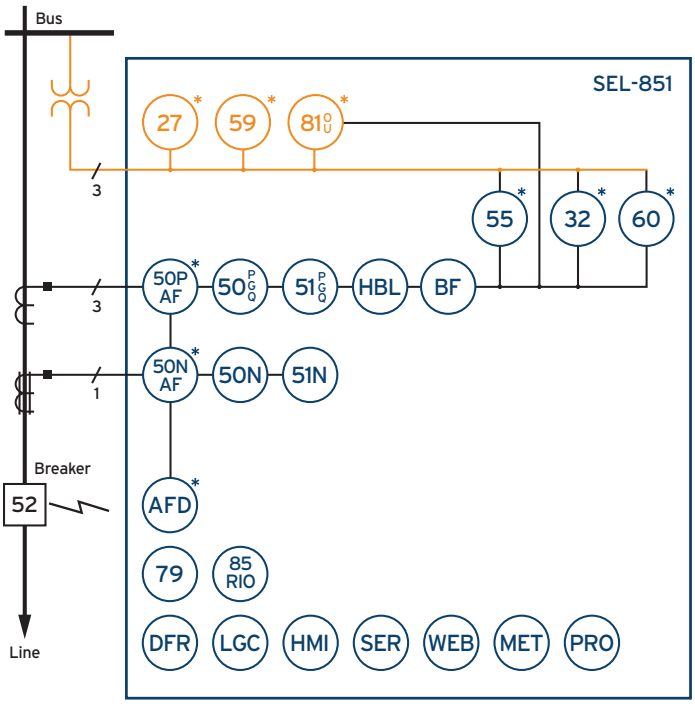
# SEL-851

## Feeder Protection Relay


## Protection, monitoring, and control in a simple, compact package

- Apply comprehensive current, voltage, and frequency elements to protect low- and medium-voltage feeders.
- Increase safety and reduce incident energy with arc-flash protection that sends a trip signal to a breaker in as fast as 1 ms.
- Quickly create, manage, and deploy relay settings using SEL Grid Configurator.
- Simplify relay selection due to the universal power supply, universal current inputs, and software-settable binary inputs.
- Easily integrate the relay into your system using dual Ethernet ports that support IEC 61850, DNP3, and Modbus protocols.

# Functional Overview




| ANSI Functions | |
|---|---|
| 27 | Undervoltage* |
| 32 | Directional Power* |
| 50N | Neutral Overcurrent |
| 50 (P,G,Q) | Overcurrent (Phase, Ground, Negative Sequence) |
| 50N AF | Arc-Flash Neutral Overcurrent* |
| 50P AF | Arc-Flash Phase Overcurrent* |
| 51 (P,G,Q) | Time Overcurrent (Phase, Ground, Negative Seq.) |
| 51N | Neutral Time Overcurrent |
| 55 | Power Factor* |
| 59 | Overvoltage* |
| 60LOP | Loss of Potential* |
| 79 | Autoreclosing |
| 81 (O,U) | Over-/Underfrequency* |

| Additional Functions | |
|---|---|
| 85 RIO | SEL Mirrored Bits® Communications |
| AFD | Arc-Flash Detector* |
| BF | Breaker Failure |
| DFR | Event Reports |
| HBL | Harmonic Blocking |
| HMI | Operator Interface |
| LGC | SELogic® Control Equations |
| MET | High-Accuracy Metering |
| PRO | Signal Profiling |
| SER | Sequential Events Recorder |
| WEB | Web Server |

*Optional feature

# Key Features

### Protect Feeders and Equipment

The SEL-851 includes four current inputs and three optional voltage inputs for comprehensive current, voltage, and frequency protection. Protect low- and medium-voltage three-phase feeders with current unbalance, breaker/contactor failure, phase, negative-sequence, neutral instantaneous, and time-overcurrent elements along with autoreclosing functionality. The voltage input option provides voltage, frequency, directional power, loss-of-potential, and power factor elements.

### Increase Safety With Arc-Flash Mitigation

Improve safety and prevent equipment damage with the relay's four optional arc-flash detection (AFD) inputs. The SEL-851 combines light-sensing technology and high-speed overcurrent protection to detect arc-flash events in as fast as 1 ms.

### Streamline Integration

Choose from Ethernet or serial communications ports and several protocols, including Mirrored Bits communications and IEC 61850 Edition 2. Pick multiple sessions of Modbus TCP, Modbus serial, DNP3 LAN/WAN, or DNP3 serial for custom configuration of your applications.

### Simplify Inventory

The SEL-851 is built with high-reliability hardware and comes with a universal power supply, setting-selectable universal current inputs (1 A/5 A), and optional software-selectable binary inputs (24—250 Vac/Vdc). Its simplified design helps reduce maintenance expenses.

### Reduce Commissioning Time

Quickly create, manage, and deploy device settings and reduce engineering and commissioning time using SEL Grid Configurator software. It features a spreadsheet-style editor, powerful protection visualization, comprehensive reporting, custom filters, and multiple-device settings management.

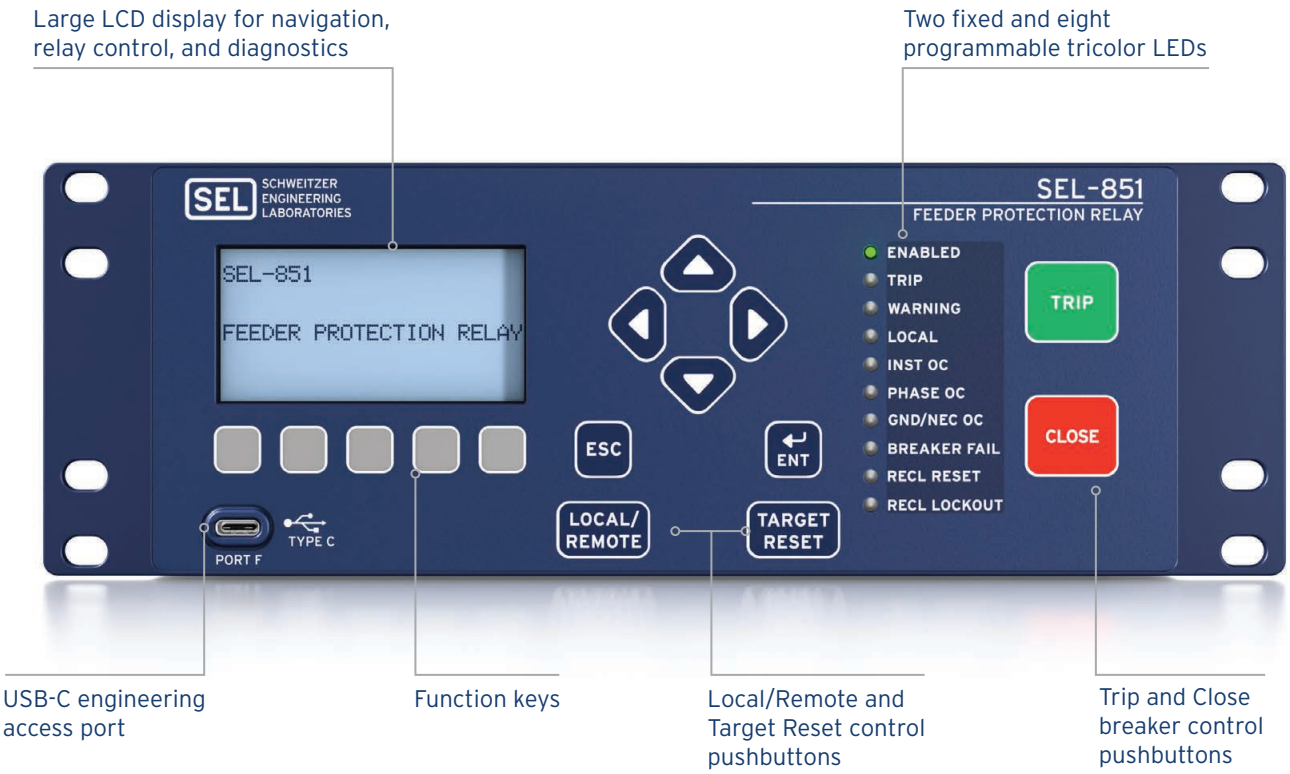
### Achieve Fast, Deterministic Relay-to-Relay Communications

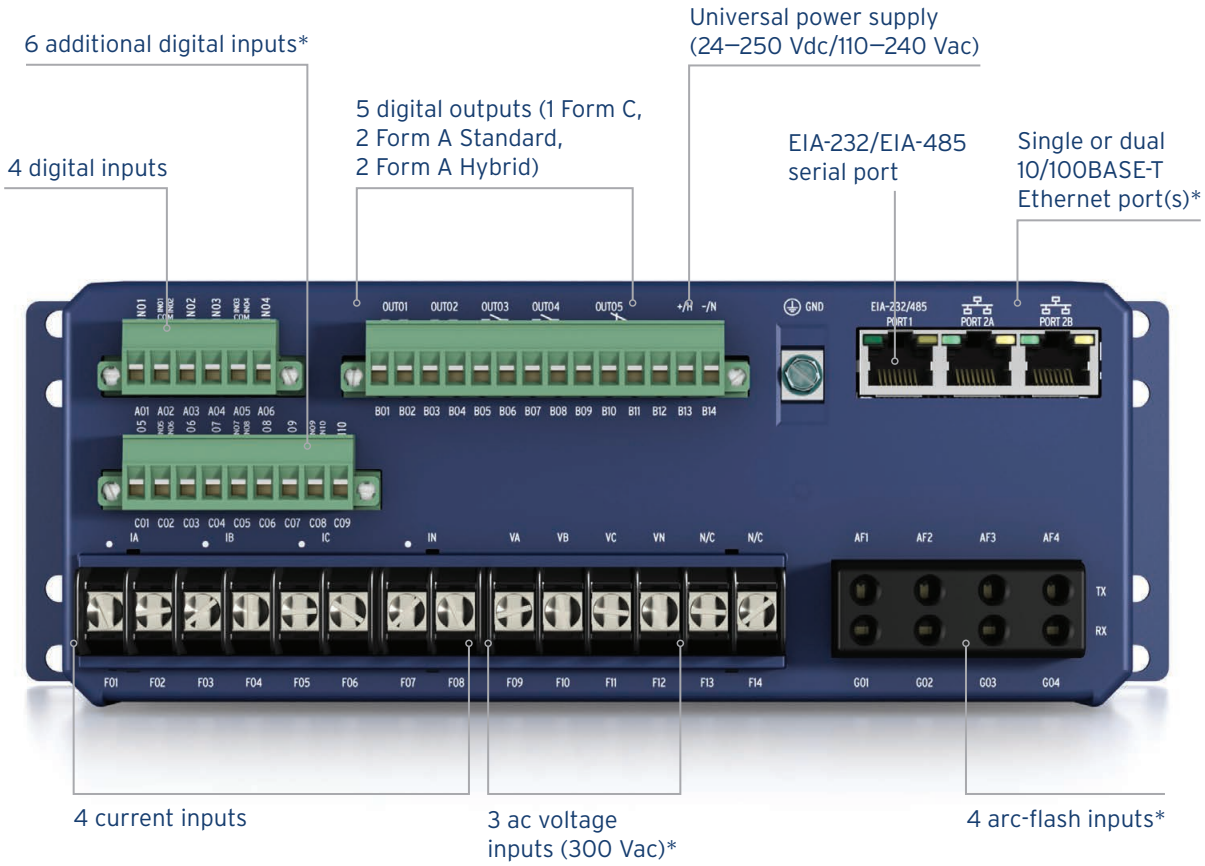
Fixed GOOSE provides ease of programming and offers the flexibility of multidevice communication of digital and analog quantities at a fixed 4 ms rate.

### Gain Greater System Visibility

With high-resolution currents and voltages sampled at 10 kHz, system visibility is improved. This allows you to identify problems, such as harmonics produced by switching or damaged cables, before they cause a significant interruption.

# Product Overview



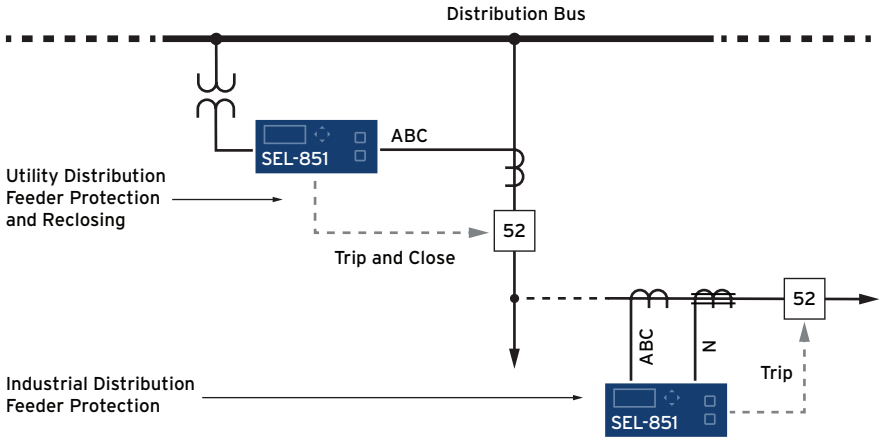




*Optional feature

# Applications

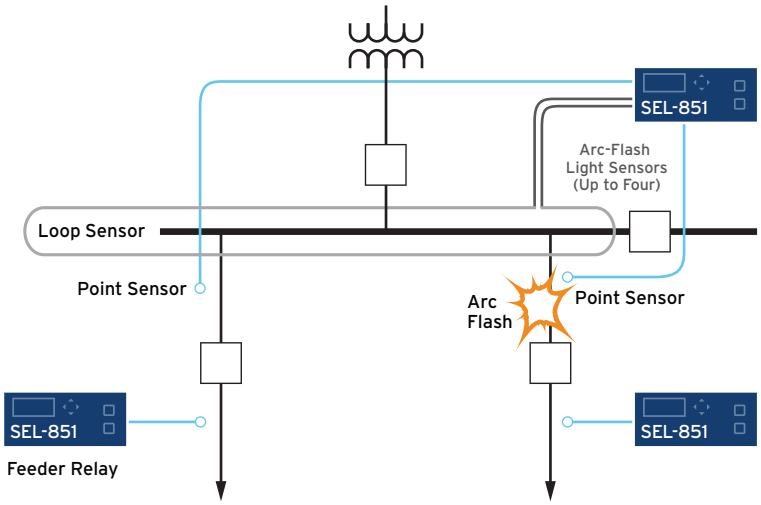
### Versatile Power System Protection

The relay's overcurrent functions protect power system circuits or devices, including lines, feeders, transformers, and capacitor banks. Over- and underfrequency and over- and undervoltage elements are well suited for applications at distributed generation sites. The relay's directional power elements also make the SEL-851 suitable for utility or customer interface protection where customer generation is present. In addition, you can use the relay's powerful SELOGIC control equations to provide custom protection and control applications.




### Arc-Flash Protection

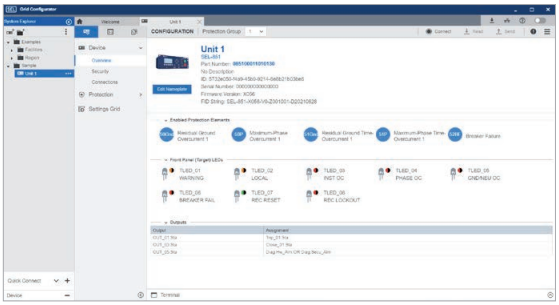
The SEL-851 offers advanced arc-flash protection to help reduce the incident energy of arc-flash events in metal-enclosed and metal-clad switchgear. It supports as many as four fiber-optic light sensors (point, loop, or a combination) that are capable of detecting high-energy arcing faults and tripping the breaker within 1 ms.



# Easy to Set and Use

### Next-Generation Configuration Software

SEL Grid Configurator simplifies setting management. The user interface allows you to create settings for one or many protection functions in a single view. With Grid Configurator's spreadsheet-style editor, custom filters, and bulk copy-paste feature, you can easily find, edit, and manage settings in a single device or across large groups. Combined, these features deliver a seamless and efficient configuration experience.



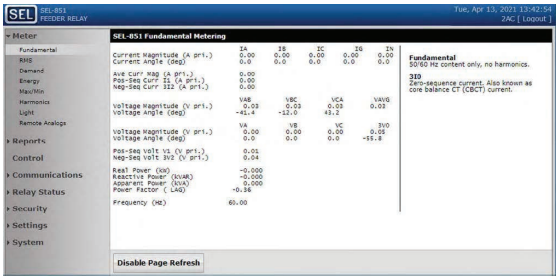
### Event Report Retrieval and Display

With SEL-5601-2 SYNCHROWAVE® Event Software, you can:

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

### Built-In Web Server

Access basic SEL-851 information on a standard Ethernet network with the built-in web server. You can view the relay status, Sequential Events Recorder (SER) data, metering information, and settings with easy access within a local network. For increased security, web server access requires a relay password and the information is limited to a read-only view. You can also upgrade relay firmware through the web server.



# Specifications

| General Specifications | |
|---|---|
| **AC Current Inputs** | 1 A or 5 A phase and 1 A or 5 A neutral (setting-selectable) |
| **AC Voltage Inputs** | 300 Vac continuous, 600 Vac for 10 seconds |
| **Inputs/Outputs** | Standard includes 4 digital inputs, 5 digital outputs (1 Form C, 2 Form A Standard, 2 Form A Hybrid) |
| **Digital Inputs Wetting** | 4 internally wetted (24 Vdc) digital inputs<br>Externally wetted universal binary digital inputs (24—250 Vdc/Vac; setting-selectable) |
| **Frequency and Phase Rotation** | System frequency: 50, 60 Hz<br>Phase rotation: ABC, ACB<br>Frequency tracking: 15—70 Hz |
| **Arc-Flash Time-Overlight® Elements (TOL1—TOL4)** | Pickup time: 1 ms (including output operation when hybrid contact is used)<br>Dropout time: 16 ms |
| **Communications Protocols** | Standard protocols include SEL protocols, Modbus RTU, Modbus TCP, Mirrored Bits communications, Telnet, the File Transfer Protocol (FTP), TCP/IP, HTTP/HTTPS web server communications, and the Simple Network Time Protocol (SNTP). Optional protocols include IEC 61850 Edition 2 and DNP3. |
| **Communications Ports** | USB-C front-panel port<br>10/100BASE-T single or dual Ethernet rear port<br>EIA-232/EIA-485 rear port with IRIG-B |
| **Universal Power Supply** | 24—250 Vdc/110—240 Vac |
| **Operating Temperature** | −40° to +85°C (−40° to +185°F) |

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