Typical Specifications

VIPER®-S SOLID DIELECTRIC, THREE PHASE RECLOSERS

PART 1- GENERAL

1.1 DESCRIPTION

This specification covers the requirements for an electronically controlled, automatic three phase, solid dielectric vacuum recloser for distribution systems through 38kV. The recloser shall be manufactured by G&W Electric Company and designated as the Viper®-S Solid Dielectric Recloser.

1.2 QUALITY ASSURANCE

A. Manufacturer Qualifications: The chosen manufacturer shall have at least 10 years experience in manufacturing solid dielectric reclosers. The manufacturer of the reclosers shall be completely and solely responsible for the performance of the reclosers well as the complete integrated assembly as rated.

B. The manufacturer shall furnish certification of ratings of the reclosers upon request.

C. The recloser shall comply with requirements of the latest revisions of applicable industry standards, including:

a) IEEE C37.60
b) IEEE 386

D. The recloser manufacturer shall be ISO 9001 and 14001 certified.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Reclosers shall be shipped preassembled at the factory. No field assembly shall be required.

B. The contractor, if applicable, shall handle, transfer and move the reclosers in accordance with manufacturer's recommendations.

PART 2- PRODUCTS

2.1 RECLOSER CONFIGURATION

Recloser configuration shall be (choose one):

- ___Polemount, center
- ___Polemount, side horizontal
- ___Substation, 45°
- ___Substation, 90°
- ___Substation, 90°Site-ready with arresters, bracket and voltage transformers preassembled
- ___Padmount, front access
- ___Padmount, front / back access

2.2 RECLOSER CONSTRUCTION

A. Mechanism Enclosure
The magnetic actuator and corresponding linkage assembly shall be housed within an integral, air insulated, stainless steel enclosure. A bolted panel at the bottom of the mechanism enclosure shall permit easy access if maintenance is required. All hardware shall be made of stainless steel or brass for maximum corrosion-resistance. An air vent shall be provided. The mechanism enclosure shall be painted light gray using a corrosion-resistant epoxy paint. Ground bosses shall be provided for system ground.

B. Operating Mechanism
The operating mechanism shall utilize a magnetic actuator for opening and closing of the vacuum interrupters. The actuator shall be powered by capacitors located in the mechanism enclosure. The manual trip and lockout handle shall be made of stainless steel for maximum corrosion resistance. Manual trip and lockout shall be provided by an external, hook-stick 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. The operating temperature range shall be -40°C to +65°C. Vacuum interrupter contact position indication shall be accomplished using green (open) and red (closed) indicators located at the bottom of the mechanism enclosure.

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

D. 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 modules shall be dead tank or dead front technology and shall conduct a fault to ground through their external surface in case of a flash over. A dual ratio, 500/1000:1 current transformer or optional dual ratio, 400/200:1 current transformer shall be integrally molded into each module. Voltage sensor(s) shall be integrally molded into each module. Modules shall be molded with one (1) source side and one (1) load side, IEEE
386 apparatus bushing interface.

E. Smart Grid / Lazer Automation
The recloser shall be automation ready simplifying conversion for any future automation requirements. Up to 6 optional LEA (Low Energy Analog) capacitive voltage sensors shall be encapsulated within each recloser module permitting voltage reading for network reconfiguration while eliminating the need for add-on external sensors and cabling. A multi-ratio current transformer shall be encapsulated within the module. The current transformer shall be field chargeable. CT accuracy shall be +/-1%. 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 +/-2% over the temperature range -20°C through +40°C when tested as a system. The accuracy shall be +/-4% at -60°C through +65°C. The phase angle accuracy of the voltage sensors shall be +/-1°. Available communications include fiber optic transceivers and wireless radio.

F. Electronic Control
The recloser shall be controlled using the following control (choose one):
- ___SEL-351 R
- ___SEL-651 R
- ___SEL-351 S package including painted steel enclosure, relay, connectorized control cable and 24V control power supply
- ___GE URC
- ___None (ordered separately)

2.3 DESIGN RATINGS

A. Reclosers

The recloser shall be rated (choose appropriate column):

SELECTION OF RATINGS	IEEE/IEC		
Maximum Design Voltage, kV	15.5	27	38
Impulse Level (BIL) Voltage, kV	110	125	150
Continuous and Load Break Current, Amperes	800/1000*	800/1000*	800
8-hour Overload, Amperes	960	960	960
60 Hz Withstand, kV rms: One minute (dry)	50	60	70
60 Hz Withstand, kV rms: 10 seconds (wet)	45	50	60
Interrupting Current, kA rms sym.	12.5	12.5	12.5
Making Current: RMS, asym, kA	20	20	20
Making Current: Peak, asym, kA	32	32	32
Short Circuit Current, kA sym. , 3 seconds	12.5	12.5	12.5
Mechanical Endurance, Operations	10k	10k	10k

*1000A continuous current available with the following conditions: L-shaped module configuration, NEMA-4 hole or clamp style lugs, and operating temperature range of -60°C through +40°C

B. IEEE C37.60 Fault Interrupting Duty

Percent of Maximum: Interrupting Rating	Approx. Interrupting: Current Amps	No. of Fault: Interruptions
15-20%	2000	44
45-55%	6000	56
90-100%	12000	16
Total Number of Fault Interruptions: 116		

2.4 CABLE BUSHINGS

Cable bushings shall be (choose one):

- ____Air insulated, removable silicone insulators over an IEEE 386 apparatus bushing interface

For Padmount design:

- ____600 amp Apparatus bushing
- ____200 amp Deepwell bushing

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

2.6 STANDARD COMPONENTS

The following shall be included as standard:

- Galvanized steel polemount center bracket
- Stainless steel mechanism enclosure painted light gray using a corrosion-resistant epoxy paint with ultra-violet protection
- Stainless steel and brass fasteners
- Lifting provisions
- Operations counter
- Grounding provisions
- Corrosion-resistant three-line diagram and nameplate(s)
- Manual open and lockout handle with mechanical block
- Dead Tank solid dielectric epoxy modules with up to six internal voltage sensors and three dual ratio CT's
- AC input cable
- Control cable
- Field Changeable silicon insulators
- Provision for lightning arresters (overhead applications only)

2.7 OPTIONS

The following options shall be supplied: (check as appropriate):

- _____NEMA 2-hole aerial lug
- _____NEMA 4-hole aerial lug
- _____Clamp style aerial lug (#2 – 500 kcmil)
- _____Clamp style aerial lug (250 – 750 kcmil)
- _____4/0 brass eyebolt style ground lug
- _____Dead-line operation permitting using the batteries located in the control for operation of the recloser if AC input power is lost. A remote status signal reports the operational status of the interrupter power supply permitting remote indication of the control's capability to open or close the recloser.
- _____Internal voltage sensing permitting voltage reading for network reconfiguration applications. Provides a secondary analog 120VAC output accepted by most relays.
- _____External 1.0 KVA oil potential transformer for 120 VAC supply power with hardware to mount on standard aluminum frame
- External 0.75 KVA solid dielectric transformer for 120 VAC supply power with hardware to mount on standard aluminum frame
- _____ Polemount site-ready assembly
- _____ Stainless steel polemount center bracket
- _____ Stainless steel polemount horizontal side bracket
- _____ Stainless steel polemount vertical side bracket
- _____ Stainless steel adjustable substation frame
- _____ Stainless steel padmount enclosure
- _____ 48 VDC power supply
- _____ 125 VDC power supply
- _____ Cold temperature operation to -60°C.
- _____ External CTs for current monitoring supplied individually
- _____ External CTs mounted on a single fixture with flexible conduit
- _____ High impact, UV stable wildlife protectors for source and load insulators
- _____ External Voltage Sensors

- _____Six (6) integral voltage sensors
- _____Dual ratio 400/200:1 current transformer
- _____19 pin control cable

2.8 LABELING

A. Hazard Alerting Signs
Appropriate hazard signs shall be applied to each unit, frame or enclosure (if applicable). A Danger sign shall warn of hazardous voltage and the need for qualified operating personnel. Warning signs shall warn against product misapplication in excess of fault ratings and the hazards when accessing moving components inside the mechanism housing. Caution signs shall warn of harmful X-ray potential.

B. Nameplates, Ratings Labels, and Connection Diagrams
Each recloser shall be provided with a nameplate label indicating the manufacturer's name, catalog number, date of manufacture, serial number, and ratings. Ratings listed on nameplate shall indicate the following: voltage rating, BIL, continuous current, and interrupting current.