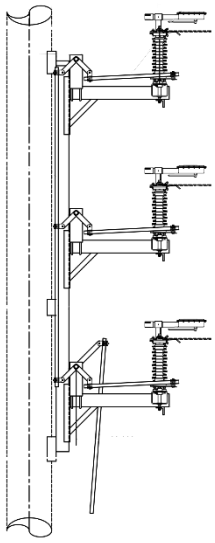
Overhead Distribution Switches, 27 kV, Gang-Operated, Vertical (Tiered Outboard)



1. Scope

This standard covers the requirements for 27 kV, overhead, three-phase, gang-operated, vertical (tiered outboard) loadbreak switches.

This standard applies to Seattle City Light (SCL) Stock No. 014163.

Horizontal and riser-style loadbreak switches are outside the scope of this standard. See SCL 4501.50.

2. Application

Overhead distribution switches are mounted on wood poles to break or pick up load, loop, and line charging current on the SCL 26.4 kV, looped radial distribution system.

Vertical (tiered outboard) loadbreak switches are used to replace KPF style switches installed in a triangle configuration in alleys where it is not possible to flat top the wire or the switches without creating a new trespass.

A taller pole will most likely be needed. Lines should deadend on the pole and jumper to the switch terminals.

Each switch comes with a tinned copper flat braid disconnect handle grounding jumper. If a replacement is needed, the jumper (Stock No. 014563) may be ordered separately.

3. Industry Standards

Overhead distribution switches shall meet the applicable requirements of the following industry standards:

ASTM A153-2016; Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware

IEEE 1247-2005; Interrupter Switches for Alternating Current, Rated Above 1000

IEEE C37.32-2002; High Voltage Switches, Bus Supports, and Accessories Schedules of Preferred Ratings, Construction Guidelines, and Specifications

IEEE C37.34-1994; Test Code for High-Voltage Air Switches

IEEE C37.37-1996; Loading Guide for AC High-Voltage Air Switches (in Excess of 1000 V)

4. Requirements

4.1 General

Complete switch assembly shall be integrally designed and produced. Manufacturer shall be solely responsible for the performance of the basic switch components as well as the complete integrated assembly.

4.2 Switch Ratings

Switches shall be distribution class as defined by IEEE C37.32.

Temperature rise tests shall be performed according to IEEE C37.32.

Switches shall have the following electrical ratings:

Continuous current, A, rms	1200
Voltage	
Nominal, kV, rms	25
Maximum, kV, rms	27
Number of phases	3
Power frequency, Hz	60
Lightning-impulse withstand voltage (BIL), kV, crest	170
Short-time (3 s) withstand current, kA, rms symmetrical	44
Momentary (10 cycles) withstand current, kA, rms symmetrical	70
Allowable Continuous Current Class (ACCC) designation, per IEEE C37.37	DO6

4.3 Interrupter Ratings

Interrupters shall be tested according to IEEE 1247.

Interrupters shall be vacuum bottle style.

Interrupters shall have the following electrical ratings:

Load current, A, rms	1500
Parallel current, A, rms	1500
Cable charging, A, rms	600
Magnetizing current, A, rms	600

4.4 Construction

Switches shall be designed for installation on wood poles with pole-top diameters ranging from 8 to 14 inches in diameter.

Switches shall be capable of ice breaking according to the requirements of IEEE C37.34, section 10. Ice thickness for ice tests shall be 3/4 in.

Switches shall be provided with four-hole terminal pads according to IEEE C37.32, figure 1.

Terminal pads shall be tinned copper, 99% conductive with a maximum surface roughness of 32 microinches, intended for use with aluminum or bronze connectors.

Insulators shall be silicone rubber, post type, with 3-in bolt circles, meeting the applicable requirements of ANSI/NEMA C29.9 for TR 208.

Lifting eyes or hoisting brackets shall be provided and clearly identified to allow safe installation.

Switches shall be operated by means of a reciprocating manual handle.

The switch bell crank shall be designed to withstand harsh environments.

Vertical control rod shall incorporate square fiberglass sections.

Switches shall be capable of being padlocked in both the open and the closed positions.

Each switch shall be supplied with sufficient operating mechanism, rods, guides, guide bearings, and couplings to allow the operating handle to be mounted (centerline of throw) 49 ft below the centerline of the steel mounting base (arm).

The operating rod shall be a combination of galvanized steel and square insulating fiberglass rod to meet the following criteria:

- The first 10 ft, which will be attached to the operating handle, shall be galvanized steel with a welded 3/8-in diameter steel eyelet with an open diameter of 1-1/2 in and pole mounted swing arm provision for attaching a secondary operating rod padlock in both the switch open and switch closed positions.
- The remaining upper sections (39 ft) shall be ultraviolet-inhibited, 1-3/4-in square fiberglass tube with Nexus Veil coating. Upper section BIL shall be 10,000 volts/inch minimum.

A tinned copper flat braid ground strap, 2/0 wire size, 36 inches long, with both 3/8-in and 1/2-in hole diameters, shall be provided for grounding the operating handle and lower galvanized steel rod section.

Switches shall be provided with a three-phase set of vacuum bottle interrupters.

4.5 Quality

Switches shall be of high-quality design and construction providing safe and reliable operation with minimal maintenance over the life of the product.

5. Documentation

One set of installation instructions, operating procedures, maintenance instructions, spare parts list, and outline drawings shall be securely attached to each switch in a waterproof, ultraviolet-light-resistant envelope.

6. Testing

Test data that establishes compliance with the requirements of the industry standards listed in Section 3 of this standard shall be provided upon request.

Test results shall be provided upon request.

7. Design Changes

Manufacturer shall inform SCL in writing of all design changes that could affect the understood or published capabilities of the product.

8. Marking

Switch crates shall be legibly and permanently marked with:

- Manufacturer name
- Manufacturer catalog number
- Product description
- Equipment serial number
- Seattle City Light stock number
- Seattle City Light purchase order number

Packages containing interrupters purchased separately shall be legibly marked with:

- Manufacturer name
- Manufacturer catalog number
- Product description
- Seattle City Light stock number

9. Packaging

Each switch shall be packaged in its own crate and delivered on its own pallet.

Pallet shall be designed for clearance and movement by either pallet jack or forklift.

The two openings for the pallet jack or forklift shall have a minimum vertical height of 4 inches and horizontal width of 21 inches.

Crate and pallet, including slates, blocking, and wedges, shall be unpainted wood.

Interrupter sets supplied with a switch shall be shipped uninstalled and packaged within the switch crate.

Interrupters purchased separately shall be individually packaged to prevent damage during shipping, inside storage, and casual handling prior to installation.

10. Shipping

Switches may be delivered on enclosed, covered, or flatbed trucks. If switches are delivered on a flatbed truck, switches shall be side-loaded. Because Washington State law requires a 10-inch minimum sideboard when driving a forklift or pallet jack onto the bed of a truck or trailer, most flatbed trucks or trailers must be side-loaded to ease off-loading.

11. Issuance

Stock unit: EA

12. Approved Manufacturers

Manufacturer:		Inertia Engineering
Catalog Number:		L21SVSB SCLS
where:		
L	=	LineBOSS unitized sidebreak line switch
2	=	25.8 kV voltage class
1	=	1200 A current rating (ANSI 30 degree C rise)
S	=	silicone rubber insulators (3.0 in BC)
V	=	vacuum bottle, AmpVac interrupter
S	=	galvanized steel crossarm
B	=	vertical (tiered outboard) mounting configuration
SCLS	=	Seattle City Light special, reciprocating manual handle, 1-3/4 inch square fiberglass control rod, interrupter shunts
Main Drawing:		9374-25-7 REV 01

13. References

SCL Material Standard 4501.50; “Overhead Distribution Switch, 27 kV Gang-Operated”

14. Sources

Shipek, John; SCL Standards Supervisor, originator, and subject matter expert for 4501.51 (john.shipek@seattle.gov)

Inertia Engineering Drawing No. 9374-25-7; 25kv 1200A Vertical Tiered Outboard AMPVAC 120" Galv Xarm Reciprocal Quad 1 Fiberglass Controls, Rev. 01, 09/16/2016