

# Auto Mains Failure with Diesel Generator Operation

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**Abstract:** - Electricity is an indispensable part of modern day life. Our economy, work, healthcare and livelihood all depends upon constant supply of power. Even a temporary of power can lead to chaos and momentary setbacks. Grid Power Loss can effect to the Losses of Production for Industries and also effect to the Home/Office Conditions also. But industrial sector gets affected more with power cut. So an auxiliary power supply is very necessary and switching of mains supply to auxiliary supply within a few seconds is necessary to reduce the downtime. Diesel Generators are mainly used as auxiliary power supply which uses fossil fuel and its costly so power factor correction using capacitors is also considered to create a well maintained switching system.

**Keywords:** Mains Power, Diesel Generator, Power Factor, Downtime

## I. INTRODUCTION

Now days we often see power cut every now and then, mains supply fails at any time of the day without prior information, this causes lot of trouble especially during summer. Life gets almost paralyzed without an electric power. Power inverters and ups solves this problem up to certain extend for low power consumers, specially household domestic loads and small shops can make use of this type of solution. But industrial sector gets affected more with power cut. Industries have now started installing diesel generator sets in their units. Even larger societies in the Metro cities have started installing diesel generator sets. Manual starting of the generator takes some time and causes panic to the people struck inside the lift compartment when the supply fails suddenly. So automatic switching of the power supply clearly reduces this time wastage.

Automatic Main Failure (AMF) System is a system by which can automatically transfer the switch from main power supply to Auxiliary when anomaly such voltage drop, over-voltage and outage or blackout is occurred at the main power.

Main objective of this study is to design an energy saving system which reduces

- 1) Time Wastage
- 2) Power Wastage

It is clear that automatic power switching will reduce the time wastage while the power wastage problem is solved by Power factor correction.

## II. Power Factor

Power factor is the relationship between working (active) power and total power consumed (apparent power). Essentially, power factor is a measurement of how effectively electrical power is being used. The higher the power factor, the more effectively electrical power is being used.

A distribution system's operating power is composed of two parts: Active (working) power and reactive (non-working magnetizing) power. The ACTIVE power performs the useful work - the REACTIVE power does not. It's only function is to develop magnetic fields required by inductive devices.

In an ac circuits there is generally a phase difference between voltage and current. The term is known as power factor of the circuit. If the circuit is inductive, the current is lags behind the voltage and the power factor is called lagging power factor and if the circuit is capacitive then current leads to voltage and power factor is said to be leading power factor. A purely resistive load (incandescent lights, electric heating elements) would have a power factor of 1.0 (unity). Low power factor means poor electrical efficiency. The lower the power factor, the higher the apparent power drawn from the distribution network. When low power factor is not corrected, the utility must provide the nonworking reactive power in addition to the working active power. This results in the use of larger generators, transformers, bus bars, wires, and other distribution system devices that otherwise would not be necessary.

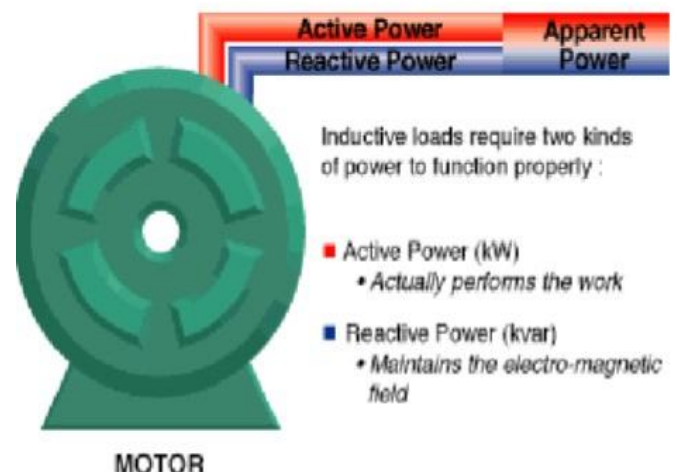


FIG.1 Functioning Powers of Induction Load

Solve low power factor problems by adding power factor correction capacitors to your electrical network. As illustrated below, power factor correction capacitors work as reactive current generators providing needed reactive power (kvar) to the power supply. By supplying their own source of reactive power, the industrial user frees the utility from having to supply it; therefore, the total amount of apparent power (kVA) supplied by the utility will be less. Power factor correction capacitors reduce the total current drawn from the distribution system and subsequently increase system capacity.

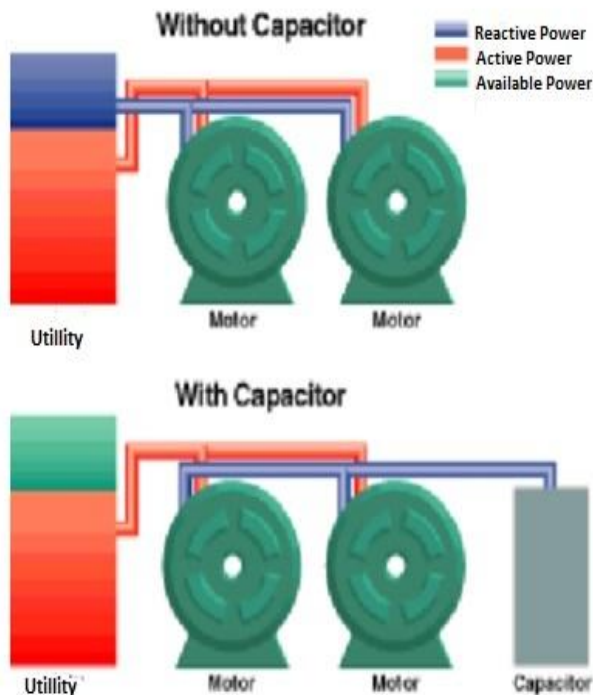


FIG.2 Correction of power factor with capacitor

Not only will Power Factor Correction Capacitors save you money, they will:

- Reduce heat loss of transformers and distribution equipment
- Prolong the life of distribution equipment
- Stabilizes voltage levels
- Increase your system's capacity, etc.

## RESULT AND DISCUSSION

As soon as the auxiliary power supply switches from main power supply when failure occurs, downtime reduces. Loss of time is loss of money so automatic switching gives benefits of time saving. Correcting Power factor reduces the heat losses which reduces the wastage of power, prolongs the life of distribution equipment and stabilizes voltage levels, increase system's capacity.

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