**Typical Specifications**

**VIPER®-ST SOLID DIELECTRIC, TRIPLE OPTION RECLOSERS**

PART 1- GENERAL

1.1 DESCRIPTION

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 38 kV. The recloser shall be designated G&W Viper-ST.

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 as 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:

1. IEEE C37.60
2. 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):

• Pole mount, center

• Pole mount, Alley Arm

• Pole mount, cluster

• Substation, 90°

• Substation, 45°

• Padmount, front access

• Padmount, front / back access

• Site-ready with options including lightning arresters, primary/secondary connections, Accusense voltage sensors, and voltage transformers preassembled

• Pole mount, 24” spacing

• Pole mount, Cross Arm, center

• Pole mount, Phase over Phase

• Pole mount, Independent Mount

2.2 RECLOSER CONSTRUCTION

A. 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.

B. 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. A mechanical block device shall further prohibit accidental closing when the manual trip handle is used. 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 located in the control.

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 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. The operating temperature range shall be -60° to +65°C. 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 bushing interface.

E. Smart Grid / Distribution Automation

The recloser shall be automation ready simplifying conversion for any future automation requirements. The recloser shall have an option for up to six (6) integral LEA (Low Energy Analog) capacitive voltage sensors that are encapsulated within each recloser module, permitting voltage sensing for network reconfiguration. The integral voltage sensing accuracy shall be +/-2% at -20°C through +40°C and +/-4% at -60°C through +65°C when tested as a system. The phase angle accuracy of the integral voltage sensors shall be +/-1°. The recloser shall have an option for external voltage sensors with 0.5 accuracy class (±0.5% Magnitude, ±0.344° Phase) at -40°C to + 65°C temperature range. These external voltage sensors shall have a 5000:1 ratio and Low Energy Analog (LEA) outputs. A dual-ratio current transformer shall be encapsulated within the module. The current transformer ratio shall be field changeable. CT accuracy shall be +/-1%. Integrated communications options can be provided.

F. Electronic Control

The recloser shall be controlled using the Schweitzer model SEL-651R control or optional VRC configurations:

* ABB RER620
* Beckwith 7679
* GE DGCR
* GE R650
* SEL 351R3 (Falcon)
* SEL 351R4
* SEL 751A

2.3 DESIGN RATINGS

A. Reclosers

The recloser shall be rated (choose appropriate column):

|  |  |
| --- | --- |
| SELECTION OF RATINGS | IEEE/IEC |
| Maximum Design Voltage, kV | 15 | 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. | 16\*\* | 16\*\* | 12.5 |
| Making Current: RMS, asym, kA | 25.6\*\* | 25.6\*\* | 20 |
| Making Current: Peak, asym, kA | 42\*\* | 42\*\* | 32 |
| Short Circuit Current, kA sym. , 3 seconds | 16\*\* | 16\*\* | 12.5 |
| Mechanical Endurance, Operations | 10k | 10k | 10k |

\*1000A continuous current available with the following conditions: 12.5kA Interrupting Current, L-shaped module configuration, NEMA-4 hole or clamp style lugs, and operating temperature range of -60°C through +40°C

\*\*12.5kA Interrupting Current available.

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:

• Aluminum polemount center bracket

• Lifting provisions

• Grounding provisions

• Operations counter for each phase located in the control

• Manual trip and lockout handle(s) with mechanical block

• SEL-651R control and associated control cable

• Triple option close capabilities

• Solid dielectric epoxy modules with 3 internal voltage sensors and dual-ratio 1000/500:1 CT’s

• Arrester mounting provisions (overhead applications only)

• Field changeable silicone insulators

• Junction box with all strain relief connections and twist connection for control cable

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

• Stainless steel polemount center bracket with arrester provisions on the load and source side

• Stainless steel polemount alley-arm bracket with arrester provisions on the load and source side

• Lightning arresters

• Dead-front padmounted design with stainless steel enclosure

• 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

• High impact, UV stable wildlife protectors for source and load insulators

• External CTs for current monitoring

• External voltage sensors

• Junction box with all twist connections

• Six (6) integral voltage sensors

• External Accusense voltage sensors with 0.5 accuracy class for voltage metering (±0.5% Magnitude, ±0.344° Phase)

• Dual ratio 400/200:1 current transformer

• 42 pin cable with 52B and cable disconnect alarm

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.