

SEL-351RS Kestrel®

Single-Phase Recloser Control

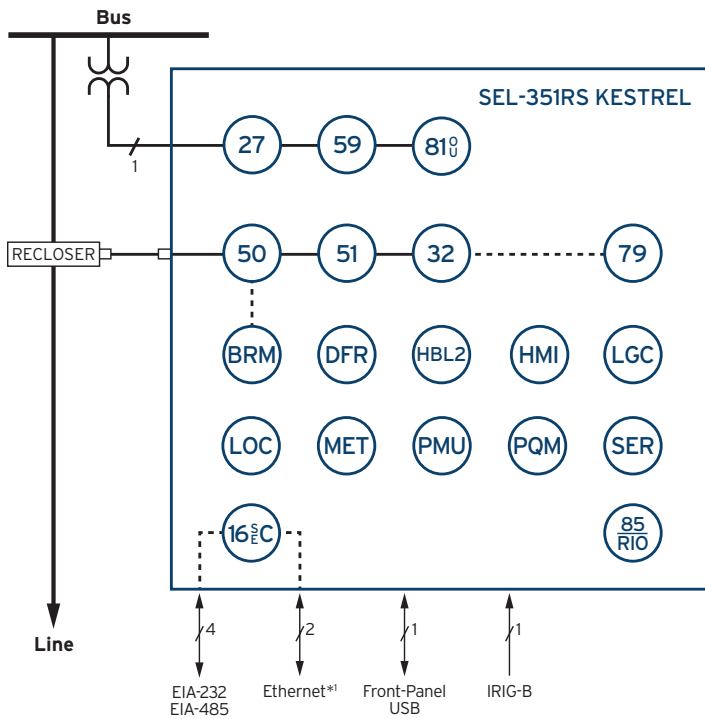


Lightweight and flexible recloser control for single-phase applications

- Plug-and-work operation with popular single-phase reclosers simplifies new and retrofit installations.
- EZ settings present a simple and familiar operator interface.
- Single-phase tripping minimizes outage times and improves reliability indices.
- Comprehensive communications protocols and interfaces ease integration into distribution automation systems.



Functional Overview



ANSI NUMBERS/ACRONYMS AND FUNCTIONS

16 SEC	Access Security (Serial, Ethernet)
27	Undervoltage
32	Directional Power
50	Overcurrent
51	Time Overcurrent
59	Overvoltage
79	Autoreclosing
81 (O,U)	Over-/Underfrequency
85 RIO	SEL MIRRORED BITS® Communications
DFR	Event Reports
HMI	Operator Interface
LGC	SELogic® Control Equations
MET	High-Accuracy Metering
PMU	Synchrophasors
PQM	Voltage Sag, Swell, and Interruption
SER	Sequential Events Recorder

ADDITIONAL FUNCTIONS

BRM	Breaker Wear Monitor
HBL2	Harmonic Blocking
LDP	Load Data Profiling
LOC	Fault Locator

¹Copper or fiber-optic

*Optional feature

Key Features

Advanced Protection

The Kestrel can protect single-phase distribution circuits with comprehensive protection capabilities, including time-overcurrent, autoreclosing, over- and undervoltage, and frequency elements. The Kestrel's accurate fault locating feature increases service restoration efficiency.

EZ Settings

You can commission the Kestrel quickly using EZ settings, which are similar to traditional recloser control settings.

Inrush Detection

The Kestrel detects transformer energization or motor startup and blocks tripping until these inrush conditions subside using a second-harmonic blocking element.

Advanced Communications Interfaces and Protocols

With the Kestrel, you can coordinate relay-to-relay operation with high-speed MIRRORING BITS communications. You can also integrate the Kestrel into serial and Ethernet communications networks with standard DNP3 or Modbus protocols or optional IEC 61850 protocols.

Metering and Power Quality Information

Accurate metering reports in the Kestrel eliminate the need for external meters. Voltage sag, swell, and interruption data are also available to provide power quality monitoring.

System Monitoring

You can view system and recloser conditions using an integrated web server. From the web server homepage, you can check settings and view meter and Sequential Events Recorder (SER) reports.

Compatibility With Popular Reclosers

The Kestrel works with the G&W Viper-SP single-phase recloser and the ABB Elastimold Molded Vacuum Recloser (MVR), and it can be configured for complete plug-and-work capability. The interface is designed and tested to exceed the IEC 62271-111/IEEE C37.60 standard. Certificates for popular single-phase reclosers are available at selinc.com/products/351RS_Kestrel.



Product Overview



Navigation controls make information readily accessible.

Programmable pushbuttons and configurable labels simplify operation.

EIA-232 front serial port provides local access.

A standard three-point latch improves physical security.

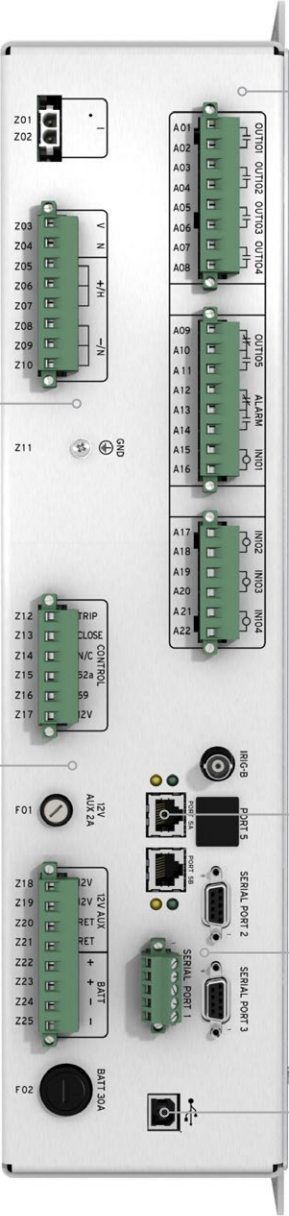
Built-in synchrophasor measurements provide real-time electrical quantities.

Standard multisesion Modbus TCP and DNP3 (and optional IEC 61850) protocols enable easy integration with existing systems.

16 SELoGIC variables replace traditional panel switches with 16 latching, 16 local, and 16 remote control points.

Standard dual-copper Ethernet ports and optional single- or dual-fiber ports improve communications.

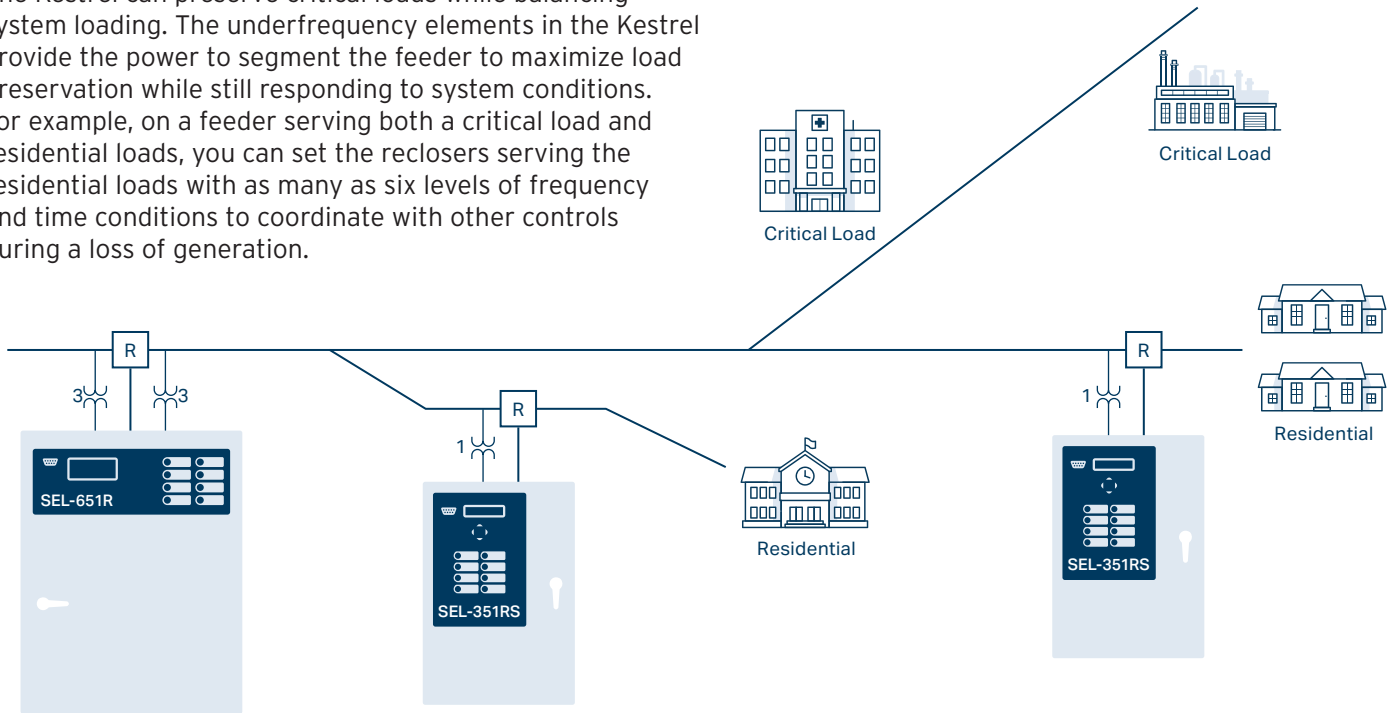
Two standard EIA-232 ports, an EIA-485 port, and a USB port provide communications flexibility.



Applications

Selective Load Shedding for Improved System Response

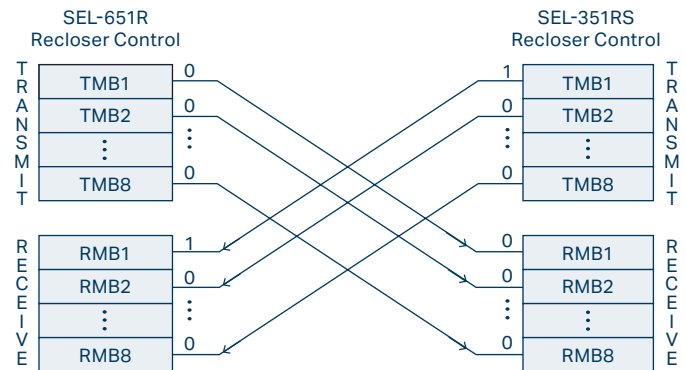
The Kestrel can preserve critical loads while balancing system loading. The underfrequency elements in the Kestrel provide the power to segment the feeder to maximize load preservation while still responding to system conditions. For example, on a feeder serving both a critical load and residential loads, you can set the reclosers serving the residential loads with as many as six levels of frequency and time conditions to coordinate with other controls during a loss of generation.



MIRRORED BITS Relay-to-Relay Communications

SEL MIRRORED BITS communications provides bidirectional relay-to-relay digital communication. MIRRORED BITS communications can operate independently on two of the Kestrel's EIA-232 serial ports. This provides communication upstream and downstream. This bidirectional digital communication creates eight virtual outputs (transmitted MIRRORED BITS) and eight virtual inputs (received MIRRORED BITS) for each serial port operating in the MIRRORED BITS mode.

You can use these MIRRORED BITS to transmit and receive information between upstream and downstream recloser controls to enhance coordination and trip faster for downstream faults. MIRRORED BITS technology also helps reduce the total scheme operating time by eliminating the need to assert output contacts to transmit information.



SEL recloser controls sending and receiving MIRRORED BITS.

Coordinated Three-Phase Lockout for Single-Phase Faults

For a single-phase permanent fault, it may be preferable to trip and lock out all three phases. The Kestrel can coordinate with other single-phase recloser controls at a single location or with upstream three-phase devices to achieve this. Using MIRRORED BITS for fast communication between recloser controls, the Kestrel can signal coordinating devices to trip and lock out until repairs are made or network reconfiguration is complete.

Customizations

SEL offers a variety of recloser control accessories that let you create a customized solution to meet your application needs. Popular accessories include a cabinet heater, accessory mounting kits, and prewired connectors. Many accessories are available for factory installation or as field upgrade kits. Listed below are some of the accessories available to create a robust recloser solution.



SEL-2401 Satellite-Synchronized Clock

Provide precise time for synchrophasor measurements and accurate Sequence of Events (SOE) reporting with the SEL-2401, which has ± 100 nanosecond accuracy for automatically updated time.



SEL-3031 Serial Radio Transceiver

The SEL-3031 combines three serial ports into one radio, allowing three different connections and protocols to operate simultaneously. The spread-spectrum, frequency-hopping radio transmits data in the license-free 900 MHz ISM band, providing an economical communications path or backup communications system.



SEL-3060 Ethernet Radio

The SEL-3060 is a multipurpose Ethernet radio for wireless distribution automation applications, including SCADA and engineering access. The SEL-3060A has a 15-mile range and operates in the license-free 900 MHz ISM frequency band. The SEL-3060B has a 10-mile range and operates in the 2.4 GHz ISM band.



SEL Fault Indicators and Sensors

SEL faulted circuit indicators allow you to pinpoint exact fault locations, even on lateral feeds. This reduces outage times by guiding repair crews directly to the faulted line section.



Kestrel Specifications

General

Compatible Single-Phase Reclosers	G&W Viper-SP ABB Elastimold Molded Vacuum Recloser (MVR)
Current Input	1 A nominal
AC Voltage Input	300 V maximum
System Frequency	50 or 60 Hz
Communications Ports	Three EIA-232 One EIA-485 One USB Type B One Ethernet: Dual 10/100BASE-T (RJ45 connectors) Single 100BASE-FX (LC connector; optional) Dual 100BASE-FX (LC connectors; optional)
Communications Protocols	SEL protocols, IEC 61850 (optional), MIRRORRED BITS communications, Modbus, DNP3, ASCII, SNTP, IEEE C37.118 (synchrophasors), HTTP web server
Power Supply	85–264 Vac; 100–350 Vdc
Weight	<34 kg (75 lb) including batteries
Battery Reserve	≥5 hours at –40°C (–40°F), and ≥15 hours at +25°C (+77°F)
Operating Temperature	Relay module: –40° to +85°C (–40° to +185°F) Batteries: –40° to +80°C (–40° to +176°F) Entire SEL-351RS unit: –40° to +60°C (–40° to +140°F)

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