

Guide Specification

Three-Phase Solid Dielectric Trident-SR with SafeVu Integral Visible Break

Part 1-GENERAL

1.1 DESCRIPTION

The switchgear shall consist of magnetically actuated solid dielectric insulated loadbreak switch ways and vacuum fault interrupter ways. All ways of the switch shall include a blade type switch incorporated within the solid dielectric module to provide a visible break of the circuit.

The specified product should be G&W Trident-SR with SafeVu switches.

1.2 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The chosen manufacturer shall have at least 15 years experience in manufacturing solid dielectric insulated medium voltage switchgear. The manufacturer shall be completely and solely responsible for the performance of the fault interrupter as rated.
- B. The manufacturer shall furnish certification of ratings of the switch upon request.
- C. The switch shall comply with requirements of the latest revision of applicable industry standards, including:

IEEE C57.12.28, IEEE C37.74, IEEE C37.60, ANSI/IEEE 386, IEC60529, IEEE 592
- D. The switch shall be tested to IEC 60529 for submersibility. The switch shall be rated IP68 for 20 days with a 20 foot head of water.
- E. The switch manufacturer shall be ISO 9001:2008 and ISO 14001:2004 certified.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. The switch shall be shipped preassembled at the factory. No field assembly shall be required.
- B. The contractor, if applicable, shall handle, transfer and move the switches in accordance with manufacturer's recommendations.

PART 2-PRODUCTS

2.1 SWITCH CONFIGURATION

- A. The switch shall have 3-phase loadbreak switch ways and 3-phase vacuum fault interrupter ways as required.

2.2 SWITCH CONSTRUCTION

- A. The switch shall be a dead-front design. The operating mechanism housing shall be stainless steel with a viewing window for verification of vacuum interrupter contact position. The mechanism housing shall be painted ANSI 70 light gray using corrosion-resistant epoxy paint. Operating handles shall be padlockable.
- B. The solid dielectric modules must be made of field proven bisphenol-A coated with a semi-conductive layer of epoxy, providing a completely dead front device. The semi-conductive layer must be tested to IEEE 592 to ensure it can carry fault current to ground so as to ensure operator safety.
- C. The switch shall be designed for long term operation in the harshest environments. The interrupter design must be tested to IEC60529 and achieve a protection rating of IP68, subjected to a 20' head of water pressure for 20 days.
- D. All ways of the switch shall be equipped with an integral blade type disconnect switch incorporated within the solid dielectric module to provide a true visible break. The Visible Break switch shall be in series with the magnetically actuated vacuum interrupter and provide a clear three-phase visible break of the circuit. The visible break must be easily seen through a viewing window molded as an integral part of each solid dielectric module. The visible break viewing window well shall only contain air and no SF6, oil, or dielectric fluid that would require monitoring or maintenance.
- E. The switch shall interrupt all load currents within the vacuum bottle. The switch shall include two mechanical interlocks, one external and one internal, for safe operation.
- F. The switch mechanism shall consist of three vacuum bottle assemblies mechanically linked to a single magnetically actuated operating mechanism. When the magnetic actuator is powered the device can be manually opened and closed via an operating handle. In the event of loss of power to the magnetic actuator, the device will retain stored energy to allow for manually tripping/opening of the vacuum interrupter without power.
- G. The switch shall be able to operate within 3.5 cycles for Open/Trip or Close.

2.3 DESIGN RATINGS

- A. Load Break Switches shall be rated

SELECTION OF RATINGS	
Maximum Design Voltage, kV	15.5
Impulse Level (BIL) Voltage, kV	95
Continuous Current, Amperes	630
Load break Current, Amperes	630
One Minute Withstand (dry), AC kV	35
Production Test Rating	34
15 Minute Withstand, DC kV	53
Momentary Current, kA, ASYM	20
Fault-Close Current, kA, ASYM	20
One Second Current, kA, SYM	12.5
Visible Break Mechanical Endurance, Operations	2000

Interrupter Mechanical Endurance, Operations	10000
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B. The fault interrupter shall be rated:

Maximum Design Voltage, kV	15.5
Impulse Level (BIL) Voltage, kV	95
Continuous Current, Amperes	630
Load break Current, Amperes	630
One Minute Withstand (dry), AC kV	35
Production Test Rating	34
Symmetrical Interrupting Rating, kA	12.5
Asymmetrical Interrupting Rating, kA	20
Visible Break Mechanical Endurance, Operations	2000
Interrupter Mechanical Endurance, Operations	10000

IEEE C37.60 Fault Interrupting Duty

Percent of Maximum Interrupting Rating	Approximate Interrupting: Current, Amps	No. of Fault: Interruptions
15-20%	2000	44
45-55%	6000	56
90-100%	12500	16
Total Number of Fault Interruptions: 116		

2.4 CABLE ENTRANCES

A. Load Break Switches

Cable entrances shall be tested to IEEE 386 and be, as indicated on the switch drawing:

___ 15.5KV 110KV BIL 600A Dead break Apparatus Bushings per IEEE 386 Figure 11

___ 15.5KV 110KV BIL 200A Bushing Well per IEEE 386 Figure 3

B. Fault interrupters

Cable entrances shall be tested to IEEE 386 and be, as indicated on the switch drawing:

___ 15.5KV 110KV BIL 600A Dead break Apparatus Bushings per IEEE 386 Figure 11

___ 15.5KV 110KV BIL 200A Bushing Well per IEEE 386 Figure 3

2.5 VACUUM INTERRUPTER CONTROL & ACTUATOR CONTROL

An electronic control shall be provided to monitor load and fault current on all three phases of the interrupter. The current transformers encapsulated within the solid dielectric modules are used for current sensing. They are available with ratios of either 500:1 or 1000:1.

The magnetically actuated switches require power for normal operation. In the event power is not available on site, contact G&W about providing an integral control power transformer as part of the switch package.

G&W to supply an integral control package programmed to provide magnetic actuator open and close control.

2.6 PAD MOUNT ENCLOSURE

(Note to specifier: for pad mount applications only)

The enclosure shall be fabricated of 12 gauge galvanized steel and manufactured to ANSI C37.72 and C57.12.28 standards. The enclosure shall be tamper resistant incorporating hinged access doors with pentahead locking bolts and provisions for padlocking. The enclosure shall be provided with lifting provisions and painted with a Munsell 7.0GY3.29/1.5 green finish.

2.7 FACTORY PRODUCTION TESTS

Each interrupter shall undergo the following production testing. Test reports must be available upon request

- A mechanical operation check
- AC hi-pot tested one minute phase-to-phase, phase-to-ground and across the open contacts
- Circuit resistance shall be checked.
- Each solid dielectric module shall undergo an X-ray inspection and a partial discharge test to ensure void-free construction.
- Leak test to insure the integrity of all seals and gaskets
- Primary current injection test to test CTs, trip mechanism, and electronic control

2.8 STANDARD COMPONENTS

The following shall be included as standard:

- Welded stainless steel mechanism housing painted light gray with stainless steel and brass fasteners.
- Lifting provisions
- ½"-13 nuts to provide sufficient grounding provisions for interrupter and all cable entrances.
- Stainless steel three line diagram and corrosion-resistant nameplates.
- Switch operating handles with padlock provision.
- Removable parking stands
- Mounting bracket
- Operating handles

2.9 OPTIONS

(Choose as necessary for the application)

The following options shall be supplied:

- Mounting frame to bolt switch to the floor (specify galvanized or stainless steel construction. Specify height of lowest bushing)
- 4/0 brass ground lugs
- Two (2) Form C contacts for remote monitoring of the position of the vacuum bottle contacts.
- Integral capacitively coupled voltage sensing bushings for monitoring of analog voltage.
- Control power transformer (for applications where power is not available).
- 12-gauge stainless steel enclosure manufactured to ANSI C37.72 and C57.12.29 standards. The enclosure shall be tamper resistant incorporating hinged access doors with penta head locking bolts and provisions for padlocking. The enclosure shall be provided with lifting provisions and painted with a Munsell 7.0GY3.29/1.5 green finish.

2.10 LABELING

A. Hazard Alerting Signs

The exterior of the pad mount enclosure (if furnished) shall be provided with "Warning--Keep Out--Hazardous Voltage Inside--Can Shock, Burn, or Cause Death" signs. Each unit of switchgear shall be provided with a "Danger--Hazardous Voltage--Failure to Follow These Instructions Will Likely Cause Shock, Burn, or Death" sign. The text shall further indicate that operating personnel must know and obey the employer's work rules, know the hazards involved, and use proper protective equipment and tools to work on this equipment. Each unit of switchgear shall be provided with a "Danger--Keep Away--Hazardous Voltage--Will Shock, Burn, or Cause Death" sign.

B. Nameplates, Ratings Labels, and Connection Diagrams

Each unit of switchgear shall be provided with a nameplate indicating the manufacturer's name, catalog number, model number, date of manufacture, and serial number. Each unit of switchgear shall be provided with a ratings label indicating the following: voltage rating; main bus continuous rating; short-circuit rating; fault interrupter ratings including interrupting and duty-cycle fault-closing; and fault interrupter switch ratings including duty-cycle fault-closing and short-time.