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## Overhead Jumpers, Fused Cutout

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### 1. Scope

This standard covers the information necessary to install fused jumpers on the 26 kV primary distribution system. Requirements for jumper size and hardware, and installation instructions to connect the jumpers between conductors, are included.

Fused jumpers for transformers are outside the scope of this standard and can be found in the transformer installation standards.

For unfused overhead jumpers, refer to SCL 0100.21 and SCL 0100.23.

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### 2. Application

This standard provides direction to Seattle City Light (SCL) engineers, crews and contractors for the installation of fused jumpers on 26 kV distribution primary conductors (#4 AWG copper, 397.5 kcmil ACSR and 954 kcmil ACSR).

Fused jumpers, which are also referred to as fused taps or sectionalizers, are used to connect feeders to a lateral or to feed a transformer.

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### 3. General Requirements

Jumper conductors at structures shall not limit the ampacity of the main line and will use a minimum conductor size of the smaller of the two conductors.

The 65K fuse and D limiter are sized to accommodate the average load on an SCL lateral.

Long jumpers or jumpers with a large radius shall use insulators to maintain clearances. For the SCL 26 kV system, jumpers shall maintain a minimum 24-inch clearance from the center of the pole. The jumper shall also maintain a minimum of 7.3 inches from another phase of the same circuit, or 12.9 inches from another phase of a different circuit.

For three-phase taps, a copper bar adapter shall be installed between the cutout and limiter to achieve an angle in which the limiter is parallel with the tap conductor.

When connecting dissimilar metals, the proper wedge connector or stirrup shall be used.

The jumpers may come in two phasing configurations. The normal configuration is 123-123 and the alternate configuration is 123-321.

Two-phase jumpers shall be constructed as three-phase jumpers without the center phase.

Single-phase deadend laterals pole-mounted under three-phase, multi-gain structures shall be mounted on poles a minimum of 55 feet tall. See figures 3g, 3h, 3i, and 3j.

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Single-phase deadend laterals pole-mounted under single-phase, multi-gain structures shall be mounted on poles a minimum of 50 feet tall. See figures 3k and 3l.

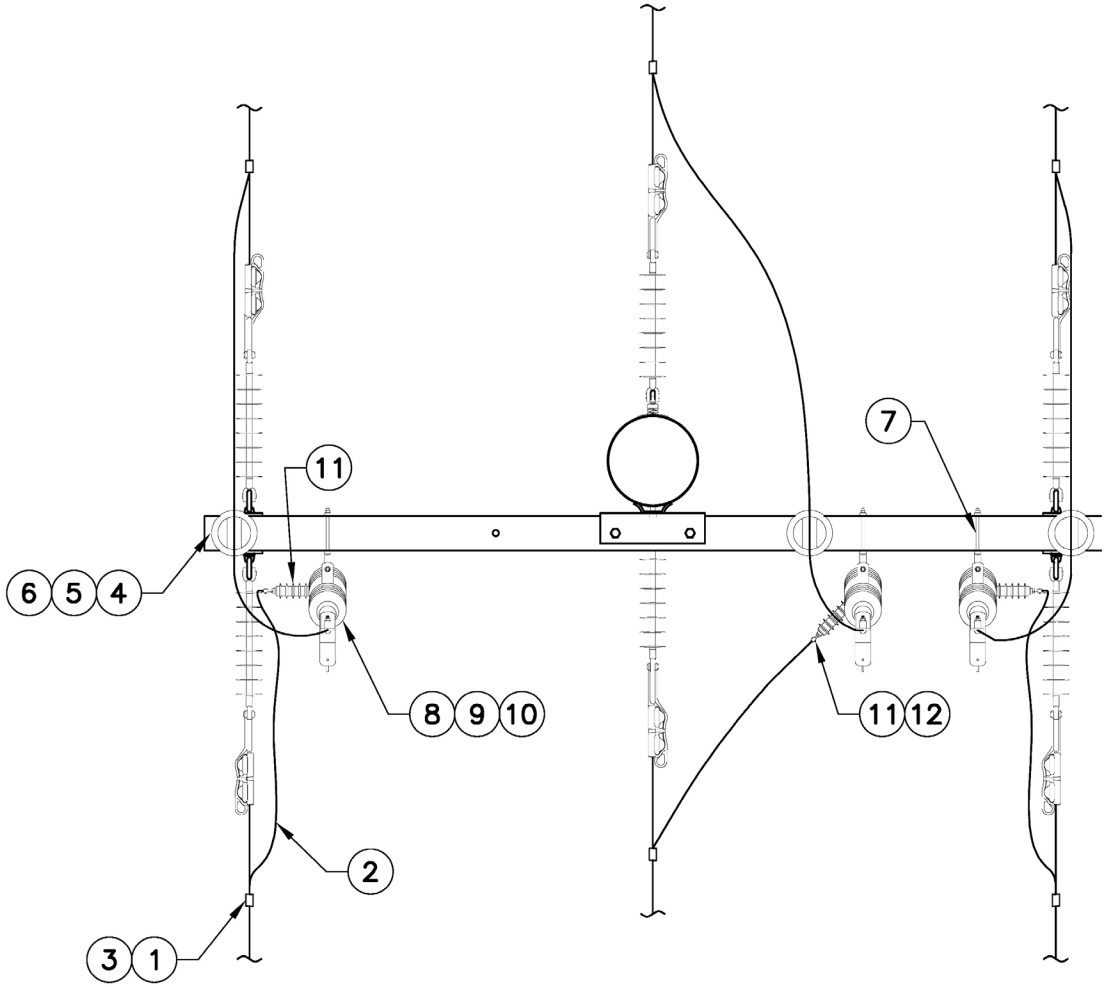
Note: polymer insulators used for deadends are not part of the compatible unit (CU) material list for jumpers and fused cutouts. See SCL 0121.05 and 0123.05.

Use Table 3 to determine the proper jumper to use. The jumper shall be constructed as shown in the figures referenced.

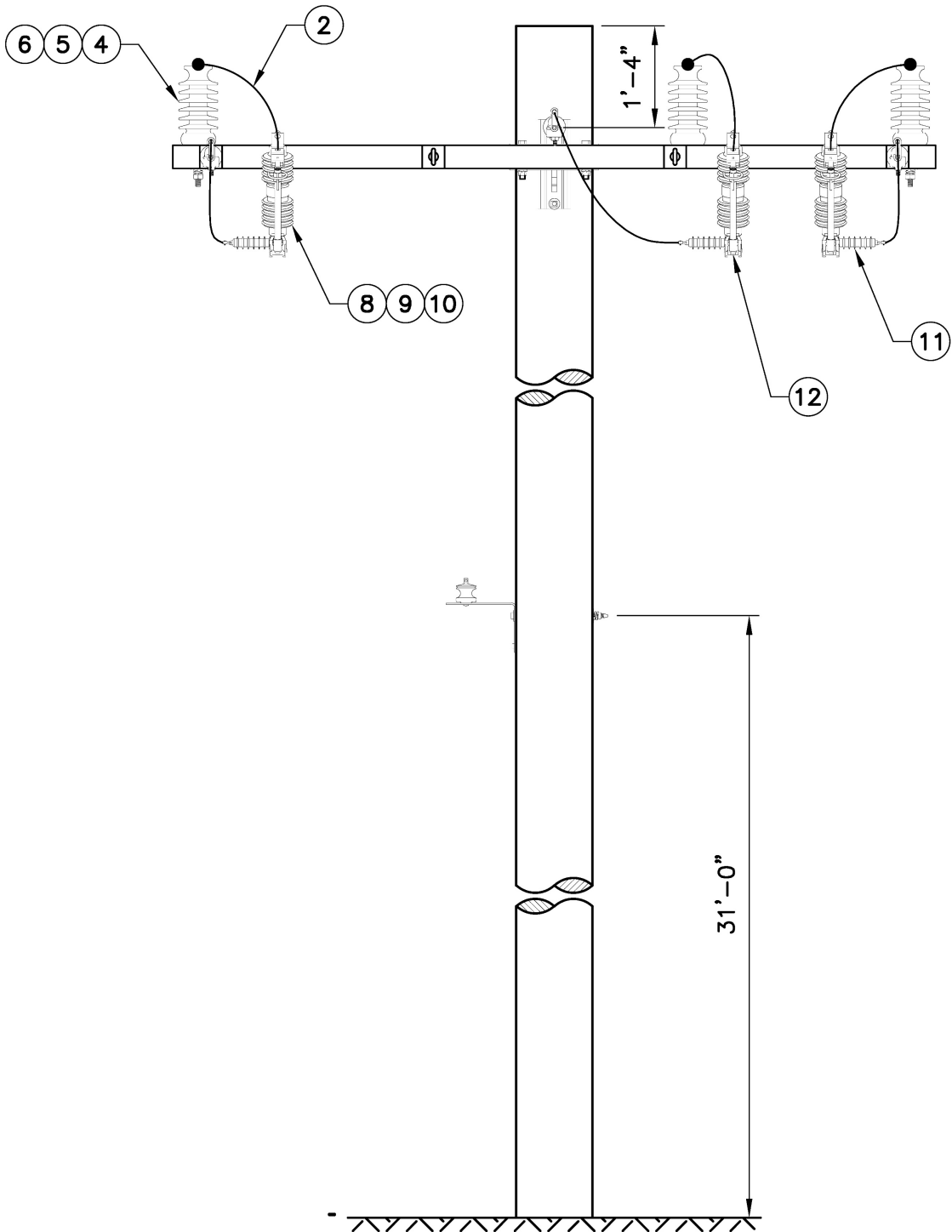
**Table 3. Fused Cutout Jumpers**

Phase	Type	Gain	Angle	Figures
3 to 3	Deadend to Deadend	1 or 2	0-180°	3a, 3b, 3c, 3d
3 to 3	Tangent to Deadend	2	0-120°	3e, 3f
3 to 1	Deadend to Deadend	1	All	3g, 3h
3 to 1	Tangent to Deadend	2	All	3i, 3j
1 to 1	Tangent/Deadend to Tangent/Deadend	2	All	3k, 3l, 3m, 3n
1 to 1	Tangent/Deadend Termination	1	None	None

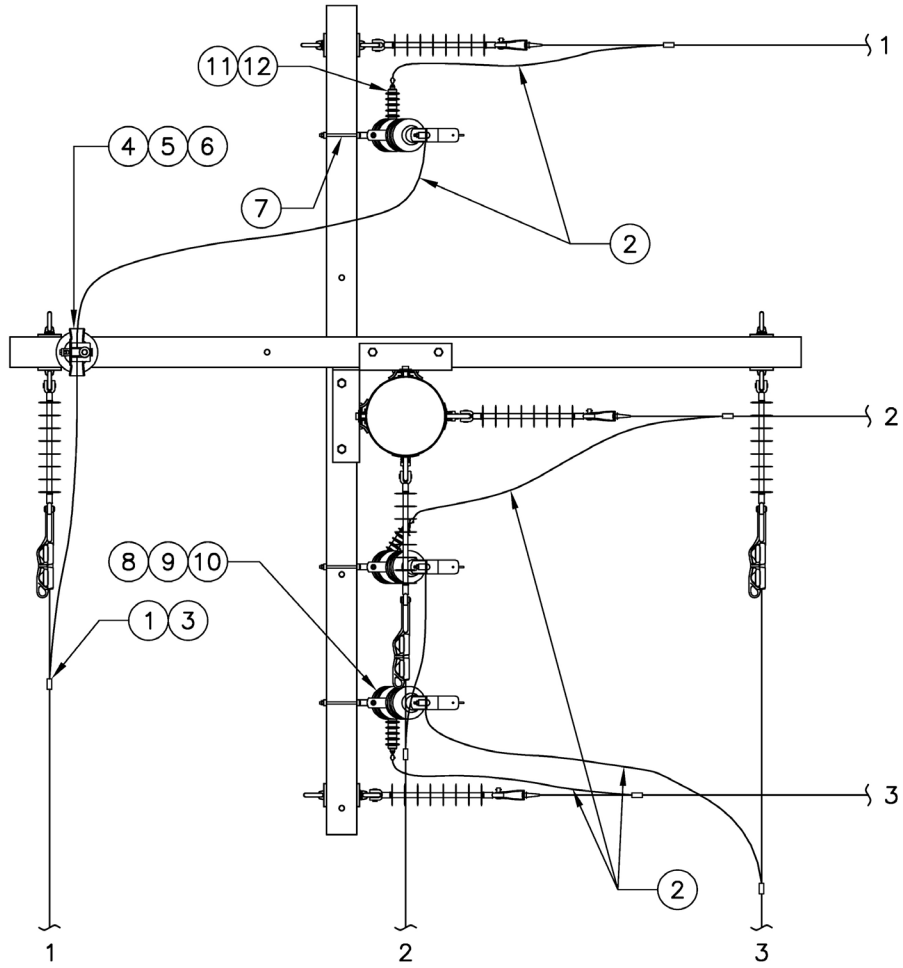
**Figure 3a. Three-Phase, Single Gain Double Deadend Fused Cutout Jumper, Top View**



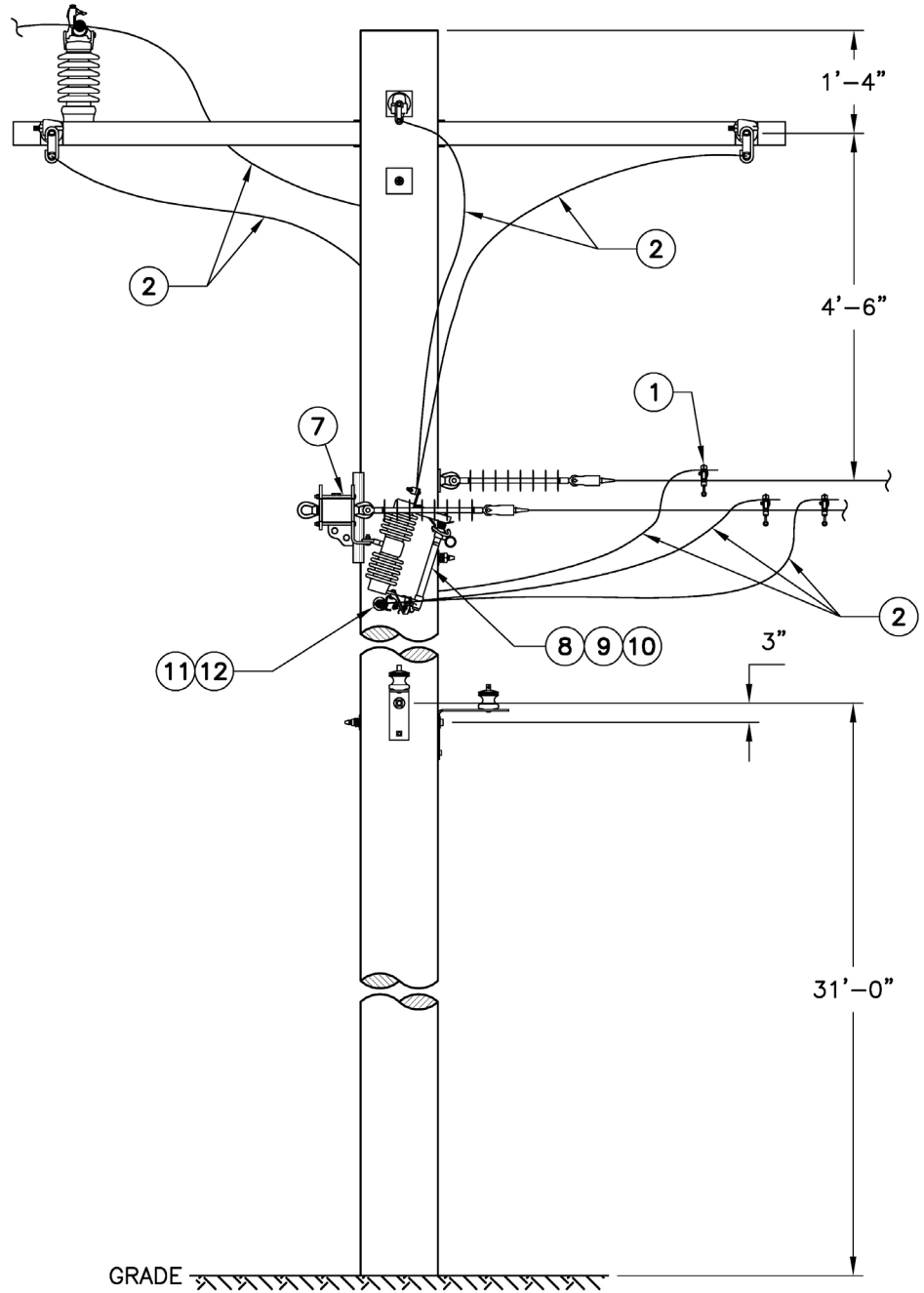
**Figure 3b. Three-Phase Single Gain Double Deadend Fused Cutout Jumper, Side View**



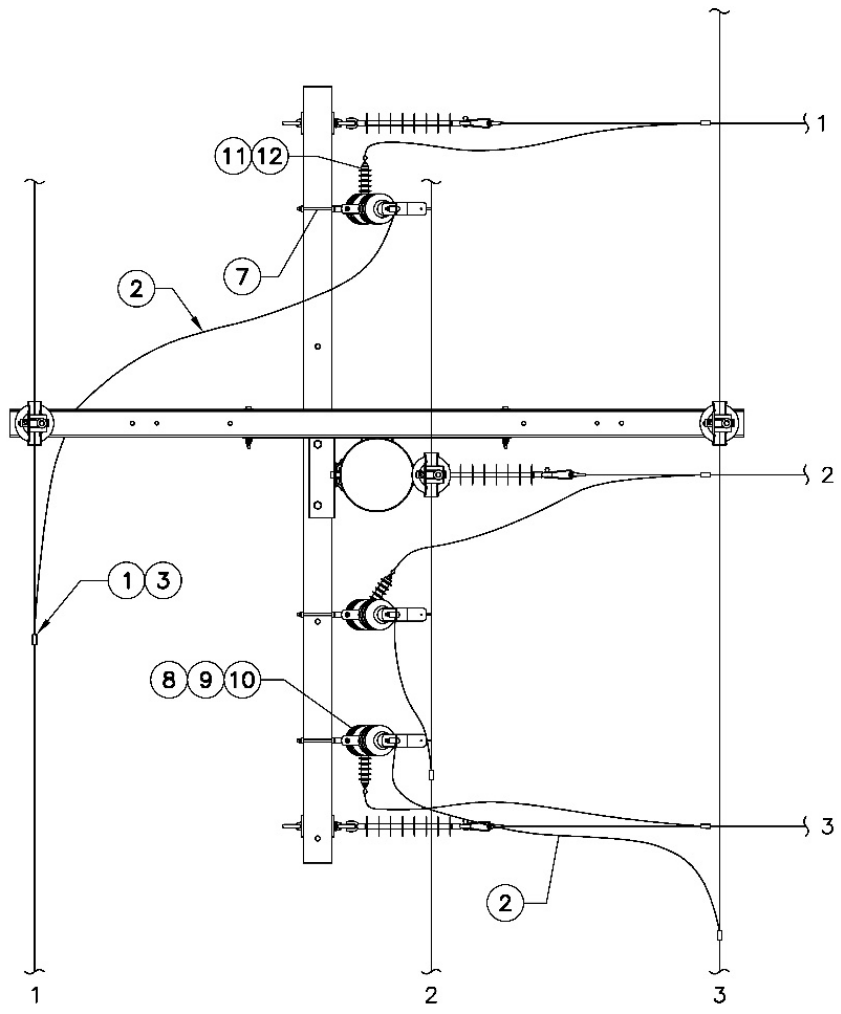
**Figure 3c. Three-Phase Multi-Gain Deadend to Three-Phase Deadend Fused Cutout Jumper, Top View**



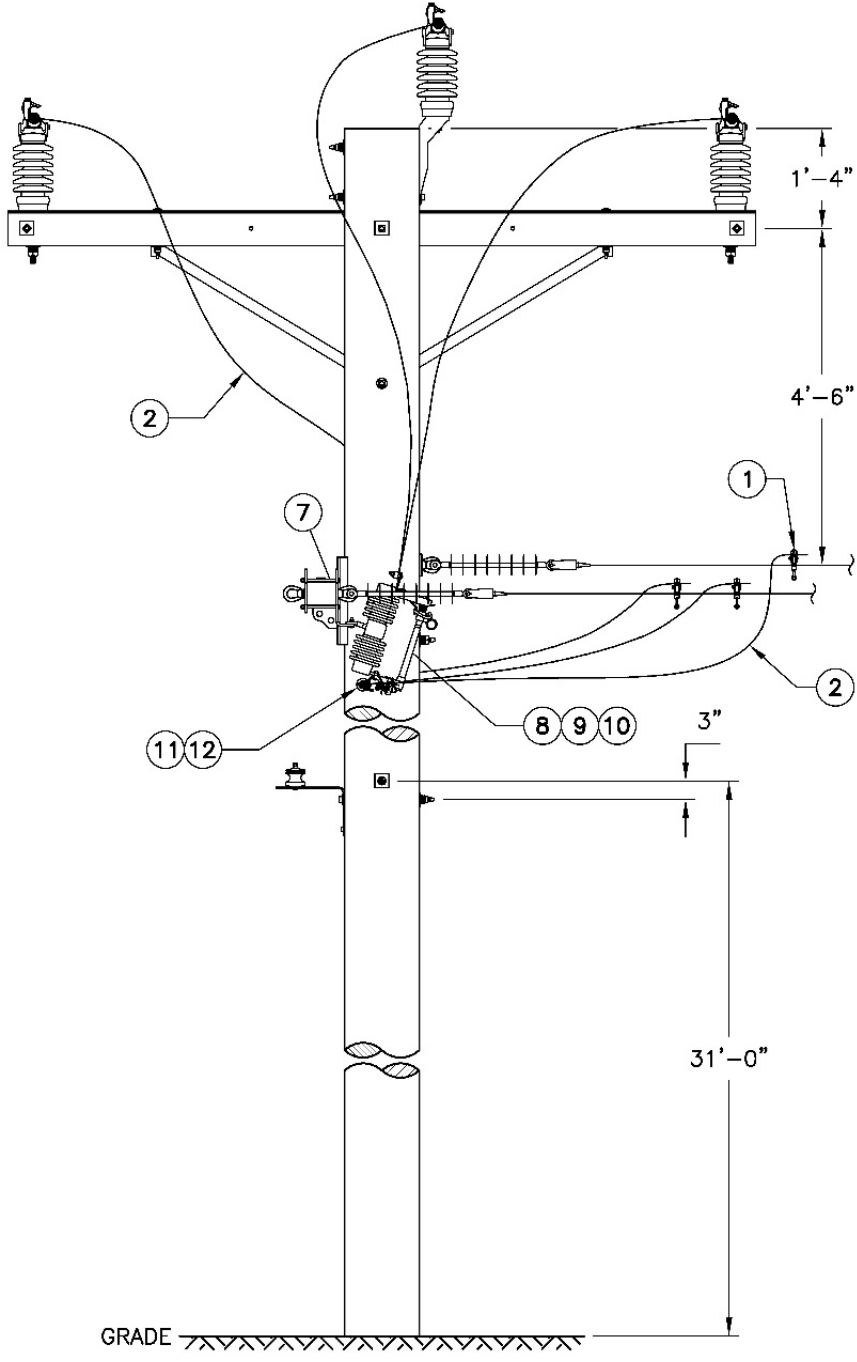
**Figure 3d. Three-Phase Multi-Gain Deadend to Three-Phase Deadend Fused Cutout Jumper, Side View**



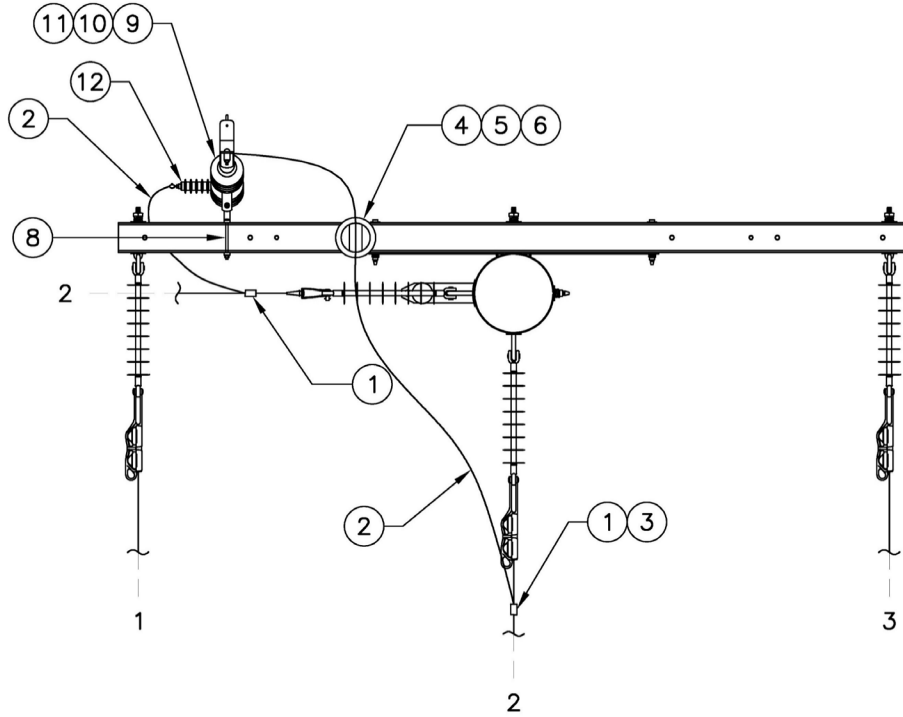
**Figure 3e. Three-Phase Multi-Gain Tangent to Three-Phase Deadend Fused Cutout Jumper, Top View**



**Figure 3f. Three-Phase Multi-Gain Tangent to Three-Phase Deadend Fused Cutout Jumper, Side View**

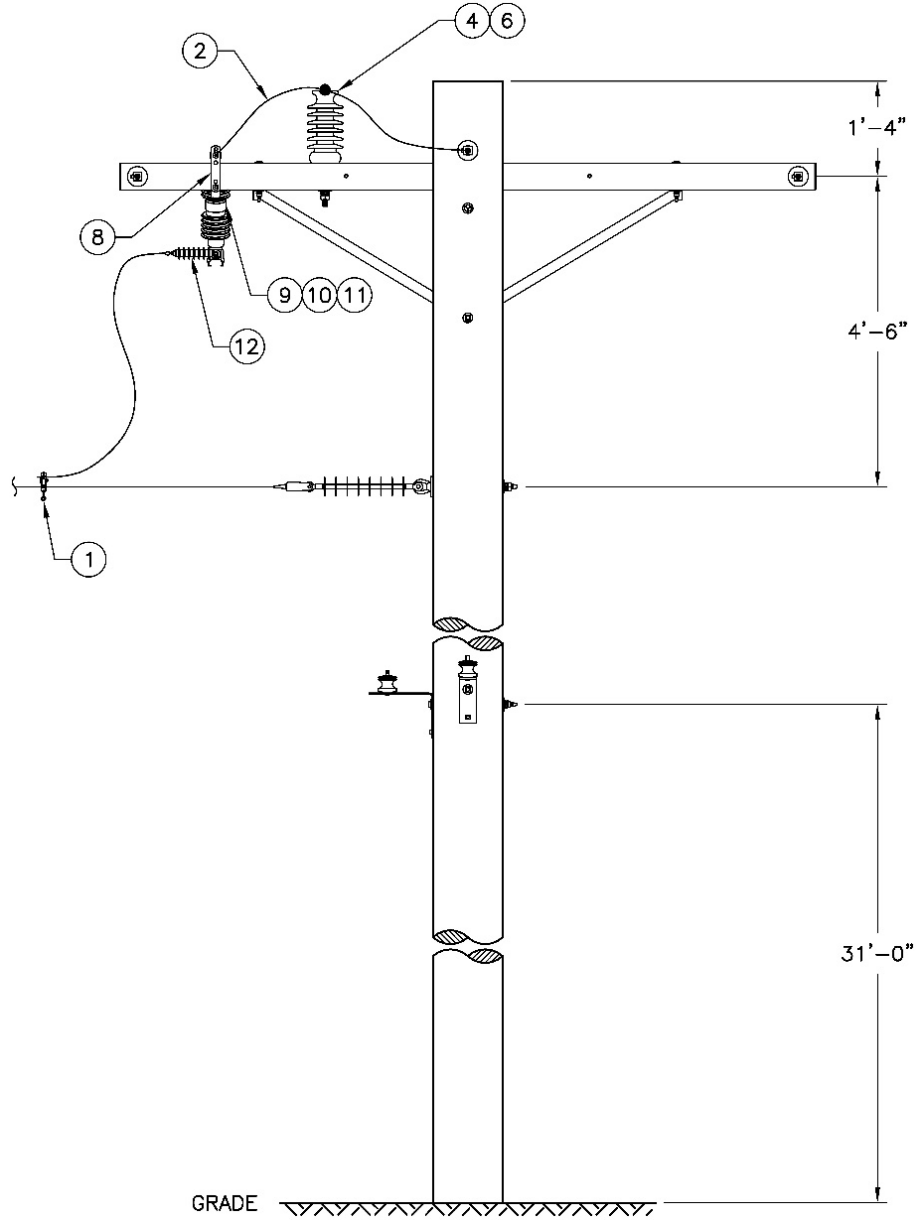


**Figure 3g. Three-Phase Multi-Gain Deadend to Single-Phase Deadend Lateral on Pole and its Cutout, Crossarm-Mounted, Top View**

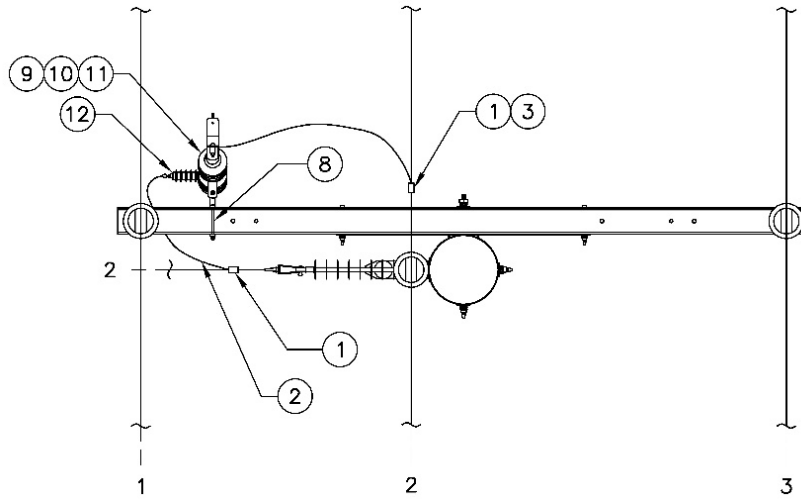




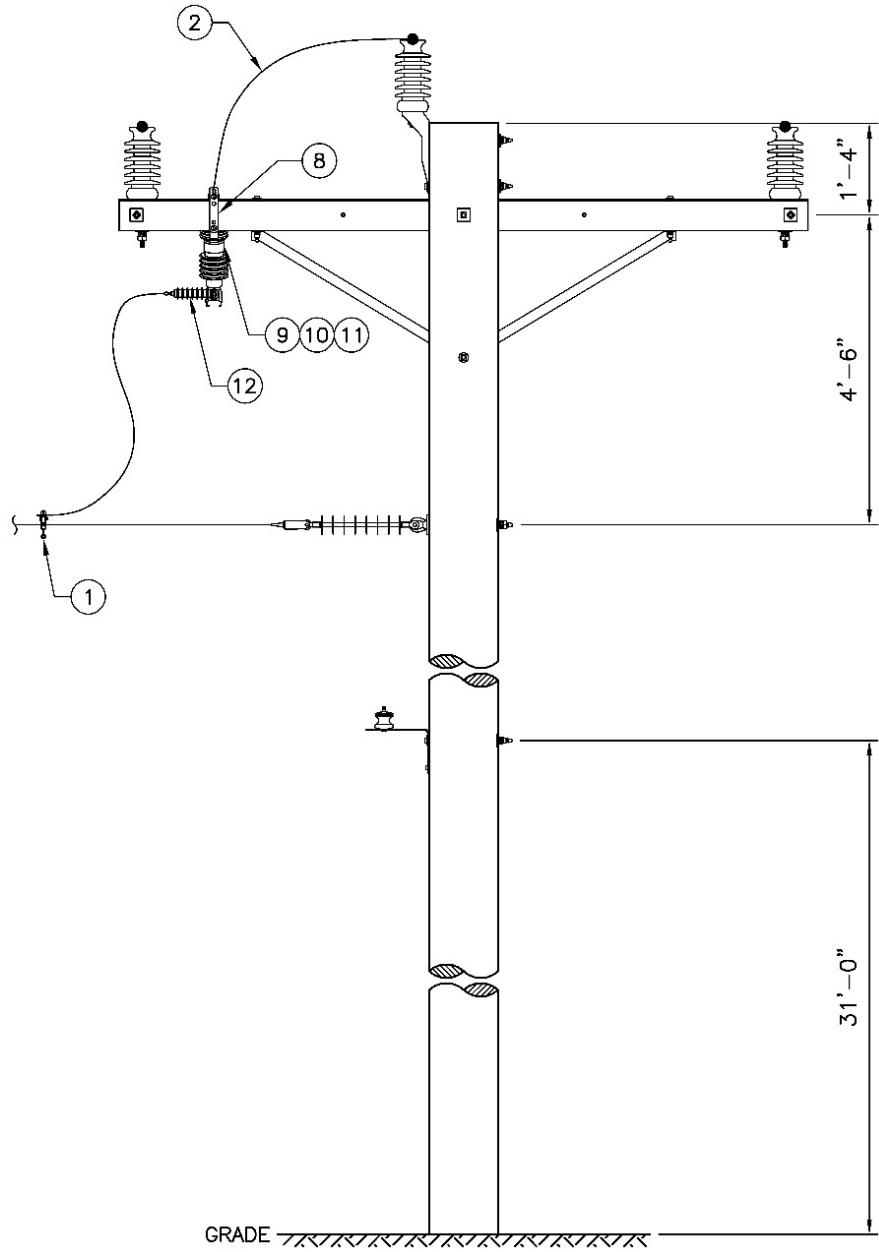
**Figure 3h. Three-Phase Multi-Gain Deadend to Single-Phase Deadend Lateral on Pole and its Cutout, Crossarm-Mounted, Side View**



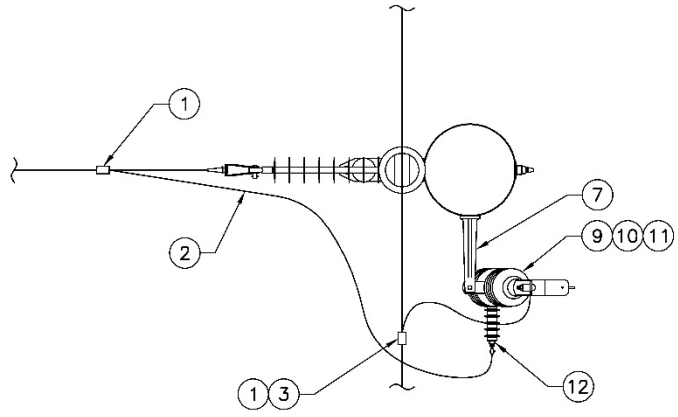
**Figure 3i. Three-Phase Tangent to Single-Phase Deadend Lateral on Pole and its Cutout, Crossarm-Mounted, Top View**



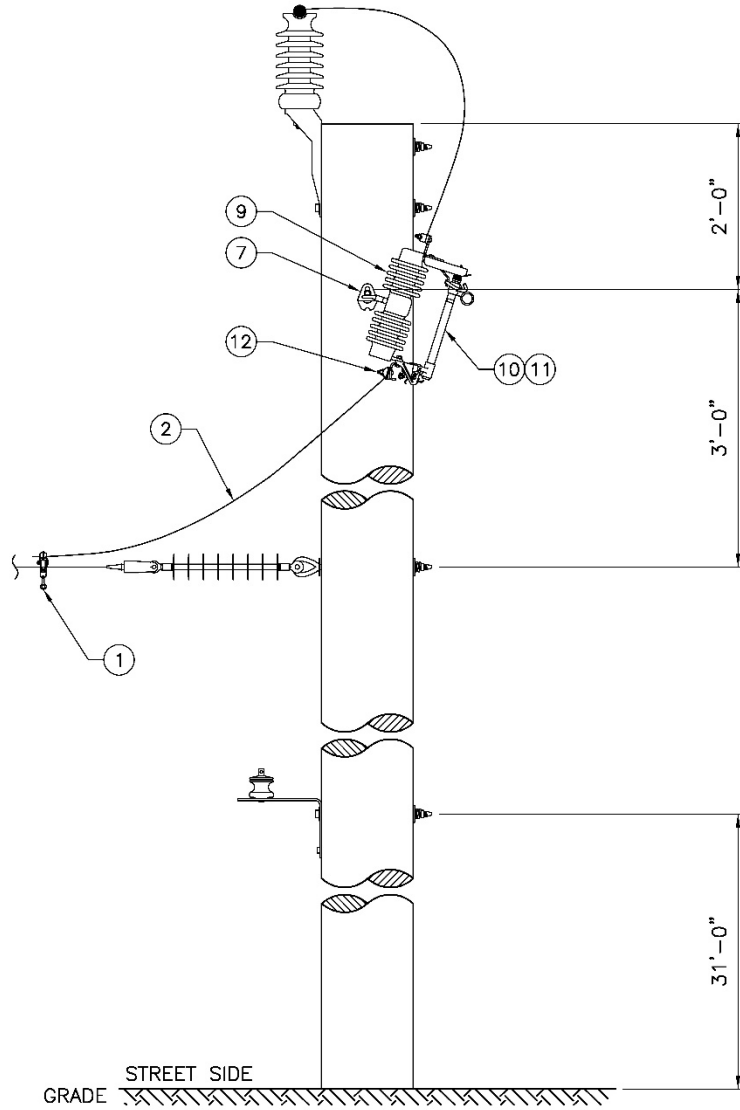
**Figure 3j. Three-Phase Multi-Gain Tangent to Single-Phase, Deadend Lateral on Pole and its Cutout, Crossarm-Mounted, Side View**



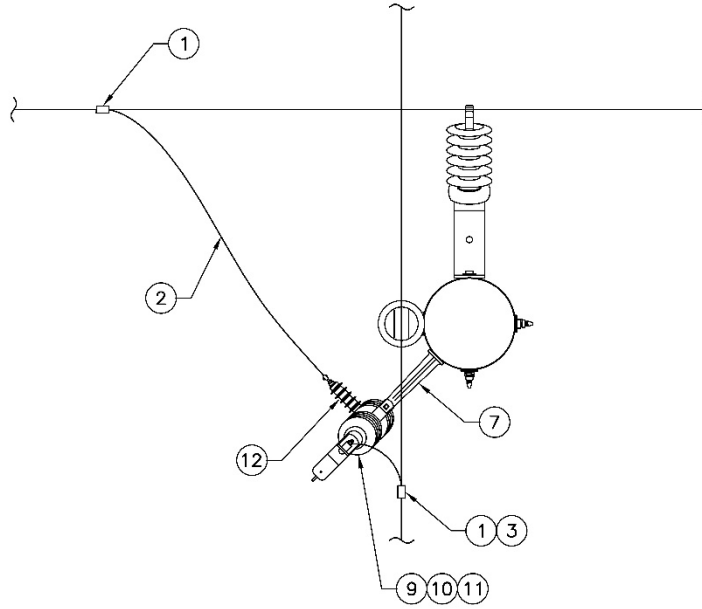
**Figure 3k. Single-Phase Multi-Gain Tangent to Single-Phase, Deadend Lateral Fused Cutout Jumper, Pole-Mounted, Top View**



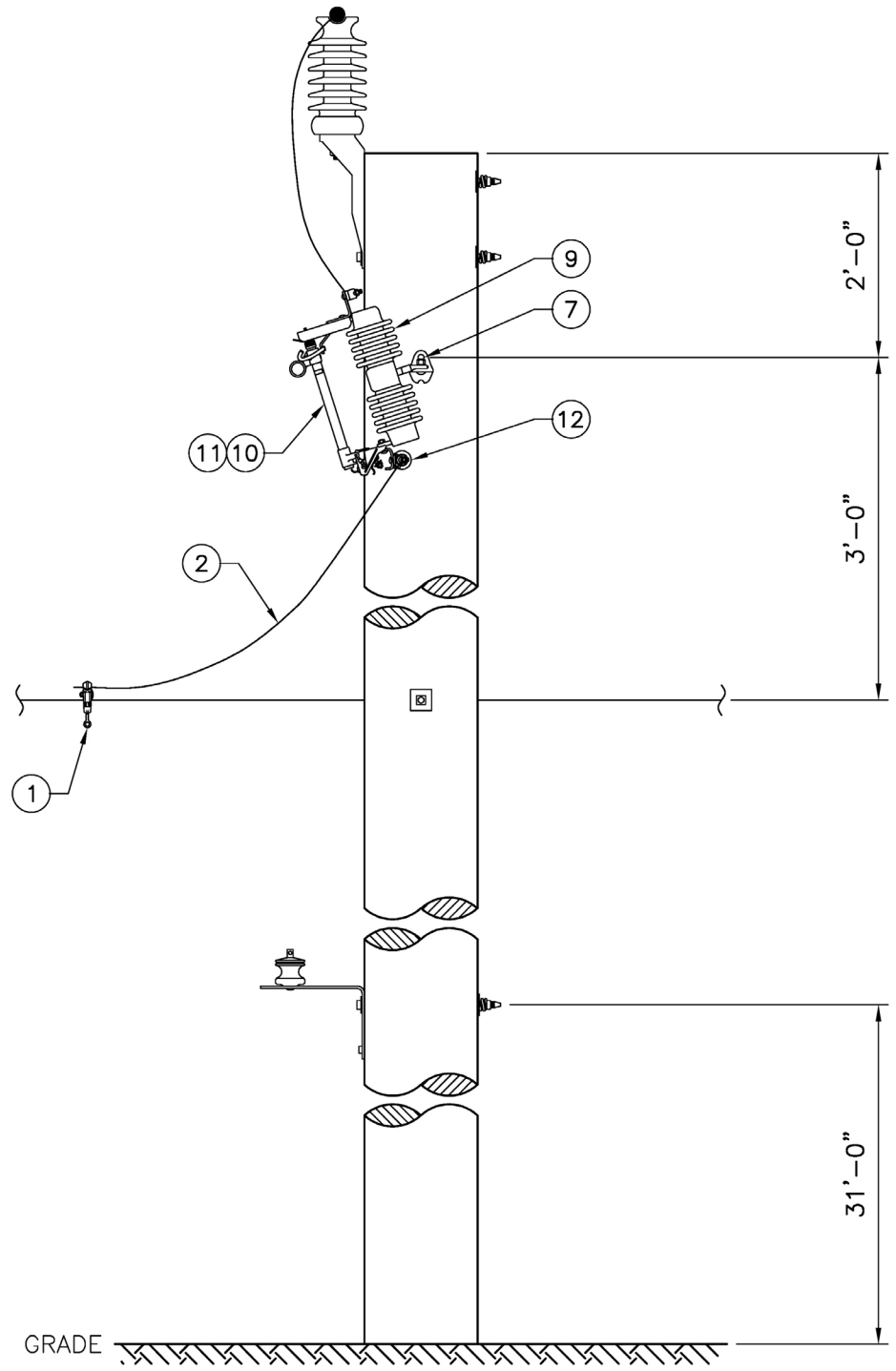
**Figure 3I. Single-Phase Multi-Gain Tangent to Single-Phase, Deadend Lateral Fused Cutout Jumper, Pole Mounted, Side View**



**Figure 3m. Single-Phase Multi-Gain Tangent to Single-Phase Tangent  
Fused Cutout Jumper, Pole Mounted, Top View**



**Figure 3n. Single-Phase Multi-Gain Tangent to Single-Phase Tangent  
Fused Cutout Jumper, Pole Mounted, Side View**



**4. Construction Notes**

Return any unused materials to the warehouse.

**5. Material Lists**

**Table 5a. Materials for Three-Phase Fused Jumpers**

Fig	Compatible Unit	ID	Quantity					
3c	TAN to DE Fused Tap Jumper #4 Cu-#4 Cu	FUSECO3#43						
3c	TAN to DE Fused Tap Jumper 397 ACSR-#4 Cu	FUSECO3973						
3c	TAN to DE Fused Tap Jumper 954 ACSR-#4 Cu	FUSECO9543						
3a	DDE Fused Jumper #4 Cu-#4 Cu	FUSECO3#43LPI						
3a	DDE Fused Jumper 397 ACSR-#4 Cu	FUSECO3973LPI						
3a	DDE Fused Jumper 954 ACSR-#4 Cu	FUSECO9543LPI						
#	Material Description	ID	↓	↓	↓	↓	↓	↓
1	Clamp, hot line tap, 2/0 - #8	580725	6	6	6	6	6	6
2	Wire, solid bare Cu, SD, jumper, #4 AWG (ft)	610208	45	45	45	45	45	45
3	Stirrup, bolted 397.5-954 kcmil ACSR	580678	3	3	-	3	3	-
4	Insulator, post top, polymer, 34.5 kV (tie-top)	014304	3	3	3	1	1	1
5	Stud, long, 3/4" x 7-1/2"	696828	3	3	3	1	1	1
6	Wire, ties, insulator, #6 Cu solid, bare, SD (ft)	610210	12	12	12	4	4	4
7	Cutout bracket, crossarm	682097	3	3	3	3	3	3
8	Cutout	013739	3	3	3	3	3	3
9	Fuse tube	682297	3	3	3	3	3	3
10	Fuse link, 65K	683718	3	3	3	3	3	3
11	Fuse, fault limiter, size D	014419	3	3	3	3	3	3
12	Connector bar, 2/0	684912	1	1	1	1	1	1



**Table 5b. Materials for Crossarm Termination Cutouts**

Fig	Compatible Unit	ID	Quantity		
None	Crossarm Termination Cutouts 10K-12K	FUSECO10K-12K			
None	Crossarm Termination Cutouts 6K-12K	FUSECO6K-12K			
None	Crossarm Termination Cutouts 3T-12K	FUSECO3T-12K			
#	Material Description	ID			
1	Clamp, hot line tap, 2/0 - #8	580725	1	1	1
2	Wire, solid bare Cu, SD, jumper, #4 AWG (ft)	610208	10	10	10
3	Line wire, covered, SD, #4 AWG	611442	10	10	10
4	Stirrup, bolted, 397.5-954 kcmil ACSR	580678	1	1	1
5	Cutout bracket, crossarm	682097	1	1	1
6	Cutout	013739	1	1	1
7	Fuse tube	682297	1	1	1
8	Fuse link, 3T	683706	1	-	-
8	Fuse link, 6K	683708	-	1	-
8	Fuse link, 10K	683710	-	-	1
9	Fuse, fault limiter, size12K	684920	1	1	1

**Table 5c. Materials for Crossarm Termination Cutouts**

Fig	Compatible Unit	ID	Quantity				
None	Crossarm Termination Cutouts 25K-B	FUSECO25K-B					
None	Crossarm Termination Cutouts 15K-B	FUSECO15K-B					
None	Crossarm Termination Cutouts 10K-B	FUSECO10K-B					
None	Crossarm Termination Cutouts 6K-B	FUSECO6K-B					
None	Crossarm Termination Cutouts 3T-B	FUSECO3T-B					
#	Material Description	ID					
1	Clamp, hot line tap, 2/0 - #8	580725	1	1	1	1	1
2	Wire, solid bare Cu, SD, jumper, #4 AWG (ft)	610208	10	10	10	10	10
3	Line wire, covered, SD, #4 AWG	611442	10	10	10	10	10
4	Stirrup, bolted, 397.5-954 kcmil ACSR	580678	1	1	1	1	1
5	Cutout bracket, crossarm	682097	1	1	1	1	1
6	Cutout	013739	1	1	1	1	1
7	Fuse tube	682297	1	1	1	1	1
8	Fuse link, 3T	683706	1	-	-	-	-
8	Fuse link, 6K	683708	-	1	-	-	-
8	Fuse link, 10K	683710	-	-	1	-	-
8	Fuse link, 15K	683711	-	-	-	1	-
8	Fuse link, 25K	683713	-	-	-	-	1
9	Fuse, fault limiter, size B	014417	1	1	1	1	1

**Table 5d. Materials for Crossarm Termination Cutouts**

Fig	Compatible Unit	ID	Quantity			
None	Crossarm Termination Cutouts 100K-D	FUSECO100K-D				
None	Crossarm Termination Cutouts 65K-D	FUSECO65K-D				
None	Crossarm Termination Cutouts 50K-C	FUSECO50K-C				
None	Crossarm Termination Cutouts 40K-C	FUSECO40K-C				
#	Material Description	ID				
1	Clamp, hot line tap, 2/0 - #8	580725	1	1	1	1
2	Wire, solid bare, Cu, SD, Jumper, #4 AWG (ft)	610208	10	10	10	10
3	Line wire, covered, SD, #4 AWG	611442	10	10	10	10
4	Stirrup, bolted, 397.5-954 kcmil ACSR	580678	1	1	1	1
5	Cutout bracket, crossarm	682097	1	1	1	1
6	Cutout	013739	1	1	1	1
7	Fuse tube	682297	1	1	1	1
8	Fuse link, 40K	683715	1	-	-	-
8	Fuse link, 50K	683717	-	1	-	-
8	Fuse link, 65K	683718	-	-	1	-
8	Fuse link, 100K	683724	-	-	-	1
9	Fuse, fault limiter, size C	014418	1	1	-	-
9	Fuse, fault limiter, size D	014419	-	-	1	1

**Table 5e. Materials for Pole Termination Cutouts**

Fig	Compatible Unit	ID			
None	Pole Termination Cutouts 10K-12K	FUSECO10K-12KPM			
None	Pole Termination Cutouts 6K-12K	FUSECO6K-12KPM			
None	Pole Termination Cutouts 3T-12K	FUSECO3T-12KPM			
			↓	↓	↓
#	Material Description	ID			
1	Clamp, hot line tap, 2/0 - #8	580725	1	1	1
2	Wire, solid bare Cu, SD, jumper, #4 AWG (ft)	610208	10	10	10
3	Line wire, covered, SD, #4 AWG	611442	10	10	10
4	Cutout bracket, pole mounted	563222	1	1	1
5	Cutout	013739	1	1	1
6	Fuse tube	682297	1	1	1
7	Fuse link, 3T	683706	1	-	1
7	Fuse link, 6K	683708	-	1	-
7	Fuse link, 10K	683710	-	-	1
8	Fuse, fault limiter, size 12K	684920	1	1	1

**Table 5f. Materials for Pole Termination Cutouts**

Fig	Compatible Unit	ID	Quantity				
None	Pole Termination Cutouts 25K-B	FUSECO25K-BPM					
None	Pole Termination Cutouts 15K-B	FUSECO15K-BPM					
None	Pole Termination Cutouts 10K-B	FUSECO10K-BPM					
None	Pole Termination Cutouts 6K-B	FUSECO6K-BPM					
None	Pole Termination Cutouts 3T-B	FUSECO3T-BPM					
#	Material Description	ID	↓	↓	↓	↓	↓
1	Clamp, hot line tap, 2/0 - #8	580725	1	1	1	1	1
2	Wire, solid bare Cu, SD, jumper, #4 AWG (ft)	610208	10	10	10	10	10
3	Line wire, covered, SD, #4 AWG	611442	10	10	10	10	10
4	Cutout bracket, pole mounted	563222	1	1	1	1	1
5	Cutout	013739	1	1	1	1	1
6	Fuse tube	682297	1	1	1	1	1
7	Fuse link, 3T	683706	1	-	-	-	-
7	Fuse link, 6K	683708	-	1	-	-	-
7	Fuse link, 10K	683710	-	-	1	-	-
7	Fuse link, 15K	683711	-	-	-	1	-
7	Fuse link, 25K	683713	-	-	-	-	1
8	Fuse, fault limiter, size B	014417	1	1	1	1	1

**Table 5g. Materials for Single-Phase Taps with Fused Jumpers**

Fig	Compatible Unit	ID	Quantity							
3k, m	Single-Phase #4 AWG Cu - #4 AWG Cu Pole Mount Cutout	FUSECO1#41								
3i	Three-Phase to Single-Phase 3 #4 Cu - 1 #4 AWG Cu Tap	FUSECO3#41								
3i	Three-Phase to Single-Phase 397 ACSR - 1 #4 AWG Cu Tap	FUSECO3971								
3g	Three-Phase to Single-Phase 954 ACSR - 1 #4 AWG Cu DDE	FUSECO9541								
3g	Three-Phase to Single-Phase 3 #4 Cu - 1 #4 AWG Cu DDE	FUSECO3#41LPI								
3g	Three-Phase to Single-Phase 397 ACSR - 1 #4 AWG Cu DDE	FUSECO3971LPI								
3g	Three-Phase to Single-Phase 954 ACSR - 1 #4 AWG Cu DDE	FUSECO9541LPI								
#	Material Description	ID	↓	↓	↓	↓	↓	↓	↓	↓
1	Clamp, hot line tap, 2/0-#8	580725	2	2	2	2	2	2	2	2
2	Wire, solid bare Cu, SD, Jumper, #4 AWG (ft)	610208	20	20	20	20	20	20	20	20
3	Stirrup, bolted, 397.5-954 kcmil ACSR	580678	1	1	-	1	1	-	-	-
4	Insulator, post top, polymer, 34.5 kV (tie-top)	014304	1	1	1	-	-	-	-	-
5	Stud, long - 3/4" x 7-1/2"	696828	1	1	1	-	-	-	-	-
6	Wire, ties, insulator, #6 Cu solid, bare, SD, ft	610210	4	4	4	-	-	-	-	-
7	Cutout bracket, pole mount	563222	-	-	-	-	-	-	-	1
8	Cutout bracket, crossarm	682097	1	1	1	1	1	1	1	-
9	Cutout	013739	1	1	1	1	1	1	1	1
10	Fuse tube	682297	1	1	1	1	1	1	1	1
11	Fuse link, 65K	683718	1	1	1	1	1	1	1	1
12	Fuse, fault limiter, size D	014419	1	1	1	1	1	1	1	1

**6. References**

- SCL Construction Standard 0100.21**; "Single-Phase Unfused Overhead Jumpers"
- SCL Construction Standard 0100.23**; "Three-Phase Unfused Overhead Jumpers"
- SCL Construction Standard 0121.05**; "Single-Phase Deadend Pole Top Assemblies"
- SCL Construction Standard 0123.05**; "Three-Phase Deadend Pole Top Assemblies"

## 7. Sources

**Dawed, Akrem**; SCL Assistant Engineer and subject matter expert for 0100.25

**Hall, Alan**; SCL Senior Electrical Engineer and subject matter expert for 0100.25

**Kumar, Vinod**; T & D Operations Supervisor and subject matter expert for 0100.25

**Lu, Curtis**; SCL Standards Engineer and originator of 0100.25

**National Electrical Safety Code (NESC); C2-2012 Edition**; Institute of Electrical and Electronics Engineers (IEEE) Inc., New York, NY, 2011

**Ryon, Sean**; Overhead Line Supervisor and subject matter expert for 0100.25

**SCL Construction Standard D9-60** (canceled); "15/26 kV Distribution Single Phase Corner Construction from Three Phase Lead"

**Warren, Todd**; Line Crew Chief and subject matter expert for 0100.25