



**SERIES G100 / G110
SPECIFICATION**

**15KV & 25KV
SUBMERSIBLE & VAULT MOUNTED
SF₆-INSULATED
VACUUM LOAD INTERRUPTING SWITCHES**

**MANUALLY OPERATED / REMOTELY OPERATED
DEAD FRONT SUBMERSIBLE AND VAULT MOUNTED SWITCHGEAR
WITH VACUUM LOAD-INTERRUPTING SWITCHES**

**FOR USE WITH SEPARABLE CONNECTORS FOR
15 KV / 95KV BIL AND 25 KV / 125KV BIL THREE-PHASE
ALTERNATING-CURRENT SYSTEMS**

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1. Scope

This specification applies to three-phase group operated 60 Hz subsurface load interrupting vacuum switches, SF₆-insulated with maximum ratings of 600A and 15.5kV or 27kV and utilizing separable insulated connectors.

2. Definitions

The definitions of terms contained in this specification, or in other standards referred to in this document, are not intended to embrace all the legitimate meanings of the terms. They are applicable only to the subject treated in this specification.

2.1 ANSI

American National Standards Institute

2.2 IEEE

Institute of Electrical and Electronic Engineers

2.3 AISI

American Iron and Steel Institute

2.4 Bus (As used in this specification)

A three-phase junction common to two or more ways

2.5 Subsurface Switch

A submersible switching assembly suitable for application in a below-grade enclosure that does not allow space for personnel access and is subject to flooding.

2.6 Surface Operable

A term indicating that the switch and its accessories are operable from above grade.

2.7 Vault Mounted

A term indicating the switch and its accessories are operable from floor level with all handles and elbows facing the operator.

2.8 Way

A three-phase circuit entrance to a switching assembly.

2.9 Switched Way

A way connected to the bus through a three-pole, gang operated switch.

2.10 Solid Tapped Way

A way solidly connected to the bus.

3. Construction Requirements

3.1 Electrical

The switch shall utilize vacuum interrupters having load and emergency fault break capabilities and shall have minimum life of 3,000 600A interruptions without changing insulation or replacing parts.

3.2 Bussing

All internal switch bussing shall be copper.

3.3 Grounding Provision

One stainless steel grounding pad with a 1/2" 13 NC hole, 7/16" (11.1 mm) deep, shall be provided for each way and shall be located near the center bushing of each way.

3.4 Ratings

Ratings for the Unit / System Voltage		
Load interruption arcing shall take place in a vacuum to keep insulation clean and system switching transients to a minimum.		
Nominal Voltage (Series)	15kV	25kV
Maximum Design Voltage	15.5kV	27kV
Device	Load Break Switch	Load Break Switch
BIL Phase-to-Phase, Phase-to-Ground	125kV	125kV
BIL Across Open Contacts	95kV	125kV
One Minute Withstand (60Hz)	34kV	40kV
Continuous Current	600A	600A
Load Switching	600A	600A
Load Switching Operations at Full Load	3,000	3,000
Maximum Interrupting Current (Symmetrical)	N/A	N/A
Number of Fault Interruptions (12.5kA)	N/A	N/A
Maximum Emergency 3-Time Interrupting (Symmetrical)	2,000A	2,000A
Momentary & Make and Latch (Asymmetrical)	20,000A	20,000A

N/A = Not Applicable

3.5 Tank Construction

- 3.5.1** The switch tank shall be made of AISI 304 Stainless steel completely welded using AISI 308 filler to maintain corrosion resistance properties.
- 3.5.2** All bushings and bushing wells to be welded to make them an integral part of the tank.
- 3.5.3** All tank penetrations shall be double o-ring sealed.
- 3.5.4** No external portion of the tank or accessories shall trap water.
- 3.5.5** Switch tanks shall be equipped with mounting provisions (such as feet or support rails) and shall include provision for anchoring the tank to the mounting stand.
- 3.5.6** Lifting provisions of AISI 304 stainless steel shall be welded to the tank so that the switch will remain level when being lifted. The provisions shall be designed and located to avoid interference between lifting slings and any attachments (bushings, switch handles, etc.).

3.5.7 Optional parking stands shall be provided and located to allow each way to be parked with a minimum elbow and cable movement distance. Some designs do not allow for a parking stand to be provided for every bushing or bushing well.

3.6 Mounting Stand

An optional mounting stand shall be made available to which the switch shall be bolted. The stand shall elevate the switch to a convenient operating height and shall be of hot-dip galvanized carbon steel or stainless steel.

4. Dielectric

SF₆ shall be provided as insulation. A color coded pressure gauge shall be provided with colors to indicate safe and unsafe operating pressures. A Dilo valve shall be provided to add SF₆ if required. A chart of temperature versus correct tank pressure for the temperature shall be provided near the pressure gauge.

5. Manual Operating Provisions

5.1 Manual operating handles shall move in to close and out to open. The direction of operation shall be apparent.

5.2 Manual operating handles shall be located where they can be operated either to open or to closed positions from the surface with standard live line tools and/or a lanyard. The force required to operate the handle shall be such that one man in a standing position can readily operate it without standing directly over the switch.

5.3 The switch mechanism shall be designed so that operation does not require any special skills, and the closing and opening speeds of the contacts are independent of the speed at which the operating handle is operated.

5.4 Manual operating handles shall be capable of being padlocked in both the open and closed positions.

6. Switch Operating Mechanism

6.1 The switch shall be equipped with an internal operating mechanism design so that speed of opening and closing of the interrupter contacts will be independent of the external operator. All contacts shall open or close simultaneously.

6.2 The switch shall be quick-make, quick-break type. Contacts shall be stable in open and closed positions without use of mechanical latches, sear pins, or detents.

7. Position Indicators

7.1 Switches shall be provided with position indicators or other suitable means that clearly and positively indicate the open and closed positions of the contacts.

7.2 The indicators shall be visible from the operating location.

8. Motor Operating Provisions

Provisions for motor operators shall be made available as an optional feature.

9. Terminations

The switch bushings shall accommodate cable terminations in accordance with ANSI/IEEE std 386-1977[3].

10. Bushing Designation

The switch bushings shall be identified and legibly marked adjacent to each bushing with the appropriate phase designation, using a nameplate of stainless steel or other corrosion resistant material.

11. Nameplate

11.1 A nameplate of stainless steel shall be provided.

11.2 The nameplate shall be tack welded securely to the top of the tank by means of AISI 308 stainless steel filler.

11.3 All letters, schematics, and numbers shall be photo engraved or stamped on the nameplate.

11.4 The nameplate shall contain at least the following information:

11.4.1 The word "switch"

11.4.2 Name of manufacturer

11.4.3 Date of manufacture (month and year, for example, 1-90)

11.4.4 Serial number

11.4.5 Model or style number

11.4.6 Rated maximum voltage

11.4.7 Rated impulse withstand voltage

11.4.8 Rated continuous current

11.4.9 Rated load interrupting current

11.4.10 Rated momentary current

11.4.11 Rated making current

11.4.12 A three-line bushing-oriented schematic diagram, using standard symbols (may be put on a separate nameplate)

11.4.13 Total weight (including insulating medium)

11.4.14 Type and quantity of insulating medium

12. Testing Requirements

12.1 Tank

The finished tank will be pressurized to 15 pounds per square inch and tested for leaks using suitable leak detection methodology.

12.2 Electrical

12.2.1 34kVAC hi-pot for 1 minute phase-to-phase, phase-to-ground, and across open contacts on all ways. Use 40kV on 27kV rated switches.

12.2.2 Continuity test all circuits.

12.2.3 Resistance test all circuits.

12.2.4 Test reports certifying the vacuum switch conforms to ANSI C37.71 Test Sequence Paragraph 5.1.5 shall be submitted.

13. Shipping Requirements

13.1 The switch shall be completely assembled, including the correct amount of insulating medium.

13.2 Switches shall be properly packaged and braced to prevent damage during shipment.

14. Documentation

Instructions and checklists for the inspection, installation, and maintenance of the switch shall be provided.

15. Standards

When the standards referred to in this document are superseded by a revision, the latest revision shall apply.

15.1 C37.71-1984 *ANSI Requirements for Three-Phase Manually Operated Subsurface Load-Interrupting Switches for Alternating-Current Systems*, or latest revision.

15.2 ANSI/IEEE std 386-1977, *Separable Insulated Connectors for Power Distribution Systems above 600V*, or latest revision.