

**29 kV, Three-phase, SF6, Multi-purpose Switchgear,
 Manually Controlled**



1. Scope

This standard covers 29 kV, three-phase, SF6-insulated, multi-purpose, manually controlled switchgear and related accessories.

This standard applies to the following Seattle City Light (SCL) stock numbers:

# of Ways	Style		Fault Interrupting		Load Interrupting		Section
					Remote Low-Pressure Alarm Contacts (R-12 feature)		
			Yes	No	Yes	No	
2	Padmount	012673	–	–	–	–	10.1
2	Padmount	–	–	–	013490	–	10.2
3	Padmount	–	–	–	012846	–	10.3
3	Wet	–	–	013347	012707 ^a	–	10.4
4	Wet	–	–	–	012748	–	10.5
5	Padmount	–	–	–	012709	–	10.6
5	Wet	–	–	–	012706	–	10.7
6	Padmount	–	–	–	012708	–	10.8
6	Wet	–	–	–	012705	–	10.9

Note:
 a. No purchase

The overcurrent control adapter cables associated with this switchgear are described in Section 11.

John Shipek

John Shipek

Darnell Cola

2. Application

This switchgear is intended for use on 26.4 kV, 4-wire, three-phase, 60 Hz, solidly grounded, wye-connected systems where the available fault current is less than 25 kA rms symmetrical.

All switches are provided with viewing windows to observe open gaps, ground positions, ground bus, and fault trip indicators (if so equipped).

Refer to SCL 9202.17 for detailed application information.

3. Industry Standards

Except as modified by this standard, switchgear shall meet the applicable requirements of the latest revisions of:

IEEE C37.112; Standard Inverse-Time Characteristic Equations for Overcurrent Relays

IEEE 386; Standard for Separable Insulated Connector Systems for Power Distribution Systems above 600 V

IEEE C57.12.28; Switchgear & Transformers – Pad Mounted Equipment Enclosure Integrity

IEEE C37.74 – Standard Requirements for Subsurface, Vault, and Padmounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems up to 38 kV

IEC 298; Appendix AA – 1 - 52 kV A.C. Metal Enclosed Switchgear and Controlgear

4. Construction

4.1 General

The switchgear assembly shall be integrally designed and produced by the manufacturer of the individual switch components. Manufacturer shall be solely responsible for the performance of the individual switch components as well as the assembly.

Padmount-style switch cabinets shall be sized to accommodate the use of S&C Electric portable (remote) motor operators.

All switchgear components shall be factory assembled and tested.

4.2 Design Changes

The manufacturer shall inform SCL in writing of all design changes that could affect the understood or published capabilities of the switchgear.

4.3 Quality

Switchgear design and construction shall be high quality and provide safe and reliable operation with minimal maintenance over the life of the product.

4.4 Switch Ratings

Switchgear shall have the following basic electrical ratings:

Maximum voltage	29 kV, rms
Number of phases	3
Power frequency	60 Hz
Lightning-impulse withstand voltage (BIL)	125 kV, crest
Short-time (1 s) withstand current	25 kA, rms symmetrical
Momentary (10 cycles) withstand current	40 kA, rms asymmetrical

5. Nameplate

Each switch shall be provided with a nameplate that meets the requirements of IEEE C37.74.

Each switch shall be provided with a label that states the amount of SF6 gas (in pounds) contained within the unit's tank.

6. Documentation

One instruction book shall be securely attached to each switch in an ultraviolet light-resistant envelope.

Provision shall be made for SCL to obtain PDF files of all relevant, switch-specific documentation, such as the following:

- Installation instructions
 - Operation and maintenance instructions
 - Outline drawings
 - Wiring and schematic drawings
-

7. Packaging

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

The pallet shall be compatible with either a pallet jack or forklift.

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

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

The outside of each crate shall be permanently and clearly marked with:

- Manufacturer name or symbol
 - Seattle City Light purchase order number
 - Seattle City Light stock number
 - Manufacturer equipment serial number
-

8. Shipping

Switches may be delivered on enclosed, covered, or flatbed trucks. If switches are delivered on flatbed truck, switches shall be side-loaded. Because Washington State law requires a 10-in minimum side board 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.

9. Issuance

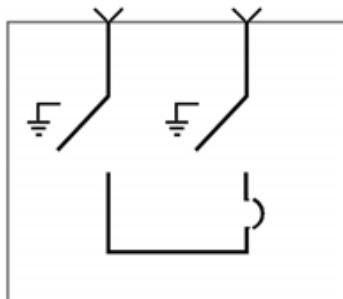
Stock Unit: EA

10. Detailed Requirements

10.1 2-Way, Padmount Style, Fault Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
012673	852113-L2-M1-O-P12-R31-S101 with one TA-3153
<i>where:</i>	
85 =	25 kA rms symmetrical short-circuit rating
211 =	Two-way, one load interrupting way, one fault interrupting way
3 =	29 kV voltage rating, maximum
L2 =	Potential indication with test feature with provision for low-voltage phasing
M1 =	600 A bushings without studs, at load-interrupter switch and bus terminals
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)
P12 =	Pad-mounted style, two-way unit, stainless steel outer enclosure, olive green finish
R31 =	External trip provisions, allows three-pole tripping of single-pole or three-pole fault interrupters via trip signal from a remote location or an external relay in addition to standard overcurrent control
TA-3153 =	Overcurrent control adapter cable accessory for field programming of overcurrent control, USB style
S101 =	6 inch stainless steel base spacer to accommodate Portable Motor Operators

Figure 10.1. 2-Way, Padmount Style, Fault Interrupting Switch



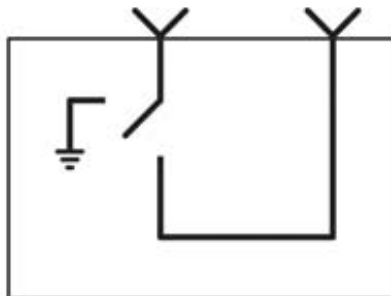
10.2 2-Way, Padmount Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
013490	852103-M1-P12-L2-O-R2-S102

where:

85 =	25 kA rms symmetrical short-circuit rating
210 =	Two-way, one load interrupting way, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
P12 =	Pad-mounted style, stainless steel outer enclosure and low-voltage compartment, olive green finish
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)
R2 =	Remote low-pressure alarm includes internal contact for remote low-pressure indication with wiring to outside of tank. Wires are terminated in an enclosure furnished with a terminal block for customer connections.
S102 =	6 inch stainless steel base spacer to accommodate Portable Motor Operators

Figure 10.2. 2-Way, Padmount Style, Load Interrupting Switch



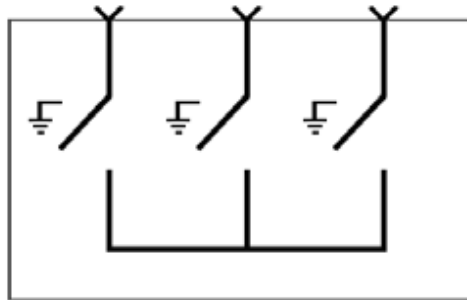
10.3 3-Way, Padmount Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
012846	853303-M1-P14-L2-O-S105

where:

85 =	25 kA rms symmetrical short-circuit rating
330 =	Three-way, three load interrupting ways, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
P14 =	Pad-mounted style, stainless steel outer enclosure and low-voltage compartment, olive green finish
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)
S105 =	6 inch stainless steel base spacer to accommodate Portable Motor Operators

Figure 10.3. 3-Way, Padmount Style, Load Interrupting Switch



10.4 3-Way, Wet Vault Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
013347	853303-M1-V4-L2-O-R12
012707 ^a	853303-M1-V4-L2-O

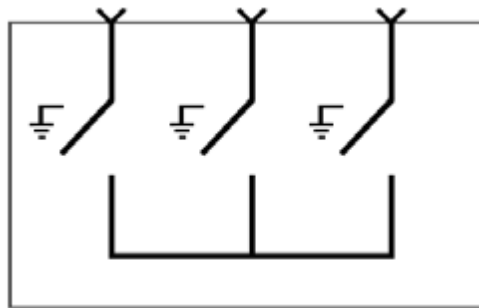
where:

85 =	25 kA rms symmetrical short-circuit rating
330 =	Three-way, three load interrupting ways, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
V4 =	Wet vault mounted style. Includes stainless steel tank and submersible wiring and control housings.
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)
R12 =	Remote low-pressure alarm. Includes internal contact for remote low-pressure indication, with wiring to outside of tank

Note:

a. No purchase

Figure 10.4. 3-Way, Wet Vault Style, Load Interrupting Switch



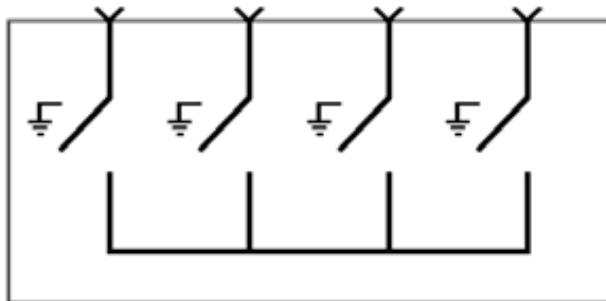
10.5 4-Way, Wet Vault Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
012748	854403-M1-V4-L2-O

where:

85 =	25 kA rms symmetrical short-circuit rating
440 =	Four-way, four load interrupting ways, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
V4 =	Wet vault mounted style. Includes stainless steel tank and submersible wiring and control housings.
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)

Figure 10.5. 4-Way, Wet Vault Style, Load Interrupting Switch



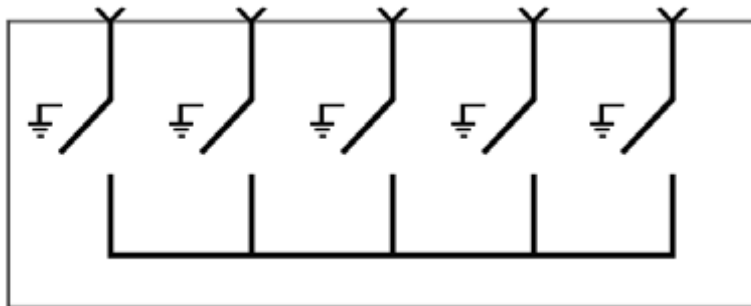
10.6 5-Way, Padmount Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
012709	855503-M1-P16-L2-O-S103

where:

85 =	25 kA rms symmetrical short-circuit rating
550 =	Five-way, five load interrupting ways, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
P16 =	Pad-mounted style, stainless steel outer enclosure and low-voltage compartment, olive green finish
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)
S103 =	6 inch stainless steel base spacer to accommodate Portable Motor Operators

Figure 10.6. 5-Way, Padmount Style, Load Interrupting Switch



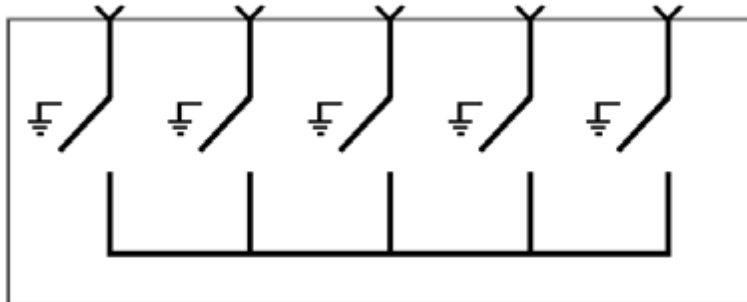
10.7 5-Way, Wet Vault Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
012706	855503-M1-V4-L2-O

where:

85 =	25 kA rms symmetrical short-circuit rating
550 =	Five-way, five load interrupting ways, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
V4 =	Wet vault mounted style. Includes stainless steel tank, submersible wiring and control housings
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)

Figure 10.7. 5-Way, Wet Vault Style, Load Interrupting Switch



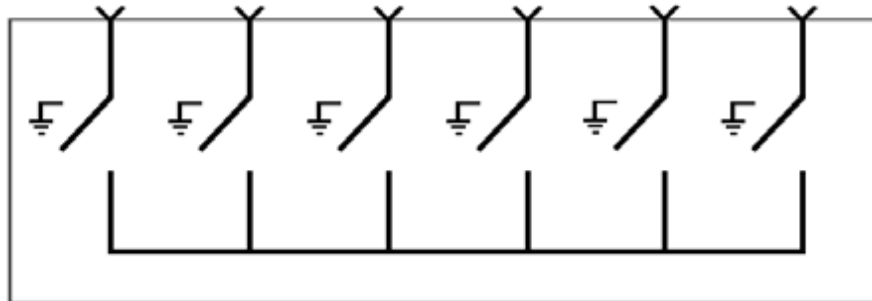
10.8 6-Way, Padmount Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
012708	856603-M1-P16-L2-O-S101

where:

85 =	25 kA rms symmetrical short-circuit rating
660 =	Six-way, six load interrupting ways, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
P16 =	Pad-mounted style, stainless steel outer enclosure and low-voltage compartment, olive green finish
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)
S101 =	6 inch stainless steel base spacer to accommodate Portable Motor Operators

Figure 10.8. 6-Way, Padmount Style, Load Interrupting Switch



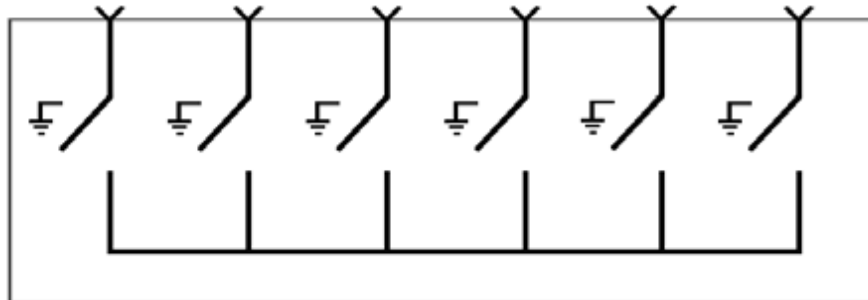
10.9 6-Way, Wet Vault Style, Load Interrupting Switch

Stock No.	S&C Electric Co. Vista Switch Catalog No.
012705	856603-M1-V4-L2-O

where:

85 =	25 kA rms symmetrical short-circuit rating
660 =	Six-way, six load interrupting ways, zero fault interrupting ways
3 =	29 kV voltage rating, maximum
M1 =	600 A bushings (without studs) at all terminals
V4 =	Wet vault mounted style. Includes stainless steel tank, submersible wiring and control housings
L2 =	Potential indication with test feature with provision for low-voltage phasing
O =	Two-hole ground pad, one per way, located below bushings or bushing wells (in lieu of standard one ground pad per tank)

Figure 10.9. 6-Way, Wet Vault Style, Load Interrupting Switch



11. Accessories

11.1 Overcurrent Control Adapter Cable, 9 Pin Style

Stock No.	S&C Electric Co. Catalog No.	Description
None ^a	TA-2367	Overcurrent control adapter cable with 9-pin connectors

Note:
a. Obtain from Relay Group

11.2 Overcurrent Control Adapter Cable, USB Style

Stock No.	S&C Electric Co. Catalog No.	Description
None ^a	TA-3153	Overcurrent control adapter cable with USB connectors

Note:
a. Obtain from Relay Group

12. References

SCL Design Standard 9202.17; "Vista Switch Application Guide"

13. Sources

S&C 681-31; Vista Underground Distribution Switchgear, Specification Bulletin, October 29, 2007; S&C Electric Company

SCL Material Standard 2501.65 (canceled); "29 kV, Three-Phase, SF6, Multi-Purpose, Distribution Switchgear, Manually Controlled"

Shetab, Muneer; SCL Standards Engineer and subject matter expert for 4501.65 (muneer.shetab@seattle.gov)

Shipek, John; SCL Standards Supervisor, subject matter expert, and originator of 4501.65 (john.shipek@seattle.gov)