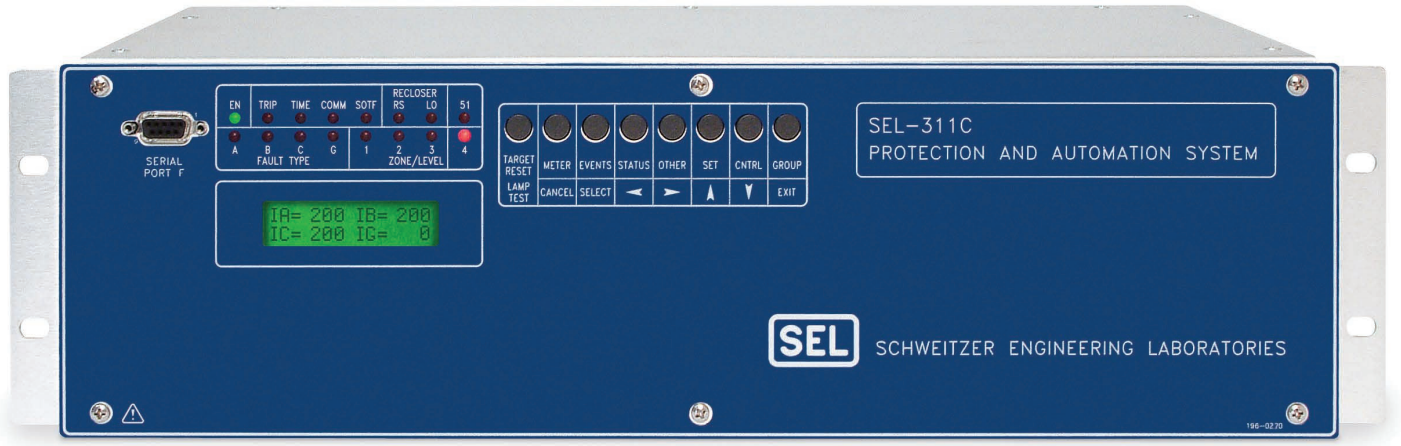
SEL-311

Protection and Automation System

Three Economical Relay Models for Your Line Protection Requirements



Choose from three models of the SEL-311 Relay for integrated protection, monitoring, and control of transmission lines.

Features and Benefits

Protection
Optimize line protection with a system of sensitive, secure, and dependable three-pole trip relay elements.

Control
Choose an SEL-311B or SEL-311C model with four-shot reclosing and synchronism check for integrated protection and control.

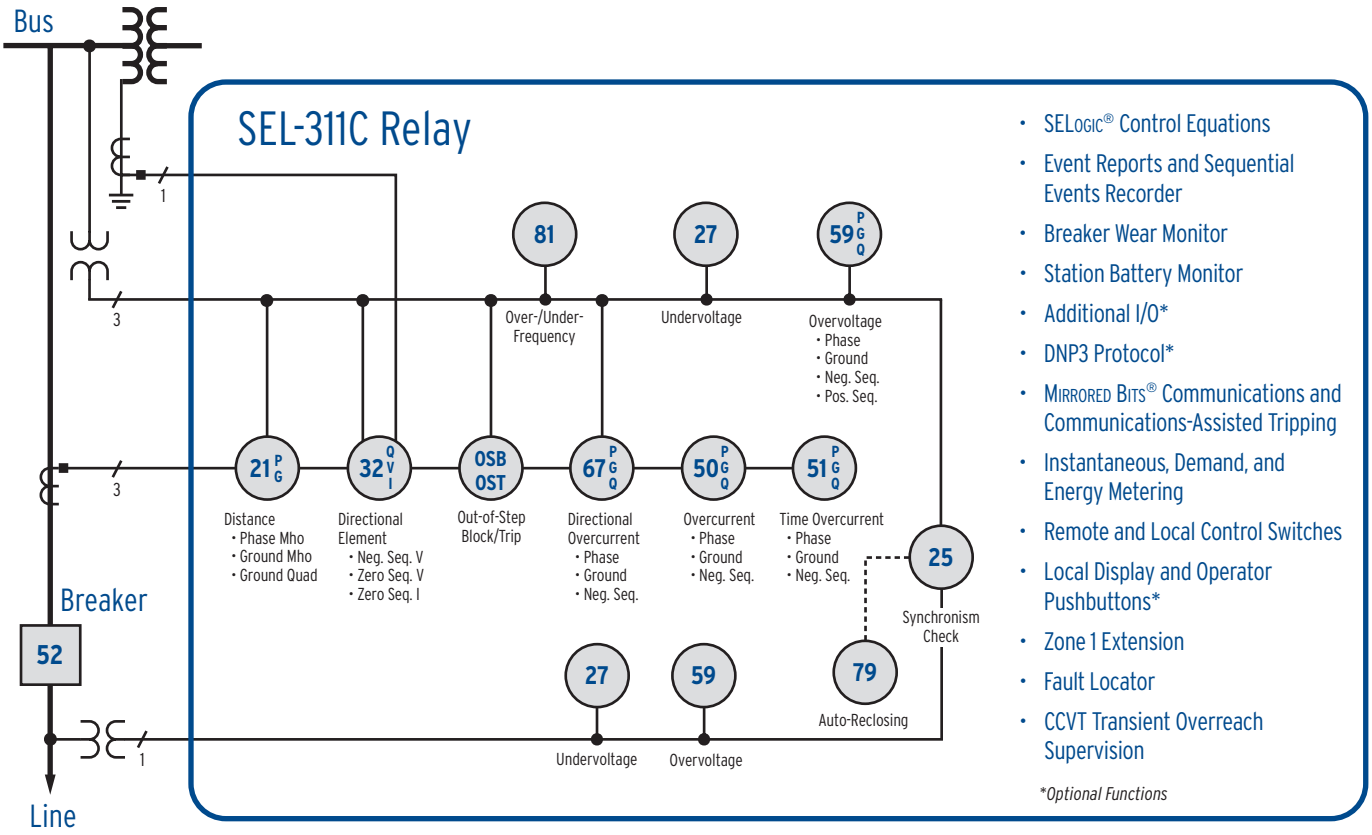
Monitoring
Simplify fault and system disturbance analyses with event reports and the Sequential Events Recorder.

Fault Locator
Isolate line problems, and restore service faster.

Automation
Reduce total project cost through remote communications capabilities and elimination of external control elements.

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

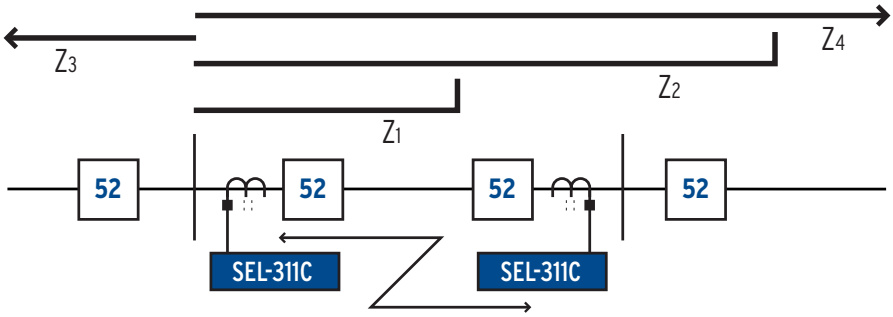
Functional Overview



Application settings save time and cost in SEL-311 distance relay schemes. The SEL-311C Relay is the most advanced model, with four zones of phase and ground mho elements.

Distance Protection

The SEL-311C Relay is the advanced technology alternative to popular SEL-221 applications. Four-zone phase and ground distance elements plus directional ground elements provide a convenient array of line protection solutions. Permissive overreaching/underreaching and directional comparison blocking/unblocking schemes are supported. Built-in, four-shot reclosing provides greater flexibility in protection and control of transmission lines.



Communications-assisted tripping.

Wire-alike solutions for SEL-221 distance relays simplify migration of line protection standards to SEL-311 series relays.

Three Distance Relays From SEL

Three different versions of the SEL-311 Protection and Automation System are available for a wide variety of protection applications.

The basic version SEL-311A Relay includes two zones of phase and ground mho distance elements for stepped distance protection of subtransmission lines. A directional ground overcurrent element provides scheme flexibility in those cases where the ground directional function is preferred over the ground mho element.

The SEL-311B Relay adds Zone 3 for both phase and ground fault protection, which can be set for either the forward or reverse direction. Four-shot reclosing including voltage and synchronism check functions expands the application of the SEL-311B to include protection and breaker reclosing control.

The SEL-311C Relay is the most advanced model, with four zones of phase and ground mho elements. These distance functions, along with a full complement of directional overcurrent elements, are further enhanced with built-in pilot protection scheme logic. Together with the four-shot reclosing, the SEL-311C provides a very attractive three-pole tripping scheme for uncompensated transmission lines.

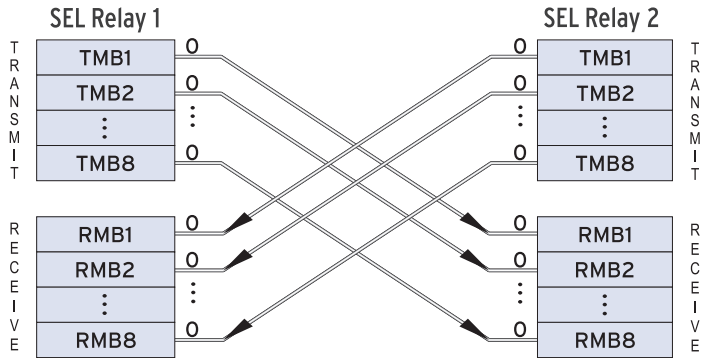
Relay-to-Relay Digital Logic Communication

Communications-Aided Tripping Schemes Made Simple Using Mirrored Bits® Communications

Mirrored Bits communications technology makes bidirectional relay-to-relay digital logic communication simple, fast, and powerful. Bidirectional communication in each relay creates eight additional virtual outputs and inputs that can be assigned for communications-aided protection schemes and other control functions. Receive Mirrored Bits (RMBs) of one relay follow the status of the respective Transmit Mirrored Bits (TMBs) sent from the other relay. Each of the relays in the scheme repeatedly sends and receives the digital logic message while continuously monitoring and checking the received message integrity.

Optimize Pilot Scheme Performance Using Mirrored Bits Technology

SEL Mirrored Bits communications can dramatically improve the performance of your pilot protection scheme using a high-speed digital channel.



Improve performance with SEL Mirrored Bits communications.

Feature Comparison: SEL-311 Relays

Function	SEL-311A	SEL-311B	SEL-311C
Mho Distance Zones—Phase	2 FWD	2 FWD, 1 FWD/REV	2 FWD, 2 FWD/REV
Mho Distance Zones—Ground	2 FWD	2 FWD, 1 FWD/REV	2 FWD, 2 FWD/REV
Quadrilateral Distance Zones—Ground			2 FWD, 2 FWD/REV
CCVT Transient Security Function	Yes	Yes	Yes
Mirrored Bits Communications	Yes	Yes	Yes
Instantaneous Overcurrent	Phase, Ground	Phase, Ground, Neg. Seq.	Phase, Ground, Neg. Seq.
Directional Phase Overcurrent	1 Torque Controlled	3 Torque Controlled	3 Torque Controlled
Directional Ground Overcurrent	1 FWD	2 FWD, 1 FWD/REV	2 FWD, 2 FWD/REV
Directional Negative Sequence		2 FWD, 1 FWD/REV	2 FWD, 2 FWD/REV
Time Overcurrent Phase	Yes	Yes	Yes
Time Overcurrent Ground	Yes	Yes	Yes
Time Overcurrent—Negative Sequence		Yes	Yes
Zone 1 Extension		Yes	Yes
Reclosing		4-Shot	4-Shot
Synchronism Check		Yes	Yes
Phase Under-/Overvoltage Elements		Yes	Yes
Sequence Under-/Overvoltage Elements			Yes
Out-of-Step Trip/Block			Yes
Pilot Scheme Logic			Yes

SEL-311 Protection and Automation System

ACSELERATOR QuickSet® SEL-5030 and ACSELERATOR QuickSet Designer® Software

Save Time and Simplify Settings

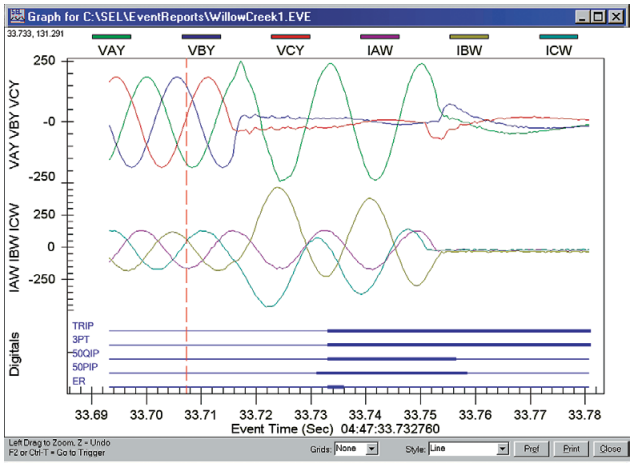
- Save engineering time while keeping flexibility. Communicate with the SEL-311 Relays through any ASCII terminal, or use the ACSELERATOR QuickSet graphical user interface.
- Develop settings offline with a menu-driven interface and completely documented help screens. Speed installation by copying existing settings files and modifying application-specific items. The interface supports Microsoft® Windows® 95, 98, 2000, NT, XP, and 7 operating systems.
- Simplify the settings procedure with rules-based architecture to automatically check interrelated settings. Out-of-range or conflicting settings are highlighted for correction.

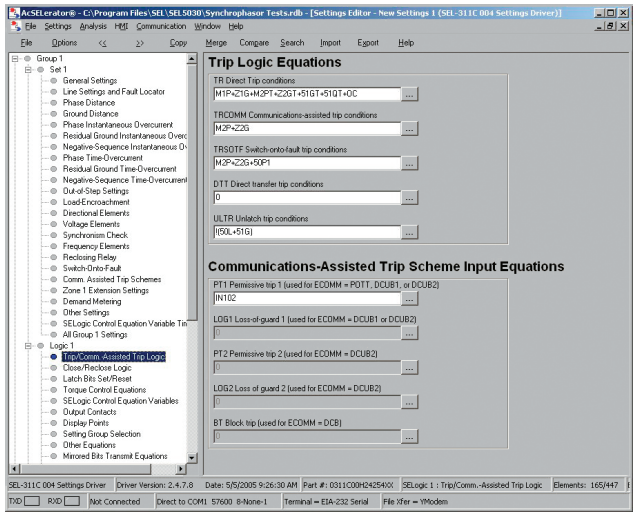
Use ACSELERATOR QuickSet to Analyze Fault Records and Relay Element Response

- Convert relay event reports to oscillography with time-coordinated element assertion and phasor/sequence element diagrams.
- Quickly analyze fault records and relay element response using the ACSELERATOR Waveform Viewer.

Use ACSELERATOR QuickSet Designer to Build and Edit QuickSet Design Templates

- ACSELERATOR QuickSet Designer features the ability to create custom views of settings, called QuickSet Design Templates. This makes the installation of a new device simple and helps ensure that new devices are applied according to your organization's standards.
- Import and use QuickSet Design Templates with ACSELERATOR QuickSet Software. Each device requires a reduced set of user entries because the standardized, unused, and application-specific settings are hidden by the template.





View system data and streamline relay settings with ACSELERATOR QuickSet Software.

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