SEL-751A
Feeder Protection Relay

2 ms arc-flash protection and feeder relay in one platform

- Combine light sensor inputs with high-speed overcurrent protection to achieve secure arc-flash protection in as fast as 2 ms.
- Enhance protection using voltage, frequency, and communications-based solution options.
- Use IEEE C37.118 synchrophasor measurements to accurately monitor wide-area power system conditions and to make decisions based on state measurements.
ANSI Numbers/Acronyms and Functions

25 Synchronism Check*
27 Undervoltage*
32 Directional Power*
50 Adaptive Overcurrent
50 (P,G,Q) Overcurrent (Phase, Ground, Neg. Seq.)
50N Neutral Overcurrent
50N AF Arc-Flash Neutral Overcurrent*
50P AF Arc-Flash Phase Overcurrent*
51 (P,G,Q) Time Overcurrent (Phase, Ground, Neg. Seq.)
51N Neutral Time Overcurrent
52PB Trip/Close Pushbuttons
55 Power Factor*
59 Overvoltage*
79 Autoreclosing*
81 (O,U,R,RF) Over-/Underfrequency (Rate, Fast Rate)*
85 RIO SEL Mirrored Bits® Communications
AFD Arc-Flash Detector®
BRM Breaker Wear Monitor
DFR Event Reports
LOP Loss-of-Potential Logic*

Additional Functions

HMI Operator Interface
LDP Load Data Profiling
LGC SELogic® Control Equations
PMU Synchrophasors
RTD Temperature
RTU Remote Terminal Unit
SBM Station Battery Monitor*
SER Sequential Events Recorder

*Optional feature  
1 Copper or fiber-optic
Key Features

**Feeder Protection**
Protect radial and looped distribution circuits with comprehensive protection, including time-overcurrent, autoreclosing, over-/undervoltage, frequency, and many more protection capabilities.

**Arc-Flash Mitigation**
Improve safety for personnel with optional arc-flash detection. The SEL-751A Feeder Protection Relay offers combined light and high-speed overcurrent detection for arc-flash events—the ideal solution for speed and security.

**Automation and Control**
Apply the SEL-751A on feeders to provide protection, automation, and control, all in one package. SELogic control equations support many automated applications without the need for additional automation controllers. The configurable front-panel buttons can replace conventional panel controls to simplify applications and wiring.

**Event Analysis**
Conduct post-event analysis more efficiently with detailed event records that combine oscillographic and digital information, making it easier to find the root cause. You can also add a satellite-synchronized time source, such as an SEL-2401 or SEL-2407® Satellite-Synchronized Clock, to conveniently align event information from multiple devices.

**Situational Awareness**
Improve situational awareness and asset utilization with IEEE C37.118 synchrophasor measurement via the serial port. Aggregated synchrophasor information from across your system can help you understand system trends, make decisions based on state measurement rather than state estimation, and perform post-event analysis.

**Harsh Environments**
Rely on the SEL-751A for protection and control applications even in harsh and hazardous environments. The SEL-751A is designed and tested to meet and exceed utility and industrial requirements. An operating temperature range of –40° to +85°C (–40° to +185°F); Class 1, Division 2 approval; and optional conformal coating mean this relay will provide years of reliable service.
The 2 × 16 character LCD provides navigation, relay control, data, and diagnostics via default messages or up to 32 customizable display messages.

Programmable operator pushbuttons with user-configurable labels allow front-panel customization.

Programmable front-panel LEDs with user-configurable labels alert operators to faulted phases and element operation.
Power supply options include 24–48 Vdc or 110–250 Vdc/110–240 Vac.

A wide variety of communications protocols and media provide flexibility to communicate with other devices and control systems.

The optional fiber-optic serial port provides quick and easy engineering access.

Card slots include positions for optional I/O, a voltage input card, or an arc-flash detection card with sensors that help improve safety and prevent damage.

Phase current and optional phase voltage inputs are on one card, freeing up space for additional SELect™ I/O card options.

A wide variety of communications protocols and media provide flexibility to communicate with other devices and control systems.
Combine light-sensing technology with fast overcurrent protection to provide high-speed arc-flash detection as fast as 2 milliseconds without false tripping.

Fast and secure arc-flash protection reduces the incident energy of arc-flash events. SEL-751A Relays have integration and communications features for secure remote access. With wireless or remote communications, you can keep out of the danger zone completely while gathering important real-time and historical data from the relays to coordinate protection for faster clearing times.

**Reduce Arc-Flash Hazards**

Easily mounted point sensors detect light from the arc flash.

Clear-jacketed fiber sensors detect light from the arc flash over the entire length of the fiber loop. This type of sensor is ideal for large areas, such as busbars.
Coordinate Protection
Use SEL Mirrored Bits communications to coordinate upstream protection if a fault occurs. Coordination and fast-bus trip schemes allow short delays (two or three cycles) for backup protection, reducing arc-flash energy.

Stay Outside the Danger Zone
Remotely obtain metering, event, and maintenance information from the relay with Ethernet or serial communications. Optional delayed breaker tripping or closing via pushbuttons allows personnel to move to a safe distance.

If you must be in the danger zone, know the dangers and wear appropriate personal protective equipment. If you do not know the arc-flash ratings and zones for your gear, the SEL Engineering Services team can provide professional arc-flash hazard studies and practical approaches to mitigate arc-flash risks.

Restricted Approach Boundary
An approach limit at a distance from an exposed energized electrical conductor or circuit part within which there is an increased likelihood of electric shock, due to electrical arc-over combined with inadvertent movement.

Limited Approach Boundary
An approach limit at a distance from an exposed energized electrical conductor or circuit part within which a shock hazard exists.

Arc-Flash Boundary
When an arc flash hazard exists, an approach limit from an arc source at which incident energy equals 1.2 cal/cm² (5J/cm²) for one second*.

This boundary can be greater or less than the limited approach boundary, based on the results of the arc-flash assessment.

Arc-rated PPE is required when within the arc-flash boundary.

*According to the Stoll skin burn injury model, the onset of a second degree burn on unprotected skin is likely to occur at an exposure of 1.2 cal/cm² (5J/cm²) for one second.
**Applications**

**Feeder Protection**
Provide comprehensive protection capabilities, including time-overcurrent, directional overcurrent, over-/undervoltage, autoreclosing, frequency, and many more.

**Industrial Feeder Protection**
Implement overcurrent, voltage, and frequency protection for industrial and commercial feeders. The addition of a core-balanced CT detects ground faults and provides an added level of protection.

**Arc-Flash Mitigation**
Improve safety and prevent damage with arc-flash detection in the SEL-751A. You can choose point sensors, loop sensors, or a combination to protect a wide variety of switchgear configurations.
Easy to Set and Use

Set, Monitor, and Control the SEL-751A With acSELeRATOR QuickSet® SEL-5030 Software

- Save engineering time, and simplify device setup. QuickSet allows you to communicate with the SEL-751A through any ASCII terminal or with the software graphical user interface.
- Develop settings offline with a menu-driven interface and completely documented help screens. By copying existing settings files and modifying only application-specific items, you can decrease the installation time.
- Simplify the setting procedure with rule-based architecture to automatically check interrelated settings. QuickSet highlights out-of-range or conflicting settings for correction.

Retrieve and Display Event Reports With acSELeRATOR Team® SEL-5045 Software

- View event report oscillograms as a plot of magnitude versus time. You can select analog and digital points to build a custom display.
- Analyze arc-flash events using the light intensity and phase current waveforms recorded during an arc fault.
- Display phase and symmetrical component phasors. The phasor view of electrical data can help you better understand asymmetrical three-phase faults. You can also build a custom plot using per-phase and symmetrical component sequence currents and voltages.
- Retrieve event reports using serial or Ethernet communications links.
Mounting and Enclosure Options

Mount the SEL-751A into multiple locations using our complete line of mounting and enclosure options. Panel-mount, rack-mount, wall-mount, indoor, or outdoor configurations provide solutions for any application. The optional mounting kits do not require any cutting or drilling, making the replacement of existing protection quick and easy.

Visit www.selinc.com/applications/mountingselector to see the complete selection of mounting and enclosure kits.
# SEL-751A Specifications

## General

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC Current Inputs</strong></td>
<td>5 A, 1 A, 50 mA, or 2.5 mA (high sensitivity) secondary, depending on model</td>
</tr>
<tr>
<td><strong>AC Voltage Inputs</strong></td>
<td>300 Vac continuous, 600 Vac for 10 seconds</td>
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<tr>
<td><strong>Output Contacts</strong></td>
<td>The relay supports Form A, B, and C outputs.</td>
</tr>
<tr>
<td><strong>Optoisolated Control Inputs</strong></td>
<td>DC/ac control signals: 250, 220, 125, 110, 48, or 24 V</td>
</tr>
<tr>
<td><strong>Frequency and Phase Rotation</strong></td>
<td>System frequency: 50, 60 Hz</td>
</tr>
<tr>
<td></td>
<td>Phase rotation: ABC, ACB</td>
</tr>
<tr>
<td></td>
<td>Frequency tracking: 15–70 Hz (requires ac voltage inputs)</td>
</tr>
<tr>
<td><strong>Arc-Flash Time-Overlight® Elements (TOL1–TOL4)</strong></td>
<td>Pickup time: 2–5 ms</td>
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<tr>
<td></td>
<td>Dropout time: 1 cycle</td>
</tr>
<tr>
<td><strong>Communications Media</strong></td>
<td>Ethernet 10/100BASE-T; Ethernet 100BASE-FX; single or dual Ethernet ports; EIA-232 serial; EIA-485 serial; fiber-optic or serial multimode ST® connectors</td>
</tr>
<tr>
<td><strong>Communications Protocols</strong></td>
<td>MIRRORED Bits communications; IEC 61850; Modbus® RTU/TCP; DNP3 serial and LAN/WAN; DeviceNet™; Telnet; File Transfer Protocol (FTP); Simple Network Time Protocol (SNTP); simple and compressed ASCII; extended Fast Meter and Fast Operate; Fast SER; Event Messenger; IEEE C37.118 synchrophasors (via serial port only)</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>110–250 Vdc or 110–240 Vac</td>
</tr>
<tr>
<td></td>
<td>Input voltage range: 85–300 Vdc or 85–264 Vac</td>
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<tr>
<td></td>
<td>24–48 Vdc</td>
</tr>
<tr>
<td></td>
<td>Input voltage range: 19.2–60 Vdc</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>−40 to +85°C (−40 to +185°F)</td>
</tr>
</tbody>
</table>

1. LCD contrast is impaired for temperatures below −20°C (−4°F) and above +70°C (+158°F).