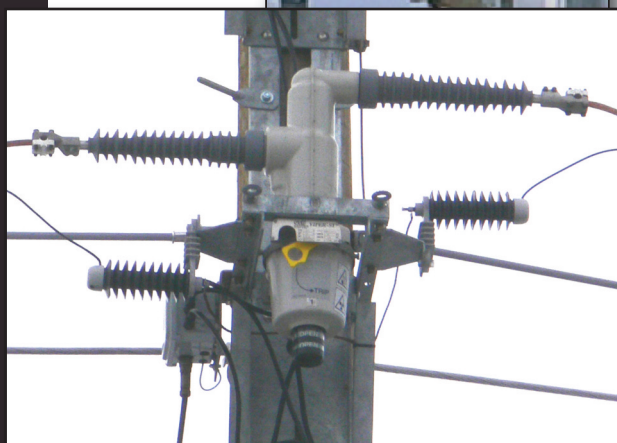
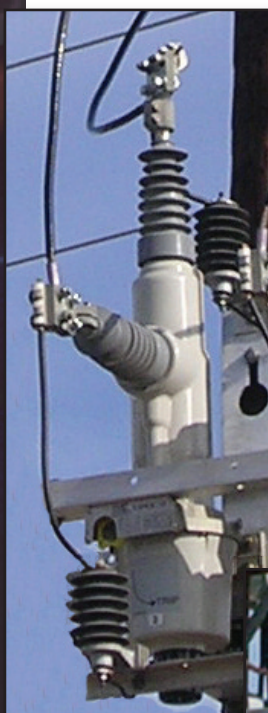


# Viper<sup>®</sup>-SP

## Solid Dielectric, Single Phase Reclosers

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



- Reliable performance
- Works directly with the popular SEL-351RS control
- Operator safety including mechanical block
- Maintenance-free operation
- Overhead, substation and dead-front padmount designs
- Ease of installation
- Ease of automation
- Application flexibility
- Various module configurations for circuit connection flexibility
- Smart Grid/Lazer<sup>™</sup> solutions
- RUS accepted

**G&W's Viper-SP** solid dielectric single phase recloser combines the time-proven reliability of electronically controlled, vacuum fault interrupters with the maintenance-free benefits of a solid dielectric insulated device. The Viper-SP is designed for automatic or manual operation providing overcurrent protection for single phase systems through 38kV maximum, 800A continuous current and 12.5kA symmetrical interrupting.

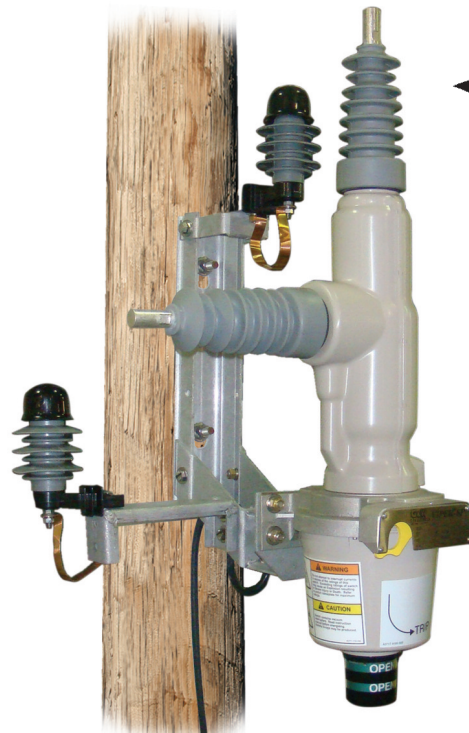
## FEATURES

**Reliable Performance** - Viper-SP reclosers utilize G&W's time-proven epoxy polymer system to fully encapsulate the vacuum interrupters. This system provides excellent insulation properties while providing fully shielded, void-free construction. All modules are UV protected and 100% factory tested for partial discharge.

The Viper-SP 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 and maintenance-free operating life.

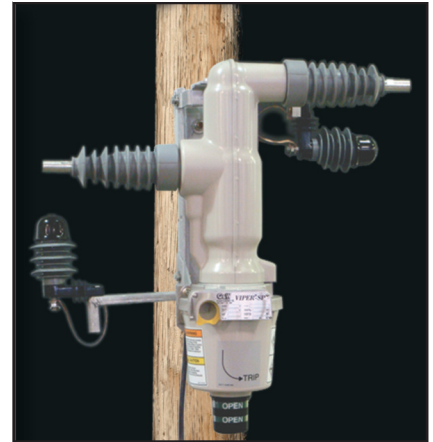
**Operator Safety** - Vacuum interrupters are sealed within solid dielectric insulation providing dead tank construction. A hookstick operable, manual trip and lockout handle prohibits operation either from the control or remotely. A mechanical blocking device further assures against accidental close through the handle. The handle is operable from ground level. 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



◀ 15kV Viper-SP "L" configuration recloser with polemount bracket.

15kV Viper-SP horizontal insulator configuration recloser with polemount bracket. ▼



of the magnetic actuator is located in the control.

**Ease of Operation** - The Viper-SP is compatible with the Schweitzer SEL-351RS Kestrel control.

**Ease of Installation** - The Viper-SP is lightweight and compact. For polemount applications, site-ready designs provide mounting brackets and lightning arresters preassembled to the recloser, significantly reducing installation time. Voltage transformers and mounting provisions are also provided. 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. 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.

## Smart Grid / Lazer Automation Solutions

- The Viper-SP 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%. 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-SP 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

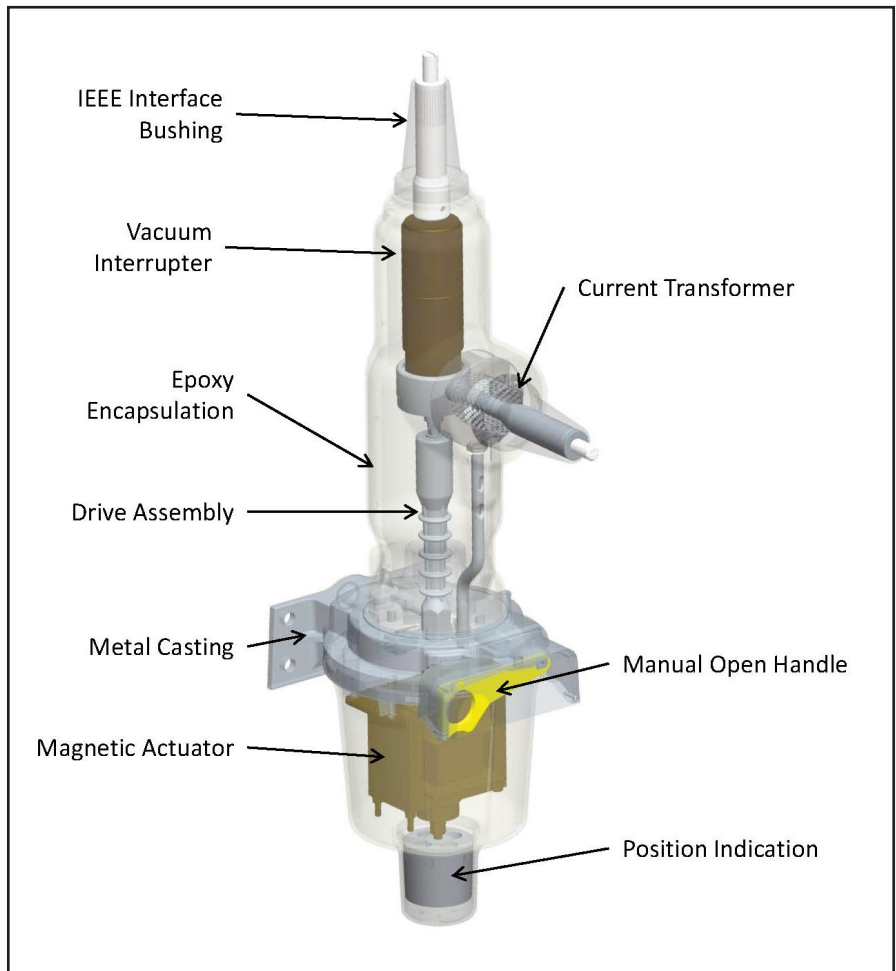
The Viper-SP recloser monitors the circuit using an internal multi-ratio current transformer. The system is powered by an external 120 VAC source. In the event AC power is lost, the unit operates through the batteries located in the control. Recloser sequence operations, tripping and overcurrent sensing is an automatic function of the electronic control. The 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.

## MANUAL TRIP OPERATION

Operation of the hookstick operable manual trip handle trips and locks out the recloser. A contact position indicator is provided indicating open or closed status of the contacts. 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 when the yellow handle is pulled. The handle is operable from ground level. Once reset, the recloser can be closed using the control.

## CATALOG NUMBER

15.5kV .....VIP178ER-12-SP  
27kV .....VIP188ER-12-SP  
38kV .....VIP198ER-12-SP  
Approximate weight = 100lbs. (45kg)



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



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



## CONTROL CAPABILITIES

G&W's Viper-SP recloser works with Schweitzer's latest SEL-351RS Kestrel control. The Kestrel has all the protection and control capabilities you'd expect from Schweitzer with several exciting new capabilities:

- Choose from two economical, low maintenance aluminum cabinet options: a swing-up door and a conventional swing panel enclosure.
- Improve substation automation and control with the included IEC 61850 communications protocol.
- View basic relay information on a connected Ethernet network with the built-in web server.
- Reduce wiring and supply accurate time throughout an Ethernet network with Simple Network Time Protocol (SNTP).
- Transfer such information as IEC 61850 configuration files and settings to and from the relay faster with File Transfer Protocol (FTP).
- Improve power quality monitoring with root-mean-square (rms) and harmonic metering up to the 16th harmonic.
- Simplify local connection and speed communication with an optional, front-panel USB port.
- Integrate with new and existing networks via standard DNP3.0 and Modbus® protocols.
- Increase communications reliability with a built-in Ethernet switch and failover mode for dual Ethernet.
- Identify phasing of single phase reclosers with standard IEEE C37.118 synchrophasors.

## CONTROL CONNECTIONS

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



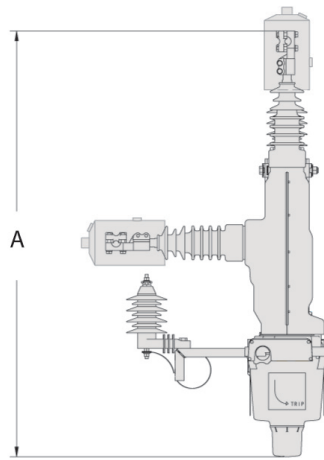
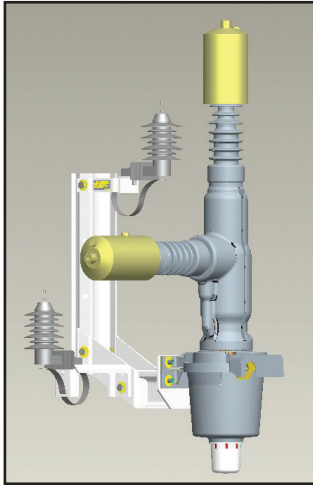
▲ Schweitzer's SEL-351RS Kestrel front access control with swing-up style door. Conventional swing panel enclosures available.

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

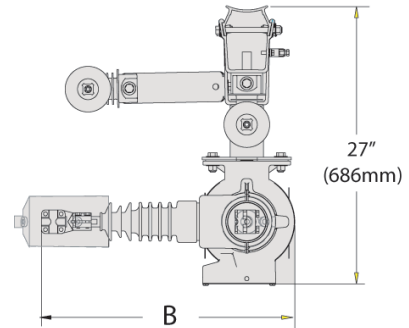


### POLEMOUNT BRACKET for "L" INSULATOR CONFIGURATION

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

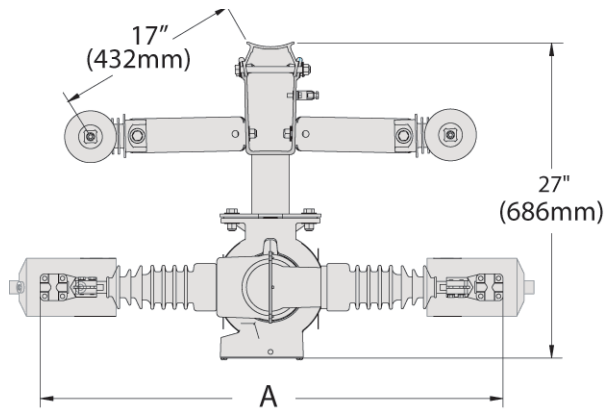
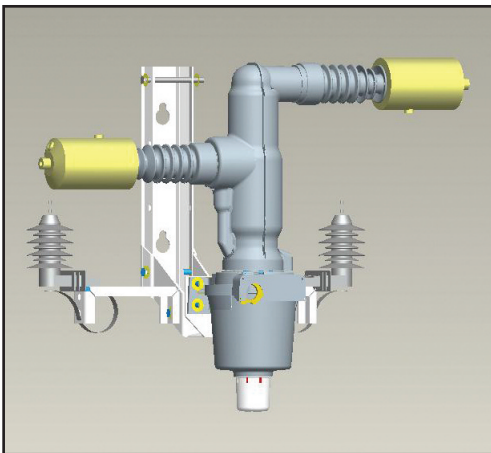


Approx. Dimensions - ins. (mm)			
	15.5kV	27kV	38kV
A	47 (1194mm)	51 (1295mm)	55 (1397mm)
B	24 (610mm)	29 (737mm)	33 (838mm)

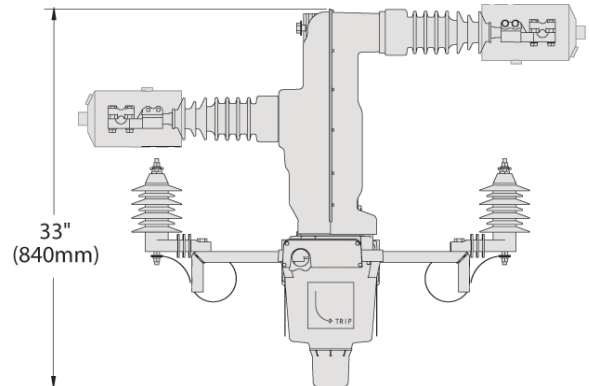
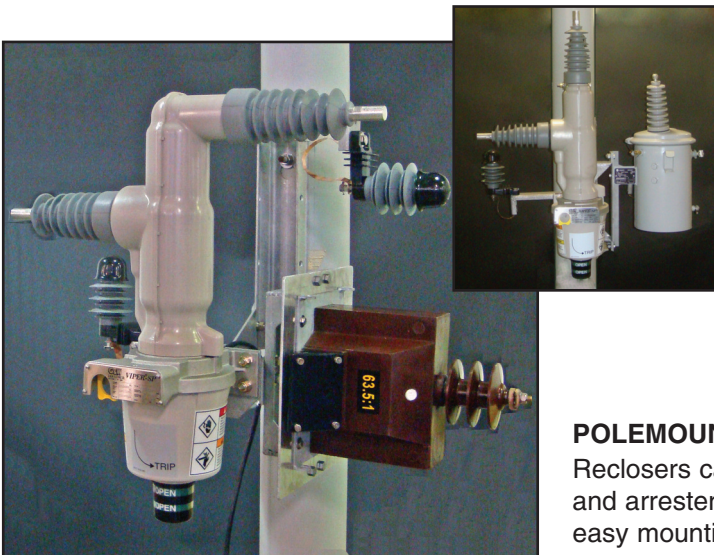


### POLEMOUNT BRACKET for HORIZONTAL INSULATOR CONFIGURATION

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



Approx. Dimensions - ins. (mm)			
	15.5kV	27kV	38kV
A	39 (991mm)	49 (1245mm)	56 (1423mm)

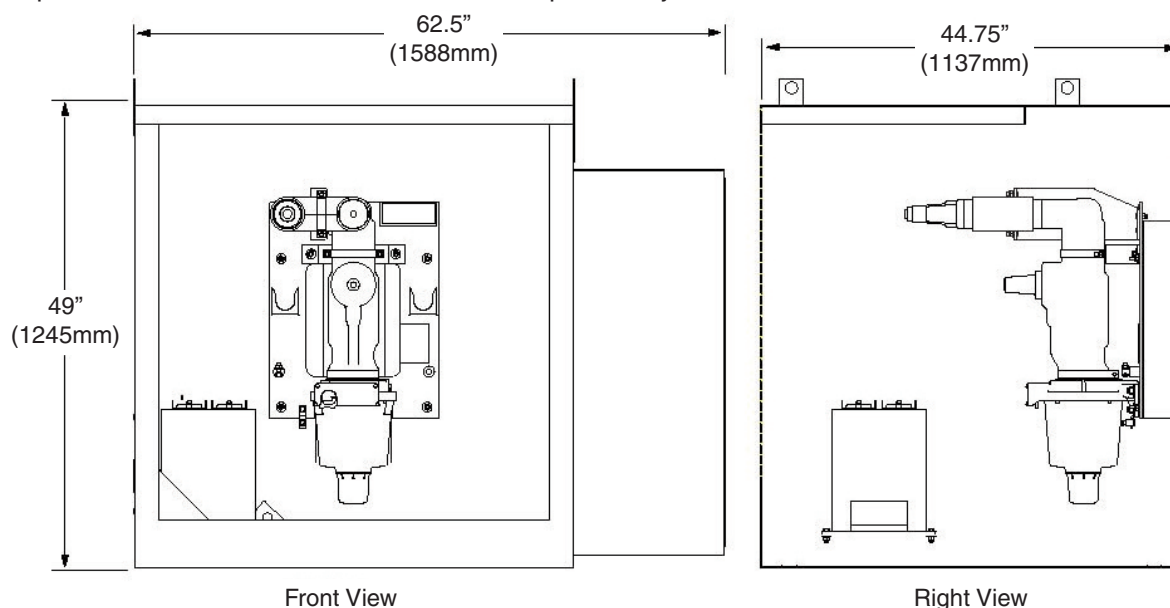


### POLEMOUNT SITE-READY ASSEMBLY

Reclosers can be supplied preassembled including bracket and arresters, reducing installation time. Provisions for easy mounting of voltage transformers are also provided.

## PADMOUNT APPLICATIONS

For applications where space is limited at the substation or where underground feeders require protection, Viper-SP 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 deepwell interface for elbow connectors. Separate compartments can be provided for accessing the cables and operators. Controls are mounted within a separate adjacent enclosure.



## TYPICAL SPECIFICATIONS

### A. GENERAL

This specification covers the requirements for an electronically controlled, solid dielectric vacuum recloser for use on single phase distribution systems through 38kV. The recloser shall be manufactured by G&W Electric Company, designated as Viper-SP solid dielectric recloser. Recloser configuration shall be (check one):

- ☐ Polemount
- ☐ Substation, 90°
- ☐ Substation, 45°
- ☐ Padmount, dead-front

The manufacturer shall be ISO 9001:2008 and ISO 14001:2004 certified.

### B. DESIGN RATINGS AND STANDARDS

Reclosers shall be designed, tested and built per IEEE C37.60 latest version. 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 sec.	.....12.5	..12.5	12.5
60Hz Withstand, kV rms			
Dry, 1 minute	.....50	.....60	....70
Wet, 10 sec.	.....45	.....50	....60
Mechanical Operations	.....10k	....10k	..10k

\*Can be applied on 29.3kV systems

### 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, air vent and lifting provisions shall be provided.

#### C2. Operating Mechanism

The operating mechanism shall utilize a magnetic actuator for opening and closing of the vacuum interrupter. 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. The operating temperature range shall be -60°C to +65°C. Vacuum interrupter contact position indication shall be accomplished using green (open) and red (closed) indicators located on the bottom of the mechanism enclosure and through LEDs inside the control.

#### C3. Vacuum Interrupter

Interruption of the fault or load current shall be accomplished through a vacuum interrupter located inside the solid dielectric module.



# TYPICAL SPECIFICATIONS continued

## C4. Solid Dielectric Module

The solid dielectric module shall utilize a time-proven EPOX solid dielectric epoxy insulation to fully encapsulate the vacuum interrupter. The module shall be fully shielded and incorporate a high impact poly-carbonate, track resistant, UV stable covering providing dead tank construction. Module 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 Padmount design:

☐ 600A apparatus bushing

☐ 200A deep well bushing

## D. OPERATION

Monitoring of the circuit shall be accomplished using an internal multi-ratio current transformer. The unit shall be powered by an external 120 VAC or 240VAC 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. 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. A multi-ratio current transformer shall be encapsulated within the module.

The current transformer shall be provided at ratios of 500:1 and 1000:1. Inputs to the control shall be field changeable. CT accuracy shall be +/-1%.

## F. MOUNTING

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

☐ Aluminum polemount 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)

## G. PADMOUNT ENCLOSURE

(if applicable)

Enclosures shall be made of 12 gauge galvanized or stainless steel and manufactured to IEEE C37.72 and C57.12.28 standards.

Enclosures shall be tamper-resistant incorporating hinged access door(s) with pentahead 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 SEL-351RS Kestrel control.

## I. FACTORY PRODUCTION TESTS

Each individual recloser shall undergo a mechanical operation check verifying contact trip/close velocity, travel profile and timing. Mechanical block test shall be performed. The recloser shall be AC hi-pot tested one minute phase-to-ground and across the open contacts. Circuit resistance shall be checked. 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. Manual trip and mechanical lockout handle
4. SEL-351RS control and associated control cable
5. Corrosion-resistant name plates
6. Solid dielectric epoxy module with internal dual ratio CT
7. Arrester mounting provisions (overhead applications only)
8. Field changeable silicone insulators

## 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 style ground lug
- ☐ Lightning arresters
- ☐ Stainless steel polemount bracket with arrester provisions on the load and source side.
- ☐ Stainless steel substation frame
- ☐ 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

# The Flexibility of Solid Dielectric Technology

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

## **Viper®-ST Triple Option Reclosers**

- To 38kV, 12.5kA interrupting
- Overhead, substation and padmount
- Smart Grid/Lazer ready solutions
- Work with SEL-651R 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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Website: [www.gwelec.com](http://www.gwelec.com)  
ISO 14001:2004 Certified



Engineered to Order  
Built to Last

### **SHANGHAI G&W ELECTRIC LTD.**

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