IJARES/November 2015/Volume-3/Issue-11/2149-2154 **ISSN 2347- 9337**

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN ENGINEERING AND SCIENCE

PROVISION OF RAPID VOLTAGE REGULATION DURING THE VOLTAGE DISTURBANCE

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ABSTRACT:

Distribution static compensator is a shunt active filter that injects currents to the point of common coupling with the intention that power factor correction, load balancing and harmonic filtering can be attained. There is lack of earlier works that deal with the possibility of voltage control mode process of distribution static compensator in stiff source. Our work presents a control-algorithm-basis distribution static compensator topology for regulation of voltage still under stiff source which is mainly attained by means of connecting an appropriate external inductor in series among load as well as source point. The projected control algorithm intends to offer speedy voltage regulation at load terminal throughout voltage disturbances, while maintaining the advantages of current control mode during the process of normal operation. The proposed system will suggest rapid voltage regulation at load terminal throughout voltage disturbances and defend critical loads. Our system for regulation of voltage still under stiff source is mostly attained by means of connecting an appropriate external inductor in series among load as well as source point.

Keywords: Distribution static compensator, Voltage control mode, control-algorithm-basis Distribution static compensator, Current control mode, Point of common coupling.

1. INTRODUCTION:

Power quality within distribution systems will influence entire associated equipments. Distributed Static Compensator is fast-compensating source of reactive power that is functional on distribution system to decrease the variations of voltage [1]. The voltage variations are sags, surges, as well as flicker, together with unevenness that is caused by altering of the demand of reactive power. Loads that are linked to a stiff source are helpless to be protected from the disturbances of voltage by means of a distribution static compensator. The occurrence of feeder impedance as well as nonlinear loads alters terminal voltage as well as source currents. The compensation of load by means of state feedback control of distribution static compensator by means of shunt filter capacitor will provide the improved results. On the basis of distance among source as well as load, a source is termed as stiff or else non-stiff. When the distance is lengthy, subsequently source is termed as non-stiff and contains high feeder impedance, when distance is extremely small, then source refers to stiff and contains small feeder impedance [2]. A source will supply a permitted range of voltage, which is enough for acceptable performance of load and in this circumstance; distribution static compensator have to function in current control mode. Because of grid faults, source voltage will alter at any instance and subsequently, operation of voltage control mode is necessary. Distribution static compensator will control the load voltage by means of managing of voltage across feeder impedance indirectly. When a load is linked a stiff source, feeder impedance will be small and in this condition, distribution static compensator cannot offer enough voltage regulation at terminal of load. There are no earlier works that deal with voltage control mode process of distribution static compensator in stiff source and this problem can be managed whereas making sure that, during the process of normal operation, benefits of current control mode are retained. In normal operation process external impedance does not have a lot of significance, while it plays an important role throughout voltage disturbances. Our work put forward a novel control-algorithm-basis distribution static compensator topology for regulation of voltage still under stiff source. It is mainly attained by means of connecting an appropriate external inductor in series among load as well as source point.

2. METHODOLOGY:

A distribution static compensator in the current control mode will introduce harmonic as well as reactive elements of load currents to construct source currents reasonable and in phase to load voltages. A source will provide an allowed range of voltage, which is enough for acceptable performance of load and here distribution static compensator have to function in current control mode. In voltage control mode, it control load voltage at a stable value to defend sensitive loads from the disturbances of voltage. Due to grid faults, source voltage will alter at any instance and subsequently, operation of voltage control mode is necessary [3][4]. The objectives of the two operation modes are unlike and cannot be attained at the same time. In the arrangement of distribution static compensator, a neutral-point-clamped topology of voltage source inverter is selected since it offers autonomous control of each leg of voltage source inverter. Our work suggests a novel control-algorithm-basis distribution static compensator topology for regulation of voltage still under stiff source. It is mostly attained by means of connecting an appropriate external inductor in series among load as well as source point. The proposed system will recommend rapid voltage regulation at load terminal throughout voltage disturbances and defend critical loads. During the normal process of operation, reference load voltages that are generated will allow control of source currents as a result; distribution static compensator will inject unconsidered as well as harmonic components concerning load currents to build the factor of source power to unity [5]. Distribution static compensator will manage the load voltage by means of managing of voltage across feeder impedance indirectly. The proposed system will obtain variable reference load voltages is constructed as a function of required source current which controls current drawn from source in support of allowable scope of source voltage. Therefore proposed system will put up source currents balanced as well as in-phase with particular source voltages throughout common procedure. Instantaneous reference voltage is guarded in such a means that source currents are indirectly guarded, and benefits of current control mode are retained while functioning in voltage control mode for an allowable range of source voltage. In the normal operation, external impedance does not have a lot of significance, while it plays

an important role throughout voltage disturbances.

3. AN OVERVIEW OF PROPOSED SYSTEM:

Power quality is a measure of difference in voltage, frequency and current of a system as well as its related components. Our work suggests a novel control-algorithm-basis distribution static compensator topology for regulation of voltage still under stiff source. Based on distance among source as well as load, a source is termed as stiff or else non-stiff. When distance is extremely small, then source refers to stiff and contains small feeder impedance. Our control-algorithm-basis distribution static compensator for regulation of voltage still under stiff source is mostly attained by means of connecting an appropriate external inductor in series among load as well as source point. The proposed control-algorithm-basis distribution static compensator to get hold of variable reference load voltages is put together as a function of required source current. This voltage not directly controls current drawn from source in support of allowable scope of source voltage hence; control algorithm will build source currents balanced as well as in-phase with particular source voltages throughout normal process. The proposed system will advise speedy voltage regulation at load terminal throughout voltage disturbances and defend critical loads. Throughout the normal process of operation, reference load voltages that are generated will allow control of source currents as a result; distribution static compensator will inject unconsidered as well as harmonic components concerning load currents to build the factor of source power to unity. Instant reference voltage is guarded in such a means that source currents are indirectly guarded, and benefits of current control mode are retained while functioning in voltage control mode for an allowable range of source voltage. Initially the currents that have to be drawn from source to get benefit of current control mode are computed [6]. By means of these currents, voltage magnitude that has to be preserved at load terminal is worked out. When this voltage magnitude stays within an allowable range, then similar voltage is used as reference voltage to offer benefits of current control mode. When the voltage lies exterior of allowed range, it denotes a voltage disturbance, and an unchanging voltage magnitude is chosen as reference

voltage at last, a discrete representation is derived to attain switching pulses.

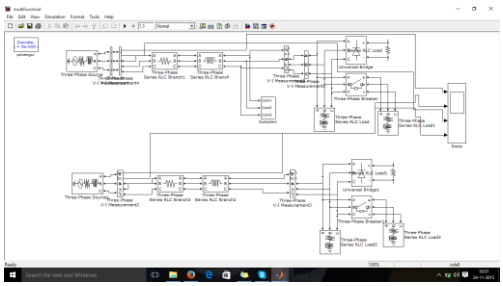

Fig 1: proposed configration of multi functonal statcom

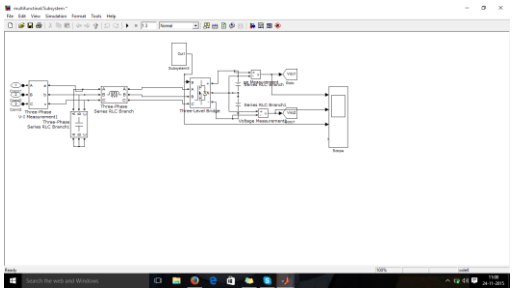

Fig 2: proposed configration of multi functonal statcom controller

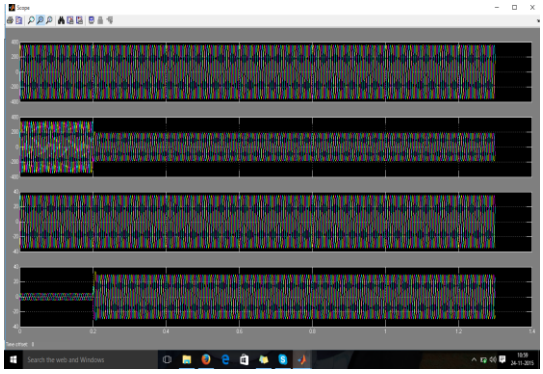

Fig 3: proposed converter responce with and with out statcom load and source voltages

4. CONCLUSION:

A distribution static compensator will mitigate the problems of power quality based on the operation mode. we introduce a novel control-algorithm-basis distribution static compensator topology for regulation of voltage still under stiff source which is attained by means of connecting an appropriate external inductor in series among load as well as source point. On basis of distance between source as well as load, a source is termed as stiff or else non-stiff and when distance is extremely small, and then source refers to stiff and contains small feeder impedance. The system will propose rapid voltage regulation at load terminal throughout voltage disturbances and defend critical loads. Our system for regulation of voltage still under stiff source is mostly attained by means of connecting an appropriate external inductor in series among load as well as source point. The proposed system will put forward speedy voltage regulation at load terminal throughout voltage disturbances, while maintaining the advantages of current control mode during the process of normal operation.

REFERENCES

[1] J. Liu, P. Zanchetta, M. Degano, and E. Lavopa, “Control design and implementation for high

performance shunt active filters in aircraft power grids," IEEE Trans. Ind. Electron., vol. 59, no. 9, pp. 3604–3613, Sep. 2012.

[2] A. Bhattacharya, C. Chakraborty, and S. Bhattacharya, "Parallelconnected shunt hybrid active power filters operating at different switching frequencies for improved performance," IEEE Trans. Ind. Electron., vol. 59, no. 11, pp. 4007–4019, Nov. 2012.

[3] Q.-N. Trinh and H.-H. Lee, "An advanced current control strategy for three-phase shunt active power filters," IEEE Trans. Ind. Electron., vol. 60, no. 12, pp. 5400–5410, Dec. 2013.

[4] M. Moradlou and H. Karshenas, "Design strategy for optimum rating selection of interline DVR," IEEE Trans. Power Del., vol. 26, no. 1, pp. 242–249, Jan. 2011.

[5] S. Srikanthan and M. K. Mishra, "DC capacitor voltage equalization in neutral clamped inverters for DSTATCOM application," IEEE Trans. Ind. Electron., vol. 57, no. 8, pp. 2768–2775, Aug. 2010.

[6] J. Barros and J. Silva, "Multilevel optimal predictive dynamic voltage restorer," IEEE Trans. Ind. Electron., vol. 57, no. 8, pp. 2747–2760, Aug. 2010.

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