

OMNIVERTER VECTO

Grid Oscillation Plus

Phasor Measurement Unit+ | Power Quality Analyzer+ | Automation+ | Billing+ | Grid Oscillation+

The case for Oscillation Phasor Monitoring

Sub-synchronous Resonance (SSR) occurs when an electrical network exchanges energy with a source at a frequency lower than the system's synchronous frequency. This energy exchange induces torsional stress on generator shafts¹, posing a risk of damage or fracture. Traditional power grids are designed to mitigate disturbances, however the increasing integration of renewables and electronic equipment has intensified and complicated oscillations.

A small signal stability algorithm has been developed to address grid oscillation that detects and calculates the frequency, amplitude and phase angle of a dominant oscillation phasor within a specified frequency range. VECTO's small signal stability algorithm concurrently identifies three ranges of dominant oscillation phasors between 0.1Hz to 52Hz., representing low, medium and high frequency ranges.

Oscillation Phasor Measurement Unit (oPMU)



VECTO includes unique phasor measurement capabilities that delivers the experience of an Oscillation Phasor Measurement Unit (oPMU). The system captures GPS time synchronized data through a fleet of wave synchronized edge computers installed throughout the grid, continuously recording and streaming oscillation phasor data using the established IEEE C37-118 protocol. Oscillation phasors captured at different locations is similar to synchrophasor data, allowing for interaction with all existing Phasor Measurement Units currently on the market.

VECTO concurrently identifies up to three dominant oscillation phasors within the range of 0.1Hz to 52Hz.

Low Frequency Range

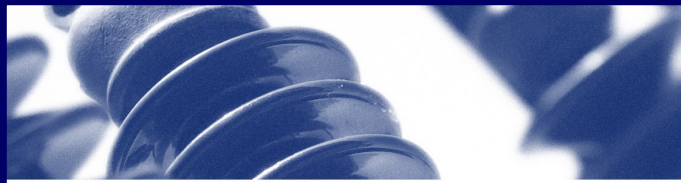
The algorithm's low-frequency range, spanning from 0.1Hz to 1Hz, is designed to identify inter-area oscillations. These oscillations typically arise from the interaction of significant energy sources that are geographically distant. This type of oscillation is commonly observed within the frequency range of 0.2Hz to 0.8Hz.

Medium Frequency Range

The algorithm's mid-frequency range, ranging from 1Hz to 10Hz, is tailored to identify local-area oscillations. These oscillations typically emerge from the interaction among energy sources situated in closer proximity. A common cause is the phenomenon known as "hunting" among a group of generators.

High Frequency Range

The algorithm's high-frequency range, spanning from 10Hz to 52Hz, is designed to pinpoint oscillations arising from control loop instability among different Inverter-Based Resources (IBR) energy sources.



The Dominant Oscillation Phasor Monitoring algorithm is a licensed software module that can be loaded onto any existing VECTO Measurement Platform. It offers the following main functionality:

Continuous trending of a dominant oscillation phasor for the low, mid & high frequency bands

- Frequency & ROCOF
- Voltage & current amplitude & phase angles
- Powers
- 16.6ms update interval (mid & higher band)
- 200ms update rate for (lower band)

3 x Event Monitors with pre- and post- event data

- 1-sec Interval Oscillation Phasor Profiles
- Waveform, RMS & Fundamental Phasor data
- Alarm & Notification on Threshold Exceedance
- Oscillation Phasor Streaming using IEEE C37-118 Protocol

Features of Grid Oscillation Plus

- High precision oscillation phasor estimation
- Simultaneous detection & estimation of up to 3 individual oscillation phasors
- 16.6ms update interval on mid & higher bands
- IEEE C37-118 oscillation phasor streaming
- 3 x event monitors with pre- and post- event data
- 1-sec interval oscillation phasor profiles
- Waveform, RMS & fundamental phasor data
- Alarm & notification on threshold exceedance
- Oscillation phasor streaming using IEEE C37-118 protocol
- Functional elements for S5.2.5.10, proposed in AEMO's review of technical requirements for connection in the NEM
- Output relay control
- Independent threshold levels for alarms and relay control



INNOVATIVE MONITORING

Add impetus to your grid oscillation analysis

Discover the power of VECTO, set up a call with one of our team now for a free demonstration.

Synchro Wave Edge Computer



SO GRID VECTO

Data visualization at the edge



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