

# Improve Safety, Reduce Downtime, and Get to Root Cause of Outages With SEL

Leading-Edge Protection Made Easy for Industrial and Commercial Applications



## Why Should You Choose SEL Relays for Your System Upgrade?

SEL leads in protective relays with high-speed, secure, and dependable fault detection; accurate fault locating; and comprehensive automation and control functions. SEL innovations provide significant advantages over electromechanical (EM) and legacy digital relays.

Feature	EM	Legacy Digital	SEL	SEL Advantage
Reliability	Mixed	Mixed	High	An observed mean time between returns for repair (MTBR) that is well over 200 years.
Relay Cost	\$\$\$	\$\$	\$	More functionality at a fraction of the cost of EM or legacy digital relays.
Root Cause Discovery	No	Limited	Robust	Detailed event reports aid root cause discovery for faster responses to unplanned outages.
Rugged Design	Limited	Limited	Yes	Relays designed and certified to withstand extreme temperatures, magnetic fields, and vibration.
Arc-Flash Detection	No	No	Yes	Protect personnel and equipment by reducing incident energy by as much as 88 percent.
Robust, Secure Protection	No	No	Yes	Multiple-function support yields better matching of protection characteristics.
Touchscreen User Interface	No	No	Yes <sup>†</sup>	Intuitive, color touchscreen means less training is required for facility personnel.
Size/Footprint	Large	Mixed	Compact	Multiple functions in a single relay mean less required space and reduced panel wiring.
Communications	No	Limited	Robust	Relays support numerous protocols, including IEC 61850.
Industry Acceptance	Declining	Limited	Yes	SEL relays are the industry standard; 84 percent of North American utility relay users choose SEL as their preferred supplier. <sup>1</sup>
Warranty (Years)	Varies	Varies	10	An industry-leading, no-questions-asked warranty on returns or repairs.

<sup>†</sup>Currently available for the SEL-751 Feeder Protection Relay only



## Unmatched Customer Support During Your Technology Migration

When you choose to upgrade your protection system with industry-leading SEL relays, SEL simplifies your upgrade by providing you with world-class technical support during each of the four stages of your technology transition: product selection, installation, commissioning, and day-to-day use. SEL works closely with you to understand your needs, develop a solution that fits your application, and provide long-term support to keep your system running smoothly. These customized solutions can help speed relay installation. Our world-class customer support personnel will assist you in sustaining your critical power system operations and ensure that you have a smooth technology migration.

## SEL Support, Training, and Tools

SEL provides an array of support, training, and tools to help you during each stage of your upgrade to new SEL technology, ranging from self-install tools to turnkey professional services.

SUPPORT		<b>Customer Service</b> SEL provides <b>FREE</b> , local technical support that is recognized by relay users as best-in-class. Our application engineers provide testing, troubleshooting, and commissioning assistance.
		<b>Engineering Services</b> SEL Engineering Services provides complete protection, automation, communications, and metering solutions for critical electrical infrastructure worldwide. SEL brings industry-experienced engineers to every project for the best possible solution.
TRAINING		<b>SEL University (SELU) Training</b> SELU offers classroom-based courses throughout the year as well as customized on-demand training where SELU brings the courses to you. SELU also offers computer- and web-based training that you can take from the comfort of your own computer.
		<b>Technical Seminars and Webinars</b> SEL offers more than 100 annual seminars, regional trainings, live webinars, and custom courses for new and experienced relay users—many of which are <b>FREE</b> .
TOOLS		<b>SEL Popular Models</b> Find more than 100 products at <a href="http://selinc.com">selinc.com</a> that offer preconfigured models, making it easy to choose the right devices for your applications and get them fast—in as little as 2 days.
		<b>User Tools and Videos</b> The SEL website hosts an extensive library of <b>FREE</b> literature and videos ( <a href="http://selinc.com/video">selinc.com/video</a> ) that will accelerate your learning path and simplify your relay installation and commissioning process.

## Migration Example Using SEL-751 Feeder Protection Relay

SELECTION	INSTALLATION	COMMISSIONING	DAILY USE
			
SELU CBT 101: Introduction to SEL Relays course ( <b>FREE</b> )  SEL-751 Popular Models ( <a href="http://selinc.com/products/751">selinc.com/products/751</a> )	SEL-751 Express Installation Guide ( <b>FREE</b> )  Support from local SEL application engineers ( <b>FREE</b> )	SEL-751 Settings Sheets ( <b>INCLUDED</b> )  How To Set SEL-751 video series ( <b>FREE</b> )	How To Use SEL-751 video ( <b>FREE</b> )  SELU APP 751: SEL-751/A Feeder Protection Relays course

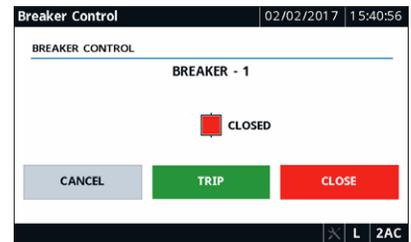
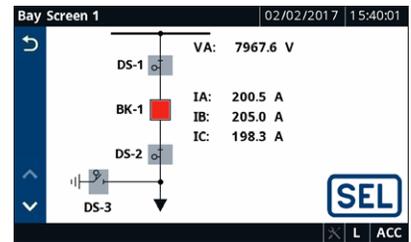
The 5-inch diagonal color display with a resolution of 800 × 480 pixels offers direct navigation via a capacitive touchscreen.

Folders and applications provide quick access to bay screens, metering and monitoring data, reports, settings, and more.

The home pushbutton allows users to easily return to the default home screen.



A full keyboard facilitates easy adjustment of settings.



## SEL-751 Display Features and Functions

With a simple tap of the SEL-751 Relay's 5-inch, 800 × 480 color touchscreen display, quickly access bay screens, metering and monitoring data, reports, settings, and more.

### Bay Screens and Bay Control

Select from predefined bay screens, or configure your own. Control a single breaker, monitor as many as five disconnect switches, and view analog and digital data in a contextual display.

Verify breaker and disconnect changes using the secure control interface.

### Meter Energy

Display the real, reactive, and apparent energy metering quantities imported and exported in your system. Easily reset the energy values via the display, and record the time and date of reset.

## Reasons to Upgrade Your Protective Relays

### Functional Restrictions of Legacy Relays

Despite numerous limitations, EM relays are still in use throughout the electric power grid. Although they are historically reliable, there are several reasons to replace legacy EM relays. For example, they:

- Fail “silently” (lack self-check capability).
- Lack data history.<sup>2</sup>
- Provide limited matching of protection characteristics.
- Have poor compatibility with renewable energy sources.
- Lack arc-flash mitigation.
- Have limited system visibility (no communications).



In many upgrades, just one or two digital relays can replace 20 or more EM relays and provide better protection.

Digital relays represent the latest modern technology. However, many first-generation digital relays are now considered legacy devices because of their limited functionality or lack of product support. Many legacy relays support only a limited number of protection elements or lack advanced protection algorithms, which can inhibit optimal power system protection.

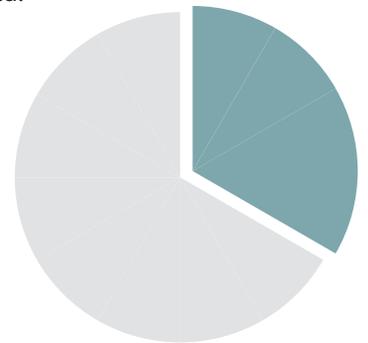
### Aging Relay Fleets Reaching the End of Useful Lives

Life expectancies for legacy relays can reach more than 20 years (for digital) or even 40 years (for EM), but this is not a very realistic measure when you consider system maintenance and reliability. A more pragmatic measure is the “useful life.” A relay’s useful life is typically significantly shorter than the device life expectancy because it takes into account factors that change over time, such as:

- Manufacturer support.
- Regulatory requirements.
- Performance and reliability requirements.
- Communications functionality.
- Demand for operational data.

Many legacy protective relays that are currently in service are nearing the end of their useful lives, so many relay users have initiated plans to replace their old protective relays. Nearly 30 percent of protective relay users plan to replace more than half of their EM relays in the next 3 years.<sup>1</sup>

Proactive relay replacement before a device reaches the end of its useful life can help prevent equipment damage and outages resulting from device failures or an inadequate protection scheme.<sup>3</sup> Planned relay obsolescence can also help mitigate complications that arise when regulations or system needs change and can help you stay ahead of the trend of diminishing product support for aging relays.



**Nearly 30% of protective relay users plan to replace more than half of their EM relays in the next 3 years.**

<sup>1</sup>Newton-Evans Research Company, “Worldwide Study of the Protective Relay Marketplace in Electric Utilities: 2016–2018, Vol. 1—North American Market,” June 2016.

<sup>2</sup>A. Feathers, A. Mubarak, N. Paz, and A. Nungo, “Relay Performance Index for a Sustainable Relay Replacement Program,” proceedings of the 41st Annual Western Protective Relay Conference, Spokane, WA, October 2014.

<sup>3</sup>IEEE Power System Relaying and Control Committee, “I22: End-of-Useful Life Assessment of P&C Devices,” May 2015. Available: [www.pes-psrc.org/Reports/I22-UsefulLife-Final-May2015a.pdf](http://www.pes-psrc.org/Reports/I22-UsefulLife-Final-May2015a.pdf).

## SCHWEITZER ENGINEERING LABORATORIES

Making Electric Power Safer, More Reliable, and More Economical  
Tel: +1.509.332.1890 | Email: [info@selinc.com](mailto:info@selinc.com) | Web: [www.selinc.com](http://www.selinc.com)

