



Viper[®]-LT

Solid Dielectric, Triple Option Reclosers

Providing electronic overcurrent protection for single or three phase operation on systems rated through 27kV, 630A or 800A continuous current, 12.5 or 16kA symmetrical interrupting



- Interrupting rating of 12.5 kA or 16kA
- Reliable performance
- Operator safety including mechanical block on trip and lockout handle
- Maintenance-free operation
- Overhead and substation mount designs
- Easy to install
- Three internal current transformers
- Integral voltage sensing
- Compact design
- Smart Grid/Lazer[®] solutions
- RUS accepted

G&W Engineered to order. Built to last.

Catalog O-vlt14

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 Viper-LT provides overcurrent protection for systems through 27kV maximum, through 800A continuous current and 12.5kA or 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.

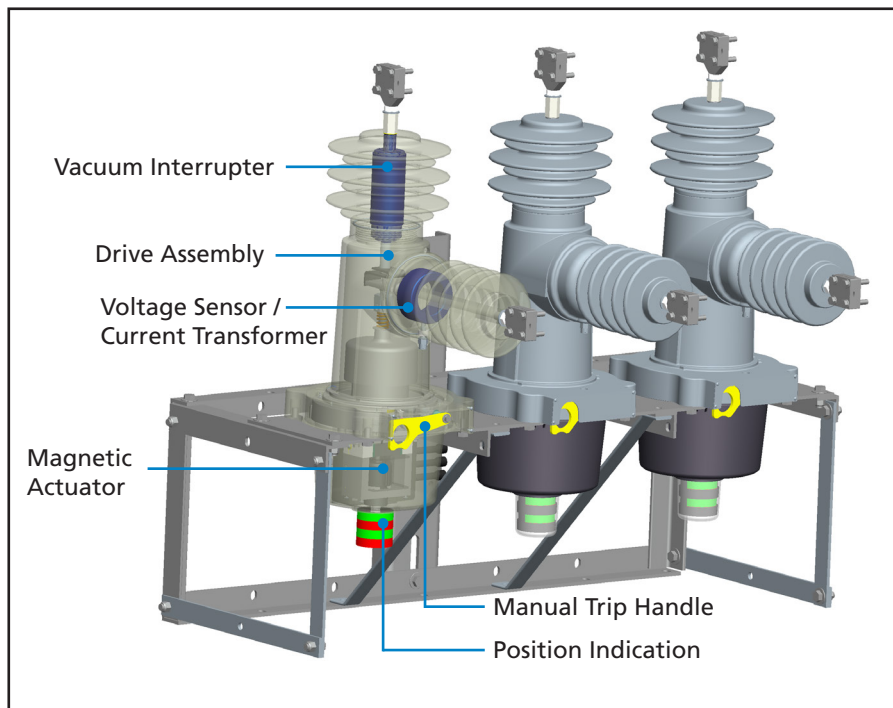
Operator Safety - A hookstick operable, manual trip and lockout handle prohibits operation either from the control or remotely. A mechanical blocking device further ensures against accidental close from a remote close signal or the control. An open and closed contact indicator verifies contact position. 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. The contact wear of the Viper-LT can be monitored through the control.

Ease of Operation - The Viper-LT is directly compatible with the SEL-651R control for a single phase operation and lockout. Electronically ganged three phase operations can be performed with the VRC/Falcon or VRC/SEL-751A combination.

Ease of Installation - The Viper-LT is lightweight and compact. (Approximate weight is 300 lbs or 136 kg). 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. Multi-ratio Current Transformers with a 1000/500:1 ratio are encapsulated inside the horizontal bushings. Other lower CT ratios can be used for low current detection such as Sensitive Earth Fault. Two different CTs are available for these applications, either a 500/400/300:1 or a 150/100/50:1. The default ratio is factory set at the highest available ratio unless otherwise requested. Ratios at the Viper and the control settings 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 voltage sensor accuracy is -4% to +3% from -40°C (-40°F) to +65°C (149°F). Two voltage ratios are available: a 10,000:1 for applications above 13.8 kV



▲ 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

L-G and a 2,500:1 ratio below that voltage. The phase angle accuracy is $\pm 1^\circ$ throughout the full temperature range.

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. Dead-Line operation allows the unit to operate through the batteries located in the control.

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.

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.

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 NUMBERS

Voltage Class	Catalog Number
15.5kV; 630A; 12.5kA	VIP376ER-12-[1 or 3]*-LT
27kV; 630A; 12.5kA	VIP386ER-12-[1 or 3]*-LT
15.5kV; 800A; 16kA	VIP378ER-16-[1 or 3]*-LT
27kV; 800A; 16kA	VIP388ER-16-[1 or 3]*-LT

* 1= SEL-651R or 3= VRC/Falcon or VRC/SEL-751A

CONTROL CAPABILITIES

The Viper-LT comes with two different control options:

1. The Viper Recloser Control (VRC) paired with a SEL-351R4, SEL-351R3 Falcon, SEL-751A, or GE DGCR; for three phase electronically ganged operations.
2. The SEL-651R control permits three distinct mechanical operating modes.
 - 1 Ø trip / 1 Ø lockout
 - 1 Ø trip / 3 Ø lockout
 - 3 Ø trip / 3 Ø lockout



▲ Viper Recloser Control (VRC) with SEL-351R3 Falcon relay.

CONTROL CONNECTIONS

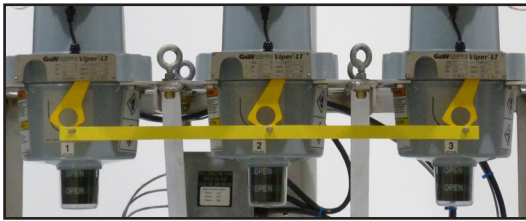
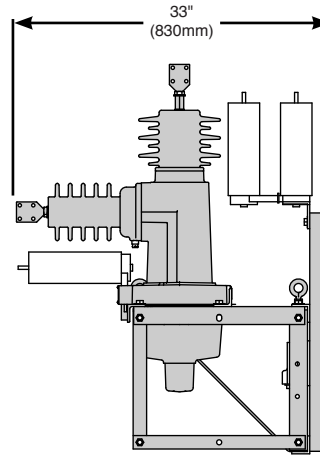
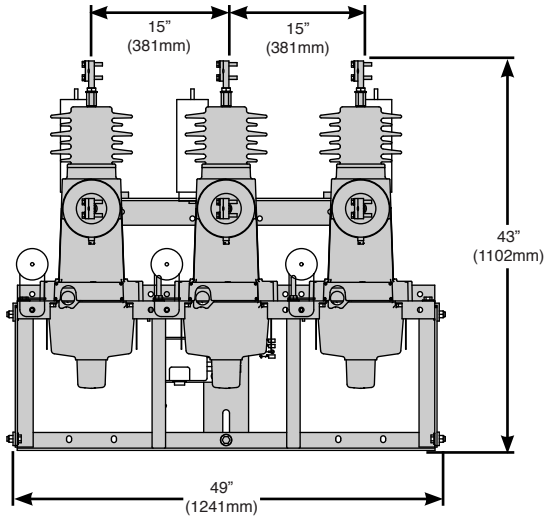
For either control, a twist lock style 32-pin connector makes the cable connection between the control and the interrupter control box. The cable provides the normal power supply to the magnetic actuator. The 32-pin interface control cable also brings down the CT and VS outputs to the control.

A standard 52a auxiliary contact for each phase comes with the 32-pin Amphenol connector. As an option, a 42-pin interface with a Harting connector is provided when an additional 52b auxiliary contact is requested. Both 52a and 52b are on the same Form C micro-switch. This 42-pin interface also offers a cable-disconnected alarm when the cable is unplugged or cut. The 42-pin interface option is only available with the SEL-651R and requires a different control part number.

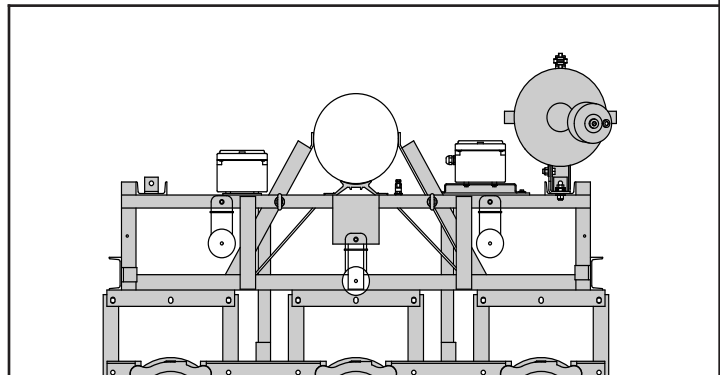
APPLICATIONS

- Sectionalizing schemes
- Midpoint reclosing
- Open bus-tie
- Distributed automatic transfer
- Distribution automation
- Circuit breaker alternative
- Automatic network reconfiguration
- Revenue grade metering
- Synchrophasor

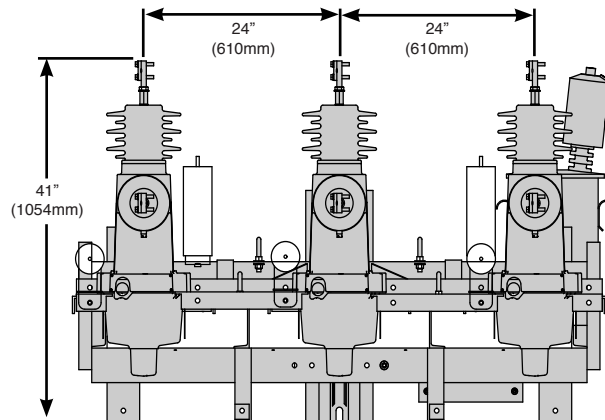
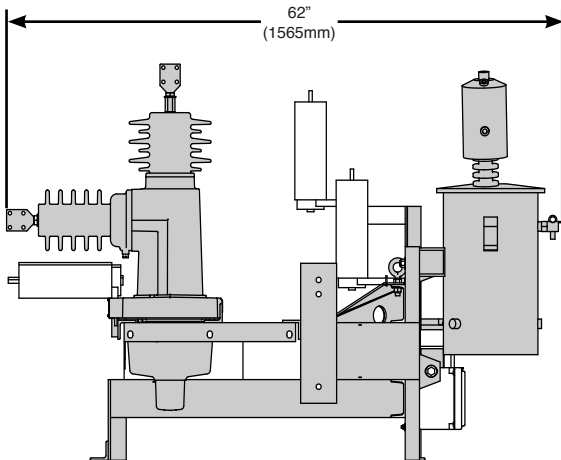
Polemount Center Bracket*



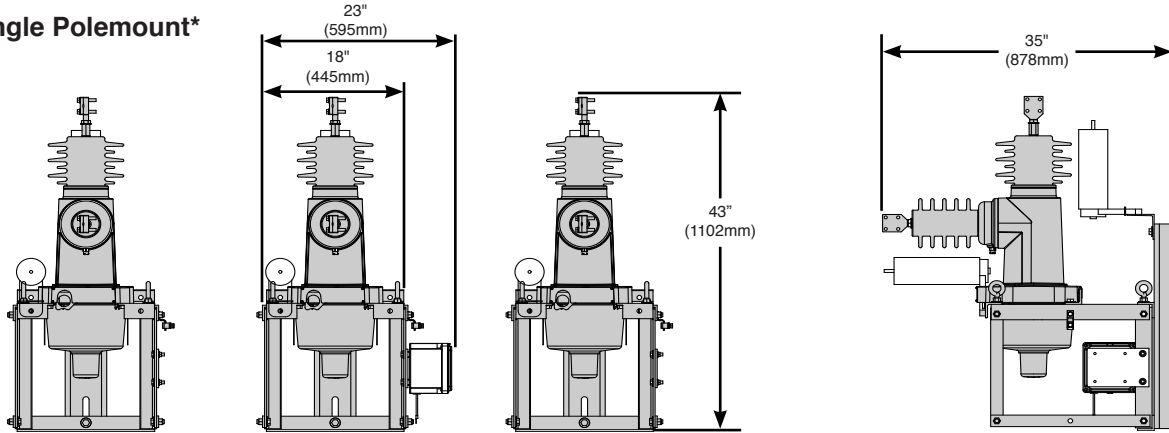
▲ *Optional 3-phase ganged manual trip handle.*



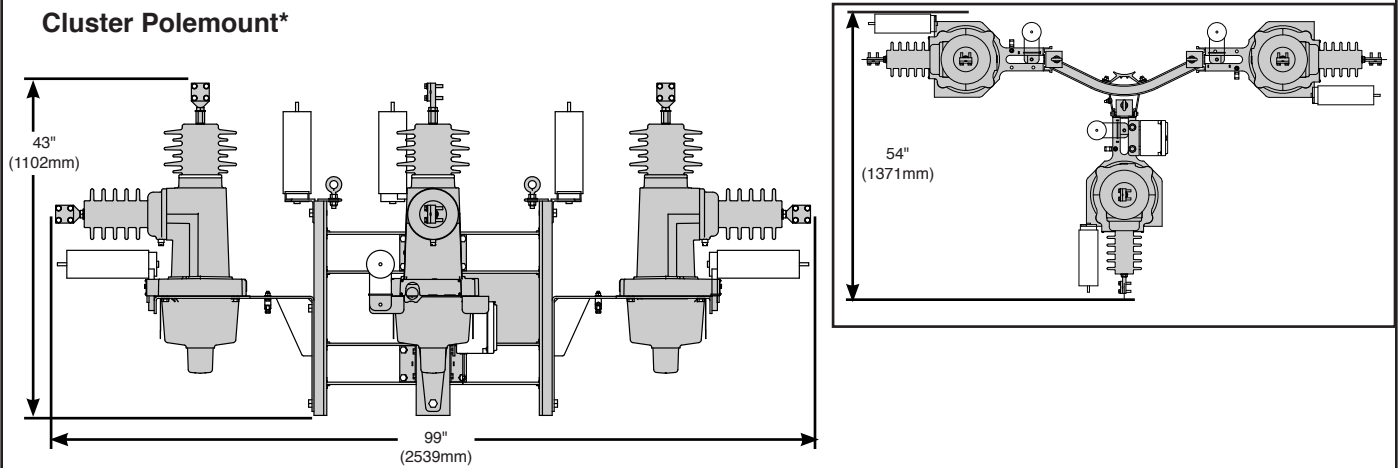
Polemount Center Bracket (with one PT and provisions up to four PTs)*



Single Polemount*

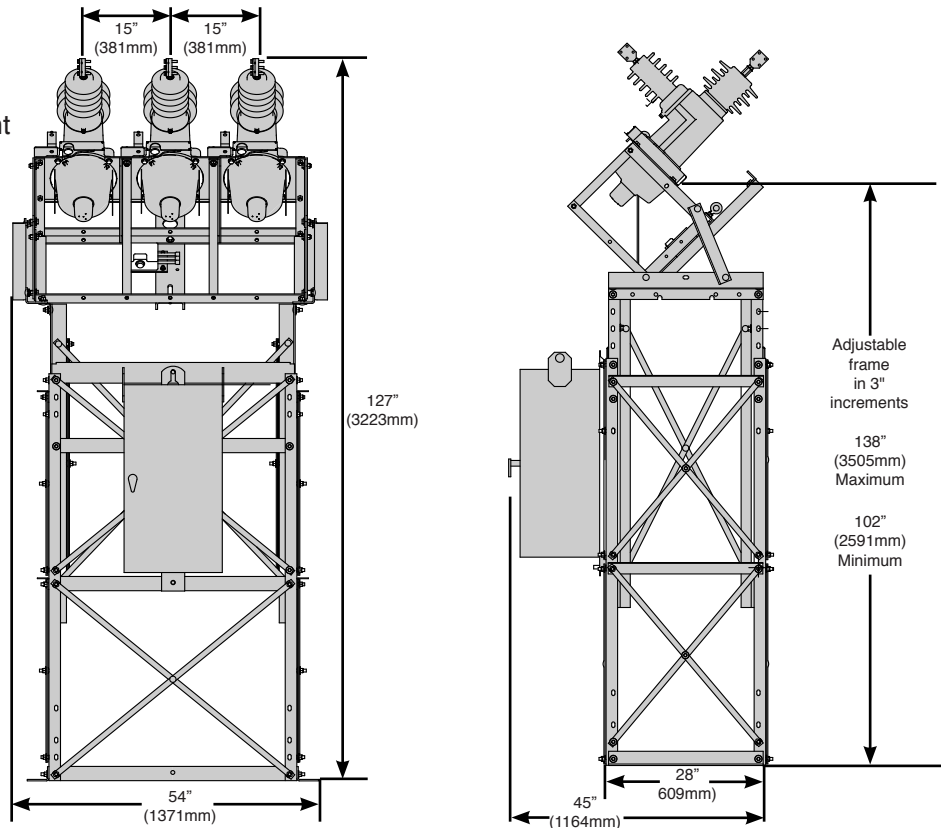


Cluster Polemount*



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.

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 12.5 or 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:

Max System Voltage (kV)	15.5		27	
	12.5	16	12.5	16
Interrupting Rating RMS (kA)	12.5	16	12.5	16
Rated Voltage (kV)	15	15	25	25
BIL (kV)	110	110	125	125
Continuous Current (A)	630	800	630	800
8 Hr. Overload, at 20° C	800	960	800	960
Making Current, RMS, asym, (kA)	20	25	20	25
Peak, asym (kA)	32	42	32	42
Short Circuit Current, (kA) sym, 3 second	12.5	16	12.5	16
60Hz Withstand, (kV) rms dry, 1 min	50	50	60	60
60Hz Withstand, (kV) rms wet, 10 sec	45	45	50	50
Mechanical Operations (open - close)	10k	10k	10k	10k
Frequency, Hz	50/60		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%. Other ratios for low current detection such as 500/400/300:1 or 150/100/50:1 shall be available.

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 voltage sensor 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. Two voltage ratios are available: a 10,000:1 for applications above 13.8 kV L-G and a 2,500:1 ratio below that voltage. 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 for triple option or the G&W Viper Recloser Control with Falcon for three phase operations 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 lightning 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 with true mechanical block
5. SEL-651R control or VRC with SEL-351R4, SEL-351R3 Falcon, SEL-751A, or GE DGCR
6. 32 pin control cable
7. One 52a auxiliary contact per phase
8. Triple Option trip/close capabilities
9. Solid dielectric cycloaliphatic epoxy modules with internal voltage sensors and multi-ratio CTs
10. Arrester mounting provisions (overhead applications only)
11. Junction box on the frame with a connectorized control cable

K. OPTIONS

The following options shall be supplied:

(Check as necessary)

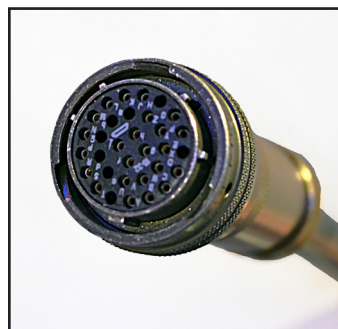
- NEMA 2-hole aerial lugs
- NEMA 4-hole aerial lugs
- Clamp style aerial lugs (#2- 750 kcmil)
- 4/0 brass eyebolt ground lug
- Galvanized polemount center bracket with arrester provisions on the load and source side.
- Stainless steel polemount center bracket with arrester provisions on the load and 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.
- 42 pin interface with additional 52b auxiliary contact (Form C type) and cable-disconnected alarm (SEL-651R only)
- 3-phase ganged manual trip handle



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



▲ UV stable wildlife protectors.



▲ 32-pin interface control cable with 1/4 twist lock connectors permit easy field installation.



▲ 42-pin interface.

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
- Integral Visible Break Designs



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



Engineered to order. Built to last.

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ISO 14001:2004 Certified

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