



Distribution Control Overview



SEL-FT50 and SEL-FR12

The SEL-FT50 and SEL-FR12 system improves distribution protection by providing fault indication in 6 ms, allowing relays and recloser controls to make better tripping decisions.



SEL-651R

The SEL-651R provides Automatic Network Reconfiguration, three-phase and single-phase tripping, and other distribution automation solutions. It is compatible with popular reclosers.



SEL-651RA

The SEL-651RA is a powerful, cost-effective, and flexible recloser control for 14-pin applications. It is compatible with popular reclosers.



SEL-351RS Kestrel®

The SEL-351RS provides integrated logic and communications and comprehensive protection for single-phase applications.



SEL-734B

The SEL-734B includes low-energy analog inputs and provides advanced monitoring and control capabilities for applications such as capacitor bank control and feeder monitoring.



SEL-734W

The enhanced SEL-734W and SEL-8340 Wireless Current Sensor solution provides advanced capacitor bank control to improve power quality.



SEL-2431

The SEL-2431 optimizes system voltages by using directional voltage profiles and detailed tap change event reports.

Applications	SEL-351RS	SEL-651RA	SEL-651R
Distribution Feeder Protection	■	■	■
Breaker Failure Protection	<i>f</i>	<i>f</i>	<i>f</i>
Generator Intertie Protection		■	■
Synchronism Check		+	■
Underfrequency Load Shedding	■	■	■
Undervoltage Load Shedding	■	■	■
Protection			
25 (G,T) Generator/Intertie Synchronism Check		■	■
27/59 Under-/Overvoltage	■	■	■
32 Directional Power Elements	■	+	■
50 (P,N,G,Q) Overcurrent Element (Phase, Neutral, Ground, Negative Sequence)	■	■	■
51 (P,N,G,Q) Time-Overcurrent Element (Phase, Neutral, Ground, Negative Sequence)	■	■	■
67 (P,N,Q) Directional Overcurrent (Phase, Neutral, Negative Sequence)		■	■
78VS Vector Shift		■	■
81 Over-/Underfrequency	■	■	■
Separate Neutral Overcurrent		■	■
Load Encroachment Supervision		■	■
Low-Energy Analog (LEA) Voltage Inputs		+	+
Directional Sensitive Earth Fault Protection		■	■
Pilot Protection Logic		<i>f</i>	<i>f</i>
Rate-of-Change of Frequency (df/dt)	■	■	■
Fast Rate-of-Change of Frequency		■	■
Harmonic Blocking	■	■	■
Arc Sense™ Technology (AST) High-Impedance Fault Detection		+	+
Phantom Phase Voltage	■	■	■
Current/Voltage Channels	1/1	4/1 4/6+	4/6

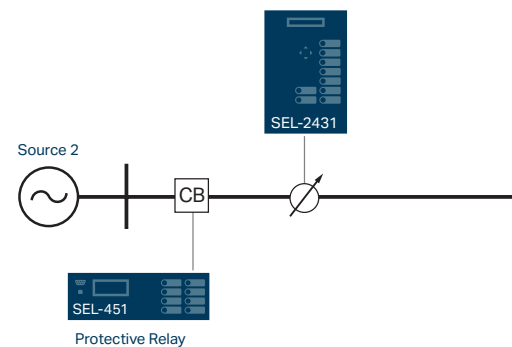
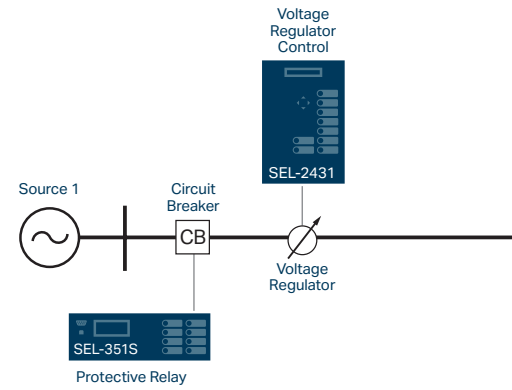
Instrumentation and Control

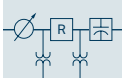
	SEL-351RS	SEL-651RA	SEL-651R
79 Automatic Reclosing	■	■	■
Fault Locating	■	+	■
SELogic® Control Equations With Remote Control Switches	■	■	■
SELogic Counters	■	■	■
Voltage Check on Closing	■	■	■
SELogic Nonvolatile Latch	■	■	■
Nonvolatile Local Control Switches	■	■	■
Breaker/Recloser Wear Monitor	■	■	■
Trip Coil Monitor	<i>f</i>	<i>f</i>	<i>f</i>
Voltage Sag, Swell, and Interruption (VSSI)	■	+	■
Load/Signal Profile Recorder	■	■	■
Sequential Events Recorder	■	■	■
DNP3 Level 2 Outstation	■	■	■
IEEE C37.118 Synchrophasors	■	■	■
Ethernet	■	■	■
IEC 61850	+	+	+
Simple Network Time Protocol (SNTP)	■	■	■
Harmonic Metering	■	■	■
RMS Metering	■	■	■

■ Standard feature + Model option *f* May be created using settings

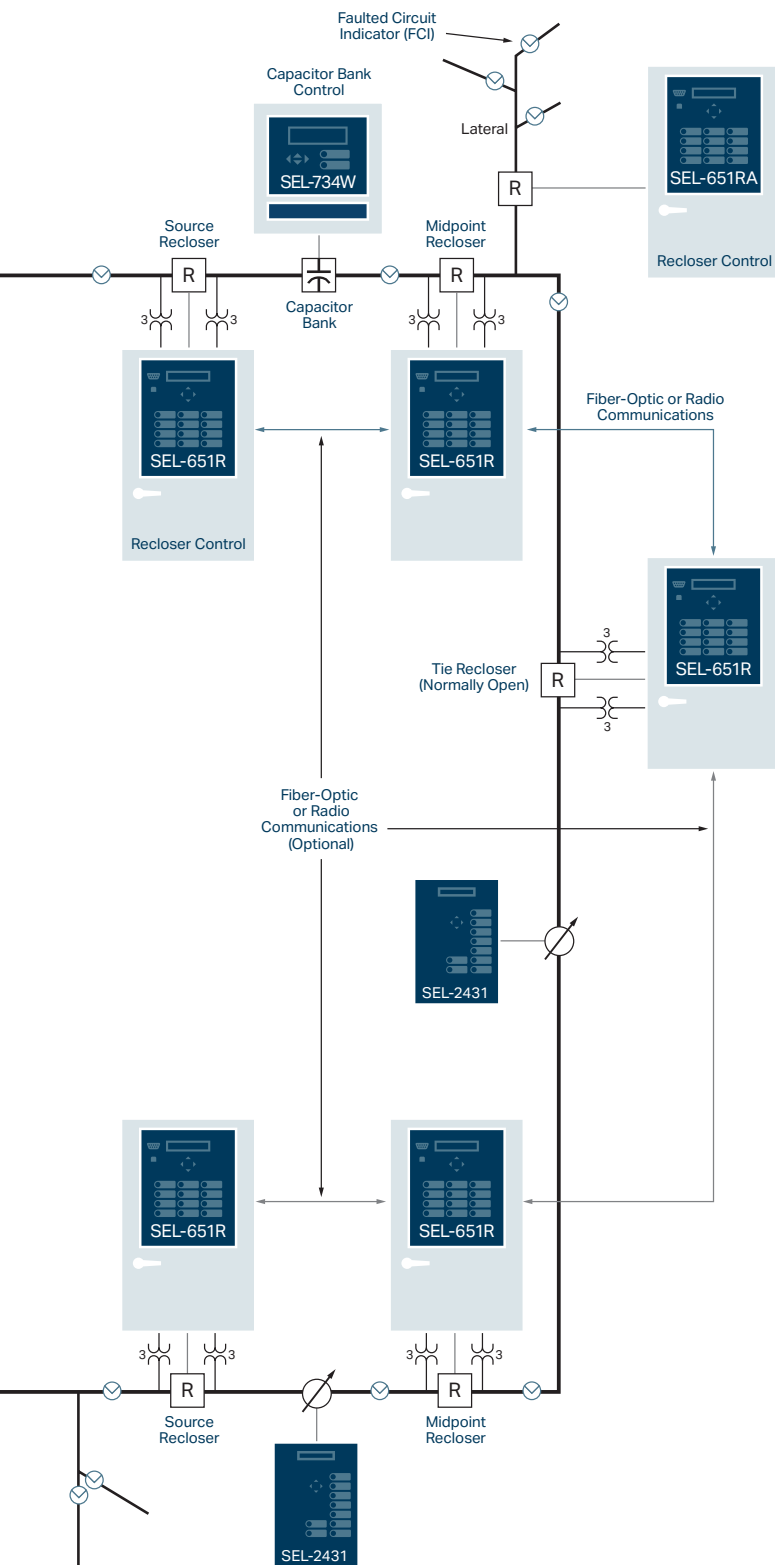
Recloser Compatibility

	SEL-351RS	SEL-651RA	SEL-651R
G&W			
Control Power Viper-S			■
Viper-G		■	■
Viper-LT			■
Viper-S		■	■
Viper-SP	■		■
Viper-ST			■
Other Reclosers			
Elastimold Molded Vacuum Recloser (MVR)	■		■
Joslyn TriMod 300R		■	■
Joslyn TriMod 600R			■
OVR-3 24-Pin (15 and 27 kV)			■
Gridshield 32-Pin (15, 27, and 38 kV)			■
Gridshield 42-Pin (15, 27, and 38 kV)			■
VR-3S (15 and 27 kV)			■
CXE		■	■
NOVA Auxiliary-Powered		■	■
NOVA Control-Powered			■
NOVA NX-T			■
NOVA Triple-Single			■
RE		■	■
RVE		■	■
RXE		■	■
VSA		■	■
VSO		■	■
VWE		■	■
VWVE 27		■	■
VWVE 38X		■	■
WE		■	■
WVE 27		■	■
WVE 38X		■	■
GVR (when equipped with interface module)		■	■
SDR Triple-Single		■	■
SDR Three-Phase		■	■
OSM_150_AI_4			■





Distribution Control Applications



DNA® (Distribution Network Automation)

Use SEL DNA solutions to automate complex distribution networks by combining SEL distribution relays, recloser controls, voltage regulators, capacitor bank controllers, and automation controllers. You can reconfigure and optimize networks based on a complex combination of load, capacity, and other criteria.

Automatic Network Reconfiguration (ANR)

Improve service reliability with ANR by isolating permanently faulted segments and quickly restoring service to nonfaulted segments. ANR is possible in a variety of systems, either with or without communications. With single-phase tripping, you can isolate only the faulted phase for additional service reliability.

Capacitor bank control

Combine volt/VAR-based capacitor bank control with power quality monitoring and advanced reporting to improve power factor and system efficiency. The SEL-734B Advanced Monitoring and Control System adapts to multiple capacitor bank control applications, ranging from basic three-phase control to intelligent single-phase control.

Voltage regulation

Control your single-phase voltage regulators to level the voltage profile and optimize your system. Voltage regulation is adaptable to fit your application. For example, you can select the locked-forward mode with traditional radial feeders. For looped systems, a bidirectional mode offers different settings based on the direction of current flow.

SEL-FT50 and SEL-FR12

Fault Transmitter and Receiver System

Starting price

SEL-FT50 Fault Transmitter: \$180 USD

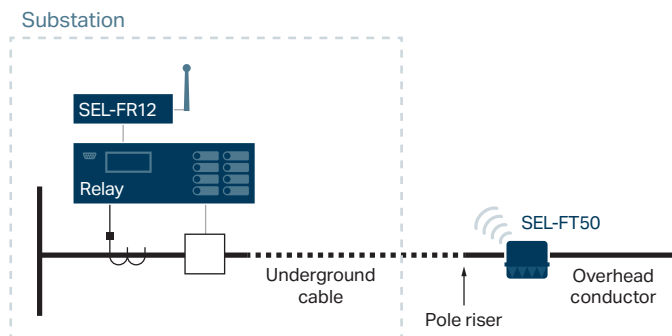
SEL-FR12 Fault Receiver: \$549 USD

selinc.com/products/FT50 

 Select models typically ship in 2 days

The SEL-FT50 and SEL-FR12 system provides an innovative approach to improve the reliability and safety of your feeder. You can apply this system with your existing protection schemes to block reclosing for underground faults. The system consists of line-powered SEL-FT50 Fault Transmitters communicating wirelessly with an SEL-FR12 Fault Receiver. The system communicates the fault data using high-speed MIRRORRED BITS® communications in less than 6 ms.

Fast detection and communications from the SEL-FT50 and SEL-FR12 system provide additional information to protective relays, enabling coordination and protection tailored to specific events based on the location of the fault. This allows your protection to trip for faults as fast as possible and allows you to selectively decide when reclosing should be enabled, improving safety and reducing wear on equipment. You can install SEL-FT50 Fault Transmitters on laterals, branches, and the main line to provide additional information for protection decisions.



Block reclosing for underground faults to enhance protection based on the fault location.

SEL-651R

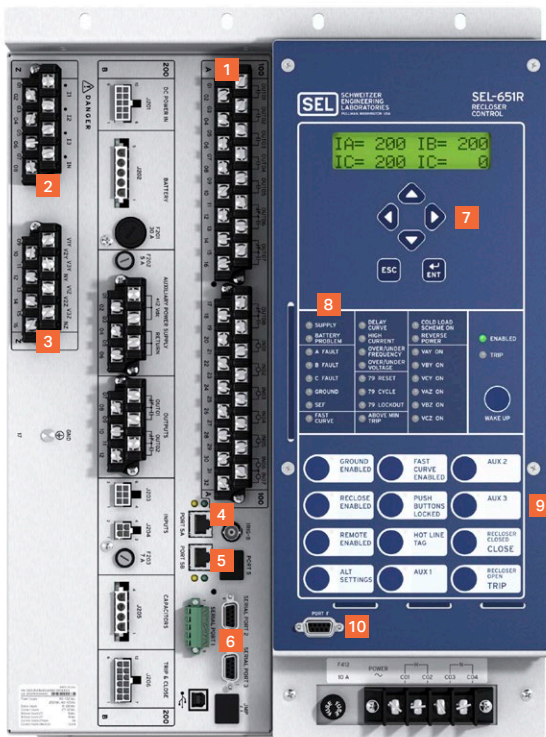
Advanced Recloser Control

Starting price
\$6,060 USD

selinc.com/products/651R

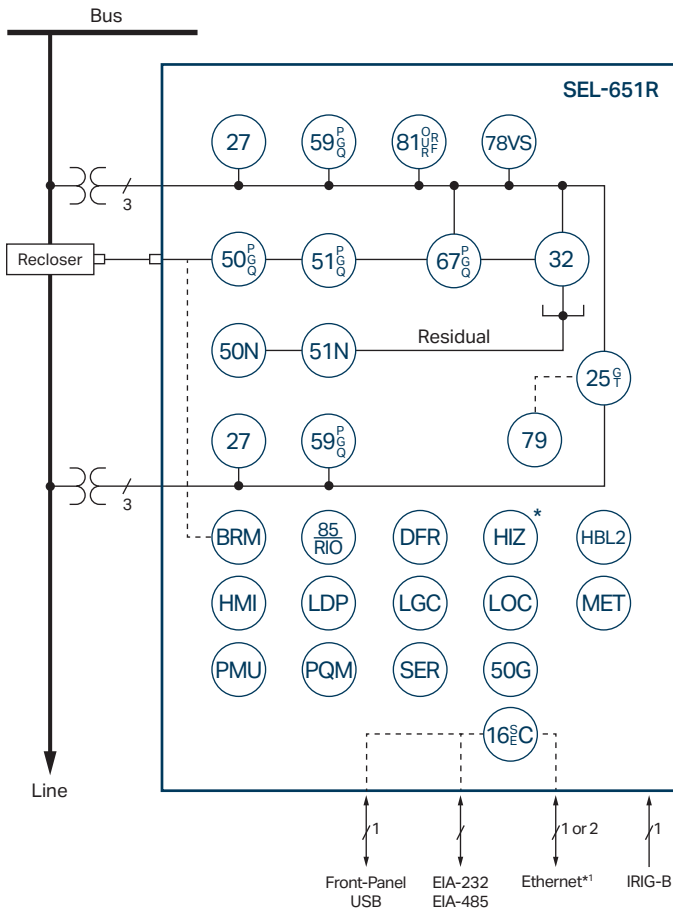
The SEL-651R offers exceptional protection and communications capabilities for Automatic Network Reconfiguration, single- and three-phase tripping, distributed energy resource (DER) interconnections, turnkey point of common coupling solutions, and other distribution automation needs. These capabilities help you maintain reliable service to as many customers as

possible in the event of a fault. You can quickly commission the SEL-651R by applying just the settings you need using ACSELEATOR QuickSet® SEL-5030 Software. Easy-to-use design templates simplify the settings interface, and you can customize them for your needs. For quick access when making settings changes, you can store templates on the recloser control.



- 1 64 SELogic® variables replace traditional panel switches with 32 latching, 16 local, and 32 remote control points.
- 2 Built-in synchrophasor measurements for real-time electrical quantities.
- 3 Standard six voltage inputs with PT and low-energy analog (LEA) options for measurements on both sides of the recloser.
- 4 Standard multisession Modbus TCP and DNP3 and optional IEC 61850 easily integrate with existing systems.
- 5 Standard dual copper Ethernet ports and optional single or dual fiber ports for improved communications.

- 6 Two standard EIA-232 ports, an EIA-485 port, and a USB port provide several communications options.
- 7 Navigation controls make information readily accessible.
- 8 Optional software-programmable tricolored LEDs for improved status indication.
- 9 Programmable control pushbuttons and configurable labels for ease of operation.
- 10 EIA-232 front serial port provides local access.
- 11 Single-door control option shown.



ANSI Functions

16 SEC	Access Security (Serial, Ethernet)
25 (G,T)	Generator/Intertie Synchronism Check
27	Undervoltage
32	Directional Power
50G	Best Choice Ground
50N	Neutral Overcurrent
50 (P,G,Q)	Overcurrent (Phase, Ground, Negative Sequence)
51 (P,G,Q)	Time Overcurrent (Phase, Ground, Negative Sequence)
51N	Neutral Time Overcurrent
59 (P,G,Q)	Overvoltage (Phase, Ground, Negative Sequence)
67 (P,G,Q)	Directional Overcurrent (Phase, Ground, Neg. Seq.)
78VS	Vector Shift
79	Autoreclosing
81 (O,U,R)	Frequency (Over, Under, Rate)
81RF	Fast Rate-of-Change of Frequency
85 RIO	SEL MIRRORED BITS® Communications
DFR	Event Reports
HIZ	SEL Arc Sense™ Technology (AST)*
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	Second-Harmonic Blocking
LDP	Load Data Profiling
LOC	Fault Locator

*Optional feature ¹ Copper or fiber-optic

Compatible with popular reclosers

The SEL-651R works with a wide range of reclosers for complete plug-and-work capability. All interfaces are designed and tested to exceed the IEEE C37.60 standard. Certificates are available at selinc.com/products/SEL-651R.

G&W

- Control Power Viper-S
- Viper-LT
- Viper-S
- Viper-SP
- Viper-ST
- Viper-G

Other Reclosers

Elastimold Molded Vacuum Recloser (MVR)	VSA
Joslyn TriMod 300R	VSO
Joslyn TriMod 600R	VVE
OVR-3 24-Pin (15 and 27 kV only)	VWVE 27
Gridshield 32-Pin (15, 27, and 38 kV)	VWVE 38X
Gridshield 42-Pin (15, 27, and 38 kV)	WE
VR-3S (15 and 27 kV only)	WVE 27
CXE	WVE 38X
NOVA Auxiliary Powered	GVR ²
NOVA Control Powered	SDR Triple-Single
NOVA NX-T	SDR Three-Phase
NOVA Triple-Single	OSM_150
RE	² When equipped with interface module
RVE	
RXE	

SEL-651RA

Recloser Control

Starting price
\$4,040 USD

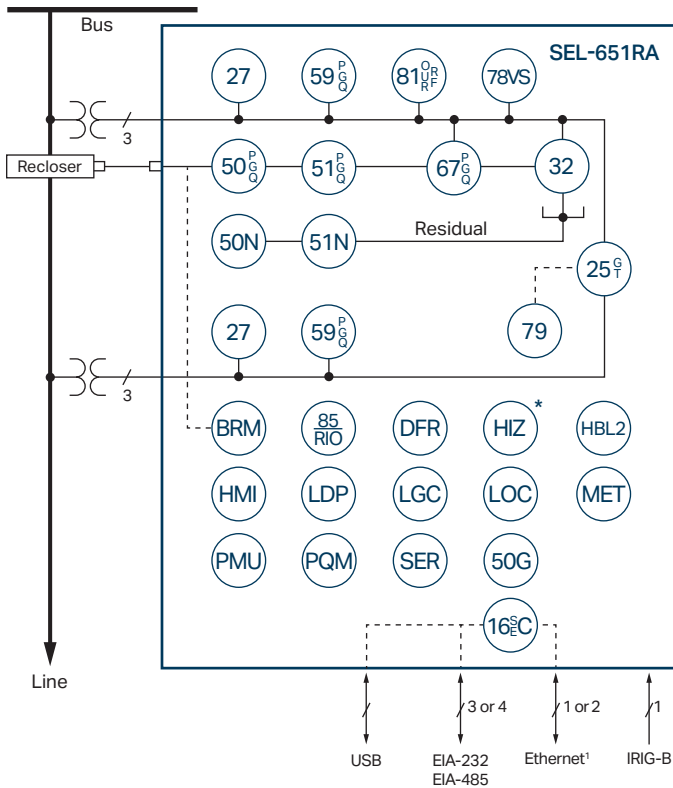
selinc.com/products/651RA 

The SEL-651RA offers exceptional protection and communications capabilities for Automatic Network Reconfiguration, distributed energy resource (DER) control, turnkey point of common coupling solutions, and other distribution automation needs. These capabilities help you maintain reliable service to as many customers as possible in the event of a fault. You can quickly commission

the SEL-651RA by applying just the settings you need using ACSELEATOR QuickSet® SEL-5030 Software. Easy-to-use design templates simplify the settings interface, and you can customize them for your needs. For quick access when making settings changes, you can store the templates on the recloser control. Familiar EZ recloser control settings further simplify and speed commissioning for basic applications.



- 1 Corrosion-resistant painted aluminum cabinet provides a maintenance-free enclosure.
- 2 Standard three-point latch for physical security.
- 3 EIA-232 front serial port provides local access.
- 4 USB port provides fast local access.
- 5 Navigation controls make information readily accessible.
- 6 Optional software-programmable tricolored LEDs for improved status indication.
- 7 Programmable control pushbuttons and configurable labels for ease of operation.



ANSI Functions

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50G	Best Choice Ground
50N	Neutral Overcurrent
50 (P,G,Q)	Overcurrent (Phase, Ground, Negative Sequence)
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81 (O,U,R)	Frequency (Over, Under, Rate)
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HIZ	SEL Arc Sense™ Technology (AST)*
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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	Second-Harmonic Blocking
LDP	Load Data Profiling
LOC	Fault Locator

*Optional feature

¹ Copper or fiber-optic

Compatible with popular reclosers

The SEL-651RA works with traditional 14-pin reclosers and 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 the Eaton (Cooper) NOVA and G&W Viper-S reclosers are available at selinc.com/products/SEL-651RA.

G&W

Viper-S
Viper-G

Other Reclosers

Joslyn TriMod 300R	VWE
NOVA Auxiliary Powered	VWVE 27
CXE	VWVE 38X
RE	WE
RVE	WVE 27
RXE	WVE 38X
VSA	GVR ²
VSO	

²When equipped with interface module

SEL-351RS Kestrel®

Single-Phase Recloser Control

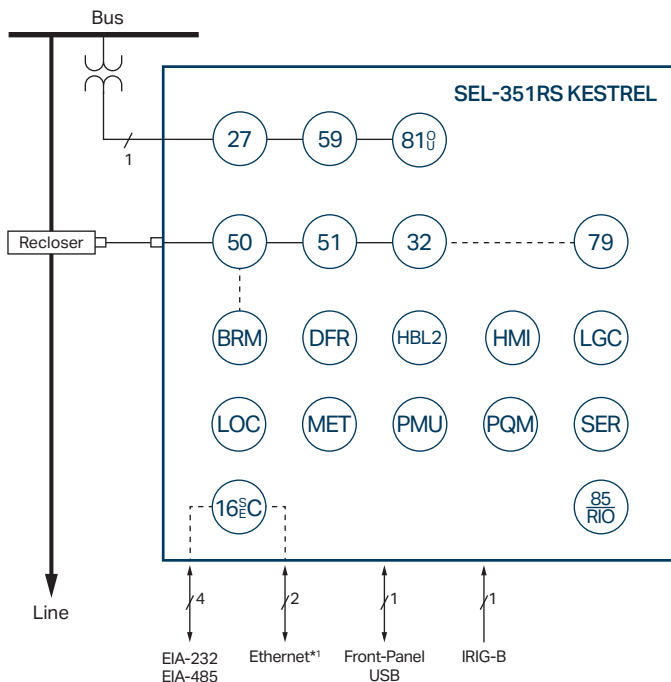
Starting price
\$2,590 USD

selinc.com/products/351RS_Kestrel

The lightweight SEL-351RS provides integrated logic, communications, and comprehensive protection for single-phase applications. Convenient operator controls allow easy local access to metering and event data. The rugged, painted aluminum enclosure reduces the need for cabinet maintenance and repairs. With built-in USB, serial, and Ethernet media and protocols, including IEC 61850 and IEEE C37.118 synchrophasors, you can easily integrate this control into new or existing systems. Familiar EZ recloser control settings further simplify and speed commissioning for basic applications.

Compatible with popular reclosers

The SEL-351RS works with single-phase reclosers, such as the G&W Viper-SP and the ABB Elastimold Molded Vacuum Recloser (MVR)—Single Phase, 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.



ANSI 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 MIRRORING 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

*Optional feature ¹ Copper or fiber-optic

SEL-734B

Advanced Monitoring and Control System

Starting price
\$1,660 USD

selinc.com/products/734B 

The SEL-734B with low-energy analog (LEA) inputs provides advanced monitoring and control capabilities for applications such as capacitor bank control and feeder monitoring. LEA sensor compatibility allows safe, fast, and inexpensive installations. Advanced communications let you report data to SCADA systems and allow remote operations from a control center. You can order enclosures with preloaded control schemes or design custom controls, such as capacitor bank controllers or sectionalizers, using AcSELERATOR QuickSet® SEL-5030 Software templates. SEL's capacitor bank control and sectionalizer templates improve efficiency, increase reliability, and reduce installation time and maintenance costs. User-customized templates add flexibility, improving any smart grid installation.

Capacitor bank control

Choose capacitor bank switching strategies for voltage, kVAR, current, and power factor control with the SEL-734B. Easily toggle control strategies, such as between SCADA and automatic control, from the control center with DNP3 binary objects. Implement a SCADA heartbeat to switch to islanded automatic control if SCADA communication is lost. Customizable logic allows you to modify and create control schemes to adapt to your application.

Complete automation

Order the SEL-734B preprogrammed for capacitor bank control, or customize it to suit virtually any need. Program the SEL-734B for sectionalizing, feeder monitoring, overcurrent detection (for use in locating faults), or virtually any other application demanded. Thirty-two SELogic® control equation elements allow powerful control and monitoring schemes. With features from the SEL-734 Revenue Meter included, the SEL-734B offers the most flexible monitoring and control solution on the market.



In addition to the compact enclosure, the SEL-734B is available as a standalone unit or in a full-size enclosure.

Plug-and-play connections

Choose from multiple enclosure styles, various sensor input ranges, and customizable enclosures to make the SEL-734B a plug-and-play device. The SEL-734B is offered as a standalone device or is installed in a compact or full-sized enclosure with a variety of connections. Make your commissioning a plug-and-play experience with the SEL-734B.

SEL-734W and SEL-8340

Capacitor Bank Control and Wireless Current Sensor

Starting price
SEL-734W: \$1,760 USD
SEL-8340: \$630 USD

selinc.com/products/734W 

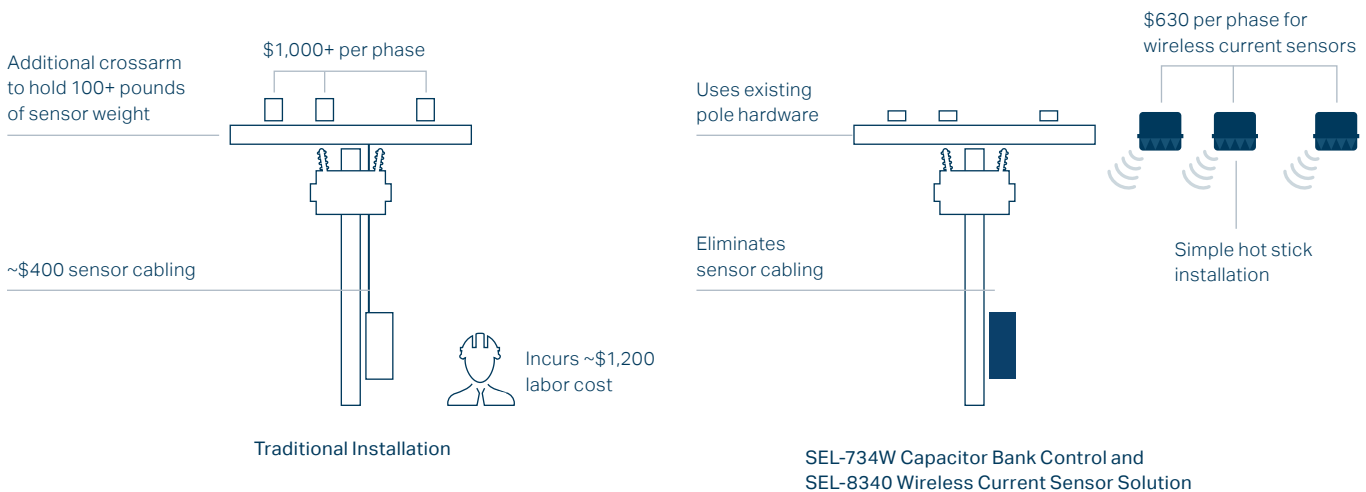
The SEL-734W and SEL-8340 solution is a quicker, simpler, and safer way to improve power quality. The SEL-734W uses current, voltage, kVARs, and power factor control to optimize capacitor bank switching. The SEL-734W and SEL-8340 solution makes replacing time- and temperature-based capacitor bank controls faster and easier. This is the first capacitor bank control to use wireless technology to improve power quality while avoiding difficult-to-install line post current sensors.



An SEL-734W Capacitor Bank Control is paired with one to three SEL-8340 Wireless Current Sensors.

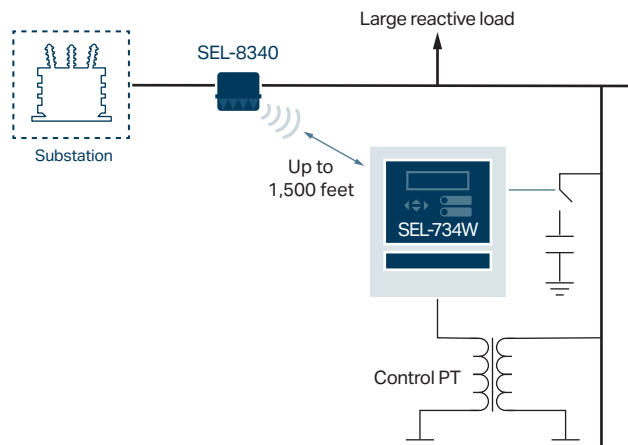
Ease of installation

The lightweight current sensors install on an overhead distribution line using a single hot stick. There is no need for an outage or significant hot-line work.



Location flexibility

Mount the wireless current sensors closer to your inductive loads, not just at the control. The sensors can be mounted up to 1,500 feet away from the capacitor bank installation.



SEL-2431

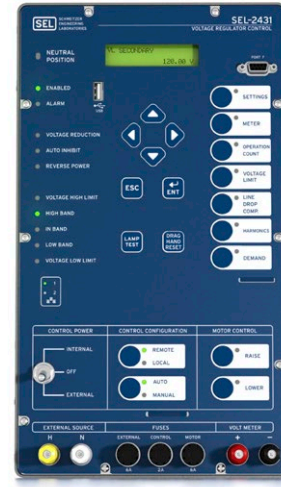
Voltage Regulator Control

Starting price
\$970 USD

selinc.com/products/2431 

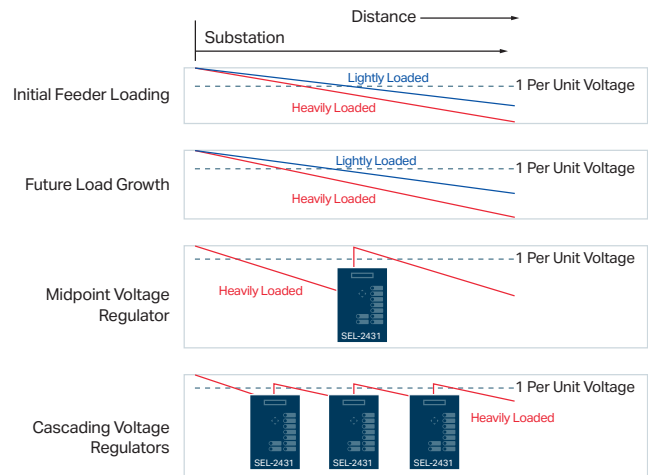
 Select models typically ship in 2 days

The SEL-2431 is compatible with most 32-step, single-phase voltage regulators manufactured in North America. Various hinge and wiring kits let you easily upgrade existing controls without removing the regulator from service. You can quickly integrate the SEL-2431 into Ethernet or serial communications networks using fiber or copper options.



Creating the optimum profile

Apply the SEL-2431 to your single-phase voltage regulators to optimize your voltage profile. After initial construction, feeder load growth causes drastic, unplanned voltage deviations. Single-phase voltage regulators installed at the midpoint or cascaded throughout the feeder can dramatically flatten the voltage profile.



Modes of operation

Program the SEL-2431 quickly and easily for your application. With configurable modes of operation, you can apply the SEL-2431 in locked-forward, locked-reverse, bidirectional, idle-reverse, or cogeneration modes.

For example, you can select the locked-forward mode for systems configured with traditional radial feeders. For looped systems where current can flow in either direction, the bidirectional mode will dynamically change the voltage regulation settings based on the direction of current flow.

	Reverse Current	0	Forward Current
Locked Forward	Operation Inhibited		Forward Operation
Locked Reverse	Reverse Operation		Operation Inhibited
Bidirectional	Reverse Operation	Operation Inhibited	Forward Operation
Idle Reverse	Operation Inhibited		Forward Operation
Cogeneration	Forward Operation (Reverse LDC)	Operation Inhibited	Forward Operation (Forward LDC)