FUSES & SWITCHES 10

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1. **SWITCHES FOR 2.4 KV THROUGH 14.4 KV APPLICATIONS**

   A. Fused Switches – (for link type expulsion fuses)

   All fused switches are stocked with a cartridge (fuse tube). Cartridges are available for replacement only.

   The 15 kV, 100 amp, 110 kV BIL, open style fused switch (Stock Number 54–07–208) may be used on 2.4 kV through 14.4 kV circuits. This switch will be used in nearly all new installations and replacements where practical.

   The 15 kV, 200 amp, 110 kV BIL, open style fused switch (Stock Number 54–07–209) may be used on 2.4 kV through 14.4 kV circuits. This switch will be used in nearly all new installations and replacements where practical.

   The 27 kV, 100 amp, 125 kV BIL, open style fused switch (Stock Number 54–07–240) may be used on 7.2 kV through 14.4 kV circuits. It shall not be used on 2.4/4.16 kV circuits. This switch (for years the most commonly installed) will not be frequently used.

   The 5 kV, 100 amp porcelain enclosed fused switch (Stock Number 54–06–046) may be used on 2.4/4.16 kV circuits where the 15 kV switch does not have adequate clearance, and for special replacements.

   B. Solid Blade Switches

   The 15 kV, 300 amp, 110 kV BIL, open style switch (Stock Number 54–07–210) may be used on 2.4 kV through 14.4 kV circuits. The 15 kV, 100 amp fused switch can be converted to a 300 amp device by removing the cartridge and inserting a solid blade (Stock Number 54–07–243).

   The 27 kV, 100 amp fused switch (Stock Number 54–07–240) can be converted to a 200 amp device by removing the cartridge and inserting a solid blade (Stock Number 54–07–199).

   The 5 kV, 200 amp porcelain enclosed switch (Stock Number 54–06–047) may be used on 2.4/4.16 kV circuits. The 5 kV, 100 amp porcelain enclosed fused switch can be converted to a 200 amp device by removing the cartridge and inserting a solid blade (Stock Number 54–06–049). 5 kV porcelain enclosed switches should be used only where the 15 kV switch does not have adequate clearance, and for special replacements.

   The 15 kV, 600 amp underslung switch (Stock Number 54–07–204) may be used on 2.4 kV through 14.4 kV circuits. The switch blade is attached and cannot be removed.

   The 15 kV, 600 amp single insulator disconnect switch (Stock Number 54–07–296) may be used on 2.4 kV through 14.4 kV circuits in terminal pole applications. The switch blade is attached and cannot be removed.

   The 15 kV, 600 amp open style in line switch (Stock Number 54–07–205) may be used on 2.4 kV through14.4 kV circuits only where special conditions warrant.

   C. Group Operated Switches

   The 15 kV, 600 amp, group operated switch, (Stock Number 54–07–239) may be used on terminal poles serving padmount transformers to prevent ferroresonance, or on primary metering poles where three phase disconnection is required. The switch is equipped with load interrupters. The switch mounts on the face of the pole on a horizontal beam below the overhead connections. It may be used on 2.4 kV through 13.8 kV circuits.

2. **SWITCHES FOR 19.9/34.5 KV APPLICATION**

A. Single Phase Switches

The 27 kV, 100 amp, 150 kV BIL fused switch (Stock Number 54−07−234) can be used for applications thru 34.5kV if on single phase to neutral or three phase solidly grounded WYE connected circuits where the TRV (Temporary Recovery Voltage) does not exceed 27kV.

The 34.5 kV, 200 amp, SMD−20 fused switch (Stock Number 54−06−052) may be used on 19.9/34.5 kV capacitor banks or conventional transformers if asymmetrical fault current is greater than 12 kA but not more than 16 kA. For asymmetrical fault currents above 16 kA contact Standards.

The 34.5 kV, 900 amp underslung switch (Stock Number 54−07−302) may be used on 14.4/24.9 kV and 19.9/34.5 kV circuits or lower distribution voltage circuits where loads in excess of 600 amps are anticipated and clearances permit. The switch blade is attached and cannot be removed.

B. Group Operated Switches

The 34.5 kV, 1200 amp, frame mounted switches without loadbreak interrupter shall be used on circuits where sectionalizing requires simultaneous interruption of all three phases. It is generally capable of interrupting charging current.

The 34.5 kV, 1200 amp, frame mounted switches with loadbreak interrupters shall be used on circuits where sectionalizing requires simultaneous interruption of all three phases and where interruption of load or circulating current is required.

The non−loadbreak switch may be converted to loadbreak interrupting by the addition of loadbreak interrupters. These switches have a mounting bracket to attach the load interrupter units. Installation instructions are included with each switch and kit.

Non−frame mounted, group operated switches (Stock Number 54−08−316) are to be scrapped when removed. Send switches to Dorsett for spare parts.

In addition to the switch bodies (mounting base, insulators and hot parts,) each switch should also include 1−5', 1−13.5', and 1−17.5' piece of 2" diameter Schedule 40 galvanized steel vertical pipe complete with pipe guides. One 8' insulating fiberglass insulator and one 34kV TR210 skytone gray porcelain station post operating rod insulator with provisions for attaching to the vertical operating pipe (for isolating the 34kV from underbuilt circuits) and from the switch operating handle shall be included. The switch operating handle shall have provisions to ground to a driven ground electrode. All switches shall comply with ANSI 37.30 and related ANSI Standards.

34kV Standard Group Operated Switches:

Stock No. (Note)	kV	Amp	Switch without or with Interrupters	Weight (Lbs.)
54-08-433	34.5	1200	Turner TS2, Three Phase with LBRK – Vertical Mount	999
54-08-437	34.5	1200	Turner TS2, Three Phase with LBRK – Flat Top Mount	999
54-08-438	34.5	1200	Turner TS2, Three Phase with LBRK – Terminal Pole Mount	999
54-08-442	34.5	1200	Seeco, Three Phase with LBRK – Vertical Mount	1400
54-08-447 (1)	34.5	1200	Seeco, Three Phase with LBRK – Flat Top Mount	1300
54-08-446	34.5	1200	Seeco, Three Phase with LBRK – Terminal Pole Mount	1150

Note:

1.Differential tension shall not exceed 333 pounds per phase using the DE tension listed in DCS **07 00 07 03.**

3. **SWITCHES FOR 69 KV APPLICATION – Group Operated Switches**

The 69 kV, 1200 amp, frame mounted switches without loadbreak interrupter shall be used on circuits which are capable of interrupting charging current :

The 69 kV, 1200 amp, frame mounted switches with loadbreak interrupters shall be used on circuits where sectionalizing requires simultaneous interruption of all three phases and where interruption of load or circulating current is required.

69kV Standard Group Operated Switches:

Stock No.	kV	Amp	Switch without or with Interrupters	Configuration
54 09 393	69	1200	Turner, CS2, Three-Phase GOP Switch without LBRK Interrupter	Triangle or Delta
54 09 395	69	1200	Turner, CS2, Three-Phase GOP Switch with LBRK Interrupter	Triangle or Delta
54 09 392	69	1200	Turner, CS2, Three-Phase GOP Switch without Interrupter	Phase over Phase
54 09 394	69	1200	Turner, CS2, Three-Phase GOP Switch with LBRK	Phase over Phase
54 09 369	69	1200	SEECO, Three Phase GOP Switch without Interrupters	Triangle or Delta
54 09 035	69	1200	SEECO, Three Phase GOP Switch with Interrupters	Triangle or Delta
54-09-368	69	1200	SEECO, Three Phase Switch without Interrupters	Phase over Phase
54-09-370	69	1200	SEECO, Three Phase Switch with Interrupters	Phase over Phase

In addition to the switch bodies (mounting base, insulators and hot parts,) each switch should also include 3–21' sections of 2" schedule 40 galv. steel operating pipe, one U–joint for operating pipe plus all necessary hardware for assembling insulators and live parts to switch bases shall be included. One 8' insulating fiberglass insulator and 1–34 kV TR210 skytone gray porcelain station post operating rod insulators with provisions for attaching to the vertical operating pipe for isolating the control mechanism from underbuilt circuits. The switch operating handle shall have provisions for grounding to a driven ground rod or a formed ground electrode. All switches shall comply with ANSI 37.30 and related ANSI Standards.

4. **MOTOR OPERATOR**

Motor operators shall include a 24 volt battery (or two 12 volt batteries in series), battery charger (powered by 120 VAC), a 24VDC to 12VDC converter (if single 24V battery provided) to power RTU and radio, a swing−out door to mount radio and RTU, remote/local switch with position terminal to provide dispatch status, low voltage DC and loss of AC alarm relays, knife blade switch plus weatherproof supply conduit for 120VAC.

Secondary arrester should be installed from factory at entrance of motor operator cabinet on 120V supply.

The following stock coded motor operators come pre−wired for an RTU. The RTU is optional and has to be ordered separately. Please contact Standards Engineering if RTU is to be installed in the motor operator cabinet by the manufacturer.

List of Motor Operators:

	Stock No.	kV		Description
	54 08 416	34	24VDC	Motor operator for Turner 34kV D switch
	54 08 430	34 or 69	24VDC	Motor Operator for Turner 34 (TSB) or 69kV (CSB) Switch
	54 09 349	69	24VDC	Motor operator for Turner 69kV D switch
	54 09 371	34 or 69	24VDC	Motor operator for SEECO 34 or 69kV switch
	54 02 011	–	–	GE Ibox RTU
	54 02 031			Novatech Orion RTU

5. **RECOMMENDED LEAD SIZE**

When a switch is used for sectionalizing circuits, the tap conductor (load side of switch) will determine the size of the switch leads. Poly covered soft drawn copper wire shall be used for leads to open style switches, as indicated in Standard **07 00 80 00**. EPR, 2400 volt, insulated copper wire shall be used to connect porcelain enclosed switches, as indicated in Standard **07 00 81 00**.

When a switch is used for underground cable feeds, the lead from the open style switch to the line conductor shall be poly covered soft drawn copper wire, while the lead to the terminator shall be poly covered hard drawn or soft drawn copper wire as indicated in the appropriate terminal pole Standard.

When a fused switch is used to connect a device such as a transformer or capacitor, the lead size will be specified in that particular equipment section of the Standards book.

Group operated 34.5 kV & 69 kV, 1200 amp switch leads shall be the same as the line conductor. The leads will be attached to the switch per Standard **07 00 30 00** with 556.6 kcmil or 954 kcmil lugs.

6. **OVERCURRENT PROTECTION**

A. Fuse Links – Expulsion Type

Fuse links are used in fused switches to protect the circuit by isolating overhead feeder taps, underground cable circuits, conventional transformers, and capacitor banks on the distribution system.

The use of 200 amp fuses shall be reviewed by a System Protection Engineer for coordination.

B. Power Fuses (Solid Material) and Mountings

Power fuses are used for higher current ratings, greater interrupting capacity, coordination requirements, and other special conditions such a contaminated atmosphere and limited space.

The solid material fuse element is called a Refill. The Refill is held by a Fuseholder, which is placed in a Mounting. The stock number of the Mounting includes the Fuseholder.

Solid material fuses are specified by voltage and current. The Mountings are also specific to these Refills.

Refil Type	Rated Voltage	Refill Amperage Available	Interrupting Amps Asymm./Symm.*	Overhead Mounting Stock Number	Padmount Swgr. Mounting Stock Number
SM–4	7.5 kV	15–200	27,500/15,600	54–03–050	
SM–4	14.4 kV	20–200	20,000/12,500	54–03–060	***
SM–4	34.5 kV	65–125	10,000/6,250	54–03–054	
SM–5	7.5 kV	50–400	44,500/26,000	54–03–051	
SM–5	14.4 kV	30–250	40,000/25,000	54–03–064	54–07–226/233
SM–5	25 kV	30–250	32,000/20,000	54–03–053	
SM–5	34.5 kV	1–250	28,000/17,500	54–03–048	
SMU**	14.4 kV	100–200	22,400/14,000	54–06–050	54–07–212/213/ 216/217
SMU**	34.5 kV	1–200	16,000/10,000	54–06–052	

* Asymmetrical amperages shown are at normal applied system voltages (2.4/4.16 kV, 7.2/12/47 kV 14.4/24.9 kV, 19.9/34.5 kV), not the nominal rated voltage of the device.

** The SMU Refills do not have separate Fuseholders. They fit directly into the SMD–20 units. The end fittings on the old Refill is reused on the new Refill

*** Ameren Missouri switchgear prior to 2001 contains SM–4 Fusing.

The overhead SM–4 and SM–5 fuse holders are not loadbreak devices but may be opened and closed with a hook stick.

The 14.4 kV, SMD–20 switch (which uses the SMU fuses) is a loadbreak device and may be opened and closed with a hook stick while using the Loadbuster tool. Mount spare refill holder (mounting: Stock Number 40–04–242) 10' above ground on pole.

Liquid power fuses are no longer available.

C. Reclosers and Sectionalizers

Reclosers and sectionalizers are used to protect circuits by isolating a faulted section of a circuit. They shall be used on circuits 14.4 kV and below. All available reclosers and sectionlizerss are identified in the Materials and Tools Catalog. Refer to EDD (Electrical Distribution Design) article PS–50 covering reclosers and sectionalizers

D. Tripsavers

Tripsavers are cutout mounted electronic reclosers that are powered by line current using an internal CT. There are 40 amp, 100 amp and 200 amp models that can carry their rated current continuously. Common size fuse T–links have stock numbers for Tripsavers that are already programmed with T–link TCC curves. There are also stock numbers for Tripsavers that are not already programmed.

Tripsavers have a symmetrical fault current rating of 6.3 kA while Ameren's standard 100 amp fused cutout has a symmetrical fault current rating of 10 kA and the 200 amp cutout is rated for 7.5 kA. A Tripsaver requires a minimum level of current to initially power up: 1 amp for 40 amp model, 4 amps for 100 amp model and 8 amps for 200 amp model. To power the control, the current must not fall below: 0.5 amps for 40 amp model, 1.5 amps for 100 amp model and 3 amps for the 200 amp model. If the current falls below this threshold, the Tripsaver can rely on fault current to power up the Tripsaver, but there could be a delay in operation depending on the fault current level.

7. **TRANSFORMER FUSING**

A. Types of Fuses

Link fuses (T and X) shall be used in fused switches to isolate most Conventional (C), Protected (P), and Completely Self Protected (CSP) transformers which are: 1) pole mounted, or 2) pad mounted and isolated by a fused terminal pole.

Power fuses (SMU, SM–4, or SM–5) shall be used to isolate Conventional (C), Protected (P), and Completely Self Protected(CSP) transformers when ***any*** of the following conditions exist:

1) the fault interrupting requirements are above the capacity of the link type fused switch (100 amp fused switch, 54–07–208, 10kA asymm. @ 15kV, 16kA asymm. @ 2.4kV) (100 amp fused switch 54–07–234, 12 kA asymm. @ 27 kV) (200 amp fused switch, 54–07–209, 12kA asymm. @ 15kV, 16kA asymm. @2.4kV)

2) a pole mounted transformer and the fuse rating is greater than 100 amps (three phase transformers larger than 500kVA @4.16 kV, or 1500 kVA @12.47 kV)

3) the transformer is fed by padmounted switchgear.

Contact Distribution Standard Engineer for fuses rated above 100 amps.

External fuses shall be used to isolate Completely Self Protected (CSP) transformers, unless the transformer is not installed on the backbone, existing pole space does not allow for installation of a fused switch, and the number of customers that could be affected by transformer failure is deemed acceptable.

B. Link Fuses For All Ameren Single Phase Pole Mount Transformers (Bold indicates new common sizes).

SINGLE PHASE TRANSFORMERS				
kVA	SYSTEM VOLTAGE			
	2400V Delta **4160V Grd. Y/2400V**	7200V Delta **12470V Grd. Y/7200V** 13200V Grd. Y/7620V 13800V Grd. Y/7970V	14400V Delta 24940V Grd. Y/14400V	34500V Grd. Y/19920V
1	–	3/4X	–	–
3	3–1/2X	3–1/2X	3–1/2X	–

5	3–1/2X	3–1/2X	3–1/2X	–
7.5	3–1/2X	3–1/2X	3–1/2X	–
10	5–1/2X	3–1/2X	3–1/2X	3/4X
15	7X	3–1/2X	3–1/2X	1X
25	**15T**	**8T**	3–1/2X	1–1/2X
37	20T	7X	3–1/2X	–
50	**30T**	**10T**	5–1/2X	3–1/2X
75	**50T**	**15T**	7X	4X
100	**65T**	**20T**	10T	7X
150	100T	30T	15T	–
167	**100T**	**30T**	15T	–
200	100T	40T	20T	–
250	**140T**	**40T**	25T	–
333	**140T**	**50T**	25T	–
500	–	**80T**	50K	–

THREE PHASE TRANSFORMERS – SINGLE UNIT OR BANKS				
kVA*	SYSTEM VOLTAGE (PHASE–TO–PHASE)			
	2400V	4160V	7200V	**12470V**, 12000V, 13200V, 13800V, 14400V
9	3–1/2X	3–1/2X	3–1/2X	3–1/2X
15	5–1/2X	3–1/2X	3–1/2X	3–1/2X
30	10T	5–1/2X	3–1/2X	3–1/2X
45	15T	7X	5–1/2X	3–1/2X
75	**25T**	**12T**	7X	**8T**
112	40T	20T	12T	7X
150	**50K**	**25T**	15T	**10T**
225	65T	40T	25T	15T
300	100T	**50T**	30T	**20T**
450	140T	100T	50K	30T
500	140T	**80T**	50K	**30T**
600	200T	100T	65T	40T
750	200T	**140T**	65T	**40T**
1000		**140T**	100T	**50T**
1500				**80T**
2000				**100T**
2500				**140T**

***** Three–phase kVA or 3x single phase kVA.

For three–phase banks with closed delta secondary where one of the transformers is larger than the other two (grounded mid–tap 120/240 Volt), select fuse for each transformer from the above fuse link table based on the individual transformer kVA and system voltage.

Example: 1–100kVA and 2–25kVA transformers on 4160 GrdY/2400 V circuit

From above fuse link chart:

100kVA – use 300kVA line and 4160 V column to select 50T fuse

2–25kVA – use 75kVA line and 4160 V column to select 12T fuses.

C. Power Fuses for Single−Phase Pole Mounted Transformers

kVA	SMU−20 Fusing		SM−4 Fusing	SM−5 Fusing
	4.16kV	12.47kV	4.16kV	4.16kV
25	15 E Slow	10 E Std.	15 E Slow	15 E Slow
50	30 E Slow	10 E Std.	30 E Slow	30 E
75	50 E Slow	15 E Slow	50 E Slow	50 E Std.
100	65 E Slow	20 E Slow	65 E Slow	65 E Slow
167	100 E Slow	30 E Slow	100 E Slow	100 E Slow
250	150 E Slow	40 E Slow	150 E Slow	150 E Slow
333	200 E Std.	50 E Slow	200 E Std.	200 E Std.
500		80 E Slow		300 E Std.

Power Fuses for Transformers

kVA	SMU−20 Fusing		SM−4 Fusing	SM−5 Fusing
	4.16kV	12.47kV	4.16kV	4.16kV
75	15 E Slow	10 E Std.	15 E Slow	15 E Slow
150	25 E Slow	10 E Std.	50 E Slow	25 E Slow
300	50 E Slow	20 E Slow	50 E Slow	50 E Slow
500	80 E Slow	30 E Slow	80 E Slow	80 E Slow
750	150 E Slow	40 E Slow	150 E Slow	150 E Slow
1000	200 E Std.	50 E Slow	200 E Std.	200 E Std.
1500		80 E Std.	*	300 E Std.
2000		100 E Std.	*	400 E Std.
2500		150 E Std.	*	400 E Std.

* 4.16 kV Transformers over 750 kVA, or feeders over 2 miles in length will require further review by Energy Delivery Technical Services.

** 12.47 kV Transformers over 1,000 kVA, or feeders over 5 miles in length will require further review by Energy Delivery Technical Services.

Padmounted switchgear shall use SMU refills. Prior to 2001, AmerenUE used SM−4 refills.

Bay−O−Net Fuses for Loop Feed Pad Mounted Transformers − See DCS 59 51 53 40

8. **CAPACITOR FUSING**

A. Fusing for Ameren Capacitor Banks

Capacitors installed on lines at 2.4 kV through 34.5 kV shall be fused with expulsion type link fuses except as noted.

Three Phase kVAR	Phase to Phase Voltage							
	2400 V	4160 V	7200 V	12470 V	13200 V	13800 V	14400 V	34500 V
150	40 T	25 T	12 T	10 T	10 T	10 T		
300	100 K	40 T	25 T	15 T	15 T	12 T	12 T	
450		65T		25T	20 T			
600	140 T	80 T	50 K	30 T	30 T	25 T	25 T	
900***			65T	40 T	40 T			
1200**				65 T	65 T		50 K	
2400								*
4500								**

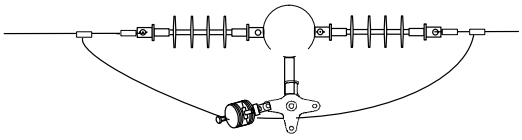
* Use a 50 K fast refill (20−04−343) in a SMD−20 fused switch (54−06−052) if available fault current is less than 16 kA asymm.
Use a 50 Std. refill (20−04−340) in a SM5 fuse mounting (54−03−048) if available fault current is greater than 16 kA asymm. but not more than 28 kA asymm.
Contact Distribution Standards for construction details.

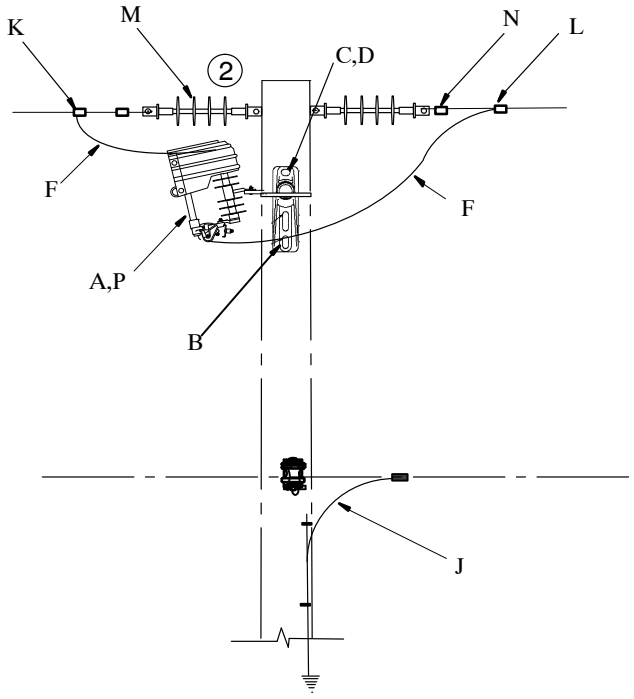
** Use a 80 E Slow refill (20−04−355) in a SMD−20 fused switch (54−06−052) if available fault current is less than 16 kA asymm.
Use a 80 E Slow refill (20−04−233) in a SM5 fuse mounting (54−03−048) if available fault current is greater than 16 kA asymm. but not more than 28 kA asymm.
Contact Distribution Standards for construction details.

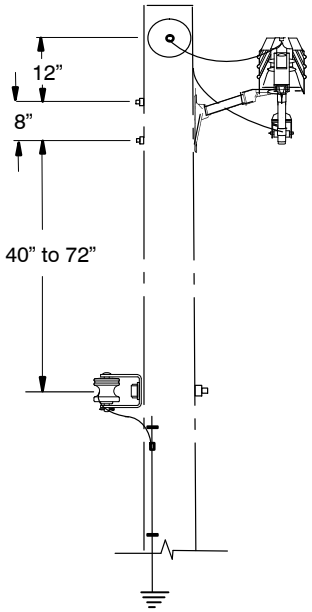
*** Bank composed of 6 − 150 kVAR units

**** Bank may be composed of 6 − 200 kVAR units

100 AMP FUSED	10 12 01 01
200 AMP FUSED	10 12 01 02
300 AMP SOLID BLADE	10 12 01 03





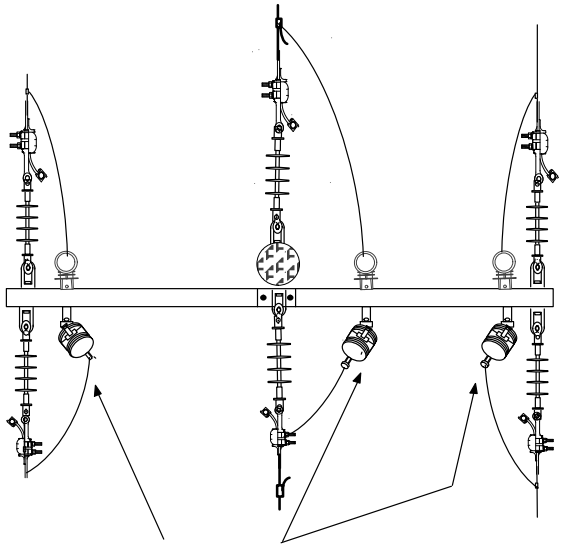


NOTES:

1. Use DCS **12 00 10 01** for ground coil application on new pole installation.
2. Double deadend on pole w/o FG extension available AmerenMO only.

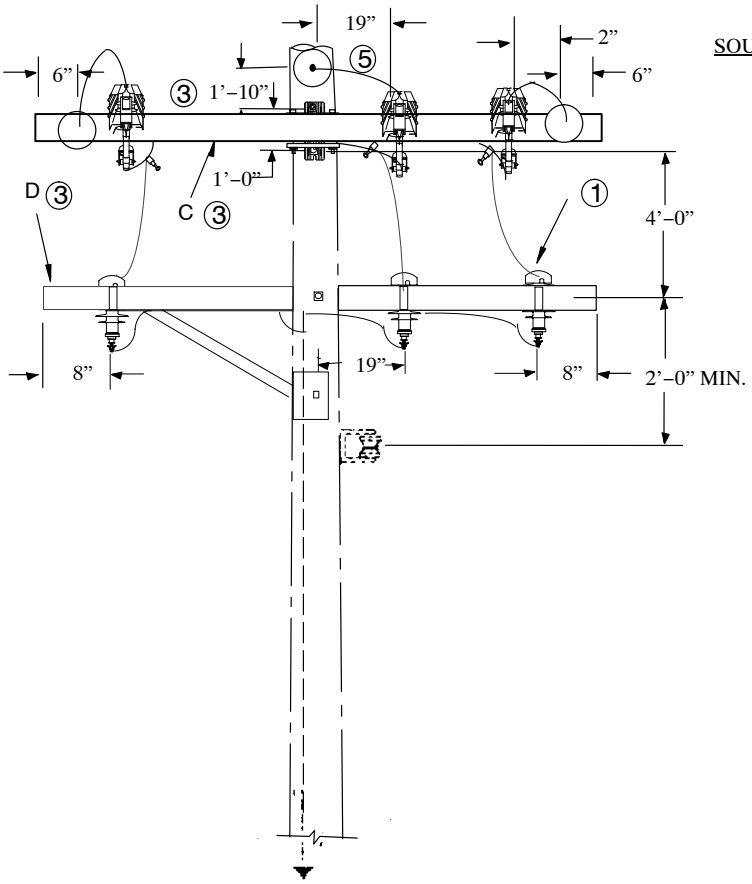
		Stnd. / Stk. No.	Description 10 12 01 **	01	02	03
	A	54 07 208	Switch, Fuse, 100A, 15kV	1		
		54 07 209	Switch, Fuse, 200A, 15kV		1	
		54 07 210	Switch, Solid Blade, 300A, 15kV			1
	B	23 56 063	Bracket, Fiberglass, Switch and Arrester	1	1	1
	C	23 52 065	Bolt, Mach., 5/8" x 12"	2	2	2
	D	23 66 027	Washer, Square, 5/8"	2	2	2
@	F	PLW*P	Wire, CU, Poly, SD, (ft.), DCS **07 00 80 00**	15	15	15
1@	J	**12 00 10 02**	Grounding Unit – Ground Rod	1	1	1
		12 00 10 01	Grounding Unit – Ground Coil	1	1	1
@	K	PG*	Clamp, Parallel Groove, DCS **07 00 25 00**	1	1	1
2@	M	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1	1	1
		06 12 30 13	Dbl Deadend on Pole w/o FG Extension	1	1	1
@	N	DEC*W or DEA*W	Clamp, Deadend, DCS **07 00 11 00**	2	2	2
@	O		Link, Fuse (Sized by Engineer)	1	1	1
	P	**05 15 10 01**	Cover, Cutout	1	1	1

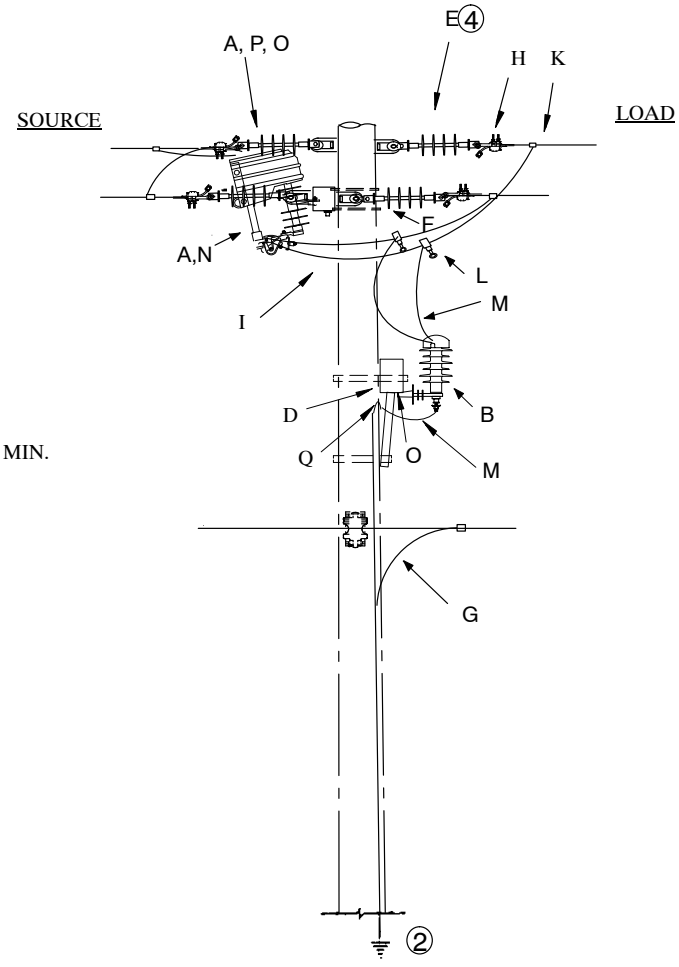
MISSOURI ONLY



TURN SWITCHES TOWARD POLE

100 AMP. FUSED	10 12 10 01
200 AMP. FUSED	10 12 10 02
300AMP. SOLID BLADE	10 12 10 03



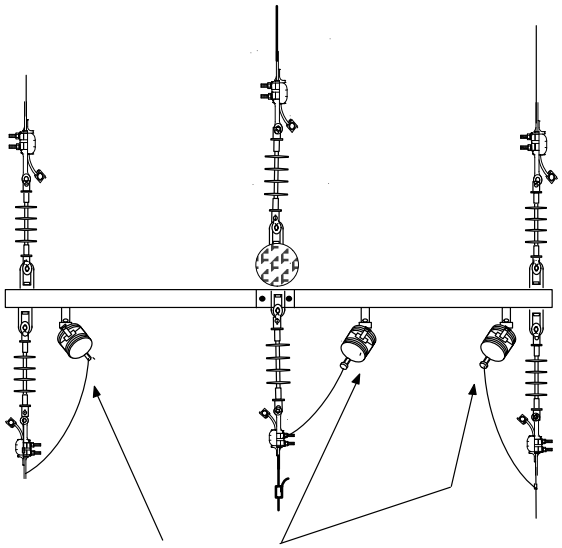


NOTES:

1. This installation is permissible for existing installation in Missouri. For new installations, arresters are not required for normally closed switch installations. Where switches are normally open, install arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. Use DCS **12 00 10 01** for ground coil application on new pole installation.
3. Double deadend on pole w/o FG extension available AmerenMO only.
4. Underbuild construction requires deadend on pole w/FG extension.

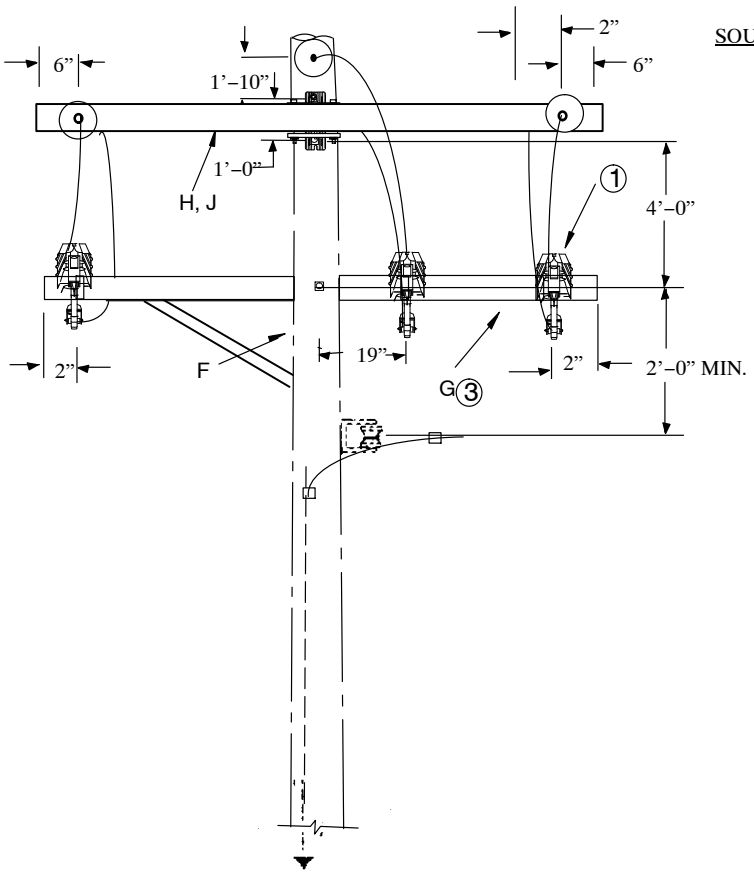
		Stnd. / Stk. No.	**Description** **10 12 10 ****	**01**	**02**	**03**
	A	54 07 208	Switch, Fuse, 100A., 15kV	3		
		54 07 209	Switch, Fuse, 200A., 15kV		3	
		54 07 210	Switch, Solid Blade, 300A., 15kV			3
1@	B	10 01 144	Arrester, 10kV w/Protective Cap	3	3	3
		10 01 133	Arrester, 3kV w/Protective Cap	3	3	3
@	C	**04 00 41 03**	Crossarm, Deadend, FG, 8’	1	1	1
		04 00 41 04	Crossarm, Deadend, FG, 10’	1	1	1
@	D	**04 00 20 03**	Crossarm, Sgl, Wood, 10’ (use only 1/2 of V–Brace)	1	1	1
		04 00 20 02	Crossarm, Sgl, Wood, 8’ (use only 1/2 of V–Brace)	1	1	1
3@	E	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1	1	1
		06 12 30 13	Dbl Deadend on Pole w/o FG Extension	1	1	1
	F	**06 12 34 05**	Double Deadend on Arm	2	2	2
2	G	**12 00 10 02**	Grounding Unit – Ground Rod	1	1	1
@	H	DEC*W or DEA*W	Clamp, Deadend	6	6	6
@	I	PLW*W	Wire, Poly covered, S.D. (ft.)	30	30	30
@	J	PG*	Clamp, Parallel Groove (See Std. 07 00 25 00)	3	3	3
		HLC*W	Clamp, Hot Line	3	3	3
@	K	PG*	Clamp, Parallel Groove (See Std. 07 00 25 00	3	3	3
	L	23 78 183	Clamp, Hot Line	3	3	3
	M	18 51 021	Wire, Poly Covered, #6 Cu., (Ft.)	15	15	15
@	N		Link, Fuse (Sized by Designer)	3	3	
	O	17 58 054	Bracket, Mounting Switch, Arrester	6	6	6
	P	**05 15 10 01**	Cover – Cutout	3	3	3
	Q	17 54 182	Connector, Split Bolt	2	2	2

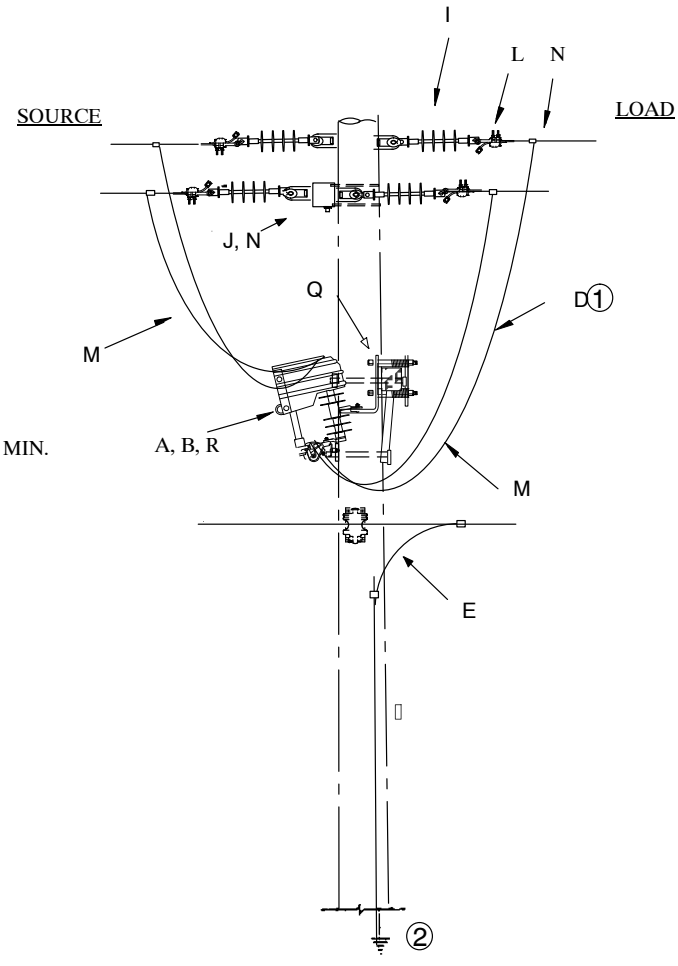
ALTERNATIVE 1



TURN SWITCHES TOWARD POLE

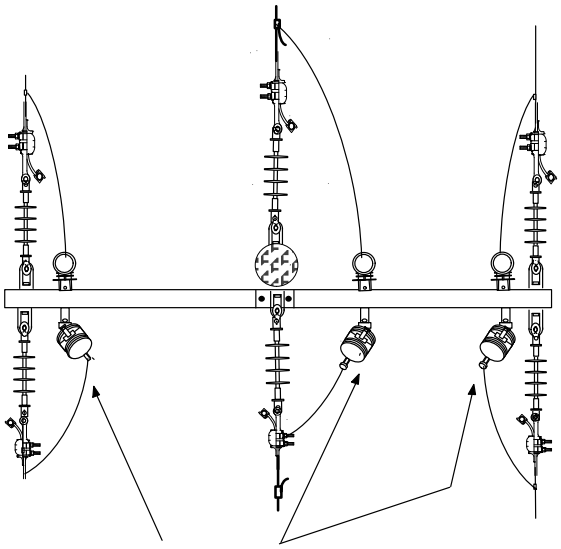
100 AMP. FUSED	10 12 11 01
200 AMP. FUSED	10 12 11 02
300AMP. SOLID BLADE	10 12 11 03





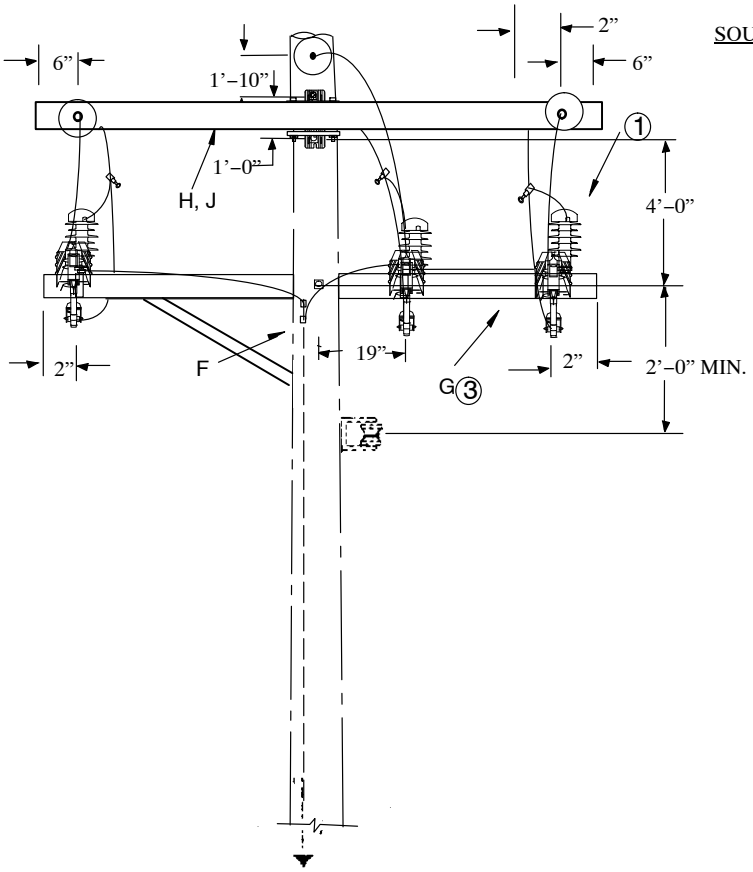
MISSOURI ONLY

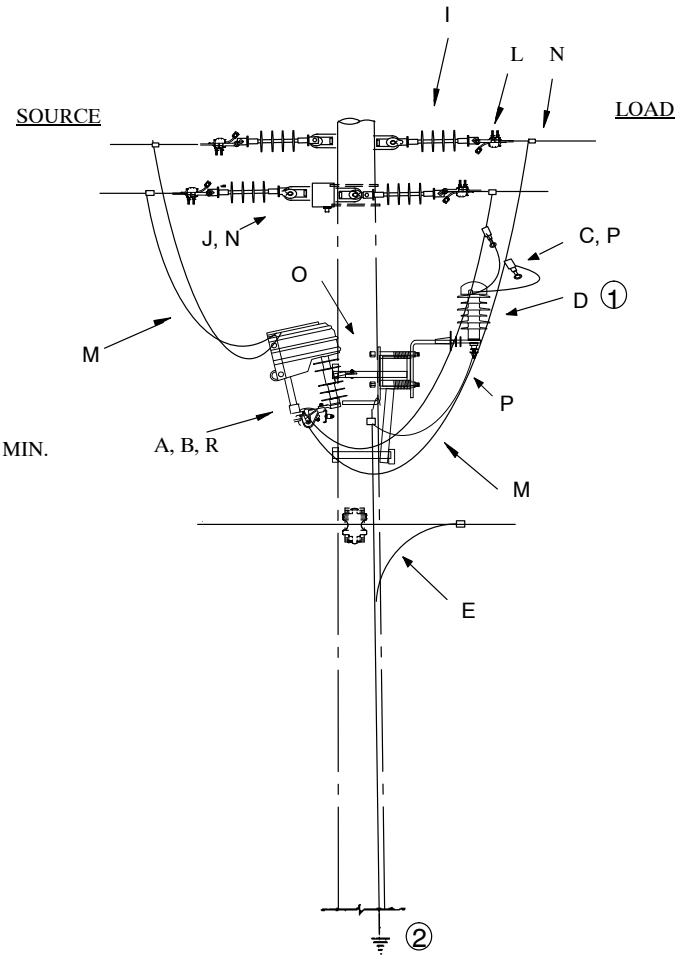
ALTERNATIVE 2



TURN SWITCHES TOWARD POLE

100 AMP. FUSED	10 12 11 04
200 AMP. FUSED	10 12 11 05
300AMP. SOLID BLADE	10 12 11 06



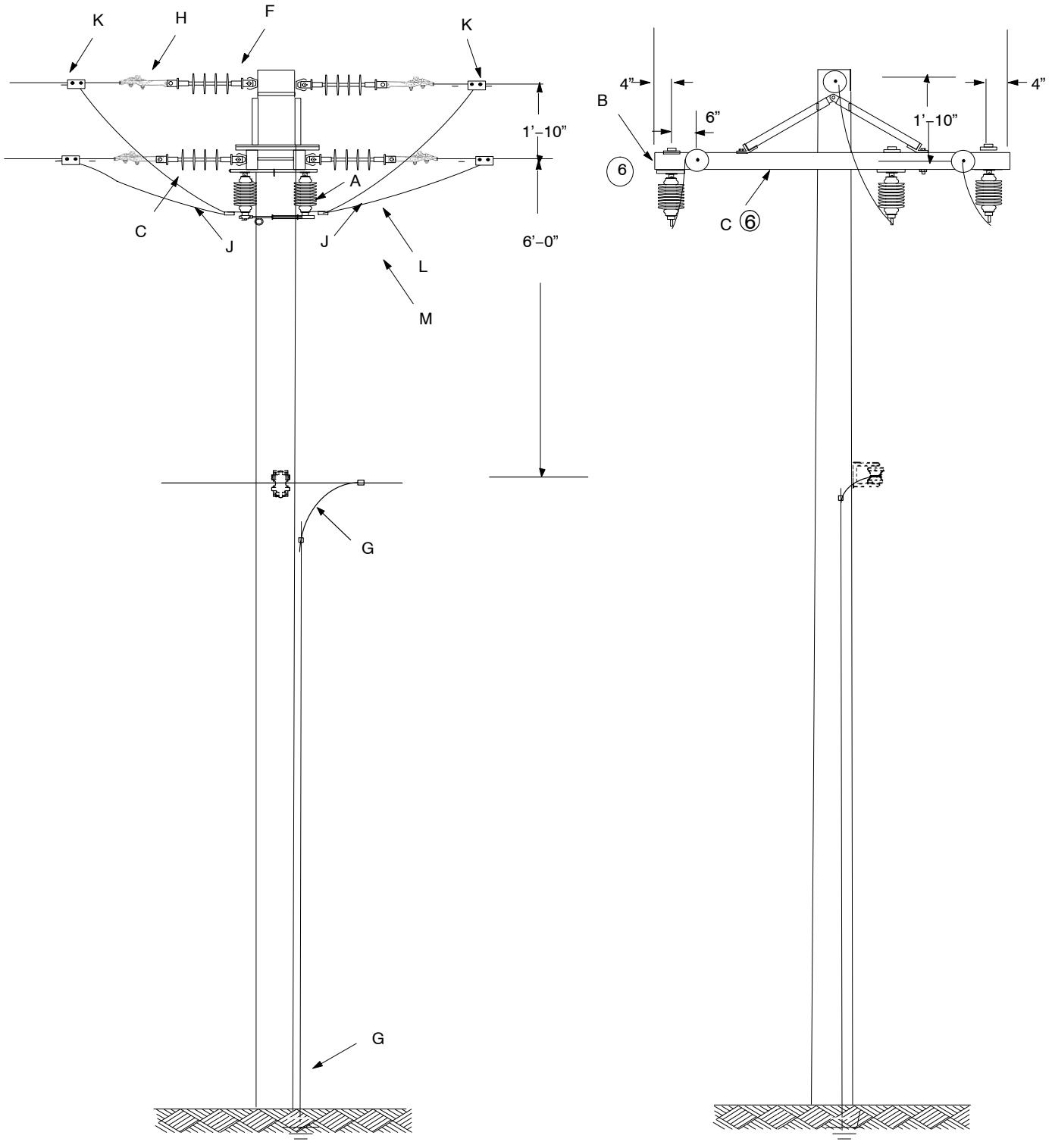


NOTES:

1. Alternative 2 is permissible for existing installation in Missouri. For new installation, both Illinois and Missouri, ar-resters are not required for normally closed switch installations; where switches are normally open, install both sets of arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. Use DCS **12 00 10 01** for ground coil application on new pole installation
3. 8' crossarm available AmerenMO only.
4. Double deadend on pole w/o FG extension available AmerenMO only.

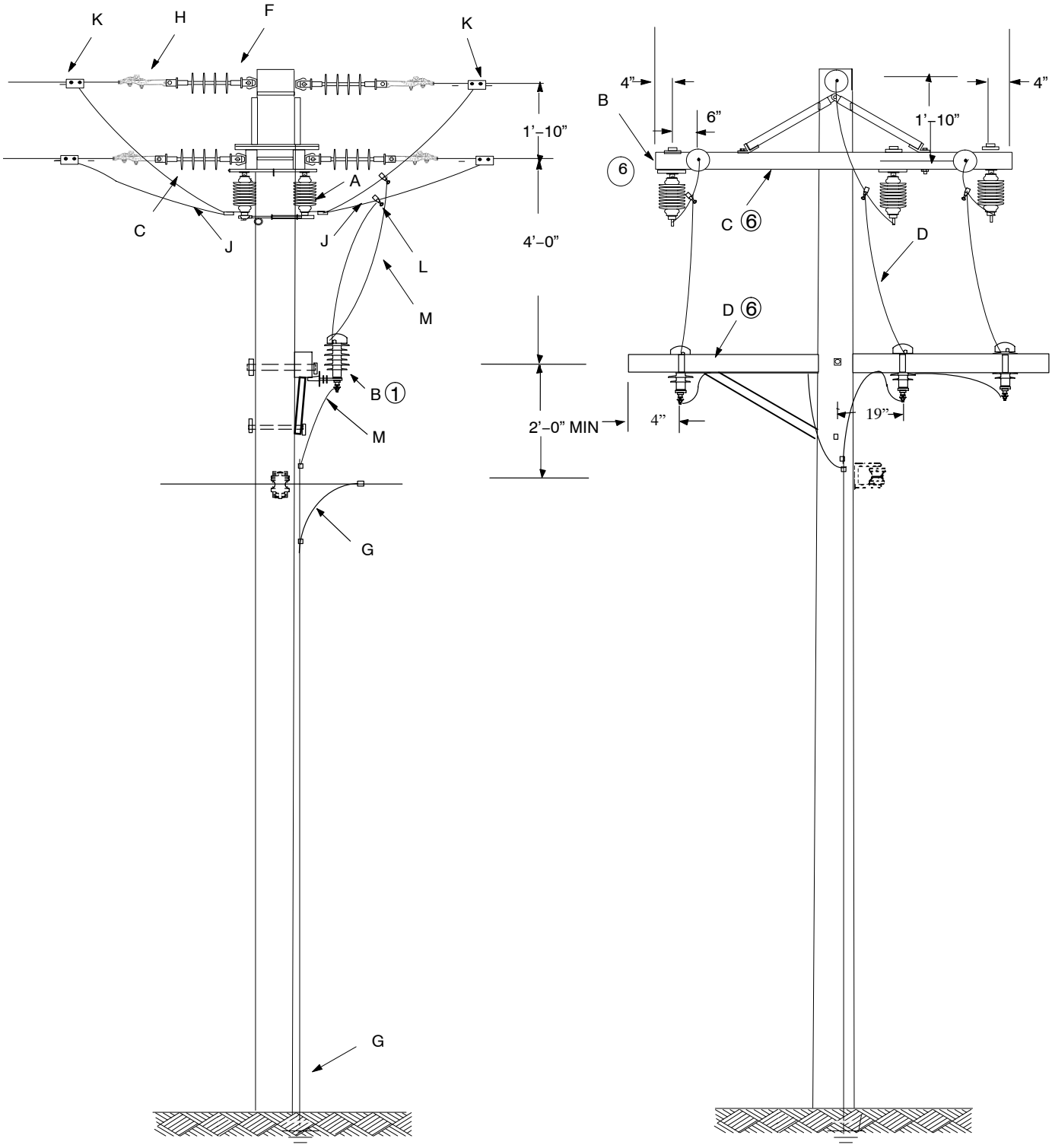
		Stnd. / Stk. No.	**Description 10 12 11 ****	**01**	**02**	**03**	04	05	06
	A	54 07 208	Switch, Fuse, 100A, 15 kV	3			3		
		54 07 209	Switch, Fuse, 200A, 15kV		3			3	
		54 07 210	Switch, Solid Blade, 300 A, 15kV			3			3
@	B		Link, Fuse (Sized by Engineer)	3	3		3	3	
	C	23 78 183	Clamp, Hot Line				3	3	3
1 @	D	10 01 144	Arrester, 10 kV w/ Protective Cap				3	3	3
		10 01 133	Arrester, 3 kV w/ Protective Cap1103				3	3	3
2@	E	**12 00 10 02**	Grounding Unit – Rod	1	1	1	1	1	1
		12 00 10 01	Grounding Unit – Coil	1	1	1	1	1	1
	F	17 54 182	Connector, Split Bolt				1	1	1
3@	G	**04 00 20 03**	Crossarm, 10', Sgl, Wood (use only 1/2 of V–brace)	1	1	1	1	1	1
		04 00 20 02	Crossarm, 8', Sgl, Wood (use only 1/2 of V–brace)	1	1	1	1	1	1
	H	**04 00 41 04**	Crossarm, Double DE, F/G, 10'	1	1	1	1	1	1
4@	I	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1	1	1	1	1	1
		06 12 30 13	Dbl Deadend on Pole w/o FG Extension	1	1	1	1	1	1
	J	**06 12 35 02**	Deadend, Dbl., on F/G crossarm	2	2	2	2	2	2
@	M	PLW*W	Wire, Poly Covered, S.D. (ft.)	30	30	30	30	30	30
@	N	PG*	Clamp, Parallel Groove DCS **07 00 25 00**	6	6	6	6	6	6
	O	23 56 088	DBL Sided NEMA Bracket for Arrester and Cutout				3	3	3
	P	18 51 021	Wire, S.D. Cu, #6 Poly				20	20	20
	Q	17 58 054	Bracket, Mounting Switch or Arrester	3	3	3			
	R	**05 15 10 01**	Cover, Cutout	3	3	3	3	3	3

ALTERNATIVE 1 – 10 12 12 01



ALTERNATIVE 2 – 10 12 12 02

MISSOURI ONLY

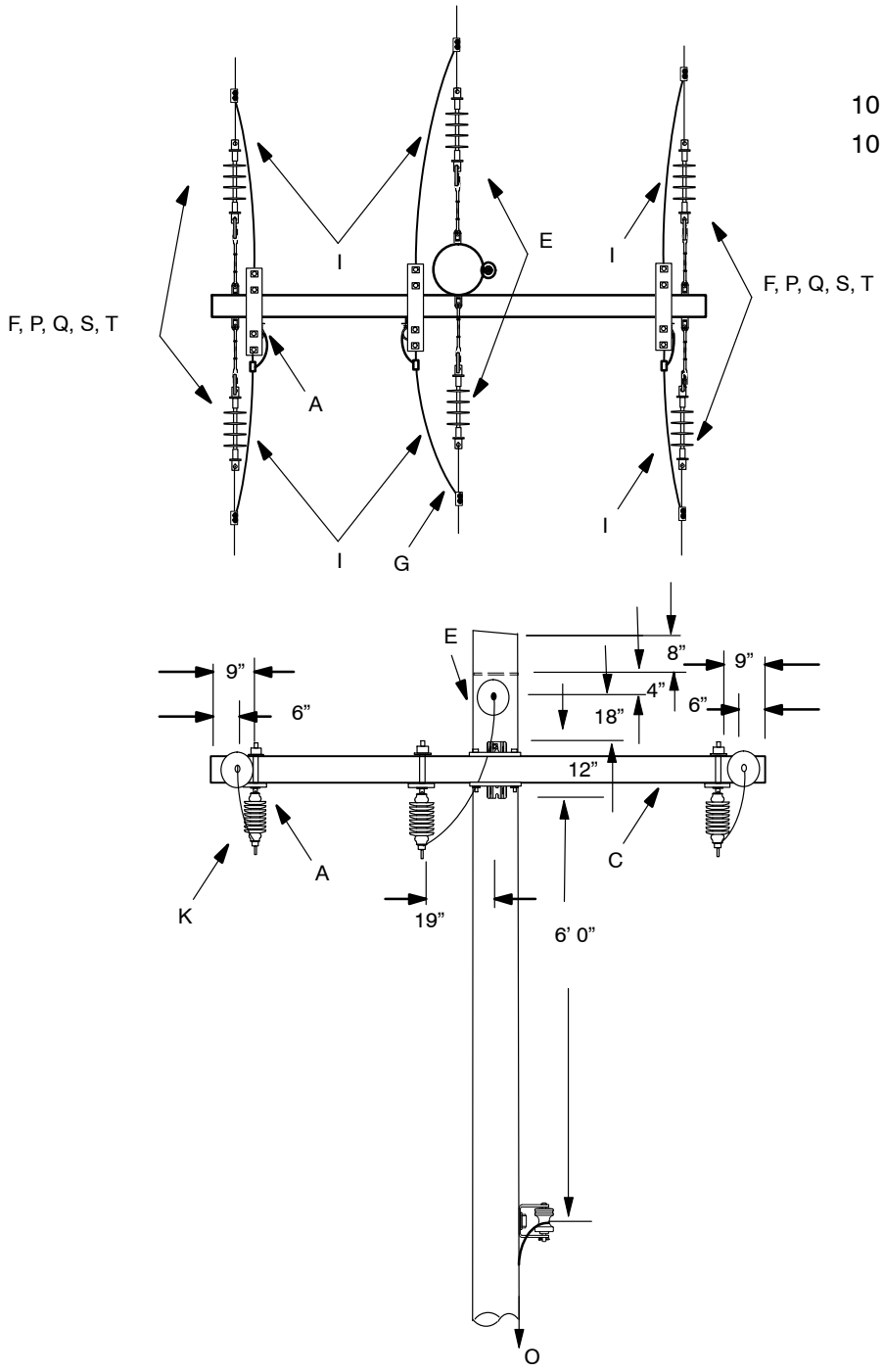


NOTES:

1. Alternative 2 is permissible for existing installation in Missouri. For new installation, both Illinois and Missouri, arresters are not required for normally closed switch installations; where switches are normally open, install both sets of arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. If insulators are not at least 2" from switch base using a single eye clevis, install one additional eye clevis in each deadend. On angle poles, a shackle may also be necessary to obtain clearances.
3. Use DCS **12 00 10 01** for ground coil application on new pole installation.
4. When required, switch number tag shall be installed here.
5. Double deadend on pole w/o FG extension available Missouri only.
6. 8' crossarm available Missouri only.

		Stnd. / Stk. No.	**Description 10 12 12****	**01**	**02**
	A	54 07 204	Switch, Dis., 600A, 15kV	3	3
1@	B	10 01 144	Arrester, 10kV w/ Protective Cap		3
		10 01 133	Arrester, 3kV w/ Protective Cap		3
8@	C	**04 00 20 07**	Crossarm, Dbl, Wood. 8' (use only ½ of V–Brace)	1	1
		04 00 20 08	Crossarm, Dbl, Wood. 10' (use only ½ of V–Brace)	1	1
6@	D	**04 00 20 02**	Crossarm, Sgl, Wood. 8' (use only ½ of V–Brace)		1
		04 00 20 03	Crossarm, Single 10' (use only 1/2 of V–brace)		1
2	E	**06 12 34 04**	Double Deadend on Arm	2	2
5@	F	**06 12 30 03**	Double Deadend on Pole w/ FG Extension	1	1
		06 12 30 13	Double Deadend on Pole w/o FG Extension	1	1
3	G	**12 00 10 02**	Grounding Unit – Ground Rod	1	1
@	H	DEC*W	Clamp, Deadend – DCS **07 00 11 00**	6	6
@	J	LW*W	Wire, Poly Covered (ft.)	30	30
@	K	PG*	Clamp, Parallel Groove (See Std, **07 00 25 00**)	6	6
	L	23 78 183	Clamp, Hot Line		3
	M	18 51 021	Wire, Poly, #6 Cu., Ft.		15

ALTERNATIVE 1

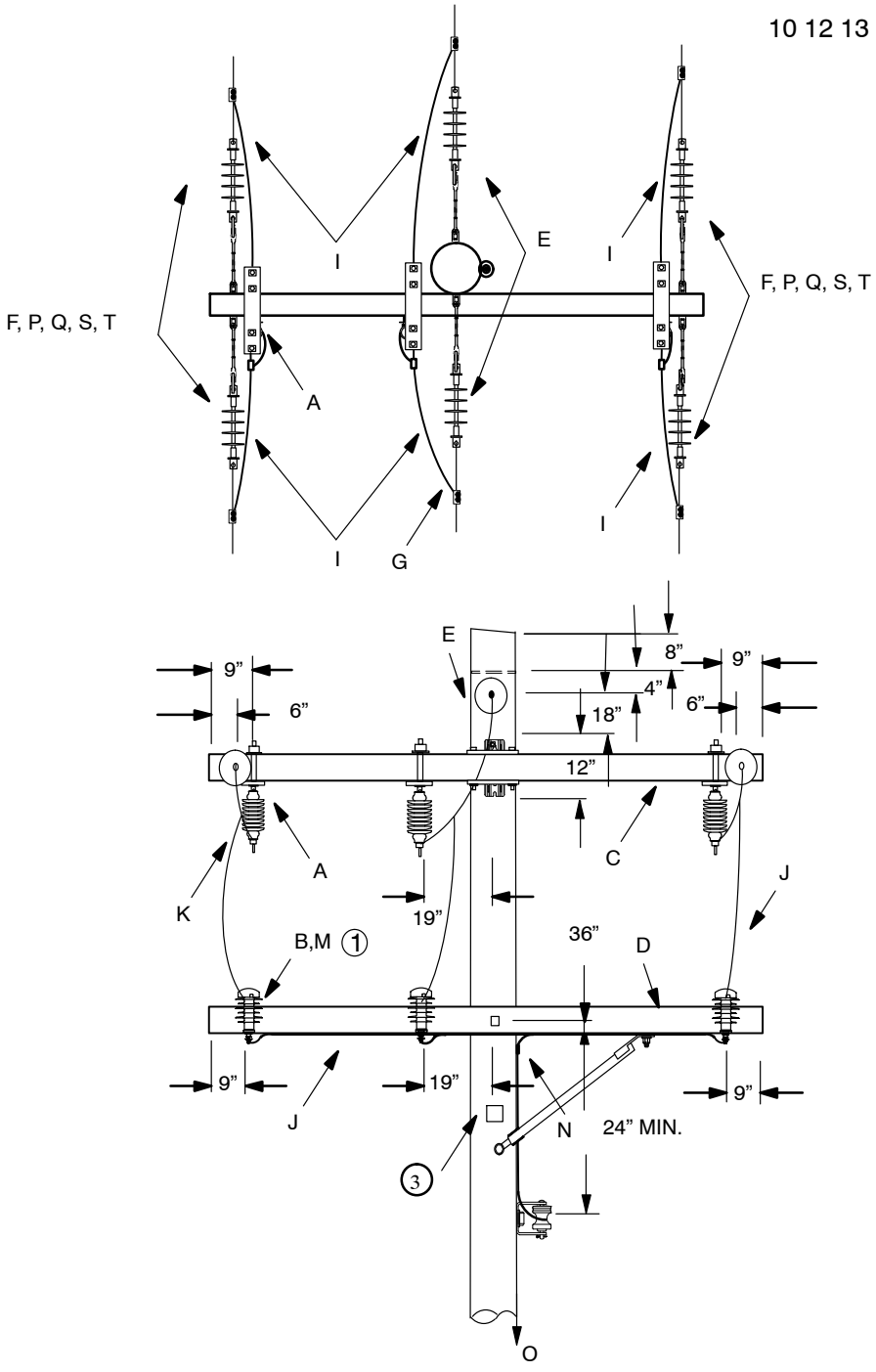


10 12 13 03 – 10 ft Crossarm
10 12 13 04 – 8 ft Crossarm

ALTERNATIVE 2

MISSOURI ONLY

10 12 13 01 – 10 ft Crossarm
10 12 13 02 – 8 ft Crossarm



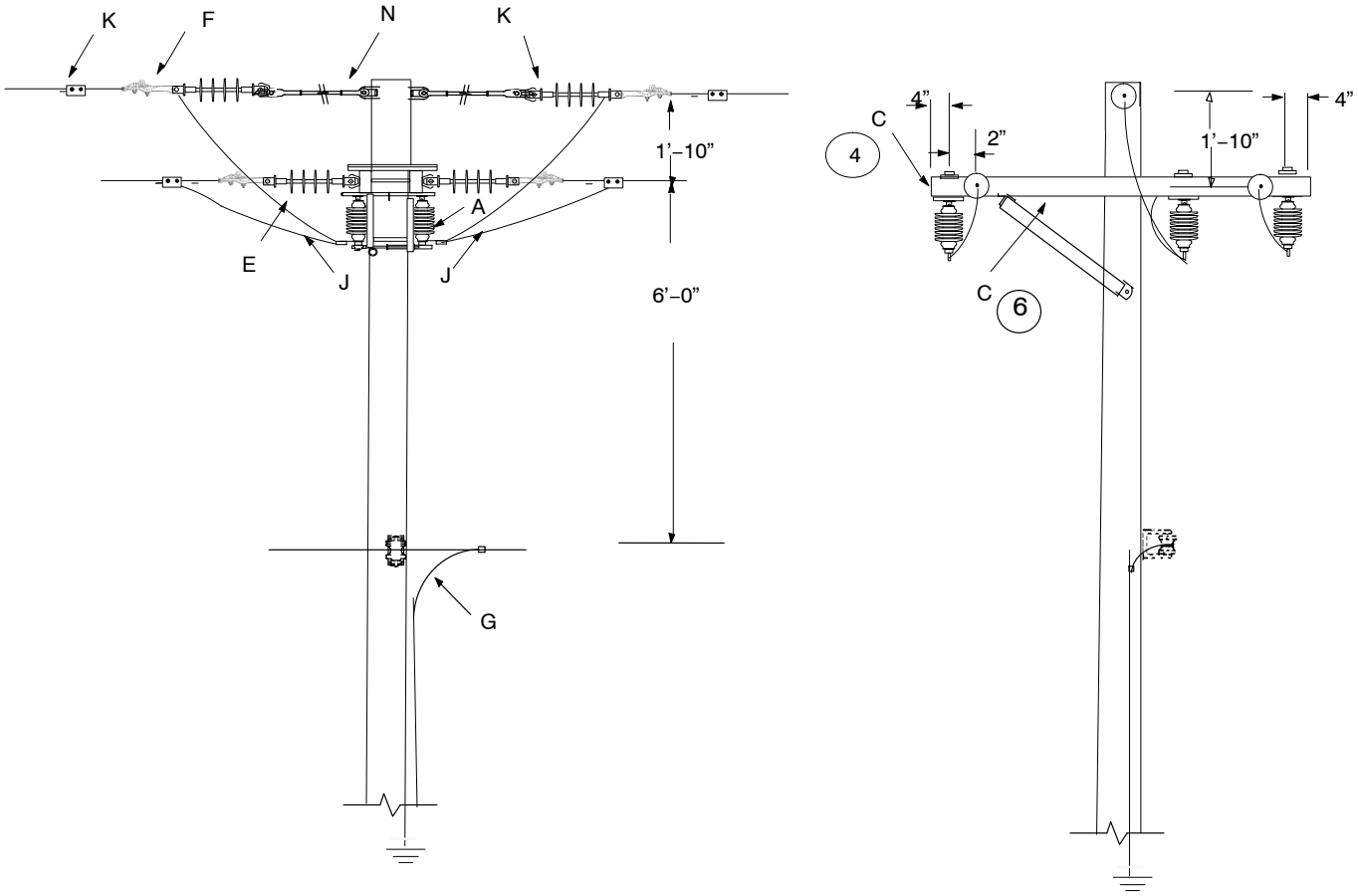
NOTES:

1. Alternative 2 is permissible for existing installation in Missouri. For new installation, both Illinois and Missouri, ar-resters are not required for normally closed switch installations; where switches are normally open, install both sets of arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. Double deadend on pole w/o FG extension available Missouri only.
3. When required, switch number tag shall be installed here.
4. 8' crossarm available Missouri only.
5. Install mounting bolts for switch as close to the crossarm as possible. Tighten bolts evenly and do not distort or warp switch base and backplate. Do not use bolts in outside/end mounting holes.

		Stnd. / Stk. No.	**Description** **10 12 13 ****	01	02	03	04
	A	54 07 204	Switch, Dis., 600A, 15kV	3	3	3	3
1@	B	10 01 144	Arrester, 10kV	3	3		
		10 01 133	Arrester, 3kV	3	3		
4	C	**04 00 41 03**	Crossarm, Deadend, FG, 8'		1		1
		04 00 41 04	Crossarm, Deadend, FG, 10'	1		1	
4	D	**04 00 20 02**	Crossarm, Sgl, Wood 8' (use only 1/2 of V–brace)		1		
		04 00 20 03	Crossarm, Sgl, Wood 10' (use only 1/2 of V–brace)	1			
2	E	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1		1	
		06 12 30 13	Dbl Deadend on Pole w/o FG Extension		1		1
	F	25 06 052	Ins., Suspension, 12kV	4	4	4	4
@	G	DEC*W	Clamp, Deadend, DCS **07 00 11 00**	4	4	4	4
@	H	PG*	Clamp, Parallel Groove, DCS **07 00 25 00**	6	6	6	6
@	I	PLW*W	Wire, Poly covered, (ft.) , DCS **07 00 80 00**	15	15	15	15
	J	18 51 021	Wire, Poly, #6 Cu., Ft.	15	15		
	K	23 78 183	Clamp, Hot Line, #6 to 400kcmil cu Main & #6 to 4/0 cu Tap	3	3		
	L	18 51 021	Clamp, PG. #6 –1/0	1	1	1	1
	M	17 58 054	Bracket, Switch/Arrester Mounting	3	3		
	N	17 54 373	Split Bolt	1	1		
@	O	**12 00 10 02**	Grounding Unit – Existing Pole – Ground Rod	1	1	1	1
		12 00 10 01	Grounding Unit – New Pole – Ground Coil	1	1	1	1
	P	23 52 058	Bolt–Mach ⅝" x 5"	2	2	2	2
	Q	23 59 005	Eyelet ⅝"	2	2	2	2
	R	23 65 012	Eyenut ⅝"	2	2	2	2
	S	23 66 027	Washer ⅝" SQ	4	4	4	4
	T	25 56 076	Insulator, Guy Strain F/G 26"	4		4	
@	U	25 56 076	Insulator, Guy Strain, F/G, 26", 15k UTS	1		1	

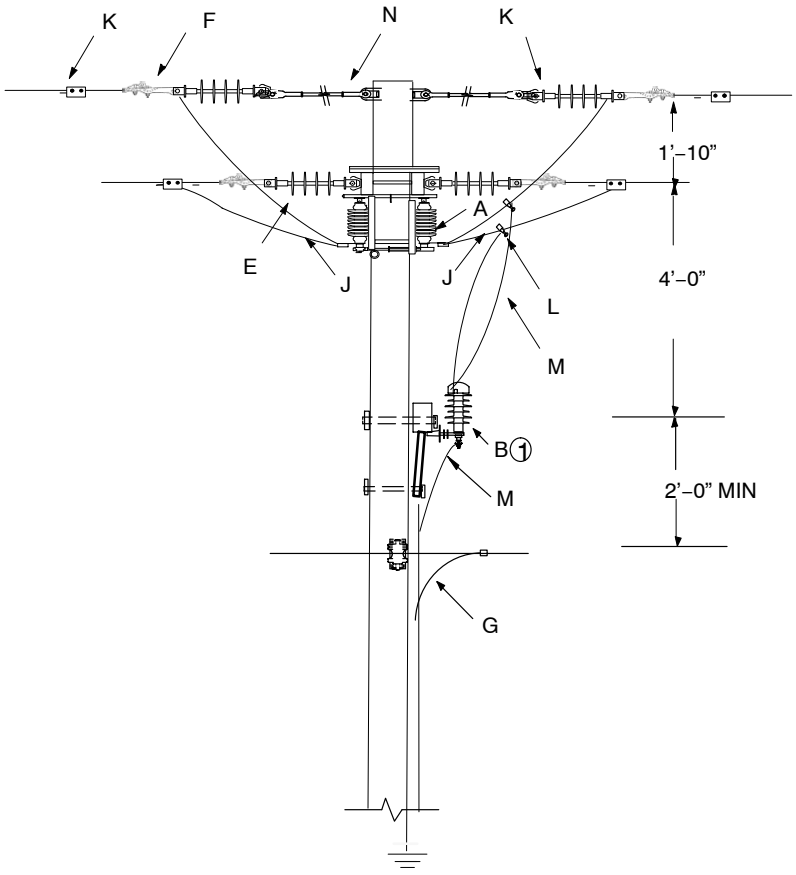
MISSOURI ONLY

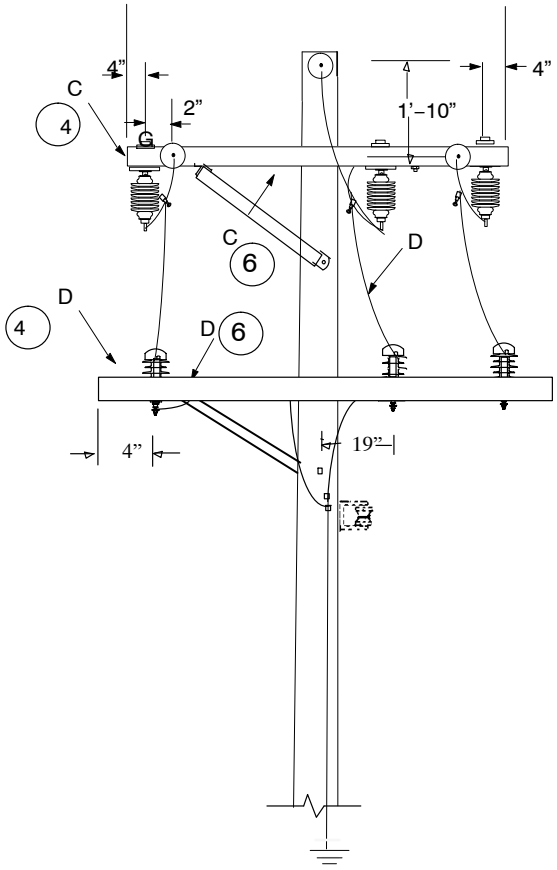
ALTERNATIVE 1 – 10 12 14 01



ALTERNATIVE 2 – 10 12 14 02

MISSOURI ONLY



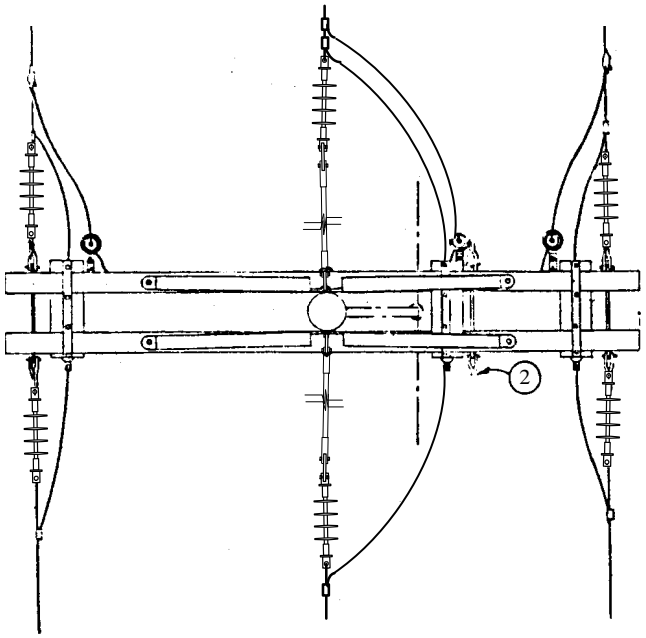


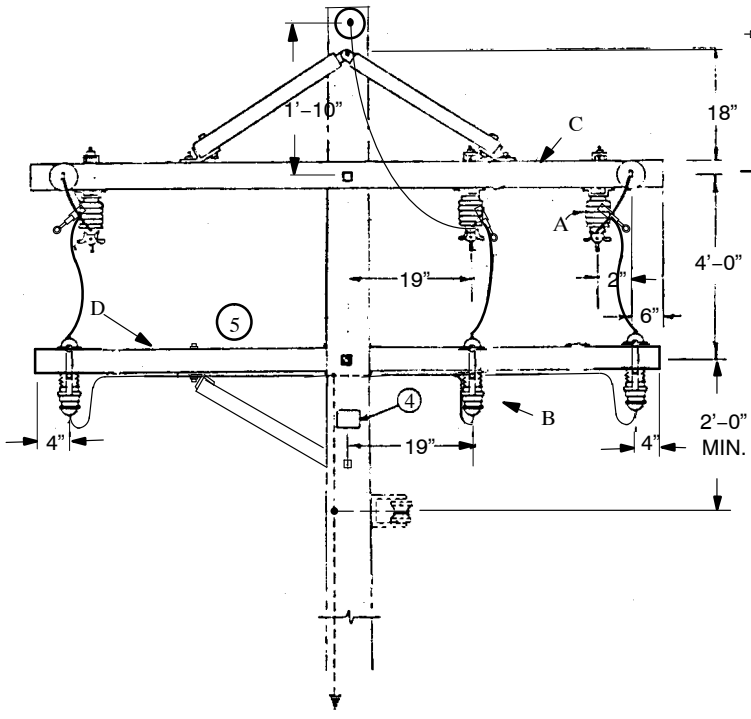
NOTES:

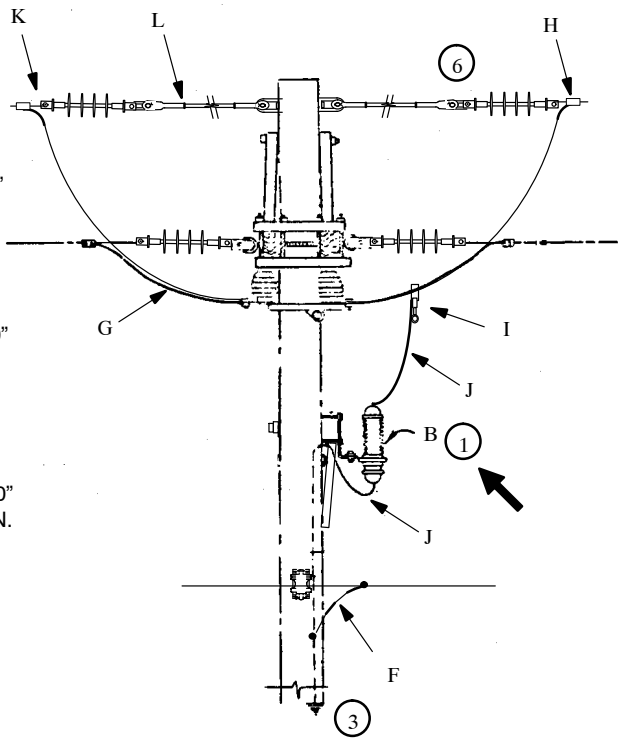
1. Alternative 2 is permissible for existing installation in Missouri. For new installation, both Illinois and Missouri, arresters are not required for normally closed switch installations; where switches are normally open, install both sets of arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. If insulators are not at least 2" from switch base using a single eye clevis, install one additional eye clevis in each deadend. On angle poles, a shackle may also be necessary to obtain clearances.
3. When required, switch number tag shall be installed here.
4. 8' crossarm available AmerenMO only.
5. Double deadend on pole w/o FG extension available Missouri only.

		Stnd. / Stk. No.	**Description** **10 12 14****	**01**	02
	A	54 07 204	Switch, Dis., 600A, 15kV	3	3
1@	B	10 01 144	Arrester, 10kV		3
		10 01 133	Arrester, 3kV		3
4@	C	**04 00 20 08**	Crossarm, Dbl, Wood 10' (use only 1/2 of V–brace)	1	1
		04 00 20 07	Crossarm, Dbl, Wood 8' (use only 1/2 of V–brace)	1	1
4@	D	**04 00 20 03**	Crossarm, Sgl, Wood 10' (use only 1/2 of V–brace)		1
		04 00 20 02	Crossarm, Sgl, Wood 8' (use only 1/2 of V–brace)		1
2	E	**06 12 34 04**	Double Deadend on Arm	2	2
@	F	DEC*W	Clamp, Deadend, DCS **07 00 11 00**	4	4
@	G	**12 00 10 02**	Grounding Unit on Existing Pole – Ground Rod	1	1
		12 00 10 01	Grounding Unit on New Pole – Ground Coil	1	1
@	J	PLW*W	Wire, Poly covered, (ft.), DCS **07 00 80 00**	30	30
@	K	PG*	Clamp, Parallel Groove, DCS **07 00 25 00**	6	6
	L	23 78 183	Clamp, Hot Line		3
	M	18 51 021	Wire, Poly, #6 Cu., Ft.		15
5@	N	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1	1
		06 12 30 13	Dbl Deadend on Pole w/o FG Extension	1	1

MISSOURI ONLY



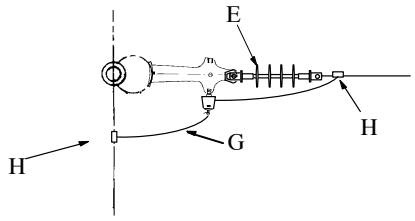




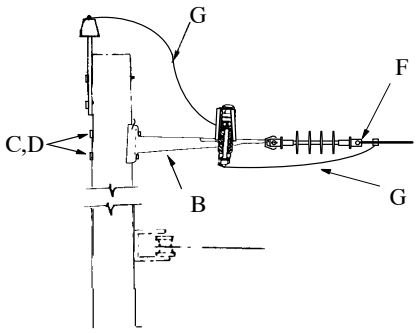
NOTES:

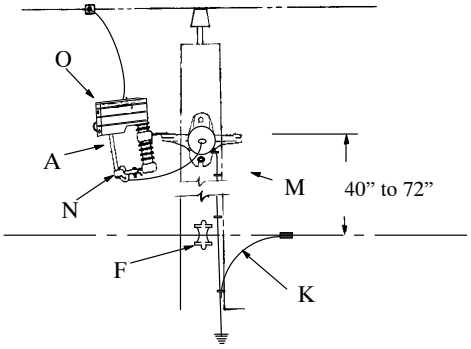
1. This installation is permissible for existing installation in Missouri. For new installation, both Illinois and Missouri, arresters are not required for normally closed switch installations; where switches are normally open, install both sets of arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. If insulators are not at least 2" from switch base using a single eye clevis, install one additional eye clevis in each deadend. On angle poles a shackle may also be necessary to obtain clearances.
3. Use DCS **12 00 10 01** for ground coil application on new pole installation.
4. When required, switch number tag shall be installed here.

		Stnd. / Stk. No.	**Description 10 12 16 02**	
	A	54 07 204	Switch, Dis., 600A, 15kV	3
1@	B	10 01 144	Arrester, 10 kV, w/ Protective Cap	3
		10 01 133	Arrester, 3 kV, w/ Protective Cap	3
	C	**04 00 20 08**	Crossarm, Double, 10'	1
5@	D	**04 00 20 03**	Crossarm, Sgl, Wood, 10'(use only 1/2 of V–brace)	1
		04 00 20 02	Crossarm, Sgl, Wood, 8'(use only 1/2 of V–brace)	1
2	E	**06 12 34 04**	Double Deadend	2
3@	F	**12 00 10 02**	Grounding Unit – Ground Rod	1
		12 00 10 01	Grounding Unit – Ground Coil	1
@	G	PLW*W	Wire, Poly covered (Ft.)	30
@	H	PG*	Clamp, Parallel Groove (See Std. **07 00 25 00**)	6
	I	23 78 183	Clamp, Hot Line	3
	J	18 51 021	Wire, Poly #6 Cu., Ft.	15
@	K	DEC*W	Clamp, Deadend	4
@	L	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1
		06 12 30 13	Dbl Deadend on Pole w/o FG Extension	1

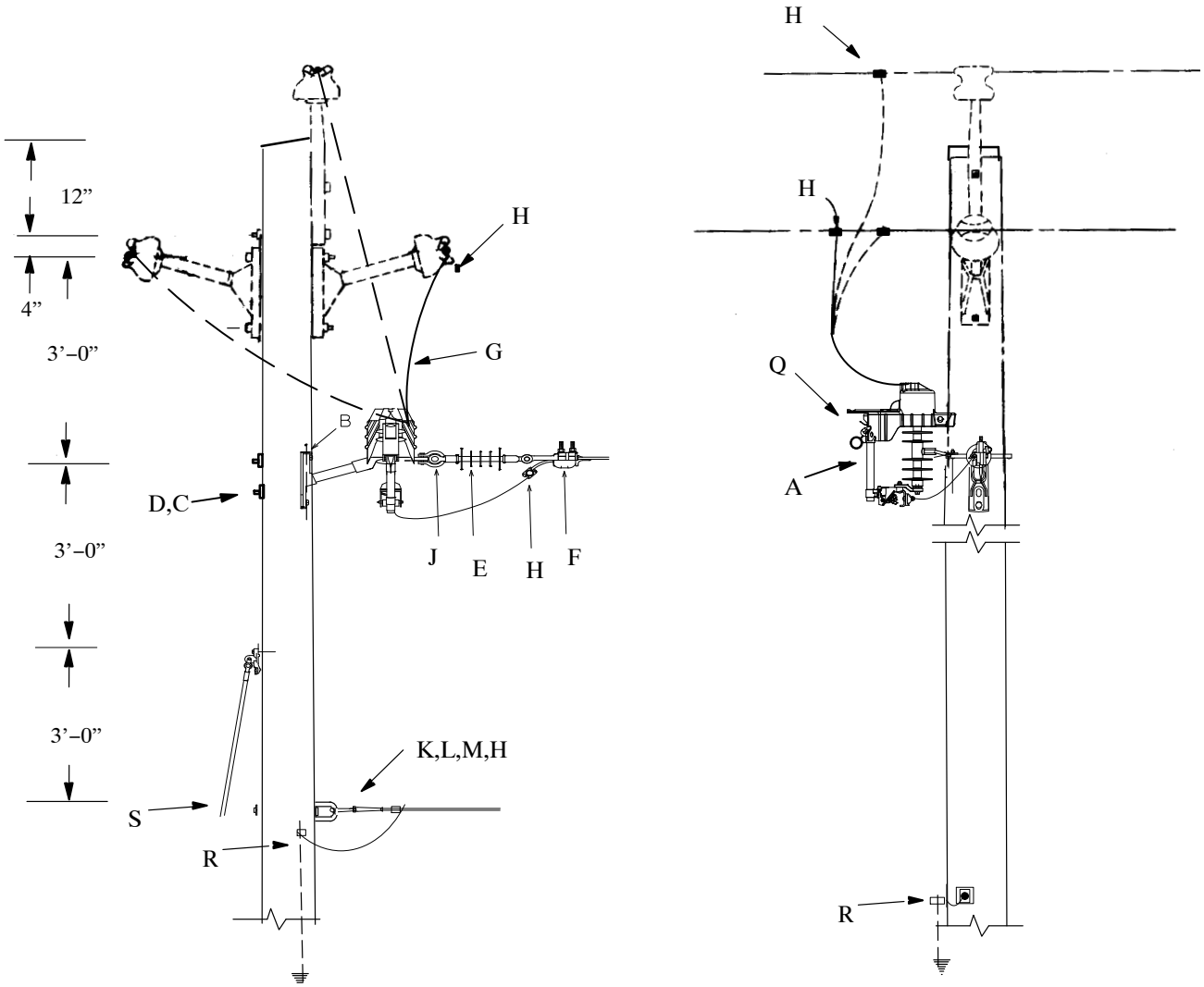


100 AMP. FUSED	10 12 19 01
200 AMP. FUSED	10 12 19 02
300 AMP. SOLID BLADE	10 12 19 03



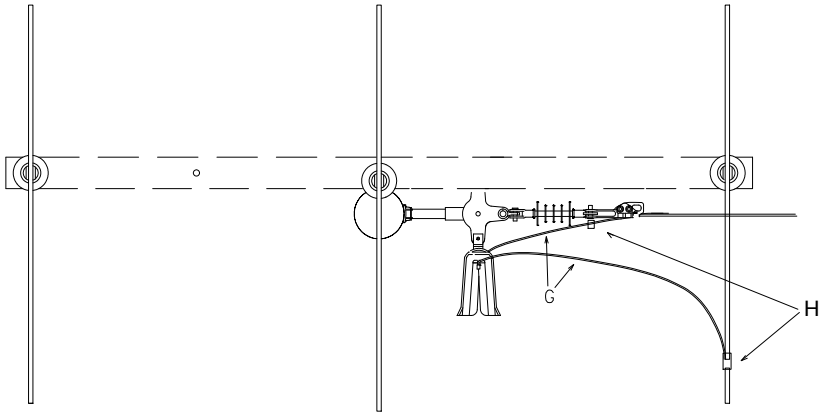


		Stnd. / Stk. No.	Description 10 12 19 **	01	02	03
	A	54 07 208	Switch, Fuse, 100A, 15 kV	1		
		54 07 209	Switch, Fuse, 200A, 15kV		1	
		54 07 210	Switch, Solid Blade, 300A, 15kV			1
	B	23 56 063	Bracket, Switch , Arr. and Deadend	1	1	1
	C	23 52 065	Bolt, Mach., 5/8" x 12"	2	2	2
	D	23 66 027	Washer, Square, 5/8"	2	2	2
	E	25 06 052	Ins., Suspension, 12kV	1	1	1
@	F	DEC*W or DEA*W	Clamp, Deadend	1	1	1
@	G	PLW*W	Wire, Poly Covered (ft.), DCS **07 00 80 00**	10	10	10
@	H	PG*	Clamp, Parallel Groove DCS **07 00 25 00**	2	2	2
@	K	**12 00 10 01**	Grounding Unit – New Pole – Ground Coil	1	1	1
		12 00 10 02	Grounding Unit – Existing Pole – Ground Rod	1	1	1
@	N		Link, Fuse (Sized by Engineer)	1	1	
	O	**05 15 10 01**	Cutout Cover	1	1	1

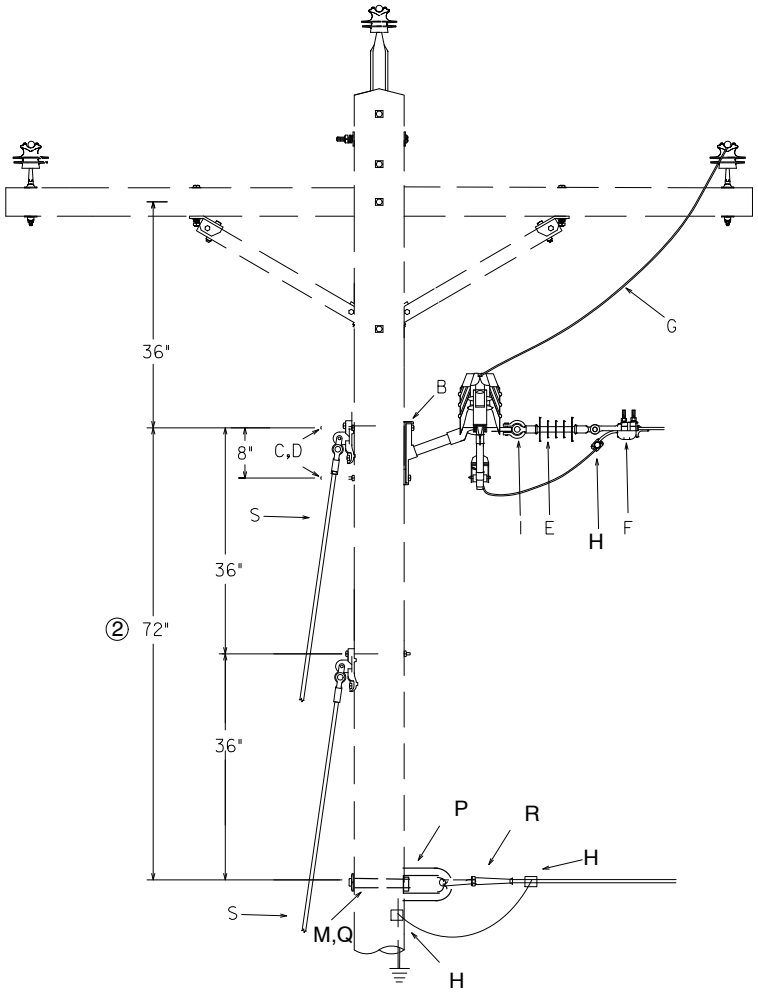


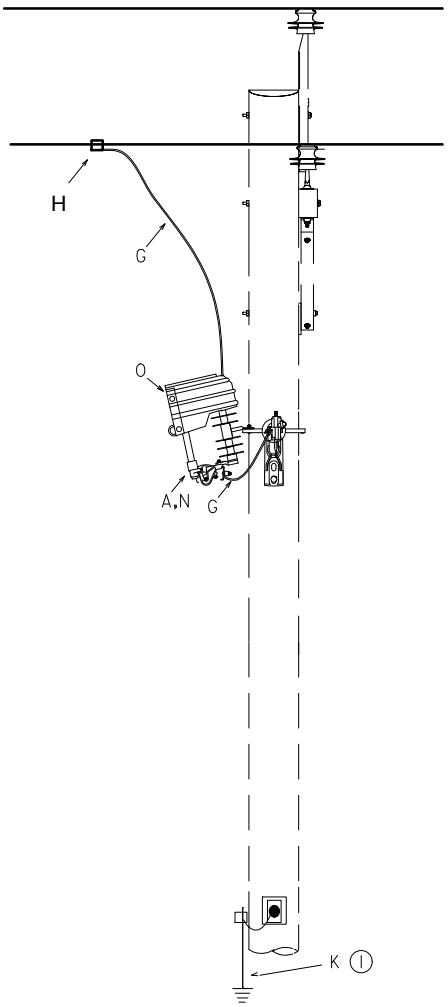
↘	100 AMP. FUSED	10 12 21 01
	200 AMP. FUSED	10 12 21 02
	300 AMP. SOLID BLADE	10 12 21 03

		Stnd. / Stk. No.	Description 10 12 21 **			
				01	02	03
	A	54 07 208	Switch, Fuse, 100A., 15 kV	1		
		54 07 209	Switch, Fuse 200A., 15kV		1	
		54 07 210	Switch, Solid Blade, 300A., 15kV			1
	B	23 56 063	Bracket, Switch, Arrestor and Deadend	1	1	1
	C	23 52 065	Bolt, Mach., 5/8" x 12"	2	2	2
	D	23 66 027	Washer, Square, 5/8"	2	2	2
	E	25 06 052	Ins., Suspension, 12kV	1	1	1
@	F	DEC*W or DEA*W	Clamp, Deadend, DCS **07 00 11 00**	1	1	1
@	G	PLW*W	Wire, Poly covered (ft.), DCS **07 00 80 00**	10	10	10
@	H	PG*	Clamp, Parallel Groove, DSC **07 00 25 00**	3	3	3
@	I	**12 00 10 01**	Grounding Unit – New Pole – Ground Coil	1	1	1
		12 00 10 02	Grounding Unit – Existing Pole – Ground Rod	1	1	1
@	P		Link, Fuse (Sized by Engineer)	1	1	
	Q	**05 15 10 01**	Cover, Cutout	1	1	1
	R	17 54 182	Connector, Split Bolt	1	1	1
	J	23 68 181	Shackle, Deadend	1	1	1
	K	23 59 095	Eyelet, ¾"	1	1	1
	L	SDEA*W	Deadend, Automatic, Secondary, DCS **08 01 10 00**	1	1	1
	M	23 52 097	Bolt, Machine, ¾" x 12"	1	1	1
@	S	**11 00 ****	Guy Unit	1	1	1



10 12 22 01 – 100 Amp Fused
10 12 22 02 – 200 Amp Fused
10 12 22 03 – 300 Amp Solid Blade

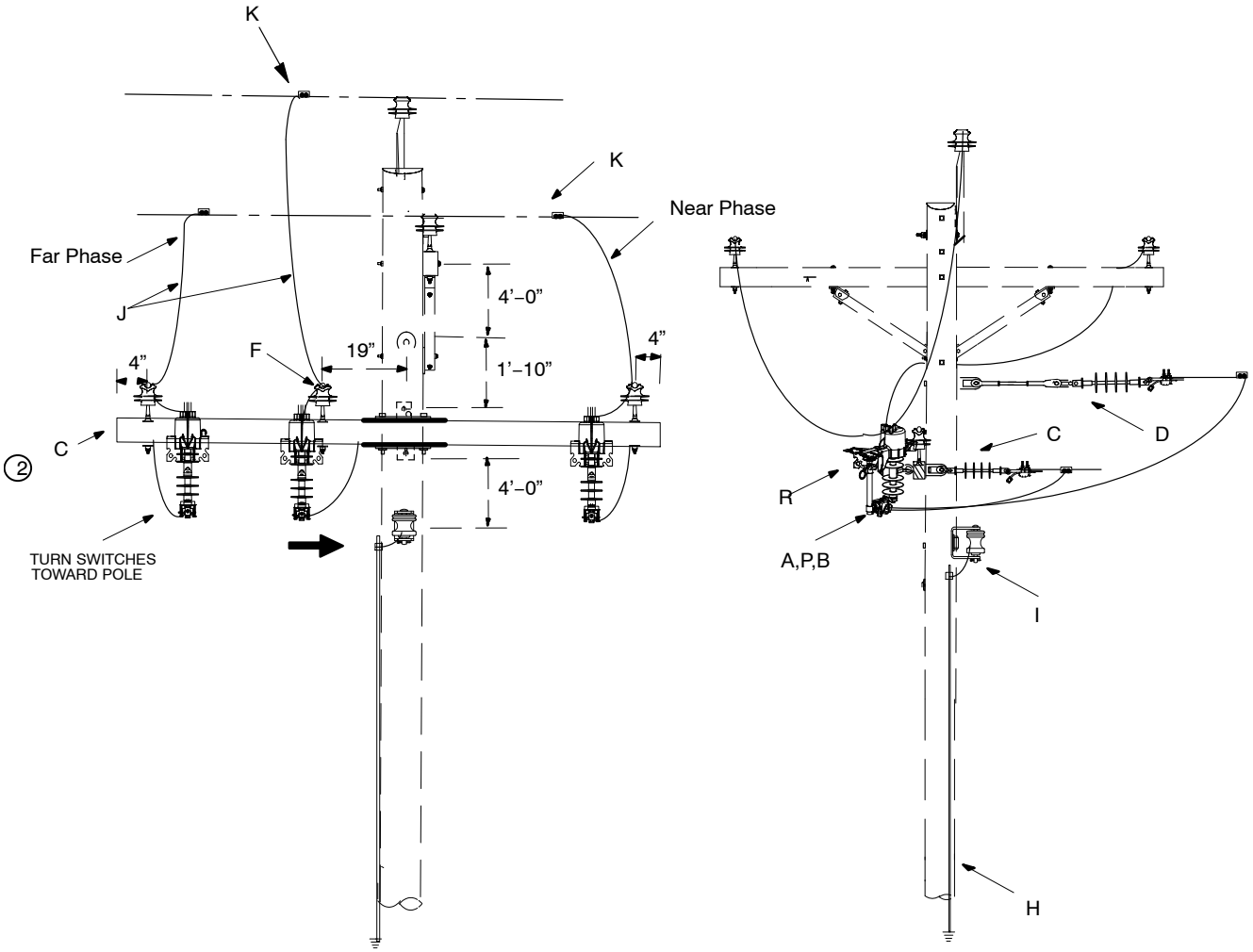




		Std. /Stk. No.	Description 10 12 22 **	01	02	03
	A	54 07 208	Switch, Fuse, 100A, 15 KV	1		
		54 07 209	Switch, Fuse, 200A, 15 KV		1	
		54 07 210	Switch, Solid Blade, 300A, 15 KV			1
	B	23 56 063	Bracket NEMA, Switch and Dead End	1	1	1
	C	23 52 065	Bolt, Mach., ⅝" x 12"	2	2	2
	D	23 66 027	Washer, Square, ⅝"	2	2	2
	E	25 06 052	Ins., Suspension, 15 KV	1	1	1
@	F	DEC*W	Clamp, Deadend DCS **07 0011 00**	1	1	1
@	G	PLW*W	Wire, Poly Covered (ft.) DCS **07 00 80 00** & **07 00 01 03**	10	10	10
@	H	PG*	Clamp, Parallel Groove or Split Bolt or Two Bolt. See **07 00 25 00**	4	4	4
	I	23 68 181	Shackle, Deadend	1	1	1
1@	K	**12 00 10 01**	Grounding Unit – New Pole – Ground Coil	1	1	1
		12 00 10 02	Grounding Unit – Existing Pole – Ground Rod	1	1	1
	M	23 66 031	Washer, SQ, ¾"	1	1	1
	N		Link, Fused, (sized by Engineer)	1	1	1
	O	23 17 411	Cover, Cutout	1	1	1
	P	23 59 095	Eyelet, ¾"	1	1	1
@	R	SDEA*W	Deadend, Automatic, Secondary. See **08 01 10 00**	1	1	1
	Q	23 52 097	Bolt, Machine ¾" x 12"	1	1	1
2@	S	**11 00 ** ****	Guy Unit	2	2	2

NOTES:

1. Use DCS **12 00 10 01** for ground coil application on new pole installation.
2. This distance may be reduced to 40 inches if approved by engineering. Center the guy attachment between the primary and neutral if this distance is reduced.



	2 PHASE	3 PHASE
100 AMP FUSED	10 12 23 01	10 12 23 04
200 AMP FUSED	10 12 23 02	10 12 23 05
300 AMP SOL. BL.	10 12 23 03	10 12 23 06

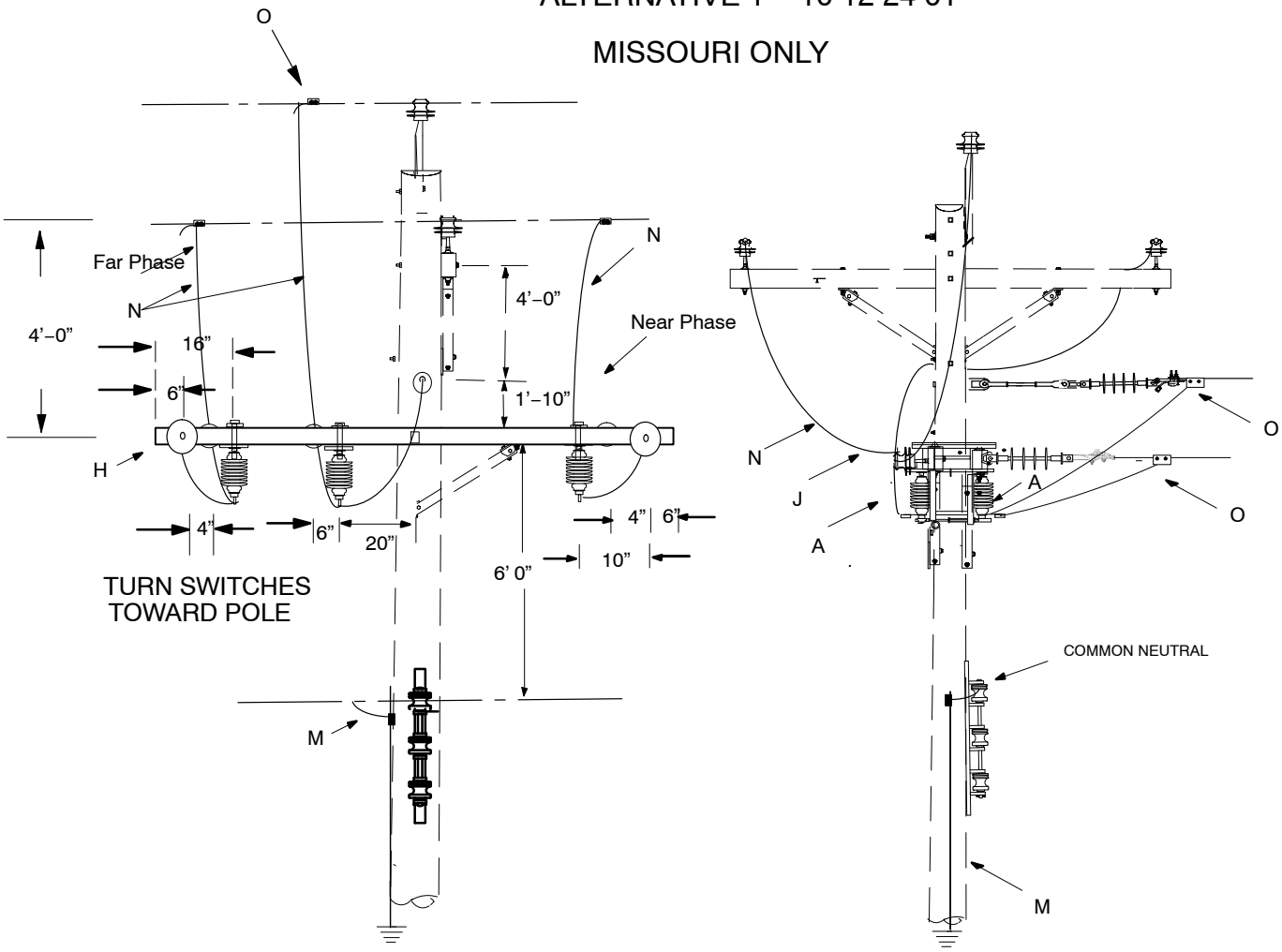
Notes:

1. Use DCS **12 00 10 01** for ground coil application on new pole installation.
2. 8' crossarm available AmerenMO only.

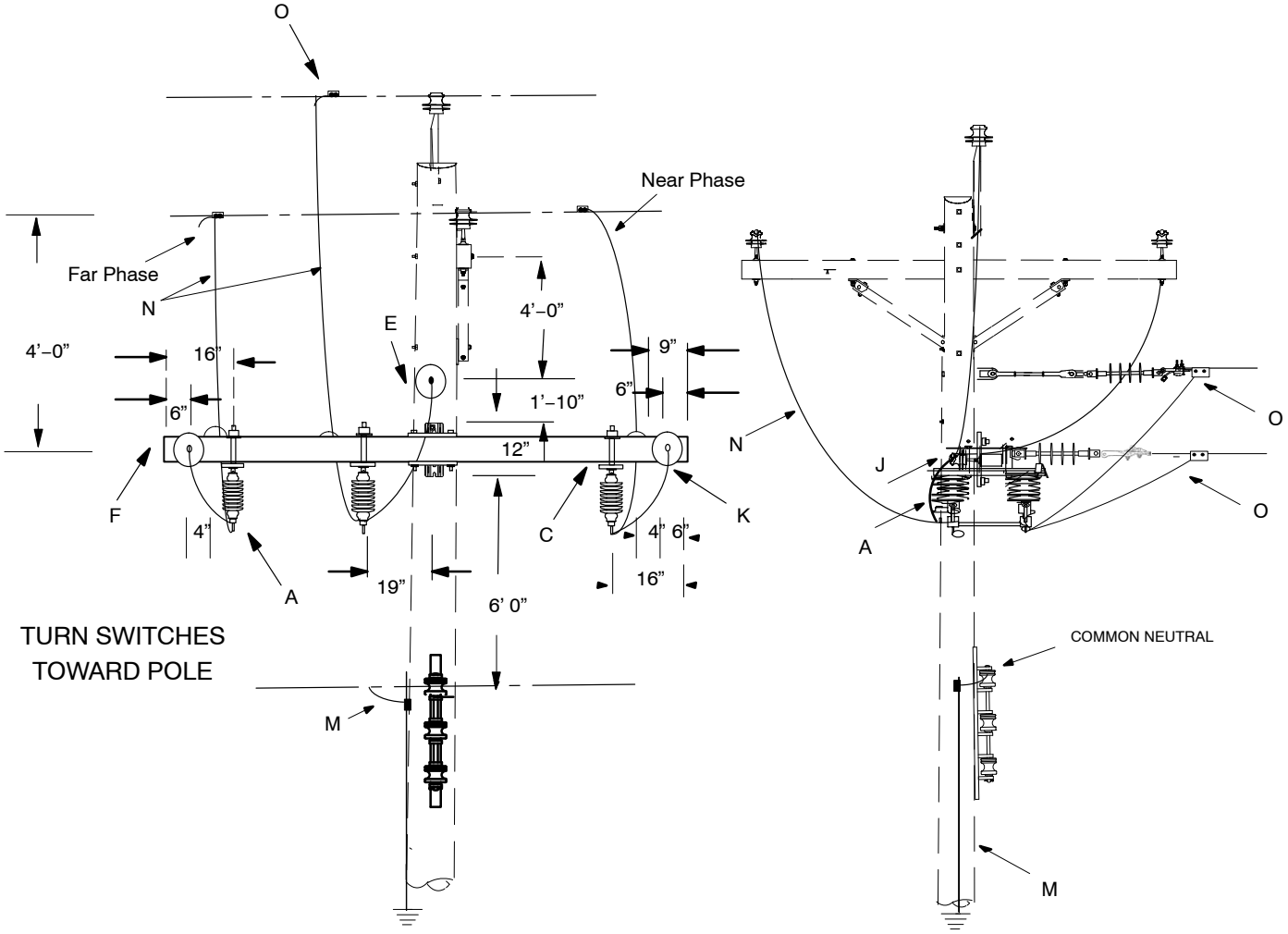
		Stnd / Stk.	Description 10 12 23 **	2 PHASE			3 PHASE		
				01	02	03	04	05	06
	A	54 07 208	Switch, Fused, 100A, 15 kV	2			3		
		54 07 209	Switch, Fused, 200A, 15 kV		2			3	
		54 07 210	Switch, Solid Blade, 300A, 15 kV			2			3
	B	17 58 054	Bracket NEMA, Switch	2	2	2	3	3	3
2@	C	**04 00 41 03**	Crossarm, Deadend, F/G, 8'	1	1	1	1	1	1
		04 00 41 04	Crossarm, Deadend, F/G, 10'	1	1	1	1	1	1
	D	**06 12 30 01**	Deadend on Pole w/FG Extension				1	1	1
	E	**06 12 34 01**	Deadend on Single Arm	2	2	2	2	2	2
	F	**06 12 01 01**	Insulator and X–Arm Pin	2	2	2	3	3	3
@	G	DEC*W or DEA*W	Clamp, Deadend	2	2	2	3	3	3
1@	H	**12 00 10 02**	Grounding Unit – Existing Pole – Ground Rod	1	1	1	1	1	1
		12 00 10 01	Grounding Unit – New Pole – Ground Coil	1	1	1	1	1	1
@	I	**03 01 01 03**	Neutral Deadend	1	1	1	1	1	1
	J	PLW*W	Wire, Poly covered, S.D.(ft.) DCS **07 00 80 00**	20	20	20	30	30	30
@	K	PG*	Clamp, Parallel Groove DCS **07 00 25 00**	4	4	4	6	6	6
@	P		Link, Fused (Sized By Designer)	2	2		3	3	
	R	**05 15 10 01**	Cover – Cutout	2	2	2	3	3	3

ALTERNATIVE 1 – 10 12 24 01

MISSOURI ONLY



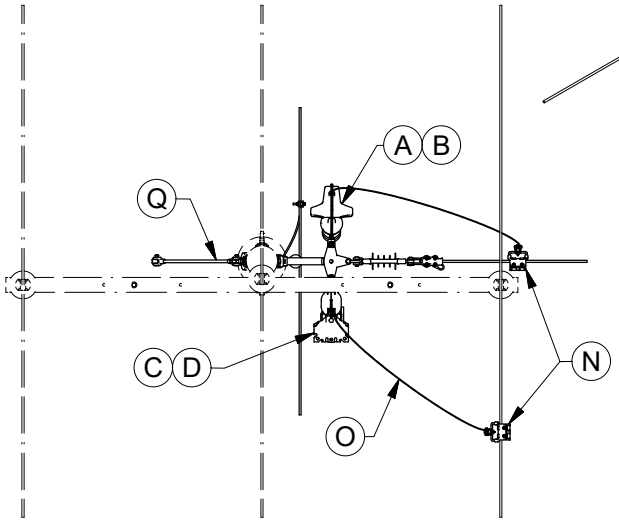
ALTERNATIVE 2 – 10 12 24 02

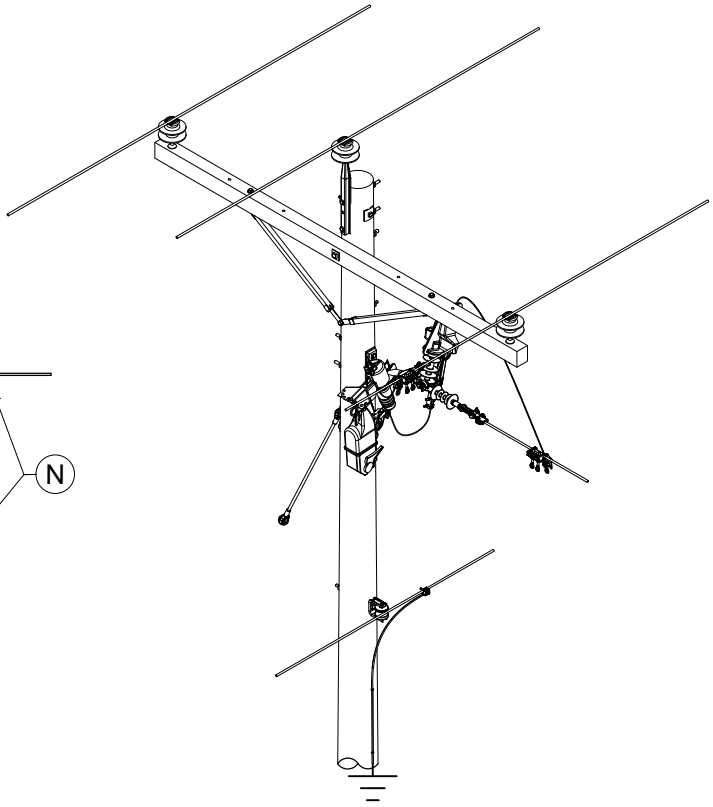


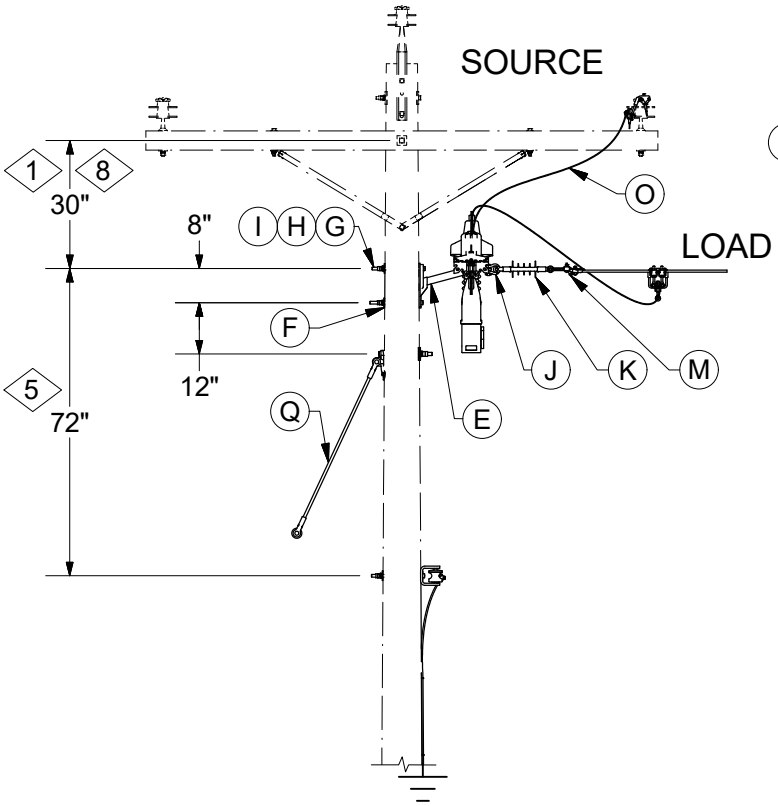
NOTES:

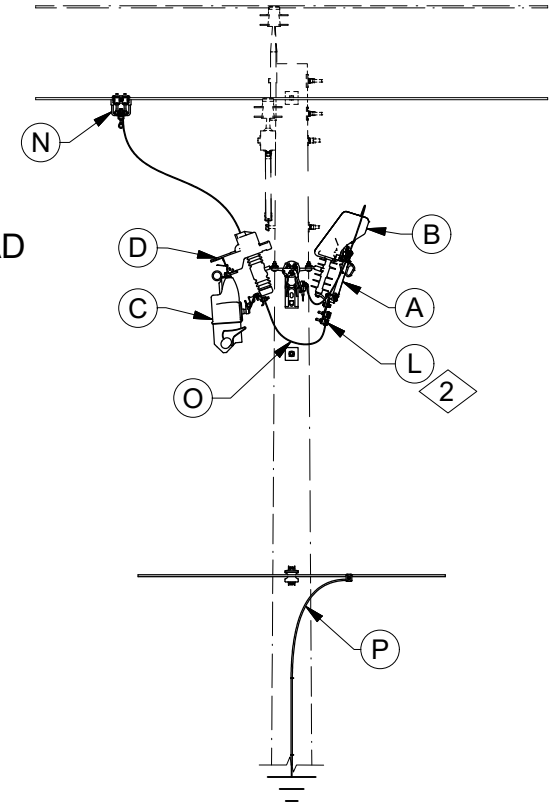
1. Alternative 1 – installing the switch on double crossarms is permissible in Missouri.
2. Use DCS **12 00 10 01** for ground coil application on new pole installation.
3. When required, switch number tag shall be installed here.

		Stnd. / Stk. No.	Materials Description 10 12 24 **	01	02
	A	54 07 204	Switch, Disc., 600A, 15kV	3	3
	D	23 62 128	Adaptor Pin 1”	4	2
	F	**04 00 41 04**	Crossarm, Deadend, FG, 10’		1
	H	**04 00 20 08**	Crossarm & Brace, 10’ Dbl.	1	
@	I	DEC*W	Clamp, Deadend	2	2
	J	25 05 143	Vice Top Insulator 15kV	4	2
	K	**06 12 34 01**	Deadend on Crossarm	2	2
	L	**06 12 30 01**	Deadend on Pole w/ FG Extension	1	1
1@	M	**12 00 10 02**	Grounding Unit – Ground Rod	1	1
		12 00 10 01	Grounding Unit – Ground Coil	1	1
@	N	PLW*W	Wire, Poly covered, S.D. (Ft.)	20	20
@	O	PG*	Clamp, Parallel Groove See **07 00 25 00**	6	6
	R	17 54 182	Connector, Split Bolt	1	1









REV	DATE	ENG	DESCRIPTION
005	07/01/20	DT	Conversion to new standard book format
004	04/01/19	DT	Added Connector 17 51 114 and replaced switch avian protection

Construction Note(s):

1 For armless construction, apply dimension shown to upper bolt of lowest insulator. For single phase pole, use 36" from the top of the pole.

2 Replace two bolt connectors on 600 amp switch with stock #17 51 114, when conductor (item N) is smaller than 1/0.

Operation Note(s):

3. When closing Tripsaver, do not pick up load.
   - Open solid blade switch.
   - Close Tripsaver.
   - Close solid blade switch.

4. When opening Tripsaver
   - Open 600 amp switch with Loadbuster
   - Open Tripsaver

DCS #	DESCRIPTION	STK #
10 12 25 01	100A 65T Tripsaver II	69 10 253
10 12 25 02	100A 80T Tripsaver II	69 10 254
10 12 25 03	100A 100T Tripsaver II	69 10 255
10 12 25 04	100A 40T Tripsaver II	69 10 258
10 12 25 05	100A User Programmed Tripsaver II	69 10 260
10 12 25 06	200A 100T Tripsaver II	69 10 269
10 12 25 07	200A 140T Tripsaver II	69 10 270
10 12 25 08	200A User Programmed Tripsaver II	69 10 267
10 12 25 09	40A User Programmed Tripsaver II	69 10 264

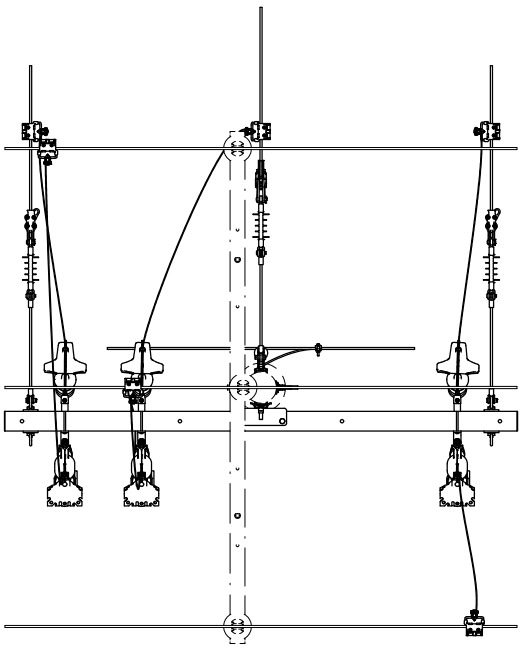
	ITEM	STK / DCS #	DESCRIPTION 10 12 25 **	QTY
	A	54 07 296	Switch - Disconnect 15kV 600 Amp	1
	B	23 17 512	Wildlife Guard - Vertical Switch 600 Amp	1
	C	-	Tripsaver II - See chart above	1
	D	23 17 411	Wildlife Guard - Cover Cutout	1
7	E	23 56 063	Bracket - Equipment Mount 3 Position	1
	F	23 66 027	Washer - Square 5/8"	2
	G	23 52 065	Bolt, Mach., 5/8" x 12"	2
	H	23 66 134	Lock Washer - 5/8" Double Coil	2
	I	23 65 043	Lock Nut - 5/8" Square	2
	J	23 68 181	Shackle - Deadend	1
	K	25 06 052	Insulator - Deadend, 12 kV	1
	L	17 51 114	Connector - One Bolt #8 to 2/0	1
@	M	**07 00 11 00 @**	Clamp, Deadend DCS **07 00 11 00**	1
@	N	**07 00 21 00 @**	Hotline Clamp and Stirrup DCS **07 00 21 00**	2
@	O	**07 00 80 00 @**	Wire - Poly Covered (ft.) DCS **07 00 80 00**	10
@	P	**12 00 10 02**	Grounding Unit - Existing Pole - Ground Rod	1
		12 00 10 01	Grounding Unit - New Pole - Ground Coil	1
@	Q	**11 00 ** ** @**	Guy Unit	1

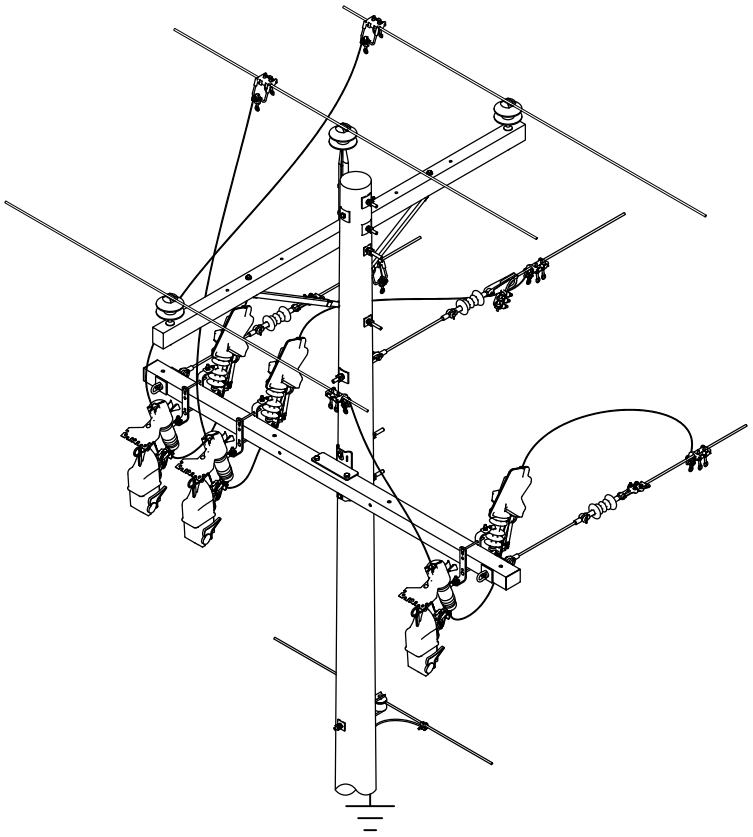
REV	DATE	ENG	DESCRIPTION
005	07/01/20	DT	Conversion to new standard book format
004	04/01/19	DT	Added Connector 17 51 114 and replaced switch avian protection

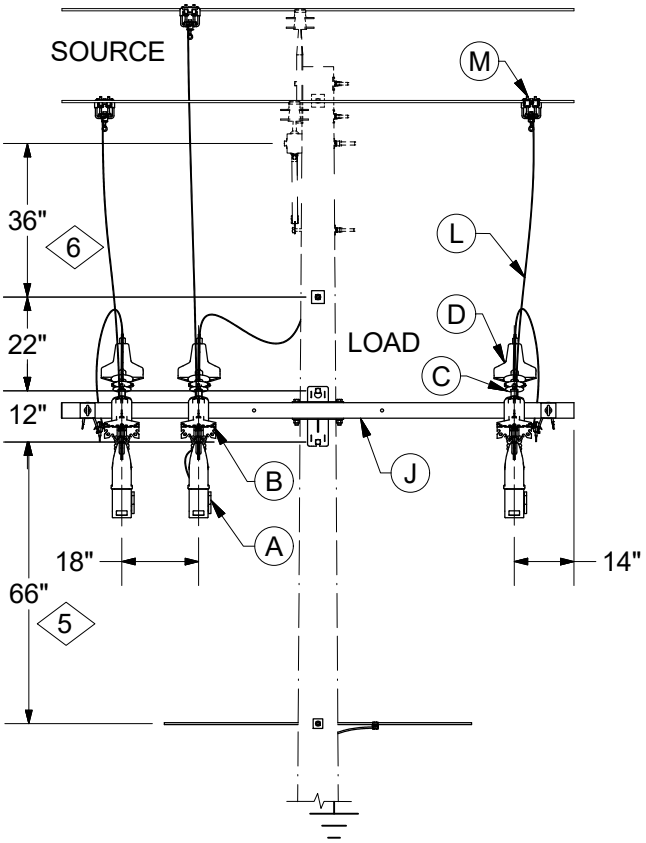
Design Note(s):

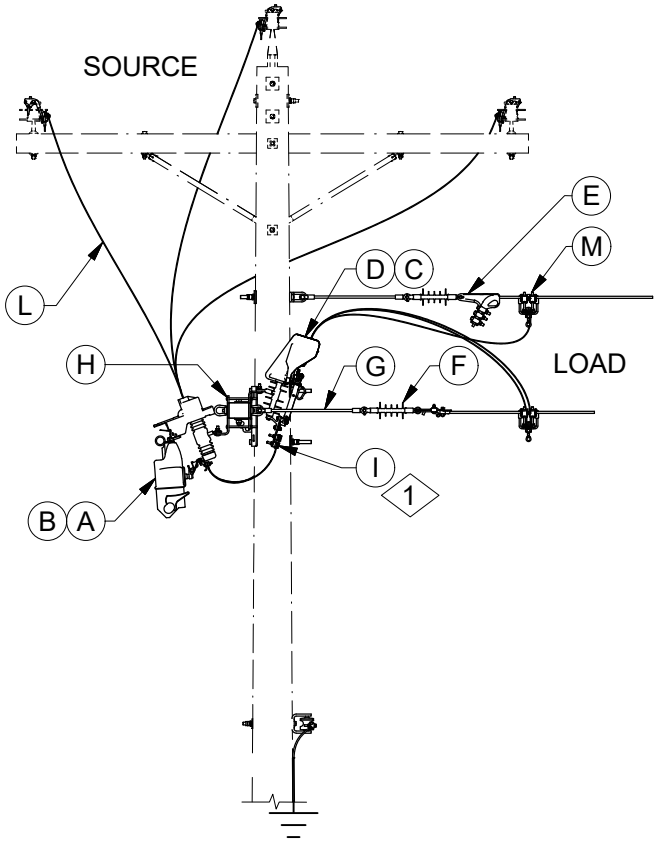
5. This dimension may be reduced to 40" for existing poles to prevent replacement of otherwise serviceable poles.
6. Stock # 69 10 260 is to be programmed by user. The stock # 69 10 259 is the programming kit if needed.
7. Maximum line tension of 5,000 pounds for item E.
8. This dimension may be reduced to 24" for existing pole to prevent replacement of otherwise serviceable poles.
9. If fused cutouts are currently installed on a three poiont bracket with this configuration, tripsavers may be installed using existing dimensions.

REV	DATE	ENG	DESCRIPTION
005	07/01/20	DT	Conversion to new standard book format
004	04/01/19	DT	Added Connector 17 51 114 and replaced switch avian protection









REV	DATE	ENG	DESCRIPTION
004	07/01/20	DT	Updated to new book format
003	04/01/19	DT	Updates to switch connectors and avian protection

Construction Note(s):

1 Replace two bolt connectors on 600 amp switch with stock # 17 51 114, when conductor (item K) is smaller than 1/0.

Operation Note(s):

2. When closing Tripsaver, do not pick up load.
   - Open solid blade switch.
   - Close Tripsaver.
   - Close solid blade switch.
3. When opening Tripsaver
   - Open 600 amp switch with Loadbuster
   - Open Tripsaver

DCS #		DESCRIPTION	STK #
2 Phase	3 Phase		
10 12 26 01	10 12 26 04	100A 65T Tripsaver II	69 10 253
10 12 26 02	10 12 26 05	100A 80T Tripsaver II	69 10 254
10 12 26 03	10 12 26 06	100A 100T Tripsaver II	69 10 255
10 12 26 07	10 12 26 08	100A 40T Tripsaver II	69 10 258
10 12 26 09	10 12 26 10	100A User Programmed Tripsaver II	69 10 260
10 12 26 11	10 12 26 12	200A 100T Tripsaver II	69 10 269
10 12 26 13	10 12 26 14	200A 140T Tripsaver II	69 10 270
10 12 26 15	10 12 26 16	200A User Programmed Tripsaver II	69 10 267
10 12 26 17	10 12 26 18	40A User Programmed Tripsaver II	69 10 264

	ITEM	STK / DCS #	DESCRIPTION 10 12 26 **	2 Phase	3 Phase
	A	-	Tripsaver II - See chart above	2	3
	B	23 17 411	Wildlife Guard - Cover Cutout	2	3
	C	54 07 296	Switch - Disconnect 15kV 600 Amp	2	3
	D	23 17 512	Wildlife Guard - Vertical Switch 600 Amp	2	3
	E	**06 12 30 01 @**	Deadend on Pole w/FG Extension	1	1
	F	**06 12 35 01 @**	Deadend on FG Single Arm	2	2
	G	25 56 076	Insulator - Guy Strain F/G 26"	2	2
	H	23 56 088	Backet - Crossarm Double Sided NEMA	2	3
	I	17 51 114	Connector - One Bolt #8 to 2/0	4	6
@	J	**04 00 41 03**	Crossarm - Deadend FG 8'	1	1
		04 00 41 04	Crossarm - Deadend FG 10'	1	1
@	K	**12 00 10 02**	Grounding Unit - Existing Pole - Ground Rod	1	1
		12 00 10 01	Grounding Unit - New Pole - Ground Coil	1	1
@	L	**07 00 80 00 @**	Wire - Poly Covered S.D. (ft.)	20	30
@	M	**07 00 21 00 @**	Hotline Clamp and Stirrup	4	6

Design Note(s):

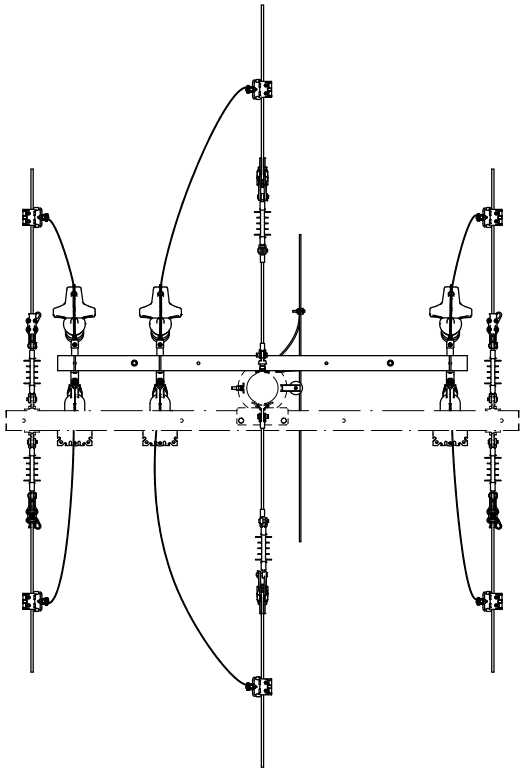
4. Stock # 69 10 260, 69 10 264, and 69 10 269 must be programmed by the end user.

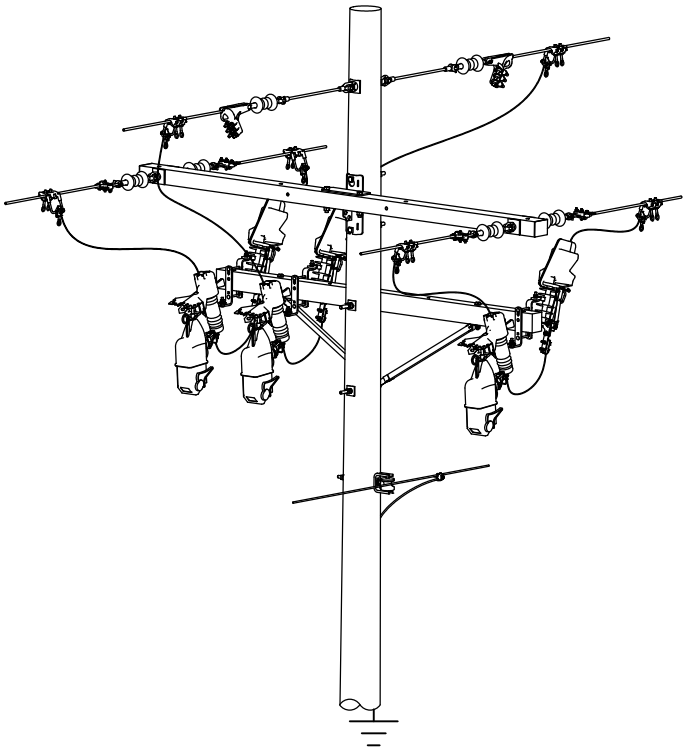
5 This dimension may be reduced to 40" for existing poles to prevent replacement of otherwise serviceable poles.

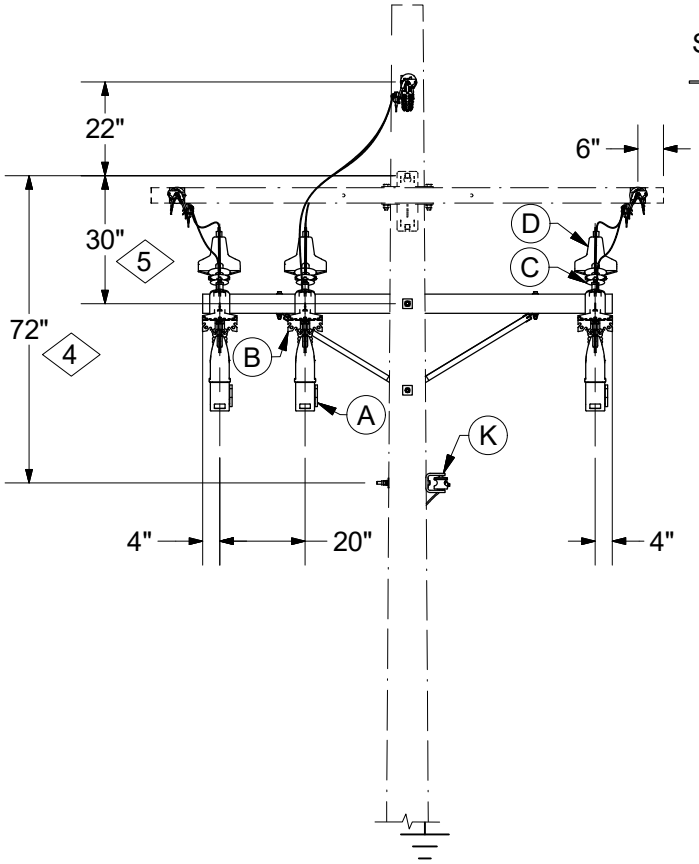
6 This dimension may be reduced to 24" for existing poles to prevent replacement of otherwise serviceable poles.

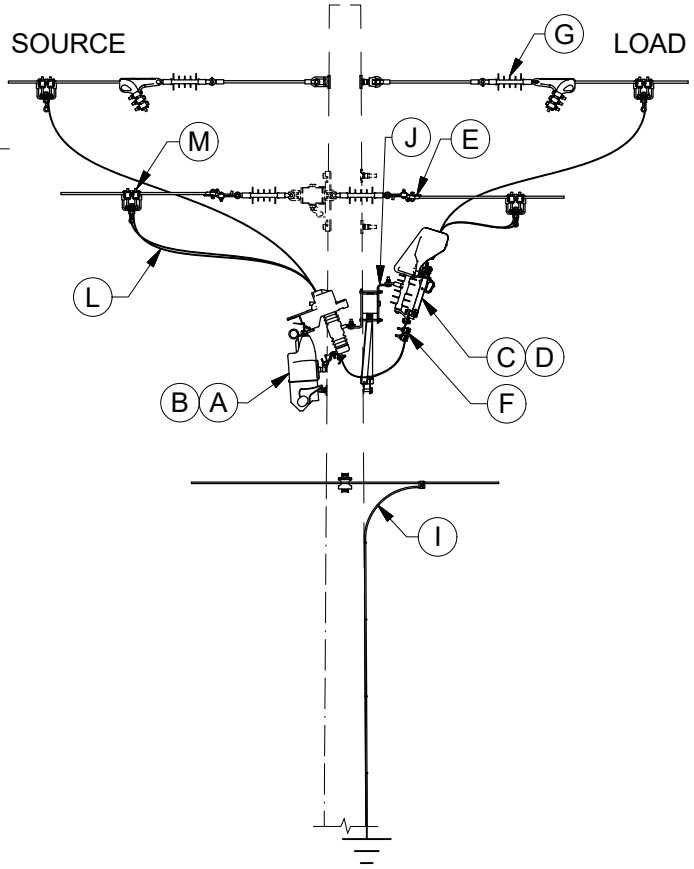
7. If fused cutout are currently installed on a crossarm with this configuration, Tripsavers may be installed using existing crossarm dimensions.

REV	DATE	ENG	DESCRIPTION
004	07/01/20	DT	Updated to new book format
003	04/01/19	DT	Updates to switch connectors and avian protection









REV	DATE	ENG	DESCRIPTION
000	07/01/20	DT	New Issue

Construction Note(s):

1. Replace two bolt connectors on 600 amp switch with stock #17 51 114, when conductor (item M) is smaller than 1/0.

Operation Note(s):

2. When closing Tripsaver, do not pick up load.
   - Open solid blade switch.
   - Close Tripsaver.
   - Close solid blade switch.

DCS #		DESCRIPTION	STK #
2 Phase	3 Phase		
10 12 27 01	10 12 27 04	100A 65T Tripsaver II	69 10 253
10 12 27 02	10 12 27 05	100A 80T Tripsaver II	69 10 254
10 12 27 03	10 12 27 06	100A 100T Tripsaver II	69 10 255
10 12 27 07	10 12 27 08	100A 40T Tripsaver II	69 10 258
10 12 27 09	10 12 27 10	100A User Programmed Tripsaver II	69 10 260
10 12 27 11	10 12 27 12	200A 100T Tripsaver II	69 10 269
10 12 27 13	10 12 27 14	200A 140T Tripsaver II	69 10 270
10 12 27 15	10 12 27 16	200A User Programmed Tripsaver II	69 10 267
10 12 27 17	10 12 27 18	40A User Programmed Tripsaver II	69 10 264

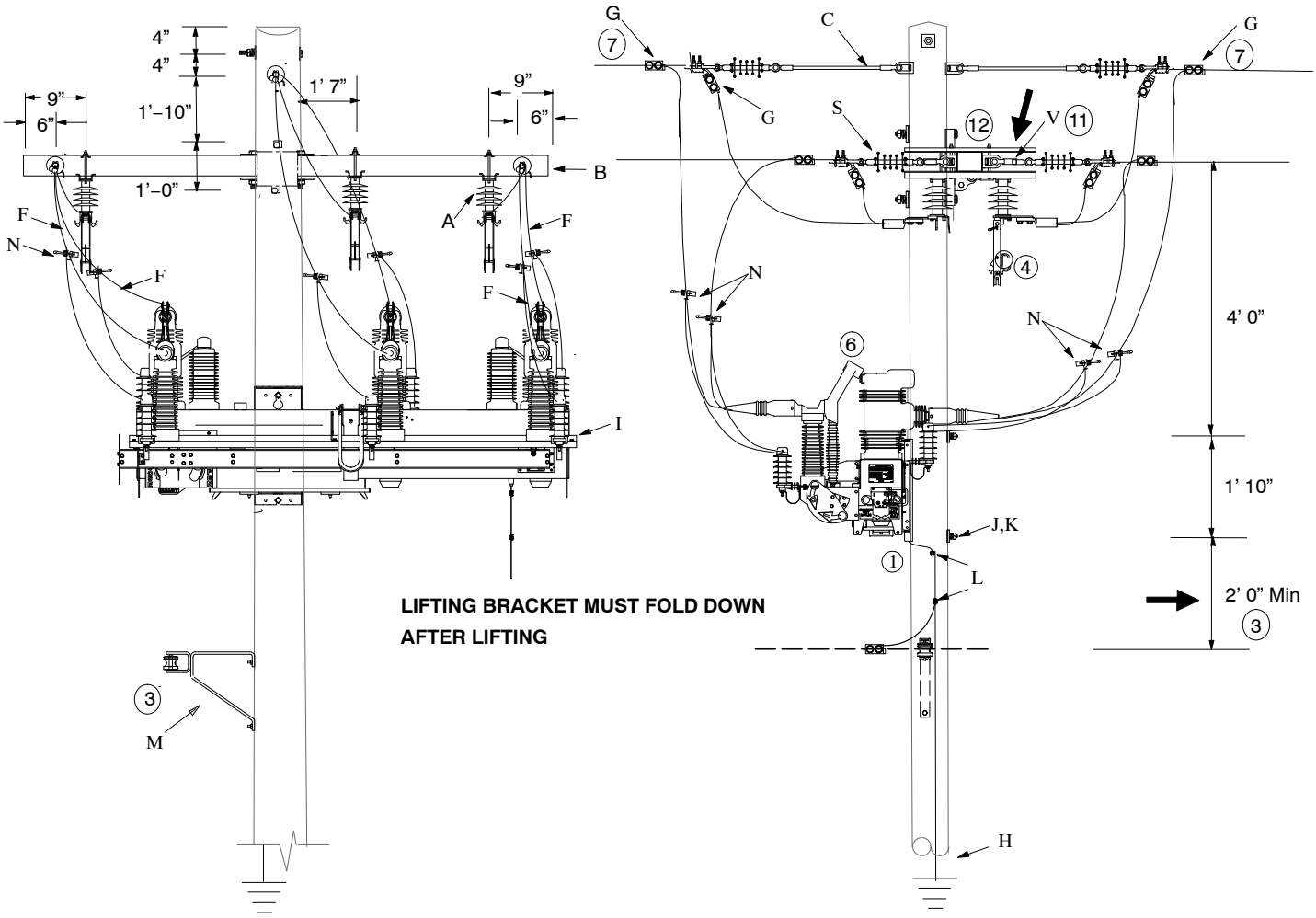
	ITEM	STK / DCS #	DESCRIPTION 10 12 27 **	2 Phase	3 Phase
	A	-	Tripsaver II - See chart above	2	3
	B	23 17 411	Wildlife Guard - Cover Cutout	2	3
	C	54 07 296	Switch - Disconnect 15kV 600 Amp	2	3
	D	23 17 512	Wildlife Guard - Vertical Switch 600 Amp	2	3
	E	**06 12 35 02 @**	Deadend on FG Single Arm	2	4
	F	17 51 114	Connector - One Bolt #8 to 2/0	4	6
@	G	**06 12 30 13 @**	Dbl Deadend on Pole w/o FG Extension		1
		06 12 30 03 @	Dbl Deadend on Pole w/FG Extension		1
@	H	**04 00 20 03**	10' Single Wood Crossarm	1	1
		04 00 20 02	8' Single Wood Crossarm	1	1
		04 00 41 03	8' F/G Deadend Crossarm	1	1
		04 00 41 04	10' F/G Deadend Crossarm	1	1
@	I	**12 00 10 02**	Grounding Unit - Existing Pole - Ground Rod	1	1
		12 00 10 01	Grounding Unit - New Pole - Ground Coil	1	1
@	J	23 56 088	Bracket - Crossarm Double Sided NEMA	2	3
@	K	**03 01 ** ****	Clevis - Secondary	1	1
@	L	**07 00 80 00 @**	Wire - Poly Covered S.D. (ft.)	20	30
@	M	**07 00 21 00 @**	Hotline Clamp and Stirrup DCS **07 00 21 00**	4	6

Design Note(s):

3. Stock #69 10 260, 69 10 264, and 69 10 267 must be programmed by user.
4. This dimension may be reduced to 40" for existing poles to prevent replacement of otherwise serviceable poles.
5. This dimension may be reduced to 24" for existing poles to prevent replacement of otherwise serviceable poles.
6. If fused cutouts are currently installed on a crossarm with this configuration, tripsavers may be installed using existing crossarm dimensions.

REV	DATE	ENG	DESCRIPTION
000	07/01/20	DT	New Issue

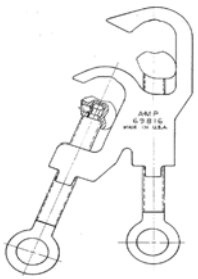
S & C INTELLIRUPTER



NOTES:

1. Intellirupter recloser frame must be connected to ground with #2 Cu. Pole ground to neutral connection must be #2 Cu.
2. Tool for removal / install of radio module and control module is 46 01 645.
3. Install neutral/secondary using extension brackets on the side of the pole with only one phase to allow access to the compartments on the bottom of the intellirupter. The neutral/secondary may be dead–ended to the pole as long as they are mounted 36 inches below the bottom mounting bolt of the intellirupter.
4. Switch to open towards climbing side of pole.
5. 8' Crossarm can be used if existing on pole in MO.
6. Integral disconnect switches on recloser shall be in the open position while connecting primary leads to the recloser.

7. The recloser leads shall be connected to the line connector with a piggy–back clamp (stock #85 38 392) (see picture below) during the installation. The lightning arresters shall be connected to the recloser leads with hot line clamps and the hot line clamps must be installed 36” away from the aluminum base of the Intellirupter. Then, the recloser leads shall be permanently connected with parallel groove clamps and the piggy–back clamps shall be removed.

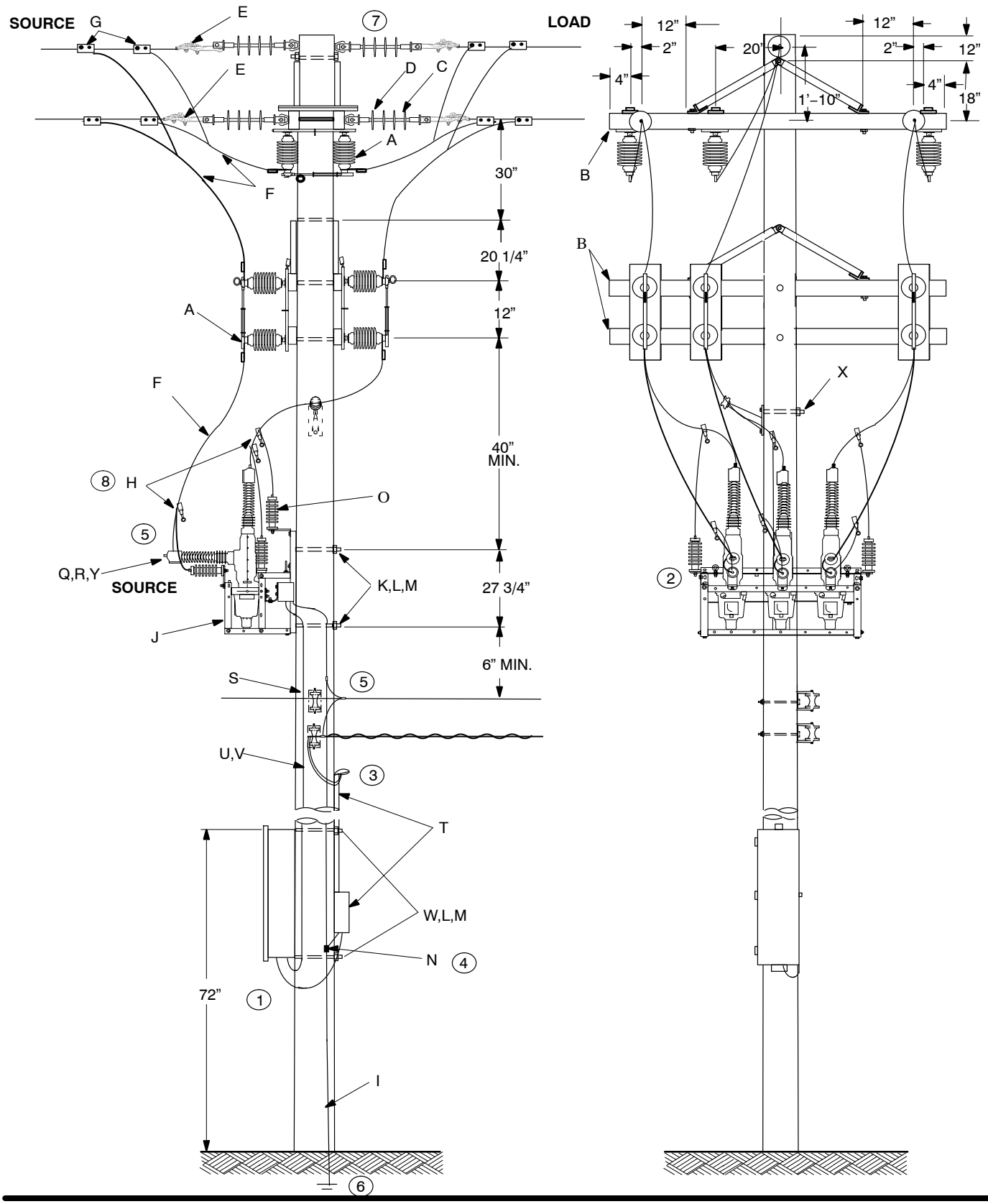


Stock #85 38 392

8. Intellirupter Recloser weights 1010 lbs.
9. Use DCS **12 00 10 03** for ground with existing poles; use DCS **12 00 10 04** for ground with new pole installation.
10. Double deadend on pole w/o FG extension available AmerenMO only.
11. Install 26” fiberglass extension to provide clearance between insulator and switch.
12. Only install the two inside bolts on the switch and slide them as close to the crossarm as possible.
13. External power supply, powered off secondary, required for installing on circuits less than 12.47 kV. Contact Distri-bution Standards for installation instructions.

		Stnd. / Stk. No.	**Description** **10 12 33****	02
	A	54 07 204	Switch, Dis., 600A, 15kV	3
5	B	**04 00 41 04**	Crossarm, Deadend, F/G, 10’	1
10@	C	**06 12 30 03**	Dbl Deadend on Pole F/G Extension	1
		06 12 30 13	Dbl Deadend on Pole w/o F/G Extension	1
	F	18 51 052	Wire, Poly, SD, 350 Cu. (Ft.)	100
@	G	PG*	Clamp. Parallel Groove (see Std. 07 00 25 00)	13
9@	H	**12 00 10 03**	Grounding Unit (with #2 S.D. Cu) – Ground Rod	1
		12 00 10 04	Grounding Unit (with #2 S.D. Cu) – Ground Coil	1
8	I	69 10 250	Recloser, S&C Intellirupter, 15kV, 600A w/Comm Module	1
	J	23 52 219	Bolt, Galv., 3/4” x 14”	2
	K	23 66 031	Curved Washer, Galv., 3/4” SQ	2
	L	17 54 373	Split Bot #4 Cu to #2 Cu	2
3@	M	03 01 01	Neutral Configuration	1
	N	23 78 183	Clamp, Hot Line	6
	S	**06 12 35 02**	Double Deadend on FG Arm	2
	V	25 56 076	Insulator, Strain FG 26”	4
13@	Y	69 10 252	4 kV power supply	1

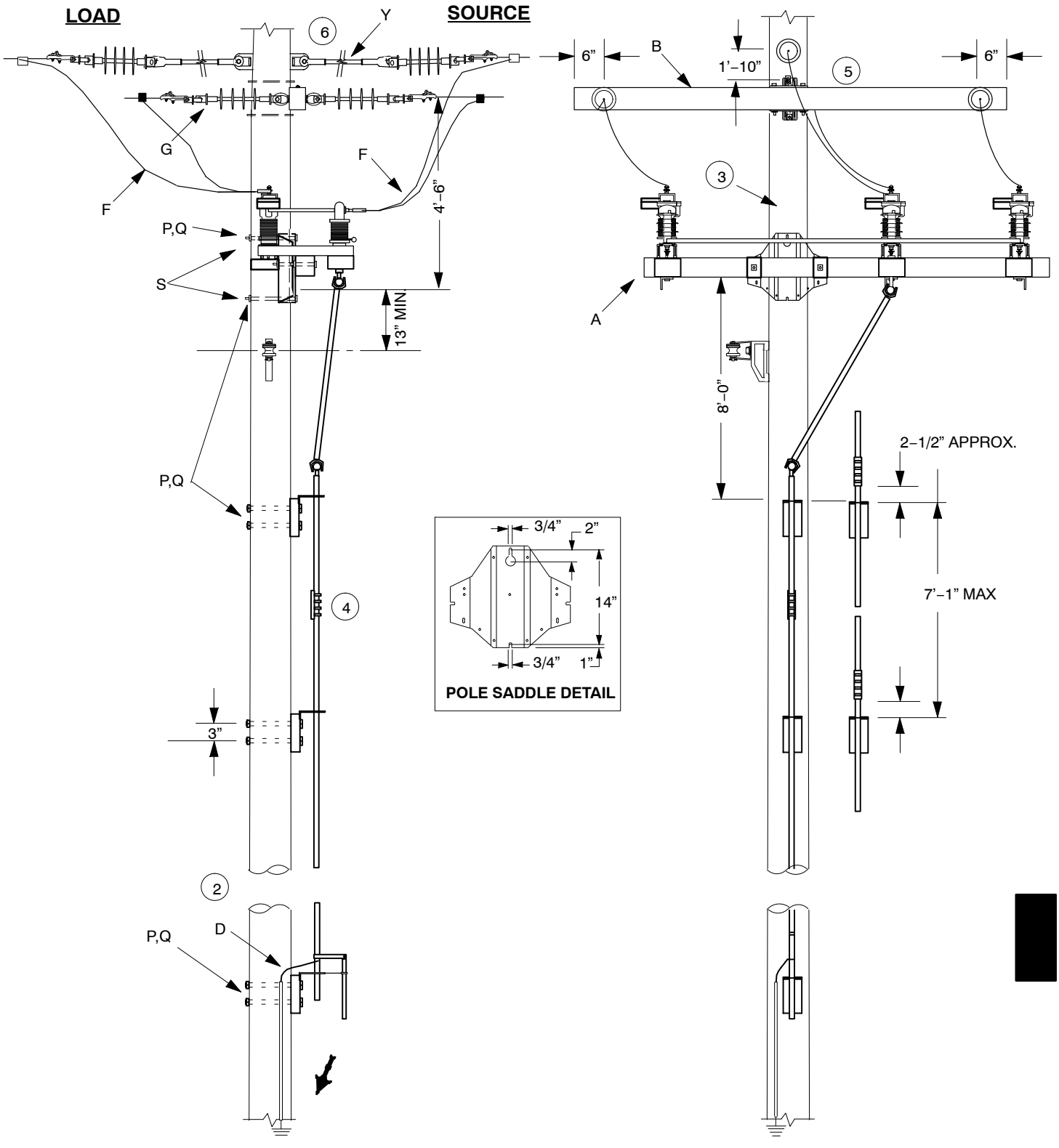
G & W RECLOSER WITH BYPASS AND DISCONNECT SWITCHES



NOTES

1. Recloser comes with a 30’ control cable. A 50’ (Stk. No. 69 10 233) and a 35’ (Stk. No. 69 12 234) may be substituted.
2. Join arrester grounds together and connect to frame and pole ground.
3. Secondary voltage can be supplied with duplex.
4. Control cabinet and circuit breaker/receptical box must be connected to pole ground, with #6 S.D. Cu.
5. Bond ground to distribution system neutral. Bond duplex neutral to distribution system neutral.
6. Use DCS **12 00 10 04** for ground coil application on new pole installation.
7. Double deadend on pole w/o FG extension available AmerenMO only.
8. The lightning arresters shall be connected to the recloser leads with hot line clamps and the hot line clamps must be installed 36” away from the connecting busing.

		Stnd. / Stk. No.	**Description 10 12 34 ****	**01**
	A	54 07 204	Disc., Switch, 600 A, 15 kV,	9
	B	**04 00 20 07**	Crossarm, Double 8 Ft.	3
	C	**06 12 34 04**	Double Deadend on Arm	2
7@	D	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1
		06 12 30 13	Dbl Deadend on Pole w/o FG Extension	1
@	E	DEC*W	Clamp, Deadend	6
@	F	18 51 022	Wire, 500 kcmil, Poly., S.D.	150
@	G	PG*	Clamp, Parallel Groove (See Std. **07 00 25 00**)	12
	H	17 02 175	Hot Line Clamp, 500kcmil Cu Main/#4 Cu Tap	6
6	I	**12 00 10 03**	Grounding Unit	1
	J	69 10 237	Recloser, G&W Viper, 15kV, 800 A	1
	K	23 52 066	Bolt, Galv., 5/8” x 14”	2
	L	23 66 027	Washer, Galv., 11/16”, Square	4
	M	23 66 046	Washer, Galv., 11/16”, Round	4
	N	17 54 003	Connector, Split Bolt	2
	O	10 01 144	Lightning Arrester, 10kV	6
	P	18 51 025	Wire, #4 Cu, Poly	30
	Q	17 54 955	Lug, 1/0 – 500 Cu.	6
	R	17 51 234	Lug, #8 TO 2/0 Cu.	6
	S	**06 01 01 03**	Sgle. Clevis, Ext. Brkt	1
	T	54 17 486	Circuit Breaker, Receptical Box, w/Riser 120V, 20A	1
	U	41 56 041	Moulding – Plastic 3/4” x 8’	4
	V	23 64 028	Staple – for 3/4” moulding	16
	W	23 52 068	Bolt, Galv., 5/8” x 16”	2
	X	**06 12 20 04**	Training Arm with Pin Insulator	1
	Y	69 58 181	Guard, Wildlife	6


LOAD
SOURCE
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G
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P,Q
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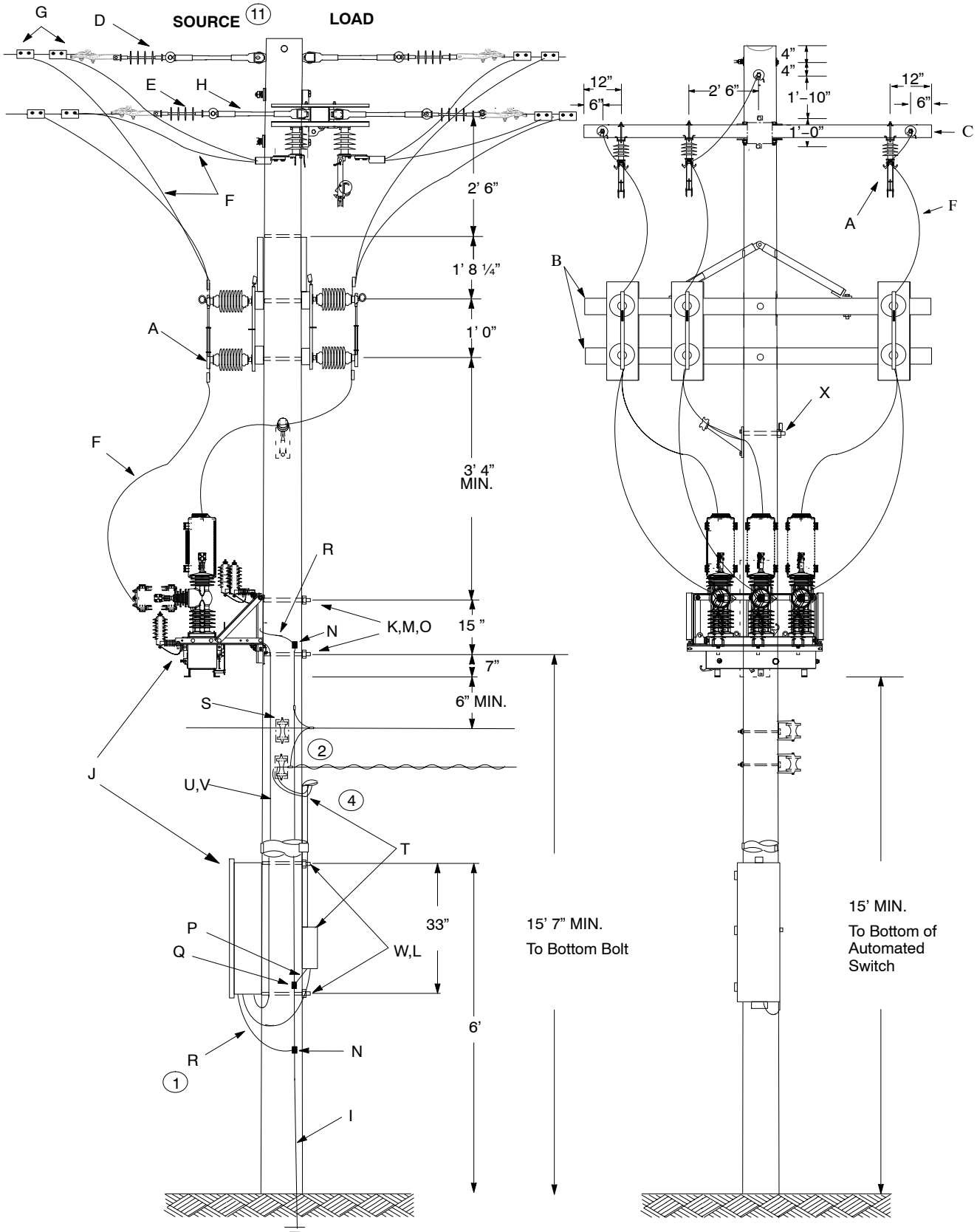
4'–6"
13" MIN.
P,Q
4
3"
2
P,Q
D
6"
B
1'–10"
6"
5
3
A
8'–0"
2–1/2" APPROX.
7'–1" MAX
3/4"
2"
14"
3/4"
1"
POLE SADDLE DETAIL

NOTES:

1. For new installation, both Illinois and Missouri, arresters are not required for normally closed switch installations; where switches are normally open, install both sets of arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. Grounding unit the switch handle.
3. When required, switch number tag shall be installed here.
4. Insulator must be installed in this section.
5. 8' crossarm available AmerenMO only.
6. Double deadend on pole w/o FG extension available AmerenMO only.

		Stnd. / Stk. No.	**Description 10 12 35 01**	**Qty**
	A	54 07 273	Switch, Group Operated 15kV	1
5@	B	**04 00 41 03**	Crossarm, Deadend, F/G, 8'	1
		04 00 41 04	Crossarm, Deadend, F/G, 10'	1
@	D	**12 69 11 05**	Grounding Unit–Ground Rod	1
		12 69 11 06	Grounding Unit–Ground Coil	1
@	E	PG*W	Clamp, PG, DCS **07 00 25 00**	6
	F	18 51 052	Wire, SD Cu, 350 kcmil, Poly covered	30
	G	**06 12 35 02**	Double Deadend on FG Crossarm	2
	P	23 52 066	Bolt, Galv., 5/8" x 14"	8
	Q	23 66 027	Washer, Galv., 11/16" Square	4
	S	23 66 046	Washer, Galv, 11/16" Round	2
@	X	DEC*W	Clamp, Deadend, DCS 07 00 30 00	4
6@	Y	**06 12 30 03**	Double Deadend on Pole w/ FG Extension	1
		06 12 30 13	Double Deadend on Pole w/o FG Extension	1

Automated Sectionalizer for DER Applications

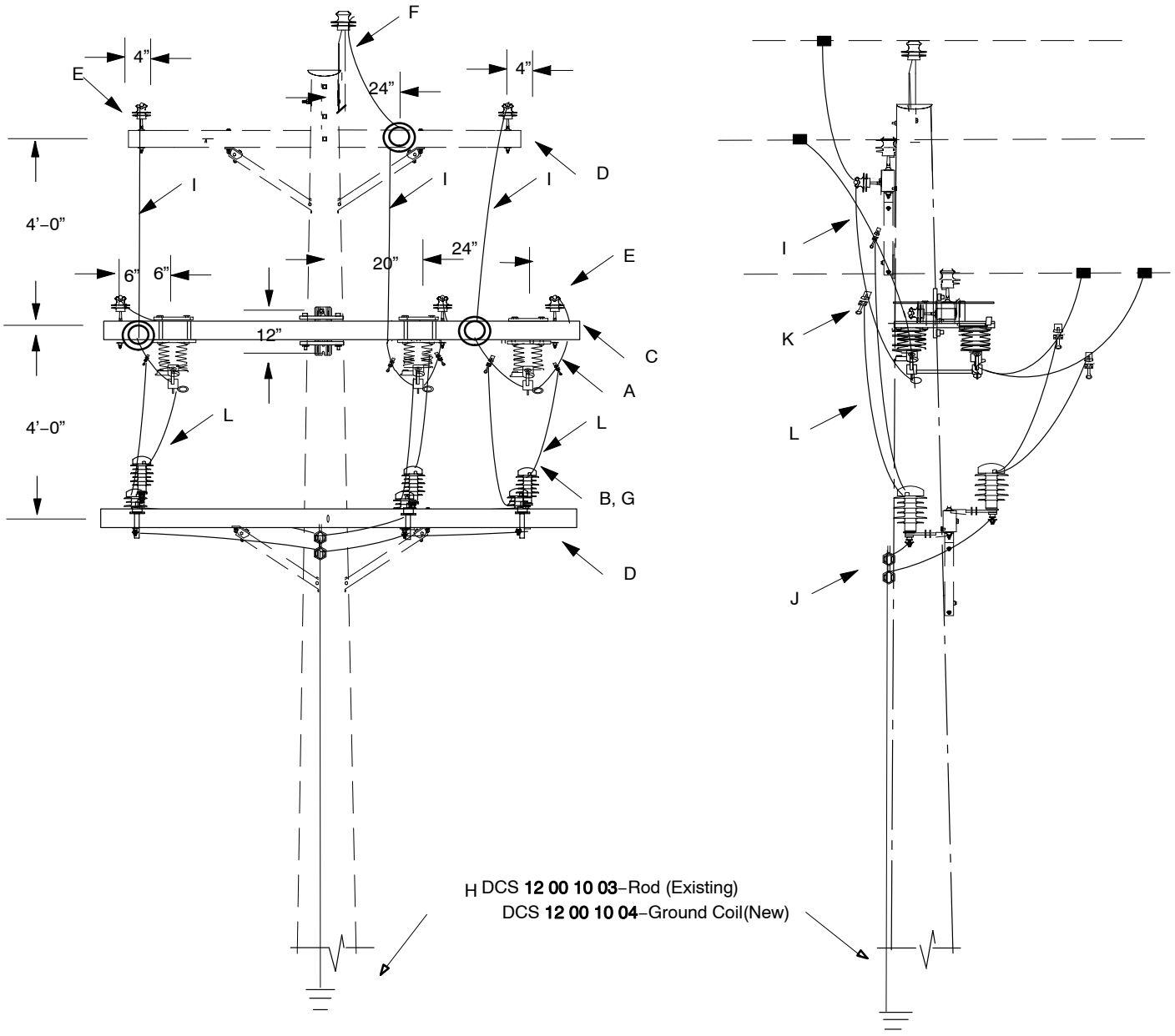


NOTES

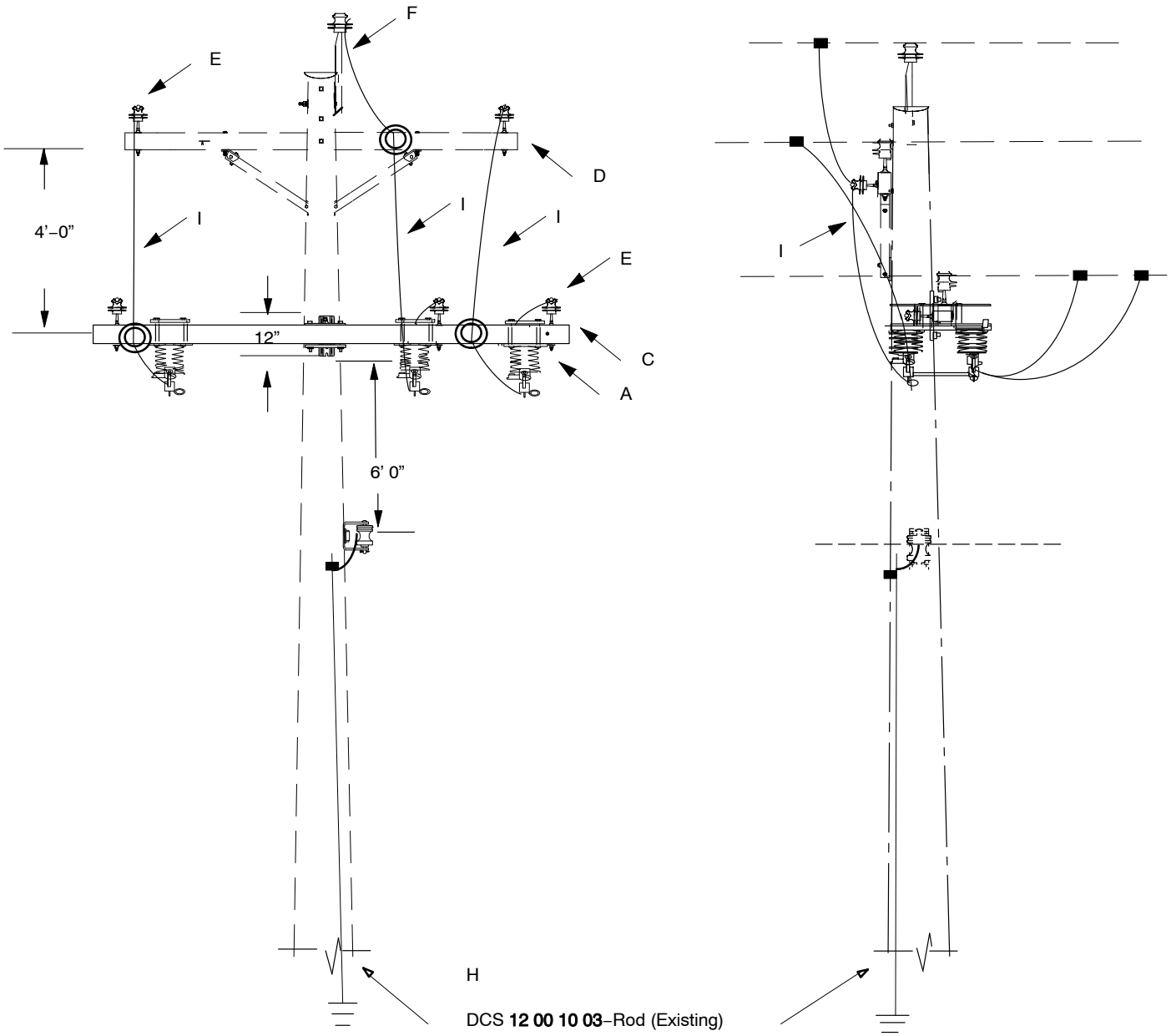
1. Control cabinet and equipment frame shall be bonded to pole ground with #2 poly covered copper. Circuit breaker box shall be bonded to pole ground with #6 poly covered copper.
2. Bond pole ground to distribution system neutral. If present, bond duplex neutral to distribution system neutral.
3. If antenna installation is required in supply space, see **25 90 00 00** for clearance requirement. If antenna installation is required in communications zone, see **29 00 17 11** for clearance requirement.
4. Minimum 40” clearance required (at pole) from lowest point on secondary (or weatherhead drip loop, whichever is lower) to communications, if present.
5. Use DCS **12 00 10 04** for ground coil application on new pole installation.
6. Voltage sensors come calibrated for 7.2 kV line to ground voltage. Automated switch rated for 630 amp continuous current and 12.5 kA withstand symmetrical fault current.
7. 10 kV lightning arresters come preinstalled. See DCS **12 00 01 01** when different arresters are required.
8. Control cabinet comes with a 55’ control and power cables.
9. Automated switch assembly weighs 400 lbs. Control cabinet weighs 105 lbs.
10. 120V supply power must be provided for control cabinet through the circuit breaker box, item T.
11. The “source” side shall be in the direction of the feeder, the “load” side shall be on the distributed generation side.

		Stnd. / Stk. No.	**Description 10 12 36 ****	**01**
	A	54 07 204	Disc., Switch, 600 A, 15 kV,	9
	B	**04 00 20 11**	Crossarm, Double 10 Ft. Vertically	2
	C	**04 00 41 04**	Crossarm, Deadend, F/G, 10’	1
	D	**06 12 30 03**	Dbl Deadend on Pole w/ FG Extension	1
	E	**06 12 35 02**	Dbl Deadend on Arm	2
	F	18 51 052	Wire, 350 kcmil, Poly., S.D.	140
@	G	PG*	Clamp, Parallel Groove (See Std. 07 00 25 00)	12
	H	25 56 076	Insulator, Strain, Fiberglass 26”	4
5@	I	**12 00 10 03**	Grounding Unit, #2 Cu	1
		12 00 10 04	Grounding Coil, #2 Cu	1
	J	69 10 262	Automated Switch, G&W Diamondback	1
	K	23 52 219	Bolt, Galv., 3/4” x 14”	2
	L	23 66 027	Washer, Flat, 5/8”, Square	2
	M	23 66 031	Washer, Curved., 3/4”	2
	N	17 54 182	Connector, Split Bolt, #2 Cu – #4 Cu	2
	O	23 66 135	Washer, Lock, 3/4”, Dbl Coil	2
	P	18 51 021	Wire, #6 Cu, Poly Covered	3
	Q	17 54 005	Connector, Split Bolt, #2 Cu – #6 Cu	1
	R	18 51 019	Wire, #2 Cu, Poly Covered	6
@	S	**06 01 01 ****	Secondary Clevis	1
		06 01 03 **	Secondary Rack	1
	T	54 17 486	Circuit Breaker Box, w/Riser 120V, 15A, sec. arrest.	1
	U	41 56 041	Moulding – Plastic 3/4” x 8’	4
	V	23 64 028	Staple – for 3/4” moulding	16
	W	23 52 068	Bolt, Galv., 5/8” x 16”	2
	X	**06 12 20 04**	Training Arm with Vice–Top Insulator	1

10 12 50 01 – Arresters On the Same Structure
MISSOURI ONLY



10 12 50 02 – Arresters On Adjacent Structures

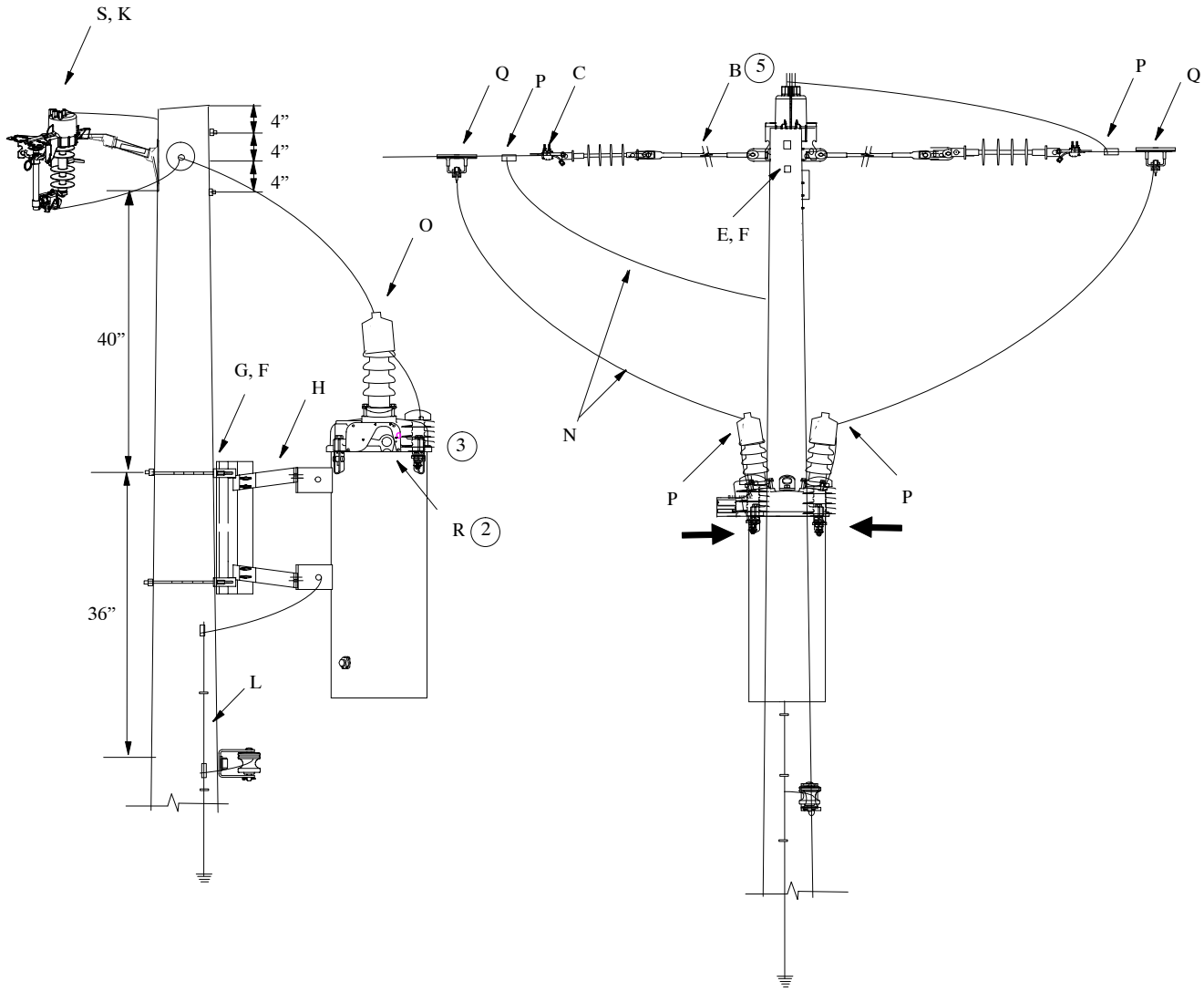


DCS **12 00 10 03**–Rod (Existing)
DCS **12 00 10 04**–Ground Coil(New)

Notes:

1. DCS 10 12 50 01 is permissible for existing installation in Missouri. For new installation, both Illinois and Missouri, arresters are not required for normally closed switch installations; where switches are normally open, install both sets of arresters on adjacent poles. Refer to DCS **12 00 01 01** for arresters selection.
2. Use DCS **12 00 10 04** for ground coil application on new pole installation.
3. When required, switch number tag shall be installed here.
4. 8' crossarm available Missouri only.
5. Install mounting bolts for switch as close to the crossarm as possible. Tighten bolts evenly and do not distort or warp switch base and backplate. Do not use bolts in outside/end mounting holes.

		Stnd. / Stk. No.	**Description 10 12 50 ****	**01**	02
	A	54 07 204	Switch, Dis., 600A, 15kV	3	3
1@	B	10 01 144	Arrester, 10kV	6	
		10 01 133	Arrester, 3kV	6	
	C	**04 00 41 04**	Crossarm, Deadend, FG, 10'	1	1
4@	D	**04 00 20 03**	Crossarm, Sgl, Wood 10'	1	
		04 00 20 02	Crossarm, Sgl, Wood 8'	1	
	E	**06 12 01 01**	Pin & Insulator	5	5
	F	**06 12 01 02**	Pin 24" Sgl Pole Top & Insulator	1	1
	G	23 56 088	DBL Sided NEMA Bracket for Arrester and Cutout	3	
2@	H	**12 00 10 03**	Grounding Unit – Ground Rod	1	1
		12 00 10 04	Grounding Unit – Ground Coil	1	1
@	I	PLW*W	Wire, Poly, S.D. (Ft.)	40	40
@	J	PG*	Clamp, Parallel Groove See **07 00 25 00**	7	7
		HLC*W	Clamp, Hot Line **07 00 21 00**	6	6
@	K	HLC*W	Clamp, Hot Line **07 00 21 00**	6	
	L	18 51 021	Wire S.D. #6 Cu. Poly (Ft.)	20	
	M	25 05 143	Vice Top Insulator 15kV	3	3
	N	23 62 128	Adaptor Pin 1"	3	3


S, K
4”
4”
4”
40”
36”
G, F
H
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3
R
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L
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E, F
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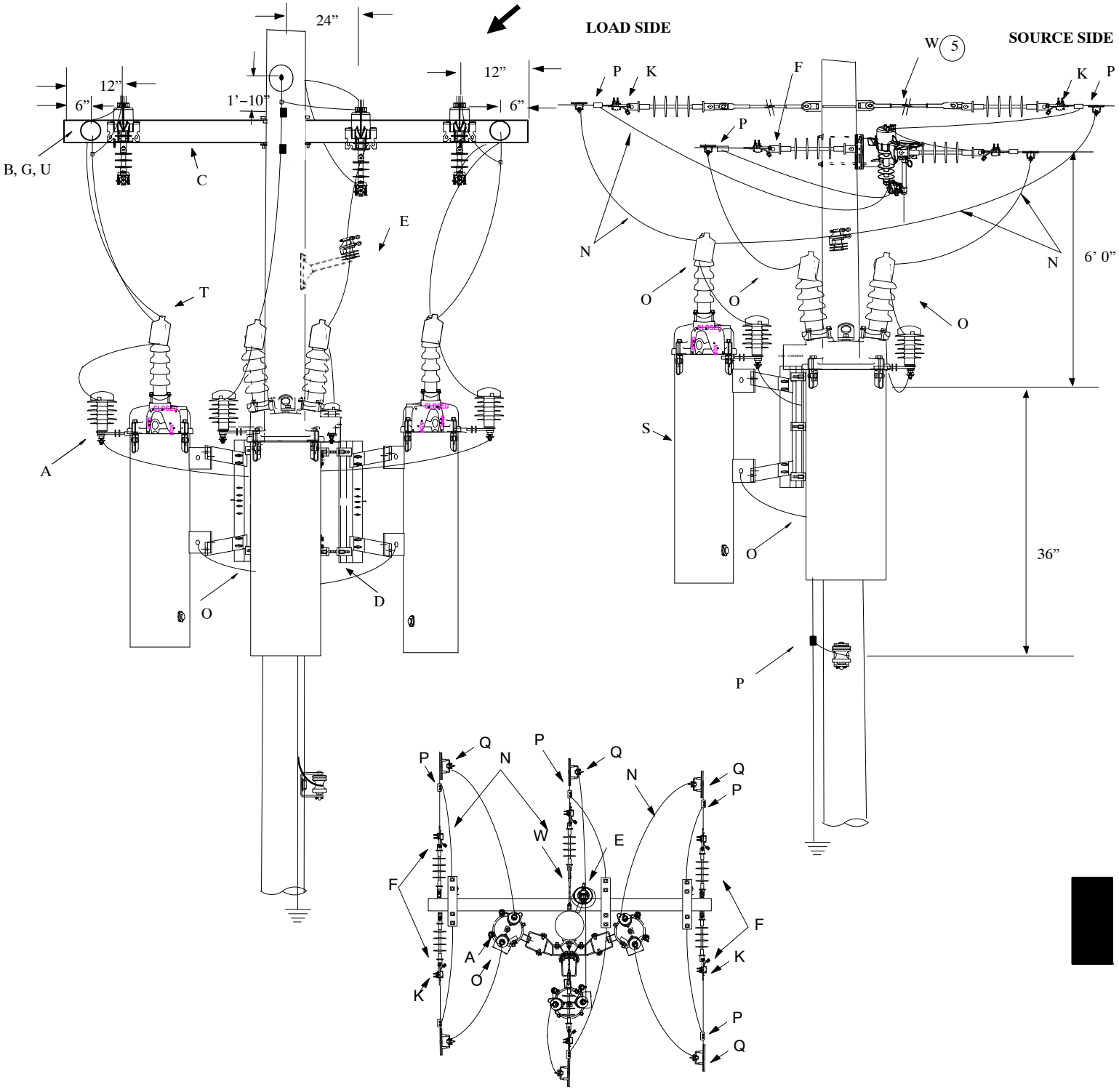
P
Q
P
P

NOTES:

1. Reclosers with only one mounting lug shall be mounted in top hole of mounting unit.
2. Recloser shall be turned in tank to position shown.
3. Lightning arresters shall be mounted on tank cover lug on source and load sides of recloser.
4. Fuse cartridge may be substituted for solid blade if sensitive circuit or extended outage anticipated.
5. Double deadend on pole w/o FG extension available AmerenMO only.

		Stnd. / Stk. No.	**Description 10 12 60 01**	
	A	10 01 144	Arrester, Lightning	2
8@	B	**06 12 30 03**	Double Deadend on Pole w/ FG Extension	1
		06 12 30 13	Double Deadend on Pole w/o FG Extension	1
@	C	DEC*W or DEA*W	Clamp, Deadend	2
	D	23 17 291	Mounting Recloser	1
	E	23 52 063	Bolt, Machine, 5/8 x 10”	2
	F	23 66 027	Washer, Square, 2–1/4”	4
	G	23 53 003	Bolt, D.A., 5/8” x 18”	2
	H	23 52 049	Bolt, Mach., 5/8” x 2”	2
	J	23 06 127	Bracket, Fiberglass, Switch	1
6	K	54 07 210	Switch, Disc., 300A, 15kV	1
7@	L	**12 00 10 02**	Grounding Unit, Ground Rod	1
		12 00 10 01	Grounding Unit, Ground Coil	1
@	N	PLW*W	Wire, Poly Covered, S.D. (Ft.)	15
	O	69 58 181	Guard, Wildlife	2
@	P	PG*	Clamp, Parallel Groove DCS **07 00 25 00**	6
@	Q	STC*W	Clamp, Stirrup, With Hot Line Clamp DCS **07 00 21 00**	2
4 @	R	69 10 XXX	Recloser	1
	S	**05 15 10 01**	Cover – Cutout	1

For #2 Cu or 1/0 Al or Smaller

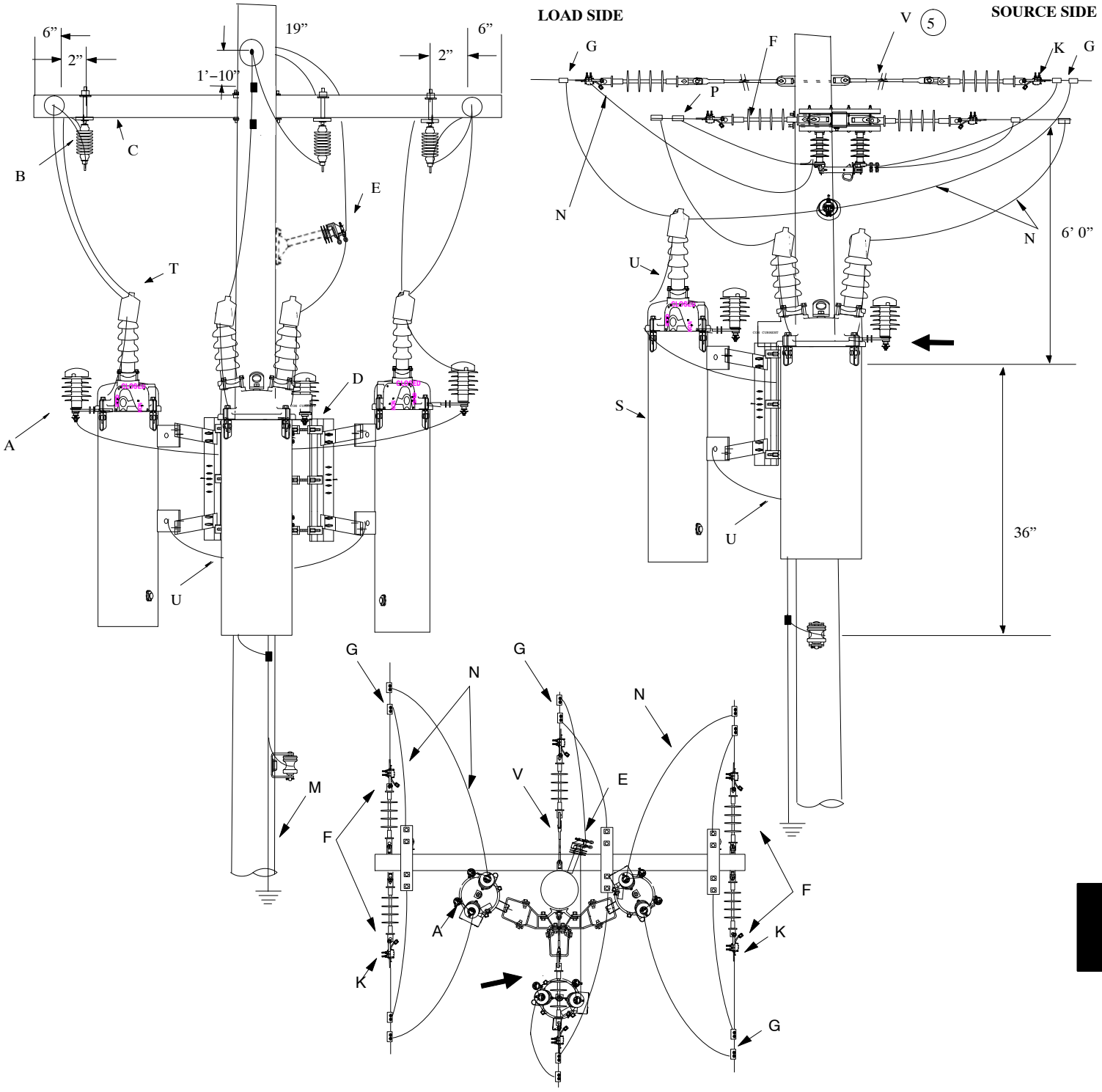


NOTES:

1. Reclosers with only one mounting lug shall be mounted in top hole of mounting unit.
2. Recloser shall be turned in tank to position shown.
3. Lightning arrester shall be mounted on tank cover lug on both source and source sides.
4. Fuse cartridge may be substituted for solid blade if sensitive circuit or extended outage anticipated.
5. Double deadend on pole w/o FG extension available AmerenMO only.
6. Underbuild construction requires deadend on pole w/ FG extension.

		Stnd. / Stk. No.	**Description** **10 12 62 01**	
	A	10 01 144	Arrester, Lightning 10kV	6
4	B	54 07 210	Switch, Disc., 300A 15kV	3
	C	**04 00 41 04**	Crossarm, Deadend, F/G, 10’	1
	D	23 17 209	Mounting Unit, Recloser	1
	E	23 06 089	Arm, Training Fiberglass, 12”	1
	F	**06 12 34 05**	Double Deadend on Arm	2
	G	17 58 054	Bracket, Switch & LA’s	3
	H	25 05 143	Vice Top Insulator, 15kV	1
	I	23 52 065	Mach Bolt, ⅝” x 12”	1
	J	23 66 027	Washer SQ ⅝”	1
@	K	DEC*W or DEA*W	Clamp, Deadend, DCS **07 00 20 00**	4
@	M	**12 00 10 03**	Grounding Unit, Ground Rod	1
		12 00 10 04	Grounding Unit, Ground Coil	1
@	N	PLW*W	Wire, Poly Covered, S.D., (Ft.), DCS **07 00 80 00**	60
	O	18 51 021	Wire, Poly, #6 Cu. (Ft.)	15
@	P	PG*	Clamp, Parallel Groove, DCS **07 00 25 00**	9
@	Q	STC*W	Clamp, Stirrup, with Hot Line, DCS **07 00 21 00**	6
@	S	69 10 XXX	Recloser, Mat Spec 2.1.170	3
	T	69 58 181	Guard, Wildlife	6
	U	**05 15 10 01**	Cover – Cutout	3
5@	W	**06 12 30 03**	Double Deadend on pole w/ FG Extension	1
		06 12 30 13	Double Deadend on pole w/o FG Extension	1

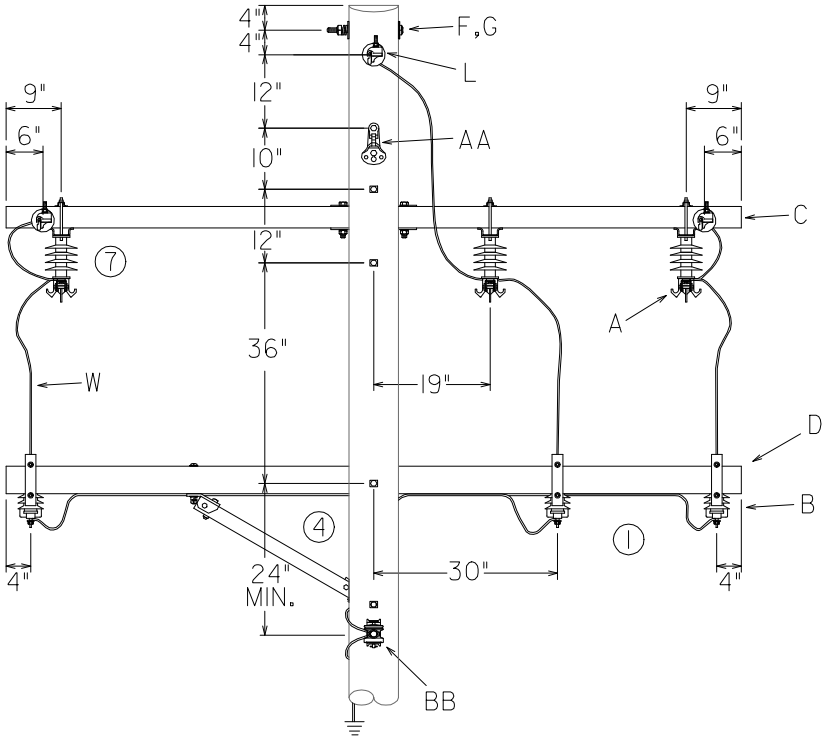
For 336.4 ACSR OR Larger



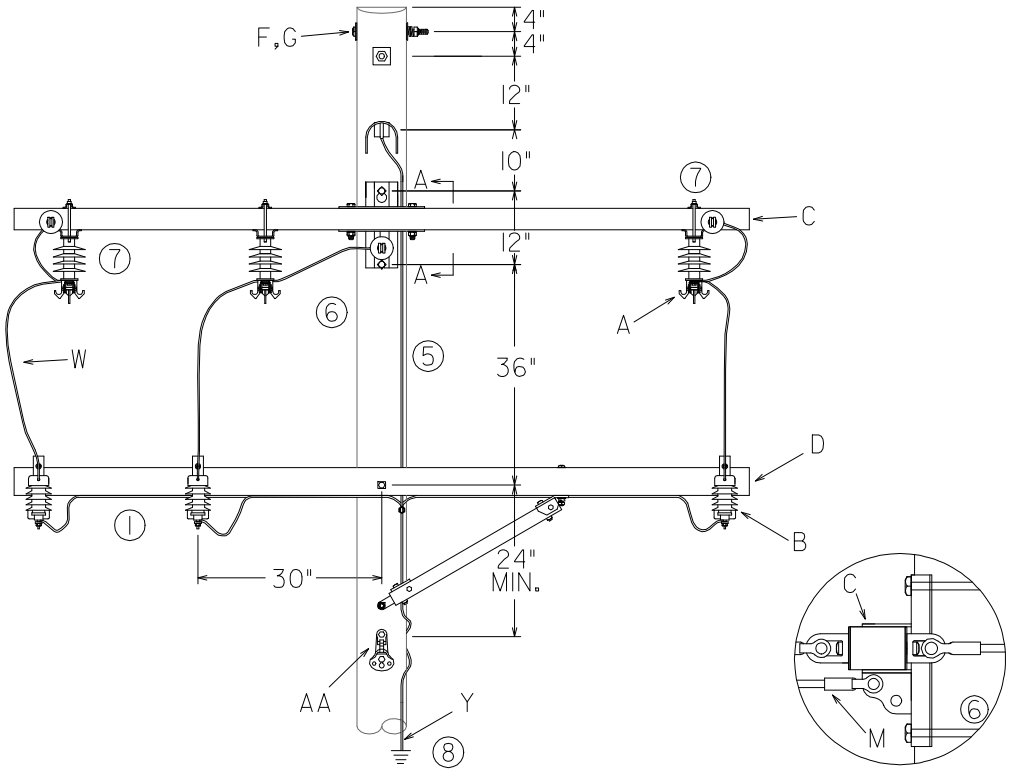
NOTES:

1. Reclosers with only one mounting lug shall be mounted in top hole of mounting unit.
2. Recloser shall be turned in tank to position shown.
3. Lightning arrester shall be mounted on tank cover lug for both source and load sides of the recloser. Keep arrester lead short.
4. Double deadend on pole w/o FG extension available AmerenMO only.
5. Underbuild construction requires deadend on pole w/ FG extension.

		Stnd. / Stk. No.	**Description 10 12 62 03**	
	A	10 01 144	Arrester, Dist., Mov, 10kV w/ Protective Cap	6
	B	54 07 204	Switch, Disc., 600A, 15kV	3
	C	**04 00 41 04**	Crossarm, Deadend, F/G, 10’	1
	D	23 17 209	Mounting Unit, Recloser	1
	E	**06 12 20 04**	Arm, Training Fiberglass, 18”	1
	F	**06 12 34 05**	Double Deadend on Arm	2
@	G	PG*	Clamp, Parallel Groove, DCS **07 00 25 00**	10
	J	23 66 027	Washer, Square, 2–1/4”	12
@	K	DEC*W	Clamp, Deadend, DCS **07 00 20 00**	4
@	L	PG*	Clamp, Parallel Groove (See Std, **07 00 25 00**)	24
@	M	**12 00 10 03**	Grounding Unit, Ground Rod	1
		12 00 10 04	Ground Unit, Ground Coil	1
@	N	PLW*W	Wire, Poly Covered, S.D. (Ft.), DCS **07 00 80 00**	60
	S	69 10 143	Recloser, Mat Spec 2.1.170	3
	T	69 58 181	Guard, Wildlife	6
	U	18 51 021	Wire, Poly, #6 Cu. Ft.	15
4@	V	**06 12 30 03**	Double Deadend on Pole w/ FG Extension	1
		06 12 30 03	Double Deadend on Pole w/o FG Extension	1

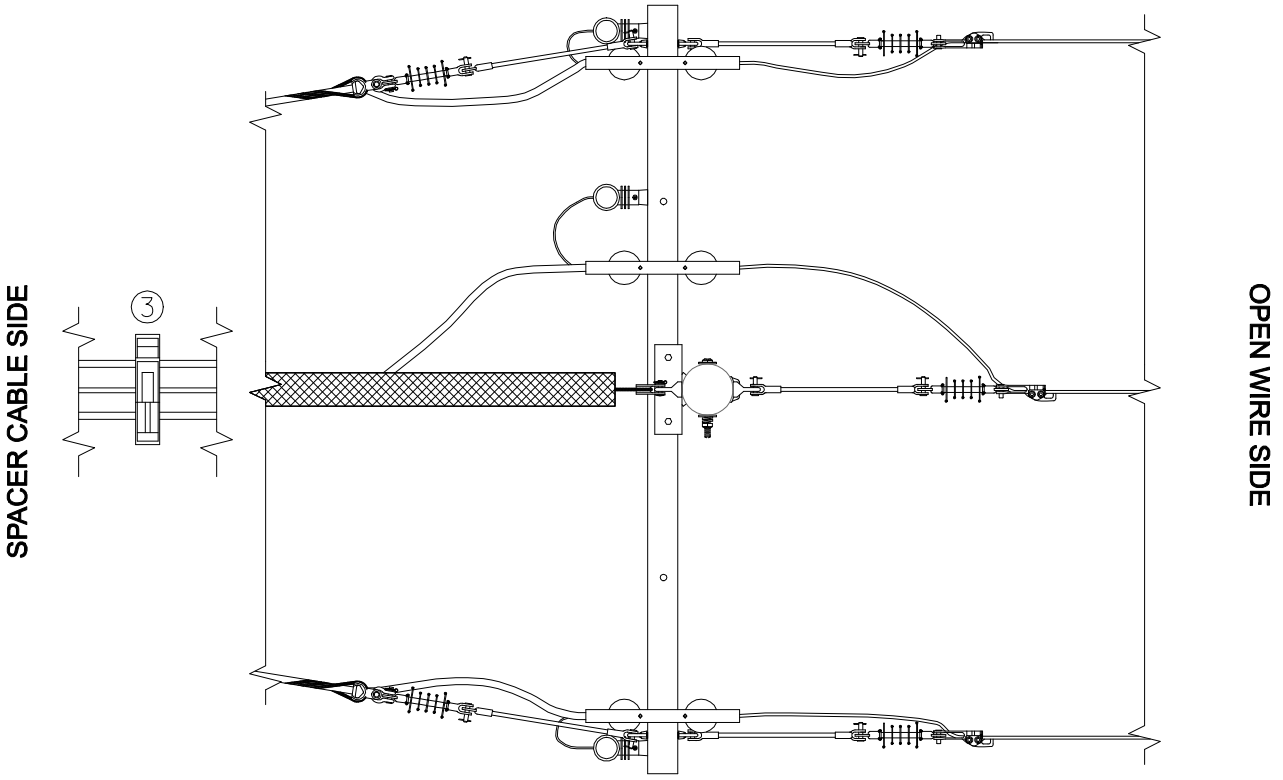


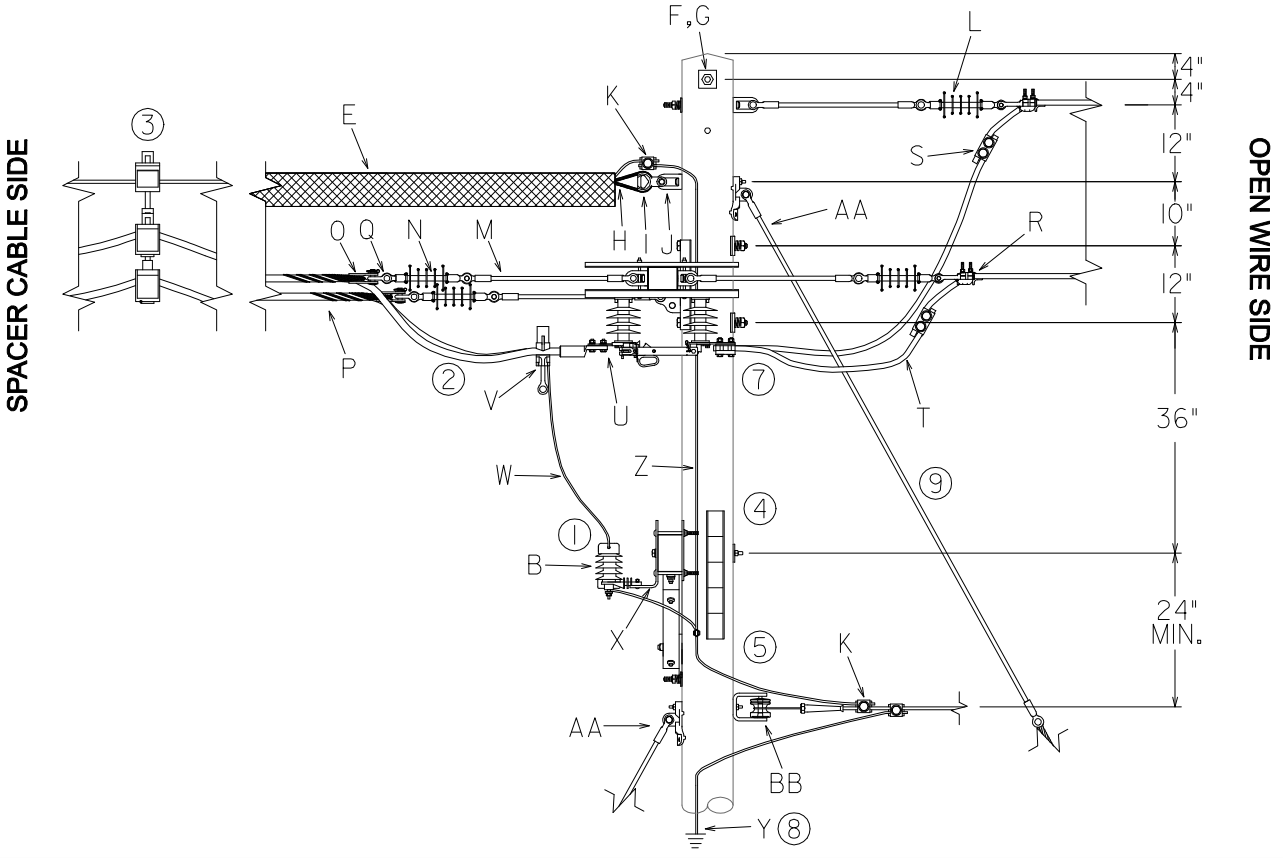
OPEN WIRE SIDE



SPACER CABLE SIDE

Detail A-A


SPACER CABLE SIDE
OPEN WIRE SIDE
3


SPACER CABLE SIDE
OPEN WIRE SIDE
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F, G
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AA
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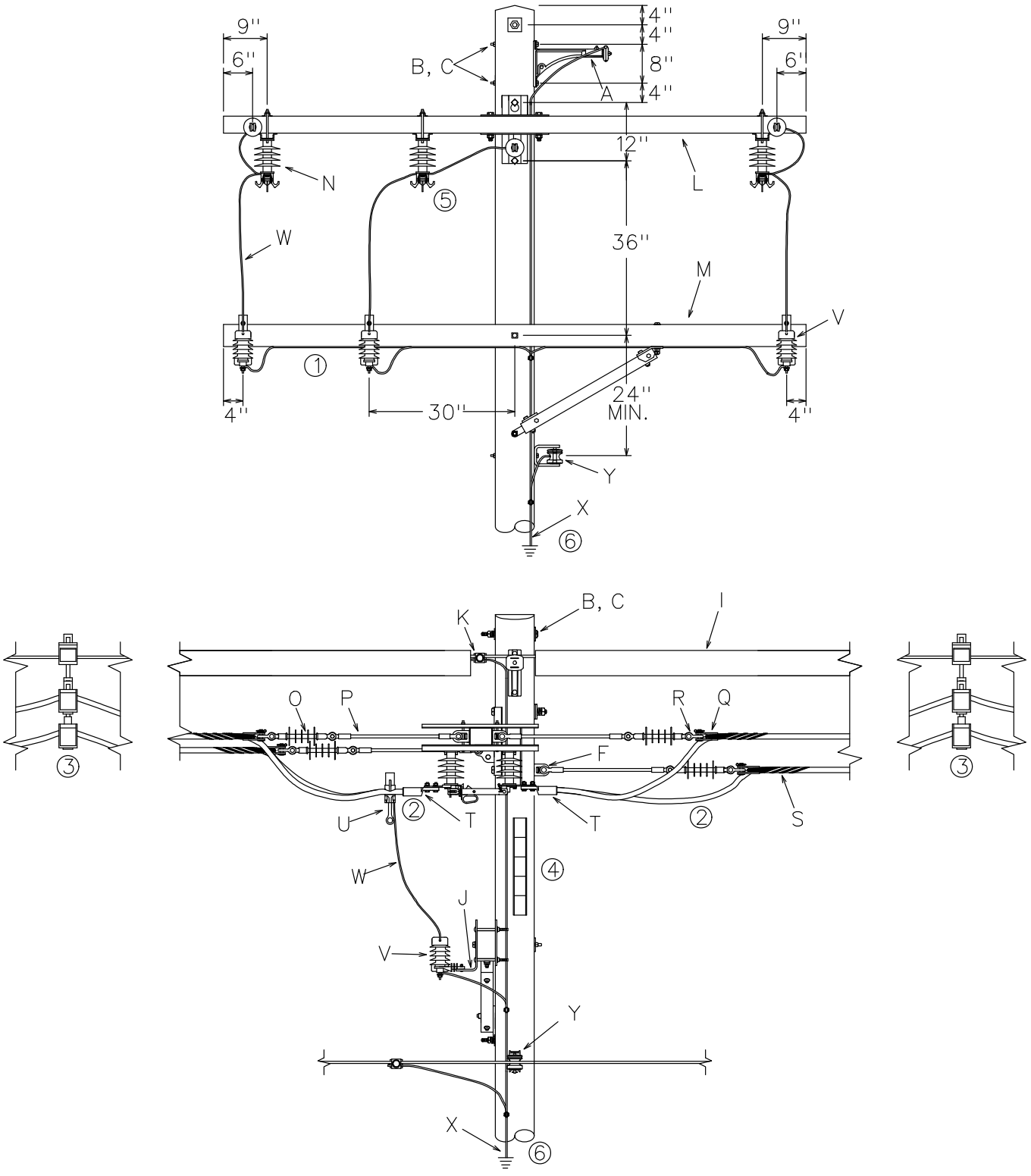
12"
36"
24"
MIN.

		Stnd. / Stk. No.	Description 10 20 05 01	
7	A	54 07 204	Switch, Dis., 600A, 15kV	3
1@	B	10 01 144	Arrester, 10kV w/ Protective Cap	3
		10 01 133	Arrester, 3kV w/ Protective Cap	3
	C	**04 00 41 04**	Crossarm, Deadend, F/G, 10’	1
	D	**04 00 20 03**	Crossarm, Sgl., Wood, 10’, (use only 1/2 of V–Brace)	1
	E	69 58 293	Line Duc (Messenger Cover), Black, 8’ Long (Each)	1
	F	23 52 065	Bolt, 5/8” x 12”	1
	G	23 66 027	Washer, Square, 2–1/4”	2
	H	23 68 713	Grip, Messenger/ Neutral, Preformed for 7#6 AW–052AWA	1
	I	23 58 054	Clevis, NM, Thimble, Galvanized Steel	1
	J	23 59 095	Eyelet, NM, STD, 3/4”, Galvanized Steel	1
	K	17 51 137	Clamp, PG – Messenger to Open Wire Neutral	2
	L	**06 12 30 01**	Deadend on Pole w/ FG Extension	1
6	M	25 56 076	Insulator, Strain, Fiberglass, 26”	5
	N	25 06 052	Insulator, Suspension, 15kV, Poly	5
	O	23 58 122	Clevis, Thimble, 7/8” opening, Galvanized Steel	3
@	P	17 69 063	Grip, Conductor Deadend, 15kV, New 477 Spacer Cable	3
		17 69 **	Size Grip per existing Spacer Cable Conductor	3
	Q	23 68 181	Shackle – Anchor, 9/16”	3
@	R	DEC*W	Clamp, Deadend	3
@	S	PG*W	Clamp, Parallel Groove (See **07 00 25 00**)	3
	T	18 51 052	Wire, Poly, SD, 350 Cu. (Ft.)	15
2	U	17 55 804	Lug, Shear Bolt, 1/0 Through 795 Spacer Cable	3
@	V	17 62 088	Clamp, Hot Line, 1/0 Through 477 Spacer Cable	3
		17 62 143	Clamp, Hot Line, 795 Spacer Cable	3
	W	18 51 021	Wire, Poly #6 Cu., (Ft.)	15
	X	17 58 054	Bracket, Switch/Arrester Mounting	3
8@	Y	**12 00 10 ** **	Grounding Unit, 7#10 Copperweld to Neutral	1
5	Z	18 51 019	Wire, #2 Cu. Poly Covered (Ft.)	15
9@	AA	**11 00 42 ** **	Guying Unit w/ FG Strain Insulator & HD Guy Hook	
@	BB	**03 01 01 ** **	Neutral Configuration	

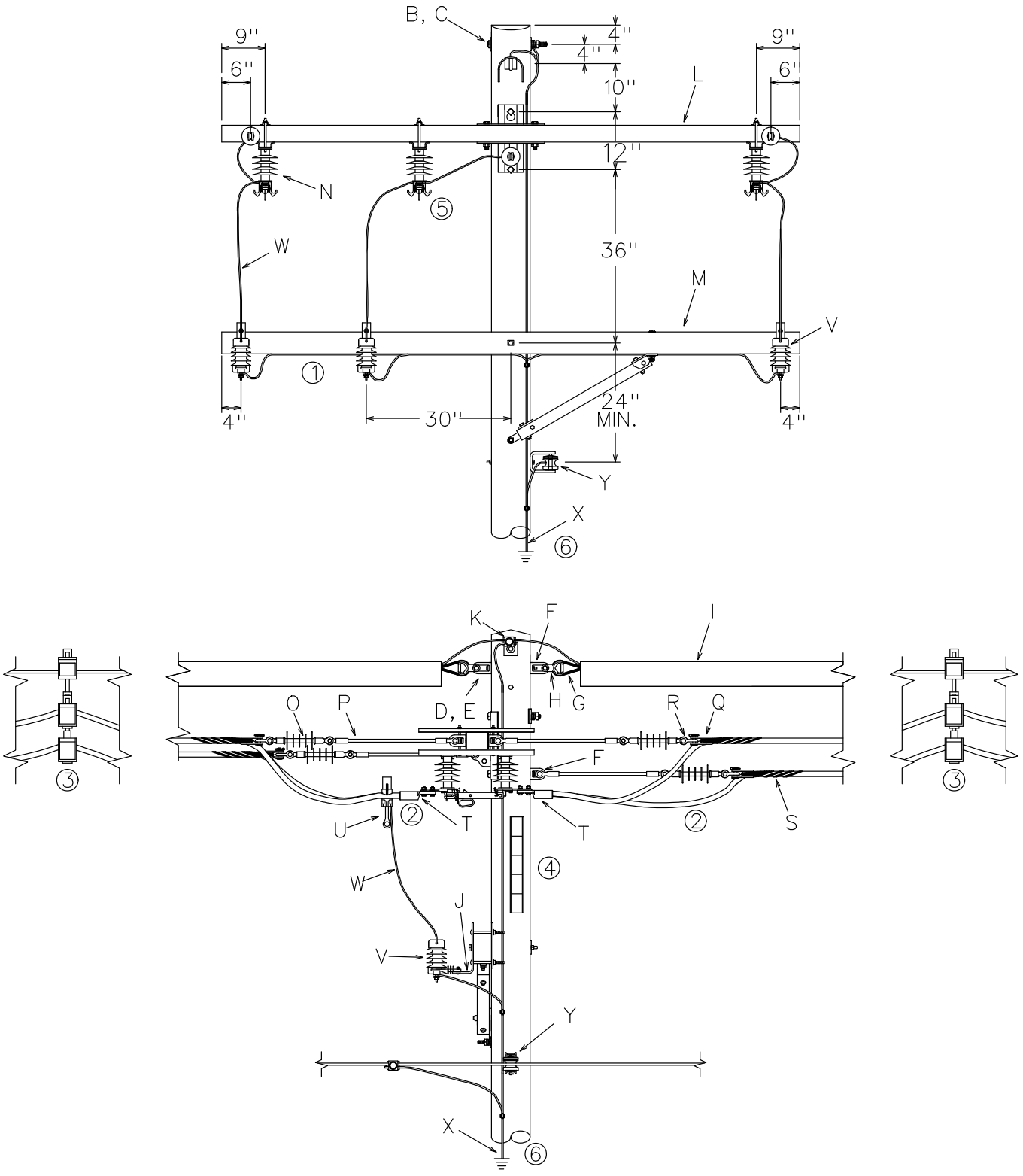
NOTES

1. Install proper voltage arresters at this location. Where switches are normally open, install additional set of arresters on the Open–wire side of the arrester arm. See Dist. Std. **12 12 01 **.**
2. Extend spacer cable conductor with covering intact through the preform into the switch using shear bolt lugs.
3. Install the first spacer (23 67 334) about 40’ from the pole as to not stress the cable. Normal spacing is 25’ to 33’.
4. Switch number tag shall be installed here.
5. Extend #2 poly covered ground wire (18 51 019) from open wire neutral to the messenger. Route along the single switch side of the pole.
6. Install the center phase of the spacer cable with fiberglass Strain Insulator into the top hole on the DE arm. This leaves the bottom hole for guying if needed.

7. Only install the two inside bolts on the switch and slide them as close to the crossarms as possible.
8. Use DCS **12 00 10 01** for ground coil application on new pole installation. Use DCS **12 00 10 02** for ground rod application on existing pole installation.
9. Size anchor and guying for heavy loading deadend tension of spacer cable.



01 - TANGENT MESSENGER

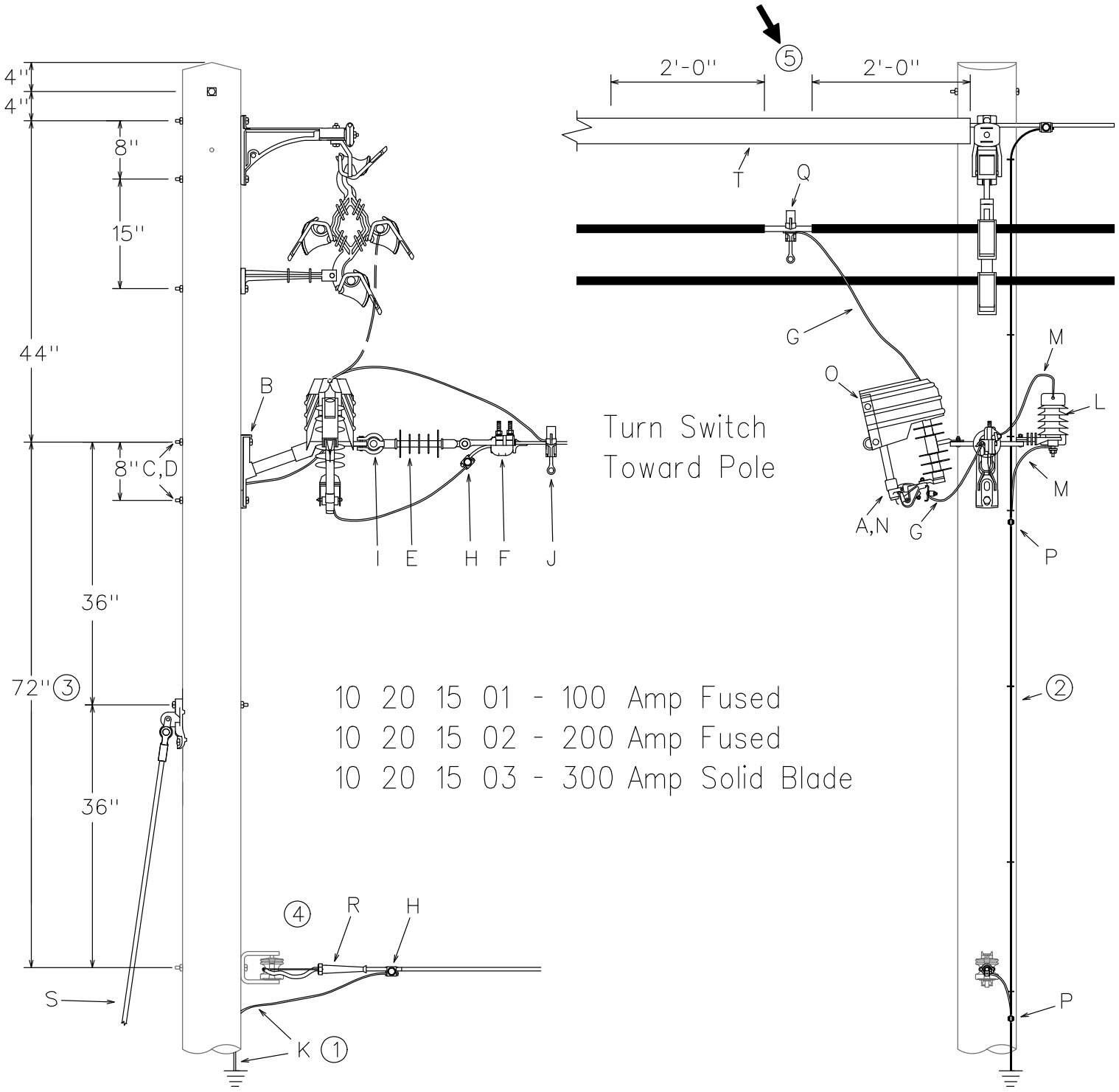


02 - DEAD END MESSENGER

		Stnd. / Stk. No.	Description 10 20 10 **	01	02
	A	23 56 075	Bracket, Messenger	1	
	B	23 52 065	Bolt, Machine, 5/8" x 12" (w/ nut)	3	1
	C	23 66 027	Washer, Square 2–1/4" x 3/16" Thick	4	2
	D	23 59 095	Eyelet, 3/4", Galvanized Steel		1
	E	23 52 097	Bolt, 3/4" x 12"		1
	F	23 65 018	Eyenut, 3/4", Galvanized Steel	1	2
	G	23 68 713	Grip, Messenger/ Neutral, Preformed – 052 AWA		2
	H	23 58 054	Clevis, NM, Thimble, Galvanized Steel		2
	I	69 58 293	Line Duc (Messenger Cover), Black, 8' Long (Each)	2	2
	J	17 58 054	Bracket, Switch/ Arrester Mounting	3	3
	K	17 51 137	Connector, PG, Pole Ground to Messenger	1	1
	L	**04 00 41 04**	Crossarm, Deadend, F/G, 10'	1	1
	M	**04 00 20 03**	Crossarm, Sgl., Wood, 10', (use only 1/2 of V–Brace)	1	1
5	N	54 07 204	Switch, Dis., 600A, 15kV	3	3
	O	25 06 052	Insulator, Suspension, 15kV, Poly	6	6
	P	25 56 076	Insulator, Strain, Fiberglass, 26", 15kV	6	6
	Q	23 58 122	Clevis, Thimble, 7/8" opening, Galvanized Steel	6	6
	R	23 68 181	Shackle – Anchor, 9/16"	6	6
@	S	23 68 701	Grip, Conductor Deadend, 15kV, New 477 Spacer Cable	6	6
			Size Grip per Existing Spacer Cable Conductor (See **07 20 11 00**)	6	6
2	T	17 55 804	Lug, Shear Bolt, 350 Through 795 Spacer Cable	6	6
@	U	17 62 088	Clamp, Hotline, 1/0 Through 477 Spacer Cable	3	3
		17 62 143	Clamp, Hotline, 795 Spacer Cable	3	3
1@	V	10 01 144	Arrester, 10kV w/ Protective Cap	3	3
		10 01 133	Arrester, 3kV w/ Protective Cap	3	3
	W	18 51 025	Wire, #4 Cu. Poly Covered (Ft.)	15	15
6@	X	**12 00 10 ****	Grounding Unit, 7#10 Copperweld	1	1
@	Y	**03 01 01 ****	Neutral Configuration		

NOTES:

1. Install proper voltage arresters at this location. Where switches are normally open, install additional set of arresters on an adjacent pole for unprotected side of switches.
2. Extend spacer cable conductor with covering intact through the preform into the switch using compression lugs.
3. Install the first spacer (23 67 334) about 40' from the pole as to not stress the cable. Normal spacing is 25' to 33'.
4. Where required, switch number tag shall be installed here.
5. Only install the two inside bolts on the switch and slide them as close to the crossarm as possible.
6. Use DCS **12 00 10 01** for ground coil application on new poles installation. Use DCS **12 00 10 02** for ground rod application on existing pole installation.

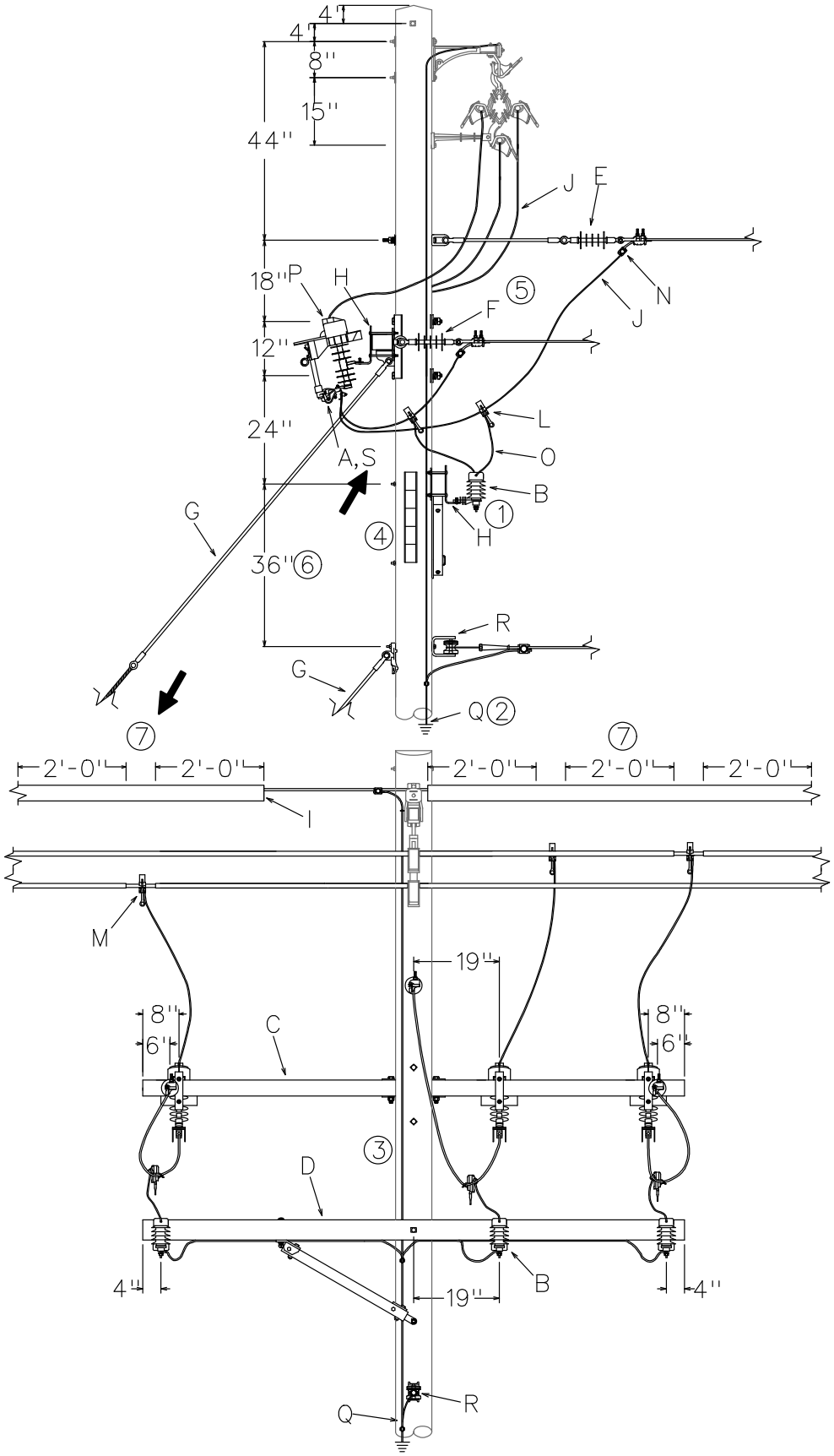


10 20 15 01 - 100 Amp Fused
10 20 15 02 - 200 Amp Fused
10 20 15 03 - 300 Amp Solid Blade

		Std. /Stk. No.	Description 10 20 15 **	01	02	03
	A	54 07 208	Switch, Fuse, 100A, 15 KV	1		
		54 07 209	Switch, Fuse, 200A, 15 KV		1	
		54 07 210	Switch, Solid Blade, 300A, 15 KV			1
	B	23 56 063	Bracket, Switch, Arrester, and Dead End	1	1	1
	C	23 52 065	Bolt, Mach., 5/8" x 12"	2	2	2
	D	23 66 027	Washer, Square, 5/8"	2	2	2
	E	25 06 052	Ins., Suspension, 15 KV	1	1	1
@	F	DEC*W	Clamp, Deadend (See **07 00 11 00**)	1	1	1
@	G	PLW*W	Wire, Poly Covered (ft.) (See **07 00 80 00** & **07 00 01 03**)	10	10	10
@	H	PG*	Clamp, Parallel Groove or Split Bolt or Two Bolt. (See **07 00 25 00**)	2	2	2
	I	23 68 181	Shackle, Deadend	1	1	1
@	J	HLC*W	Clamp, Hot Line See 07 00 21 00	1	1	1
1,2@	K	**12 00 10 02**	7#10 Pole Ground with Ground Rod	1	1	1
		12 00 10 03	#2 Cu. Pole Ground with Ground Rod	1	1	1
@	L	10 01 144	Arrester, 10 KV w/ Protective Cap	1	1	1
		10 01 133	Arrester, 3 KV w/ Protective Cap	1	1	1
	M	18 51 021	Wire, S.D., #6 Cu, Poly (ft.)	6	6	6
	N		Link, Fused, (sized by Engineer)	1	1	1
	O	23 17 411	Cover, Cutout	1	1	1
	P	17 54 373	Connector, Split Bolt	2	2	2
@	Q	17 62 088	Clamp, Hotline, 1/0 through 477 Spacer Cable	1	1	1
		17 62 143	Clamp, Hotline, 795 Spacer Cable	1	1	1
4 @	R	SDEA*W	Deadend, Automatic, Secondary. (See **08 01 10 00**)	1	1	1
3 @	S	**11 00 ** ****	Guy Unit	1	1	1
	T	69 58 293	Line DUC, Messenger Cover, Black (Each)	1	1	1

NOTES

1. The pole ground is included with a new pole. Only needed when mounting switch on existing pole
2. The conductor between the messenger and open–wire tap neutral must be #2 copper if the messenger is the system neutral, i.e. there is no secondary neutral present
3. This distance may be reduced to 40 inches if approved by engineering. Center the guy attachment between the primary and neutral if this distance is reduced.
4. Use a primary dead end clamp for tensions greater than 1,500 pounds.
5. Stagger taps and other areas where the covering has been removed to provide a minimum 2'–0" horizontal separation between the opening and another opening or ground point. Install line duc over the messenger anywhere the cable covering is stripped to maintain the required 2'–0" of horizontal separation.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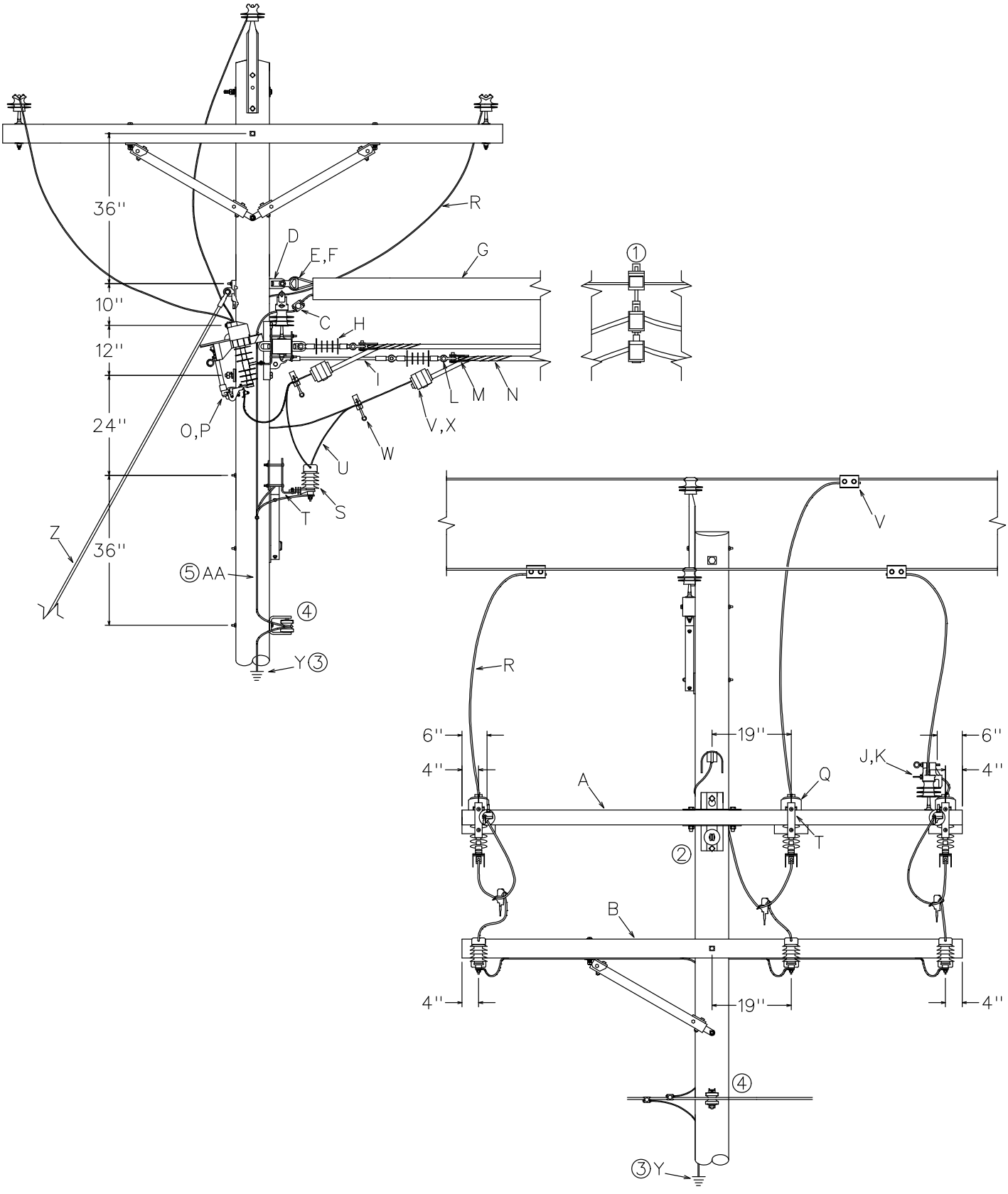
		Stnd. / Stk. No.	Description 10 20 20 **	2 Phase			3 Phase		
				01	02	03	04	05	06
	A	54 07 208	Switch, Fused, 100A, 15kV	2			3		
		54 07 209	Switch, Fused, 200A, 15kV		2			3	
		54 07 210	Switch, Solid Blade, 300A, 15kV			2			3
@1	B	10 01 144	Arrester, 10kV w/ Protective Cap	2	2	2	3	3	3
		10 01 133	Arrester, 3kV w/ Protective Cap	2	2	2	3	3	3
	C	**04 00 41 04**	Crossarm, Deadend, FG 10'	1	1	1	1	1	1
	D	**04 00 20 03**	Crossarm, Sgl, Wood, 10' (use only 1/2 of V–brace)	1	1	1	1	1	1
	E	**06 12 30 01**	Deadend on pole with FG extension, 10'				1	1	1
	F	**06 12 35 02**	Deadend on single arm	1	1	1	1	1	1
@	G	**11 00 42 ****	Guying Unit w/ FG Strain Insulator and HD Guy Hook						
	H	17 58 054	Bracket, Switch/Arrester Mounting	4	4	4	6	6	6
	I	69 58 293	Line Duc (Messenger Cover), Black. 8' Long (Each)	2	2	2	2	2	2
@	J	PLW*W	Wire, Poly Covered, S.D. (ft) (DCS **07 00 80**)	20	20	20	30	30	30
	L	23 78 394	Clamp, Hotline, #6 to 2/0	2	2	2	3	3	3
@	M	17 62 088	Clamp, Hotline, 1/0 through 477 Spacer Cable	2	2	2	3	3	3
		17 62 143	Clamp, Hotline, 795 Spacer Cable	2	2	2	3	3	3
@	N	PG*	Clamp, Parallel Groove (DCS **07 00 25 00**)	2	2	2	3	3	3
	O	18 51 021	Wire, #6 CU., S.D. Covered (ft)	6	6	6	9	9	9
	P	**05 15 10 01**	Cover – Cutout	2	2	2	3	3	3
@2,3	Q	**12 00 10 ****	#2 Copper Ground Unit	1	1	1	1	1	1
@	R	**03 01 01 ****	Neutral Configuration						
@	S		Link, Fused, (sized by Engineer)	2	2		3	3	

NOTES

1. Install proper voltage arresters at this location. Where switches are normally open, install additional set of arresters on the spacer cable side of the switch.
2. The pole ground is included with a new pole. Only needed when installing tap on an existing pole.
3. The ground wire between the messenger and open–wire tap neutral must be #2 copper if the messenger is the system neutral, i.e. there is no secondary neutral present.
4. Switch number tag shall be installed here.
5. The mirror of this configuration can be built with the dead–end arm and switches installed under the spacer cable and the open wire extending in the opposite direction than shown in the drawing.
6. This distance may be reduced to 24 inches if approved by engineering.
7. 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.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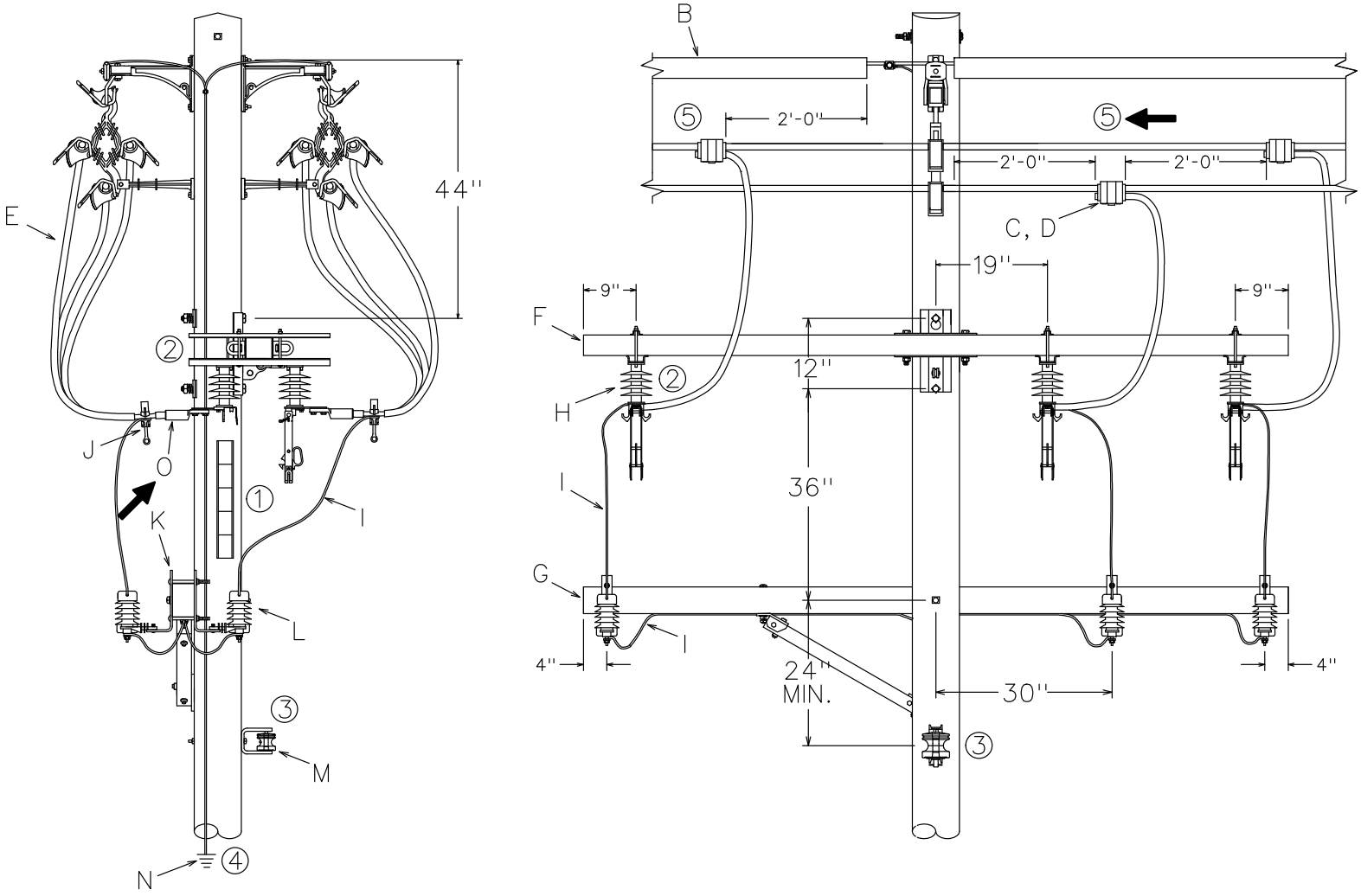
		Stnd./Stk. No.	Description **10 20 25 **	01	02	03
	A	**04 00 41 04**	Deadend Assy, FG Arm, 10’	1	1	1
	B	**04 00 20 03**	Crossarm, Sgl, Wood, 10’ (use only 1/2 of V–Brace)	1	1	1
	C	17 51 137	Connector, PG, Pole Ground to Messenger	1	1	1
	D	23 59 095	Eyelet, NM, STD, 3/4”	1	1	1
	E	23 68 713	Grip, Messenger/Neutral, Preformed for 7#6 – 052AWA	1	1	1
	F	23 58 054	Clevis, NM, Thimble, Galvanized Steel	1	1	1
	G	69 58 293	Line Duc Cover – (Messenger Cover), Black. 8’ Long (Each)	1	1	1
	H	25 06 052	Insulator, Suspension, 15kV, Poly	3	3	3
	I	25 56 076	Insulator, Guy Strain, Fiberglass 26”, 15kV	1	1	1
	J	25 05 143	Insulator, Pin, 15kV, Vice–Top	1	1	1
	K	23 62 028	Pin, Insulator, Long Shank	1	1	1
	L	23 68 181	Shackle – Anchor, 9/16”	3	3	3
	M	23 58 122	Clevis, Thimble, 7/8” Opening, Galvanized Steel	3	3	3
@	N	23 68 701	Grip, Conductor Deadend, 15kV, 477 Spacer Cable	3	3	3
			Size Grip per existing Spacer Cable Conductor (See **07 20 11 00**)	3	3	3
	O	54 07 208	Switch, Fused, 100A	3		
		54 07 209	Switch, Fused, 200A		3	
		54 07 210	Switch, Solid Blade, 300A			3
@	P		Link, Fuse (Sized by Engineer)	3	3	
	Q	23 17 411	Cover, Cutout	3	3	3
@	R	LW*W	Wire, Poly Covered, S.D. (ft.) (See **07 00 80 00**)	30	30	30
@	S	10 01 144	Arrester, 10kV w/ Protective Cap	3	3	3
		10 01 133	Arrester, 3kV w/ Protective Cap	3	3	3
	T	17 58 054	Bracket, Switch/Arrester Mounting	6	6	6
	U	18 51 021	Wire, Poly #6 CU., (FT.)	15	15	15
@	V	PG*W	Clamp, Parallel Groove (See **07 00 25 00**)	3	3	3
		HLC*W	Hot Line Clamp	3	3	3
@	W	HLC*W	Hot Line Clamp	3	3	3
	X	38 51 608	Cover, Large, Vice Type Connectors	3	3	3
@,3	Y	**12 00 10 ****	Grounding Unit, 7#10 Copperweld	1	1	1
@	Z	**11 00 42 ****	Guying Unit with FG Strain Insulator & HD Guy Hook			
5	AA	18 51 019	Wire, #2 Cu. Poly Covered (Ft.)	15	15	15

NOTES:

1. Install the first spacer (23 67 334) about 40 feet from the pole as to not stress the cable. Normal spacing is 25’ to 33’. See DCS **07 20 01 01** for spacer installation between poles.
2. Install the center phase of the spacer cable with fiberglass Strain Insulator into the top hole on the DE arm. This leaves the bottom hole for guying if needed.
3. Use DCS **12 00 10 01** ground coil application on new pole installation. Use DCS **12 00 10 02** for ground rod application on existing pole installation.
4. Secondary location if present. Connect secondary neutral to pole ground.
5. Extend #2 poly covered ground wire (18 51 019) from open wire neutral to the messenger.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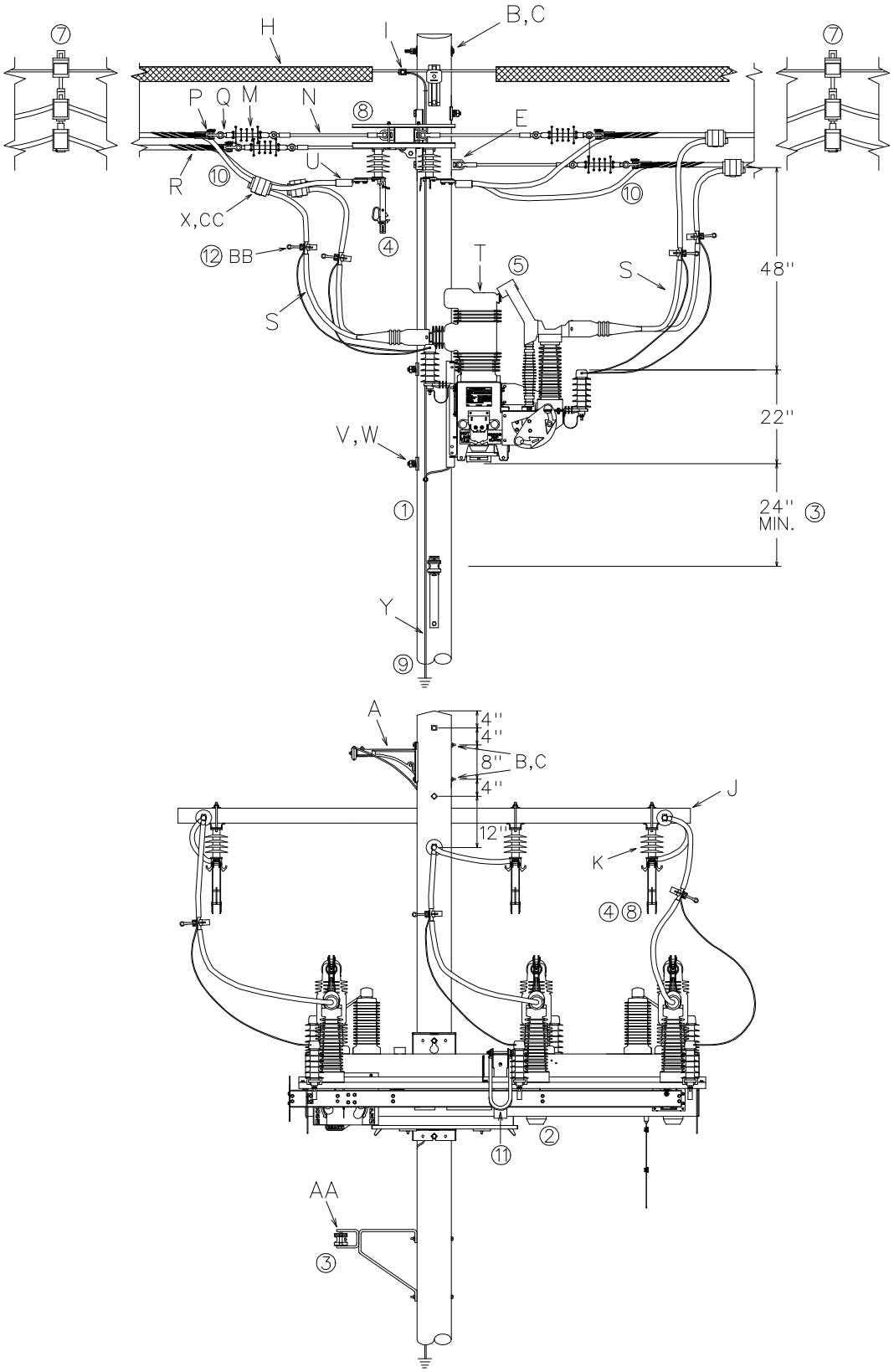
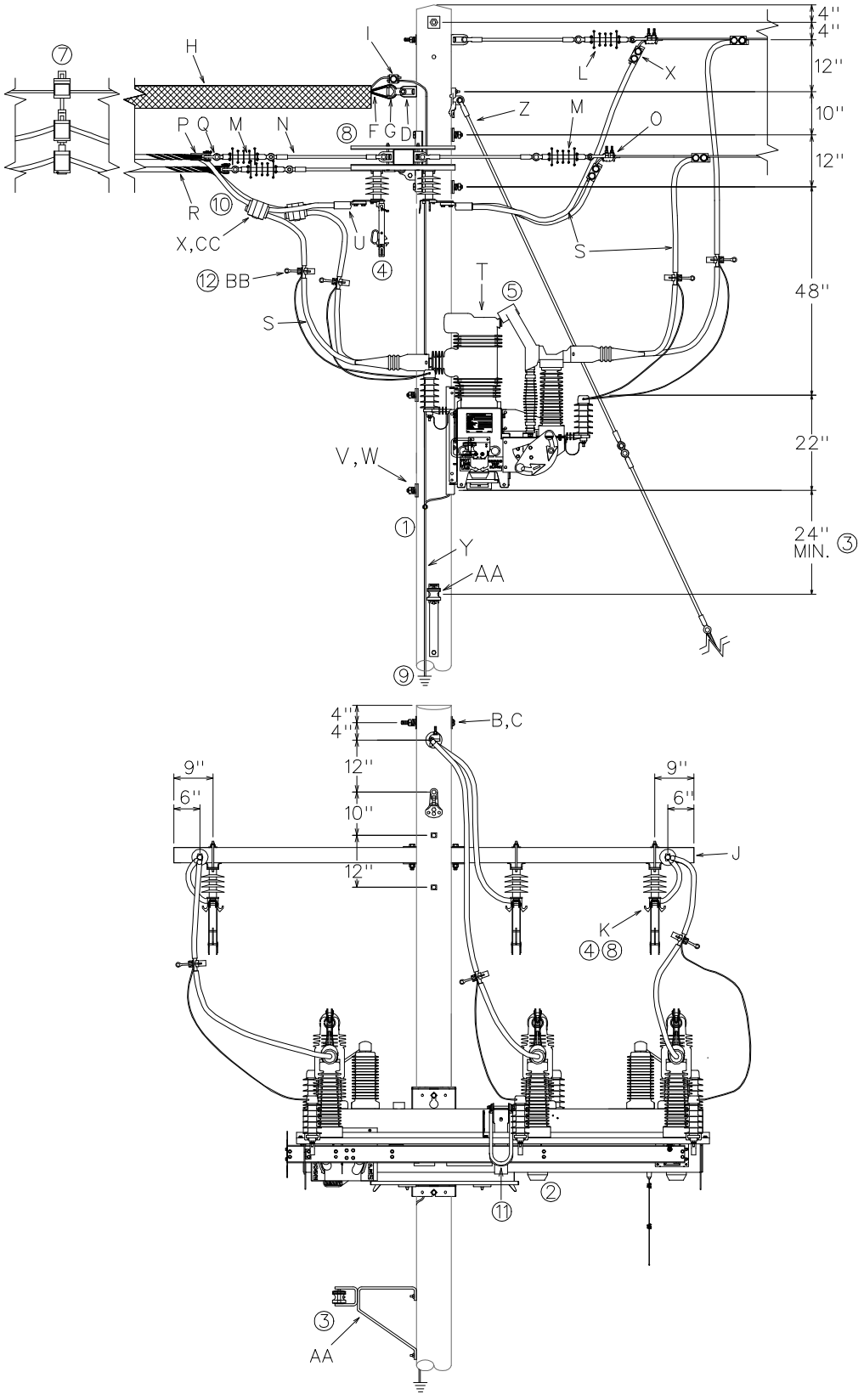
		Stnd./Stk. No.	Description 10 20 30 01	
@	A	03 20 02 01	Double Circuit – Tangent – Back to Back Configuration	
	B	69 58 293	Line Duc (Messenger Cover), Black, 8' Long (Each)	2
@	C	PG*W	Clamp, PG, Conductor to Conductor	6
	D	38 51 608	Cover, Large, Vise Type Connectors	6
	E	18 51 052	Wire, Poly, SD, 350 Cu. (Ft.)	36
	F	04 00 41 04	Crossarm, Deadend, F/G, 10'	1
	G	04 00 20 03	Crossarm, Sgl., Wood, 10', (use only 1/2" of V-Brace)	1
2	H	54 07 204	Switch, Dis., 600A, 15kV	3
	I	18 51 021	Wire, #6 Cu. Poly Covered (Ft.)	40
@	J	17 62 088	Clamp, Hotline, 1/0 Through 477 Spacer Cable	6
		17 62 143	Clamp, Hotline, 795 Spacer Cable	6
	K	23 56 088	Bracket, Crossarm, CO/LA – Double	3
@	L	10 01 144	Arrester, 10kV w/ Protective Cap	6
		10 01 133	Arrester, 3kV w/ Protective Cap	6
@	M	03 01 01 **	Neutral Configuration	
@	N	12 00 10 03	Grounding Unit, #2 Cu. Pole Ground With Ground Rod	1
		12 00 10 04	Grounding Unit, #2 Cu. Pole Ground With Ground Coil	1
	O	17 55 804	Lug, Shear Bolt, 350 Through 795 Spacer Cable	6

NOTES:

1. Where required, switch number tag shall be installed here.
2. Only install the two inside bolts on the switch and slide them as close to the crossarm as possible.
3. Secondary location if present. Connect secondary neutral to pole ground.
4. Use DCS 12 00 10 04 for ground coil application on new pole installation. Use DCS 12 00 10 03 for ground rod application on existing pole installation.
5. Stagger taps and other areas where the covering has been removed to provide a minimum 2'–0" horizontal sepa-ration 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.



01 - SPACER CABLE TO SPACER CABLE



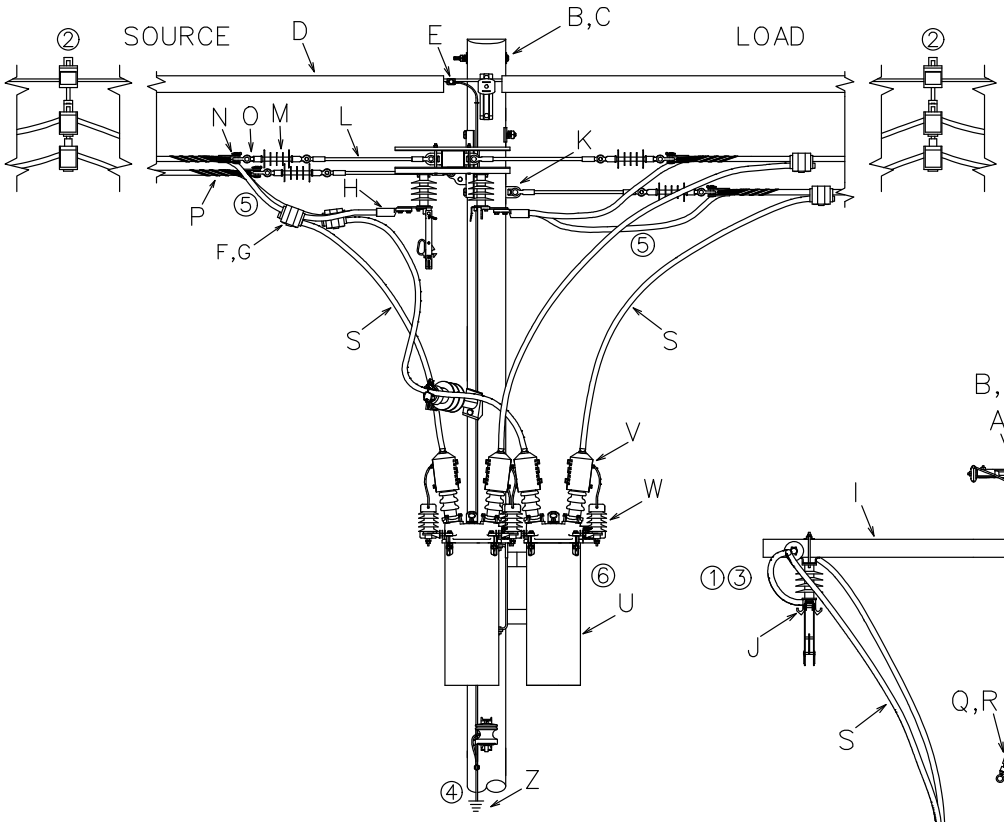
02 - SPACER CABLE TO OPEN WIRE

		Stnd. / Stk. No.	Description 10 20 33 **	01	02
	A	23 56 075	Bracket, Messenger	1	
	B	23 52 065	Bolt, Machine, 5/8" x 12" (w/ nut)	3	1
	C	23 66 027	Washer, Square, 2–1/4" x 2–1/4" x 3/16" Thick	3	1
	D	23 59 095	Eyelet, 3/4" Galvanized Steel		1
	E	23 65 018	Eyenut, 3/4" Galvanized Steel	1	
	F	23 68 713	Grip, Messenger/Neutral, Preformed 7#6 – 052 AWA		2
	G	23 58 054	Clevis, NM, Thimble, Galvanized Steel		1
	H	69 58 293	Line Duc (Messenger Cover), Black. 8' Long (Each)	2	1
	I	17 51 137	Clamp, PG, Pole Ground to Messenger	1	1
	J	**04 00 41 04**	Crossarm, Deadend, F/G, 10'	1	1
4,8	K	54 07 204	Switch, Dis., 600A, 15kV	3	3
	L	**06 12 30 01**	Deadend on Pole w/ FG Extension		1
	M	25 06 052	Insulator, Suspension, 15kV, Poly	6	5
	N	25 56 076	Insulator, Strain, Fiberglass, 26", 15kV	6	5
@	O	DEC*W	Clamp, Deadend		3
	P	23 58 122	Clevis, Thimble, 7/8" Opening, Galvanized Steel	6	3
	Q	23 68 181	Shackle – Anchor, 9/16"	6	3
@	R	17 69 063	Grip, Conductor Deadend, 15kV, New 477 Spacer Cable	6	3
		17 69 ***	Size Grip per Existing Spacer Cable Conductor	6	3
	S	18 51 052	Wire, Poly, SD, 350 Cu. (Ft.)	75	100
5,6	T	69 10 250	Recloser, S&C Intellirupter, 15kV, 600A w/ Comm Module	1	1
10	U	17 55 804	Lug, Shear Bolt, 1/0 Through 795 Spacer Cable	6	3
	V	23 52 219	Bolt, Galv., 3/4" x 14"	2	2
	W	23 66 031	Washer, NM, Curved, 3/4"	2	2
@	X	PG*W	Clamp, Parallel Groove (See **07 00 25 00**)	6	9
1,9 @	Y	**12 00 10 ****	Grounding Unit, #2 CU Poly Covered	1	1
@	Z	**11 00 42 ****	Guying Unit w/ FG Strain Insulator & HD Guy Hook		1
3 @	AA	**03 01 01 ****	Neutral Configuration	1	1
12	BB	23 78 183	Clamp, Hot Line	6	6
	CC	38 51 608	Cover	6	3

NOTES

1. Intellirupter recloser frame must be connected to ground with #2 copper wire. Pole ground to neutral connection must be #2 copper wire.
2. Tool to remove/install radio module and control is 46 01 645
3. Install neutral/secondary using extension brackets. Install to the one phase side of the pole to allow access to the compartments on the bottom of the intellirupter. The neutral/ secondary may be dead–ended to the pole as long as they are mounted 36 inches below the bottom mounting bolt of the intellirupter.
4. Switches are to open towards the climbing side of the pole.

5. Integral disconnect switches on recloser shall be in the open position while connecting primary leads to the recloser.
6. Intellirupter Recloser weight is 1,010 lbs.
7. Install the first spacer (23 67 334) about 40’ from the pole as to not stress the cable. Normal spacing is 25’ to 33’.
8. Only install to two inside bolts on the switch and slide them as close to the crossarms as possible.
9. Use DCS **12 00 10 04** for ground coil application on the new pole installation. Use DCS **12 00 10 03** for ground rod application on existing pole installation.
10. Extend spacer cable conductor with covering intact through the preform into the switch using shear bolt lugs.
11. Fold lifting bracket down after lifting.
12. The lightning arresters shall be connected to the recloser leads with hot–line clamps installed a minimum of 36 inches away from the aluminum base of the intellirupter. The arrester wire is included with the intellirupter.


②
SOURCE
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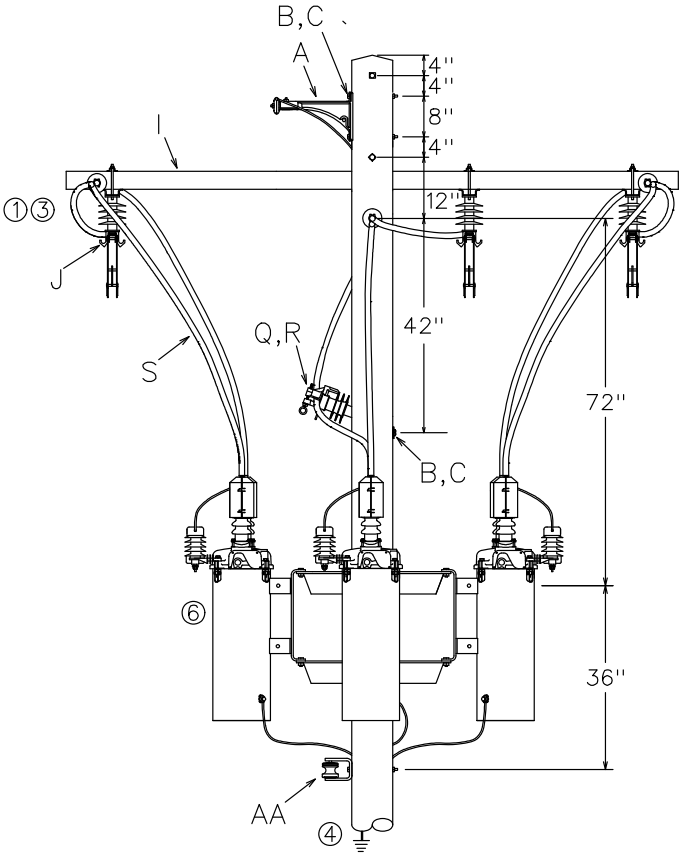
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I
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J
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Q,R
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72"
B,C
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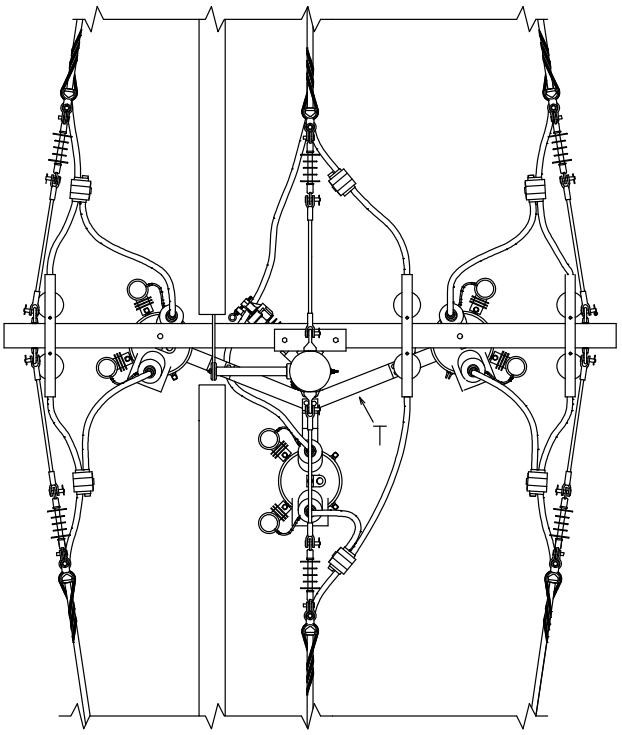
36"
AA
④


T

		Stnd./Stk. No.	Description 10 20 35 01	
	A	23 56 075	Bracket, Messenger	1
	B	23 52 065	Bolt, Machine, 5/8" x 12" (w/nut)	4
	C	23 66 027	Washer, Square 2-1/4" x 2-1/4" x 3/16" Thick	4
	D	69 58 293	Line Duc (Messenger Cover), Black. 8' Long (Each)	2
	E	17 51 137	Connector, PG, Pole Ground to Messenger	1
@	F	PG*W	Clamp, Parallel Groove (See **07 00 25 00**)	6
	G	38 51 608	Cover	6
	H	17 55 804	Lug, Shear Bolt, 350 Through 795 Spacer Cable	6
	I	**04 00 41 04**	Crossarm, Deadend, F/G, 10'	1
1,3	J	54 07 204	Switch, Dis., 600A, 15kV	3
	K	23 65 018	Eyenut, 3/4", Galvanized Steel	1
	L	25 56 076	Insulator, Strain, Fiberglass, 26", 15kV	6
	M	25 06 052	Insulator, Suspension, 15kV, Poly	6
	N	23 58 122	Clevis, Thimble, 7/8" opening, Galvanized Steel	6
	O	23 68 181	Shackle – Anchor, 9/16"	6
@	P	23 68 701	Grip, Conductor Deadend, 15kV, New 477 Spacer Cable	6
			Size Grip per Existing Spacer Cable Conductor (See **07 20 11 00**)	6
	Q	25 05 143	Insulator, Vise-Top, 15kV	1
	R	23 12 122	Bracket, FG, Standoff, LD, 10"	1
	S	18 51 024	Wire, Poly, S.D., 1/0 Cu. (Ft.)	36
	T	23 17 209	Mounting, NM, Recloser	1
6	U	69 10 143	Recloser	3
	V	69 58 181	Guard, Clam-Shell, Wildlife	6
	W	10 01 144	Arrester, Lightning, 10kV	6
	X	23 52 219	Bolt, Galv., 3/4" x 14"	2
	Y	23 66 031	Washer, NM, Curved, 3/4"	2
@,4	Z	**12 00 10 ****	Grounding Unit, #2 CU Poly Covered	1
@	AA	**03 01 01 ****	Neutral Configuration	

NOTES:

1. Switches are to open toward the climbing side of the pole.
2. Install the first spacer (23 67 334) about 40' from the pole as to not stress the cable. Normal spacing is 25' to 33'.
3. Only install to two inside bolts on the switch and slide them as close to the crossarms as possible.
4. Use DCS **12 00 10 04** for ground coil application on new pole installation. Use DCS **12 00 10 03** for ground rod application on existing pole installation.
5. Extend spacer cable conductor with covering intact through the preform into the switch using shear bolt lugs.
6. Reclosers should be turned in tank to position shown so all operating handles are accessible from the load side of the pole.

A. Installation Instructions 34 kV Group Operated Switches – 34 kV group operated switches are fully assembled and adjusted, and require proper lifting.

1. Once the switch is unbolted from a wood frame, which the switch is shipped on, the switch can be raised with a winch line by the lifting bracket on the top of the switch. However, the switch should not be raised until the bottom phase interrupter has been removed if it is assembled with the switch.
2. To remove the lower phase interrupter, remove the 4–1/2" galvanized bolts that secure the interrupter to the vertical mounting member. Save these bolts, nuts and washers.
3. Once the switch has been carefully lifted and is mounted on the pole, the lower phase interrupter can be remounted with the original bolts and hardware. Remove lifting bracket.
4. Check lever stops at base of rotating insulator for full opening and closing.
5. Install vertical operating pipe rods, lever, and guide bearings. Start from the top and work down. Tighten "U" bolts but leave set screw loose if it exists. Install 8 ft. fiberglass rod insulator (stock #54 08 324) between sub–transmission and distribution lines. The 8ft fiberglass rod insulator is to be installed with a minimum of 24" above distribution line and a minimum of 12" below the lowest electric line . One 34.5kV, TR–210 porcelain operating rod insulator (stock #25 09 045) is be installed at minimum of 8 ft. above the ground between the lowest electric and manually operated handle to protect operator in case of flashover.
6. Check that switch opens properly with a moderate speed:
   a. Blade contacts interrupter finger in the "red" zone.
   b, Arc horns open
   c. Interrupter clicks, opening the circuit
   d. Blade opens fully and interrupter lever snaps back.
   e. All arcing horns release simultaneously.
   f. For TSB switch, check to see that blade position indicator is green.
7. Check to insure that the switch is closed properly with a fast even motion:
   a. All blades are latched in the closed position.
   b. All pick–up fingers bypass the interrupter actuator rods without restriction.
   c. For TSB, check to insure that the switch is closed properly with a moderate even motion. Confirm blade position indicator is red.
8. Repeat Step #6 and #7 several times to insure the switch opens and closed properly.
9. Install operating handle 4 ft. above the ground (14 ft. where traffic damage or vandalism is likely)
10. Adjust operating handle travel so some pressure is needed to lock open or closed.
11. Tighten all piercing screw until a slug is punched through the pipe and tighten all nuts.
12. Coat all ungalvanized steel with Galvanox with stock #30 01 222.

B. Installation 69 kV Switches Instructions – Install and adjust 69kV switches according to manufacturer's instruction since each switch supplier has its own mounting assembly. All 69kV switches shall be installed on composite or steel structures for new installation.

C. **Pole ground wire, ground mat and switch operating rod insulators requirements and installations for normal closed group operated switches:**

1. **Switch is mounted on a steel pole with or without motor operator:**
   a. A pole ground wire is not required but there must be provisions (Rivnuts) for grounding a shield wire, primary system neutral (if present), a motor operator cabinet (if present), and the base of the pole. The manually operated switch handle must be grounded directly to the driven ground rod or the field formed electrode riser with a #2 cu ground wire. The motor operator cabinet can be bonded to a steel pole or connected to the ground electrode.
   b. A ground mat is required for a steel pole. Refer to DCS **12 69 11 02**.
   c. Operating rod insulators, TR–210 porcelain operating rod insulator, stock #25 09 045 and 8 ft fiberglass insulator, stock #54 08 324 shall be eliminated on a steel pole which come with the switch, and both items should be put back in the stock with stock # as assigned.
2. **Switch is mounted on a wood pole and manually operated:**
   a. Pole ground wire shall be omitted/removed.
   b. Operating rod insulators: 8ft fiberglass rod insulator and 1–34kV rod insulator between circuits are required:
   Install 8 ft. fiberglass rod insulator between sub–transmission and distribution lines. The 8ft fiberglass rod insulator is to be installed with a minimum of 24” above distribution line and a minimum of 12” below the lowest electric line . One 34.5kV, TR–210 porcelain operating rod insulator is be installed at minimum of 8 ft. above the ground between the lowest electric and manually operated handle to protect operator in case of flashover.
   c. Attach the switch operating handle to a driven ground rod or a field formed ground electrode with #2 cu ground wire.
   d. A ground mat is not required. Refer to DCS **12 69 11 04.**
3. **Switch is mounted on a wood pole with a motor operator:**
   a. A #2 cu pole ground wire is required to extend up the pole for grounding of motor operator cabinet, switch operating handle, primary system neutral (if present) and static wire.
   b. Operating rod insulators: 8ft fiberglass rod insulator and 1–34kV rod insulator between circuits are required:
   Install 8 ft. fiberglass rod insulator between sub–transmission and distribution lines. The 8ft fiberglass rod insulator is to be installed with a minimum of 24” above distribution line and a minimum of 12” below the lowest electric line . One 34.5kV, TR–210 porcelain operating rod insulator is be installed at minimum of 8 ft. above the ground between the lowest electric and manually operated handle to protect operator in case of flashover.
   c. A ground mat is required. Refer to DCS **12 69 11 01**.
4. **Switch is mounted on a composite pole with or without motor operator:**
   a. A ground mat is required. See DCS **12 69 11 03**.
   b. Static wire, primary system neutral (if present), switch operating handle, and motor operator (if present) must be bonded to the #2 cu pole ground wire which comes with the pole.
   c. Operating rod insulators: 8ft fiberglass rod insulator and 1–34kV rod insulator between circuits are required:
   Install 8 ft. fiberglass rod insulator between sub–transmission and distribution lines. The 8ft fiberglass rod insulator is to be installed with a minimum of 24” above distribution line and a minimum of 12” below the lowest electric line . One 34.5kV, TR–210 porcelain operating rod insulator is be installed at minimum of 8 ft. above the ground between the lowest electric and manually operated handle to protect operator in case of flashover.

D. Normal open switch
In addition to the grounding requirement stated above, arresters on source and load sides are required. Refer to DCS **10 34 05**, DCS **10 34 07**, DCS **10 69 05**, DCS **10 69 07**, DCS **10 69 09**, DCS **10 69 20**, and DCS **10 69 30** for arresters installations. The arresters must be bonded to the pole ground, or bonded to the shield wire if no pole ground exists on the switch structure. Refer to DCS **12 00 01 01** for arresters' selection.

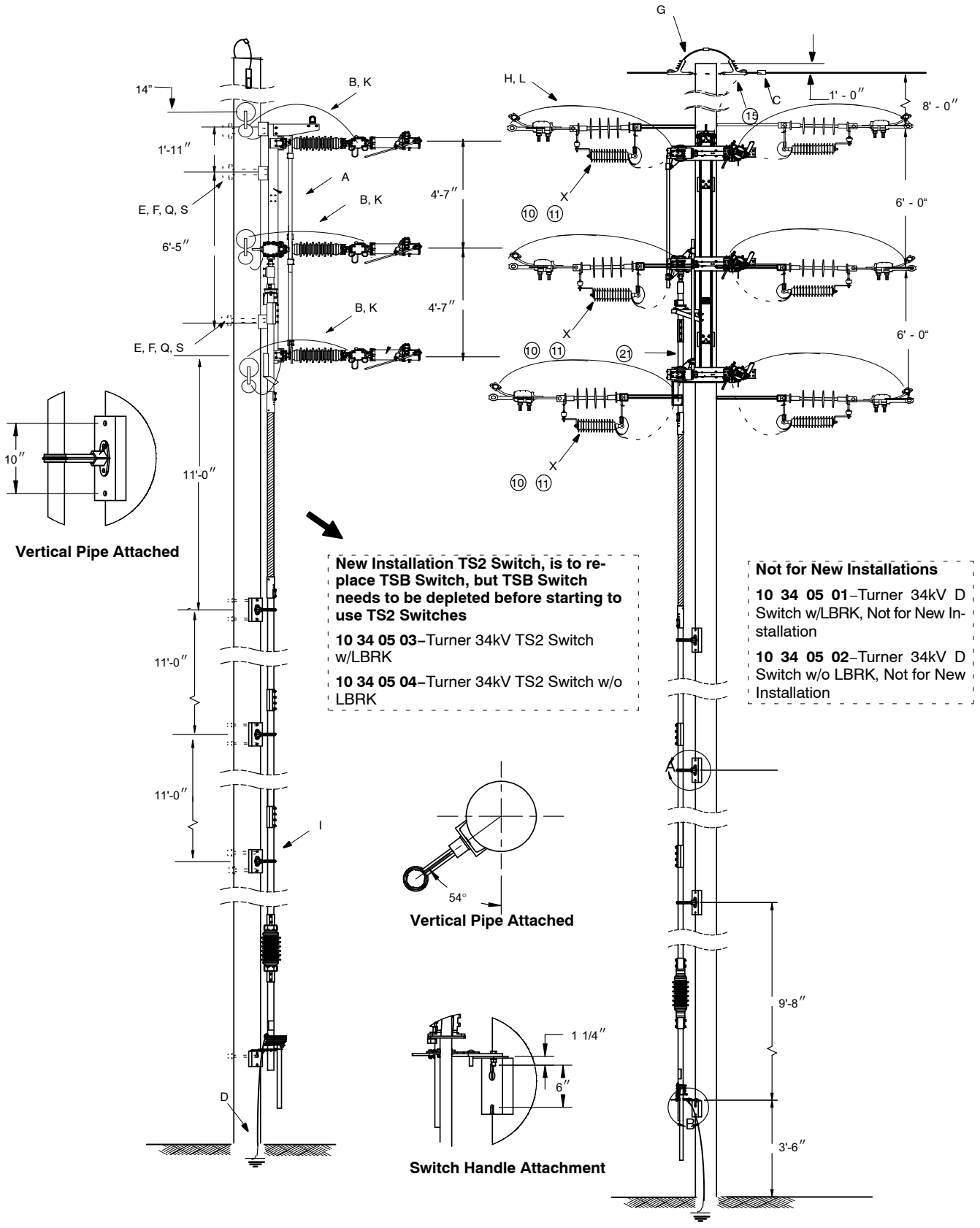
E. Removal Instructions

1. Remove vacuum Interrupters before any other disassembly. Handle with care and place in a separate box by themselves for return to salvage.
2. Remove switches and handle carefully to prevent breaking porcelain or stressing blades or contacts. All parts should be kept together for return to salvage. Tighten nuts and bolts enough so they are not lost in shipping.

F. Switch Pole Location
Switch pole shall be installed at a location, not subject to heavy vehicle and pedestrian traffic and with a level footing to allow safely operating of the switch.

G. For switch with radial feed, the jaw end should be installed on the portion of line that can be de−energized if possible.

Turner 34kV TS2 Switch



New Installation TS2 Switch, is to replace TSB Switch, but TSB Switch needs to be depleted before starting to use TS2 Switches

10 34 05 03–Turner 34kV TS2 Switch w/LBRK

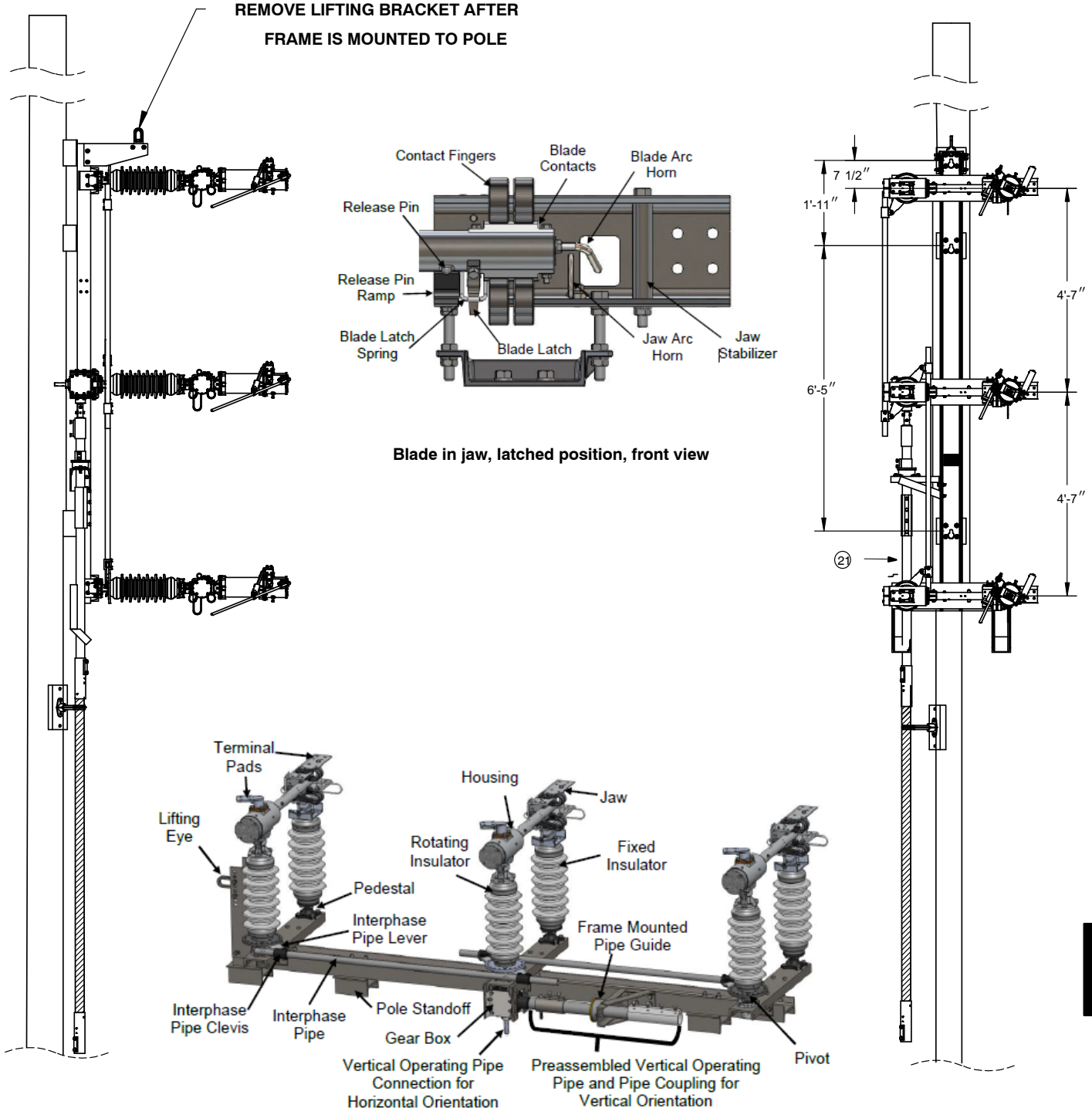
10 34 05 04–Turner 34kV TS2 Switch w/o LBRK

Not for New Installations

10 34 05 01–Turner 34kV D Switch w/LBRK, Not for New Installation

10 34 05 02–Turner 34kV D Switch w/o LBRK, Not for New Installation

Turner 34kV TS2 Switch

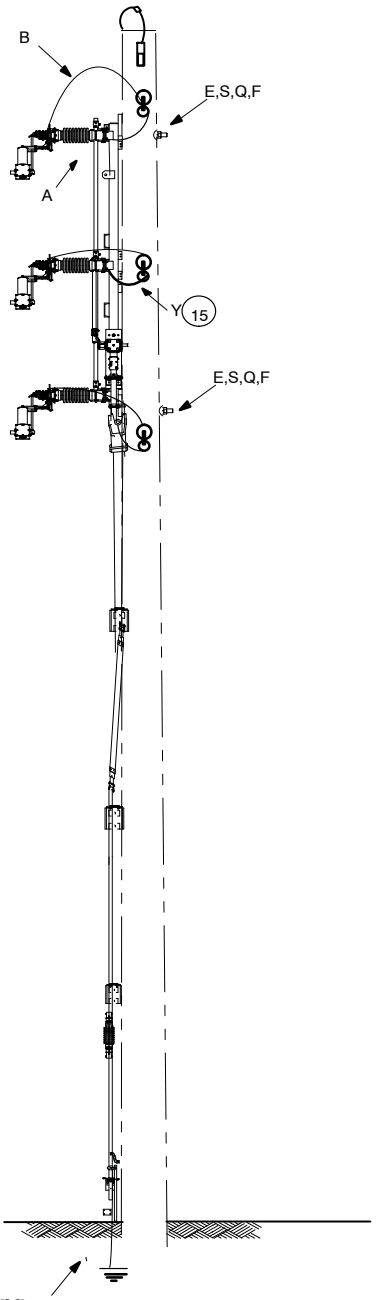


Blade in jaw, latched position, front view

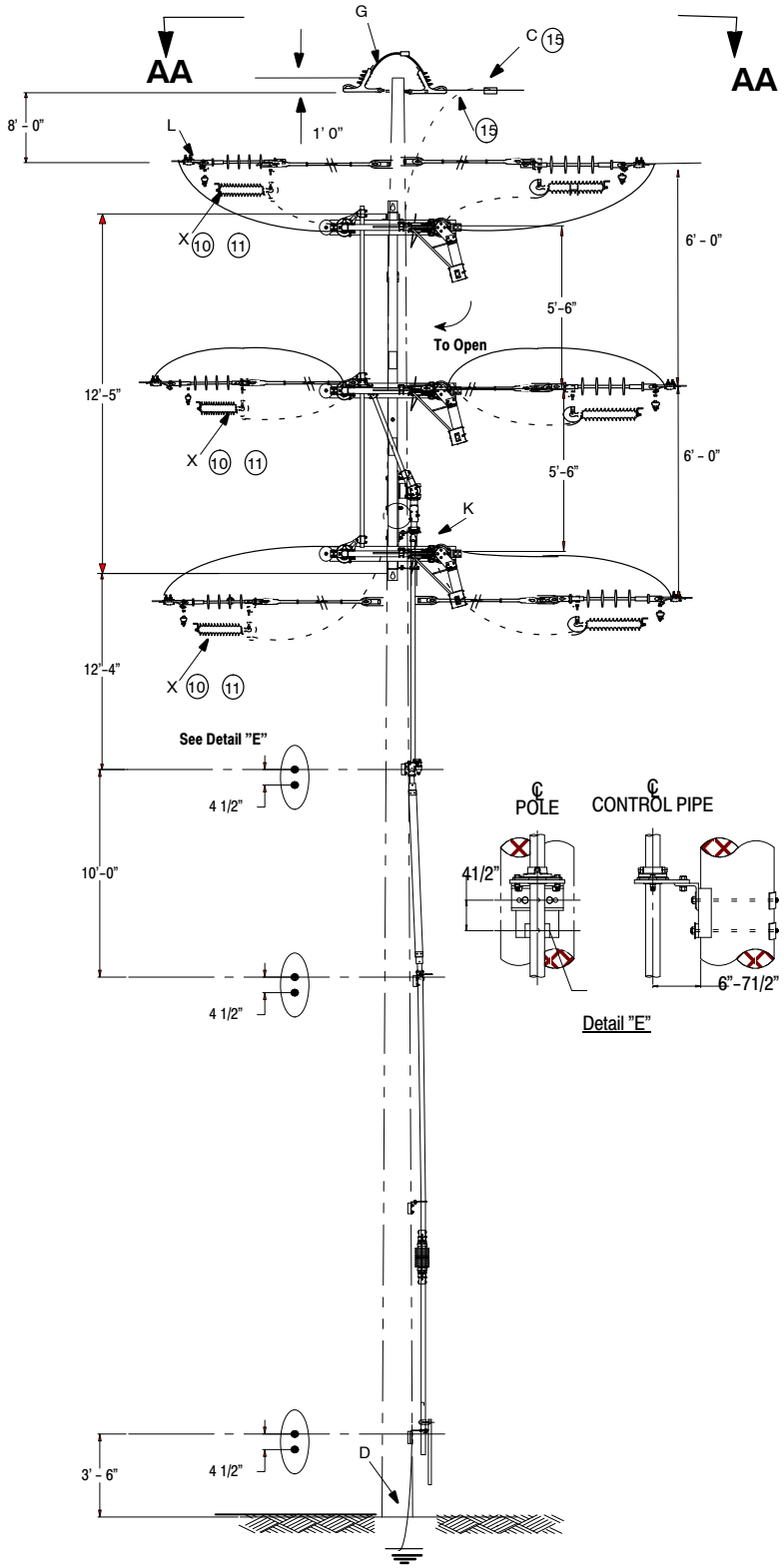
TS2 Switch Veritcal Orientation

SEECO 34kV Switch - Alternative

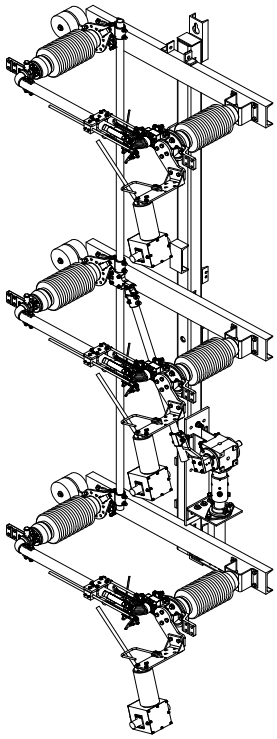
10 34 05 05–SEECO 34kV Switch w/LBRK



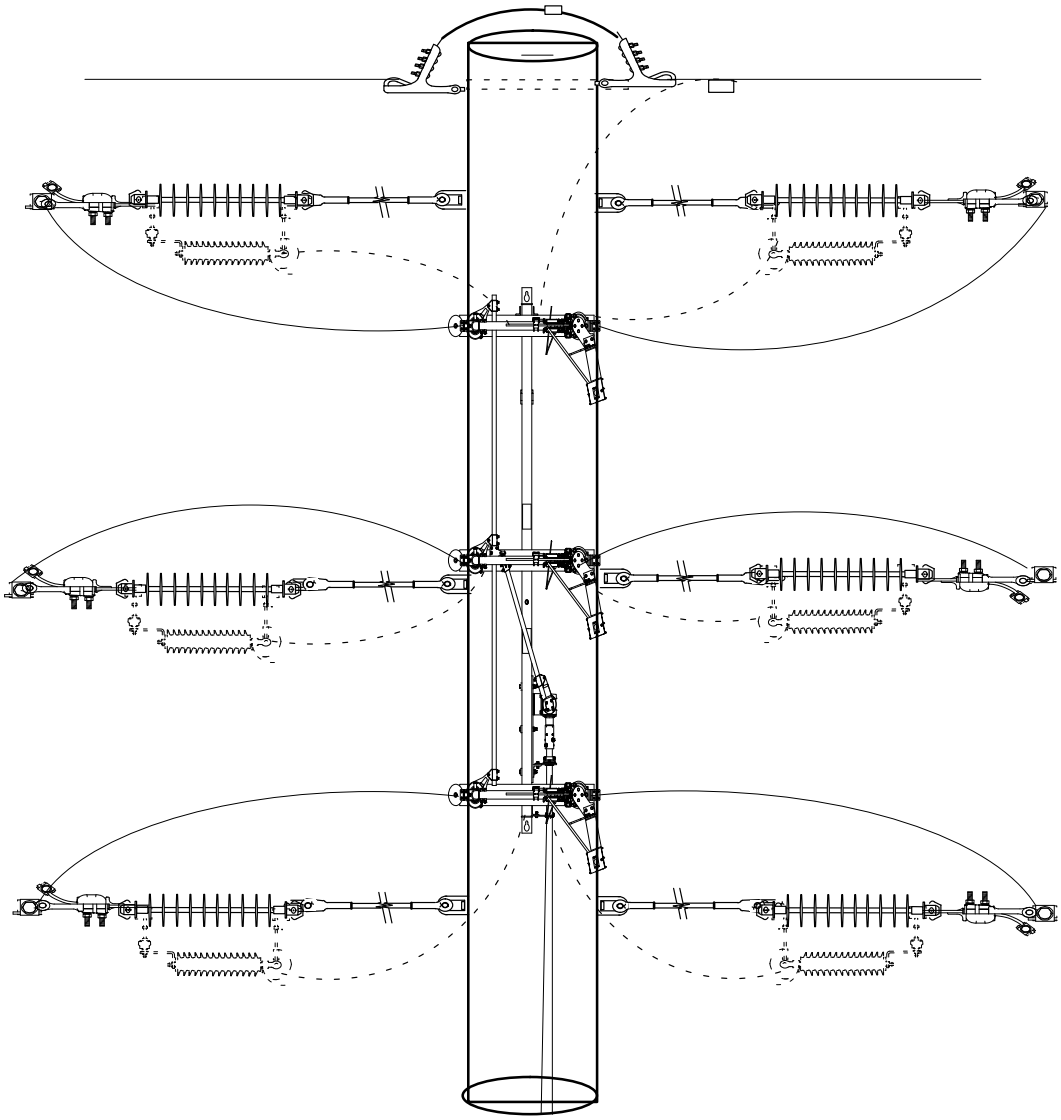
Grounding,
DCS 12 69 11**



SEECO 34KV SWITCH



Detail "M"



SECTION AA–AA

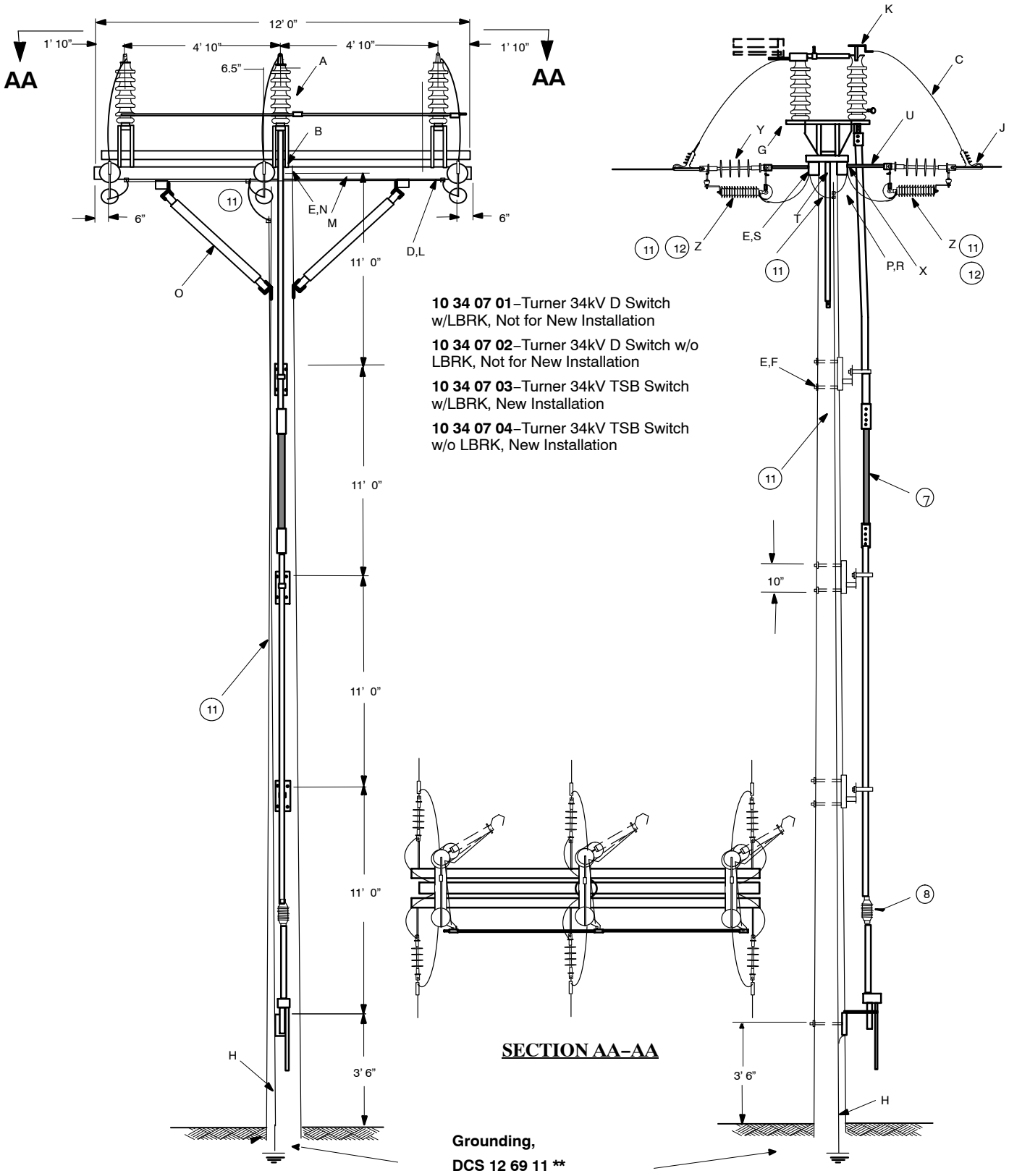
NOTES:

1. Switch handle must be grounded , refer to DCS **12 69 11 ****. Pole ground, operating pipe insulators, and ground mat installations and requirements, refer to DCS **10 34 01 01**, Section C.
2. See DCS **06 00 11 **** for shield wire details.
3. When operating handle is subject to vehicular damage or vandalism, increase mounting height to approx. 14 ft.
4. Install padlock on handle to prevent switch operation by the public.
5. Use 2 hand lines to prevent switch from turning while it is raised to mounting height.
6. Install 1–8 ft. fiberglass section to isolate underbuild (or future secondary). Refer to DCS **10 34 01 01**
7. Install 1–34kV TR210 operating rod insulator below secondary (or future secondary). Refer to DCS **10 34 01 01**
8. If motor operator is required, refer to DCS **10 00 01 01** and **10 69 10 ****.
9. The group operated switch weights 1080 lbs including load interrupters and 800 lbs. without load interrupters.
10. Arresters are not required for normally closed switch installation unless the switch with sensor devices which may be susceptible to lightning . Where switches are normally open, install both sets of arresters as shown. Refer to DCS **12 00 01 01** for arresters' selection.
11. The line arrester shown from the drawing is suspended from the compressed–on end fittings of the polymer deadend insulator and supported by aluminum hot line clamps, and will not work with porcelain deadend bells. The disconnector coupling assembly detaches the line end of the arrestor should the arrestor fail and will cause the arrester to pivot and drop down into a vertical position which makes the failed arrester much more visible. The disconnect coupling assembly with a 3/8" threaded stud that can be inserted into the tap lead eyebolt of the hot line clamp on the line end and an eyebolt with 3/8" stud that can be inserted into the tap lead eyebolt of the hot line clamp on the ground end. One of the tinned copper leads (on the left (pole end) of the assembly) is to shunt the clevis–eye connection to eliminate radio noise. The longer tinned copper lead is for connection to a pole ground wire or a metal switch based with line clamp (stk no. 23 78 394) connected the line end on a stainless bolt (stk no. 21 56 433, 21 75 106 (hex nut), and 21 61 142 (washer)), which is bolted on the switch base.
Use some Loctite on the threads of the 3/8" bolts to keep bolts from coming loose and also use a 3/8" carriage head bolt through the hot line clamp eyebolt which would keep the assembly from falling if the hot line clamp tap lead eyebolt should loosen.
12. Caution: To prevent damage to the interrupter, do not install the bottom interrupter and keep unattached when lifting the switch vertically until the switch is installed on the pole, then attach the interrupter.
13. Remove lifting bracket.
14. Ground terminal of arresters to be bonded to switch base.
15. The lead connection is only required if the arresters are installed and grounded to the switch base.
16. The stock #54 08 314 and stock #5408317 are Turner 34kV D switches not for new installation.
17. The stock #54 08 433 and stock #54 08 434 are Turner 34kV TS2 switches for new installation. TS2
18. Only needed if additional vertical pipe is required.
19. Group operated 34.5kV, 1200 amp switch leads shall be the same as the line conductor. The leads will be attached to the switch per DCS **07 00 30 **** with 556.6kcmil or 954kcmil lugs.
20. The stock #43 08 442 are SEECO 34kV switch with LBRK.
21. Field cut pipe lengths as needed

		Stnd. / Stk. No.	Description 10 34 05 **	01	02	03	04	05
16	A	54 08 314	Turner D Switch, 34 kV, 1200A w/o LBRK(not for new installation)		1			
16		54 08 317	Turner D Switch, 34 kV, 1200A w/LBRK(not for new installation)	1				
17		54 08 433	Turner TS2 Switch, 34kV, 1200A w/LBRK Vertical Mount			1		
17		54 08 434	Turner TS2 Switch, 34kV, 1200A w/o LBRK Vertical Mount				1	
		54 08 442	SEECO 34kV, 1200A w/LBRK Vertical Mount					1
	J	54 08 327	Kit, for 34 kV Switch Vertical Construction	1	1			
@	B	LW*W	Wire, Bare, – Std. 07 00 80 00	60	60	60	60	60
10@	C	17 51 032	Clamp, Parallel Groove #6AWG – 1/0AWG	8	8	8	8	8
1@	D	**12 69 11 ****	Grounding Unit – Switching Pole	1	1	1	1	1
	E	23 52 219	Bolt, Machine 3/4" Sq. Head/Sq. Nut x 14"	3	3	3	3	3
	F	23 65 042	Nut, Lock, MF Galv 3/4"	3	3	3	3	3
@	G	**06 00 11 09**	Deandend, Looparound, Static Wire	1	1	1	1	1
	H	**06 34 60 15**	Pole, Deadend, 34 kV	6	6	6	6	6
18@	I	32 01 821	2" x 10' Steel Pipe w/Coupling	1	1	1	1	1
@	K	CL*W	Lug, Compression – Std. **07 00 20 00**	6	6	6	6	6
@	L	DEC*W	Clamp, Deadend – Std. **07 00 30 00**	6	6	6	6	6
	Q	23 66 031	Washer, Curved, 3/4"	3	3	3	3	3
	S	23 66 131	Washer, Flat, 3/4"	3	3	3	3	3
10,11@	X	10 01 237	Arrester, Line Protection, 30 kV Rated	As Req.	As Req.	As Req.	As Req.	As Req
10,11,15 @	Y	18 51 021	Wire, #6 Cu SD Poly Covered	As Req	As Req	As Req	As Req	As Req
*1@	AA	18 51 091	Wire, #2 Cu SD Poly Covered	As Req.	As Req.	As Req.	As Req.	As Req
*1@	BB	23 64 001	Staple, Steel Coated Cu	As Req.	As Req.	As Req.	As Req.	As Req
*1@	DD	17 52 142	Clamp, PG, Bronze, Cable(two) #4 to 2/0 Cu	1	1	1	1	1

* Only needed when arresters are required, see note 10.

Shaded standards: **10 34 05 01** and **10 34 05 02** are no longer available for new installations.



10 34 07 01–Turner 34kV D Switch w/LBRK, Not for New Installation

10 34 07 02–Turner 34kV D Switch w/o LBRK, Not for New Installation

10 34 07 03–Turner 34kV TSB Switch w/LBRK, New Installation

10 34 07 04–Turner 34kV TSB Switch w/o LBRK, New Installation

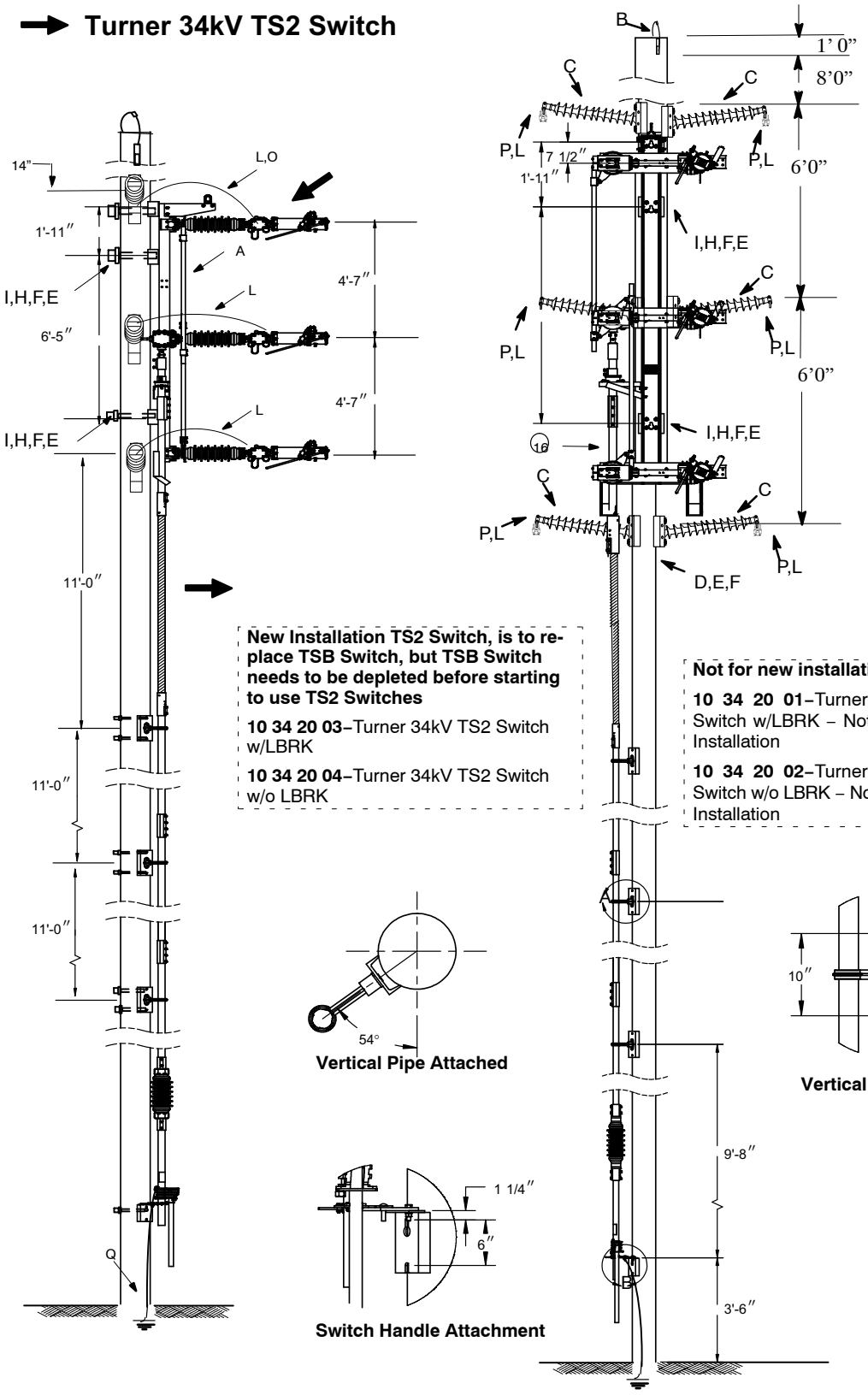
NOTES:

1. Install grounding unit on switch handle, refer to DCS **12 69 11****. For pole ground, vertical pipe insulators, and ground mat requirement, refer to DCS **10 34 01 01**, Section C.
2. The configuration has no provision for installing static shield wire; otherwise use DCS **10 34 05 ****
3. Vertical Operating Pipe shipped with the Switch is for pole length up to 50 feet. Additional steel pipe is required if a taller pole is called for.
4. When operating handle is subject to vehicular damage or vandalism, increase mounting height to approx. 14 ft.
5. Install padlock on handle to prevent switch operation by the public.
6. Place channels flange up.
7. Install 1–8 ft. fiberglass section to isolate underbuild (or future secondary). Refer to DCS **10 34 01 01**.
8. Install 1–34kV TR210 operating rod insulator below secondary (or future secondary). Refer to DCS **10 34 01 01**.
9. If motor operator is to be installed, refer to DCS **10 00 01 01** and **10 69 10 ****.
10. The group operated switch weights 1080 lbs. including load interrupters and 800 lbs. without load interrupters.
11. Arresters are not required for normally closed switch installations unless the switch with sensor devices which may be susceptible to lightning. Where switches are normally open, install both sets of arresters as shown and pole ground wire to the top of the pole for grounding path of the arresters. Refer to DCS **12 00 01 01** for arresters' selection.
12. The line arrester shown from the drawing is suspended from the compressed–on end fittings of the polymer deadend insulator and supported by aluminum hot line clamps, and will not work with porcelain deadend bells. The disconnector coupling assembly detaches the line end of the arrestor should the arrestor fail and will cause the arrester to pivot and drop down into a vertical position which makes the failed arrester much more visible. The disconnect coupling assembly with a 3/8" threaded stud that can be inserted into the tap lead eyebolt of the hot line clamp on the line end and an eyebolt with 3/8" stud that can be inserted into the tap lead eyebolt of the hot line clamp on the ground end. One of the tinned copper leads (on the left (pole end) of the assembly) is to shunt the clevis–eye connection to eliminate radio noise. The longer tinned copper lead is for connection to a pole ground wire or a metal switch based with line clamp (stk no. 23 78 394) connected the line end on a stainless bolt (stk no. 21 56 433, 21 75 106 (hex nut), and 21 61 142 (washer)), which is bolted on the switch base.
Use some Loctite on the threads of the 3/8" bolts to keep bolts from coming loose and also use a 3/8" carriage head bolt through the hot line clamp eyebolt which would keep the assembly from falling if the hot line clamp tap lead eyebolt should loosen.
13. Caution: To prevent damage to interrupters do not install the bottom interrupter and keep unattached when lifting the switch vertically until the switch is installed on the pole, then attach the interrupter.
14. Remove lifting bracket.
15. The switches, stock #54 08 314 and stock #54 08 317 are not for new installation.
16. The switches, stock #54 08 437 and stock #54 08 439 are for new installation.
17. Group operated 34.5kV, 1200 amp switch leads shall be the same as the line conductor. The leads will be attached to the switch per DCS **07 00 30 ****with 556.6kcmil or 954kcmil lugs.

		Stnd. / Stk. No.	Description 10 34 07 **	01	02	03	04
14	A	54 08 314	Turner D Switch, 34kV, 1200A w/o LBRK (not for new installation)		1		
14		54 08 317	Turner D Switch, 34kV, 1200A w/LBRK (not for new installation)	1			
15		54 08 437	Turner TSB Switch, 34kV, 1200A w/LBRK–Flat Top Mount			1	
15		54 08 439	Turner TSB Switch, 34kV, 1200A w/o LBRK–Flat Top Mount				1
	B	54 08 328	Mounting Kit, for 34 kV D Switch Flat Top Construction	1	1		
@	C	LW*W	Wire, Bare (Ft.) – Std. **07 00 80 00**	45	45	45	45
	D	23 52 041	Bolt, Mach. –1/2" x 8"	12	12	12	12
	E	23 66 027	Washer, Sq –2 1/4"	26	26	26	26
	F	23 52 065	Bolt, Mach – 5/8" x 12"	9	9	9	9
11@	G	17 51 032	Clamp, Parallel Groove #6AWG – 1/0AWG	6	6	6	6
1@	H	**12 69 11 ****	Grounding Unit – Switch Pole	1	1	1	1
3@	I	32 01 821	Pipe, Steel Galv. 2" x 10' w Coupling, Turner	1	1	1	1
	J	DEC*W	Clamp, Deadend – Std. **07 00 30 00**	6	6	6	6
@	K	CL*W	Lug, Compression – Std. **07 00 20 00**	6	6	6	6
	L	23 66 017	Washer, Round 1/2"	12	12	12	12
	M	41 01 023	4" x 6" x 12'–0" Crossarm	2	2	2	2
	N	23 52 069	Bolt, Machine, 5/8" x 18"	1	1	1	1
	O	41 56 021	5'–0" Wood Heel Brace	2	2	2	2
	P	23 52 049	Bolt, Machine, 5/8" x 2"	2	2	2	2
	R	23 66 006	Washer, Lock, 5/8" Galv. Steel	2	2	2	2
	S	23 52 256	Bolt, Machine, 5/8" x 7"	4	4	4	4
	T	23 53 004	5/8" x 20" Spacer Bolt	3	3	3	3
	U	23 65 012	5/8" Eyenut	6	6	6	6
	V	23 51 015	Bolt, Clevis, 3/4" x 10"	6	6	6	6
	W	23 65 018	3/4" Eyenut	6	6	6	6
	X	23 77 210	Plate Heel Brace, 13–3/8" to 19"	2	2	2	2
	Y	25 06 053	Insulator, Susp. 34 kV	6	6	6	6
11@	Z	10 01 237	Arrester, Lightning, 30 kV, Metal Oxide	As Req.	As Req.	As Req.	As Req.
*1@	AA	18 51 091	Wire, #2 Cu Covered SD	As Req.	As Req.	As Req.	As Req.
*1@	BB	23 64 001	Staple, Cu Coated Steel	As Req.	As Req.	As Req.	As Req.
*1@	CC	23 64 038	Staple, Molding Galv.	As Req.	As Req.	As Req.	As Req.
*1@	DD	17 52 142	Clamp, PG, Grounding, Bronze, Cable (two) #4 to 2/0 Cu	1	1	1	1

* Only needed when a pole ground is required. See Dist. Std. **10 34 01 01**.

Turner 34kV TS2 Switch



New Installation TS2 Switch, is to replace TSB Switch, but TSB Switch needs to be depleted before starting to use TS2 Switches

10 34 20 03–Turner 34kV TS2 Switch w/LBRK

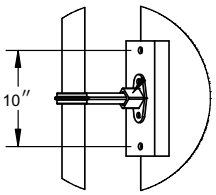
10 34 20 04–Turner 34kV TS2 Switch w/o LBRK

Not for new installations

10 34 20 01–Turner 34kV D Switch w/LBRK – Not for New Installation

10 34 20 02–Turner 34kV D Switch w/o LBRK – Not for New Installation

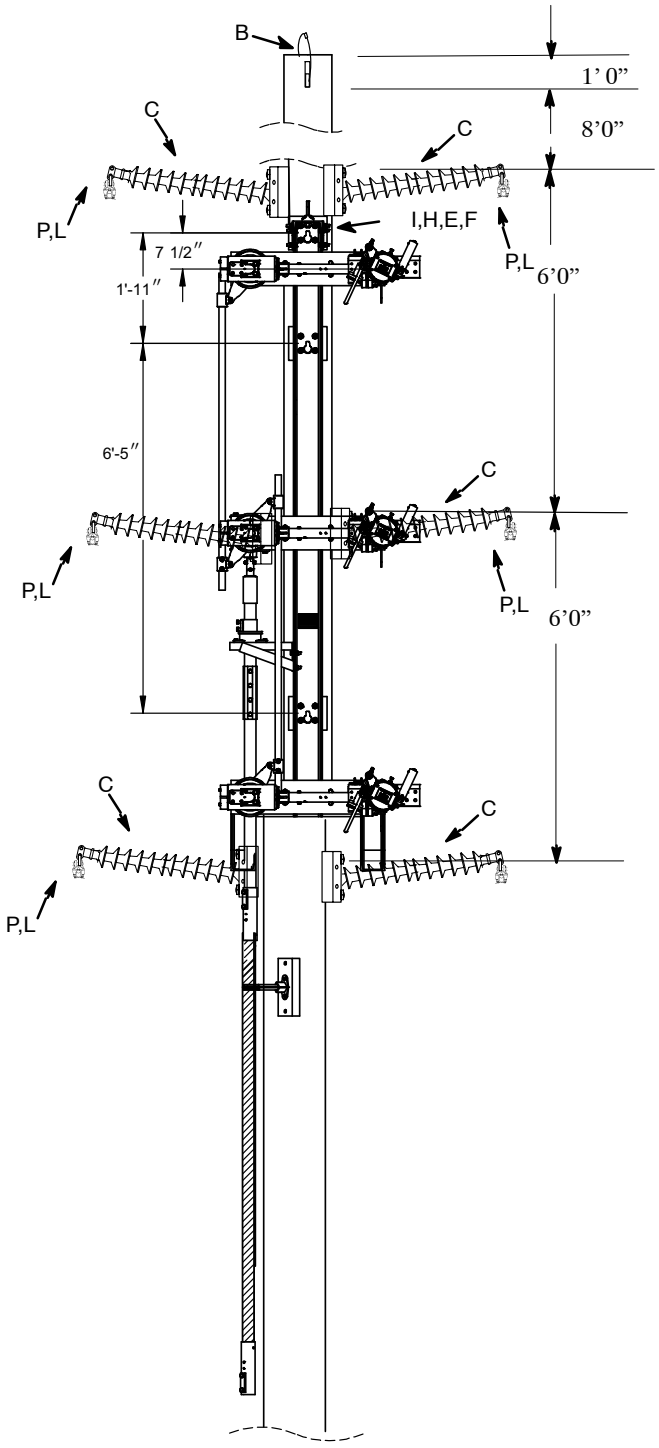
Vertical Pipe Attached

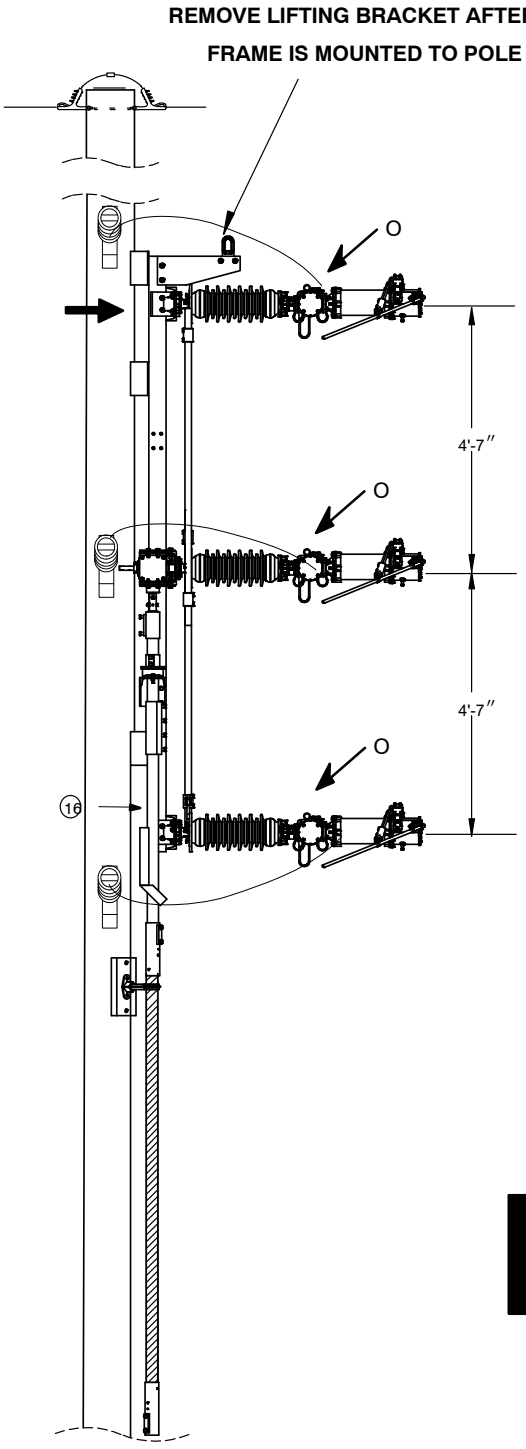


Vertical Pipe Attached

Switch Handle Attachment

Turner 34kV TS2 Switch



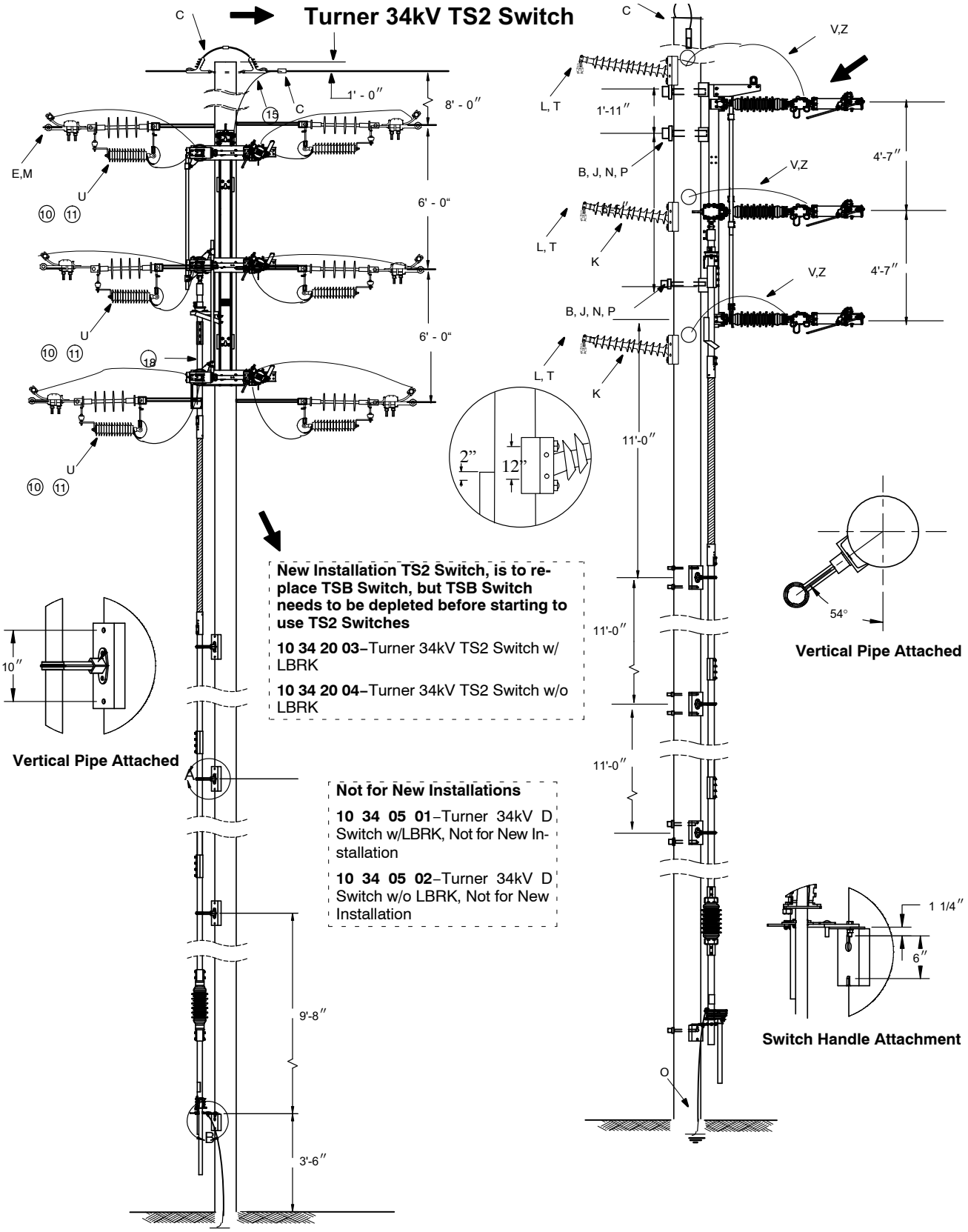


NOTES:

1. Install Grounding unit on switch handle, See DCS **12 69 11 ****. Pole ground requirement, see DCS **10 34 01 01**, Section C.
2. See DCS **06 00 11 **** for shield wire details.
3. When operating handle is subject to vehicular damage or vandalism, increase mounting height to approx. 14ft.
4. Install padlock on handle to prevent switch from turning while it is raised to mounting height.
5. Use 2 hand lines to prevent switch from turning while it is raised to mounting height.
6. Install 1–8ft. fiberglass section or 1–34kV operating rod insulator to isolate underbuild (or future secondary).
7. Install 1–34kV TR210 operating rod insulator below secondary (or future secondary).
8. If motor operator is to be installed, see DCS **10 00 01 01** and **10 69 10 ****.
9. The group operator switch weights 1080lbs including interrupters and 800lbs without interrupters.
10. Caution: To prevent damage to interrupters, do not install the bottom interrupter when lifting the switch vertically. Attached the bottom interrupter after the switch is installed on the pole.
11. Remove lifting bracket from switch.
12. Order additional steel pipe only when is required.
13. The switches, stock #54 08 314 and stock #54 08 317 are not for new installation.
14. The switches, stock #54 08 433 and stock #54 08 434 are for new installation.
15. Group operated 34.5kV, 1200 amp switch leads shall be the same as the line conductor. The leads will be attached to the switch per DCS **07 00 30 **** with 556.6kcmil or 954kcmil lugs.
16. Field cut pipe lengths as needed.

		Stnd. / Stk. No.	Description 10 34 20 **	01	02	03	04
13	A	54 08 314	Turner D Switch, 34 kV, 1200 A. w/o LBRK		1		
13		54 08 317	Turner D Switch, 34 kV, 1200 A., w/LBRK	1			
14		54 08 433	Turner TS2 Switch, 34kV, 1200A w/LBRK Vertical Mount			1	
14		54 08 434	Turner TS2 Switch, 34kV, 1200A w/o LBRK Vertical Mount				1
	G	54 08 327	Kit for 34kV Switch Vertical Construction	1	1		
@	B	**06 00 11 ** **	Deadend, Looparound, Static Wire	1	1	1	1
	C	25 05 132	Insulator, Line Post, Horizontal, 138kV	6	6	6	6
	D	23 53 060	Bolt, DA, 3/4" x 20"–top	4	4	4	4
		23 53 062	Bolt, DA, 3/4" x 22"–bottom	2	2	2	2
	E	23 66 031	Washer, Curved, 3" x 3" for 3/4" Bolt	12	12	12	12
	F	23 56 042	Nut Locking, 3/4" M–F	15	15	15	15
	H	23 66 011	Washer, Round, 3/4" Bolt	15	15	15	15
	I	23 52 254	Bolt, Mach., 3/4" x 16"	2	2	2	2
	J	23 52 070	Bolt, Mach., 5/8" x 20"	8	8	8	8
	K	23 66 027	Washer, Square, 5/8"	8	8	8	8
	L	23 58 063	Wye Clevis – (Rotated) Eye Fitting	6	6	6	6
@	M	LW*W	Wire, Bare – Std. **07 00 80 00**	60	60	60	60
	N	PG*	Clamp, Parallel Groove – Std. **07 00 25 00**	12	12	12	12
@	O	CL*W	Lug, Compression – Std. **07 00 30 00**	12	12	12	12
@	P	SC*W	Clamp, Suspension – Std. **07 00 20 00**	3	3	3	3
@	Q	**12 69 11 ** **	Grounding Unit – Switch Pole	1	1	1	1
12@	R	32 01 821	2"x10' Galv. Steel Pipe with Coupling	1	1	1	1

Shaded standards **10 34 20 01** and **10 34 20 02** are not for new installations.



New Installation TS2 Switch, is to replace TSB Switch, but TSB Switch needs to be depleted before starting to use TS2 Switches

10 34 20 03–Turner 34kV TS2 Switch w/ LBRK

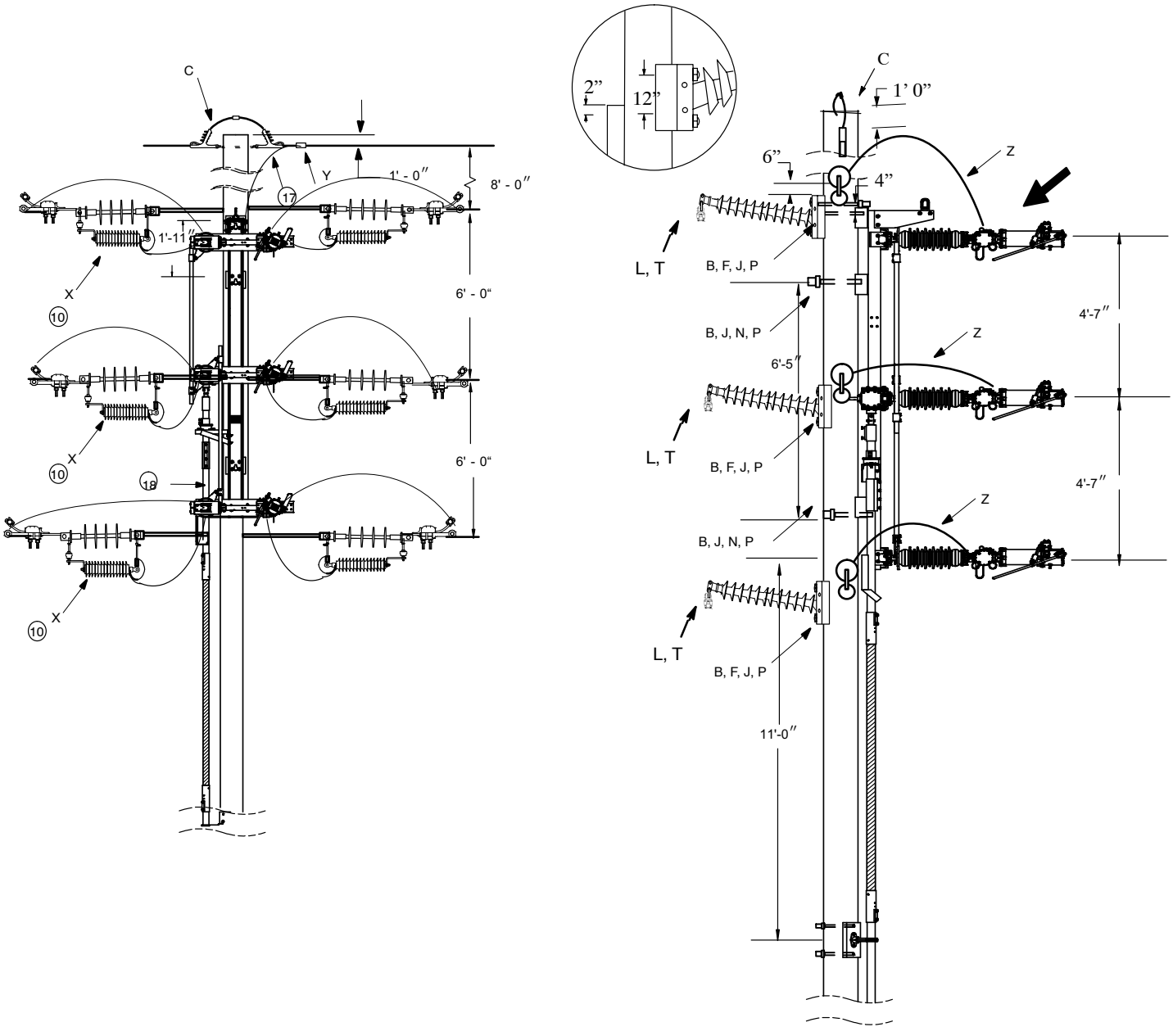
10 34 20 04–Turner 34kV TS2 Switch w/o LBRK

Not for New Installations

10 34 05 01–Turner 34kV D Switch w/LBRK, Not for New Installation

10 34 05 02–Turner 34kV D Switch w/o LBRK, Not for New Installation

Turner 34kV TS2 Switch



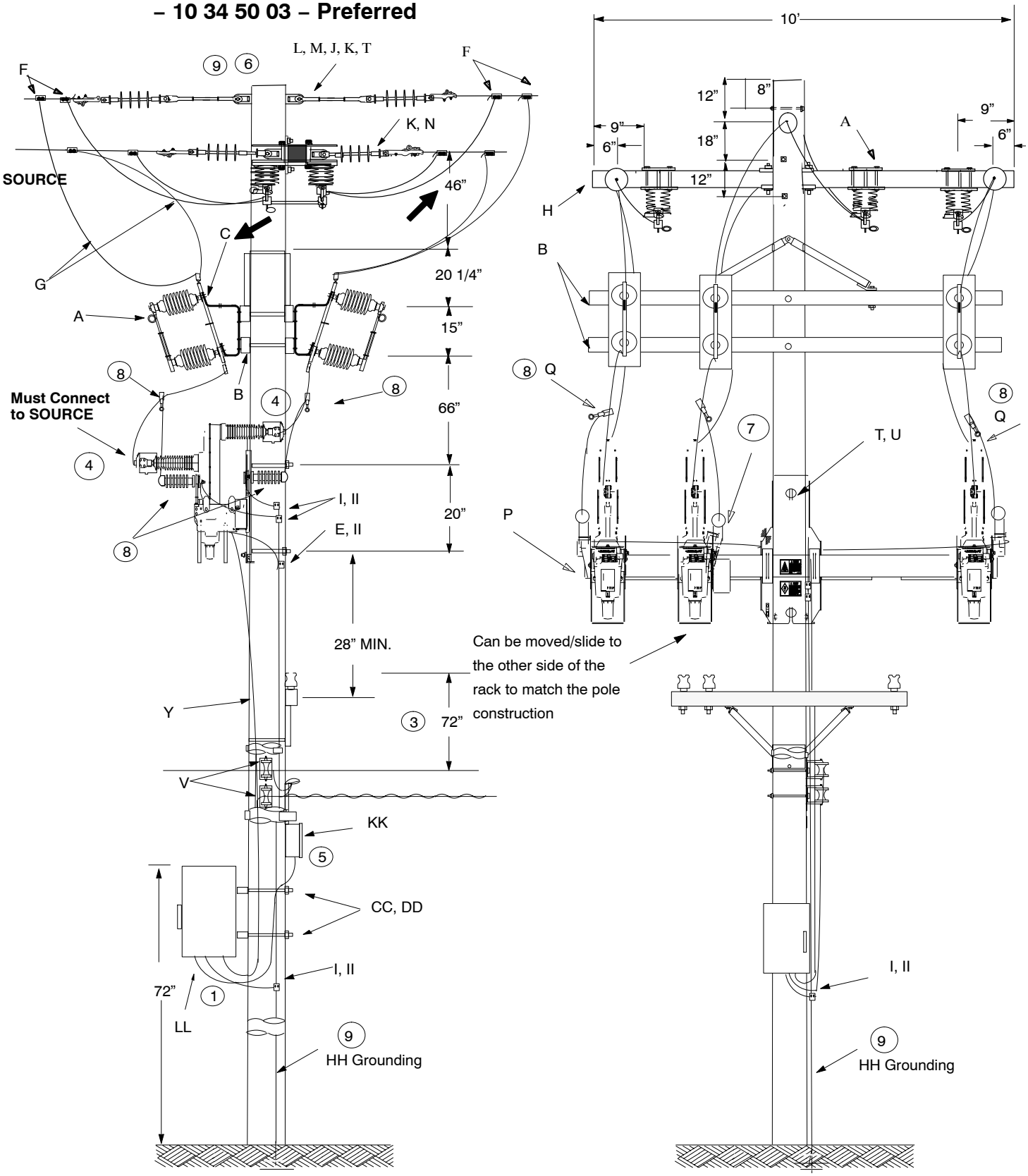
NOTES:

1. Install grounding unit on switch handle see Dist. Std. **12 00 01 01**. Pole ground requirement, see DCS **10 34 01 01**, Section C.
2. See Dist. Std. **06 00 11**** for shield wire details.
3. When operating handle is subject to vehicular damage or vandalism, increase mounting height to approx. 14 ft.
4. Install padlock on handle to prevent switch operation by the public.
5. Use 2 hand lines to prevent switch from turning while it is raised to mounting height.
6. Install 1–8 ft. fiberglass section or 1–34kV TR210 operating rod insulator to isolate underbuild (or future secondary).
7. Install 1–34kV TR210 operating rod insulator below secondary (or future secondary).
8. If motor operator is to be installed, see Dist. Std. **10 00 01 01** and **10 69 10 ****.
9. The group operated switch weights 1080 lbs. including load interrupters and 800 lbs. without load interrupters.
10. Arresters are not required for normally closed switch installation unless the switch with sensor devices which may be susceptible to lightning . Where switches are normally open, install both sets of arresters as shown. Refer to DCS **12 00 01 01** for arresters' selection.
11. Caution: to prevent damage to interrupters, do not install the bottom interrupter and keep unattached when lifting the switch vertically until the switch is installed on the pole, and then attach the interrupter.
12. Remove lifting bracket.
13. The switch is not for new installation.
14. The switch is for new installation.
15. Only needed if additional vertical pipe is required.
16. Group operated 34.5kV, 1200 amp switch leads shall be the same as the line conductor. The leads will be attached to the switch per DCS **07 00 30 **** with 556.6kcmil or 954kcmil lugs.
17. The lead connection is only required if the arresters are installed and grounded to the switch base.
18. Field cut pipe lengths as needed.

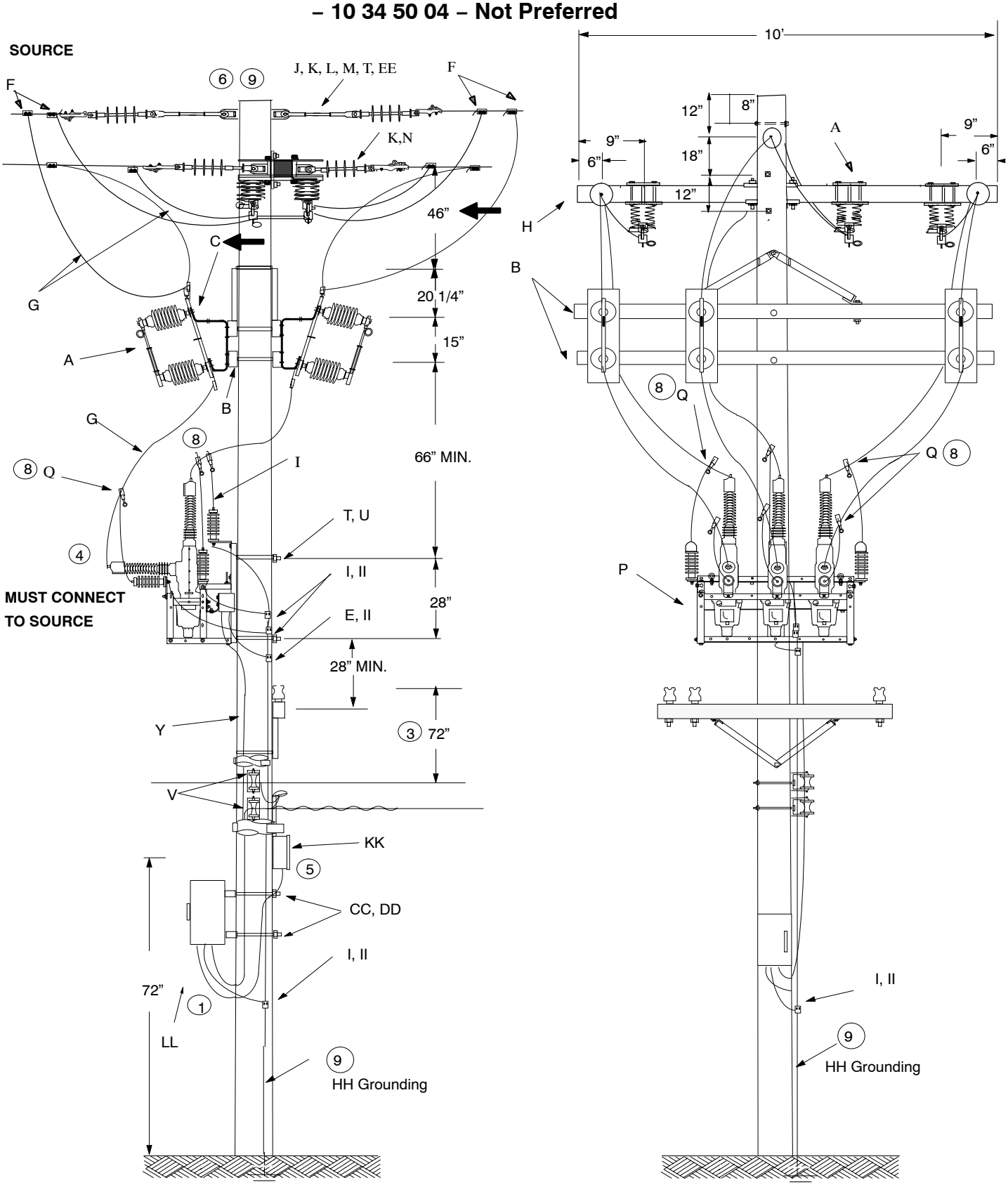
		Stnd. / Stk. No.	Description 10 34 26 **	01	02	03	04
13	A	54 08 314	Turner D Switch, 34kV, 1200A, w/o LBRK		1		
13		54 08 317	Turner D Switch, 34kV, 1200A, w/LBRK	1			
14		54 08 433	Turner TS2 Switch, 34kV, 1200A, w/LBRK			1	
14		54 08 434	Turner TS2 Switch, 34kV, 1200A, w/o LBRK				1
	R	54 08 327	Kit for 34kV Switch Vertical Construction	1	1		
	B	23 56 042	Nut, Locking, 3/4" M–F	15	15	15	15
@	C	**06 00 11 ****	Deadend, Looparound, Static Wire	1	1	1	1
@	D	DEC*W	Clamp, Deadend – Std. **07 00 11 00**	6	6	6	6
	E	25 56 059	Insulator, F.G. Strain, 26"	6	6	6	6
	F	23 53 060	Bolt, DA, 3/4" x 20"	4	4	4	4
		23 53 062	Bolt, DA, 3/4" x 24"	2	2	2	2
	G	23 52 070	Bolt, Mach. 5/8" x 20"	8	8	8	8
	H	23 66 027	Washer, Square, 5/8"	8	8	8	8
15@	I	32 01 821	2" x 10' Steel Pipe w/coupling	1	1	1	1
	J	23 66 031	Washer, Curved, 3" x 3", for 3/4" Bolt	15	15	15	15
	K	25 05 132	Insulator, Line Post, Horizontal, 138 kV	3	3	3	3
	L	23 58 063	Wye Clevis – (Rotated) Eye Fitting	3	3	3	3
	M	**06 34 60 15**	Deadend, Pole, 34.5 kV, Double	6	6	6	6
	N	23 52 254	Bolt, Mach, 3/4" x 16"	2	2	2	2
		23 52 213	Bolt, Mach, 3/4" x 24"	1	1	1	1
@	O	**12 69 11 ****	Grounding Unit – Switch Pole	1	1	1	1
	P	23 66 011	Washer, Round, 3/4" Bolt	6	6	6	6
	S	23 59 064	Eye–Eye Link	6	6	6	6
@	T	SC*W	Clamp, Suspension – Std. **07 00 20 00**	3	3	3	3
10@	U	10 01 237	Arrester, Line protection, 30kV Duty Cycle, 24.4kV MCOV Rated	As Req.	As Req.	As Req.	As Req.
@	V	CL*W	Lug, Compression – Std. **07 00 30 00**	6	6	6	6
@	Y	PG*	Clamp, Parallel Groove – Std. **07 00 25 00**	6	6	6	6
@	Z	LW*W	Wire, Bare – Std. **07 00 80 00**	30	30	30	30

Shaded standards are not for new installations.

G & W "Z" STYLE VIPER RECLOSER – 10 34 50 03 – Preferred



G & W "L" STYLE VIPER RECLOSER
– 10 34 50 04 – Not Preferred

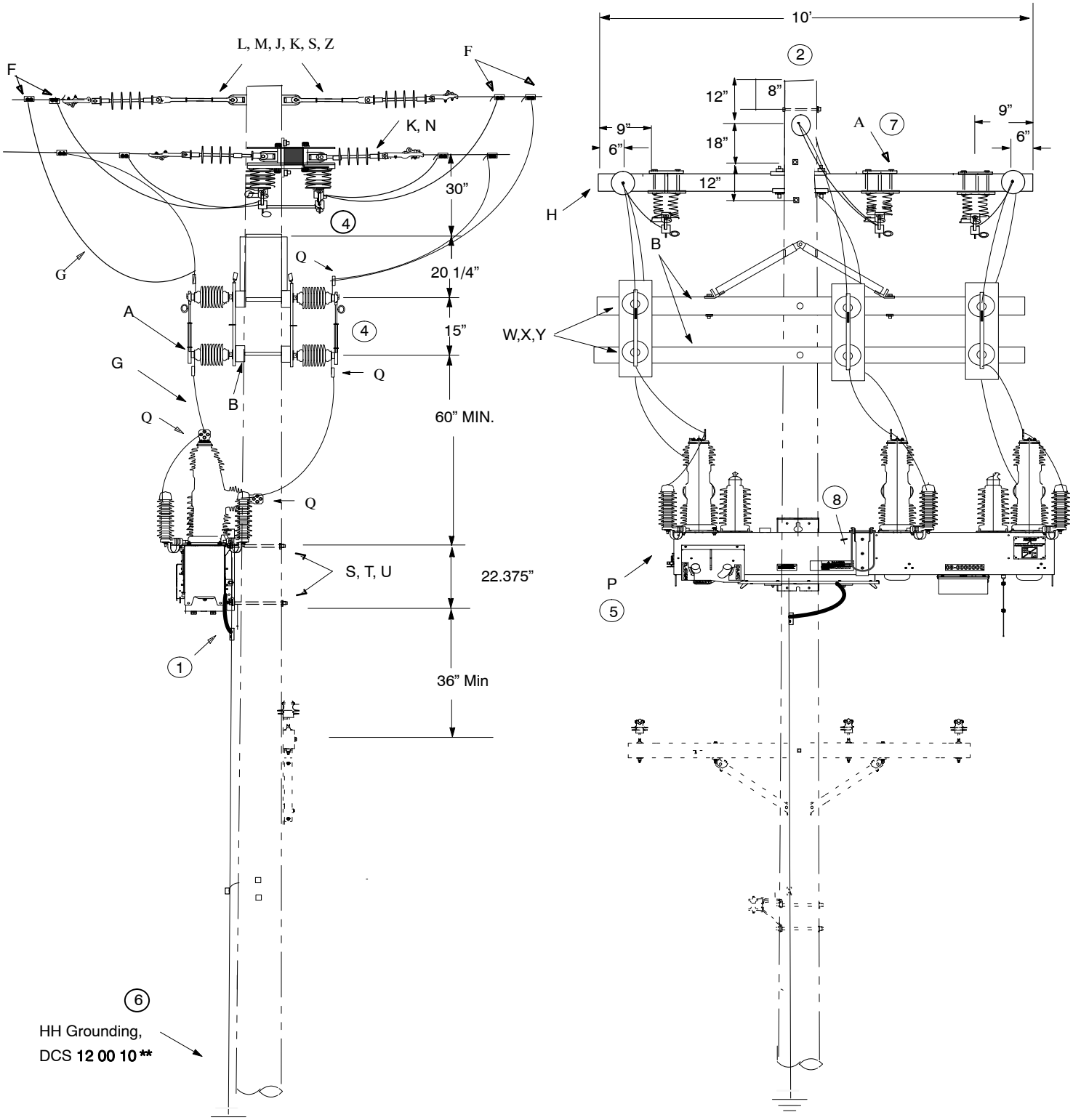


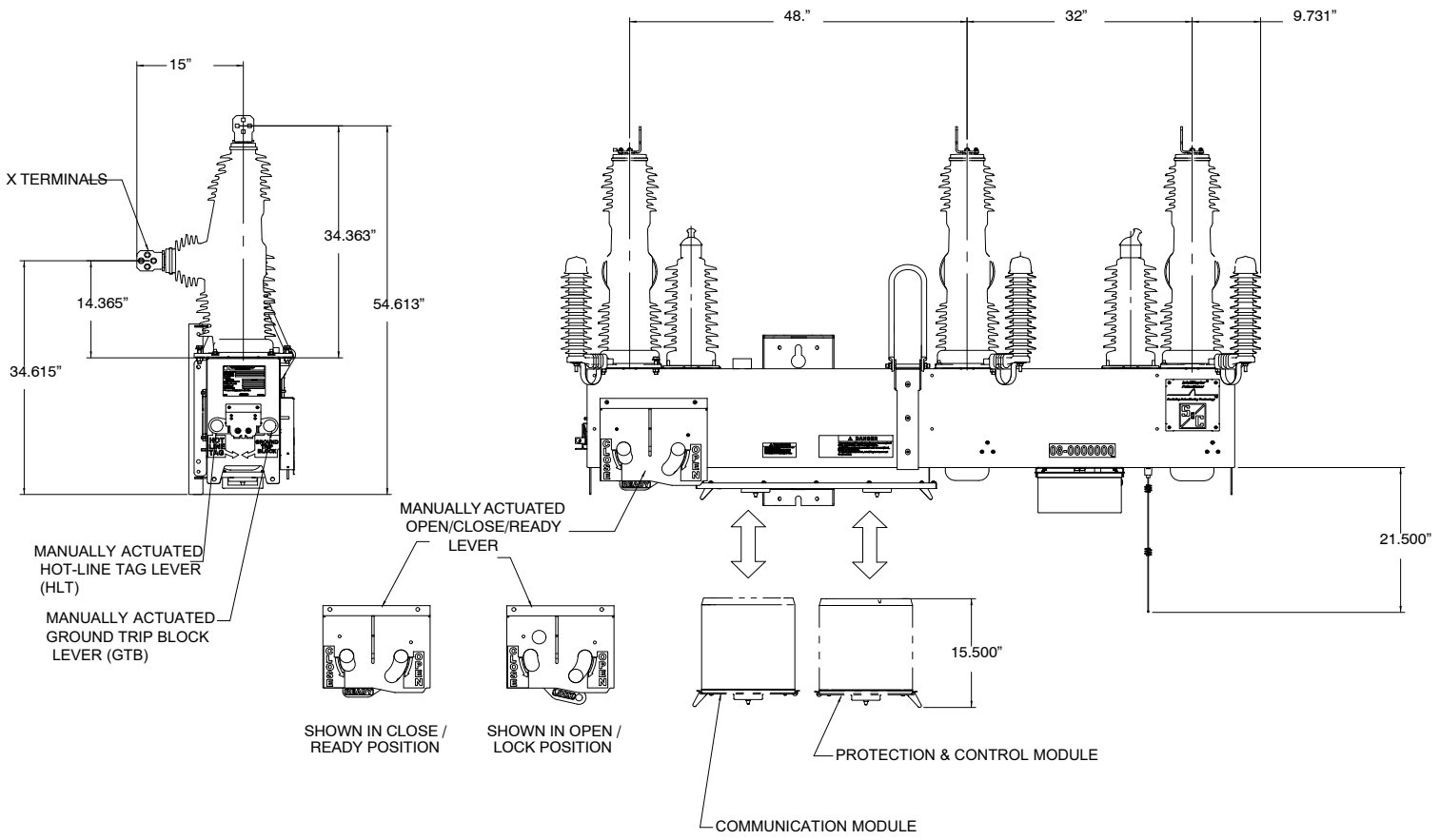
NOTES

1. Control cables can be ordered in other lengths: G & W 35' – stock #69 10 234. If a different cable is used for G&W, place the extra 50' cable back into stock #69 10 233.
2. The maximum height – measured from the ground to the bottom of the recloser – shall be 3 feet less than the length of the control cable (ie. 49 feet above ground if cable is 52 feet long).
3. See DCS **03 00 01 00** for spacing information. May be reduced to 40" if pole space is limited.
4. Position lugs so the cable enters the animal guard through the side entry point, in order to direct cables to the switches.
5. Secondary breaker / receptacle box shall be connected to ground wire with #6, S.D. copper. Incoming wire must be protected.
6. If static present, maintain 8' separation from the static wire to the center of phase crossarm.
7. The middle arresters should always be mounted on the pole side, the outside pole arresters should be mounted to the outside of the viper arm. The arrangement will maximize the phase–phase spacing of energized parts.
8. The lightning arresters pre–installed on the viper recloser by the factory come with 36 ft of #4 cu poly covered wire and the poly covered wire must be connected to the recloser leads with hot line clamps. The hot line clamps must be installed 36" away from the base of recloser or any exposed component.
   To installed the viper recloser on un–grounded delta system, the lightning arresters rated 24.4kV MCOV pre–installed on the viper recloser by factory must be removed and replaced with 29kV MCOV arrester (stock #10 01 252), and return the removed arresters (stock #10 01 148) back to store.
9. **If system neutral is present**, bond #2 Cu ground to the system neutral. **If system neutral is not present and a static/shield wire is present**, then bond the #2 Cu ground to the static/shield wire. **If system neutral and static wire are both present**, only bond the #2 Cu ground to the system neutral.

		Stnd. / Stk. No.	Description 10 34 50 **	03	04
	A	54 07 302	Disc., Switch, 900 A, 34 kV,	9	9
	B	**04 00 20 10**	Crossarm, Double 10 Ft.	2	2
	C	23 06 131	Bracket, Angle Mount, Bypass Switch	6	6
	E	18 51 019	Wire, #2 Cu Poly (Ft)	10	10
@	F	PG*	Clamp, Parallel Groove (See Std. **07 00 25 00**)	12	12
	G	18 51 022	Wire, 500 Cu, Poly (Ft.)	110	110
	H	**04 00 41 04**	Crossarm, Deadend, F/G, 10’	1	1
	J	25 56 076	Insulator, Guy Strain F/G 26”	2	2
	K	25 06 053	34kV Deadend Insulator	6	6
	L	23 59 095	Eyelet, ¾”	1	1
	M	23 65 018	Eyenut, ¾”	1	1
	N	DEC*W	Clamp, Deadend, DCS **07 00 20 00**	6	6
	P	69 10 235	Recloser, 35kV, 800 Amp (G&W) L Style (obsolete)		1
		69 10 248	Recloser, 35kV, 800 Amp (G&W) Z Style (standard)	1	
	Q	17 02 175	Hot Line Clamp, 500kcmil Cu Main/#4 Cu Tap	6	6
	R	17 51 234	Lug, 1 Bolt, #8 – 2/0 Cu.	6	6
8@	S	10 01 252	Lightning Arrester, 29kV MCOV (un–Grd Delta System)	6	6
	T	23 52 097	Bolt, Mach., 3/4” x 12”	2	2
	U	23 66 031	Washer, Curved, 3/4”	2	2
	V	**06 01 01 03**	Secondary Clevis and Insulator	1	1
	Y	23 64 001	Staple – for ⅜”Wx2”Lx0.44” Dia.	12	12
	CC	23 66 027	Washer, SQ, ⅝”	2	2
	DD	23 52 066	Bolt, Mach., 5/8” x 14”	2	2
9@	HH	**12 00 10 04**	Ground Unit, #2 Cu Poly, Ground Coil	1	1
		12 00 10 03	Ground Unit, #2 Cu Poly, Ground Rod	1	1
	II	17 54 373	Connector – PG, 2–2/0 Cu to Cu	8	8
	KK	54 17 486	Circuit Breaker, w/Riser 120V 20A	1	1
	LL	10 01 032	Secondary Surge Device	1	1

S&C INTELLIRUPTER RECLOSER



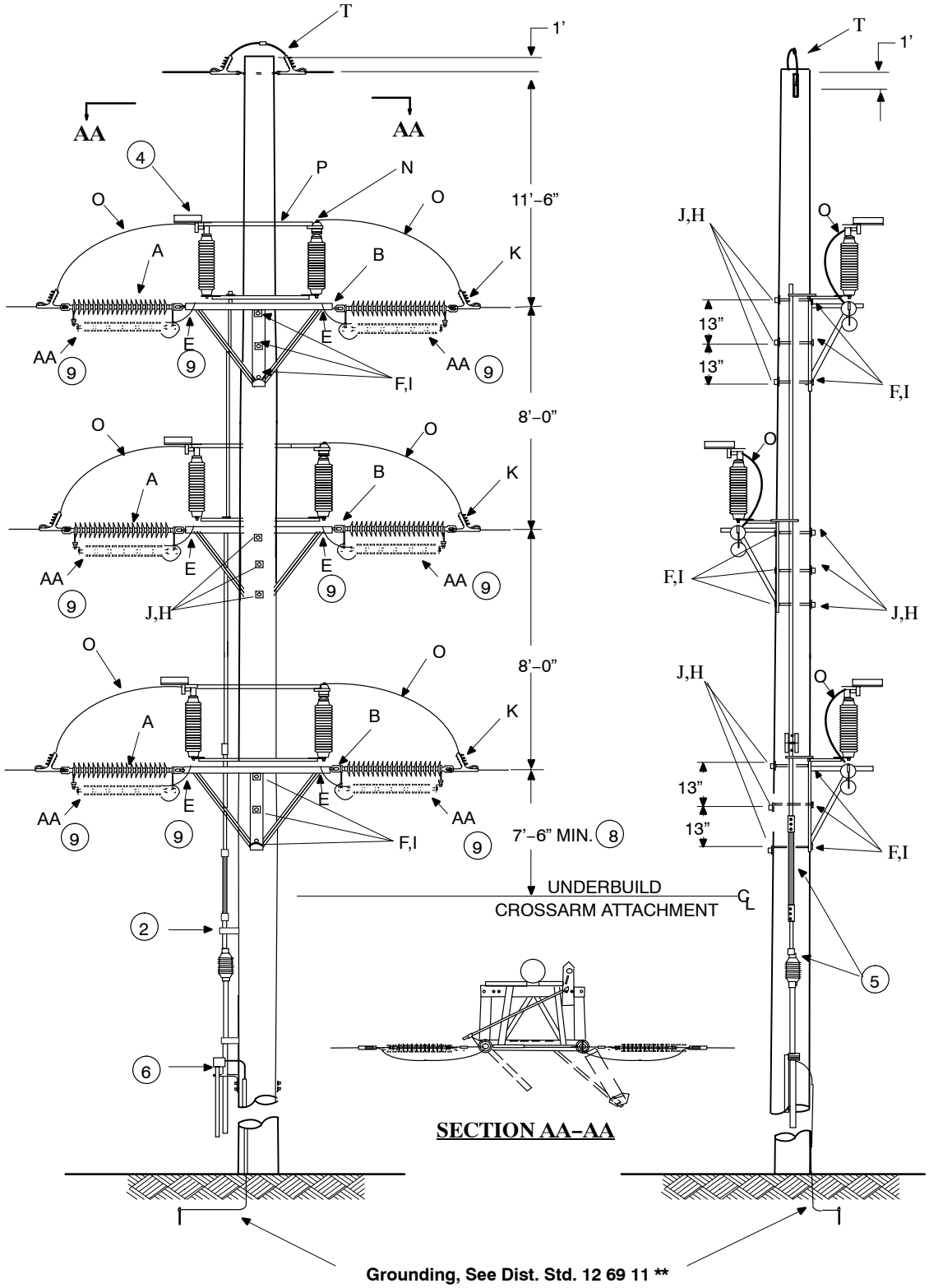


NOTES

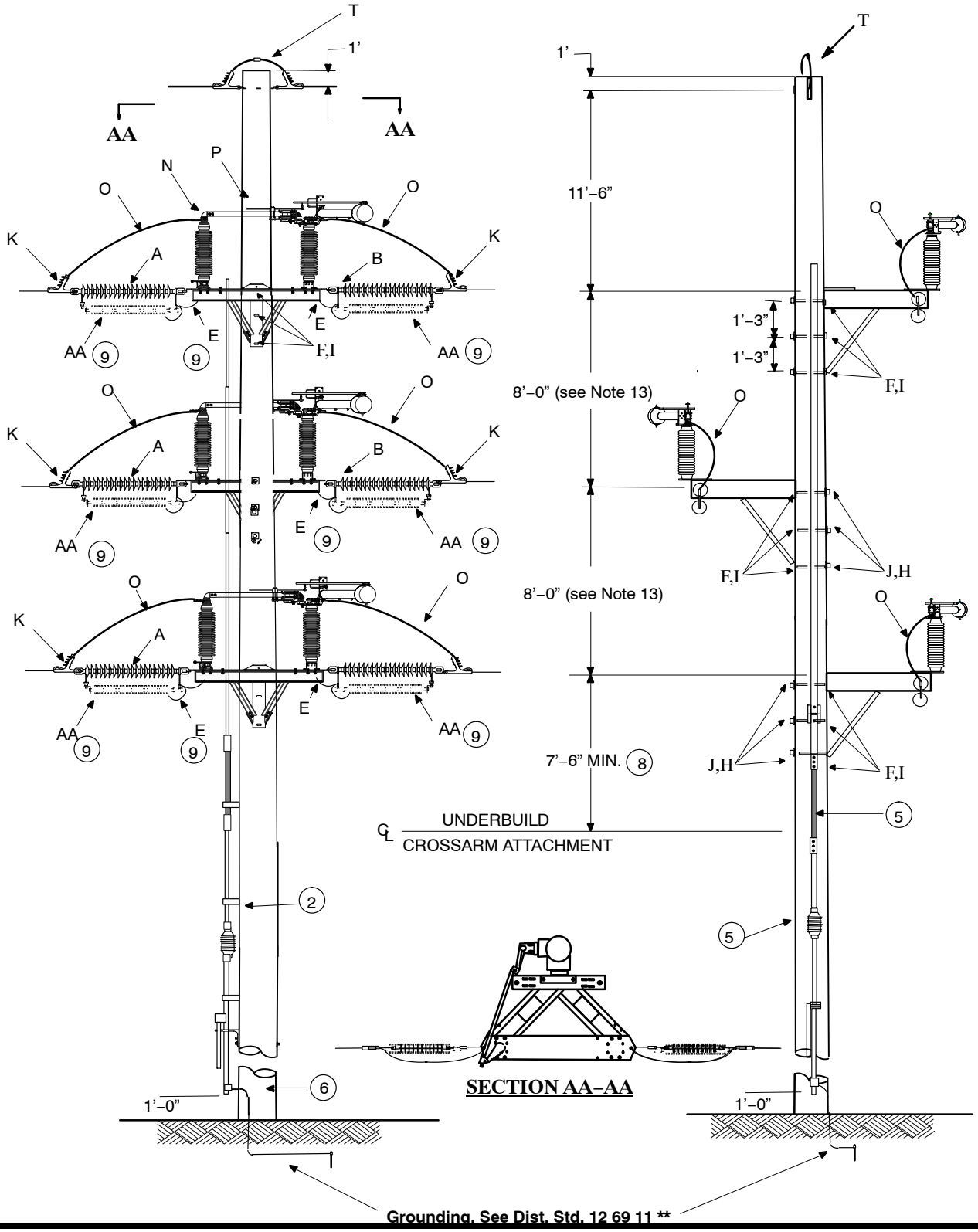
1. Intellirupter recloser frame must be connected to ground with #2 Cu. Pole ground to neutral connection must be #2 Cu.
2. If system neutral is present, bond #2 Cu ground to the system neutral is present. If system neutral is not present and a static/shield wire is present, then bond the #2 Cu ground to the static/shield wire. If system neutral and static wire are both present, only bond the #2 Cu ground to the system neutral.
3. Tool to removal / install radio module and control is 46 01 645.
4. Switch to open towards climbing side of pole.
5. Intellirupter Recloser weight is 900 lbs.
6. Use DCS **12 00 10 03** – ground rod and DCS **12 00 10 04** – ground coil installation on new pole installation.
7. **Only install the two inside bolts on the switch and slide them as close to the crossarm as possible.**
8. Make sure lifting bails are folded down before energizing.

		Stnd. / Stk. No.	Description 10 34 51 **	01
	A	54 07 302	Disc., Switch, 900 A, 34 kV,	9
	B	**04 00 20 10**	Crossarm, Double 10 Ft.	2
	E	18 51 019	Wire, #2 Cu Poly (Ft)	10
@	F	PG*	Clamp, Parallel Groove (See Std. **07 00 25 00**)	12
	G	18 51 022	Wire, 500 Cu, Poly (Ft.)	110
	H	**04 00 41 04**	Crossarm, Deadend, F/G, 10’	1
	J	25 56 076	Insulator, Guy Strain F/G 26”	2
	K	25 06 053	34kV Deadend Insulator	6
	L	23 59 095	Eyelet, ¾”	1
	M	23 65 018	Eyenut, ¾”	1
	N	DEC*W	Clamp, Deadend, DCS **07 00 20 00**	6
	P	69 10 247	Recloser, 35kV, 800 Amp S&C IntelliRupter	1
	Q	17 54 177	Connector, Cable to Flat 1/0 to 500 kcmil, Spade Type, Bronze	18
	S	23 52 097	Bolt, Mach., 3/4” x 12”	3
	T	23 66 031	Washer, Curved, 3/4”	2
	U	23 66 135	Washer Lock DBL, Coil, ¾”	2
	W	23 52 441	Bolt, Carriage, Galvanized	18
	X	21 75 735	Washer, ⅜”	18
	Y	23 65 057	Nut, Lock, ⅜”	18
	Z	23 66 131	Washer, SQ, ¾”	2
@	HH	**12 00 10 04**	Ground Unit, #2 Cu Poly, Ground Coil	1
		12 00 10 03	Ground Unit, #2 Cu Poly, Ground Rod	1
	II	17 54 373	Connector – PG, 2–2/0 Cu to Cu	1

Turner Switch 69kV 1200A Loadbreak Interrupters 10 69 05 01
Turner Switch 69kV 1200A without Loadbreak Interrupters 10 69 05 02



SEECO Switch 69kV 1200A Load Interrupters 10 69 05 03
SEECO Switch 69kV 1200A without Load Interrupters 10 69 05 04



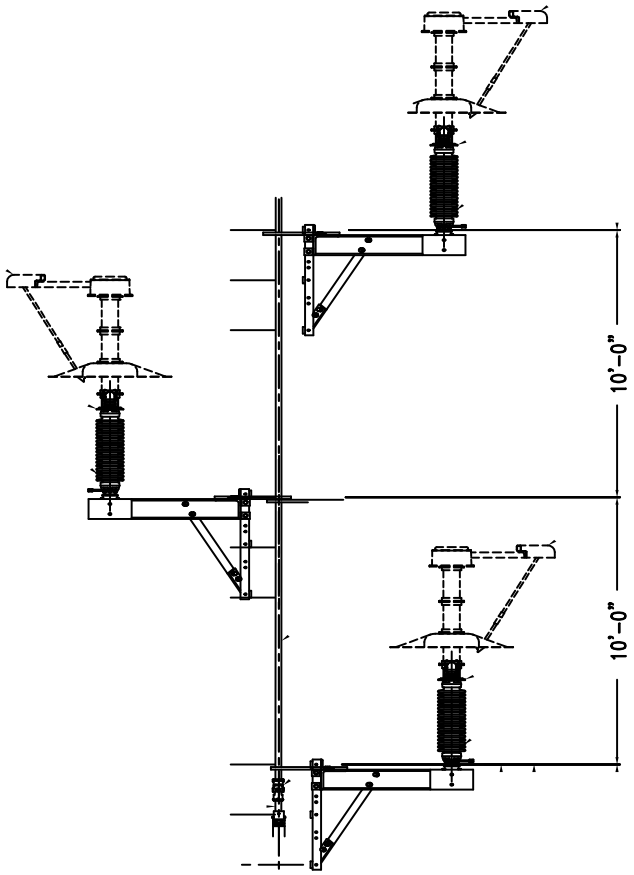
NOTES

1. See DCS **06 00 11**** for shield wire details.
2. Evenly space pipe guides 10'–0" to 15'–0" apart.
3. Each phase of the group operated switch with insulators and interrupting devices weighs approximately 600 pounds.
4. Switch can be equipped with or without loadbreak interrupting devices.
5. For switch pole grounding, operating rod insulators and ground mat requirement and installation, refer to DCS **10 34 01 01**.
6. The switch operating handle must be grounded to a driven ground rod or a field formed ground electrode, refer to DCS **12 69 11****.
7. If motor operator is required, see Dist. Std. **10 69 10 ****
8. The space may be decreased if distribution conductor is T–2.
9. Arresters are used for normally open switches, or switches with sensor devices which may be susceptible to lightning. The line arrester is suspended from the compressed–on end fittings of the polymer deadend insulator and supported by aluminum hot line clamps. The disconnector coupling assembly detaches the line end of the arrestor should the arrestor fail and will cause the arrester to pivot and drop down into a vertical position which makes the failed arrester much more visible. The disconnect coupling assembly with a 3/8" threaded stud that can be inserted into the tap lead eyebolt of the hot line clamp on the line end and an eyebolt with 3/8" stud that can be inserted into the tap lead eyebolt of the hot line clamp on the ground end. One of the tinned copper leads (on the left (pole end) of the assembly) is to shunt the clevis–eye connection to eliminate radio noise. The longer tinned copper lead is for connection to a pole ground wire or a metal switch based with line clamp (stk no. 23 78 394) connected the line end on a stainless bolt (stk no. 21 56 433, 21 75 106 (hex nut), and 21 61 142 (washer)), which is bolted on the switch base.

   Notes (as suggestion):

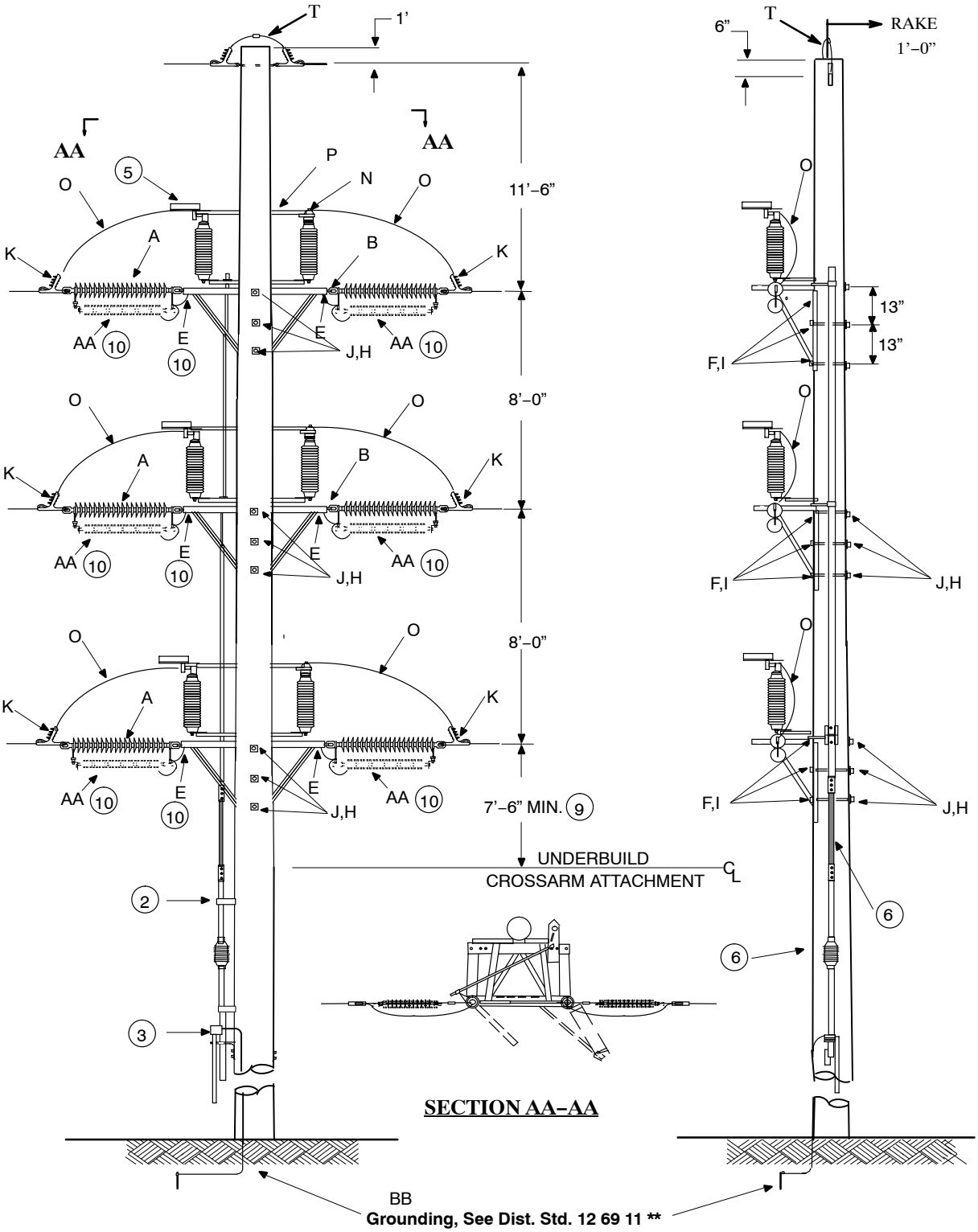
   1. Use some Loctite on the threads of the 3/8" bolts to keep bolts from coming loose and also use a 3/8" carriage head bolt through the hot line clamp eyebolt which would keep the assembly from falling if the hot line clamp tap lead eyebolt should loosen.
   2. The arrester assembly will not work with porcelain deadend bells.
   3. If space is limited on the switch pole but available on adjacent pole, install the arresters on the adjacent pole.
10. Install padlock on handle to prevent switch operation by the public.
11. Train phase conductor thru DE clamp and terminate with compression lug to attach to switch terminal.
12. Where to mount switch's number plate is based on your local description.
13. For maintaining 8ft spacing, the interrupter must be side mount to the insulator as shown from the standards; otherwise the spacing has to be 10ft for stacked mount of the interrupter, as page 4 shown. We are no longer purchase the stacked mount interrupter but still maintaining. The stacked mount interrupter can be replaced with the side mount interrupter.

Note 13. If Interrupter is stacked on the insulator, the spacing must be 10 ft in between phases.

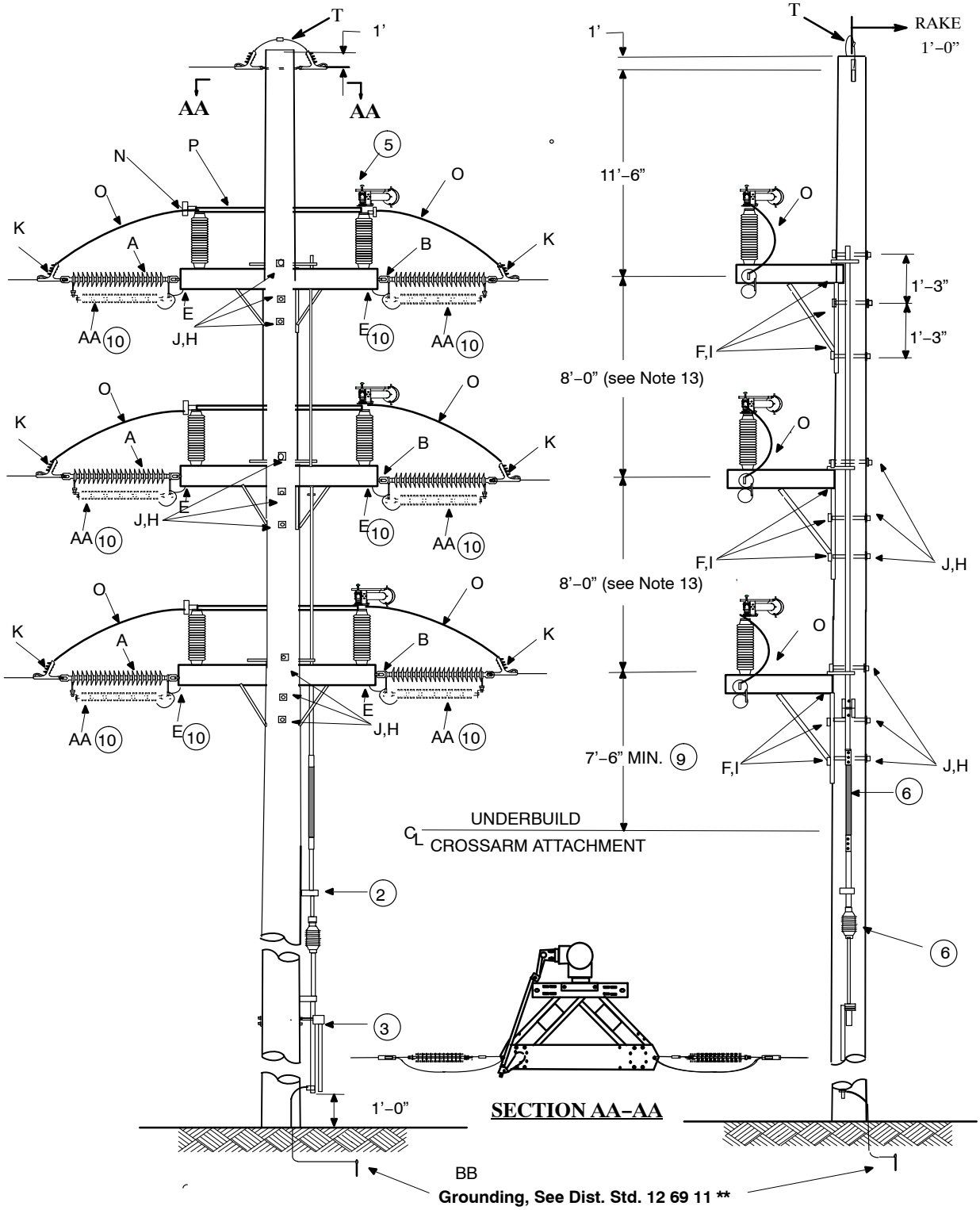


		Stnd. / Stk. No.	Description 10 69 05 **	01	02	03	04
@		Contact Dist. Engr.	Composite or Steel Pole	1	1	1	1
	A	25 06 113	Insulator, Polymer, Suspension, Wye Clevis– Oval Eye, 42”L (nominal)	6	6	6	6
	B	23 68 440	Shackle, Anchor, 3/4” Pin, 1–1/16” opening, Galv.	12	12	12	12
9@	E	17 51 032	Clamp, Parallel Groove, #6AWG–1/0 AWG AL	6	6	6	6
@	F	23 52	Bolt, Mach., Galv., 3/4” Sq. Head/Sq. Nut, length as required	9	9	9	9
	H	23 65 042	Nut, Lock, MF, Galv., 3/4”	9	9	9	9
	I	23 66 131	Washer, Sq. Flat, Galv., 3/4”	9	9	9	9
	J	23 66 031	Washer, Sq. Curved, Galv., for 3/4” Bolt	11	11	11	11
@	K	DEC*W	Clamp, Deadend (wire type and size required), DCS 07 00 17 00	6	6	6	6
	N	CL*W	Lug, Compr. Terminal, AL, DCS **07 00 30 00**	12	12	12	12
11@	O	LW&W	Wire, Bare, DCS **07 00 01 01**	As Req.	As Req.	As Req.	As Req.
6	P	54 09 395	Turner CS2 Switch, 69kV, 1200 Amp., Pole Mounted, Side Break w/Interrupter	1			
		54 09 393	Turner CS2 Switch, 69kV, 1200 Amp., Pole Mounted, Side Break w/o Interrupter		1		
		54 09 035	SEECO Switch, 69kV, 1200 Amp., Pole Mounted, Side Break w/Interrupter			1	
		54 09 369	SEECO Switch, 69kV, 1200 Amp., Pole Mounted, Side Break w/o Interrupter				1
	Q	22 13 099	Lock, Switch, 7/8” vertical opening	1	1	1	1
12	R	16 01 229	Plate, Number & Caution Sign, Alum.	1	1	1	1
	T	06 00 11 09	Deadend Looparound, Static Wire	1	1	1	1
9@	AA	10 01 236	Arrester, Line Protection, 60kV Rated, 48kV MCOV	6	6	6	6
@	BB	**12 69 11****	Grounding Unit	1	1	1	1

Turner Switch 69kV 1200A Load Interrupters 10 69 07 01
Turner Switch 69kV 1200A without Load Interrupters 10 69 07 02



SEECO Switch 69kV 1200A Loadbreak Interrupters 10 69 07 03
SEECO Switch 69kV 1200A without Loadbreak Interrupters 10 69 07 04



NOTES

1. See DCS **06 00 11**** for shield wire details.
2. Evenly space pipe guides 10'–0" to 15'–0" apart.
3. Install padlock on handle to prevent switch operation by the public.
4. Each phase of the group operated switch with insulators and interrupting devices weighs approximately 600 pounds.
5. Switch can be equipped with or without loadbreak interrupting devices.
6. For switch pole grounding, operating rod insulators and ground mat requirement and installation, refer to DCS **10 34 01 01**.
7. The switch operating handle must be grounded to a driven ground rod or a field formed ground electrode. Refer to DCS **12 69 11****.
8. If motor operator is required, refer to DCS **10 69 10 ****
9. The space may be decreased if distribution conductor is T–2.
10. Arresters are used for normally open switches, or switches with sensor devices which may be susceptible to lightning. The line arrester is suspended from the compressed–on end fittings of the polymer deadend insulator and supported by aluminum hot line clamps. The disconnector coupling assembly detaches the line end of the arrestor should the arrestor fail and will cause the arrester to pivot and drop down into a vertical position which makes the failed arrester much more visible. The disconnect coupling assembly with a 3/8" threaded stud that can be inserted into the tap lead eyebolt of the hot line clamp on the line end and an eyebolt with 3/8" stud that can be inserted into the tap lead eyebolt of the hot line clamp on the ground end. One of the tinned copper leads (on the left (pole end) of the assembly) is to shunt the clevis–eye connection to eliminate radio noise. The longer tinned copper lead is for connection to a pole ground wire or a metal switch based with line clamp (stk no. 23 78 394) connected the line end on a stainless bolt (stk no. 21 56 433, 21 75 106 (hex nut), and 21 61 142 (washer)), which is bolted on the switch base.

    Notes (as suggestion):

    1. Use some Loctite on the threads of the 3/8" bolts to keep bolts from coming loose and also use a 3/8" carriage head bolt through the hot line clamp eyebolt which would keep the assembly from falling if the hot line clamp tap lead eyebolt should loosen.
    2. The arrester assembly will not work with porcelain deadend bells.
    3. If space is limited on the switch pole but available on adjacent pole, install the arresters on the adjacent pole.
11. Train phase conductors thru DE clamp and terminate with compression lugs to attach to switch terminals.
12. Where to mount switch's number plate is based on your local description.
13. For maintaining 8ft spacing, the interrupter must be side mount to the insulator as shown from the standards; otherwise the spacing has to be 10ft for stacked mount of the interrupter, as page 4 shown. We are no longer purchase the stacked mount interrupter but still maintaining. The stacked mount interrupter can be replaced with the side mount interrupter.

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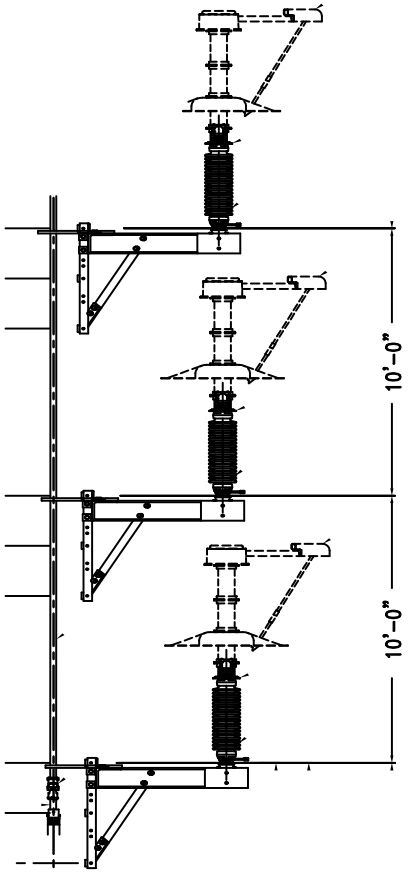
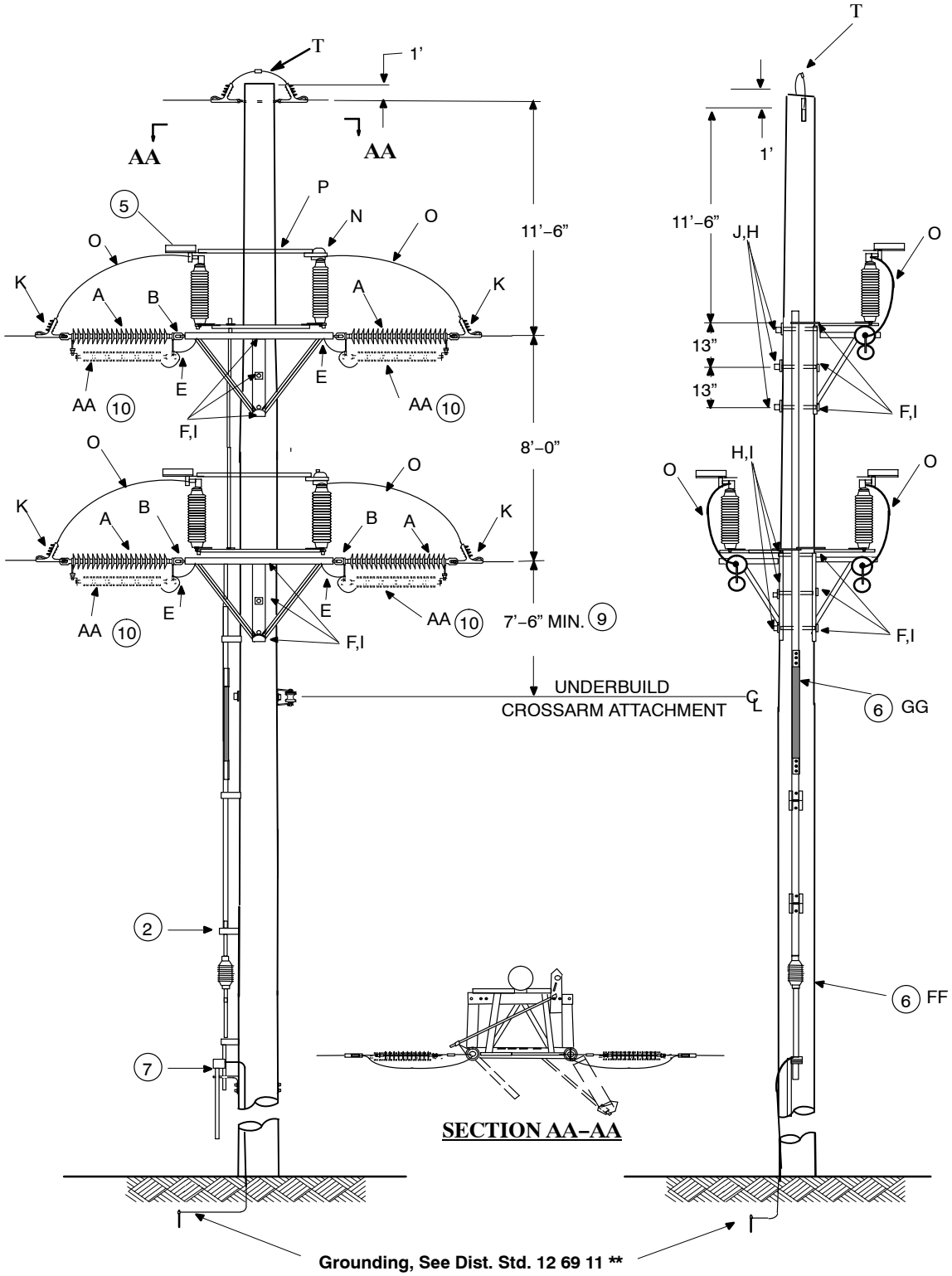
Note 13. If Interrupter is stacked on the insulator, the spacing must be 10 ft in between phases.

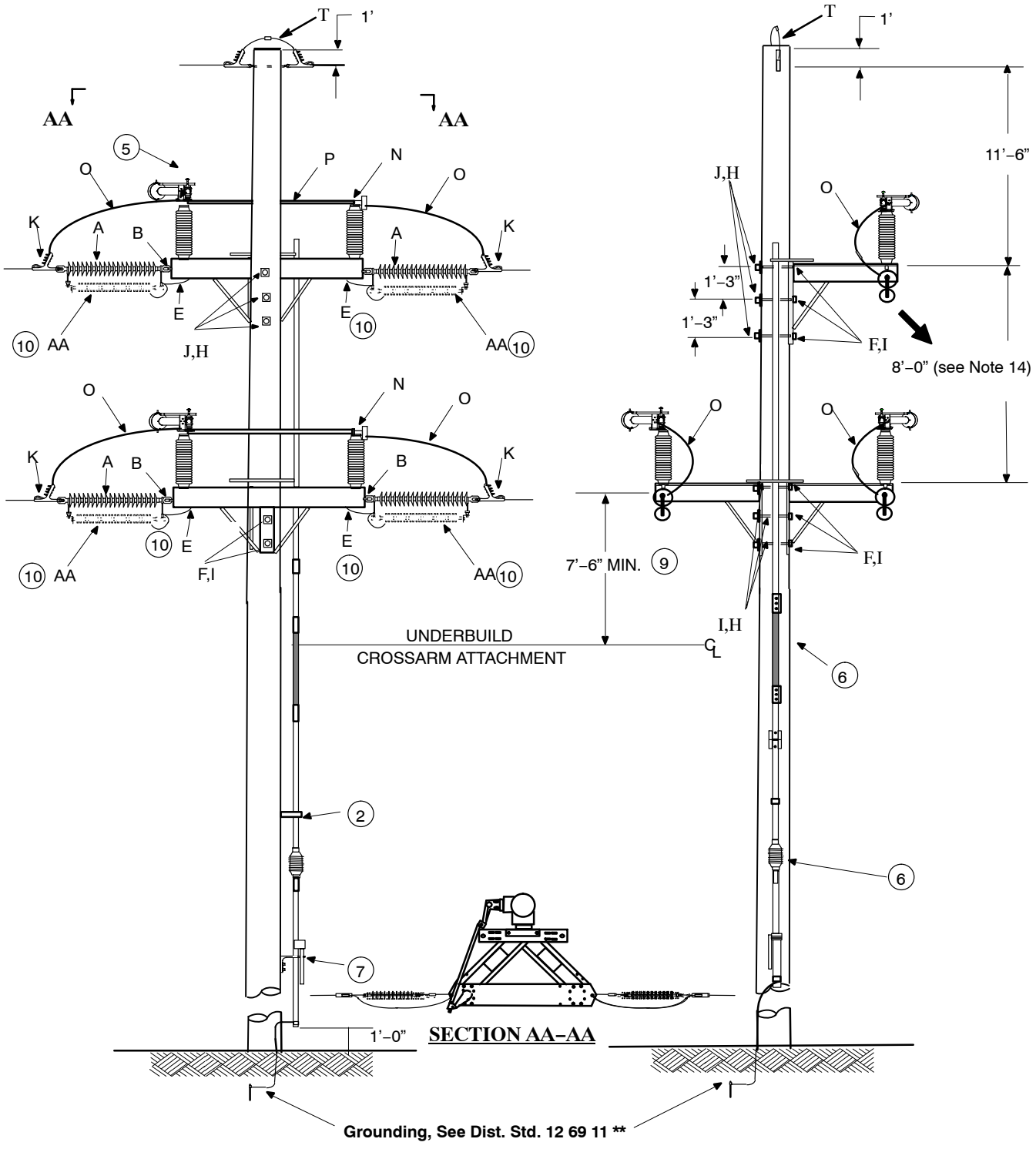


		Stnd. / Stk. No.	Description 10 69 07**	01	02	03	04
		Contact Dist. Eng.	Composite or Steel Pole	1	1	1	1
	A	25 06 113	Insulator, Polymer, Suspension, Wye Clevis–Oval Eye, 42" L (nominal)	6	6	6	6
	B	23 68 440	Shackle, Anchor, 3/4" Pin, 1–1/16" Opening, Galv.	12	12	12	12
10@	E	17 51 032	Clamp, Parallel Groove, #6AWG–1/0 AWG AL	6	6	6	6
@	F	23 52 103	Bolt, Mach., Galv., 3/4" Sq. Head/Sq. Nut, 18" Length	9	9	9	9
	H	23 65 042	Nut, Lock, MF, Galv., 3/4"	9	9	9	9
	I	23 66 131	Washer, Sq. Flat, Galv., 3/4"	9	9	9	9
	J	23 66 031	Washer, Sq. Curved, Galv., for 3/4" Bolt	9	9	9	9
@	K	DEC*W	Clamp, Deadend (wire type and size required), DCS 07 00 17 00	6	6	6	6
@	N	CL*W	Lug, Compr. Terminal, Al., DCS **07 00 30 00**	6	6	6	6
11@	O	LW&W	Wire, Bare, DCS **07 00 01 01**	As Req.	As Req.	As Req.	As Req.
	P	54 09 394	Turner Switch, CS2 69kV, 1200 Amp., Pole Mounted, Vertical Mount, Side Break w/Interrupter	1			
		54 09 392	Turner Switch, CS2 69kV, 1200 Amp., Pole Mounted, Vertical Mount Side Break w/o Interrupter		1		
		54 09 370	SEECO Switch, 69kV, 1200 Amp., Pole Mounted, Vertical Mount, Side Break w/Interrupter			1	
		54 09 368	SEECO Switch, 69kV, 1200 Amp., Pole Mounted, Vertical Mount, Side Break w/o Interrupter				1
	Q	22 13 099	Lock, Switch, 7/8" Vertical Opening	1	1	1	1
12	R	16 01 229	Plate, Number & Caution Sign, Alum.	1	1	1	1
	T	**06 00 11 09**	Deadend – Looparound, Static Wire	1	1	1	1
10@	AA	10 01 236	Arrester, Line Protection, 60kV Rated, 48kV MCOV	6	6	6	6
	BB	**12 69 11 ****	Grounding Unit	1	1	1	1

Turner 69kV – 1200 Amp – Load Interrupter 10 69 09 01
Turner 69kV – 1200 Amp – without Load Interrupter 10 69 09 02



SEECO 69kV – 1200 Amp – Load Interrupters 10 69 09 03
SEECO 69kV – 1200 Amp – without Load Interrupters 10 69 09 04



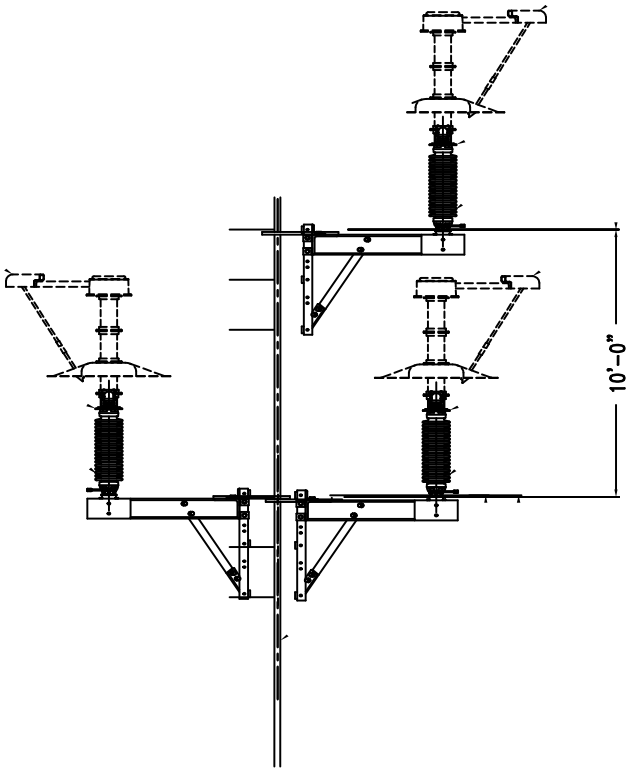
NOTES

1. Refer to DCS **06 00 11**** for shield wire details.
2. Evenly space pipe guides 10'–0" to 15'–0" apart.
3. Install padlock on handle to prevent switch operation by the public.
4. Each phase of the group operated switch with insulators and interrupting devices weighs approximately 600 pounds.
5. Switch can be equipped with or without loadbreak interrupting devices.
6. For switch pole grounding, operating rod insulators and ground mat requirement and installation, refer to DCS **10 34 01 01**.
7. The switch operating handle must be grounded to a driven ground rod or a field formed ground electrode, refer to **12 69 11**.**
8. If motor operator is required, refer to DCS **10 69 10 ****.
9. The space may be decreased if distribution conductor is T–2.
10. Arresters are used for normally open switches, or switches with sensor devices which may be susceptible to lightning. The line arrester is suspended from the compressed–on end fittings of the polymer deadend insulator and supported by aluminum hot line clamps. The disconnector coupling assembly detaches the line end of the arrestor should the arrestor fail and will cause the arrester to pivot and drop down into a vertical position which makes the failed arrester much more visible. The disconnect coupling assembly with a 3/8" threaded stud that can be inserted into the tap lead eyebolt of the hot line clamp on the line end and an eyebolt with 3/8" stud that can be inserted into the tap lead eyebolt of the hot line clamp on the ground end. One of the tinned copper leads (on the left (pole end) of the assembly) is to shunt the clevis–eye connection to eliminate radio noise. The longer tinned copper lead is for connection to a pole ground wire or a metal switch based with line clamp (stk no. 23 78 394) connected the line end on a stainless bolt (stk no. 21 56 433, 21 75 106 (hex nut), and 21 61 142 (washer)), which is bolted on the switch base.

    Notes (as suggestion):

    1. Use some Loctite on the threads of the 3/8" bolts to keep bolts from coming loose and also use a 3/8" carriage head bolt through the hot line clamp eyebolt which would keep the assembly from falling if the hot line clamp tap lead eyebolt should loosen.
    2. The arrester assembly will not work with porcelain deadend bells.
    3. If space is limited on the switch pole but available on adjacent pole, install the arresters on the adjacent pole.
11. Install padlock on handle to prevent switch operation by the public.
12. Train phase conductor thru DE clamp and terminate with compression lug to attach to switch terminal.
13. Where to mount switch's number plate is based on your local description.
14. For maintaining 8ft spacing, the interrupter must be side mount to the insulator as shown from the standards; otherwise the spacing has to be 10ft for stacked mount of the interrupter, as page 4 shown. We are no longer purchase the stacked mount interrupter but still maintaining. The stacked mount interrupter can be replaced with the side mount interrupter.

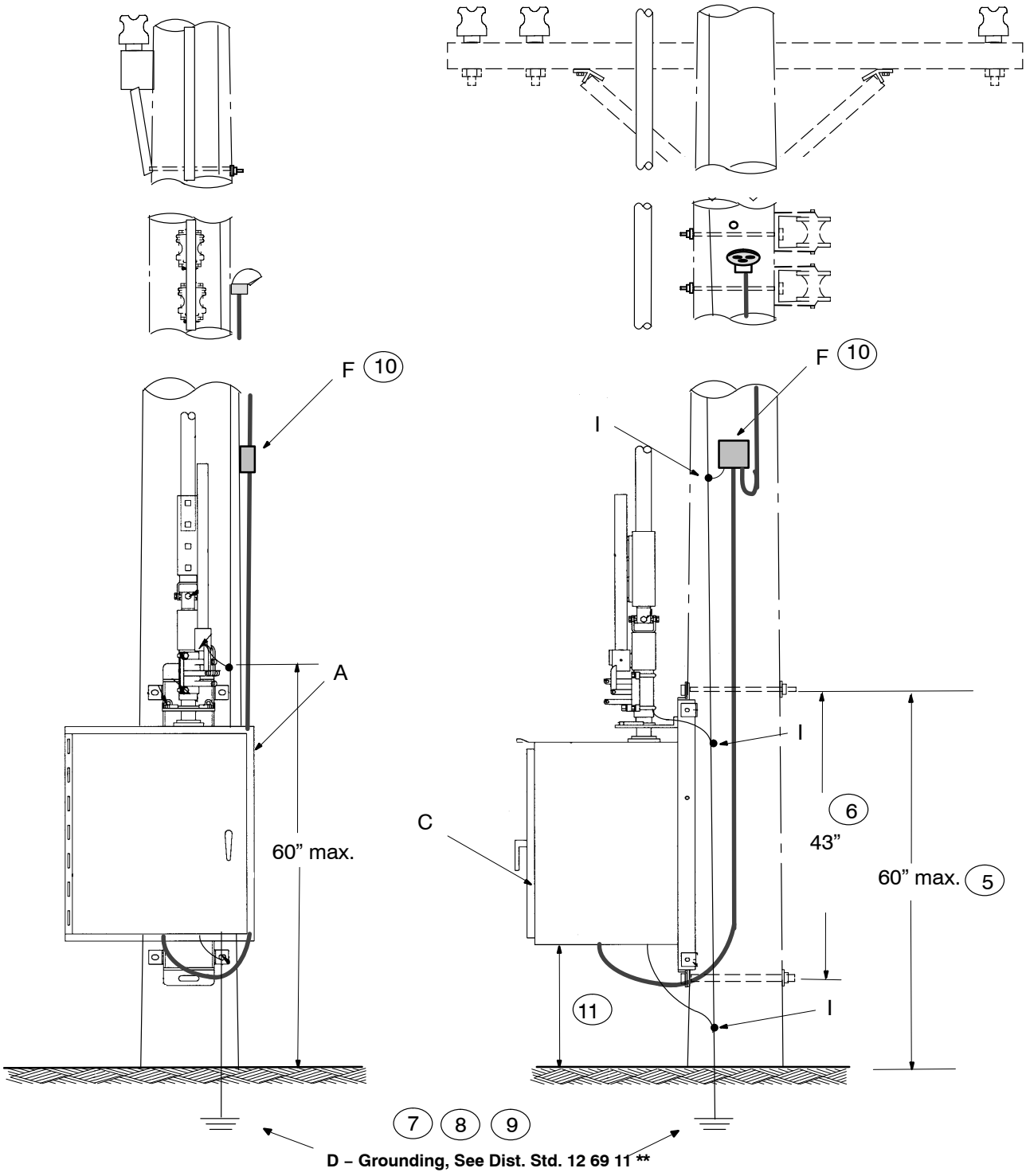
Note 14. If Interrupter is stacked on the insulator, the spacing must be 10 ft in between phases.



		Stnd. / Stk. No.	Description 10 69 09 **	01	02	03	04
@		Contact Dist. Engr.	Composite or Steel Pole	1	1	1	1
	A	25 06 113	Insulator, Polymer, Suspension, Wye Clevis–Oval Eye, 42” Long (nominal)	6	6	6	6
	B	23 68 440	Shackle, Anchor, 3/4” Pin, 1 1/16” opening, Galv.	12	12	12	12
10@	E	17 51 032	Clamp, Parallel Groove, #6AWG–1/0 AWG AL	6	6	6	6
	F	23 52 103	Bolt, Mach., Galv., 3/4” Sq. Head/Sq. Nut, 18” length	6	6	6	6
	H	23 65 042	Nut, Lock, MF, Galv., 3/4”	6	6	6	6
	I	23 66 131	Washer, Sq. Flat, Galv., 3/4”	9	9	9	9
	J	23 66 031	Washer, Sq. Curved, Galv., for 3/4” Bolt, 3”–3”	3	3	3	3
@	K	DEC*W	Clamp, Deadend (wire typed and size required), DCS 07 00 17 00	6	6	6	6
@	N	CL*W	Lug, Compr. Terminal, Al.. DCS **07 00 30 00**	12	12	12	12
12@	O	LW&W	Wire, Bare, DCS **07 00 01 01**	As Req.	As Req.	As Req.	As Req.
	P	54 09 395	Turner CS2 Switch, 69kV, 1200 Amp., Pole Mounted, Delta Mount, Side Break w/Interrupters	1			
		54 09 393	Turner CS2 Switch, 69kV, 1200 Amp., Pole Mounted, Delta Mount, Side Break w/o Interrupters		1		
		54 09 035	SEECO Switch, 69kV, 1200 Amp., Pole Mounted, Delta Mount, Side Mount w/Interrupters			1	
		54 09 369	SEECO Switch, 69kV, 1200 Amp., Pole Mounted, Delta Mount, w/o Interrupters				1
	Q	22 13 099	Lock, Switch, 7/8” Vertical Opening	1	1	1	1
13	R	16 01 229	Plate, Number & Caution Sign, Alum.	1	1	1	1
	T	**06 00 11 09**	Deadend – Looparound, Static Wire	1	1	1	1
10@	AA	10 01 236	Arrester, Line Protection, 60kV Rated, 48kV MCOV	6	6	6	6
	BB	**12 69 11****	Grounding Unit	1	1	1	1

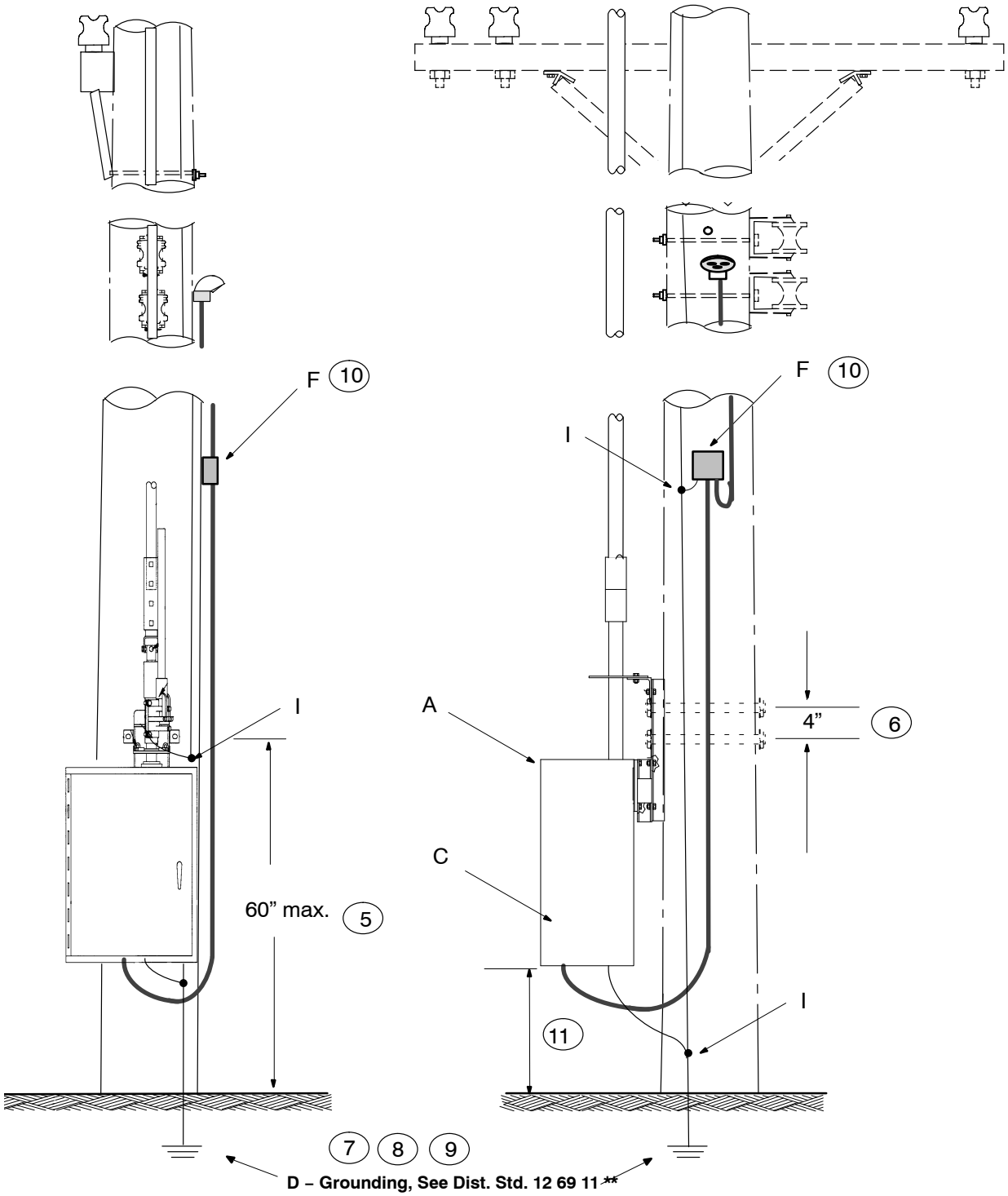
34 & 69kV – 1200 Amp – Turner Motor Operator

See Dist. Std. 10 34 ** ** for 34kV Switch Pole Installation
See Dist. Std. 10 69 ** ** for 69kV Switch Pole Installation



34 & 69kV – 1200 Amp – SEECO Motor Operator

See Dist. Std. 10 34 ** ** for 34kV Switch Pole Installation
See Dist. Std. 10 69 ** ** for 69kV Switch Pole Installation



Notes:

1. Stk no. 54 08 416 for Turner 34kV D Switch – DCS 10 69 10 01 – not for new switch installations
   Stk no. 54 08 430 for Turner 34kV TS2 and TSB and Turner 69kV CS2 and CSB Switch – DCS 10 69 10 04
   Stk no. 54 09 349 for Turner 69kV D switch –DCS 10 69 10 02 – not for new switch installations
   Stk no. 54 09 371 for SEECO's 34kV & 69kV switches – DCS 10 69 10 03

2. If a motor operator is to be installed on a new or existing switch, the switch should be completely and properly adjusted and operating satisfactorily prior to motor operator installation. If the motor operator is to be mounted on an existing switch, proper maintenance should be performed. (In Illinois, contact Distribution Automation to schedule adjustment and commissioning of motor operator and RTU.)

3. Pull fuses and/or open knife switches to disconnect power to the motor operator before working inside cabinet to avoid hazard of electric shock.

4. Use the aluminum support channel for lifting the motor operator.

5. Locate the required mounting heights for the motor operator. This would normally be at a height where an operating person can easily access the manual handle. Align operator power shaft with switch vertical operating pipe, with a level. Mount the motor operator securely to the switch structure or pole with through bolts and lag screws.

6. Each supplier of motor operator requires different mounting; see details of motor operator installation furnished with each motor operator.

7. If motor operator is mounted on wood pole:
   a. A #2 cu pole ground wire is required for grounding of motor operator cabinet, static wire, circuit breaker box and switch handle.
   b. Operating rod insulators between circuits are required, See DCS **10 34 01 01**.
   c. A ground mat is required, See DCS **12 69 11 01**.
   d. The motor operator cabinet and switch operating handle must be grounded to the driven ground rod or a field formed ground electrode with a #2 cu wire, See **12 69 11****.

8. If motor operator is mounted on steel pole:
   a. A pole ground wire is not required but there must be provisions (Rivnuts) for grounding a shield wire, a primary system neutral (if present), a motor operator cabinet, circuit breaker box and the base of the pole.
   b. The motor operator cabinet must be grounded to the pole ground wire.
   c. Operating rod insulators, TR–210 porcelain operating rod insulator, stock #25 09 045 and 8 ft. fiberglass insulator, stock #54 08 324 shall be eliminated on a steel pole which come with the switch, and both items should be put back in the stock with stock # as assigned.
   d. The operating handle shall be grounded to a driven ground rod or a field formed ground electrode with a #2 cu.
   e. A ground mat is required. See DCS **12 69 11 02**.

9. If motor operator is mounted on composite pole:
   a. The #2 cu pole ground wire comes with the pole must be bonded to the grounding electrode at the base of the pole, motor operator, circuit breaker box and shield wire, and a primary system neutral (if present).
   b. Operating rod insulators between circuits are required, See DCS 10 34 01 01.
   c. The operating handle shall be grounded to a driven ground rod or a field formed ground electrode with a #2 cu wire.
   d. A ground mat is required. See DCS **12 69 11 03**.

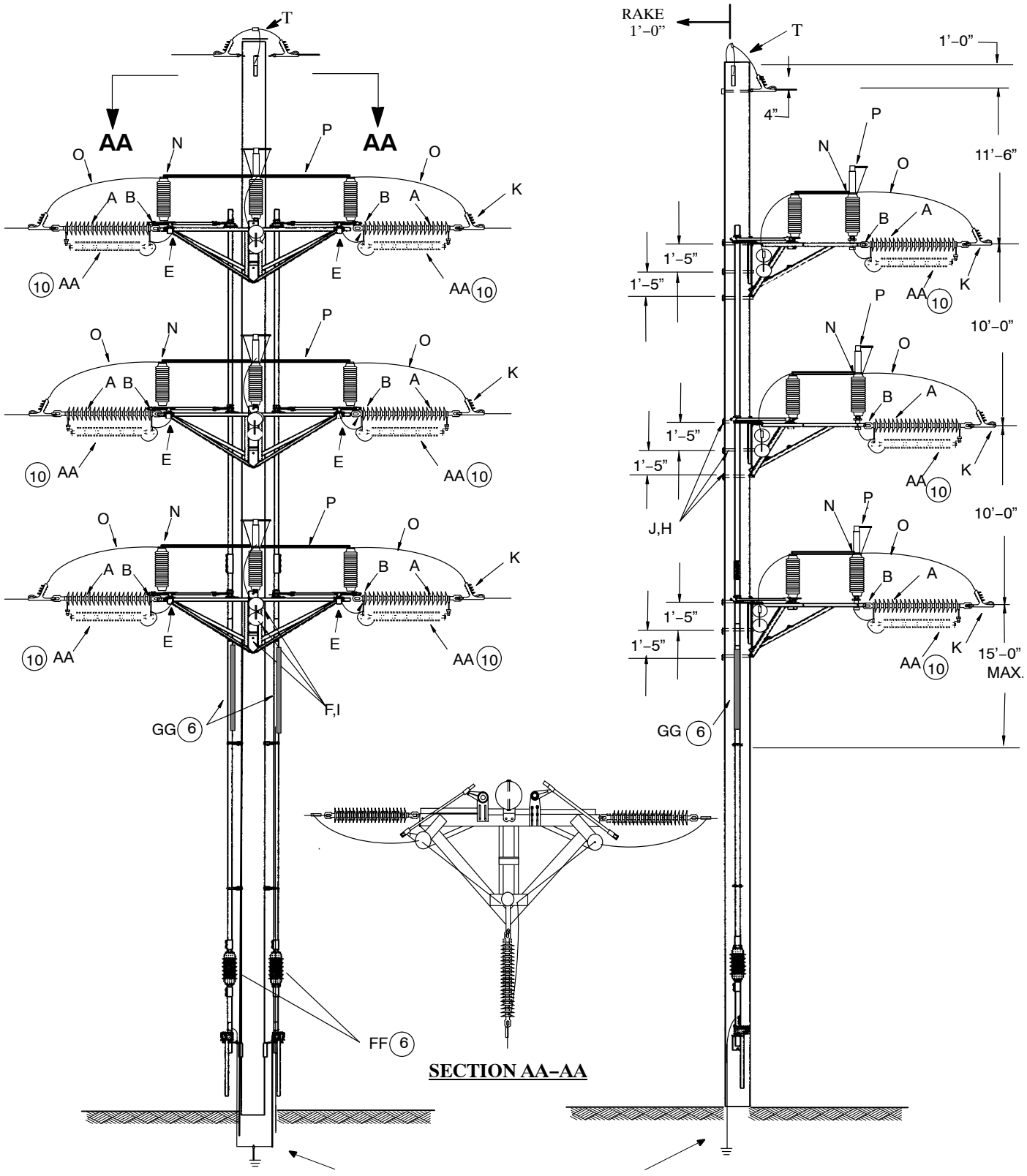
10. Attach secondary breaker box to pole and route black, white and green wires in 10' of ½" liquid–tight conduit to controller and route black and white wires in 20' of ¾" liquid–tight conduit to the weatherhead.

11. If the bottom of cabinet is mounted at 12" or less above ground line, a protective barrier should be considered by spreading some rocks under the cabinet and around pole to prevent physical damage from mowing equipment.

12. If antenna installation is required in supply space, see **25 90 00 00** for clearance requirement. If antenna installation is required in communications zone, see **29 00 17 11** for clearance requirement.

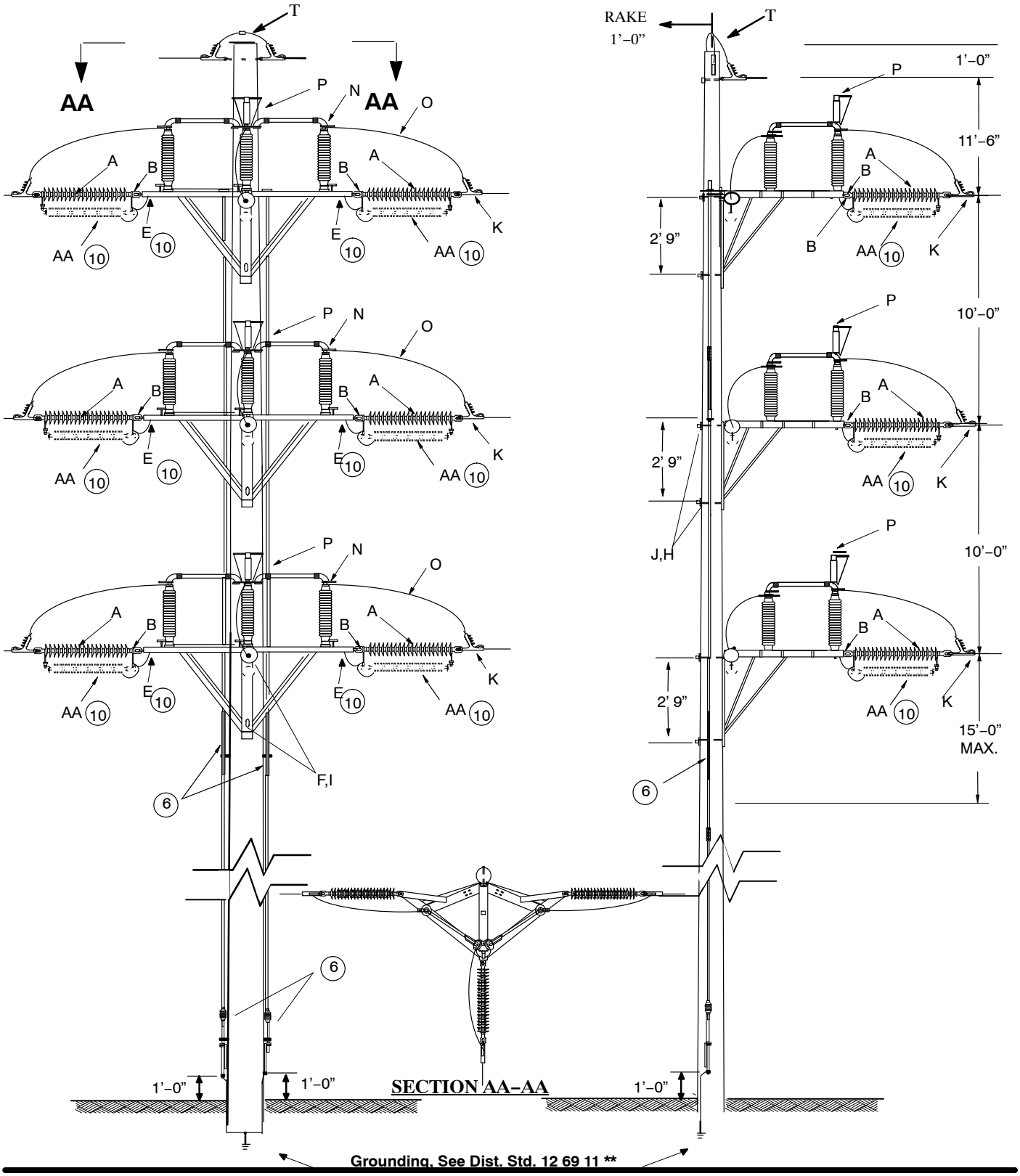
		Stnd. / Stk. No.	Description 10 69 10 **	01	02	03	04
1	A	54 08 416	Motor Operator for Turner D 34kV Switch	1			
		54 08 430	Motor Op. for Turner TSB or TS2 34kV and 69kV Switch				1
		54 09 349	Motor Operator for Turner D 69kV Switch		1		
		54 09 371	Motor Operator for SEECO 34kV or 69kV Switch			1	
@	C	54 02 011	GE iBox	1	1	1	1
		54 02 031	NovaTech Orion	1	1	1	1
7,8,9@	D	**12 69 11 ****	Grounding Unit	1	1	1	1
	F	54 17 486	Circuit Breaker Box, 120V, 15A w/10' of ½" and 20' of ¾" Liquidtight Conduit	1	1	1	1
	G	23 52 070	Bolt, Mach., 5/8" x 20"	2	2	2	2
	H	23 66 027	Washer, Flat, ⅝"	2	2	2	2
	I	17 54 373	Connector, Split Bolt, Bronze (range #14str – #2str)	3	3	3	3

Turner 69kV – 1200 Amp – Loadbreak Interrupters 10 69 20 01
Turner 69kV – 1200 Amp – without Loadbreak Interrupters 10 69 20 02



Grounding, See Dist. Std. 12 69 11 **

SEECO Switch 69kV – 1200 Amp – Loadbreak Interrupters 10 69 20 03
SEECO Switch 69kV – 1200 Amp – without Loadbreak Interrupters 10 69 20 04



Grounding, See Dist. Std. 12 69 11 **

		Stnd. / Stk. No.	Description 10 69 05 **	01	02	03	04
@		Contact Dist. Eng.	Composite or Steel Pole	1	1	1	1
	A	25 06 113	Insulator, Polymer, Suspension, Wye Clevis– Oval Eye, 42”L (nominal)	9	9	9	9
	B	23 68 440	Shackle, Anchor, 3/4” Pin, 1–1/16” opening, Galv.	18	18	18	18
10@	E	17 51 032	Clamp, Parallel Groove, #6AWG–1/0 AWG AL	6	6	6	6
	F	23 52 103	Bolt, Mach., Galv., 3/4” Sq. Head/Sq. Nut, 18” Length	9	9	9	9
	H	23 65 042	Nut, Lock, MF, Galv., 3/4”	9	9	9	9
	I	23 66 131	Washer, Sq. Flat, Galv., 3/4”	9	9	9	9
	J	23 66 031	Washer, Sq. Curved, Galv., for 3/4” Bolt	9	9	9	9
@	K	DEC*W	Clamp, Deadend (wire type and size required)	9	9	9	9
	N	CL*W	Lug, Compr. Terminal, AL, DCS **07 00 30 00**	12	12	12	12
11@	O	LW *W	Wire, Bare, DCS **07 00 01 01**	As Req.	As Req.	As Req.	As Req.
	P	Special Order Item	Turner CSB Switch, 69kV, 1200 Amp., LBRK 2–Way	1			
		Special Order Item	Turner CSB Switch, 69kV, 1200 Amp., Non LBRK 2–Way		1		
		Special Order Item	SEECO Switch, 69kV, 1200 Amp., LBRK 2–Way			1	
		Special Order Item	SEECO Switch, 69kV, 1200 Amp., Non LBRK 2–Way				1
	Q	22 13 099	Lock, Switch, 7/8” vertical opening	3	3	3	3
9	R	16 01 229	Plate, Number & Caution Sign, Alum.	3	3	3	3
10@	AA	10 01 236	Arrester, Line Protection, 60kV Rated, 48kV MCOV	As Req.	As Req.	As Req.	As Req.
@	T	**06 00 11 ****	Deadend – Looparound, Static Wire	1	1	1	1
@	AAA	**12 69 11 ****	Grounding Unit	1	1	1	1

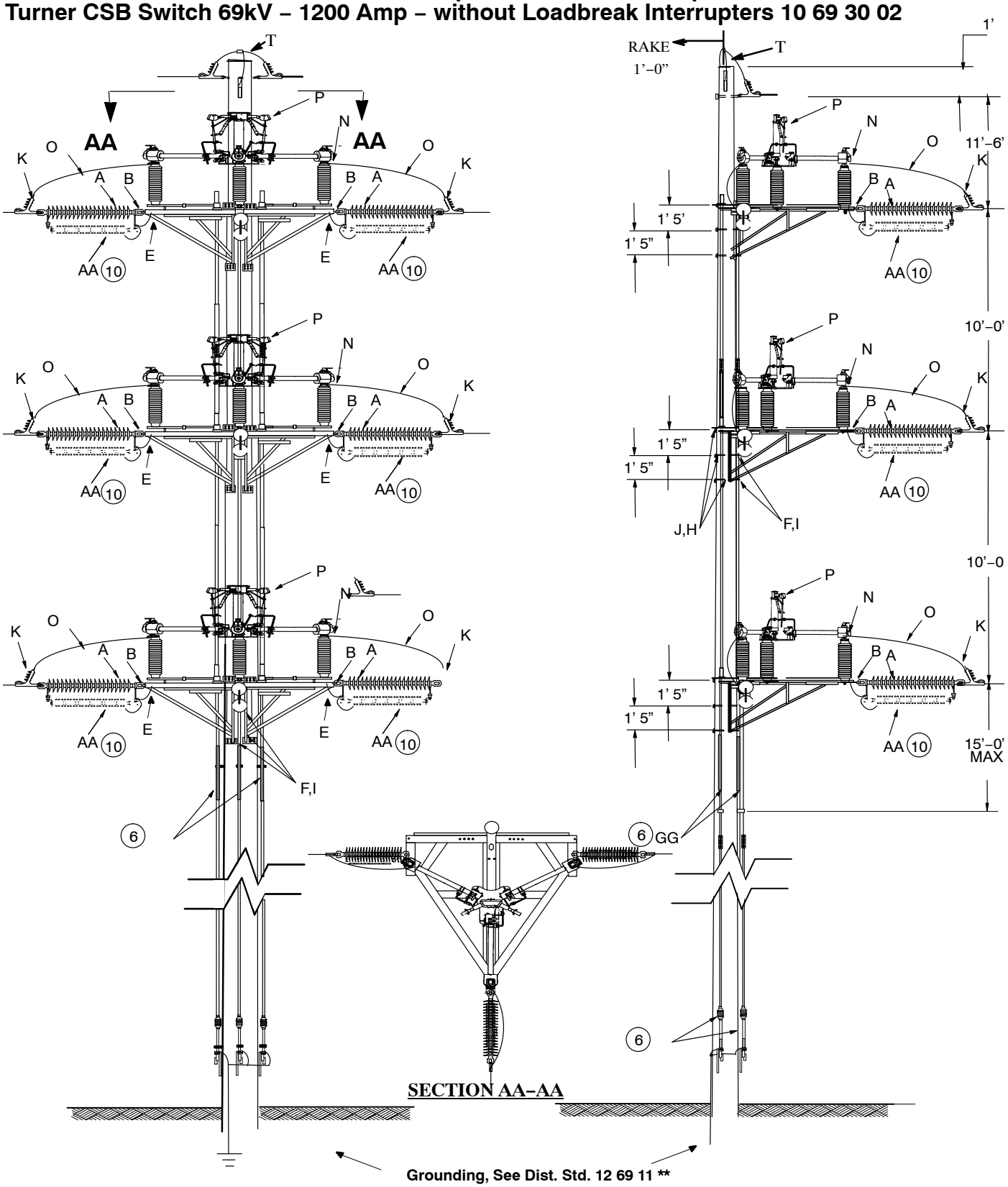
NOTES:

1. See Dist. Std. **06 00 11**** for shield wire details
2. Evenly space pipe guides 10'–0" to 15'–0" apart
3. Refer to DCS **12 69 11 **** for grounding switch pole. The switch handle must be grounded to a driven ground rod or a field formed ground electrode.
4. Switch weight must be considered when determining pole class. Each switch with insulators and interrupting devices weights approximately 2109 Pounds.
5. Switch can be equipped with or without load interrupting devices.
6. Switch pole grounding, operating rod insulators and ground mat requirement and installation, refer to DCS **10 34 01 01**.
7. If motor operator is to be installed, See Dist. Std. **10 00 01 01** & **10 69 10 ****.
8. The space shall be increased 7'–6" when distribution conductor is not T–2.
9. Where to mount switch's number plate is based on your local description
10. Arresters are used for normally open switches, or switches with sensor devices which may be susceptible to lightning. The line arrester is suspended from the compressed–on end fittings of the polymer deadend insulator and supported by aluminum hot line clamps. The disconnector coupling assembly detaches the line end of the arrestor should the arrestor fail and will cause the arrester to pivot and drop down into a vertical position which makes the failed arrester much more visible. The disconnect coupling assembly with a 3/8" threaded stud that can be inserted into the tap lead eyebolt of the hot line clamp on the line end and an eyebolt with 3/8" stud that can be inserted into the tap lead eyebolt of the hot line clamp on the ground end. One of the tinned copper leads (on the left (pole end) of the assembly) is to shunt the clevis–eye connection to eliminate radio noise. The longer tinned copper lead is for connection to a pole ground wire or a metal switch based with line clamp (stk no. 23 78 394) connected the line end on a stainless bolt (stk no. 21 56 433, 21 75 106 (hex nut), and 21 61 142 (washer)), which is bolted on the switch base.

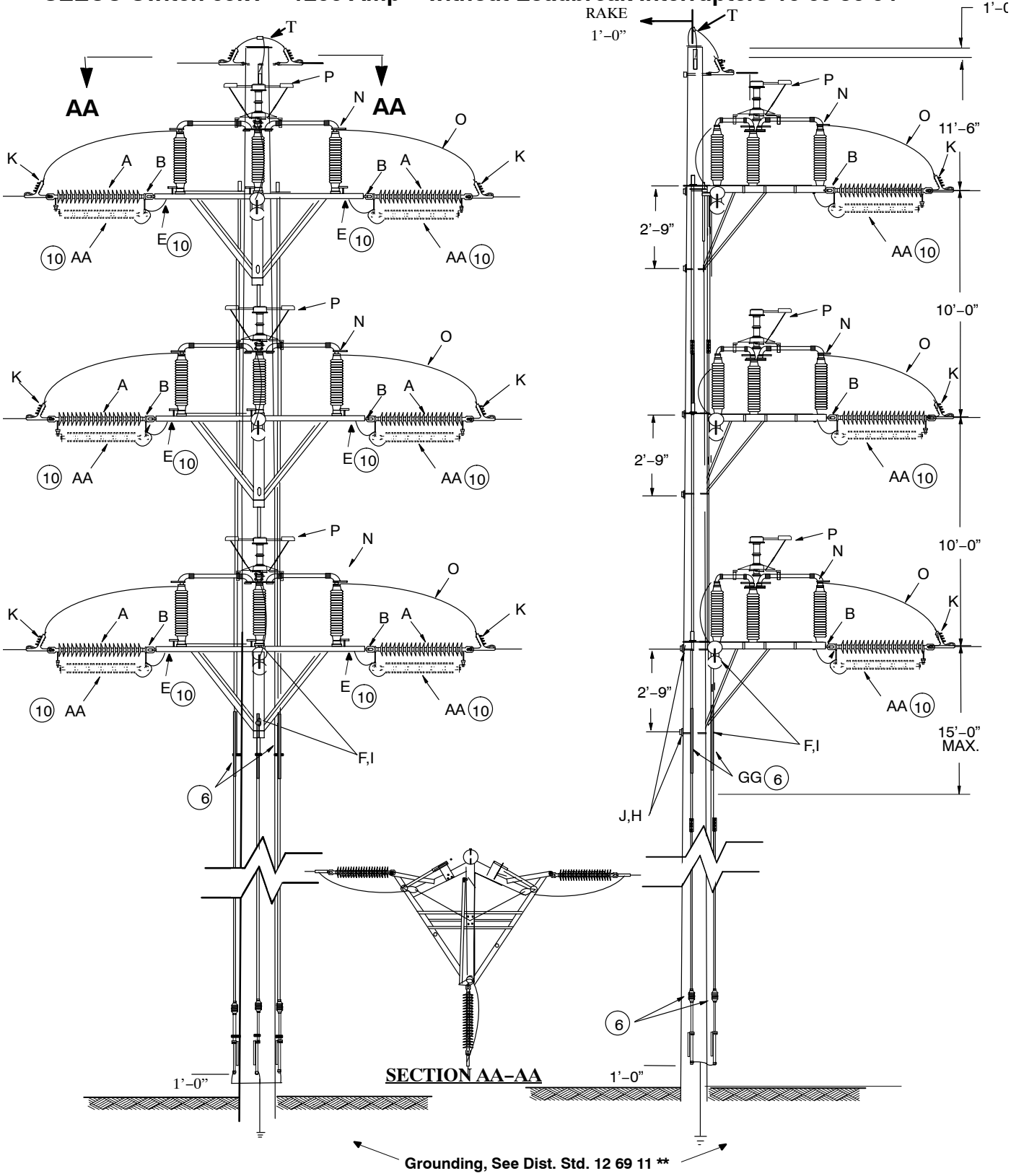
    Notes (as suggestion):

    1. Use some Loctite on the threads of the 3/8" bolts to keep bolts from coming loose and also use a 3/8" carriage head bolt through the hot line clamp eyebolt which would keep the assembly from falling if the hot line clamp tap lead eyebolt should loosen.
    2. The arrester assembly will not work with porcelain deadend bells.
    3. If space is limited on the switch pole but available on adjacent pole, install the arresters on the adjacent pole.
11. Train phase conductors thru DE clamp and terminate with compression lugs to attach to switch terminals.
12. If pull offs from switch frame other than 0°, 90°, or 180°, precaution must be taken to avoid torque to the switch frame out of alignment.
13. The operating rod insulator (8 ft. interphase fiberglass insulator for isolating 69 kV from underbuilt circuits and one TR210 porcelain station post insulators for isolating underbuilt circuits from the switch operating handle) can be eliminated for a steel pole.

Turner CSB Switch 69kV – 1200 Amp – Loadbreak Interrupters 10 69 30 01
Turner CSB Switch 69kV – 1200 Amp – without Loadbreak Interrupters 10 69 30 02



SEECO Switch 69kV – 1200 Amp – Loadbreak Interrupters 10 69 30 03
SEECO Switch 69kV – 1200 Amp – without Loadbreak Interrupters 10 69 30 04



NOTES:

1. See DCS **06 00 11**** for shield wire details
2. Evenly space pipe guides 10'–0" to 15'–0" apart
3. Refer to DCS **12 69 11**** for grounding switch structure. The switch handle must be grounded to a driven ground rod or a field formed ground electrode.
4. Switch weight must be considered when determining pole class. Each switch with insulators and interrupting devices weights approximately 2109 Pounds.
5. Switch can be equipped with or without loadbreak interrupting devices.
6. Switch pole grounding, operating rod insulators and ground mat requirement and installation, refer to DCS **10 34 01 01**.
7. If motor operator is required, See DCS **10 00 01 01** & **10 69 10 ****.
8. The space shall be increased 7'–6" when distribution conductor is not T–2.
9. Where to mount switch's number plate is based on your local description.
10. Arresters are used for normally open switches, or switches with sensor devices which may be susceptible to lightning. The line arrester is suspended from the compressed–on end fittings of the polymer deadend insulator and supported by aluminum hot line clamps. The disconnector coupling assembly detaches the line end of the arrestor should the arrestor fail and will cause the arrester to pivot and drop down into a vertical position which makes the failed arrester much more visible. The disconnect coupling assembly with a 3/8" threaded stud that can be inserted into the tap lead eyebolt of the hot line clamp on the line end and an eyebolt with 3/8" stud that can be inserted into the tap lead eyebolt of the hot line clamp on the ground end. One of the tinned copper leads (on the left (pole end) of the assembly) is to shunt the clevis–eye connection to eliminate radio noise. The longer tinned copper lead is for connection to a pole ground wire or a metal switch based with line clamp (stk no. 23 78 394) connected the line end on a stainless bolt (stk no. 21 56 433, 21 75 106 (hex nut), and 21 61 142 (washer)), which is bolted on the switch base.

    Notes (as suggestion):

    1. Use some Loctite on the threads of the 3/8" bolts to keep bolts from coming loose and also use a 3/8" carriage head bolt through the hot line clamp eyebolt which would keep the assembly from falling if the hot line clamp tap lead eyebolt should loosen.
    2. The arrester assembly will not work with porcelain deadend bells.
    3. If space is limited on the switch pole but available on adjacent pole, install the arresters on the adjacent pole.
11. Train phase conductors thru DE clamp and terminate with compression lugs to attach to switch terminals.
12. If pull offs are from switch frame other than 0°, 90°, or 180°, precaution must be taken to avoid torque to the switch frame out of alignment.
13. The operating rod insulator (8 ft. interphase fiberglass for isolating 69 kV underbuilt circuits and one TR210 porce-lain station post insulators for isolating underbuilt circuit from the switch operating handle) can be eliminated for a steel pole.

		Stnd. / Stk. No.	Description 10 69 05 **	01	02	03	04
		Contact Dist. Eng.	Composite or Steel Pole	1	1	1	1
	A	25 06 113	Insulator, Polymer, Suspension, Wye Clevis– Oval Eye, 42”L (nominal)	9	9	9	9
	B	23 68 440	Shackle, Anchor, 3/4” Pin, 1–1/16” opening, Galv.	18	18	18	18
10@	E	17 51 032	Clamp, Parallel Groove, #6AWG–1/0 AWG AL	6	6	6	6
@	F	23 52	Bolt, Mach., Galv., 3/4” Sq. Head/Sq. Nut, length as required	9	9	9	9
	H	23 65 042	Nut, Lock, MF, Galv., 3/4”	9	9	9	9
	I	23 66 131	Washer, Sq. Flat, Galv., 3/4”	9	9	9	9
	J	23 66 031	Washer, Sq. Curved, Galv., for 3/4” Bolt	11	11	11	11
@	K	DEC*W	Clamp, Deadend (wire type and size required)	9	9	9	9
@	N	CL*W	Lug, Compr. Terminal, AL, DCS **07 00 30 00**	12	12	12	12
11@	O	LW *W	Wire, Bare, DCS **07 00 01 01**	As Req.	As Req.	As Req.	As Req.
	P	Special Order Item	Turner CSB Switch, 69kV, 1200 Amp., LBRK 3–Way	1			
		Special Order Item	Turner CSB Switch, 69kV, 1200 Amp., Non LBRK 3–Way		1		
		Special Order Item	SEECO Switch, 69kV, 1200 Amp., LBRK 3–Way			1	
		Special Order Item	SEECO Switch, 69kV, 1200 Amp., Non LBRK 3–Way				1
	Q	22 13 099	Lock, Switch, 7/8” vertical opening	3	3	3	3
9	R	16 01 229	Plate, Number & Caution Sign, Alum.	3	3	3	3
@	T	**06 00 11 ****	Deadend – Loop around, Static Wire	1	1	1	1
10	AA	10 01 236	Arrester, Line Protection, 60kV Rated, 48kV MCOV	As Req.	As Req.	As Req.	As Req.
	BB	**12 69 11****	Grounding Unit	1	1	1	1
			Number Switch	3	3	3	3