



# Viper<sup>®</sup>-LT

## 16kA Solid Dielectric, Triple Option Reclosers

Providing electronic overcurrent protection for single or three phase operation on systems rated through 27kV, 630A continuous current, 16kA symmetrical interrupting



- Interrupting rating of 16kA
- Reliable performance
- Works directly with SEL-651R control
- Operator safety including manual open mechanical block
- Maintenance-free operation
- Overhead and substation mount designs
- Easy to install
- Three internal current transformers
- Integral voltage sensing
- Compact design
- Smart Grid/Lazer<sup>®</sup> solutions

**G&W**

Engineered to order. Built to last.

Catalog VLT12

# Viper-LT

**G&W's Viper®-LT** 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 Ø trip /1 Ø lockout
- 1 Ø trip /3 Ø lockout
- 3 Ø trip /3 Ø lockout

The Viper-LT provides overcurrent protection for systems through 27kV maximum, 630A continuous current and 16kA symmetrical interrupting.

## FEATURES

**Reliable Performance** - Viper-LT reclosers utilize a time-proven cycloaliphatic epoxy system to fully encapsulate the vacuum interrupters. All modules are UV resistant and 100% factory tested for partial discharge. The Viper-LT recloser utilizes the latest in magnetic actuator technology. The interrupter and actuator assembly have been tested for over 10,000 mechanical operations to assure a long operating life.

**Operator Safety** - A hookstick operable, manual trip and lockout handle prohibits operation either from the control or remotely. A mechanical blocking device further ensures against accidental close from a remote close signal or the control. An open and closed contact indicator verifies contact position. Contact status and lockout condition can also be verified at the control.

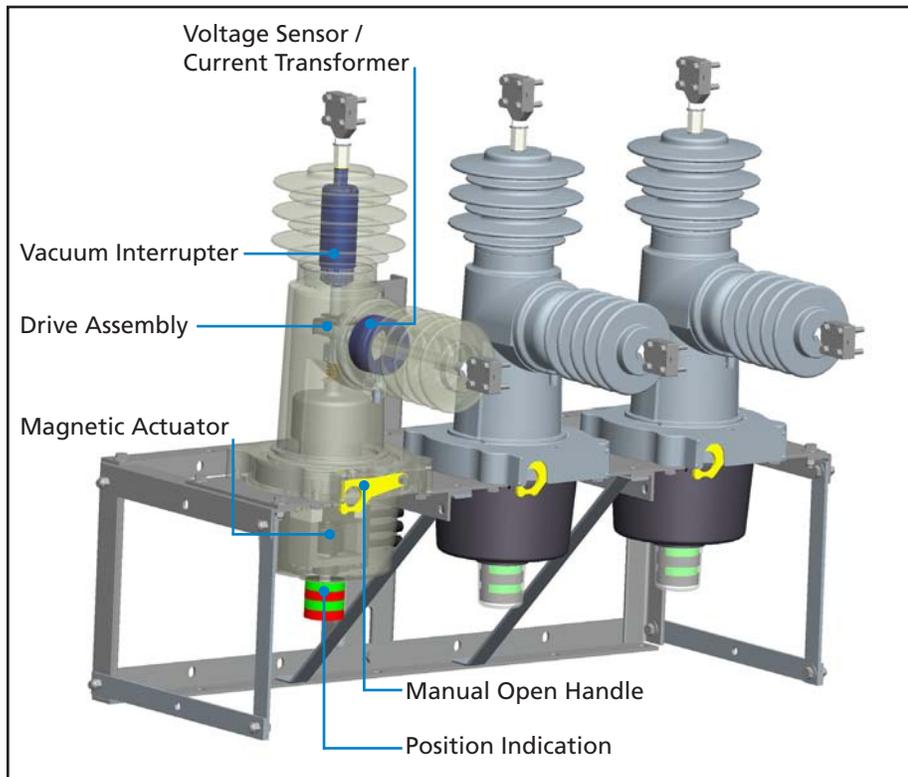
**Maintenance-free** - Solid dielectric insulation provides a maintenance-free installation. Electronic equipment associated with the operation of the magnetic actuator(s) is located in the control.

### Ease of Operation -

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

**Ease of Installation** - The Viper-LT is lightweight and compact. The optional 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.

**Smart Grid/ Lazer® Automation Solutions** - The Viper-LT 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. The CTs have a current amplitude accuracy of +/-1%. Capacitive style voltage sensors encapsulated within each module permit analog voltage monitoring for network reconfiguration while eliminating the need for add-on sensors and cabling. Voltage sensing amplitude accuracy is +/- 2% when tested as a system from -10°C (14°F) to +50°C (122°F). The VS accuracy is -4% to +3% from -40°C (-40°F) to +65°C (149°F). The phase angle accuracy is +/-1° throughout the full temperature range.



▲ Manual trip handle prohibits electronic closing operation through the control and features mechanical and electrical block providing the utmost in safety.

◀ 27kV, 16kA Viper-LT recloser with polemount center bracket

Complete Lazer® automation packages are available offering a pre-engineered solution for applications requiring intelligent automatic switching and power restoration. Automated packages feature one or more protective relays equipped with all communication and logic accessories for a plug and play system that can be quickly implemented.

### DEAD-LINE OPERATION

The unique design of the Viper-LT 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-LT recloser monitors the circuit using internal multi-ratio current transformers and voltage sensors. The control is powered by an external 120 VAC or 125 VDC source. The Viper-LT is powered directly from the control, with no other external power required. 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 Ø trip /1 Ø lockout
- 1 Ø trip /3 Ø lockout
- 3 Ø trip /3 Ø 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 ensures against accidental close from a remote close signal or the control. The handle is operable from ground level. Once reset, the recloser can be closed using the control.

### CATALOG NUMBER

15.5kV ..... VIP376ER-16-1-LT  
 27kV ..... VIP386ER-16-1-LT

Approximate weight = 300lbs. (136 kg).

### CONTROL CAPABILITIES

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

- 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
- Minimum trip for phase, ground and sensitive earth faults
- Sequence coordination
- Harmonics up to the 15th for the THD analysis
- Cold load pickup



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

### 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. The 32 pin interface control cable also brings down the CT and VS outputs to the control.

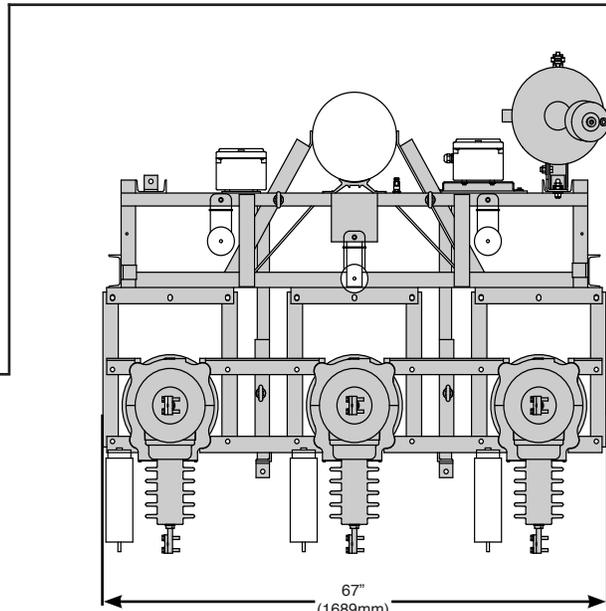
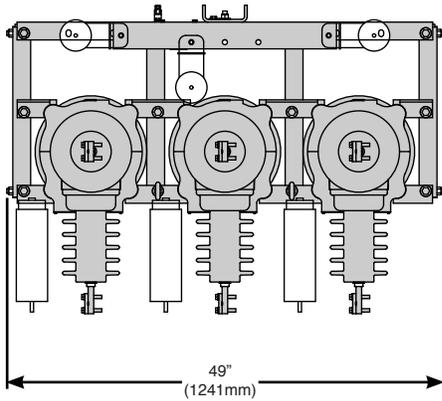
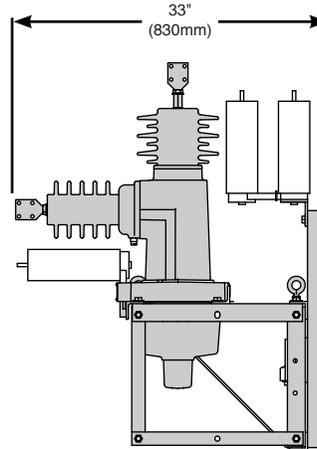
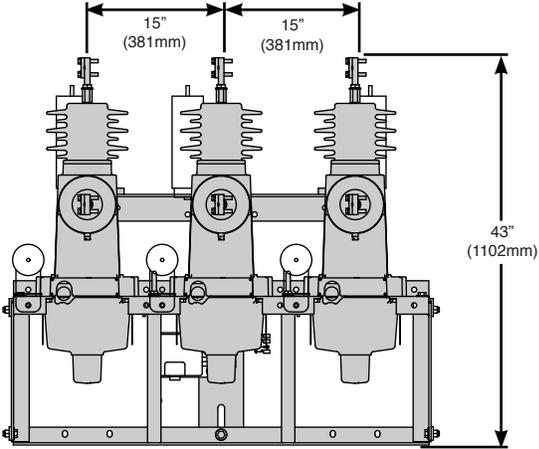
### APPLICATIONS

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

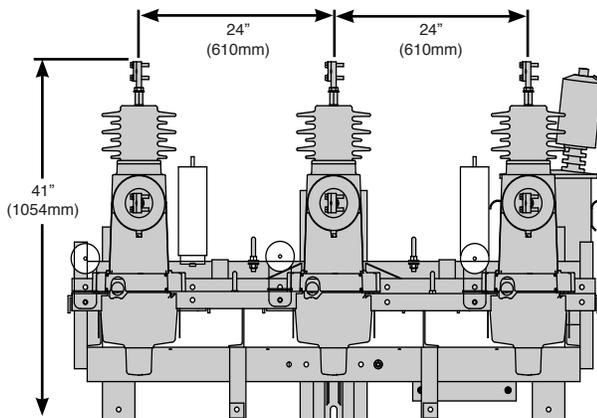
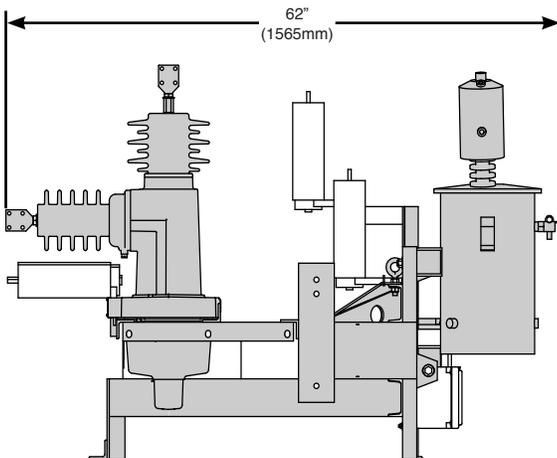


▶ Cabling from each recloser module is terminated inside an encapsulated junction box.

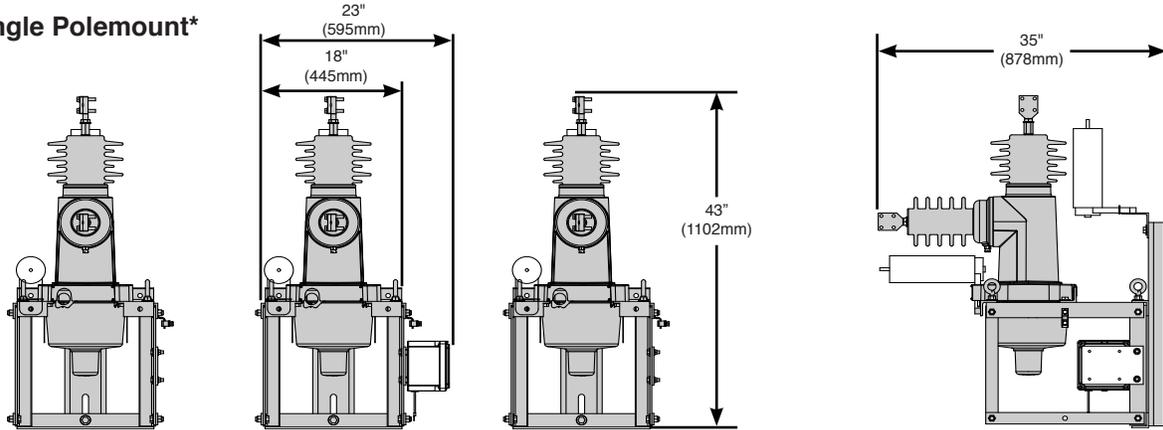
## Polemount Center Bracket\*



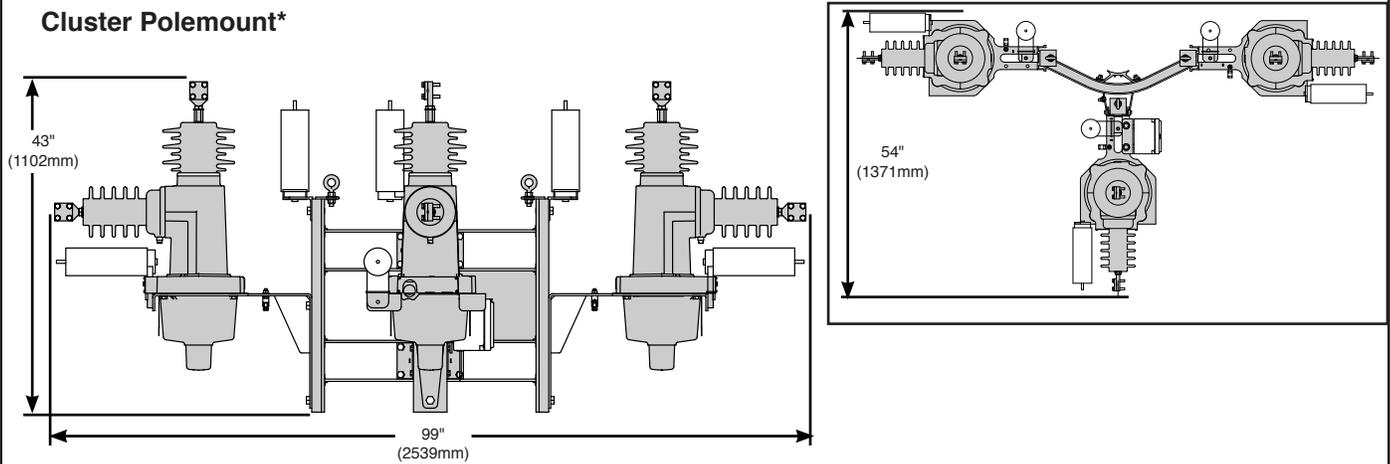
## Polemount Center Bracket (with one PT and provisions up to four PTs)\*



### Single Polemount\*

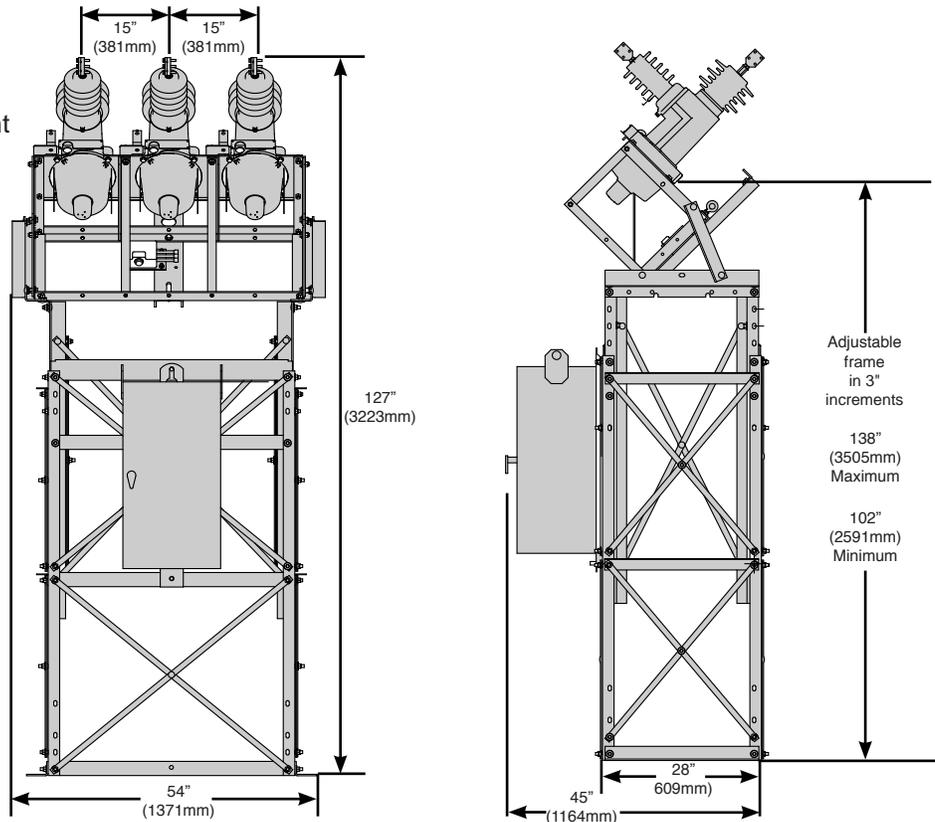


### Cluster Polemount\*



### 45° Substation Frame (with front control mount)

- 45° or 90° installations
- Side or front control mount
- Galvanized steel frame is standard.
- Dimensions are approximate. Do not use for construction.



\* Dimensions are approximate. Do not use for construction. Brackets are aluminum as standard.

# 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 27kV and an interrupting current of 16kA. The recloser shall be manufactured by G&W Electric Company designated as Viper-LT solid dielectric recloser. Recloser configuration shall be either polemount center, cluster, or substation frames.

## B. DESIGN RATINGS AND STANDARDS

Reclosers shall be designed, tested, and built per IEEE C37.60 and IEC 62271-111 standards, latest version. Certified test reports shall be provided. The recloser shall be rated:

Voltage Class (kV)	15	25
Max System Voltage (kV)	15.5	27
BIL (kV)	110	125
Continuous Current (A)	630	630
8 Hr. Overload, at 20° C	800	800
Interrupting Rating RMS (kA)	16	16
Making Current, RMS, asym, KA	25	25
Peak, asym (kA)	42	42
Short Circuit Current, kA sym, 3 second	16	16
60Hz Withstand, kV rms Dry, 1 min	50	60
60Hz Withstand, kV rms Wet, 10 sec	45	50
Mechanical Operations	10K	10K
Frequency , Hz	50/60	

## 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 must include a trip spring to ensure the recloser will fully open 100% of the time. Likewise, the trip spring will maintain the recloser on the open position if it can not perform a full close operation. The magnetic actuator shall be powered by capacitors located in the control enclosure. A mechanical block shall be provided to prevent accidental close signals to operate the recloser when the trip and lock out handle is engaged. The manual trip and lockout handle shall be made of aluminum 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 cycloaliphatic epoxy insulation to fully encapsulate each of the three vacuum interrupters. The operating temperature range shall be -40°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%.

## 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 voltage sensors shall be encapsulated within each recloser module permitting voltage reading for network reconfiguration. Voltage sensing amplitude accuracy is +/- 2 % when tested as a system from -10°C (14°F) to +50°C (122°F). The VS accuracy is -4% to +3% from -40°C (-40°F) to +65°C (149°F). The phase angle accuracy is +/-1° throughout the full temperature range. Integrated communication devices can be provided.

### F. MOUNTING

Lifting provisions shall be provided. Mounting provisions shall be supplied as follows with arrester provisions on the load and source side:

- Aluminum polemount center bracket
- Galvanized steel substation frame
- Aluminum cluster polemount

### H. ELECTRONIC CONTROLS

The recloser shall be controlled using the Schweitzer model SEL-651R control. Only one control cable interface shall be used between the control and the recloser.

### 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 (power frequency withstand voltage) 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. System testing shall be performed on each Viper-LT with their respective matching control and any other site-ready add-on such as lighting arrester or potential transformers.

### 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 handles
5. SEL-651R control and associated 32 pin control cable
6. Triple Option trip/close capabilities
7. Solid dielectric cycloaliphatic epoxy modules with internal voltage sensors and multi-ratio CTs
8. Arrester mounting provisions (overhead applications only)
9. Junction box on the frame with a connectorized control cable

### 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- 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.
- Polemount site-ready assembly
- Lightning arresters
- External 1.0 KVA oil transformer (3% accuracy) for 120 VAC supply power with hardware to mount on 24" phase spacing aluminum frame
- External 0.75 KVA solid dielectric voltage transformer (0.3% accuracy) for 120 VAC supply power with hardware to mount on standard aluminum frame
- UV stable wildlife protectors for source and load insulators
- External voltage sensors
- Junction box with all twist lock connections
- Junction box with twist lock connections for control cable and strain relief for module connections.
- Additional Form C auxiliary contact.



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



▲ UV stable wildlife protectors. Horizontal and vertical bushing wildlife protector respectively.

# G&W offers a complete line of **smart distribution voltage equipment** including:

## Lazer® Automation

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



## Solid Dielectric Switchgear

- To 38kV, 16kA interrupting
- Submersible vault and padmount
- Smart Grid / Lazer® solutions
- Single phase and three phase



## SF6 Insulated Switchgear

- To 38kV, 25kA interrupting
- Submersible vault and padmount
- Smart Grid / Lazer® solutions
- Load and Fault Interrupting



## Solid Dielectric Reclosers

- To 38kV, 12.5kA interrupting
- To 27kV, 16kA interrupting
- Overhead, substation and padmount
- Smart Grid / Lazer® solutions
- Single phase and three phase
- Six voltage sensing available



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

### G&W Electric Company

305 W. Crossroads Pkwy  
Bolingbrook, IL 60440-4938 USA  
Tel 708.388.5010 Fax 708.388.0755

www.gwelec.com  
ISO 9001:2008 Certified  
ISO 14001:2004 Certified

**Catalog VLT12**  
March, 2012