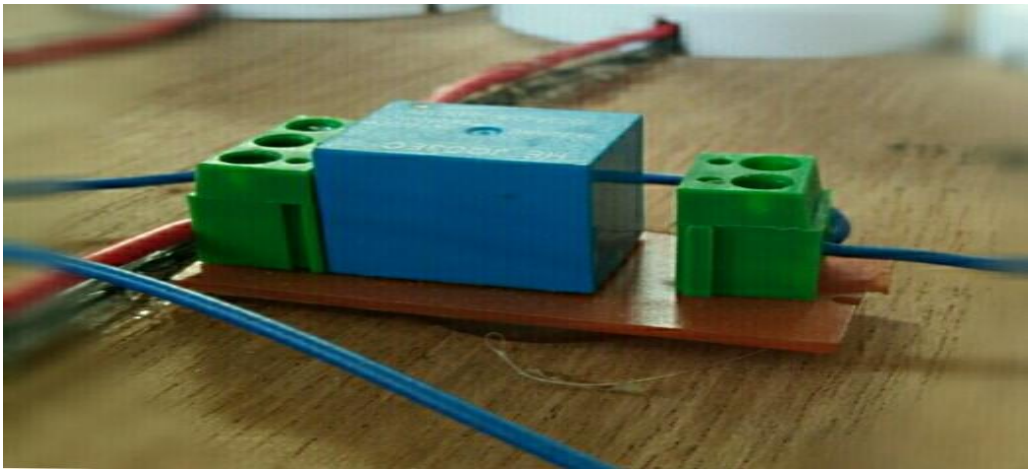
II BLOCK DAIGRAM



PLC (Allen Bradley)

A programmable logic controller is a device which performing a various operation. PLC areuse to various type of controlling system in industries. The PLC work there operation with help of ladder diagram. This PLC is Allen Bradley micro logic 1000.PLC are very useful in industries for repeatable operations. PLC are perform automatic operation according to ladder diagram and device coding. They have capability to continuous operation without maintenance. The languages of PLC are ladder logic, functional chart, instruction list. There are number of input and output sets.

RELAY 12v



Relay is a device which operate as a switch. It is used for protection purpose. It is work on Electromagnetic principle. The relay coil passed a large value of current.

TRANSFORMER

Transformer is an electrical staticdevice which transfer energy from one circuit to another circuit. Transformer works on the principle of Electromagnetic induction when current passed through the primary winding and EMF (electromagnetic force) get induced and it link with secondary coil.A 12v step down transformer are used to step down the supply voltage from 230v to 12v.

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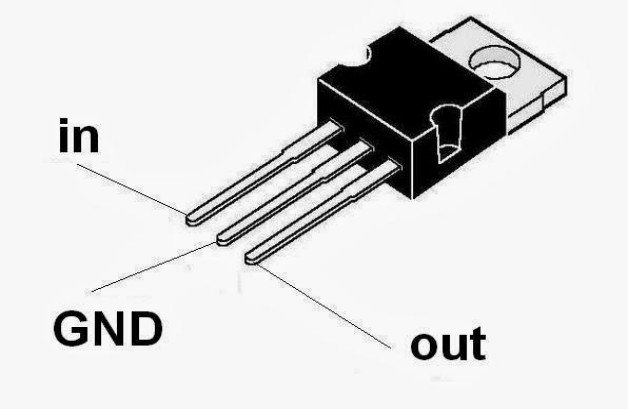
Voltage regulator 7812



7812 is a **12V Voltage Regulator** that restricts the voltage output to **12V** and draws 12V regulated power supply. The 7812 is the most common, as its regulated 12-volt supply provides a convenient power source for most TTL components.

7812 is a series of 78XX voltage regulators. For ICs within the family, the xx is replaced with two digits, indicating the output voltage (for example, the 7805 has a 5-volt output, while the 7812 produces 12 volts).

BULB LOAD

Incandescent lamp consist of a glass glow completely evacuated and a fine wire known as filament. The glass glow is to prevent the oxidation of the filament and also to prevent the temperature lower by radiation. The material which can be used for filaments for incandescent lamp must pusses the properties of high melting point low vapour pressure high resistivity and sufficient mechanical strain to withstand vibration during use. Now a

days tungsten is commonly used filament due to it's high melting point, high resistivity, low temperature, low vapour etc.

SWITCH

An electrical switch is device which is allow the flow of current or the interrupt the flow of current in electrical circuits. Switch is either completely "ON" or completely "OFF". In electrical circuits different types of switch are used.

ADVANTAGES OF THE SYSTEM

1) This system are used for reduce overload condition.
2) This system are used reduce fault like over current, over voltage etc.
3) This system are safe for electrical networks.

DRAWBACK OF SYSTEM

When the overload condition takes place in all the 3 phases there is no automatic phase balancing or load balancing condition are work.

III CONCLUSION

When the overload can takes place in one phase it take the power from another phase. In this concept we can shift the phase or load automatically when overload condition. And the fault like overcurrent, overvoltages, damaging the equipment, phase unbalanced are reduce.

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