International Journal of Research
Available at https://edupediapublications.org/journals
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 12
April 2018

An Integrated Dynamic Voltage Restorer –Ultra Capacitor Design For Improving Power Quality Of The Distribution Grid

JESUDURAI.R , M.TECH (POWER SYSTEM), PRIST UNIVERSITY,THANJAVUR

ABSTRACT

Energy storage technologies are increasing their presence in the market and integration of these technologies into the power grid is slowly becoming a reality. An interline dynamic voltage restorer has used to provide sag and swell the compensation and improvement of displacement power factor during normal condition.

The concept of integrating ultra capacitor based energy storage into an interline dynamic voltage restoring displacement factor controlling device (IVDFC) will able to independently compensate voltage sag and swells without relying on the grid to compensate for fault on the grid. UCAPS have low energy density and high power density ideal characteristics for compensation of voltage sag and swell which are both high power and low energy event. UCAP is integrated into DC-link of

the IVDFC through a bi-directional DC-DC convertors which helps in provide stiff DC-link voltage and the integration helps in compensating deeper voltage sag voltage swell and improvement of displacement power factor during normal condition designed control of both the DC-AC inverter and DC-DC are discussed the simulation model of the overall system is developed.

INTRODUCTION

Distribution network are mostly inductive at the fundamental frequency because of the nature of the dominant connected to the load (e.g. induction motor)this in turn reduce the electrical supply. Low DF operation is not recommended due to

several negative effects on power system several practical techniques are commonly used to improve DF. Displacement factor improvement employing UCAP with size and locating optimization has been introduced. The different techniques are employed. To minimize the power loss in distribution network. The feeder reconfiguration concept in distribution system is introduced to reduce system loss. In a combined system for harmonic suppression and reactive power compensative is proposed not only to improve the DF but also the power factor.

The DVR is one of the most common and effective solution for preventing for protecting critical load against voltage sag the DVR is a power electronics device used to inject three-phase voltage in series and in connected with the DC-DC convertor and ultra capacitor voltage in order to reduce voltage sag and swell. PWM recommended to modulating the DVR simple digital realization and improved DC-link utilization. In the distribution system load voltage restoration can be achieved by injecting active and/or reactive power into the distribution feeder. Active power capability of the DVR is governed by the capacity of the energy storage element and the employed compensation technique Several control technique have been proposed for voltage sag compensation such as pre-sag in-phase and minimal energy control approaches.

The IVDR can be using to mitigate voltage sag or swell at critical load in distribution system; it consists of several back to back voltage source converters with common DC link connecting in dependent feeder. Each converter can be operated in either power control (pc) or voltage control (vc) mode if one of the feeder is subjected in voltage sag, its converter will operate in vc mode and required power for

voltage restoration will be observed from DC link. In this state, the other converters connected to the healthy feeder should be switched to pc mode to replenish the DC link voltage; the power sharing scheme to determine the reference power of each healthy feeder. The injected voltage of each in a healthy feeder during pc mode should have two components the first component is in-phase with line current which observe active power from the supply and provides it's to the DC-link to support its voltage.

EXISTING SYSTEM:

Dynamic voltage restorer (DVR) is one product that can provide improved voltage sag and swell compensation with energy storage integration. Ultra capacitors (UCAP) have low-energy density and high-power density ideal characteristics for compensation of voltage sags and voltage swells, which are both events that require high power for short spans of time. The novel contribution of this paper lies in the integration of rechargeable UCAP-based energy storage into the DVR topology. With this integration, the UCAP-DVR system will have active power capability and will be able to independently compensate temporary voltage sags and swells without relying on the grid to compensate for faults on the grid like in the past.

PROPOSED SYSTEM

Integrating ultra capacitor based energy storage into an interline dynamic voltage restoring displacement factor controlling device(IVDFC)will able to independently compensate voltage sag and swells without relying on the grid to compensate for fault on the grid. UCAPS have low energy density and high power density ideal characteristics for compensation of voltage sag and swell which are both high power and low energy event.

CONCLUSION

The DF of different feeders under normal operation. In the DF of one of the feeder is improved via active and reactive power exchange (PQ sharing) between feeders through the common link. The proposed operational mode for IVDR to improve the DF of different feeders under normal operation. In the DF of one of the feeder is improved via active and reactive power exchange(PQ sharing) between feeders through the common link.

REFERENCES:

1. S.A.Quresti and N.Aslam, "efficient power factor improvement technique and energy conservation of power system"int. conf. energy manage. Power del.., Vol.2, pp. 749- 752, NOV. 21-23, 1995

2. J.J. Grainger and S.H.Lee, "optimum size and location of shunt capacitor for reduction of losses on distribution feeder", "IEEE trans power APP, sys.., vol. PAS100, no.3,pp.1105-1118, Mar.1981.

3. L.Ramesh, S.P.Choudhury, S. Choudhury, A.A.Natrajan, and C.T.Gaunt, "minimization of power loss in distribution networks in distribution networks by different technique. "Int .J.Electr.power energy syst. Eng.,vol 3, no.9,pp.521-527, 2009, oct.1991.

4. T.P.Wanger, A.Y.Chikani, and R.Hackam "feeder reconfiguration for loss reduction: an application of distribution automation,". IEEE trans. Power del., vol 6.no.4 pp.1992-1993.

5. A.Luo, Z.shuai, w.zhu, and shen, combined system for harmonic suppression and reactive power compensation" IEEE trans. Power del, vol56, no:2, pp.418-428, feb.2009.

6. C.wessels, f.gebhardt, and f.w.fuhes, "fault circle through of a DFIG wind turbine using a dynamic voltage restorer during symmetrical and asymmetrical grid fault", IEEEtrans power electr., vol.26, no:3,pp.807-815, mar-2011.