

SEL-351RS Kestrel®



Single-Phase Recloser Control



SEL-351RS KESTREL®

Protect, communicate with, and automate your distribution system with the SEL-351RS Single-Phase Recloser Control.

Improve System Reliability

- Preserve critical loads and improve reliability indices by isolating only the faulted phase.
- Reduce permanent faults with downstream fuse coordination.
- Improve protection using the second-harmonic blocking elements to detect transformer energization, and block selected tripping elements until the inrush conditions subside.
- Monitor contact wear on reclosers to plan condition-based maintenance.
- Optimize feeder operation with synchrophasor data and high-accuracy metering.

Apply Flexible Communication

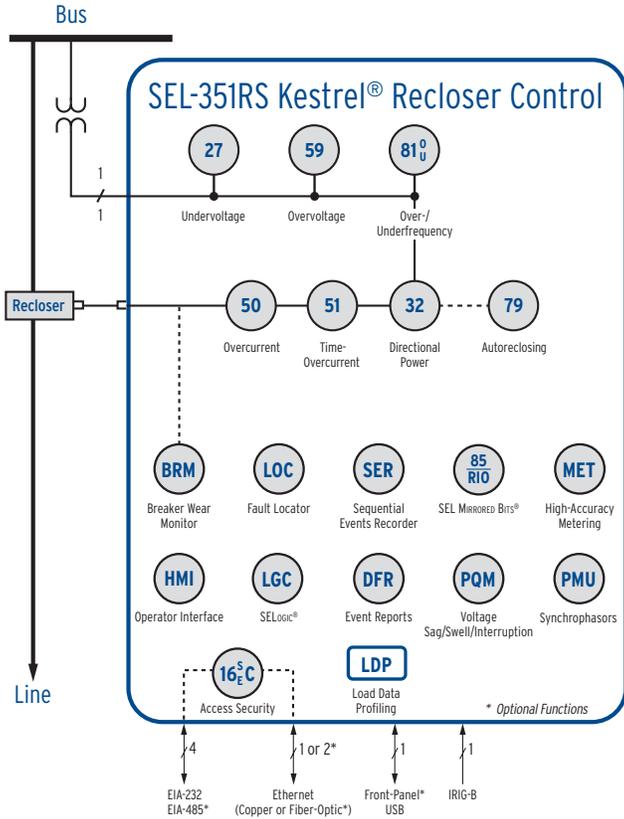
- Coordinate relay-to-relay operation with patented MIRRORED BITS® communications for high-speed protection.
- Integrate the SEL-351RS Kestrel into Ethernet or serial-based communications networks with standard DNP3 and Modbus® protocols or the optional IEC 61850 protocol.

Monitor the System With Ease

- Access operator controls, metering, and event data locally with the easy-to-navigate front-panel display and pushbuttons.
- View system and recloser conditions with the integrated web server.

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

Functional Overview



Recloser Compatibility Chart

Manufacturer	SEL-351RS Kestrel
Recloser	Compatible
G&W	
Viper®-SP	✓
Thomas & Betts	
Elastimold MVR—Single-Phase	✓

Compatible With acSELERATOR QuickSet® SEL-5030 Software

Save Time and Simplify Settings

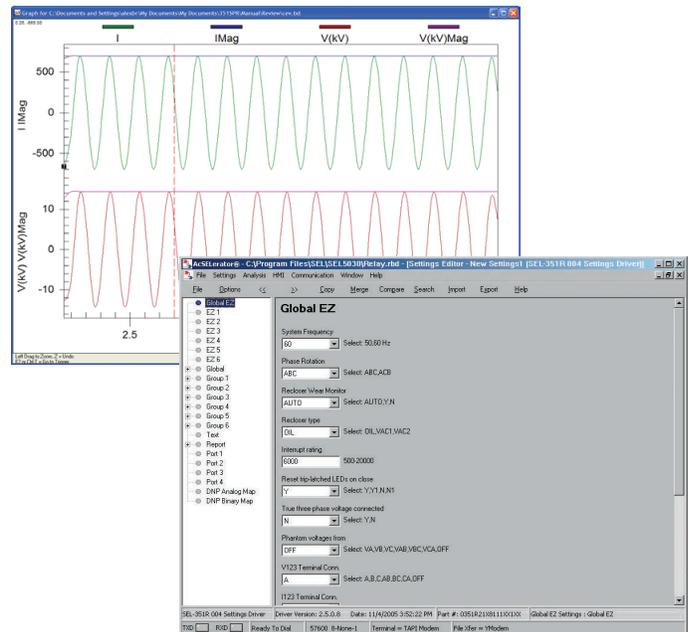
- Save engineering time while keeping flexibility. Communicate with the SEL-351RS Kestrel through any ASCII terminal, or use the acSELERATOR QuickSet graphical user interface.
- Develop settings offline with a menu-driven interface and completely documented help screens. Speed installation by copying existing settings files and modifying application-specific items.

Analyze Fault Records and Relay Element Response With acSELERATOR QuickSet

- Convert relay event reports to oscillography with time-coordinated element assertion and phasor display.
- Quickly analyze fault records and relay element response using the acSELERATOR® Waveform Viewer.

Build and Edit QuickSet Design Templates With acSELERATOR QuickSet Designer® Software

- Create custom views of settings, called QuickSet Design Templates. This makes installation of a new device simple and helps ensure that new devices are applied according to your organization's standards.
- Import and use QuickSet Design Templates with acSELERATOR QuickSet Software. Each device requires fewer user entries because the standardized, unused, and application-specific settings are hidden by the template.



View system data and streamline relay settings with acSELERATOR QuickSet Software.

Secure Communications

Communications Protocols

- MIRRORED BITS Communications
- IEEE C37.118 Synchrophasors
- IEC 61850 GOOSE
- IEC 61850 MMS
- Modbus® TCP
- Modbus RTU
- Telnet
- IRIG-B
- DNP3 Serial
- DNP3 IP
- Web Server
- Simple Network Time Protocol (SNTP)
- FTP
- SEL Fast Messages
- ASCII

Communications Media

- 10/100BASE-T Ethernet
- 100BASE-FX Ethernet*
- EIA-232 Serial
- EIA-485 Serial*
- USB Type B*
- BNC

* Optional Features

Synchrophasor Applications

Improve System Performance With Synchrophasor Technology

SEL implemented synchrophasor technology to improve the situational awareness of the power system. Real-time updates of the system condition help operators prevent a cascading system collapse and improve system stability. The comprehensive software and hardware package available from SEL will enable the visualization of the measurements from the SEL-351RS Kestrel.

- Verify phasing of single-phase reclosers by comparing synchrophasor measurements between the recloser and the substation.
- Provide detailed event information across the distribution network with IEEE C37.118 standard format at up to 60 messages per second.
- Control islanding of distributed generation (DG) using wide-area phase angle slip and acceleration measurements.



Intuitive web browser-based interface of the SEL SYNCHROWAVE® Central Software

Recloser Accessories

SEL offers best-in-class accessories to optimize efficiency and use of your recloser controls. Many accessories can either be factory-installed or supplied as a field upgrade kit.

SEL-2401 Satellite-Synchronized Clock

Relay Event Correlation

Reduce system event analysis time by having perfectly aligned events from both distribution and substation devices. SCADA-based distributed time commonly provides accuracy to only ± 0.5 seconds. As a result, events between multiple devices cannot be compared. The SEL-2401 simplifies comparison with ± 100 -nanosecond time accuracy, making event correlation easy.

SEL-3031 Serial Radio Transceiver

Versatile, Economical Operation

Combine three serial ports into one radio, allowing up to three different connections and protocols to operate simultaneously. The spread-spectrum radio transmits data in the license-free 900 MHz ISM band, providing an economical communications path or backup communications system.

Secure

Protect critical data and thwart malicious attacks with session authentication and strong 256-bit Advanced Encryption Standard (AES) encryption.

Rugged

The radio operates trouble-free in extreme environments and is tested for operation in extreme conditions (temperature, RFI, shock, and vibration).

SEL-2925 BLUETOOTH® Serial Adapter

Avoid exposing personnel to hazardous conditions by enabling them to control and monitor equipment from their trucks or other safe locations.

The adapter transmits data up to 115200 bits per second to distances over 100 meters (300 feet) in typical applications with a clear line-of-sight communications path. For even greater distances, use directional gain antennas.

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.

SEL Fault Indicators

Find Faults Faster

SEL fault indicators reduce fault-finding time by as much as 50 percent, helping to restore power more quickly and efficiently. They also help reduce costly damage to the power system caused by faults and fault-finding by eliminating the need to use multiple fuses for the re-fuse and sectionalize method of fault locating.

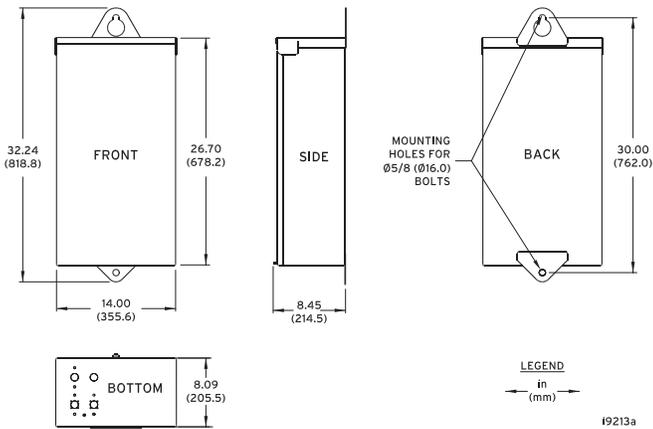
Recloser Controls and Fault Indicators Work Together

When SEL fault indicators are combined with recloser controls, they can pinpoint the exact location of a fault, even on lateral feeds—something neither product can do on its own. When a fault occurs, the SEL recloser control reports the distance from the recloser to the fault; however, for lines with branches, the recloser control cannot determine on which branch of the line the fault has occurred. By following the line along the tripped fault indicators, the line crew can easily find the area of the fault.

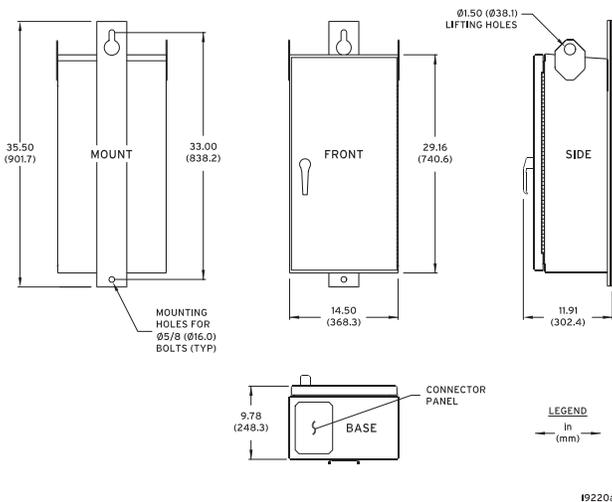
Enclosure Options

The SEL-351RS Kestrel is available with a choice of two enclosures. The lift-to-open pole-mount enclosure is constructed from painted aluminum that will not rust or corrode. It is an economical choice and carries a NEMA 3R environmental rating. The swing-open pole-mount enclosure is constructed of heavy-gauge painted aluminum that also will not rust or corrode. This rugged enclosure is NEMA 3R-rated and includes additional space for mounting accessories.

LIFT-TO-OPEN POLE-MOUNT ENCLOSURE



SWING-OPEN POLE-MOUNT ENCLOSURE



General Specifications

AC Current Input

1 A nominal

3 A continuous, linear to 20 A symmetrical, 100 A for 1 second
Burden 0.13 VA @ 1 A; 1.31 VA @ 3 A

AC Voltage Input

300 V_{L-N} continuous (connect any voltage up to 300 Vac)

600 Vac for 10 seconds

Burden 0.03 VA @ 67 V; 0.06 VA @ 120 V; 0.8 VA @ 300 V

Power Supply

85–264 Vac, 120/230 Vac nominal

85–350 Vdc, 125/250 Vdc nominal

12 V Radio Supply

10.2–16 Vdc, 6 W continuous, 13 W for 1 second

Communications Ports

EIA-232	1 front; 2 side
EIA-485	1 side, 2100 Vdc of isolation (optional)
Baud rate	300–57600 bps
USB	1 front, optional (Type B connector, CDC class device)
Ethernet	1 standard 10/100BASE-T rear port (RJ45 connector) Second 10/100BASE-T rear port optional (RJ45 connector) 1 or 2 100BASE-FX rear ports optional (LC connectors) Internal Ethernet switch included with second Ethernet port

Operating Temperature

Relay module	–40° to +85°C (–40° to +185°F)
Batteries	–40° to +80°C (–40° to +140°F)
Entire SEL-351RS Kestrel unit	–40° to +60°C (–40° to +122°F)

Note: LCD contrast impaired for temperatures below –20°C (–4°F). The entire SEL-351RS Kestrel unit was operation-tested up to +70°C (+158°F). The +20°C (+36°F) difference in ratings allows for temperature rise due to sunlight.

Weight

<18.1 kg (40 lbs) without battery

Oscillography

Length	15, 30, or 60 cycles
Total storage	11 seconds of analog and binary
Length	128 samples per cycle unfiltered 32 and 16 samples per cycle unfiltered and filtered 4 samples per cycle filtered



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