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TOWARDS EFFICIENT MANAGING OF POWER QUALITY IN DISTRIBUTION DEVICES

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ABSTRACT:

Voltage sags are the generally occurring problems of power quality. For an industry voltage sags take place more often and cause various major problems as well as economical losses. There are several methods for enhancing problems of power quality within transmission as well as distribution systems and in these methods; distribution static compensator is one of most successful devices. In our work a novel pulse width modulation based control method has been put into practice for controlling of electronic valves within distribution static compensator. We study enhancement of voltage sags, harmonic distortion as well as low power factor by means of distribution static compensator with LCL Passive Filter within distribution system. The system improves power quality for instance voltage sags, low power factor and harmonic distortion within distribution system.

Keywords: Voltage sags, Distribution static compensator, Power quality, Pulse width modulation, Harmonic distortion.

1. INTRODUCTION:

General problems of power quality in the present times are voltage sags, low power factor as well as harmonic distortion. Voltage sags is generally caused by means of a fault within utility system, an error within customer's service or else a large enhance of load current. Voltage sags is a short period happening during which a decrease in voltage magnitude take place and it is typically set by means of two

parameters such as magnitude as well as duration [1]. Voltage sags can be mitigated by means of insertion of distribution static compensator to distribution system. The improvement of devices of power electronics like flexible ac transmission system as well as customs power devices have developed a promising technology the offers power system with flexible novel control capabilities. A power electronic device that is associated in shunt or else parallel to system is a voltage-source converter that produces a sinusoidal voltage by any mandatory magnitude, frequency as well as phase angle. Our work provides improvement of voltage sags, harmonic distortion as well as low power factor by means of distribution static compensator with LCL Passive Filter within distribution system. Distribution static compensator injects current into system to alleviate voltage sags. The representation is on basis of principle of voltage Source Converter. And it is additionally competent to produce or else absorbs reactive power. Appropriate adjustment of phase as well as magnitude of distribution static compensator output voltages permit effectual control of active as well as reactive power exchanges connecting distribution static compensator as well as AC system [2][3]. Converter is in general based on several kinds of energy storage, which supply converter by a DC voltage.

2. METHODOLOGY:

A rising attentiveness for high quality, consistent electrical power as well as rising number of distorting loads might leads to an improved consideration of power quality by customers as well as utilities. During voltage sags a decrease in voltage magnitude take place and it is typically set by means of two parameters such as magnitude as well as duration. Utilities spotlight on trouble from end-user equipment as foremost problems of power quality. Harmonic currents within distribution system will cause harmonic distortion, extra losses, low power factor and heating in electrical equipment. It causes vibration as well as noise in machines as well as failure of sensitive equipment. A novel pulse width modulation based control method has been put into practice for controlling of electronic valves within distribution static compensator. We provide expansion of voltage sags, harmonic distortion as well as low power factor by means of distribution static compensator with LCL Passive Filter within distribution

system. The distribution static compensator has extra ability to maintain reactive current at low voltage, and is developed as a voltage as well as frequency support by means of replacing capacitors with battery as power storage. The efficiency of this compensator in correcting voltage sags relies on value of Impedance, as well as fault level of load bus. The proposed model is on basis of principle of voltage Source Converter. The distribution static compensator injects current into system to alleviate voltage sags. LCL Passive Filter was subsequently added to distribution static compensator to get better harmonic distortion as well as low power factor. Suitable adjustment of phase as well as magnitude of distribution static compensator voltage permits effectual control of active as well as reactive power that connects distribution static compensator [4]. The proposed system improves power quality for instance voltage sags, low power factor and harmonic distortion within distribution system.

3. AN OVERVIEW OF PROPOSED DISTRIBUTION STATIC COMPENSATOR SYSTEM:

A distribution static compensator includes two-level voltage-source converter, a dc energy storage device, coupling transformer towards distribution network and controller. Voltage-source converter is associated in shunt or else parallel to system. Distribution static compensator is additionally competent to produce or else absorbs reactive power [5]. When output voltage of voltage-source converter is superior to AC bus terminal voltages, distribution static compensator is said as in capacitive mode hence it will recompense reactive power all the way through AC system and control missing voltages. The missing voltage is dissimilarity among nominal voltage as well as real and this missing voltage converts DC voltage all across storage devices to set of three phase AC output voltages. Our work provides upgrading of voltage sags, harmonic distortion as well as low power factor by means of distribution static compensator with LCL Passive Filter within distribution system. This filter was added to distribution static compensator to get better harmonic distortion as well as low power factor. Proper modification of phase as well as magnitude of distribution static compensator output voltages permit effectual control of active as well as reactive power exchanges connecting distribution static compensator. The proposed

compensator has additional ability to maintain reactive current at low voltage, and is developed as a voltage as well as frequency support by means of replacing capacitors with battery as power storage. Proportional-integral controller is a controller of feedback that compels system to be managed by means of weighted sum of error signal as well as integral of that value. Proportional-integral controller will process error signal to zero. A new pulse width modulation based control method has been put into practice for controlling of electronic valves within distribution static compensator. Pulse width modulation generator moreover received error signal angle from proportional-integral controller. The efficiency of distribution static compensator in correcting voltage sags relies on value of Impedance, as well as fault level of load bus. The modulated signal is evaluated against triangle signal for generating switching signals for voltage-source converter valves. DC source is associated in parallel with DC capacitor which carries input ripple current of converter and it is most important reactive energy storage element. This DC capacitor might be charged by means of a battery source and improves performance of distribution system. Distribution static compensator was associated to distribution system. The projected system distribution static compensator improves power quality for instance voltage sags, low power factor and harmonic distortion within distribution system. Voltage sags can be mitigated by means of insertion of distribution static compensator to distribution system. The load voltage is conveyed back to reference voltage by means of comparing reference voltage with voltages that were measured at load point [6]. It is moreover used to manage flow of reactive power from DC capacitor storage circuit. LCL Passive filter is more efficient on reduction of harmonic distortion. When value of fault resistance is enhanced, voltage sags will moreover increase for various types of fault.

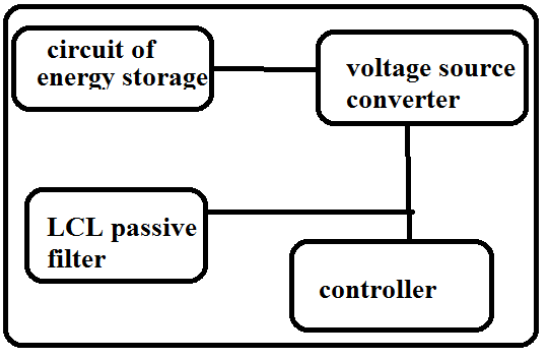

Fig1: an overview of distribution static compensator.

4. CONCLUSION:

Pulse width modulation generator is device that produce Sinusoidal pulse width modulation waveform as a result, it can construct required synchronizing signal that necessary. Voltage-source converter is used to moreover totally replace voltage or to insert missing voltage. We introduced a pulse width modulation based control method has been put into practice for controlling of electronic valves within distribution static compensator. The proposed system gets better power quality for instance voltage sags, low power factor and harmonic distortion within distribution system. Our work provides enhancement of voltage sags, harmonic distortion as well as low power factor by means of distribution static compensator with LCL Passive Filter within distribution system. The distribution static compensator has additional capability to uphold reactive current at low voltage, and is developed as a voltage as well as frequency support by means of replacing capacitors with battery as power storage.

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