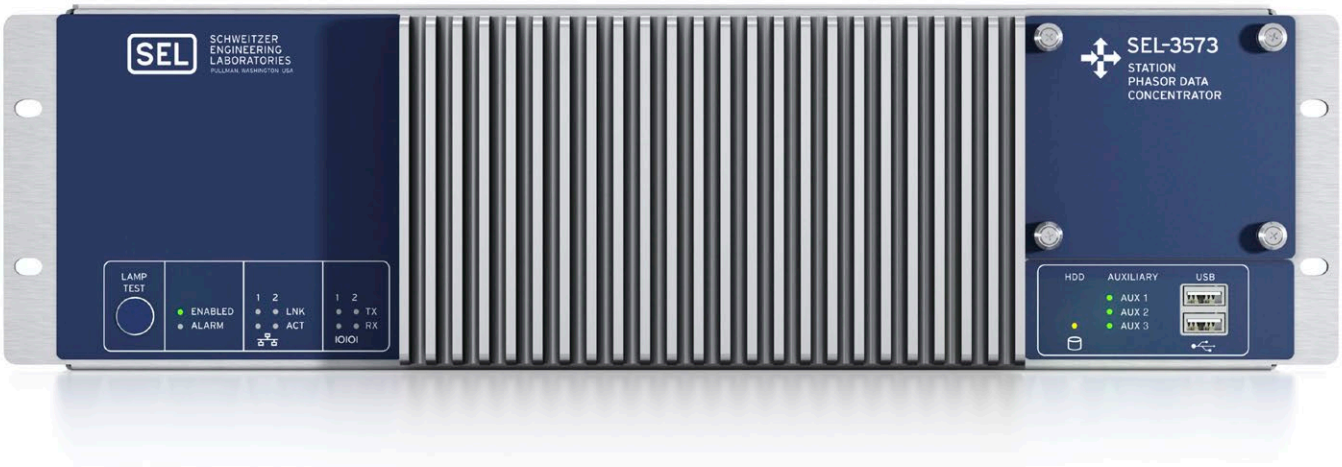
SEL-3573

Station Phasor Data Concentrator (PDC)



Substation-hardened, real-time performance PDC with archiving

- Improve situational awareness while dramatically reducing the time needed to analyze events with wide-area, time-synchronized archived data.
- Meet the dynamic disturbance recording requirement of NERC PRC-002-2 by archiving PMU data at 30 messages/second.
- Obtain NERC CIP compliance support with individual user- and role-based account authentication, centralized user authentication, a built-in firewall, and SEL exe-GUARD® whitelist antivirus technology.
- Concentrate data with up to 120 IEEE C37.118-2005 or C37.118-2011 phasor measurement units (PMUs) at rates up to 240 messages/second.

Key Features

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.

The Station PDC solution:

- Complies with NERC PRC-002-2 disturbance recording requirements when combined with SEL relays and ACSELERATOR TEAM® SEL-5045 Software.
- Archives data locally in a substation, the main office, and/or a control center.
- Provides read-only, secure access to the archived database via the included PDC Assistant Software or the ODBC interface.
- Allows you to share data with a neighboring utility or send data to a regional control center. You decide which data to send.
- Offers programmable phasor angle scaling for downstream PT/CT phase error correction and phase rotation adjustment.

Real-Time, Wide-Area Monitoring and Control

See the up-to-the-second status of the entire power system. When combined with SEL-5078-2 SYNCHROWAVE® Central Software, observe the system's dynamic behavior in a graphical display. This real-time information helps operator decision-making.

Apply the capabilities of the SEL-3573 to:

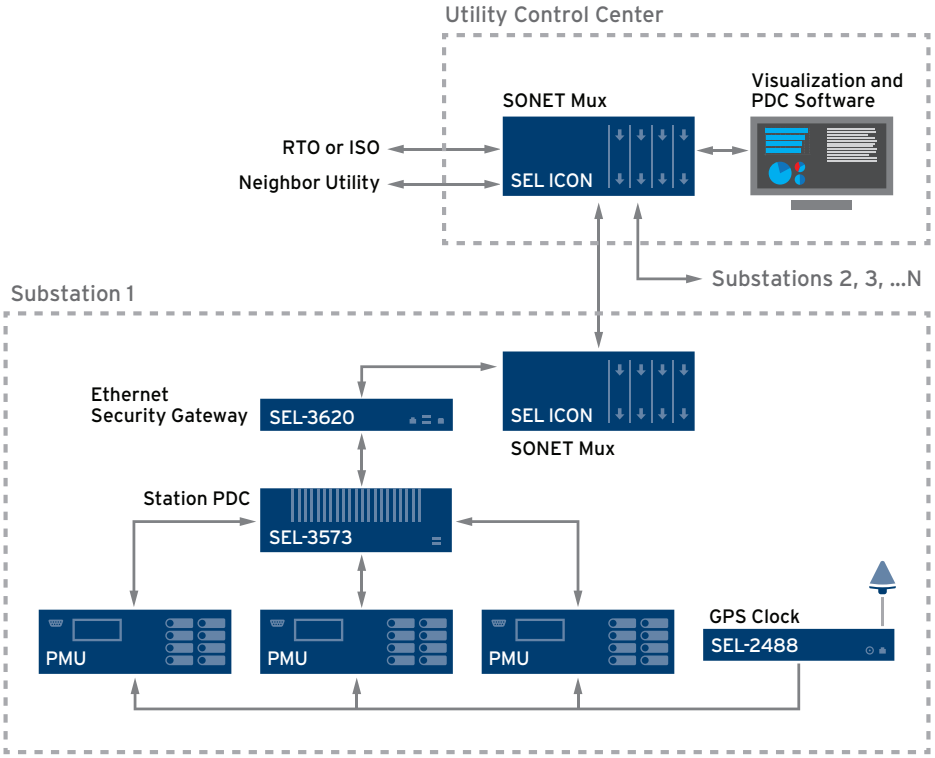
- Provide data to SYNCHROWAVE Central for archived data analysis and real-time visualization.
- Archive disturbance data to the solid-state drive (SSD).
- Calculate time-stamped power quantities.
- Stream phasor data to the independent system operator (ISO).
- Meet ISO phasor measurement unit (PMU) naming conventions with aliasing support for tags, PMU names, and IDs.
- Monitor network performance with packet delay and network latency calculations.

Typical Synchrophasor Measurement System Architecture

The SEL-3573 plays a key role in wide-area synchrophasor measurement, control, or distributed disturbance recording systems. The diagram represents a typical architecture using station and system PDCs. The PDCs provide local archiving and phasor data concentration. SEL-5073 SYNCHROWAVE PDC Software and the SEL-3573 Station PDC share a common user interface, allowing you to seamlessly implement both into your system. You decide how many PMU inputs you want to concentrate. The SEL-3573 provides up to 120 PMU inputs and the SYNCHROWAVE PDC more than 500 inputs, making these solutions ideal for typical applications, such as individual substations, utility control centers, and regional control centers. Configure the PDC to only provide the data you want to send to other utilities or the regional control center.

Satellite-synchronized clocks at each substation provide time synchronization for synchrophasor data and for disturbance event recording. Additionally, security gateways or encrypted serial communications devices form SEL secure communications.

The Station PDC can time-align, process, and concentrate data from any IEEE C37.118-2005 or C37.118-2011 compliant PMU.

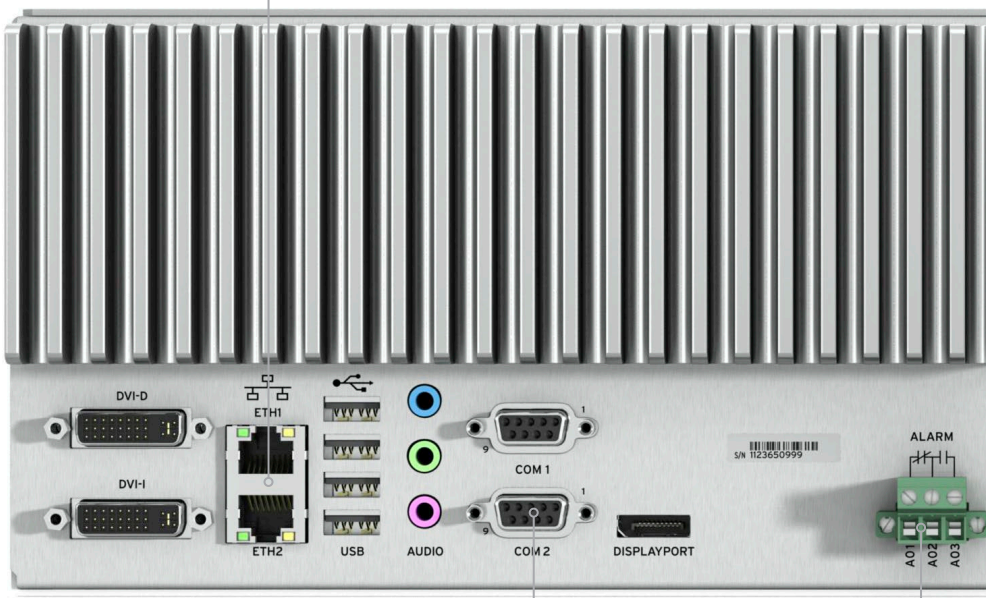


Product Overview

Integrated firewall and antivirus.

LEDs for visible indication of transmit/receive activity on the various I/O ports.

Configurable physical network separation for enhanced security.



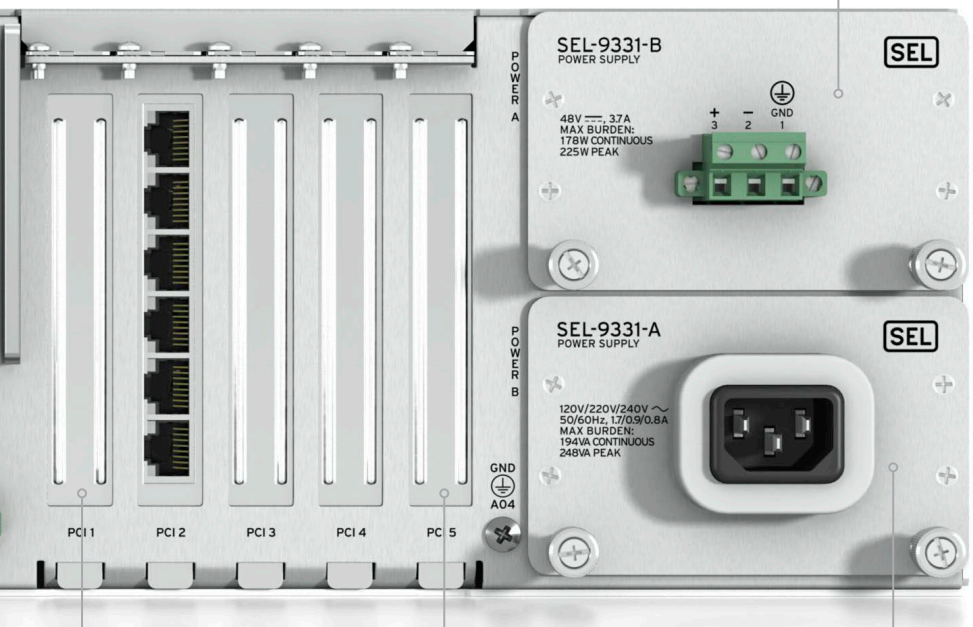
2 EIA-232 serial communications ports.

Alarm contacts for self-test or power supply failure.

Solid-state design with no moving parts.

Included PDC Assistant Software for quick and easy commissioning.

Optional secondary power supply to maximize availability.



In addition to the included six-port SEL-3390S8 PCIe x1 Serial Expansion Card, add up to three additional SEL-3390S8 Cards for a total of 24 RJ45 serial ports.

Wide-range ac or dc power supply.

PDC Selection Chart

The SEL product line includes several PDC solutions. The following table summarizes product offerings to assist you in selecting the right one for your application.

	SEL-3573 Station PDC	SEL-5073 SYNCHROWAVE PDC Software	SEL-3555 Real-Time Automation Controller (RTAC)
Number of Inputs	120	>500	100
Number of Outputs	10	6	100
Archiving	Yes	Yes	Yes (with DDR extension)
Data Rates	Up to 240 messages per second	Up to 240 messages per second	Up to 240 messages per second
Control	No	No	Yes
Input Format	IEEE C37.118	IEEE C37.118	IEEE C37.118 DNP3 Modbus SEL Fast Message
Output Format	IEEE C37.118	IEEE C37.118	IEEE C37.118 DNP3 Modbus SEL MIRRORED BITS® communications SEL Fast Message
Platform	Hardware	Software	Hardware
Selectable Outputs	Yes	Yes	Yes
Multiple Input Rates	Yes	Yes	No

SEL-3573 Station PDC

Configuration and Commissioning With PDC Assistant Software

- Configure PDC settings in online or offline mode.
- Create input connections for PMUs or other PDCs.
- Archive continuous synchrophasor data and/or triggered events.
- Monitor the status of your synchrophasor system in real time.
- Manage user accounts.
- Configure the various PDC calculations.
- Download diagnostic and communications logs.

SEL-3573 Specifications

General	
Security Features	**Account Management** LDAP for centralized management of user access Role-based accounts Strong passwords **Security Audit** Access logs Audit facility **Other** Firewall Alarm contact and LED SEL exe-GUARD whitelist antivirus technology and mandatory access control
Supported Communications Protocols	Inputs: EIA-232, TCP, UDP, UDP_U, UDP_T, UDP_S (unicast and multicast) Outputs: TCP, UDP_U, UDP_T, UDP_S (unicast and multicast) Compatible with IEEE C37.118-2005 and C37.118-2011 clients/servers
Diagnostics and Status	Up to 10 syslog outputs (RFC 3164) Remote log retrieval Detailed system diagnostics
Archiving (optional)	Conforms to IEEE C37.232 naming practice for time-sequence file names Secure ODBC API for use with database management systems User-configurable archive collection service ASCII COMTRADE format CSV format Compressed CSV format Continuous archiving Triggered archiving Up to 90 minutes of pretrigger and 90 minutes of posttrigger data
Calculations	**Mathematical Calculations** Power calculations: watts and VARs Sequence components: positive, negative, and zero Phasor and analog algebra: addition, subtraction, multiplication, and division Phasor and analog value scaling: magnitude or angle using a constant Derivative: calculates the rate of change in analog values **Utility Calculations** Network latency: instantaneous, average, and maximum latency measurements Interpacket delay: instantaneous, average, and maximum packet-to-packet delay Component: separates a phasor into its components

SEL-3573 Specifications (continued)

General	
Operating System	SEL Linux Krakatoa
Archiving Storage Options	One 2.5" SSD: 30, 60, 120, or 250 GB
CPU	Intel Core i7-3612 QE quad core, 2.1 GHz, 3.1 GHz turbo
PMU Inputs	120 inputs (standard)
RAM	8 GB DDR3 error-correcting code (ECC) (1,333 MHz)
Configurable Outputs	10 fully configurable outputs
Operating Temperature Range	−40° to +60°C (−40° to +140°F)
Ethernet	Two rear-panel 10/100/1,000 Mbps copper RJ45 ports
Power Supply[1]	125/250 Vdc or 120/240 Vac; 50/60 Hz DC range: 100−300 Vdc AC range: 85−264 Vac Frequency range: 45−65 Hz Typical burden: 50 W DC ripple: <15% rated voltage Peak inrush: 20 A Max burden: 300 W Insulation: 3,100 Vdc

[1]Optional second power supply to maximize availability with same specification.

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