

SEL-2240 Axion[®] NERC PRC-002 Recording Solutions



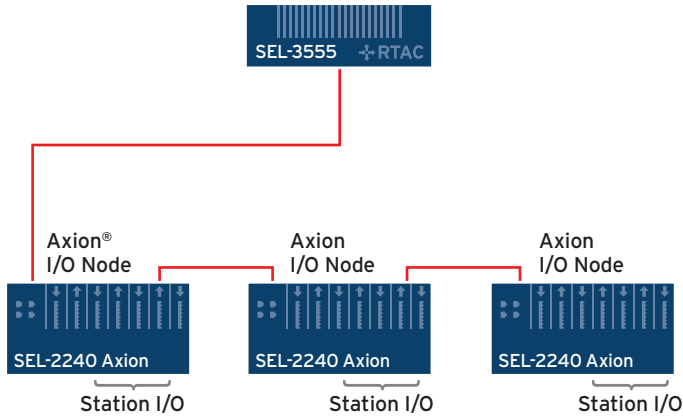
Reliable, flexible, modular disturbance recording

- Create advanced recording solutions for your system with the SEL-2240 Axion[®] and SEL-3555 Real-Time Automation Controller (RTAC).
- Capture power system events with 24 kHz sampling.
- Record system-wide transients with continuous dynamic disturbance data.
- Analyze events with intuitive, powerful, and feature-rich SYNCHROWAVE[®] Software.



Standalone System Features

With SEL RTAC and SEL Axion I/O Modules



High-Speed Fault Recording With Axion I/O

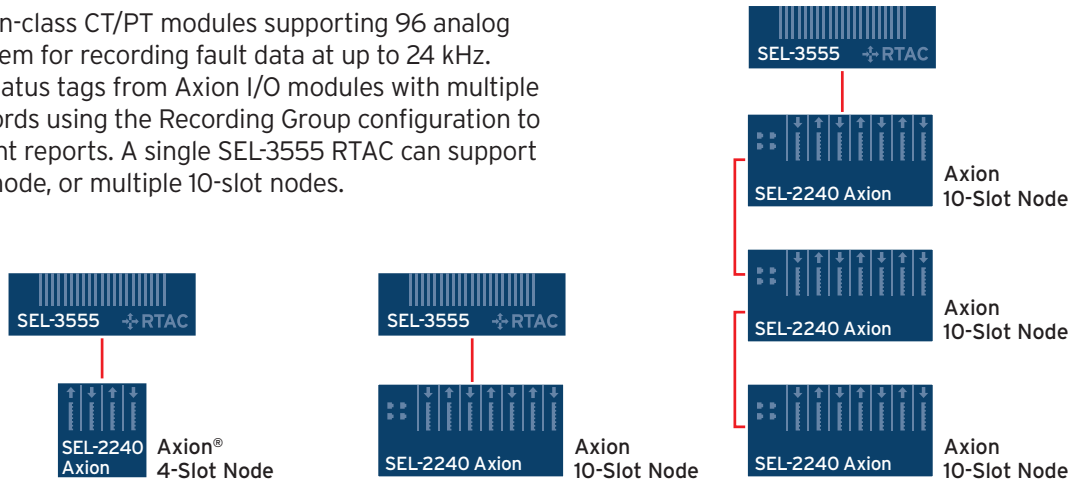
Customize fault recording by choosing from 1 to 24 kHz reports varying from 1 to 576 seconds. With up to 250 GB available for fault record storage, you can store thousands of reports.

Use the advanced SELogic® engine in the Axion to trigger events. You can cross-trigger other fault recorder systems or relays using IEC 61850 GOOSE messages or MIRRORING BITS® communications. The Recording Triggers extension in acSELEATOR RTAC® SEL-5033 Software lets you configure triggers without writing a single line of code.

With SYNCHROWAVE Event Viewer, you can perform detailed analysis, like Fast Fourier Transform (FFT) and spectral analysis, to find harmonic content in the power system.

Scalable

Apply up to 16 protection-class CT/PT modules supporting 96 analog inputs in one Axion system for recording fault data at up to 24 kHz. You can merge digital status tags from Axion I/O modules with multiple CT/PT module fault records using the Recording Group configuration to create system-level event reports. A single SEL-3555 RTAC can support a 4-slot node, a 10-slot node, or multiple 10-slot nodes.



Dynamic Disturbance Recording

Analyze archived synchrophasor data and event reports in one display for a complete disturbance monitoring solution. You can easily find system disturbances and export data to CSV and COMTRADE data formats for NERC PRC-002-2 compliance. In addition to archiving with SEL-5078-2 SYNCHROWAVE Central Software, the SEL-3555 RTAC can store more than 10 days of data on the internal SSD using the Dynamic Disturbance Recording (DDR) library.



Wide-Area Situational Awareness

Use SYNCHROWAVE Central for the viewing and analysis of disturbance monitoring data. SYNCHROWAVE Central provides comprehensive visualization capabilities, such as viewing multiple event files simultaneously, time-aligning synchrophasor data with event reports, and viewing dynamic disturbance data in real time. You can also perform and display complex calculations on measured data.

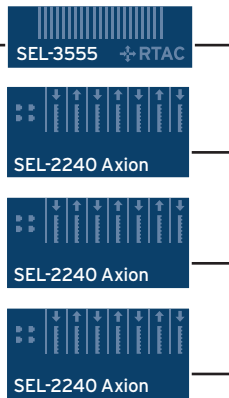


Combined System Features



ACSELERATOR TEAM®
SEL-5045 Database

ACSELERATOR TEAM SEL-5045
Software automatically collects
data from the RTAC.



Powerful Data Management

Leverage existing systems with SEL relays and other intelligent electronic devices (IEDs) to perform dynamic disturbance and fault recording that exceeds NERC PRC-002-2 requirements. In places with electromechanical relays, the Axion I/O can record additional analog or digital I/O not previously monitored. You can merge multiple SEL-2245-42 AC Protection Module event reports with Axion digital I/O in a single COMTRADE file with a recording group configuration. ACSELERATOR TEAM lets you automatically collect those merged COMTRADE files and separate the relay event files.

Secure Operation

The system provides secure operation and access with SEL exe-GUARD® whitelist antivirus technology to protect against cybersecurity threats. The exe-GUARD technology ensures that only authorized programs will operate. All Ethernet communications are encrypted via Secure Shell (SSH) and Secure Sockets Layer (SSL)/Transport Layer Security (TLS) tunneling. The system can send alerts via syslog, text, email, and Sequence of Events (SOE) logging.

Reliable Performance

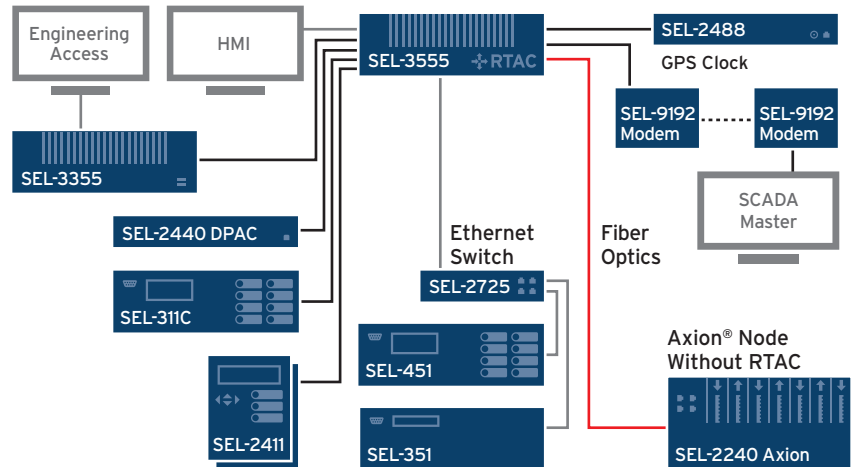
All of the system components operate reliably in harsh environments and conform to IEEE C37.90 and IEC 60255 protective relay standards. Additionally, SEL products use reliable solid-state storage and have no fans or moving parts to wear out, which translates to less downtime and the best mean time between failures (MTBF) in the industry. We are so confident in our reliability that we offer an industry-leading ten-year warranty on the entire system.



Applications

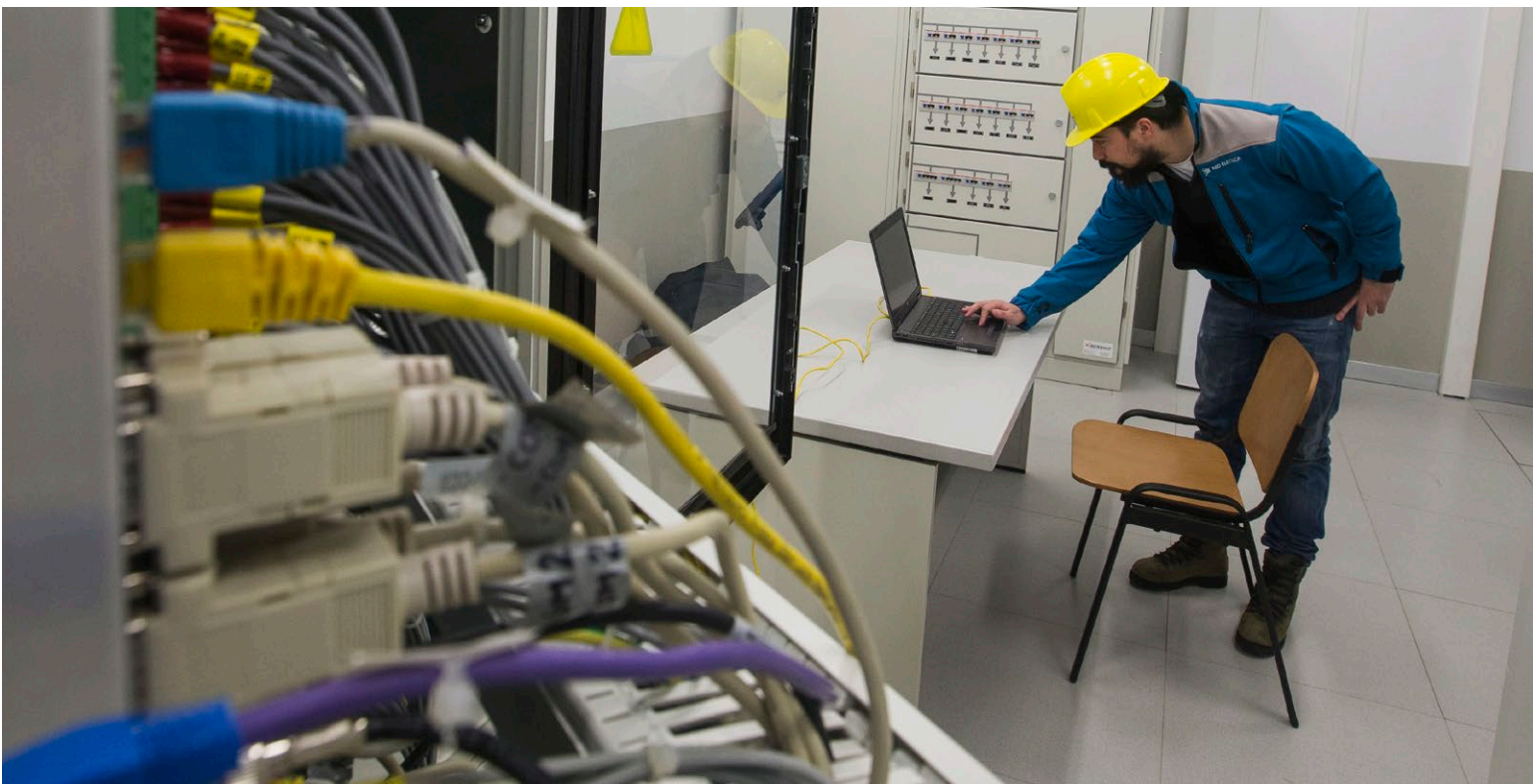
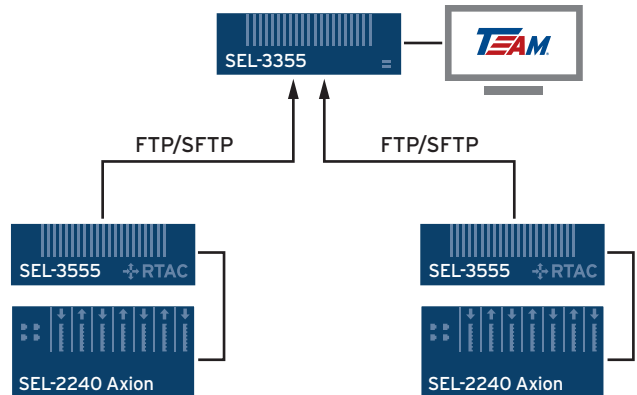
Disturbance Recorder and More

Deploy the RTAC as both a disturbance recorder and a data concentrator to collect data using modern and legacy protocols. You can design an integrated substation remote terminal unit (RTU) system that includes digital fault recording, protocol conversion, SCADA communication, synchrophasors, time synchronization, data management, and custom logic.



Automatic Event Collection

Detect, filter, and collect event data automatically from connected SEL relays. Fault location, fault current, and other data are populated into tags for easy retrieval through SCADA protocols. TEAM can automatically collect and archive events through the RTAC using MMS File Services or the Secure File Transfer Protocol (SFTP).

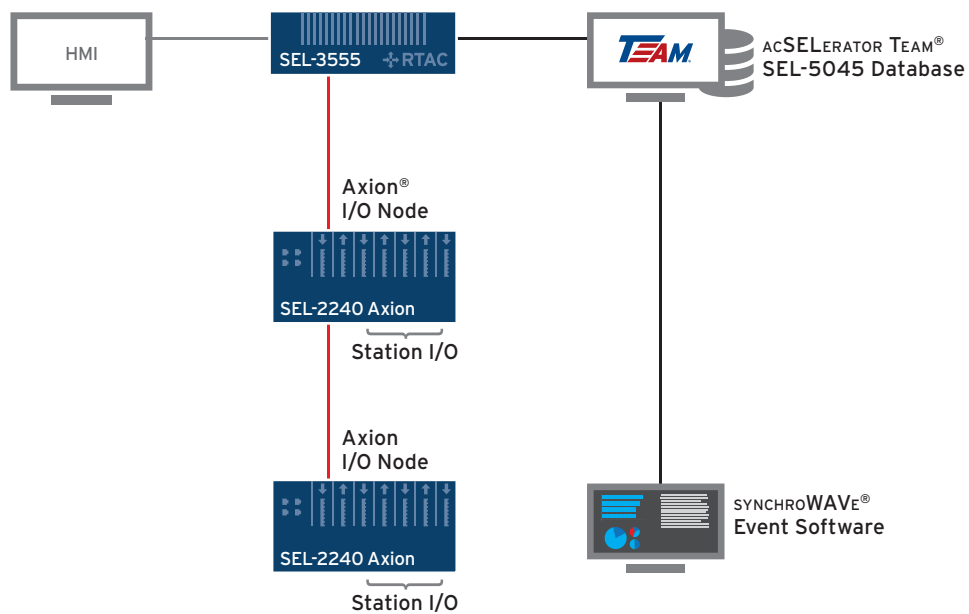




Analyze System Performance

You can use the SEL-3555 RTAC as the main controller. A single SEL-3555 provides up to 250 GB of reliable solid-state storage for thousands of event reports and offers the ability to view SOE data via an HMI. The Axion can scale up to 96 analog points and over 1,000 digital points.

Set up automatic event notifications using TEAM, which collects COMTRADE event reports directly from the SEL-3555 RTAC.



Specifications

General

Analog Inputs Per CT/PT Module	3 Voltages: 67–240 V _{LN} (rated range); 0–300 V _{LN} (operational range) 3 Currents: 0.1–20.0 A _{rms} (rated range); 0.1–300.0 A _{rms} (operational range)
I/O Modules	Digital input 24 contact inputs (24, 48, 110, 125, 220, 250 Vac/Vdc) Standard digital output 16 standard control outputs All Form A, all Form B, or mixed
Fault Recording	Sampling rates: 1, 2, 4, 8, 24 kHz software-selectable Transient Fault Record Length Prefault time: 0.05 s – (max. event length – 0.05 s) Individual records as long as: 24 seconds for 24 kHz 72 seconds for 8 kHz 144 seconds for 4 kHz 288 seconds for 2 kHz 576 seconds for 1 kHz Data format: IEEE C37.111-2013 COMTRADE File naming: IEEE C37.232 COMNAME Store up to 1,024 COMTRADE events.
SOE Recording	Store up to 30,000 records as fast as 1 ms. Longer term SOE storage is configured through the DDR library.
DDR	Record currents, voltages, frequency, and digital status inputs up to 60 times a second. Store up to 250 GB of data.
Synchrophasors (SEL-2245-42 AC Protection Modules only)	Conformance: IEEE C37.118.1-2011 as amended by IEEE C37.118.1a-2014, IEEE C37.118.2-2011 Accuracy: Level 1 as specified by IEEE C37.118 Measurements: Software-selectable (P or M class) Phase voltages Phase currents Positive-sequence current, frequency, df/dt
Triggering	Trigger fault recording via the Recording Triggers extension using zero lines of code for most common conditions, such as analog threshold levels or rate of change. Alternatively, use the protection library or create custom IEC-61131-3 logic for other trigger conditions.
Time Synchronization	IRIG-B with 250 ns accuracy Precision Time Protocol (PTP)
Operating Temperature	SEL-3555: –40° to +75°C (–40° to +167°F) Axion modules: –40° to +85°C (–40° to +185°F)

For additional details, please refer to the SEL-3555 and Axion datasheets.

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