

Lessening of Issues Regarding Power Quality in Electrical Power Devices

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Abstract: In the recent times, issues of power quality are extremely vital for customers and hence for the devices of custom power, dynamic voltage restorer is employed to lessen the issues of power quality. Dynamic voltage restorer device manages active power flow and includes minute cost when measured to others. By dynamic voltage restorer device, introduced on feeder of load, line voltage is returned to its common level within few milliseconds as a result preventing power disruption. We carry out a control method of hysteresis voltage for building purpose of switching pulses for the inverter of dynamic system of voltage restorer. By added benefits of low expenditure as well as simple functioning, our proposed system is tremendously accepted for power supply of microprocessors. The proposed method of hysteresis voltage presents quick transient response without additional loop compensation.

Keywords: Power Quality; Hysteresis Voltage; Dynamic Voltage Restorer; Microprocessor; Power Supply; Inverter; Transient Response.

I. INTRODUCTION

With the improvisation in the areas related to deregulation in addition to competition among various utilities, the recent problems associated to power quality are most vital. The notion of custom power makes usage of electronic controllers for the networks of power system. There are several components of custom power such as Distribution Statcom [1], Battery systems, Power supplies, restorer of dynamic Voltage and so on. Restorer of dynamic voltage is an altered device of power system that improves the stability of voltage by means of minimizing the problems of power quality in the systems of electrical power. This dynamic voltage restorer system is on the whole matched to various safe vulnerable or else slight loads from small period voltage dips as well as swells. The dynamic voltage restorer device is used as a proficient custom power unit because of quite a lot of advantages. Dynamic voltage restorer device needs less maintenance and contains extreme energy capacity; it includes various characteristics such as improvement of power factor as well as removal of harmonics. When there is a short circuit in the power systems, a sudden dip of voltage will occur on nearby feeders. In our work we implement a control technique of hysteresis voltage for the building purpose of switching pulses for the inverter of dynamic system of voltage restorer [2][3]. The proposed method of hysteresis voltage presents rapid transient response without added loop compensation and is extremely superior method for restorer of dynamic voltage since it plays a significant role in improvement of voltage sag, swell and harmonics. The recognition methods of sag and swell are mainly significant task for suitable functioning of dynamic voltage restorer.

II. METHODOLOGY

Due to extensive usage of susceptible as well as nonlinear loads within the devices of electrical power, problems regarding power quality are extremely crucial. The general situations noticeable for the power quality are voltage swell, dip and harmonic currents. Due to the disturbance that occurs in power quality, numerous customers of industries are influenced powerfully. For handling of the situation of power quality, generally custom power devices are used. Restorer of dynamic voltage is device of power system that improves stability of voltage by minimizing power quality issues in electrical power devices. The most important principle involved in designing of the dynamic voltage restorer device is introduction of voltage in a series pattern and in synchronism with standard voltage for balancing of voltage influences. By means of dynamic voltage restorer device which is introduced on the feeder of load, line voltage is returned to its common level within few milliseconds thus power disruption is avoided. A series connected dynamic voltage restorer device is outlined to boost missing voltage into line all the way through a booster transformer. There are several control techniques that are used for procedure of dynamic voltage restorer. Important components of dynamic voltage restorer device comprises of inverter of voltage source, energy storage device, boost transformers and filters. The dynamic voltage restorer device is used as an effective custom power unit because of several advantages. It includes various characteristics such as improvement of power factor as well as removal of harmonics. It is more slight size and has less expense when compared to others and the system moreover recompense voltage dip and swell [4]. We implement a control method of hysteresis

voltage for purpose of switching pulses for inverter of dynamic system of voltage restorer. Our work provides a solution for the issues of power quality, since the issues of power quality have a straight cost-effective impact on a variety of industrial customers. The proposed control method of hysteresis voltage offers quick transient response devoid of additional loop compensation. The control technique that is useful in our work is on the basis of voltage error and is a technique of non linear control.

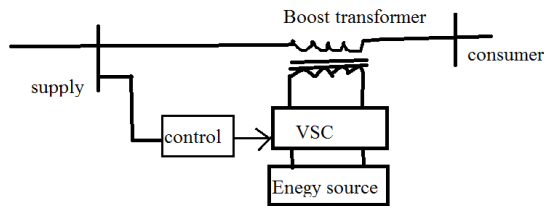


Fig1: Common design of dynamic voltage restorer.

III. AN OVERVIEW OF PROPOSED SYSTEM

In the environment of power devices, power is considered as the most important issue. Voltage swell, dip and harmonic currents and their effects on vulnerable loads are renowned. When there is short circuit in power systems, a sudden dip of voltage will occur on nearby feeders. Voltage dip is short drop within voltage waveforms that is brought by means of limitation on the networks of power system [5]. The voltage dip depends on parameters of size as well as duration. In our work we implement a control technique of hysteresis voltage for the building purpose of switching pulses for the inverter of dynamic system of voltage restorer. By means of additional benefits of low expenditure and simple functioning, our proposed system is extremely accepted for power supply of microprocessors. The dynamic voltage restorer device is used as a proficient custom power unit and there are numerous control methods that are used for procedure of dynamic voltage restorer. A normally used series associated dynamic voltage restorer device is outlined to boost missing voltage into line all the way through a booster transformer and its most important purpose is to decrease the outcome of voltage sag or else swell and it is used for decrease of harmonics. Numerous industries comprise vast number of power devices as well as energy effective devices and these are more vulnerable towards unbalance in input supply voltage. The method of hysteresis voltage offers quick transient response devoid of additional loop compensation. Proposed control system of hysteresis voltage is enormously good technique for restorer of dynamic voltage since it plays a significant role in improvement of voltage sag, swell and harmonics. In the scheming of dynamic

voltage restorer, introduction of voltage as a series pattern and in synchronism with standard voltage for balancing of voltage influences is done. Dynamic voltage restorer introduced on feeder of load, make the line voltage to be returned to general level hence avoids power disruption. A dynamic voltage restorer purpose is to detect voltage sag or else swell and it is used for generation of reference voltage for the purpose of introduction. The detection methods of sag and swell are particularly significant task for suitable functioning of dynamic voltage restorer. There are a variety of techniques for recognition of voltage sag, and swell. In the system of dynamic voltage restorer including proposed hysteresis voltage controller there are three phase inverter of IGBT, booster transformer, Energy storage component and the controller of hysteresis voltage. The hysteresis controller mostly necessitates two signals of voltage among which one is from the side of supply and the other is from booster transformer which is voltage that is injected by restorer of dynamic voltage [6]. The controller makes a comparison of two signals of voltage and based on the signals switching a pattern is set up. The control method that is functional in our work is on the basis of voltage error and is a technique of non linear control and it includes a comparison among output voltage as well as tolerance limits about reference voltage. When the output voltage is among upper limit as well as lower limit, no process of switching take place and when output voltage enhances to upper limit, there is a decrease of output voltage.

IV. CONCLUSION

For the better quality of power systems, usage of devices of custom power is done. A solution was provided for the issues of power quality, since the issues of power quality have a straight cost-effective impact on a variety of industrial customers. Here we apply a control method of hysteresis voltage for purpose of switching pulses for the inverter of dynamic system of voltage restorer. The device of dynamic voltage restorer acts as a proficient custom power unit because of quite a lot of advantages. It moreover needs less maintenance and contains extreme energy capacity; its size is less and has less expense when compared to others and the system moreover recompense voltage dip and swell. By several advantages of low expenditure and simple functioning, our proposed system is extremely accepted for power supply of microprocessors. The proposed control method of hysteresis voltage makes a quick transient response without additional loop compensation. Proposed control system of hysteresis voltage is extremely good system for restorer of dynamic voltage since it plays a significant role in improvement of voltage sag, swell and harmonics.

V. REFERENCES

- [1] C. Fitzer, M. Barnes and P. Green, “Voltage Sag Detection Technique for a Dynamic Voltage Restorer”, IEEE Trans. Industry Applications, Vol. 40(1), Jan. 2004, pp. 203 - 212.
- [2] Power Quality Enhancement Using Custom Power Devices by A. Ghosh and G. Ledwich. 2002. Kluwer Academic Publishers.
- [3] S. Choi, J. Li and M. Vilathgamuwa, “A Generalized Voltage Compensation Strategy for Mitigating the Impacts of Voltage Sags/Swells”, IEEE Trans. Power Delivery, Vol. 20(3),
- [4] J. G. Nielsen, “Design and Control of a Dynamic Voltage Restorer,” Ph.D. dissertation, Institute of Energy Technology, Aalborg Univ., Aalborg, Denmark, 2002.
- [5] Boonchiam P, and Mithulananthan N, “Understanding of Dynamic Voltage Restorers through MATLAB Simulation”. Thammasat Int. J. Sc. Tech., Vol. 11, No. 3, July-Sept 2006.
- [6] Yusuf K: “Industrial power quality problems Electricity Distribution. IEEE Conf. Pub1 No. 482, Vol: 2, 18–21 June 2001 Pages: 5 pp. vol.2.