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69KV TERMINAL POLE 500 KCMIL – 1000 KCMIL

14-69-01-**



CABLE TERMINALS

Location & Placement of Risers

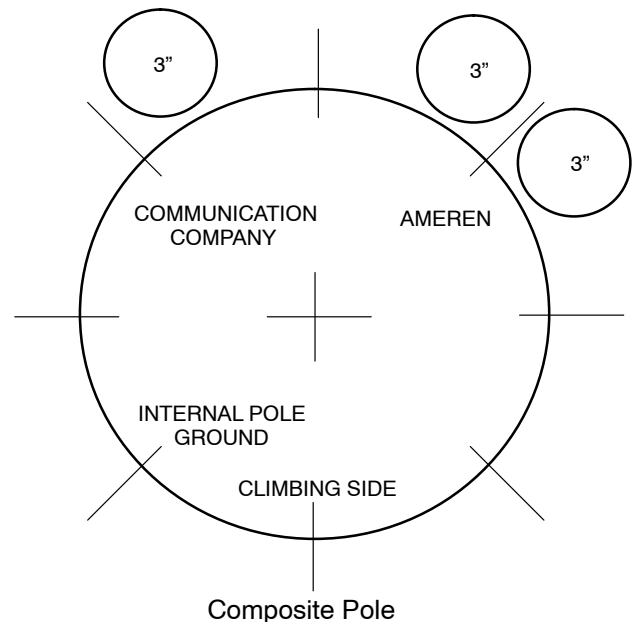
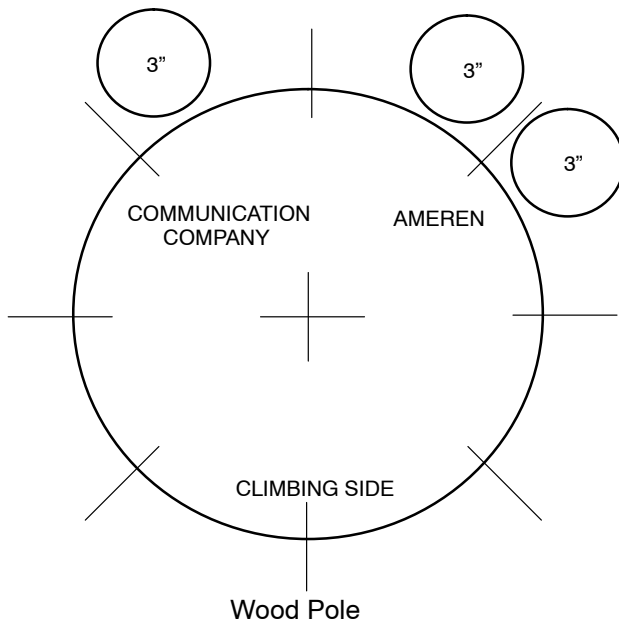
On Joint Use Poles

14 00 01 02

Sheet 1 of 1

Composite poles are a new addition to the Ameren distribution and sub-transmission systems. Below are the guidelines for communication companies using Ameren wood and composite poles.

1. Ameren and communication companies vertical runs shall not be placed on the same pole if it is practicable to place them on separate poles. If vertical runs must be placed on the same pole, the runs shall be placed in adjacent quadrants so that one-half of the pole is left open for climbing.
2. A riser should not be placed on a pole which by its addition exceeds the allotted quadrant or infringes on that portion of the pole considered as the climbing side.
3. Where an existing riser is in slotted circuit, an additional riser on the same pole should be placed in the same conduit, if possible, in order to conserve pole space. Primary and secondary risers may be placed in the same conduit.
4. Preferred construction will be Schedule 80 conduit for the first 10 foot section. If non-shielded cable operating above 2000 volts to ground is to be installed, a metal guard must be installed over the conduit.
5. Communication companies can be attached by pre-fabricated bolted option or by field assembly banded option on composite pole.



Ameren riser combinations which can be attached directly to the pole. This includes any ground wire lead which may be present on the pole.

Conduit	Conduit Riser								
	One Riser						Two Risers		
Diameter	2"	2-1/2"	3"	4"	5"	6"	2"	2-1/2"	3"

I. GENERAL INFORMATION

1. According to an NESC subcommittee's interpretation, metal brackets and straps used to support non-conductive conduits do not need to be grounded. However, conductive-material conduits that enclose electrical supply lines or are exposed to contact with open supply conductors must be effectively grounded.
2. Ideally, the first (lowest) standoff bracket will be positioned a minimum of 8' above ground to prevent anyone from walking into the bracket or using it to climb the pole. If the lowest bracket is less than 8' above the ground or any other accessible surface, there must be a minimum of 8' between the two lowest brackets.
3. If the conduit being supported is conductive (steel or iron) and the standoff bracket is less than 8' above ground the bracket must be bonded to the system neutral.
4. The bond will be made with #6 solid copper conductor.
5. The #6 solid copper conductor must be attached to the conduit support bracket and then trained along the DA bolt or bracket and attached to the system neutral or static wire.

ANY AND ALL BONDING MUST BE TO THE SYSTEM NEUTRAL OR STATIC WIRE

6. The #6 solid copper conductor that is trained along the DA bolt or bracket may be secured to the DA bolt or bracket with plastic wire ties.

II. BONDING METHOD #1 – CONDUIT STRAPS

This method is for bonding to conduit straps. Examples of the support brackets that may require this type of bonding are shown in Figures 1 & 2.

In addition to the general instructions shown in Section I, the following instructions will apply.

1. Remove a conduit strap bolt.
2. Install two washers on the strap bolt and replace the bolt.

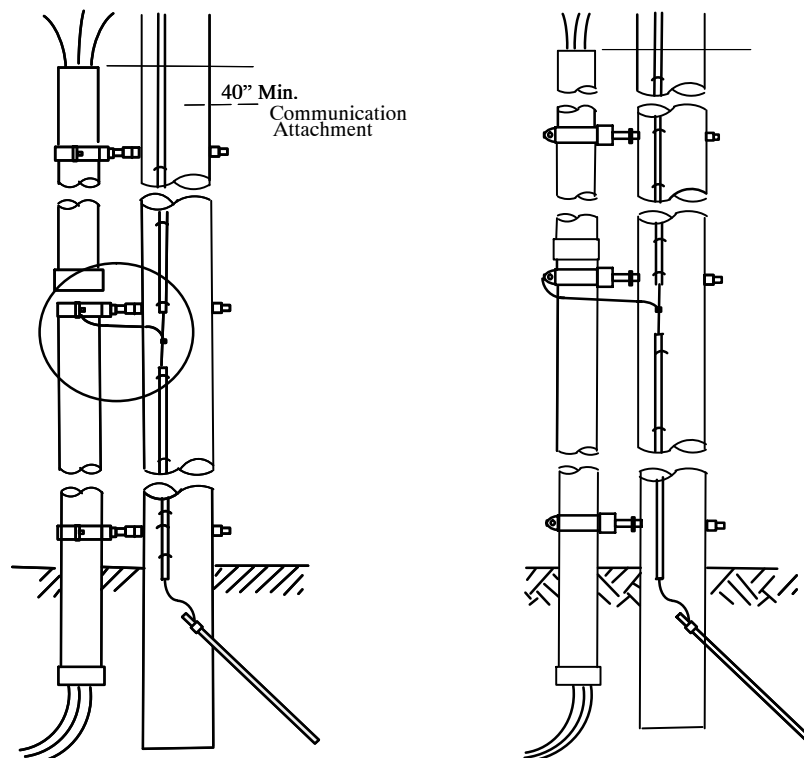


Figure 1

3. Wrap the #6 CU around the strap bolt between the two washers and tighten the bolt securely.

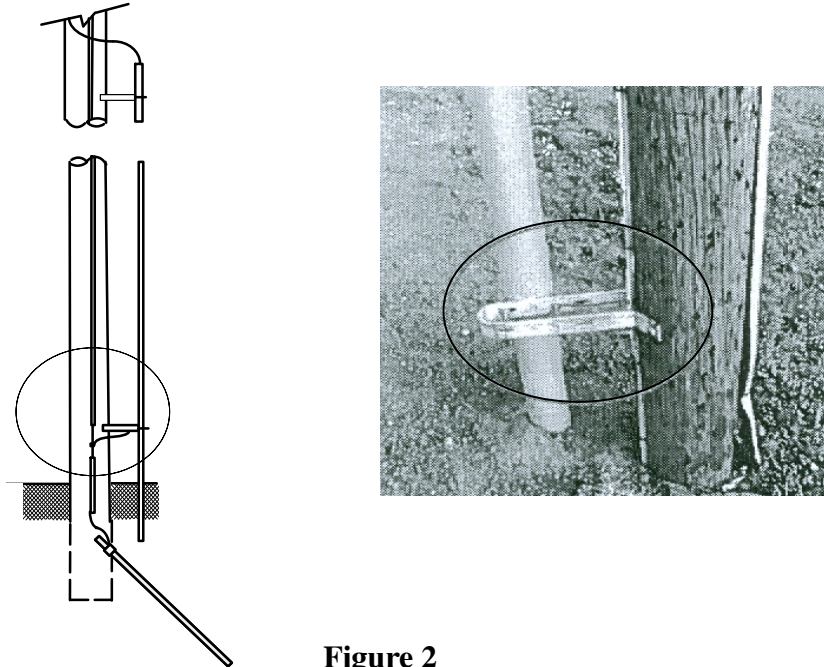


Figure 2

III. BONDING METHOD #2 – SLOTTED SUPPORT BRACKETS

This method is for bonding slotted conduit support bracket. Figure 3 shows the bonding on an H-slotted conduit support bracket. In addition to the general instructions shown above the following instructions will apply.

1. Use a transformer ground connector (Stk.#69-58-121) and M-F locknut (Stk.#23-65-053).
2. Place the M-F locknut on the transformer ground connector stud and then slide the nut into the small slot on the support bracket.
3. Tighten the transformer ground connector into the locknut.
4. Insert the #6 CU conductor into the transformer ground connector and securely tighten.

Note: Some slotted conduit support brackets may have pre-drilled holes. If the holes are of sufficient size, the transformer ground connector may be installed into one of the pre-drilled holes.

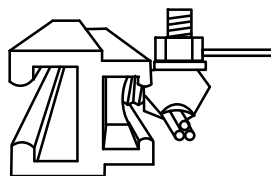
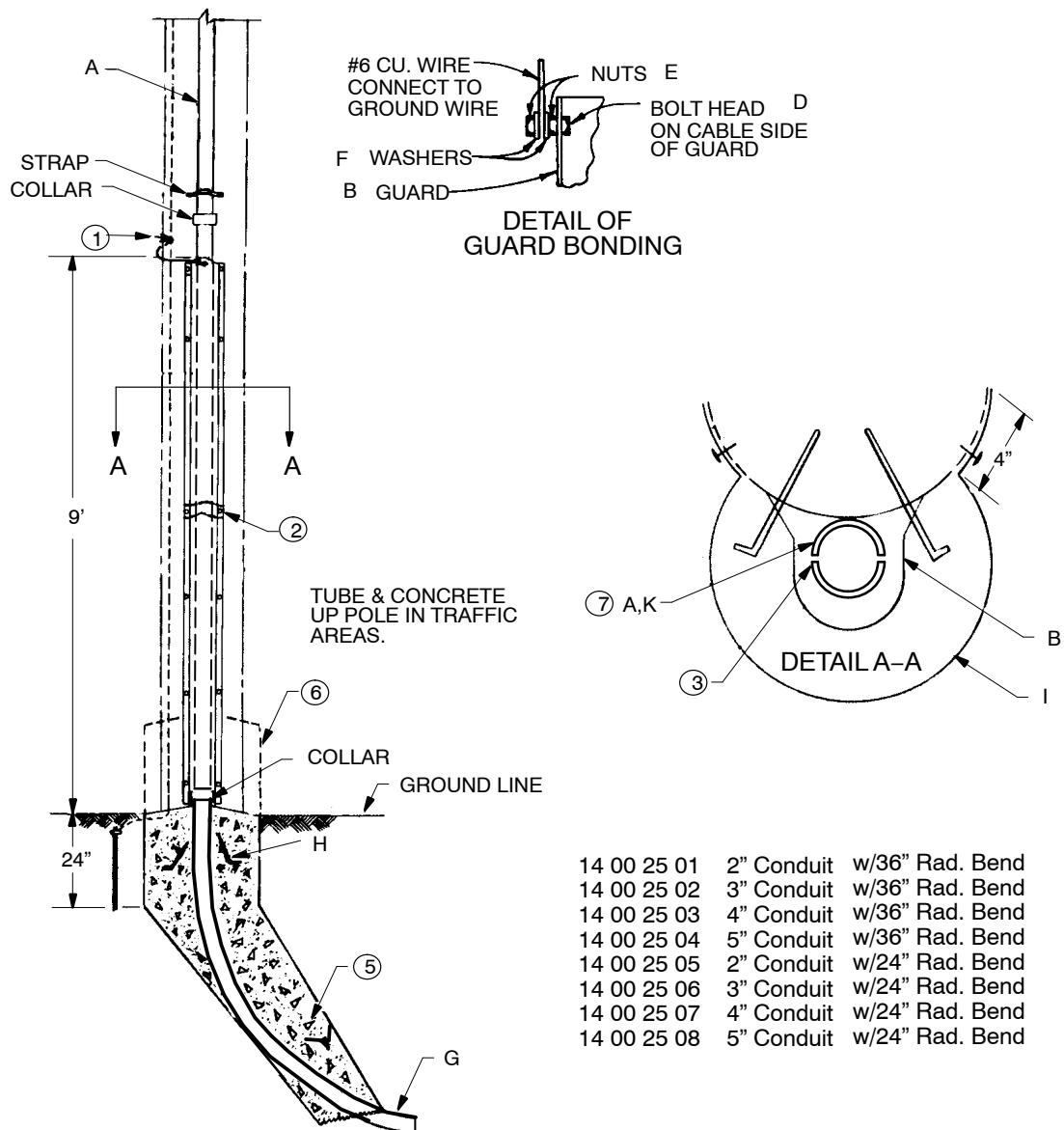


Figure 3

THIS STANDARD MUST BE USED FOR NON-SHIELDED CABLES ABOVE 2000V

THIS STANDARD MAY BE USED FOR REPAIRS TO EXISTING RISERS MOUNTED DIRECTLY TO THE POLE



14 00 25 01	2" Conduit	w/36" Rad. Bend
14 00 25 02	3" Conduit	w/36" Rad. Bend
14 00 25 03	4" Conduit	w/36" Rad. Bend
14 00 25 04	5" Conduit	w/36" Rad. Bend
14 00 25 05	2" Conduit	w/24" Rad. Bend
14 00 25 06	3" Conduit	w/24" Rad. Bend
14 00 25 07	4" Conduit	w/24" Rad. Bend
14 00 25 08	5" Conduit	w/24" Rad. Bend

NOTES:

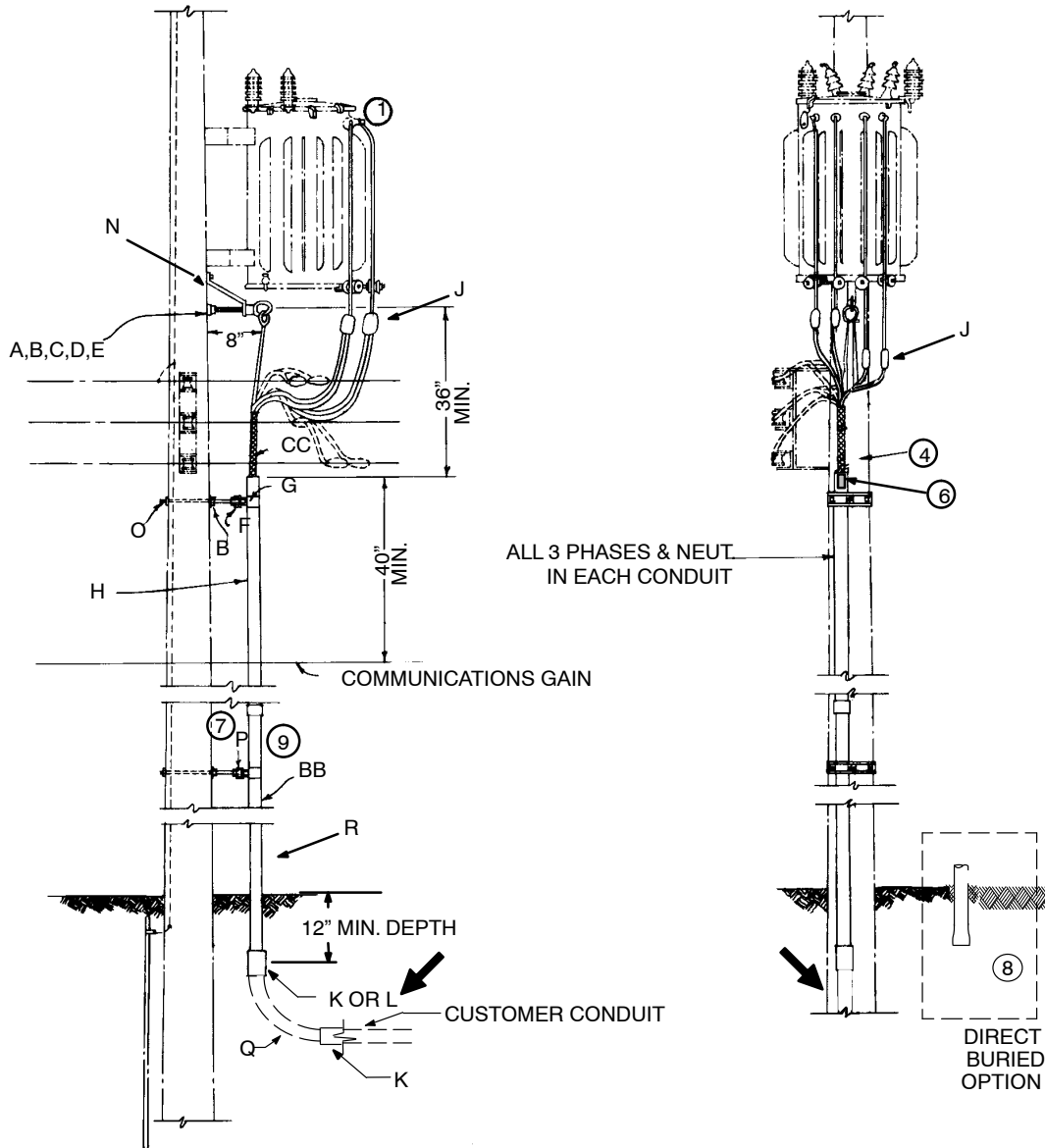
1. Bond guard to neutral conductor or to lightning arrester ground, if present.
2. 3" steel guards may be in 2-5' sections. If so, overlap lower section and align lag bolt holes.
3. Rotate split conduit so that splits are away from pole.
4. Cut the tube lengthwise: Bend back 4" tab for 10" dia. tube, 5" for 14" tube. See Detail A-A.
5. Additional Concrete on Bend ** - 03, 04, 07, 08. 6 to 8 cubic feet needed.
6. When located in possible traffic areas, the concrete cylinder protecting the conduit shall be extended up the pole. Bumper height - 18 inches to 2 ft.
7. Schedule 40 conduit may be substituted for the split conduit.

CABLE TERMINALS
One Riser w/ U Guard
2", 3", 4", & 5" Split Conduit or Schedule 40

14 00 25 **

Sheet 2 of 2

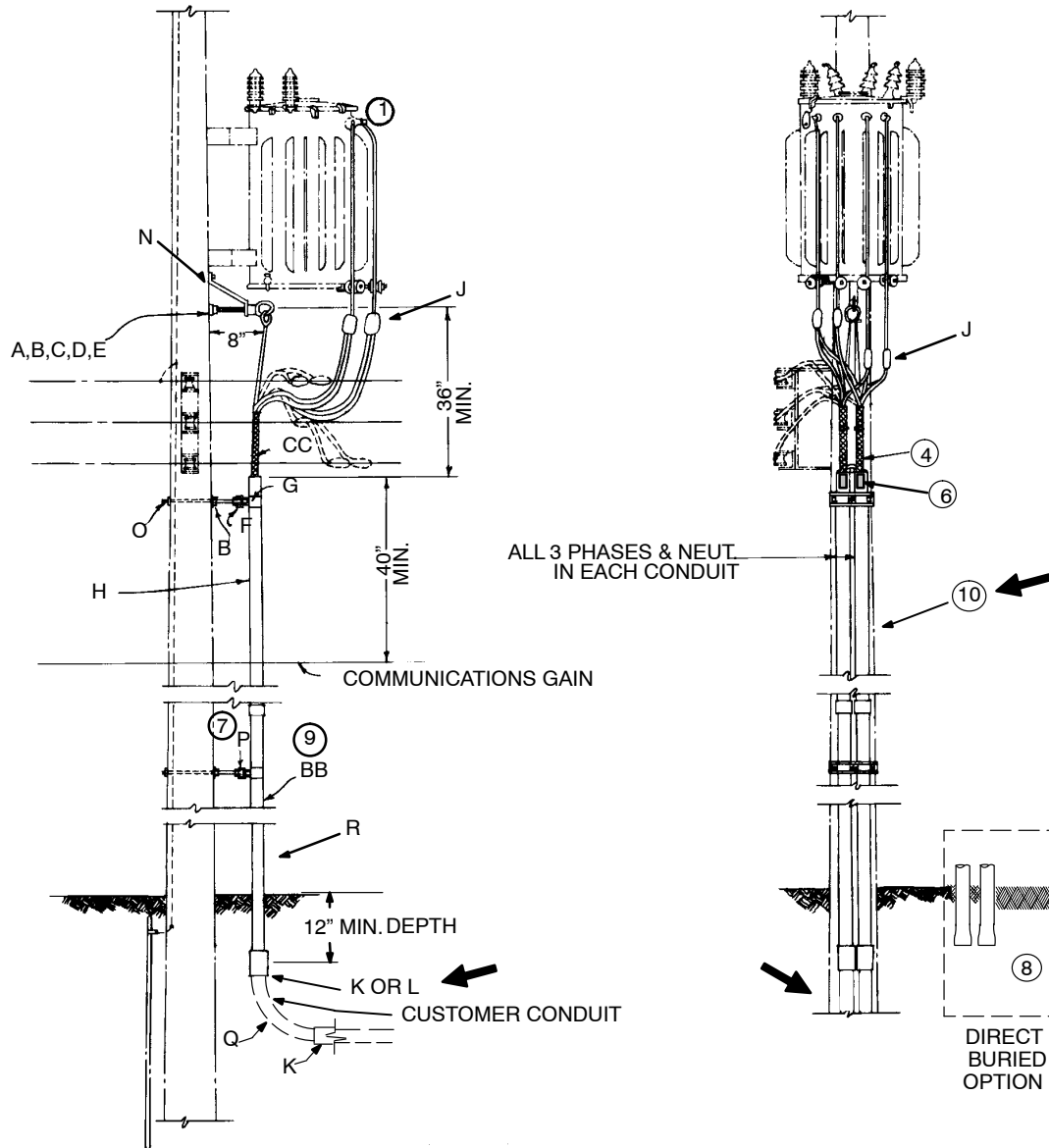
		Std. / Stk. No.	Description	14 00 25 **	01	02	03	04	05	06	07	08
@ @7	A	12 51 217	Cond. – Plas., 2" Split		10'				10'			
		12 51 218	Cond. – Plas. 3" Split			10'				10'		
		12 51 219	Cond. – Plas. 4" Split				10'				10'	
		12 51 220	Cond. – Plas. 5" Split					10'				10'
	B	23 18 237	Guard – Conduit 3"		1	1			1	1		
		23 18 202	Guard – Conduit 5"				1	1			1	1
	C	23 60 005	Screw – Lag 3/8" x 3"		10	10	6	6	10	10	6	6
	D	21 53 007	Bolt – Mach., 3/8" x 1-1/2"		1	1	1	1	1	1	1	1
	E	21 61 006	Nut – Hex., 3/8"		2	2	2	2	2	2	2	2
	F	23 66 016	Washer – 3/8" Galv.		2	2	2	2	2	2	2	2
	G	12 51 180	Bend – 2", 36" Rad		1							
		12 51 173	Bend – 3", 36" Rad			1						
		12 51 176	Bend – 4", 36" Rad				1					
		12 51 206	Bend – 5", 36" Rad					1				
		12 51 252	Bend – 2", 24" Rad						1			
		12 51 253	Bend – 3", 24" Rad							1		
		12 51 249	Bend – 4", 24" Rad								1	
		12 51 250	Bend – 5", 24" Rad									1
	H	23 67 036	Step – Pole 5/8 x 10"				2	2			2	2
	I	11 04 109	Tube – Concrete 10" Dia.		4	4			4	4		
		11 04 110	Tube – Concrete 14" Dia.				4	4			4	4
	J	98 00 001	Concrete 4 SK									
	K	12 01 280	Cond. – Plas. 2" Sch. 40		10				10			
		12 01 279	Cond. – Plas. 3" Sch. 40			10				10		
		12 01 278	Cond. – Plas. 4" Sch. 40				10				10	
		12 01 303	Cond. – Plas. 5" Sch. 40 or					10				10
		12 01 297	Cond. – Plas. 5" Sch. 40					10				10



1. Do not put aluminum conductors in transformer bushing connectors use copper secondary leads per Dist. Std. 13 00 03 01
2. Customer cable must be a type approved by the National Electrical Code and by Ameren. Cable must be suitable for exposure to sunlight and water. Cable should extend to the base of the pole or to a point designated by Ameren with sufficient additional cable provided for connection on pole as directed by an Ameren representative. The customer conduit shall extend to a nominal distance from the pole to accommodate the conduit bend. The location of the bend on the pole (quadrant) shall be specified by an Ameren representative.
3. It is recommended that the cable be installed in conduit under driveways and parking areas.
4. Apply two layers of tape to protect cable under the cable grips.
5. For alternate construction, call for split conduit – 3" (Stock #12-51-218), 4" (Stock #12-51-219), 5" (Stock #12-51-220).
6. Top of conduit may be sealed with polyurethane expanding foam, Stock #31 53 082. Expanding foam must be used with dispensing gun, Stock #85-20-073.

7. Some standoff brackets require that one of the nuts on the double arming bolt be replaced with a jam nut. The jam nut should then be inserted into the 5/8" slot on the standoff bracket. If the nut on the double arming bolt will fit into the 5/8" slot on the bracket – Do Not Use the jam nut.
8. In direct buried installations the conduit may have a coupling attached to the end or a duct shield inserted into the conduit to prevent cable damage.
9. See Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements.

		Std. / Stk. No.	Description Material	14 02 01**	01	02	03	04
9	A	23 52 069	Bolt – Machine 5/8" x 18" Sq Head w/Sq Nut		1	1	1	1
	B	23 66 031	Washer – Curved, 3 1/4" x 3 1/8"		7	7	7	7
	C	23 68 330	Link – Guy		1	1	1	1
	D	23 65 012	Eyenuit – 5/8"		1	1	1	1
	E	23 68 181	Shackle		1	1	1	1
	F	23 06 087	Bracket – Standoff, 12"		3	3	3	3
	G	23 67 189	Strap – Conduit 2-1/2"		3			
		23 67 182	Strap – Conduit 3"			3		
		23 67 183	Strap – Conduit 4"				3	
		23 67 184	Strap – Conduit 5"					3
	H	12 01 263	Conduit 2-1/2", SCH 40		20'			
		12 01 279	Conduit 3", SCH 40			20'		
		12 01 278	Conduit 4", SCH 40				20'	
		12 01 303	Conduit 5", SCH 40					20'
	J	31 53 055	Compound – Sealer (lb.)		1	1	1	1
	K	12 51 158	Coupling – 3" SCH 40			1		
		12 51 157	Coupling – 4" SCH 40				1	
		12 51 265	Coupling – 2-1/2" SCH 40		1			
		12 51 156	Coupling – 5" SCH 40					1
	L	40 53 666	Reducer – Conduit 3" x 2-1/2"		–		–	
	M	12 06 053	Solvent – Cement, PVC		1	1	1	1
	N	23 60 011	Screw – Lag, 5/8" x 5"		1	1	1	1
	O	23 53 003	Bolt – Arming Double 5/8" x 18" w/4 Sq Nuts		3	3	3	3
	P	23 65 053	Nut – 5/8" Jam		3	3	3	3
7	Q	12 51 264	Bend, 2-1/2", 24" Radius		1			
		12 51 253	Bend, 3", 24" Radius			1		
		12 51 249	Bend, 4", 24" Radius				1	
		12 51 206	Bend, 5", 36" Radius					1
	R	12 01 274	Conduit, 2-1/2" SCH 80		10'			
		12 01 276	Conduit, 3" SCH 80			10'		
		12 01 273	Conduit, 4" SCH 80				10'	
		12 01 272	Conduit, 5" SCH 80					10'
	BB		Cable		40	40	40	40
	CC	23 17 207	Grip – Cable 1-3/4", 2" Dia.		1	1	1	1
		23 17 220	Grip – Cable 3", 3-1/2" Dia.		1	1	1	1
		OP277 or OP279	Install Cable Up Pole		1	1	1	1



NOTES:

1. Do not put aluminum conductors in transformer bushing connectors use copper secondary leads per Dist. Std. 13 00 03 01
2. It is recommended that the cable be installed in conduit under driveways and parking areas.
3. Apply two layers of tape to protect cable under the cable grips.
4. For alternate construction, call for split conduit – 3" (Stock #12-51-218), 4" (Stock #12-51-219), 5" (Stock #12-51-220).
5. Top of conduit may be sealed with polyurethane expanding foam, Stock #31 53 082. Expanding foam must be used with dispensing gun, Stock #85-20-073.
6. Some standoff brackets require that one of the nuts on the double arming bolt be replaced with a jam nut. The jam nut should then be inserted into the 5/8" slot on the standoff bracket. If the nut on the double arming bolt will fit into the 5/8" slot on the bracket – Do Not Use the jam nut.

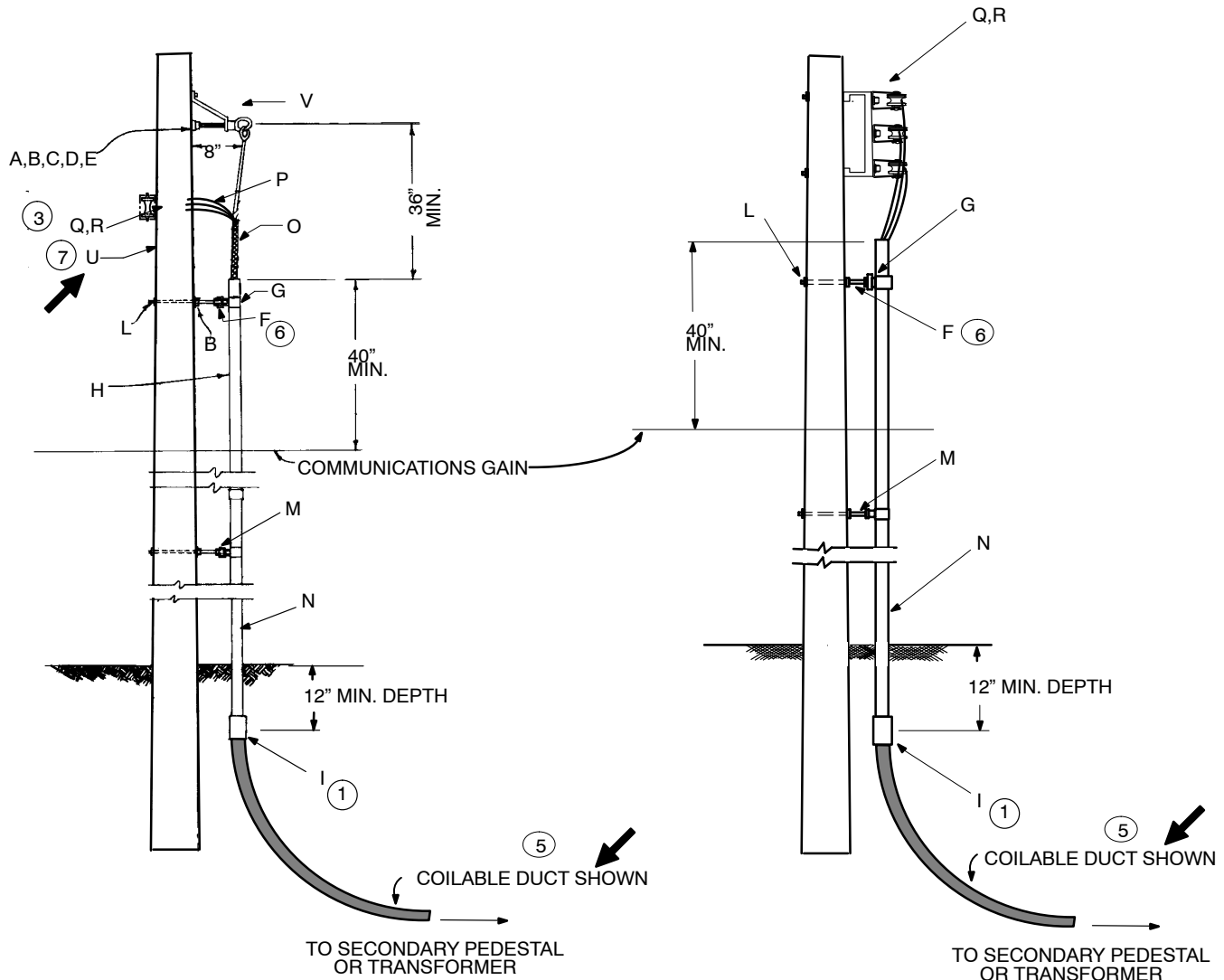
7. In direct buried installations the conduit may have a coupling attached to the end or a duct shield inserted into the conduit to prevent cable damage.
8. See Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements.
9. To reduce the amount of congestion on a pole, it may be possible to eliminate multiple service risers and use a secondary riser with cables feeding a pedestal (Stock# 12-05-049) or padmount secondary/service enclosure (Stock# 54-07-236).

		Std. / Stk. No.	Description Material	14 02 02 **	01	02	03	04
9	A	23 52 069	Bolt – Machine 5/8" x 18" Sq Head w/Sq Nut		1	1	1	1
	B	23 66 031	Washer – Curved, 3 1/4" x 3 1/8"		7	7	7	7
	C	23 68 330	Link – Guy		1	1	1	1
	D	23 65 012	Eyenuit – 5/8"		1	1	1	1
	E	23 68 181	Shackle		1	1	1	1
	F	23 06 087	Bracket – Standoff, 12"		3	3	3	3
	G	23 67 189	Strap – Conduit 2-1/2"		6			
		23 67 182	Strap – Conduit 3"			6		
		23 67 183	Strap – Conduit 4"				6	
		23 67 184	Strap – Conduit 5"					6
	H	12 01 263	Conduit 2-1/2", SCH 40		40			
		12 01 279	Conduit 3", SCH 40			40		
		12 01 278	Conduit 4", SCH 40				40	
		12 01 303	Conduit 5", SCH 40					40
	J	31 53 055	Compound – Sealer (lb.)		1	1	1	1
@	K	12 51 158	Coupling – 3" SCH 40			1		
		12 51 157	Coupling – 4" SCH 40				1	
		12 51 156	Coupling – 5" SCH 40					1
	L	40 53 666	Reducer – Conduit 3" x 2-1/2"		–		–	
@	M	12 06 053	Solvent – Cement, PVC		1	1	1	1
	N	23 60 011	Screw – Lag, 5/8" x 5"		1	1	1	1
	O	23 53 003	Bolt – Arming Double 5/8" x 18" w/4 Sq Nuts		3	3	3	3
	P	23 65 053	Nut – 5/8" Jam		3	3	3	3
7	Q	12 51 264	Bend, 2-1/2", 24" Radius		1			
		12 51 253	Bend, 3", 24" Radius			1		
		12 51 249	Bend, 4", 24" Radius				1	
		12 51 206	Bend, 5", 36" Radius					1
@	R	12 01 274	Conduit, 2-1/2" SCH 80		10'			
		12 01 276	Conduit, 3" SCH 80			10'		
		12 01 273	Conduit, 4" SCH 80				10'	
		12 01 272	Conduit, 5" SCH 80					10'
@	BB		Cable		40	40	40	40
@	CC	23 17 207	Grip – Cable 1-3/4", 2" Dia.		2	2	2	2
		23 17 220	Grip – Cable 3", 3-1/2" Dia.		2	2	2	2
@		OP277 or OP279	Install Cable Up Pole		2	2	2	2

CABLE – TERMINALS
0 – 600V
Underground to OH Service

14 02 03 **

Sheet 1 of 2



14 02 03 01

14 02 03 02

14 02 03 03

14 02 03 04

NOTES:

1. Attach the coupling to the coilable duct with epoxy cement – Stock #12-06-126.
2. If only one riser is being installed the bracket can be cut from Stock # 23-06-099 to accommodate a single conduit.
3. Connections between the underground cables and the overhead service wires should be sealed.
4. Quantities may be increased to allow for multiple risers.
5. Coilable duct shown. If conduit installed add item "T".
6. See Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements.
7. Attach a "Danger UG Feeds OH" sign below the secondary rack, and 5' above ground line.

**DISTRIBUTION
 CONSTRUCTION STANDARDS**



ENG. HLH
 REV. NO: 5
 REV. DATE: 11/18/15

CABLE – TERMINALS
0 – 600V
Underground to OH Service

14 02 03 **

Sheet 2 of 2

④

		Std. / Stk. No.	Description Material	14 02 03 **	01	02	03	04
2,6	A	23 52 069	Bolt – Machine 5/8" x 18" Sq Head w/Sq Nut		1	1		
	B	23 66 031	Washer – Curved, 3 1/4" x 2 1/8"		7	7		
	C	23 68 330	Link – Guy		1	1		
	D	23 65 012	Eyenuit – 5/8"		1	1		
	E	23 68 181	Shackle		1	1		
	F	23 06 087	Bracket – Standoff, 12"		3	3	3	3
1	G	23 67 189	Strap – Conduit 2-1/2"			3		3
		23 67 182	Strap – Conduit 3"		3		3	
	H	12 01 279	Conduit 3", SCH 40		20		20	
		12 01 263	Conduit 2-1/2", SCH 40			20		20
	I	12 51 265	Coupling – 2-1/2" SCH 40			1		1
		12 51 158	Coupling – 3" SCH 40		1		1	
@	J	12 56 099	Cement – Solvent, PVC		1	1	1	1
@	K	12 06 126	Cement – Epoxy HDPE Duct to PVC		1	1	1	1
	L	23 53 003	Bolt – Double Arming 5/8" x 18" w4 Sq Nuts		3	3	3	3
	M	23 65 053	Nut – 5/8" Jam		3	3	3	3
3	N	12 01 276	Conduit – 3" SCH 80		10		10	
		12 01 274	Conduit – 2-1/2" SCH 80			10		10
	O	23 17 220	Grip – Cable 3-1/2" Dia.		1	1		
	P	18 07 201	Cable – 600V 2-350 KCMIL x 1-4/0AWG		40		40	
		18 07 202	Cable – 600V 2-3/0 AWG x 1-1/0AWG			40		40
	Q	06 01 01 01	Secondary Clevis		1	1		
@		06 01 03 01	3 Wire Extended Clevis Bracket				1	1
	R	09 01 10**	Multiple Service Cable Installation	@	@			
		09 01 28 00	Service Takeoff at Pole				1	1
	S	31 53 055	Compound – Sealer (lb.)		1	1	1	1
	T	12 51 264	Bend – 2 1/2", 24" Radius			1		1
		12 51 253	Bend – 3", 24" Radius		1		1	
5@	U	16 02 585	Sign, Danger UG Feed		1	1	1	1
	V	23 60 011	Screw – Lag, 5/8" x 5"		1	1		

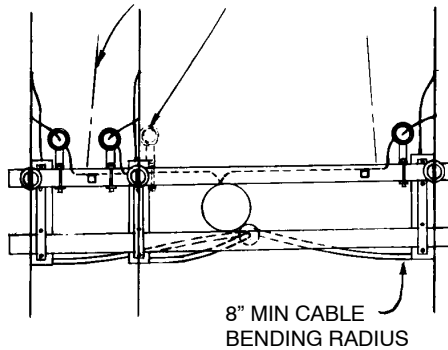
CABLE TERMINALS

4 kV Non Shielded Cable

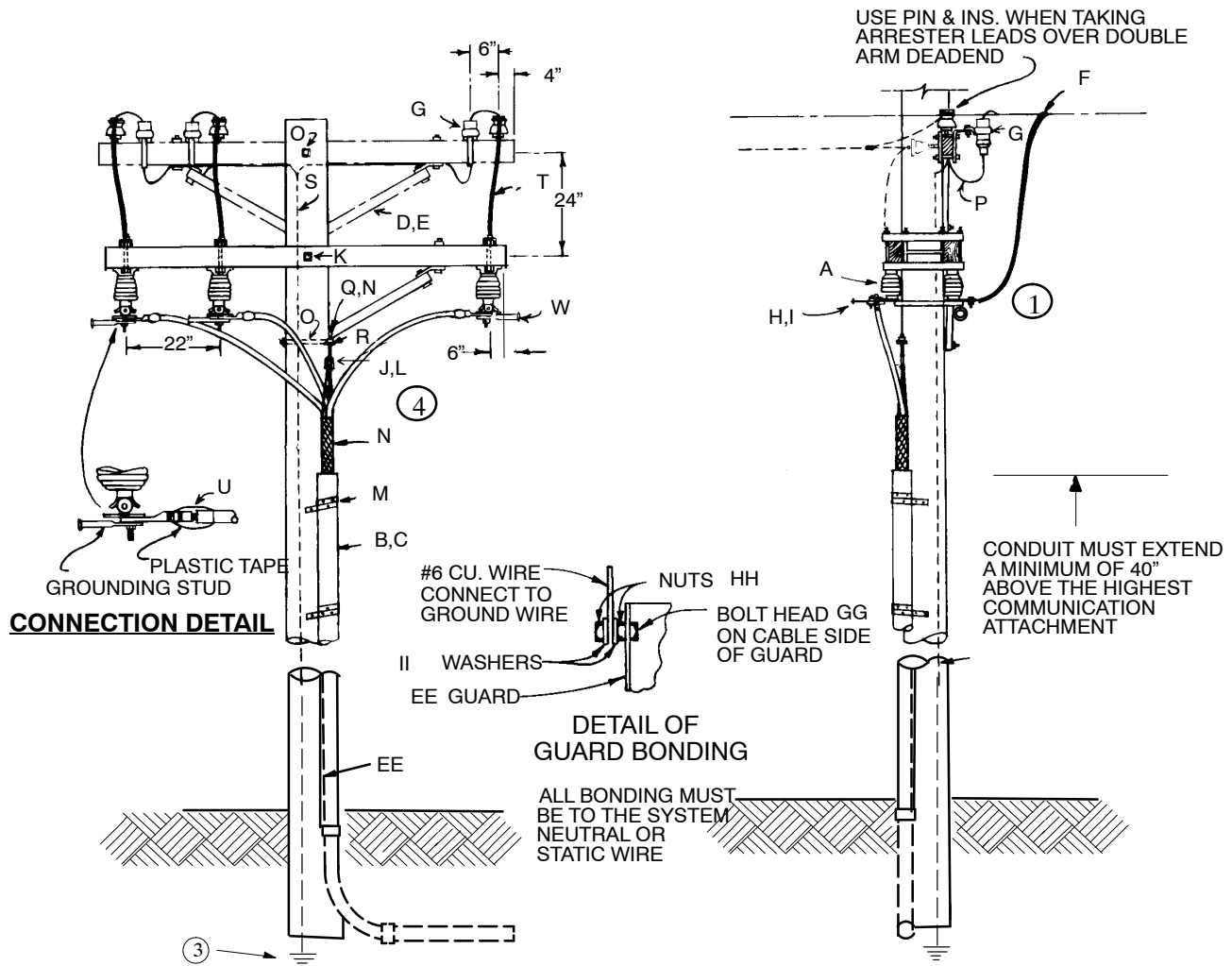
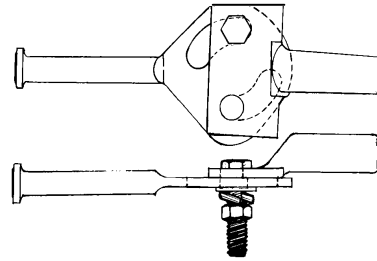
600 Amp Switch

14 04 07 **
Sheet 1 of 3

For Deadend Construction where Arm
Guys are Req'd. Spread Arresters
and Locate Guy between Them



DETAIL - GROUNDING STUD



CABLE TERMINALS
4 kV Non Shielded Cable
600 Amp Switch

14 04 07 **
Sheet 2 of 3

		Std. / Stk. No.	Description	14 04 07 **	01	02	03	04
@	A	54 07 204	Switch, S.B. 600A – 15 kV		3	3	3	3
	B	12 01 278	Conduit, Plastic, 4", SCH 40		20'		20'	
	C	12 01 182	Conduit, Plastic, 5", EB			20'		20'
	D	04 00 20 07	Crossarm & Brace, 8'		1	1		
	E	04 00 20 08	Crossarm & Brace, 10'				1	1
	F	PG*	See 07 00 25 00		3	3	3	3
	G	10 01 133	Arrester – Lightning, 3 kV		3	3	3	3
	H	17 55 275	Lug – 350 kcmil Copper, 90°, 2 Hole		3		3	
	I	17 55 274	Lug – 750 kcmil Copper, 90°, 2 Hole			3		3
	J	23 59 005	Eyelet – 5/8"		1	1	1	1
	K	23 66 027	Washer – Square, 5/8", 2-1/4" SQ		3	3	3	3
	L	23 68 181	Shackle		1	1	1	1
	M	27 60 035	Iron, Hanger		10	10	10	10
	N	23 17 220	Grip, Cable, 3" – 3-1/2" Cable Dia, 34" Long		1	1	1	1
	O	23 52 065	Bolt – Machine, 5/8" x 12" Galv, SQ Head w/ nut		2	2	2	2
	P	18 51 021	Wire – Cu., #6 S.D., Covered (Ft.)		10	10	10	10
	Q	23 52 061	Bolt – Machine, 5/8" x 8"		1	1	1	1
	R	23 65 012	EyenuT for 5/8" Bolt		1	1	1	1
	S	12 00 10 04	Grounding Unit		1	1	1	1
2	T	18 53 102	Wire – 5 kV 350 kcmil		15	15	15	15
	U	25 53 055	Tape – Plastic		1	1	1	1
	W	23 64 037	Stud – Grounding, Univ.		3	3	3	3
	X	17 58 054	Bracket, Crossarm, Arrester		3	3	3	3
	AA	12 01 272	Conduit – 5" SCH 80			10'		10'
		12 01 273	Conduit – 4" SCH 80		10'		10'	
	BB	18 07 040	Cable – 5 kV, 350 kcmil		35		35	
		18 07 031	Cable – 5 kV, 750 kcmil			35		35
	CC	12 51 250	Bend – 5", 24" Rad.			1		1
		12 51 206	Bend – 5", 36" Rad.			1		1
3	DD	12 51 249	Bend – 4", 24" Rad.		1		1	
		12 51 176	Bend – 4", 36" Rad.		1		1	
	EE	23 18 202	Guard – Conduit 5"		1	1	1	1
	FF	23 60 005	Screw – Lag 3/4" x 3"		6	6	6	6
	GG	21 53 007	Bolt – Mach. 3/8" x 1-1/2"		1	1	1	1
	HH	21 61 006	Nut – Hex, 3/8"		2	2	2	2
	II	23 66 016	Washer – 3/8" Galv.		2	2	2	2
		OP 277	Install Cable Up Pole		1	1	1	1
@								
@								

NOTES:

- Switch blades should open towards the riser cables so the blades are de-energized when the cable is de-energized.
- Conduit straps may be substituted for iron hangers.

CABLE TERMINALS
4 kV Non Shielded Cable
600 Amp Switch

14 04 07 **
Sheet 3 of 3

-
3. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.

CABLE TERMINALS

15 kV & Below Single Phase

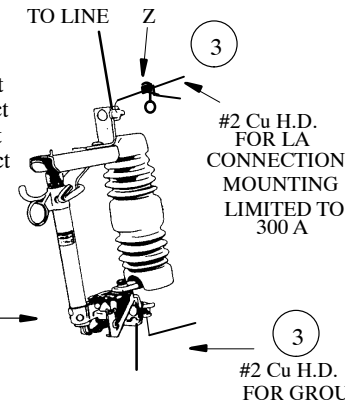
#2 Through 4/0

14 12 01 **

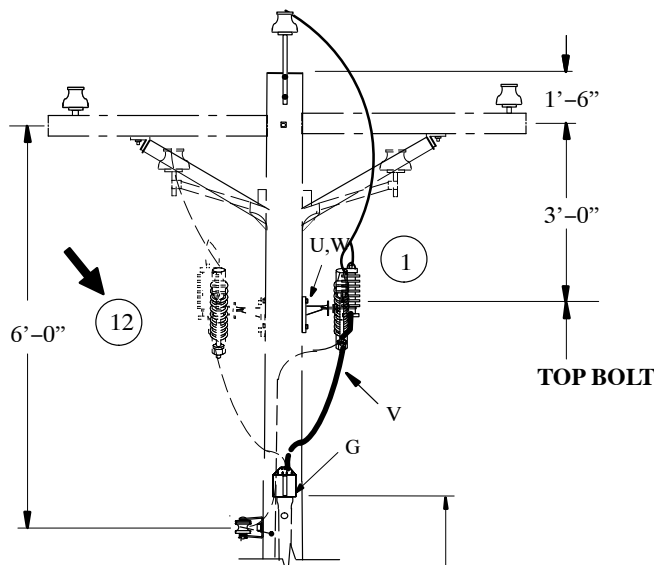
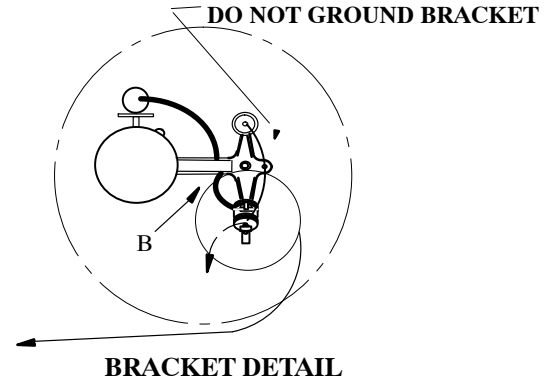
Sheet 1 of 3

- 01 - #2 Direct Buried or In 2" Conduit/Duct
- 02 - 4/0 Direct Buried or In 2" Conduit/Duct
- 03 - #2 Direct Buried or In 3" Conduit/Duct
- 04 - 4/0 Direct Buried or In 3" Conduit/Duct

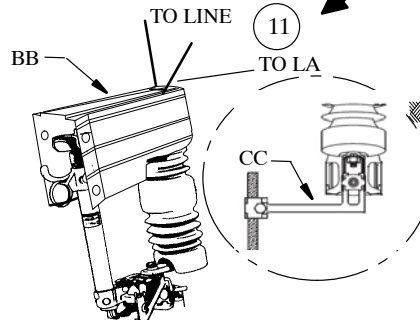
Use #4 Cu Line Lead w/ 100A Barrel
Use #1/0 Cu Line Lead w/ 200A Barrel
Use #1/0 Cu Line Lead w/ 300A Barrel



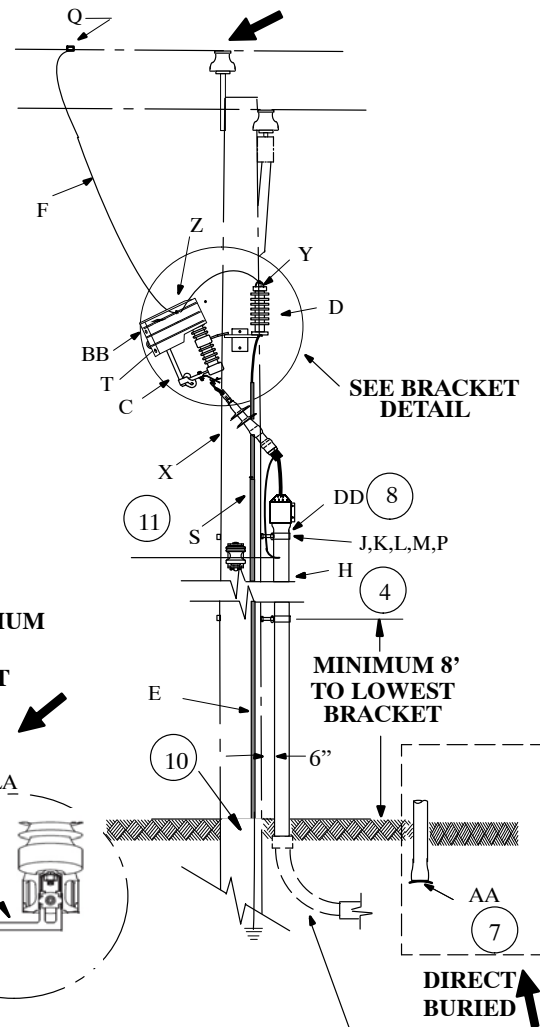
TO TERMINATOR
SWITCH DETAIL



CONDUIT MUST EXTEND A MINIMUM
OF 40" ABOVE THE HIGHEST
COMMUNICATION ATTACHMENT
AND TO THE NEUTRAL.



SWITCH DETAIL W/COVER



**SWEEP INSTALLED AS A PART OF
CONDUIT INSTALLATION**

CABLE TERMINALS
15 kV & Below Single Phase
#2 Through 4/0

14 12 01 **

Sheet 2 of 3

		Std. / Stk. No.	Description	14 12 01 **	01	02	03	04
2@	B	23 56 063	Bracket,Fiberglass, 3 Position Mounting		1	1	1	1
	C	54 07 208	Switch, Fused, 100A, 15kV		1	1	1	1
	D	10 01 129	Arrester, Lightning, 9kV		1	1	1	1
		10 01 133	Arrester, Lightning, 3kV		1	1	1	1
9		10 01 146	Arrester, Lightning, 10kV		1	1	1	1
	E	12 00 10 04	Grounding Unit		1	1	1	1
	F	18 51 025	Wire, Cu., #4 S.D. Covered		10		10	
		18 51 024	Wire, Cu., 1/0 S.D. Covered			10		10
4@	G	12 01 280	Conduit, Plastic, 2", SCH 40		20	20		
		12 01 279	Conduit, Plastic, 3", SCH 40				20	20
	H	12 01 275	Conduit, 2" SCH 80		10	10		
		12 01 276	Conduit, 3" SCH 80				10	10
	J	23 06 086	Bracket, Standoff 20"		3	3	3	3
		23 06 087	Bracket, Standoff 12"		3	3	3	3
	K	23 53 003	Bolt, Double Arming 5/8" x 18"		3	3	3	3
	M	23 67 190	Strap. Conduit 2"		3	3		
		23 67 182	Strap. Conduit 3"				3	3
	N	17 51 137	Clamp, PG, 1/0 – 350 kcmil		1	1	1	1
	P	23 65 053	Nut, Jam 5/8"		3	3	3	3
	Q	PG*	See 07 00 25 00		1	1	1	1
@		HLC*W	Clamp, Hot line		1	1	1	1
@	S	17 51 032	Clamp, PG, 1/0 – #6		1	1	1	1
	T		Fuse Sized By Engineer		1	1	1	1
	U	23 52 066	Bolt, Mach., 5/8" x 14"		2	2	2	2
	V	18 07 238	Cable, 15kV, #2		35		35	
		18 07 239	Cable, 15kV, 4/0			35		35
	W	23 66 027	Washer, Square, 5/8"		8	8	8	8
	X	42 34 59 01	Termination, 15kV, #2 Al.		1		1	
		42 34 59 03	Termination, 15kV, 4/0			1		1
	Y	18 51 021	Wire, #6 Cu, S.D. Covered		2'	2'	2'	2'
	Z	23 78 394	Clamp, Hotline, #6 to 2/0		1	1	1	1
	AA	12 53 017	Shield, Duct, Cable		1	1	1	1
	BB	23 17 411	Cover – Cutout, 100A Fused		1	1	1	1
8	CC	17 55 828	Stirrup – Grounding, 1/2" x 7"		1	1	1	1
	DD	23 17 472	Cover – Conduit		1	1	1	1
		OP278	Install Cable Up Pole		1	1	1	1

CABLE TERMINALS
15 kV & Below Single Phase
#2 Through 4/0

14 12 01 **

Sheet 3 of 3

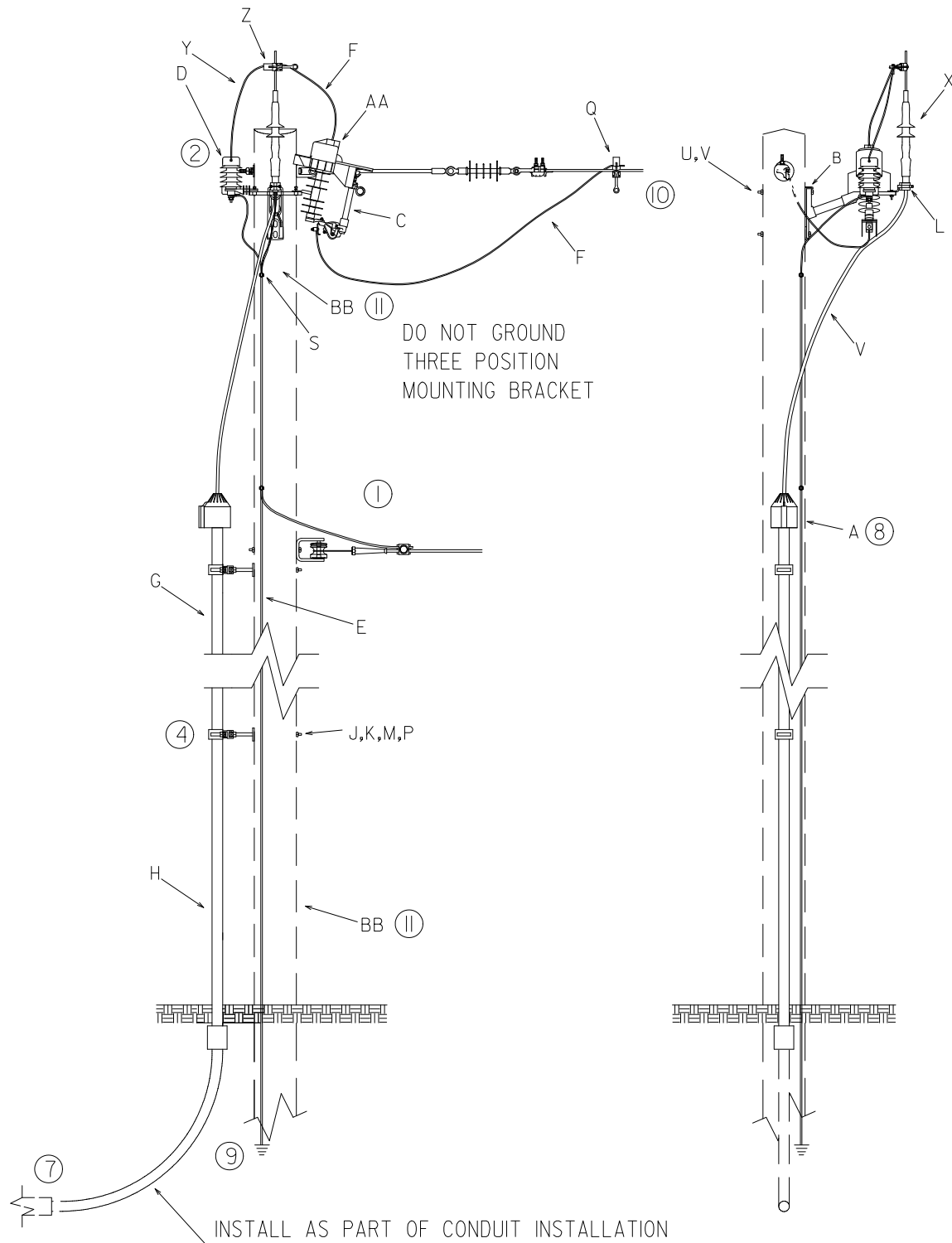
NOTES:

1. Keep arrester ground lead as short as possible.
2. On 13 kV terminal poles use 10 kV lightning arrester, Stock # 10-01-146.
3. Insert a piece of #2 H.D. Cu for LA and grounding attachments. See note 11 for avian protection requirements.
4. See DCS 14000103 for standoff bracket placement and grounding requirements.
5. Some standoff brackets require that one of the nuts on the double arming bolt be replaced with a jam nut. The jam nut should then be inserted into the 5/8" slot on the standoff bracket. If the nut on the double arming bolt will fit into the 5/8" slot on the bracket – Do Not Use the jam nut.
6. On the front of the 20" standoff bracket, the following conduits may be mounted: 4-2" conduits, 3-2-1/2" conduits, 3-3" conduits, 3-4" conduits, 2-5" conduits. Various combinations of conduits may also be mounted. On the front of the 12" standoff bracket, the following conduits may be mounted: 2-2" conduits, 2-2-1/2" conduits, 1-3" & 1-2" conduits, 1-3" and 1-2-1/2" conduit, 1-4" conduit, and 1-5" conduit.
7. To prevent damage to direct buried cables, install a cable shield (Stk# 12-53-017) at the conduit entry and increase the quantity of cable shields shown in the Materials List by "1".
8. Install a conduit cover at the top end of the conduit to prevent cable damage.
9. Use DCS 12 00 10 04 for ground coil application on new pole installation.
10. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
11. For all of Illinois and locations in Missouri where additional avian protection is needed, omit the piece of #2 bare copper wire and hot line clamp "Z". Connect the #6 copper poly covered arrester wire "Y" directly to the fused switch connector.
12. More than one single phase riser can be on a pole. Generally, installing three to four single phase risers on a pole will require the use of a crossarm. Refer to DCS 14 12 05 ** for proper spacing of cutouts.

CABLE TERMINALS
15 kV & Below Single Phase, UG to OH Feed
#2 Through 4/0

14 12 02 **

Sheet 1 of 3



CABLE TERMINALS
15 kV & Below Single Phase, UG to OH Feed
#2 Through 4/0

14 12 02 **

Sheet 2 of 3

		Std. / Stk. No.	Description	14 12 02 **	01	02	03	04
8	A	23 17 472	Cover, Conduit		1	1	1	1
	B	23 56 063	Bracket, Fiberglass, 3 Position Mounting		1	1	1	1
	C	54 07 208	Switch, Fused, 100A, 15kV		1	1	1	1
3 @	D	10 01 129	Arrester, Lightning, 9kV		1	1	1	1
		10 01 133	Arrester, Lightning, 3kV		1	1	1	1
		10 01 146	Arrester, Lightning, 10kV		1	1	1	1
1,9	E	12 00 10 04	Grounding Unit		1	1	1	1
	F	18 51 025	Wire, Cu., #4 S.D. Covered		10		10	
		18 51 024	Wire, Cu., 1/0 S.D. Covered			10		10
4, 6 @	G	12 01 280	Conduit, Plastic, 2", SCH 40		20	20		
		12 01 279	Conduit, Plastic, 3", SCH 40				20	20
	H	12 01 275	Conduit, Plastic, 2", SCH 80		10	10		
		12 01 276	Conduit, Plastic, 2" SCH 80				10	10
	J	23 06 086	Bracket, Standoff 20"		3	3	3	3
		23 06 087	Bracket, Standoff 12"		3	3	3	3
	K	23 53 003	Bolt, Double Arming 5/8" x 18"		3	3	3	3
	L	23 67 193	Bracket, Cable Positioner		1	1	1	1
	M	23 67 190	Strap, Conduit 2"		3	3		
		23 67 182	Strap, Conduit 3"				3	3
5 @	N	17 51 137	Clamp, PG, 1/0 – 350 kcmil		1	1	1	1
	P	23 65 053	Nut, Jam 5/8"		3	3	3	3
	Q	PG*	See 07 00 25 00		1	1	1	1
HLC*W		Clamp, Hot Line		1	1	1	1	
@	S	17 51 032	Clamp, PG, 1/0 – #6		1	1	1	1
	T		Fuse Sized By Engineer		1	1	1	1
	U	23 52 066	Bolt, Mach., 5/8" x 14"		2	2	2	2
	V	18 07 238	Cable, 15kV, #2		35		35	
		18 07 239	Cable, 15kV, 4/0			35		35
	W	23 66 027	Washer, Square, 5/8"		8	8	8	8
	X	42 34 59 01	Termination, 15kV, #2		1		1	
		42 34 59 03	Termination, 15kV, 4/0			1		1
	Y	18 51 021	Wire, #6 Cu., S.D. Covered		2'	2'	2'	2'
	Z	23 78 394	Clamp, Hotline, #6 to 2/0		1	1	1	1
AA	23 17 411	Cover, Cutout		1	1	1	1	
BB	16 02 585	Sign, Danger UG Feed		2	2	2	2	
		OP 279	Install Cable Up Pole		1	1	1	1

NOTES

1. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-stranded #10 copperweld ground wire may look like a stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.

CABLE TERMINALS
15 kV & Below Single Phase, UG to OH Feed
#2 Through 4/0

14 12 02 **

Sheet 3 of 3

2. Keep arrester ground lead as short as possible. Aerial tap it to concentrics close to the termination.
3. On 13 kV terminal poles use 10 kV lightning arrester, Stock # 10-01-146.
4. See DCS 14 00 01 03 for standoff bracket placement and grounding requirements.
5. Some standoff brackets require that one of the nuts on the double arming bolt be replaced with a jam nut. The jam nut should then be inserted into the 5/8" slot on the standoff bracket. If the nut on the double arming bolt will fit into the 5/8" slot on the bracket – Do Not Use the jam nut.
6. On the front of the 20" standoff bracket, the following conduits may be mounted: 4– 2" conduits, 3– 2-1/2" conduits, 3– 3" conduits, 3– 4" conduits, 2– 5" conduits. Various combinations of conduits may also be mounted. On the front of the 12" standoff bracket, the following conduits may be mounted: 2– 2" conduits, 2– 2-1/2" conduits, 1– 3" & 1– 2" conduits, 1– 3" and 1– 2-1/2" conduit, and 1– 5" conduit.
7. To prevent damage to direct buried cables, install a cable shield (Stk# 12-53-017) at the conduit entry.
8. Install a cable conduit cover at the top end of the conduit to prevent cable damage.
9. See DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.
10. See DCS 03 12 01 ** for single phase deadend configuration.
11. Attach "Danger UG Feeds OH" sign approximately 5' above the ground line, and 3' below the cutout.

CABLE TERMINALS

15kV & Below Three-Phase

#2 Through 4/0

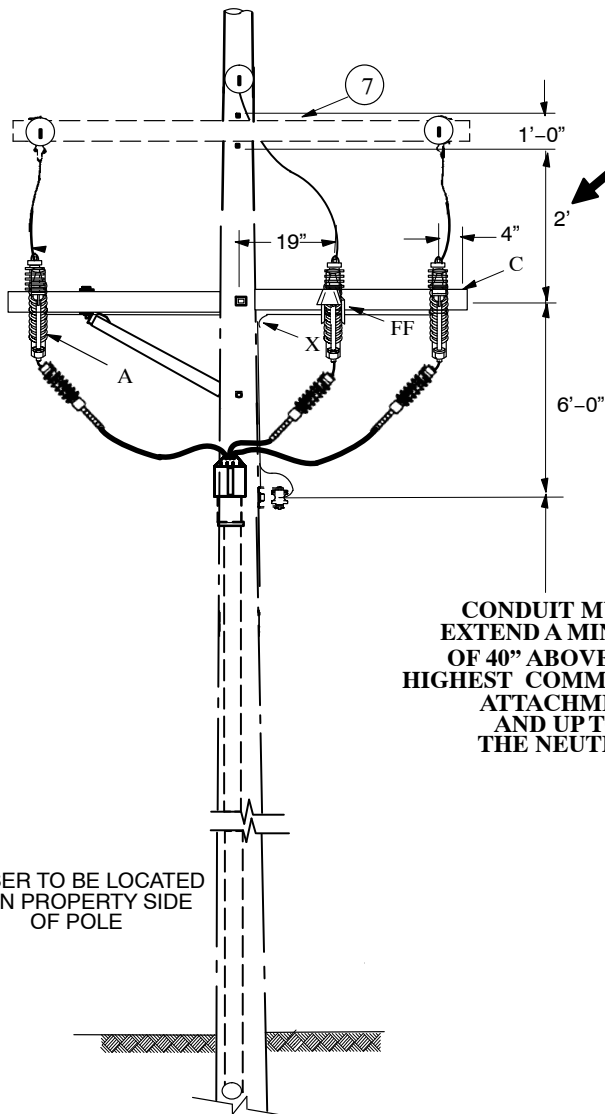
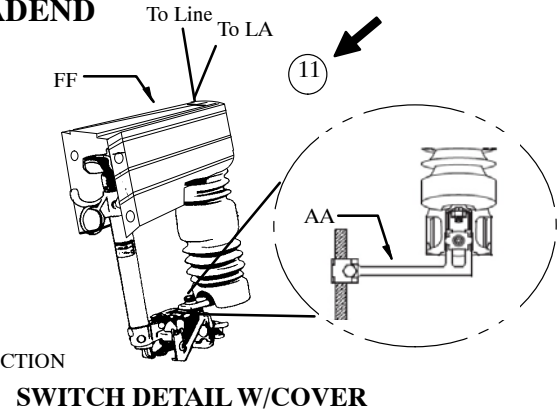
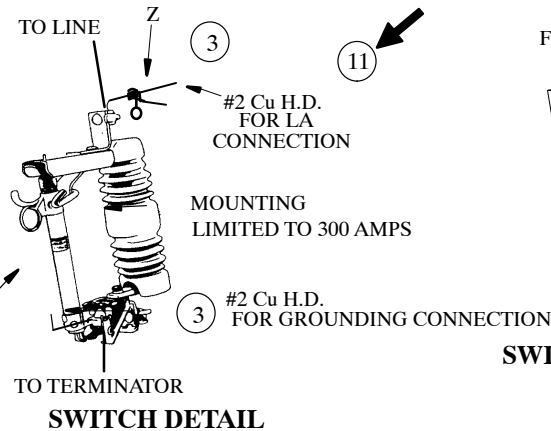
14 12 05 **

Sheet 1 of 3

THROUGH POLE OR DEADEND

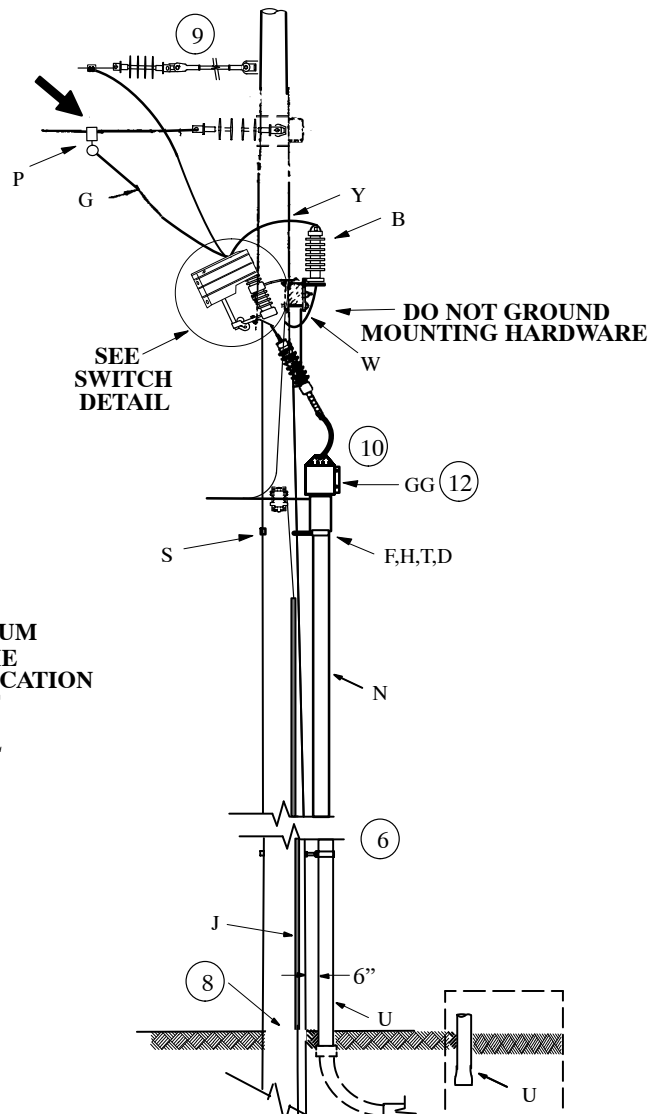
#2-3C 14 12 05 01
#2-1C 14 12 05 02
4/0-3C 14 12 05 03
4/1-1C 14 12 05 04

Use #4 Cu w/ 100A Barrel
Use #1/0 Cu w/ 200A Barrel
Use #1/0 Cu w/ 300A Barrel



CONDUIT MUST
EXTEND A MINIMUM
OF 40" ABOVE THE
HIGHEST COMMUNICATION
ATTACHMENT
AND UP TO
THE NEUTRAL

RISER TO BE LOCATED
ON PROPERTY SIDE
OF POLE



SWEEP INSTALLED AS A PART OF
CONDUIT INSTALLATION

DIRECT
BURIED

DISTRIBUTION
CONSTRUCTION STANDARDS



ENG: HLH
REV. NO: 17
REV. DATE: 11/24/15

CABLE TERMINALS
15kV & Below Three-Phase
#2 Through 4/0

14 12 05 **

Sheet 2 of 3

		Std. / Stk. No.	Description	14 12 05 **	01	02	03	04
@ 4	A	54 07 208	Switch, Fused, 100A, 15 kV		3	3	3	3
	B	10 01 129	Arrester, Lightning, 9 kV		3	3	3	3
		10 01 133	Arrester, Lightning, 3 kV		3	3	3	3
		10 01 146	Arrester, Lightning, 10 kV		3	3	3	3
C		04 00 20 02	Crossarm, Sgl, Wood, 8' on (use only 1/2 of V-brace)		1	1	1	1
		04 00 20 03	Crossarm, Sgl, Wood, 10' on (use only 1/2 of V-brace)		1	1	1	1
D		23 53 003	Bolt, Double Arming, 5/8" x 18"		3	3	3	3
		23 65 053	Nut, 5/8" Jam		3	3	3	3
G		18 51 025	Wire, Cu. , #4 S.D. Covered		15	15		
		18 51 024	Wire, Cu. , 1/0 S.D. Covered				15	15
H		23 06 087	Bracket, Conduit, Standoff, 12"		3	3	3	3
J		12 00 10 04	Grounding Unit		1	1	1	1
K		17 51 032	Clamp, PG, 1/0-6		3	3	3	3
L		17 51 137	Clamp, PG 1/0-350 kcmil		1	1	1	1
M			Fuse Sized by Engineer		3	3	3	3
N		12 01 278	Conduit, Plastic, 4", SCH 40		20	20	20	20
P		HLC*W	Line Clamp		3	3	3	3
		PG*	See 07 00 25 00		3	3	3	3
S		23 66 027	Washer, Square 5/8"		6	6	6	6
T		23 67 183	Strap, Conduit 4"		3	3	3	3
U		12 01 273	Conduit, 4" SCH 80		10'	10'	10'	10'
W		17 58 054	Bracket, Arrester/Cutout Mounting		6	6	6	6
X		18 52 019	Misc. #6 bare Cu SD (ft) for ground buss.		12'	12'	12'	12'
Y		18 51 021	Wire, #6 Cu. S.D. Covered		6'	6'	6'	6'
Z		23 78 394	Clamp, Hotline, #6 to 2/0		3	3	3	3
AA		17 55 828	Stirrup - Grounding 1/2" X 7"		3	3	3	3
BB		18 07 237	Cable, 15 kV, #2-3C Al.		35			
		18 07 238	Cable, 15 kV, #2-1C Al.			105		
		18 07 239	Cable, 15 kV, 4/0-1C Al.					105
		18 07 240	Cable, 15 kV, 4/0-3C Al.				35	
CC		42 34 59 01	Termination, 15 kV, #2		3	3		
		42 34 59 03	Termination, 15 kV, 4/0				3	3

CABLE TERMINALS
15kV & Below Three-Phase
#2 Through 4/0

14 12 05 **

Sheet 3 of 3

12	FF	23 17 411	Cover – Cutout, 100 Amp Fused	3	3	3	3
		OP 279	Install Cable Up Pole	1	1	1	1
	GG	23 17 472	Cover – Conduit	1	1	1	1

NOTES:

1. Keep arrester ground lead as short as possible. Keep arrester primary lead as short as possible.
2. 8' crossarm available, Ameren Mo only.
3. Insert a piece of #2 H.D. Cu for LA and grounding attachments. See note for avian protection requirement.
4. On 13 kV terminal poles use 10 kV lightning arrester, Stock # 10-01-146.
5. If a longer bracket is required, use Stock # 23-06-086 (20" long).
6. See DCS 14 00 01 03 for standoff bracket placement and grounding requirements.
7. See DCS 03 12 05 **, 03 12 06 ** or 03 12 09 ** for through pole or deadend configuration.
8. See DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.
9. Underbuild construction requires deadend on pole w/FG extension, for deadend application.
10. Always connect the metallic shields on the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and / or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
11. For all of Illinois and locations in Missouri where additional avian protection is needed, omit the piece of #2 bare Cu, and hot line clamp "Z". Connect the #6 Cu poly covered arrester wire "Y" directly to the fused switch connector.
12. Install a conduit cover at the top end of the conduit to prevent cable damage.

CABLE TERMINALS

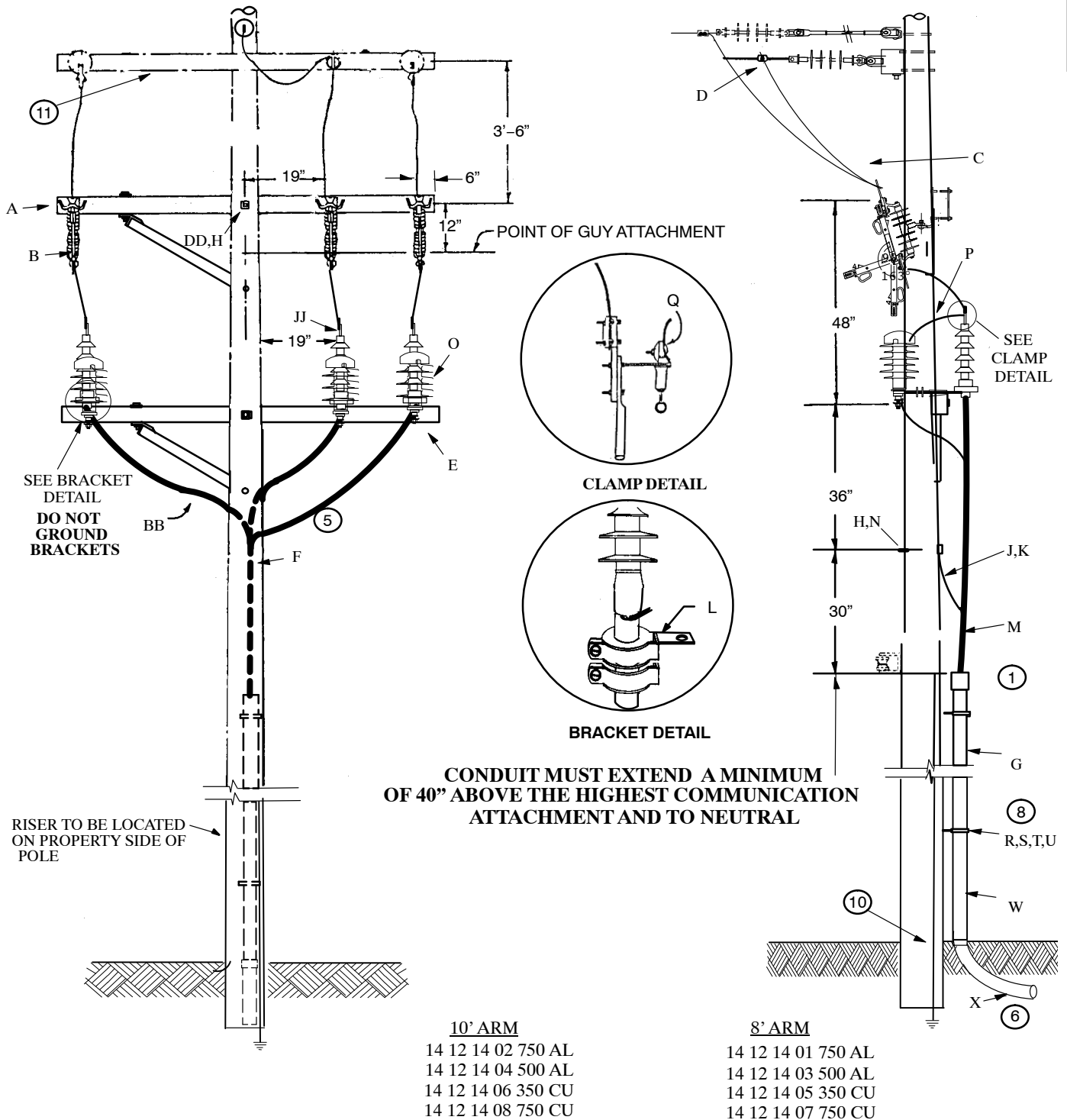
15 kV Below Three Phase 600 Amp Disconnect Switches Vertical Crossarm Mount 350 kcmil-750 kcmil

14 12 14 **

Sheet 1 of 3

THROUGH POLE OR DEADEND

THIS CONSTRUCTION SHALL NOT BE USED FOR NON-SHIELDED CABLES
OPERATING ABOVE 2000 VOLTS TO GROUND. CONDUIT MUST BE PLACED
AGAINST THE POLE AND COVERED WITH A BONDED GUARD.



CABLE TERMINALS
15 kV Below Three Phase 600 Amp Disconnect Switches
Vertical Crossarm Mount 350 kcmil–750 kcmil

14 12 14 **

Sheet 2 of 3

		Std. / Stk. No.	Description	14	12	14**	01	02	03	04	05	06	07	08
5	A	04 00 20 02	Crossarm, 8' w/60" V Brace	1			1			1			1	
		04 00 20 03	Crossarm, 10' w/60" V Brace		1			1		1			1	
	B	54 07 296	Switch, Disc. 600A., 15kV	3	3	3	3	3	3	3	3	3	3	3
@	C	18 51 052	Wire, Cu. 350 S.D. , Covered	35	35	35	35	35	35	35	35	35	35	35
	D	PG*	See 07 00 25 00	3	3	3	3	3	3	3	3	3	3	3
	E	41 01 008	Crossarm, 10'		1			1			1			1
41 01 014		Crossarm, 8'	1			1			1			1		
5,11														
5,11														
9	F	12 00 10 04	Grounding Unit	1	1	1	1	1	1	1	1	1	1	1
	G	12 01 303	Conduit, 5" Plastic, SCH 40	20	20	20	20	20	20	20	20	20	20	20
	H	23 52 065	Bolt, Mach., 5/8" x 12"	3	3	3	3	3	3	3	3	3	3	3
	J	23 65 012	Eyebut, 5/8", Oval Eye	1	1	1	1	1	1	1	1	1	1	1
	K	23 68 181	Shackle	1	1	1	1	1	1	1	1	1		
	L	23 67 197	Bracket, Cable Support, 500–750 kcmil	3	3	3	3	3	3	3	3	3	3	3
	M	23 17 245	Grip, Cable Riser, 2"–2.5" Dia., Split	3	3	3	3	3	3	3	3	3	3	3
	N	23 66 027	Washer, Square, For 5/8" Bolt	9	9	9	9	9	9	9	9	9	9	9
	O	10 01 129	Arrester, Lightning, 9kV	3	3	3	3	3	3	3	3	3	3	3
10 01 133		Arrester, Lightning, 3kV	3	3	3	3	3	3	3	3	3	3	3	3
10 01 146		Arrester, Lightning, 10kV	3	3	3	3	3	3	3	3	3	3	3	3
7@	P	18 51 021	Wire, #6 Cu, S.D. Covered	6	6	6	6	6	6	6	6	6	6	6
	Q	23 78 183	Clamp, Hot Line, #6–400 kcmil, Cu.	3	3	3	3	3	3	3	3	3	3	3
	R	23 53 003	Bolt, Double Arming, 5/8" x 18"	3	3	3	3	3	3	3	3	3	3	3
	S	23 65 053	Nut, Jam 5/8"	3	3	3	3	3	3	3	3	3	3	3
	T	23 67 184	Strap, Conduit, 5"	3	3	3	3	3	3	3	3	3	3	3
	U	23 06 087	Bracket, Standoff, 12"	3	3	3	3	3	3	3	3	3	3	3
8	W	12 01 272	Conduit, 5" SCH 80	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'
	X	12 51 206	Bend, 5", 36" Rad.	1	1	1	1	1	1	1	1	1	1	1
		Y	23 52 038	Bolt, Machine 1/2" x 10"	2	2	2	2	2	2	2	2	2	2
Z		23 66 017	Washer, Round 1/2"	2	2	2	2	2	2	2	2	2	2	2
6@	@	AA	42 34 61 04	Termination, 15kV, 750 kcmil AL	3	3								
		42 34 61 10	Termination, 15kV, 500 kcmil AL			3	3							
		42 34 61 06	Termination, 15kV, 350 kcmil Cu					3	3					
42 34 61 02		Termination, 15 kV, 750 kcmil Cu								3	3			
	BB	18 07 243	Cable, 750 kcmil Al	35	35									
		18 07 261	Cable, 500 Al kcmil (3 Cables, 35' Ea.)			105	105							
		18 07 245	Cable, 350 kcmil Cu					35	35					
18 07 244		Cable, 750 kcmil Cu								35	35			
@	DD	23 66 134	Washer, 5/8", Dbl. Coil	2	2	2	2	2	2	2	2	2	2	2

CABLE TERMINALS
15 kV Below Three Phase 600 Amp Disconnect Switches
Vertical Crossarm Mount 350 kcmil–750 kcmil

14 12 14 **
Sheet 3 of 3

EE	23 66 133	Washer, 1/2", Dbl. Coil	2	2	2	2	2	2	2	2
FF	23 56 088	Bracket, Crossarm, Dbl. Sided	3	3	3	3	3	3	3	3
GG	23 52 063	Bolt, Machine 1/2" x 6"	2	2	2	2	2	2	2	2
JJ	23 17 415	Cover, wildlife, 2"x36"	1	1	1	1	1	1	1	1
	OP 277	Install Cable Up Pole	1	1	1	1	1	1	1	1

NOTES:

1. Wrap cable with friction tape prior to installation of cable grip.
2. When guy is required, use 45" fiberglass strain insulator and select links to obtain maximum clearance.
3. For alternate construction call for split conduit with steel guard.
4. Keep arrester primary lead as short as possible. Keep arrester ground lead short (attach it to concentric close to the terminator).
5. Use only one V brace on each crossarm.
6. Bend normally included in conduit instructions.
7. On 13 kV terminal poles use 10 kV lightning arrester.
8. See DCS 14 00 01 03 for standoff Bracket placement and grounding requirements.
9. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use DCS 12 00 10 03 for ground rod on existing pole.
10. See DCS 03 for through pole or deadend configuration.
11. Use 8' arm with DCS 14 12 14 01 where easement or horizontal clearances are concern.

CABLE TERMINALS

15kV & Below – Three Phase – 600A Disconnect Switches

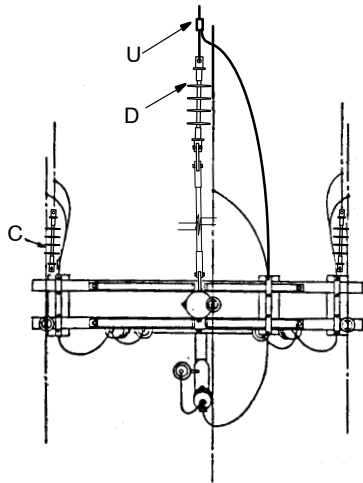
350 kcmil – 750 kcmil Shielded Cable

14 12 16 **

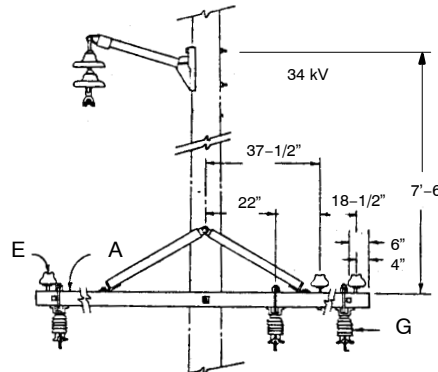
Sheet 1 of 3

SHIELDED CABLE THROUGH POLE OR DEADEND

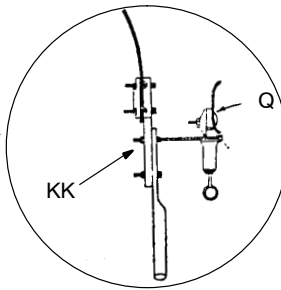
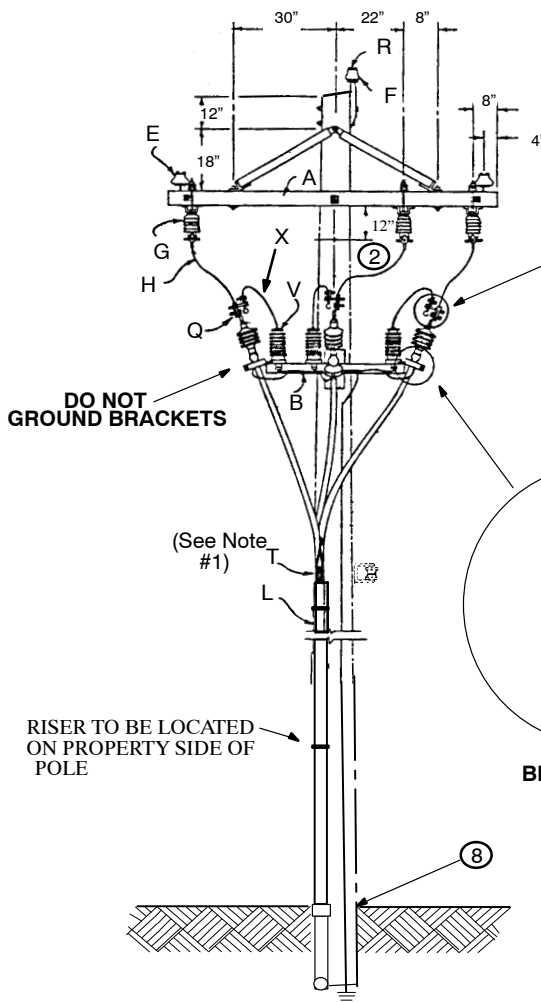
This construction shall not be used for non-shielded cables operating above 2000 volts to ground. Conduit must be placed against the pole and covered with a bonded guard.



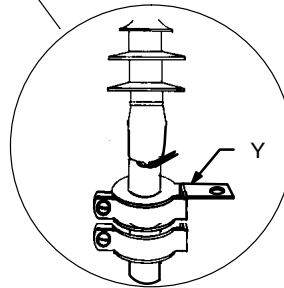
	Thru Circuit	Dead End
Overhead	14 12 16 05 14 12 16 01	14 12 16 06 14 12 16 02
Underbuild	14 12 16 03	14 12 16 04



UNDER BUILD DETAIL

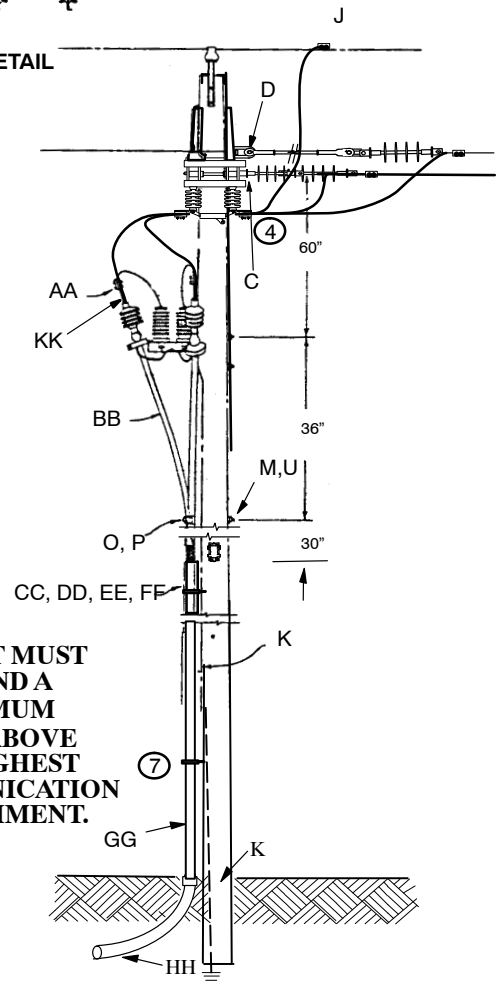


CLAMP DETAIL



BRACKET DETAIL

CONDUIT MUST
EXTEND A
MINIMUM
OF 40" ABOVE
THE HIGHEST
COMMUNICATION
ATTACHMENT.



CABLE TERMINALS
15kV & Below – Three Phase – 600A Disconnect Switches
350 kcmil – 750 kcmil Shielded Cable

14 12 16 **
Sheet 2 of 3

		Std. / Stk. No.	Description	14 12 16 **	01	02	03	04	05	06
9	A	04 00 20 07	Crossarm , Dble., 8'		1	1				
		04 00 20 08	Crossarm, Dble., 10'				1	1	1	1
□	B	17 08 057	Bracket, Mounting, Terminator		1	1	1	1	1	1
	C	06 12 34 01	Deadend On Arm			2		2	3	3
□	D	06 12 32 01	Deadend On Pole			1		1		
	E	06 12 01 01	Pin & Ins. On Arm		2		3			
	F	06 12 01 02	Pin & Ins. On Pole Top		1					
	G	54 07 204	Switch, Disc. 600A., 15kV		3	3	3	3	3	3
	H	18 51 052	Wire, Cu. 350 S.D., covered		25	25	25	25	25	25
	J	PG*	See 07 00 25 00		3	3	3	3	3	3
8	K	12 00 10 04	Grounding Unit		1	1	1	1	1	1
	L	12 01 303	Conduit, 5", Plastic, SCH 40		20	20	20	20	20	20
	M	23 52 065	Bolt, Mach., 5/8" x 12"		3	3	3	3	3	3
	N	27 60 035	Iron, Hanger		2	2	2	2	2	2
	O	23 65 012	Eyenuit, 5/8", Oval Eye		1	1	1	1	1	1
	P	23 68 181	Shackle		1	1	1	1	1	1
	Q	23 78 183	Clamp, Hot Line, # 6-400 kcmil, Cu		3	3	3	3	3	3
	R	TT*W	Top Tie		3		3			
@	S	DEC*W	Deadend Clamp			3		3	3	3
@	T	23 17 245	Grip, Cable Riser, 2"-2.5" OD		1	1	1	1	1	1
		23 17 254	Grip Cable Riser, 2.5"-3.00" OD		1	1	1	1	1	1
		23 17 220	Grip, Cable Riser, 3.0"-3.5" OD		1	1	1	1	1	1
		23 17 246	Grip, Cable Riser, 3.5"-4.0" OD		1	1	1	1	1	1
	U	23 66 027	Washer, Square, For 5/8" Bolt		3	3	3	3	3	3
	V	10 01 129	Arrester, Lightning, 9kV		3	3	3	3	3	3
6@	V	10 01 133	Arrester, Lightning, 3kV		3	3	3	3	3	3
		10 01 146	Arrester, Lightning, 10kV		3	3	3	3	3	3
	X	18 51 021	Wire, # 6 Cu, S.D. Covered		6	6	6	6	6	6
	Y	23 67 197	Bracket, Cable Support, 750 kcmil		3	3	3	3	3	3
@	AA	42 34 61 02	Termination, 15 kV, 750 kcmil Cu. CN		3	3	3	3	3	3
		42 34 61 04	Termination, 15 kV, 750 kcmil Al. CN		3	3	3	3	3	3
		42 34 61 06	Termination, 15 kV, 350 kcmil Cu. CN		3	3	3	3	3	3
		42 34 61 10	Termination, 15 kV, 500 kcmil Al. CN		3	3	3	3	3	3
@	BB	18 07 243	Cable – 750 kcmil Al. CN		35	35	35	35	35	35
		18 07 261	Cable – 500 kcmil Al. CN		105	105	105	105	105	105
		18 07 245	Cable – 350 kcmil Cu. CN		35	35	35	35	35	35
		18 07 244	Cable – 750 kcmil Cu. CN		35	35	35	35	35	35
	CC	25 53 003	Bolt, Double Arming, 5/8" x 18"		3	3	3	3	3	3
	DD	23 65 053	Nut, Jam, 5/8"		3	3	3	3	3	3
	EE	23 67 184	Strap, Conduit, 5"		3	3	3	3	3	3

CABLE TERMINALS
15kV & Below – Three Phase – 600A Disconnect Switches
350 kcmil – 750 kcmil Shielded Cable

14 12 16 **

Sheet 3 of 3

7 @	FF	23 06 087	Bracket, Standoff, 12"	3	3	3	3	3	3
	GG	12 01 272	Conduit, 5" SCH 80	10'	10'	10'	10'	10'	10'
	HH	12 51 206	Bend, 5" 36" Rad.	1	1	1	1	1	1
	KK	23 17 415	Tape, Fusion MV	1	1	1	1	1	1
		OP 277	Install Cable Up Pole	1	1	1	1	1	1

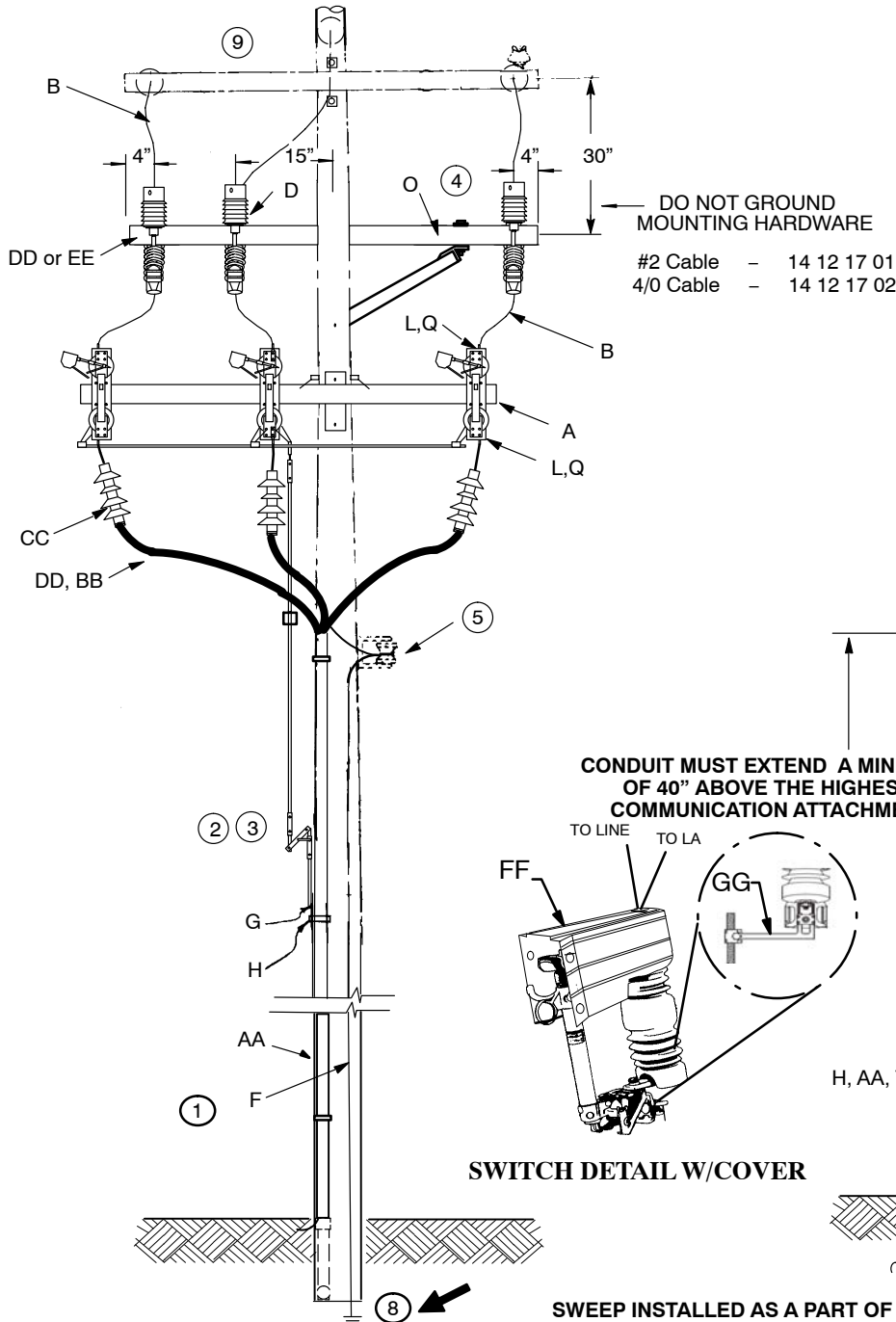
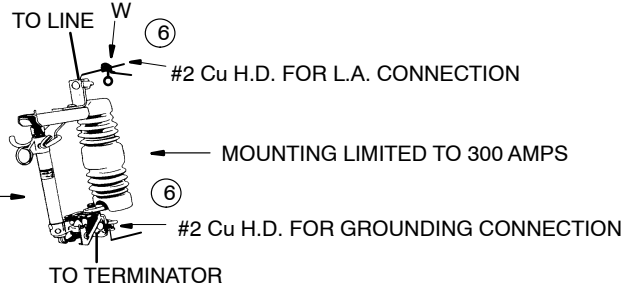
NOTES:

1. Wrap cable with friction tape prior to installation of cable grip.
2. When guy is required, use 45" fiberglass strain insulator and select links to obtain maximum clearance.
3. For alternate construction call for split conduit with steel guard.
4. Switch blades should open away from the terminators.
5. Keep arrester primary and ground leads as short as possible.
6. Use the 10 kV lightning arrester on 13 kV terminal poles.
7. See DCS 14 00 01 03 for standoff bracket placement and grounding requirements.
8. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.
9. 8' crossarm available AmerenMO only.

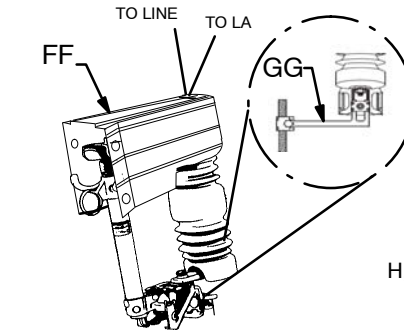
DEADEND OR THROUGH CIRCUIT

SWITCH DETAIL

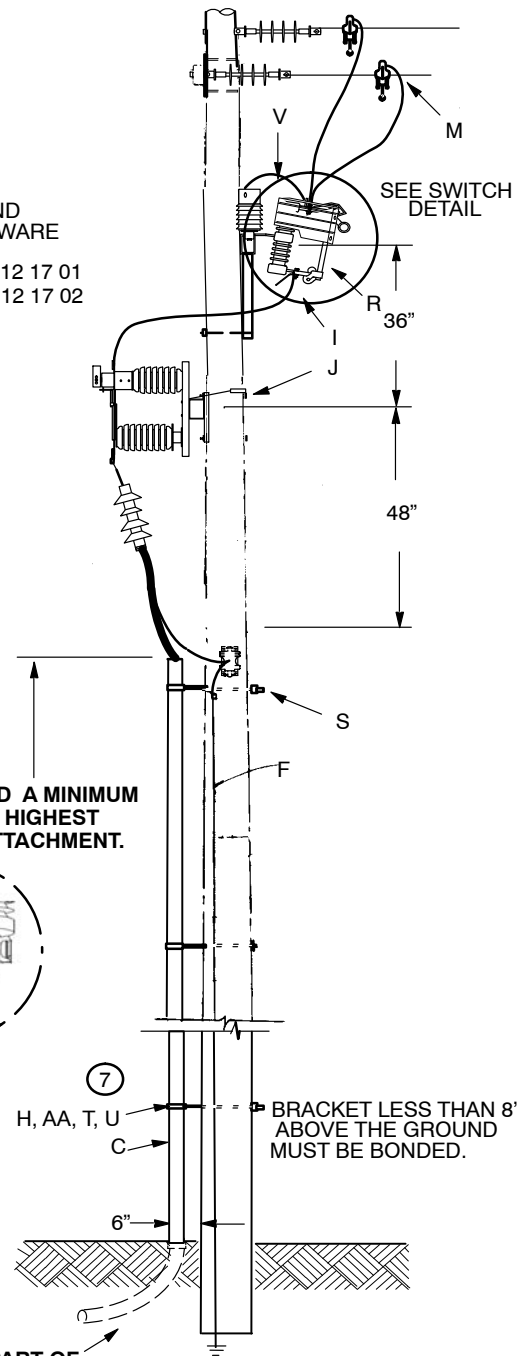
Use #4 Cu w/ 100A Barrel
 Use #1/0 Cu w/ 200A Barrel
 Use #1/0 Cu w/ 300A Barrel



CONDUIT MUST EXTEND A MINIMUM OF 40" ABOVE THE HIGHEST COMMUNICATION ATTACHMENT.



SWITCH DETAIL W/COVER



SWEEP INSTALLED AS A PART OF CONDUIT INSTALLATION

NOTES:

1. Locate ground opposite operating rod. Do not install pole ground where it would bypass the operating rod insulator.
2. Locate lever assembly half way between switch and operation handle or a little above halfway point.
3. Connect ground to switch handle mounting.
4. Use only one V brace. Keep extra brace for future use.
5. Always connect the metallic shields on the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and / or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
6. Insert a piece of #2 H.D. Cu. for LA and grounding attachments, Missouri only.
7. See DCS 14 00 00 03 for standoff bracket placement and grounding requirements.
8. Use DCS 12 00 10 04 for ground coil application on new pole installation.
Use 12 00 10 03 for ground rod on an existing pole.
9. See DCS 03 12 05 ** for through pole or deadend configuration.
10. For all of Illinois and locations in Missouri where additional avian protection is needed, omit the piece of #2 bare Cu, and hot line clamp "W". Connect the #6 Cu poly covered arrester wire "V" directly to the fused switch connector.

CABLE TERMINALS

14 12 17 **

15 kV & Below #2 thru 4/0 Three Phase – Group Operated Switch
For Ferroresonance Condition

Sheet 3 of 3

		Std. / Stk. No.	Description	14 12 17 **	01	02
	A	54 07 239	Switch, 15kV, Group Oper., 600A		1	1
	B	18 51 025	Wire, Cu., #4 S.D. Covered		40	
		18 51 024	Wire, Cu., 1/0 S.D. Covered			40
	C	12 01 273	Conduit, 4" Sch 80		10	10
@	D	10 01 129	Arrester, Lightning, 9kV		3	3
		10 01 133	Arrester, Lightning, 3kV		3	3
		10 01 146	Arrester, Lightning, 10kV		3	3
5,8	F	12 00 10 04	Grounding Unit		1	1
	G	12 01 278	Conduit, Plas. 4", Sch 40		20	20
7	H	23 06 087	Bracket, Conduit Standoff, 12"		3	3
	I	54 07 209	Switch, Fused, 200 A, 15kV			3
		54 07 208	Switch, Fused, 100 A, 15kV		3	
	J	23 52 065	Bolt Machine, 5/8" x 12"		2	2
	K	23 66 027	Washer, Square, For 5/8" Bolt		1	1
	L	17 05 215	Lug, Comp. Cu. #2		6	
		17 05 194	Lug, Comp. Cu 4/0			6
@	M	HLC*W	Hot Line Clamp		3	3
@	N	PG*	See 07 00 25 00		3	3
4@	O	04 00 20 02	Crossarm, Sgl, Wood, 8' (1/2 of V-brace)		1	1
		04 00 20 03	Crossarm, Sgl, Wood, 10' (1/2 of V-brace)		1	1
	Q	21 53 046	Bolts, Everdur, 1/2" x 2-1/2"		6	6
@	R		Fuse Sized By Engineer		3	3
	S	23 66 027	Washer, Square, 5/8"		6	6
	T	23 67 183	Strap, Conduit 4"		3	3
	U	23 65 053	Nut, 5/8" Jam		3	3
	V	18 51 021	Wire, #6 Cu S.D. Covered		6'	6'
	W	23 78 394	Clamp, Hotline, #6 to 2/0		3	3
	AA	23 53 003	Bolt, Double Arming, 5/8" x 18"		3	3
@	BB	18 07 237	Cable, 15kV, #2-3 C Al.		35	
		18 07 238	Cable, 15kV, #2-1 C Al.		105	
		18 07 239	Cable, 15kV, 4/0-1 C Al.			105
		18 07 240	Cable, 15kV, 4/0-3 C Al.			35
	CC	42 34 59 01	Termination, 15kV #2		3	
		42 34 59 03	Termination, 15kV, 4/0			3
	DD	23 56 088	Bracket, Crossarm Mounting, Double Sided		3	
	EE	17 58 054	Bracket, Crossarm Mounting			3
	FF	23 17 411	Cover, Cutout		3	3
@	GG	17 55 828	Stirrup – Grounding, 1/2" X 7"		1	1
		OP 279	Install Cable Up Pole		1	1

CABLE TERMINALS

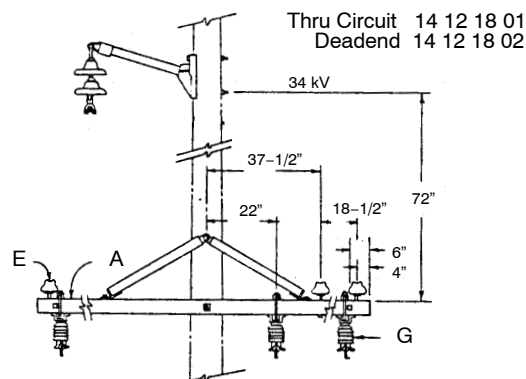
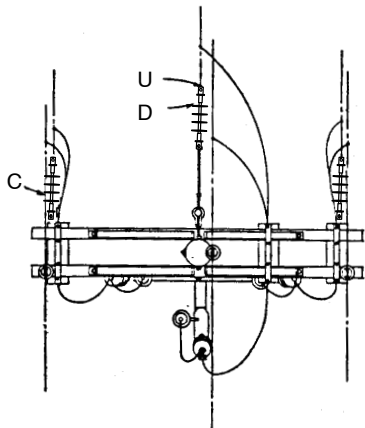
15kV & Below – Three Phase – 600A Disconnect Switches
& SM-5 Fuses

14 12 18 **

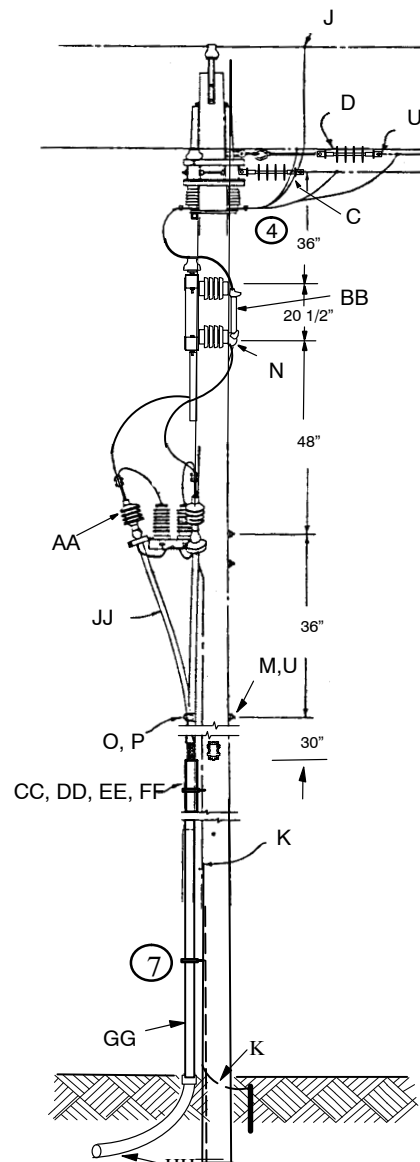
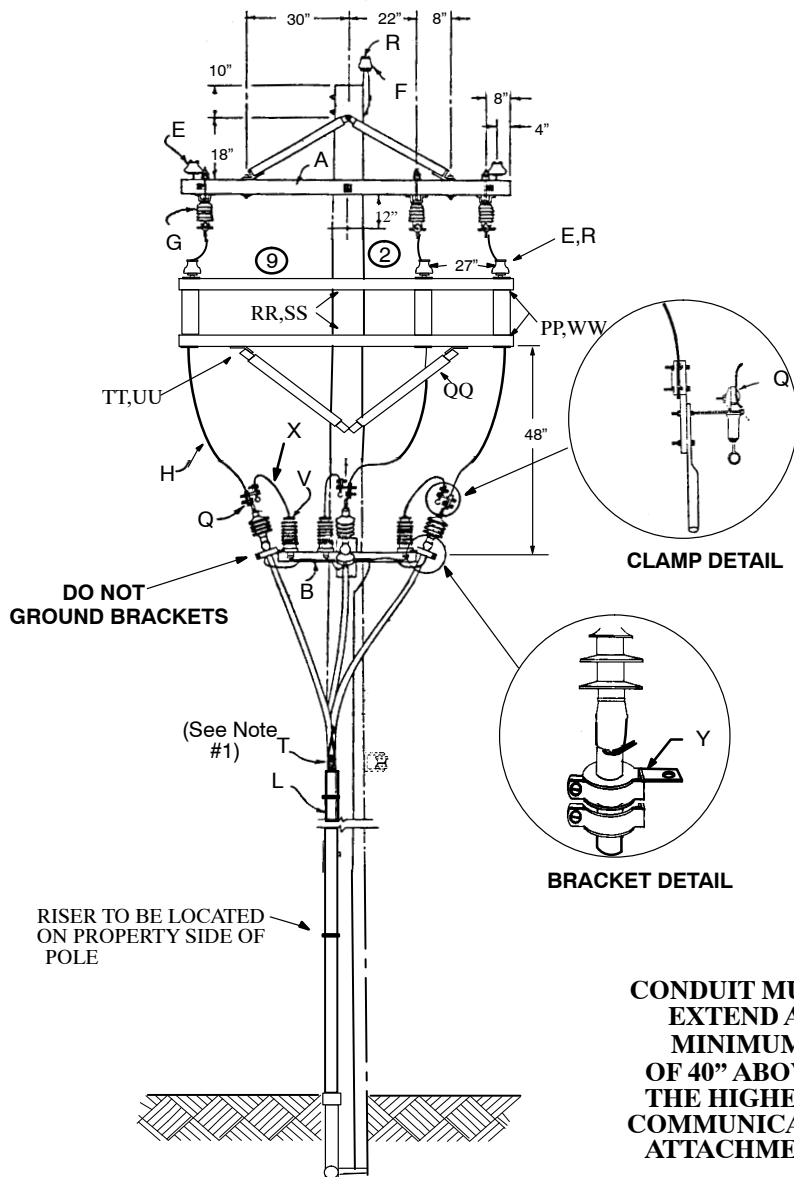
Sheet 1 of 3

SHIELDED CABLE THROUGH POLE OR DEADEND

This construction shall not be used for non-shielded cables operating above 2000 volts to ground.
Conduit must be placed against the pole and covered with a bonded guard.



UNDER BUILD DETAIL



CABLE TERMINALS

15kV & Below – Three Phase – 600A Disconnect Switches & SM-5 Fuses

14 12 18 **

Sheet 2 of 3

NOTES:

1. Wrap cable with friction tape prior to installation of cable grip.
2. When guy is required, use 45" fiberglass strain insulator and select links to obtain maximum clearance.
3. For alternate construction call for split conduit with steel guard.
4. Switch blades should open away from the terminators.
5. Keep arrester primary and ground leads as short as possible.
6. Use the 10 kV lightning arrester on 13 kV terminal poles.
7. See Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements.
8. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use DCS 12 00 10 03 for grounding rod on an existing pole.

		Std. / Stk. No.	Description	14 12 18 **	01	02
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">8</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">6@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> <div style="margin-bottom: 10px;">@</div> </div>	A	04 00 20 08	Crossarm , Dble., 10'		1	1
	B	17 08 057	Bracket, Mounting, Terminator		1	1
	C	06 12 34 01	Deadend On Arm			2
	D	06 12 32 01	Deadend On Pole			1
	E	06 12 01 01	Pin & Ins. On Arm		5	3
	F	06 12 01 02	Pin & Ins. On Pole Top		1	
	G	54 07 204	Switch, Disc. 600A., 15kV		3	3
	H	18 51 052	Wire, Cu. 350 S.D., Poly covered		40	40
	J	PG*	See 07 00 25 00		3	3
	K	12 00 10 04	Grounding Unit		1	1
	L	12 01 303	Conduit, 5", Plastic, SCH 40		20	20
	M	23 52 065	Bolt, Mach., 5/8" x 12"		1	1
	N	54 03 051	Mounting – Fuse SM5, 400A		3	3
	O	23 65 012	Eyenuit, 5/8", Oval Eye		1	1
	P	23 68 181	Shackle		1	1
	Q	23 78 183	Clamp, Hot Line,# 6–400 kcmil, Cu		3	3
	R	TT*W	Top Tie		6	3
	S	DEC*W	Deadend Clamp			3
	T	23 17 246	Grip, Cable Riser, 3.5"–4.0" Dia. Split		1	1
	U	23 66 027	Washer, Square, For 5/8" Bolt		3	3
	V	10 01 129	Arrester, Lightning, 9kV		3	3
6@		10 01 133	Arrester, Lightning, 3kV		3	3
		10 01 146	Arrester, Lightning, 10kV		3	3
	X	18 51 021	Wire, # 6 Cu, S.D. Covered		6	6
	Y	23 67 197	Bracket, Cable Support, 750 kcmil		3	3
@	AA	42 34 61 02	Termination, 15 kV, 750 kcmil Cu. CN		3	3
		42 34 61 04	Termination, 15 kV, 750 kcmil Al. CN		3	3

CABLE TERMINALS
15kV & Below – Three Phase – 600A Disconnect Switches
& SM-5 Fuses

14 12 18 **

Sheet 3 of 3

<div style="display: flex; flex-direction: column; align-items: center; justify-content: space-around;"> <div>@</div> <div>7</div> <div>@</div> <div>@</div> <div>@</div> </div>	BB		Refill (Sized by Eng.)	3	3
	CC	23 53 003	Bolt, Double Arming, 5/8" x 18"	3	3
	DD	23 65 058	Nut, Jam, 5/8"	3	3
	EE	23 67 184	Strap, Conduit, 5"	3	3
	FF	23 06 087	Bracket, Standoff, 12"	3	3
	GG	12 01 272	Conduit, 5" SCH 80	10'	10'
	HH	12 51 206	Bend, 5" 36" Rad.	1	1
	JJ	18 07 243	Cable, 750 kcmil AL, CN	35	35
		18 07 244	Cable, 750 kcmil CU, CN	35	35
	PP	41 01 014	Crossarm, 3 1/2" x 4 1/2" x 8' 0"	2	2
		41 01 008	Crossarm, 3 1/2" x 4 1/2" x 10' 0"	2	2
	QQ	41 56 016	Brace, 60" V	1	1
	RR	23 52 065	Bolt, Machine, 5/8" x 12"	2	2
	SS	23 66 027	Washer, Square, 2 1/4"	6	6
	TT	23 52 038	Bolt, Machine, 1/2" x 6"	2	2
	UU	23 66 017	Washer, Round, 1/2"	2	2
	VV	23 52 063	Bolt, Machine, 5/8" x 10"	1	1
	WW	23 52 036	Bolt, Machine, 1/2" x 5"	12	12
		OP 277	Install Cable Up Pole	1	1

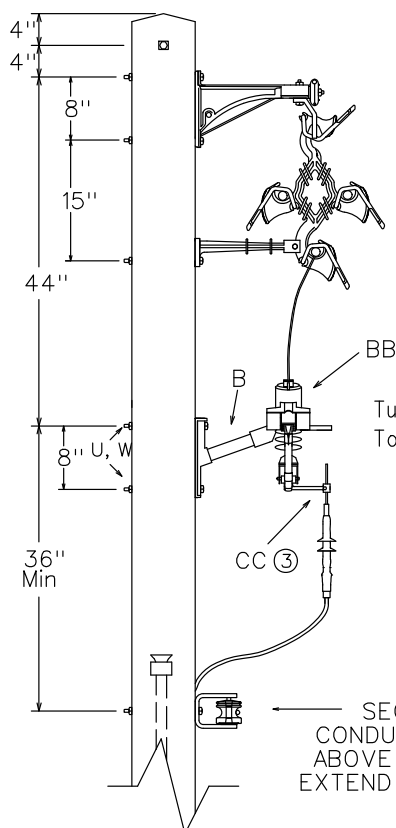
CABLE TERMINALS

15KV & Below – Spacer Cable

#2 through 4/0 Single Phase Riser

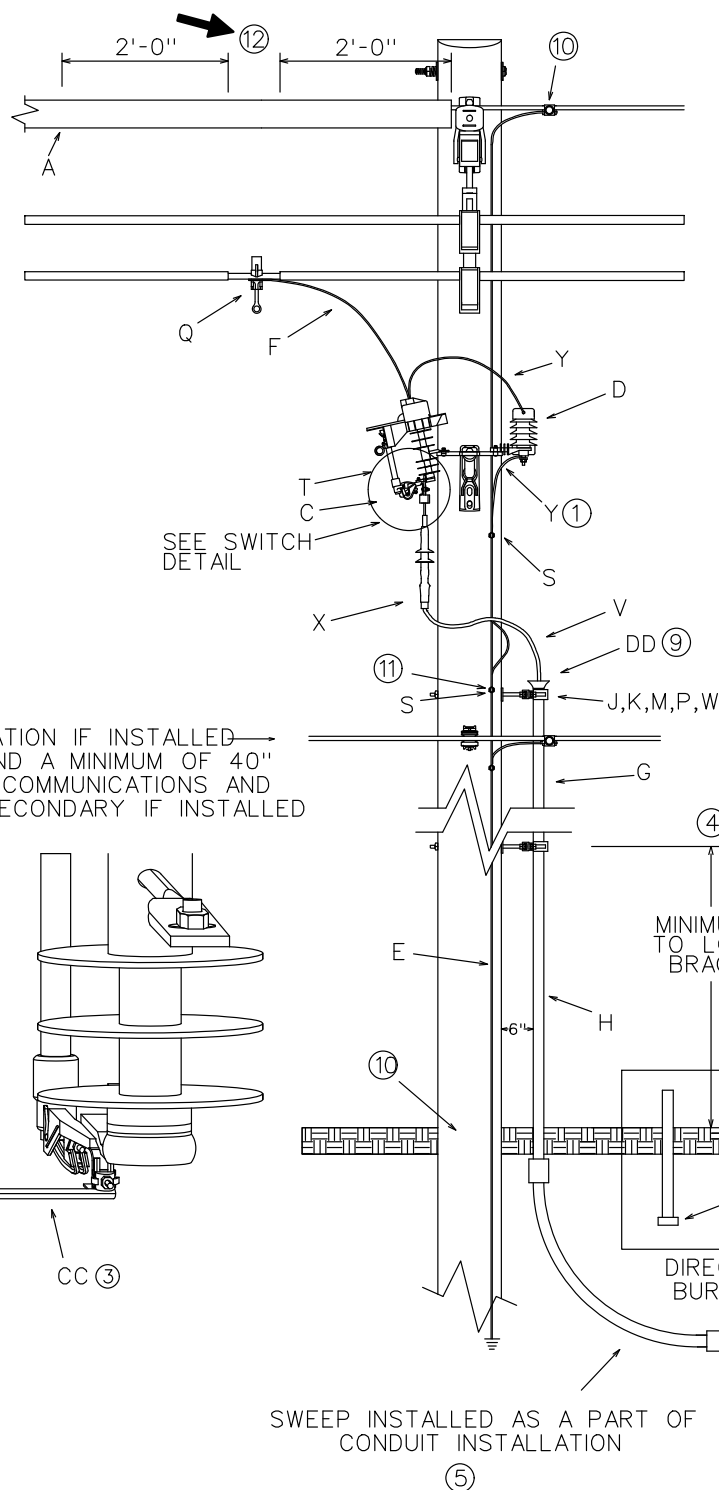
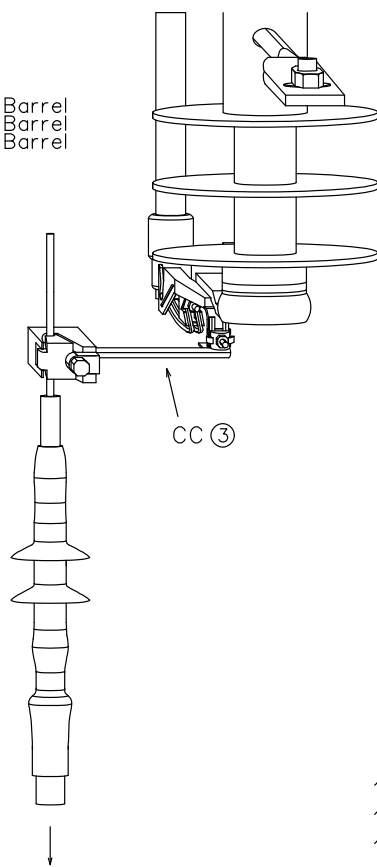
14 20 01 **

Sheet 1 of 3



Use #4 Cu Line Lead w/ 100A Barrel
 Use #1/0 Cu Line Lead w/ 200A Barrel
 Use #1/0 Cu Line Lead w/ 300A Barrel

SWITCH DETAIL



- 14 20 01 01- #2 Direct Buried or In 2" Conduit/Duct
- 14 20 01 02- 4/0 Direct Buried or In 2" Conduit/Duct
- 14 20 01 03- #2 Direct Buried or In 3" Conduit/Duct
- 14 20 01 04- 4/0 Direct Buried or In 3" Conduit/Duct

DISTRIBUTION
CONSTRUCTION STANDARDS



ENG: JMW
 REV. NO: 3
 REV. DATE: 6/19/18

CABLE TERMINALS
15KV & Below – Spacer Cable
#2 through 4/0 Single Phase Riser

14 20 01 **

Sheet 2 of 3

		Std. / Stk. No.	Description	01	02	03	04
2@	A	69 58 293	Line DUC (Messenger Cover), Black, 8' long (Each)	1	1	1	1
	B	23 56 063	Bracket, Fiberglass, 3 Position Mounting	1	1	1	1
	C	54 07 208	Switch, Fuse, 100A, 15KV	1	1	1	1
10@	D	10 01 129	Arrester, Lightning, 9KV	1	1	1	1
		10 01 133	Arrester, Lightning, 3KV	1	1	1	1
		10 01 146	Arrester, Lightning, 10KV	1	1	1	1
@	E	12 00 10 03	#2 Copper Ground Unit with ground rod	1	1	1	1
	F	18 51 025	Wire, Cu., #4 S.D. Covered	10		10	
		18 51 024	Wire, Cu., 1/0 S.D. Covered		10		10
4@	G	12 01 280	Conduit, Plastic, 2", SCH 40	20	20		
		12 01 279	Conduit, Plastic, 3", SCH 40			20	20
	H	12 01 275	Conduit, Plastic, 2", SCH 80	10	10		
		12 01 276	Conduit, Plastic, 3", SCH 80			10	10
	J	23 06 086	Bracket, Standoff 20"	3	3	3	3
		23 06 087	Bracket, Standoff 12"	3	3	3	3
@	K	23 53 003	Bolt, Double Arming 5/8' x 18"	3	3	3	3
	M	23 67 190	Strap, Conduit 2"	3	3		
		23 67 182	Strap, Conduit 3"			3	3
	P	23 65 053	Nut, Jam 5/8"	3	3	3	3
	Q	17 62 088	Hot Line Clamp, 1/0 through 477 Spacer Cable	1	1	1	1
		17 62 143	Hot Line Clamp, 795 Spacer Cable	1	1	1	1
@	S	17 54 373	Connector, Split Bolt, 2 AWA Stranded	2	2	2	2
	T		Fuse Sized By Engineer	1	1	1	1
	U	23 52 066	Bolt, Mach., 5/8" x 14"	2	2	2	2
	V	18 07 238	Cable, 15 kv, #2	35		35	
		18 07 239	Cable, 15 kv, 4/0		35		35
	W	23 66 027	Washer, Square, 5/8"	8	8	8	8
8@	X	42 34 59 01	Termination, 15KV, #2 Al.	1		1	
		42 34 59 03	Termination, 15KV, 4/0		1		1
	Y	18 51 021	Wire, #6 Cu., S.D. Covered (ft)	6	6	6	6
	AA	12 53 017	Shield, Duct, Cable	1	1	1	1
	BB	23 17 411	Cover, Cutout	1	1	1	1
	3	CC	17 55 828	Stirrup – Grounding, 1/2" x 7"	1	1	1
9	DD	40 83 491	Coupling, Bell End, 2"	1	1		
		12 51 008	Coupling, Bell End, 3"			1	1
		OP278	Install Cable Up Pole	1	1	1	1

NOTES

1. Attached arrester ground lead to the pole ground keeping to lead as short as possible.
2. On 13kv terminal poles use 10 kv lightning arrester, Stock Number 10-01-146.
3. Insert a grounding stirrup into the bottom of the cutout for a grounding attachment point.
4. See DCS 14 00 01 03 for standoff bracket placement and grounding requirements.

CABLE TERMINALS
15KV & Below – Spacer Cable
#2 through 4/0 Single Phase Riser

14 20 01 **

Sheet 3 of 3

5. See DCS 59 40 41 01 for information on making PVC to HDPE Duct connection at the end of the sweep if HDPE Duct is used.
6. Some standoff brackets require that one of the nuts on the double arming bolt be replaced with a jam nut, stock number 23-65-053. The jam nut should then be inserted into the 5/8" slot on the standoff bracket. If the nut on the double arming bolt will fit into the 5/8" slot on the bracket - Do Not use the jam nut.
7. On the front of the 20" standoff bracket, the following conduits may be mounted: 4-2" conduits, 3-2 1/2" conduits, 3-3" conduits, 3-4" conduits, 2-5" conduits. Various combinations of conduits may also be mounted. On the front of the 12" standoff bracket, the following conduits may be mounted: 2-2" conduits, 2-2 1/2" conduits 1-3" & 1-2" conduits, 1-3" and 1-2 1/2" conduits, and 1-5" conduit.
8. To prevent damage to direct buried cables, install a cable shield (Stk# 12-53-017) at the conduit entry.
9. If water entering the duct becomes a problem, the top of the duct can be sealed with polyurethane expanding foam, stock number 31-53-082. Expanding foam requires a dispensing gun, stock number 85-20-073.
10. All poles with spacer cable should be installed with a properly sized pole ground for the equipment being installed. Add a pole ground if not already installed or not properly sized. Pole ground shall be extended up to the messenger which is system neutral and attached on the non – switch side of the pole. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.
11. Connect the metallic shields of the riser cable to the system neutral/ messenger by attaching to the #2 stranded copper pole ground that extends to the system neutral/messenger. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
12. 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 covering is stripped to maintain the required 2'-0" of horizontal separation.

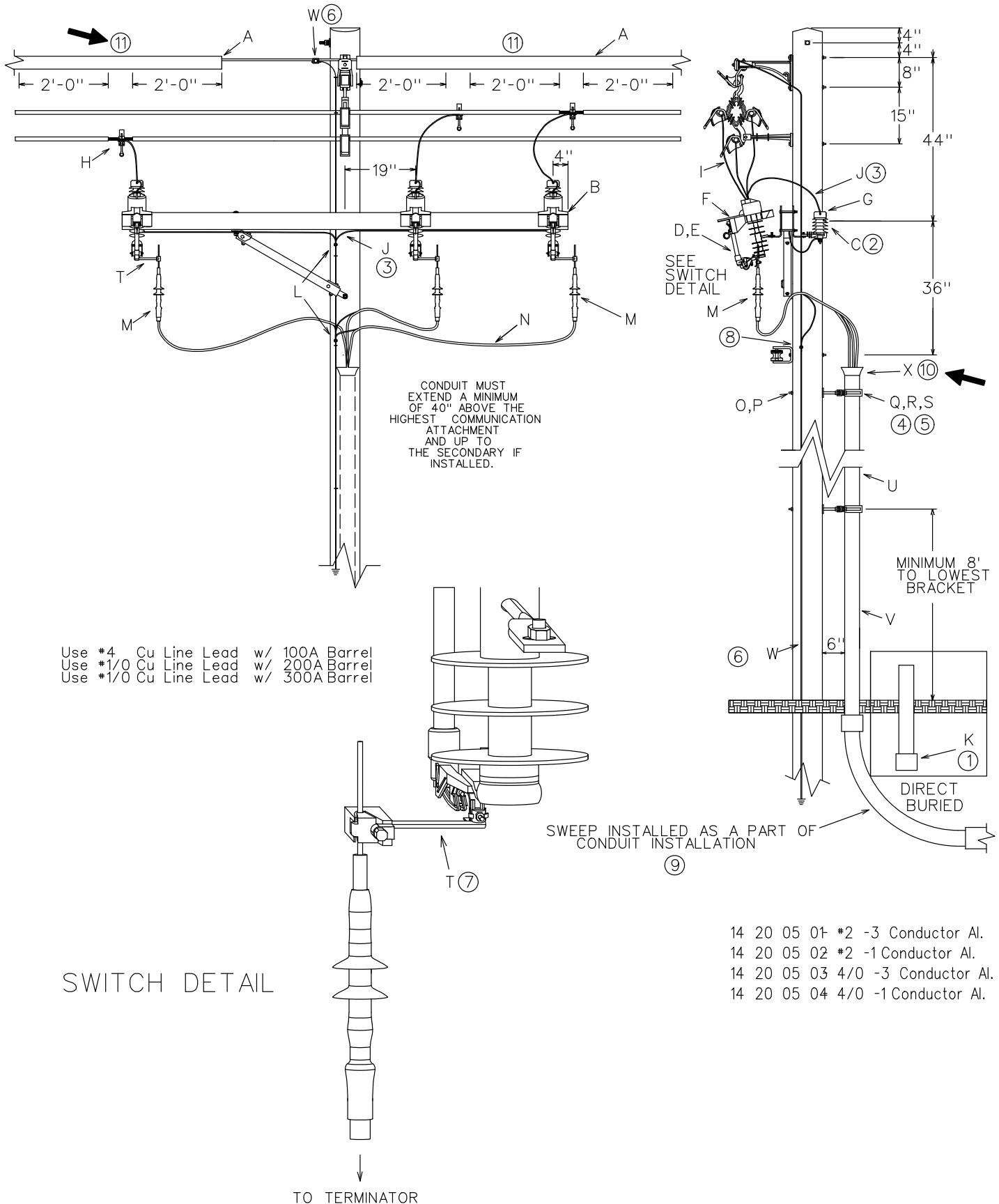
CABLE TERMINALS

15KV & Below – Spacer Cable

#2 through 4/0 Three Phase Riser

14 20 05 **

Sheet 1 of 3



CABLE TERMINALS
15KV & Below – Spacer Cable
#2 through 4/0 Three Phase Riser

14 20 05 **

Sheet 2 of 3

		Std. / Stk. No.	Description	01	02	03	04
1	A	69 58 293	Line DUC (Messenger Cover), Black, 8' long (Each)	2	2	2	2
	B	04 00 20 03	Crossarm, Single, Wood, 10' (Use only ½ of V-brace)	1	1	1	1
2	C	17 58 054	Bracket, Arrester/Cutout Mounting	6	6	6	6
	D	54 07 208	Switch, Fuse, 100A, 15KV	3	3	3	3
@	E		Fuse Sized by Engineer	3	3	3	3
@	F	23 17 411	Cover, Cutout	3	3	3	3
	G	10 01 129	Arrester, Lightning, 9KV	3	3	3	3
10 01 133		Arrester, Lightning, 3KV	3	3	3	3	
10 01 146		Arrester, Lightning, 10KV	3	3	3	3	
@	H	17 62 088	Hot Line Clamp, 1/0 through 477 Spacer Cable	3	3	3	3
		17 62 143	Hot Line Clamp, 795 Spacer Cable	3	3	3	3
@	I	18 51 025	Wire, Cu., #4 S.D. Covered(ft)	15		15	
		18 51 024	Wire, Cu., 1/0 S.D. Covered(ft)		15		15
3	J	18 51 021	Wire, #6 Cu., S.D. Covered (ft)	16	16	16	16
1@	K	12 53 017	Shield, Duct Cable	1	1	1	1
	L	17 54 373	Connector, Split Bolt, 2AWA Stranded	4	4	4	4
	M	42 34 59 01	Termination, 15KV, #2 Al.	3	3		
		42 34 59 03	Termination, 15KV, 4/0 Al.			3	3
	N	18 07 237	Cable, 15KV, #2–3C Al.	35			
		18 07 238	Cable, 15KV, #2–1C Al.		105		
		18 07 240	Cable, 15KV, 4/0–3C Al.			35	
		18 07 239	Cable, 15KV, 4/0–1C Al.				105
	O	23 53 003	Bolt, Double Arming 5/8" x 18"	3	3	3	3
	P	23 66 027	Washer, Square, 5/8"	6	6	6	6
	Q	23 65 053	Nut, Jam 5/8"	3	3	3	3
	4,5	R	23 06 087	Bracket, Standoff 12"	3	3	3
	S	23 67 183	Strap, Conduit 4"	3	3	3	3
	7	T	17 55 828	Stirrup – Grounding, 1/2" x 7"	3	3	3
	U	12 01 278	Conduit, Plastic, 4", SCH 40	20	20	20	20
	V	12 01 273	Conduit, Plastic, 4" SCH 80	10	10	10	10
6@	W	12 00 10 03	#2 Copper Ground Unit with ground rod	1	1	1	1
10	X	12 51 254	Coupling, Bell End, 4"	1	1	1	1
		OP279	Install Cable Up Pole	1	1	1	1

NOTES

- To prevent damage to direct buried cables, install a cable shield (stk# 12 53 017) at the conduit entry.
- Discard the backs of the brackets mounting them together with the cutout and arrester in the low position below the crossarm. Three double brackets stock number 23 56 088 may be substituted.
- Route the arrester ground leads under the crossarm to attached to the pole ground keeping them as short as possible. Connect the arrester primary leads under the cutout cover to the arrester and keep them as short as possible.
- Substitute the 20" standoff bracket, stock number 23 06 086 if a longer bracket is required.

CABLE TERMINALS
15KV & Below – Spacer Cable
#2 through 4/0 Three Phase Riser

14 20 05 **

Sheet 3 of 3

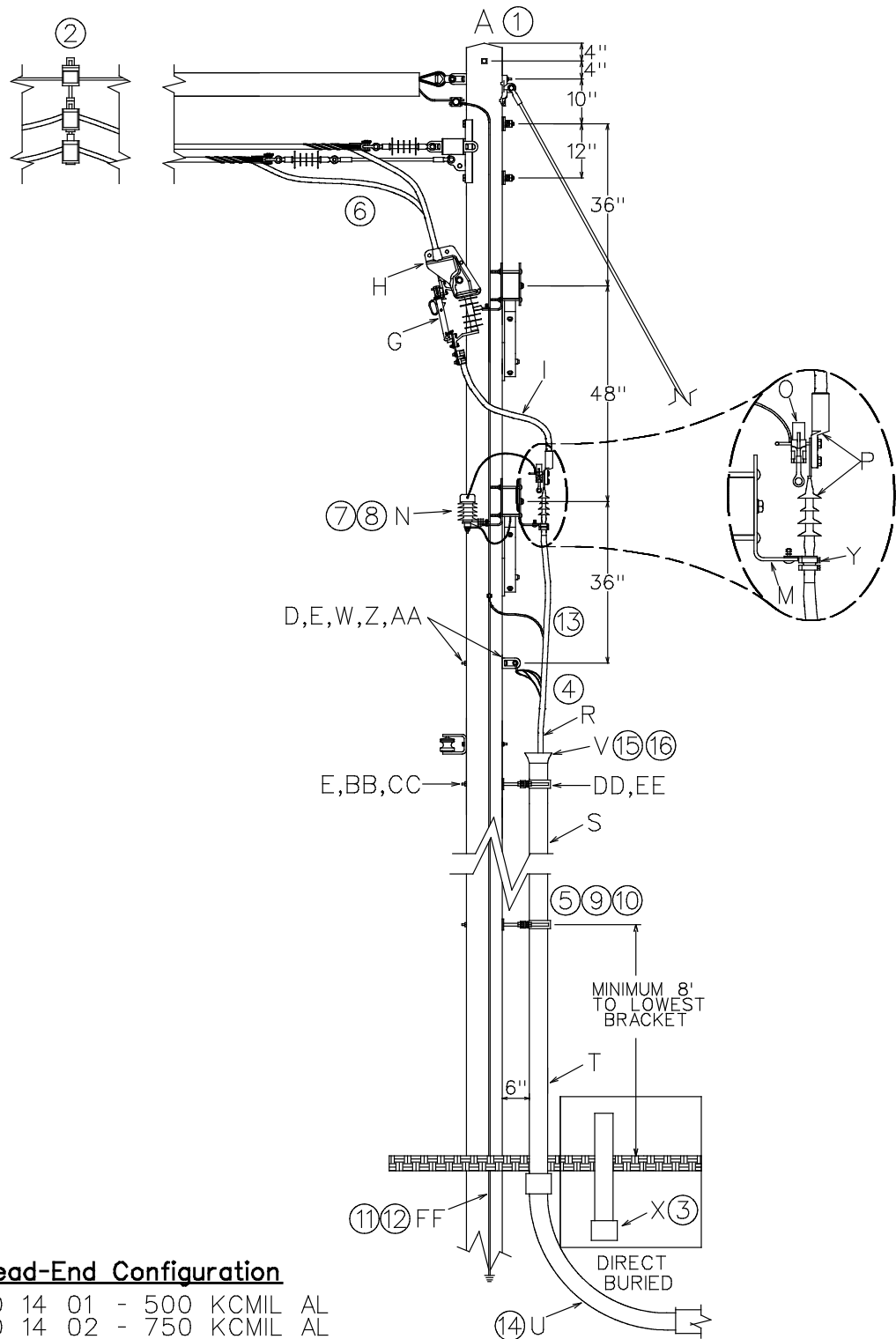
5. See DCS 14 00 01 03 for standoff bracket placement and grounding requirements.
6. All poles with spacer cable should be installed with a properly sized pole ground for the equipment being installed. Add a pole ground if not already installed or not properly sized. Pole ground shall be extended up to the messenger which is system neutral and attached on the single switch side of the pole.
7. Insert a grounding stirrup into the bottom of the cutout for a grounding attachment point.
8. Always connect the metallic shields of the riser cable to the system neutral/ messenger by attaching to the #2 stranded copper pole ground that extends to the system neutral/ messenger. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
9. See DCS 59 40 41 01 for information on making PVC to HDPE Duct connection at the end of the sweep if HDPE Duct is used.
10. If water entering the duct becomes a problem, the top of the duct can be sealed with polyurethane expanding foam, stock number 31-53-082. Expanding foam requires a dispensing gun, stock number 85-20-073.
11. 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 duct over the messenger anywhere the cable covering is stripped to maintain the required 2'-0" of horizontal separation.

CABLE TERMINALS

15kV & Below-Spacer Cable-Three Phase Tangent and DE
600A Vertical Disconnect Switches 350 kcmil-750 kcmil

14 20 14 **

Sheet 1 of 5



Dead-End Configuration

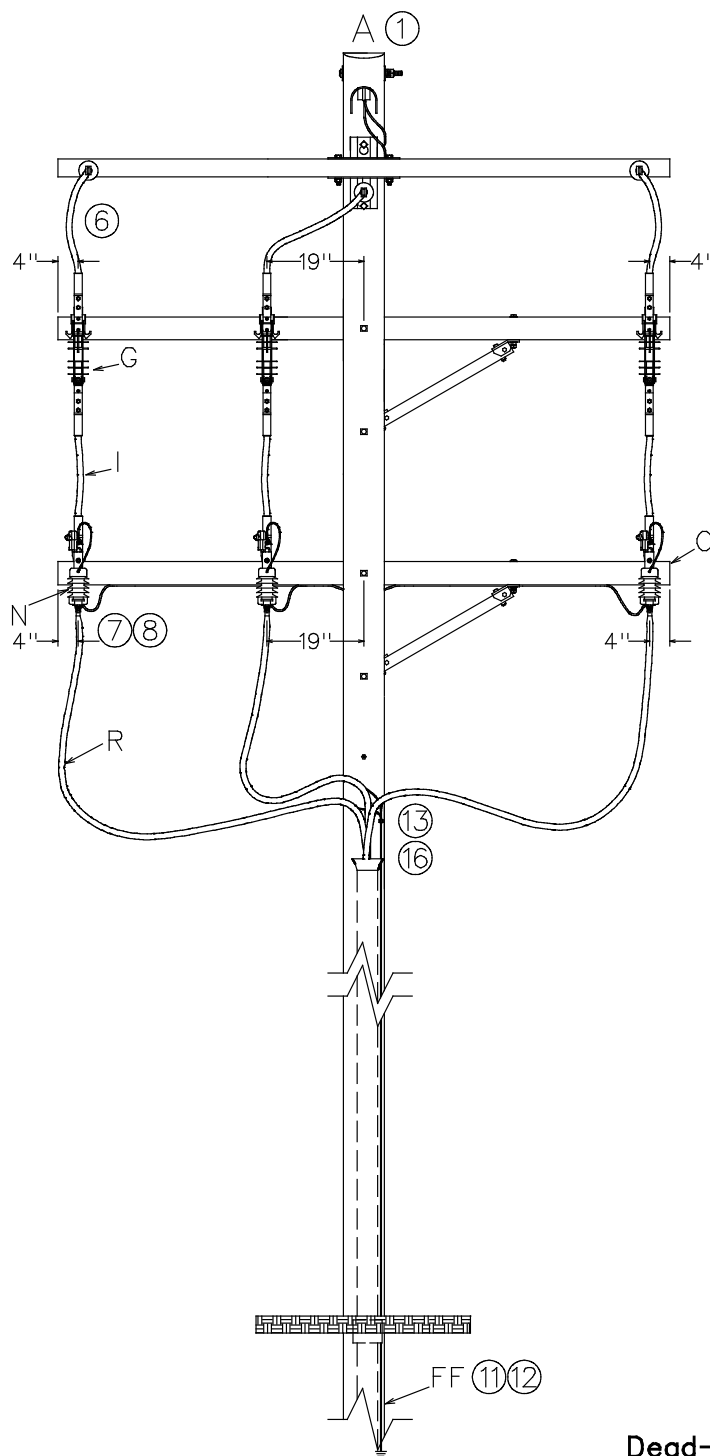
14	20	14	01	-	500	KCMIL	AL
14	20	14	02	-	750	KCMIL	AL
14	20	14	03	-	350	KCMIL	CU
14	20	14	04	-	750	KCMIL	CU

CABLE TERMINALS

15kV & Below-Spacer Cable-Three Phase Tangent and DE
600A Vertical Disconnect Switches 350 kcmil-750 kcmil

14 20 14 **

Sheet 2 of 5



Dead-End Configuration

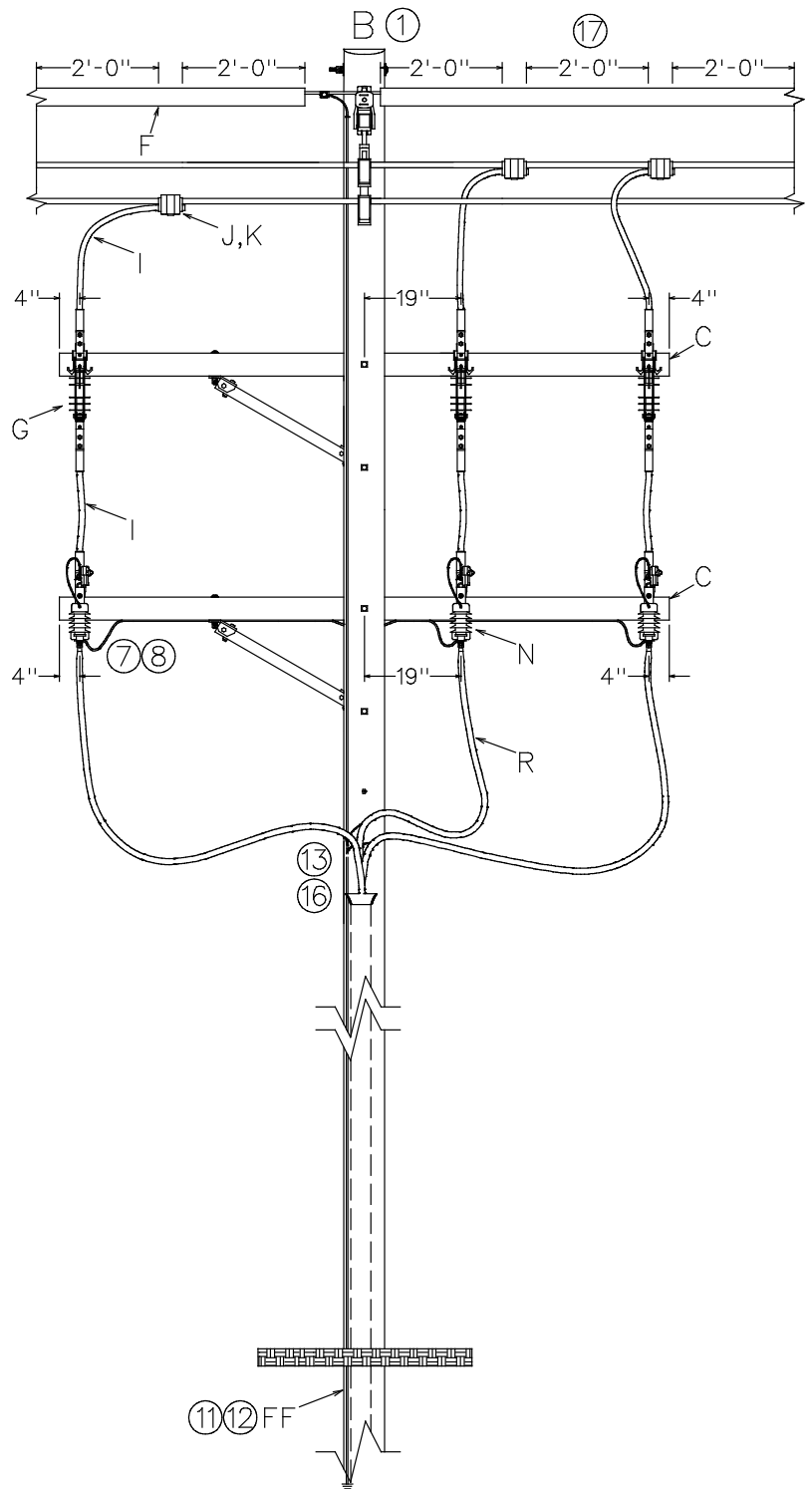
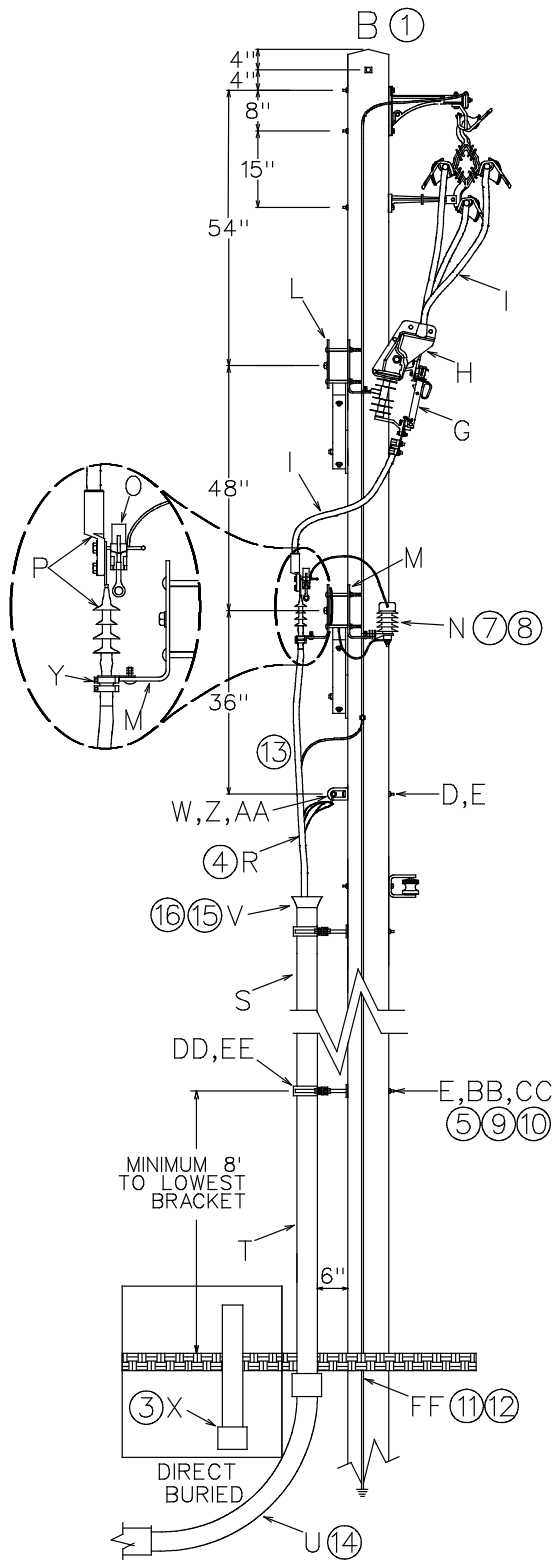
14	20	14	01	-	500	KCMIL	AL
14	20	14	02	-	750	KCMIL	AL
14	20	14	03	-	350	KCMIL	CU
14	20	14	04	-	750	KCMIL	CU

CABLE TERMINALS

15kV & Below-Spacer Cable-Three Phase Tangent and DE
600A Vertical Disconnect Switches 350 kcmil-750 kcmil

14 20 14 **

Sheet 3 of 5



Tangent Configuration

14	20	14	05	-	500	KCMIL	AL
14	20	14	06	-	750	KCMIL	AL
14	20	14	07	-	350	KCMIL	CU
14	20	14	08	-	750	KCMIL	CU

CABLE TERMINALS

15kV & Below-Spacer Cable-Three Phase Tangent and DE
600A Vertical Disconnect Switches 350 kcmil-750 kcmil

14 20 14 **

Sheet 4 of 5

		Std./Stk. No.	Description	14 20 14 **	01	02	03	04	05	06	07	08
@1	A	03 20 10 01	15kV & Below-Spacer Cable Single Circuit-Dead End Structure		1	1	1	1				
@1	B	03 20 01 01	15kV & Below – Spacer Cable Single Circuit – Tangent Structure						1	1	1	1
	C	04 00 20 03	Crossarm, Sgl., Wood, 10' (Use only 1/2" of VBrace)		1	1	1	1	2	2	2	2
	D	23 52 066	Bolt, Mach., 5/8 x 14"		1	1	1	1	1	1	1	1
	E	23 66 027	Washer, Square, 2-1/4" x 2-1/4" x 3/16"		7	7	7	7	7	7	7	7
	F	69 58 293	Line Duc Cover-(Messenger Cover), Black, 8' Long(Ea)						2	2	2	2
	G	54 07 296	Switch, Disc., 600A, Vertical, 15kV		3	3	3	3	3	3	3	3
	H	23 17 512	Cover, Vertical Switch, 600 Amp		3	3	3	3	3	3	3	3
	I	18 51 052	Wire, Cu. 350 S.D., Covered		15	15	15	15	35	35	35	35
@	J	PG*W	Clamp, Parallel Groove (See 07 00 25 00)						3	3	3	3
	K	38 51 608	Cover, Large, Vice Type Connectors						3	3	3	3
	L	17 58 054	Bracket, Switch, Arrester						3	3	3	3
	M	23 56 088	Bracket, Switch, Arrester, Double		3	3	3	3	3	3	3	3
@7,8	N	10 01 133	Arrester, Lighting, 3kV		3	3	3	3	3	3	3	3
		10 01 129	Arrester, Lighting, 9kV		3	3	3	3	3	3	3	3
		10 01 146	Arrester, Lighting, 10kV		3	3	3	3	3	3	3	3
	O	23 78 183	Clamp, Hot Line, #6-400 kcmil, CU.		3	3	3	3	3	3	3	3
@	P	42 34 61 10	Termination, 15kV, 500 kcmil AL.		3				3			
		42 34 61 04	Termination, 15kV, 750 kcmil AL.			3				3		
		42 34 61 06	Termination, 15kV, 350 kcmil CU.				3				3	
		42 34 61 02	Termination, 15kV, 750 kcmil CU.					3				3
	Q	23 17 415	Cover, Wildlife, 2" X 36 ft. Self-Fusing Tape		1	1	1	1	1	1	1	1
	R	18 07 261	Cable, 500 kcmil AL. (3 Cables, 35' Ea.)		105				105			
		18 07 243	Cable, 750 kcmil AL.			35				35		
		18 07 245	Cable, 350 kcmil CU.				35				35	
		18 07 244	Cable, 750 kcmil CU.					35				35
5	S	12 01 303	Conduit, 5" Plastic, SCH. 40		20	20	20	20	20	20	20	20
5	T	12 01 272	Conduit, 5" Plastic, SCH. 80		10	10	10	10	10	10	10	10
@	U	12 51 206	Bend, 5", 36" Radius		1	1	1	1	1	1	1	1
	V	12 51 233	Coupling, Bell End, 5"		1	1	1	1	1	1	1	1
	W	23 65 012	Nut, Eye, Oval, 5/8"		1	1	1	1	1	1	1	1
@3	X	12 53 017	Shield, Duct Cable		1	1	1	1	1	1	1	1
	Y	23 67 197	Bracket, Cable Support, 500-750 kcmil		3	3	3	3	3	3	3	3

CABLE TERMINALS

15kV & Below–Spacer Cable–Three Phase Tangent and DE
600A Vertical Disconnect Switches 350 kcmil–750 kcmil

14 20 14 **

Sheet 5 of 5

4 9,10 @11,12	Z	23 17 245	Grip, Cable Riser, 2"-2.5" Dia.	3	3	3	3	3	3	3	3
	AA	23 68 181	Shackle – Anchor, 9/16"	1	1	1	1	1	1	1	1
	BB	23 53 003	Bolt, Double Arming, 5/8"x18"	3	3	3	3	3	3	3	3
	CC	23 65 053	Nut, Jam, 5/8"	3	3	3	3	3	3	3	3
	DD	23 67 184	Strap, Conduit, 5"	3	3	3	3	3	3	3	3
	EE	23 06 087	Bracket, Standoff, 12"	3	3	3	3	3	3	3	3
	FF	12 00 10 **	Grounding Unit #2 Cu.	1	1	1	1	1	1	1	1
		OP277	Install Cable Up Pole	1	1	1	1	1	1	1	1

NOTES:

1. Refer to DCS 03 20 10 01 for dead end material. Refer to DCS 03 20 01 01 for the tangent material.
2. Install the first spacer, stock # 23 67 334, about 40' from the pole as to not stress the cable. Normal spacing is 25' to 33'.
3. To prevent damage to direct buried cables, install a cable shield (stk# 12 53 017) at the conduit entry.
4. Wrap cable with friction tape prior to installation of cable grip.
5. For alternate construction, call for split conduit with steel guard.
6. Extend spacer cable conductor with covering intact through the preform into the switch.
7. On 13kV terminal poles, a 10kV arrester shall be used.
8. Route the arrester ground leads under the crossarm and attach to the pole ground keeping them as short as possible. Connect the arrester primary leads under the cutout cover to the arrester and keep them as short as possible.
9. Substitute the 20" standoff bracket, stock number 23 06 086 if a longer bracket is required.
10. See DCS 14 00 01 03 for standoff bracket placement and grounding requirements.
11. All poles with spacer cable should be installed with a properly sized pole ground for the equipment being installed. Add a pole ground if not already installed or not properly sized. Pole ground shall be extended up to the messenger which is system neutral and attached on the single switch side of the pole.
12. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use DCS 12 00 10 03 for ground rod on existing pole.
13. Always connect the metallic shields of the riser cable to the system neutral/ messenger by attaching to the #2 stranded copper pole ground that extends to the system neutral/ messenger. Be aware that the bare and/or covered 7#10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
14. See DCS 59 40 41 01 for information on making PVC to HDPE Duct connection at the end of the sweep if HDPE duct is used.
15. If water entering the duct becomes a problem, the top of the duct can be sealed with polyurethane expanding foam, stock number 31 53 082. Expanding foam requires a dispensing gun, stock number 85 20 073.
16. Conduit must extend a minimum of 40" above the highest communication attachment and up to the secondary, if installed.
17. 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 covering is stripped to maintain the required 2'-0" of horizontal separation.

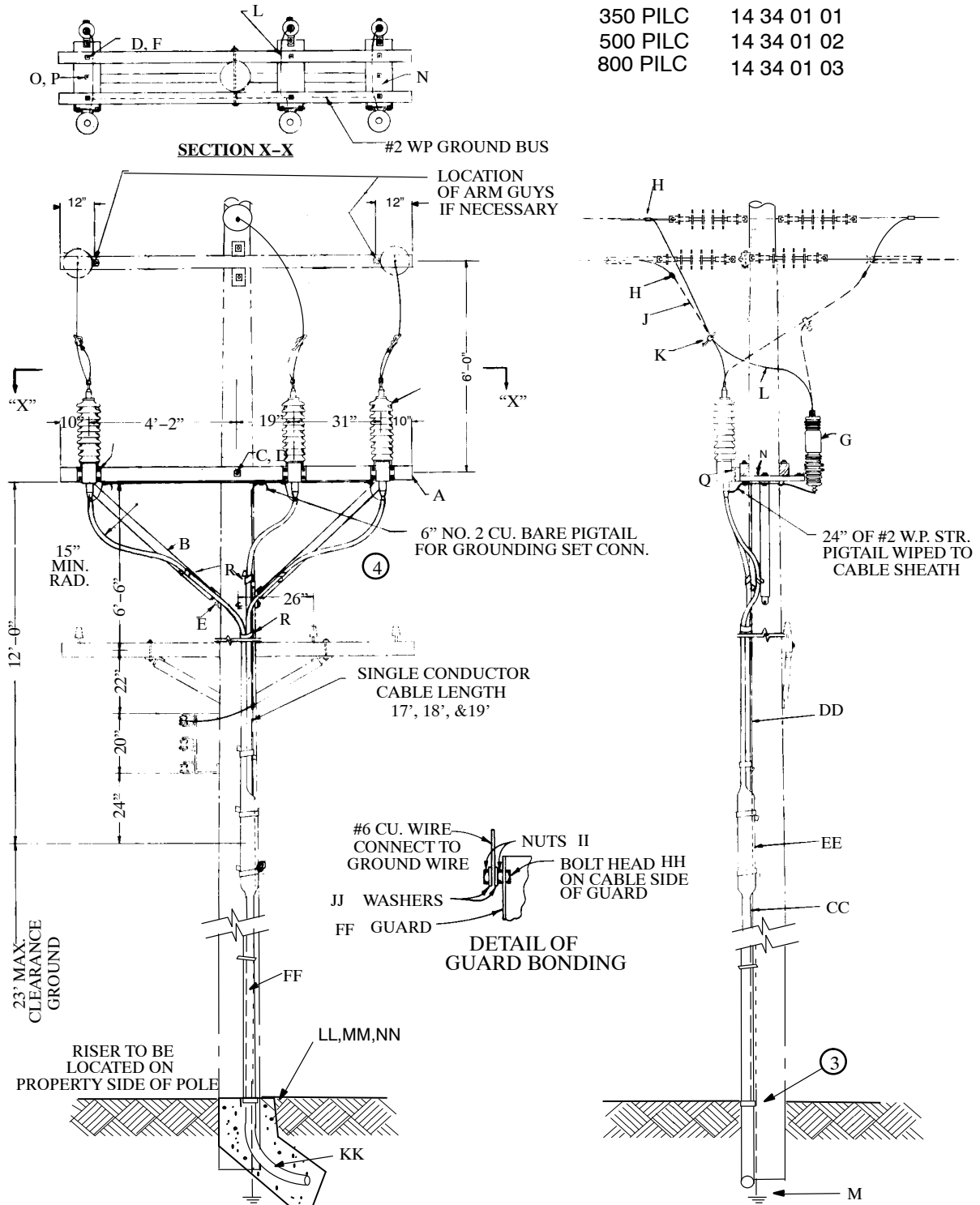
CABLE TERMINALS

34 kV Single Circuit – PILC Cable

Up to 600 Amp. Normal Rating

14 34 01 **

Sheet 1 of 3



CABLE TERMINALS
34 kV Single Circuit – PILC Cable
Up to 600 Amp. Normal Rating

14 34 01 **

Sheet 2 of 3

		Std. / Stk. No.	Description	14 34 01 **	01	02	03
@	A	41 01 022	Crossarm 10'		2	2	2
	B	41 56 021	Brace, Heel 5'		2	2	2
	C	23 52 070	Bolt, Mach., 5/8" x 20"		1	1	1
	D	23 66 027	Washer, Square 2-1/4"		8	8	8
	E	23 52 066	Bolt, Mach., 5/8" x 14"		1	1	1
	F	23 52 061	Bolt, Mach., 5/8" x 8"		6	6	6
	G	10 01 137	Arrester Lighting, 27 kV		3	3	3
	H	PG*	See 07 00 25 00		3	3	3
	J	18 52 024	Wire Cu. 4/0 S.D.		15'		
		18 52 023	Wire Cu. 350 S.D.			15'	15'
	K	23 78 183	Clamp Live Line		3	3	3
	L	18 51 021	Wire Cu #6 S.D. Covered		25'	25'	25'
	M	12 00 10 04	Grounding Unit		1	1	1
	N	23 06 065	Bracket LA & Pothead		3	3	3
	O	23 66 006	Washer, Lock 5/8"		2	2	2
	P	23 52 049	Bolt, Mach., 5/8" x 2"		2	2	2
	Q	21 53 021	Bolt, Mach 1/2" x 1-1/2"		12	12	12
	R	49 17 181	Strap, Poly		5	5	5
	AA	12 51 220	Conduit, Plastic, 5" Split		30	30	30
	BB	17 07 125	Pothead, 35kV 500 kcmil		3	3	
		17 07 097	Pothead, 35kV 750 kcmil				3
	CC	18 08 171	Cable, 35kV 350 3C. P		20		
		18 08 210	Cable, 35kV 500 3C. P			20	
		18 08 203	Cable, 35kV 800 3C. P				20
	DD	18 08 070	Cable, 35kV 350 1C.		55	55	
		18 08 180	Cable, 35kV 750 1C.				55
	EE	41 43 11 02	Joint, 35kV Trifurcating		1		
		41 43 11 01	Joint, 35kV Trifurcating			1	
		41 41 13 02	Joint, 35kV Trifurcating				1
	FF	23 18 202	Guard, Conduit 5"		1	1	1
	GG	23 60 005	Screws, Lag 3/8" x 3"		6	6	6
	HH	21 53 007	Bolt, Mach. 3/8" x 1 1/2"		1	1	1
	II	21 61 006	Nut, Hex, 3/8"		2	2	2
	JJ	23 66 016	Washer, 3/8" Galv.		2	2	2
	KK	12 51 206	Bend, 5", 36" Rad.		1	1	1
	LL	23 67 036	Step, Pole 5/8" x 10"		2	2	2
	MM	11 04 110	Tube, Concrete 14" Dia.		4	4	4
	NN	99 00 001	Concrete, 4 SK		-	-	-
		OP 281	Install Potheads		3	3	3

CABLE TERMINALS
34 kV Single Circuit – PILC Cable
Up to 600 Amp. Normal Rating

14 34 01 **

Sheet 3 of 3

NOTES:

1. Pothead 17-07-105, 46 kV for 350¹ leads to be used in locations where contamination is prevalent.
2. Grip – cable, stock #85-21-054 should be used when a down hill duct run exists away from the pole.
3. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for crowd rod on an existing pole.
4. Always connect the metallic shields on the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
5. If there is no system neutral or shield wire available install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper wire.

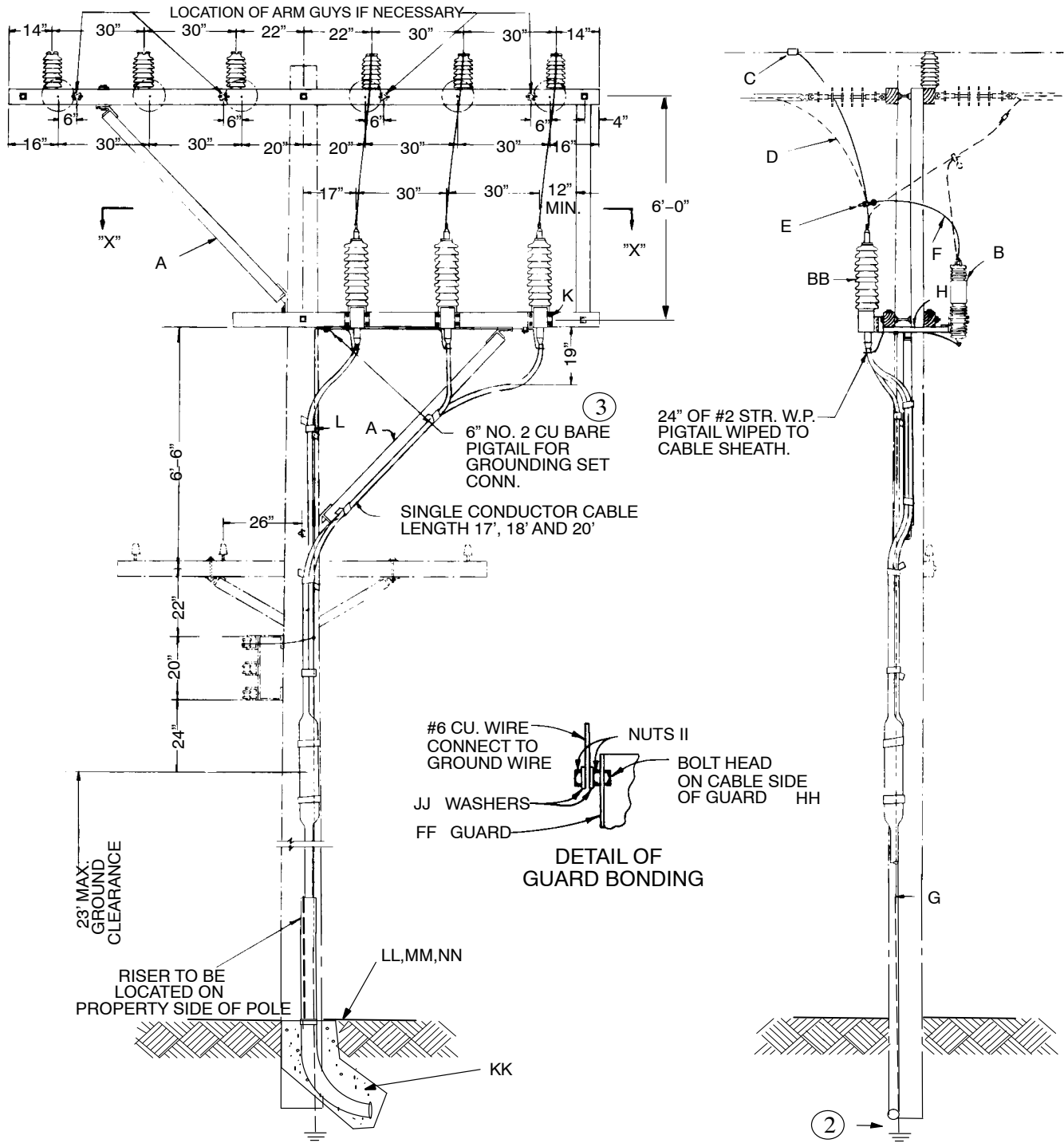
CABLE TERMINALS

34 kV Double Circuit – PILC Cable

Up to 600 Amp. Normal Rating

14 34 02 **

Sheet 1 of 2



CABLE TERMINALS
34 kV Double Circuit – PILC Cable
Up to 600 Amp. Normal Rating

14 34 02 **

Sheet 2 of 2

		Std. / Stk. No.	Description	14 34 02 **	01	02	03
@	A	14 34 03 01	Mounting Unit		1	1	1
	B	10 01 137	Arrester Lighting, 27 kV		3	3	3
	C	PG*	See 07 00 25 00		3	3	3
	D	18 51 023	Wire Cu. 4/0 S.D.	15'			
		18 51 052	Wire Cu. 350 S.D.		15'	15'	
	E	23 78 183	Clamp Live Line		3	3	3
	F	18 51 021	Wire Cu #6 S.D. Covered	25'	25'	25'	
	G	12 00 10 04	Grounding Unit		1	1	1
	H	23 06 065	Bracket LA & Pothead		3	3	3
	K	21 53 021	Bolt 1/2 x 1-1/2"		12	12	12
	L	49 17 181	Strap – Poly		5	5	5
	M	23 52 061	Bolt, Mach., 5/8" x 8"		6	6	6
	N	23 66 027	Washer – Square 2-1/4"		6	6	6
	AA	12 51 220	Conduit, Plastic 5" Split		10	10	10
	BB	17 07 125	Pothead, 35kV 500 kcmil		3	3	
		17 07 097	Pothead, 35kV 750 kcmil				3
	CC	18 08 171	Cable, 35kV 350 3C.,P	20			
		18 08 210	Cable, 35kV 500 3C.,P		20		
		18 08 203	Cable, 35kV 800 3C.,P				20
	DD	18 08 070	Cable, 35kV 350 1C.,P	55	55		
		18 08 180	Cable, 35kV 750 1C.,P				55
2	EE	41 43 11 02	Joint, 35kV Trifurcating	1			
		41 43 11 01	Joint, 35kV Trifurcating		1		
		41 41 13 02	Joint, 35kV Trifurcating				1
	FF	23 18 202	Guard, Conduit 5"		1	1	1
	HH	21 53 007	Bolt, Mach. 3/8" x 1 1/2"		1	1	1
	II	21 61 006	Nut, Hex 3/8"		2	2	2
	GG	23 60 005	Screw, Lag 3/8" x 3"		6	6	6
	JJ	23 66 016	Washer, 3/8" Galv.		2	2	2
	KK	12 51 206	Bend, 5", 36" Rad.		1	1	1
	LL	23 67 036	Step, Pole, 5/8" x 10"		2	2	2
@	MM	11 04 110	Tube, Concrete 14" Dia.		4	4	4
	NN	98 00 001	Concrete 4 SK		–	–	–
		OP 281	Install Pothead		3	3	3

NOTES:

1. Grip – Cable, Stock #85–21–054, should be used when a down hill duct run exists away from the pole.
2. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.
3. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7–strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
4. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper wire.

DISTRIBUTION
CONSTRUCTION STANDARDS

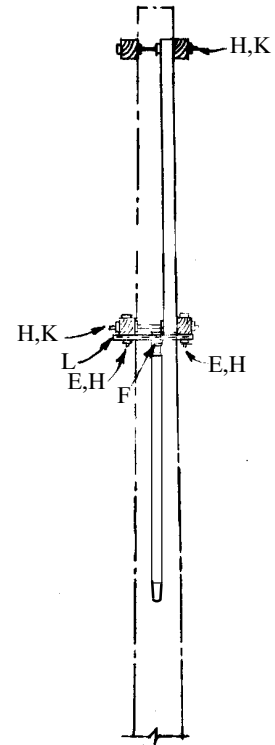
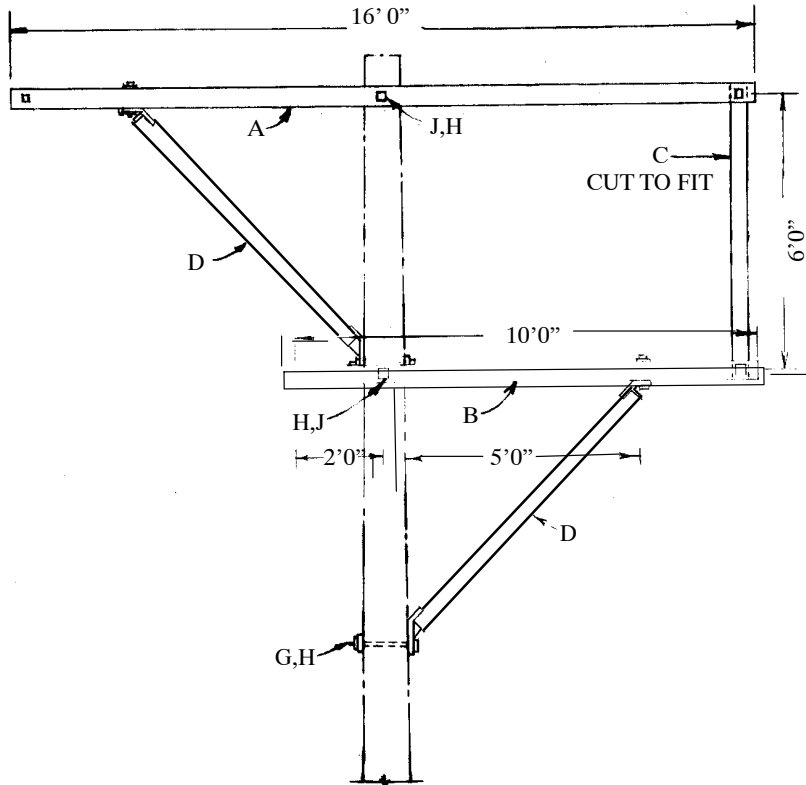
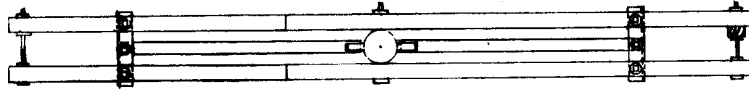


ENG: HLH
 REV. NO: 10
 REV. DATE: 03/11/16

CABLE TERMINALS
34 kV Double Circuit
Mounting Unit

14 34 03 **

Sheet 1 of 1



		Std. / Stk. No.	Description	14 34 03 **	01	02
O.H. MATERIALS						
→	A	41 01 010	Arm, Cross - 3-3/4" x 5-3/4" x 16' 0"		2	2
	B	41 01 022	Arm, Cross - 3-3/4" x 4-3/4" x 10' 0"		2	2
	C	41 01 020	Arm, Cross - 3-3/4" x 4-3/4" x 7' 0"		1	1
→	D	41 56 022	Brace, Heel, Wood - 7' 0" Long		2	2
→	E	23 52 256	Bolt, Mach. - 5/8" x 7" Galv., SQ Head w/nut		4	4
→	F	23 52 049	Bolt, Mach. - 5/8" x 2" Galv., SQ Head w/nut		2	2
→	G	23 52 066	Bolt, Mach. - 5/8" x 14" Galv., SQ Head w/nut		2	2
→	H	23 66 027	Washer, Sq. - 5/8", 2-1/4" SQ		20	20
→	J	23 52 070	Bolt, Mach. - 5/8" x 20" Galv., SQ Head w/nut		2	2
→	K	23 53 004	Bolt, D.A. - 5/8" x 20" Galv., w/4 SQ Nuts		3	3
→	L	23 77 212	Plate, Heel Brace - 8-3/4" to 13-3/8" Mount Centers		2	
		23 77 210	Plate, Heel Brace - 13-3/8" to 19" Mount Centers			2

CABLE TERMINALS

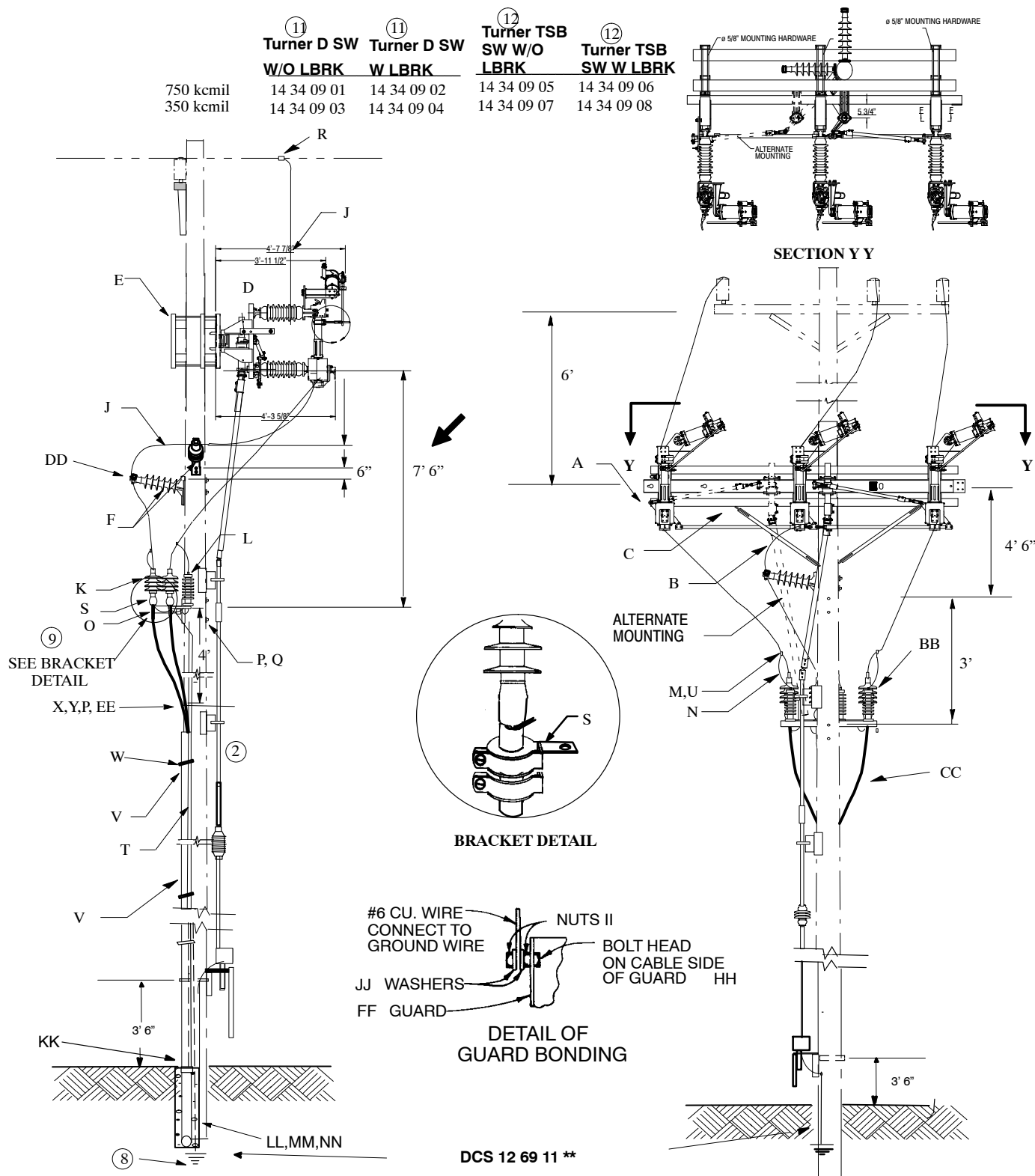
34 kV Single Circuit Cable Terminal With Airbreak Switch

750 kcmil and 350 kcmil

14 34 09 **

Sheet 1 of 3

SWITCHES & TERMINALS SHALL BE ON SEPARATE POLES WHENEVER POSSIBLE



CABLE TERMINALS
34 kV Single Circuit Cable Terminal With Airbreak Switch
750 kcmil and 350 kcmil

14 34 09 **

Sheet 2 of 3

		Std. / Stk. No.	Materials Description	14 34 09 **	01	02	03	04	05	06	07	08
	A	41 01 023	Crossarm, 3 3/4" x 5 3/4 x 12'		4	4	4	4	4	4	4	4
	B	41 56 023	Brace, Heel, 6'		2	2	2	2	2	2	2	2
	C	23 77 210	Plate, Heel Brace		2	2	2	2	2	2	2	2
	D	41 56 015	Brace, Xarm, Slab, 24"		2	2	2	2	2	2	2	2
	E	23 53 007	Bolt, 5/8", Double Arming, 24"		4	4	4	4	4	4	4	4
	F	06 34 03 04	Insulator, Linepost, Polymer		2	2	2	2	2	2	2	2
11	G	54 08 317	Turner D 34kV Switch w/LBRK			1		1				
11		54 08 314	Turner D 34kV Switch w/o LBRK		1		1					
12		54 08 438	Turner TSB 34kV Switch w/LBRK, Terminal Pole Mounting							1		1
12		54 08 440	Turner TSB 34kV Switch w/o LBRK, Terminal Pole Mounting						1		1	
	I	54 08 329	Kit, Vertical Mount Turner D Switch, 35kV		1	1	1	1				
13@	H	32 01 821	Pipe, Steel Galv. 2" x 10' w/ Coupling, Turner		1	1	1	1	1	1	1	1
	J	18 05 047	Wire, 556 AA (ft)		40	40	40	40	40	40	40	40
	K	17 55 192	Lug, Comp. 556 Al.		9	9	9	9	9	9	9	9
10@	L	10 01 137	Arrester, Lightning, 27kV Duty Cycle 22kV MCOV		3	3	3	3	3	3	3	3
		10 01 199	Arrester, Lightning, 27kV Duty Cycle 22kV MCOV Gaped		3	3	3	3	3	3	3	3
	M	23 78 394	Clamp, Hot Line		3	3	3	3	3	3	3	3
	N	18 51 021	Wire, Cu, #6 S.D. Covered		6	6	6	6	6	6	6	6
	O	17 08 058	Bracket, Terminator		1	1	1	1	1	1	1	1
	P	23 52 070	Bolt, Machine, 5/8" x 20"		3	3	3	3	3	3	3	3
	Q	23 66 027	Washer, Square 2-1/4"		2	2	2	2	2	2	2	2
@	R	PG*	See 07 00 25 00		3	3	3	3	3	3	3	3
	S	23 67 197	Bracket, Cable Support		1	1	1	1	1	1	1	1
8@	T	12 69 11 **	Grounding Unit for New Pole		1	1	1	1	1	1	1	1
		12 00 10 03	Grounding Unit for Existing Pole		1	1	1	1	1	1	1	1
	U	17 62 167	Clamp, Stirrup, Hot Line		3	3	3	3	3	3	3	3
4	V	12 51 220	Conduit, Plastic, 5" Split		40'	40'	40'	40'	40'	40'	40'	40'
6	W	27 60 035	Iron Hanger		8'	8'	8'	8'	8'	8'	8'	8'
	X	23 68 181	Shackle		1	1	1	1	1	1	1	1
	Y	23 65 012	Eyenuit, 5/8"		1	1	1	1	1	1	1	1
	BB	42 44 12 03	Termination, 35 kV, 750 kcmil		3	3			3	3		
		42 44 12 02	Termination, 35 kV, 350 kcmil				3	3			3	3
	CC	18 07 249	Cable, 35 kV, 750 kcmil		45'	45'			45'	45'		
		18 07 250	Cable, 35 kV, 350 kcmil				45'	45'			45'	45'
@	DD	TC*W	Trunnion Clamp		2	2	2	2	2	2	2	2
	EE	23 17 207	Grip, Cable Riser		3	3	3	3	3	3	3	3
	GG	23 60 005	Screw, Lag 3/8" x 3"		6	6	6	6	6	6	6	6

CABLE TERMINALS
34 kV Single Circuit Cable Terminal With Airbreak Switch
750 kcmil and 350 kcmil

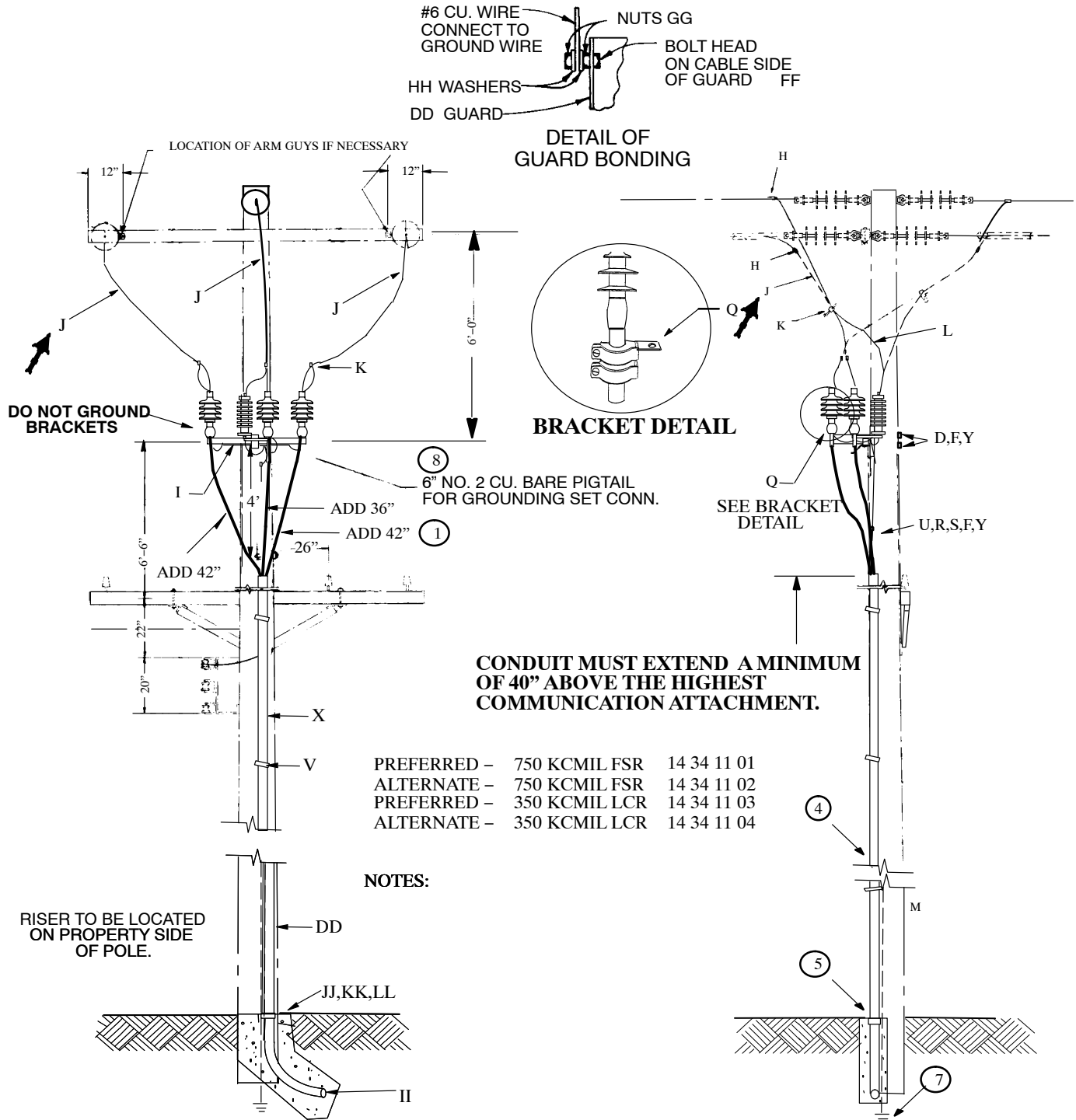
14 34 09 **
Sheet 3 of 3

5 @	HH	21 53 007	Bolt, Mach. 3/8" x 1 1/2"	1	1	1	1	1	1	1	1
	II	21 61 006	Nut, Hex. 3/8"	2	2	2	2	2	2	2	2
	JJ	23 66 016	Washer, 3/8" Galv.	2	2	2	2	2	2	2	2
	KK	12 51 206	Bend, 5" 36" Rad.	1	1	1	1	1	1	1	1
	LL	23 67 036	Step, Pole 5/8" x 10"	2	2	2	2	2	2	2	2
	MM	11 04 110	Tube, Concrete 14" Dia.	4	4	4	4	4	4	4	4
	NN	98 00 001	Concrete 4 SK	-	-	-	-	-	-	-	-
		OP 277	Install Cable Up Pole	3	3	3	3	3	3	3	3

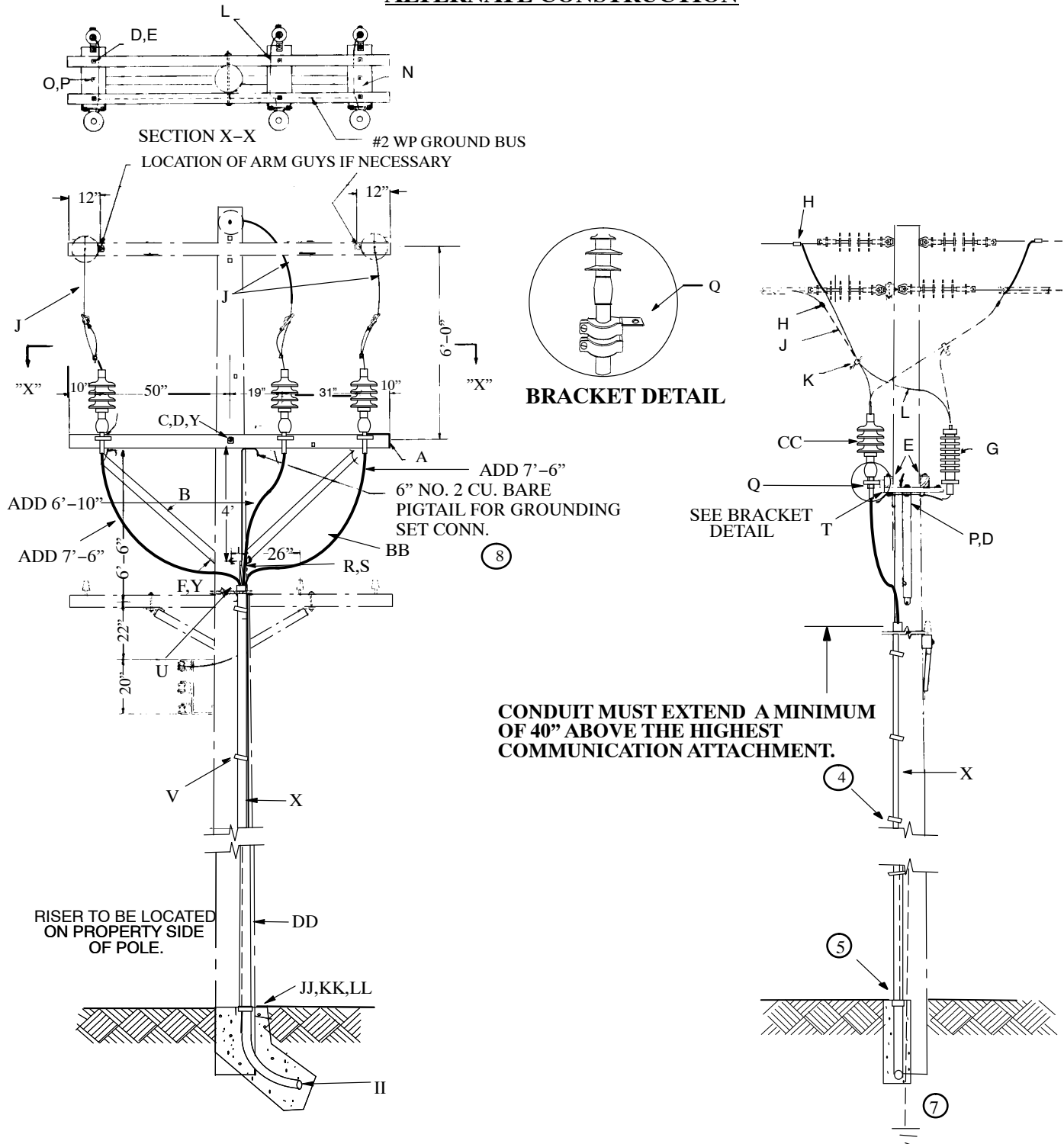
Notes:

1. Locate switch operating rod & cable as shown on Section Y-Y to leave one side of pole clear for climbing.
2. Extend plastic riser to 12" above operating rod insulator.
3. The minimum bending radius is 24" for both the 750 kcmil and 350 kcmil cables.
4. Schedule 80 conduit may be substituted for the split conduit and guard. Use Schedule 80 (12-01-272) for the first section of the riser if installed on standoff brackets.
5. Concrete encasement is also required if riser conduit is on standoff brackets.
6. Conduit straps may be substituted for iron hangers.
7. If it is necessary to stand the riser conduit off of the pole, see Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements. Use standoff brackets 23-06-087, conduit straps 23-67-184, jam nuts 23-65-053, and double arming bolts 23-53-003.
8. Use DCS 12 00 10 03 for ground rod application on existing pole and DCS 12 69 11 -for ground new pole installation.
9. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
10. Stock #10 01 137 - 27kV Duty Cycle 22kV MCOV Arrester for grounded system;
 Stock #10 01 199 - 27kV Duty Cycle 22kV MCOV Gaped Arrester for ungrounded system.
11. The switch is not for new installation.
12. The switch is for new installation.
13. Order additional vertical steel pipe only as needed.
14. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 Cu wire.

PREFERRED CONSTRUCTION



ALTERNATE CONSTRUCTION



PREFERRED - 750 KCMIL	14 34 11 01
ALTERNATE - 750 KCMIL	14 34 11 02
PREFERRED - 350 KCMIL	14 34 11 03
ALTERNATE - 350 KCMIL	14 34 11 04

CABLE TERMINALS
34 kV Single Circuit Up To 600 Amp Normal Rating
750 kcmil and 350 kcmil

14 34 11 **

Sheet 3 of 4

		Std. / Stk. No.	Description	14 34 11 **	01	02	03	04
9@	A	41 01 022	Crossarm-10'			2		2
	B	41 56 021	Brace-Heel 5'			2		2
	C	23 52 070	Bolt-Machine 5/8" x 20"			1		1
	D	23 66 027	Washer-Square 2 1/4" for 5/8" Bolt	2	8	2	8	
	E	23 52 061	Bolt-Machine 5/8" x 8"		6		6	
	F	23 52 066	Bolt-Machine 5/8" x 14"	2	1	2	1	
@	G	10 01 137	Arrester-Lightning 27kV Duty Cycle, 22kV MCOV	3	3	3	3	
		10 01 199	Arrester-Lightning 27kV Duty Cycle, 22kV MCOV Gaped	3	3	3	3	
7@	H	PG*	See 07 00 25 00	3	3	3	3	
	I	17 08 058	Bracket-Terminator	1		1		
	J	18 51 022	Wire-Cu.,500, S.D., Covered	15'	15'			
		18 51 023	Wire- Cu. 4/0, S.D. Covered			15'	15'	
	K	23 78 183	Clamp-Hot Line, #6-400	3	3	3	3	
	L	18 51 021	Wire-Cu. # 6 S.D., Covered	25'	25'	25'	25'	
6	M	12 00 10 04	Grounding Unit on New Poles	1	1	1	1	
		12 00 10 03	Grounding Unit on Existing Poles	1	1	1	1	
	N	23 06 065	Bracket L.A. & Pothead		3		3	
	O	23 66 006	Washer-Lock 5/8"		2		2	
	P	23 52 049	Bolt-Machine 5/8" x 2"		2		2	
	Q	23 67 197	Bracket-Cable Support	3	3	3	3	
3	R	23 68 181	Shackle	1	1	1	1	
	S	23 65 012	Eyenuit-5/8"	1	1	1	1	
	T	23 06 052	Bracket-Angle Clip		3		3	
	U	2317 207	Grip-Cable Riser	3	3	3	3	
	V	27 60 035	Iron Hanger	8'	8'	8'	8'	
	W	21 53 021	Bolt-Mach. 1/2" x 1 1/2"		9		9	
5@	X	12 51 220	Conduit - Plastic, 5" Split	40'	40'	40'	40'	
	Y	23 66 134	Washer, Lock, 5/8" Dbl Coil Type	2	2	2	2	
	BB	18 07 249	Cable-35kV, 750 kcmil	45'	45'			
		18 07 250	Cable-35kV, 350 kcmil			45'	45'	
	CC	42 44 12 03	Termination, 35 kV, 750 kcmil	3	3			
		42 44 12 02	Termination, 35 kV, 350 kcmil			3	3	
	DD	23 18 202	Guard, Conduit 5"	1	1	1	1	
	EE	23 60 005	Screw, Lag 3/8" x 3"	6	6	6	6	
	FF	21 53 007	Bolt, Mach. 3/8" x 1 1/2"	1	1	1	1	
	GG	21 61 006	Nut, Hex, 3/8"	2	2	2	2	
	HH	23 66 016	Washer, 3/8" Galv.	2	2	2	2	
	II	12 51 206	Bend, 5" 36" Rad.	1	1	1	1	
	JJ	23 67 036	Step, Pole 5/8" x 10"	2	2	2	2	
	KK	11 04 110	Tube, Concrete 14" Dia.	4	4	4	4	
	LL	98 00 001	Concrete, 4SK	-	-	-	-	
		OP 277	Install Cable Up Pole	3	3	3	3	

**DISTRIBUTION
CONSTRUCTION STANDARDS**



ENG: WYW
REV. NO: 14
REV. DATE: 03/11/16

CABLE TERMINALS
34 kV Single Circuit Up To 600 Amp Normal Rating
750 kcmil and 350 kcmil

14 34 11 **

Sheet 4 of 4

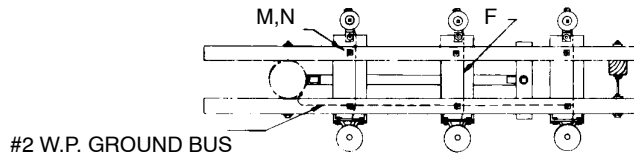
NOTES:

1. For cable lengths, measure the distance to the grip thru bolt located 4' below the terminator bracket or crossarm and add the amounts shown.
2. Cable minimum bending radius is 24" for both of the 750 kcmil and 350 kcmil cables.
3. Schedule 80 conduit may be substituted for the split conduit and guard. Use Schedule 80 conduit (12-01-272) for the first section of the riser if installed on standoff brackets.
4. If it is necessary to stand the riser conduit off of the pole, see DCS 14 00 01 03 for standoff bracket placement and grounding requirement. Use standoff brackets 23-06-087, conduit straps 23-67-184, jam nuts 23-65-053, and double arming bolts 23-53-003.
5. Concrete encasement is also required if riser conduit is on standoff brackets.
6. Conduit straps may be substituted for iron hangers.
7. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on existing poles.
8. Always connect the metallic shields on the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
9. Stock #10 01 137 for grounded system; Stock #10 01 199 for ungrounded system.
10. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper.

CABLE TERMINALS 34 kV Double Circuit 750 kcmil and 350 kcmil

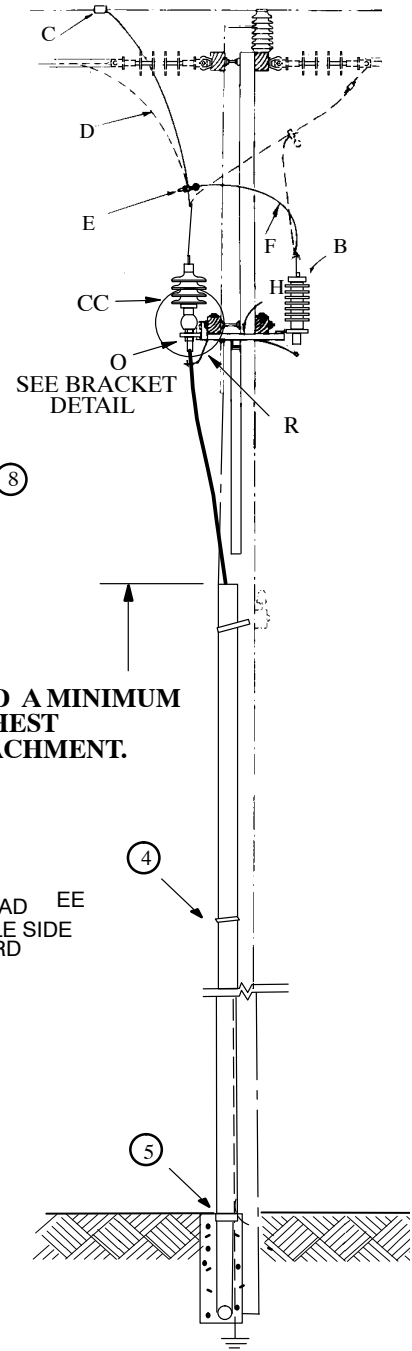
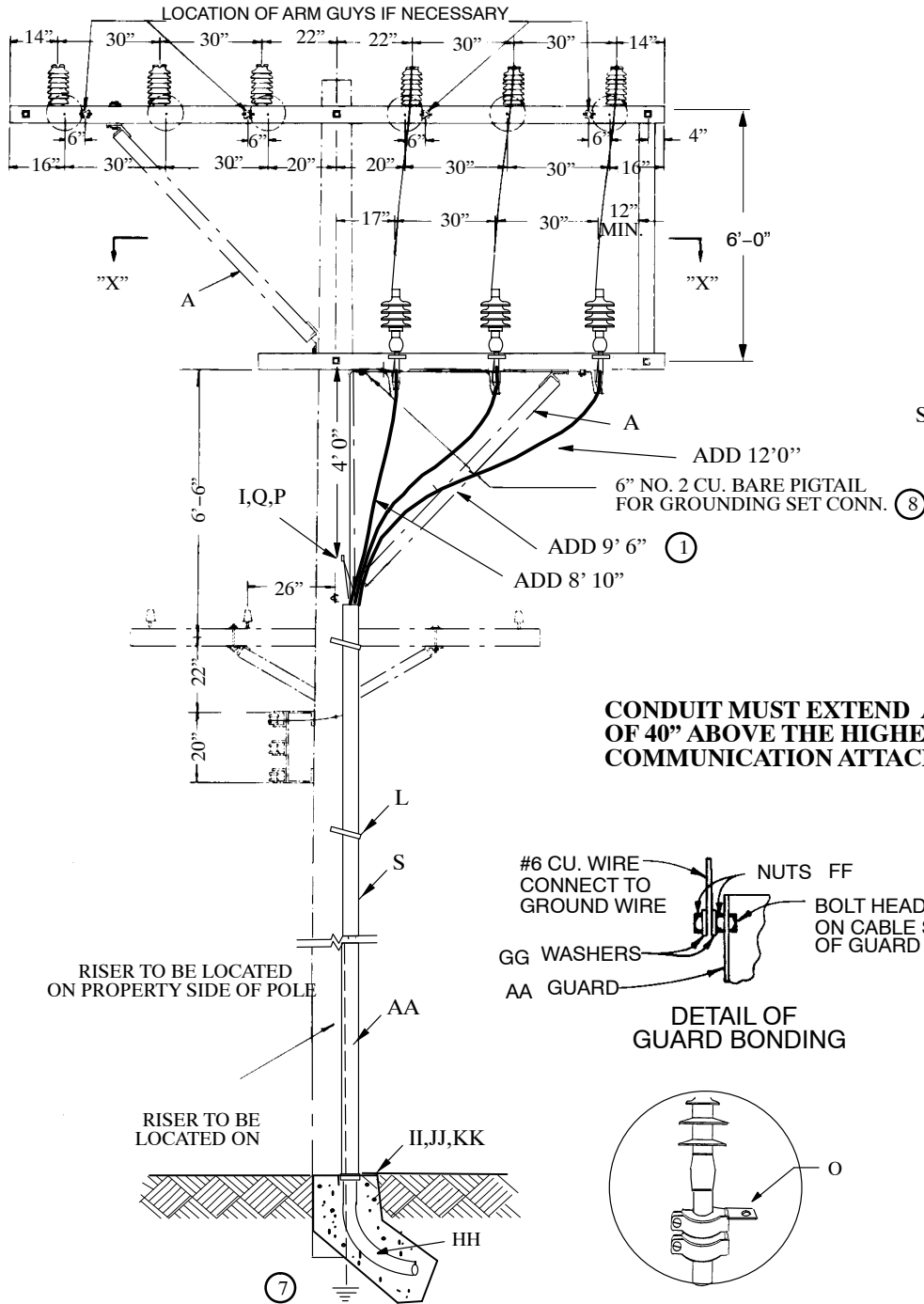
14 34 12 **

Sheet 1 of 3



750 KCMIL
350 KCMIL

14 34 12 01
14 34 12 02



CABLE TERMINALS
34 kV Double Circuit
750 kcmil and 350 kcmil

14 34 12 **

Sheet 2 of 3

		Std. / Stk. No.	Description	14 34 12 **	01	02
@	A	14 34 03 01	Mounting Unit		1	1
	B	10 01 137	Arrester, Lightning 27kV		3	3
	C	PG*	See 07 00 25 00		3	3
	D	18 52 023	Wire, Cu. 350, S.D. Bare		15'	
		18 52 024	Wire, Cu. 4/0, S.D. Bare			15'
	E	23 78 183	Clamp, Hotline, #6-400		3	3
	F	18 51 021	Wire, Cu. #6, S.D. Covered		25'	25'
	G	12 00 10 04	Grounding Unit		1	1
	H	23 06 065	Bracket, LA & Pothead		3	3
	I	23 52 070	Bolt, Machine 5/8" x 20"		1	1
	J	23 17 207	Grip, Cable Riser		3	3
	K	21 53 021	Bolt, Machine, 1/2" x 1-1/2"		9	9
	L	27 60 035	Iron Hanger		8'	8'
	M	23 52 061	Bolt, Machine 5/8" x 8"		6	6
	N	23 66 027	Washer, Square 2-1/4"		6	6
	O	23 67 197	Bracket, Cable Support		3	3
	P	23 68 181	Shackle		1	1
	Q	23 65 012	Eyebut, 5/8"		1	1
	R	23 06 052	Bracket, Angel Clip		3	3
	S	12 51 220	Conduit, Plastic, 5" Split		40'	40'
7	AA	23 18 202	Guard, Conduit, 5"		1	1
	BB	18 07 249	Cable, 35kV, 750 kcmil		55'	
		18 07 250	Cable, 35kV, 350 Kcmil			55'
	CC	42 44 12 03	Termination, 35kV, 750 kcmil		3	
		42 44 12 02	Termination, 35kV, 350 kcmil			3
	DD	23 60 005	Screw, Lag 3/8" x 3"		6	6
	EE	21 53 007	Bolt, Machine, 3/8" x 1 1/2"		1	1
	FF	21 61 006	Nut, Hex, 3/8"		2	2
	GG	23 66 016	Washer, 3/8" Galv.		2	2
	HH	12 51 206	Bend, 5", 36" Rad.		1	1
6	II	23 67 036	Step, Pole 5/8" x 10"		2	2
	JJ	11 04 110	Tub, Concrete 14" Dia.		4	4
	KK	98 00 001	Concrete 4SK			
		OP 277	Install Cable Up Pole		3	3
3						
5@						

NOTES:

- For cable lengths, measure the distance to the grip thru bolt located 4' below the crossarm and add amounts shown.
- Minimum bending radius is 24" for both the 750 kcmil and 350 kcmil cables.
- Schedule 80 conduit may be substituted for the split conduit and guard. Use Schedule 80 conduit (12-01-272) for the first section of the riser if installed on standoff brackets.

DISTRIBUTION
CONSTRUCTION STANDARDS



ENG: HLH
REV. NO: 14
REV. DATE: 07/08/15

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4. If it is necessary to stand the riser conduit off of the pole, see Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements. Use standoff brackets 23-06-087, conduit straps 23-67-184, jam nuts 23-65-053, and double arming bolts 23-53-003.
 5. Concrete encasement is also required if riser conduit is on standoff brackets.
 6. Conduit straps may be substituted for iron hangers.
 7. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.
 8. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
 9. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper wire.

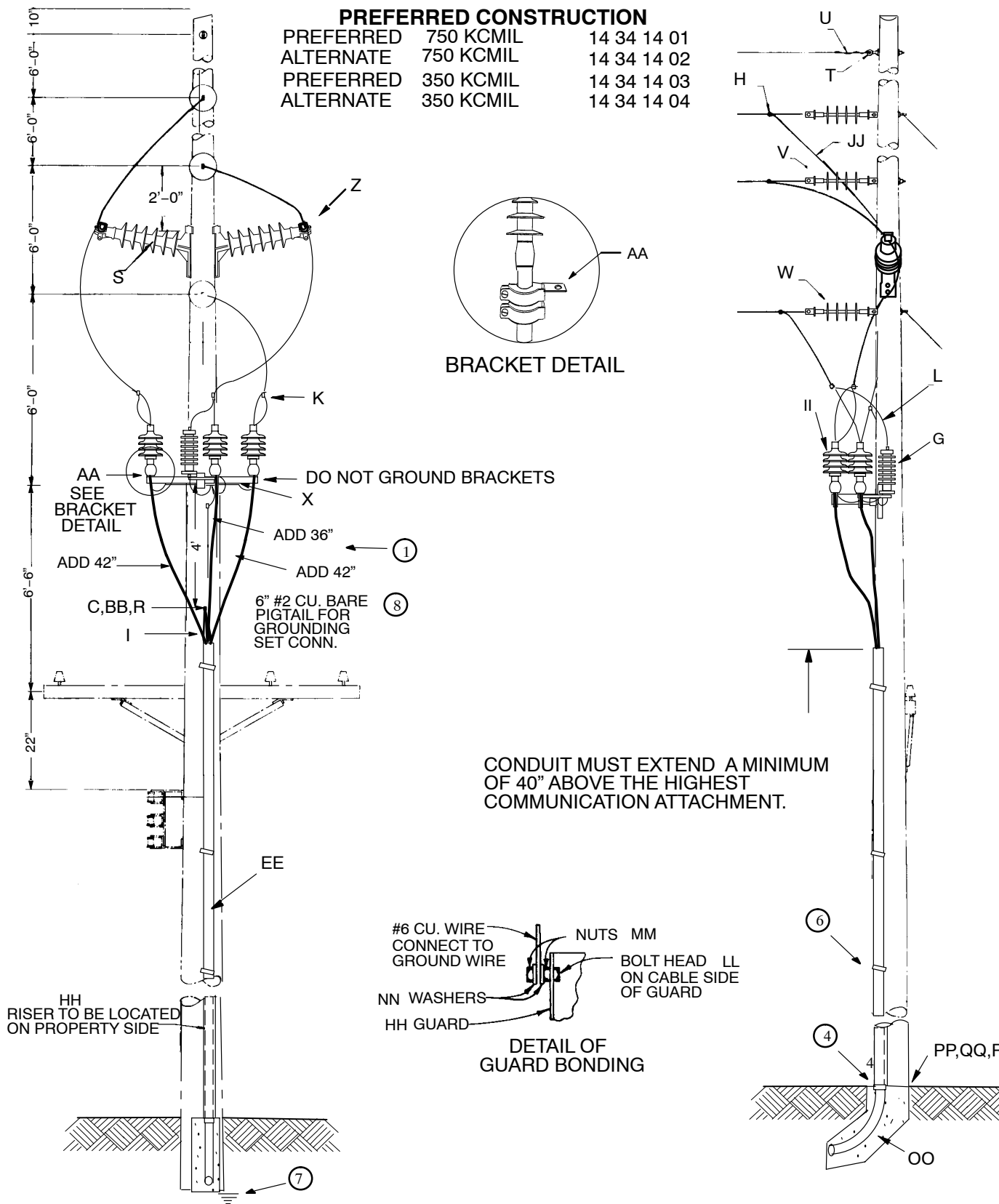
CABLE TERMINALS

34 kV Single Circuit Vertical Deadend

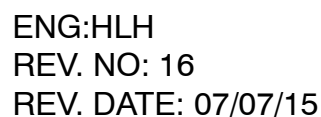
750 kcmil and 350 kcmil

14 34 14 **

Sheet 1 of 4



Sheet 2 of 4



CABLE TERMINALS
34 kV Single Circuit Vertical Deadend
750 kcmil and 350 kcmil

14 34 14 **

Sheet 3 of 4

		Std. / Stk. No.	Description	14 34 14 **	01	02	03	04
@	A	41 01 022	Crossarm, 10'			2		2
	B	41 56 021	Brace, Heel 5'			2		2
	C	23 52 070	Bolt, Machine 5/8" x 20"	3	2	3	2	
	D	23 66 027	Washer, Square 2-1/4"	3	10	3	10	
	E	23 52 061	Bolt, Machine 5/8" x 8"		6		6	
	F	23 52 066	Bolt, Machine 5/8" x 14"		1		1	
	G	10 01 137	Arrester, Lightning 27kV	3	3	3	3	
	H	PG*	See 07 00 25 00	3	3	3	3	
	I	23 17 207	Grip, Cable Riser	3	3	3	3	
	J	18 52 023	Wire, Cu. 350, S.D. Bare	15'	15'			
		18 52 024	Wire, Cu. 4/0, S.D. Bare			15'	15'	
	K	23 78 183	Clamp, Hotline, #6-400	3	3	3	3	
	L	18 51 021	Wire, Cu. #6, S.D. Covered	25'	25'	25'	25'	
	M	12 00 10 04	Grounding Unit	1	1	1	1	
	N	23 06 065	Bracket, LA & Pothead		3		3	
	O	23 66 006	Washer, Lock, 5/8"		2		2	
	P	23 52 049	Bolt, Machine 5/8" x 2"		2		2	
	Q	21 53 021	Bolt, Machine, 1/2" x 1-1/2"		9		9	
	R	23 68 181	Shackle	1	1	1	1	
	S	06 34 03 07	Insul, Linepost, Polymer, Double, Trunnion	1	1	1	1	
	T	06 00 11 01	Deadend, Neutral	1	1	1	1	
@	U	DEC*W or DEA*W	Clamp, Deadend	1	1	1	1	
	V	06 34 60 02	Deadend, Pole	1	1	1	1	
	W	06 34 60 12	Deadend, H.D. Guy Hook	2	2	2	2	
	X	17 08 058	Bracket, Terminator	1		1		
	Y	27 60 035	Iron Hanger	8'	8'	8'	8'	
	Z	TCA*W	Clamp, Trunnion	2	2	2	2	
	AA	23 67 197	Bracket, Cable Support	3	3	3	3	
	BB	23 65 012	Eyenuit, 5/8"	1	1	1	1	
	CC	23 06 052	Bracket, Angle Clip		3		3	
	EE	12 51 220	Conduit, Plastic, 5" Split	40'	40'	40'	40'	
3	HH	23 18 202	Guard, Conduit 5"	1	1	1	1	
	II	42 44 12 03	Termination, 35kV, 750 kcmil	3	3			
		42 44 12 02	Termination, 35kV, 350 kcmil			3	3	
	JJ	18 07 249	Cable, 35kV, 750 kcmil	45'	45'			
		18 07 250	Cable, 35kV, 350 kcmil			45'	45'	
	KK	23 60 005	Screw, Lag 3/8" x 3"	6	6	6	6	
	LL	21 53 007	Bolt, Machine, 3/8" x 1 1/2"	1	1	1	1	
	MM	21 61 006	Nut, Hex, 3/8"	2	2	2	2	
	NN	23 66 016	Washer, 3/8" Galv.	2	2	2	2	
	OO	12 51 206	Bend, 5", 36" Rad.	1	1	1	1	
4	PP	23 67 036	Step, Pole 5/8" x 10"	2	2	2	2	
	QQ	11 04 110	Tube, Concrete 14" Dia.	4	4	4	4	
	RR	98 00 001	Concrete 45 SK					
		OP 277	Install Cable Up Pole	3	3	3	3	

CABLE TERMINALS
34 kV Single Circuit Vertical Deadend
750 kcmil and 350 kcmil

14 34 14 **

Sheet 4 of 4

NOTES:

1. For cable lengths, measure the distance to the grip thru bolt located 4' below the crossarm or bracket and add the amounts shown.
2. Minimum bending radius is 24" for both 750 kcmil and 350 kcmil cables.
3. Schedule 80 conduit may be substituted for the split conduit and guard. Use Schedule 80 conduit (12-01-272) for the first section if the riser is installed on standoff brackets.
4. Concrete encasement is also required if riser conduit is on standoff brackets.
5. Conduit straps may be substituted for iron hangers.
6. If it is necessary to stand the riser conduit off of the pole, see Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements. Use standoff bracket 23-06-087, conduit straps 23-67-184, jam nuts 23-65-053, and double arming bolts 23-53-003.
7. Use DCS 12 00 10 04 for ground coil application on new installation. Use 12 00 10 03 for ground rod on an existing pole.
8. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
9. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper wire.

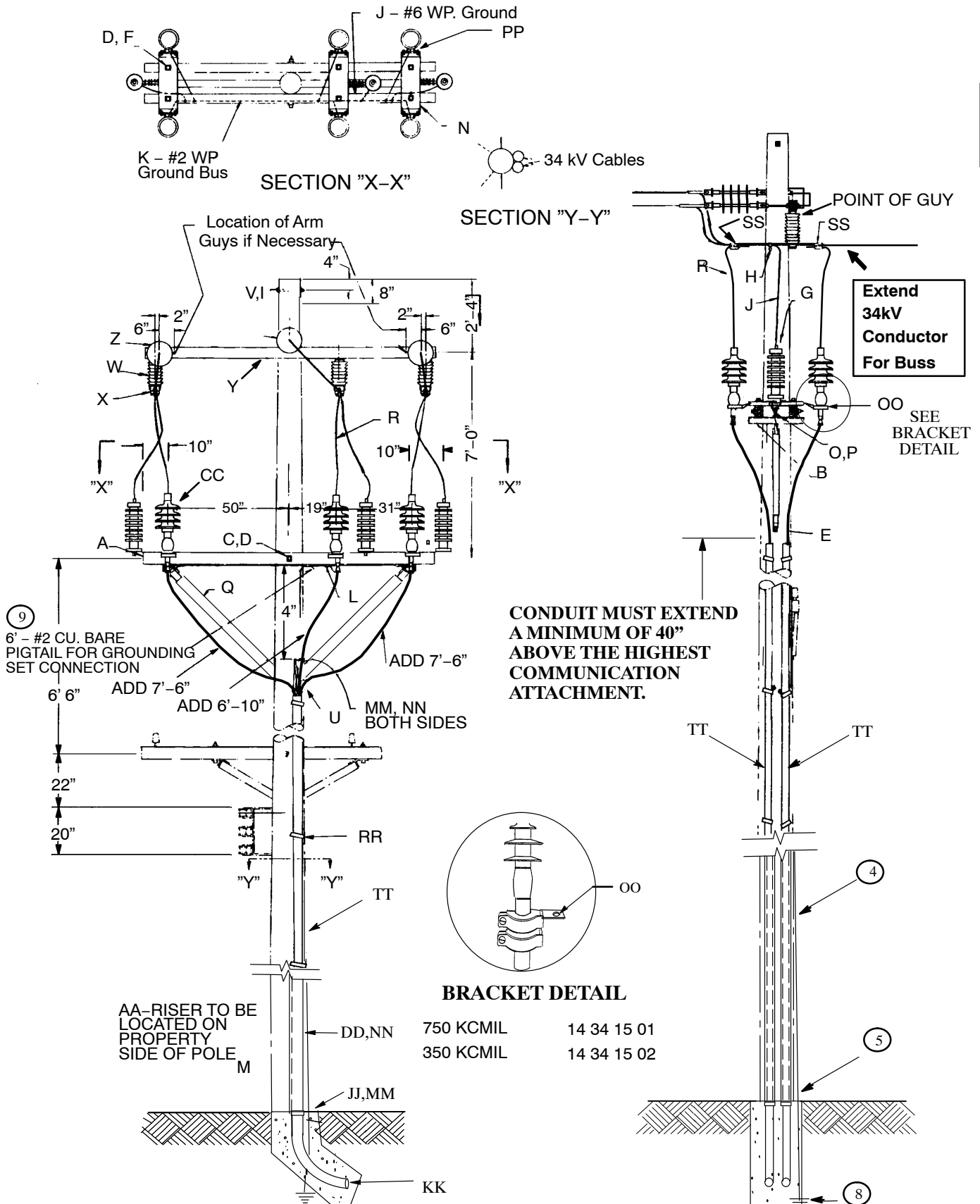
CABLE TERMINALS

34 kV Single Circuit Deadend

Parallel Assembly Unit¹ 750 kcmil and 350 kcmil

14 34 15 **

Sheet 1 of 3



CABLE TERMINALS
34 kV Single Circuit Deadend
Parallel Assembly Unit¹ 750 kcmil and 350 kcmil

14 34 15 **

Sheet 2 of 3

		Std. / Stk. No.	Description	14 34 15 **	01	02
@	A	41 01 022	Crossarm, 10'		2	2
	B	23 77 212	Plate, Heel Brace, 8-3/4" to 13-3/8"		2	2
		23 77 210	Plate, Heel Brace, 13-3/8" to 19"		2	2
	C	23 52 070	Bolt, Machine, 5/8" x 20"		2	2
	D	23 66 027	Washer, Square, 2-1/4"		8	8
	E	23 52 066	Bolt, Machine, 5/8" x 14"		1	1
	F	23 52 256	Bolt, Machine, 5/8" x 7"		6	6
	G	10 01 137	Arrester, Lightning, 27 kV		3	3
	H	23 78 183	Clamp, Hot Line, #6 - 400		3	3
	I	23 66 031	Washer, Curved, 3/4"		2	2
	J	18 51 021	Wire, Cu, #6 S.D. Covered		20'	20'
	K	18 51 019	Wire, Cu, #2 S.D. Poly		15'	15'
	L	17 54 005	Connector, Solderless, #2 Cu.		7	7
	8 M	12 00 10 04	Grounding Unit		1	1
		N	23 06 078	Bracket, LA & Potthead	3	3
	O	23 66 006	Washer, Lock, 5/8"		2	2
	P	23 52 049	Bolt, Machine, 5/8" x 2"		2	2
	Q	41 56 021	Brace, Heel, 5'		2	2
	R	18 52 023	Wire, Cu, 350 S.D. Bare		30'	
		18 52 024	Wire, Cu, 4/0 S.D. Bare			30'
5@	S	17 54 132	Connector, 350		6	
		17 54 140	Connector, 4/0			6
	T	06 34 60 02	Deadend, Pole		1	1
	U	23 17 207	Grip, Cable Riser		6	6
	V	23 52 097	Bolt, Machine, 3/4" x 12"		1	1
	W	25 05 064	Insulator, Line Post		3	3
	X	18 52 009	Tie for Bare Copper Cond.		3	3
	Y	04 00 41 04	Crossarm - Dbl., D.E., F/G, 4-Wire, 10'		1	1
	Z	06 34 66 02	Deadend on Crossarm		2	2
	AA	23 18 202	Guard, Conduit, 5"		2	2
	BB	18 07 249	Cable, 35 kV 750 kcmil		95	
		18 07 250	Cable, 35 kV 350 kcmil			95
	CC	42 44 12 03	Termination, 35 kV, 750 kcmil		6	
		42 44 12 02	Termination, 35 kV, 350 kcmil			6
	DD	23 60 005	Screw, Lag 3/8" x 3"		12	12
	EE	21 53 007	Bolt, Machine 3/8" x 1 1/2"		2	2
	FF	21 61 006	Nut, Hex, 3/8"		4	4
	GG	23 66 016	Washer, 3/8" Galv.		4	4
	HH	12 51 206	Bend, 5", 36" Rad.		2	2
	II	23 67 036	Step, Pole 5/8" x 10"		4	4
	JJ	11 04 110	Tube, Concrete 14" Dia.		8	8
	5@ KK	98 00 001	Concrete 4 SK		-	-
		MM	23 65 012	Eyenuit, 5/8"	2	2
		NN	23 68 181	Shackle	2	2
		OO	23 67 197	Bracket, Cable Support	6	6
		PP	23 06 052	Bracket, Angle Clip	6	6

CABLE TERMINALS
34 kV Single Circuit Deadend
Parallel Assembly Unit¹ 750 kcmil and 350 kcmil

14 34 15 **
Sheet 3 of 3

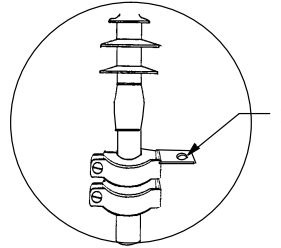
		Std. / Stk. No.	Description	14 34 15 **	01	02
@	QQ	21 53 021	Bolt, 1/2" x 1-1/2"		18	18
	RR	27 60 035	Iron Hanger		8'	8'
	SS	PG*	See 07 00 25 00		3	3
	TT	12 51 220	Conduit, Plastic, 5" Split		80'	80'
		OP 277	Install Cable up Pole		6	6

NOTES:

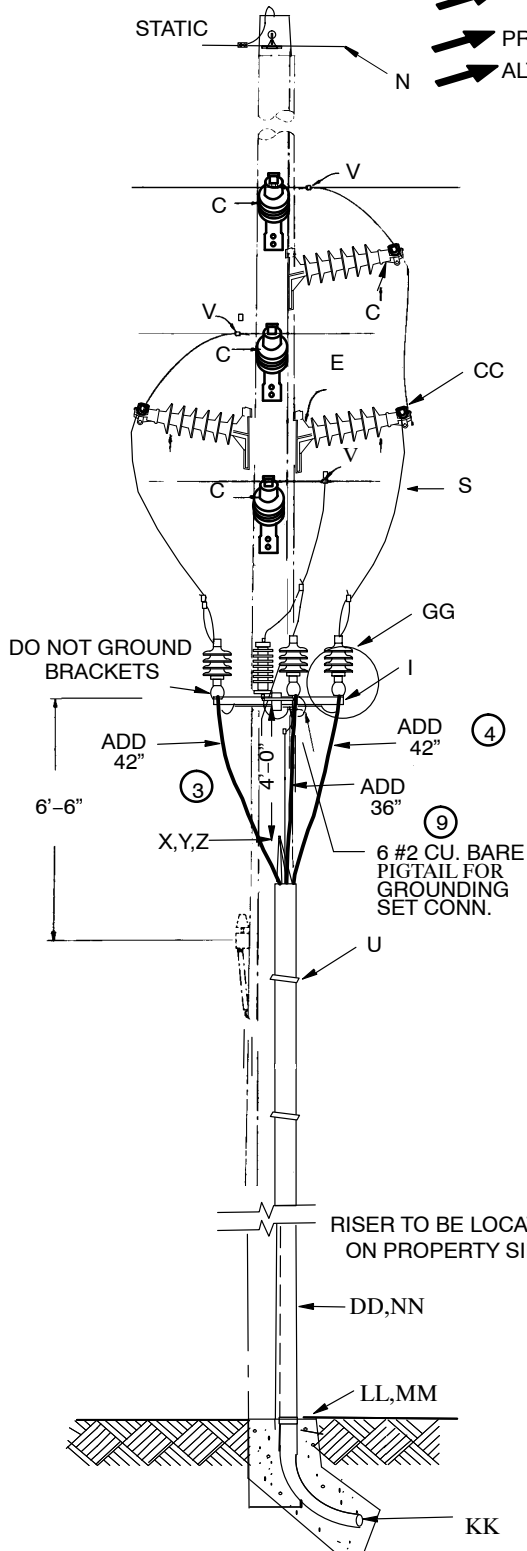
1. This standard to be used only when cables are operated in parallel as a single circuit to serve a single customer.
2. For cable lengths, measure distance to the thru bolt located 4' below the crossarm and add amounts shown.
3. Minimum bending radius is 24" for both the 750 kcmil and 350 kcmil cables.
4. Schedule 80 conduit may be substituted for the split conduit and guard. Use Schedule 80 conduit (12-01-272) for the first section of the riser if installed on standoff brackets.
5. Concrete encasement is also required if riser conduit is on standoff brackets.
6. Conduit straps may be substituted for iron hangers.
7. If it is necessary to stand the riser conduit off of the pole, see Distribution Standard 14 00 01 03 for standoff bracket placement and grounding requirements. Use standoff bracket 23-06-087, conduit straps 23-67-184, jam nuts 23-65-053, and double arming bolts 23-53-003.
8. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on the existing pole.
9. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
10. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper wire.

PREFERRED CONSTRUCTION

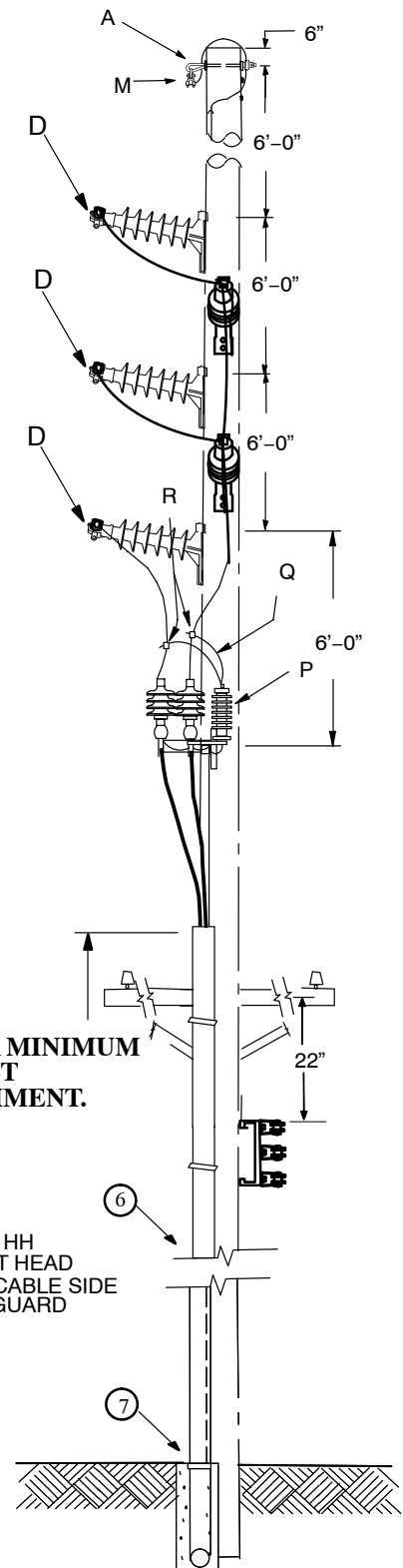
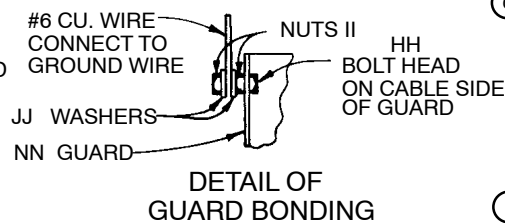
	PREFERRED 750 KCMIL	14 34 16 01
	ALTERNATE 750 KCMIL	14 34 16 02
	PREFERRED 350 KCMIL	14 34 16 03
	ALTERNATE 350 KCMIL	14 34 16 04



BRACKET DETAIL

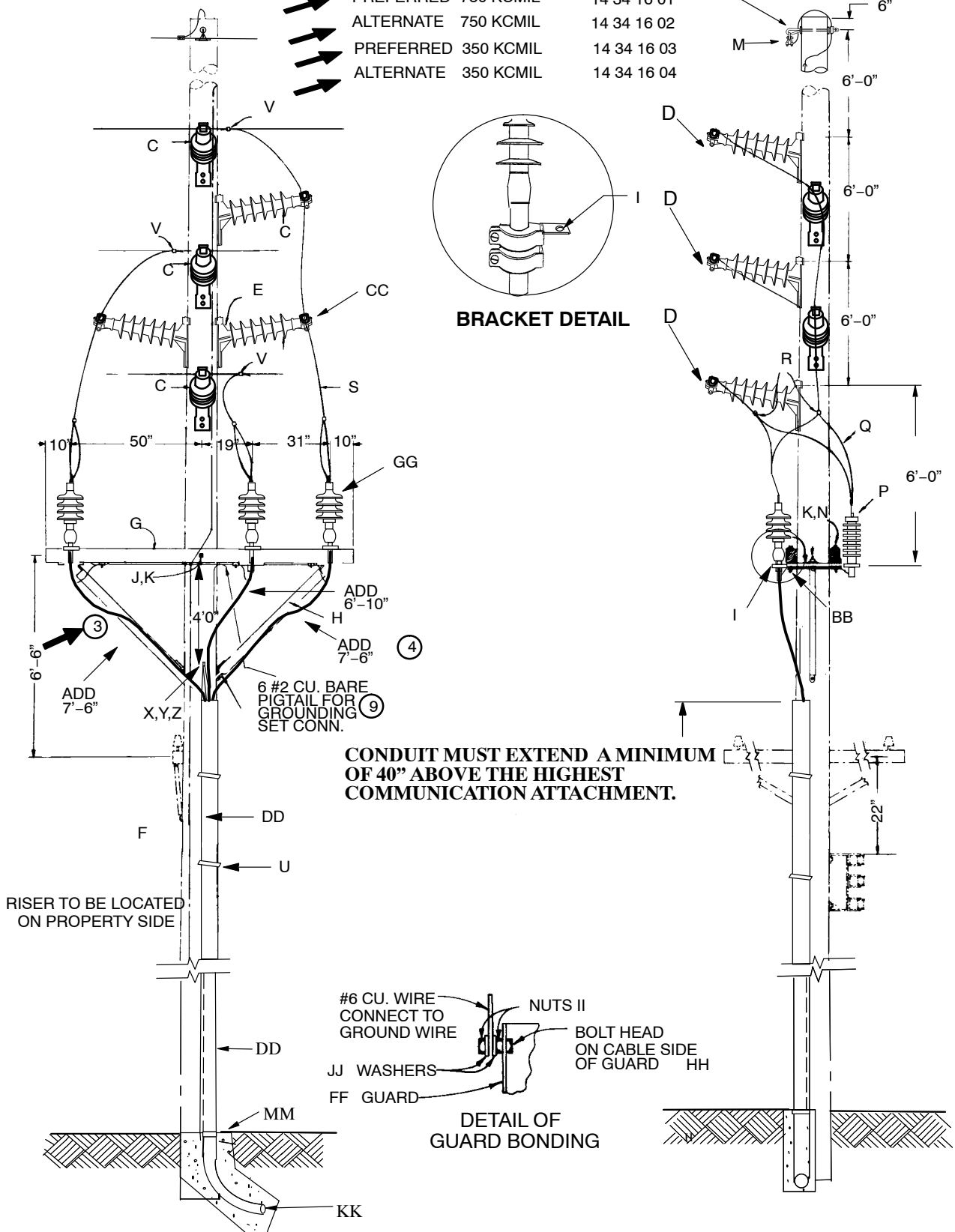


CONDUIT MUST EXTEND A MINIMUM OF 40" ABOVE THE HIGHEST COMMUNICATION ATTACHMENT.



ALTERNATE CONSTRUCTION

→ PREFERRED 750 KCMIL	14 34 16 01
→ ALTERNATE 750 KCMIL	14 34 16 02
→ PREFERRED 350 KCMIL	14 34 16 03
→ ALTERNATE 350 KCMIL	14 34 16 04



		Std. / Stk. No.	Description	14 34 16 **	01	02	03	04
@	A	06 00 11 04	Static Support w/ Suspension Clamp		1	1	1	1
	B	17 51 032	Clamp, PG		1	1	1	1
	C	06 34 03 04	Insulator, Linepost, Polymer, Single Trunnion Clamp		4	4	4	4
	D	TCA*W	Clamp, Trunion		3	3	3	3
	E	06 34 03 07	Insulator, Linepost, Polymer, Double Trunnion Clamp		2	2	2	2
	F	12 00 10 04	Grounding Unit		1	1	1	1
	G	41 01 022	Crossarm, 10'			2		2
	H	41 56 021	Brace, Heel 5'			2		2
@	I	23 67 197	Bracket, Cable Support		3	3	3	3
	K	23 66 027	Washer, Sq. 2 1/4"		8	6	8	6
	J	23 52 070	Bolt, Machine, 5/8" x 20"		3	2	3	2
	L	23 52 066	Bolt, Machine, 5/8" x 14"			1		1
	M	SC*W	Clamp, Suspension		1	1	1	1
	N	23 52 061	Bolt, Machine 5/8" x 8"			4		4
	O	23 52 049	Bolt, Machine 5/8" x 2"			2		2
	P	10 01 137	Arrester, Lightning 27 kV		3	3	3	3
@	Q	18 51 021	Wire, Cu. #6 S.D., Covered		10'	10'	10'	10'
	R	23 78 183	Clamp, Hotline, #6-400		3	3	3	3
	S	18 52 024	Wire, Cu. 4/0 S.D. Bare				50'	50'
		18 52 023	Wire, Cu. 350 S.D. Bare		50'	50'		
	T	23 06 065	Bracket, L.A. & Pothead			3		3
	U	27 60 035	Iron Hanger		8'	8'	8'	8'
	V	PG*	See 07 00 25 00		3	3	3	3
	W	21 53 021	Bolt, Machine 1/2" x 1 1/2"			9		9
1	X	23 17 207	Grip, Cable Riser		3	3	3	3
	Y	23 68 181	Shackle		1	1	1	1
	Z	23 65 012	Eyebolt 5/8"		1	1	1	1
	AA	17 08 058	Bracket, Terminator		1		1	
	BB	23 06 052	Bracket, Angle Clip			3		3
	CC	23 78 331	Clamp, Susp., 1/2" - 1" Cond.		3	3	3	3
	DD	12 51 220	Conduit, Plastic, 5" Split		40	40	40	40
	EE	23 60 005	Screw, Lag, 3/8" x 3"		6	6	6	6
	FF	18 07 249	Cable, 35 kV 750 kcmil		45'	45'		
		18 07 250	Cable, 35 kV 350 kcmil				45'	45'
	GG	42 44 12 03	Termination, 35 kV, 750 kcmil		3	3		
		42 44 12 02	Termination, 35 kV, 350 kcmil				3	3
	HH	21 53 007	Bolt, Machine 3/8" x 1 1/2"		1	1	1	1
	II	21 61 006	Nut, Hex, 3/8"		2	2	2	2
	JJ	23 66 016	Washer, 3/8" Galv.		2	2	2	2
	KK	12 51 206	Bend, 5", 36" Rad.		1	1	1	1

LL	23 67 036	Step, Pole 5/8" x 10"	2	2	2	2
MM	11 04 110	Tube, Concrete 5"	4	4	4	4

		Std. / Stk. No.	Description	14 34 16 **	01	02	03	04
1	NN	23 18 202	Guard, Conduit 5"		1	1	1	1
7 @	PP	98 00 001	Concrete, 4 SK		-	-	-	-
	OP	277	Install Cable Up Pole		3	3	3	3

NOTES:

- Schedule 80 conduit may be substituted for the split conduit and guard. Use Schedule 80 conduit (12-01-272) for the first section of the riser if installed on standoff brackets.
- Conduit straps may be substituted for iron hangers.
- Identify phases.
- For cable lengths, measure the distance to the grip thru bolt located 4' below the terminator bracket or crossarm and add the amounts shown.
- Minimum bending radius is 24" for both the 750 kcmil and 350 kcmil cables.
- If it is necessary to stand the riser conduit off the pole, see DCS 14 00 01 03 for standoff bracket placement and grounding requirements. Use standoff brackets 23-06-087, conduit straps 23-67-184, jam nuts 23-65-053, and double arming bolts 23-53-003.
- Concrete encasement is also required if riser conduit is on standoff brackets.
- Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 10 03 for ground rod on an existing pole.
- Always connect the metallic shields on the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and / or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
- If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper wire.

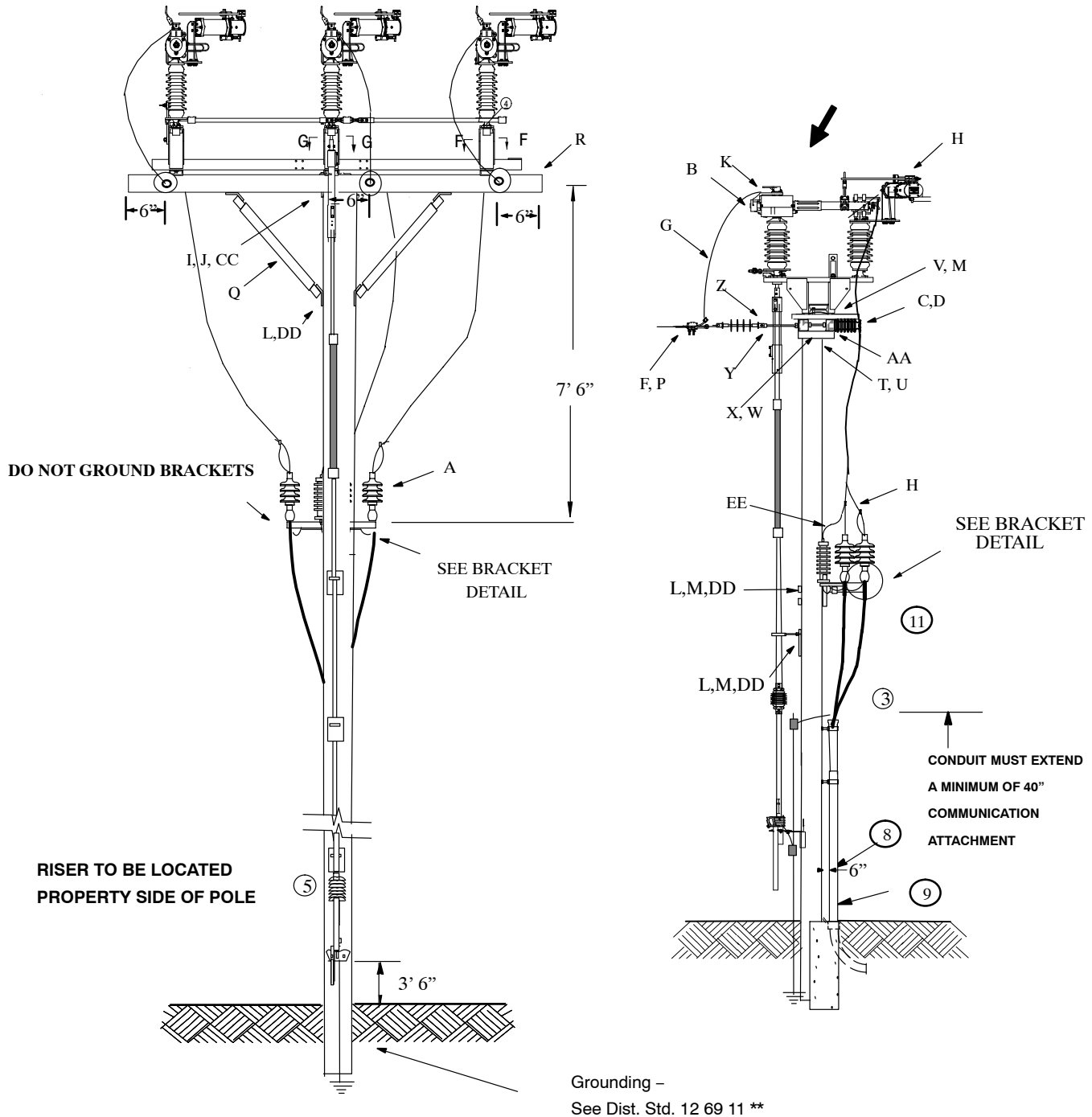
CABLE TERMINALS

34 kV Single Circuit – Deadend – Cable Terminal With Airbreak Switch – 750 kcmil and 350 kcmil

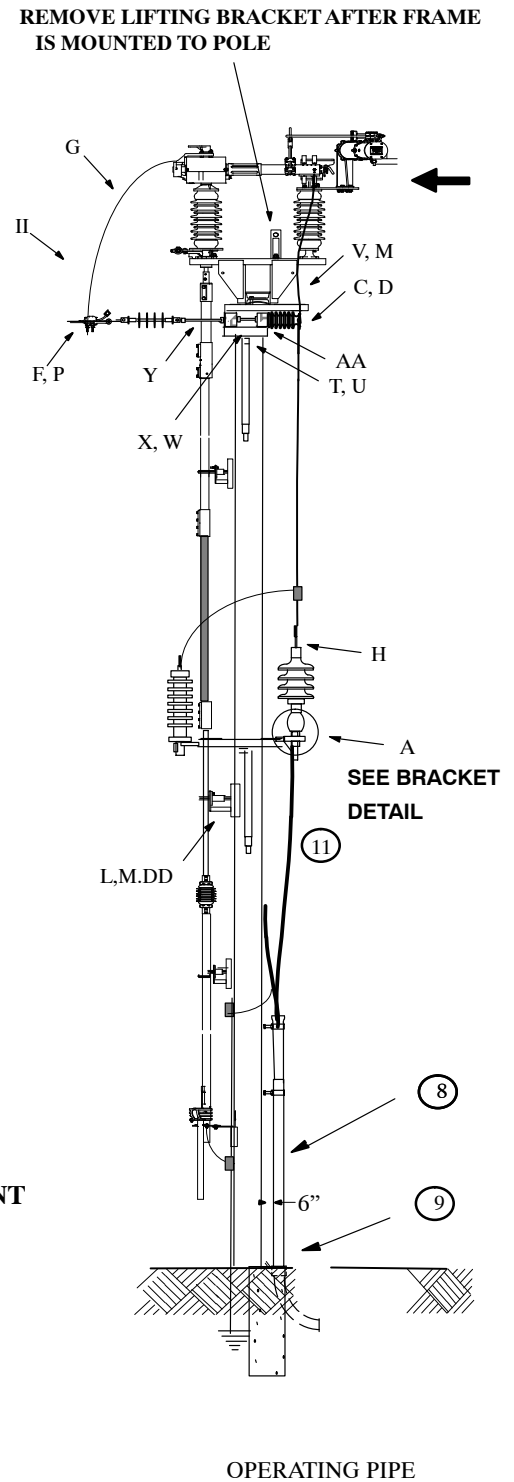
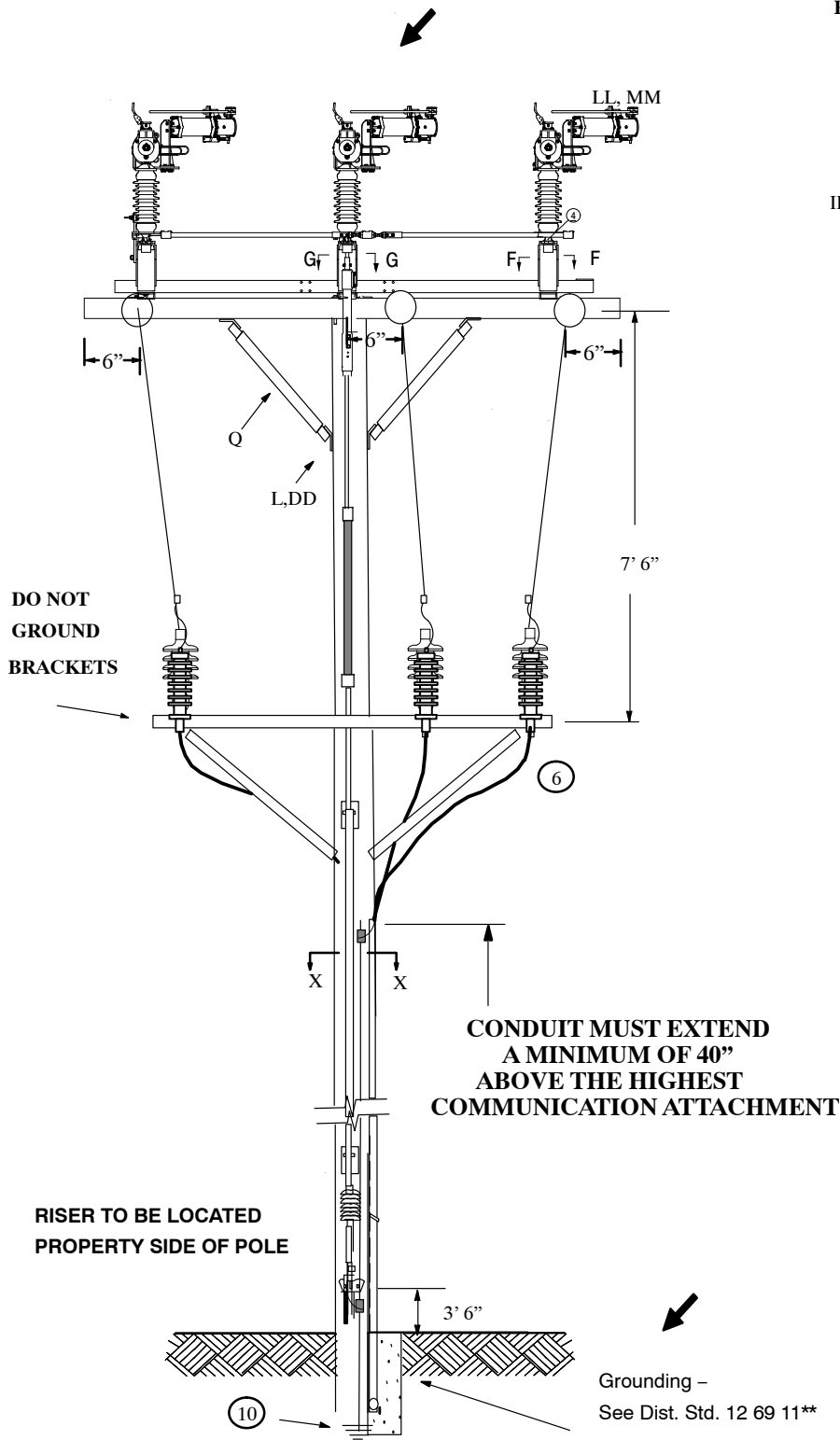
14 34 17 **

Sheet 1 of 6

PREFERRED CONSTRUCTION



ALTERNATE CONSTRUCTION

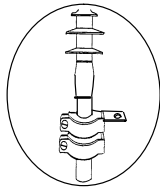
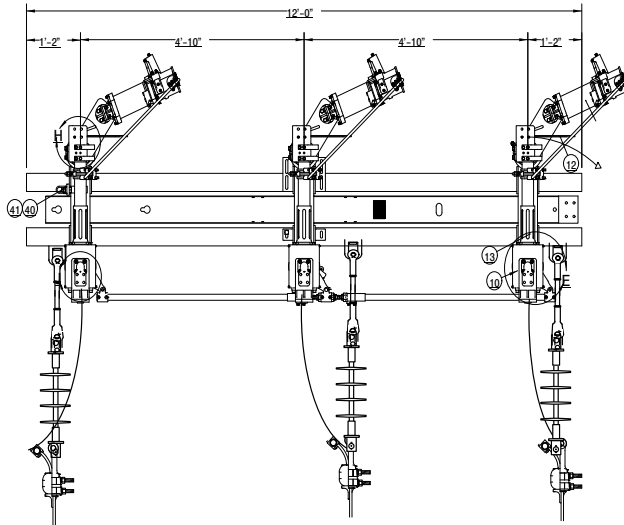


CABLE TERMINALS

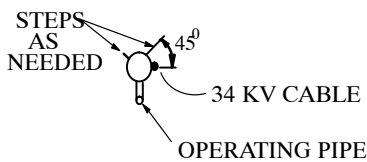
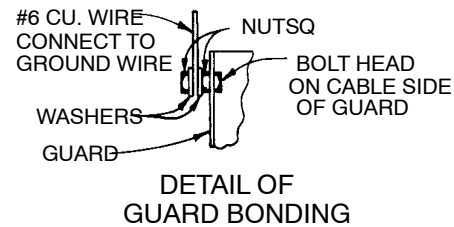
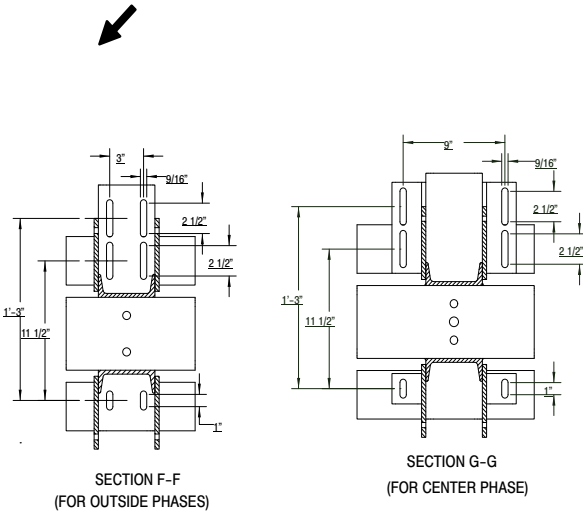
34 kV Single Circuit – Deadend – Cable Terminal With Airbreak Switch – 750 kcmil and 350 kcmil

14 34 17 **

Sheet 3 of 6



BRACKET DETAIL



SECTION XX

		TURNER	TURNER	TURNER	TURNER
		D SW	D SW	TSB SW	TSB SW
		W/O LBRK	W/ LBRK	W/O LBRK	W/ LBRK
PREFERRED	750 KCMIL	14 34 17 02	14 34 17 01	14 34 17 10	14 34 17 09
ALTERNATE	750 KCMIL	14 34 17 04	14 34 17 03	14 34 17 12	14 34 17 11
PREFERRED	350 KCMIL	14 34 17 06	14 34 17 05	14 34 17 14	14 34 17 13
ALTERNATE	350 KCMIL	14 34 17 08	14 34 17 07	14 34 17 16	14 34 17 15

CABLE TERMINALS
34 kV Single Circuit – Deadend – Cable Terminal
With Airbreak Switch – 750 kcmil and 350 kcmil

14 34 17 **
Sheet 4 of 6

Turner 34kV D Switch – Not for New Installation after the inventory is depleted												
		Std. / Stk. No.	Description	14 34 17 **	01	02	03	04	05	06	07	08
@	4	A	14 34 11 01	Cable Terminal – 750 kcmil on bracket	1	1						
			14 34 11 02	Cable Terminal – 750 kcmil on crossarm			1	1				
			14 34 11 03	Cable Terminal – 350 kcmil on bracket					1	1		
			14 34 11 04	Cable Terminal – 350 kcmil on crossarm							1	1
12	12	B	54 08 317	Turner 34kV D Switch w LBRK.	1		1		1		1	
		54 08 314	Turner 34kV D Switch w/o LBRK		1		1		1		1	
		C	25 05 064	Insulator–Line Post	3	3	3	3	3	3	3	3
		D	18 52 009	Tie, Hand For Cu	3	3	3	3	3	3	3	3
		F	17 51 135	Clamp, PG. 450–1000 kcmil	3	3	3	3	3	3	3	3
		G	18 05 047	Wire, 556 AA.(ft)	45	45	45	45	45	45	45	45
		H	17 55 296	Lug, Comp, 350 cu.	6	6	6	6	6	6	6	6
		I	23 52 041	Bolt, 1/2” x 8”	12	12	12	12	12	12	12	12
		J	23 66 017	Washer–Round 9/16”	12	12	12	12	12	12	12	12
		K	17 55 192	Lug, Comp. 556 Al.	3	3	3	3	3	3	3	3
		L	23 52 065	Bolt, 5/8” x 12”	7	7	7	7	7	7	7	7
		M	23 66 027	Washer, Square , 11/16”	24	24	24	24	24	24	24	24
		N	54 08 328	Kit, 34.5 kV Switch	1	1	1	1	1	1	1	1
14@		O	32 01 821	Pipe, Steel Galv. 2” x 10’ w/Coupling	1	1	1	1	1	1	1	1
@		P	DEC*W	Deadend Clamp	3	3	3	3	3	3	3	3
		Q	41 56 021	Heel Brace, 5’–0” Wood	2	2	2	2	2	2	2	2
		R	41 01 023	Crossarm, 3–3/4” x 5–3/4” x 12	2	2	2	2	2	2	2	2
		S	23 52 069	Bolt, 5/8” x 18”	1	1	1	1	1	1	1	1
		T	23 52 049	Bolt, 5/8” x 2”	2	2	2	2	2	2	2	2
		U	23 66 006	Washer, Lock, 5/8”	2	2	2	2	2	2	2	2
		V	23 52 256	Bolt, 5/8” x 7”	4	4	4	4	4	4	4	4
		W	23 53 004	Bolt, Spacer, 5/8” x 20”	3	3	3	3	3	3	3	3
		X	23 65 012	EyenuT, 5/8”	3	3	3	3	3	3	3	3
		Y	23 51 015	Bolt, Clevis, 3/4” x 10”	3	3	3	3	3	3	3	3
		Z	23 65 018	EyenuT, 3/4”	3	3	3	3	3	3	3	3
		AA	23 77 210	Plate, Heel Brace, 13–3/8” to 19”	2	2	2	2	2	2	2	2
		BB	25 06 053	Insulator, Susp., 34 kV	3	3	3	3	3	3	3	3
		CC	23 66 133	Washer, Lock, 1/2”, Dbl. Coil	12	12	12	12	12	12	12	12
		DD	23 66 134	Washer, Lock, 5/8”, Dbl. Coil	7	7	7	7	7	7	7	7
		EE	18 51 021	Wire, Cu. #6 SD Covered	12	12	12	12	12	12	12	12
10 @	FF	12 69 11**	Grounding Unit on New Poles	1	1	1	1	1	1	1	1	1
		12 00 10 03	Grounding Unit on Existing Pole	1	1	1	1	1	1	1	1	1

CABLE TERMINALS
34 kV Single Circuit – Deadend – Cable Terminal
With Airbreak Switch – 750 kcmil and 350 kcmil

14 34 17 **

Sheet 5 of 6

Turner 34kV TSB Switch – New Installation

		Std. / Stk. No.	Materials Description	14 34 17 **	09	10	11	12	13	14	15	16
4	A	14 34 11 01	Cable Terminal – 750 kcmil on bracket	1	1							
		14 34 11 02	Cable Terminal – 750 kcmil on crossarm			1	1					
		14 34 11 03	Cable Terminal – 350 kcmil on bracket					1	1			
		14 34 11 04	Cable Terminal – 350 kcmil on crossarm							1	1	
13	B	54 08 437	Turner 34kV TSB Switch w/LBRK, Flat Top Mounting	1		1		1		1		
13		54 08 439	Turner 34kV TSB Switch w/o LBRK, Flat Top Mounting		1		1		1		1	
14 @	C	25 05 064	Insulator–Line Post	3	3	3	3	3	3	3	3	3
	D	18 52 009	Tie, Hand For Cu	3	3	3	3	3	3	3	3	3
	F	17 51 135	Clamp, PG. 450–1000 kcmil	3	3	3	3	3	3	3	3	3
	G	18 05 047	Wire, 556 AA. (ft)	45	45	45	45	45	45	45	45	45
	H	17 55 296	Lug, Comp, 350 cu.	6	6	6	6	6	6	6	6	6
	I	23 52 041	Bolt, 1/2" x 8"	12	12	12	12	12	12	12	12	12
	J	23 66 017	Washer–Round 9/16"	12	12	12	12	12	12	12	12	12
	K	17 55 192	Lug, Comp. 556 Al.	3	3	3	3	3	3	3	3	3
	L	23 52 065	Bolt, 5/8" x 12"	7	7	7	7	7	7	7	7	7
	M	23 66 027	Washer, Square , 11/16"	24	24	24	24	24	24	24	24	24
	N	32 01 821	Pipe, Steel, Galv. 2" x 10' w/Coupling	1	1	1	1	1	1	1	1	1
	P	DEC*W	Deadend Clamp	3	3	3	3	3	3	3	3	3
	Q	41 56 021	Heel Brace, 5'–0" Wood	2	2	2	2	2	2	2	2	2
	R	41 01 023	Crossarm, 3–3/4" x 5–3/4" x 12	2	2	2	2	2	2	2	2	2
	S	23 52 069	Bolt, 5/8" x 18"	1	1	1	1	1	1	1	1	1
	T	23 52 049	Bolt, 5/8" x 2"	2	2	2	2	2	2	2	2	2
	U	23 66 006	Washer, Lock, 5/8"	2	2	2	2	2	2	2	2	2
	V	23 52 256	Bolt, 5/8" x 7"	4	4	4	4	4	4	4	4	4
	W	23 53 004	Bolt, Spacer, 5/8" x 20"	3	3	3	3	3	3	3	3	3
	X	23 65 012	EyenuT, 5/8"	3	3	3	3	3	3	3	3	3
10 @	Y	23 51 015	Bolt, Clevis, 3/4" x 10"	3	3	3	3	3	3	3	3	3
	Z	23 65 018	EyenuT, 3/4"	3	3	3	3	3	3	3	3	3
	AA	23 77 210	Plate, Heel Brace, 13–3/8" to 19"	2	2	2	2	2	2	2	2	2
	BB	25 06 053	Insulator, Susp., 34 kV	3	3	3	3	3	3	3	3	3
	CC	23 66 133	Washer, Lock, 1/2", Dbl. Coil	12	12	12	12	12	12	12	12	12
	DD	23 66 134	Washer, Lock, 5/8", Dbl. Coil	7	7	7	7	7	7	7	7	7
	EE	18 51 021	Wire, Cu. #6 SD Covered	12	12	12	12	12	12	12	12	12
	FF	12 69 11**	Grounding Unit on New Pole	1	1	1	1	1	1	1	1	1
		12 00 10 03	Grounding Unit on Existing Pole	1	1	1	1	1	1	1	1	1

NOTES:

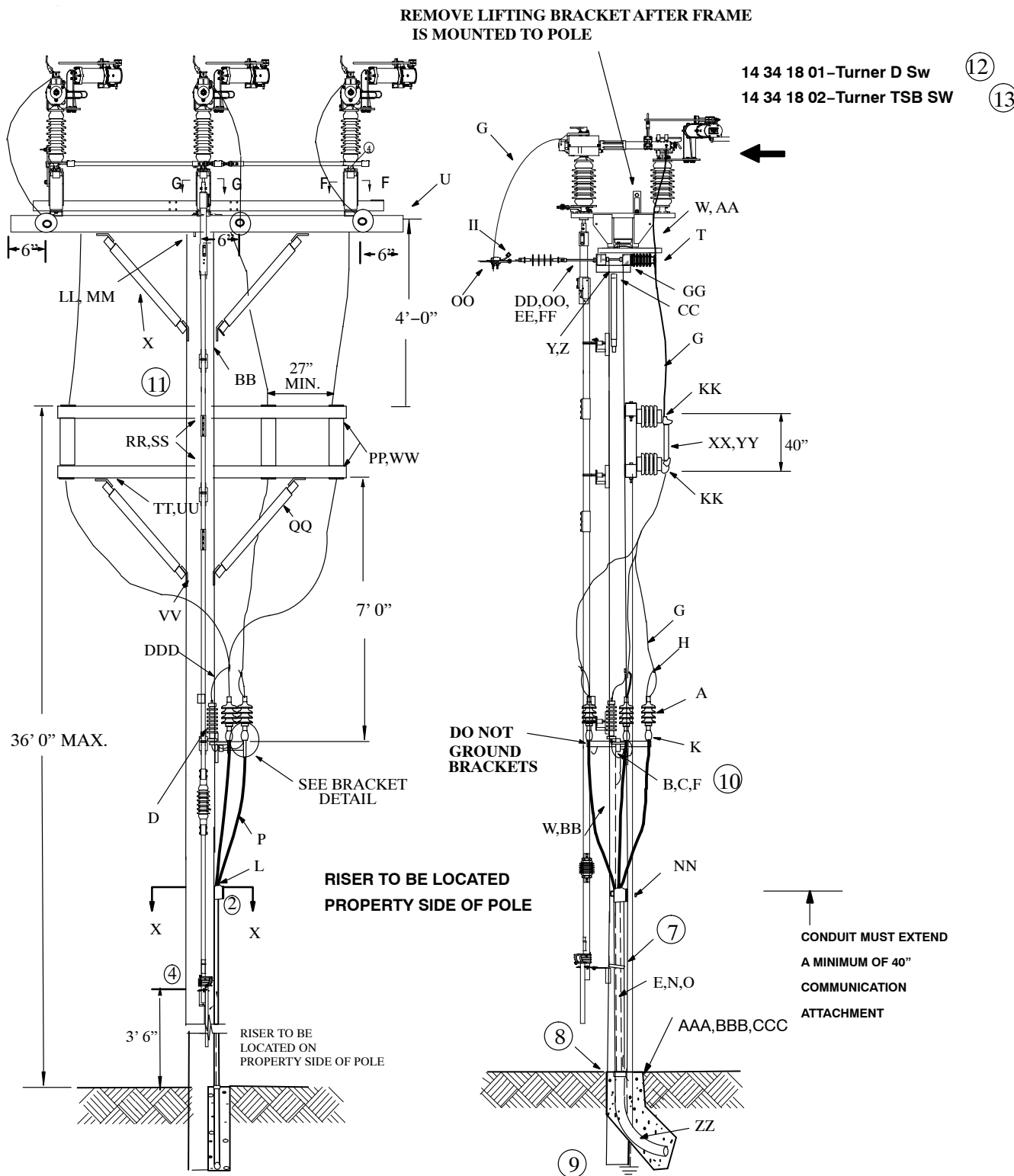
1. Switches & terminals shall be on separate poles whenever possible.
2. Locate switch operating rod & cable as shown on section XX to leave one side of pole clear for climbing. Install rod after terminators are placed.
3. Extend plastic riser to 12" above operating rod insulator.,
4. Maximum pole length 50 feet, otherwise check with construction. Conduit lengths may vary from those shown.
5. Do not install ground lead on terminator bracket or where it would bypass the operating rod insulator.
6. See DCS 14 34 11 ** for additional details.
7. Minimum bending radius is 24" for both the 750 kcmil and 350 kcmil cables.
8. If it is necessary to stand the riser conduit off of the pole, see DCS 14 00 01 03 for standoff bracket grounding requirements. Use standoff brackets 23 06 087, conduit straps 23 67 184, jam nuts 23 65 053, and double arm-ing bolts 23 53 003.
9. Concrete encasement is also required if riser conduit is on standoff brackets.
10. Use DCS 12 00 10 03 for ground rod application on existing pole and DCS 12 69 11 for ground new pole installation.
11. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
12. The switch is not for new installation.
13. The switch is for new installation.
14. Order additional vertical steel pipe only as needed.
15. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 Cu wire.

CABLE TERMINALS

34 kV Single Circuit – Deadend – Cable Terminal With Loadbreak Switch – 1/0

14 34 18 **

Sheet 1 of 4

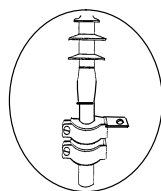
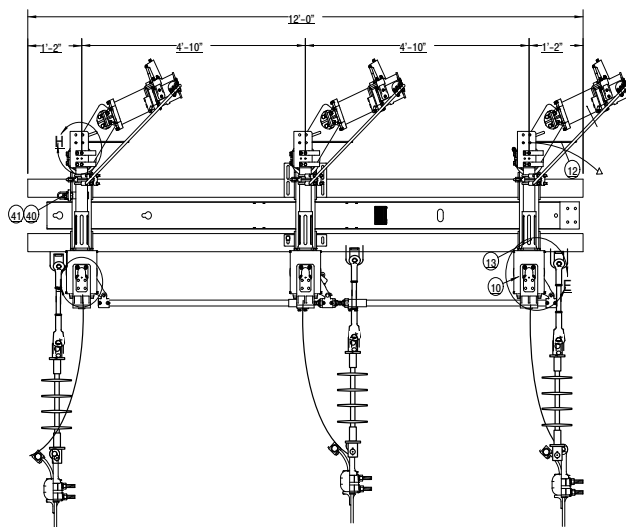


CABLE TERMINALS

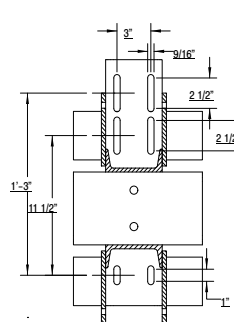
34 kV Single Circuit – Deadend – Cable Terminal With Loadbreak Switch – 1/0

14 34 18 **

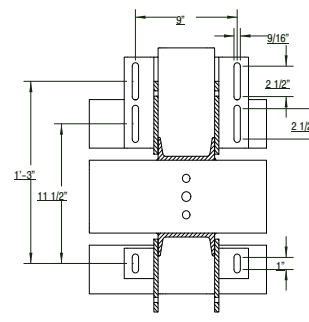
Sheet 2 of 4



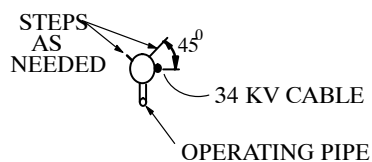
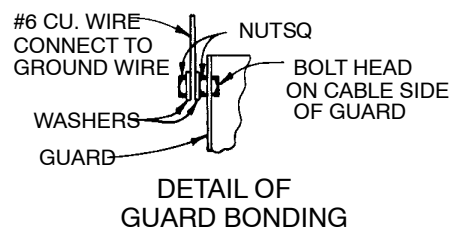
BRACKET DETAIL



SECTION F-F
(FOR OUTSIDE PHASES)



SECTION G-G
(FOR CENTER PHASE)



SECTION XX

CABLE TERMINALS
34 kV Single Circuit – Deadend – Cable Terminal
With Loadbreak Switch – 1/0

14 34 18 **

Sheet 3 of 4

		Std. / Stk. No.	Materials Description	14 34 18 **	01	02
	A	42 44 12 05	Termination, 35 kV, 1/0–750 kcmil		3	3
	B	23 52 070	Bolt, Machine 5/8" x 20"		3	3
	C	23 66 027	Washer, Square, 2 1/4"		3	3
	D	10 01 137	Arrester, Lightning, 27 kV		3	3
	E	23 60 005	Screw, Lag 3/8" X 3"		6	6
	F	17 08 058	Bracket, Terminator		1	1
	G	18 52 026	Wire, Cu. 1/0 Str., Bare		50'	50'
	H	23 78 183	Clamp, Hot Line, #6–400		1	1
	I	21 53 007	Bolt, Machine, 3/8" x 1 1/2"		1	1
9@	J	12 69 11	Grounding Unit on New Pole		1	1
		12 00 10 03	Grounding Unit on Existing Pole		1	1
	K	23 67 193	Bracket, Cable Support		3	3
	L	49 17 181	Strap, Poly., 2" x 36"		1	1
6	M	27 60 035	Iron Hanger		8'	8'
5	N	12 51 220	Conduit, Plastic, 5" Split		30'	30'
5	O	23 18 202	Guard, Conduit 5"		1	1
	P	18 07 291	Cable, 35 kV, 3–1/0 AL		35'	35'
	Q	21 61 006	Nut, Hex, 3/8"		2	2
	R	277	Install Cable Up Pole		1	1
12	S	54 08 317	Turner 34kV D Switch LBRK		1	
13		54 08 437	Turner 34kV TSB Switch LBRK–Flat Top			1
	NN	54 08 328	Kit, Mount Turner D Switch on Terminal Pole		1	1
	T	25 05 064	Insulator, Line Post		3	3
	U	41 01 023	Crossarm, 4" x 6" x 12'–0"		2	2
	V	23 52 069	Bolt, Machine, 5/8" x 18"		1	1
	W	23 66 027	Washer, Square, 2 1/4"		24	24
	X	41 56 021	Brace, Wood Heel, 5'–0"		2	2
	Y	23 52 049	Bolt, Machine, 5/8" x 2"		2	2
	Z	23 66 006	Washer, Lock, 5/8" Galv.		2	2
	AA	23 52 256	Bolt, Machine, 5/8" x 7"		4	4
	BB	23 52 065	Bolt, Machine, 5/8" x 12"		7	7
	CC	23 53 004	Bolt, Spacer, 5/8" x 20"		3	3
	DD	23 65 012	Eyenuit, 5/8"		3	3
	EE	23 51 015	Bolt, Clevis, 3/4" x 10"		3	3
	FF	23 65 018	Eyenuit, 3/4"		3	3
	GG	23 77 210	Plate, Heel Brace, 13 3/8" to 19"		2	2
	HH	25 06 053	Insulator, Susp., 34 kV		3	3
	II	17 51 032	Clamp, P.G., #6–1/0		3	3
	JJ	23 66 016	Washer, 3/8" Galv.		2	2
	KK	17 55 297	Lug, Comp., 1/0 Cu.		12	12
	LL	23 52 041	Bolt, Machine, 1/2" x 8"		12	12
	MM	23 66 017	Washer, Round, 1/2"		12	12

CABLE TERMINALS

34 kV Single Circuit – Deadend – Cable Terminal With Loadbreak Switch – 1/0

14 34 18 **

Sheet 4 of 4

		Std. / Stk. No.	Materials Description	14 34 18 **	01	02
@	OO	DEC*W	Clamp, Deadend – DCS 07 00 30 00		3	3
	NN	23 17 472	Cover, Riser Conduit for 2" – 4"		1	1
11@	PP	41 01 014	Crossarm, 3 1/2" X 4 1/2" X 8' 0"		2	2
		41 01 008	Crossarm, 3 1/2" X 4 1/2" X 10' 0"		2	2
	QQ	41 56 016	Brace, 60" V		1	1
	RR	23 52 065	Bolt, Machine, 5/8" x 12"		2	2
	SS	23 66 027	Washer, Square, 2 1/4"		6	6
	TT	23 52 038	Bolt, Machine, 1/2" x 6"		2	2
	UU	23 66 017	Washer, Round, 1/2"		2	2
	VV	23 52 063	Bolt, Machine, 5/8" x 10"		1	1
	WW	23 52 036	Bolt, Machine, 1/2" x 5"		12	12
	XX	54 03 048	Mounting, Fuse, 300A, SM-5		3	3
	YY		SM-5 Refill (Sized By Engr.)		3	3
	ZZ	12 51 206	Bend, 5", 36" Rad.		1	1
	AAA	23 67 036	Step, Pole 5/8" x 10"		2	2
8	BBB	11 04 110	Tube, Concrete 14" Dia.		4	4
8@	CCC	98 00 001	Concrete, 4SK		–	–
	DDD	18 51 021	Wire, Cu #6 SD Covered		12	12
3@	EEE	32 01 821	Pipe, Steel Galv. 2" x 10' w/Coupling		1	1

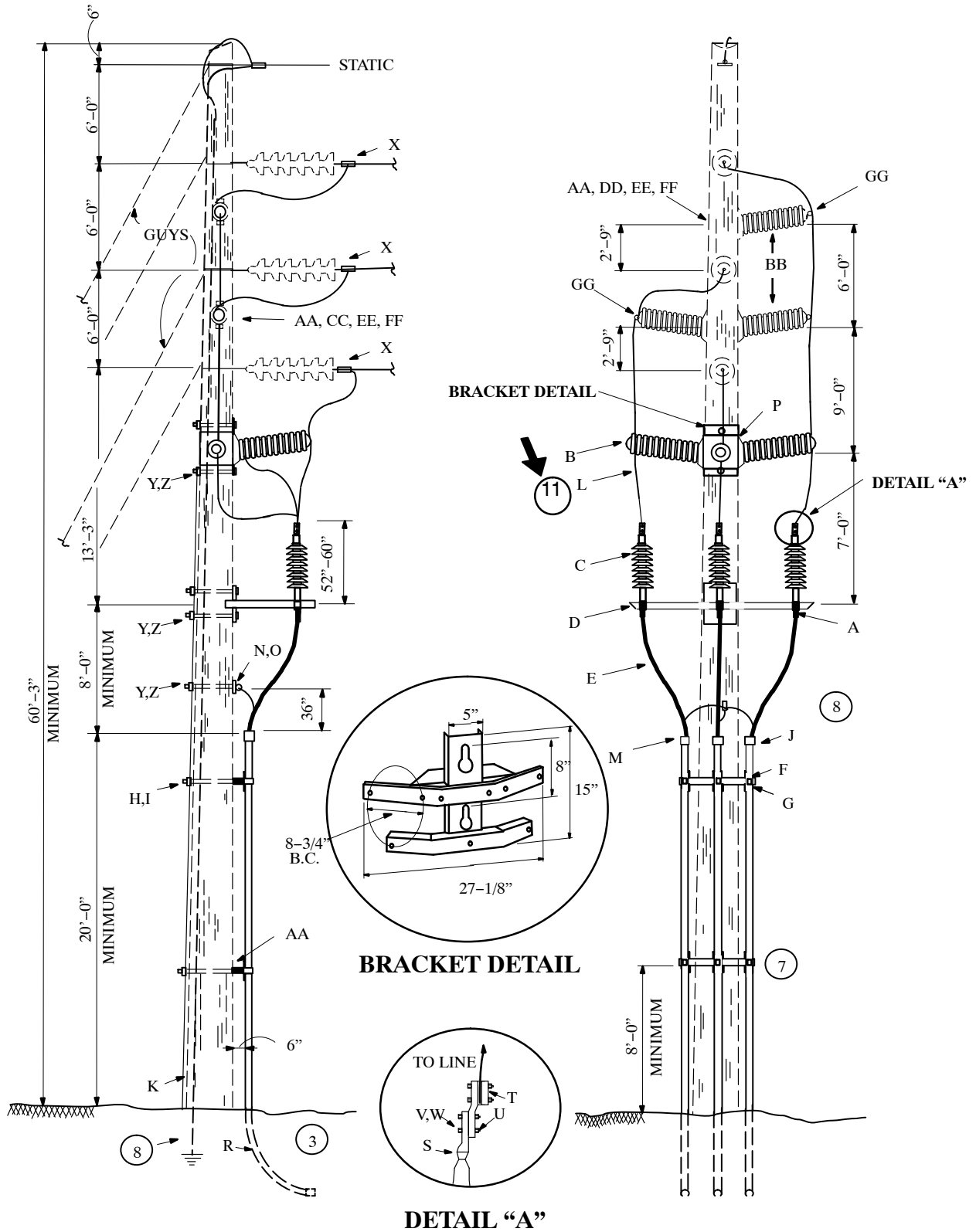
NOTES:

1. Locate switch operating rod & cable as shown on section XX to leave one side of pole clear for climbing.
2. Extend plastic riser to 12" above operating rod insulator.
3. Vertical steel pipe shipped with the switch is for maximum pole length of 50 feet, order additional vertical steel pipe as needed. Conduit lengths may vary from those shown.
4. Do not install ground lead on terminator bracket or where it would bypass the operating rod insulator.
5. Schedule 80 conduit may be substituted for the split conduit and guard. Use schedule 80 conduit (12-01-272) for the first section of the riser if installed on standoff brackets.
6. Conduit straps may be substituted for iron hangers.
7. If it is necessary to stand the riser conduit off of the pole, see DCS 14 00 01 03 for standoff bracket placement and grounding requirements. Use standoff brackets 23-06-087, conduit straps 23-67-184, jam nuts 23-65-053, and double aiming bolts 23-53-003.
8. Concrete encasement is also required if riser conduit is on standoff brackets.
9. Use DCS 12 00 10 03 for ground rod application on existing pole and DCS 12 69 11 for ground new pole installation.
10. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld ground wire for the #2 stranded copper wire when constructing the primary neutral buss.
11. 8' crossarm available AmerenMO only.
12. The switch is not for new installation.
13. The switch is for new installation.
14. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 Cu wire.

**DISTRIBUTION
CONSTRUCTION STANDARDS**



ENG: WYW
REV. NO: 7
REV. DATE: 12/15/15



NOTES:

1. Wrap cable with tape prior to installing the grip.
2. Positioner is used to secure the terminator to the bracket. The weight of the cable is supported by the cable grip.
3. Bends should be encased in concrete.
4. Minimum pole height 70'.
5. See DCS 59 52 00 43 for Belleville Washer installation procedures.
6. Cut bracket to required mounting length.
7. See DCS 14 00 01 03 for standoff bracket placement and grounding requirements.
8. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use 12 00 1003 for ground rod on an existing pole.
9. Always connect the metallic shields of the riser cables to the system neutral with at least a #2 stranded copper wire. Be aware that the bare and/or covered 7-strand #10 copperweld ground wire may look like stranded #2 copper wire. Never substitute the copperweld wire for the #2 stranded copper wire when constructing the primary neutral buss.
10. If there is no system neutral or shield wire available, install a pole ground per DCS 12 00 10 03 and bond all shields and ground wires to the #2 copper wire.
11. If avian protection is required, covered wire may be substituted for the bare 350 kcmil and 500 kcmil wire. If covered wire is needed, replace the bare 350 kcmil wire with Stock #1851052 and replace the bare 500 kcmil wire with stock #1851022.
Caution: The covered wire incorporates a XLP covering that has a maximum temperature rating of 90° C. If the circuit is expected to operate above 90° C, the bare wire should be used.

		Std. / Stk. No.	Materials Description	14 69 01	01	02	03
6,7	A	23 67 185	Positioner, Cable		3	3	3
	B	71 10 002	Arrester, Lightning, Intermediate, 60kV		3	3	3
	C	17 07 179	Terminator, 69kV		3	3	3
	D	17 08 058	Bracket, 60"		1	1	1
	E	18 07 283	Cable, 69kV, 500 kcmil, Al.		105		
		18 07 292	Cable, 69kV, 750 kcmil, Al.			105	
		18 07 408	Cable, 69kV, 1000 kcmil, Cu.				105
	F	23 06 099	Bracket, Standoff, 10'		1	1	1
	G	23 67 184	Straps, Conduit 5"		6	6	6
	H	23 53 046	Bolt, DA 5/8" x 36"		2	2	2
	I	23 65 053	Nuts, Jam		2	2	2
	J	12 01 272	Conduit, Sch. 80, 5"		60'	60'	60'
	K	12 00 10 04	Grounding Unit		1	1	1
	L	18 52 023	Wire, 350 Bare Cu.		60'	60'	
		18 52 021	Wire, 500 Bare Cu.				60'
1	M	23 17 220	Grip, Cable Riser, 3"-3.49" Dia., Split			3	3
		23 17 254	Grip, Cable Riser, 2.50"-2.99" Dia., Split		3		
3	N	23 65 012	Eyebut, 5/8", Oval Eye		1	1	1
	O	23 68 181	Shackle		1	1	1
	P	23 06 119	Bracket, 3 Phase Intermediate Arrester		1	1	1
	R	12 51 206	Bend, 5", 36" Rad.		3	3	3
	S	17 55 324	Lug, Compression, 500 Al., 2 Hole		3		
		17 55 260	Lug, Compression, 750 Al., 2 Hole			3	
		17 05 236	Lug, Compression, 1000 Cu., 2 Hole				3

CABLE TERMINALS

69 kV Terminal Pole

14 69 01 **

→500 kcmil–1000 kcmil Cables

Sheet 3 of 3

5 @	T	17 54 177	Connector, Cable to Flat, Bronze, 1/0–500 kcmil	3	3	3
	U	21 56 078	Bolt, Machine, 1/2" x 2", SS	6	6	6
	V	12 56 052	Washer, Belleville Spring, 1/2", SS	6	6	6
	W	12 56 053	Washer, Flat, 1/2", SS	12	12	12
	X	PG*	See 07 00 25 00	3	3	3
	Y	23 52 069	Bolt, Machine, 5/8" x 18"	5	5	5
	Z	23 66 027	Washer, Square, For 5/8" Bolt	5	5	5
	AA	23 66 031	Washer, Curved, 3/4"	6	6	6
	BB	25 05 098	Ins., Porc., N–Neck Tie Top, Stud Mount 69kV	3	3	3
	CC	23 52 219	Bolt, DA 3/4" x 14"	1	1	1
	DD	23 52 097	Bolt, DA 3/4" x 12"	1	1	1
	EE	23 65 042	Nut, Lock Type M–F	3	3	3
	FF	23 66 135	Washer, Double Coil Spring, 3/4"	3	3	3
	GG	18 52 009	Wire, Hand Tie, 6 AWG Bare CU, SD	3	3	3