

# Power Generation Solutions



Protection, Control, Automation, and Monitoring of Power Plants



*Improve plant operation and reliability.*

## Features and Benefits

### **Complete Protection, Control, and Automation**

Protect critical assets, such as motors, generators, transformers, and transmission ties, with electric-utility-preferred SEL relays. Providing secure and fast protection, our relays are designed for advanced system automation and control. Easily connect multiple relays for a high-performance, low-cost, complete solution.

### **Seamless Integration**

SEL solutions include common protocols for seamless automation and integration. Solutions combine the functionality of high-speed protection with modern communications links to create elegant modern protection and control schemes. Ethernet, serial, and fiber-optic communications options make system connections easy and affordable.

### **Reduced Repair Costs**

Monitor and predict equipment health and decrease overall repair costs by detecting problems before a failure occurs. Information in the relay is easily communicated to maintenance or engineering departments for evaluation and action.

### **Secure Remote Access**

Security is built into every SEL product. Multilevel password restrictions and tamper indication provide security at the relay level. State-of-the-art SEL cybersecurity, firewall, and gateway devices provide defense in depth and assure strong protection against intruders.

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

## Protection, Monitoring, and Control

### Motor

#### SEL-710 Motor Protection Relay

The SEL-710 Relay features the industry's most accurate motor protection together with settings, mounting, and communications options designed for easy application. The SEL-710 with AccuTrack™ Thermal Model determines the longest safe starting time (no speed switch needed) and reduces wait times between motor starts by up to 33 percent.

#### SEL-849 Motor Management Relay

The SEL-849 Relay offers current-, voltage-, and thermal-based motor protection; arc-flash detection; and power metering. It provides all basic motor protection features, including short circuit, load loss, load jam, and frequent-starting protection as well as imbalance-current and phase-reversal protection. The SEL-849 installs easily inside a motor control center.

### Transformer

#### SEL-787 Transformer Protection Relay

Protect and monitor most industrial transformer applications with the versatile SEL-787 Relay. Apply 2 three-phase winding inputs, and an optional single-phase restricted earth fault input and three-phase voltage inputs for comprehensive transformer protection.

### Feeder

#### SEL-751 Feeder Protection Relay

The SEL-751 Relay is ideal for directional overcurrent, fault location, arc-flash detection, main-tie-main, and high-impedance fault detection applications. Flexible I/O options, easy mounting, and fast settings make the SEL-751 the right solution for industrial and utility feeder protection.

## Secure Remote Access

With SEL products, such as the SEL-3025 Serial Shield™, SEL-3620 Ethernet Security Gateway, or the SEL-2924 and SEL-2925 BLUETOOTH® Serial Adapters, you can securely connect wired or wireless devices to any network.



The BLUETOOTH® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc., and any use of such marks by SEL is under license.

## Automation and Integration

### Generator

#### SEL-700G Generator Protection Relay

The right solution for small or large generators, the SEL-700G provides a built-in autosynchronizer, flexible I/O, and advanced communication for comprehensive primary or backup generator protection.

### Automation

All relays include advanced automation features and flexibility, single or dual copper or fiber Ethernet communications ports, asset management data, and easy retrofit of electromechanical relays.

A wide range of protocols make connections easy:

#### SEL Protocols

Communications designed for high-speed transmission of critical data.

#### Modbus®

Universal communication that conforms to any Modbus network.

#### DNP3

The standard for North American utilities implementing polling SCADA networks.

#### IEC 61850

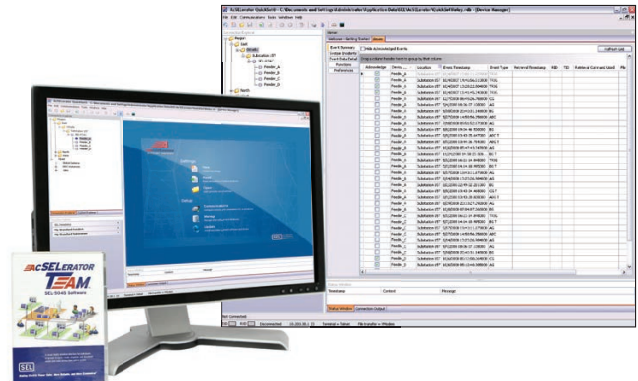
The international standard Ethernet substation communications protocol.

### Real-Time Control

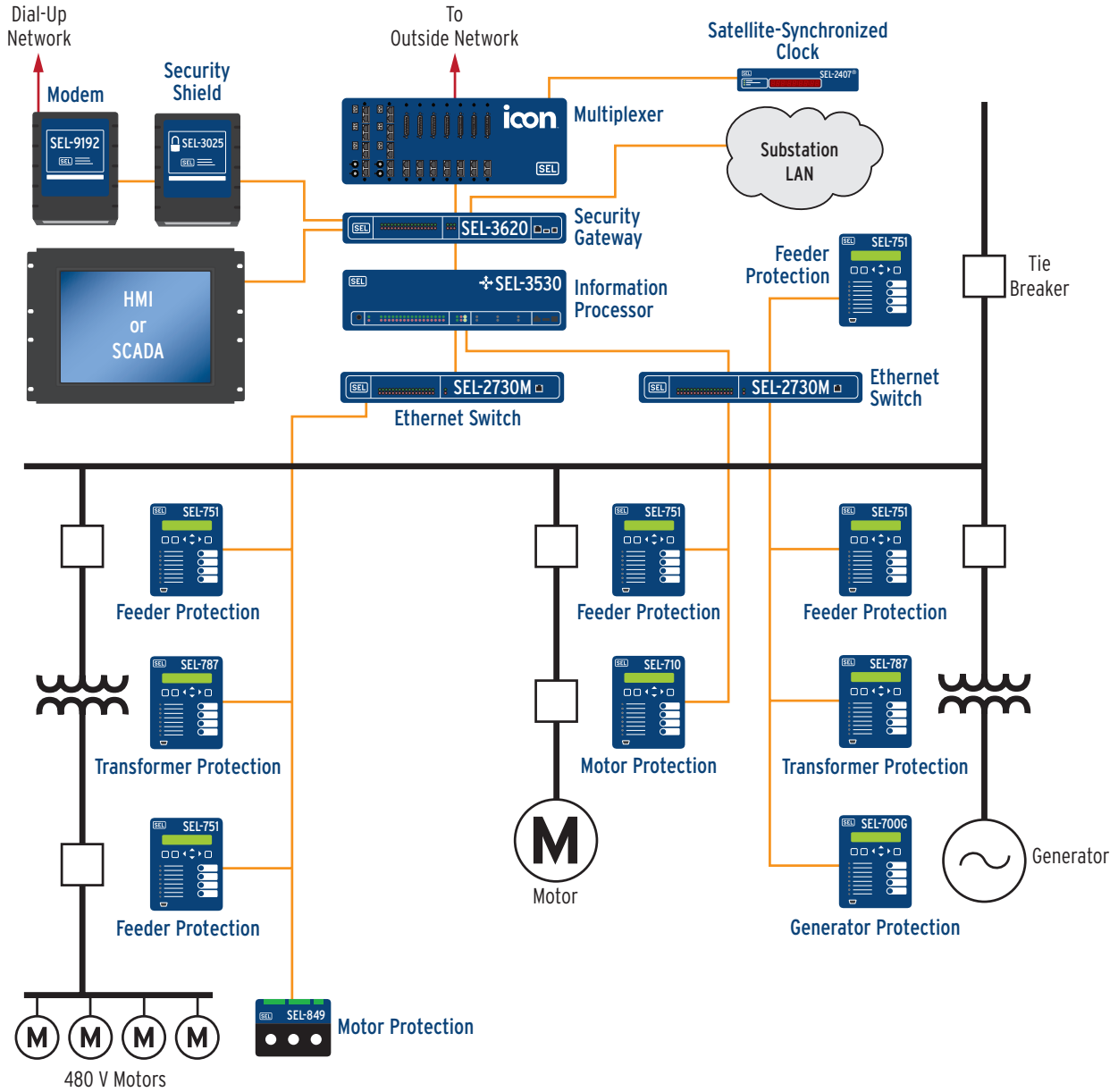
Automate and integrate any system with an SEL-3530/3530-4 Real-Time Automation Controller (RTAC). Build your own human-machine interface (HMI), and control and monitor any intelligent electronic device (IED) from a centralized location with optional free ACSELERATOR QuickSet® SEL-5030 Software. Or, integrate a system with an SEL rugged computer, such as the SEL-3354 Embedded Automation Computing Platform.

## Build Your Own System

Use the SEL product family to build your own automated system. From networks to automation and control, SEL solutions can provide a fully configurable system to meet your specifications. Build a system yourself with the free ACSELERATOR Software solutions, or hire SEL Engineering Services to network IEDs into the system to provide comprehensive monitoring and control for your whole system.



# System Overview



## Arc-Flash Protection

Protect personnel and equipment, improve safety, and ensure power system availability. Arc-flash detection decreases fault-clearing time, which reduces arc-flash hazards, improves safety, and lowers personal protective equipment (PPE) requirements. SEL's cost-effective arc-flash mitigation technology reduces arc-flash-related equipment damage in both standard and arc-resistant switchgear.

Returning affected equipment to service faster maximizes power system availability. SEL arc-flash detection is always enabled, so an operator doesn't have to modify protective settings before and after performing live work to be protected from arc-flash events. Arc-flash events trigger an instant response from SEL relays while coordination is maintained with downstream protection for external faults.

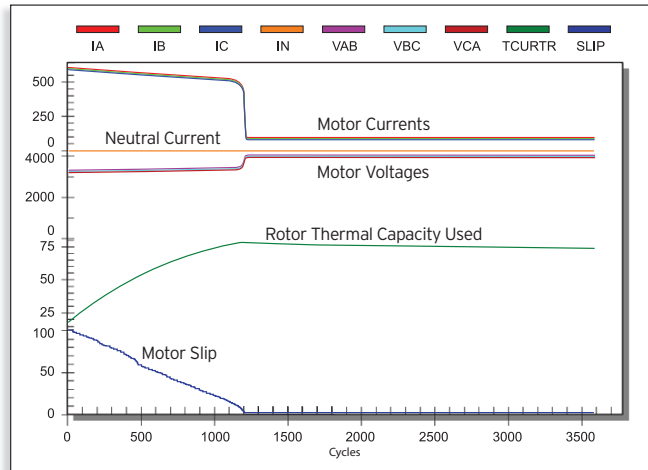
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## System Advantages

Building a system with SEL protective relays leverages the data processed by the relays into valuable operations and maintenance information at very little cost. Gather and display event reports, oscillography, equipment status, communications channel condition, and equipment condition. Condition monitoring information available in SEL relays can be used to detect process problems, identify overloaded equipment, and highlight system changes before a failure occurs, saving valuable production time and materials. Upgrading outdated protection with modern SEL digital protective relays provides a fast return on your investment while improving the safety of your personnel. With SEL relays, you are provided the following:

- Motor start reports
- Sequence of Events reports
- Overload warning
- Time needed to start
- Voltage drop
- Motor starting current
- Thermal capacity used
- Broken rotor bar detection
- Phasor diagrams
- CT connection check
- Through-fault current
- Breaker wear monitor
- Arc-flash detection status
- Relay self-test status
- Near-trip reports

Connect with multiple protocols, and present information locally through SCADA or to many popular distributed control systems, such as Emerson Ovation™ or DeltaV™, or Rockwell Automation. Complete SEL systems are available that include Ethernet switches and multiplexers.



Graphical Motor Start Report

## System Components

### Protection Relay Options

- SEL-700G Generator Protection Relay
- SEL-710 Motor Protection Relay (medium-voltage)
- SEL-849 Motor Management Relay (low-voltage)
- SEL-787 Transformer Protection Relay
- SEL-735 Power Quality and Revenue Meter
- SEL-751 Feeder Protection Relay With Arc-Flash Detection
- SEL-487B Bus Protection Relay

#### Ethernet:

- 10/100 copper
- 100BASE-FX multimode connector

#### Communications Protocols:

- DNP3
- Modbus
- IEC-61850
- MIRRORING BITS®
- IEEE C37.118 synchrophasor data
- Simple Network Time Protocol (SNTP)
- Telnet
- FTP

### Free Software Options

- acSELERATOR Architect®
- SEL-5030 acSELERATOR QuickSet
- SEL-5033 acSELERATOR RTAC® Software
- SEL-5010 Relay Assistant Software
- SEL-5020 Settings Assistant Software

### Synchronized Phasor Measurement

- Included at no charge in most SEL relays
- SEL-3378 Synchrophasor Vector Processor

### Communications

- SEL ICON™ Integrated Communications Optical Network
- SEL-3354 Embedded Automation Computing Platform
- SEL-3530 Real-Time Automation Controller (RTAC)
- SEL-2730M Managed 24-Port Ethernet Switch
- SEL-2725 Five-Port Ethernet Switch (unmanaged)
- SEL-2407® Satellite-Synchronized Clock
- SEL-3025 Serial Shield



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