Turnkey Synchrophasor Solutions

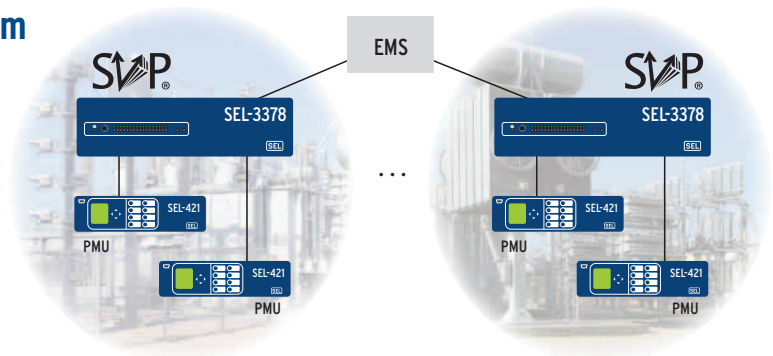*Optimize Your Power System With a Practical, Economical Synchrophasor System*

Improve Reliability and Make Informed Decisions

Synchronized phasor measurements (synchrophasors) provide time-coherent electrical quantities across a power system. SEL Engineering Services supports the application and operation of SEL equipment and other intelligent electronic devices (IEDs) on electric power systems. Our knowledgeable engineers will work with your operations requirements and existing equipment to custom design and implement a complete synchrophasor solution.

- Validate and improve system models using accurate time-coherent system voltage and current measurements.
- Directly measure system state, turning state estimation into state measurement.
- Determine system stability limits and margins to allow for increased system loading.
- Improve operator awareness for situations such as overload conditions, transmission outages, or generator shutdown.
- Advance system knowledge with correlated event reporting and real-time system visualization.
- Create alarms based on critical stability indicators, such as oscillatory frequency and damping ratio, to assess power system health or to trigger remedial action schemes.

Measure the State of Your Power System

Send combined and conditioned measurements from an entire station to an energy management system (EMS) via the SEL-3378 Synchrophasor Vector Processor. Isolate incorrect data and alert operators. Calculate state vectors for adjoining stations to provide built-in measurement redundancy.

*Making Electric Power Safer, More Reliable, and More Economical®*

Typical Synchrophasor Measurement System Architecture

SEL phasor data concentrators (PDCs) play a key role in wide-area synchrophasor measurement and control.

The diagram represents a typical architecture using the SEL-3373 Station Phasor Data Concentrator (PDC), SEL-5073 SYNCHROWAVE® PDC Software, and SEL-3378 Synchrophasor Vector Processor. These products provide phasor data concentration. The SEL-3373 and SEL-5073 archive data locally, and the SEL-3378 provides flexible control capability.

Satellite-synchronized clocks at each substation provide time synchronization for synchrophasor data and for disturbance event recording. Security gateways or serial encryption devices secure communications. Visualize the system's varying nature with graphical results using SEL-5078 SYNCHROWAVE® Console Software.

The PDCs and the SEL-5078 Software will work with any IEEE C37.118-2005 compliant device.
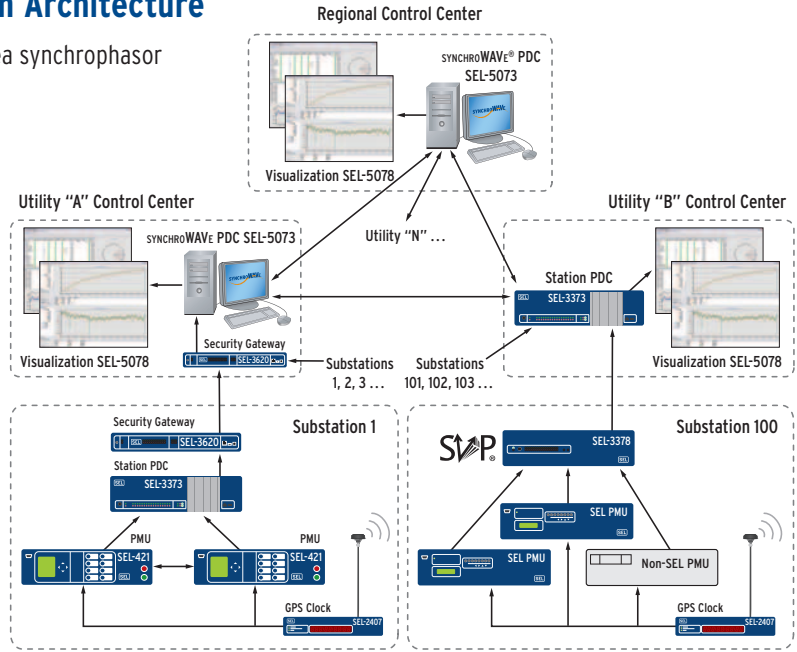
Measure System Angle, Slip, and Acceleration for Out-of-Step Detection

Use direct angle measurement with slip frequency and rate of change of slip for accurate and fast detection of out-of-step conditions.
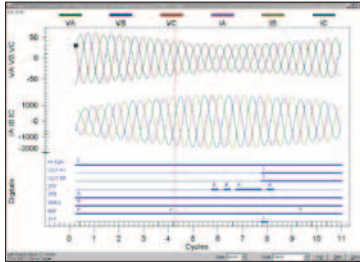
Control Flexible AC Transmission Devices Using Wide-Area Measurements

Use real-time streaming values from remote transmission ends to control SVCs, power system stabilizers, and other active components based on voltage or current magnitude and phase angle, real or reactive power, or rate of change of input quantities.
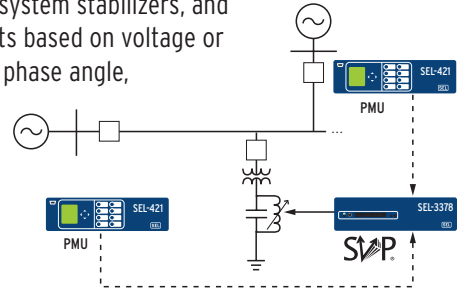
Disturbance Data Recording and Archiving

After major power system events, analyzing synchronized, high-quality data dramatically reduces the time needed to understand the events. Additionally, observing trends and patterns in archived data helps in developing future power system design and control.

SEL-3373 and SEL-5073 phasor data concentrators:

- Archive data locally in a substation, the main office, and/or the control center.
- Provide read-only, secure access to the archived database via the included PDC Assistant software.
- Allow you to share data with a neighboring utility or send the data to a regional control center.