

Stackable Isolated Voltage Optimization Module

A method that enables isolated voltage optimization and control

Georgia Tech researchers have developed a method that enables isolated voltage optimization and control. Stackable isolated voltage optimization modules (SIVOM) can be used to control voltage and/or power flow in the grid and especially at the edge. One or more of the SIVOM(s) can be used in a wide range of applications including, e.g., high power utility and industrial applications rated at, e.g., 208V, 480V, or 600V AC (3 phase), with currents from 1000A to around 6000A per circuit (0.36MVA to SMVA), which is typically the limit for 480 Volt transformers. Each SIVOM unit has the capability to operate and be controlled autonomously. The SIVOM unit can also be configured to inject out-of-phase voltage to improve both voltage control and phase angle control. Operations of multiple SIVOM units can be coordinated using communications or line sensing to achieve specific system level objectives in a dispatch mode of operation.

Summary Bullets

- Provides the ability to boost or buck the voltage of in one phase of a three phase circuit without affecting the corresponding phase angle
- Enables autonomous operation and control

Solution Advantages

- Provides the ability to boost or buck the voltage of in one phase of a three phase circuit without affecting the corresponding phase angle
- Enables autonomous operation and control

Potential Commercial Applications

- Applicable to various transformer types – e.g. coaxial winding transformer (CWT) or toroidal transformer (TT)
- In meshed grid applications, it can provide balanced loading of transformers and circuits
- The basis for reducing energy consumption and peak demand charges

Background and More Information

A common solution to achieve precise control of voltage at the edge of the power grid is using transformers with tapped windings and electromechanical switching. This solution suffers from slow response and limited life for

the switching contacts. Alternately, series connected transformers are used to inject voltage in the line and provide the precise regulation needed. However, any grid faults that occur can cause high short circuit currents which can impress high stress on the series transformer, and require challenging and expensive repairs.

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IP Status

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Publications

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Images

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