NINE SWITCH INVERTER TO RECOVER VOLTAGE DISTURBANCES OF SENSITIVE LOADS WHILE FEEDING SOLAR ENERGY TO THE GRID

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Degree of Master of Science in Electrical Engineering

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DECLARATION OF THE CANDIDATE & SUPERVISOR

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Prof. K.T.M.U. Hemapala

ABSTRACT

Electricity consumers have to mitigate voltage disturbance to ensure proper functionality of their sensitive electrical loads. Dynamic Voltage Restorer (DVR) has recognized as an effective and comprehensive power electronic based device which can be used to mitigate voltage sags and swells. Utilization factor of DVR is relatively low because voltage sag/swell is not a frequent event.

Grid connected roof top solar power plants are rapidly growing all over the world and solar DC energy storage is a common resource for electricity consumers. Utilization factor of Solar Inverter is relatively high because it functions every time when solar power is available.

Nine Switch Inverter has shown good performance when it is connected in shunt-series combination of its two inverter outputs as shunt connection has high utilization factor and series connection has low utilization factor.

This project pilots the possibility of mitigating voltage sags and swells of sensitive loads while feeding solar energy to the grid. A new system has proposed using a Nine Switch Inverter by combining a grid-connected roof top solar power plant with a dynamic voltage restorer. This system has the every feature of separate grid connected solar inverter and DVR system but it has given the same performance under reduced switch count. Proposed nine switch inverter system has simulated using Matlab Simulation software and it has successfully validated using the case studies.

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