SERIES 807
SPECIFICATION

15KV & 25KV PADMOUNTED LIQUID-INSULATED VACUUM LOAD INTERRUPTERS WITH DRYWELL ASSEMBLIES

MANUALLY OPERATED / REMOTELY OPERATED
DEAD FRONT PADMOUNTED SWITCHGEAR
WITH VACUUM LOAD INTERRUPTING SWITCHES
AND DRYWELL FUSES

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

TABLE OF CONTENTS

1. Scope

This specification applies to liquid-insulated 15kV and 25kV 60Hz class three-phase gang-operated padmounted load interrupting switches with maximum continuous ratings of 600A and drywell fuse assemblies with maximum continuous ratings of 50A for use on underground distribution systems utilizing dead front equipment.

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. Any documents or industry standards referred to shall be of the latest revision.

2.1 ASTM
American Society for Testing and Materials

2.2 ANSI
American National Standards Institute

2.3 IEEE
Institute of Electrical and Electronic Engineers

2.4 NEMA
National Electrical Manufacturers Association

2.5 IEC
International Electrotechnical Commission

2.6 AISI
American Iron and Steel Institute

2.7 Bus (as used in this specification)
A three-phase junction common to two or more ways

2.8 Dead Front Padmounted Switchgear
An assembly in which all energized parts are insulated and completely enclosed within a grounded shield system when separable connectors are in place

2.9 Way
A three-phase circuit entrance to a switching assembly

2.10 Switched Way
A way connected to the bus through a three-pole group operated switch

2.11 Tapped Way
A way solidly connected to the bus

2.12 Fused Way
A way connected to the bus through a drywell fuse assembly

3. Construction Requirements

3.1 Electrical

3.1.1 The switchgear shall be of total dead front design. All energized parts shall be sealed behind a welded ground plane to avoid the possibility of exposure to electrical shock when separable connectors are in place.

3.1.2 The load interrupter switch shall be a three-phase gang-operated device of a quick-make, quick-break design that operates at a speed independent of the speed of the external operating handle and shall utilize vacuum contacts rated at 600A continuous. The mechanism shall have a minimum life of 10,000 operations at a full 600A load without the need for service, replacements, or adjustments.

3.1.3 The fuse holders shall be liquid immersed holders mounted individually or in groups of two or three. The fuse holder shall be capable of accepting fuses from any US manufacturer intended for drywell applications up to and including 50A capacity. Full-range current limiting fuses, Combined Technologies (Cooper) type X Limiters and FX (KHT).

3.1.4 The visible disconnect device, when installed, shall be a three-phase two position gang-operated open-blade switch device of a quick-make, quick-break design that operates at a speed independent of the speed of the external operating handle and shall be rated at 600A continuous and 20,000A asymmetrical momentary, to be used in series with a load interrupter switch to establish a visible open on the circuit. The contacts of the visible disconnect device shall be clearly visible in the open and closed positions through a window located on the tank face adjacent to the operating handles. The operating handle of the visible disconnect device shall be externally interlocked with the operating handle of the load interrupter in such a manner as to prevent the visible disconnect device from performing load break operations The interlock shall be clearly visible to the operator for the purpose of confirming proper operation.

3.1.5 All internal bus shall be of copper bar or copper ribbon; no braid shall be used and no aluminum shall be used. All internal electrical clearances shall be a minimum of 2” to maintain a 125kV BIL rating for the bus work. All connections shall be double nut secured to maintain connection integrity.

3.2 Fusing

3.2.1 Fused ways shall be switched.

3.2.2 The fuse assembly shall be designed to eliminate the possibility of removing the fuse with the switch handle in the closed position. The design shall include a physical barrier that moves out of the fuse removal path with the opening of the switch handle.

3.2.3 Fused ways shall be available in single-, two-phase or three-phase groups.

3.3 Ratings

Ratings for the Unit/System Voltage	15kV	25kV
Nominal Voltage	15kV	25kV
Maximum Design Voltage	15.5kV	27kV
BIL Phase-to-Phase, Phase-to-Ground	95kV	125kV
BIL Across Open Contacts	95kV	150kV
One Minute Withstand (60Hz)	34kV	40kV
Continuous Current	600A	600A
Load Switching	600A	600A
Load Break Operations at Full Load	10,000	10,000
Maximum Interrupting Current (symmetrical) of a Fused Way (with current limiting fuses)	50kA	50kA
Maximum Three-Time Emergency Interrupting Rating	2000A	2000A
Momentary Make and Latch		
600A ways (asymmetrical)	20kA	20kA
200A ways (asymmetrical)	15kA	15kA

3.4 Tank Construction

3.4.1 The entire assembly shall be constructed of AISI type 304 stainless steel and shall be fully welded using AISI type 308 filler material to maintain the corrosion resistant properties. Bolted/gasketed tank assemblies will not be allowed.

3.4.2 The tank body shall be constructed with a minimum material thickness of AISI 7 ga.

3.4.3 All line-side bushings and bushing wells to be welded to make them an integral part of the tank.

3.4.4 Bushings shall be arranged to allow for easy cable training while maintaining a minimum 8” spacing between bushings.

3.4.5 The entire switch tank shall be hermetically sealed and be fully submersible with all tank penetrations being double o-ring sealed.

3.4.6 No external portion of the tank or its accessories shall trap water.

3.4.7 Lifting lugs shall be welded to the tank so that the switch will remain level when being lifted. Lifting lugs shall have a rounded contour to limit damage to lifting slings.

3.4.8 Parking stands shall be provided and located to allow each way to be parked with a minimum elbow and cable movement distance. (for parking stand dimensions, see ANSI C57.12.26-1975, Fig. 5[2])

3.4.9 One grounding provision with a ½″ 13 NC stainless steel nut, 7/16″ (11.1mm) deep, shall be provided for each way and shall be located to allow for easy access for grounding each way. The grounding provision shall be welded to the switch tank.

3.5 Enclosure Construction

3.5.1 The entire enclosure, consisting of bases and hoods OR cabinets with doors and lift-up tops, shall be constructed of AISI type 304 stainless steel and shall be welded using AISI type 308 filler material to maintain the corrosion resistant properties.

3.5.2 The enclosure bases or cabinets shall be constructed of a minimum material thickness of AISI 11ga. and enclosure hoods or lift-up tops shall be of a minimum material thickness of AISI 14ga.

3.5.3 The enclosure hoods or cabinet doors shall include a fully encased and padlockable Pentahead security bolt.

3.5.4 No external portion of the enclosure or its accessories shall trap water.

3.6 Paint

Because of the corrosion resistant nature of AISI type 304 stainless steel only the outside of the enclosure will be painted. Paint processes shall meet or exceed ANSI standard C57.12.28. Color shall be Munsell 7GY 3.29/1.5 Padmount Green unless otherwise specified.

4. Dielectric

4.1 Unit shall utilize a liquid dielectric to insulate all internal components. Load interruption shall take place in sealed vacuum contact bottles to protect the liquid insulation from exposure to arcing during load interruption.

4.2 Provisions for adding liquid insulation shall be provided by means of a one inch half coupling and provisions for draining or sampling shall be made available as an optional feature.

4.3 A liquid level indicating device shall be provided to positively identify a low liquid level condition. This device shall display, in white letters on a red background, the words “LOW OIL” when the liquid level drops below prescribed limits. This device shall be static with no moving parts and shall be unaffected by the environmental conditions for the life of the switchgear assembly.

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 Switch and visible disconnect device operating handles shall be designed to be easily operated with standard live line tools. The handles shall be of a channel shape and formed from AISI type 304 stainless steel, with the lower edge of sufficient width to support the hook end of standard live line tools, and assist in guiding the hook into the handle opening for live line tool operation. They shall be located where they can be operated either to open or to closed positions with standard live-line tools. The force required to operate the handle shall be such that one average-strength person in a standing position can readily operate it.

5.3 Switch and visible disconnect operating handles shall be capable of being padlocked in both the open and closed positions and shall be labeled to clearly indicate switch position.

6. Switch Operating Mechanisms

6.1 The switch and visible disconnect 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.

6.2 The switch and visible disconnect switch shall be of a gang-operated three-phase design so that all contacts of the three phases shall be operated simultaneously with no possibility of single phasing due to teasing of switch handle.

6.3 The switch and visible disconnect 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 Switch and visible disconnect switch handles shall act as position indicators that clearly and positively indicate the open and closed positions of the switch mechanisms. Nameplates of a corrosion resistant material shall be fixed to the switch tank adjacent to the operating handle to assist in identifying switch position.

7.2 Visible disconnect switch contact positions shall be clearly visible though a viewing window located near the operating handle.

8. Motor Operating Provisions

Provisions for motor operators is optional.

9. Terminations

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

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 securely welded to the tank.

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** Name of manufacturer
- **11.4.2** Date of manufacture (month and year, for example, 1-90)
- **11.4.3** Serial number
- **11.4.4** Model number or style number
- **11.4.5** Rated maximum voltage
- **11.4.6** Rated impulse withstand voltage
- **11.4.7** Rated continuous current
- **11.4.8** Rated load interrupting current
- **11.4.9** Rated momentary current
- **11.4.10** Rated making current
- **11.4.11** A three-line bushing-oriented schematic diagram, using standard symbols (this may be put on a separate nameplate)
- **11.4.12** Total weight (including insulating medium)
- **11.4.13** Type of insulating medium

12. Testing Requirements

12.1 Tank

The finished tank will be pressurized to 7 pounds per square inch using dry nitrogen and tested for leaks using suitable leak detection methodology.

12.2 Electrical

12.2.1 AC hipot for 1 minute phase-to-phase, phase-to-ground, and across open contacts on all ways at 34kV for 15kV equipment and 40kV for 25kV equipment

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 C37.72 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 fluid.

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.