

## Separable Connector, Bolted Type, Deadbreak, Cable Joint Parts and Kits, 600 A, 125 kV BIL



### 1. Scope

This standard covers the requirements for 125 kV BIL, 600 A, bolted, deadbreak, cable joint kits, straight cable-to-apparatus connector kits, insulating caps with bails, cable adapter retaining rings and special tools.

Connector systems of this type are known within Seattle City Light (SCL) as modular systems. Straight cable-to-apparatus connectors are sometimes referred to as SOB connectors, where SOB stands for straight-on-bushing.

Cable joint parts consist of housings, bolts, flat washers, Belleville washers, insulated bus bars, straight receptacle adapters, and cable adapter retaining rings.

Compression lugs and cable adapters are outside the scope of this standard, but are required to make a complete connection. For selection information, refer to SCL 6863.10 for 600 A compression connectors and SCL 6863.15 for 125 kV BIL cable adapters.

Jacket sealing and metallic shield adapters are also outside the scope of this standard. For more information regarding the installation of straight cable-to-apparatus connection kits, refer to SCL NSP-320 and SCL NSP-321.

This standard applies to the following SCL stock numbers:

Stock No.	Description	Page
687429	Housing kit	5
013075	3-way bus (only)	5
013076	4-way bus (only)	5
687430	H joint kit	5
687431	Y joint kit	6
687437	Straight cable-to-apparatus connector kit	6
014479	Spiking stem kit	6
687435	Insulating cap with bail	6
687604	Cable adapter retaining ring, #1 AWG compressed conductor	7
015114	Cable adapter retaining ring, 2/0 AWG compressed conductor	7
687606	Cable adapter retaining ring, 3/0 AWG compressed conductor	7
687610	Cable adapter retaining ring, 350 kcmil compact conductor	7
687612	Cable adapter retaining ring, 500 kcmil compressed conductor	7
687614	Cable adapter retaining ring, 750 kcmil compact conductor	7
687615	Cable adapter retaining ring, 1000 kcmil compressed conductor	8
687490	Assembly/disassembly tool	8
012856	Assembly/disassembly tool	8

## 2. Application

A bolted cable joint is a fully insulated and shielded system for terminating and electrically connecting an insulated power cable to electrical apparatus or other power cables.

Bolted cable joints are available in cable-to-apparatus (one way), straight (two-way), Y (three way), and H (four way) versions.

De-energized (and grounded) joints can be quickly and easily connected and disconnected using standard hand tools. Bus bars can be changed to add or remove cables from the joint. Note that when modifying an existing joint, jacket sealing and metallic shield adapter connections may need to be reworked.

Spiking stem kit, Stock No. 014479, provides a means to ground a modular cable joint without destroying the associated cable. Once used, the stem is easily replaced for future grounding activities.

The cable-to-apparatus connector specified in this standard has an IEEE 386 interface on one end and is designed to be operated in the same manner as 600 A, T-body, separable connector.

The connectors specified in this material standard are intended for use on the following three-phase, 60 Hz systems:

- 13.8 kV, 3-wire, delta, where load consists of network type transformers with delta-connected primary and grounded wye-connected secondary
- 26.4 kV, 4-wire, solidly-grounded, wye-connected

For cable technical data, refer to SCL 0525.04.

### 3. Industry Standards

Bolted cable joints shall meet the applicable requirements of **either one** of the following industry standards:

**IEEE 386-2016** – Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V

**IEEE 404-2012** – Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2500 V to 500 000 V

### 4. Detailed Requirements

Bushing interfaces shall meet the applicable requirements of IEEE 386 and have the following electrical ratings and attributes:

<b>Voltage class</b>	25 kV
<b>Maximum voltage rating (ph-g)</b>	8.3 kV RMS (delta systems) 15.2 kV RMS (grounded WYE systems)
<b>BIL</b>	125 kV crest
<b>Continuous current rating</b>	600 A RMS
<b>Short-time current rating</b>	25 kA RMS, symmetrical
<b>IEEE 386-2016 interfaces</b>	Figure 12 – Interface 19 (new to IEEE 386-2016) Figure 13 – Interface 11 (previously Figure 11 in IEEE 386-2006)

Bolted cable joints shall have the following electrical ratings and attributes:

<b>Voltage class</b>	25 kV
<b>Voltage rating (ph-ph)</b>	25 kV RMS (grounded WYE systems)
<b>Voltage rating (ph-g)</b>	15.2 kV RMS (grounded WYE systems)
<b>BIL</b>	125 kV crest
<b>Continuous current rating</b>	600 A RMS
<b>Short-time current rating</b>	25 kA RMS, symmetrical

**Bolted cable joint kits** (H or Y joint kits) shall include:

- Straight receptacle housings (quantity appropriate for number of ways)
- Insulated bus
- Bolts, flat washers, Belleville washers (quantity appropriate for number of ways)
- Silicone lubricant
- Vent rod
- Instruction sheet

**Spiking stem kits** shall include:

- Spiking stem assembly
- Housing
- Barrier bolt pack (one flat washer, one Belleville washer)
- Silicone lubricant
- Vent rod
- Adjustable clamp
- Instruction sheet

Each **insulated bus bar** shall be provided with a test point with cap.

**Straight cable-to-apparatus connector kits** shall include:

- Straight receptacle housing (with shipping cap each end)
- Bushing converter
- Contact adapter
- Brass bolt (5/8-11, specialized socket head)
- Loctite 271, thread locker, single application package
- Stainless steel bolt (5/8-11 x 1-1/2), flat washer, Belleville washer
- Silicone lubricant, single application package
- Vent rod
- Instruction sheet

**Cable adapter retaining rings** shall be marked with the intended conductor size or an application code (manufacturer shall provide Seattle City Light with a legend, if an application code is employed.) See Table 4.

**Table 4. Cable Adapter Retaining Ring Associated Conductor Size (by Cable Stock No.)**

<b>Cable Adapter Retaining Ring Stock No.</b>	<b>Description</b>	<b>Cable Stock No.</b>
687604	Cable adapter retaining ring, 1 AWG compressed conductor	613522
		613523
015114	Cable adapter retaining ring, 2/0 AWG compressed conductor	613520
687606	Cable adapter retaining ring, 3/0 AWG compressed conductor	613521
		613526
687610	Cable adapter retaining ring, 350 kcmil compact conductor	012099
		613530
		613543
		613613
687612	Cable adapter retaining ring, 500 kcmil compressed conductor	012735
		613645
687614	Cable adapter retaining ring, 750 kcmil compact conductor	012101
		602119
		613534
		613618
		623660
687615	Cable adapter retaining ring, 1000 kcmil compressed conductor	613655
		623670

## 5. Testing

Bushing interfaces shall be tested according to the requirements of IEEE 386, Section 7.

Bolted cable joints shall be tested according to the requirements of IEEE 386, Section 7, or IEEE 404, Section 7.

Test results shall be provided upon request.

## 6. Design Changes

Manufacturer shall inform Seattle City Light in writing of all design changes that could affect the product's understood or published capabilities.

## 7. Marking

Bushing interfaces shall be marked according to the requirements of IEEE 386, Section 6.1.

Bolted cable joints shall be marked according to the requirements of IEEE 386, Section 6.1, or IEEE 404, Section 6.1.

## 8. Packaging

Bolted cable joint parts and kits shall be individually packaged in heavy duty, clear plastic bags or cardboard boxes, as appropriate for their size and weight, to prevent damage and/or contamination during shipping, handling, and storage.

Each individual package shall be marked with the following information:

- Manufacturer identification
- Product description
- Each shipping container shall be legibly marked with the following information:
  - Manufacturer identification
  - Product description
  - Quantity contained
  - Seattle City Light Stock Number

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## 9. Issuance

Stock Unit: EA

## 10. Approved Manufacturers

<b>Stock Number:</b>	<b>687429</b>
<b>Description:</b>	<b>Housing kit</b> , includes bolt and washers
<b>Application:</b>	For adding a primary cable to an existing insulated bus with at least one unused way. Additional parts are required to complete the connection.
Richards Manufacturing Co.	P625JS1
Thomas & Betts (Elastimold)	K655Y-BSR



<b>Stock Number:</b>	<b>013075</b>
<b>Description:</b>	<b>3-way bus</b> (only)
<b>Application:</b>	For building a Y-joint when housings and bolt kits will be obtained elsewhere.
Richards Manufacturing Co.	P625JY0



<b>Stock Number:</b>	<b>013076</b>
<b>Description:</b>	<b>4-way bus</b> (only)
<b>Application:</b>	For building a H-joint when housings and bolt kits will be obtained elsewhere.
Richards Manufacturing Co.	P625JH0



<b>Stock Number:</b>	<b>687430</b>
<b>Description:</b>	<b>H joint kit</b>
<b>Application:</b>	For joining four primary cables through a single, insulated bus. Additional parts are required to complete the connection.
Richards Manufacturing Co.	P625JH2
Thomas & Betts (Elastimold)	K656CH-HP



<b>Stock Number:</b>	<b>687431</b>
<b>Description:</b>	<b>Y joint kit</b>
<b>Application:</b>	For joining three primary cables through a single, insulated bus. Additional parts are required to complete the connection.

Richards Manufacturing Co.	P625JY2
Thomas & Betts (Elastimold)	K656CY-HP



<b>Stock Number:</b>	<b>687437</b>
<b>Description:</b>	<b>Straight cable-to-apparatus connector kit</b>
<b>Application:</b>	For connecting primary cable inline to an IEEE 386, 600 A, apparatus bushing. Additional parts are required to complete the connection.

Richards Manufacturing Co.	P625SRA1
Thomas & Betts (Elastimold)	K655-BSR



<b>Stock Number:</b>	<b>014479</b>
<b>Description:</b>	<b>Spiking stem assembly</b>
<b>Application:</b>	For grounding a modular cable joint without destroying the associated cable.

Richards Manufacturing Co.	93DSSB1
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<b>Stock Number:</b>	<b>687435</b>
<b>Description:</b>	<b>Insulating cap, with bail</b>
<b>Application:</b>	An accessory device designed to electrically insulate, electrically shield, and mechanically seal an unused way of an insulated bus.

Richards Manufacturing Co.	P625JIC
Thomas & Betts (Elastimold)	K655YDR



<b>Stock Number:</b>	<b>687604</b>
<b>Description:</b>	<b>Cable adapter retaining ring</b>
<b>Application:</b>	To secure the cable adapter within a bolted cable joint. For #1 AWG compressed conductor.
Richards Manufacturing Co.	P6JR-8
Thomas & Betts (Elastimold)	650ARR-230 ( <i>part stamped 10</i> )



<b>Stock Number:</b>	<b>015114</b>
<b>Description:</b>	<b>Cable adapter retaining ring</b>
<b>Application:</b>	To secure the cable adapter within a bolted cable joint. For 2/0 AWG compressed conductor.
Richards Manufacturing Co.	P6JR-10
Thomas & Betts (Elastimold)	650ARR-250

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<b>Stock Number:</b>	<b>687606</b>
<b>Description:</b>	<b>Cable adapter retaining ring</b>
<b>Application:</b>	To secure the cable adapter within a bolted cable joint. For 3/0 AWG compressed conductor.
Richards Manufacturing Co.	P6JR-11
Thomas & Betts (Elastimold)	650ARR-260 ( <i>part stamped 1</i> )



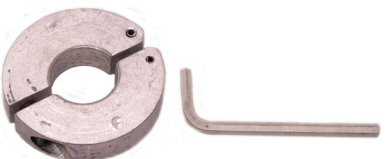
<b>Stock Number:</b>	<b>687610</b>
<b>Description:</b>	<b>Cable adapter retaining ring</b>
<b>Application:</b>	To secure the cable adapter within a bolted cable joint. For 350 kcmil compact conductor.
Richards Manufacturing Co.	P6JR-14
Thomas & Betts (Elastimold)	650ARR-290 ( <i>part stamped 3</i> )



<b>Stock Number:</b>	<b>687612</b>
<b>Description:</b>	<b>Cable adapter retaining ring</b>
<b>Application:</b>	To secure the cable adapter within a bolted cable joint. For 500 kcmil compressed conductor.
Richards Manufacturing Co.	P6JR-17
Thomas & Betts (Elastimold)	650ARR-330 ( <i>part stamped 5</i> )



<b>Stock Number:</b>	<b>687614</b>
<b>Description:</b>	<b>Cable adapter retaining ring</b>
<b>Application:</b>	To secure the cable adapter within a bolted cable joint. For 750 kcmil compact conductor.
Richards Manufacturing Co.	P6JR-21
Thomas & Betts (Elastimold)	650ARR-360 ( <i>part stamped 6</i> )





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<b>Stock Number:</b>	<b>687615</b>
<b>Description:</b>	<b>Cable adapter retaining ring</b>
<b>Application:</b>	To secure the cable adapter within a bolted cable joint. For 1000 kcmil compressed conductor.
Richards Manufacturing Co.	P6JR-28
Thomas & Betts (Elastimold)	650ARR-410 ( <i>part stamped 8</i> )

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<b>Stock Number:</b>	<b>687490</b>
<b>Description:</b>	<b>Assembly/disassembly tool, lever drive type</b>
<b>Application:</b>	Recommended for ease of assembly/disassembly of receptacle to insulated bus bar.
Thomas & Betts (Elastimold)	600YADT

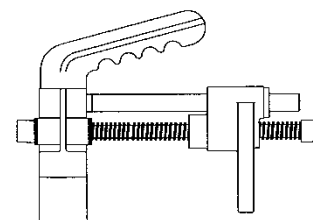
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<b>Stock Number:</b>	<b>012856</b>
<b>Description:</b>	<b>Assembly/disassembly tool, worm gear type</b>
<b>Application:</b>	Recommended for ease of assembly/disassembly of receptacle to insulated bus bar.
Richards Manufacturing Co.	P6JAT3

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## 11. References

**SCL Construction Guideline NSP-320**; “Deadbreak Straight Line Connector 600 Amp, 13 kV and 26 kV”

**SCL Construction Guideline NSP-321**; “25 kV 600 Amp, Straight Receptacle Installation Instructions”

**SCL Material Standard 6863.10**; “Compression Connectors, All-Aluminum Type”

**SCL Material Standard 6863.15**; “Separable Connector, Deadbreak, Dielectric Components, 125 kV BIL”

**SCL Work Practice 0525.04**; “Properties of Medium Voltage Cables”

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## 12. Sources

**PG-CA-0506**; Cable Accessories for 5 kV-35 kV Distribution Systems, Product Selection Guide; Thomas & Betts (Elastimold)

**Shipek, John**; SCL Standards Supervisor and originator of 6863.16

**Richards Manufacturing Co.**; Installation Instructions, Spiking Stem, 93DSS, RP-II93DSSC[C]