

A Review On DVR Based Voltage Sag control

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Abstract: Recently, power quality problems become a major concern of industries due to massive loss in terms of time and money. Hence, there are always demands for good power quality, which positively resulting in reduction of power quality problems like voltage sag, harmonic and flicker. Voltage sag is always considered as one of the major power quality problems because the frequency of occasion is so high.

Voltage sag is literally one of power quality problem and it become severe to industrial customers. Voltage sag can cause miss operation to several sensitive electronic equipment's. That problem can be mitigating with voltage injection method using custom power device, Dynamic Voltage Restorer (DVR) or controlling the PWM signal. The different technique has been reported in literature for the improvement of classification performance. This paper overviews the methods proposed for the compensation of voltage sag, different solutions for enhancing the performance of the power system.

KEYWORDS: Voltage sag, PI controller, DVR, PWM, etc.

I Introduction

The voltage sag / swell is the most common power quality related problem among the industries. Such voltage sag / swell have a major impact on the performance of the microprocessor based loads as well as the sensitive loads. In a power line voltage sags / swells can occur as a result of load switching, motor starting, faults, lightning, non-linear loads, intermittent loads, etc. IEEE 519-1992 and IEEE 1159-1995 describe the Voltage sags / swells and within which controlling equipment should be connected together with the critical loads as corrective measures. DVR is a commercially available cost effective device, which is capable of addressing the above voltage sag problem effectively.

The problem of poor power quality like voltage sag for sensitive loads can be better dealt or solved by power electronics based Dynamic Voltage Restorer [1]. The application of dynamic voltage restorer, the power technique can be operated without voltage sag and power supply through flexibly changing the distribution configuration after the occurrence of a fault scheme.

Basic functions of customer power applications are fast switching and current or voltage injection for correcting anomalies in supply voltage or load current. The DVR is a series conditioner based on a pulse width modulated (PWM) voltage source inverter (VSI), which could generate or absorb real or reactive power independently system.

Dynamic sag correctors are also proved to be helpful in mitigation of voltage sag problem along with cost effective method. Most of the voltage topologies are categorized into two groups the inverter based regulator and direct ACAC converter. Also AC voltage sag/swell compensator are classified into three groups according to their combination as electromagnetic, electric and hybrid voltage compensators. There are also many series connected devices used by consumers, one of these series connected device (SD) which mitigate the sag by injecting missing voltage in the series with grid. Dynamic voltage restorer (DVR) is one of the commonly used SD topology, its designing and effectiveness in compensating voltage sag is investigated. When the source side voltage has disturbed, the use of a DVR is one of the most effective solution in restoring the quality of voltage at load side.

The DVR is a series connected power electronics device is used to inject voltage of required magnitude and frequency and basic structure of DVR shown in fig.1.

These are:

- An Injection Transformer
- A Harmonic Filter
- Storage Devices
- A Voltage Source Converter
- Dc Charging Circuit
- Control System
- Protection System

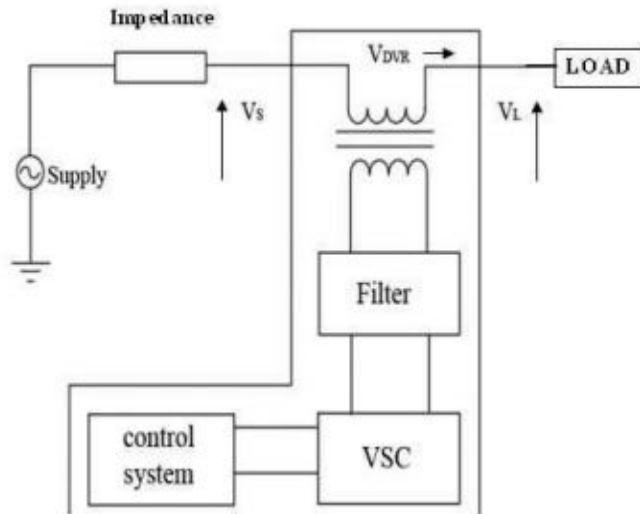


Fig. 1. Dynamic voltage restorer block

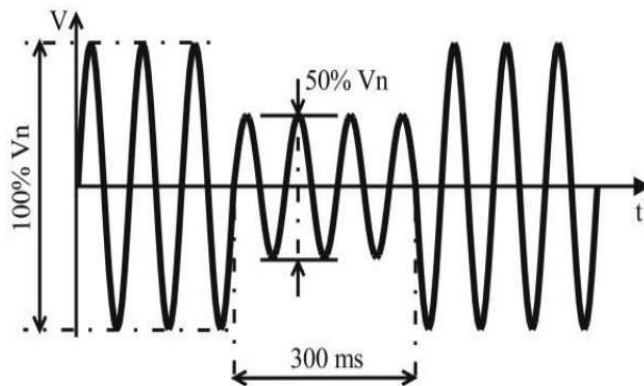


Fig. 2. Voltage sag generator block

II RELATED WORK

The many researchers have been done in field of economic dispatch problem some of the work is described in this paper.

P. ShyamKiran, et.al, done study in this paper, the performance of voltage sag mitigation using pulse width modulation switched autotransformer through matlab simulation. The technique employs a PWM AC to AC converter along with a auto transformer. The during a disturbance such as voltage sag control, supplies the missing voltage and helps in maintaining the rated voltage at the terminals of the critical load. The method has less number of switching devices and has good compensating

capability in comparison to commonly used compensators. In technique is simple and only one IGBT switch per phase is required. The more simple and economical compared to commonly used DVR technique or STATCOM technique. The simulation analysis results is performed for 27% voltage sag, for three phase and simulation results verify that the proposed device is effective in compensating the voltage sag disturbances side [1].

JaykantVishwakarma, et.al, the investigation this paper DVR used for voltage sag mitigation at distribution side. DVR is custom power system which is utilized to mitigate the voltage at load terminals. The power quality is one of major disquiets in the present era. The most important especially, with introduction of sophisticated devices, and performance is very sensitive to the quality of power supply. One of the major problems deal at here is the power sag. DVR injects required voltage in series with supply voltage through injection transformer for correcting voltage amplitude, phase and harmonic component into line. To enhance the voltage sag restoration capability of the DVR system, this paper deals with the development of a control structure using a Discrete PWM pulse generator. In this paper control PWM only requires voltage measurements. It is characteristic makes it ideally suitable for low-voltage custom power applications. The simulations carried out showed that the DVR provides good voltage regulation capabilities and present show good accuracy [2].

Rachana, et.al, in this paper mitigation of voltage sags/swells using PWM switched autotransformer condition in three phase power system is discussed. The proposed technique employs a PWM signal switched auto transformer voltage sag compensator based on an AC-AC converter. During a disturbance like a voltage sag, this proposed scheme supplies the missing voltage and helps in maintaining the rated voltage at the terminals of the critical load for during distribution. In the system has less number of switching devices and has good compensating capability in comparison to commonly used other compensators. The technique identify distribution and maintaining distribution load voltage. The technique is simple and only one IGBT switch per phase is required scheme. More simple and economical compared to commonly used DVR or STATCOM. Performed for voltage sag for three phase system and simulation results verify that the proposed device is effective in compensating the voltage sag disturbances. The analysis results the perform voltage sag control for three phase and simulation results verify for that proposed devise in

compensating the voltage sag disturbances [3].

PriyankaKumari, this paper dynamic voltage restorer using enhance power quality in distribution system. The power quality is one of major concerns in the present era. Power supply that results in a failure of end user equipment's. One of the major problems dealt here is the voltage sag. The solve this problem, custom power devices are used. The most efficient and effective modern custom power device used in power distribution networks system. Its appeal includes smaller size, lower cost, and its fast dynamic response to the disturbance. It can provide the most commercial solution to mitigation voltage sag by injecting voltage as well as power into the system. The efficiency of the DVR depends on the efficiency control technique involved in switching the inverters. In this paper are use model a PI controller and Discrete PWM pulse generator is used. A DVR is connected to a system through a series transformer with a capability to insert a maximum voltage of 50% of phase to ground system voltage. In-phase compensation method is used. The main advantages of the proposed DVR are simple control, fast response and low cost. The proposed PWM control scheme using PI. The main shortcoming of the DVR, being a series device, is its inability to mitigate complete interruptions [4].

III CONCLUSION

The various papers and literature has been studied for voltage sag control. The starting with power quality till voltage compensation methods have been taken. Overview of power quality and DVR is studied. All other topologies has their own advantages like DVR based topology and AC-AC topology for voltage sag supporter, have the advantage of dc-link storage free operation, but they involve transformers' and choppers. The requirement power devices have also been discussed are very attractive solution to the short duration voltage sags, but the PB-AVQR topology provides long duration voltage sag. However, according to need and usefulness, industries and distribution systems uses any of the above voltage sag mitigation technologies.

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