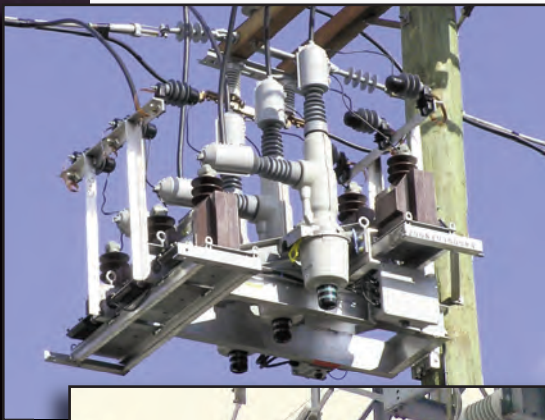


Viper[®]-ST

Solid Dielectric, Triple Option Reclosers

*Providing electronic overcurrent protection for
single or three phase operation on systems
rated through 38kV, 800A continuous current,
12.5kA symmetrical interrupting*



- Reliable performance
- Works directly with the popular SEL-651R control
- Operator safety including mechanical block
- Maintenance-free operation
- Overhead, substation and dead-front padmount designs
- Ease of installation
- Ease of automation
- Internal voltage sensing
- Application flexibility
- Various module configurations for circuit connection flexibility
- Smart Grid/Lazer™ solutions
- RUS accepted

CATALOG VST11

April, 2011

G&W

Engineered to Order
Built to Last

G&W's Viper-ST solid dielectric triple option recloser combines the time-proven reliability of electronically controlled, vacuum fault interrupters with the maintenance-free benefits of a solid dielectric insulated device. The triple option feature offers user flexibility by permitting three distinct mechanical operating modes.

- 1 trip /1 lockout
- 1 trip /3 lockout
- 3 trip /3 lockout

The Viper-ST provides overcurrent protection for systems through 38kV maximum, 800A continuous current and 12.5kA symmetrical interrupting.

FEATURES

Reliable Performance - Viper-ST reclosers utilize G&W's time-proven epoxy polymer system to fully encapsulate the vacuum interrupters. This system provides excellent insulation while providing fully shielded, void-free construction. All modules are UV protected and 100% factory tested for partial discharge. The Viper-ST recloser utilizes the latest in magnetic actuator technology. The interrupter and actuator assembly has been tested for over 10,000 mechanical operations to assure a long operating life.

Operator Safety - Vacuum interrupters are sealed within solid dielectric insulation providing dead tank construction. A hookstick operable, manual trip and lockout handle prohibits operation either from the control or remotely. A mechanical blocking device further assures against accidental close through the handle. An open and closed contact indicator verifies contact position. Contact status and lockout condition can also be verified at the control.

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



▲ 15kV Viper-ST recloser with polemount center bracket

Ease of Operation -

The Viper-ST is compatible with the Schweitzer SEL-651R control.

Ease of Installation - The Viper-ST is lightweight and compact. Site-ready designs provide all accessories including bracket, arresters and voltage transformers preassembled prior to shipment significantly reducing installation time. One single control cable brings all current, breaker status and trip/close information into the control.

Application Flexibility - Units are designed for overhead, substation and padmount applications. Polemounted units can be equipped with either horizontal or vertical insulators. Viper reclosers are designed with IEEE interface apparatus bushings permitting the use of either silicone insulators for overhead applications or elbow connectors for padmount or riser applications. Removable silicone insulators are standard for overhead applications. This feature permits 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 if necessary.



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

Smart Grid / Lazer™ Automation Solutions - The Viper-ST is automation ready, simplifying conversion for any future automation requirements. A multi-ratio current transformer is encapsulated within the module. The current transformer is provided at ratios of 500:1 and 1000:1. Inputs to the control are field changeable. CT accuracy is +/-1%. Capacitive style voltage sensors encapsulated within each module permit voltage reading for network reconfiguration while eliminating the need for add-on sensors

and cabling. Voltage sensing accuracy is +/-3% over the temperature range +65°C through -20°C when tested as a system. The accuracy is +/-5% at -20°C through -60°C. External voltage and current sensors can also be used depending on application requirements.

Complete Lazer automation packages are available offering a pre-engineered solution for applications requiring intelligent automatic switching and power restoration. The packages feature one or more protective relays (typically Schweitzer), equipped with distribution and communication capabilities. Available communication devices include fiber optic transceivers and wireless radio.

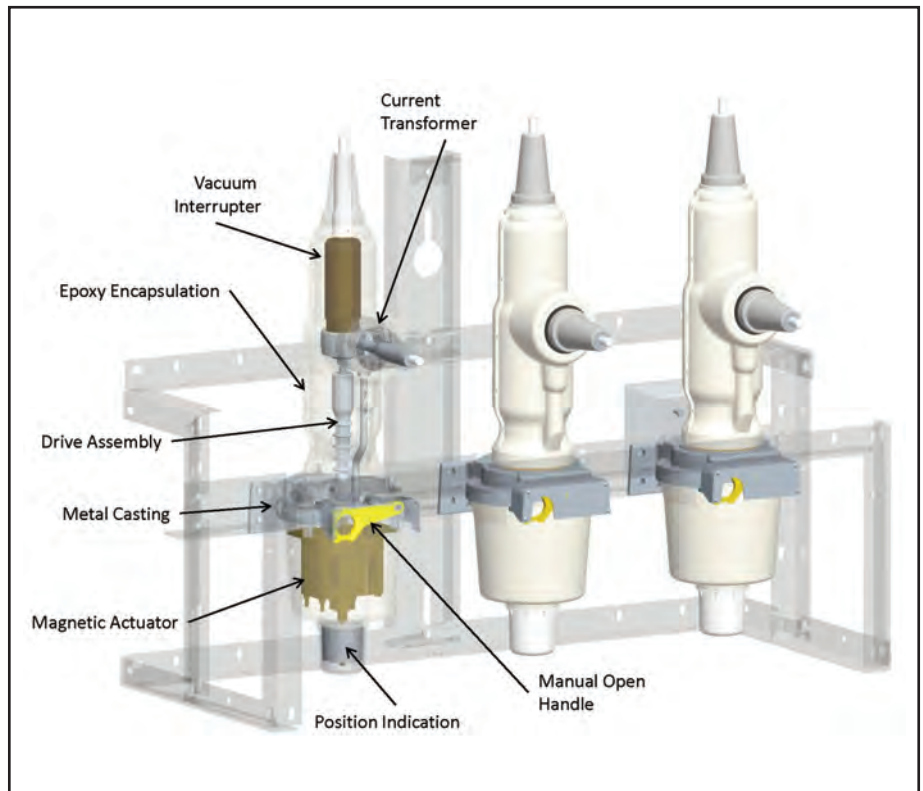
DEAD-LINE OPERATION

The unique design of the Viper-ST magnetic actuator system provides for local and remote operation of the recloser in the event that the AC source power is lost or interrupted.

OPERATION PRINCIPLE

The Viper-ST recloser monitors the circuit using internal multi-ratio current transformers and voltage sensors. The unit is powered by an external 120 VAC or 125 VDC source. In the event AC power is lost, the unit operates through the batteries located in the control.

Recloser sequence operations, tripping and overcurrent sensing is an automatic function of the electronic control. Each phase module incorporates a magnetic actuator and drive assembly. Each magnetic actuator uses a permanent magnet to hold a solenoid plunger in the closed position while maintaining a charge on the opening spring. Trip/close operation is simply accomplished by energizing the trip coil which generates a magnetic flux in the opposite direction and releases the trip spring. The control



may be set for three distinct operating modes to allow for maximum application flexibility:

- 1 trip /1 lockout
- 1 trip /3 lockout
- 3 trip /3 lockout

MANUAL TRIP OPERATION

Operation of the hookstick operable manual trip handle trips and locks out the recloser. Pulling the handle down trips and locks out the selected phase. A contact position indicator is provided indicating open or closed status of the contacts for each phase. Module contact status is also displayed at the control. Operation of the manual trip handle disables any local or remote closing operation until the handle is reset. A mechanical blocking device further assures against accidental close through the handle. The handle is operable from ground level. Once reset, the recloser can be closed using the control.



▲ Manual trip handle prohibits electronic closing operation through the control.

CONTROL CAPABILITIES

The Viper-ST works directly with the popular Schweitzer SEL-651R control. Typical features of the SEL-651R include:

- Six voltage inputs necessary for loop scheme designs
- Full line metering capabilities using the voltage inputs from the internal sensors
- Programming to recognize seasonal loads and shift between three phase and single phase trip/close modes for optimal system efficiency
- For loop schemes the control can be programmed to act as a recloser “looking” in either direction
- Minimum trip for phase, ground and sensitive earth faults
- Capable of up to four shots to lockout
- Sequence coordination
- Harmonics up to the 15th for the THD analysis
- Cold load pickup

CONTROL CONNECTIONS

A twist lock style connector makes the cable connection between the control and the interrupter control box. AC power provides the normal supply power to the control.

SOLID DIELECTRIC MODULES

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



▲ Schweitzer SEL-651R front access control (above) for conventional recloser applications. Front/back access control cabinets are available.

Control cable with twist lock connectors permit easy field installation. ▶



CATALOG NUMBER

15.5kVVIP378ER-12-1-ST
27kVVIP388ER-12-1-ST
38kVVIP398ER-12-1-ST
Approximate weight (for a single phase module less bracket) = 125lbs. (57kg)

APPLICATIONS

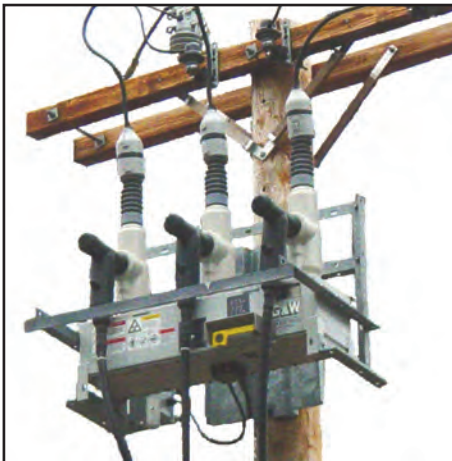
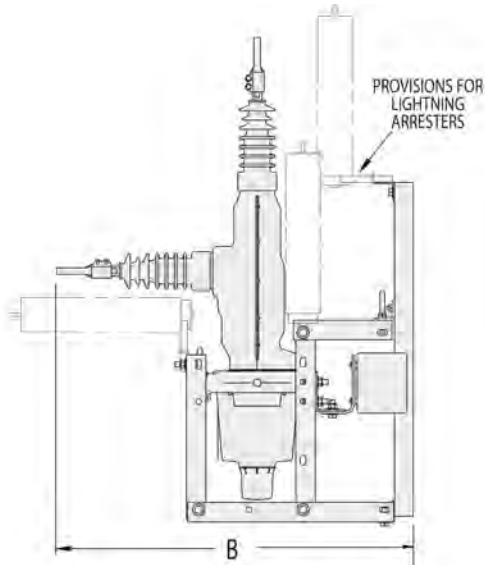
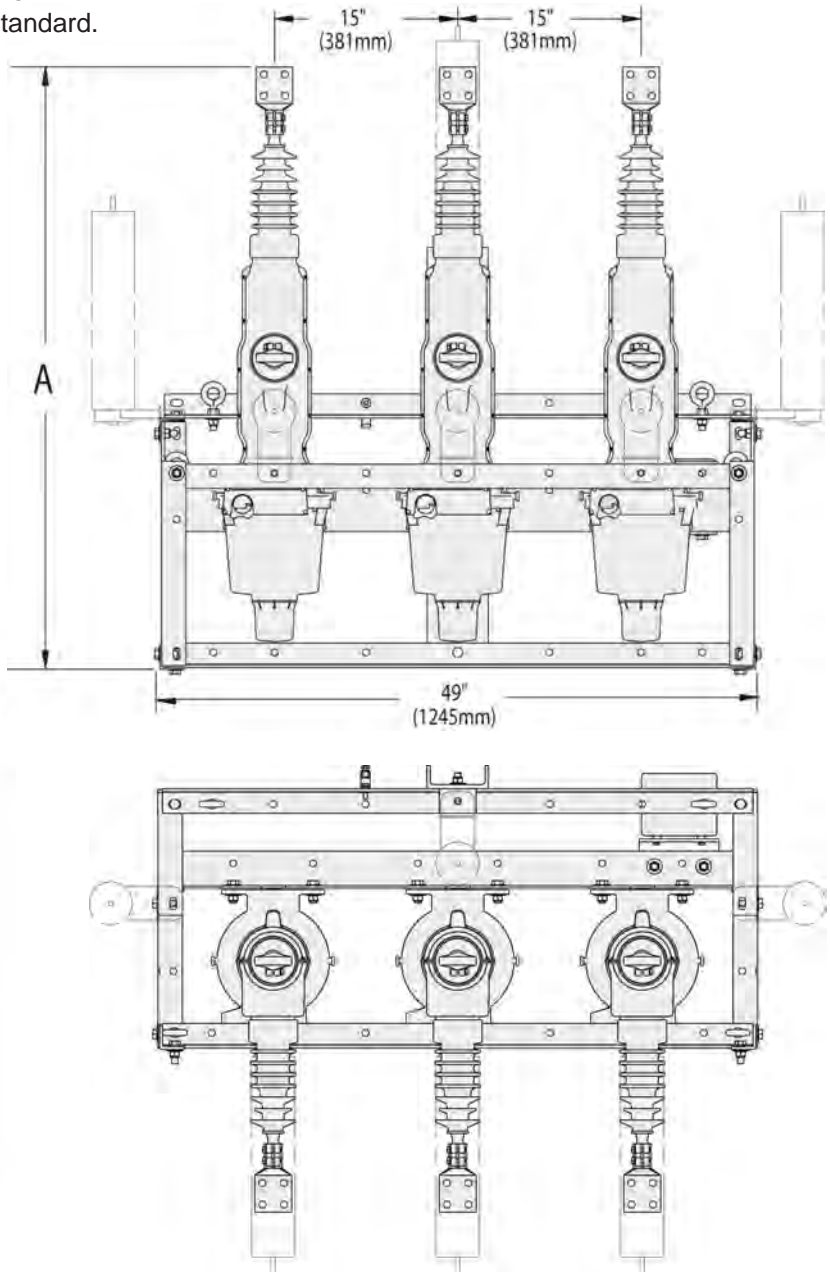
- Sectionalizing schemes
- Distributed automatic transfer
- Distribution automation
- Circuit breaker alternative
- Relay protection
- Revenue grade metering
- Open bus tie



▲ Cabling from each recloser module is terminated inside a junction box permitting a single cable to go to the control. Cable entry can be using either strain relief or twist lock style connectors.

Polemount Center Bracket

Dimensions are approximate. Do not use for construction. Brackets are aluminum as standard. Galvanized and stainless steel brackets are available.



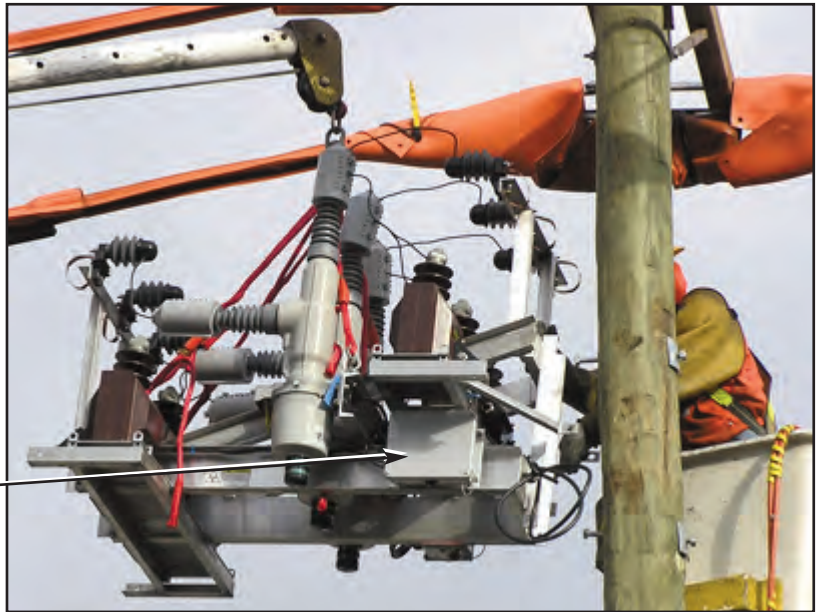
Approx. Dimensions - ins. (mm)

	15.5kV	27kV	38kV
A	49 (1245)	54 (1372)	58 (1473)
B	36 (925)	41 (1040)	45 (1140)

◀ Riser application using elbow connectors for the load side. G&W Viper-S style shown.

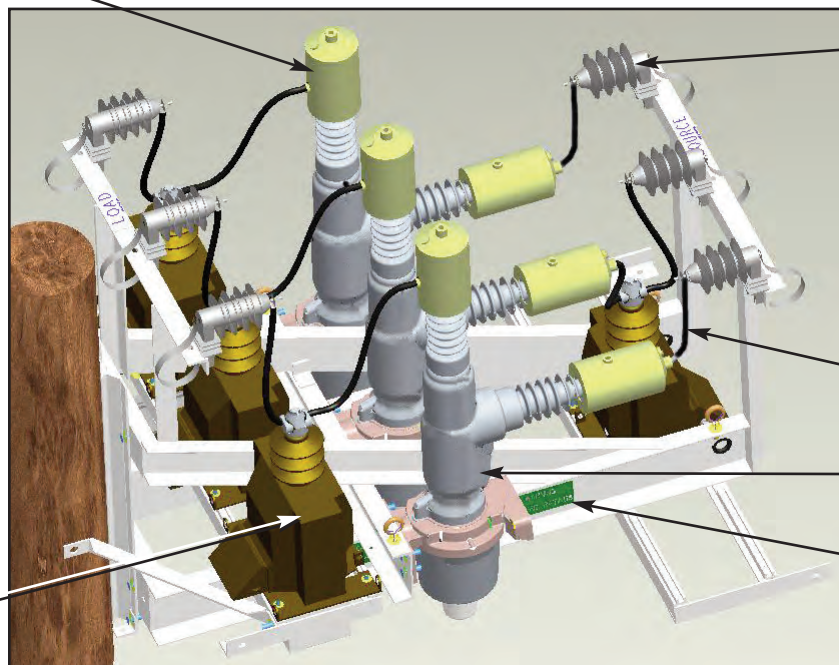
Polemount Site-Ready Assembly

Preassembly of all auxiliary equipment significantly reduces recloser preparation time for product installation in the field. Includes potential transformers or voltage transformers, arresters, aerial lugs, terminal/junction boxes, wildlife protectors and all associated wiring. Control cables are connectorized on both ends and cut to length for a cleaner installation. User identification markers can be preapplied to each unit prior to shipment further reducing installation time.



Terminal junction box

Wildlife protectors



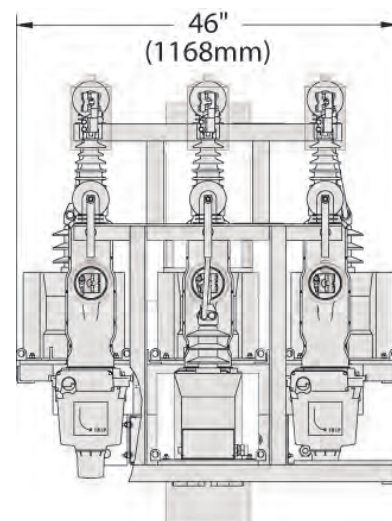
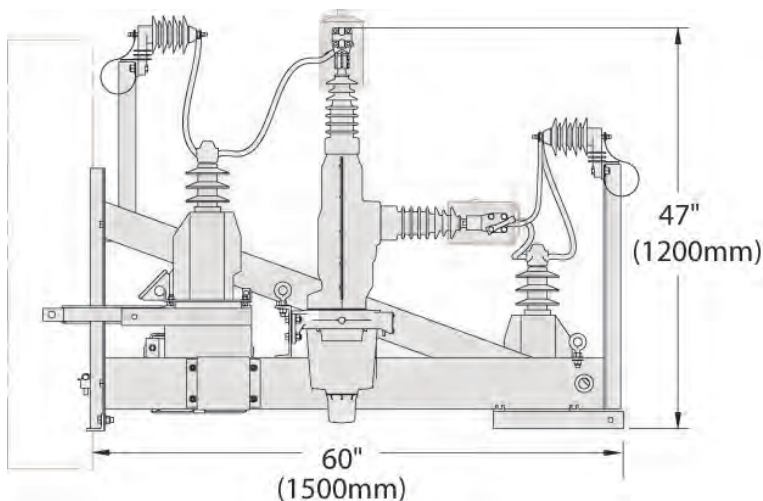
Lightning arresters

Primary wiring

Recloser

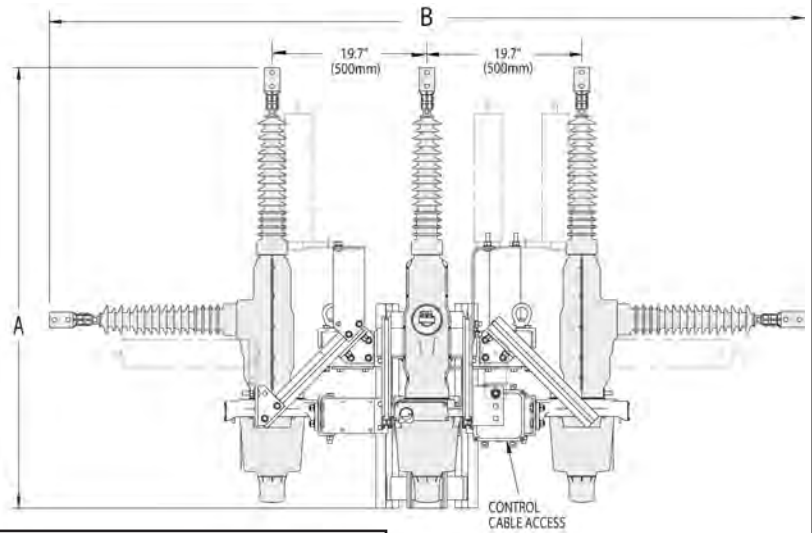
User ID markers

Voltage transformer



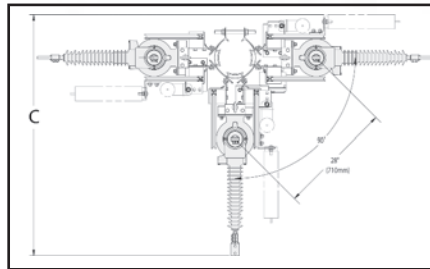
Polemount Cluster Bracket

Dimensions are approximate. Do not use for construction. Aluminum bracket is standard.



Approx. Dimensions - ins. (mm)

	15.5kV	27kV	38kV
A	48 (1473)	52 (1321)	56 (1422)
B	80 (2032)	88 (2235)	92 (2337)
C	50 (1270)	55 (1397)	59 (1499)

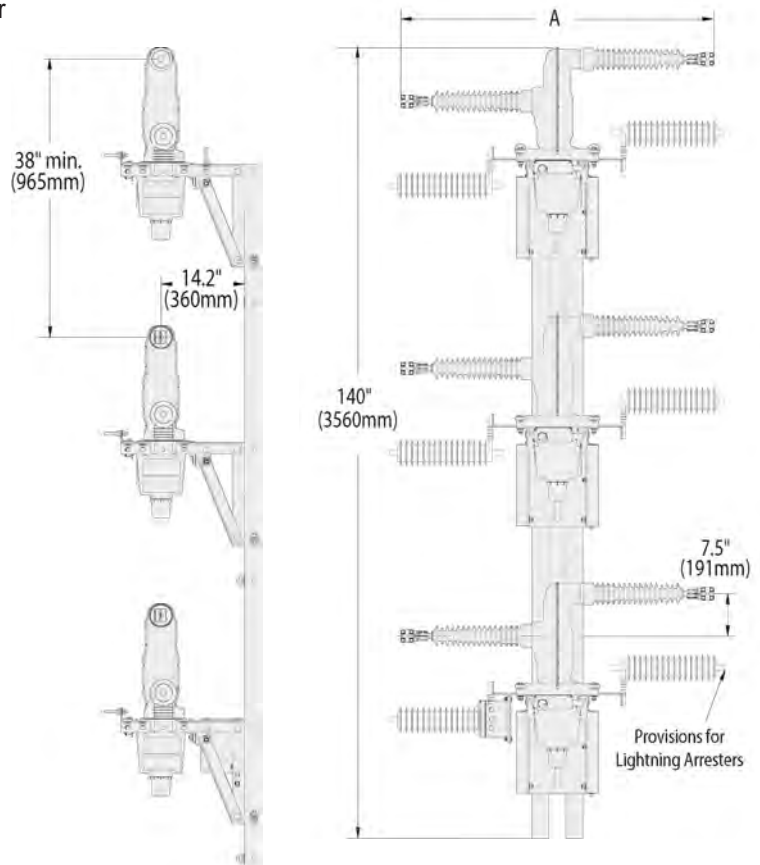
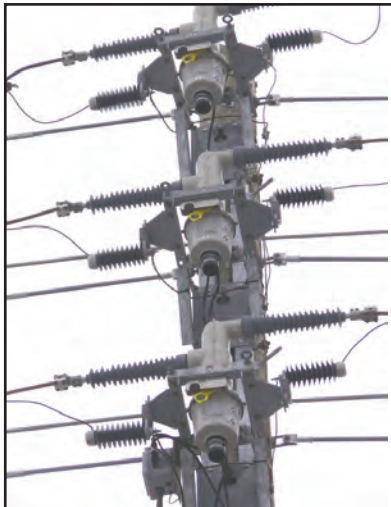


Horizontal Insulator Bracket

Dimensions are approximate. Do not use for construction. This configuration is 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. Galvanized bracket is standard. Stainless steel is available.

Approx. Dimensions - ins. (mm)

	15.5kV	27kV	38kV
A	42 (1067)	50 (1270)	58 (1473)

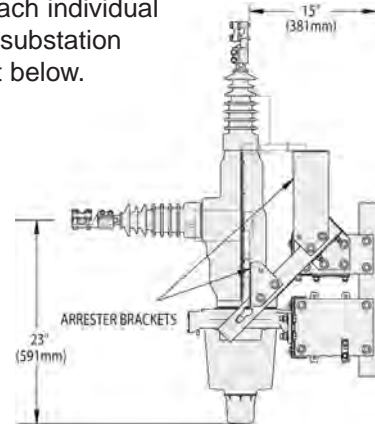
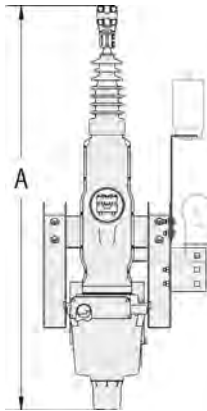


Substation Mount Recloser

Dimensions are approximate. Do not use for construction. Frame is adjustable. Photo and drawings below show a three phase gang mounted unit. Galvanized is standard. Stainless steel is available.

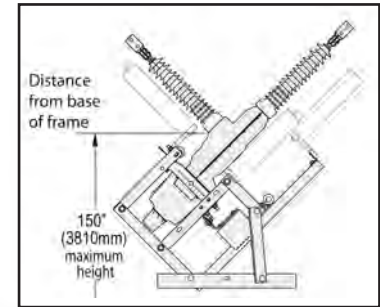
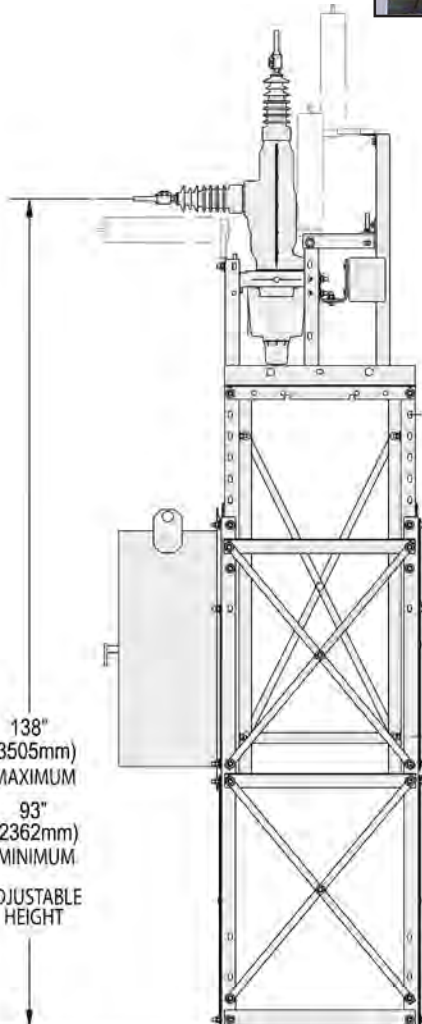
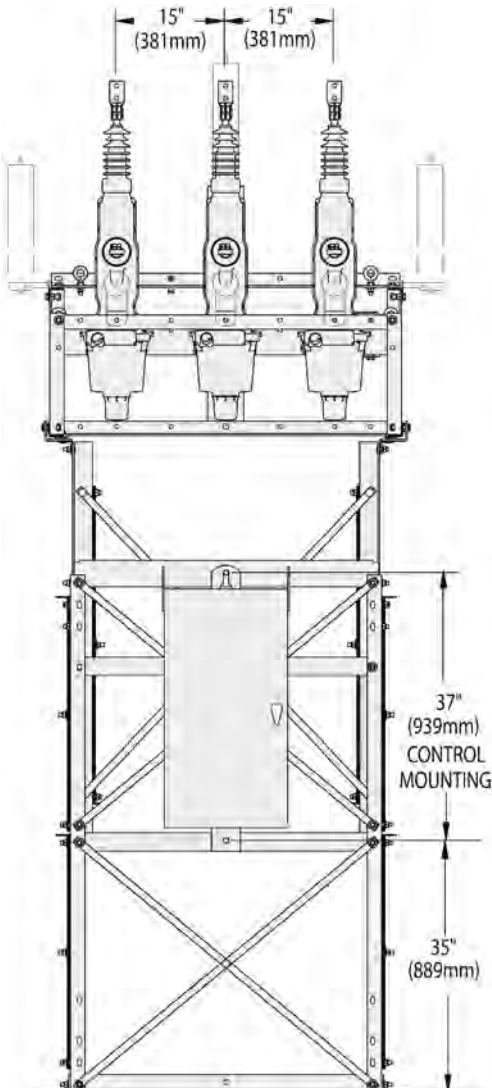


Brackets can be supplied for each individual module permitting customized substation configurations. See photo inset below.

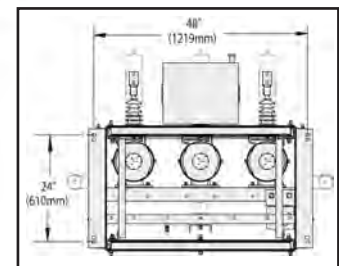


Approx. Dimensions - ins. (mm)

	15.5kV	27kV	38kV
A	46 (1168)	51 (1295)	55 (1397)



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

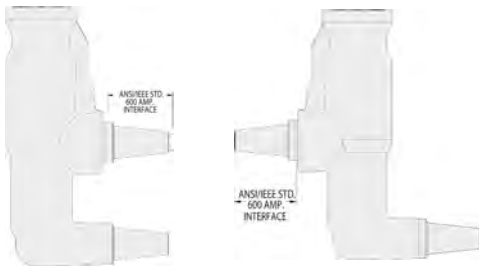


PADMOUNT APPLICATIONS

For applications where space is limited at the substation or where underground feeders require protection, Viper-ST solid dielectric reclosers can provide an ideal solution using a dead-front padmount design. In this configuration, the cable connections can be provided with either a standard IEEE 600A apparatus or 200A deep-well interface for elbow connectors. Separate compartments are provided for accessing the cables and operators. Controls can be mounted directly to the recloser frame or within a separate adjacent enclosure.



Module Configurations

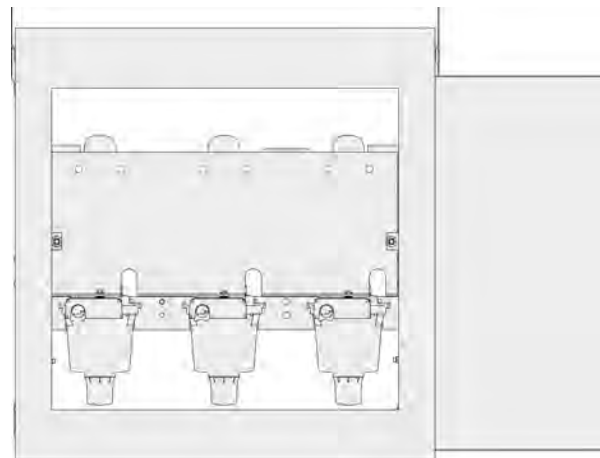
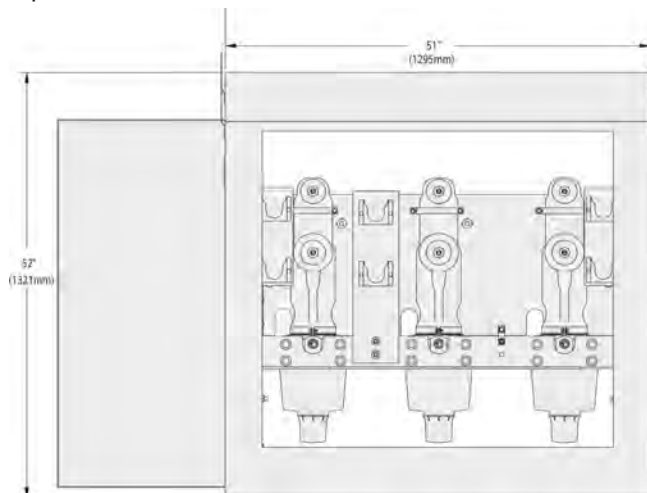
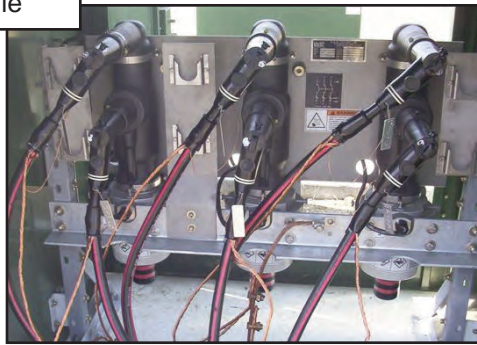


“C” Module

“Z” Module

Padmount Reclosers with Front / Back Access

Dimensions are approximate. Do not use for construction. Drawing shows separate compartments for access to cables and operators. Galvanized steel enclosure is standard. Stainless steel is optional.



TYPICAL SPECIFICATIONS

A. GENERAL

This specification covers the requirements for an electronically controlled, solid dielectric vacuum recloser with Triple Option trip/close capabilities for use on distribution systems through 38kV. The recloser shall be manufactured by G&W Electric Company designated as Viper-ST solid dielectric recloser. Recloser configuration shall be (**check one**):

- Polemount, center
- Polemount, side horizontal
- Polemount, cluster
- Substation, 90°
- Substation, 45°
- Padmount, dead-front

B. DESIGN RATINGS AND STANDARDS

Reclosers shall be designed, tested and built per IEEE C37.60 latest version, IEC 1109-Section 5.3.4, Annex C. Certified test reports shall be provided. The recloser shall be rated: (**select column**):

Voltage Class,			
kV	15	25	35
Max. System Voltage,			
kV	15.5	27	38
BIL, kV	110	125	150
Continuous Current,			
A	800	800	800
8 Hr. Overload,			
@20°C	960	960	960
Interrupting Rating,			
RMS, kA	12.5	12.5	12.5
Making Current, RMS, asym,			
kA	20	20	20
Peak, asym, kA	32	32	32
Short Circuit Current, kA sym,			
3 second	12.5	12.5	12.5
60Hz Withstand, kV rms			
Dry, 1 min.	50	60	70
Wet, 10 sec.	45	50	60
Mechanical Operations			
.....	10k	10k	10k

C. RECLOSER CONSTRUCTION

C1: Mechanism Enclosure

The magnetic actuator and corresponding linkage assembly shall be housed within a high impact, UV stable, air insulated, poly-carbonate enclosure. A contact position indicator and air vent shall be provided. Lifting provisions shall be provided.

C2. Operating Mechanism

The operating mechanism shall utilize a magnetic actuator for opening and closing of the vacuum interrupters. The magnetic actuator shall be powered by capacitors located in the control enclosure. The manual trip and lockout handle shall be made of stainless steel for maximum corrosion resistance. Vacuum interrupter contact position indication shall be accomplished using green (open) and red (closed) indicators located on the bottom of each mechanism enclosure and through LEDs inside the control.

C3. Vacuum Interrupters

Interruption of the fault or load current shall be accomplished through vacuum interrupters located inside the solid dielectric modules.

C4. Solid Dielectric Modules

The solid dielectric modules shall utilize a time-proven EPOX solid dielectric epoxy insulation to fully encapsulate each of the three vacuum interrupters. The solid dielectric modules shall be fully shielded and incorporate a high impact poly-carbonate, track resistant, UV stable covering. The operating temperature range shall be -60°C to +65°C. A dual ratio, 500:1 and 1000:1, current transformer and voltage sensor shall be integrally molded into each module. CT accuracy shall be +/-1%. Modules shall be molded with one (1) source side and one (1) load side, IEEE apparatus bushing interface.

C5. Bushings

Cable bushings shall be (check one):

- Air insulated, removable silicone insulators over an IEEE apparatus bushing interface

For Riser Pole

- Air insulated, silicone insulators for line side and elbow connectors on load side.

For Padmount design:

- 600A apparatus bushing
- 200A deep well bushing

D. OPERATION

Monitoring of the circuit shall be accomplished using internal multi-ratio current transformers and voltage sensors. The unit shall be powered by an external 120 VAC or 125 VDC source. In the event AC power is lost, the unit shall have trip/close operating capabilities through the batteries located in the control.

Recloser sequencing, tripping and overcurrent sensing, shall be an automatic function of the electronic control. If the control is set for single phase trip/lockout, the control will trip only the affected phase and not disturb the other two phases. If set for single phase trip, three phase lockout, only the affected phase will trip, and if the fault is not cleared, all three phases will lockout. If set for three phase trip, a fault current on any phase will trip all three phases.

Manual trip and lockout shall be provided by an external, hookstick operable handle. Operation of the manual trip handle shall activate a mechanical block device, disabling any local or remote closing operation until the handle is reset.

E. SMART GRID / LAZER AUTOMATION

The recloser shall be automation ready simplifying conversion for any future automation requirements. Capacitive style voltage sensors shall be encapsulated within each recloser module permitting voltage reading for network reconfiguration while eliminating the need for add-on sensors and cabling. Voltage sensing accuracy shall be +/-3% over the temperature range +65°C through -20°C when tested as a system. The accuracy shall be +/-5% at -20°C through -60°C. Available communications include fiber optic transceivers and wireless radio.

TYPICAL SPECIFICATIONS continued

F. MOUNTING

Lifting provisions shall be provided. Mounting provisions shall be supplied as follows:

- ___ Aluminum polemount center bracket with arrester provisions on the load and source side. Galvanized and stainless steel optional.
- ___ Aluminum polemount cluster bracket with arrester provisions on the load and source side.
- ___ Galvanized polemount side bracket with arrester provisions on the load and source side. Stainless steel optional.
- ___ Galvanized steel substation frame. Stainless steel optional.
- ___ Dead-front padmounted design with galvanized steel enclosure. Stainless steel enclosure optional. (See section G)
- ___ Polemount site-ready assembly

G. PADMOUNT ENCLOSURE

Enclosures shall be made of 12 gauge galvanized or stainless steel and manufactured to IEEE C37.72 and C57.12.28 standards. The enclosure shall be mounted independently to facilitate cable installation, if desired or for future replacement. Enclosures shall be tamper-resistant incorporating hinged access door(s) with pentahed locking bolts(s) and provisions for padlocking. The enclosure shall be provided with lifting provisions and painted with a Munsell 7.0GY3.29/1.5 green finish.

H. ELECTRONIC CONTROLS

The recloser shall be controlled using the Schweitzer model SEL-651R control.

I. FACTORY PRODUCTION TESTS

Each individual recloser shall undergo a mechanical operation check verifying contact trip/close velocity, travel profile, timing and phase synchronicity. The recloser shall be AC hi-pot tested one minute phase-to-

phase, phase-to-ground and across the open contacts. Circuit resistance shall be checked on all phases. Timing tests shall be conducted to verify TCC performance.

J. STANDARD COMPONENTS

The following shall be included as standard:

1. Lifting provisions
2. Grounding provisions
3. Operations counter for each phase located in the control
4. Manual trip and lockout handle(s)
5. SEL-651R control and associated control cable
6. Triple Option trip/close capabilities
7. Solid dielectric epoxy modules with internal voltage sensors and dual ratio CT's
8. Arrester mounting provisions (overhead applications only)
9. Field changeable silicone insulators
10. Junction box with all strain relief connections

K. OPTIONS

The following options shall be supplied: (Check as necessary)

- ___ NEMA 2-hole aerial lugs
- ___ NEMA 4-hole aerial lugs
- ___ Clamp style aerial lugs (#2-500 kcmil)
- ___ Clamp style aerial lugs (250-750 kcmil)
- ___ 4/0 brass eyebolt ground lug
- ___ Galvanized polemount center bracket with arrester provisions on the load and source side.
- ___ Stainless steel polemount center bracket with arrester provisions on the load and source side.
- ___ Stainless steel polemount side bracket with arrester provisions on the load and source side.
- ___ Stainless steel substation frame.
- ___ Polemount site-ready assembly
- ___ Lightning arresters
- ___ Dead-front padmounted design with stainless steel enclosure.

- ___ External 1.0 KVA oil transformer (3% accuracy) for 120 VAC supply power with hardware to mount on standard aluminum frame
- ___ External 0.75 KVA solid dielectric transformer (0.3% accuracy) for 120 VAC supply power with hardware to mount on standard aluminum frame
- ___ High impact, UV stable wildlife protectors for source and load insulators
- ___ External CTs for current monitoring
- ___ External voltage sensors
- ___ Junction box with all twist lock connections
- ___ Junction box with twist lock connections for control cable and strain relief for others.



▲ NEMA 4-hole, 2-hole and clamp style aerial lugs



▲ Viper-ST reclosers with external CTs and wildlife protectors

The Flexibility of Solid Dielectric Technology

*G&W offers a variety of epoxy encapsulated
products including:*

Viper®-SP Single Phase Reclosers

- To 38kV, 12.5kA interrupting
- Overhead, substation and padmount
- Smart Grid/Lazer ready solutions
- Work with SEL-351RS controls

Viper®-S Three Phase Reclosers

- To 38kV, 12.5kA interrupting
- Overhead, substation and padmount
- Smart Grid/Lazer ready solutions
- Work with SEL-351R controls

Trident® Solid Dielectric Switchgear

- To 38kV, 12.5kA interrupting
- Submersible vault and padmount
- Smart Grid/Lazer ready solutions
- Single phase and three phase

Smart Grid / Lazer™ Automation

- Multiple levels of protection
- Open, flexible communication
- Pre-engineered, factory tested
- Transfer, loop and network applications



ISO 9001:2008 Certified Company

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ISO 14001:2004 Certified



Engineered to Order
Built to Last

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