

VOLT/VAR CONTROL SOLUTIONS

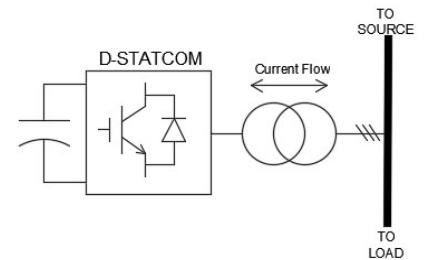


VVC Solutions apply a power quality compensator to monitor the grid and provide application targeted support

Mitsubishi Electric's Volt/Var Control (VVC) Solution is a power electronic product and solution for distribution market customers requiring improved voltage stability and autonomous real or reactive power control.

Offered as a response to distributed energy resource (DER) penetration at the distribution grid, as well as a market segments not traditionally targeted by centralized transmission level solutions, Mitsubishi Electric Power Product's Distribution-STATCOM (D-STATCOM) is a customized solution to meet utility and industrial power quality requirements. The D-STATCOM is comprised of voltage source converters utilizing insulated gate bipolar transistors (IGBTs) and an associated bulk capacitor DC link to convert DC to AC voltage in order to control bi-directional power flow and an advanced application level controller capable of interfacing with a utility's SCADA and feedback and measurement devices.

By regulating the output voltage of the D-STATCOM, the converter can source or absorb vars with respect to the connected power system based on the required application. Utilizing proven power converter technology, the D-STATCOM is able to respond to rapidly changing grid conditions and offer increased dynamic reactive compensation compared to traditional solutions such as shunt reactors, capacitors, and



Static Synchronous Compensator (D-STATCOM)

- ◆ Replaces unloaded synchronous machines to control reactive power.
- ◆ Faster response time than a SVC, capacitors, or reactor bank.
- ◆ Dynamic reactive power response with output characteristic shaping and programmable droop controls
- ◆ Standard software package and parameterized controls for applications
- ◆ Application specific mapping and sequencing
- ◆ Interfacing with existing capacitor and reactor banks for improved feeder reactive power coverage

MEPPI VVC SOLUTIONS

load tap changers. Using this technology and designed for this application, the D-STATCOM is superior to other “smart” inverters, typically, repurposed as reactive devices with potentially higher harmonics or bulky filters, limited redundancy and the inability to manage unbalanced loads.

Capabilities

- ◆ Volt-Var Optimization (VVO)
- ◆ Conservation Voltage Reduction (CVR)
- ◆ Current Phase Balancing
- ◆ Harmonic Mitigation
- ◆ Var Regulation
- ◆ Power Factor Correction
- ◆ Voltage Stability
- ◆ Transient Over/Under voltage Reduction

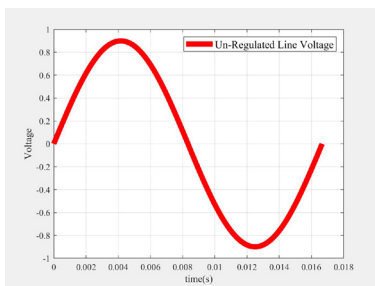
Applications

- ◆ Distributed Generation Integration
- ◆ Voltage Imbalance Situations
- ◆ IEEE 519 Compliance (Harmonics)
- ◆ Peak Demand Shaving
- ◆ Power Quality Requirements
- ◆ Asset Life Maximization
- ◆ Industrial Load Compensation

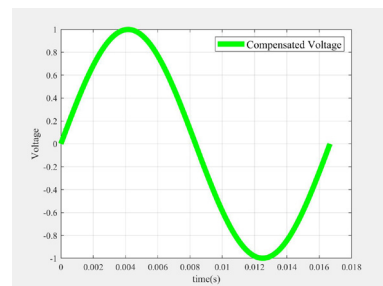
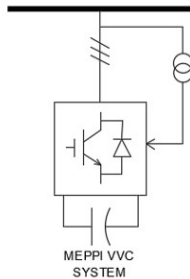
Customized solutions to the application:

By tailoring each system to solving the utility’s specific needs, VVC Solutions is able to maximize the utility’s investment by supplying only the features and capability required. Integrating a D-STATCOM with Mitsubishi Electric developed software makes long term reliability and resilience part of every installation.

Example: 2-Quadrant Operations

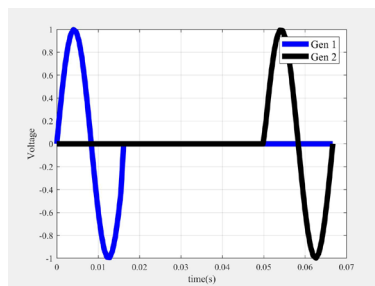


Voltage Regulation

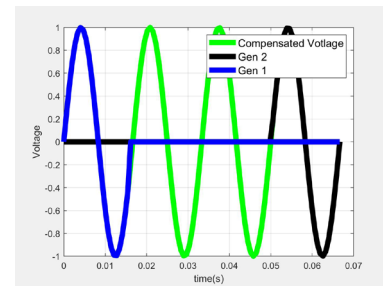
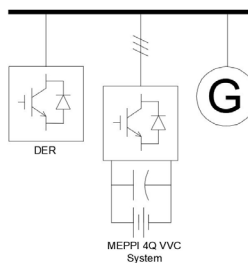


Mitigates voltage variation by VAR injection

Example: 4-Quadrant Operations



Grid Bridging



Watt injection and interim cycle replacement during generation loss

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 Publication No. SA0030300001
 January 2020

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