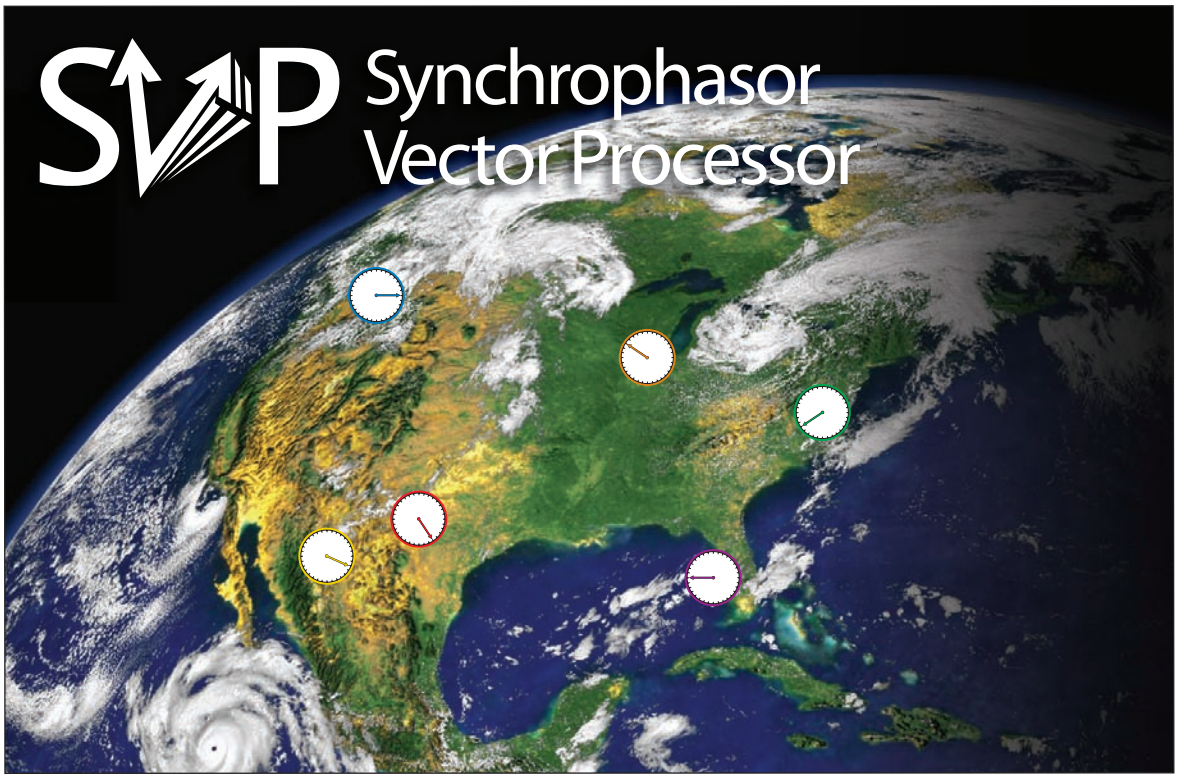
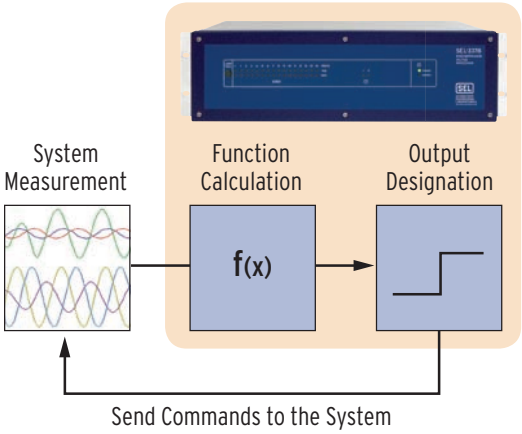
SEL-3378 Synchrophasor Vector Processor

Real-Time Wide-Area Control



Synchrophasor measurements for power system control.

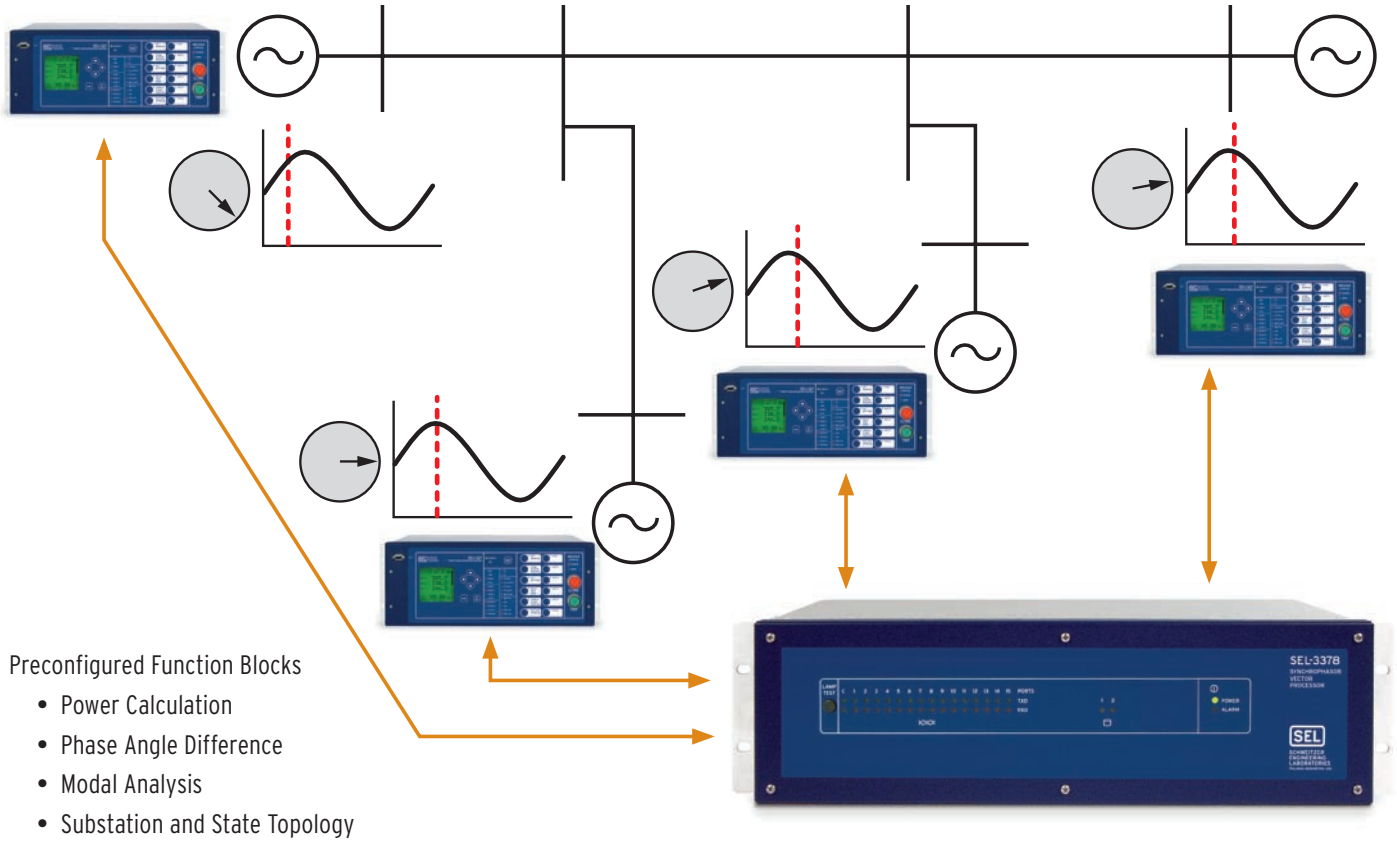


The SEL-3378 Synchrophasor Vector Processor closes the control loop between the power system and wide-area measurements.

Features and Benefits

- **Identify** oscillatory conditions with preconfigured modal analysis.
- **Measure** system phase angles, voltages, currents, and real/reactive power.
- **Improve** system efficiency by minimizing loop flow, optimizing voltages, and balancing loads.
- **Control** circuit breakers, static VAR controls (SVCs), generators, and other devices with wide-area-based algorithms.

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



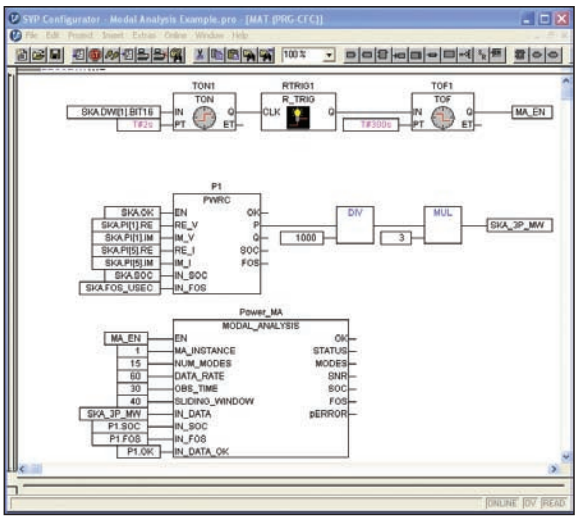
Preconfigured Function Blocks

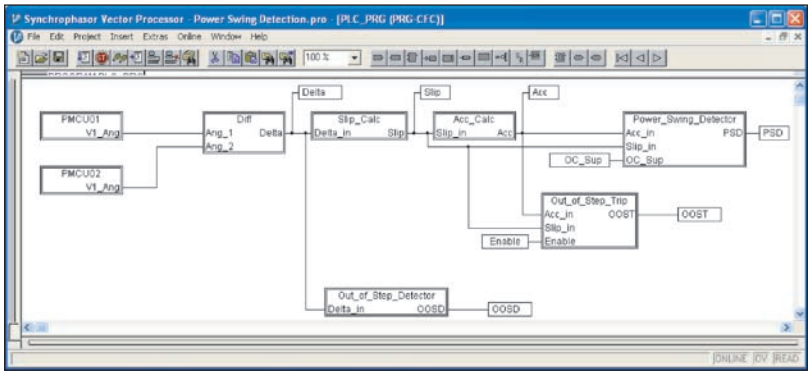
- Power Calculation
- Phase Angle Difference
- Modal Analysis
- Substation and State Topology

Complete IEC 61131-3 Programming Engine

Connect to C37.118-compliant PMUs and relays with serial or Ethernet communications.

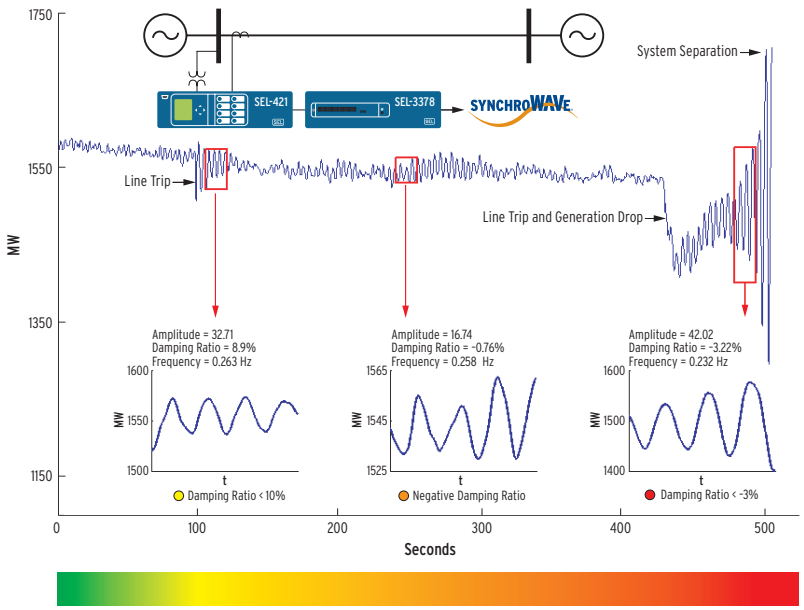
Flexible IEC 61131 Programming for Easy Setup and Powerful Applications





Apply preconfigured function blocks and customized applications to meet any control needs. Subcycle processing produces SEL Fast Operate commands to send to any connected SEL device or PMU.

Detect Instability With Preconfigured Modal Analysis Function Block



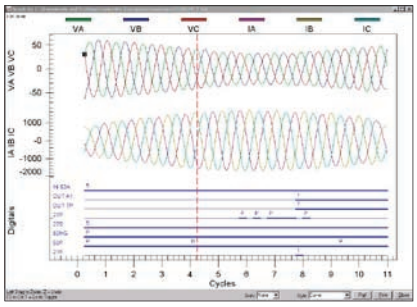
Create Alarms for Underdamped Conditions

Close a contact based on critical stability indicators, such as oscillatory frequency and damping ratio, to assess power system health. Analyze up to 15 different modes from up to six different input voltages, currents, or real/reactive power. Detect unstable operating conditions, or check model predictions.

Base alarms on mode amplitude, frequency, damping constant, and ratio for direct alarm or in combination with other conditions.

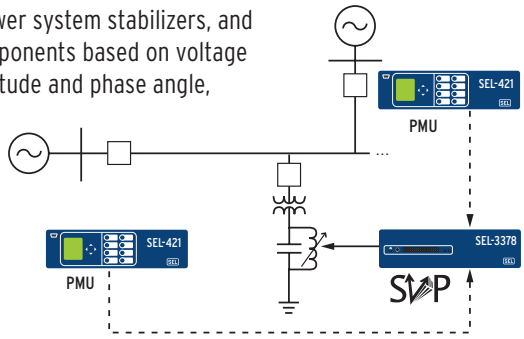
Measure System Angle, Slip, and Acceleration for Out-of-Step Detection

Use direct angle measurement with slip frequency and rate of change of slip for accurate and fast detection of out-of-step conditions.



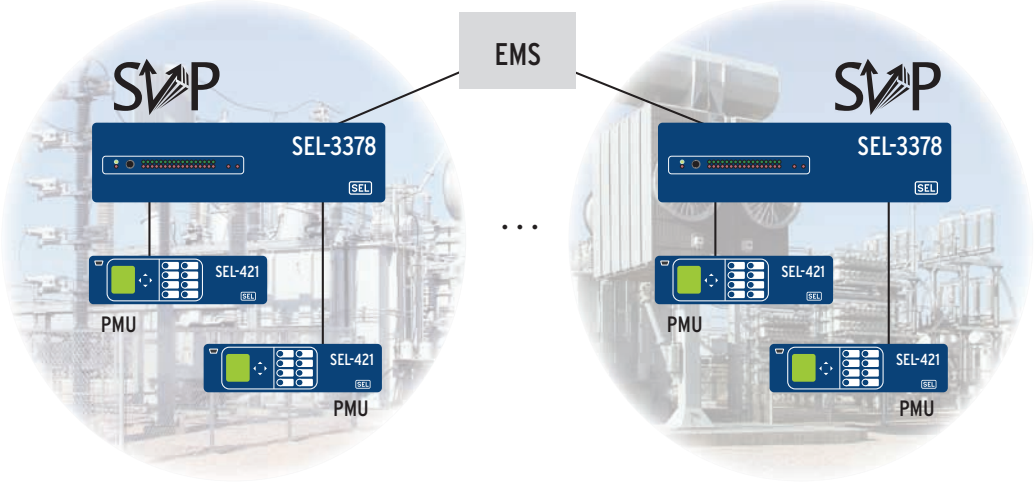
Control Flexible AC Transmission Devices Using Wide-Area Measurements

Apply remote measurements to local control. 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.

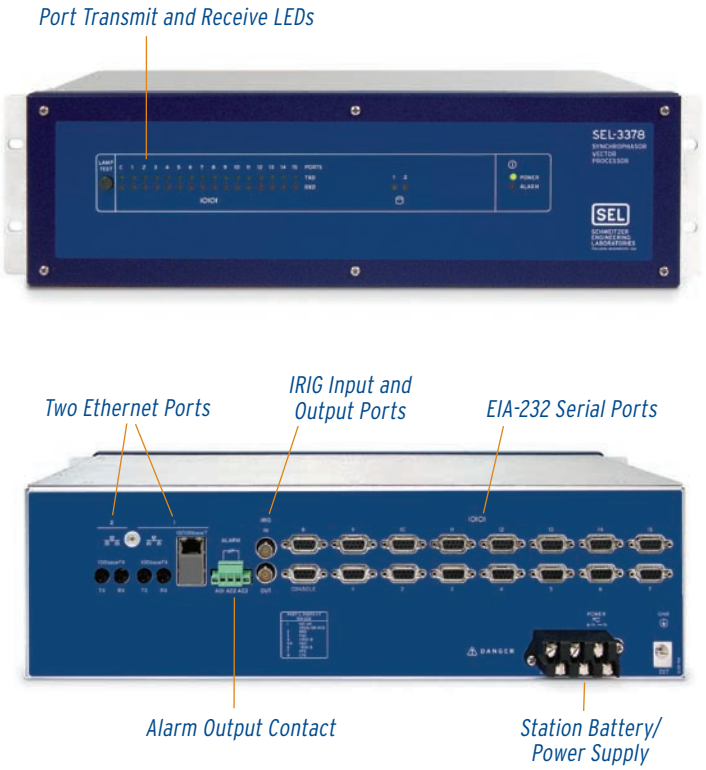


Measure the State of Your Power System

- Send combined and conditioned measurements from an entire station to the energy management system (EMS). Isolate bad data, and alert operators of input failures.
- Calculate state vectors for adjoining stations to provide built-in measurement redundancy.



SEL-3378 Synchrophasor Vector Processor



The SEL-3378 Synchrophasor Vector Processor is rugged enough for substation installations. Long life is assured, with no moving parts and a relay-type power supply.

General Specifications

Operating Temperature −40° to +75°C (−40° to +167°F)

Communications Ports

Serial Ports	16
Console Port	EIA-232 with DB-9 connectors
Serial Data Speed	9600 bps
Ports 1–15	EIA-232 with DB-9 connectors
Serial Data Speed	9600, 19200, 38400, 57600, and 115200 bps
Ethernet Ports	2
Ethernet Port 1	10/100BASE-T copper or 100BASE-FX fiber-optic
Ethernet Port 2	100BASE-FX fiber-optic

IRIG-B Ports

Time-Code Input	
Connector	Female BNC
Time Code	Demodulated IRIG-B TTL
Time-Code Output	
Connector	15 rear DB-9 port connectors Female BNC
Time Code	Demodulated IRIG-B TTL compatible

Synchrophasor Data Format

Input Data Formats	
IEEE C37.118-2005	Ethernet and Serial
Output Data Formats	
IEEE C37.118-2005	Ethernet

Synchrophasor Input/Output Message Rates

60 Hz Nominal Data Rate	1, 2, 4, 5, 10, 12, 15, 20, 30, and 60 messages per second
50 Hz Nominal Data Rate	1, 2, 5, 10, 25, and 50 messages per second

Synchrophasor Data Ports

Serial	15
Ethernet	2

Synchrophasor Processing Capacity

Processing Capacity	Data from as many as 16 PMCUs
Typical Message Size	158 bytes
Maximum Data Rate	60 messages per second

Fast Operate Commands

Remote Bits per External Device	32
Breaker Control Bits per External Device	8
Output	Serial and Ethernet

Power Supply

125/250 Vdc or 120/230 Vac; 50/60 Hz
48/125 Vdc or 120 Vac; 50/60 Hz
24/48 Vdc

Pullman, Washington USA
Tel: +1.509.332.1890 • Fax: +1.509.332.7990 • www.selinc.com • info@selinc.com