



Viper[®]-ST

Solid Dielectric, Independent Pole Operated Recloser

Providing overcurrent protection for single or three-phase operation

G&W Electric
Engineered to order. Built to last.

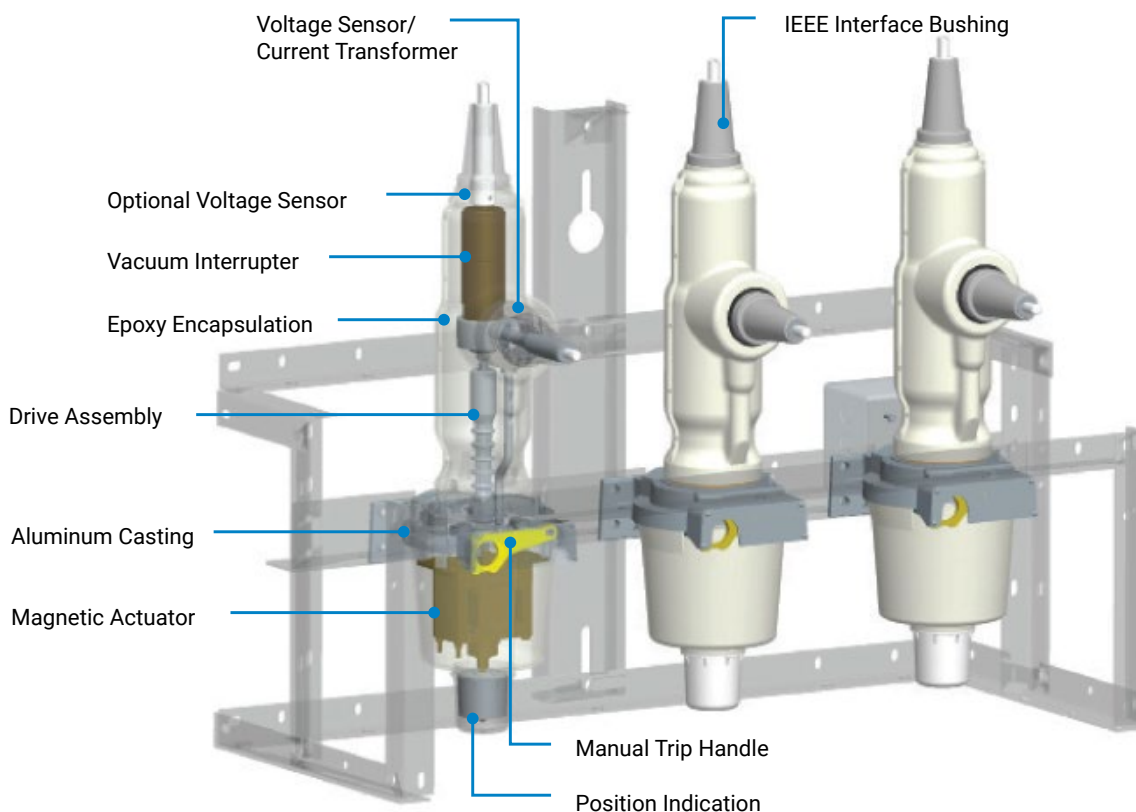
Recloser Innovation Leader

As the North American leader in reclosers, G&W Electric offers the broadest line of medium-voltage reclosers. Backed by more than 115 years of experience, the Viper®-ST recloser incorporates the latest technology to deliver reliable, maintenance-free overcurrent protection for power systems up to 40.5kV. It is available in various pole-mounted configurations, as well as substation and pad-mounted options, to accommodate a wide range of applications.

Viper-ST Overview

The Viper-ST recloser combines the time proven reliability of the electronically controlled, vacuum fault interrupters with the maintenance-free benefits of a solid dielectric insulated device. The recloser offers user flexibility with voltages ratings from 15.5kV to 40.5kV with three distinct mechanical operating modes.

- 1-phase trip / single-phase lockout
- 1-phase trip / three-phase lockout
- 3-phase trip / three-phase lockout



Isometric view of the Viper-ST Recloser without insulators.

BENEFITS

Reliable Performance

- Utilizes time-proven epoxy to fully encapsulate the vacuum interrupter
- Offers excellent insulation while providing fully shielded construction
- All modules are UV protected and 100% factory tested for partial discharge
- Utilizes the latest in magnetic actuator technology
- Interrupter and actuator assembly tested for over 10,000 mechanical operations to ensure a long operating life

Operator Safety

- Vacuum interrupter and all energized parts are sealed within solid dielectric insulation
- Installation flexibility with L-shaped and Z-shaped module designs
- Module bodies are fully grounded to provide a dead-front construction, providing optimum operator safety and additional protection to wildlife
- The hot stick operable manual trip and lockout handle prohibits operation from either the control or remotely
- Manual trip handle with true mechanical blocking further ensures against accidental close operations
- Open and closed contact indicator verifies contact position
- Contact status and lockout condition can also be verified at the control

Application Flexibility

G&W Electric provides a consultative approach to your recloser design. Our engineers will provide you a design that meets your specific needs. Customized control cabinets, recloser frames and Category 4 hurricane-proof designs are some of the options available to our customers.

- Units are designed for overhead, substation and padmount applications
- Pole mounted units can be equipped with either one horizontal and vertical insulator or both horizontal insulators
- Designed with IEEE 386 interface apparatus bushings permitting the use of either long lasting silicone insulators for overhead applications or elbow connectors for both padmount and riser pole applications
- Removable silicone insulators are standard for overhead applications, providing easy field replacement if an insulator is damaged
- Higher external BIL rated insulators can also be used in high pollution areas and can be retrofitted on-site if necessary

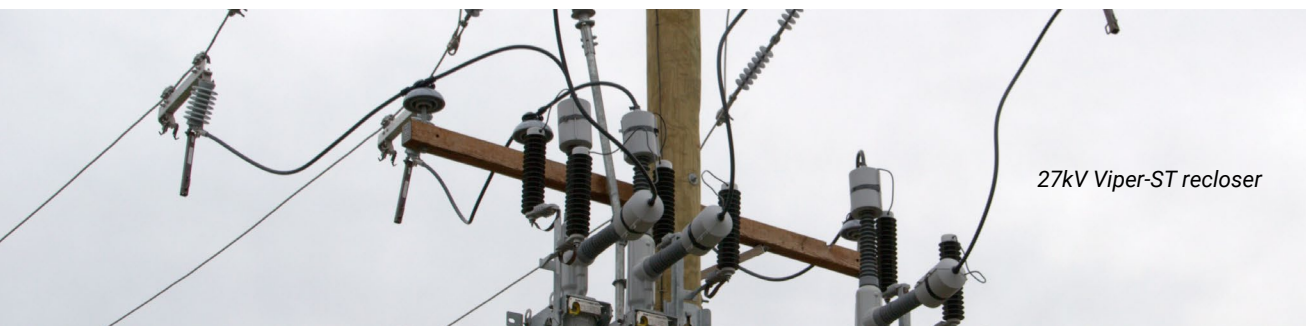
Maintenance Free

- Solid dielectric insulation provides maintenance-free installation
- Electronic equipment associated with the operation of the magnetic actuator(s) are located in the control

Ease of Operation

- Compatible with the SEL-651R, Beckwith M-7679 and ABB RER620
- Site-ready options available

As the leading supplier of reclosers, G&W Electric sets the standard for innovation, reliability, and versatility. Our advanced recloser solutions are designed to meet the evolving needs of power systems, offering unmatched performance across a wide range of applications. From distribution networks to renewable energy integration, our reclosers deliver precise protection and control at every level. With the widest range of voltage offerings in the industry, we provide tailored solutions that empower our customers to enhance grid resilience, optimize efficiency, and adapt to future challenges with confidence. Partner with us for cutting-edge technology and unparalleled expertise in recloser solutions.



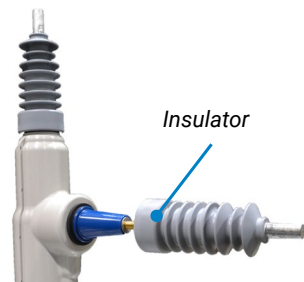
27kV Viper-ST recloser

Viper®-ST Recloser Operation Principle

The Viper-ST recloser monitors the circuit using internal dual-ratio current transformers (CT) and voltage sensors. The Viper-ST recloser system is powered by an external 120 VAC or 48/125 VDC source with energy to operate the recloser mechanism coming directly from the control.

Solid Dielectric Modules

The Viper-ST modules are manufactured with an IEEE 386 apparatus bushing interface. Removable silicone insulators are standard for all overhead applications. If higher external BIL ratings are required due to high altitude or local environmental conditions, such as coastal environments, higher rated insulators can be provided initially or retrofitted in the field by personnel. For dead-front, padmounted applications, 600A apparatus bushings or 200A deep well bushings (up to 27kV) are available.



Silicone insulators are removable, permitting easy replacement in the field if damaged or if higher external BIL level is required.

Integrated Current and Voltage

- A 1000/500:1 dual-ratio current transformer is encapsulated within each module. An optional 400/200:1 dual-ratio CT is also available for lower current detection.
- CT accuracy is $\pm 1\%$.
- Low Energy Analog (LEA) capacitive voltage sensors are encapsulated within each module. The accuracy $\pm 2\%$ over the temperature range -20°C to $+40^{\circ}\text{C}$ (-4°F to $+104^{\circ}\text{F}$) and $\pm 4\%$ from -60°C to $+65^{\circ}\text{C}$ (-76°F to $+149^{\circ}\text{F}$). The voltage sensing phase angle accuracy is $\pm 1^{\circ}$ throughout the full temperature range.

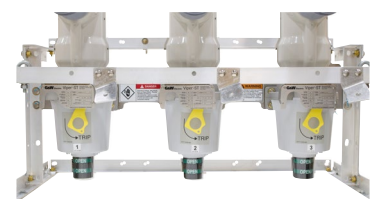
Accusense® Voltage Sensors

Accusense Voltage Sensors are a metering-class voltage sensing solution that enables users to collect critical voltage data needed for monitoring and optimizing grid power. Accusense voltage sensing technology eliminates the need for metering with traditional voltage transformers and is available as a site-ready solution with the Viper-ST Recloser.

Accusense voltage sensors have been tested to IEC 60044-7:1999 standard and comply with 0.5 accuracy class ($\pm 0.5\%$ Magnitude, $\pm 0.344^{\circ}$ Phase). They are rated to operate up to 38kV voltages, 225kV BIL, -40°C to $+65^{\circ}\text{C}$ temperature range, and do not require ratio correction factors.

Manual Trip Operation

- The hookstick manual trip handle opens and locks out the selected phase, or all three phases according to the control settings, disabling any local or remote closing operation until the handle is reset
- Once reset, the recloser can be closed using the control
- Contact position indicator displays open or closed status of the contacts for each phase, individual phase status is also displayed at the control
- Handle is operable from ground level



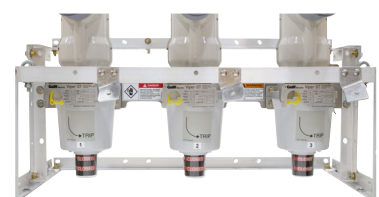
Open position



Yellow Handle Reset

Dead-Line Operation

- Unique design of magnetic actuator system provides for local and remote operation if the AC source power is lost or interrupted
- Dead-line operation allows the recloser to operate utilizing the DC power from the battery located in the control



Closed position

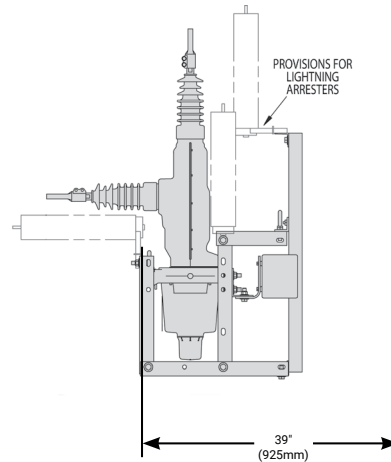
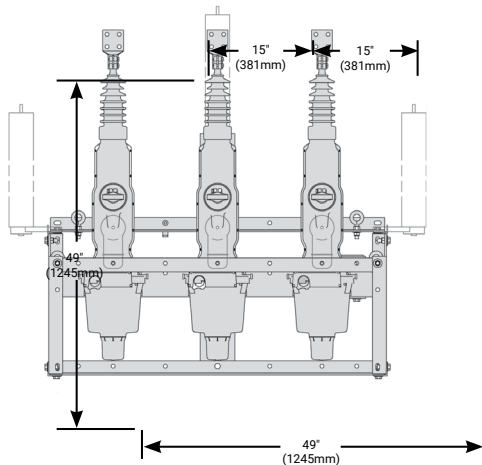
Viper®-ST Recloser Configurations

Polemount Center Bracket (15kV shown)*

- Aluminum centermount frames are standard. Galvanized and stainless steel options are also available.
- Frames can be designed to incorporate site-ready accessories, such as potential transformers and lightning arresters.

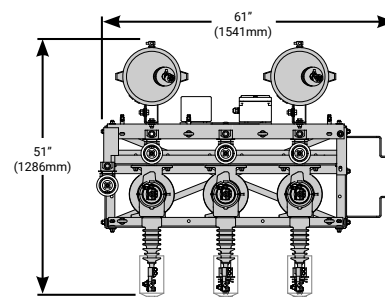
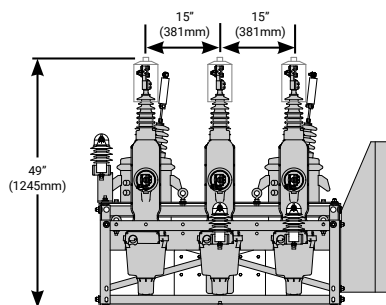


15kV center polemount Viper-ST recloser



Alley-Arm Frame (15kV shown)*

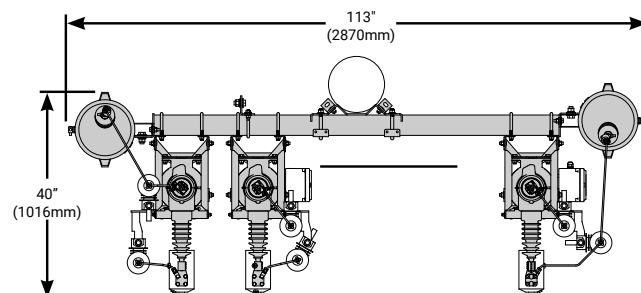
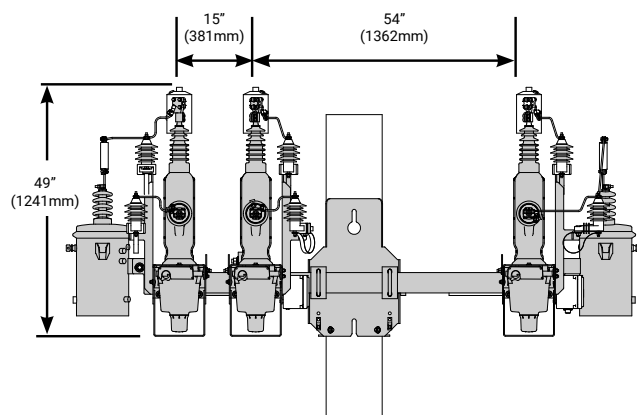
- Outline is a full site-ready package with two oil control power transformers
- Alley-Arm frame is galvanized
- Mounting bracket can be mounted on either side to match overhead lines
- Bracket position can be changed on-site without the need for special tools



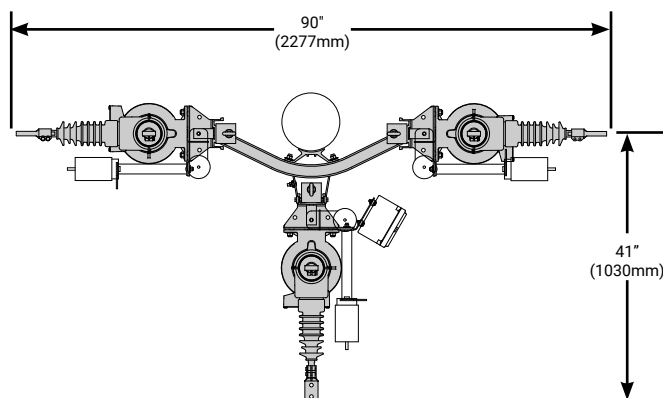
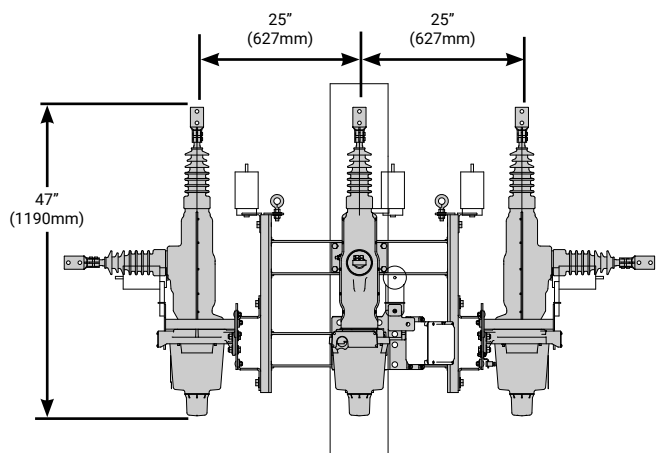
*Dimensions are approximate. Do not use for construction. Brackets are aluminum as standard.
Note: 38kV and 40.5kV frames have a minimum of 17" spacing.

Cross-Arm Frame (15kV shown)*

- Phase B can be moved on site, without special tools, to either side of the pole to match the overhead line configuration
- Shown as a site-ready unit
- Stainless steel options available

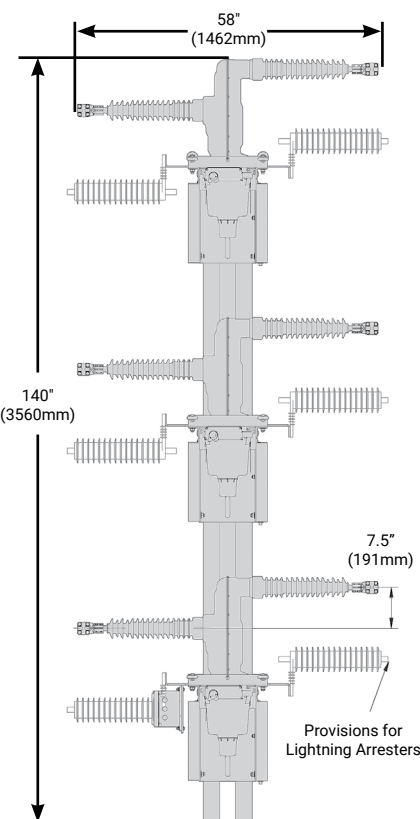


Polemount Cluster Bracket (15kV shown)*



Horizontal Insulator Bracket (38kV shown)*

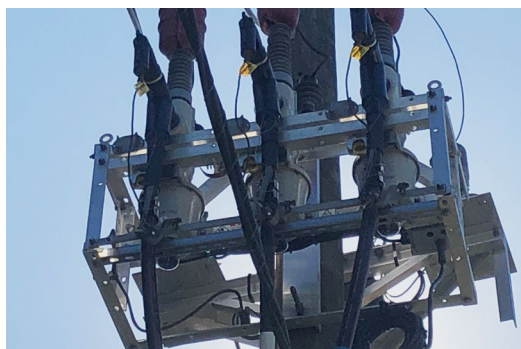
- Ideal for overhead applications where all three phase conductors are on the same side of the pole or for congested installations with minimal phase spacing
- Stainless steel option is available



*Dimensions are approximate. Do not use for construction.

Riser Pole

- Dead-front design allows for riser pole installations that can be simplified with directly connected IEEE386 dead break connectors on the horizontal bushing.



Polemount Site-Ready Assembly (15kV shown)*

- Preassembly of all accessories reduces recloser installation time in the field and may include potential transformers, arresters, aerial lugs, terminals, junction boxes, wildlife protectors, and all associated wiring. Control cables are assembled with connectors on both ends for a cleaner installation. User identification markers can be applied to each unit prior to shipment further reducing installation time.
- G&W standard relay is the SEL651R2, however the Viper-ST is compatible with a wide selection of control systems, including those from other industry leaders.
- Galvanized steel frames are standard and stainless steel frames optional.

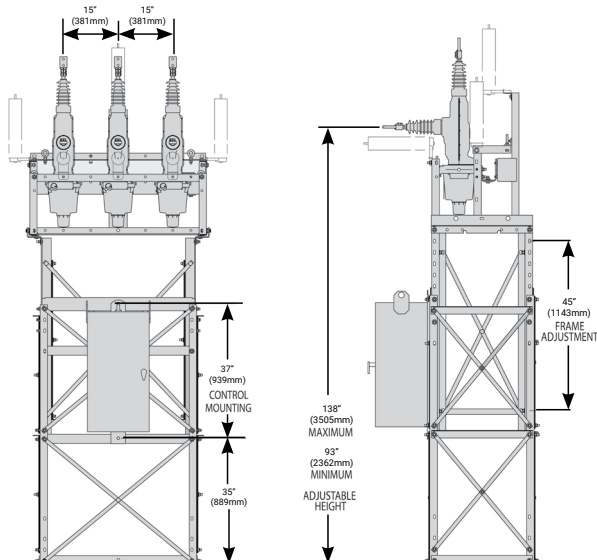


Substation Mount Recloser*

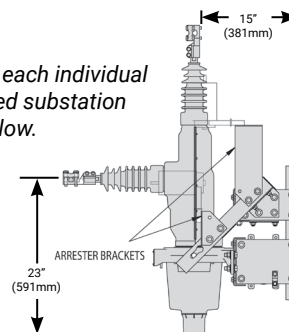
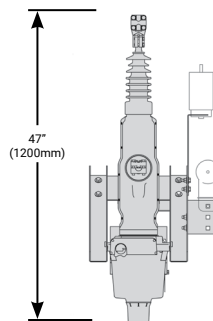
- Adjustable frame height
- Photo and drawings below show a three-phase mounted unit
- Aluminum recloser frame on galvanized substation mounting structure is standard. Stainless steel options are available.



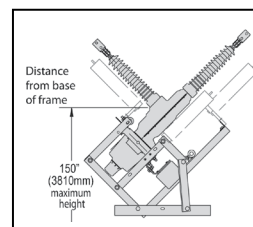
Viper-ST Recloser with one set of external CTs. A second set of CTs can be provided on the other side.



Brackets can be supplied for each individual module permitting customized substation configurations. See photo below.



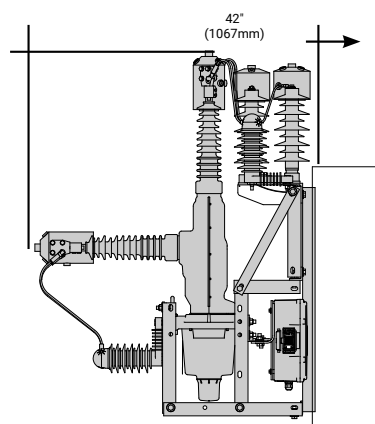
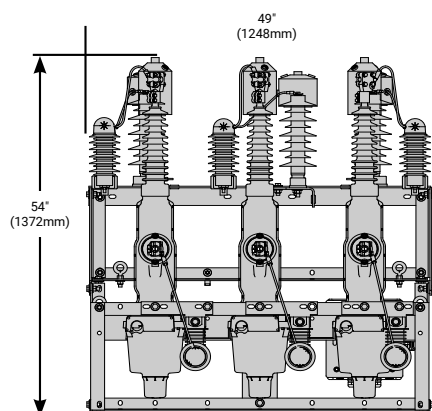
Retrofit installation with Z-shaped module Viper-ST Recloser on individual frames.



Drawing shows 45° angle mounting for applications requiring the same load and line side connector height.

Viper-ST Recloser with Accusense® Voltage Sensor (27kV shown)*

- Centermount or cross-arm frames with factory-installed Accusense voltage sensors and lightning arresters
- Additional site-ready options are available, such as potential transformers for control power
- Galvanized and stainless steel options are available

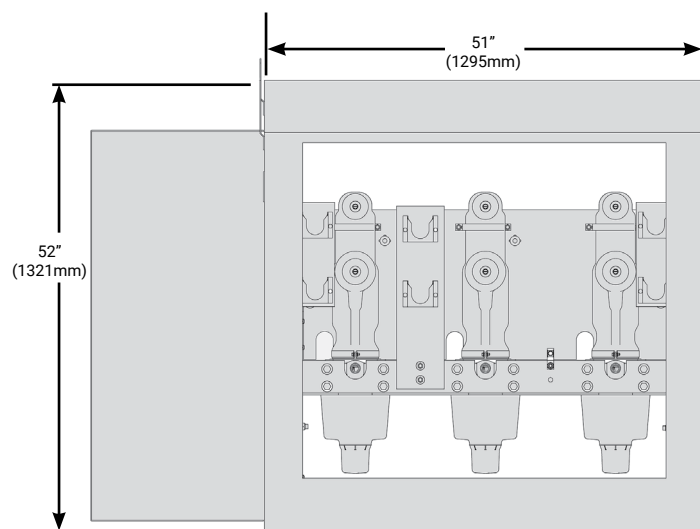
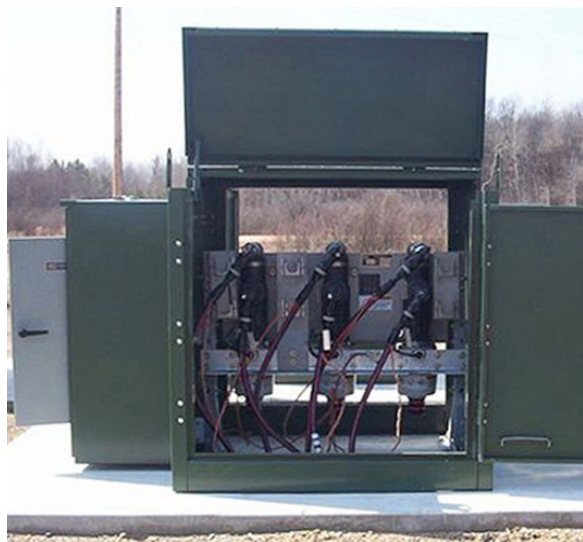


*Dimensions are approximate. Do not use for construction.

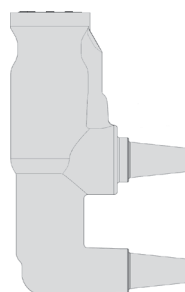
Padmount Applications

For applications where space is limited at the substation, fenceless substations, or where underground feeders require protection, Viper-ST solid dielectric reclosers can provide an ideal solution using a dead-front padmount design.

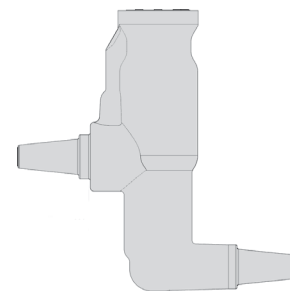
- 100% dead-front construction that eliminates the need for a transition compartment from live-front terminations to dead-front and removes the necessity for insulating dielectric barriers
- Can be used as a breaker or as a tie-switch
- Cable connections can be provided with either a standard IEEE 600A apparatus or 200A deepwell interface for elbow connectors
- Controls can be mounted inside the recloser enclosure or within a separate adjacent low voltage enclosure
- Up to six internal LEA voltage sensors can be provided with Z-shaped (front/back access) or C-shaped (front only access) modules, perfect for tie points on FLISR schemes and automatic transfer applications
- Galvanized steel enclosure standard. Stainless steel options are available



Module Configurations



C-shaped Module



Z-shaped Module

*Dimensions are approximate. Do not use for construction.

Viper®-ST Recloser Applications

Reclosers play a critical role in improving distribution reliability. By applying Viper-ST reclosers on the distribution system, permanent faults can be isolated to minimize outage areas and temporary faults can be cleared to restore power, thereby improving service continuity and system reliability.

The Viper-ST recloser can be used in a variety of applications including stand-alone reclosers, complex loop schemes with sectionalizing and tie switches, replacements for circuit breakers for feeder protection, and distributed generation intertie switches. The Viper-ST recloser is a versatile solution for your overcurrent protection and distribution automation needs.

High accuracy Accusense® voltage sensors integrated with the Viper-ST recloser are often used as an additional sensor platform, improving power optimization initiatives such as, volt-var optimization (VVO), conservation voltage reduction (CVR), and end-of-line metering. The Viper-ST recloser solutions with Accusense voltage sensors are designed as a metering point to provide data metering for power factor adjustments, optimizing voltages, and managing peak loads. External CTs can be installed over the Viper-ST recloser insulators for metering applications requiring high accuracy current measurement.

Stand-Alone Recloser Application

Temporary Fault Between Viper-ST Recloser and Load

G&W Electric takes a consultative approach to recloser design to develop solutions tailored to the customer's specific needs. Our engineers deliver customized designs, whether specialized cabinets, space-saving frame configurations, or Category 4 hurricane-resistant structures are required.

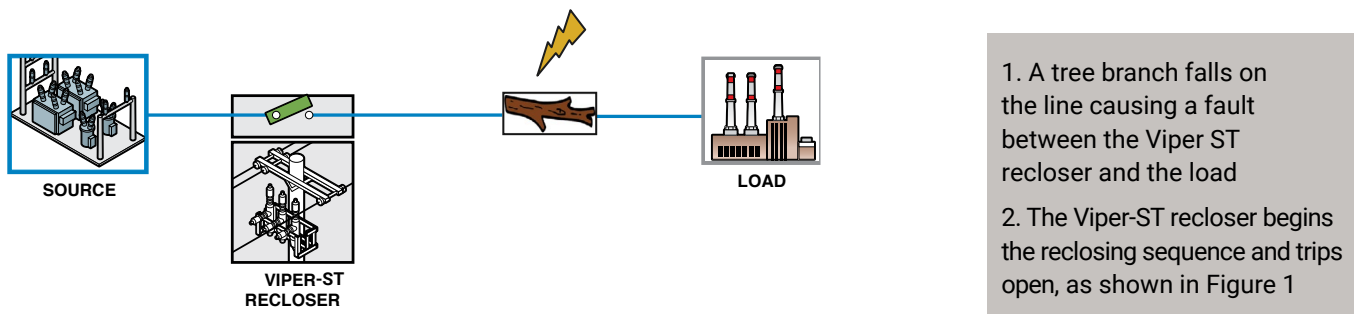


Figure 1: Stand-Alone Viper Recloser trips on a fault

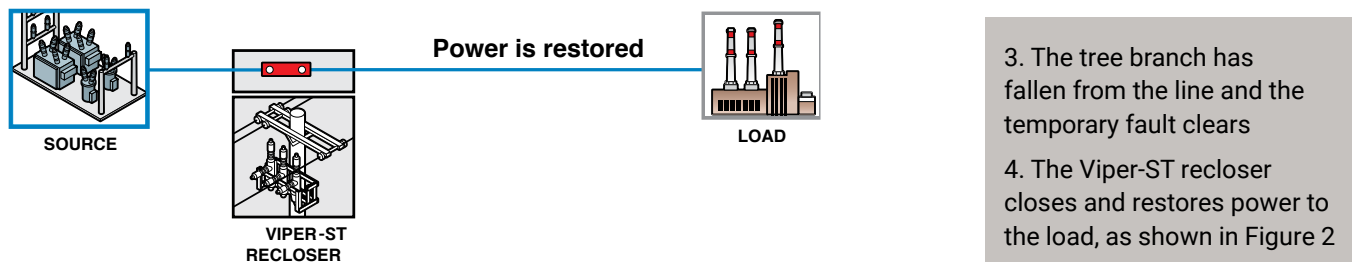
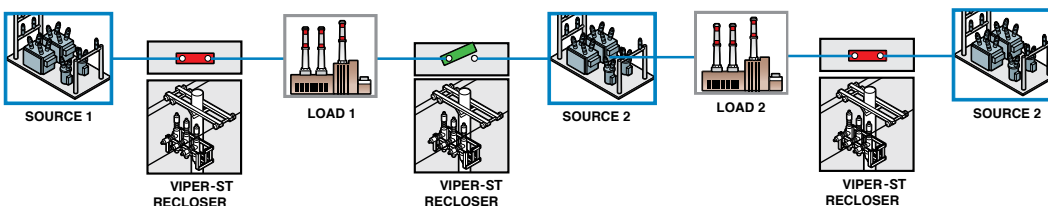


Figure 2: Stand-Alone Viper-ST Recloser restores power after temporary fault cleared

Main-Tie-Main Application

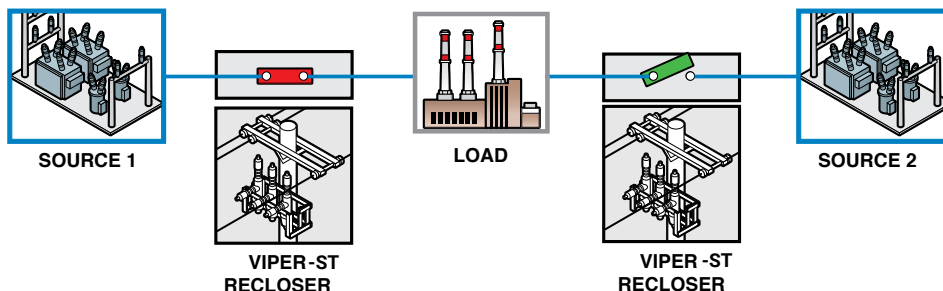
Any fault or loss of source can be handled by closing the open tie point to supply power to the loads.



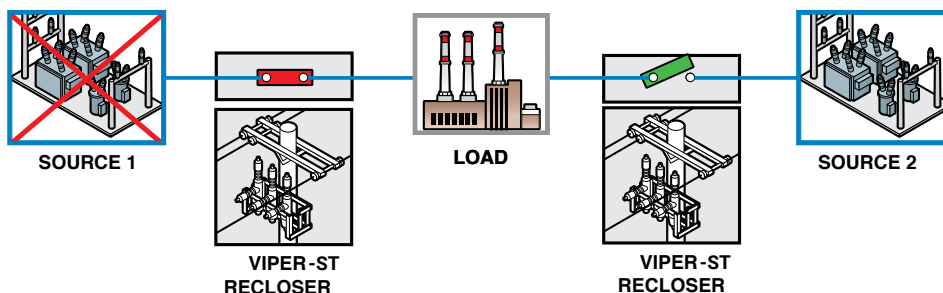
Automatic Transfer

For critical load applications such as hospitals, processing plants, military bases and others, automatic transfer schemes are common. For overhead systems, this scheme requires two switches, voltage sensors, current transformers, and a voltage-time controller. A loss of voltage on the primary source is sensed and initiates the control to open the primary source and close the alternate source recloser to automatically restore power.

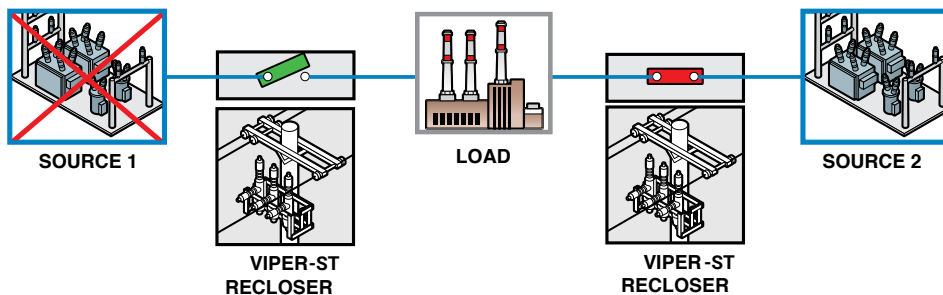
Automatic Source Transfer Application – Single Line Example



Source 1 is providing power to the load with Source 1 Viper-ST recloser closed and Source 2 Viper-ST recloser open.

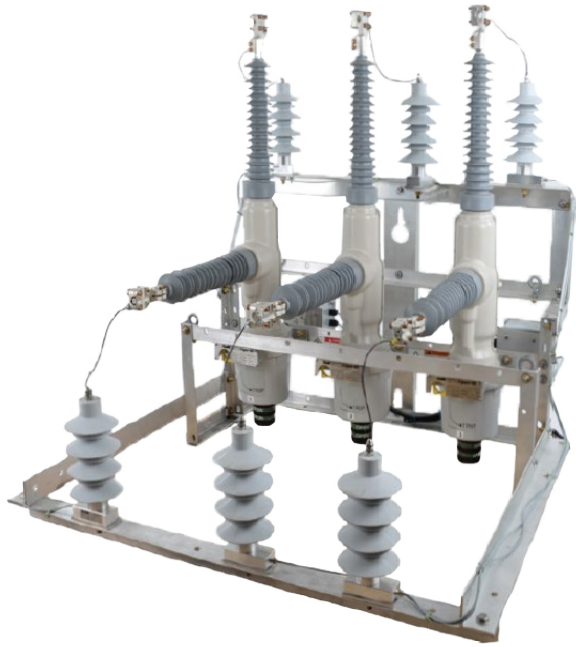


Source 1 fails. System recognizes loss of voltage.



Source 1 Viper-ST recloser opens upon loss of voltage and Source 2 Viper-ST recloser closes to provide power to the load from Source 2.

For additional automation information, refer to our LaZer® Power Grid Automation brochure on our website.



Overhead L-Module Configuration

Voltage	Nominal Frequency (Hz):	50 / 60	50 / 60	50 / 60	50 / 60
	Rated Maximum Voltage (kV RMS)	15.5	27	38	40.5
	Voltage Sensors	0, 3 or 6	0, 3 or 6	6	6
	Voltage Sensor Ratio	2,500:1***	10,000:1	10,000:1	10,000:1
	Voltage Sensor Accuracy*	2%	2%	2%	2%
	Impulse Level (BIL), kV	110	125	170	170
	Power-Frequency Voltage Withstand Rating, kV RMS(60 Seconds Dry)	50	60	70	70
	Power-Frequency Voltage Withstand Rating, kV RMS(10 Seconds Wet)	45	50	-	-
	Power-Frequency Voltage Withstand Rating, kV RMS(60 Seconds Wet)	-	-	70	70
Current	CT Ratio	400/200:1 1000/500:1	400/200:1 1000/500:1	400/200:1 1000/500:1	400/200:1 1000/500:1
	CT Accuracy	+/-1%	+/-1%	+/-1%	+/-1%
	Continuous Current, A RMS	630‡ / 800 / 1000**	630‡ / 800 / 1000**	630‡ / 800 / 1000**	630‡ / 800
	Short Circuit Interrupting Current, kA Sym, 3 Seconds	12.5 / 16	12.5 / 16	12.5	16
	Withstand Current (kA, peak)	32.5 / 41.6	32.5 / 41.6	32.5	41.6
	Line Charging Current (A)	5	5	5	5
	Cable-Charging Current (100%) A	25	25	40	40
	First Pole to Clear Factor (kpp)	1.5	1.5	1.5	1.5
Mechanical	Mechanical Operations	10,000	10,000	10,000	10,000
	Creepage Distance (mm)	435	724	1300	1300
	Minimum Phase Spacing (Inches)	15	15	17	17
	Temperature Range	-60°C to +65°C	-60°C to +65°C	-50°C to +65°C	-50°C to +65°C

NOTE: Power-Frequency Voltage Withstand Rating (Wet) is not applicable for recloser with dead break or elbow connections

*Voltage Sensor Accuracy: +/- 2% for temperatures from -20°C to +40°C, +/-4% for temperatures from -60°C to +65°C

** 1000A reclosers are rated at 40°C ambient temperature (from 41°C to 65°C rating is 800A)

*** System voltages of 11.6kV or less utilize a ratio of 2,500:1. System voltages above 11.6kV utilize a ratio of 10,000:1

‡ limited to 630A for 400/200:1 CT ratios

Overhead and Padmount Z-Module Configuration

Voltage	Nominal Frequency (Hz):	50 / 60	50 / 60	50 / 60	50 / 60
	Rated Maximum Voltage (kV RMS)	15.5	27	38	40.5
	Voltage Sensors	0, 3 or 6	0, 3 or 6	6	6
	Voltage Sensor Ratio	2,500:1***	10,000:1	10,000:1	10,000:1
	Voltage Sensor Accuracy*	2%	2%	2%	2%
	Impulse Level (BIL), kV	110	125	170	170
	Power-Frequency Voltage Withstand Rating, kV RMS(60 Seconds Dry)	50	60	70	70
	Power-Frequency Voltage Withstand Rating, kV RMS(10 Seconds Wet)	45	50	-	-
	Power-Frequency Voltage Withstand Rating, kV RMS(60 Seconds Wet)	-	-	70	70
Current	CT Ratio	400/200:1 1000/500:1	400/200:1 1000/500:1	400/200:1 1000/500:1	400/200:1 1000/500:1
	CT Accuracy	+/-1%	+/-1%	+/-1%	+/-1%
	Continuous Current, A RMS	630 _‡ / 800	630 _‡ / 800	630 _‡ / 800	630 _‡ / 800
	Short Circuit Interrupting Current, kA Sym, 3 Seconds	12.5 / 16	12.5 / 16	12.5	16
	Withstand Current (kA, peak)	32.5 / 41.6	32.5 / 41.6	32.5	41.6
	Line Charging Current (A)	5	5	5	5
	Cable-Charging Current (100%) A	25	25	40	40
	First Pole to Clear Factor (kpp)	1.5	1.5	1.5	1.5
Mechanical	Mechanical Operations	10,000	10,000	10,000	10,000
	200A Deepwell	Available	Available	N/A	N/A
	Creepage Distance (mm)	435	724	1300	1300
	Minimum Phase Spacing (Inches)	15	15	17	17
	Temperature Range	-60°C to +65°C	-60°C to +65°C	-50°C to +65°C	-50°C to +65°C

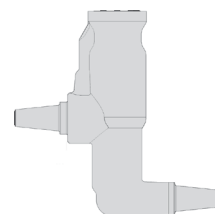
NOTE: Power-Frequency Voltage Withstand Rating (Wet) is not applicable for recloser with dead break or elbow connections

NOTE: Creepage Distance is not applicable to "Z"- shaped padmounted configurations

*Voltage Sensor Accuracy: +/- 2% for temperatures from -20°C to +40°C, +/-4% for temperatures from -60°C to +65°C

*** System voltages of 11. 6kV or less utilize a ratio of 2,500:1. System voltages above 11.6kV utilize a ratio of 10,000:1

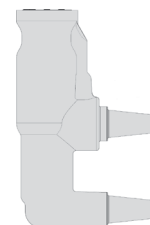
‡ limited to 630A for 400/200:1 CT ratios



Z-shaped Module

Padmount C-Module Configuration

Voltage	Nominal Frequency (Hz):	50 / 60	50 / 60	50 / 60
	Rated Maximum Voltage (kV RMS)	15.5	27	38
	Voltage Sensors	0 or 3	0, 3 or 6	0 or 3
	Voltage Sensor Ratio	2,500:1***	10,000:1	10,000:1
	Voltage Sensor Accuracy*	2%	2%	2%
	Impulse Level (BIL), kV	110	125	150
	Power-Frequency Voltage Withstand Rating, kV RMS(60 Seconds Dry)	35	40	50
	DC Withstand (15 Minutes)	53	78	103
Current	CT Ratio	400/200:1 1000/500:1	400/200:1 1000/500:1	400/200:1 1000/500:1
	CT Accuracy	+/-1%	+/-1%	+/-1%
	Continuous Current, A RMS	630 _‡ /800	630 _‡ /800	630 _‡ /800
	Short Circuit Interrupting Current, kA Sym, 3 Seconds	12.5 / 16	12.5 / 16	12.5
	Withstand Current (kA, peak)	32.5 / 41.6	32.5 / 41.6	32.5
	Line Charging Current (A)	5	5	5
	Cable-Charging Current (100%) A	25	25	40
	First Pole to Clear Factor (kpp)	1.5	1.5	1.5
Mechanical	Mechanical Operations	10,000	10,000	10,000
	Creepage Distance (mm)	Available	Available	N/A
	Minimum Phase Spacing (Inches)	N/A	N/A	N/A
	Temperature Range	-60°C to +65°C	-60°C to +65°C	-50°C to +65°C



C-shaped Module

NOTE: Power-Frequency Voltage Withstand Rating (Wet) is not applicable for recloser with dead break or elbow connections

*Voltage Sensor Accuracy: +/- 2% for temperatures from -20°C to +40°C, +/-4% for temperatures from -60°C to +65°C

*** System voltages of 11. 6kV or less utilize a ratio of 2,500:1. System voltages above 11.6kV utilize a ratio of 10,000:1

‡ limited to 630A for 400/200:1 CT Ratios

Power Grid Automation Solutions

Control Options



SEL-651R front access control for conventional recloser applications.



Beckwith M-7679 front access control for recloser applications.



ABB RER620 front access control for recloser applications.

Control Options	SEL-651R	Beckwith M-7679	ABB RER620
32-pin, 1/4 turn twist-lock connector	✓	✓	
42-pin Hasting Connector	✓	✓	✓

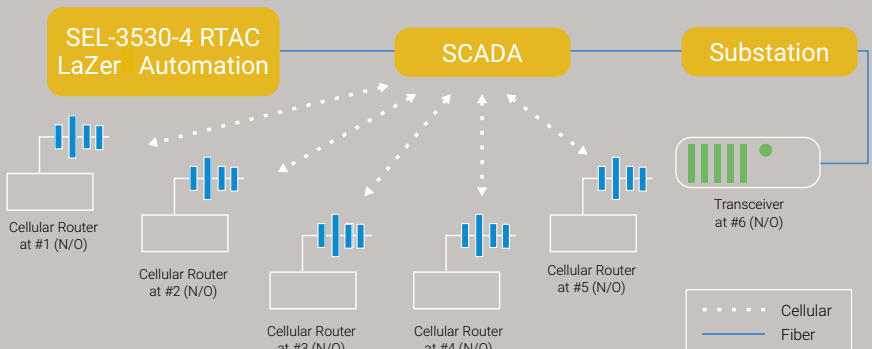
Consult your local G&W Electric Sales Agent for 14-pin control options.

LaZER® Automation Solutions

G&W Electric's LaZER power grid automation solutions offer a comprehensive range of pre-engineered systems designed to meet your specific application needs. These solutions feature custom programming, system testing, and upgradeable options, with scalable distributed or centralized architectures for monitoring and control—including FLISR—all managed through a single point of contact.

Whether integrating new or existing components such as reclosers, switches, radios, SCADA systems, GIS imports, and controls, LaZER automation ensures a seamless transition from manual to semi-automated or fully automated operations. G&W Electric also provides vendor-agnostic integration of relays and communication equipment. To ensure reliability, factory acceptance testing (FAT) is conducted on all systems, reducing on-site start-up time and guaranteeing performance under any conditions.

Our LaZER automation solutions team collaborates with the customer to develop designs tailored to the industry and application. We deliver turnkey solutions by seamlessly integrating switchgear, relays, communication equipment, and software to support various levels of automation.



Contact us today

1+708.388.5010 or info@gwelectric.com



Engineered to order. Built to last.

Since 1905, G&W Electric has been a leading provider of innovative power grid solutions including the latest in load and fault interrupting switches; reclosers; sensors; system protection equipment; power grid automation; transmission and distribution cable terminations; and joints and other cable accessories. G&W Electric is headquartered in Bolingbrook, Illinois, U.S.A., with manufacturing facilities and sales support in more than 100 countries, including Canada, Italy, China, Mexico, Brazil, India and Singapore. We help our customers meet their challenges and gain a competitive edge through a suite of advanced products and technical services.