

OMNIVERTER VECTO

Phasor Measurement Unit PMU+

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



Synchrophasor Software Module

PMU+ is a sophisticated software module specifically created to work alongside the power quality features present in all VECTO 3 devices. This module allows users to record and stream synchrophasor data following the C37.118-2 (IEEE PMU protocol) standards. The PMU+ module achieves both Class-P and Class-M benchmarks simultaneously.

Adds PMU data to current set of diagnostic information

The suite of diagnostic data now contains the following:

- Waveforms
- RMS & Phasor data and powers
- Voltage & current synchrophasors

C37.118.2 Streaming

Synchrophasor streaming protocol enables device integration into existing wide area monitoring (WAM) networks.

Add Synchrophasor Data to PQ Events

The PMU+ module allows synchrophasor data to be combined with power quality event data, providing an additional data stream with powerful diagnostic capabilities.

Long Pre- and Post-PQ Event Data

The PMU+ module retains a long pre-event buffer, which enables detailed analysis of the build-up to & the impact of complex PQ events. Users can specify the duration of long pre- and post-event synchrophasor data recording, spanning tens of minutes, as part of the PMU+ module set-up process.

16.6ms Modbus Update Rate

The update rate of synchrophasor data via Modbus is once per cycle. This high update rate is required by most plant controllers.

Stable under highly distorted waveforms

When studying the performance of inverter-based power plants, it's common to encounter voltage and current waveforms that are either chopped or heavily distorted. The PMU+ algorithm used can accurately determine the fundamental frequency phasor set despite all these distortions.

Very High Time Resolution

The absolute time synchronization on the VECTO 3 devices is <math><100\text{ns}</math>. This translates to 4-digit frequency measurement resolution and an industry-leading ± 0.0018 -degree phasor angle resolution.

Simultaneous Class-M & Class-P Compliance

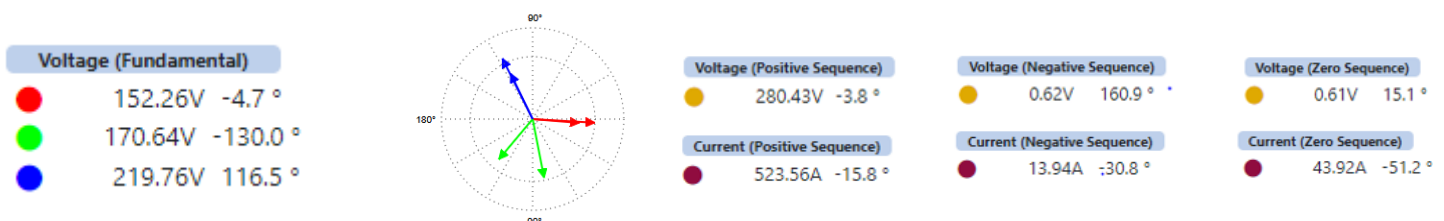
Most PMU devices need to be configured in either Class-P or Class-M mode. The PMU+ algorithm simultaneously meets both Class-P and Class-M requirements, eliminating the need to configure for Class-M's accuracy and Class-P's speed. This is particularly useful when analyzing grid stability events that contain very small amplitude information at higher frequencies (~20Hz), where both speed and accuracy are required.

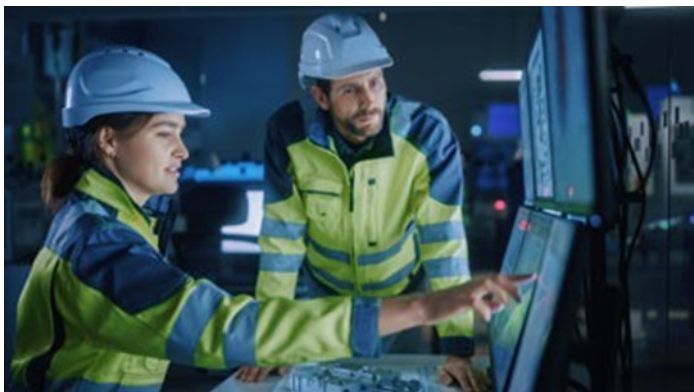
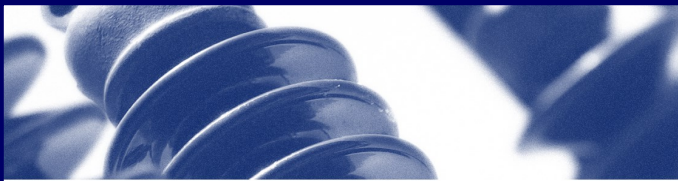
Offline Synchrophasor Recording

Synchrophasor data is recorded offline and is available for download as part of the existing data streams – without the use of the C37.118.2 streaming protocol. This means that synchrophasor data can be collected throughout the network – without having to rely on expensive broadband communication infrastructure required by the C37.118.2 protocol.

Available on Modbus Protocol

Synchrophasor data is accessible via the Modbus protocol interface. This simplifies the integration of the devices as part of plant control strategies.





VECTO Multifunction Platforms

Omniverter offers a range of Linux-based measurement devices that are permanently GPS or PTP synchronized to within <100ns from absolute time. Each of the Class-A wave synchronized devices offer high accuracy and high bandwidth analog inputs.

The VECTO 3 also offers analog and digital IO functionality. The devices can operate stand-alone or are permanently connected to VECTO Grid OS big data hosting, visualization, analysis & reporting platform.

Technical Specifications

Measurement Compliance	C37.118-1
Protocol Compliance	C37.118-2
Accuracy Class	Class-P&M Simultaneously
Frequency Accuracy	<0.001Hz

Voltage & Current Accuracy	<0.1%
Power Accuracy	<0.2%
SCADA Protocol	MODBUS
SCADA Update Speed	16.6ms

VECTO combines PMU, power quality, automation, billing & grid oscillation capabilities in a single platform.

Internal clocks are permanently synchronized to within ± 100 ns from absolute time.

The platform can also be used to implement several control strategies without compromising on any standard functionalities



Five Class-A systems in a single management system

Synchro Wave Edge Computer



Data visualization at the edge



SO GRID
VECTO OS



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