

# Industrial and Commercial Relay Retrofits



## Leading-edge protection made easy for industrial and commercial applications

- Arc-flash mitigation protects personnel and equipment by reducing incident energy by as much as 88%.
- An intuitive, color touchscreen display means facility personnel need less training.
- Rugged relays operate reliably in extreme environments.
- Detailed event reports aid root cause discovery for faster responses to unplanned outages.
- World-class technical support and tools ensure a smooth retrofit process.



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

SEL protective relays offer high-speed, secure, and dependable fault detection; accurate fault locating; robust event reporting; and comprehensive automation and control functions. The innovative features in our protective relays provide significant advantages over electromechanical (EM) and legacy digital relays in low- and medium-voltage applications.

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	Protection for personnel and equipment by reducing incident energy by as much as 88%.
Robust, Secure Protection	No	No	Yes	A broad range of protective elements enables better matching of protection characteristics.
Touchscreen User Interface	No	No	Yes	An intuitive, color touchscreen means facility personnel need less training.
Size/Footprint	Large	Mixed	Compact	Multiple functions in a single relay means the relays require less space and 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.







<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.



The SEL-700 series protective relays offer options for feeder, generator, transformer, and motor protection. They provide rugged, comprehensive, and reliable protection for industrial and commercial applications.

## SEL Support, Training, and Tools

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

SUPPORT		<b>Customer Service</b> Our free, local technical support is recognized by relay users as best-in-class. We have application engineers around the world that 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. We bring industry-experienced engineers to every project for the best possible solution.
TRAINING		<b>SEL University Training</b> SEL University offers classroom-based courses throughout the year as well as customized on-demand training where we bring the courses to you. We also offer computer- and web-based training that you can complete from the comfort of your home or office.
		<b>Technical Seminars and Webinars</b> We host more than 100 annual seminars, regional trainings, live webinars, and custom courses for new and experienced relay users—many of which are free.
TOOLS		<b>SEL Popular Models</b> We offer preconfigured models for all of our products on <a href="http://selinc.com">selinc.com</a> , 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> SEL has an extensive library of free literature and videos on <a href="http://selinc.com">selinc.com</a> that will accelerate your learning path and simplify your relay installation and commissioning process.

## Unmatched Customer Support During Your Retrofit Process

When you upgrade your protection system with industry-leading SEL relays, we simplify your upgrade by providing world-class technical support during each of the four stages of the retrofit process: selection, installation, commissioning, and daily operation. We work 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. Our world-class customer support personnel will assist you in sustaining your critical power system operations and ensure that you have a smooth retrofit process.

### Example Retrofit Support Resources

#### SELECTION



SEL University course: Introduction to SEL Relays (free)

SEL-751 popular models ([selinc.com/products/751](http://selinc.com/products/751))

#### INSTALLATION



SEL-751 Express Installation Guide (free)

Support from local SEL application engineers (free)

#### COMMISSIONING



SEL-751 settings sheets (free)

How to Set the SEL-751 video series (free)

#### DAILY OPERATION



How to Use the SEL-751 video (free)

SEL University course: SEL-751/A Feeder Protection Relays

## 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).
- Provide limited flexibility to support protection applications.
- Have poor compatibility with renewable energy sources.
- Lack arc-flash mitigation.
- Have limited system visibility (no communications).

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.

<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>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).

### 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:

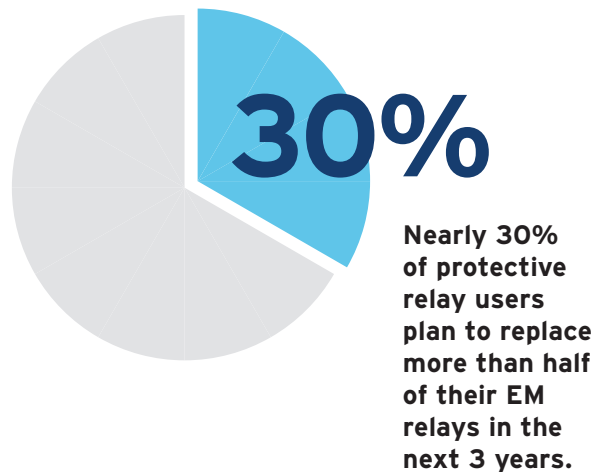
- Manufacturer support.
- Regulatory requirements.
- Performance and reliability requirements.
- Communications functionality.
- Demand for operational data.

Many in-service legacy protective relays 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>2</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.



In many upgrades, just 1 or 2 digital relays can replace 20 or more EM relays and provide better protection.



## **SEL** SCHWEITZER ENGINEERING LABORATORIES

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