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## 1. Historical Neutral Locations

### 1.1 CIPS Service Territory

Since at least 1986, CIPS Distribution Standard DS2100 has stated that the preferable location for the neutral is down 6'2" from the line arm on spans less than 200 feet. Where span lengths exceeded 200 feet, the 6'2" spacing was mandatory. However, it was permitted to place the neutral on the line arm or at 40" spacing to eliminate replacing otherwise adequate poles for increased height.

### 1.2 UE Service Territory

Prior to this edition being published, UE Distribution Construction Standards called for neutrals on new line poles without any equipment mounted on the pole to be 40" down from the line arm. This was applicable to both 4 kV and 12 kV areas. Several Standards indicate 22" spacing is permitted for existing construction on 4kV poles or on poles being converted from 2400 Volt single phase to 7200 Volt single phase.

## 2. Consolidated Ameren Standards

The Standards in this book show neutral spacing on all new configurations to be 6 ft. The previous range was to accommodate present conditions of most of the existing poles at being at 40" and many of the existing poles at 74".

### 2.1 New Pole Installations

New pole lines and relocated pole lines should use the 6 foot neutral spacing in general. Major advantage to the 6 foot spacing is that it permits a truck's basket to maneuver between the phase conductors and the neutral to reach the field side of the pole.

### 2.2 Working on Existing Poles or Replacing Existing Poles

The rule of permitting 40" to avoid replacing otherwise acceptable poles shall continue. When replacing a pole in a lead, the existing spacing should generally be used on the new pole, except that a 40" minimum neutral spacing from the line arm is required. Increasing from a 40" spacing to a 6' spacing would change the conductor tensions considerably and likely cause future problems.

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General

The phase locations shown in this distribution standard shall be standard for the Ameren System. It is not intended to change all existing structures that do not conform to this standard. However, all new constructions, as well as reconstructed existing circuits, shall, to the extent it is practicable, be in accordance with this standard.

Vertical Construction

No standard phase locations are designated for vertical single circuit construction at corners or angles in a line. (Note Exception under 4160 Volt Single Phase Construction Insulated for 7200 Volt Operation). This will allow the most practicable positioning, based on the configuration of the adjacent poles. When possible, however, the phase locations should be selected so as to give the maximum distance between conductors. For example, for 4 kV and 12 kV when going from flat configuration (Fig. 2) to vertical, the phase designation from the top of the pole shall be B, A, and C. The neutral conductor, when present on vertical corners, shall take a position below the primary phase conductor.

4160 Volt Single Phase Construction Insulated for 7200 Volt Operation

Where a line is built for initial operation at 4160 volt single phase but is insulated and spaced for future 7200 volt operation, the conductor on the road side shall be considered the future phase wire and the field side conductor shall be the future multigrounded neutral. (See Figure 10 of this standard.) On private property the east, northeast, north and northwest sides shall be equivalent to the road side, while the west, southwest, south and southeast sides shall be equivalent to the field side. At vertical corners the road side conductor (future 7200 volt phase wire) shall occupy the high position on the pole. There will be instances where it will be impracticable to follow these general rules (e.g. where adjacent poles are on opposite sides of a winding road to keep line angles at a minimum). Where it is necessary to deviate from the standard conductor locations on poles adjacent to vertical corner poles the estimator shall show on his construction plats the conductor that must take the high position on the corner pole. This will obviate the need for construction changes when the line is cutover for 7200 volt operation.

When the line is cutover to 7200 volt operation all conductors in positions other than the standard shall be marked by fastening the proper identifying aluminum letter on the crossarm directly below the conductor.

Marking

Any deviations from the standard phase locations shall be plainly marked with letters "A", "B", "C", or "N" attached to the crossarm below the respective conductor. These deviations may be due to transpositions or unusual construction. In addition to the marking of these deviations, all three phase switch locations, three phase capacitor installations, three phase recloser installations, three phase sectionalizer installations, and three phase terminal poles shall be plainly marked with the proper phase letter. These letters shall be attached to the crossarm or pole so that phases can be readily identified.

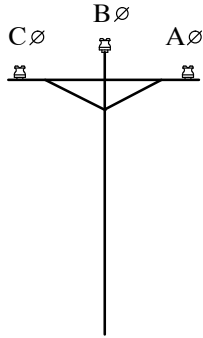
On long feeders with considerable distances between three phase switches, additional locations as required may also be marked to facilitate phase identification. Normally, these additional phase identification points should be located on poles where single phase taps take off from the three phase feeder main.

The phase locations on poles adjacent to vertical configurations shall be plainly marked to facilitate identification when making repairs. These letters shall be attached to the crossarm below the respective conductors.

# CONFIGURATIONS Phase Locations (Preferred Locations)

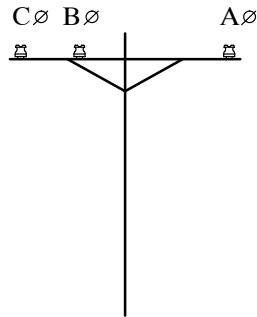
03 00 01 02

Sheet 1 of 1



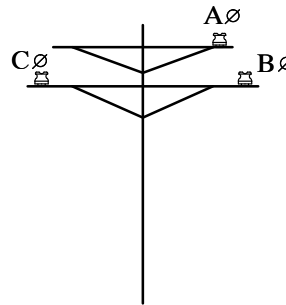
TRIANGULAR CONSTRUCTION

**FIG. 1**



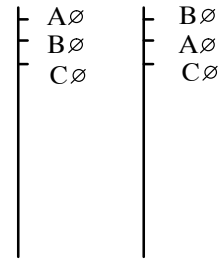
FLAT CONSTRUCTION

**FIG. 2**



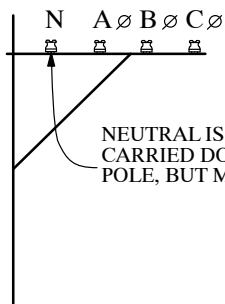
SINGLE CIRCUIT  
2 ARM TRIANGULAR

**FIG. 3**



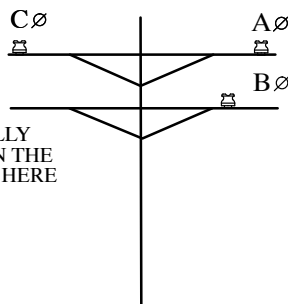
34 KV 4 OR 12 KV  
VERTICAL CONSTRUCTION

**FIG. 4**



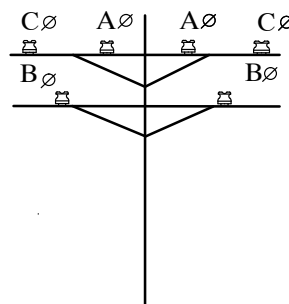
SIDEARM CONSTRUCTION

**FIG. 5**



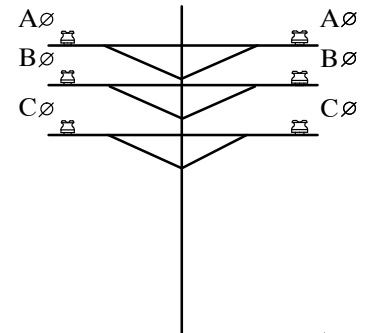
FUTURE DOUBLE CIRCUIT  
2 ARM TRIANGULAR

**FIG. 6**



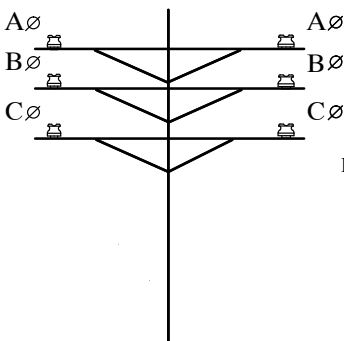
DOUBLE CIRCUIT  
2 ARM TRIANGULAR

**FIG. 7**



DOUBLE CIRCUIT  
3 ARM VERTICAL  
SEE NOTE

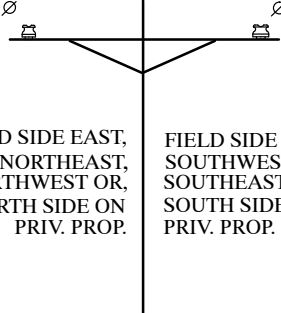
**FIG. 8**



34kV  
DOUBLE CIRCUIT  
3 ARM VERTICAL

**FIG. 9**

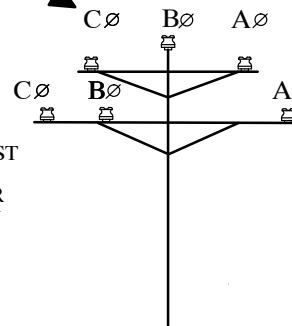
FUTURE NEUTRAL POSITION FOR  
7200 V OPERATION



ROAD SIDE EAST,  
NORTHEAST,  
NORTHWEST OR,  
NORTH SIDE ON  
PRIV. PROP. FIELD SIDE WEST,  
SOUTHWEST,  
SOUTHEAST, OR  
SOUTH SIDE ON  
PRIV. PROP.

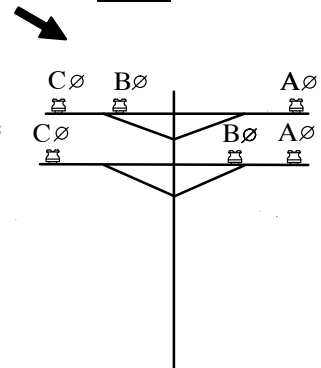
4160 V - SINGLE PHASE  
INSULATED FOR FUTURE  
7200 V OPERATION

**FIG. 10**



DOUBLE CIRCUIT  
OVERHEAD

**FIG. 11**



DOUBLE CIRCUIT  
UNDERBUILT

**FIG. 12**

## NOTE:

Phase positions shown in Fig. 8 should be used only when this configuration is adjacent to poles with configuration shown in Fig. 6. When phases are in positions shown in Fig. 8, they shall be marked with identifying letters.

1. General

This standard gives the design limits of the structural elements employed in building standard configurations. These limits are based on the allowable loading of crossarms and pins as shown in Dist. Std. 29 00 04, and also on required conductor separation to prevent midspan conductor contact.

2. Angle Limits

Tables 1, 2, 3, 4 and 5 specify the maximum angle capable of being turned on pins, insulators, fiberglass stand-offs, combination fiberglass and porcelain standoffs, and crossarms for various types of construction. This data is based on the transverse strength of the components of the structure and the load applied to it, due to the line angles.

3. Dead End Loadings

Table 6 specifies the maximum balanced dead end loading for unguyed crossarms. It shows the number of conductors permitted to dead end on a structure, depending on the size of conductor and the type of dead end structure. The data is based on standard conductor tensions and allowable equivalent horizontal loadings on the crossarm. The purpose of this table is to provide the information necessary to get the most out of a dead end structure without having to resort to crossarm guying.

TABLE 1A  
Maximum Line Angles Capable of Being Turned on Pins and Crossarms  
SHORT SPAN (STD. 07 00 07 03)

Conductor Size AWG or kcmil	Pins (All) (See Note 4)		Single Crossarm # of Conductors (1200# arm limit)					DOUBLE CROSSARM									
								Without Grid Plate # of Conductors (2400#)					With Grid Plate (5) # of Conductors (4000#)				
	Sgl	DbI	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
	600#	1200#															
#4 ACSR	42	90	42	26	18	13	10	90	59	42	32	26	90	90	78	59	47
1/0 AAAC	25	56	25	16	11	8	6	56	35	25	19	16	90	64	46	35	29
110.8 ACSR	20	44	20	12	8	6	5	44	28	20	15	12	80	50	44	28	23
556.5 AAC	10	21	10	6	4	3	2	21	13	10	7	6	37	24	17	13	11
T2 Penguin	14	32	14	9	6	4	3	32	20	15	11	9	57	36	26	20	16
954 ACSR Rail	11	25	11	6.7	4.4	3	2	25	16	11	8	7	42	28	21	16	13

Notes:

- Maximum number of pins for single crossarm is 2. Maximum number of pins for double crossarm without grid plate is 4; and maximum number of pins for double crossarm with grid plate is 6. The number of conductors that can be deadended back to back (not on pins) is only limited by the strength of the joint between the arm(s) and the pole.
- Above table based on Grade N construction.

TABLE 1B

Maximum Line Angles Capable of Being Turned on Pins or Crossarms  
MEDIUM SPAN (STD. 07 00 07 03)

Conductor Size AWG or kcmil	Pins (All) (See Note 4)		Single Crossarm # of Conductors (1200# arm limit)					DOUBLE CROSSARM									
								Without Grid Plate # of Conductors (2400#)					With Grid Plate (5) # of Conductors (4000#)				
	Sgl	Dbl	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
	<b>600#</b>	<b>1200#</b>															
#4 ACSR	33	79	33	20	14	10	7	79	48	34	25	20	90	90	62	47	38
1/0 AAAC	21	47	21	12	8	6	4	47	29	21	16	12	87	53	38	29	23
110.8 ACSR	14	32	14	8	5	4	3	32	20	14	11	8	57	36	26	20	16
556.5 AAC	7	17	7	4	3	2	1	17	10	7	5	4	29	19	14	10	8
T2 Penguin	11	24	11	6	4	1	–	34	15	11	8	6	43	27	20	15	12
954 ACSR Rail	9	20	9	5	3	2	1	20	12.5	9	6	5	36	23	16	12.6	10

Notes:

- Maximum number of pins for single crossarm is 2. Maximum number of pins for double crossarm without grid plate is 4; and maximum number of pins for double crossarm with grid plate is 6. The number of conductors that can be deadended back to back (not on pins) is only limited by the strength of the joint between the arm(s) and the pole.
- Above table based on Grade N construction.

TABLE 1C

Maximum Line Angles Capable of Being Turned on Pins or Crossarms  
LONG SPAN (STD. 07 00 07 03)

Conductor Size AWG or kcmil	Pins (All) (See Note 4)		Single Crossarm # of Conductors (1200# arm limit)					DOUBLE CROSSARM									
								Without Grid Plate # of Conductors (2400#)					With Grid Plate (5) # of Conductors (4000#)				
	Sgl	Dbl	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
	<b>600#</b>	<b>1200#</b>															
#4 ACSR	28	65	28	16	11	7	5	65	40	28	21	16	90	75	52	40	32
1/0 AAAC	17	38	17	10	6	4	3	38	24	17	12	10	70	43	31	24	19
110.8 ACSR	8	19	8	5	3	2	1	19	12	8	6	5	33	21	15	12	9
556.5 AAC	6	14	6	3	2	1	–	14	9	6	4	3	25	16	11	9	7
T2 Penguin	8	19	8	4	3	1	–	19	12	8	6	4	35	22	16	12	9
954 (45/7) ACSR	6	14.6	6	3	1.8	1	–	14.6	9	6	4	3	26	17	12	9	7

Notes:

- Maximum number of pins for single crossarm is 2. Maximum number of pins for double crossarm without grid plate is 4; and maximum number of pins for double crossarm with grid plate is 6. The number of conductors that can be deadended back to back (not on pins) is only limited by the strength of the joint between the arm(s) and the pole.
- Above table based on Grade N construction.

TABLE 1D  
Maximum Line Angles Capable of Being Turned on Pins or Crossarms  
EXTRA LONG SPAN (STD. 07 00 07 03)

Conductor Size AWG or kcmil	Pins (All) (See Note 4)		Single Crossarm # of Conductors (1200# arm limit)					DOUBLE CROSSARM									
								Without Grid Plate # of Conductors (2400#)					With Grid Plate (5) # of Conductors (4000#)				
	Sgl	Dbl	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
	<b>600#</b>	<b>1200#</b>															
1/0 AAAC	14	30	14	8	5	3	2	30	20	14	10	8	61	38	27	20	16
110.8 ACSR	8	18	8	4	2	1	–	18	11	8	6	4	32	21	15	11	9
556 AAC	5	13	5	3	1	–	–	13	7	5	3	2	23	15	10	8	6
T2 Penguin	6.5	16	6.5	3.3	2	1	–	16	9.6	6.5	4.4	3.3	29	18	13	9.7	7.8
954 ACSR Rail	4.4	11.3	4.4	2	1	–	–	11.3	6.8	4.4	3	2	21	13	9	6.6	5

**Notes:**

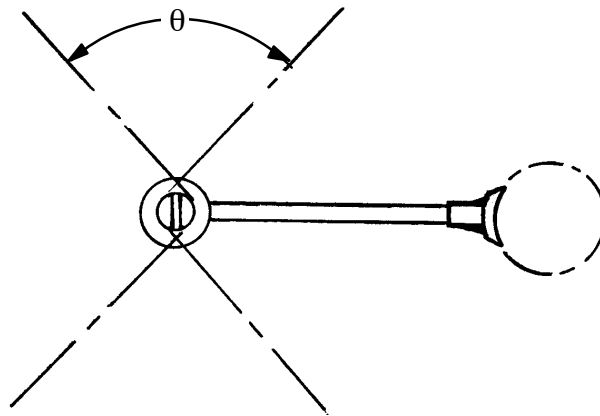
- Maximum number of pins for single crossarm is 2. Maximum number of pins for double crossarm without grid plate is 4; and maximum number of pins for double crossarm with grid plate is 6. The number of conductors that can be deadended back to back (not on pins) is only limited by the strength of the joint between the arm(s) and the pole.
- Above table based on Grade N construction.

Select The Required Crossarm Assembly Unit Using The Following As A Guide

- The above table, based on maximum span length of applicable sag table, automatically takes care of vertical loadings. For shorter span lengths the crossarm may be strong enough; however, a strength calculation should be made. See Dist. Std. 29 00 04 01 for examples and allowable crossarm loads.
- Inadequate vertical strength for the number and size of conductors shown.
- Double arms and double dead end pole top construction shall always be used.
  - At all railroad crossings. Note: If tensions do not exceed 2000 lbs. per conductor during heavy loading; double pins and ties may be used. Double pole top pins mounted on the face of the pole may be used to meet this requirements. (Tensions for conductors sagged in accordance with Sag Table 1 does not exceed 2000 lbs. under heavy loaded conditions except for 556.5 kcmil A.A. and 795 kcmil A.A.).
  - On grade "B" circuits where the line angle exceeds 20°.
  - On grade "B" circuits at communications crossings, if the supply conductors are not continuous and of uniform tension in the crossing span and each adjacent span.
- Angles shown for single or double pins refer to crossarm pins and existing pole top pins mounted on the face of the pole.
- Grid gain plates (Dist. Std. 04 00 35) shall be used only when required for the larger angles shown. Use caution to insure that pin angle limits are not exceeded (2 or 3 conductors). If pin limits are exceeded, use double dead ends.
- Above table based on grade N construction.



**Table 2**  
**Maximum Line Angle Capability of Distribution Standards**

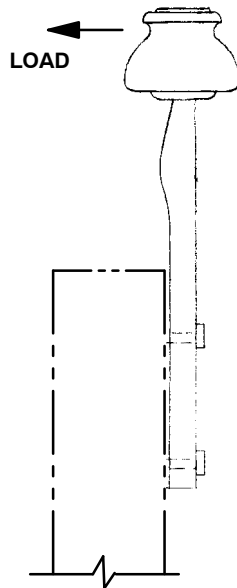


Side tie in tension or compression on pin insulator of full tension take off unit.

Sag Table	Conductor	Angle°
SHORT SPAN	#4 (7/1) ACSR	78
	1/0 AAAC, bare or poly	46
	1/0 ACSR, bare	59
	110.8 (12/7) ACSR, bare	45
	336.4 (18/1) ACSR	32
	556 (19) AAC	17
	335.6 T2 Pigeon	41
	432.2 T2 Penguin	35
	954 (45/7) ACSR	17
	556 (19) T2	12
MEDIUM SPAN	#4 (7/1) ACSR	62
	1/0 AAAC, bare or poly	38
	1/0 ACSR, bare	46
	110.8 (12/7) ACSR, bare	35
	336.4 (18/1) ACSR	23
	556 (19) AAC	14
	335.6 T2 Pigeon	31
	432.2 T2 Penguin	26
	954 (45/7) ACSR	12
	556 (19) T2	10

Sag Table	Conductor	Angle <sup>o</sup>
LONG SPAN	#4 (7/1) ACSR	52
	1/0 AAAC, bare or poly	31
	1/0 ACSR, bare	37
	110.8 (12/7) ACSR, bare	28
	336.4 (18/1) ACSR	18
	556 (19) AAC	11
	335.6 T2 Pigeon	25
	432.2 T2 Penguin	20
	954 (45/7) ACSR	9
	556 (19) T2	9

**Table 3**  
**Maximum Line Angle Capability of Distribution Standards**  
**Dist. Stds. 06-12-01-02 Pole Top Pins**

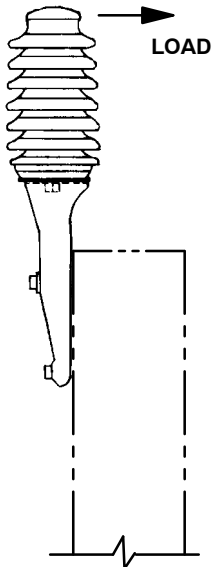


**Pole Top Pin (1000# Limit, Transverse)**

<b>Sag Table</b>	<b>Conductor</b>	<b>Angle°</b>
<b>SHORT SPAN</b>	#4 (7/1) ACSR	78
	1/0 AAAC, bare or poly	46
	1/0 ACSR, bare	59
	110.8 (12/7) ACSR, bare	45
	336.4 (18/1) ACSR	32
	556 (19) AAC	17
	335.6 T2 Pigeon	41
	432.2 T2 Penguin	35
	954 (45/7) ACSR	17
	556 (19) T2	12
<b>MEDIUM SPAN</b>	#4 (7/1) ACSR	62
	1/0 AAAC, bare or poly	38
	1/0 ACSR, bare	46
	110.8 (12/7) ACSR, bare	35
	336.4 (18/1) ACSR	23
	556 (19) AAC	14
	335.6 T2 Pigeon	31
	432.2 T2 Penguin	26
	954 (45/7) ACSR	12
	556 (19) T2	10
<b>LONG SPAN</b>	#4 (7/1) ACSR	52
	1/0 AAAC, bare or poly	31
	1/0 ACSR, bare	37
	110.8 (12/7) ACSR, bare	28
	336.4 (18/1) ACSR	18
	556 (19) AAC	11
	335.6 T2 Pigeon	25
	432.2 T2 Penguin	20
	954 (45/7) ACSR	9
	556 (19) T2	9
<b>EXTRA LONG SPAN</b>	1/0 AAAC, bare or poly	26
	1/0 ACSR, bare	31
	110.8 (12/7) ACSR, bare	23
	336.4 (18/1) ACSR	15
	556 (19) AAC	10
	335.6 T2 Pigeon	20
	432.2 T2 Penguin	16
	954 (45/7) ACSR	9
	556 (19) T	8

**Table 4**  
**Maximum Line Angle Capability of Distribution Standards**  
**Dist. Stds. 06-34-01-\*\*-**  
**Vertical Line Post Insulator (Tie Top) 25-05-064 F Neck 25-05-098 N Neck**

**Vertical Line Post (1120# Limit, Cantilever)**



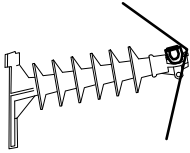
Sag Table	Conductor	F Neck Angle ***	N Neck Angle*
SHORT SPAN	#4 (7/1) ACSR	NL	15
	1/0 AAAC, bare or poly	52	15
	1/0 ACSR, bare	68	15
	110.8 (12/7) ACSR, bare	52	15
	336.4 (18/1) ACSR	36	15
	556 (19) AAC	19	15
	335.6 T2 Pigeon	47	15
	432.2 T2 Penguin	40	15
	954 (45/7) ACSR	19	15
	556 (19) T2	14	15
MEDIUM SPAN	#4 (7/1) ACSR	72	15
	1/0 AAAC, bare or poly	43	15
	1/0 ACSR, bare	52	15
	110.8 (12/7) ACSR, bare	40	15
	336.4 (18/1) ACSR	26	15
	556 (19) AAC	15	15
	335.6 T2 Pigeon	35	15
	432.2 T2 Penguin	29	15
	954 (45/7) ACSR	14	15
	556 (19) T2	11	15
LONG SPAN	#4 (7/1) ACSR	60	15
	1/0 AAAC, bare or poly	35	15
	1/0 ACSR, bare	42	15
	110.8 (12/7) ACSR, bare	32	15
	336.4 (18/1) ACSR	21	15
	556 (19) AAC	13	15
	335.6 T2 Pigeon	28	15
	432.2 T2 Penguin	23	15
	954 (45/7) ACSR	10	15
	556 (19) T2	10	15
EXTRA LONG SPAN	1/0 AAAC, bare or poly	31	15
	1/0 ACSR, bare	36	15
	110.8 (12/7) ACSR, bare	26	15
	336.4 (18/1) ACSR	17	15
	556 (19) AAC	12	15
	335.6 T2 Pigeon	23	15
	432.2 T2 Penguin	19	15
	954 (45/7) ACSR	10	15
	556 (19) T2	10	15

\* All 15° line angles shown for N Neck insulators are based on top groove.

\*\*\* Angles shown in above table are for single insulators only. For multiple conductors on a crossarm use grade N loads in DCS 11 00 04 02 for the conductor, span and line angle being considered. Compare the total transverse load with the transverse crossarm intermittent load limits shown in Table 1 of DCS. 29 00 04 01.

**Table 5**

**Maximum Line Angle Capability of Distribution Standards  
DCS 06 34 03 \*\* and 06 69 03 \*\* in Compression and Tension  
34 and 69 kV Polymer Horizontal Line Post Insulator (Clamp Top Line Terminal)  
Stock Nos. 25 05 145 and 25 05 095 (2500 LB Limit in Compression and Tension)**



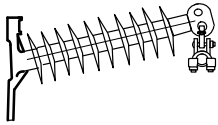
Sag Table	Conductor	Angle
SHORT SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	NL*
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	NL*
	336.4 (18/1) ACSR	NL*
	556 (19) AAC	47
	335.6 T2 Pigeon	NL*
	432.2 T2 Penguin	NL*
	954 (45/7) ACSR	47
	556 (19) T2	34
	954 (45/7) T2	23
MEDIUM SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	NL*
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	NL*
	336.4 (18/1) ACSR	66
	556 (19) AAC	37
	335.6 T2 Pigeon	90
	432.2 T2 Penguin	76
	954 (45/7) ACSR	34
	556 (19) T2	28
	954 (45/7) T2	18
LONG SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	NL*
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	84
	336.4 (18/1) ACSR	52
	556 (19) AAC	32
	335.6 T2 Pigeon	73
	432.2 T2 Penguin	60
	954 (45/7) ACSR	26
	556 (19) T2	26
	954 (45/7) T2	14
EXTRA LONG SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	80
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	69
	336.4 (18/1) ACSR	43
	556 (19) AAC	30
	335.6 T2 Pigeon	61
	432.2 T2 Penguin	50
	954 (45/7) ACSR	26
	556 (19) T2	26
	954 (45/7) T2	14

**Table 5**

**Maximum Line Angle Capability of Distribution Standards**

**69 kV Polymer Horizontal Line Post Insulator (w/ 2-Hole Line Terminal Blade)**

**Stock No. 25 05 184 (Maximum Transverse Working Load – 5000 Lbs. (Tension & Compression))**



Sag Table	Conductor	Angle
SHORT SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	NL*
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	NL*
	336.4 (18/1) ACSR	NL*
	556 (19) AAC	NL*
	335.6 T2 Pigeon	NL*
	432.2 T2 Penguin	NL*
	954 (45/7) ACSR	47
	556 (19) T2	76
	954 (45/7) T2	48
MEDIUM SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	NL*
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	NL*
	336.4 (18/1) ACSR	NL*
	556 (19) AAC	83
	335.6 T2 Pigeon	NL*
	432.2 T2 Penguin	NL*
	954 (45/7) ACSR	75
	556 (19) T2	61
	954 (45/7) T2	37
LONG SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	NL*
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	NL*
	336.4 (18/1) ACSR	NL*
	556 (19) AAC	71
	335.6 T2 Pigeon	NL*
	432.2 T2 Penguin	NL*
	954 (45/7) ACSR	58
	556 (19) T2	57
	954 (45/7) T2	30
EXTRA LONG SPAN	#4 (7/1) ACSR	NL*
	1/0 AAAC, bare or poly	NL*
	1/0 ACSR, bare	NL*
	110.8 (12/7) ACSR, bare	NL*
	336.4 (18/1) ACSR	NL*
	556 (19) AAC	65
	335.6 T2 Pigeon	NL*
	432.2 T2 Penguin	NL*
	954 (45/7) ACSR	57
	556 (19) T2	57
	954 (45/7) T2	30

**TABLE 7**  
**TABLE GIVING MAXIMUM NUMBER OF CONDUCTORS**  
**THAT CAN BE DEADENDED ON UNGUYED CROSSARMS**  
**(BASED ON STANDARD CONDUCTOR TENSIONS)**

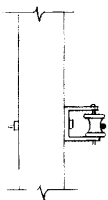
Conductor Size	Sag Table Span	Sgl Arm DE	Dbl Arm DE	Double Arm DE	Fiberglass DE Arms	
		3-1/2" x 4-1/2" x 8Ft		3-3/4" x 4-3/4" x 10Ft	8 Ft.	10 Ft.
# 4 ACSR 7/1 Bare	Short	0	2	4	2	4
	Medium	0	2	4	2	4
	Long	0	2	4	2	4
1/0 AAAC (7 ) Bare	Short	0	2	2	2	4
	Medium	0	2	2	2	4
	Long	0	0	2	2	4
	X-Long	0	0	0	2	4
1/0 ACSR (6/1) Bare	Short	0	0	2	2	4
	Medium	0	0	2	2	4
	Long	0	0	2	2	4
	X-Long	0	0	2	2	4
336.4 ACSR (18/1) Bare	Short	0	0	2	2	4
	Medium	0	0	0	2	4
	Long	0	0	0	2	4
	X-Long	0	0	0	2	2
335.6 ACSR T2 Pigeon	Short	0	0	2	2	4
	Medium	0	0	0	2	4
	Long	0	0	0	2	4
	X-Long	0	0	0	2	2
556.5 AA (19) Bare	Short	0	0	0	2	2
	Medium	0	0	0	2	2
	Long	0	0	0	2	0
	X-Long	0	0	0	2	0
432.2 ACSR T2 Penguin	Short	0	0	0	2	4
	Medium	0	0	0	2	4
	Long	0	0	0	2	4
	X-Long	0	0	0	2	2
954 ACSR (45/7) Bare	Short	0	0	0	2	2
	Medium	0	0	0	2	0
	Long	0	0	0	2	0
	X-Long	0	0	0	2	0

**CONFIGURATIONS**  
Structural Elements – Design Limits

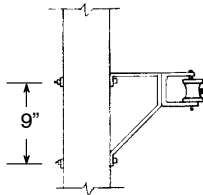
**03 00 03 00**  
Sheet 11 of 11

Conductor Size	Sag Table Span	Sgl Arm DE	Dbl Arm DE	Double Arm DE	Fiberglass DE Arms	
		3-1/2" x 4-1/2" x 8Ft		3-3/4" x 4-3/4" x 10Ft	8 Ft.	10 Ft.
556 AAC T2 Dahlia	Short	0	0	0	2	2
	Medium	0	0	0	2	0
	Long	0	0	0	2	0
	X-Long	0	0	0	2	0

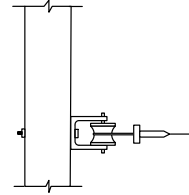




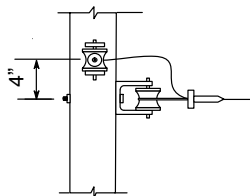
03 01 01 01  
THRU



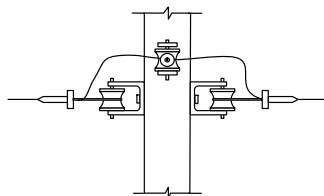
03 01 01 02  
THRU W/EXT.



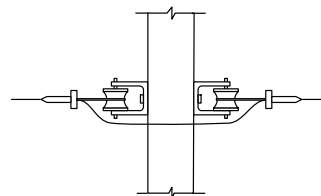
03 01 01 03  
DEADEND



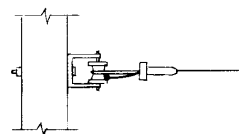
03 01 01 04  
90 DEG. ANGLE



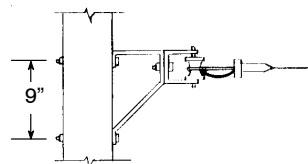
03 01 01 05  
"T" CORNER



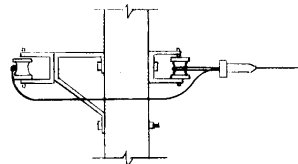
03 01 01 06  
LOOP AROUND



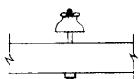
03 01 01 07  
THRU W/TAP



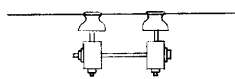
03 01 01 08  
THRU W/EXT. W/TAP



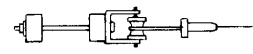
03 01 01 09  
THRU W/EXT. W/TAP  
ON BACK SIDE



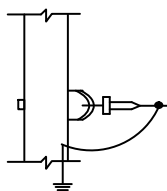
03 01 01 10  
THRU X-ARM



03 01 01 11  
THRU DBLE. X-ARM



03 01 01 12  
DEADEND X-ARM



03 01 01 13  
DEADEND  
TENSION > 1500 LBS.

# CONFIGURATIONS

## Neutral

03 01 01 \*\*

Sheet 2 of 2

		Std./ Stk. No.	Description 03 01 01 **	01	02	03	04	05	06	07	08	09	10	11	12	13
	A	06 01 01 01	Clevis, Secondary	1		1	2	1		1		1			1	
	B	06 01 01 03	Single Clevis Extension		1						1	1				
	C	23 52 095	Bolt, Mach, 3/4"x10"													1
	D	06 12 01 01	Crossarm Pin and Insulator										1	2		
@	E	SDEA*W	Deadend (See 08 01 10 00)			1	2	3	2	1	1	2			1	
@	F	PG*	See Std. 07 00 25 00				1	2	1	1	1	1				
@	G	TT*W	TopTie										1			
@	H	DTT*W	Double Top Tie											1		
@	I	DEA*W	Deadend (See 07 00 11 00)													1
	J	23 59 095	Eyelet, 3/4"													1
	K	06 01 01 02	Double Clevis					1	1							
	L	23 66 031	Washer, Square, 3/4"													1
@	M	12 00 10**	Grounding Unit													1

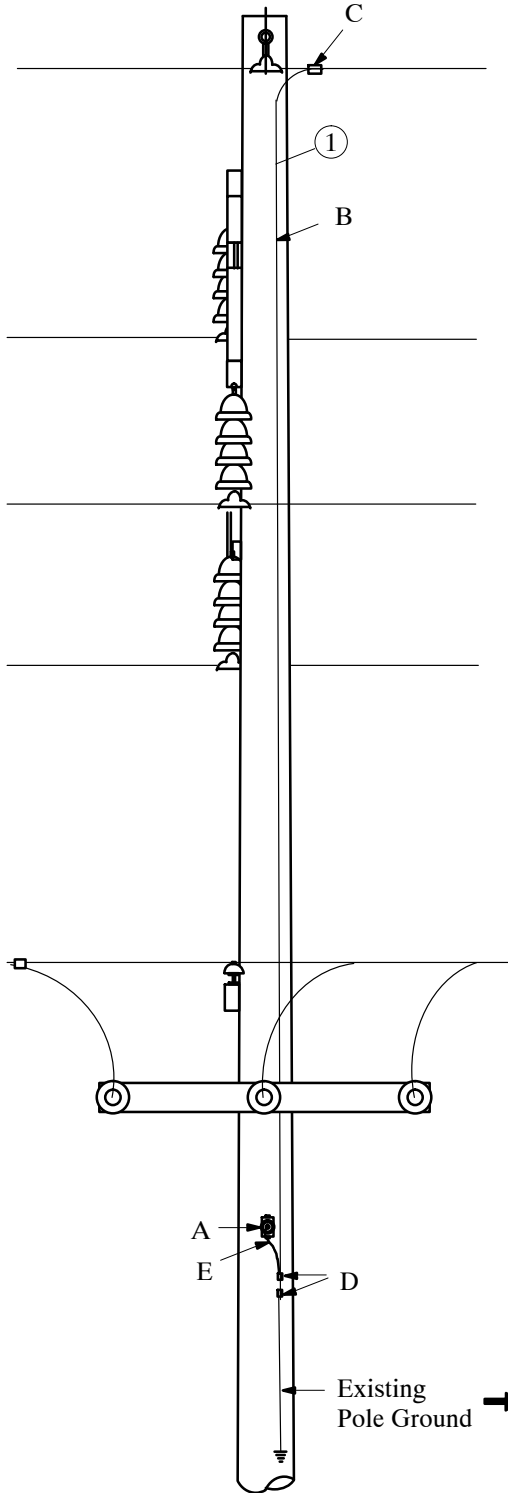
NOTE: If the deadend tension is greater than 1500 lbs., use Dist. Std. 03 01 01 13.

# CONFIGURATIONS

## Distribution Neutral Tap Connection to Sub-Transmission Static Wire

03 01 02 \*\*

Sheet 1 of 1



### Notes:

1. Connection from tap neutral to static/neutral wire must be at least the same ampacity as the tap neutral. For tap neutral, replace existing pole ground with #2 SD Cu. to a point 2-3' below tap neutral.
2. Install ground wire moulding in congested areas as required.
3. Install ground wire on quarter of pole that provides best clearance from center phase.

### Tap Neutral

1/0 ACSR or AAAC

#4 ACSR

### Std.

03 01 02 01

03 01 02 02

	Std./Stk. No.	Description	03 01 02 **	01	02
A	06 01 01 01	Clevis, Secondary		1	1
B	18 51 019	Wire, Cu, #2 SD, Poly Covered		30	
C	17 51 137	Clamp, PG		1	
D	17 51 032	Connector, Split Bolt		2	1
E	23 68 472	Deadend, Preformed, 1/0 ACSR or AAAC		1	
	23 68 469	Deadend, Preformed, #4 ACSR			1

# CONFIGURATIONS

## Preassembled Cable Secondary Secondary Run

03 01 03 \*\*

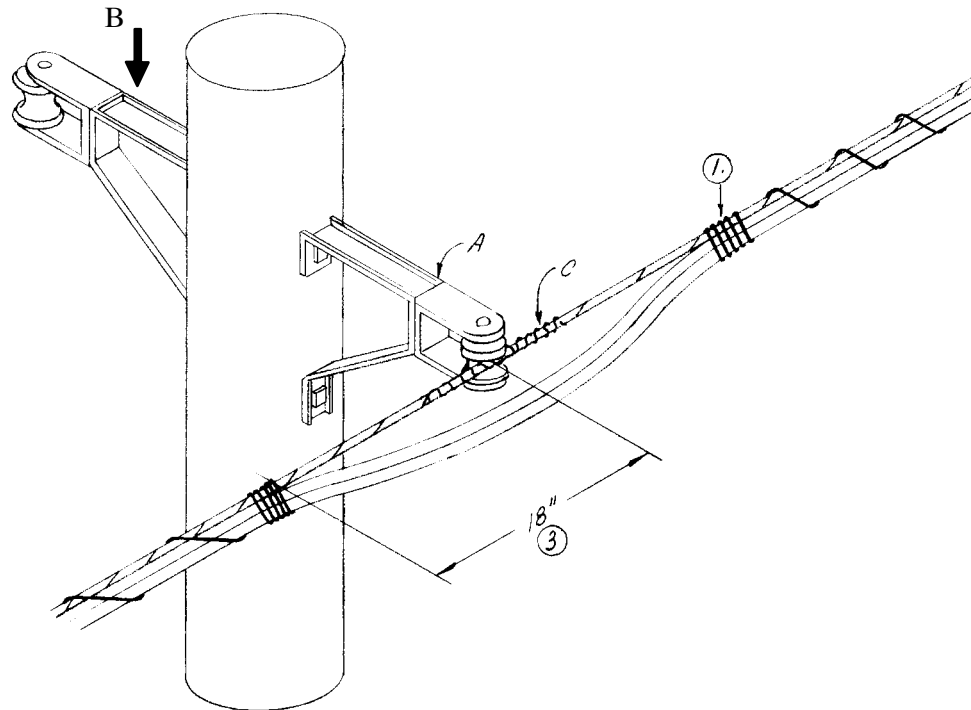
Sheet 1 of 1

Without Service Takeoff

03 01 03 01

With Service Takeoff

03 01 03 02



### NOTES:

1. Terminate lashing ribbon with 5 close turns around entire cable and end on messenger with 2 turns and a half hitch. Train leads neatly and eliminate excess slack.
2. For Service Construction Details, see Dist. Std. 09 01 34 00.
3. For ease in making connections, cable may be opened up as far as required.

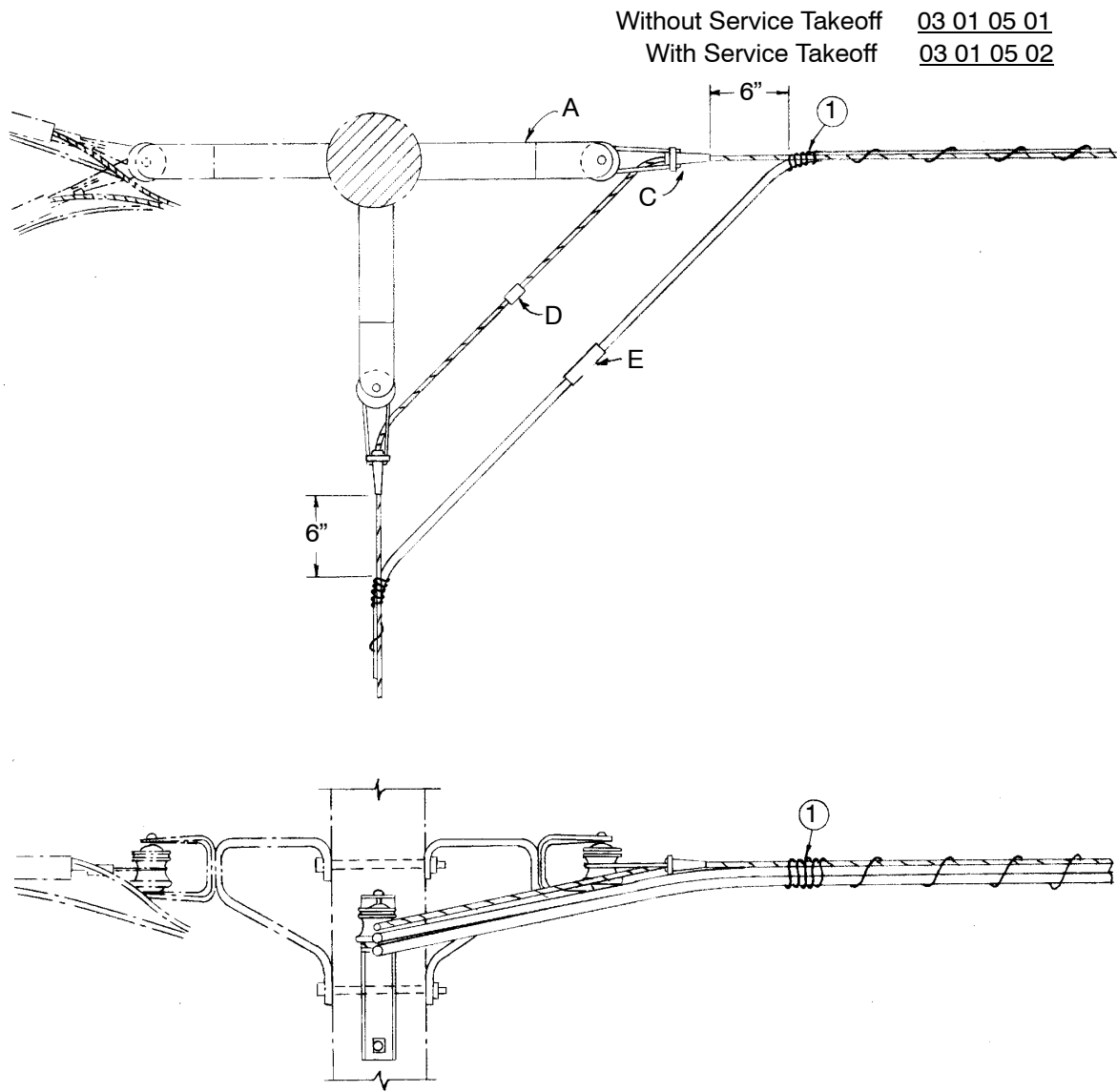
	Std. / Stk. No.	Description	03 01 03 **	01	02
A	06 01 01 03	Sgle. Clevis, Ext. Brkt.		1	
B	06 01 01 04	Dble. Sgle. Clevis Brkt.			1
C	23 68 358	Tie, Preformed, 1/0 AAAC		1	1

# CONFIGURATIONS

## Preassembled Cable Secondary L Corner

03 01 05 \*\*

Sheet 1 of 1



### NOTE:

1. Terminate lashing ribbon with 5 close turns around entire cable and end on messenger with two turns and a half hitch.

	Dist. Std. Or Stk. No.	Description	03 01 05 **	01	02
A	06 01 01 03	Sgle. Clevis, Ext. Brkt.		2	1
B	06 01 01 04	Dble. Sgle. Clevis Brkt.			1
C	23 78 333	Deadend, 1/0 AAAC		2	2
D	17 51 032	Clamp, 1/0 AAAC		1	1
E	17 51 138	Clamp, 4/0 AA		2	2

# CONFIGURATIONS

## Preassembled Cable Secondary Deadend

03 01 07 \*\*

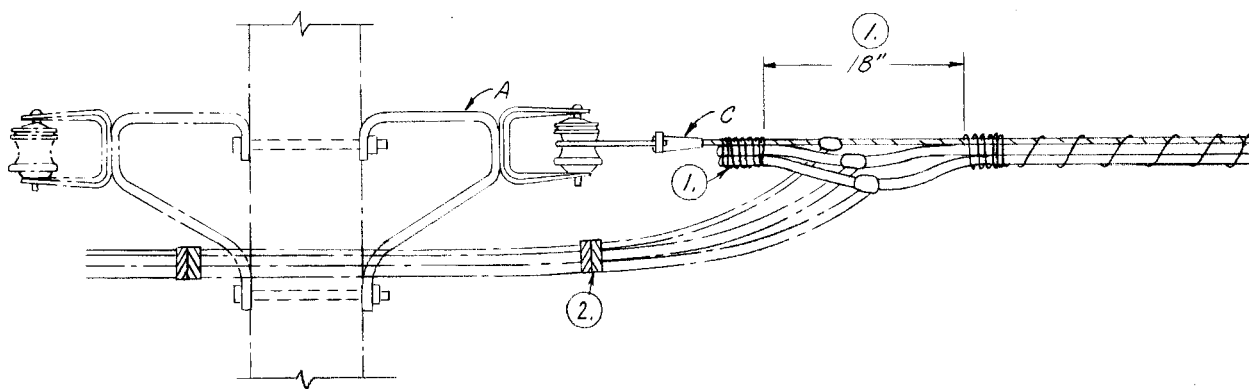
Sheet 1 of 1

Without Service Takeoff

03 01 07 01

With Service Takeoff

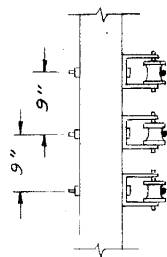
03 01 07 02



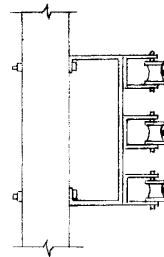
### NOTES:

1. Open cable for distance of approximately 18" to allow room for making taps. Tape ends of conductors with rubber tape 25 53 008, followed by friction tape, 25 53 003, and lash cable to messenger on both sides of opening with 5 close turns around entire cable and end on messenger with 2 turns and a half hitch.
2. Bunch same phase wires to form a cable and tape as necessary.

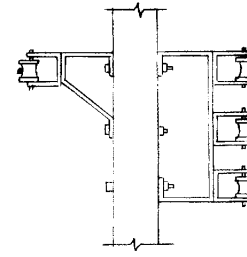
	Std. / Stk. No.	Description	03 01 07 **	01	02
A	06 01 01 03	Sgle. Clevis, Ext. Brkt.		1	
B	06 01 01 04	Dble. Sgle. Clevis Brkt.			1
C	23 78 333	Deadend 1/0 AAAC		1	1



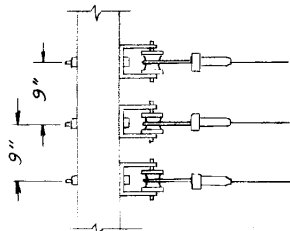
03 01 20 01  
Thru



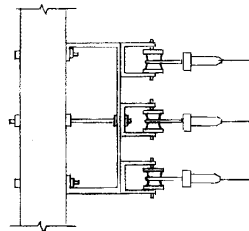
03 01 20 02  
Thru w/Ext.  
03 01 20 10  
W/O Ext.



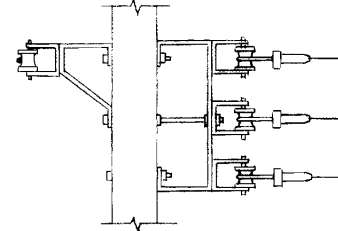
03 01 20 03  
Thru w/Ext.  
w/Service Ext.



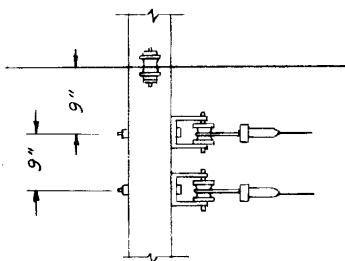
03 01 20 04  
Deadend



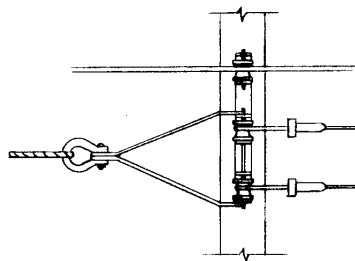
03 01 20 05  
Deadend Ext.  
03 01 20 11  
Deadend w/o Ext.



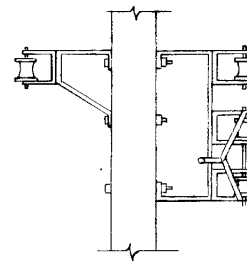
03 01 20 06  
Deadend Ext.  
w/Service Ext.



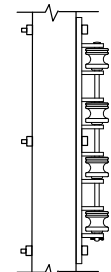
03 01 20 07  
Neutral Thru  
Sec. Deadend



03 01 20 08  
Neutral Thru  
Sec. Deadend w/Ext.



03 01 20 09  
Neutral Thru  
Sec. Deadend w/Ext.  
Service w/Ext.



03 01 20 12  
4 Wire Thru

### Notes:

- When multiple secondary racks are installed on the same side of the poles, a 6" separation is required between the racks.

# CONFIGURATIONS

## Open Wire Secondary

03 01 20 \*\*

Sheet 2 of 2

		Std. / Stk. No.	Description	03 01 20 **	01	02	03	04	05	06	07	08	09	10	11	12
@	A	06 01 01 01	Secondary Clevis		3			3			3					
	B	06 01 03 01	Ext. Bracket, 3-Clevis			1			1			1				
	C	06 01 03 02	Dble. Ext. Brkt's. 3 & 1 Clevis				1			1			1			
	D	11 00 49 01	Secondary Ext. Guy									1	1			
	E	DEP*W	Preformed Deadend					3	3	3	2	2	2		3	
		SDEA*W	Secondary Deadend					3	3	3	2	2	2		3	
	F	06 01 03 04	3 Spool Secondary Rack											1	1	
	G	06 01 07 01	4 Spool Secondary Rack													1



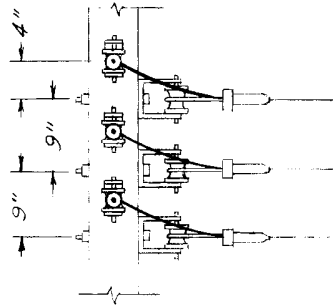
# CONFIGURATIONS

## Open Wire Secondary

### 90° Angle

03 01 21 \*\*

Sheet 1 of 1

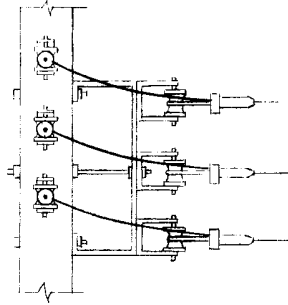


03 01 21 01

90 Deg. Angle

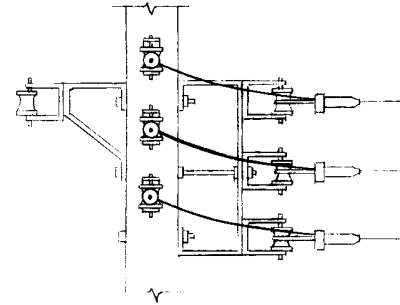
03 01 21 07

90 Deg. Angle w/3 Spool Rack



03 01 21 02

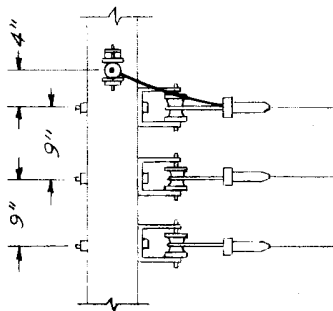
90 Deg. Angle w/ Ext.



03 01 21 03

90 Deg. Angle w/Ext.

Service w/Ext.



03 01 21 04

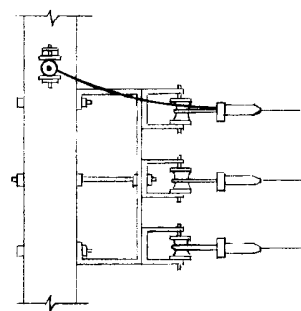
Sec. Deadend

Neutral 90 Deg. Angle

03 01 21 08

Sec. Deadend

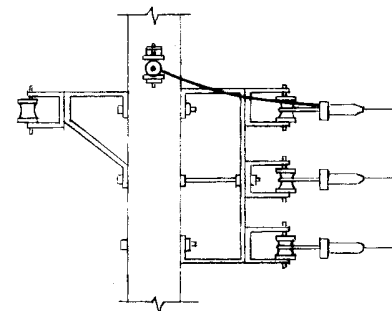
Neutral 90 Deg. Angle w/3 Spool Rack



03 01 21 05

Sec. Deadend w/Ext.

Neutral 90 Deg. Angle



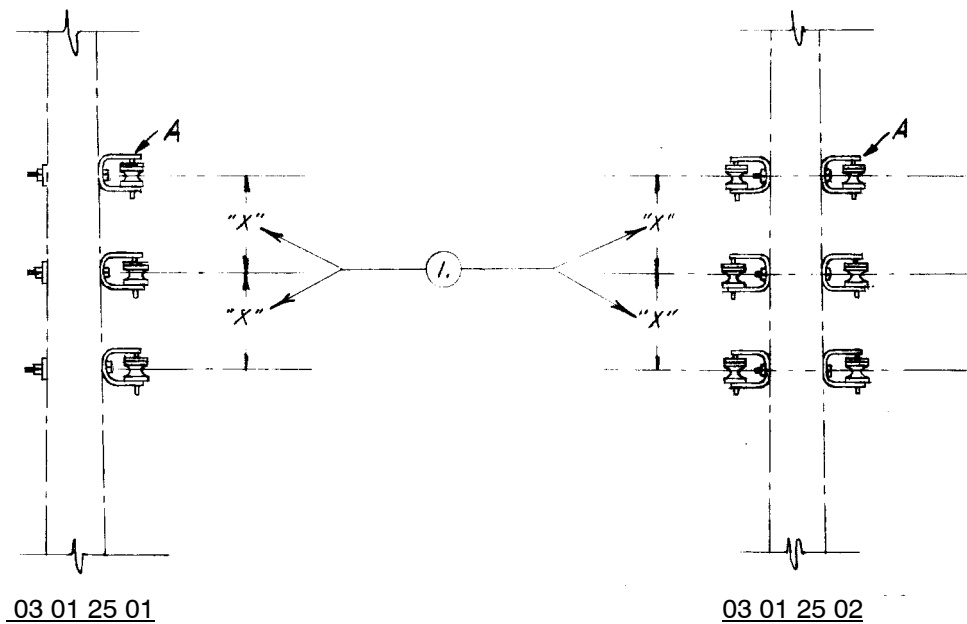
03 01 21 06

Sec. Deadend w/Ext.

Neutral 90 Deg. Angle

Service w/Ext.

		Dist. Std. Or Stk. No.	Description	03 01 21 **	01	02	03	04	05	06	07	08
-►@	A	06 01 01 01	Secondary Clevis		6	3	3	4	1	1	3	1
	B	06 01 03 01	Extension Brkt., 3- Clevis			1			1			
	C	06 01 03 02	Dble. Ext. Brkt's, 3 Clevis & 1 Clevis				1			1		
	D	DEP*W	Preformed Deadend		6	6	6	4	4	4		
		SDEA*W	Secondary Deadend		6	6	6	4	4	4	6	4
E	06 01 03 04		3 Spool Secondary Rack								1	1



	Std. / Stk. No.	Description	
A	06 01 01 01	Secondary Clevis	3

	Std. / Stk. No.	Description	
A	06 01 01 02	Service Takeoff	3

"X" = 9" for Spans up to 200 Ft.

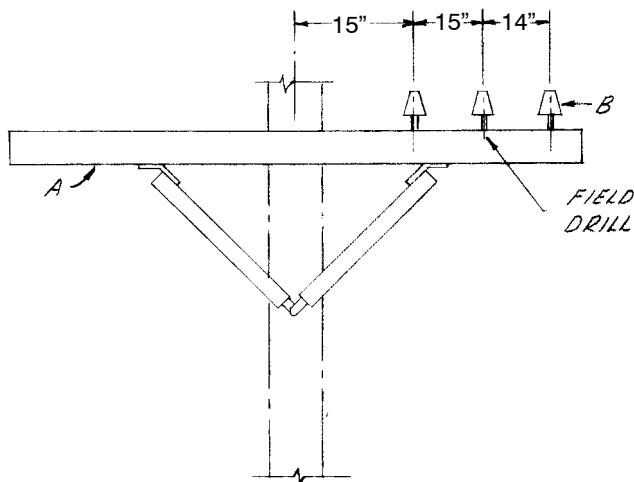
"X" = 12" for 200 Ft. to 250 Ft. Spans

"X" = 18" for 250 Ft. to 350 Ft. Spans

"X" = 24" for 350 Ft. to 400 Ft. Spans

**NOTES:**

1. This dimension may be reduced to 6" for spans up to 150 Ft. if necessary to meet joint use requirements.
2. Use secondary rack Stock No. 23-11-001 when available for spans up to 150 Ft.
3. For location of secondary clevises on rack with respect to primary circuits, see Dist. Std. 29 00 17 08.
4. This construction is applicable to only those cases where climbing space can be obtained without use of secondary extension bracket.



8'

Sgle. Arm      03 01 26 03

Dble. Arm      03 01 26 04

3 Wire Secondary On One Side of Pole

1. This construction to be used only where existing facilities prohibit the use of secondary racks or clevises.
2. For location of secondary arms with respect to primary circuits, see Dist. Std. 29 00 17 16.

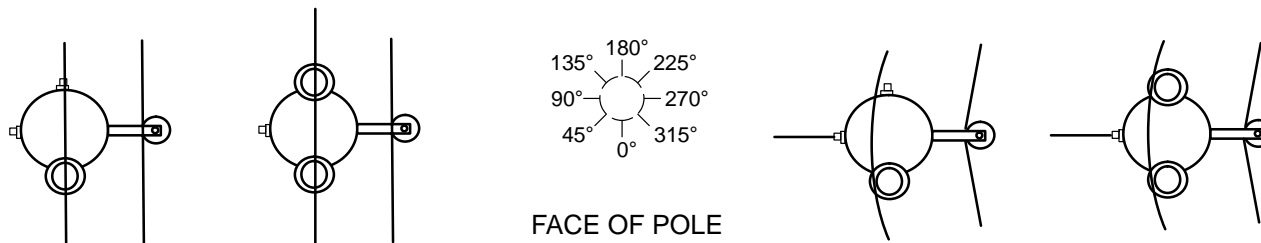
	Std. / Stk. No.	Description	03 01 26 **	03	04
A	04 00 20 02	Crossarm, Sgle., 8'		1	
	04 00 20 07	Crossarm, Dble., 8'			1
B	06 12 01 01	Insulator On Arm		3	6

# CONFIGURATIONS

Single Phase  
4 to 15 kV

03 12 01 \*\*

Sheet 1 of 5

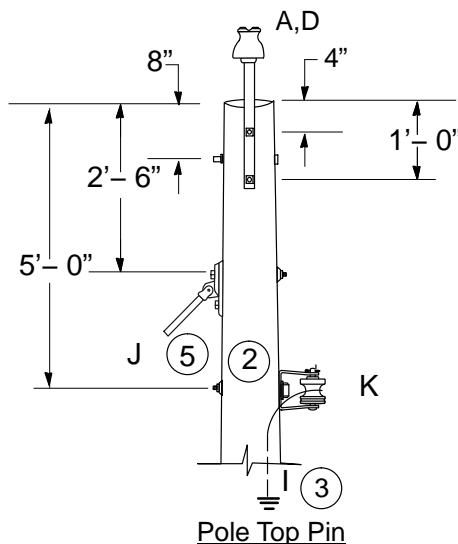


03 12 01 01  
Tangent, Single Pin

03 12 01 03  
Tangent, Double Pin

03 12 01 02 ①  
Angle, Single Pin

03 12 01 22 ①  
Angle, Double Pin



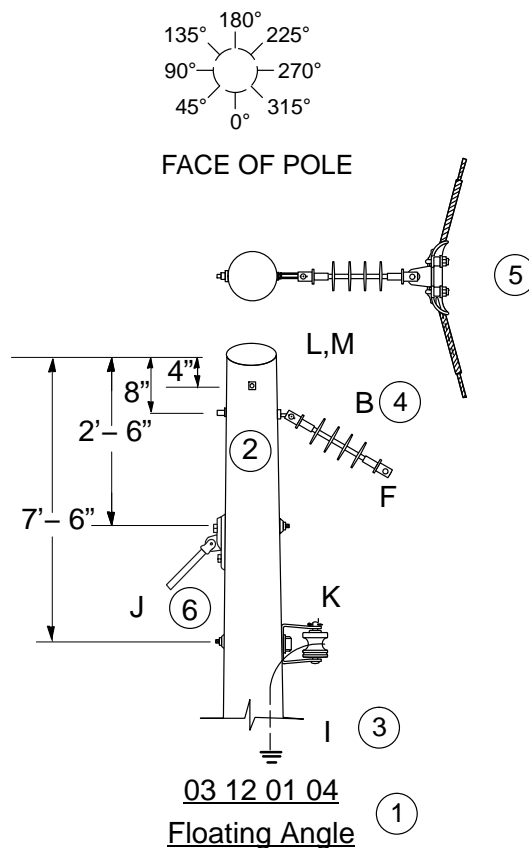
1. See DCS 03 00 03 00 for angle and span length limitations.
2. See DCS 02 00 04 02 for unguyed composite pole application.
3. Composite pole has factory installed (internal) pole ground in the 45° quadrant. Wood pole may require pole ground depending on application.
4. Double coil washer is not required on composite pole.
5. See DCS 11 00 02 02 for typical guy insulator placement.

		Std. / Stk. No.	Description	03 12 01 **	01	02	03	22
4	A	06 12 01 02	Insulator, Pole Top, Sgl Pin		1	1		
		06 12 01 13	Insulator, Pole Top, Dbl Pin				1	1
@	D	TT*W	Single Top Tie, See DCS 07 00 41 00		1			
		ST*W	Single Side Tie, See DCS 07 00 41 00			1		
		DTT*W	Double Top Tie, See DCS 07 00 41 00				1	
		DST*W	Double Side Tie, See DCS 07 00 41 00					1
@3	I	12 00 10 **	Grounding Unit, Wood Pole	@	@	@	@	@
		12 00 10 11	Grounding Unit, Composite Pole	1	1	1	1	1
@5	J	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)		1			1
@	K	03 01 01 **	Neutral	1	1	1	1	1

DISTRIBUTION  
CONSTRUCTION STANDARDS



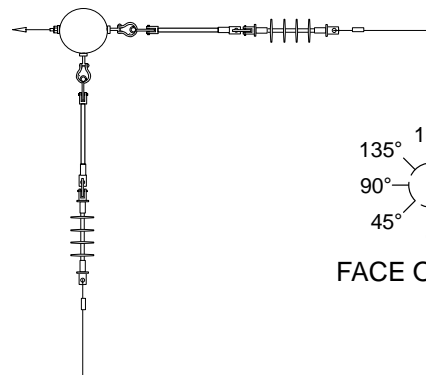
ENG: KR  
REV. NO: 11  
REV. DATE: 04/01/19



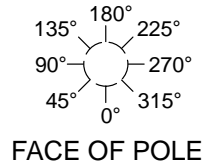
### NOTES:

1. See DCS 07 00 16 00 for angle limitations.
2. See DCS 02 00 04 02 for unguyed composite pole application.
3. Composite pole has factory installed (internal) pole ground in the 45° quadrant. Wood pole may require pole ground depending on application.
4. If application is under-built (not top attachment on the pole), use DCS 03 12 02 04.
5. For ACSR, AAAC, and AAC conductors where spans exceed 300 feet, see DCS 07 00 08 01 for application of armor rods.
6. See DCS 11 00 02 02 for typical guy insulator placement.

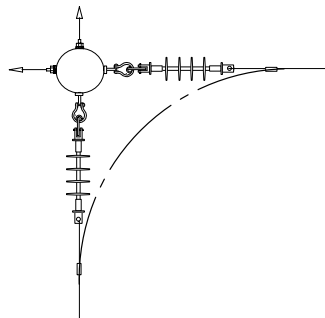
		Std. / Stk. No.	Description	03 12 01 **	04
@	B	06 12 30 02	Insulator, Floating Angle		1
	F	SC*W	Clamp, Suspension See DCS 07 00 16 00		1
@3	I	12 00 10 **	Grounding Unit, Wood Pole		@
		12 00 10 11	Grounding Unit, Composite Pole		1
@6	J	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)		1
@	K	03 01 01 **	Neutral		1
	L	23 52 065	Bolt, Mach., 5/8" x 12" (Anti-Split)		1
	M	23 66 031	Washer, Curved, 3/4"		2



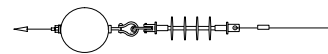
W/EXTENSION ①



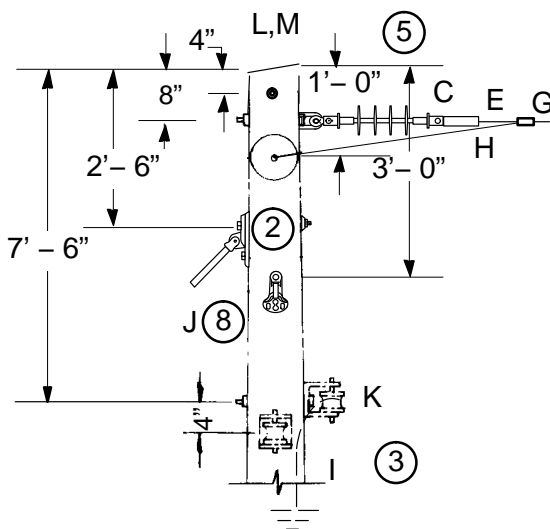
W/EXTENSION ①



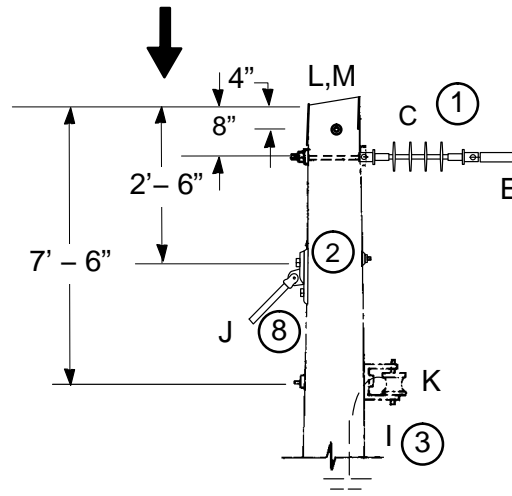
W/O EXTENSION ⑨



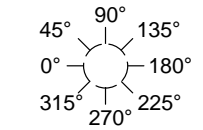
W/O EXTENSION ⑨



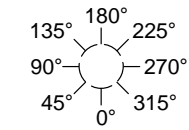
W/FG Extension 03 12 01 05  
W/O FG Extension 03 12 01 12 ⑨  
90 Deg. Angle



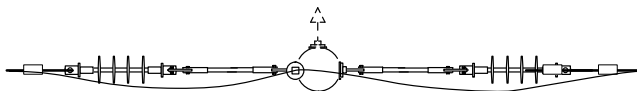
W/FG Extension 03 12 01 06 ①  
W/O FG Extension 03 12 01 11 ⑨  
Deadend



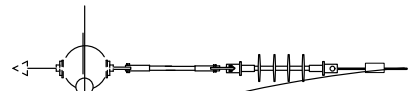
FACE OF POLE



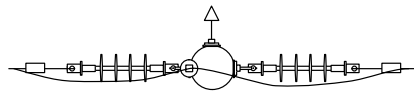
FACE OF POLE



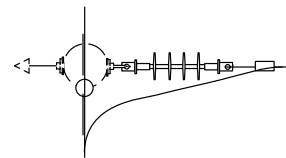
W/EXTENSION ①



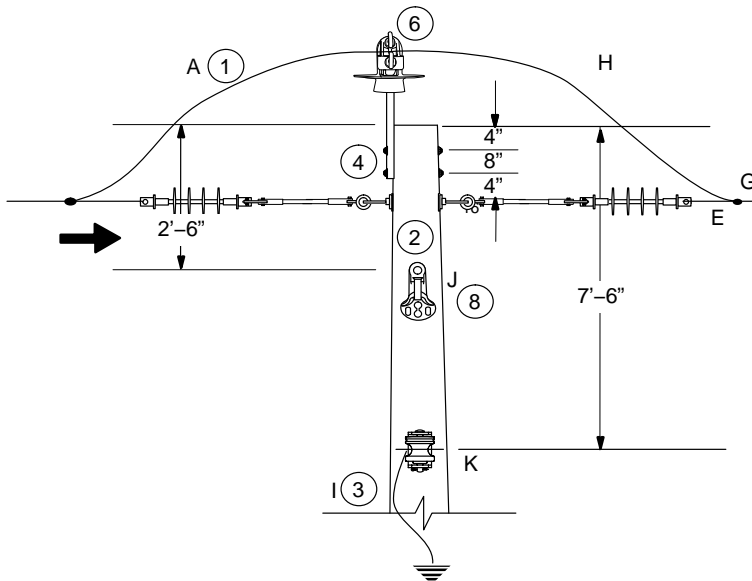
W/EXTENSION ①



W/O EXTENSION ⑨



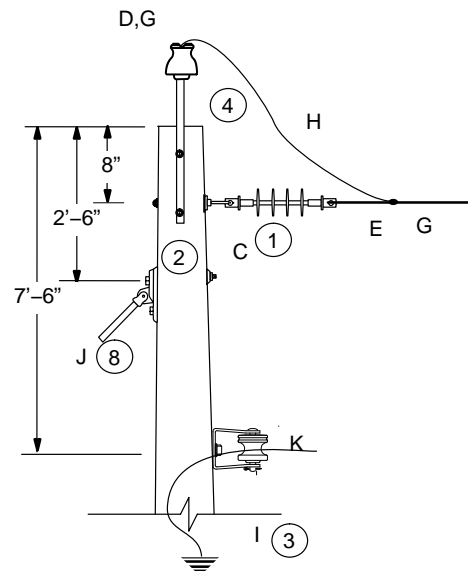
W/O EXTENSION ⑨



W/FG Extension  
W/O FG Extension

03 12 01 07 ①  
03 12 01 13 ⑨

LOOPOVER



W/FG Extension  
W/O FG Extension

03 12 01 08 ①  
03 12 01 14 ⑨

TAP

# CONFIGURATIONS

## Single Phase 4 to 15 kV

**03 12 01 \*\***  
Sheet 5 of 5

### NOTES:

1. For Ameren Mo., use FG extension if other equipment is installed on this pole and additional working space is needed.
2. See DCS 02 00 04 02 for unguyed composite pole application.
3. Composite pole has factory installed (internal) pole ground in the 45° quadrant. Wood pole may require pole ground depending on application.
4. Double coil washer is not required on composite pole.
5. If application is under-built (not top attachment on the pole), use DCS 03 12 02 05.
6. For jumper support application, hand tighten only and do not twist the eye off.
7. See DCS 17 31 50 \*\* and 17 31 51 \*\* for explanation of Operation Codes.
8. See DCS 11 00 02 02 for typical guy insulator placement.
9. Deadend on pole w/o fiberglass extension available Ameren Mo. Only.

		Std. / Stk. No.	Description	03 12 01 **	05	06	07	08	11	12	13	14
1,4	A	06 12 30 04	Pole Top, Loopover w/FG Extension				1					
9		06 12 30 14	Pole Top, Loopover w/o FG Extension								1	
1	C	06 12 30 01	Deadend w/FG Extension		2	1		1				
9		06 12 30 11	Deadend w/o FG Extension						1	2		1
@	D	TT*W	Top Tie See DCS 07 00 41 00					1				1
@	E	DEC*W	Clamp, Deadend See DCS 07 00 11 00		2	1	2	1	1	2	2	1
@	G	PG*	See DCS 07 00 25 00		2		2	2		2	2	2
@	H	PLW*W	Wire, Poly Covered, (ft.) See DCS 07 00 80 00		10		10	5		5	5	5
@ 3	I	12 00 10 **	Grounding Unit, Wood Pole		@	@	@	@	@	@	@	@
		12 00 10 11	Grounding Unit, Composite Pole		1	1	1	1	1	1	1	1
@ 8	J	11 00 4* **	Guying Unit ( Down , Span, or Sidewalk)		2	1	1	1	1	2	1	1
@	K	03 01 01 **	Neutral		2	1	1	1	1	2	1	1
	L	23 52 065	Bolt, Mach., 5/8" x 12" (Anti-Split)		1	1			1	1		
	M	23 66 031	Washer, Curved, 3/4"		2	2			2	2		
7		252, 255, or 260	Install Jumper		1		1	1		1	1	1



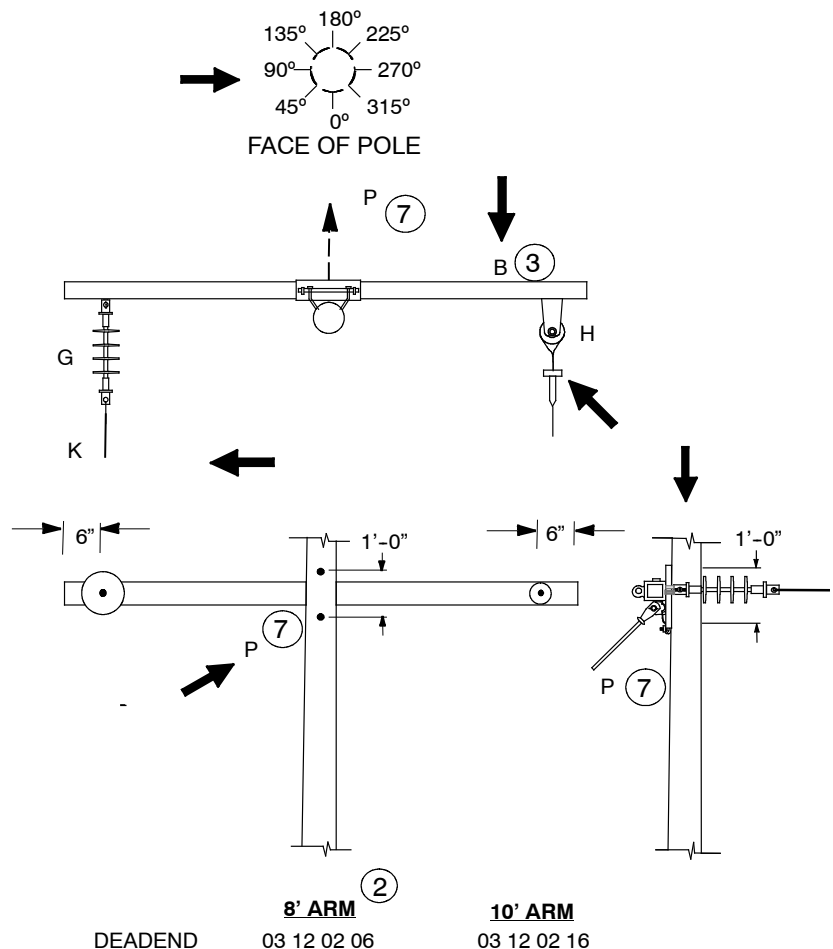
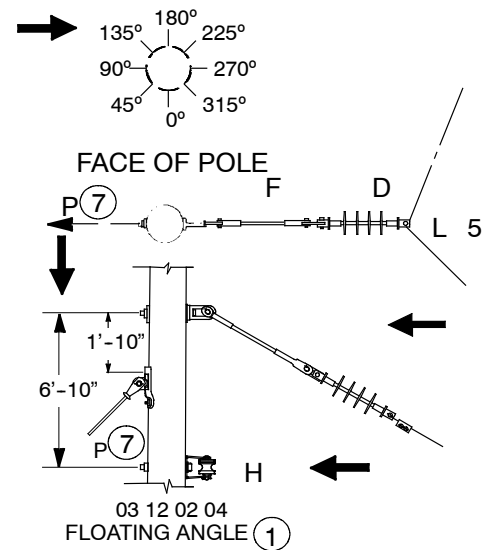
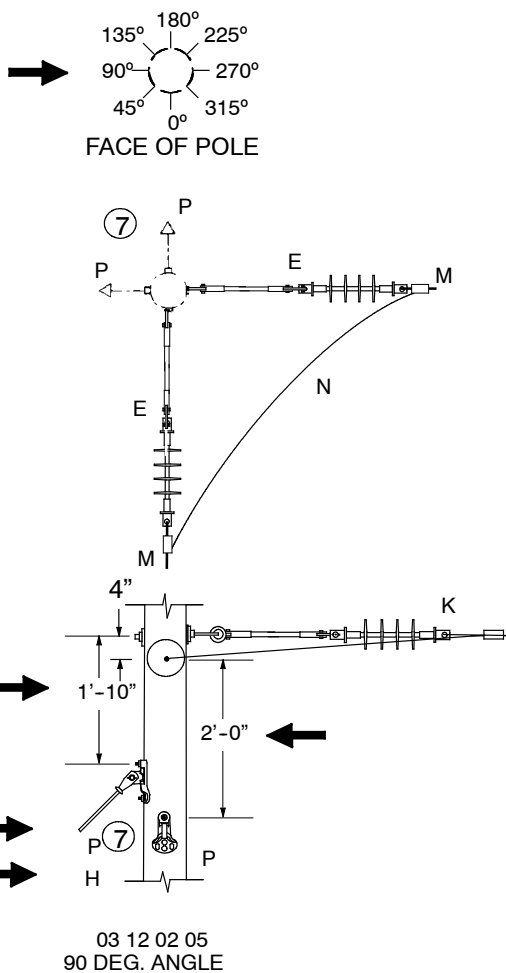
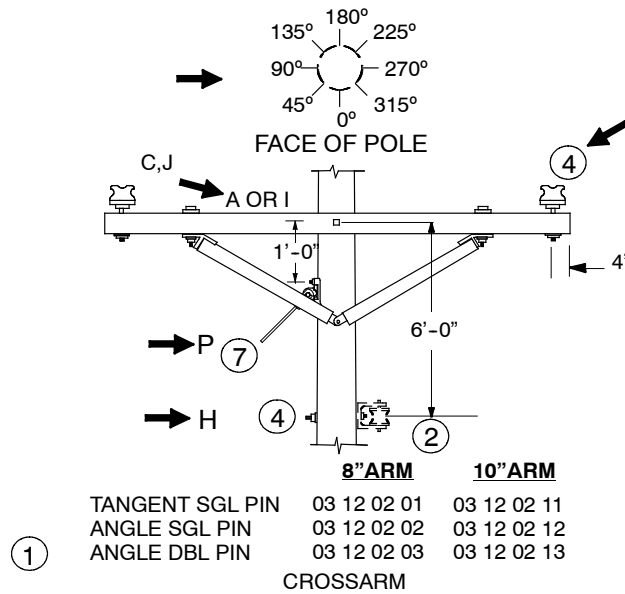
# CONFIGURATIONS

## Single Phase - Underbuild

### 4 to 15kV

03 12 02 \*\*

Sheet 1 of 2



# CONFIGURATIONS

## Single Phase – Underbuild

### 4 to 15kV

03 12 02 \*\*

Sheet 2 of 2

#### NOTES:

1. See DCS 03 00 03 00 for angle and span length limitations.
2. 8' crossarm available for use in Ameren Mo only.
3. See DCS 04 00 41 \*\* for maximum working loads for F/G deadend arms.
4. If neutral installed below arm, omit one pin insulator and see DCS 03 01 01 \*\* for neutral materials.
5. For ACSR, AAAC, and AAC conductors where spans exceed 300 feet, see DCS 07 00 08 01 for application of armor rods.
6. See DCS 17 31 50 \*\* and 17 31 51 \*\* for explanation of Operation Codes.
7. See DCS 11 00 02 02 for typical guy insulator placement



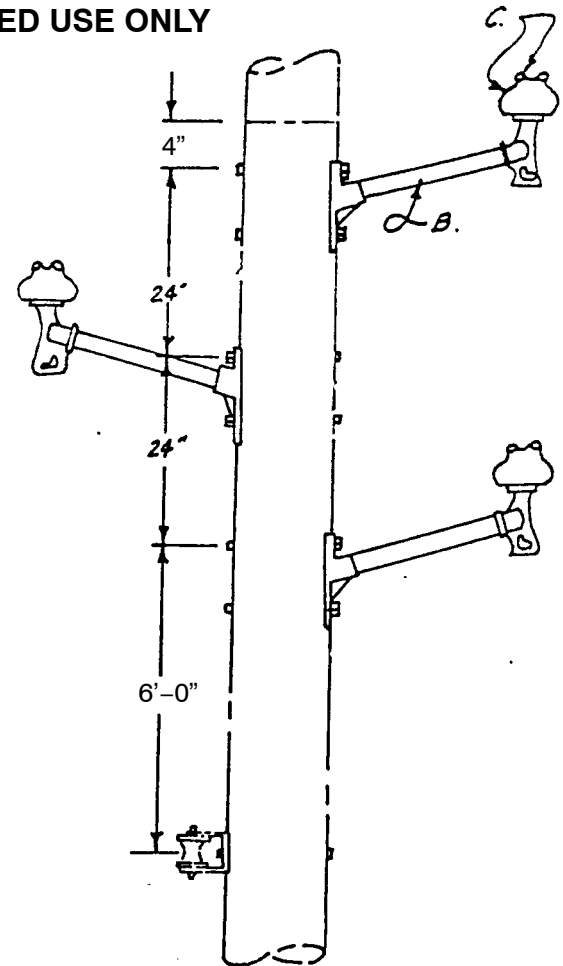
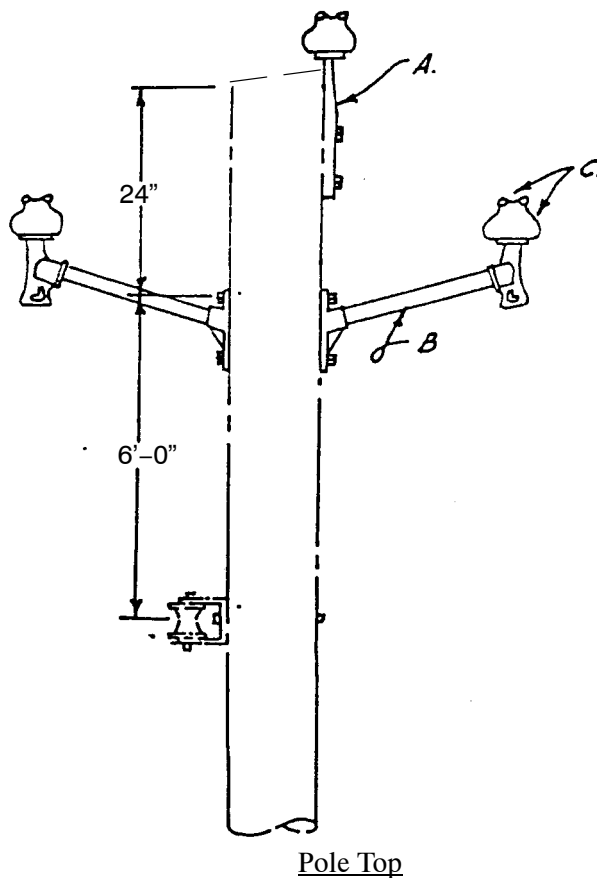
		Std. / Stk. No.	Description	03 12 02 **	01	02	03	04	05	06	11	12	13	16
2	A	04 00 20 02	Crossarm, 8' Wood, Sgl.		1	1								
		04 00 20 03	Crossarm, 10' Wood, Sgl.								1	1		
2,3	B	04 00 41 03	Crossarm, Deadend, FG, 8'							1				
		04 00 41 04	Crossarm, Deadend, FG, 10'											1
	C	06 12 01 01	Insulator, Arm, Sgl Pin		2	2					2	2		
		06 12 01 11	Insulator, Arm, Dbl Pin				2						2	
	D	06 12 30 02	Insulator, Floating Angle					1						
	E	06 12 30 01	Deadend w/ FG Extension						2					
	F	25 56 076	Insulator, Guy Strain, FG, 26"					1						
	G	06 12 34 01	Deadend On Arm							1				1
@	H	03 01 01 **	Neutral		1	1	1	1	2	1	1	1	1	1
2	I	04 00 41 14	Crossarm, Tangent, F/G, 8'				1							
		04 00 41 16	Crossarm, Tangent, F/G, 10'										1	
@	J	TT*W	Sgl Top Tie (See DCS 07 00 41 00)		2						2			
		ST*W	Sgl Side Tie (See DCS 07 00 41 00)			2						2		
		DST*W	Dble. Side Tie (See DCS 07 00 41 00)				2						2	
@5	K	DEC*W	Deadend, Clamp (See DCS 07 00 11 00)						2	1				1
@	L	SC*W	Suspension, Clamp (See 07 00 20 00)					1						
@	M	PG*W	See Std. (See DCS 07 00 25 00)						2					
@	N	PLW*W	Wire, Poly covered, (Ft.) (See DCS 07 00 80 00)						18					
@7	P	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)			1	1	1	2	1		1	1	1
6		252, 255, or 260	Install jumper						1					

**CONFIGURATIONS**  
Armless – Two or Three Phase  
4kV to 15kV

**03 12 03 \*\***

Sheet 1 of 1

**MAINTENANCE AND LIMITED USE ONLY**



2Ø                      3Ø

Tangent    03 12 03 01                      03 12 03 03  
Angle        03 12 03 02                      03 12 03 04

Underbuild

2Ø                      3Ø

Tangent    03 12 03 05                      03 12 03 07  
Angle        03 12 03 06                      03 12 03 08

		Std. / Stk. No.	Description	03 12 03 **	01	02	03	04	05	06	07	08
					Pole Top				Underbuild			
					<u>2Ø</u>		<u>3Ø</u>		<u>2Ø</u>		<u>3Ø</u>	
@	A	06 12 01 02	Insulator, Pole Top		1	1	1	1				
	B	06 12 21 04	Assembly – Standoff, 24" F.G.		1	1	2	2	2	2	3	3
	C	TT*W	Top Tie		2		3		2		3	
		ST*W	Side Tie			2		3		2		3

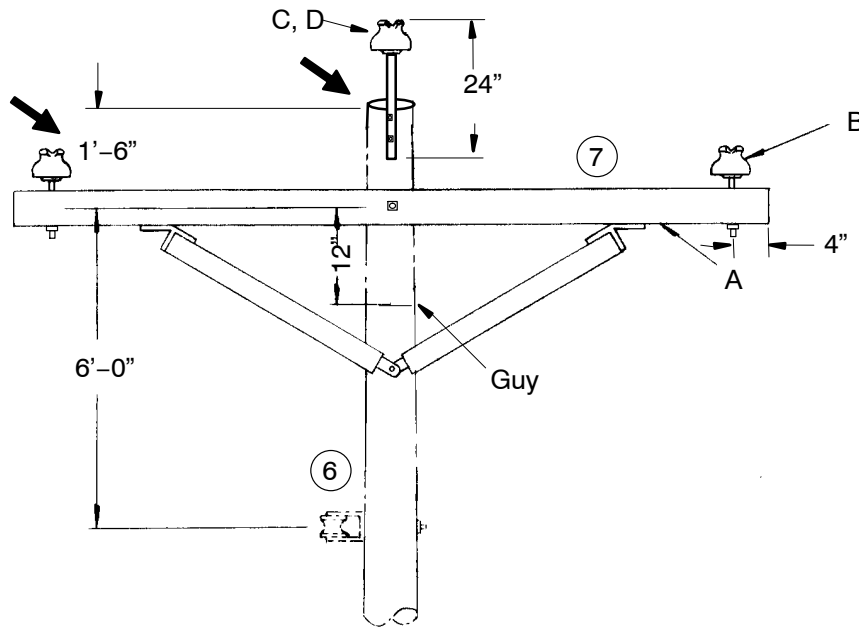
# CONFIGURATIONS

## Two or Three Phase

### Tangent Or Angle On Wood Crossarm – 4 to 15 kV

03 12 05 \*\*

Sheet 1 of 3



	3Ø	2Ø
Tangent 8' Sgle. Arm	03 12 05 01	03 12 05 07
Angle 8' Sgle. Arm	03 12 05 02	03 12 05 08
Tangent 10' Sgle. Arm	03 12 05 04	03 12 05 10
Angle 10' Sgle. Arm	03 12 05 05	03 12 05 11

#### NOTES:

- See DCS 03 00 03 for angle and span length limitations.
- See DCS 04 00 20 \*\* for arm detail.
- For 2 phase configuration, eliminate the center phase position.
- See DCS 02 00 04 03 for unguyed composite pole application.
- Composite pole has factory installed pole ground; wood pole may require pole ground based on application.
- See DCS 03 01 01 \*\* for neutral configuration.
- 8 ft. crossarm available AmerenMO only.

		Std. / Stk. No.	Description	03 12 05 **									
				01	02	04	05	07	08	10	11		
7	A	04 00 20 02	Crossarm, 8' Sgl.	1	1			1	1				
		04 00 20 03	Crossarm, 10' Sgl.			1	1			1	1		
	B	06 12 01 01	Insulator, Arm, Sgl	2	2	2	2	2	2	2	2		
	C	06 12 01 02	Insulator, Pole Top, Sgl	1	1	1	1						
@	D	TT*W	Sgl Top Tie	3		3		2		2			
		ST*W	Sgl Side Tie		3		3		2		2		

**DISTRIBUTION  
CONSTRUCTION STANDARDS**



ENG: MJ  
REV. NO: 9  
REV. DATE: 1/06/12

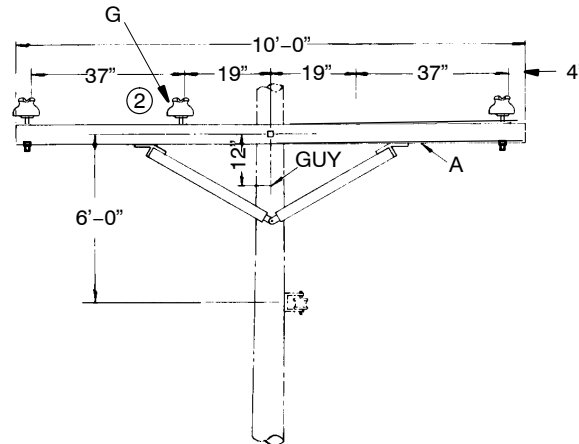
# CONFIGURATIONS

## Two or Three Phase

### Tangent Or Angle On Wood Crossarm – 4 to 15 kV

03 12 05 \*\*

Sheet 2 of 3



	<u>3Ø</u>	<u>2Ø</u>
TANGENT 10' SGLE. ARM	03 12 05 51	03 12 05 60
ANGLE 10' SGLE. ARM	03 12 05 52	03 12 05 61

➔ UNDERBUILD

#### NOTES:

1. See DCS 03 00 03 for angle and span length limitations.
2. Underbuild cover available AmerenIL only.

		Std. / Stk. No.	Description	03 12 05 **			
				51	52	60	61
@				3Ø		2Ø	
	A	04 00 20 03	Crossarm, 10' Sgle.	1	1	1	1
	C	06 12 01 01	Insulator, Arm	3	3	2	2
	E	TT*W	Top Tie, Sgl Pin	3		2	
		ST*W	Side Tie, Sgl Pin		3		2
2@	G	05 16 10 01	Cover – Single Pin	1	1		

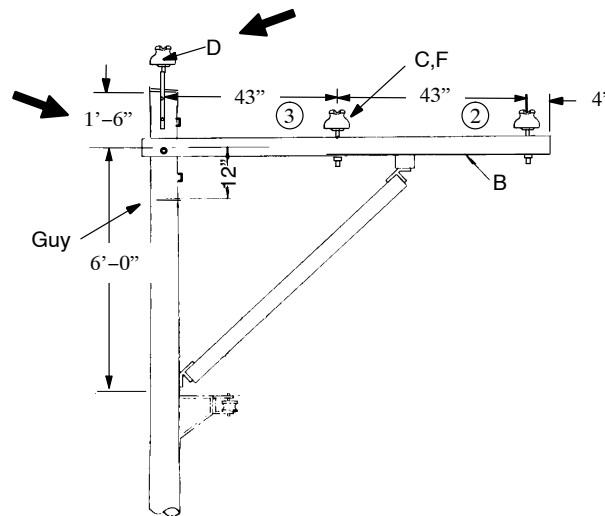
# CONFIGURATIONS

## Two or Three Phase

### Tangent Or Angle On Wood Crossarm – 4 to 15 kV

03 12 05 \*\*

Sheet 3 of 3



	<u>3Ø</u>	<u>2Ø</u>
TANGENT 8' SGLE. ARM	03 12 05 54	03 12 05 63
ANGLE 8' SGLE. ARM	03 12 05 55	03 12 05 64
ANGLE DBLE. ARM	03 12 05 56	03 12 05 65

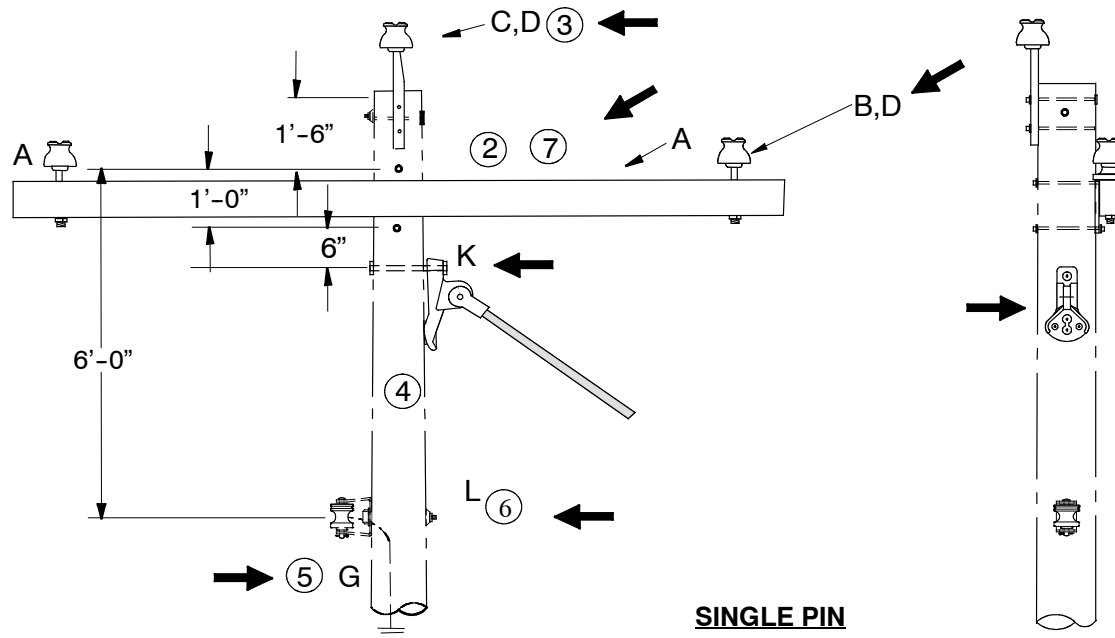
SIDE ARM ①

#### NOTES:

1. See DCS 03 00 03 for angle and span length limitations.
2. 8 ft. alley arm available AmerenMO only.
3. Cover available AmerenIL only.

		Std./ Stk. No.	Description	03 12 05 **	54	55	56	63	64	65
					3Ø			2Ø		
@	B	04 00 24 02	Sidearm, 8' Sgle.		1	1		1	1	
		04 00 24 05	Sidearm, 8' Dble.				1			1
	C	06 12 01 01	Insulator, Arm		2	2	4	1	1	4
	D	06 12 01 02	Insulator, Pole Top		1	1	2	1	1	
	E	TT*W	Top Tie		3			2		
		ST*W	Side Tie			3			2	
		DST*W	Double Side Tie				3			2
3@	F	05 16 10 01	Cover – Single Pin		1	1				

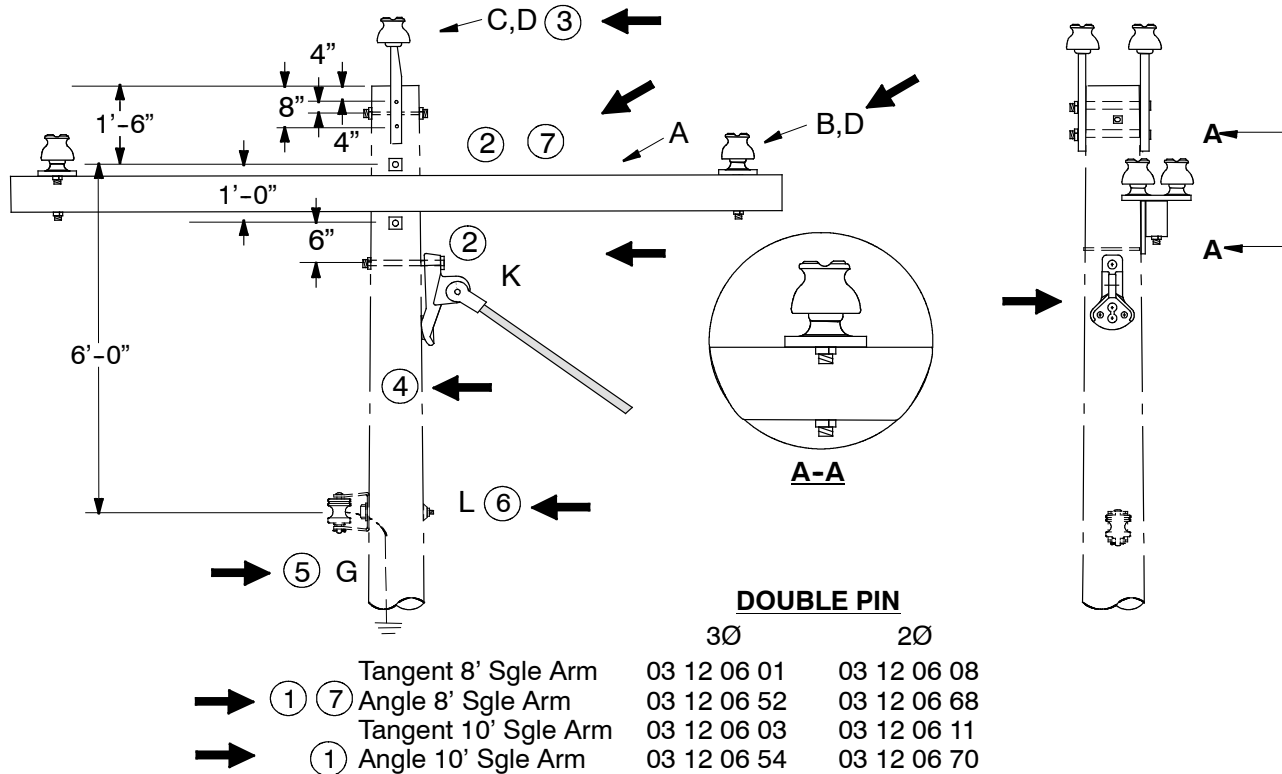
## Tangent Or Angle On Fiberglass Crossarm



## NOTES:

1. See DCS 03 00 03 00 for angle and span length limitations.
2. See DCS 04 00 41 \*\* for arm detail.
3. For 2 phase configuration, eliminate the center phase position.
4. See DCS 02 00 04 03 for unguyed composite pole application.
5. Composite pole has factory installed (internal) pole ground. Wood pole may require pole ground depending on application.
6. See DCS 03 01 01 \*\* for neutral configuration.
7. 8 ft. crossarm available Ameren Mo. only.

		Std. / Stk. No.	Description	03 12 06 **	02	04	05	13	07	10	14	15
					3Ø				2Ø			
7	A	04 00 41 14	Crossarm, F/G, 8'		1			1	1		1	
		04 00 41 16	Crossarm, F/G, 10'			1	1			1		1
	B	06 12 01 12	Insulator, Arm, Sgl Pin		2	2	2	2	2	2	2	2
	C	06 12 01 02	Insulator, Pole Top, Sgl Pin		1	1	1	1				
@	D	TT*W	Top Tie, Sgl Pin See DCS 07 00 41 00		3	3			2	2		
		ST*W	Side Tie, Sgl Pin See DCS 07 00 41 00				3	3			2	2
5@	G	12 00 10 01	Grounding Unit, Wood Pole		@	@	@	@	@	@	@	@
		12 00 10 11	Grounding Unit, Composite Pole		1	1	1	1	1	1	1	1
@	K	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)				1	1			1	1
6@	L	03 01 01 01	Neutral, Tangent		1	1	1	1	1	1	1	1
		03 01 01 02	Neutral, Tangent w/Ext		1	1	1	1	1	1	1	1



## NOTES:

- See DCS 03 00 03 00 for angle and span length limitations.
- See DCS 04 00 41 \*\* for arm detail.
- For 2 phase configuration, eliminate the center phase position.
- See DCS 02 00 04 03 for unguyed composite pole application.
- Composite pole has factory installed (internal) pole ground. Wood pole may require pole ground depending on application.
- See DCS 03 01 01 \*\* for neutral configuration.
- 8 ft. crossarm available Ameren Mo. only.

		Std. / Stk. No.	Description	03 12 06 **	01	03	52	54	08	11	68	70
					3Ø				2Ø			
7	A	04 00 41 14	Crossarm, F/G, 8'		1		1		1		1	
		04 00 41 16	Crossarm, F/G, 10'			1		1		1		1
	B	06 12 01 11	Insulator, Arm, Dbl Pin		2	2	2	2	2	2	2	2
	C	06 12 01 13	Insulator, Pole Top, Dbl Pin		1	1	1	1				
@	D	DTT*W	Double Top Tie, Dbl Pin See DCS 07 00 41 00		3	3			2	2		
		DST*W	Double Side Tie, Dbl Pin See DCS 07 00 41 00				3	3			2	2
5@	G	12 00 10 01	Grounding Unit, Wood Pole		1	1	1	1	1	1	1	1
		12 00 10 11	Grounding Unit, Composite Pole		1	1	1	1	1	1	1	1
@	K	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)				1	1			1	1
6@	L	03 01 01 01	Neutral, Tangent		1	1	1	1	1	1	1	1
		03 01 01 02	Neutral, w/Ext		1	1	1	1	1	1	1	1



# CONFIGURATIONS

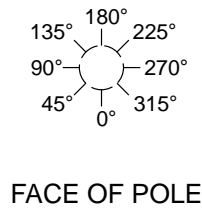
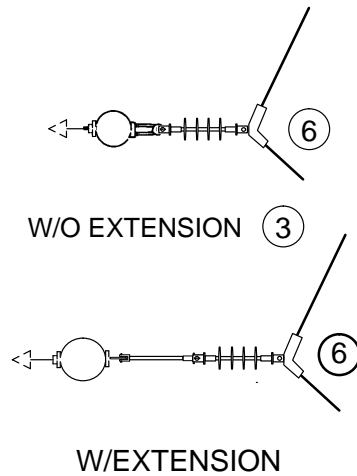
## Two or Three Phase Floating and 90° Angles

### 4kV to 15kV

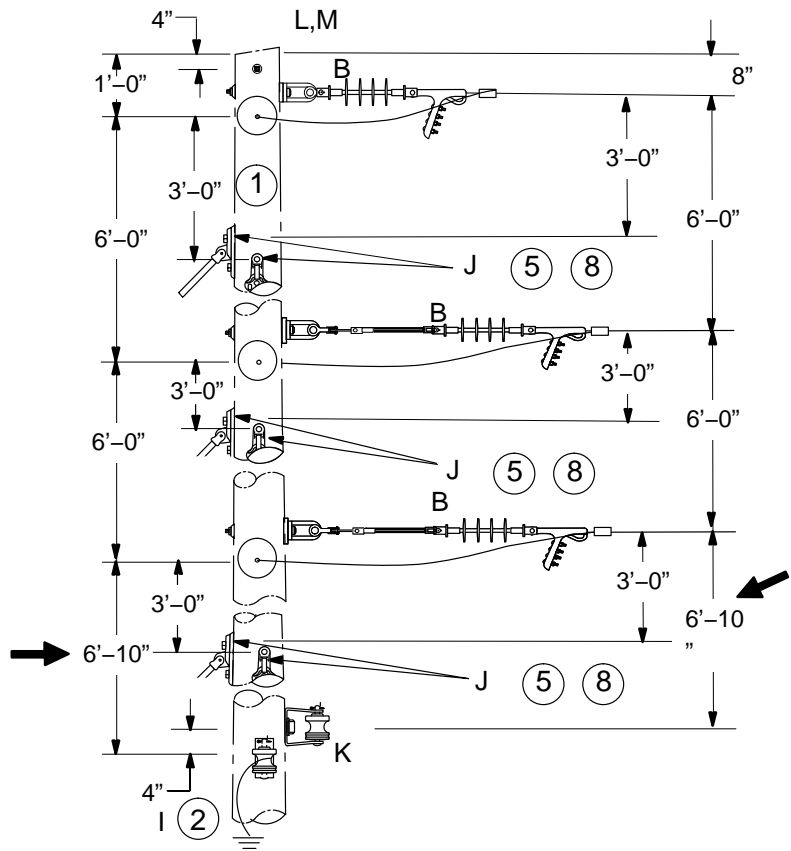
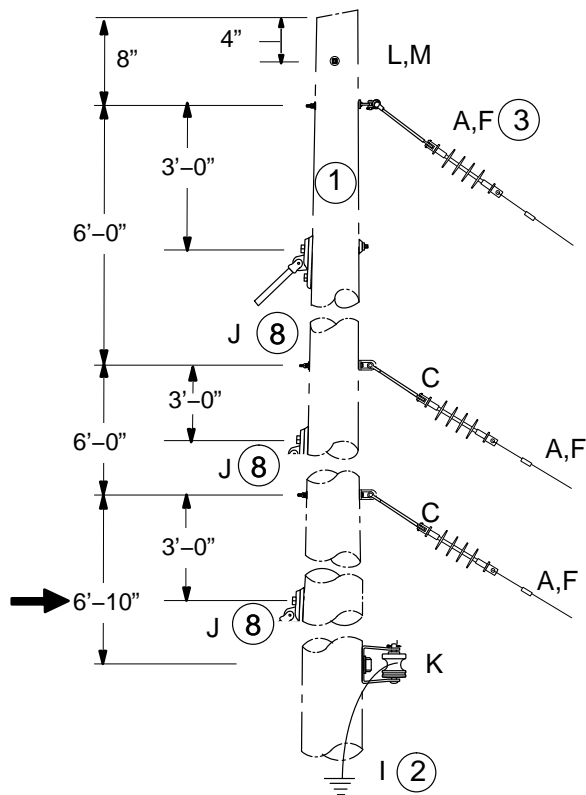
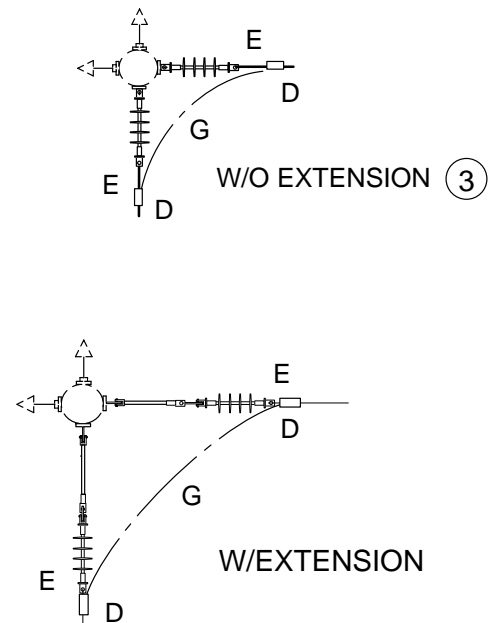
03 12 07 \*\*

Sheet 1 of 2

#### FLOATING ANGLES



#### 90° ANGLES



- (4) Floating Angle
- Deadend w/FG Extension in Top Phase
- Deadend w/o FG Extension in Top Phase

3Ø  
03 12 07 02  
03 12 07 04  
03 12 07 03

2Ø  
03 12 07 06  
03 12 07 08  
03 12 07 07

# CONFIGURATIONS

## Two or Three Phase Floating and 90° Angles

### 4kV to 15kV

**03 12 07 \*\***  
Sheet 2 of 2

**NOTES:**

1. See DCS 02 00 04 03 for unguyed composite pole application.
2. Composite pole has factory installed (internal) pole ground in the 45° quadrant. Wood pole may require pole ground depending on application.
3. Use FG extension in top phase for climbing space if application is under-built (not top attachment on the pole). For 03 12 07 02 & 06 this requires ordering 1 additional FG extension.
4. 03 12 07 04 & 08 are for under-build construction and include FG extensions for the top phases.
5. If a span guy or guys are required or two through-bolts are used to attach the guy hook(s), the location of one or both of the guy hooks will need to be adjusted up or down 2 inches.
6. For ACSR, AAAC, and AAC conductors where spans exceed 300 feet, see DCS 07 00 08 01 for application of armor rods.
7. See DCS 17 31 50 \*\* and 17 31 51 \*\* for explanation of Operation Codes.
8. See DCS 11 00 02 02 for typical guy insulator placement.

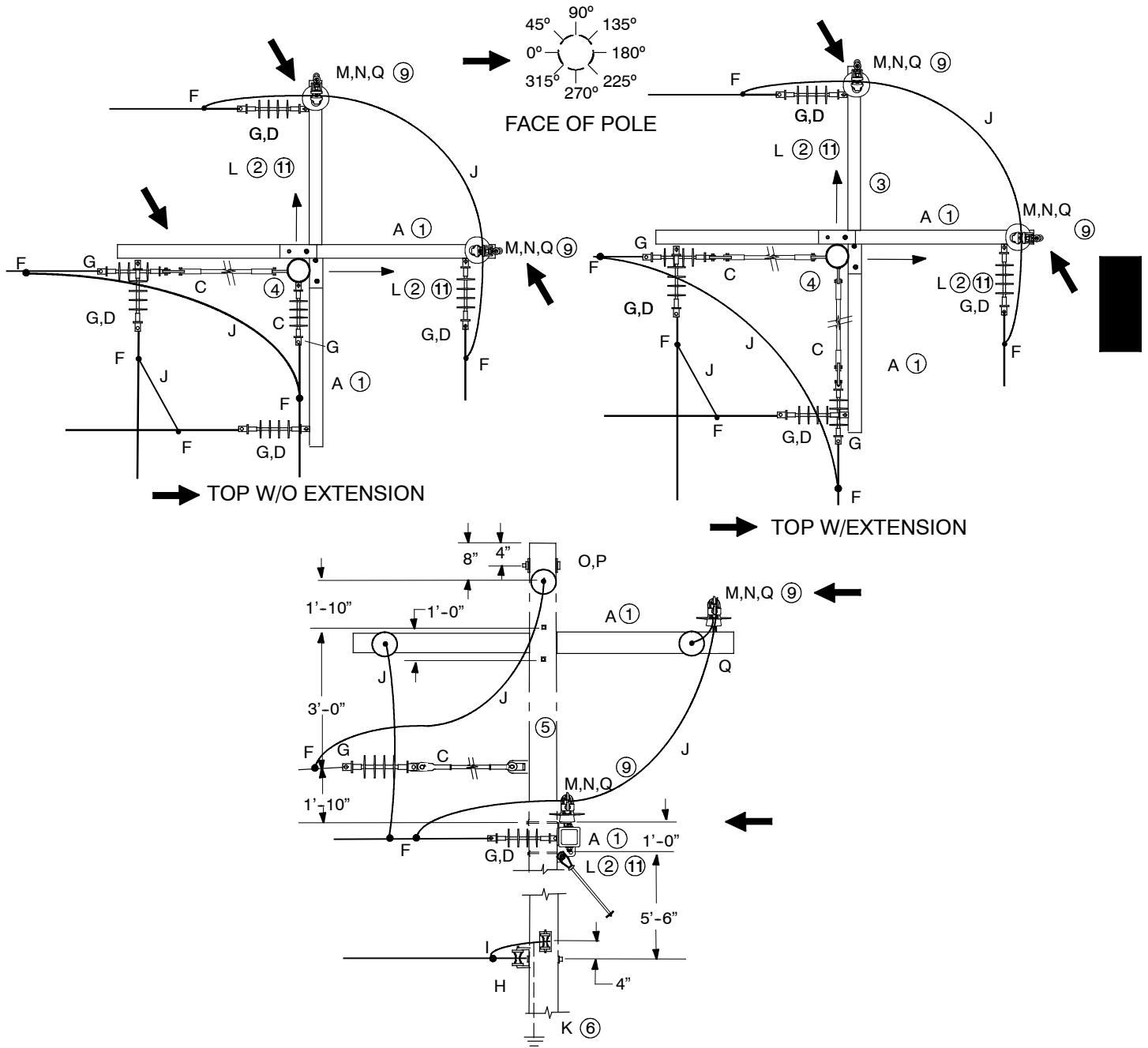
		Std. / Stk. No.	Description	03 12 07 **					
				02	03	04	06	07	08
				3Ø			2Ø		
	A	06 12 30 02	Insulator, Floating Angle	3			2		
	B	06 12 30 01	Deadend w/FG Extension		4	6		2	4
		06 12 30 11	Deadend w/o FG Extension		2			2	
3	C	25 56 076	Insulator, Guy Strain, FG, 26"	2			1		
@	D	PG*	See Std. 07 00 25 00		6	6		4	4
@	E	DEC*W	Deadend Clamp See DCS 07 00 11 00		6	6		4	4
@	F	SC*W	Suspension Clamp See DCS 07 00 16 00	3			2		
@	G	PLW*W	Wire, Poly covered, (Ft.) See DCS 07 00 80 00		30	30		20	20
@2	I	12 00 10 **	Grounding Unit, Wood Pole	@	@	@	@	@	@
		12 00 10 11	Grounding Unit, Composite Pole	1	1	1	1	1	1
@8	J	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)	3	6	6	2	4	4
@	K	03 01 01 **	Neutral	1	1	1	1	1	1
	L	23 52 065	Bolt, Mach., 5/8" X 12" (Anti Split)	1	1	1	1	1	1
	M	23 66 031	Washer, Curved, 3/4"	2	2	2	2	2	2
7		252, 255, or 260	Install Jumper		3	3		2	2

# CONFIGURATIONS

Two or Three Phase Buck Arm - 90° Angle  
4 to 15kV

03 12 09 \*\*

Sheet 1 of 2



→	⑦ 8' FG Arm, Pole w/o Ext	3Ø 03 12 09 01	2Ø ④ 03 12 09 04
	⑧ 8' FG Arm, Pole w/Ext	03 12 09 03	03 12 09 04
	⑧ 10' FG Arm, Pole w/o Ext	03 12 09 05	03 12 09 08
	③ 10' FG Arm, Pole w/Ext	03 12 09 02	03 12 09 08

# CONFIGURATIONS

## Two or Three Phase Buck Arm - 90° Angle 4 to 15kV

03 12 09 \*\*

Sheet 2 of 2

### NOTES:

1. See DCS 04 00 41 \*\* for arm strength.
2. Attach guy to bracket of fiberglass arm.
3. Use 10' deadend arm with F/G extension on pole for underbuild application.
4. For 2 phase construction, keep the arm spacing as shown but eliminate the center phase position.
5. See DCS 02 00 04 03 for unguyed composite pole application.
6. Composite pole has factory (internal) installed pole ground in the 45° quadrant. Wood pole may require pole ground depending on application.
7. The 8' crossarm is available for Ameren Mo. only.
8. Deadend on pole w/o fiberglass extension available Ameren Mo. only.
9. For jumper support applications, hand tighten only and do not twist the eye off.
10. See DCS 17 31 50 \*\* and 17 31 51 \*\* for explanation of Operation Codes.
11. See DCS 11 00 02 02 for typical guy insulator placement.

		Std. / Stk. No.	Description	03 12 09 **					
				01	02	03	05	04	08
				3Ø				2Ø	
3,7	A	04 00 41 03	Deadend Assy., F/G, 8'	2		2		2	
		04 00 41 04	Deadend Assy., F/G, 10'		2		2		2
8	C	06 12 30 01	Deadend w/FG Extension	1	2	2	1		
		06 12 30 11	Deadend w/o FG Extension	1			1		
	D	06 12 35 01	Deadend on Arm	4	4	4	4	4	4
@	F	PG*	See Std. 07 00 25 00	6	6	6	6	4	4
@	G	DEC*W	Clamp, Deadend See 07 00 11 00	6	6	6	6	4	4
@	H	03 01 01 **	Neutral	@	@	@	@	@	@
	I	17 51 032	Neutral PG Clamp	2	2	2	2	2	2
@	J	PLW*W	Lead Wire, Poly Covered, Ft. See 07 00 80 00	30	30	30	30	20	20
@6	K	12 00 10 **	Grounding Unit, Wood Pole	@	@	@	@	@	@
		12 00 10 11	Grounding Unit, Composite Pole	1	1	1	1	1	1
@2,5,11	L	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)	2	2	2	2	2	2
	M	23 62 028	Pin, Insulator, Long Shank	2	2	2	2	2	2
	N	25 05 143	Insulator, Vice-Top, 15kV	2	2	2	2	2	2
	O	23 52 065	Bolt, Mach., 5/8" x 12" (Anti-Split)	1	1	1	1	1	1
	P	23 66 031	Washer, Curved, 3/4"	2	2	2	2	2	2
	Q	23 66 132	Washer, Flat, Sq., 4"x4", w/ 13/16" hole	4	4	4	4	4	4
10		252, 255, or 260	Install Jumper	3	3	3	3	2	2

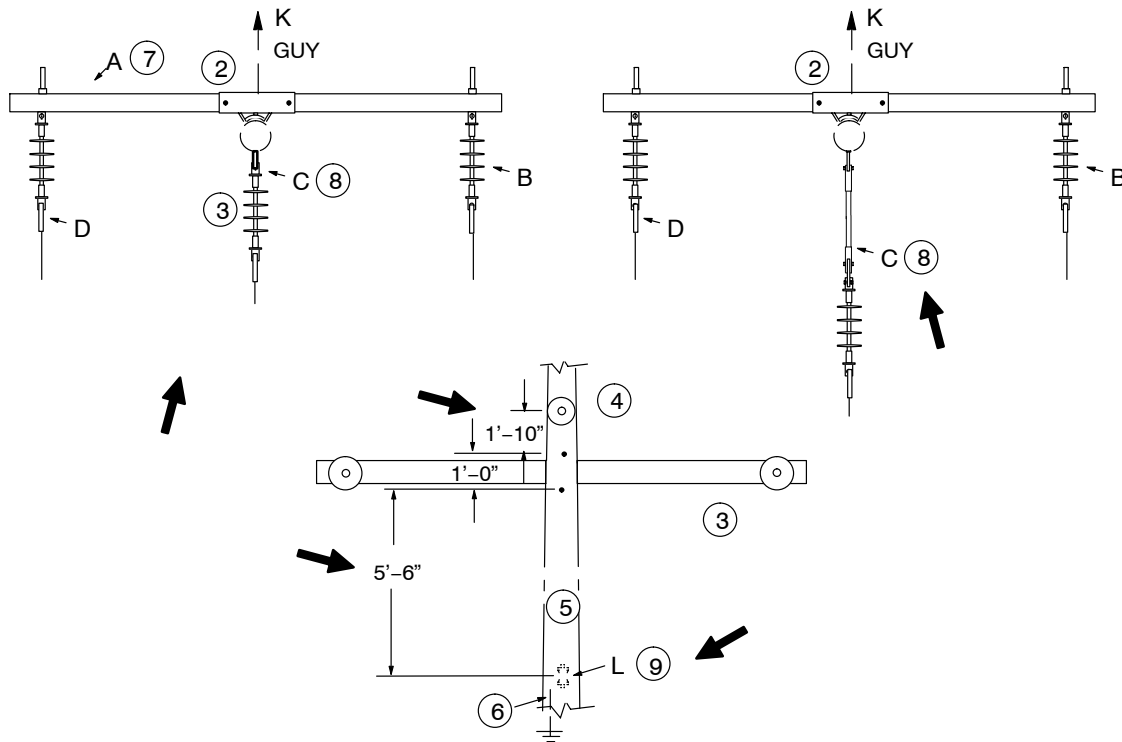
# CONFIGURATIONS

## Two or Three Phase Deadends

### 4 to 15kV

03 12 11 \*\*

Sheet 1 of 2



	8' Arm	10' Arm
Std	03 12 11 01	03 12 11 52
Std	03 12 11 51	03 12 11 72
Std	03 12 11 31	03 12 11 54

#### NOTES:

1. See DCS 04 00 41 for arm strength.
2. Attach guy to bracket of F.G. arm.
3. Use 10' deadend arm with F/G extension for underbuild application.
4. For 2 phase construction, eliminate the center phase position.
5. See DCS 02 00 04 03 for unguyed composite pole application.
6. Composite pole has factory (internal) installed pole ground; wood pole may require pole ground based on application, and underbuild uses existing pole ground.
7. 8' crossarm available Ameren MO only.
8. Deadend on pole w/o fiberglass extension available Ameren MO only.
9. See DCS 03 01 01 \*\* for neutral configuration.

**CONFIGURATIONS**  
Two or Three Phase Deadends  
4 to 15kV

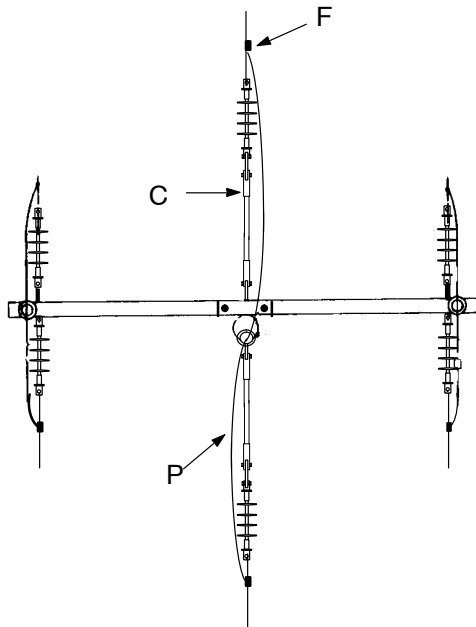
**03 12 11 \*\***

Sheet 2 of 2

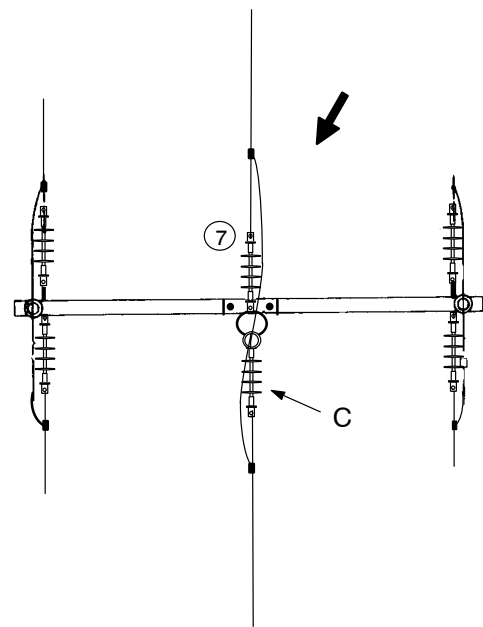


		Std. / Stk. No.	Description	03 12 11 **					
				01	51	52	72	31	54
				3Ø				2Ø	
7	A	04 00 41 03	Deadend Assy, FG Arm, 8'	1	1			1	
		04 00 41 04	Deadend Assy, FG Arm, 10'			1	1		1
	B	06 12 34 07	Deadend on Sgl Arm	2	2	2	2	2	2
8	C	06 12 30 01	Deadend on Pole w/FG Extension		1	1			
		06 12 30 11	Deadend on Pole w/o FG Extension	1			1		
@	D	DEC*W	Clamp, Deadend	3	3	3	3	2	2
6@	G	12 00 10 01	Grounding Unit, Wood Pole	1	1	1	1	1	1
		12 00 10 11	Grounding Unit, Composite Pole	1	1	1	1	1	1
5@	K	11 00 41 **	Guying Unit	1	1	1	1	1	1
9@	L	03 01 01 03	Neutral, Deadend	1	1	1	1	1	1

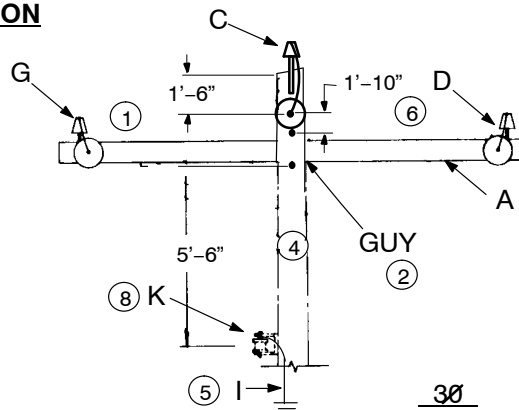
**POLE TOP – F/G ARM**



**W/EXTENSION**



**W/O EXTENSION**



Deadend – 8' Arm, Pole w/Ext.  
Deadend – 8' Arm, Pole w/o Ext.  
Deadend – 10' Arm, Pole w/Ext.  
Deadend – 10' Arm, Pole w/o Ext.

<u>3Ø</u>	<u>2Ø</u> ③
03 12 14 65	03 12 14 69
03 12 14 73	03 12 14 69
03 12 14 64	03 12 14 68
03 12 14 74	03 12 14 68

**NOTES:**

1. See DCS 04 00 41 for arm strength.
2. Attach guy to center bracket of fiberglass arm for difference in tension.
3. For 2 phase construction, eliminate the center phase position
4. Contact Standards using unguyed composite pole for difference in conductor tension application.
5. Composite pole has factory (internal) installed pole ground; wood pole may require pole ground based on application.
6. 8' crossarm available AmerenMO only.
7. Deadend on pole w/o fiberglass extension available AmerenMO only.
8. See DCS 03 01 01 \*\* for neutral configuration.

**CONFIGURATIONS**  
Two or Three Phase  
Loopovers 4 to 15kV

**03 12 14 \*\***

Sheet 2 of 5

		Dist. Std. Or Stk. No.	Description	03 12 14 **					
				64	65	73	74	68	69
				3Ø				2Ø	
6	A	04 00 41 03	Deadend Assy. FG, 8'		1	1			1
		04 00 41 04	Deadend Assy. FG, 10'	1			1	1	
	C	06 12 30 04	Loopover w/FG Extension, Pole Top	1	1				
		06 12 30 14	Loopover w/o FG Extension, Pole Top			1	1		
	D	06 12 34 02	Loopover, Sgl Arm	2	3	3	3	1	2
@	F	DEC*W	Clamp, Deadend	6	6	6	6	4	4
@	G	TT*W	Top Tie, Sgl Pin	3	3	3	3	2	2
@5	I	12 00 10 01	Grounding Unit, Wood Pole	1	1	1	1	1	1
		12 00 10 11	Grounding Unit, Composite Pole	1	1	1	1	1	1
@	J	PG*	See Std. 07 00 25 00	6	9	9	9	4	
8@	K	03 01 01 01	Neutral, Thru	1	1	1	1	1	1
@	P	PLW*W	Lead Wire, Poly covered, Ft.	15	24	24	24	10	24
@		252 or 260	Install jumper	3	3	3	3	2	2



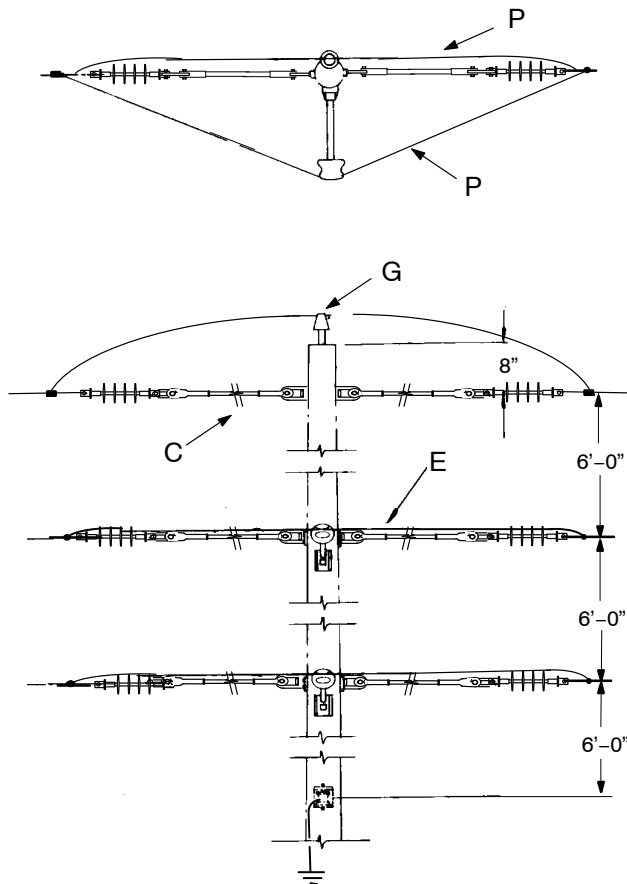
# CONFIGURATIONS

## Two or Three Phase

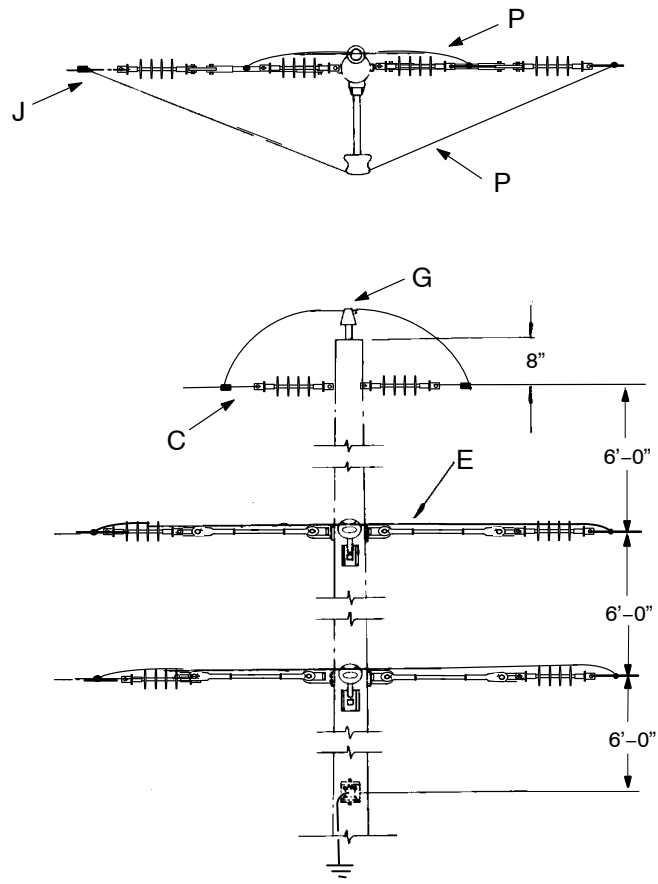
### Loopovers 4 to 15kV

03 12 14 \*\*

Sheet 3 of 5



**W/EXTENSION**

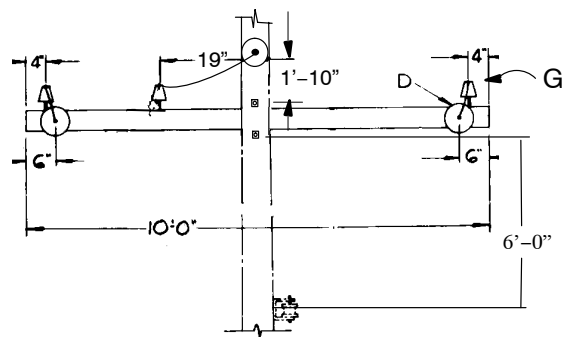
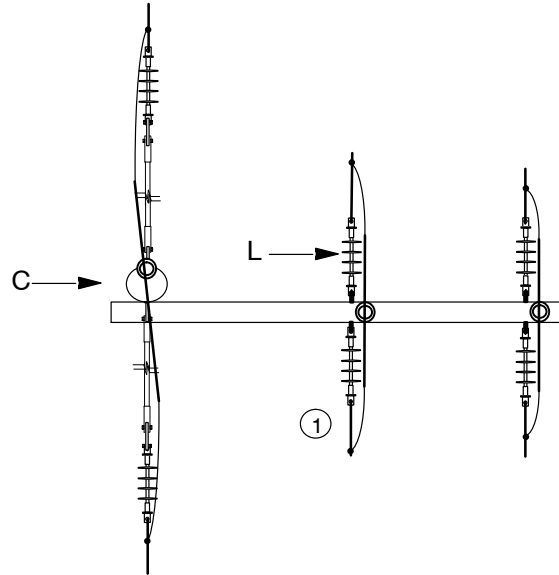
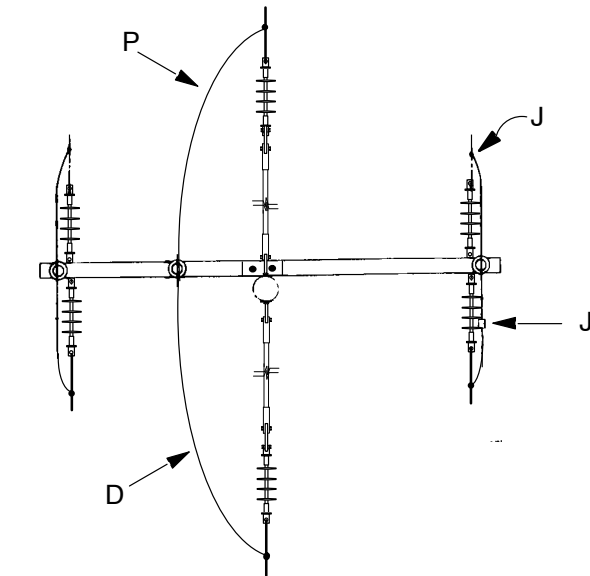


**W/O EXTENSION**

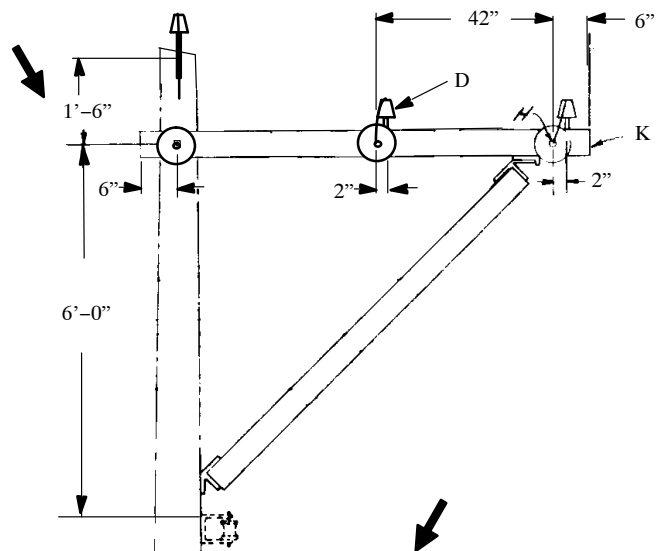
➔ Pole Top – w/o Extension  
Pole Top – w/Extension  
Underbuild

3Ø      2Ø  
03 12 14 04    03 12 14 09  
03 12 14 54    03 12 14 59  
03 12 14 55    03 12 14 60

		Dist. Std. Or Stk. No.	Description	03 12 14 **	04	54	55	09	59	60
					3Ø			2Ø		
	C	06 12 30 04	Pole Top Loopover w/Extension			1			1	
		06 12 30 14	Pole Top Loopover w/o Extension		1			1		
	E	06 12 33 01	Looparound, Pole		2	2	3	1	1	1
@	F	DEC*W	Clamp, Deadend		6	6	6	4	4	4
@	G	TT*W	Top Tie, Sgl Pin		3	3	3	2	2	2
@	J	PG*	See Std. 07 00 25 00		6	6	6	4	4	4
@	P	PLW*W	Lead Wire, Poly covered, Ft.		15	15	15	10	10	10
@		252 or 260	Install jumper		3	3	3	2	2	2



DE Assy. 10' Arm 03 12 14 65 03 12 14 69  
**UNDERBUILD - F/G ARM**



8' Arm 03 12 14 58 03 12 14 66  
**SIDEARM**

**NOTES:**

1. Wildlife cover required for AmerenIL only.

**CONFIGURATIONS**  
Two or Three Phase  
Loopovers 4 to 15kV

**03 12 14 \*\***

Sheet 5 of 5

		Dist. Std. Or Stk. No.	Description	03 12 14 **			
				58	65	66	69
				3Ø		2Ø	
	C	06 12 30 04	Pole Top Loopover	1		1	
	D	06 12 34 02	Loopover Arm	2	3	1	2
	E	06 12 33 02	Looparound Pole				
@	F	DEC*W	Deadend Clamp	6	6	4	4
@	G	TT*W	Top Tie	3	3	2	2
	I	04 00 41 04	Crossarm, DE Assy., 10'		1		1
@	J	PG*	See Std. 07 00 25 00	6	9	4	4
@	P	PLW*W	Lead Wire, Poly covered, Ft.	15	24	15	24
	K	04 00 24 05	Sidearm, Double, 8'	1		1	
1@	L	05 16 12 01	Wildlife Cover – DE	2			
@		252 or 260	Install jumper	3	3	2	2

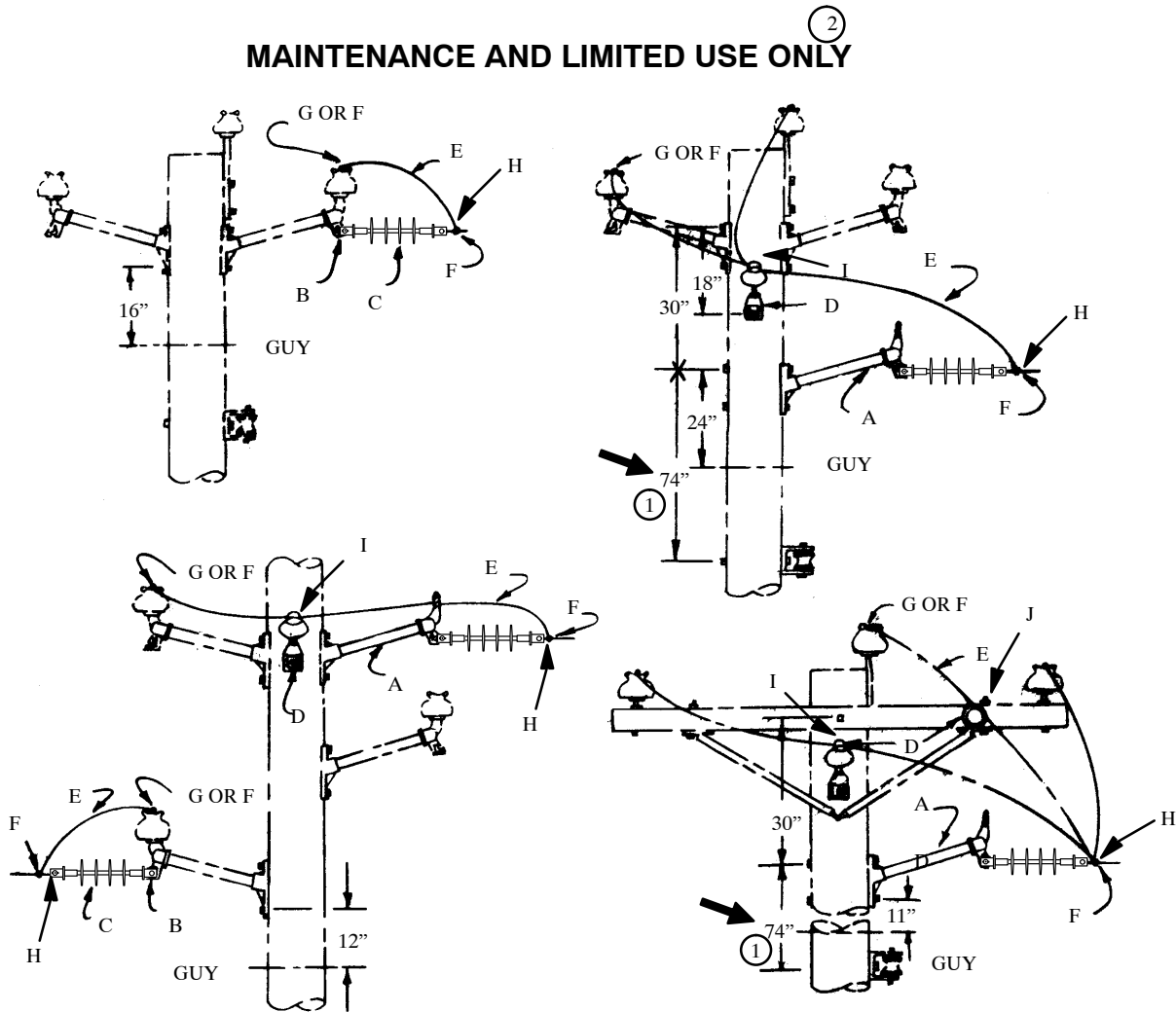
# CONFIGURATIONS

## Single Phase Tap from Two or Three Phase Line 4 to 15kV

03 12 20 \*\*

Sheet 1 of 2

### MAINTENANCE AND LIMITED USE ONLY



#### ARMLESS CONSTRUCTION

Near Phase	03 12 20 01
Top or Far Phase	03 12 20 02

#### CROSSARM CONSTRUCTION

Near Phase	03 12 20 05
Top Phase	03 12 20 06
Far Phase	03 12 20 02

#### Notes

1. See Dist. Std. 03 00 01 00 for neutral spacing information. May be reduced to 40" if pole space is limited.
2. This standard to be used only for non-fused single phase taps that do not pass through wooded areas and are of limited length (1 or 2 spans).

**CONFIGURATIONS**  
Single Phase Tap from Two or Three Phase Line  
4 to 15kV

**03 12 20 \*\***

Sheet 2 of 2

		Std. / Stk. No.	Description	03 12 20 **	01	02	05	06
	A	06 12 21 06	Assembly – Standoff, 24" FG			1	1	1
	B	23 68 181	Shackle – Deadend		2			
	C	25 06 052	Insulator – Deadend, 12 kV		1			
	D	06 12 20 04	Insulator – Standoff, 18" LD			1	1	
		06 12 01 01	Insulator – Crossarm					1
@	E	PLW*W	Lead Wire, Poly Covered Ft.		3	10	6	10
@	F	PG*	See Std. 07 00 25 00		2	2	2	2
@	G	HLC*W	Hot Line Clamp					
@	H	DEC*W	Deadend Clamp		1	1	1	1
@		252 or 260	Install connector or jumper		@	@	@	@
@	I	TT*W	Top Tie			1	1	
@	J	ST*W	Side Tie					1

# CONFIGURATIONS

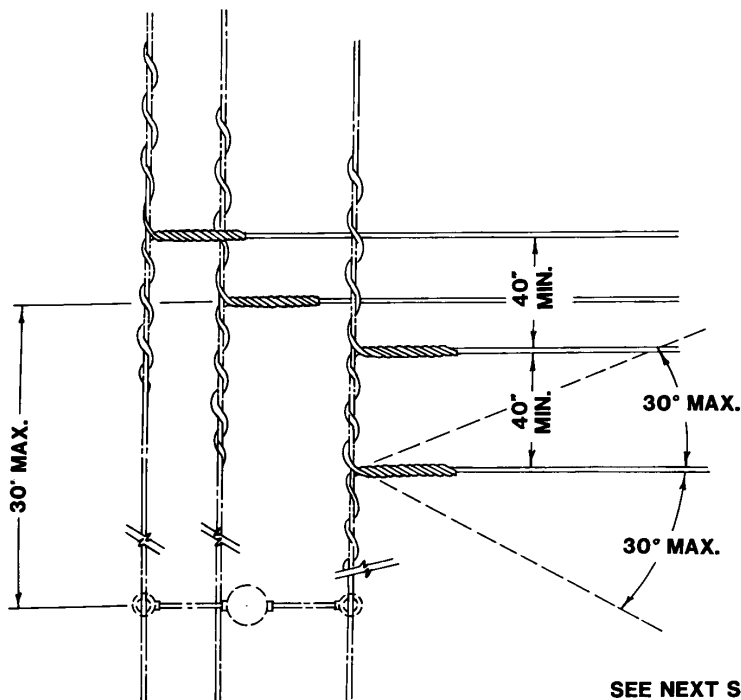
Aerial Mid-Span Tap



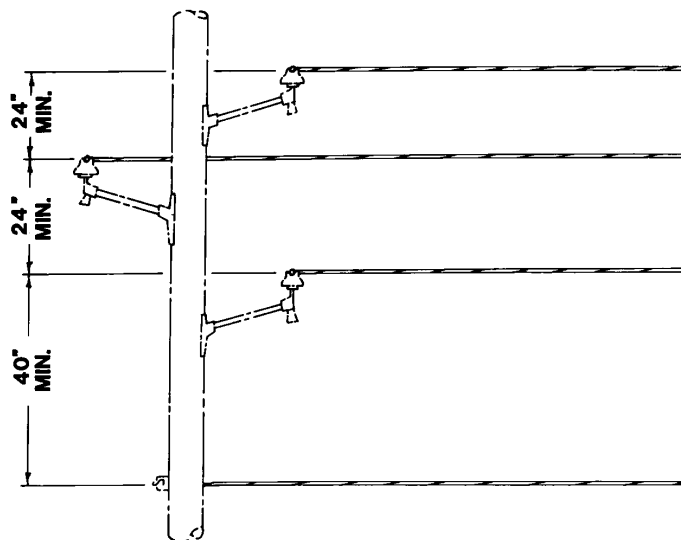
4 to 15kV

03 12 21 \*\*

Sheet 1 of 2



SEE NEXT SHEET FOR SAG, TENSION AND SPAN LIMITATIONS.



STOCK NO.	LINE SIZE		COLOR CODE		01	02	03	04	05
	Main	Tap	Main	Tap					
17 54 284	#4 ACSR	#4 ACSR	Orange	Orange	1				
17 54 285	1/0 AAAC	#4 ACSR				1			
17 54 286	1/0 AAAC	1/0 AAAC	Yellow	Yellow			1		
17 54 287	556 AA	1/0 AAC	Orange	Black				1	
17 54 288	556 AA	556 AA	Orange	Orange					1
295	Operations Code				1	1	1	1	1

**DISTRIBUTION  
CONSTRUCTION STANDARDS**



ENG: MJ  
REV. NO: 1  
REV. DATE: 10/04/05  
REAFFIRMED DATE: 02/21/12

Sag and Tension Table for Mid-Span Taps

LINE SIZE		TAP SPAN IN FEET				Tap Tension Per Conductor in Pounds
		40	60	80	100	
Main	Tap	Tap Sag in Inches				
#4 ACSR	#4 ACSR	6	13	24	37	27
1/0 AAAC	#4 ACSR	4	9	20	25	40
	1/0 AAC	5	12	22	34	51
556 AA	1/0 AAAC	5	11	19	30	58
	556 AA	15	34			85

**NOTES:**

1. Mid-span taps are permitted only under the following conditions:
  - a. The location is easily accessible to a basket truck, and
  - b. The run conductor(s) is full tension, and
  - c. The tap will be made on the nearest phase, or from vertical construction in the case of two or three phase taps, and
  - d. The tap can be made in accordance with the above sag and tension table, and
  - e. The mid-span tap will eliminate setting an additional pole.
2. Clearance shall be based on the run conductor's attachment height less three feet (3') less the sag indicated in the above table. Tap spans shall be as level as possible.
3. Switch(es) shall be installed at the first pole in the tap circuit.
4. Taps shall be limited to one per run conductor span.
5. Quantity specified in the material list is for tapping one conductor.
6. This Standard applicable for tangent construction. Angle construction satisfactory if angle complies with Dist. Std. 03 00 03 \*\* and tap(s) is within 10 ft. of insulator. Tap(s) 10 to 30 ft. from the insulator on angle construction require specific investigation.

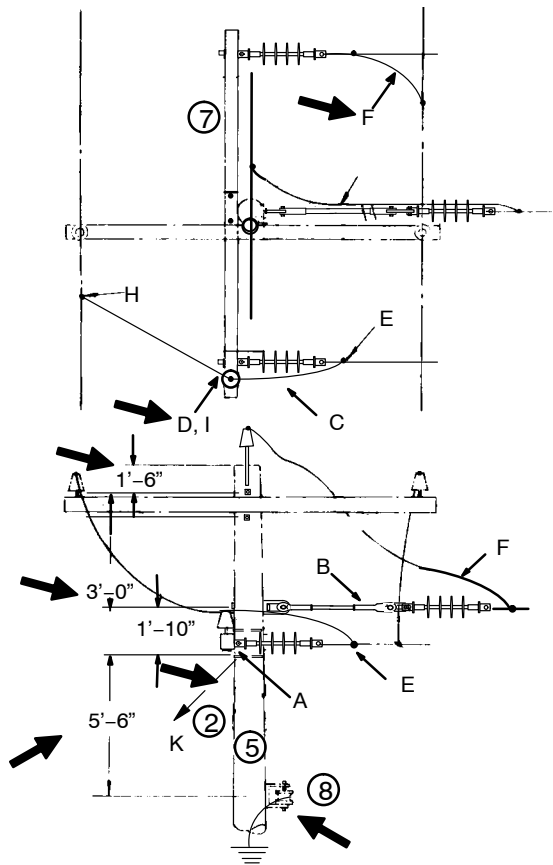
# CONFIGURATIONS

## Two or Three Phase Line—Two or Three Phase Tap

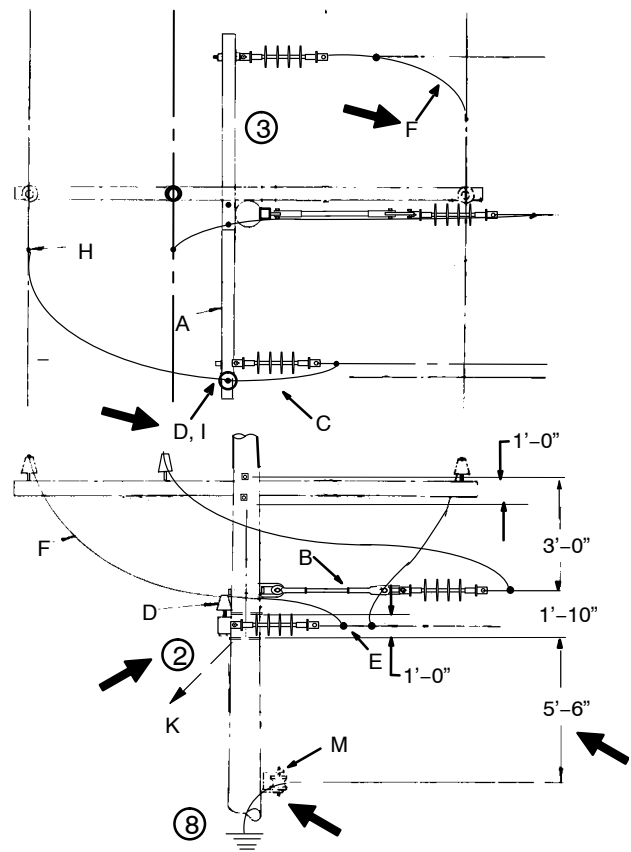
### 4 to 15kV

03 12 24 \*\*

Sheet 1 of 3



**OVERHEAD**



**UNDERBUILD**

#### DEADEND TAP

3Ø

2Ø

DE Assy 8' Arm  
DE Assy 10' Arm

03 12 24 51  
03 12 24 52

03 12 24 53  
03 12 24 54

#### NOTES:

1. See DCS 04 00 41 for arm strength.
2. Attach guy to center bracket of FG arm.

**DISTRIBUTION  
CONSTRUCTION STANDARDS**



ENG: MJ  
REV. NO: 7  
REV. DATE: 01/12/12



# CONFIGURATIONS

## Two or Three Phase Line–Two or Three Phase Tap 4 to 15kV

**03 12 24 \*\***

Sheet 2 of 3

1. Use 10' deadend arm with F/G extension on pole for underbuild application.
2. For 2 phase construction, eliminate the center phase position.
3. See DCS 02 00 04 03 for unguyed composite pole application.
4. Composite pole has factory (internal) installed pole ground; wood pole may require pole ground based on application, and underbuild uses existing pole ground.
5. 8' crossarm available AmerenMO only.
6. See DCS 03 01 01 \*\* for neutral configuration.



		Std. / Stk. No.	Description	03 12 24 **			
				51	52	53	54
				3Ø		2Ø	
7	A	04 00 41 03	Deadend Assy., FG, 8'	1		1	
		04 00 41 04	Deadend Assy., FG, 10'		1		1
	B	06 12 32 01	Deadend on Pole w/ FG Extension	1	1		
	C	06 12 34 01	Deadend on Sgl Arm	2	2	2	2
	D	06 12 01 01	Insulator and X-Arm Pin	1	1	1	1
@	E	PG*	See Std. 07 00 25 00	3	3	2	2
@	F	PLW*W	Lead Wire, Poly covered	24	24	16	16
5	G	12 00 10 01	Grounding Unit, Wood Pole	@	@	@	@
		12 00 10 11	Grounding Unit, Composite Pole	1	1	1	1
@	H	STC*W	Hot Tap w/Stirrup	3	3	2	2
@		PG*	See Std. 07 00 25 00	3	2	2	2
@	I	TT*W	Top Tie	1	1	1	1
@	J	DEC*W or DEA*W	Deadend Clamp	3	3	2	2
@	K	11 00 41 **	Guying Unit	1	1	1	1
@	M	03 01 01 07	Neutral, Tangent w/Tap	1	1	1	1
@		252 or 260	Install connector or jumper				

# CONFIGURATIONS

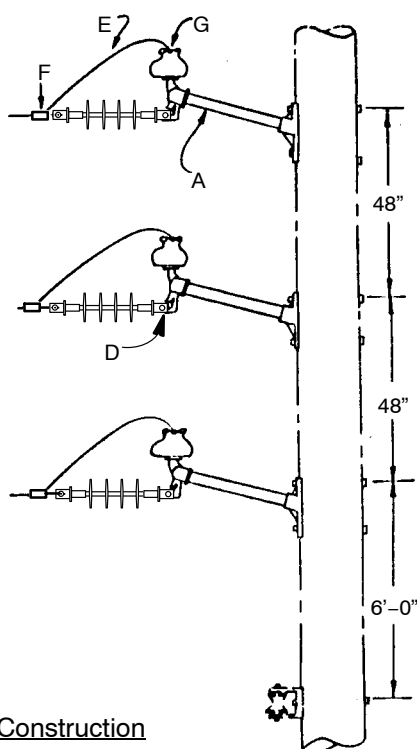
## Two or Three Phase Line–Two or Three Phase Tap

### 4 to 15kV

03 12 24 \*\*

Sheet 3 of 3

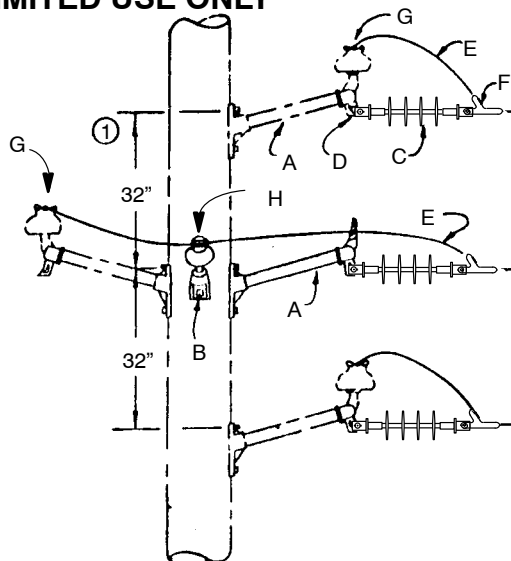
#### MAINTENANCE AND LIMITED USE ONLY



#### New Construction

3Ø Tap 03 12 24 01

2Ø Tap 03 12 24 04



#### Existing Construction

As Shown Opposite

3Ø Tap 03 12 24 02 03 12 24 03

2Ø Tap 03 12 24 05 03 12 24 11  
(2 same side) (1 each side)

- On existing circuits this spacing can be obtained by raising the top phase 8" and lowering the bottom phase 8". Tap spans may not exceed 175'.

		Std. / Stk. No.	Description	03 12 24 **	01	02	03	04	05	11
					3 Ph			2 Ph		
	A	06 12 21 05	Assembly – Standoff, 24" F.G.		3			2		
		06 12 21 06	Assembly – Standoff, 24" F.G.			1	2			1
	B	06 12 20 04	Insulator – Standoff, 18"			1	2			1
	C	25 06 052	Insulator – Deadend, 12kV			3	3		2	2
	D	23 68 181	Shackle – Deadend			3	3		2	2
@	E	PLW*W	Lead Wire, Poly covered		9	15	21	6	6	12
@	F	PG*	See Std. 07 00 25 00		3	3	3	2	2	2
@	G	HLC*W	Hot Line Clamp w/Stirrup		3	3	3	2	2	2
		PG*	See Std. 07 00 25 00		3	3	3	2	2	2
@	H	TT*W	Top Tie		3	1	2	2		1
@	I	DEC* or DEA*W	Deadend Clamp		3	3	3	2	2	2
@		252 or 260	Install connector or jumper		@	@	@	@	@	@

**DISTRIBUTION  
CONSTRUCTION STANDARDS**



ENG: MJ  
REV. NO: 7  
REV. DATE: 01/12/12

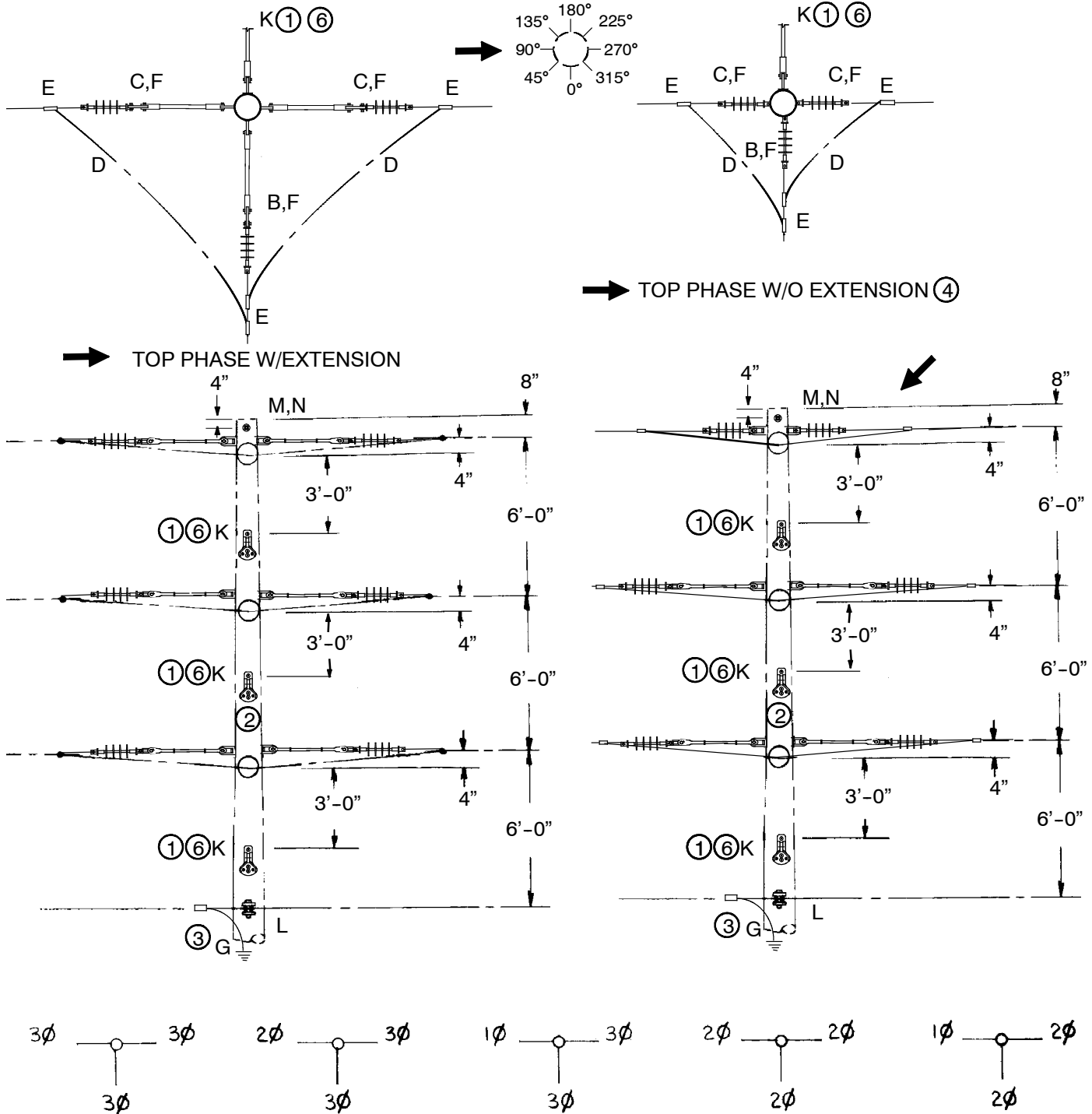
# CONFIGURATIONS

## Two Or Three Phase - Vertical Tap

### 4 or 12 kV

03 12 30 \*\*

Sheet 1 of 2



03 12 30 11

03 12 30 12

03 12 30 13

03 12 30 14

03 12 30 15

03 12 30 01

03 12 30 02

03 12 30 03

03 12 30 04

03 12 30 05

# CONFIGURATIONS

## Two Or Three Phase – Vertical Tap

### 4 or 12 kV

**03 12 30 \*\***

Sheet 2 of 2

#### NOTES:

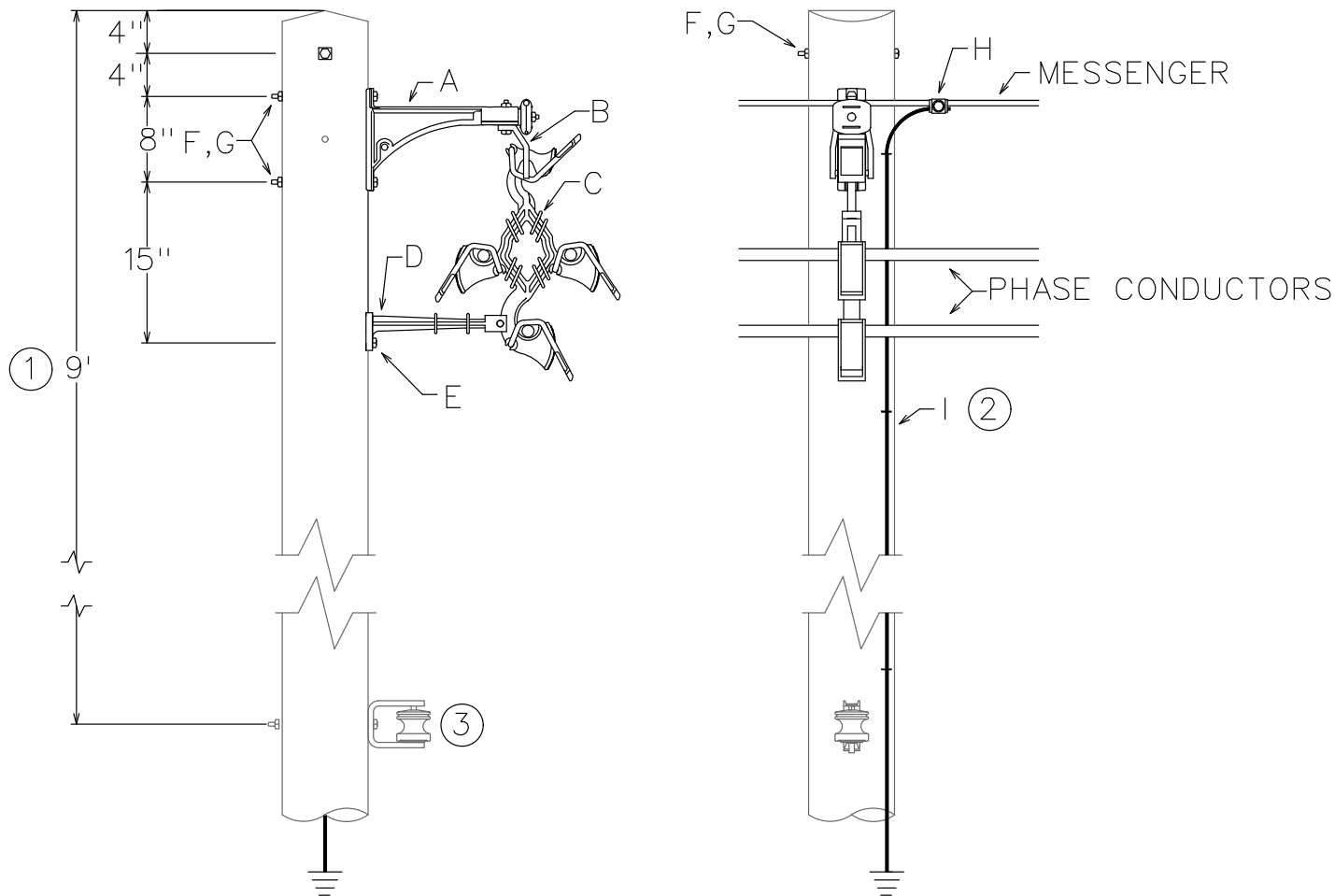
1. Top bolt of guy attachments should be centered between phase positions and between phase and neutral position.
2. See DCS 02 00 04 03 for unguyed composite pole application.
3. Composite pole has factory (internal) installed pole ground in the 45° quadrant. Wood pole may require pole ground depending on application.
4. Deadend on pole w/o fiberglass extension available Ameren Mo only.
5. See DCS 17 31 50 \*\* and 17 31 51 \*\* for explanation of Operation Codes.
6. See DCS 11 00 02 02 for typical guy insulator placement.

		Std. / Stk. No.	Description	03 12 30 **										
				01	02	03	11	12	13	04	05	14	15	
				3Ø						2Ø				
4	B	06 12 30 01	Deadend on Pole w/FG Extension	2	3	4	3	4	5	1	2	2	3	
		06 12 30 11	Deadend on Pole w/o FG Extension	1	1	1				1	1			
4	C	06 12 30 03	Dbl Deadend on Pole w/Extension	2	1		3	2	1	1		2	1	
		06 12 30 13	Dbl Deadend on Pole w/o Extensions	1	1	1				1	1			
@	D	PLW*W	Lead Wire, Poly Covered See 07 00 80 00	30	25	20	30	25	20	20	15	20	15	
@	E	PG*	See 07 00 25 00	12	10	8	12	10	8	8	6	8	6	
@	F	DEC*W	Clamp, Deadend See 07 00 11 00	9	8	7	9	8	7	6	5	6	5	
@ 3	G	12 00 10 **	Grounding Unit, Wood Pole	@	@	@	@	@	@	@	@	@	@	
		12 00 10 11	Grounding Unit, Composite Pole	1	1	1	1	1	1	1	1	1	1	
@6	K	11 00 4* **	Guying Unit (Down, Span, or Sidewalk)	3	4	5	3	4	5	2	3	2	3	
@	L	03 01 01 **	Neutral	1	1	1	1	1	1	1	1	1	1	
	M	23 52 065	Bolt, Mach., 5/8" x 12" (Anti-Split)	1	1	1	1	1	1	1	1	1	1	
	N	23 66 031	Washer, Curved, 3/4"	2	2	2	2	2	2	2	2	2	2	
5		252, 255, or 260	Install Jumper	6	5	4	6	5	4	4	3	4	3	

**CONFIGURATIONS**  
**15 KV & Below – Spacer Cable**  
**Single Circuit – Tangent Structure**

**03 20 01 01**

Sheet 1 of 1



	Std. / Stk. No.	Description	03 20 01 01
2@	A	23 56 075 Bracket, Messenger	1
	B	23 06 124 Stirrup, Spacer Support	1
	C	23 67 334 Spacer, High Density Polyethylene	1
	D	23 06 123 Bar, Anti-Sway	1
	E	23 60 007 Screw, Lag, Fetter Type, 1/2" x 4"	1
	F	23 52 065 Bolt, Machine, 5/8" x 12" (w/nut)	3
	G	23 66 027 Washer, Square 2- 1/4" x 2- 1/4" x 3/16" Thick	3
	H	17 51 032 Connector, PG, Pole Ground to Messenger	1
	I	12 00 10 01 7#10 Grounding Unit	1
		12 00 10 04 #2 Cu. Poly Grounding Unit	1

**NOTES**

1. This distance can be reduced to a minimum of 6ft if needed when replacing a pole in an existing line.
2. A pole ground is required on every spacer cable pole. Install a covered 7#10 pole ground if no equipment is being installed or install a covered #2 pole ground if the equipment being installed requires it such as a riser, recloser, etc.
3. Secondary location if present. Connect secondary neutral to pole ground.
4. See DCS 07 20 01 01 for spacer installation between poles.

# CONFIGURATIONS

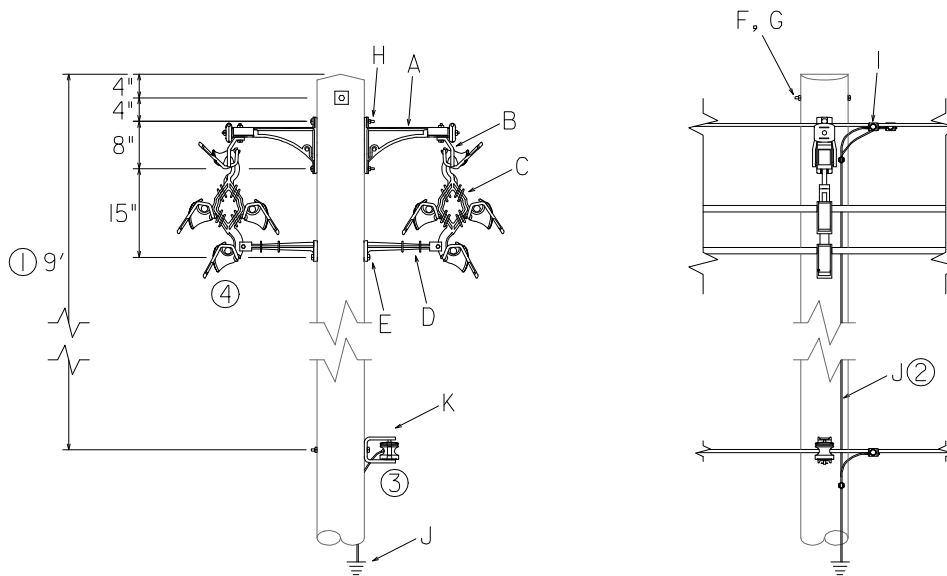
## 15kV & Below – Spacer Cable

### Double Circuit – Tangent Structure

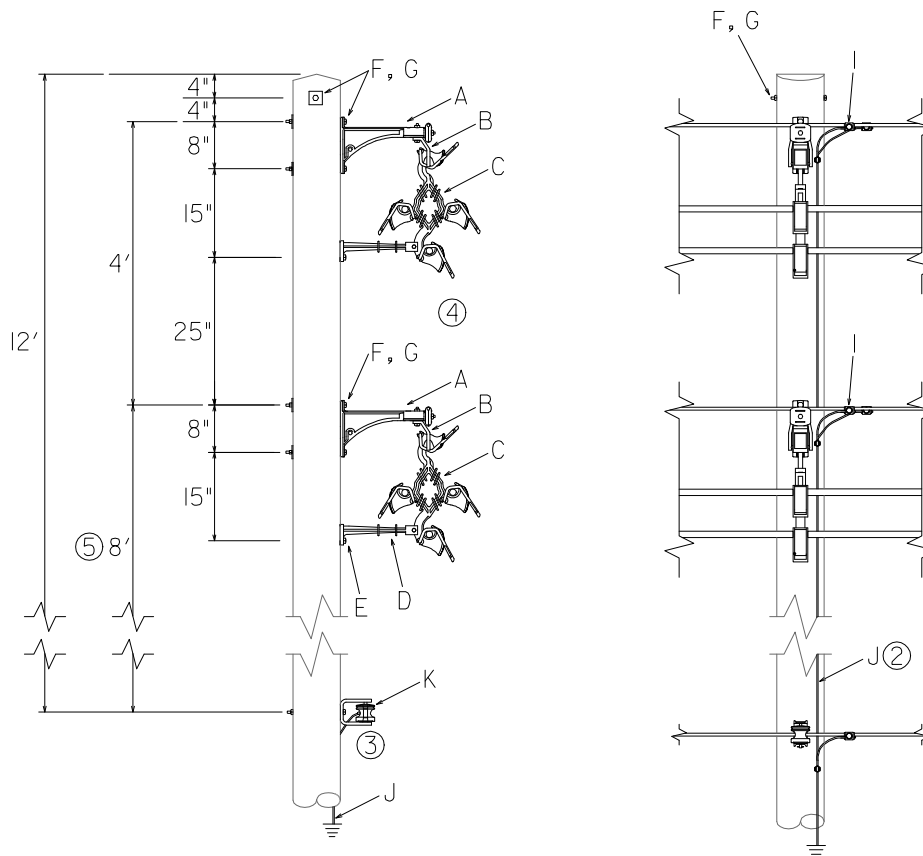
03 20 02 \*\*

Sheet 1 of 2

#### 01 - DOUBLE CIRCUIT TANGENT - BACK TO BACK CONFIGURATION



#### 02 - DOUBLE CIRCUIT TANGENT - STACKED CONFIGURATION



**CONFIGURATIONS**  
**15kV & Below – Spacer Cable**  
**Double Circuit – Tangent Structure**

**03 20 02 \*\***

Sheet 2 of 2

		<b>Std. / Stk. No.</b>	<b>Description</b>	<b>03 20 02 **</b>	<b>01</b>	<b>02</b>
2@	A	23 56 075	Bracket, Messenger		2	2
	B	23 06 124	Stirrup, Spacer Support		2	2
	C	23 67 334	Spacer, High Density Polyethylene		2	2
	D	23 06 123	Bar, Anti-Sway		2	2
	E	23 60 007	Screw, Lag, Fetter Type, 1/2" x 4"		2	2
	F	23 52 065	Bolt, Machine, 5/8" x 12" (w/ nut)		1	5
	G	23 66 027	Washer, Square 2-1/4" x 2-1/4" x 3/16" Thick		2	6
	H	23 52 066	Bolt, Machine, 5/8" x 14" (w/ nut)		2	
	I	17 51 137	Clamp, Parallel Groove, Aluminum – Messenger to pole ground		2	2
	J	12 00 10 01	Grounding Unit, 7#10 Copperweld		1	1
@		12 00 10 04	Grounding Unit, #2 Cu. Poly		1	1
	K	03 01 01 **	Neutral Configuration			

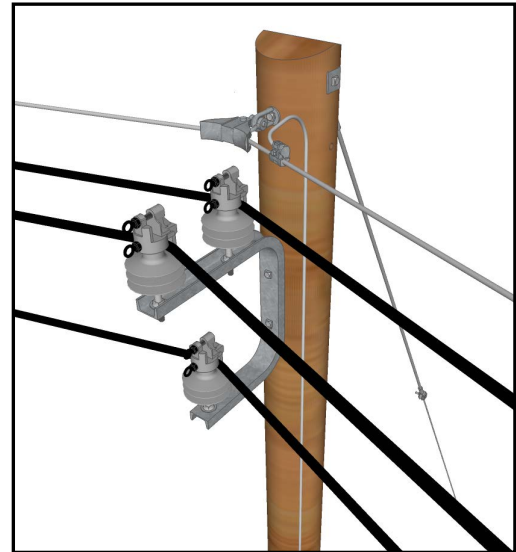
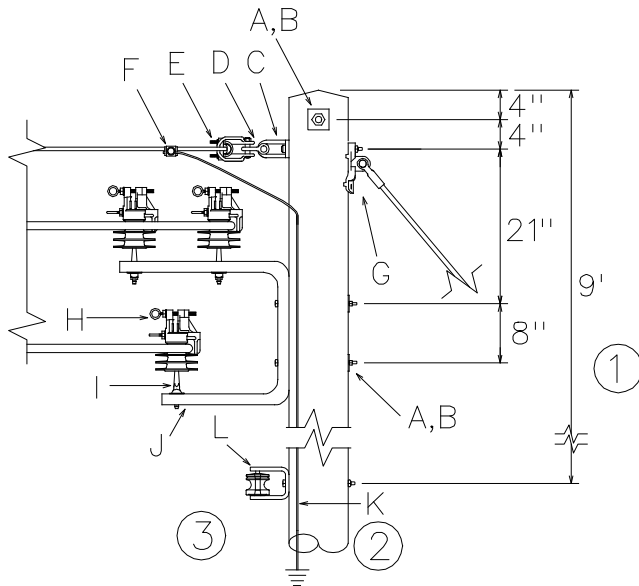
**NOTES**

1. The distance can be reduced to a minimum of 6ft if needed when replacing a pole in an existing line.
2. A pole ground is required on every spacer cable pole. Install a covered 7#10 pole ground if no equipment is being installed or install a covered #2 pole ground if the equipment being installed requires it such as a riser, recloser, etc.
3. Secondary location if present. Connect secondary neutral to pole ground.
4. See DCS 07 20 01 01 for spacer installation between poles.
5. The distance can be reduced to a minimum of 5 ft. If approved by Engineering.

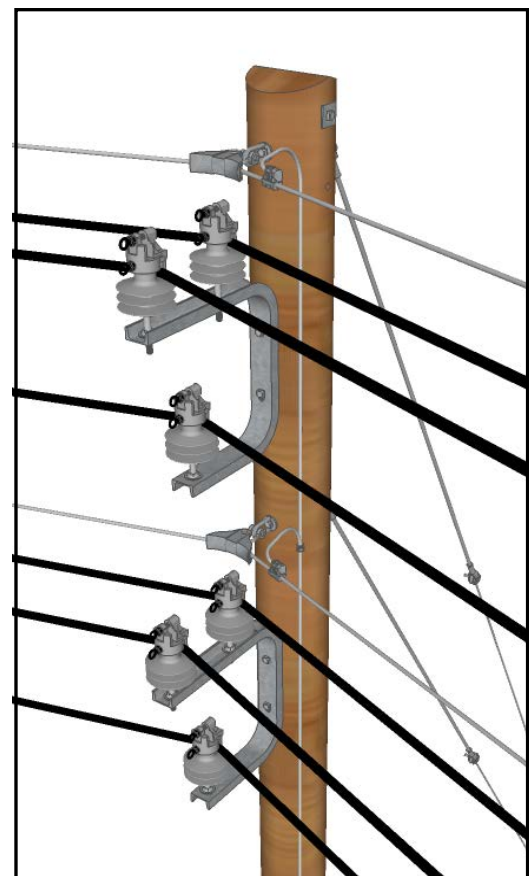
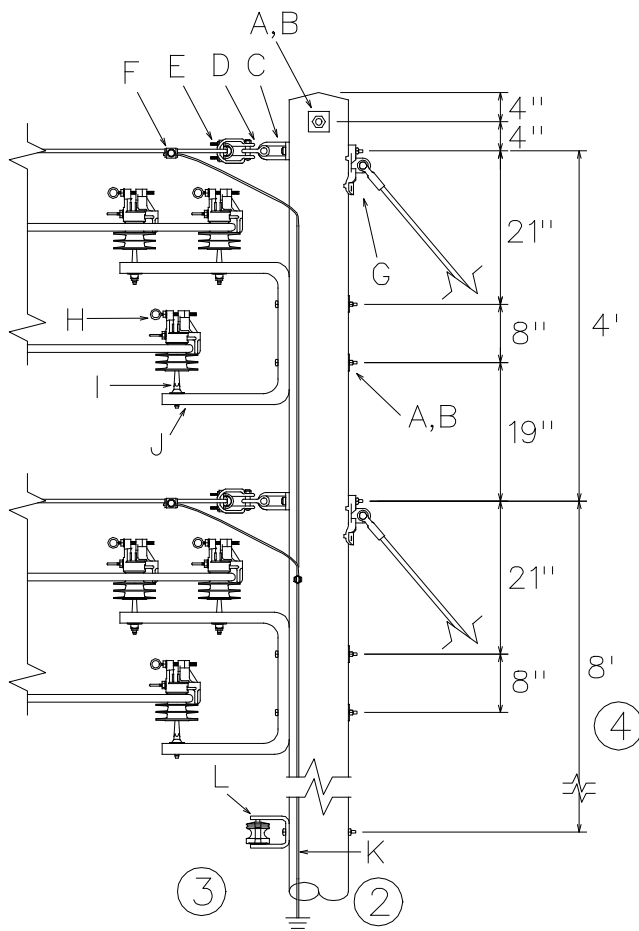
**CONFIGURATIONS**  
**4-15 kV Spacer Cable**  
**Angle Structure 7° – 60°**

**03 20 03 \*\***

Sheet 1 of 2



**03 20 03 01 - SINGLE CIRCUIT**



**03 20 03 02 - DOUBLE CIRCUIT**



**CONFIGURATIONS**  
**4-15 kV Spacer Cable**  
**Angle Structure 7° – 60°**

**03 20 03 \*\***

Sheet 2 of 2

		<b>Std. / Stk. No.</b>	<b>Description</b>	<b>03 20 03 **</b>	<b>01</b>	<b>02</b>
	A	23 52 066	Bolt, Machine, 5/8" x 14" (w/ nut)		3	5
	B	23 66 027	Washer, Square, 2-1/4" x 2-1/4" x 3/16"		4	6
	C	23 59 095	Eyelet, NM, STD, 3/4"		1	2
	D	23 68 181	Shackle, Anchor, 9/16"		1	2
	E	23 18 342	Clamp, Suspension		1	2
	F	17 51 137	Connector, PG, Pole Ground to Messenger		1	2
@	G	11 00 42 **	Guying Unit w/ FG Strain Insulator & HD Guy Hook		1	2
	H	25 05 143	Insulator, Pin, 15 kV, Vise-Top		3	6
	I	23 62 151	Pin, Insulator, 1" Thread, Short Shank, 5/8"		3	6
	J	23 56 073	Bracket, Angle, Insulator Support		1	2
@	K	12 00 10 **	Grounding Unit, 7#10 Copperweld		1	1
@	L	03 01 01 **	Neutral Configuration			

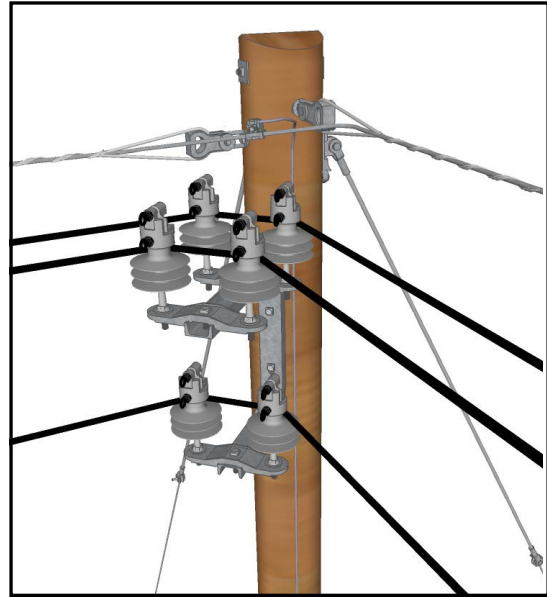
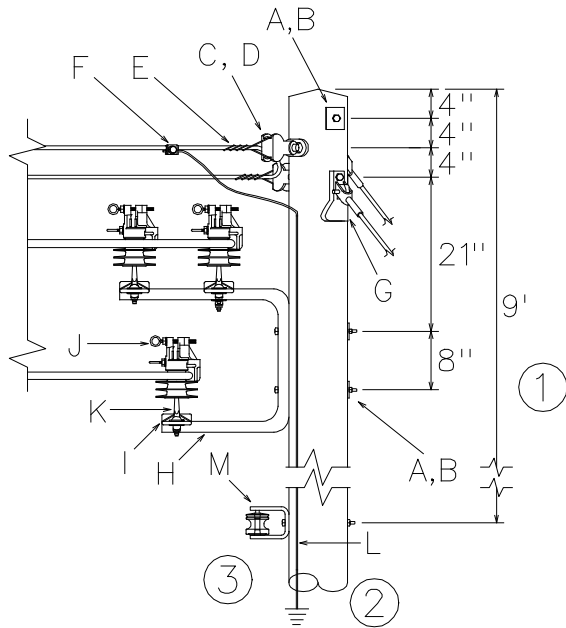
**NOTES**

1. The distance can be reduced to a minimum of 6ft if needed when replacing a pole in an existing line.
2. A pole ground is required on every spacer cable pole. Install a covered 7#10 pole ground if no equipment is being installed or install a covered #2 pole ground if the equipment being installed requires it such as a riser, recloser, etc.
3. Secondary location if present. Connect secondary neutral to pole ground.
4. The distance can be reduced to a minimum of 5ft. if approved by Engineering.

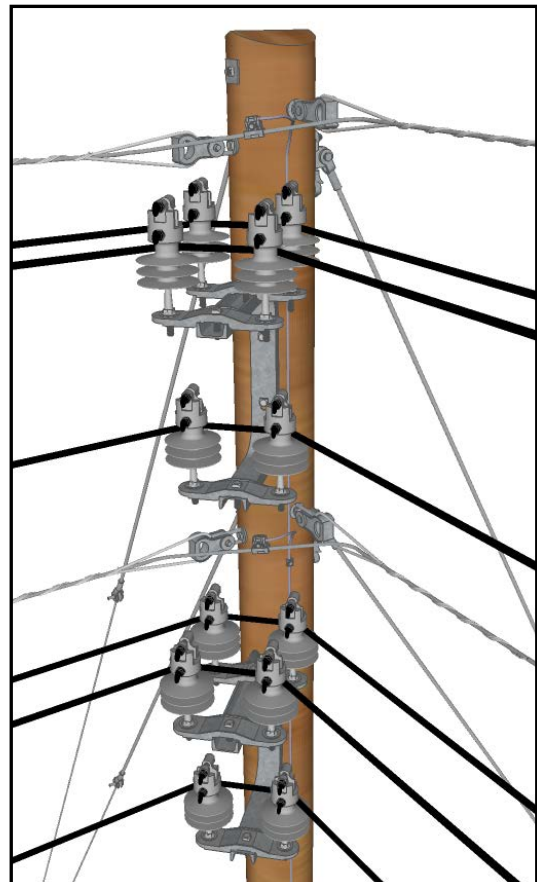
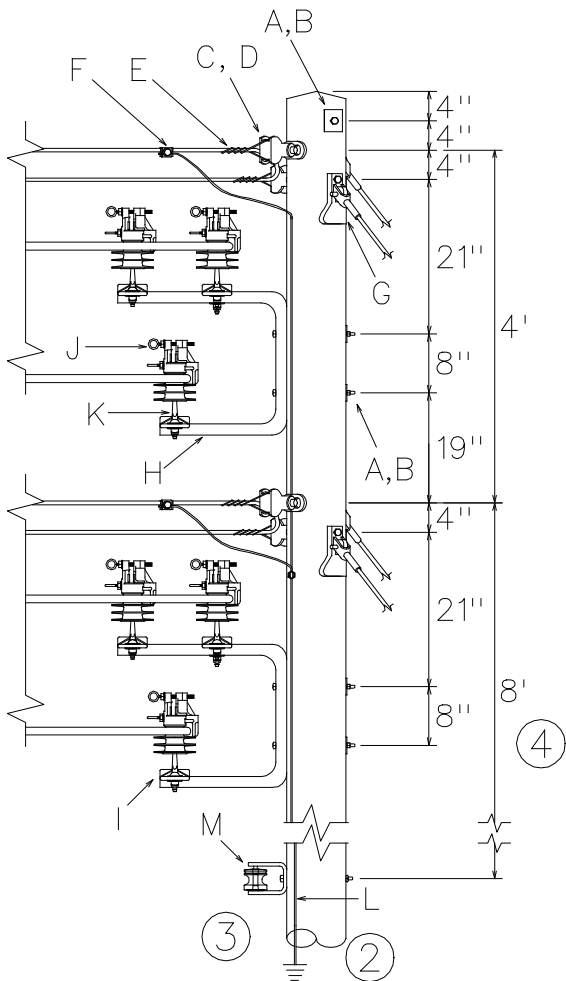
**CONFIGURATIONS**  
**4-15 kV Spacer Cable**  
**Angle Structure 61° and ≤90°**

**03 20 04 \*\***

Sheet 1 of 2



**03 20 04 01 - SINGLE CIRCUIT**



**03 20 04 02 - DOUBLE CIRCUIT**

**CONFIGURATIONS**  
**4-15 kV Spacer Cable**  
**Angle Structure 61° and ≤90°**

**03 20 04 \*\***

Sheet 2 of 2

		<b>Std. / Stk. No.</b>	<b>Description</b>	<b>03 20 04 **</b>	<b>01</b>	<b>02</b>
	A	23 52 066	Bolt, Machine, 5/8" x 14" (w/ nut)		3	5
	B	23 66 027	Washer, Square, 2-1/4" x 2-1/4" x 3/16"		4	6
	C	23 59 095	Eyelet, NM, STD, 3/4"		2	4
	D	23 58 054	Clevis, NM, Thimble, Galvanized Steel		2	4
	E	23 68 713	Grip, Messenger/ Neutral, Preformed 7#6 - 052 AWA		2	4
	F	17 51 137	Connector, PG, Pole Ground to Messenger		1	2
@	G	11 00 42 **	Guying Unit w/ Fiberglass Insulator & HD Guy Hook		2	4
	H	23 56 073	Bracket, Angle, Insulator Support		1	2
	I	23 67 384	Plate, Mounting, Dbl Pin Insulator		3	6
	J	25 05 143	Insulator, Pin, 15kV, Vise-Top		6	12
	K	23 62 151	Pin, Insulator, 1" Thread, Short Shank, 5/8"		6	12
@	L	12 00 10 **	Grounding Unit, 7#10 Copperweld		1	1
@	M	03 01 01 **	Neutral Configuration			

**NOTES**

1. The distance can be reduced to a minimum of 6ft if needed when replacing a pole in an existing line.
2. A pole ground is required on every spacer cable pole. Install a covered 7#10 pole ground if no equipment is being installed or install a covered #2 pole ground if the equipment being installed requires it such as a riser, recloser, etc.
3. Secondary location if present. Connect secondary neutral to pole ground.
4. The distance can be reduced to a minimum of 5ft. if approved by Engineering.

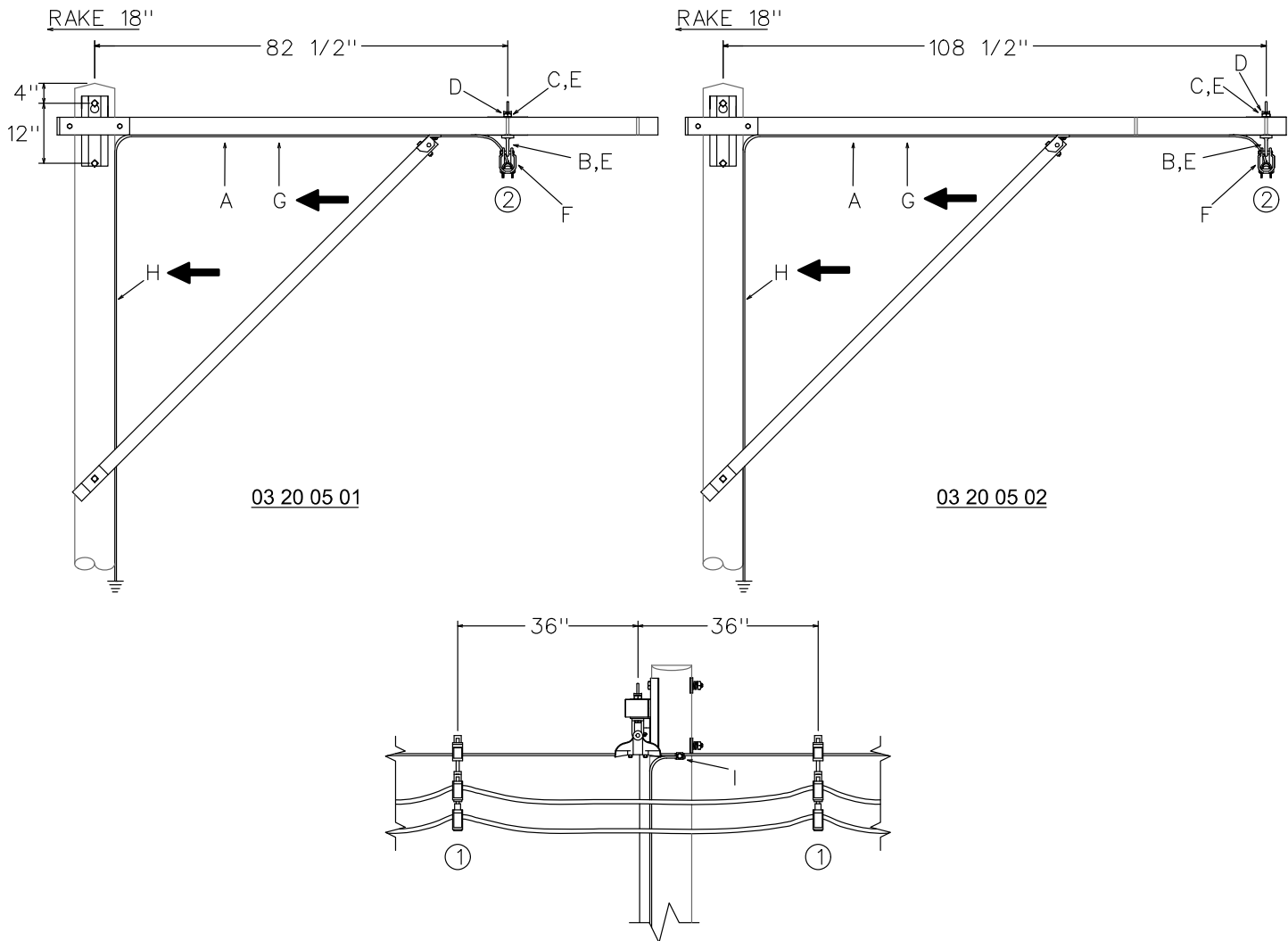
# CONFIGURATIONS

## 15kV & Below – Spacer Cable

### Single Circuit – Tangent Structure – Alley Arm Configuration

**03 20 05 \*\***

Sheet 1 of 1



		Std. / Stk. No.	Description	03 20 05 **	01	02
@	A	04 00 41 18	10' FG Alley Arm Assembly		1	1
	B	23 59 005	Eyelet, NM, 5/8"		1	1
	C	23 52 061	Bolt, Mach., 5/8" x 8"		1	1
	D	23 65 043	Nut, Lock, 5/8"		1	1
	E	23 66 132	Washer, Square, Galv. 4" x 4" x 3/16" w/ 13/16" hole		2	2
	F	23 18 342	Clamp, Suspension (conductor Range: 0.312" – 0.62")		1	1
	G	23 68 746	Clip, Electrical, Grd.		1	1
	H	12 00 10 **	Grounding Unit, 7#10 Copperweld		1	1
	I	17 51 032	Connector, PG, Pole Ground to Messenger		1	1

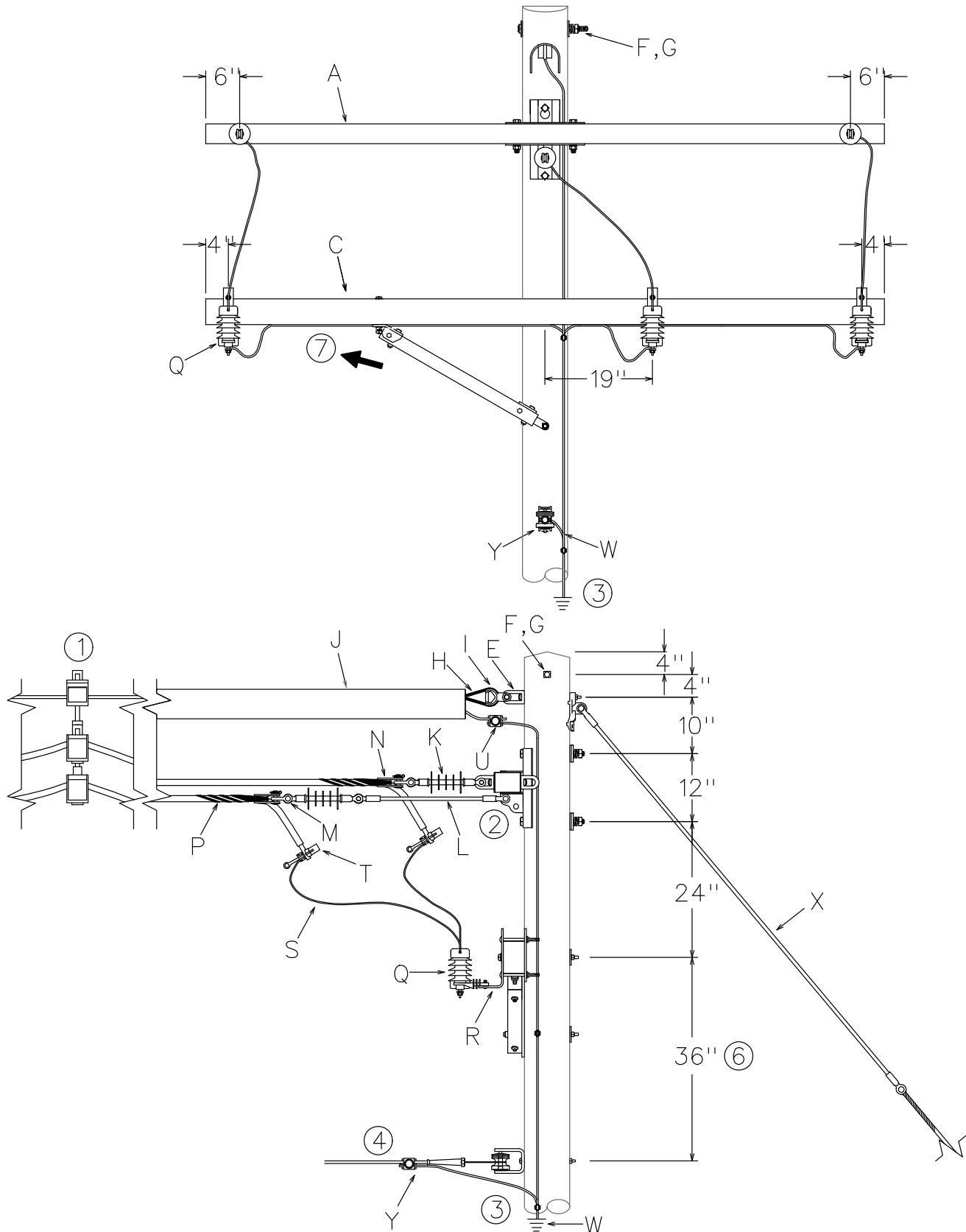
#### NOTES

1. Install spacers 3' from crossarm in each direction. See DCS 07 20 01 01 for spacer installation between poles.
2. Vertical load limited to 1500 lbs. Max spans are: 1/0 span = 258', 477 span = 167', and 795 span = 132'.

**CONFIGURATIONS**  
 15 kV & Below – Spacer Cable  
 Single Circuit – Dead End Structure

**03 20 10 \*\***

Sheet 1 of 4

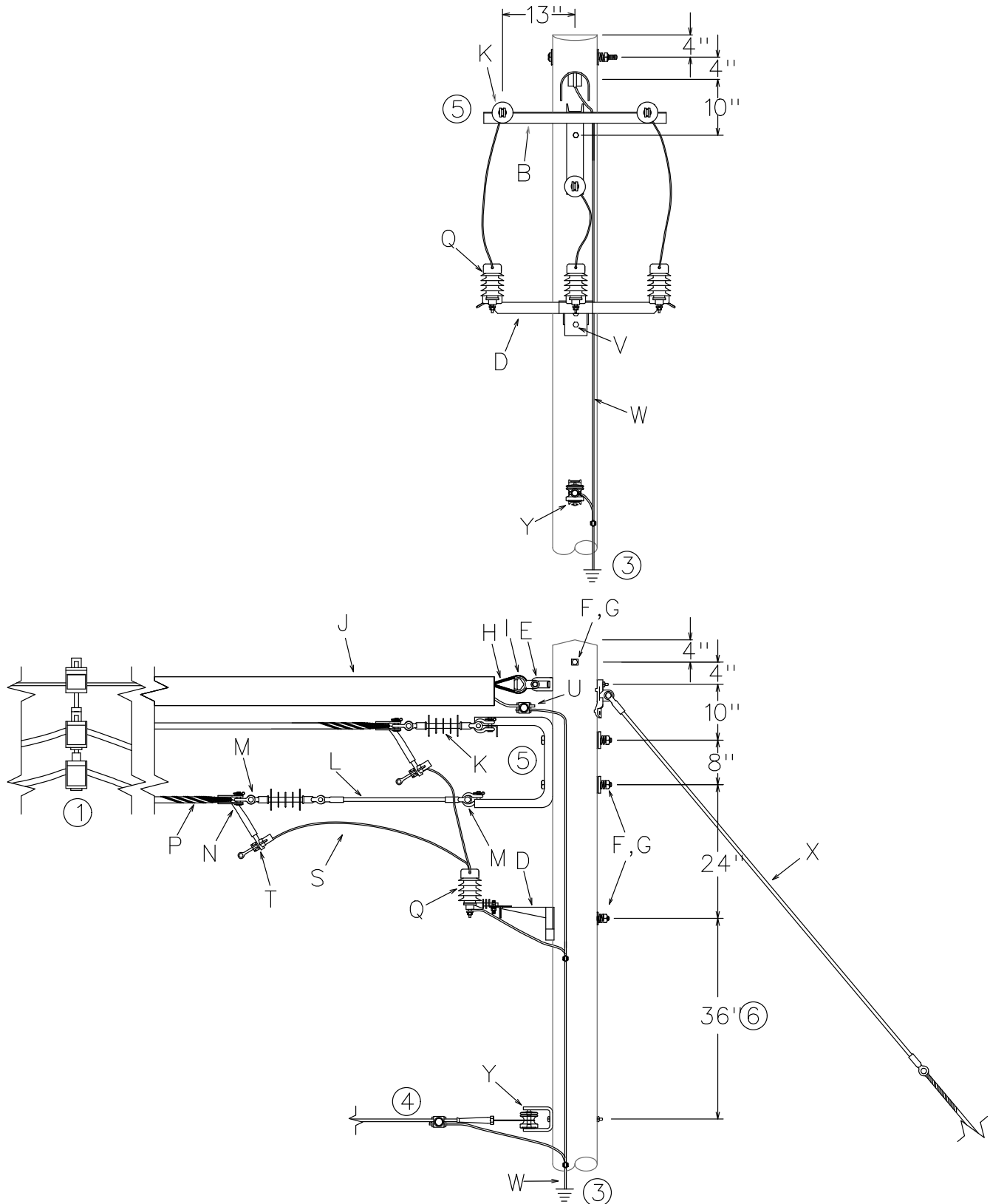


01 - DE ON FG CROSSARM - PREFERRED

**CONFIGURATIONS**  
 15 kV & Below – Spacer Cable  
 Single Circuit – Dead End Structure

**03 20 10 \*\***

Sheet 2 of 4

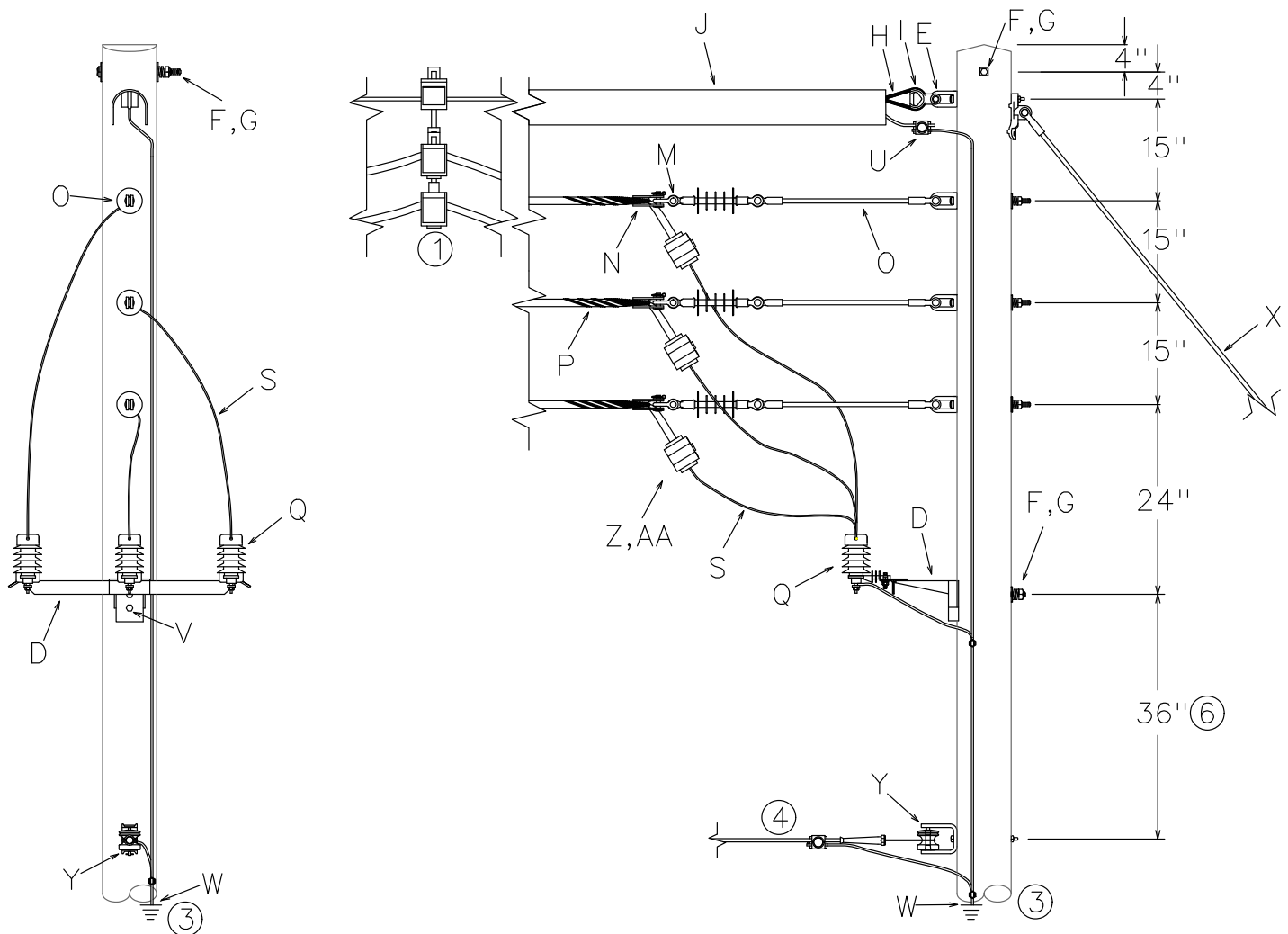


02 - DE ON SPACER CABLE BRACKET

**CONFIGURATIONS**  
15 kV & Below – Spacer Cable  
Single Circuit – Dead End Structure

**03 20 10 \*\***

Sheet 3 of 4



03 - VERTICAL DE ON POLE - LIMITED USE

**CONFIGURATIONS**  
15 kV & Below – Spacer Cable  
Single Circuit – Dead End Structure

**03 20 10 \*\***

Sheet 4 of 4

		Std. / Stk. No.	Description	03 20 10 **	01	02	03
	A	04 00 41 04	Deadend Assy., FG Arm, 10'		1		
	B	23 56 114	Spacer Cable Dead End Bracket			1	
	C	04 00 20 03	Crossarm, Sgl., Wood, 10' (use only 1/2 of V-Brace)		1		
	D	17 08 057	Bracket, Mounting, Arrester			1	1
	E	23 59 095	Eyelet, NM, STD 3/4"		1	1	1
	F	23 52 065	Bolt, Mach., 5/8" x 12"		1	4	2
	G	23 66 027	Washer, Square, 2-1/4" x 2-1/4" x 3/16"		2	5	3
	H	23 68 713	Grip, Messenger/ Neutral, Preformed 7#6 – 052AWA		1	1	1
	I	23 58 054	Clevis, NM, Thimble, Galvanized Steel		1	1	1
	J	69 58 293	Line Duc Cover – (Messenger Cover), Black, 8' Long (Each)		1	1	1
	K	25 06 052	Insulator, Suspension, 15kV, Poly		3	3	
	L	25 56 076	Insulator, Guy Strain, Fiberglass, 26", 15kV		1	1	
	M	23 68 181	Shackle – Anchor, 9/16"		3	6	3
	N	23 58 122	Clevis, Thimble, 7/8" Opening, Galvanized Steel		3	3	3
	O	06 12 30 01	Deadend on Pole with FG Ext.				3
@	P	23 68 701	Grip, Conductor Deadend, 15kV, 477 Spacer Cable		3	3	3
			Size Grip per Existing Spacer Cable Conductor (See 07 20 11 00)		3	3	3
@	Q	10 01 144	Arrester, 10kV w/ Protective Cap		3	3	3
		10 01 133	Arrester, 3kV w/ Protective Cap		3	3	3
	R	17 58 054	Bracket, Switch/ Arrester Mounting		3		
	S	18 51 021	Wire, Poly #6 Cu., (FT.)		15	15	15
@	T	17 62 088	Clamp, Hot Line, 1/0 Through 477 Spacer Cable		3	3	
		17 62 143	Clamp, Hot Line, 795 Spacer Cable		3	3	
	U	17 51 137	Connector, PG, Pole Ground to Messenger		1	1	1
	V	23 60 007	Lag, Square Head, Galvanized, 1/2" x 4"			1	1
4,3@	W	12 00 10 **	Grounding Unit, 7#10 Copperweld		1	1	1
@	X	11 00 42 **	Guying Unit with FG Strain Insulator & HD Guy Hook				
@	Y	03 01 01 **	Neutral Configuration				
	Z	17 51 139	PG Clamp				3
	AA	38 51 608	Cover				3

**NOTES:**

1. Install the first spacer (23 67 334) about 40 feet from the pole as to not stress the cable. Normal spacing is 25' to 33'. See DCS 07 20 01 01 for space installation between poles.
2. Install the center phase of the spacer cable with Fiberglass Strain Insulator into the top hole on the DE arm.
3. Use DCS 12 00 10 01 ground coil application on new pole installation. Use DCS 12 00 10 02 for ground rod application on existing pole installation.
4. Secondary location if present. Connect secondary neutral to pole ground.
5. Only use 03 20 10 02 when extending the line with open wire is unlikely or when required by clearance restrictions.
6. Distance may be reduced to 24" if approved by Engineering.
7. For installations on a composite pole, substitute a fiberglass crossarm, Stock #41 01 285, in place of the wood arm. Use electrical ground clips, stock #23 68 746, to attach the ground wire to the bottom of the fiberglass crossarm.



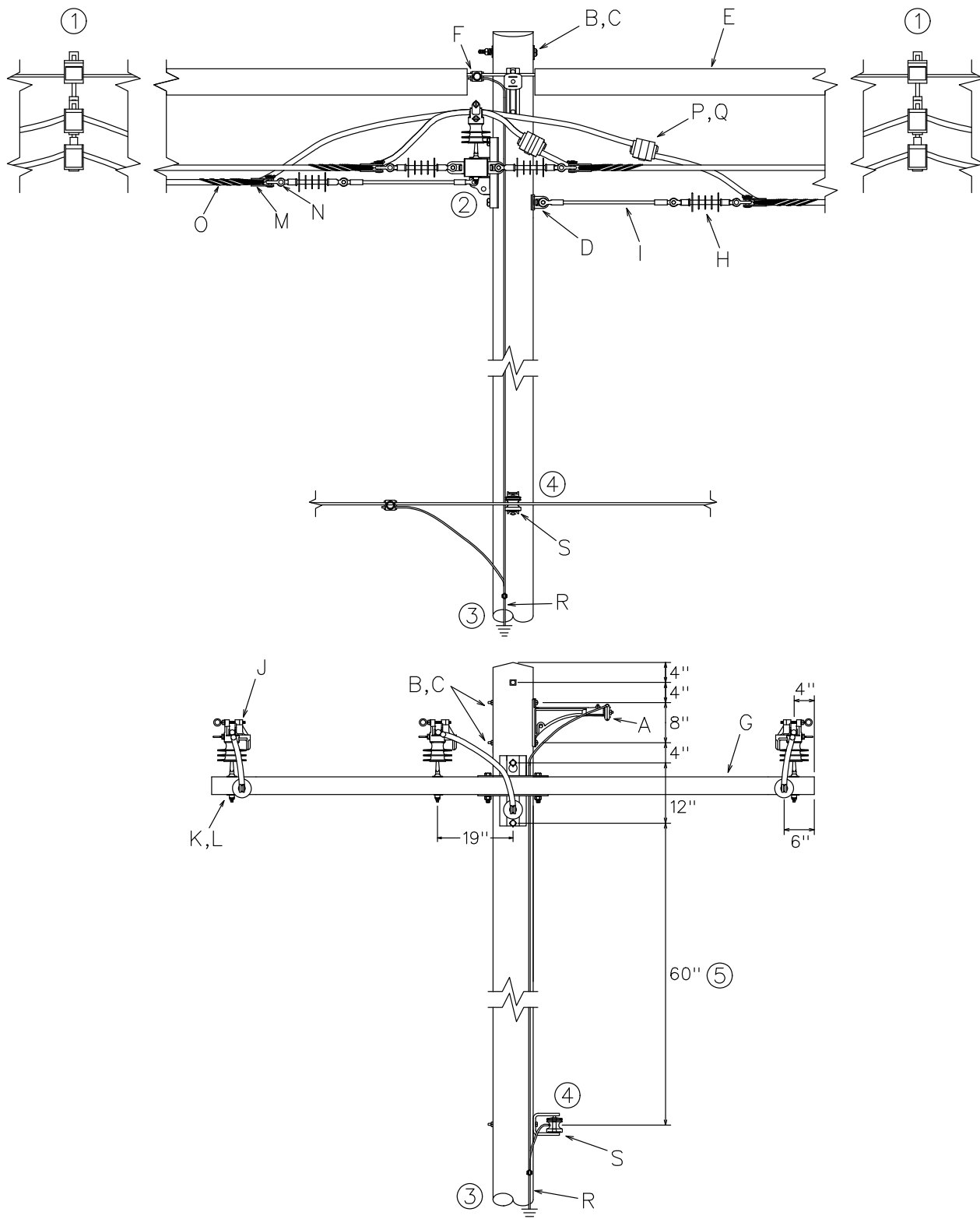
# CONFIGURATIONS

## 15 kV & Below Spacer Cable

### Three Phase Loopover – Spacer Cable to Spacer Cable

03 20 15 \*\*

Sheet 1 of 3



01 - TANGENT MESSENGER

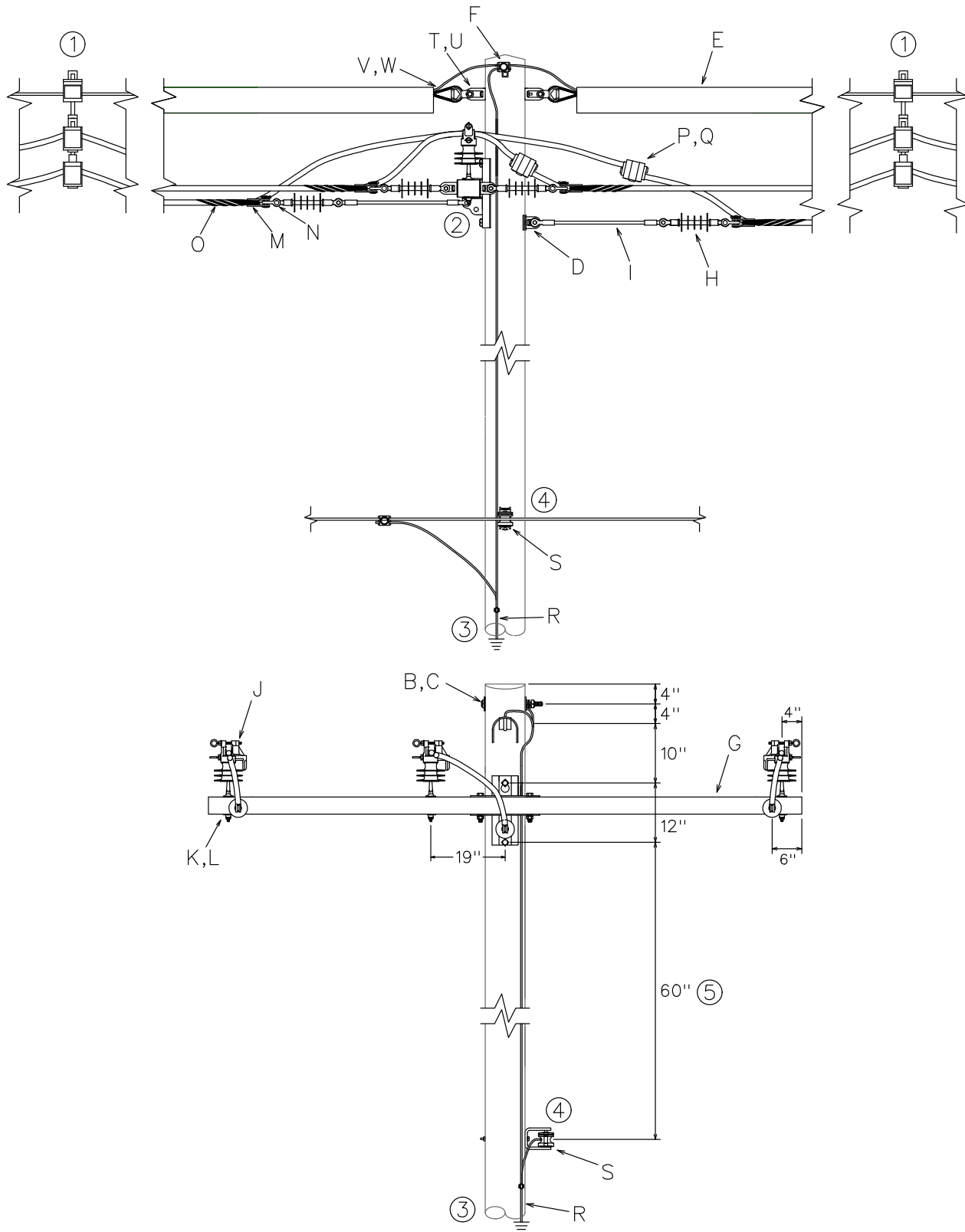
# CONFIGURATIONS

## 15 kV & Below Spacer Cable

### Three Phase Loopover – Spacer Cable to Spacer Cable

03 20 15 \*\*

Sheet 2 of 3



02 - DOUBLE DEADEND MESSENGER

**CONFIGURATIONS**  
**15 kV & Below Spacer Cable**  
**Three Phase Loopover – Spacer Cable to Spacer Cable**

**03 20 15 \*\***

Sheet 3 of 3

		Std. / Stk. No.	Description	03 20 15 **	01	02
	A	23 56 075	Bracket, Messenger		1	
	B	23 52 065	Bolt, Machine, 5/8" x 12" (w/ nut)		3	1
	C	23 66 027	Washer, Square, 2-1/4" x 2-1/4" x 3/16" Thick		4	2
	D	23 65 018	Eyebut, 3/4", Galvanized Steel		1	2
	E	69 58 293	Line Duc (Messenger Cover), Black, 8' Long (Each)		2	2
	F	17 51 137	Connector, PG, Pole Ground to Messenger		1	1
	G	04 00 41 04	Crossarm, Deadend, F/G, 10'		1	1
	H	25 06 052	Insulator, Suspension, 15kV, Poly		6	6
	I	25 56 076	Insulator, Strain, Fiberglass, 26", 15kV		2	2
	J	25 05 143	Insulator, Pin, 15kV, Vise-Top		3	3
	K	23 62 028	Pin, Insulator, Long Shank		3	3
	L	23 66 132	Washer, Flat, Sq., 4" x 4", w/ 13/16" hole		3	3
	M	23 58 122	Clevis, Thimble, 7/8" opening, Galvanized Steel		6	6
	N	23 68 181	Shackle – Anchor, 9/16"		6	6
@	O	23 68 701	Grip, Conductor Deadend, 15kV, New 477 Spacer Cable (See 07 20 11 00)		6	6
			Size Grip per Existing Spacer Cable Conductor		6	6
@	P	PG*W	Clamp, Parallel Groove (See 07 00 25 00)		3	3
	Q	38 51 608	Cover, Large, Vice Type Connectors		3	3
@	R	12 00 10 **	Grounding Unit, 7#10 Copperweld		1	1
@	S	03 01 01 **	Neutral Configuration			
	T	23 59 095	Eyelet, 3/4", Galvanized Steel			1
	U	23 52 097	Bolt, 3/4" x 12"			1
	V	23 68 713	Grip Messenger/Neutral, Preformed – 052 AWA			2
	W	23 58 054	Clevis, NM, Thimble, Galvanized Steel			2

**NOTES**

1. Install the first spacer (23 67 334) about 40 feet from the pole as to not stress the cable. Normal spacing is 25' to 33'. See DCS 07 20 01 01 for spacing installation between poles.
2. Install the center phase of the spacer cable with fiberglass strain insulator into the top hole on the DE arm. This leaves the bottom hole for guying if needed.
3. Use DCS 12 00 10 01 ground coil application on new pole installation. Use DCS 12 00 10 02 for ground rod application on existing pole installation.
4. Secondary location if present. Connect secondary neutral to pole ground.
5. This distance can be reduced to 40 inches if approved by engineering.

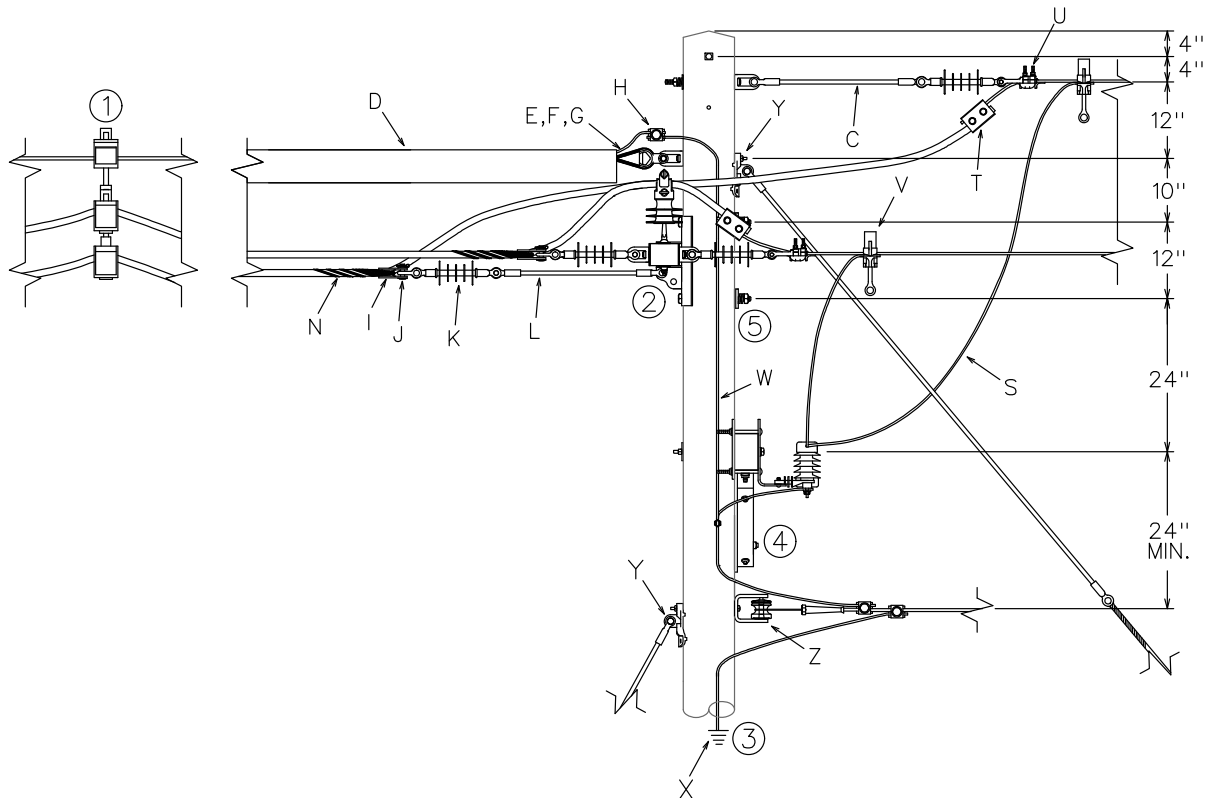
## Sheet 1 of 3



**CONFIGURATIONS**  
**15 kV & Below – Spacer Cable**  
**Three Phase Loopover – Spacer Cable to Open Wire**

**03 20 20 01**

Sheet 2 of 3



		Std. / Stk. No.	Description	03 20 20 01	01
	A	23 52 065	Bolt, 5/8" x 12"		1
	B	23 66 027	Washer, Square, 2-1/4"		2
	C	06 12 30 01	Deadend on Pole w/ FG Extension		1
	D	69 58 293	Line Duc (Messenger Cover), Black. 8' Long (Each)		1
	E	23 68 713	Grip, Messenger/Neutral, Preformed for - 052 AWA		1
	F	23 58 054	Clevis, NM, Thimble, Galvanized Steel		1
	G	23 59 095	Eyelet, NM, Thimble, 3/4", Galvanized Steel		1
	H	17 51 137	Clamp, PG - Messenger to Open Wire Neutral		2
	I	23 58 122	Clevis, Thimble, 7/8" opening, Galvanized Steel		3
	J	23 68 181	Shackle - Anchor, 9/16"		3
	K	25 06 052	Insulator, Suspension, 15kV, Poly		5
	L	25 56 076	Insulator, Strain, Fiberglass, 26"		1
	M	25 05 143	Insulator, Pin, 15kV, Vise-Top		3
@	N	23 68 701	Grip, Conductor Deadend, 15kV, New 477 Spacer Cable		3
			Size Grip per existing Spacer Cable Conductor (See 07 20 11 00)		3
	O	04 00 41 04	Crossarm, Deadend, F/G, 10'		1
	P	04 00 20 03	Crossarm, Sgl., Wood, 10', (use only 1/2 of V-Brace)		1

**CONFIGURATIONS**  
**15 kV & Below – Spacer Cable**  
**Three Phase Loopover – Spacer Cable to Open Wire**

**03 20 20 01**

Sheet 3 of 3

@	Q	10 01 144	Arrester, 10kV w/ Protective Cap	3
		10 01 133	Arrester, 3kV w/ Protective Cap	3
	R	17 58 054	Bracket, Switch/ Arrester Mounting	3
	S	18 51 021	Wire, Poly #6 Cu., (Ft.)	15
@	T	PG*	Clamp, Parallel Groove (See 07 00 25 00)	3
@	U	DEC*W	Clamp, Deadend	3
@	V	HLC*W	Hot Line Clamp	3
	W	18 51 019	Wire, #2 Cu. Poly Covered (Ft.)	15
3 @	X	12 00 10 **	Grounding Unit, 7#10 Copperweld	1
@	Y	11 00 42 **	Guying Unit with FG Strain Insulator & HD Guy Hook	
@	Z	03 01 01 **	Neutral Configuration	
	AA	23 62 028	Pin, Insulator, Long Shank	3
	BB	23 66 132	Washer, Flat, Sq., 4" x 4" w/ 13/16" hole	3

**NOTES**

1. Install the first spacer (23 67 334) about 40 feet from the pole as to not stress the cable. Normal spacing is 25' to 33'. See DCS 07 20 01 01 for spacing installation between poles.
2. Install the center phase of the space cable with fiberglass Strain Insulator into the top hole on the DE arm. This leaves the bottom hole for guying if needed.
3. Use DCS 12 00 10 01 ground coil application on new pole installation. Use DCS 12 00 10 02 for ground rod application on existing pole installation.
4. Secondary location if present. Connect secondary neutral to pole ground.
5. Extend #2 poly covered ground wire (18 51 019) from open wire neutral to the messenger.
6. For installations on a composite pole, substitute a fiberglass crossarm, Stock #41 01 285, in place of the wood arm. Use electrical ground clips, stock #23 68 746, to attach the ground wire to the bottom of the fiberglass crossarm.

15 kV & Below – Spacer Cable  
Three Phase Tap From Open Wire

Sheet 1 of 2



ENG: KR  
REV. NO: 1  
REV. DATE: 06/18/18

# CONFIGURATIONS

## 15 kV & Below – Spacer Cable Three Phase Tap From Open Wire

03 20 24 01

Sheet 2 of 2

		Std./Stk. No.	Description	03 20 24 01	
	A	04 00 41 04	Deadend Assy, FG Arm, 10'		1
	B	04 00 20 03	Crossarm, Sgl, Wood, 10' (use only 1/2 of V-Brace)		1
	C	17 51 137	Connector, PG, Pole Ground to Messenger		1
	D	23 59 095	Eyelet, NM, STD, 3/4"		1
	E	23 68 713	Grip, Messenger/Neutral, Preformed for 7#6 – 052AWA		1
	F	23 58 054	Clevis, NM, Thimble, Galvanized Steel		1
	G	69 58 293	Line Duc Cover – (Messenger Cover), Black. 8' Long (Each)		1
	H	25 06 052	Insulator, Suspension, 15kV, Poly		3
	I	25 56 076	Insulator, Guy Strain, Fiberglass 26", 15kV		1
	J	25 05 143	Insulator, Pin, 15kV, Vice-Top		1
	K	23 62 028	Pin, Insulator, Long Shank		1
	L	23 68 181	Shackle – Anchor, 9/16"		3
	M	23 58 122	Clevis, Thimble, 7/8" Opening, Galvanized Steel		3
@	N	23 68 701	Grip, Conductor Deadend, 15kV, 477 Spacer Cable		3
			Size Grip per existing Spacer Cable Conductor (See 07 20 11 00)		3
	R	LW*W	Wire, Poly Covered, S.D. (ft.) (See 07 00 80 00)		30
@	S	10 01 144	Arrester, 10kV w/ Protective Cap		3
		10 01 133	Arrester, 3kV w/ Protective Cap		3
	T	17 58 054	Bracket, Switch/Arrester Mounting		3
	U	18 51 021	Wire, Poly #6 CU., (FT.)		15
@	V	PG*W	Clamp, Parallel Groove (See 07 00 25 00)		3
@	W	HLC*W	Hot Line Clamp		3
	X	38 51 608	Cover, Large, Vice Type Connectors		3
@,3	Y	12 00 10 **	Grounding Unit, 7#10 Copperweld		1
@	Z	11 00 42 **	Guying Unit with FG Strain Insulator & HD Guy Hook		
5	AA	18 51 019	Wire, #2 Cu. Poly Covered (Ft.)		15
	BB	23 66 132	Washer, Flat, Sq., 4" x 4" w/ 13/16" hole		1

### NOTES:

1. Install the first spacer (23 67 334) about 40 feet from the pole as to not stress the cable. Normal spacing is 25' to 33'. See DCS 07 20 01 01 for spacer installation between poles.
2. Install the center phase of the spacer cable with fiberglass strain insulator into the top hole on the DE arm. This leaves the bottom hole for guying if needed.
3. Use DCS 12 00 10 01 ground coil application on new pole installation. Use DCS 12 00 10 02 for ground rod application on existing pole installation.
4. Secondary location if present. Connect secondary neutral to pole ground.
5. Extend #2 poly covered ground wire (18 51 019) from open wire neutral to the messenger.
6. For installations on a composite pole, substitute a fiberglass crossarm, Stock #41 01 285, in place of the wood arm. Use electrical ground clips, stock #23 68 746, to attach the ground wire to the bottom of the fiberglass crossarm.



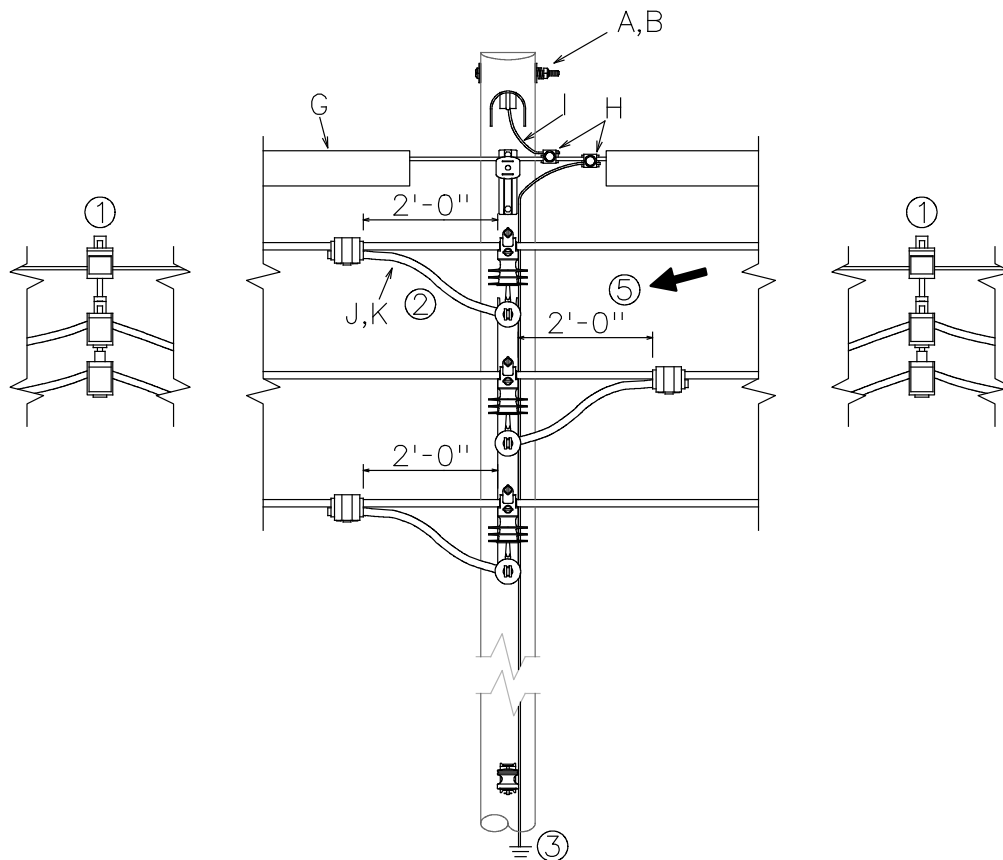
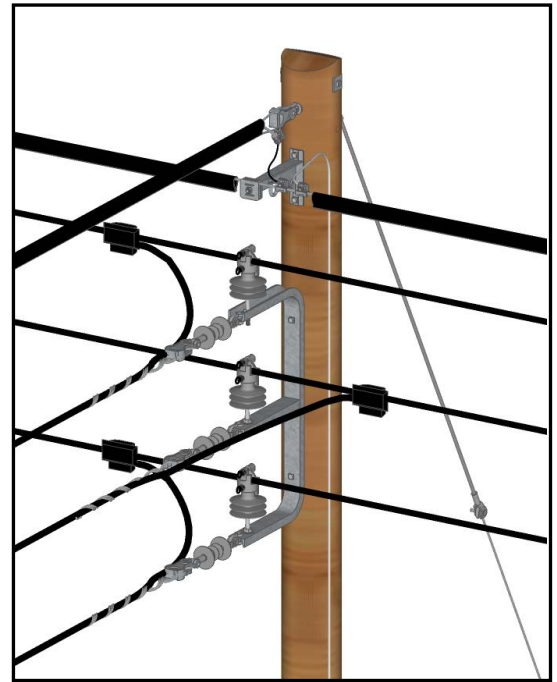
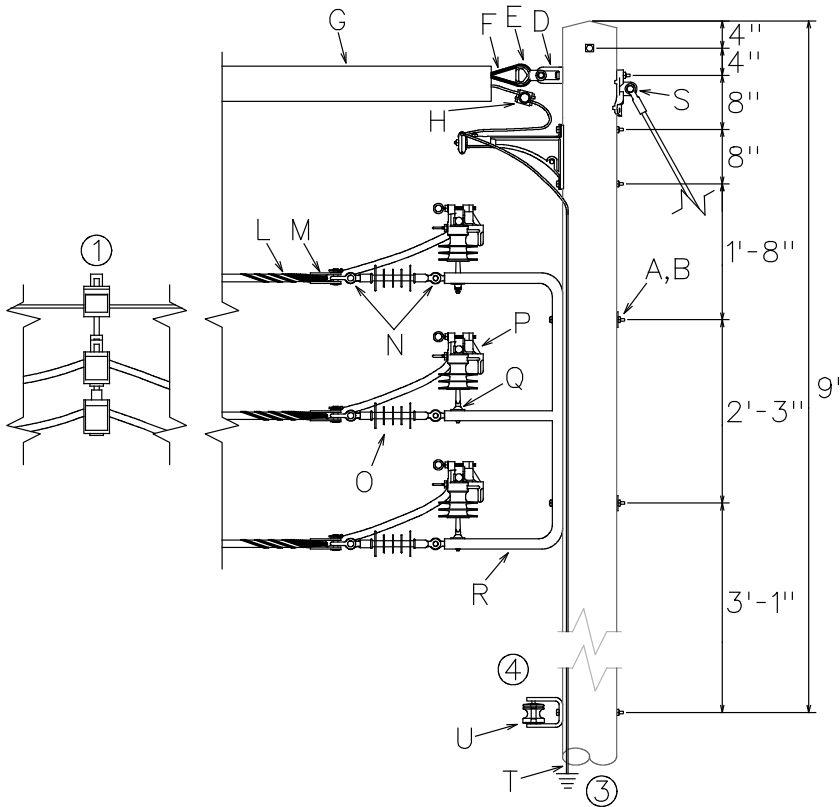
# CONFIGURATIONS

## 15 kV & Below - Spacer Cable

### Three Phase Lateral Tap

03 20 25 01

Sheet 1 of 2



**CONFIGURATIONS**  
15 kV & Below – Spacer Cable  
Three Phase Lateral Tap

**03 20 25 01**

Sheet 2 of 2

		Std. / Stk. No.	Description	03 20 25 01	01
	A	23 52 065	Bolt, Machine, 5/8" x 12" (w/ nut)		3
	B	23 66 027	Washer, Square, 2-1/4" x 2-1/4" x 3/16" Thick		4
	C	23 56 075	Bracket, Messenger		1
	D	23 59 095	Eyelet, 3/4", Galvanized Steel		1
	E	23 58 054	Clevis, NM, Thimble, Galvanized Steel		1
	F	23 68 713	Grip, Messenger/Neutral, Preformed – 052 AWA		1
	G	69 58 293	Line Duc (Messenger Cover), Black. 8' Long (Each)		3
	H	17 51 137	Clamp, PG, Pole Ground to Messenger		3
	I	18 51 019	Wire, #2 Cu. Poly Covered (Ft.)		3
@	J	PG*W	Clamp, PG, Conductor to Conductor		3
	K	38 51 608	Cover, Large, Vise Type Connectors		3
@	L	23 68 701	Grip, Conductor Deadend, 15kV, New 477 Spacer Cable		3
			Size Grip per Existing Spacer Cable Conductor (See 07 20 11 00)		3
	M	23 58 122	Clevis, Thimble, 7/8" opening, Galvanized Steel		3
	N	23 68 181	Shackle – Anchor, 9/16"		6
	O	25 06 052	Insulator, Suspension, 15kV, Poly		3
	P	25 05 143	Insulator, Pin, 15kV, Vise-Top		3
	Q	23 62 151	Pin, Insulator, 1" Thread, Short Shank, 5/8"		3
	R	23 56 105	Bracket, Vertical Tap		1
@	S	11 00 42 **	Guying Unit w/ FG Strain Insulator & HD Guy Hook		1
@	T	12 00 10 **	Grounding Unit, 7#10 Copperweld		1
@	U	03 01 01 **	Neutral Configuration		

**NOTES**

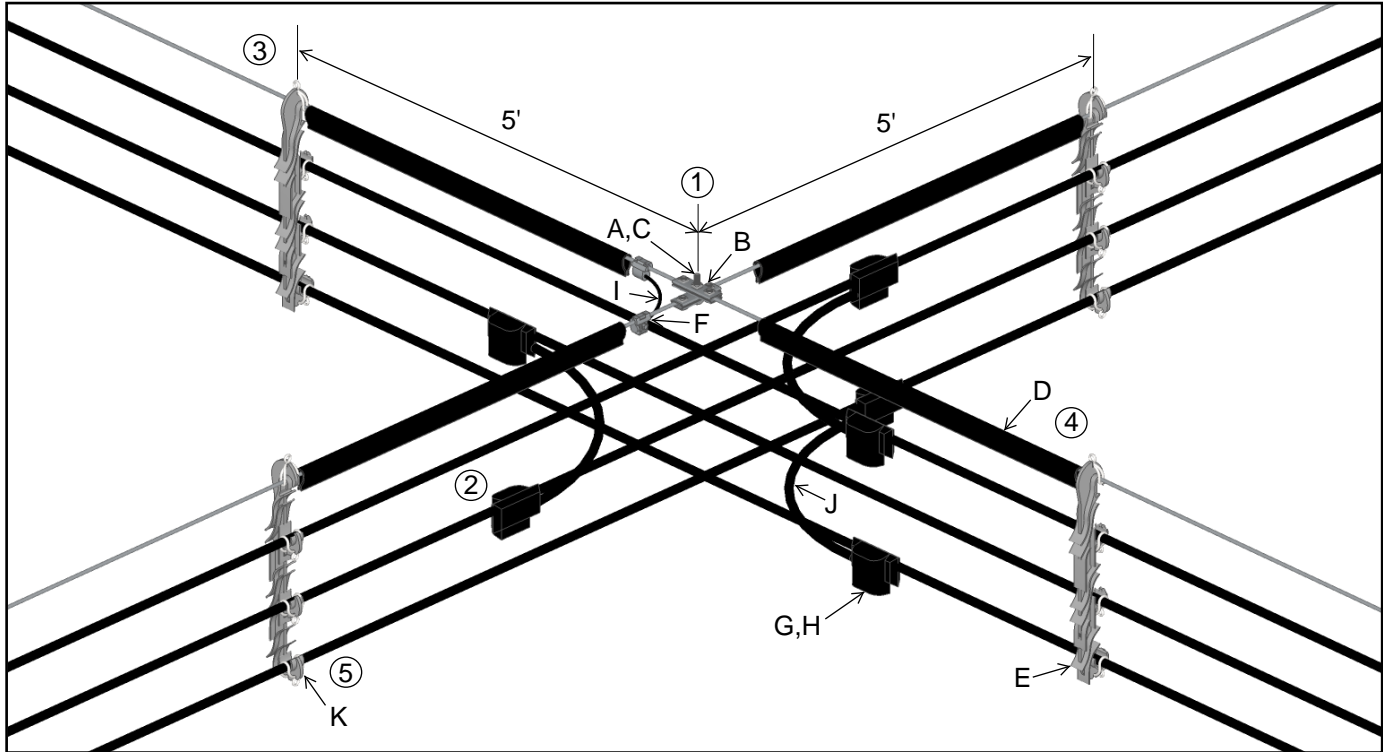
1. Install the first spacer (23 67 334) about 40 feet from the pole as to not stress the cable. Normal spacing is 25' to 33'. See DCS 07 20 01 01 for spacing installation between poles.
2. Extend spacer cable conductor with the covering intact through the preform and connect with PG clamps to the tap/source conductor for all three primary conductors.
3. Use DCS 12 00 10 01 ground coil application on new pole installation. Use DCS 12 00 10 02 for ground rod application on existing pole installation.
4. Secondary location if present. Connect secondary neutral to pole ground.
5. Stagger taps and other areas where the covering has been removed to provide a minimum 2'-0" horizontal separation between the opening and another opening or ground point. Install line duc over the messenger anywhere the cable is stripped to maintain the required 2'-0" of horizontal separation.

# CONFIGURATIONS

## 15kV & Below – Spacer Cable Three Phase Mid-Span Tap

03 20 30 01

Sheet 1 of 1



		Std./Stk. No.	Description	03 20 30 01	
	A	23 52 438	Bolt, Machine, 5/8" x 3" (w/ nut)		1
	B	23 68 657	Clamp, Cable		2
	C	23 65 043	Nut, Lock, 5/8"		1
4	D	69 58 293	Line Duc (Messenger Cover), Black. 8' Long (Each)		2
3	E	23 67 411	Spacer, Aerial Cable, Vertical		4
	F	17 51 137	Clamp, PG, Messenger		2
@	G	PG*W	Clamp, PG, Conductor		6
	H	38 51 608	Cover, Large, Vise Type Connectors		6
	I	18 51 019	Wire, #2 Cu., Poly Covered (Ft.)		3
	J	18 51 052	Wire, Poly, SD, 350 CU. (Ft.)		12
5@	K	23 67 333	Ring, Conductor Tie		16

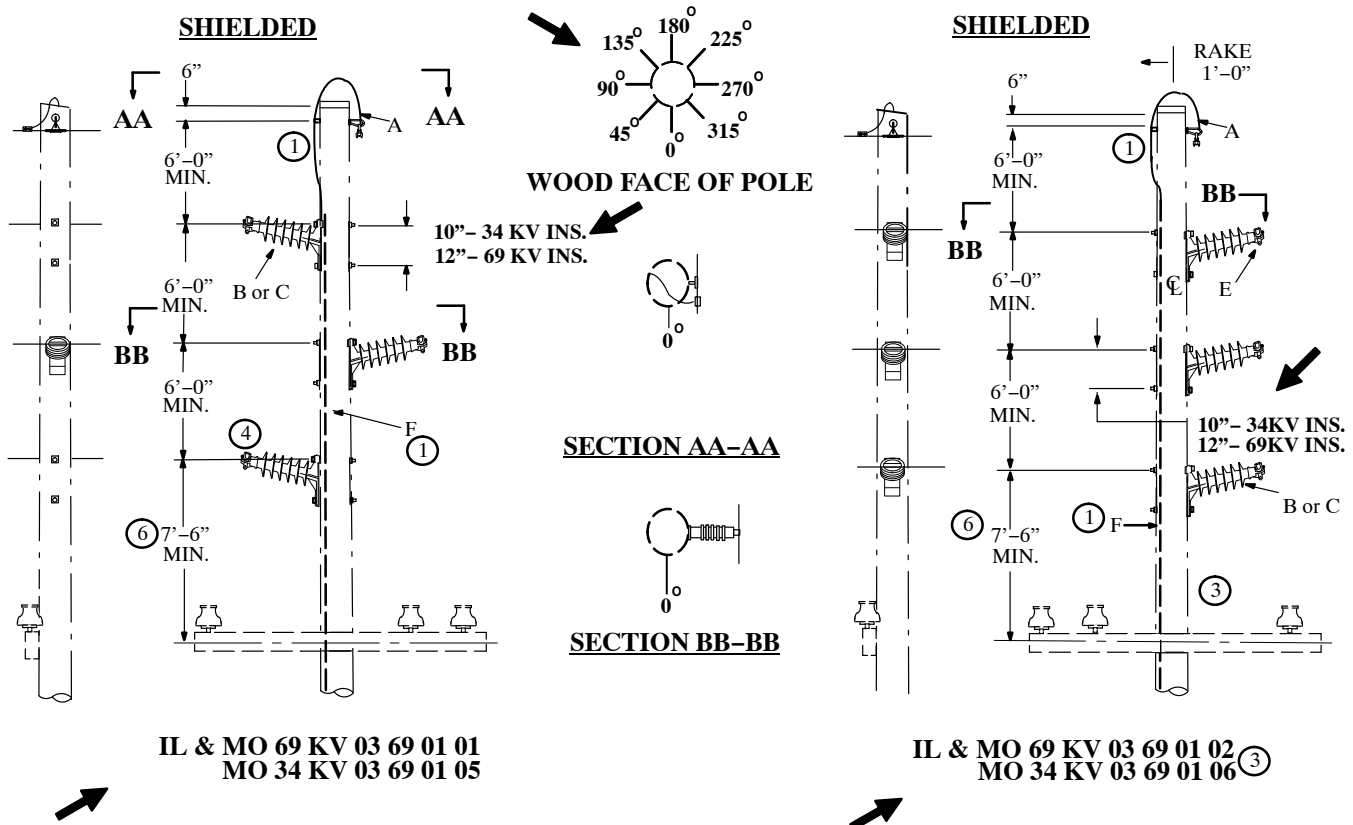
### NOTES

1. This Standard is **Limited Use Only**. Use only to replace existing mid-span taps after close examination determines that the mid-span tap configuration cannot be engineered to be built with any other standard or configuration.
2. Alternate taps as shown in the drawing to maximize the distance between each tap. All taps are to be covered.
3. The vertical spacers are to be located 5' from the intersection of the messenger/conductors.
4. Cut the 8' pieces of line duc in 4' pieces to install between the vertical spacer and the intersection of the two messengers.
5. (4) Ring ties (23 67 333) are included with each vertical spacer (23 67 411), but may be ordered separately if existing vertical spacers are used.

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Tangent Structure for Line Angle  $\leq 1^\circ$

**03 69 01 \*\***

Sheet 1 of 3

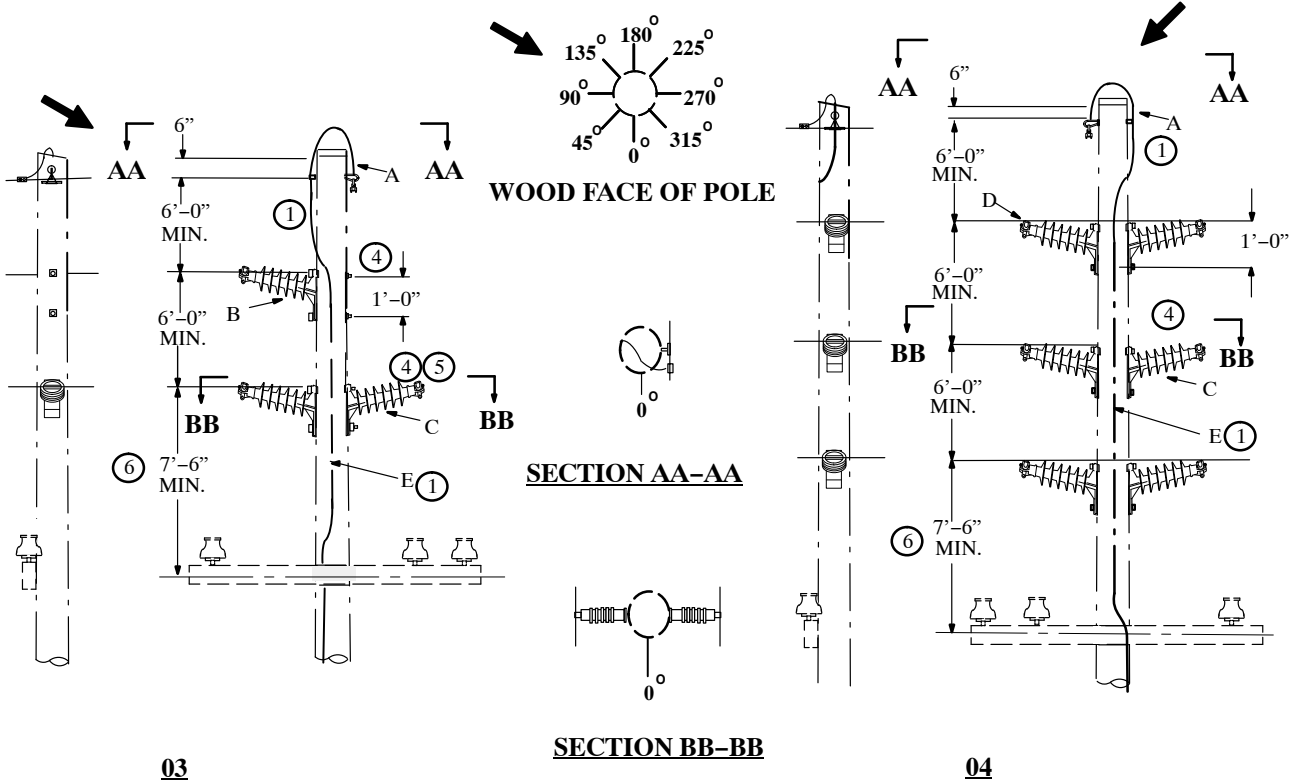


		Std./Stk. No.	Description	03 69 01 **	01	02	05	06
@	A	06 00 11 04	Static Support w/Susp. Clamp		1	1	1	1
	B	06 34 03 03	Insul., 34kV, Horiz., Sgl Post w/Clamp Top				3	3
	C	06 69 03 03	Insul., 69kV, Horiz., Sgl Post w/Clamp Top		3	3		
		06 69 03 01	Insul., 69kV, Horiz., Sgl Post w/Susp. Clamp		3	3		
@	E	TC*W	Clamp, Top, Tang/Ang, Cond.		3	3	3	3
		SC*W	Clamp, Susp, Tang/Ang, Cond.		3	3		
@7	F	12 00 10 09	Grounding, Wood Pole		1	1	1	1
		12 00 10 12	Grounding, Composite Pole		1	1	1	1

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Tangent Structure for Line Angle  $\leq 1^\circ$

**03 69 01 \*\***

Sheet 2 of 3



		Std./Stk. No.	Description	03 69 01 **	03	04
@	A	06 00 11 04	Static Support w/Susp. Clamp		1	1
	B	06 69 03 03	Insul., 69 kV, Horz. Sgl Post w/Clamp Top		1	
@		06 69 03 01	Insul., 69 kV, Horz., Sgl Post w/Susp. Clamp		1	
	C	06 69 03 04	Insul., 69 kV, Horz., Dbl Post w/Clamp Top		1	3
@		06 69 03 02	Insul., 69 kV, Horz., Dbl Post w/Susp. Clamp		1	3
	D	TC*W	Clamp, Top, Tang/Ang, Cond.		1	3
@7		SC*W	Clamp, Susp., Tang/Ang, Cond.		1	3
	E	12 00 10 09	Grounding, Wood Pole		1	1
@4		12 00 10 12	Grounding, Composite Pole		1	1
	F	25 05 132	Insul, 138 kV, Horz., Dbl Post w/Susp. Clamp			

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Tangent Structure for Line Angle  $\leq 1^\circ$

**03 69 01 \*\***

Sheet 3 of 3

NOTES:

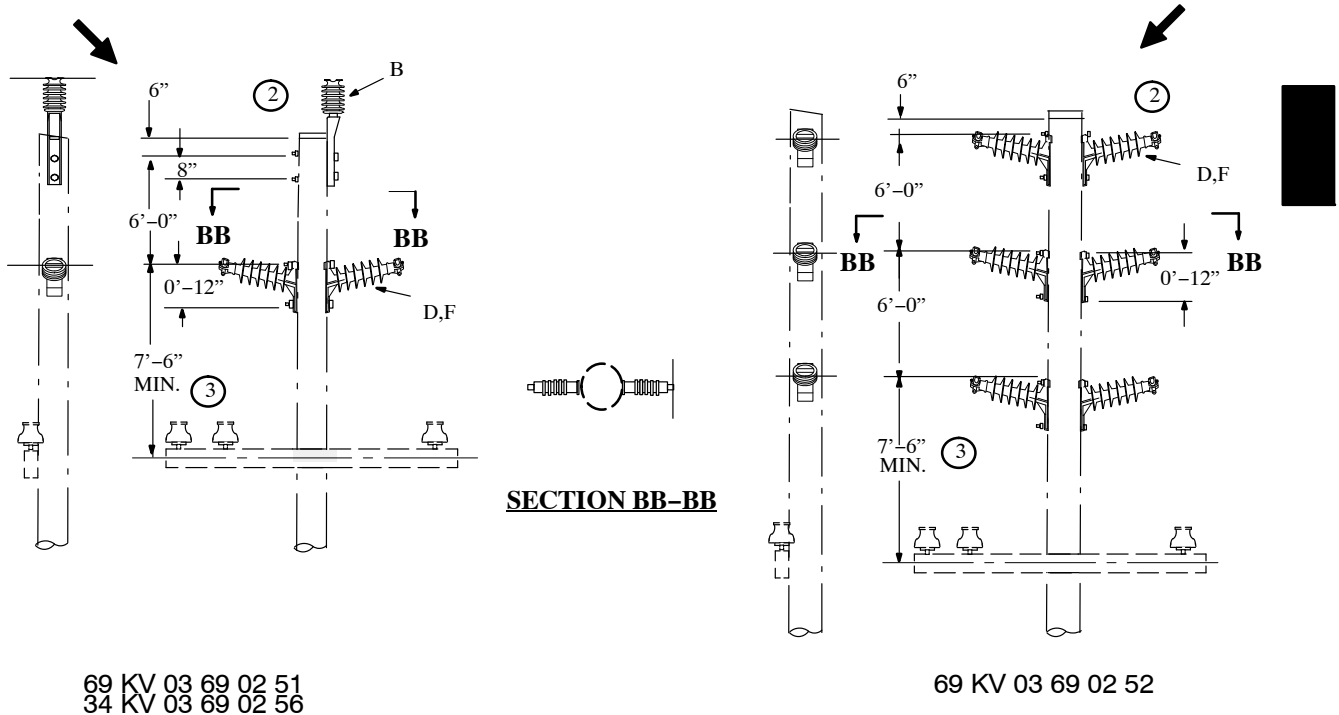
1. Install pole ground on wood pole as shown on configuration. Composite pole is pre-assembled with #2 Str. Cu. Pole ground at 45 degree quadrant. See DCS 12 00 10 09 or 12 00 10 12 for grounding detail.
2. A taller pole shall be selected to replace existing 4' spacing and also to provide adequate ground clearance. If taller pole does not provide adequate ground clearances, consider utilizing Standard 03.
3. This standard is to be used where a future second circuit is anticipated or where constrained by horizontal clearance requirements or right-of-way issues.
4. Modify configuration 01 to 03 for additional clearance or use 138kV insulator to maintain additional horizontal separation if galloping is a concern.
5. If future circuits are anticipated reposition back to back insulator arrangement to upper position to 03 if strength requirements and shielding angle are met.
6. Use 7'-6" spacing for tangent structure and 7'-0" spacing for deadend structure. (use top bolt of fiberglass arm)
7. Install ground clamp above grade on wood and below grade on composite pole. See DCS 12 00 10\*\*.
8. Use composite pole for storm structure as existing maintenance replacement or new line installation. See DCS 02 03 10 01 for storm pole selection.

**CONFIGURATIONS**  
34kV or 69kV  
Tangent Structure for Line Angle  $\leq 1^\circ$

**03 69 02 \*\***

Sheet 1 of 2

LIMITED USE STANDARD



		Std./Stk. No.	Description	03 69 02 **	51	52	56
@	B	06 34 01 05	Ins., 34 kV, Vert. Tie Top F Neck w/Tie				1
		06 34 01 07	Ins., 69 kV, Vert. Tie Top N Neck w/Tie		1		
@	D	06 69 03 04	Insul., 69 kV, Horz., Dbl Post w/Clamp Top		1	3	1
		06 69 03 02	Insul., 69 kV, Horz., Dbl Post w/Susp. Clamp		1	3	1
@	F	TC*W	Clamp, Top, Tang/Ang, Cond.		2	6	2
		SC*W	Clamp, Susp., Tang/Ang, Cond.		2	6	2
@	G	12 00 10 09	Grounding, Wood Pole		1	1	1
		12 00 10 12	Grounding, Composite Pole		1	1	1
@2	H	12 34 01**	Arrester Assy.		1	1	1
@4	L	25 05 132	Insul, 138 kV, Horz., Dbl Post w/Susp. Clamp		1	1	1

**CONFIGURATIONS**  
34kV or 69kV  
Tangent Structure for Line Angle  $\leq 1^\circ$

---

**03 69 02 \*\***

Sheet 2 of 2

NOTES:

1. A taller pole should be selected to replace existing 4' phase spacing and also to provide adequate ground clearance.
2. See Dist. Std. 12 00 01 01 for lighting arresters application and construction.
3. Use 7'-6" distance to tangent and 7'-0" to deadend crossarm (top bolt on FG arm) hole.
4. Use 138kV insulator to maintain horizontal separation if galloping is a concern.

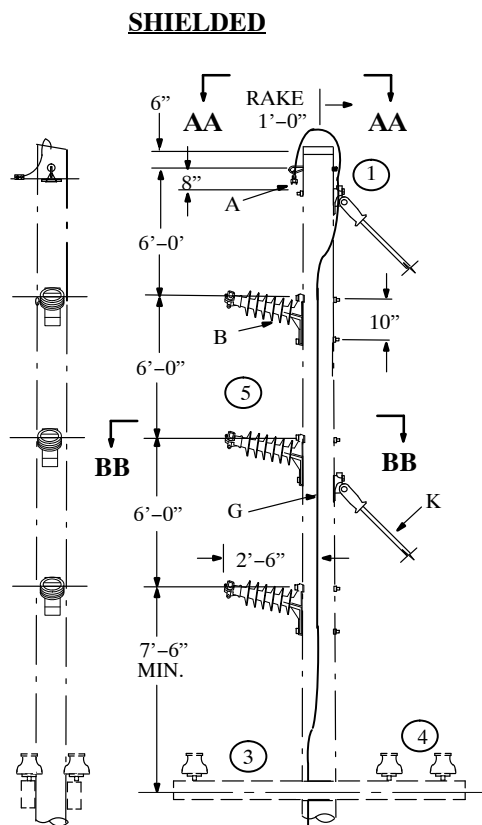




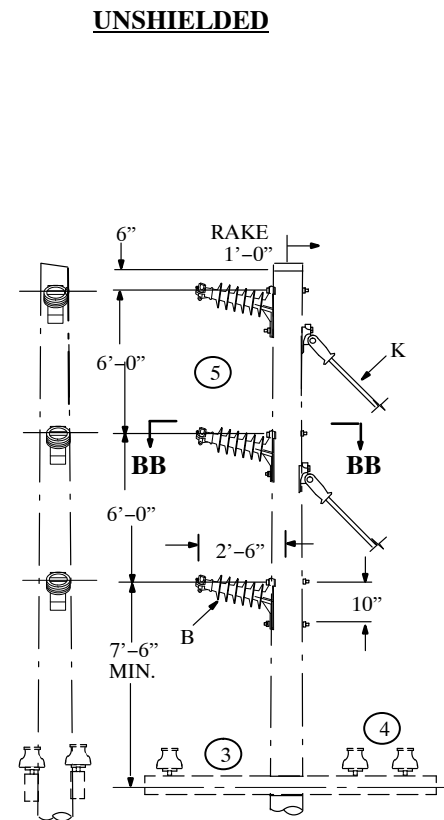
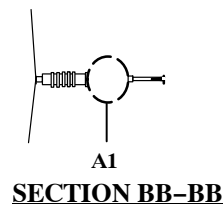
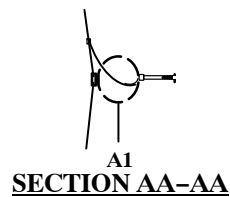
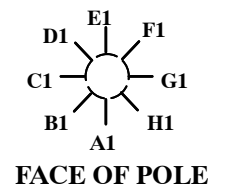
**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Fixed Angle Structure for Line Angle > 1° and ≤ 20°

03 69 05\*\*

Sheet 1 of 2



**01.02**



**51.52**

**NOTES:**

1. Install pole ground at static support in quadrant G1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant B1 on non-metallic pole.
2. Replace existing floating angle structure with new fixed angle structure if the angle is 20° or less.
3. See Dist. Std. 03 00 03 00 for underbuild line angle limitation and Dist. Std. 29 00 04 01 for crossarm(s) loading.
4. Reposition underbuild phases and pole ground if guying conflicts.
5. Contact Standards if existing vertical phase spacing is greater than 6' spacing in a galloping area.
6. See DCS 12 00 01 01 for lightning arrester application and construction.

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Fixed Angle Structure for Line Angle > 1° and ≤ 20°

**03 69 05\*\***

Sheet 2 of 2

⑥

⑥

				69kV		34kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 10 **	01	51	02	52
	A 06 00 11 04	Static Tangent Support w/Suspension Clamp		1		1	
	B 06 34 03 08	Insulator, 34kV, Sgl Horiz. Line Post w/Trunion clamp				3	3
	06 69 03 01	Insulator, 69kV, Sgl Horiz. Line Post w/Suspension clamp		3	3		
	G 12 00 10 09	Grounding Unit		1		1	
@	H 12 34 02 **	Arrester Assembly			1		1
@	K 11 00 43 **	Guying Unit		2	2	2	2

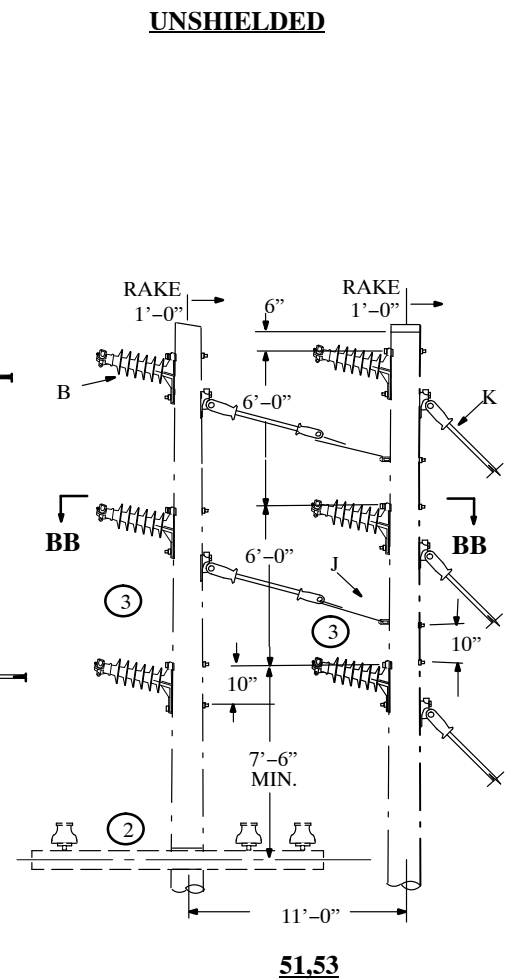
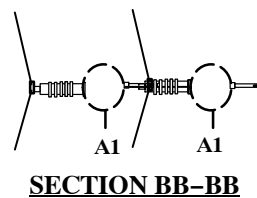
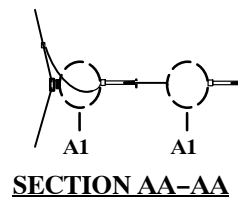
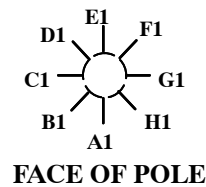
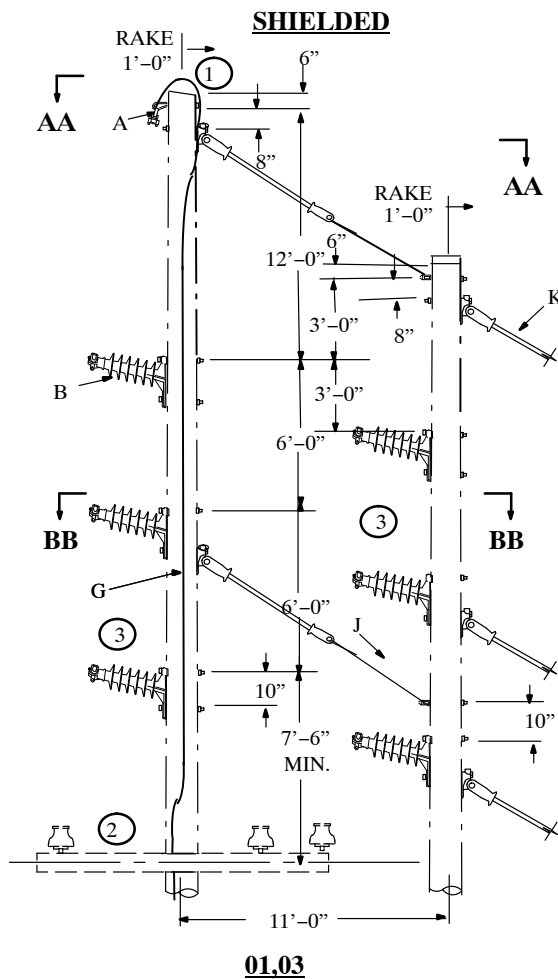
# CONFIGURATIONS

Double Circuit – 34kV or 69kV  
Fixed Angle Structure for Line Angle  $> 1^\circ$  and  $\leq 20^\circ$

03 69 06\*\*

Sheet 1 of 4

## DOUBLE POLE ARRANGEMENT



### NOTES:

1. Install pole ground at static support in quadrant G1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant B1 on non-metallic pole.
2. See Dist. Std. 03 00 03 00 for underbuild line angle limitations and Dist. Std. 29 00 04 01 for crossarm(s) loading.
3. Contact standards if existing vertical phase spacing is greater than 6' in a galloping area.
4. See DCS 12 00 01 01 for lightning arrester application and construction.

**CONFIGURATIONS**  
Double Circuit – 34kV or 69kV  
Fixed Angle Structure for Line Angle > 1° and ≤ 20°

**03 69 06\*\***

Sheet 2 of 4

④

④

				69kV		34kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 10 **	01	51	03	53
@	A	06 00 11 04	Static Tangent Support w/Suspension Clamp	1		1	
	B	06 34 03 08	Insulator, 34kV, Sgl Horiz. Line Post w/Trunion clamp			6	6
		06 69 03 01	Insulator, 69kV, Sgl Horiz. Line Post w/Suspension clamp	6	6		
	G	12 00 10 09	Grounding Unit	1		1	
	H	12 34 02 **	Arrester Assembly		1		1
	J	11 00 46 **	Span Guy Unit	2	2	2	2
	K	11 00 43 **	Guying Unit	3	3	3	3

# CONFIGURATIONS

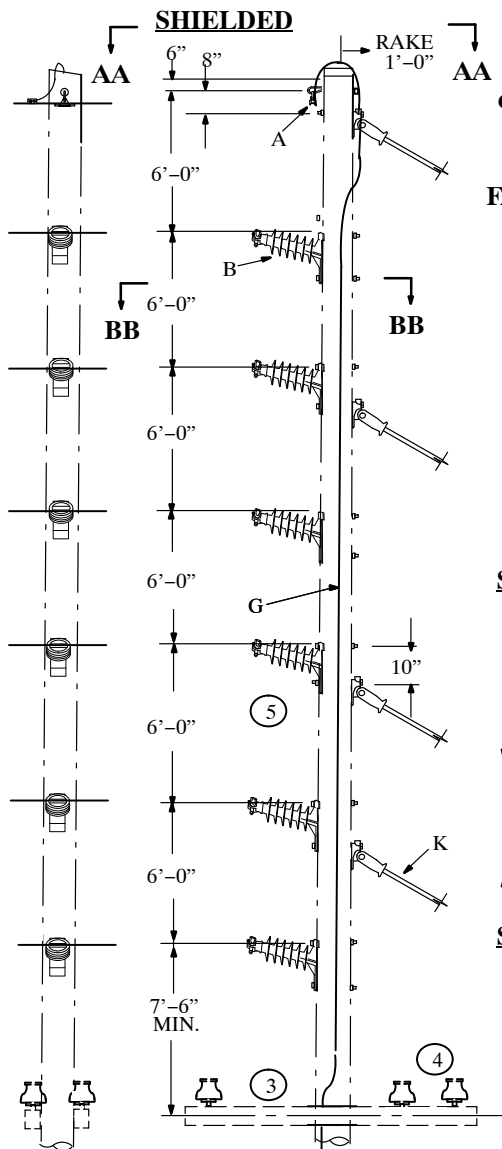
## Double Circuit – 34kV or 69kV

### Fixed Angle Structure for Line Angle $> 1^\circ$ and $\leq 20^\circ$

03 69 06\*\*

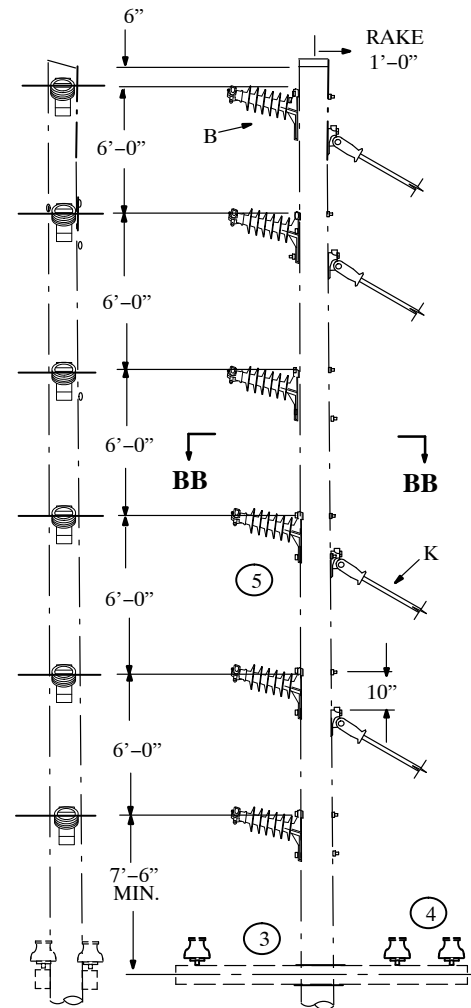
Sheet 3 of 4

#### SINGLE POLE ARRANGEMENT



**02,04**

#### UNSHIELDED



**52,54**

#### NOTES:

1. Install pole ground at static support in quadrant G1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant B1 on non-metallic pole.
2. Replace existing floating angle structure with new fixed angle structure if the angle is  $20^\circ$  or less.
3. See Dist. Std. 03 00 03 00 for underbuild line angle limitation, and Dist. Std. 29 00 04 01 for crossarm(s) loading.
4. Reposition underbuild phases and pole ground if guying conflicts.
5. Contact standards if existing vertical phase spacing is greater than 6' in a galloping area.
6. See DCS 12 00 01 01 for lightning arrester application and construction.

**CONFIGURATIONS**  
Double Circuit – 34kV or 69kV  
Fixed Angle Structure for Line Angle > 1° and ≤ 20°

**03 69 06\*\***

Sheet 4 of 4

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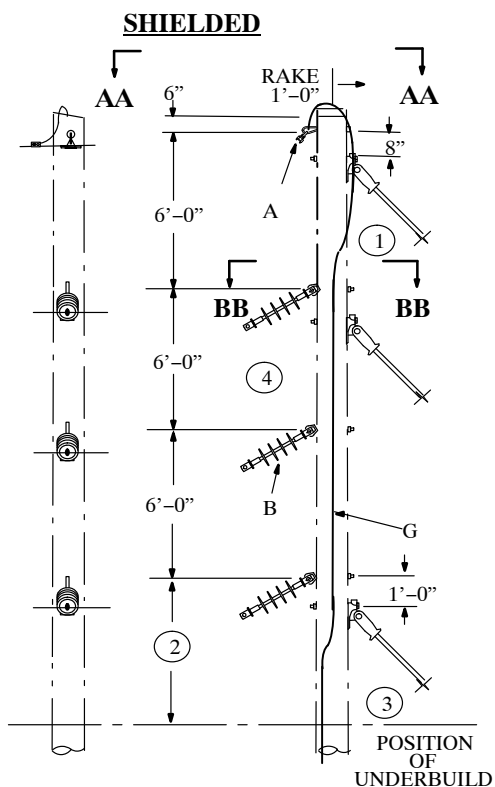
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				69kV		34kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 10 **	02	52	04	54
@	A	06 00 11 04	Static Tangent Support w/Suspension Clamp	1		1	
	B	06 34 03 08	Insulator, 34kV, Sgl Horiz. Line Post w/Trun-nion clamp			6	6
		06 69 03 01	Insulator, 69kV, Sgl Horiz. Line Post w/Sus-pension clamp	6	6		
	G	12 00 10 09	Grounding Unit	1		1	
	H	12 34 02 **	Arrester Assembly		1		1
	J	11 00 46 **	Span Guy Unit				
	K	11 00 43 **	Guying Unit	4	4	4	4

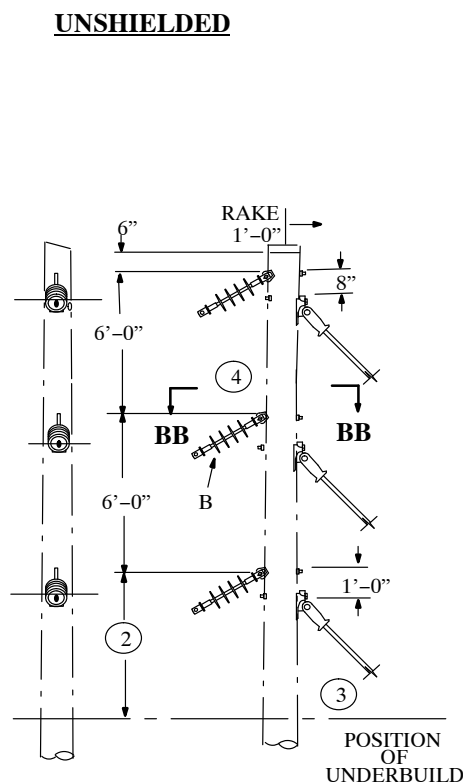
**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Floating Angle Structure for Line Angle  $> 20^\circ$  and  $\leq 60^\circ$

03 69 10\*\*

Sheet 1 of 2



**01.03**



**51.53**

**NOTES:**

1. Install pole ground at static support in quadrant G1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant H1 on non-metallic pole.
2. If underbuild is in vertical configuration, 6' spacing is adequate. But if underbuild is on arm then increase to 7'-6".
3. Reposition underbuild phases and pole ground if guying conflicts.
4. Contact Standards if existing vertical phase spacing is greater than 6' in a galloping area.
5. See DCS 12000101 for lightning arrester application and construction.

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Floating Angle Structure for Line Angle > 20° and ≤ 60°

**03 69 10\*\***  
 Sheet 2 of 2

⑤

⑤

				69kV		34kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 10 **	01	51	03	53
@	A	06 00 11 04	Static Support w/Suspension Clamp	1		1	
	B	06 34 60 08	Insulator, 34kV, Sgl Suspension w/ Suspension clamp			3	3
		06 34 60 17	Insulator, 69kV, Sgl Suspension w/ Suspension clamp	3	3		
	G	12 00 10 09	Grounding Unit	1		1	
	H	12 34 02 **	Arrester Assembly		1		1
	K	11 00 43 **	Guying Unit	3	3	3	3



# CONFIGURATIONS

## Double Circuit – 34kV or 69kV

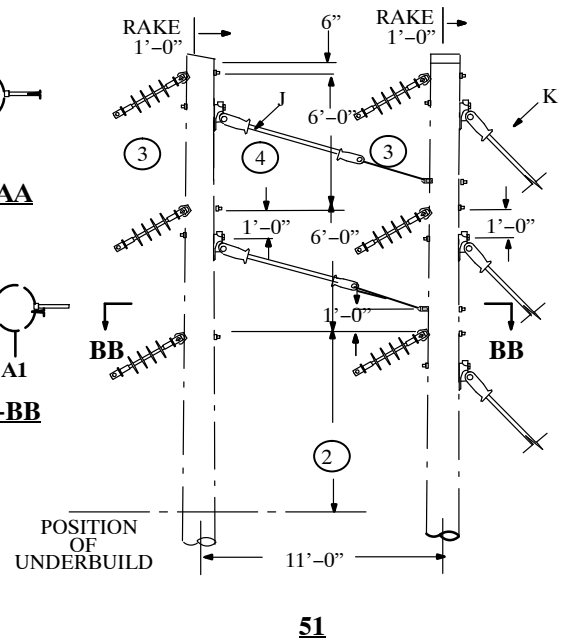
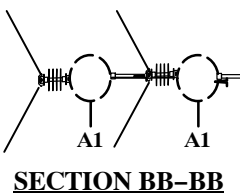
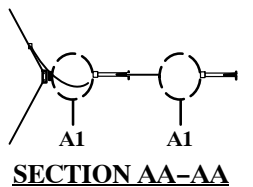
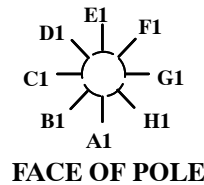
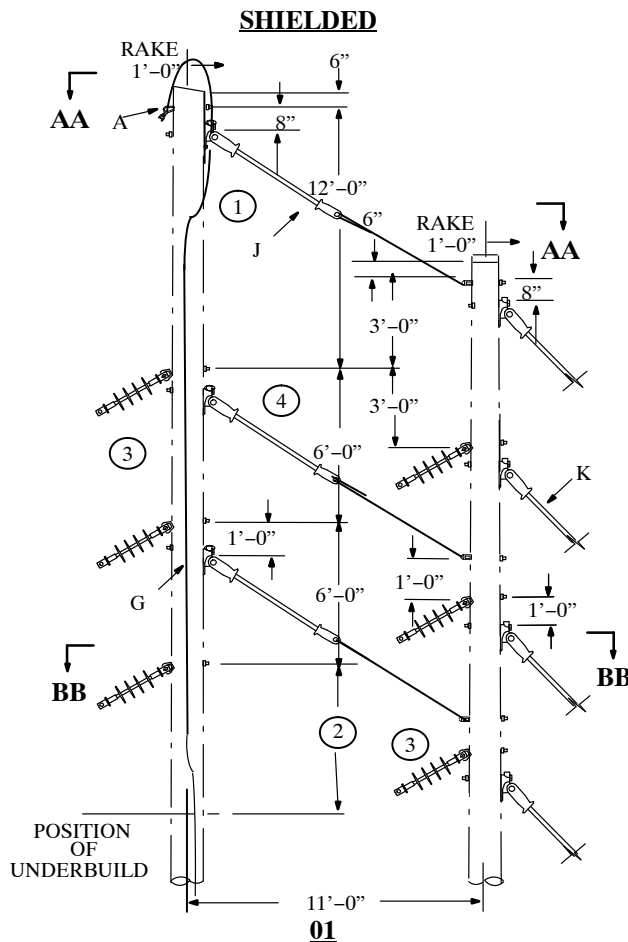
### Floating Angle Structure for Line Angle > 20° and ≤ 60°

03 69 11\*\*

Sheet 1 of 3

#### DOUBLE POLE ARRANGEMENT

#### UNSHIELDED



#### NOTES:

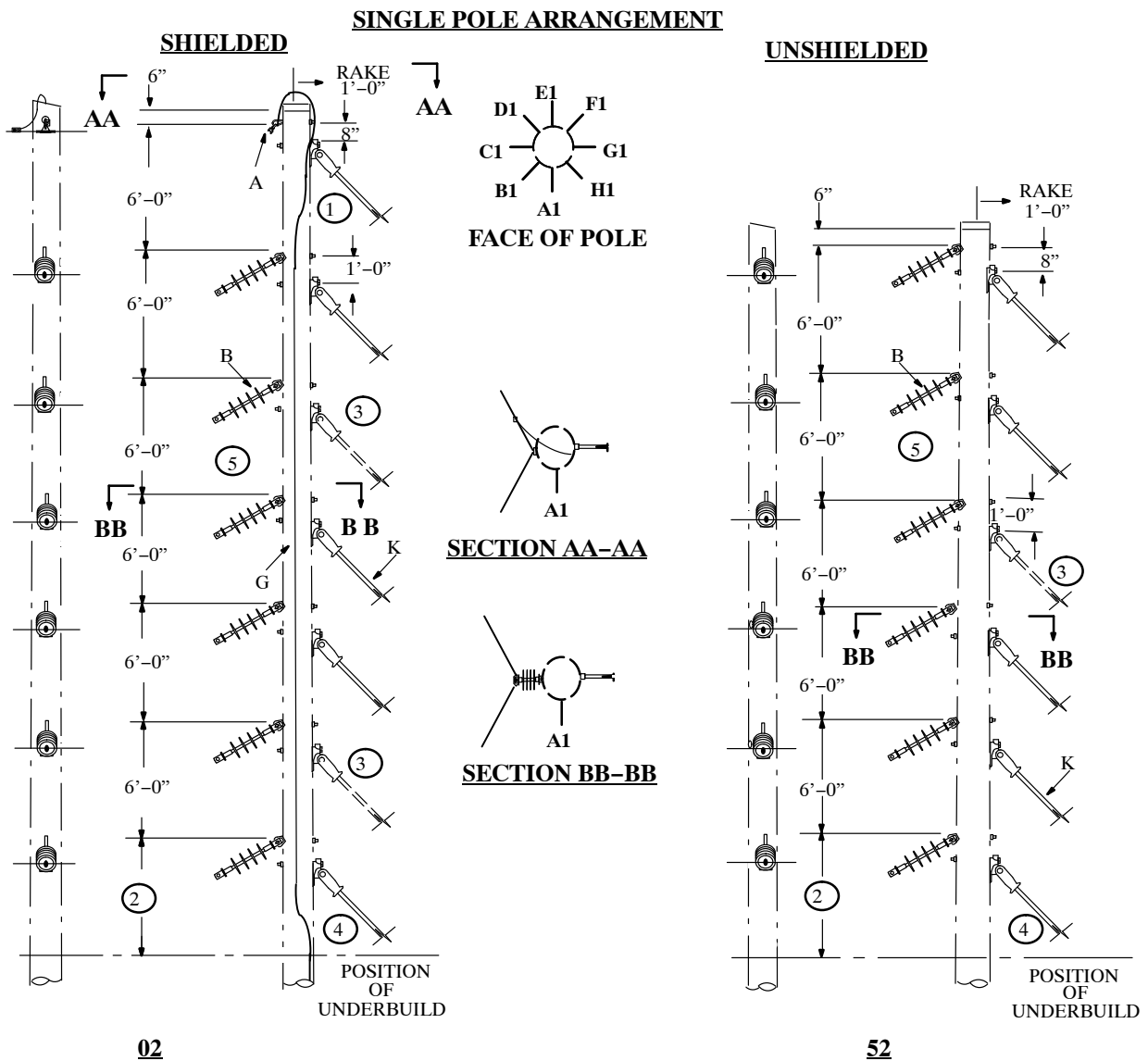
1. Install pole ground at static support in quadrant G1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant H1 on non-metallic pole.
2. If underbuild is in vertical configuration, 6' spacing is adequate. But if underbuild is on arm then increase to 7'-6" spacing.
3. Contact Standards if existing vertical phase spacing is greater than 6' spacing in a galloping area.
4. Lower span guy 2' on pole 1 if electrical clearance is an issue on pole 2 with line angle closer to 20°.
5. Item B can be replaced by two 35kV polymer deadend insulators (Stock No. 25 06 053 – section length 21-25 inches) if transverse load is ≤ to 7500 lbs.

		Std. / Stk. No.	Description	03 69 11 **	SHIELDED	UNSHIELDED
					01	51
	A	06 00 11 04	Static Support w/Suspension Clamp		1	
5	B	06 34 60 17	Insulator, 69kV, Susp. Polymer w/Clamps-Angle		6	6
	G	12 00 10 09	Grounding Unit		1	
@	J	11 00 46 **	Span Guy Unit		3	2
@	K	11 00 43 **	Down Guy Unit		4	3

**DISTRIBUTION  
CONSTRUCTION STANDARDS**



ENG: DCG  
REV. NO: 1  
REV. DATE: 12/19/11



**NOTES:**

1. Install pole ground at static support in quadrant G1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant H1 on non-metallic pole.
2. If underbuild is in vertical configuration, 6' spacing is adequate. But if underbuild is on arm then increase to 7'-6".
3. Guying may be required in this position depending on the conductor tension and line angle.

**CONFIGURATIONS**  
Double Circuit – 34kV or 69kV  
Floating Angle Structure for Line Angle > 20° and ≤ 60°

**03 69 11\*\***

Sheet 3 of 3

4. Reposition underbuild phases and pole ground if guying conflicts.
5. Contact Standards if existing vertical phase spacing is greater than 6' in a galloping area.
6. Item B can be replaced by two 35kV polymer deadend insulators, Stock No. 25 06 053 (section length 21"–25") provided transverse load is ≤ 7500 lbs.

				SHIELDED	UNSHIELDED
		Std. / Stk. No.	Description	03 69 11 **	
6	A	06 00 11 04	Static Support w/Suspension Clamp	02	52
	B	06 34 60 17	Insulator, 69kV, Susp., Polymer w/Clamps – Angle	1	6
	G	12 00 10 09	Grounding Unit	6	1
	K	11 00 43 **	Guying Unit	5	5

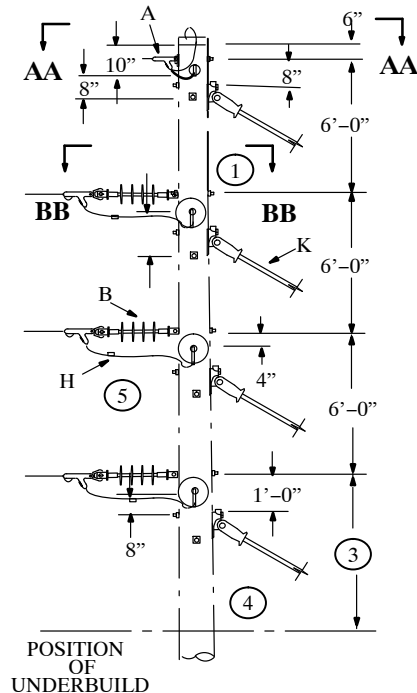
# CONFIGURATIONS

Single Circuit – 34kV or 69kV  
Deadend Corner Structure for Line Angle  $> 60^\circ$  and  $\leq 90^\circ$

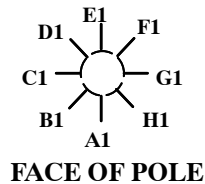
**03 69 15\*\***

Sheet 1 of 2

## SHIELDED



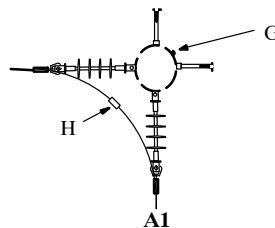
01,02



FACE OF POLE

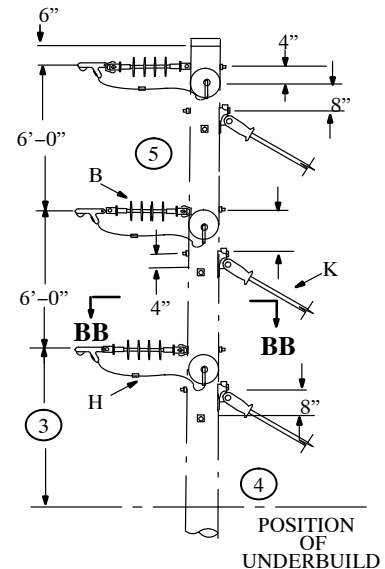


SECTION AA-AA



SECTION BB-BB

## UNSHIELDED



51,52

### NOTES:

1. Install pole ground at static support in quadrant E1, and at insulators, at underbuild crossarm, and above ground line in quadrant F1 on non-metallic pole.
2. Replace existing 4' phase spacing configuration with a 5' taller pole to gain 6' spacing.
3. If underbuild is in vertical configuration, 6' spacing is adequate. But if underbuild is on arm then increase to 7'-6".
4. Reposition underbuild phases and pole ground if guying conflicts.
5. Contact Standards if existing vertical phase spacing is greater than 6' in a galloping area.

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Deadend Corner Structure for Line Angle > 60° and ≤ 90°

**03 69 15\*\***

Sheet 2 of 2



				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
		Std. / Stk. No.	Description <b>03 69 15 **</b>	<b>01</b>	<b>51</b>	<b>02</b>	<b>52</b>
	A	06 00 11 05	Deadend Static w/Clamp	1		1	
	B	06 34 60 02	Ins., 34 kV, Suspension, Sgl w/Deadend Clamp			6	6
		06 34 60 06	Ins., 69 kV, Suspension, Sgl w/Deadend Clamp	6	6		
	G	12 00 10 09	Grounding Unit	1		1	
@	H	PG**	Clamp, Parallel Grove (see DCS 07 00 25 00)	3	3	3	3
@	K	11 00 43 **	Down Guy Unit	8	6	8	6
@	L	12 34 01 **	Arrester Assembly		1		1

# CONFIGURATIONS

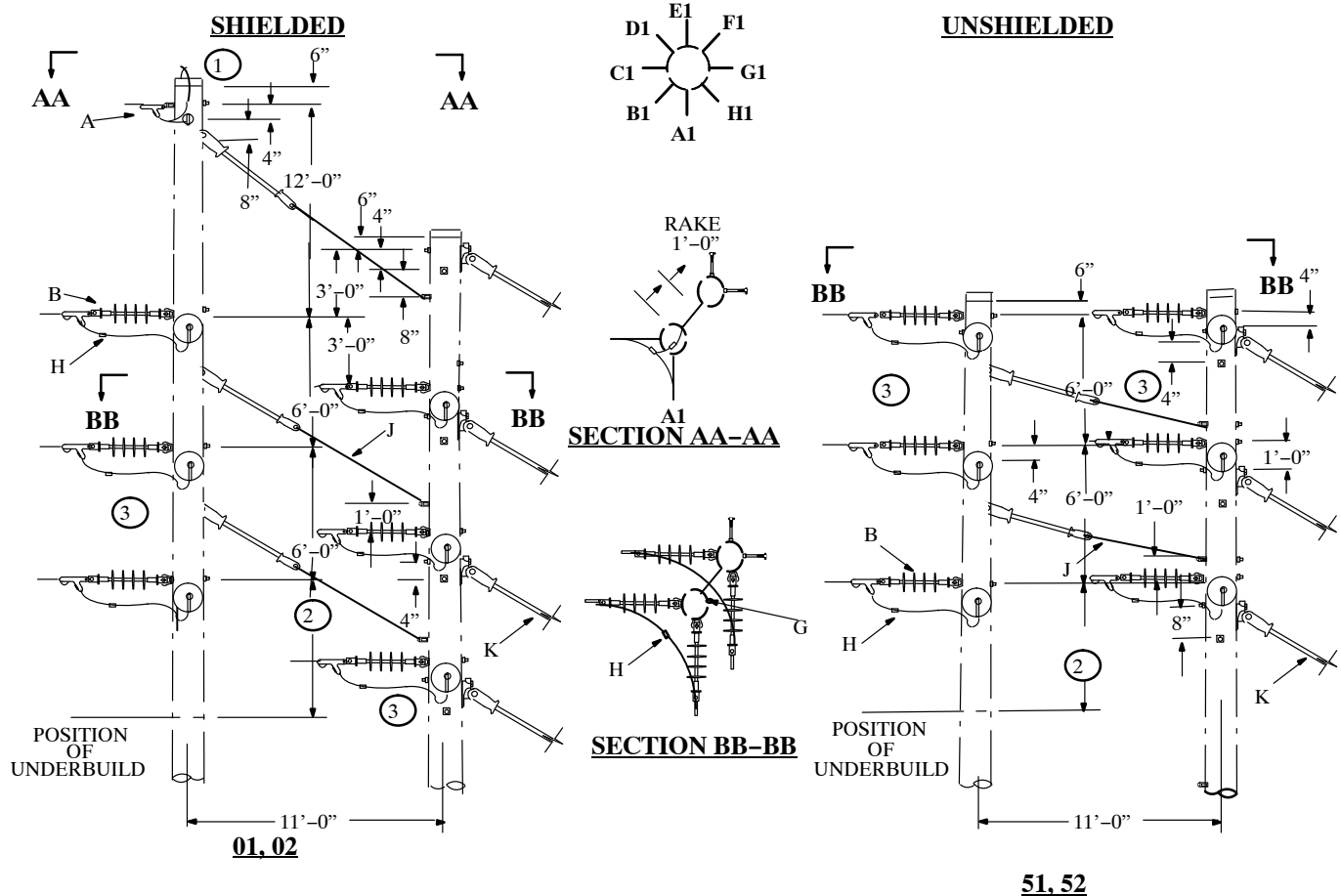
03 69 16\*\*

Double Circuit – 34kV or 69kV

Sheet 1 of 4

Deadend Corner Structure for Line Angle  $> 60^\circ$  and  $< 90^\circ$

## DOUBLE POLE ARRANGEMENT



### NOTES:

1. Install pole ground at static support in quadrant E1, at insulators between quadrant E1 and F1, at underbuild crossarm and above ground line in quadrant F1 on non-metallic pole.
2. If underbuild is in vertical configuration, 6' spacing is adequate. But if underbuild is on arm then increase to 7'-6".
3. Contact Standards if existing vertical phase spacing is greater than 6' in a galloping area.
4. Contact Standards with questions about arrester application and configuration.

# CONFIGURATIONS

03 69 16\*\*

Double Circuit – 34kV or 69kV  
Deadend Corner Structure for Line Angle > 60° and < 90°

Sheet 2 of 4

④

④

				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 16 **	01	51	02	52
@	A	06 00 11 05	Deadend Static w/Clamp	1		1	
	B	06 34 60 02	Ins., 34 kV Sgl Deadend w/Clamp			12	12
		06 34 60 06	Ins., 69 kV, Sgl Deadend w/Clamp	12	12		
	G	12 00 10 09	Grounding Unit	1		1	
	H	PG**	Clamp, Parallel Grove (see DCS 07 00 25 00)	6	6	6	6
	J	11 00 46 **	Span Guy Unit	3	2	3	2
	K	11 00 43 **	Down Guy Unit	8	6	8	6
@	L	12 34 02 **	Arrester Assembly		1		1

# CONFIGURATIONS

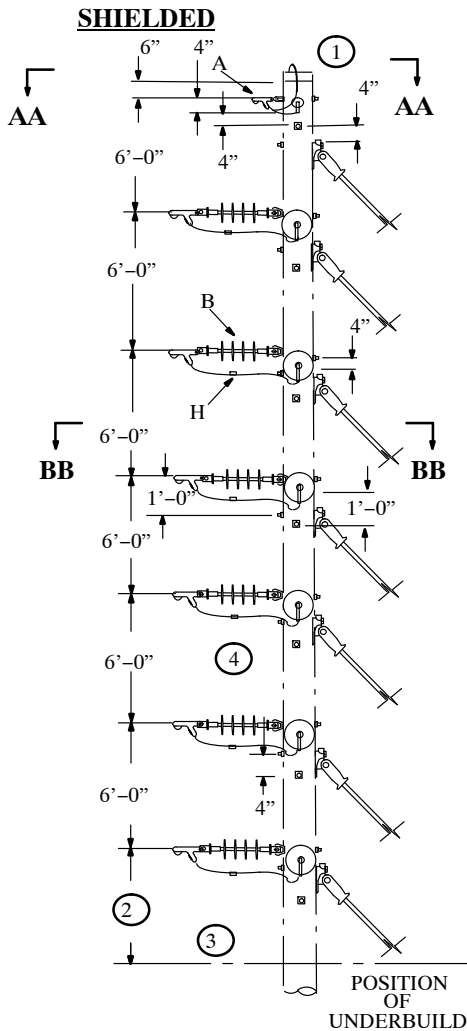
03 69 16\*\*

Double Circuit – 34kV or 69kV

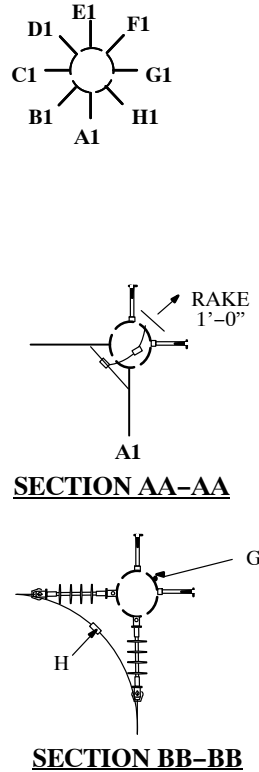
Sheet 3 of 4

Deadend Corner Structure for Line Angle  $> 60^\circ$  and  $< 90^\circ$

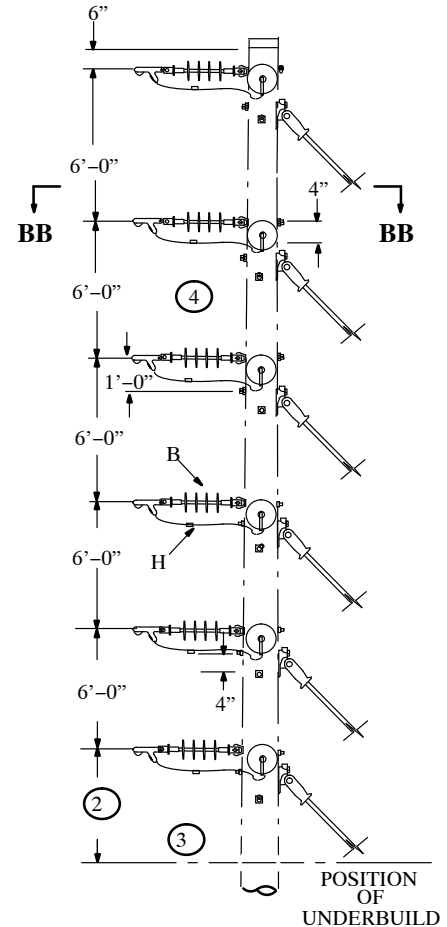
## SINGLE POLE ARRANGEMENT



03, 04



## UNSHIELDED



53, 54

### NOTES:

1. Install pole ground at static support in quadrant E1, and at insulators and 2' above underbuild crossarm in quadrant F1 on non-metallic pole.
2. If underbuild is in vertical configuration, 6' spacing is adequate. But if underbuild is on arm then increase to 7'-6".
3. Reposition underbuild phases and pole ground if guying conflicts.
4. Contact Standards if existing vertical phase spacing is greater than 6' in a galloping area.
5. Contact Standards with questions about arrester application and configuration.



# CONFIGURATIONS

03 69 16\*\*

Double Circuit – 34kV or 69kV  
Deadend Corner Structure for Line Angle > 60° and ≤ 90°

Sheet 4 of 4

⑤

⑤

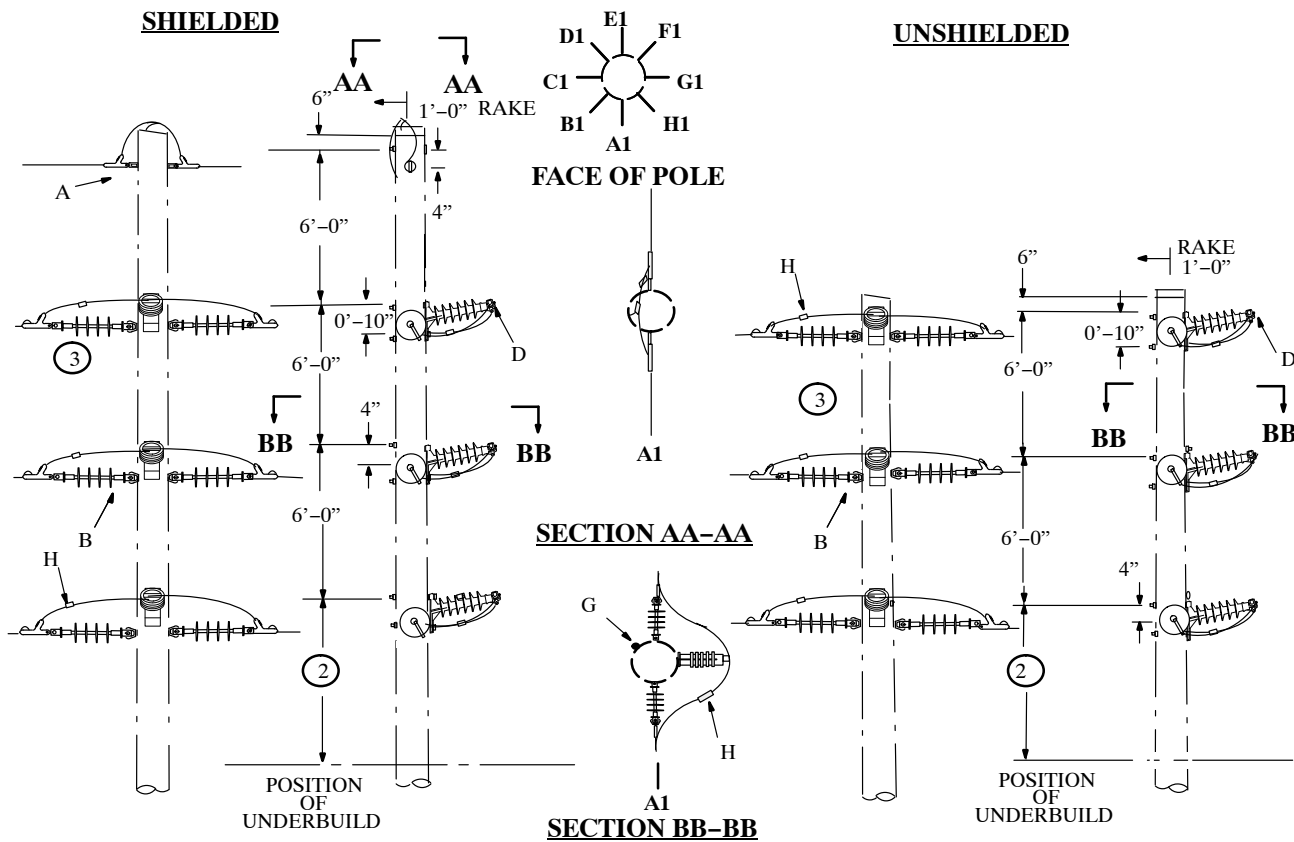
				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
		Std. / Stk. No.	Description 03 69 16 **	03	53	04	54
@	A	06 00 11 05	Deadend Static w/Clamp	1		1	
	B	06 34 60 02	Ins., 34 kV, Suspension, Sgl w/Deadend Clamp			12	12
		06 34 60 06	Ins., 69 kV, Suspension, Sgl w/Deadend Clamp	12	12		
	G	12 00 10 09	Grounding Unit	1		1	
@	H	PG**	Clamp, Parallel Grove (see DCS 07 00 25 00)	7	6	7	6
@	K	11 00 43 **	Down Guy Unit	14	12	14	12
@	L	12 34 01 **	Arrester Assembly		1		1

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Deadend Tangent Structure for Line Angle  $\leq 1^\circ$

03 69 17\*\*

Sheet 1 of 6

**EQUAL TENSION**



**01**

**51**

**NOTES:**

1. Install pole ground in quadrant C1 and at insulators, at underbuild crossarm, and above ground line in quadrant D1 on non-metallic pole.
2. If underbuild is in vertical configuration, 6' spacing is adequate. But if underbuild is on arm then increase to 7'-6".
3. Contact Standards if required vertical phase spacing is greater than 6' in a galloping area.

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Deadend Tangent Structure for Line Angle  $\leq 1^\circ$

**03 69 17\*\***

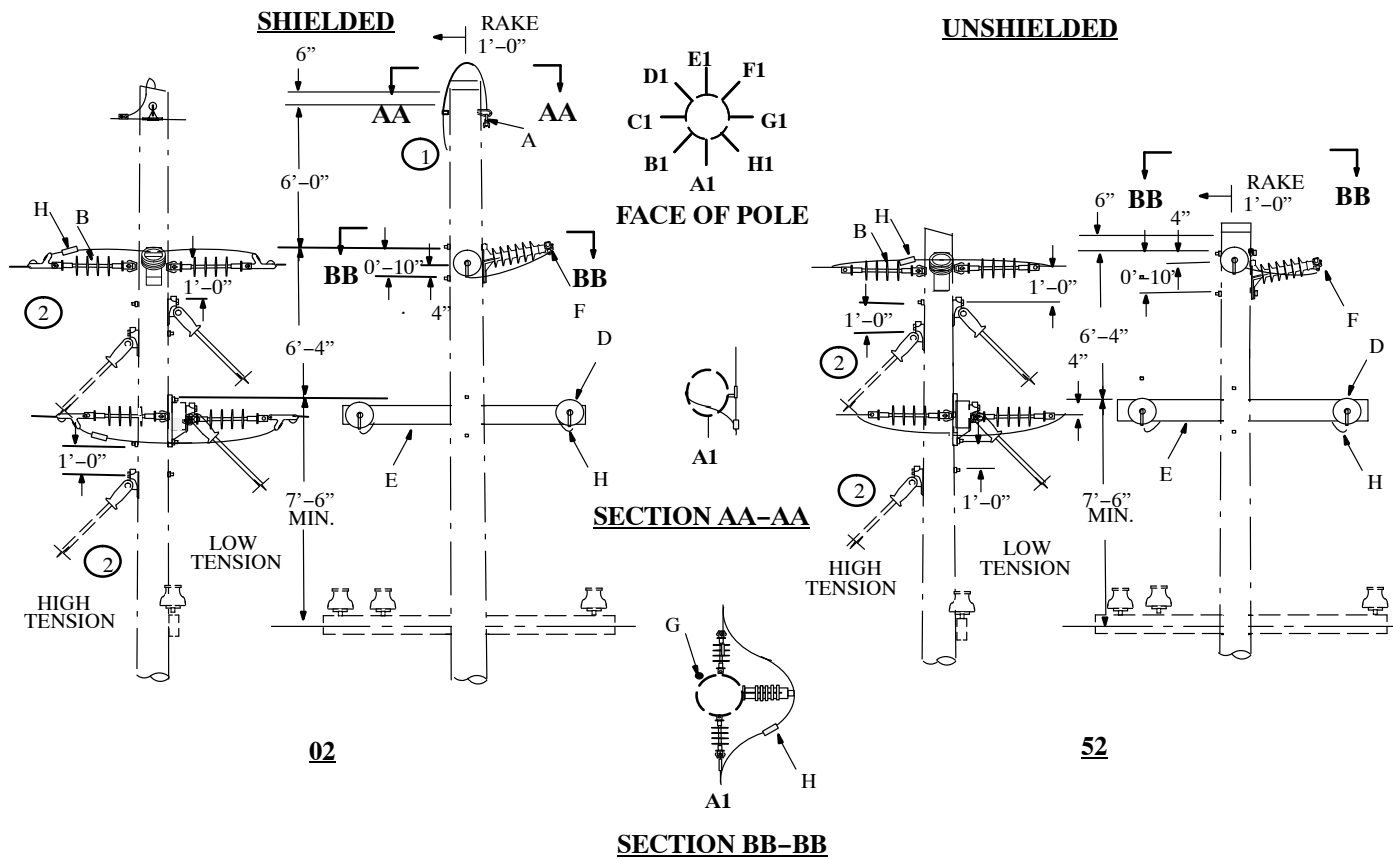
Sheet 2 of 6

				69kV		34kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
@      @		Std. / Stk. No.	Description03 69 11 **	01	51	04	54
	A	06 00 11 06	Deadend Clamp, Static	1		1	
	B	06 34 72 01	Deadend, 69kV, Dbl, Looparound w/Deadend Clamp	3	3		
		06 34 72 05	Deadend, 34kV, Dbl, Looparound w/Deadend Clamp			3	3
	D	TC*W	Clamp, Trunnion	3	3	3	3
	G	12 00 10 09	Grounding Unit	1		1	
	H	PG**	Clamp, Parallel Groove (see DCS 07 00 25 00)	3	3	3	3
		252 or 260	Install Connector	@	@	@	@

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Deadend Tangent Structure for Line Angle  $\leq 1^\circ$

03 69 17\*\*

Sheet 3 of 6



**NOTES:**

1. Install pole ground at static support in quadrant C1 and at insulators and 2' above underbuild crossarm in quadrant D1 on non-metallic pole.
2. Add down guy if this standard is used for storm structure with equal tension on both sides.

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Deadend Tangent Structure for Line Angle  $\leq 1^\circ$

**03 69 17\*\***

Sheet 4 of 6

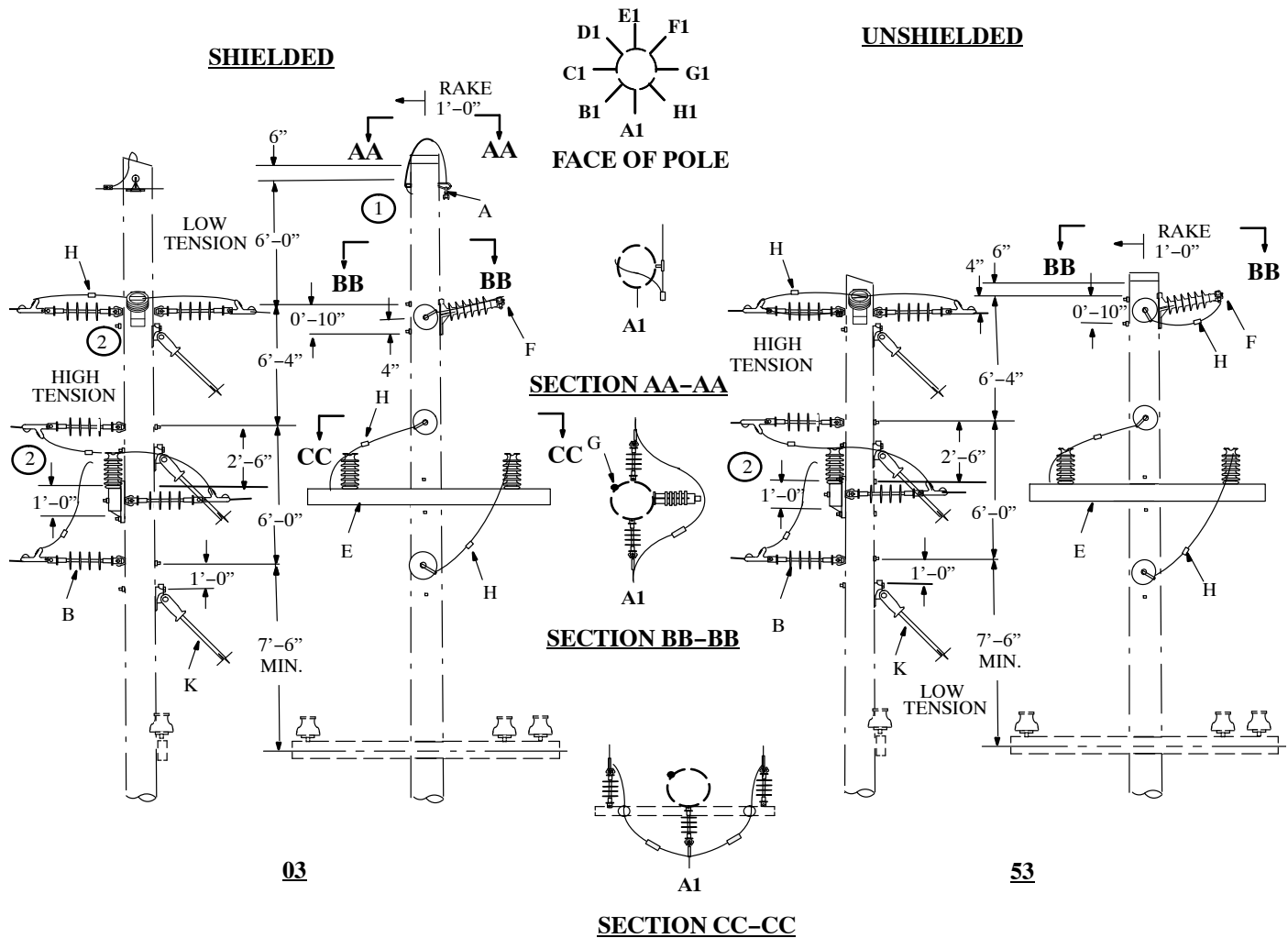
				69kV		34kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Stnd. / Stk. No.	Description	03 69 17 **	01	51	05	55
	A	06 00 11 04	Static Tangent Support w/Suspension Clamp	1		1	
	B	06 34 72 01	Deadend, 69kV, Double Looparound w/DE Clamp	1	1		
		06 34 72 05	Deadend, 34kV, Double Looparound w/DE Clamp	1	1	1	1
	E	04 00 41 03	Fiberglass Deadend Arm Assembly, 8'	1	1	1	1
@	F	TC*W	Clamp, Trunnion	1	1	1	1
	G		Grounding Unit	1		1	
@	H	PG*	Clamp, Parallel Groove (see DCS 07 00 25 00)	3	3	3	3
@	K	11 00 43 **	Guying Unit	2	2	2	2
		252 or 260	Install Connector	@	@	@	@

**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Deadend Tangent Structure for Line Angle  $\leq 1^\circ$

03 69 17\*\*

Sheet 5 of 6

UNEQUAL TENSION-TRANSITION



NOTES:

1. Install pole ground at static support in quadrant C1 and at insulators and 2' above underbuild crossarm in quadrant D1 on non-metallic pole.
2. District engineering determines number of deadend arm(s) based on span length, line tension, and conductor weight.

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Deadend Tangent Structure for Line Angle  $\leq 1^\circ$

**03 69 17\*\***

Sheet 6 of 6

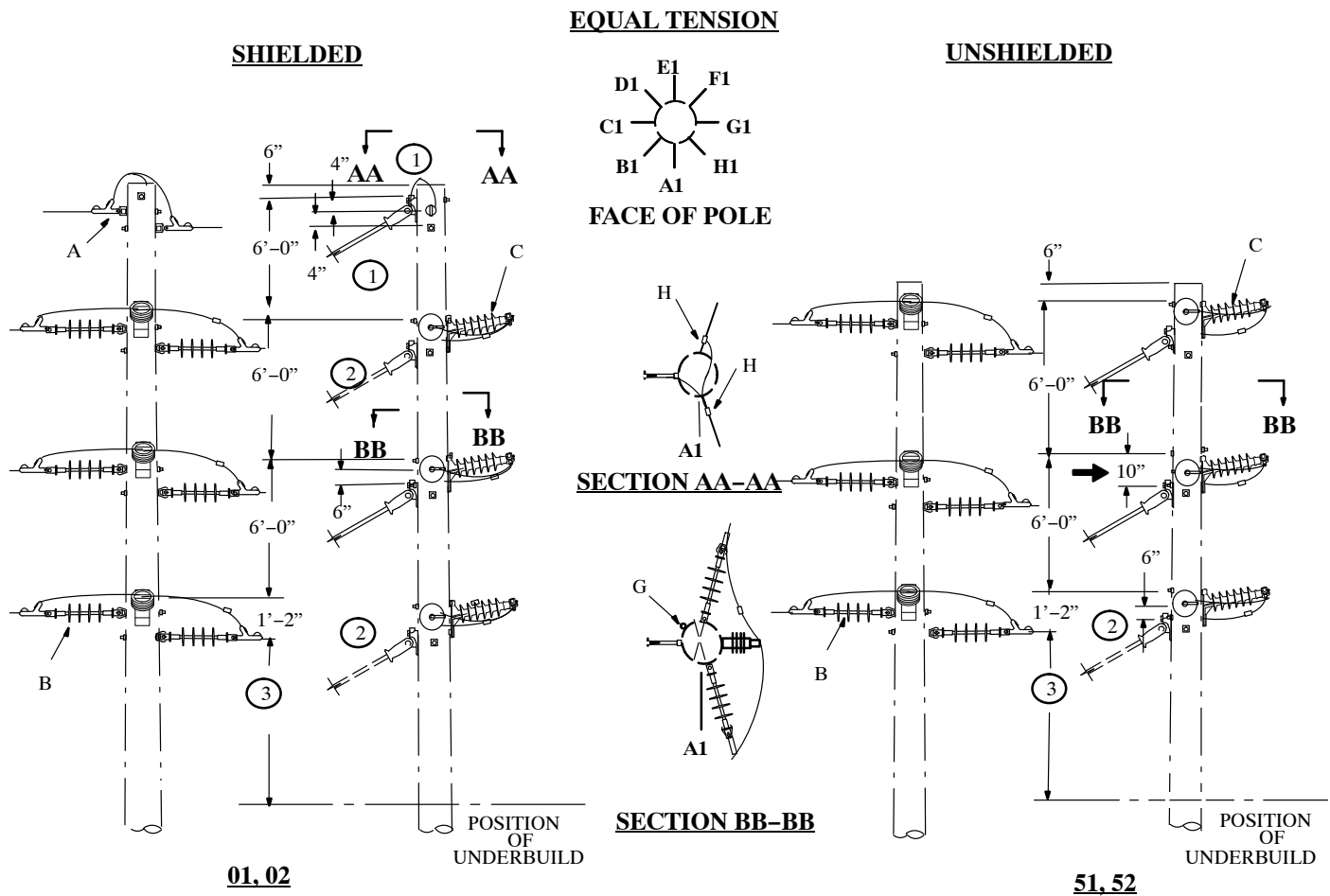
				69kV		34kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 17 **	03	53	05	55
	A	06 00 11 04	Static Tangent Support w/Suspension Clamp	1		1	
	B	06 34 72 01	Deadend, 69kV, Double Looparound w/DE Clamp	1	1		
		06 34 72 05	Deadend, 34kV, Double Looparound w/DE Clamp			1	1
	D	06 34 72 03	Deadend, 69kV, Double loopover w/DE Clamp	2	2		
		06 34 72 07	Deadend, 34kV, Double loopover w/DE Clamp			2	2
	E	12 00 10 09	Fiberglass Deadend Arm Assembly, 8'	1	1	1	1
@	F	TC*W	Clamp, Trunnion	1	1		
	G	12 00 10 09	Grounding Unit	1		1	
@	H	12 34 02 **	Clamp, Parallel Groove (see DCS 07 00 25 00)	3	3	3	3
@	K	11 00 46 **	Guying Unit	3	3	3	3
		252 or 260	Install Connector	@	@	@	@

# CONFIGURATIONS

Single Circuit – 34kV or 69kV  
Deadend Angle Structure for Line Angle  $> 1^\circ$  and  $\leq 60^\circ$

03 69 18\*\*

Sheet 1 of 2



**NOTES:**

1. Install pole ground at static support in quadrant C1 and at insulators and 2' above underbuild crossarm in quadrant D1 on non-metallic pole.
2. Additional guys may be required depending on line tension and line angle.
3. If underbuild is in vertical configuration. 6' spacing is adequate, but if underbuild is on arm then increase to 7'-6".
4. Contact Standards with questions about arrester application and configuration.



**CONFIGURATIONS**  
 Single Circuit – 34kV or 69kV  
 Deadend Angle Structure for Line Angle > 1° and ≤ 60°

**03 69 18\*\***

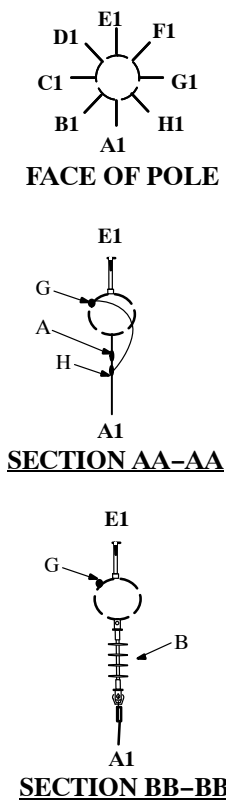
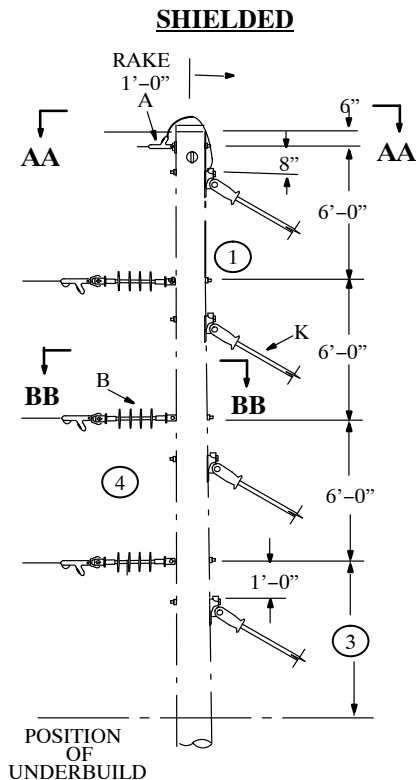
Sheet 2 of 2

				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 16 **	01	51	02	52
@	A	06 00 11 07	Deadend Static w/Clamp	2		2	
	B	06 34 60 02	Ins., 34 kV, Sgl Deadend w/Clamp			6	6
		06 34 60 06	Ins., 69 kV, Sgl Deadend w/Clamp	6	6		
	C	06 69 03 03	Ins., 69 kV, Hor. Line Post, Sgl w/Trunnion Clamp	3	3		
		06 34 03 03	Ins., 34 kV, Hor. Line Post, Sgl w/Trunnion Clamp			3	3
	G	12 00 10 09	Grounding Unit	1		1	
	H	PG**	Clamp, Parallel Grove (see DCS 07 00 25 00)	2	2	2	2
	K	11 00 43 **	Down Guy Unit	4	3	4	3
@	L	12 34 02**	Arrester Assembly		1		1
		252 or 260	Install Connector	@	@	@	@

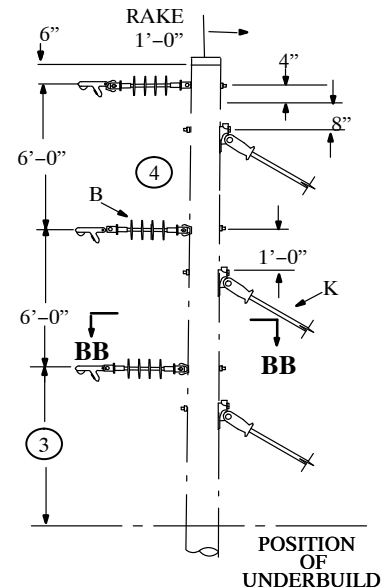
**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Deadend Endline Structure

**03 69 19\*\***

Sheet 1 of 4



**UNSHIELDED**



**NOTES:**

1. Install pole ground at static support in quadrant G1, and at insulators, at underbuild crossarm, and above ground line in quadrant F1 on non-metallic pole.
2. Replace existing 4' phase spacing configuration with a 5' taller pole to gain 6' spacing.
3. If underbuild is in vertical configuration, 6' is adequate, but if underbuild is on arm then increase to 7'-6".
4. Contact Standards if required phase spacing is greater than 6' in a galloping area.
5. Contact Standards with questions about arrester application and configuration.

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Deadend Endline Structure

**03 69 19\*\***

Sheet 2 of 4

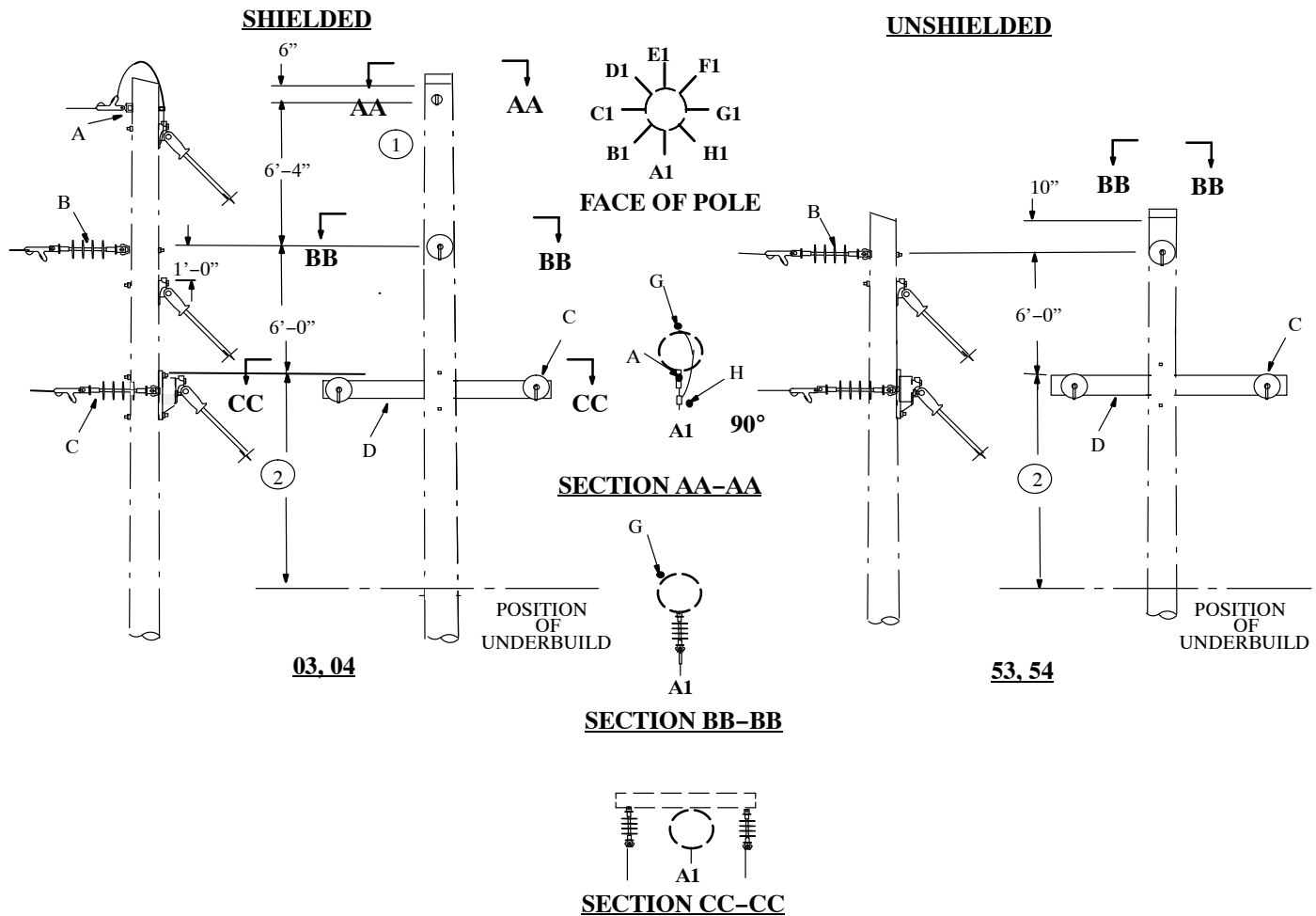
				⑤		⑤	
				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
		<b>Std. / Stk. No.</b>	<b>Description</b> <b>03 69 19 **</b>	<b>01</b>	<b>51</b>	<b>02</b>	<b>52</b>
	A	06 00 11 08	Deadend, Static w/Clamp	1		1	
	B	06 34 60 02	Ins., 34 kV, Suspension, Sgl w/Deadend Clamp			3	3
		06 34 60 06	Ins., 69 kV, Suspension, Sgl w/Deadend Clamp	3	3		
	G	12 00 10 09	Grounding Unit	1		1	
@	H	PG**	Clamp, Parallel Grove (see DCS 07 00 25 00)	1		1	
@	K	11 00 43 **	Down Guy Unit	4	3	4	3
@	L	12 34 02 **	Arrester Assembly		1		1
		252 or 260	Install Connector	@	@	@	@

# CONFIGURATIONS

Single Circuit – 34kV or 69kV  
Deadend Endline Structure

03 69 19\*\*

Sheet 3 of 4



## NOTES:

1. Install pole ground at static support in quadrant G1 and at insulators and 2' above underbuild crossarm in quadrant D1 on non-metallic pole.
2. If underbuild is in vertical configuration. 6' spacing is adequate, but if underbuild is on arm then increase to 7'-6".
3. Contact Standards with questions about arrester application and configuration.

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Deadend Endline Structure

**03 69 19\*\***

Sheet 4 of 4

③

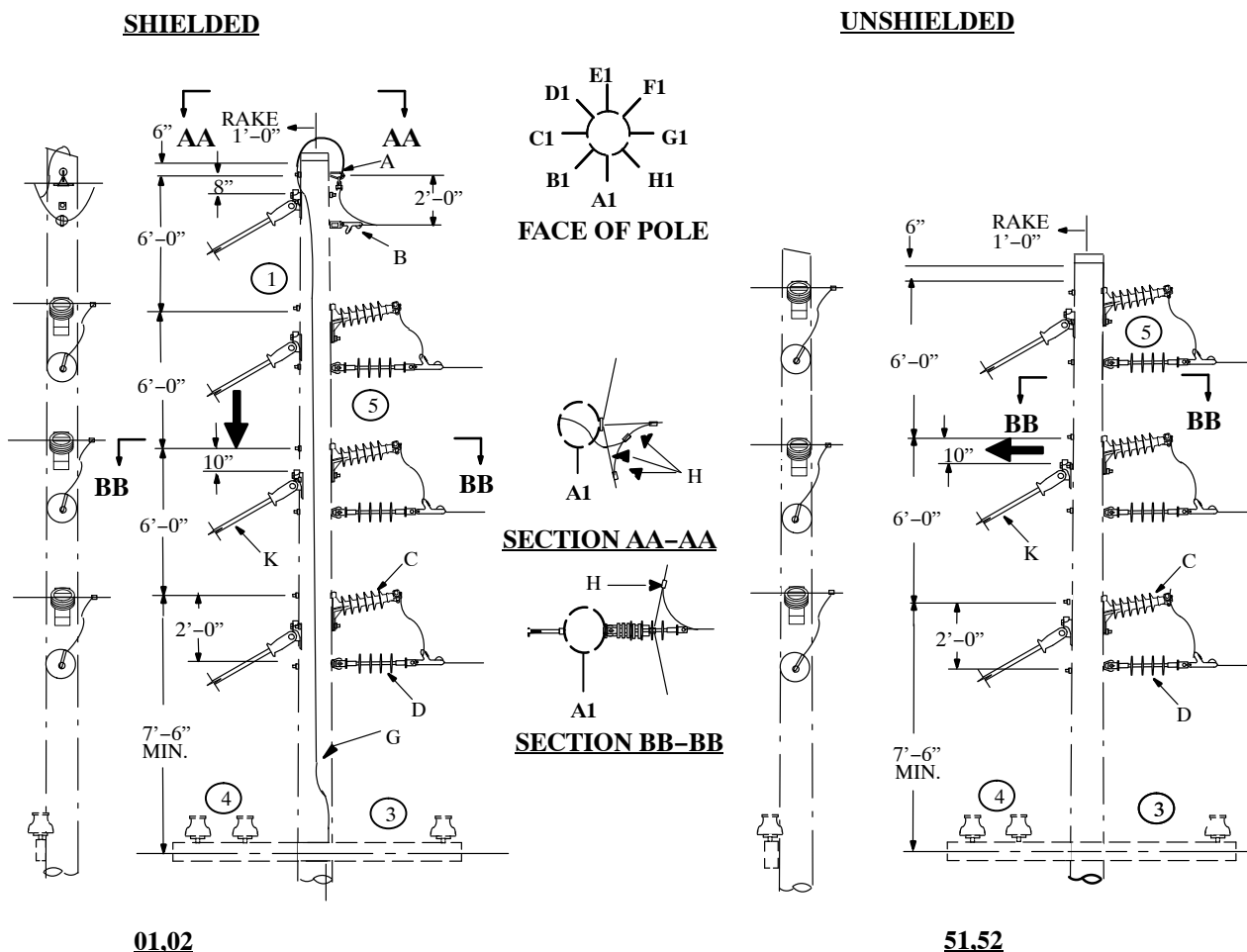
③

				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description **	03 69 19	03	53	04	54
	A 06 00 11 05	Deadend, Static w/Clamp		2		2	
	06 34 60 02	Ins., 34 kV, Suspension, Sgl w/Deadend Clamp				1	1
	B 06 34 60 06	Ins., 69 kV, Suspension, Sgl 2/Deadend Clamp		1	1		
	06 34 60 09	Ins., 69 kV, Suspension, Sgl. w/Deadend Clamp		2	2		
	C 06 34 60 18	Ins., 69 kV, Suspension, Sgl. w/Deadend Clamp				2	2
	D 04 00 41 03	Deadend Arm Assy. Fiberglass, 8"		1	1	1	1
	G 12 00 10 09	Grounding Unit		1		1	
@	H PG**	Clamp, Parallel Grove (see DCS 07 00 25 00)		1		1	
@	K 11 00 43 **	Down Guy Unit		3	2	3	2
@	L 12 34 01 **	Arrester Assembly			1		1

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Tap Structure for Line Angle  $> 0^\circ$  and  $\leq 20^\circ$

03 69 20\*\*

Sheet 1 of 2



**NOTES:**

1. Install pole ground at static support in quadrant C1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant H1 on non-metallic pole.
2. Replace existing floating angle structure with new fixed angle structure if the angle is  $20^\circ$  or less.
3. See Dist. Std. 03 00 03 00 for underbuild line angle limitation and Dist. Std. 29 00 04 01 for crossarm(s) loading.
4. Reposition underbuild phases and pole ground if guying conflicts.
5. Contact Standards if existing vertical phase spacing is greater than 6' in a galloping area.
6. Contact Standards with questions about arrester application and configuration.

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Tap Structure for Line Angle > 0° and ≤ 20°

**03 69 20\*\***

Sheet 2 of 2

⑥

⑥

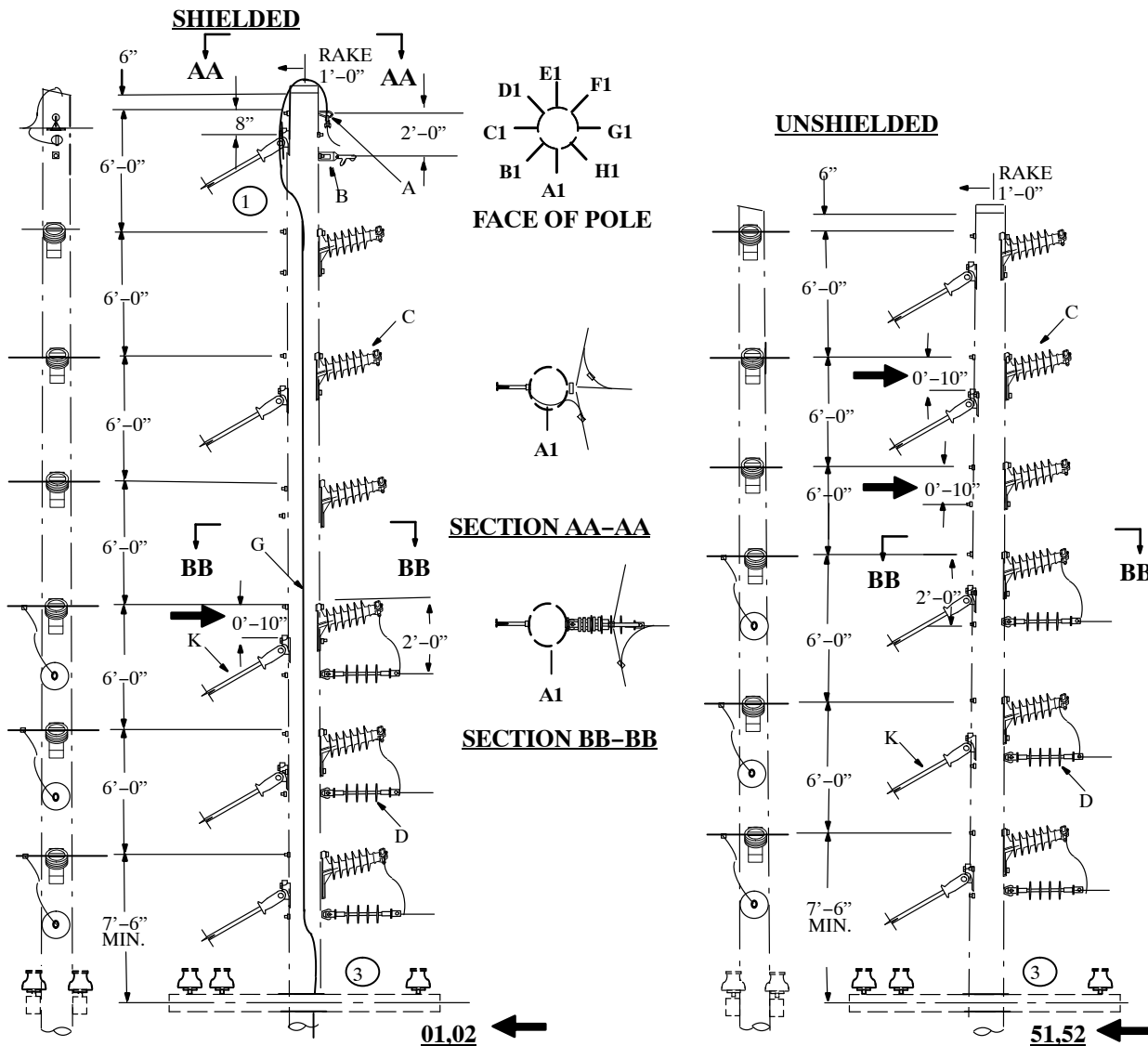
				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 20 **	01	51	02	52
	A 06 00 11 11	Deadend, Static Wire, 3-Way w/Pole Gnd		1		1	
	C 06 69 03 03	Ins., 69 kV, Hor. Line Post, Sgl, w/Trunnion Clamp		3	3		
	06 34 03 03	Ins., 34 kV, Hor. Line Post, Sgl, w/Trunnion Clamp				3	3
	D 06 34 60 06	Ins., 69kV, Suspension, w/Deadend Clamp		3	3		
	06 34 60 02	Ins., 34kV, Suspension, w/Deadend Clamp				3	3
	G 12 00 10 09	Grounding Unit		1		1	
@	H PG**	Clamp, Parallel Grove (see DCS 07 00 25 00)		4	3	4	3
@	K 11 00 43 **	Down Guy Unit		4	3	4	3
@	L 12 34 02 **	Arrester Assembly			1		1
	252 or 260	Install Connector		@	@	@	@

# CONFIGURATIONS

Double Circuit – 34kV or 69kV  
Tap Structure for Line Angle  $> 0^\circ$  and  $\leq 20^\circ$

03 69 21\*\*

Sheet 1 of 2



**NOTES:**

1. Install pole ground at static support in quadrant G1, at insulators in quadrant A1, and 2' above underbuild cross-arm in quadrant H1 on non-metallic pole.
2. Replace existing floating angle structure with new fixed angle structure if the angle is  $20^\circ$  or less.
3. See Dist. Std. 03 00 03 00 for underbuild line angle limitation and Dist. Std. 29 00 04 01 for crossarm(s) loading.
4. Contact Standards with questions about arrester application and configuration.



**CONFIGURATIONS**  
Double Circuit – 34kV or 69kV  
Tap Structure for Line Angle > 0° and ≤ 20°

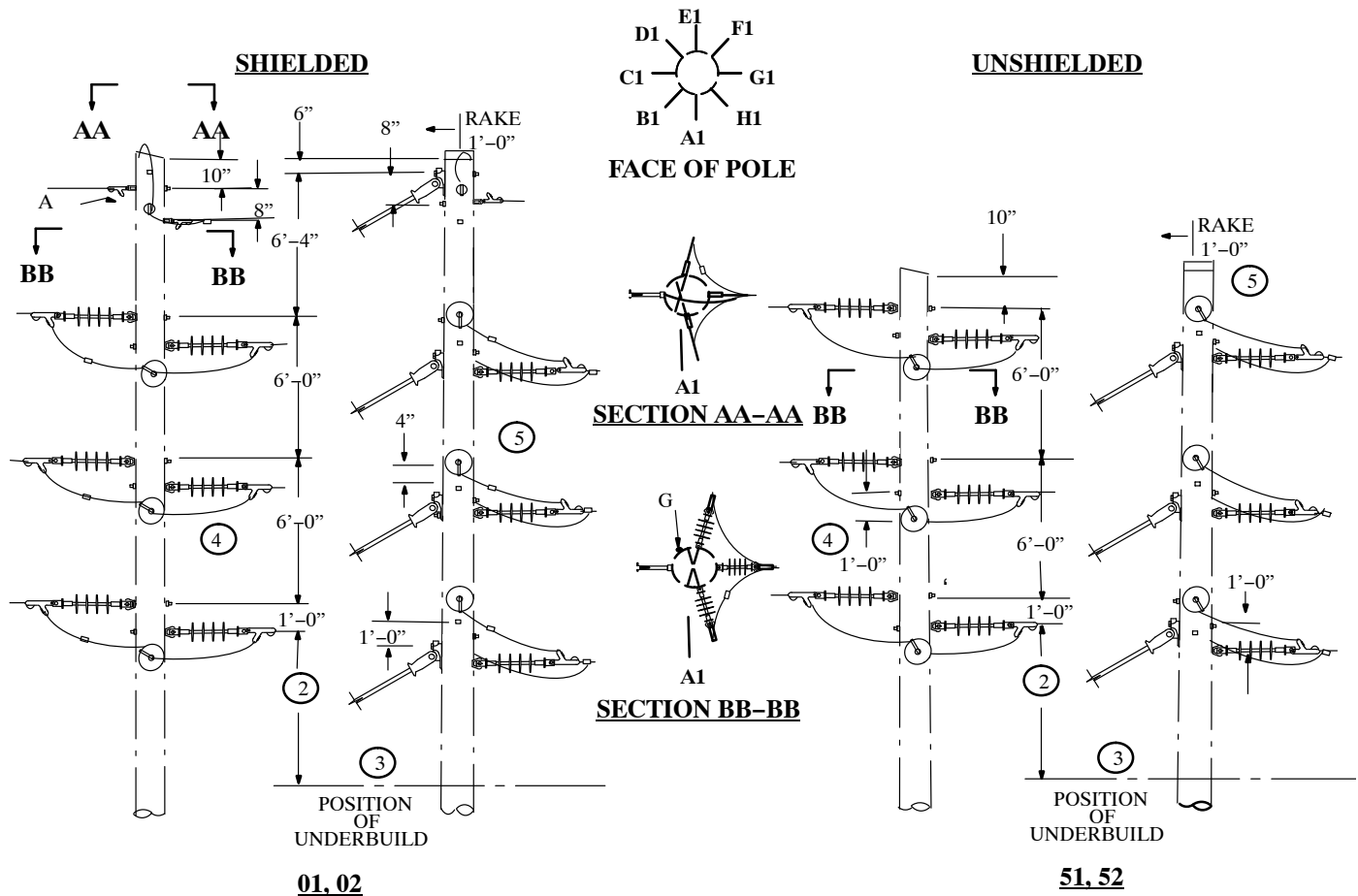
**03 69 21\*\***

Sheet 2 of 2



				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
	Std. / Stk. No.	Description	03 69 22 **	01	51	02	52
@	A	06 00 11 04	Support, Shield Wire w/Suspension Clamp	1		1	
	B	06 00 11 01	Deadend, Shield Wire, w/DE Clamp	1		1	
	C	06 69 03 03	Ins., 69 kV, Hor. Line Post, Sgl. w/Trunnion Clamp	6	6		
		06 34 03 03	Ins., 34 kV, Hor. Line Post, Sgl. w/Trunnion Clamp			6	6
	D	06 34 60 06	Ins., 69 kV, Suspension, w/Deadend Clamp	3	3		
		06 34 60 02	Ins., 34 kV, Suspension, w/Deadend Clamp			3	3
	G	12 00 10 09	Grounding Unit	1		1	
	H	PG**	Clamp, Parallel Groove (See DCS 07 00 25 00)	4	3	4	3
	K	11 00 43 **	Down Guy Unit	4	3	4	3
	L	12 34 02 **	Arrester Assembly		1		1
		252 or 260	Install Connector	@	@	@	@

**EQUAL LINE TENSION-T CORNER**



**NOTES:**

1. Install pole ground at static support in quadrant D1 on non-metallic pole.
2. If underbuild is in vertical configuration, 6' spacing is adequate, but if underbuild is on arm then increase to 7'-6".
3. Reposition underbuild phases and pole ground if guying conflicts.
4. Contact Standards if existing vertical phase spacing is greater than 6' in a galloping area.
5. Install jumper with support if deadend tap has smaller wire size.
6. Contact Standards with questions about arrester application and configuration.

**CONFIGURATIONS**  
Single Circuit – 34kV or 69kV  
Tap Structure for Line Angle > 0° and ≤ 60°

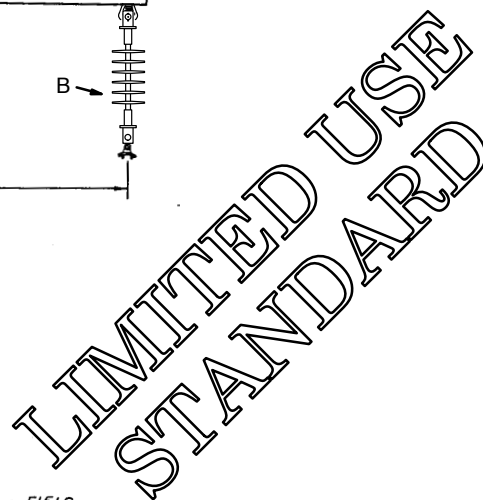
**03 69 22\*\***

Sheet 2 of 2



				69 kV		34 kV	
				SHIELDED	UNSHIELDED	SHIELDED	UNSHIELDED
		Std. / Stk. No.	Description	01	51	02	52
@	A	06 00 11 07	Deadend, Shield Wire, w/DE Clamp	1		1	
	B	06 34 60 06	Insulator, 69kV, Suspension, w/Deadend Clamp	9	9		
		06 34 60 02	Insulator, 34kV, Suspension, w/Deadend Clamp			9	9
	G	12 00 10 09	Grounding Unit	1		1	
	H	PG**	Clamp, Parallel Groove (See DCS 07 00 25 00)	8	6	8	6
@	K	11 00 43 **	Down Guy Unit	4	3	4	3
@	L	12 34 02 **	Arrester Assembly		1		1
@		252 or 260	Install Connector	@	@	@	@

## Sheet 1 of 1



## DISTRIBUTION CONSTRUCTION STANDARDS



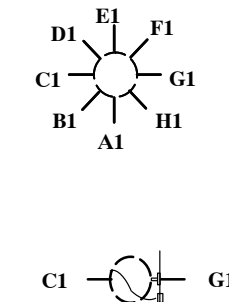
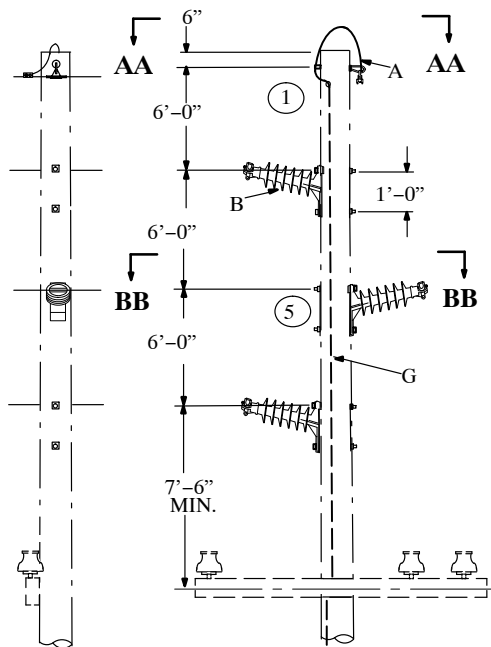
ENG: MJ  
REV. NO: 1  
REV. DATE: 07/23/07

# CONFIGURATIONS

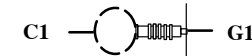
## Unguyed Composite Pole – 34kV or 69kV Tangent Structure for Line Angle $\leq 1^\circ$

**03 69 51 \*\***

Sheet 1 of 2



**SECTION AA-AA**



**SECTION BB-BB**

**01**

**02**

### NOTES:

1. Factory (internal) installed pole ground in quadrant B1. See DCS 12 00 10 12 for grounding detail.
2. See DCS 02 00 04 04 and 02 00 04 05 for pole selection on tangent structure.
3. Use above configuration for storm structure on existing or new line installation. See DCS 02 30 10 01 for storm or super pole selection.
4. Pole rake for line with less than or equal to  $1^\circ$  line angle.
5. Double coil washer is not required on composite pole.

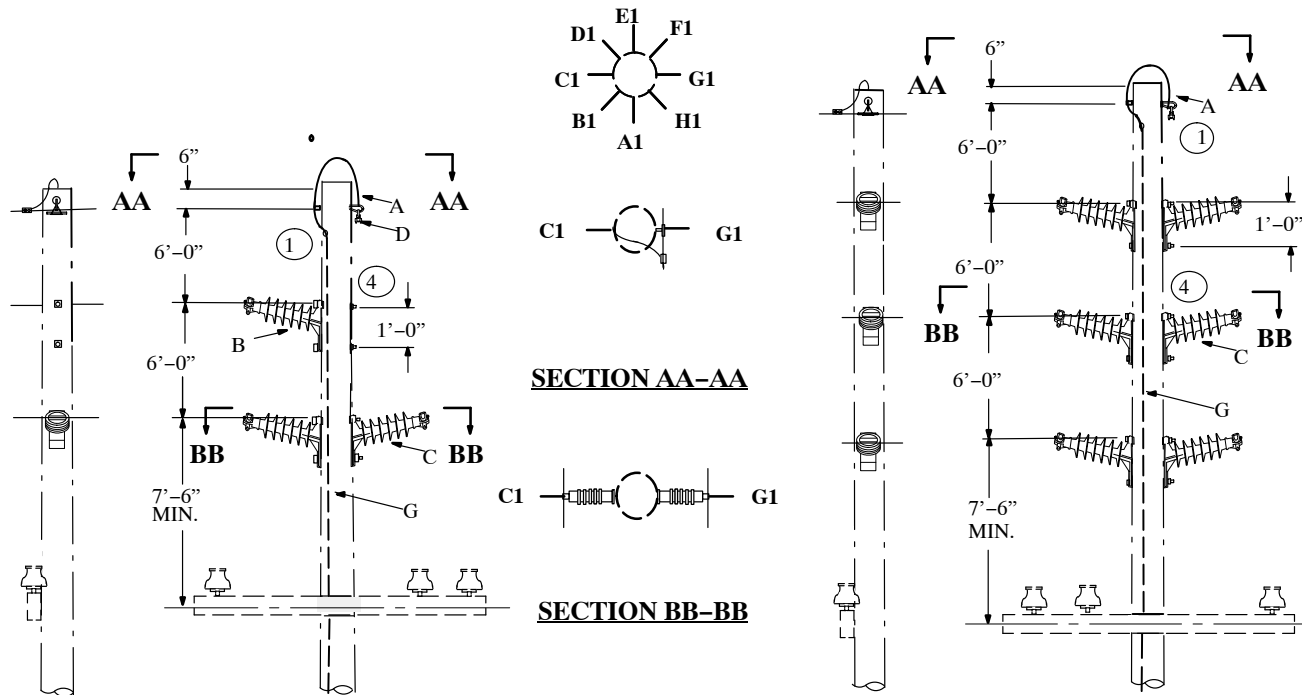
		Std./Stk. No.	Description	03 69 51 **	01	02
5@	A	06 00 11 04	Static Support w/Suspension Clamp		1	1
	B	06 69 03 03	Insulator, 69kV, Horz. Post, Single Polymer w/Trunnion Clamp		3	3
		06 69 03 01	Insulator, 69kV, Horz. Post, Single Polymer w/Susp. Clamp		3	3
@	D	SC*W	Clamp, Suspension, Static wire		1	1
@	E	TC*W	Clamp, Trunn, Tangent, Conductor		3	3
		SC*W	Clamp, Suspension, Tangent, Conductor		3	3
	G	12 00 10 12	Grounding Unit		1	1

# CONFIGURATIONS

## Unguyed Composite Pole – 34kV or 69kV Tangent Structure for Line Angle $\leq 1^\circ$

**03 69 51 \*\***

Sheet 2 of 2



### NOTES:

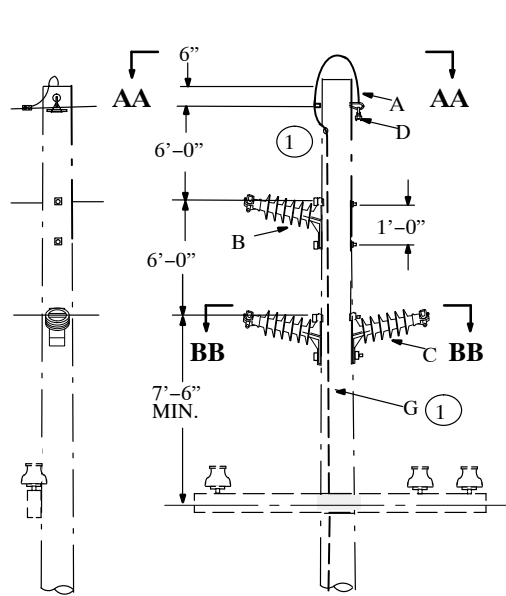
1. Factory (internal) installed pole ground in quadrant B1. See DCS 12 00 10 12 for grounding detail.
2. See DCS 02 00 04 04 and DCS 02 00 04 05 for proper pole selection on tangent structure.
3. Use above configuration for storm structure on existing or new line installation. See DCS 02 30 10 01 for storm pole selection.
4. Double coil washer is not required on composite pole.

		Std./Stk. No.	Description	03 69 51 **	03	04
@	A	06 00 11 04	Static Support w/Suspension Clamp		1	1
	B	06 69 03 03	Insulator, 69kV, Horz. Post, Single Polymer w/Trunn Clamps		1	
@		06 69 03 01	Insulator, 69kV, Horz. Post, Single Polymer w/Susp. Clamps		1	
	C	06 69 03 04	Insulator, 69kV, Horz. Post, Double Polymer w/Trunn. Clamps		1	3
@		06 69 03 02	Insulator, 69kV, Horz. Post, Double Polymer w/Susp. Clamps		1	3
	D	SC*W	Clamp, Suspension, Static wire		1	1
@	E	TC*W	Clamp, Trunn., Tangent, Conductor		3	6
		SC*W	Clamp, Suspension, Tangent, Conductor		3	6
	G	12 00 10 12	Grounding Unit		1	1

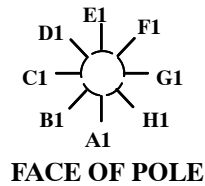
**CONFIGURATIONS**  
 Unguyed Composite Pole – 34kV or 69kV  
 Angle Structure for Line Angle >1° and ≤ 20°

**03 69 52 \*\***

Sheet 1 of 2



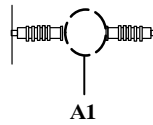
**01**



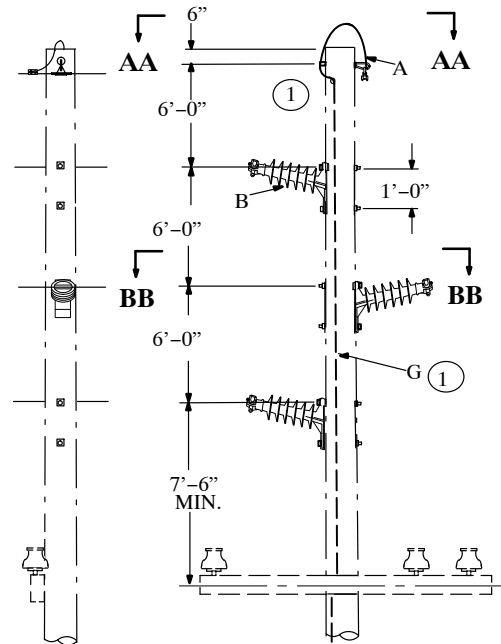
**FACE OF POLE**



**SECTION AA-AA**



**SECTION BB-BB**



**02**

**NOTES:**

1. Factory (internal) installed pole ground in quadrant B1. See DCS 12 00 10 12 for grounding detail.
2. See DCS 02 00 04 04 and DCS 02 00 04 05 for proper conductor tension, depth, and pole rake based on line angle.

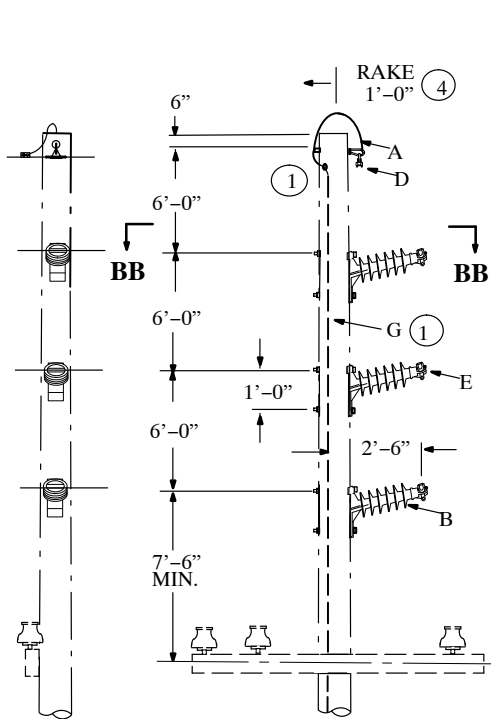
		Std./Stk. No.	Description	03 69 52 **	01	02
@	A	06 00 11 04	Static Support w/Suspension Clamp		1	1
	B	06 69 03 03	Insulator, 69kV Horz, Post, Single Polymer w/Trunnion Clamp		1	3
@		06 69 03 01	Insulator, 69kV Horz, Post, Single Polymer w/Susp. Clamp		1	3
	C	06 69 03 02	Insulator, 69kV Horz, Post, Double Polymer w/Susp. Clamp		1	
@		06 69 03 04	Insulator, 69kV Horz, Post, Double Polymer w/Trunnion Clamp		1	
	D	SC*W	Clamp, Suspension, Static wire		1	1
@	E	TC*W	Clamp, Trunn, Angle, Conductor		3	3
		SC*W	Clamp, Suspension, Angle, Conductor		3	3
@	F	02 20 05 12	Backfill and Reinforcement		1	1
	G	12 00 10 12	Grounding Unit		1	1

# CONFIGURATIONS

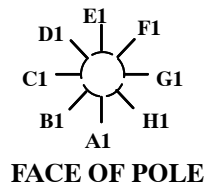
Unguyed Composite Pole – 34kV or 69kV  
Angle Structure for Line Angle >1° and ≤ 20°

**03 69 52 \*\***

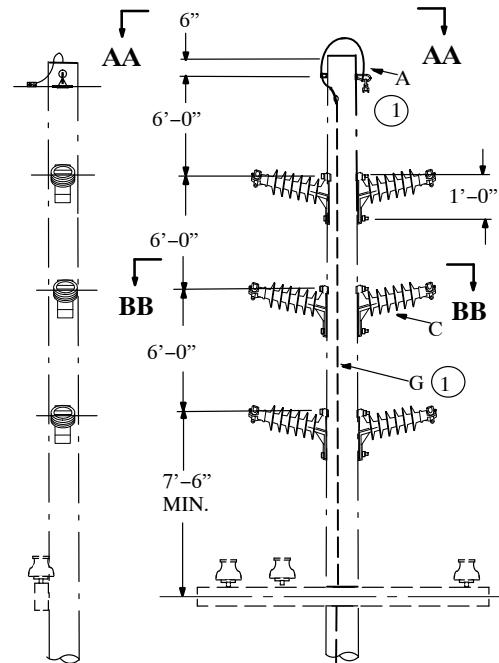
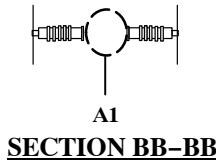
Sheet 2 of 2



**03**



**SECTION AA-AA**



**04**

**NOTES:**

1. Factory (internal) installed pole ground in quadrant B1. See DCS 12 00 10 12 for grounding detail.
2. See DCS 02 00 04 04 and DCS 02 00 04 05 for proper conductor tension, depth, and pole rake based on line angle.

		Std./Stk. No.	Description	03 69 52 **	03	04
@	A	06 00 11 04	Static Support w/Suspension Clamp		1	1
	B	06 69 03 03	Insulator, 69kV Horz, Post, Single Polymer w/Trunn Clamps		3	
@		06 69 03 01	Insulator, 69kV Horz, Post, Single Polymer w/Susp. Clamps		3	
	C	06 69 03 04	Insulator, 69kV Horz, Post, Double Polymer w/Trunn. Clamps			3
@		06 69 03 02	Insulator, 69kV Horz, Post, Double Polymer w/Susp. Clamps			3
	D	SC*W	Clamp, Suspension, Static wire		1	1
@	E	TC*W	Clamp, Trunn., Angle, Conductor		3	6
		SC*W	Clamp, Suspension, Angle, Conductor		3	6
@	F	02 20 05 12	Backfill and Reinforcement		1	1
	G	12 00 10 12	Grounding Unit		1	1



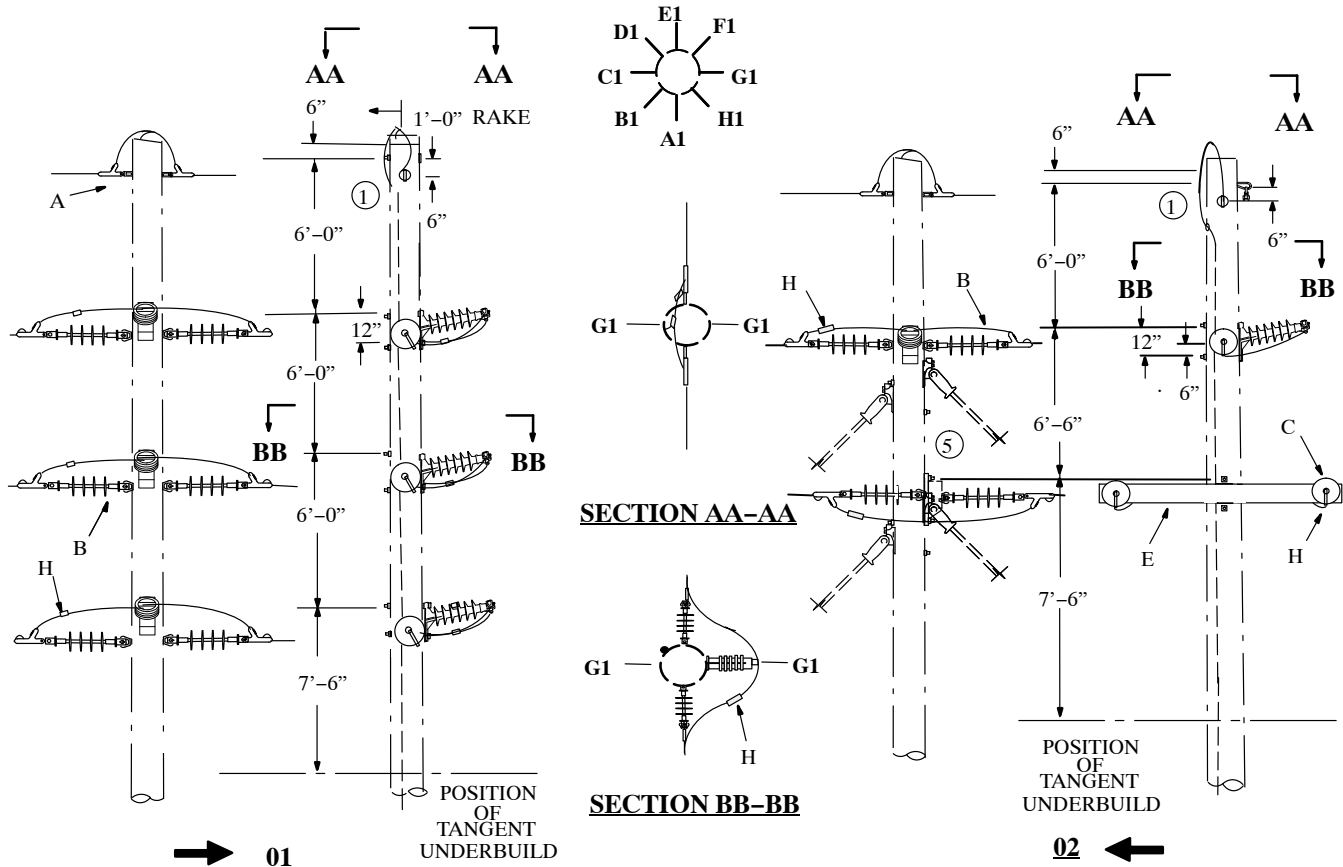
# CONFIGURATIONS

## Unguyed Composite Pole – 34kV or 69kV

### Deadend Tangent Structure for Line Angle $\leq 1^\circ$

**03 69 71\*\***

Sheet 1 of 1



#### NOTES:

1. Factory (internal) installed pole ground in quadrant B1. See DCS 12 00 10 12 for grounding detail.
2. See DCS 02 00 04 04 and DCS 02 00 04 05 for pole selection on tangent structure.
3. Use above configuration for storm structure on existing or new line installation. See DCS 02 30 10 01 for storm or super pole selection. Use DCS 02 20 02 12 for area with poor soil.
4. 8' crossarm available Ameren Missouri only.
5. Use double arm if DE tension is higher than 4000# on 10' crossarm.

		Std. / Stk. No.	Description	03 69 71 **	01	02
4@	A	06 00 11 06	Deadend Clamp, Static		1	1
	B	06 34 72 01	Deadend, 69kV, Dbl, Looparound w/Deadend Clamp		3	1
	C	06 34 72 04	Deadend, 69kV, Dbl, Loopunder w/Deadend Clamp			2
	E	04 00 41 03	Fiberglass Deadend Arm Assembly, 8'			1
3@		04 00 41 04	Fiberglass Deadend Arm Assembly, 10'			1
	F	02 20 05 11	Backfill and Reinforcement, Tangent		1	1
		02 20 05 12	Backfill and Reinforcement, Angle		1	1
	G	12 00 10 12	Grounding Unit		1	1
@	H	PG**	Clamp, Parallel Groove (see DCS 07 00 25 00)		3	3
@	K	11 00 43 **	Guying Unit		2	2
		252 or 260	Install Connector		@	@

**DISTRIBUTION  
CONSTRUCTION STANDARDS**



ENG: MJ  
REV. NO: 01  
REV. DATE: 09/13/13