



CAPACITORS AND REGULATORS

TABLE OF CONTENTS

16 00 00 01
1 of 1

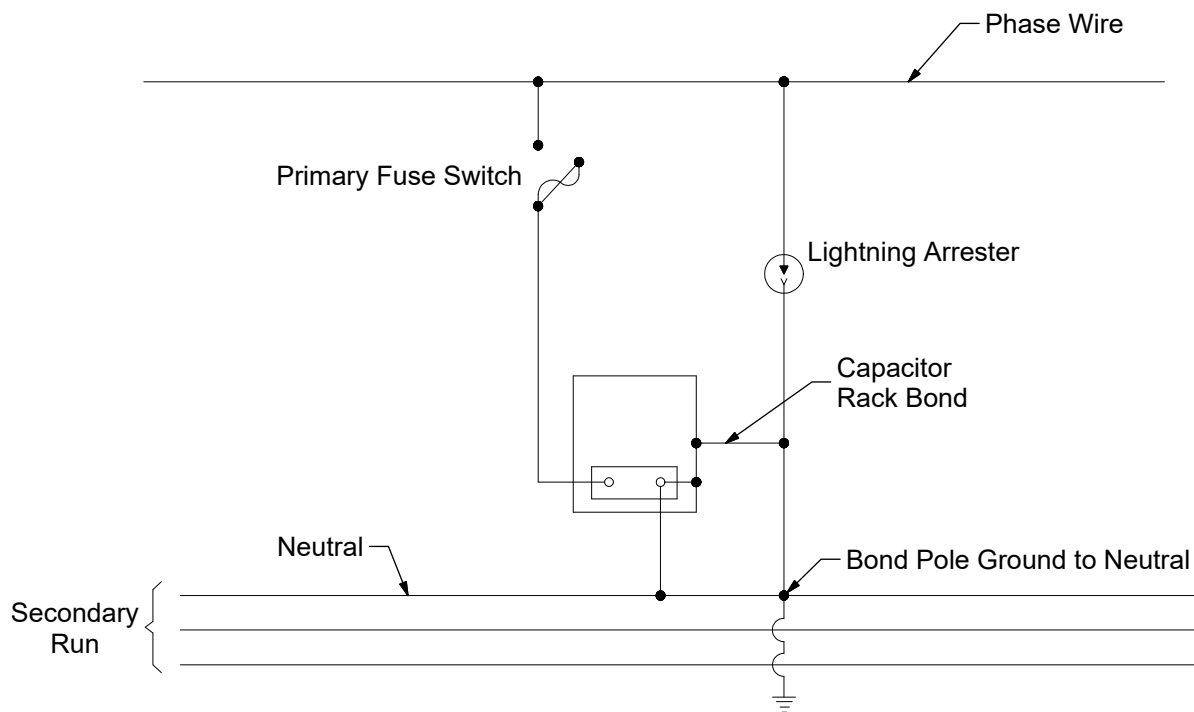
CAPACITOR BANK WIRING SCHEMATIC, SINGLE PHASE, FIXED - 5kV, 15kV.....	16 00 02 00
CAPACITOR BANK WIRING SCHEMATIC, THREE PHASE, SWITCHED AND FIXED - 5kV, 15kV, 34kV.....	16 00 05 00
SWITCHED CAP BANK CONTROL AND WIRING, TIME, TEMP, AND VOLTAGE - COMMUNICATING - 5kV, 15kV, 35kV.....	16 00 24 **
SWITCHED CAP BANK CONTROL AND WIRING, TIME, TEMP, VOLTAGE, CURRENT, AND VAR - COMMUNICATING - 5kV, 15kV, 35kV.....	16 00 26 **
FIXED CAPACITOR INSTALLATION, SINGLE PHASE - 5kV, 15kV.....	16 15 01 **
FIXED CAP BANK INSTALLATION, THREE PHASE - 5kV, 15kV.....	16 15 02 **
SWITCHED CAP BANK INSTALLATION, THREE PHASE - COMMUNICATING - 5kV, 15kV.....	16 15 03 **
INSTALLATION OF 1kVA TRANSFORMER, CAPACITOR BANK - 15kV.....	16 15 05 01
SWITCHED CAP BANK INSTALLATION, THREE PHASE - COMMUNICATING - 35kV.....	16 34 02 **
REGULATOR POLE MOUNTED, SINGLE PHASE - 5kV, 15kV.....	16 80 01 **
REGULATOR POLE MOUNTED, THREE PHASE - 5kV, 15kV.....	16 80 03 01



CAPACITORS AND REGULATORS

Capacitor Bank Wiring Schematic
Single Phase, Fixed

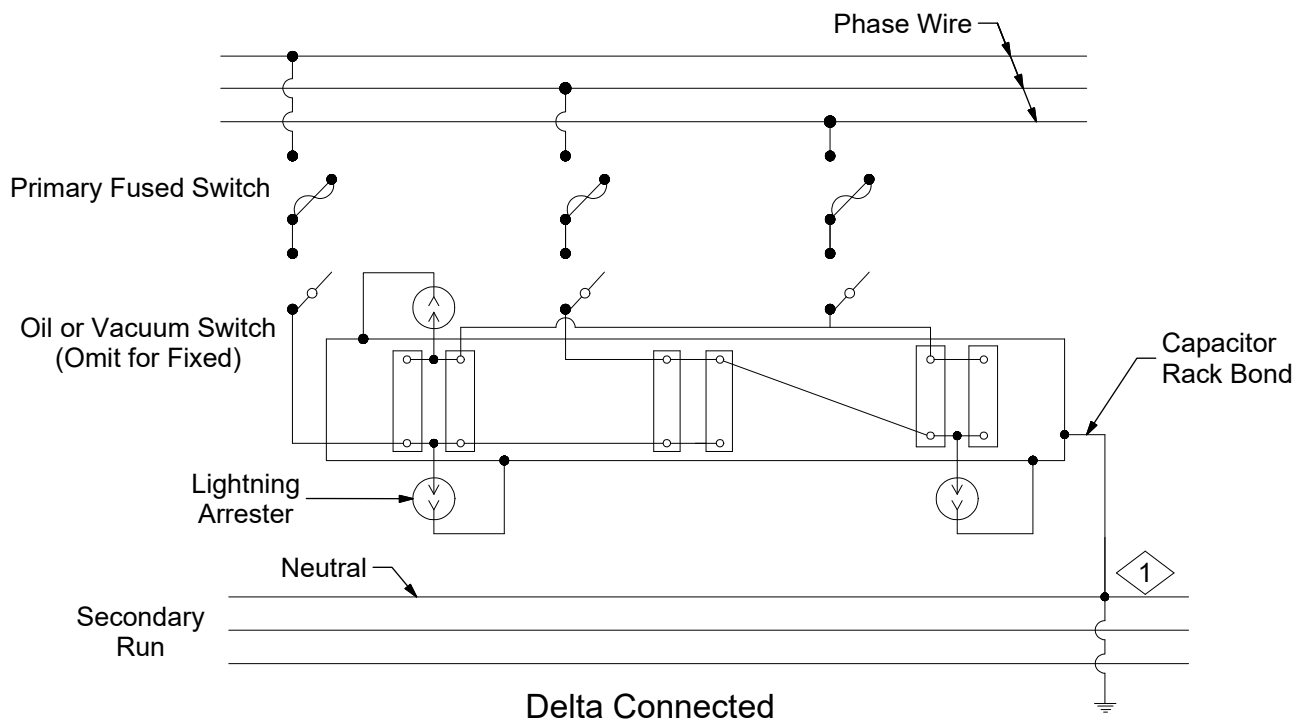
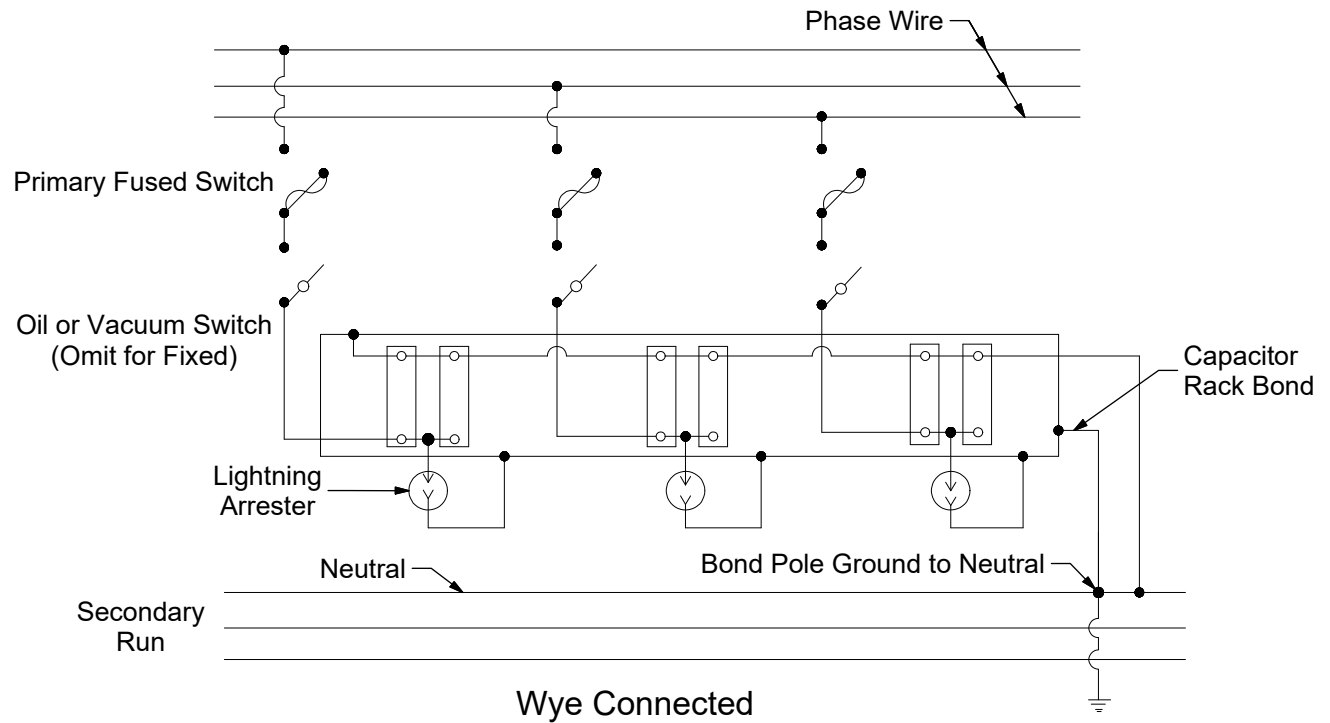
16 00 02 00
5, 15kV
1 of 1



CONSTRUCTION NOTE(s):

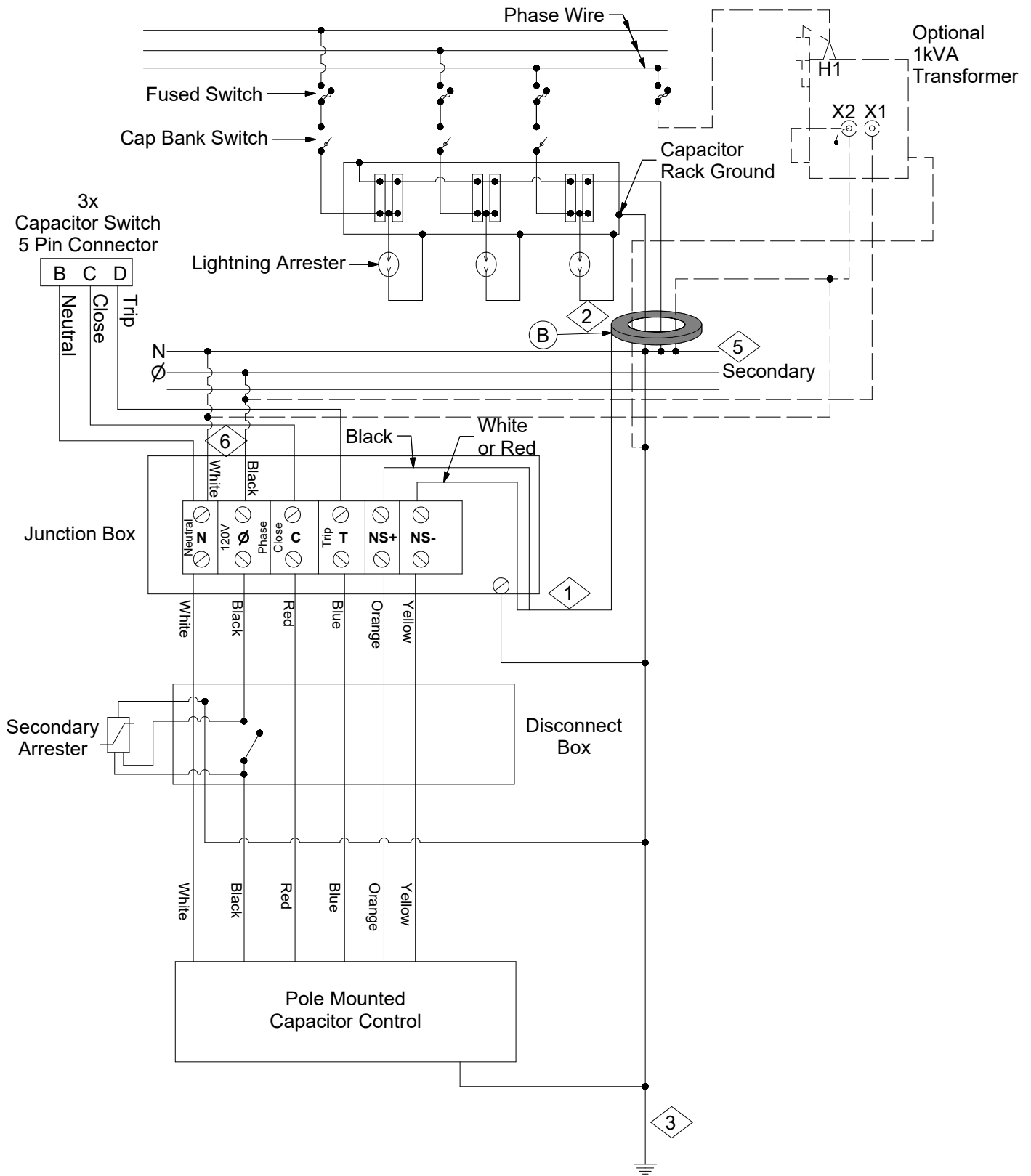
1. See DCS **16 15 01** ** for single phase fixed capacitor installation.

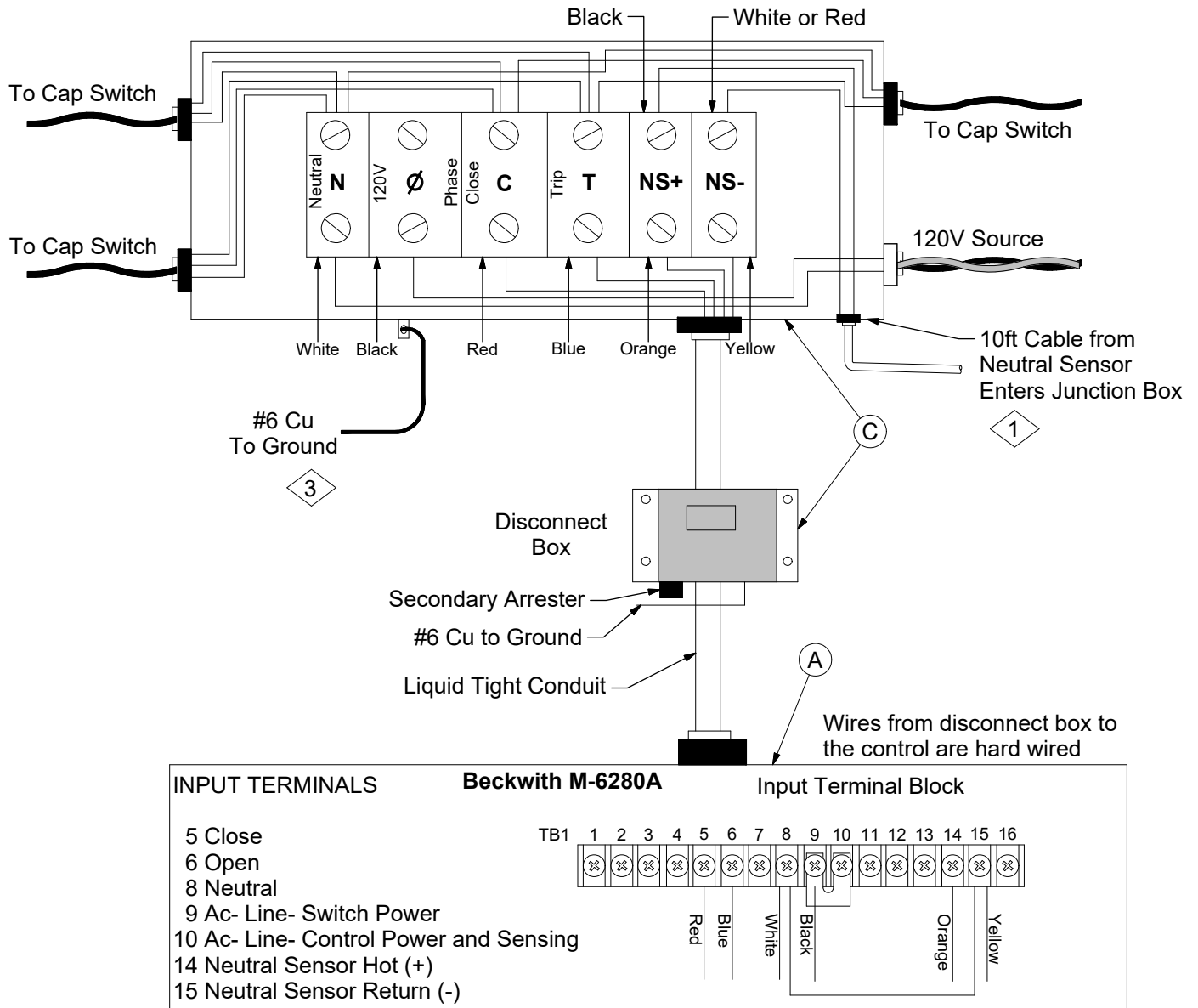
REV	DATE	ENG	DESCRIPTION
5	10/01/23	DT	Converted to new format, Added Note 1
4	06/15/16	WYW	



CONSTRUCTION NOTE(s):

1. Bond between pole ground and neutral shall only be made when neutral is common to primary and/or static.







CAPACITORS AND REGULATORS

Switched Cap Bank Control and Wiring
Time, Temp, and Voltage - Communicating

16 00 24 **

5, 15, 35kV

3 of 3

CONSTRUCTION NOTE(s):

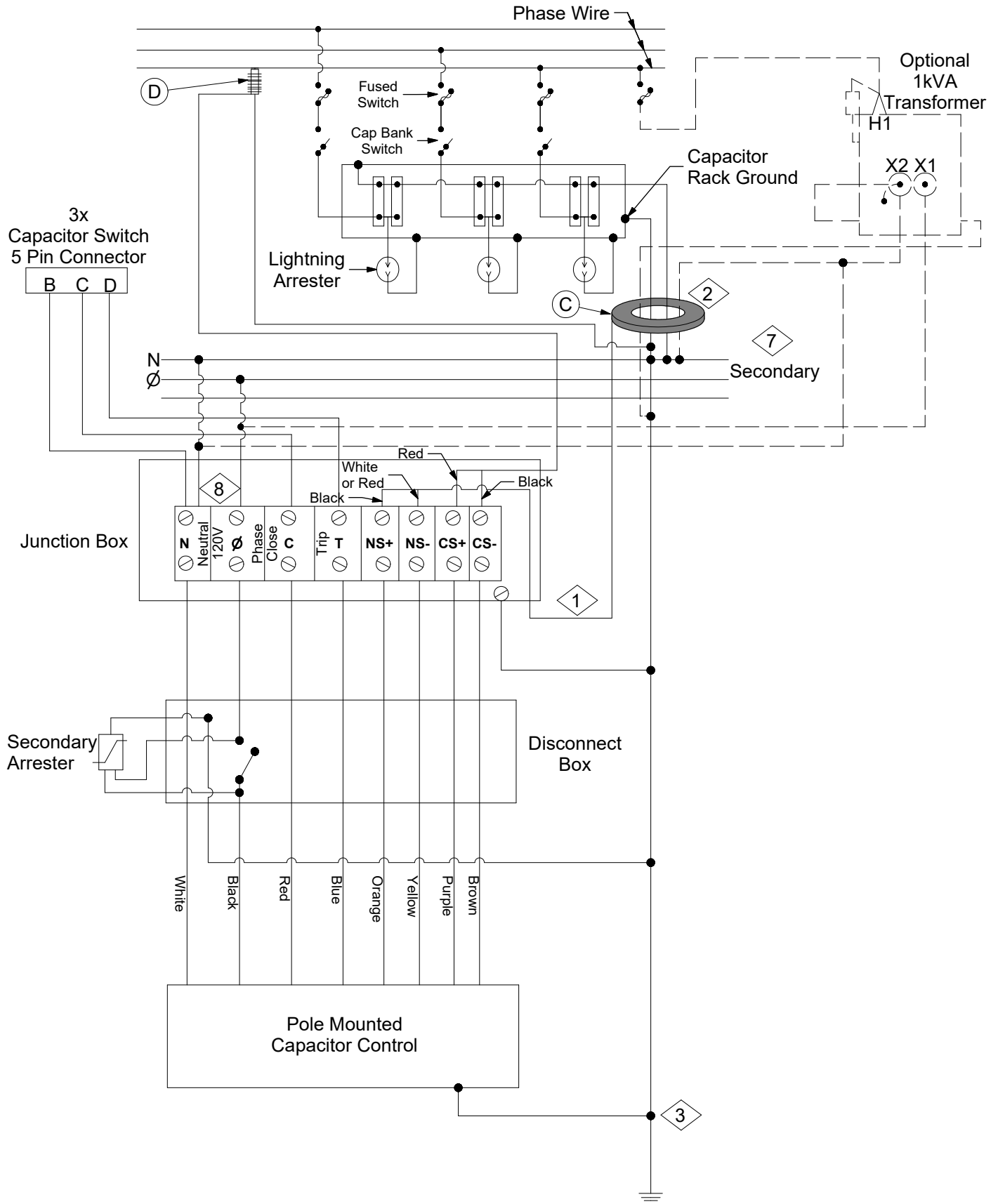
1. Neutral current sensor output can reach 40V if sensor wires are not terminated when current is present on wires routed through sensor. Terminate the neutral sensor wires in the junction box. The black neutral sensor wire connects to the NS+ terminal and the white or red neutral sensor wire connects to the NS- terminal.
2. The neutral current sensor, if equipped, shall be mounted below the bank. All connections between the cap bank neutral or cap bank ground, including any equipment installed on the capacitor rack frame, and pole ground or neutral shall pass through the neutral current sensor in the same direction to capture all the neutral current. No other wires should pass through the sensor. The sensor shall be installed on the wires between the capacitor rack and their connections to pole ground and the distribution system neutral using a staple to secure a wire above and below the sensor. If a 1kVA transformer is installed on the cap bank frame, the neutral and ground wires from the transformer must also pass through the neutral current sensor. If transformer is mounted on pole, the transformer neutral and ground wires do not need to be routed through sensor unless it's ground connection is made between sensor and cap bank frame. The sensor cable should be routed to the junction box.
3. The junction box, disconnect box, capacitor rack and capacitor control shall be connected to pole ground.
4. See DCS **16 15 03 **** for distribution capacitor bank installation. See DCS **16 34 02 **** for 34 kV capacitor bank installation.
5. Bond between pole ground and neutral shall only be made when neutral is common to primary and/or static.
6. If capacitor controller will be powered off secondary, connect #10 white conductor to distribution neutral and #10 black conductor to 120V supply. If 1kVA transformer is being installed on cap bank; route #10 white conductor and connect to #4 neutral lead connected to X2, route #10 black conductor and connect to #4 supply lead connected to X1.

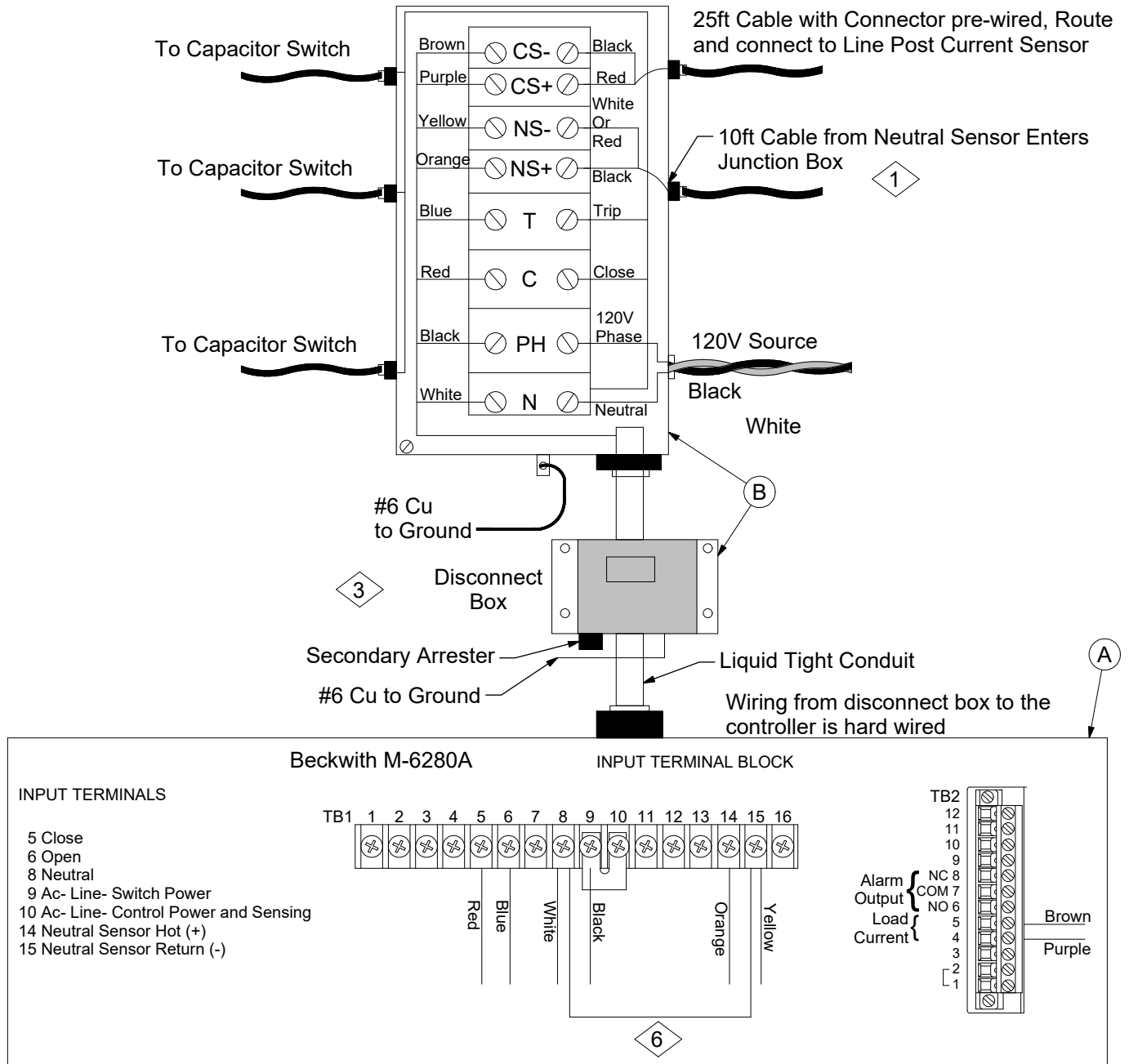
	ITEM	STK / DCS #	DESCRIPTION	16 00 24 **	01
	A	69 11 307	Control, Communicating, Time, Temp, Volt - Beckwith		1
	B	69 11 304	Neutral Current Sensor - Beckwith, with 10' cable w/o Connector		1
	C	54 17 498	Junction Box (6-terminal)/Disconnect Box, Pre-Wired with 35' Liquidtight Cable		1
	D	17 54 182	Connector, Split Bolt		4
7,@	E	69 59 001	Communications Kit, Coax and Antenna (VO only)		1
7,@	F	69 59 003	GE Orbit ECR Cell Modem (VO Only)		1
		16 08 298	GE Orbit ECR Cell Modem		1
7,@	G	16 16 078	Low Profile Omnidirectional Antenna		1
7,@	H	16 16 181	Coax. Cable, 2ft Jumper with SMA (male) to N (male)		1

DESIGN NOTE(s):

7. Illinois uses Stock #69 59 001 and Stock #69 59 003 for VO only. Missouri and Illinois uses Stock #16 08 298, Stock #16 16 078, and Stock #16 16 181 if SCADA control is needed (not for Illinois VO).
8. For VO circuits, 120V controller supply shall be from a transformer no more than 1 span (250') away loaded below 100% of nameplate.
9. Communicating cap bank controllers may be used on non-communicating applications using local settings.

REV	DATE	ENG	DESCRIPTION
8	10/01/23	DT	Updated Drawing, Removed S&C Controller, Added Note 5, 6, & 9
7	1/01/20	DT	







CAPACITORS AND REGULATORS

Switched Cap Bank Control and Wiring
Time, Temp, Voltage, Current, and VAR - Communicating

16 00 26 **

5, 15, 35kV

3 of 4

CONSTRUCTION NOTE(s):

1. Neutral current sensor output can reach 40V if sensor wires are not terminated when current is present on wires routed through sensor. Terminate the neutral sensor wires in the junction box. The black neutral sensor wire connects to the NS+ terminal and the white or red neutral sensor wire connects to the NS- terminal.
2. The neutral current sensor, if equipped, shall be mounted below the bank. All connections between the cap bank neutral or cap bank ground, including any equipment installed on the capacitor rack frame, and pole ground or neutral shall pass through the neutral current sensor in the same direction to capture all the neutral current. No other wires should pass through the sensor. The sensor shall be installed on the wires between the capacitor rack and their connections to pole ground and the distribution system neutral using a staple to secure a wire above below the sensor. If a 1kVA transformer is installed on the cap bank frame, the neutral and ground wires from the transformer must also pass through the neutral current sensor. If transformer is mounted to pole, the transformer neutral and ground wires do not need to be routed through sensor unless it's ground connection is made between sensor and cap bank frame. The sensor cable should be routed to the junction box.
3. The junction box, disconnect box, capacitor rack, capacitor control, and current sensor shall be bonded to pole ground.
4. Contact Standards Engineer for the replacement line post current sensor cable.
5. See DCS **16 15 03 **** for distribution capacitor bank installation. See DCS **16 34 02 **** for 34 kV capacitor bank installation.
6. For Beckwith controllers, connect jumper wire from TB1-8 to TB1-15 when neutral sensor is used. When neutral current sensor is not used, connect jumper wire from TB2-4 to the ground stud to the right of TB-1.
7. Bond between pole ground and neutral shall only be made when neutral is common to primary and/or static.
8. If capacitor controller will be powered off secondary, connect #10 white conductor to distribution neutral and #10 black conductor to 120V supply. If 1kVA transformer is being installed on cap bank; route #10 white conductor and connect to #4 neutral lead connected to X2, route #10 black conductor and connect to #4 supply lead connected to X1.

DCS #	DESCRIPTION
16 00 26 03	Current and VAR Sensing for 15kV and below with Beckwith Controller
16 00 26 04	Current and VAR Sensing for 34kV with Beckwith Controller

REV	DATE	ENG	DESCRIPTION
6	10/01/23	DT	Updated Drawing, Removed S&C Controller, Added Note 7, 8, & 11
5	01/01/20	DT	



CAPACITORS AND REGULATORS

Switched Cap Bank Control and Wiring
Time, Temp, Voltage, Current, and VAR - Communicating

16 00 26 **

5, 15, 35kV

4 of 4

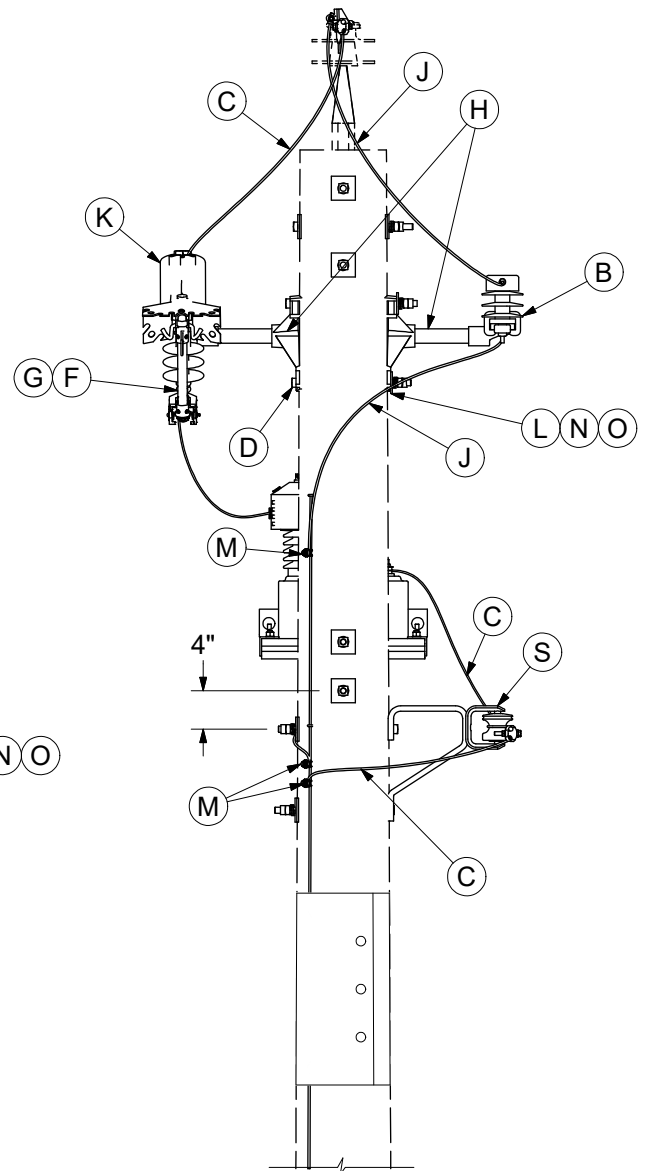
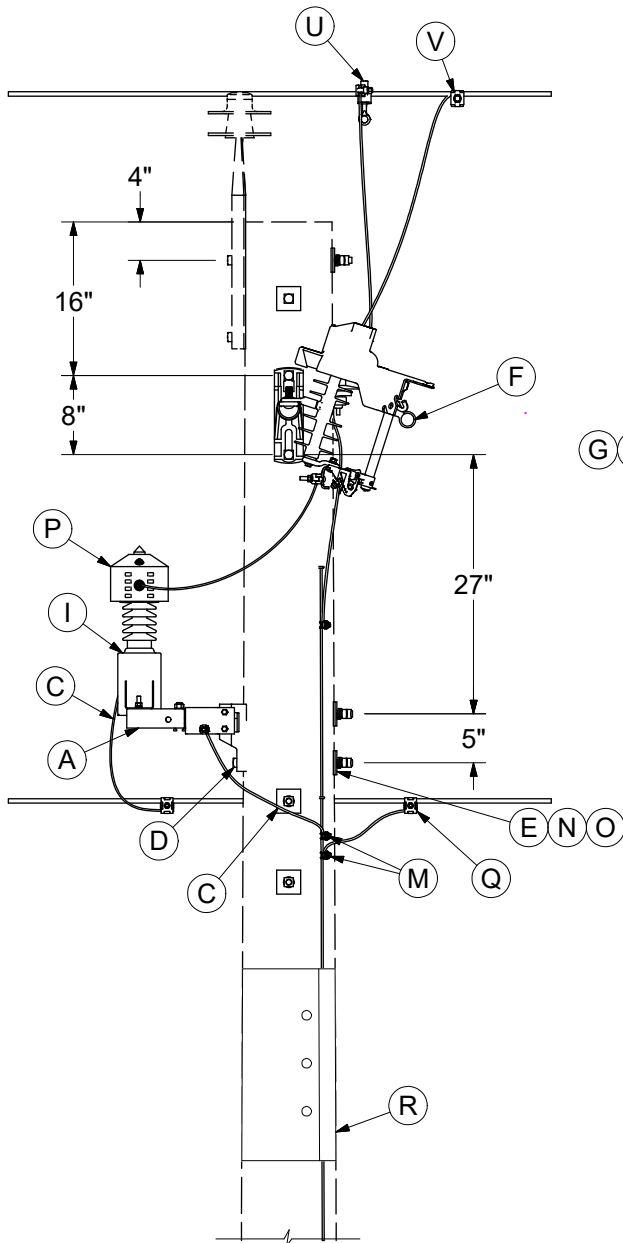
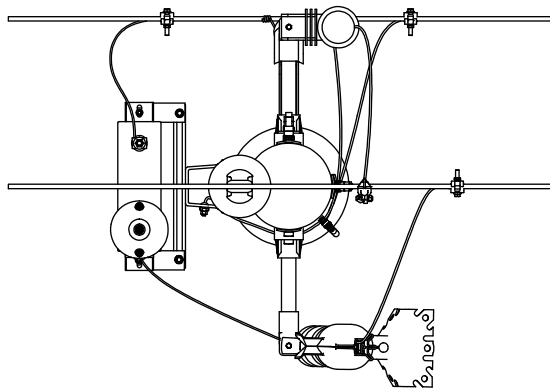
	ITEM	STK / DCS #	DESCRIPTION	16 00 26 **	03	04
	A	69 11 316	Control, Time, Temp, Volt, Current or VAR - Beckwith		1	1
	B	54 17 512	Junction Box (8-terminal)/Disconnect Box, Pre-Wired w/ 35' Liquidtight Conduit		1	1
	C	69 11 304	Sensor, Neutral Current with 10' Cable - Beckwith		1	1
	D	69 11 297	Sensor, Current, Line Post Type, 15kV		1	-
		69 11 202	Sensor, Current, Line Post Type, 35kV		-	1
	E	23 64 034	Stud, 5/8" x 7"		1	1
	F	21 75 008	Washer, Flat, 5/8"		2	2
	G	17 54 182	Connector, Split Bolt		5	5
	H	18 51 021	Wire, #6 Cu., S.D. Poly Covered		7	7
9,@	I	69 59 001	Communications Kit, Coax and Antenna (VO Only)		1	1
9,@	J	69 59 003	GE Orbit ECR Cell Modem (VO Only)		1	1
		16 08 298	GE Orbit ECR Cell Modem		1	1
9,@	K	16 16 078	Low Profile Omnidirectional Antenna		1	1
9,@	L	16 16 181	Coax. Cable, 2ft Jumper with SMA (male) to N (male)		1	1

DESIGN NOTE(s):

- Illinois uses Stock #69 59 001 and Stock #69 59 003 for VO only. Missouri and Illinois uses Stock #16 08 298, Stock #16 16 078 and Stock #16 16 181 if SCADA control is needed (not for Illinois VO).
- For VO circuits, 120V controller supply shall be from a transformer no more than 1 span (250') away loaded below 100% of nameplate.
- Communicating cap bank controllers may be used on non-communicating applications using local settings.

DISTRIBUTION CONSTRUCTION STANDARDS

REV	DATE	ENG	DESCRIPTION
6	10/01/23	DT	Updated Drawing, Removed S&C Controller, Added Note 7, 8, & 11
5	01/01/20	DT	





CAPACITORS AND REGULATORS

Fixed Capacitor Installation
Single Phase

16 15 01 **

5, 15kV

2 of 2

CONSTRUCTION NOTE(s):

1. Minimum clearance from the ground to the bottom of the capacitor mount or capacitor cell, whichever is lower, shall be 15'-0".
2. A minimum of 6" of clearance is required between neutral and bottom of capacitor mount, or capacitor cell, which-ever is closer. Capacitor cell sizes vary based on kVAR, voltage, manufacturer, and age.
3. See DCS #16 00 02 00 for single phase capacitor wiring schematic.
4. Pole wrap, Stock #23 17 473 comes in 100 ft. roll.

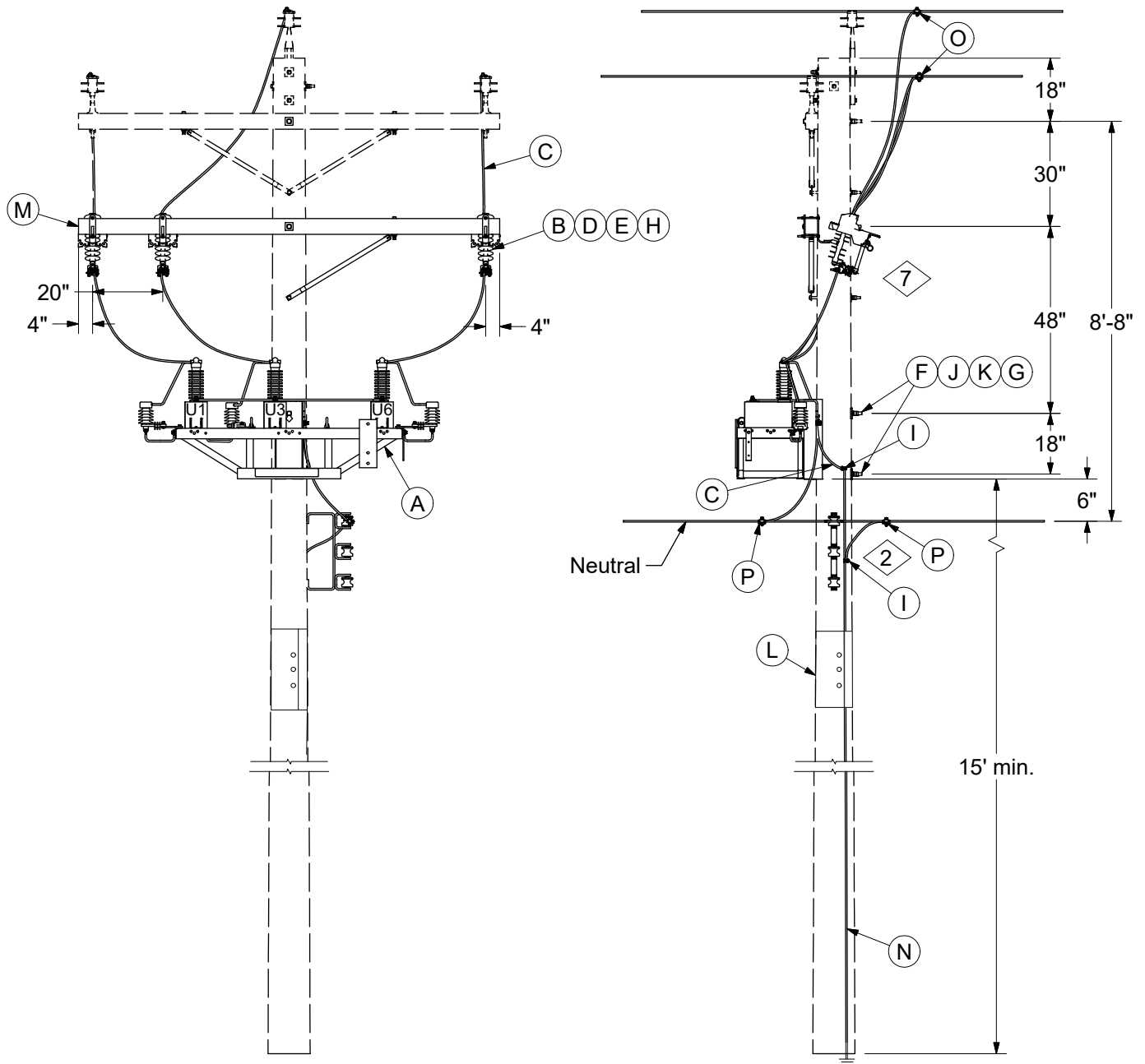
	ITEM	STK / DCS #	DESCRIPTION	16 15 01 **	01	02	03	04	05	06
	A	69 11 002	Capacitor, Hanger		1	1	1	1	1	1
	B	10 01 144	Arrester, Lightning, 10kV		-	-	1	1	1	1
		10 01 133	Arrester, Lightning, 3 kV		1	1	-	-	-	-
	C	18 51 025	#4 Wire, Riser, Poly Covered		10	10	10	10	10	10
	D	23 52 065	Bolt, Mach., 5/8" x 12" w/ square nut		4	4	4	4	4	4
	E	23 66 207	Washer, Curved, Square, 5/8"		2	2	2	2	2	2
	F	54 07 208	Switch, Fused, Open Type, 100 Amp		1	1	1	1	1	1
	G	20 53 084	Link, Fuse - 12T		-	-	1	-	-	-
		20 53 085	Link, Fuse - 15T		-	-	-	1	1	-
		20 53 087	Link, Fuse - 30T		-	-	-	-	-	1
		20 53 089	Link, Fuse - 25T		1	-	-	-	-	-
		20 53 097	Link, Fuse - 50K		-	1	-	-	-	-
	H	23 06 127	Bracket - Standoff, 12" FG		2	2	2	2	2	2
	I	69 11 029	Cap, 7.2kV, 50kVAR, Two Bushing		-	-	1	-	-	-
		69 11 030	Cap, 2.4kV, 50kVAR, Two Bushing		1	-	-	-	-	-
		69 11 043	Cap, 7.2kV, 100kVAR, Single Bushing		-	-	-	1	-	-
		69 11 044	Cap, 2.4kV, 100kVAR, Single Bushing		-	1	-	-	-	-
		69 11 069	Cap, 7.96kV, 100kVAR, Single Bushing		-	-	-	-	1	-
		69 11 294	Cap, 7.62kV, 200kVAR, Single Bushing		-	-	-	-	-	1
	J	18 51 021	Wire, Cu, #6 SD., Poly Covered		6	6	6	6	6	6
	K	23 17 411	Wildlife Guard - Cover Cutout		1	1	1	1	1	1
	L	23 66 027	Washer, Flat, Square 5/8"		2	2	2	2	2	2
	M	17 54 182	Connector - Split Bolt, #4 Str. to 1/0 Str.		3	3	3	3	3	3
	N	23 66 134	Lock Washer - 5/8" Double Coil		4	4	4	4	4	4
	O	23 65 043	Lock Nut - 5/8" Square		4	4	4	4	4	4
	P	69 58 296	Wildlife Guard - Transformer Bushing Cover		1	1	1	1	1	1
@	Q	07 00 25 00 @	PG Clamp, PG*W		1	1	1	1	1	1
@	R	23 17 473	Animal Guard - Pole Wrap		#	#	#	#	#	#
@	S	03 01 ** ** @	Secondary Configuration		1	1	1	1	1	1
@	T	12 00 10 01	Grounding Unit - Ground Coil		1	1	1	1	1	1
		12 00 10 02	Grounding Unit - Ground Rod		1	1	1	1	1	1
@	U	07 00 21 00 @	Clamp, Hot Line, HLC*W		1	1	1	1	1	1
@	V	07 00 21 00 @	Clamp, Hot Line, HLC*W		1	1	1	1	1	1
		07 00 25 00 @	Clamp, Parallel Groove, PG*		1	1	1	1	1	1

DESIGN NOTE(s):

5. Capacitors wired line to ground shall only be installed on circuits with a continuous primary neutral and/or static from substation.

DISTRIBUTION CONSTRUCTION STANDARDS

REV	DATE	ENG	DESCRIPTION
8	10/01/23	DT	updated Drawing, Updated BOM, New Note 2, 3, 4, & 5
7	12/15/16	WYW	



CONSTRUCTION NOTE(s):

1. Capacitor rack frame shall be bonded to pole ground.
2. Bond between pole ground and neutral shall only be made when neutral is common to primary or static.
3. For wiring schematic, refer to DCS 16 00 05 00.
4. Pole Wrap, Stock #23 17 473, comes on roll of 100 ft.



CAPACITORS AND REGULATORS

Fixed Cap Bank Installation
Three Phase

16 15 02 **

5, 15kV

2 of 2

ITEM	STK / DCS #	DESCRIPTION	16 15 02 **	01	02	03	04	09	05	06	07	08
A	69 11 085	Capacitor Bank - Fixed, 300kVAR 14.4kV Delta		-	-	-	-	-	-	-	1	-
	69 11 072	Capacitor Bank - Fixed, 600kVAR 13.8kV Wye		-	-	-	-	-	-	1	-	-
	69 11 073	Capacitor Bank - Fixed, 300kVAR 13.8kV Wye		-	-	-	-	-	1	-	-	-
	69 11 222	Capacitor Bank - Fixed, 600kVAR 13.2kV Wye		-	-	-	-	1	-	-	-	-
	69 11 062	Capacitor Bank - Fixed, 600kVAR 12kV Wye		-	-	-	1	-	-	-	-	-
	69 11 061	Capacitor Bank - Fixed, 300kVAR 12kV Wye		-	-	1	-	-	-	-	-	-
	69 11 057	Capacitor Bank - Fixed, 600kVAR 4kV Wye		-	1	-	-	-	-	-	-	-
	69 11 083	Capacitor Bank - Fixed, 600kVAR 14.4kV Delta		-	-	-	-	-	-	-	-	1
	69 11 055	Capacitor Bank - Fixed, 300kVAR 4kV Wye		1	-	-	-	-	-	-	-	-
B	54 07 208	Switch, Fused, Open Type 100A		3	3	3	3	3	3	3	3	3
C	18 51 025	Wire, #4 Riser		24	24	24	24	24	24	24	24	24
D	20 53 200	Link, Fuse - 80T		-	3	-	-	-	-	-	-	-
	20 53 085	Link, Fuse - 15T		-	-	3	-	-	-	-	-	-
	20 53 084	Link, Fuse - 12T		-	-	-	-	-	3	-	3	-
	20 53 089	Link, Fuse - 25T		-	-	-	-	-	-	3	-	3
	20 53 087	Link, Fuse - 30T		-	-	-	3	3	-	-	-	-
	20 53 088	Link, Fuse - 40T		3	-	-	-	-	-	-	-	-
E	23 17 411	Wildlife Guard - Cover Cutout		3	3	3	3	3	3	3	3	3
F	23 52 097	Bolt, Mach., 3/4" x 12" w/ square nut		2	2	2	2	2	2	2	2	2
G	23 66 031	Washer, Curved, Square, 3/4"		2	2	2	2	2	2	2	2	2
H	17 58 054	Bracket, Switch, Arrester		3	3	3	3	3	3	3	3	3
I	17 54 182	Connector - Split Bolt, #4 Str. to 1/0 Str.		2	2	2	2	2	2	2	2	2
J	23 65 042	Lock Nut - 3/4" Square		2	2	2	2	2	2	2	2	2
K	23 66 135	Lock Washer - 3/4" Double Coil		2	2	2	2	2	2	2	2	2
4,@	L	23 17 473	Animal Guard - Pole Wrap	#	#	#	#	#	#	#	#	#
5,@	M	04 00 20 03	Crossarm w/ Brace, 10'	1	1	1	1	1	1	1	1	1
		04 00 41 16	FG Crossarm 10' Tangent	1	1	1	1	1	1	1	1	1
@	N	12 00 10 01	Grounding Unit - Ground Coil	1	1	1	1	1	1	1	1	1
		12 00 10 02	Grounding Unit - Ground Rod	1	1	1	1	1	1	1	1	1
@	O	07 00 21 00 @	Clamp, Hot Line, HLC*W	3	3	3	3	3	3	3	3	3
		07 00 25 00 @	Clamp, PG, PG*	3	3	3	3	3	3	3	3	3
@	P	07 00 25 00 @	Clamp, PG, PG*	2	2	2	2	2	2	2	2	2

DESIGN NOTE(s):

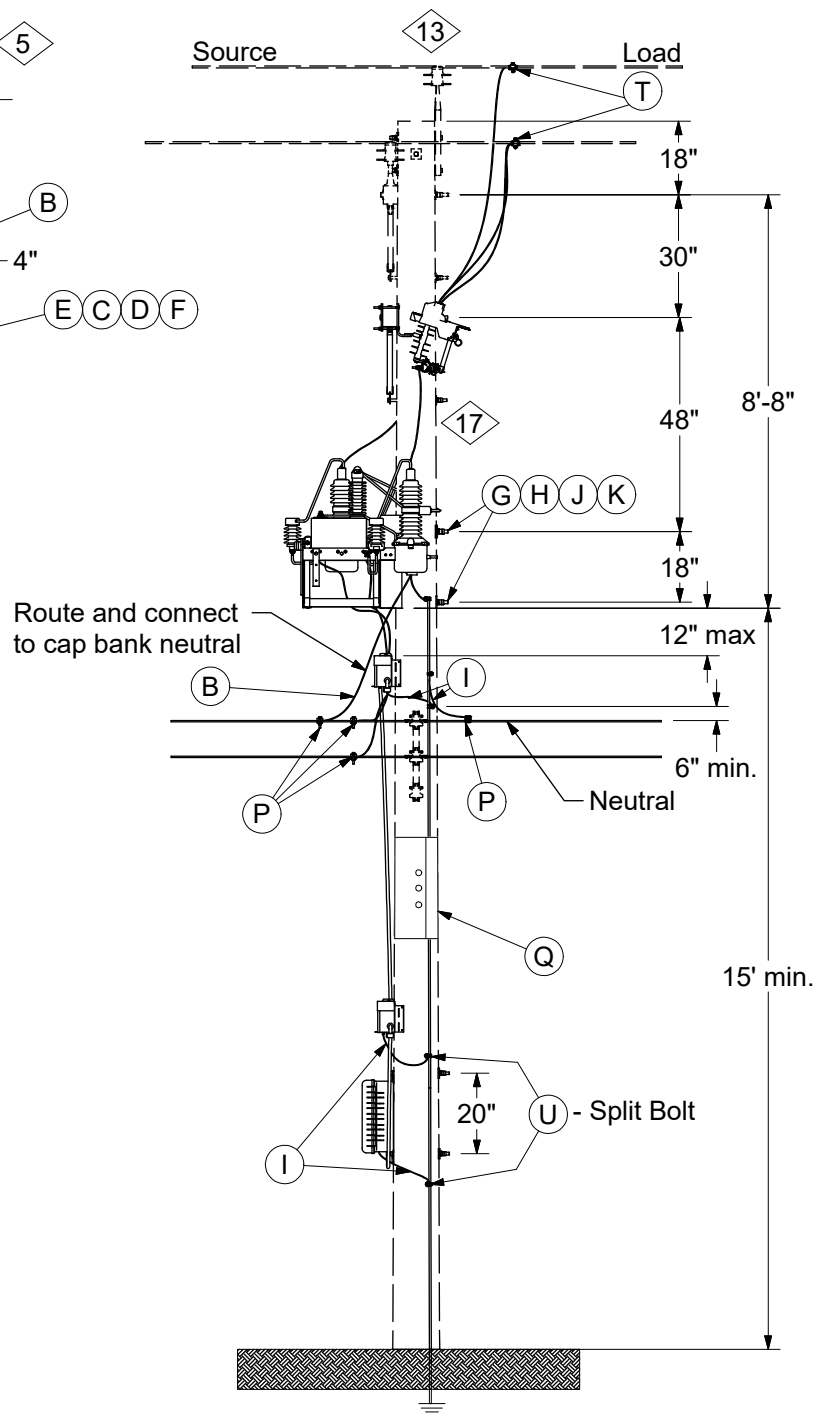
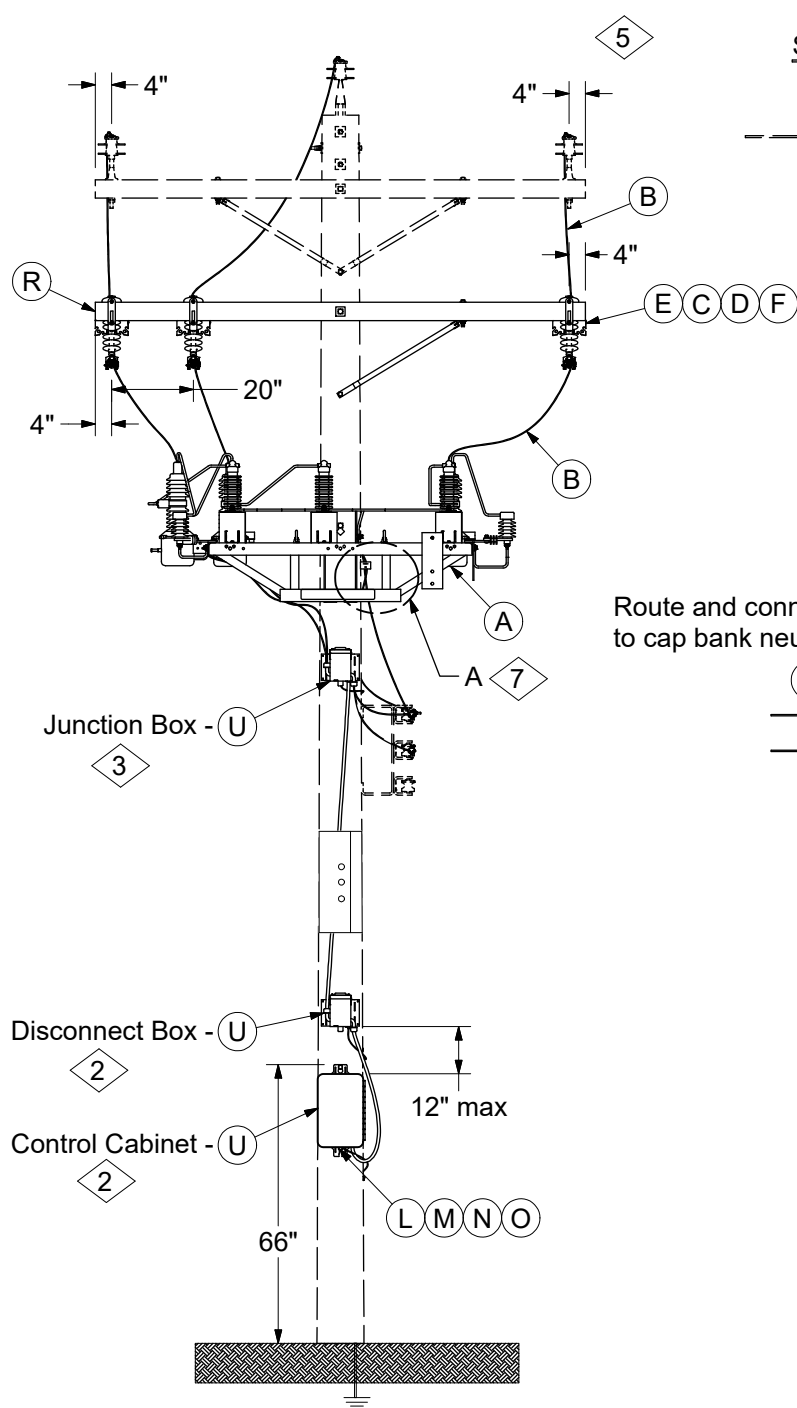
- 8'-0" Crossarms may be substituted when required.
- Grounded wye cap banks shall only be installed on circuits with a continuous neutral and/or static from substation.

OPERATIONS NOTE(s):

- Loadbreak tool (Stock #83 38 028) must be used to operate switches.

DISTRIBUTION CONSTRUCTION STANDARDS

REV	DATE	ENG	DESCRIPTION
11	10/01/23	DT	Updated Drawing, Updated BOM, New note 2, 3, 4, & 6
10	12/15/16	WYW	



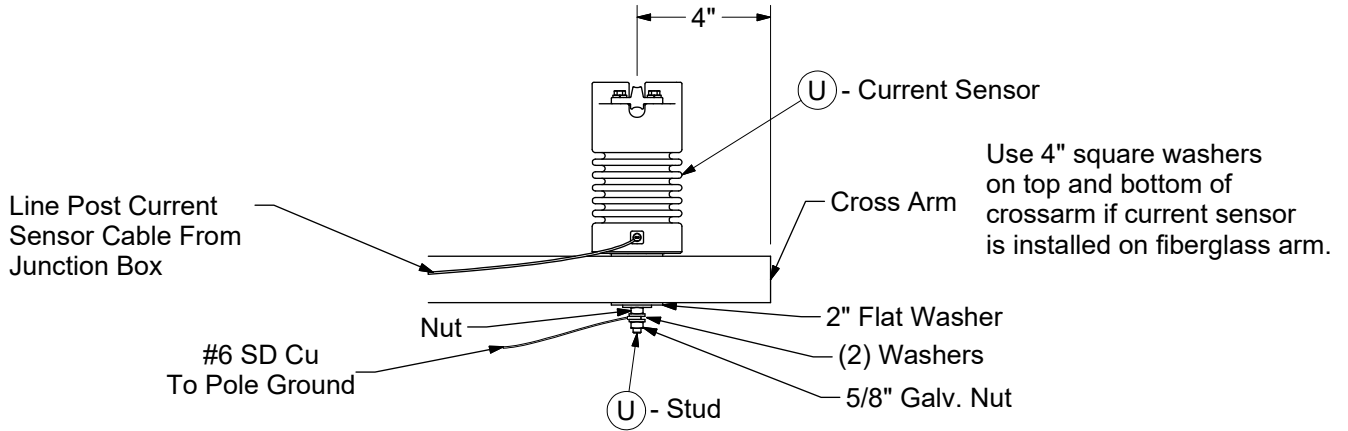
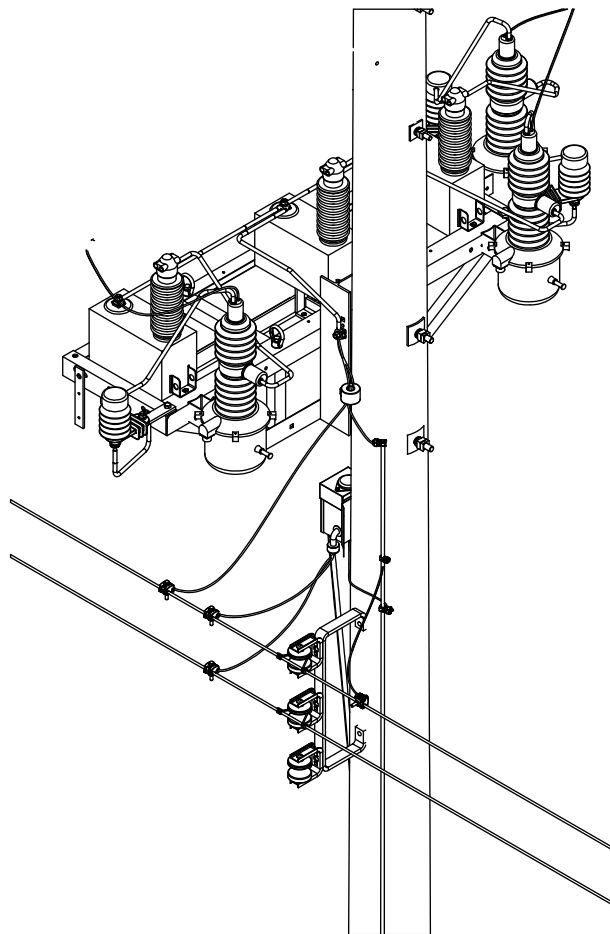
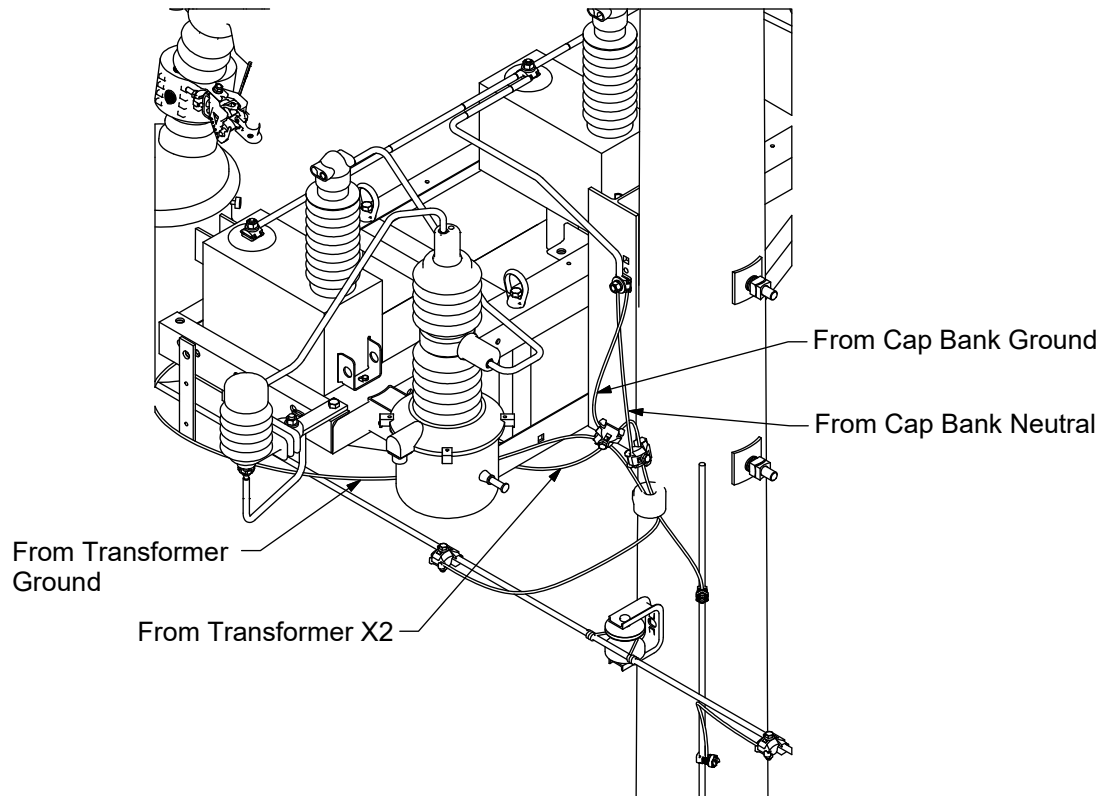


Figure 1



Detail A
Without 1kVA Transformer on Cap Bank



Detail A

With 1kVA Transformer on Cap Bank



CAPACITORS AND REGULATORS

Switched Cap Bank Installation
Three Phase - Communicating

16 15 03 **

5, 15kV

4 of 6

CONSTRUCTION NOTE(s):

1. Minimum clearance from the ground to the bottom of the capacitor rack shall be 15 feet.
2. Clearance from the ground to the top of the control cabinet shall be 66" from the ground. The bottom of disconnect box shall be installed 1'-0" max above the top of control cabinet. The next hand or foot hold shall be 8' or greater above the top of the disconnect box.
3. The top of the junction box shall be mounted a maximum of 1'-0" below the capacitor bank frame. Leads to the capacitor switches shall be secured to the frame of the bank with wire ties. The junction box/meter socket kit includes 35'-0" of pre-wired liquid-tight conduit. The liquid-tight must be stapled every 2'-0". Excess liquid-tight shall be coiled with tie wire and secured to the pole between the junction box and the disconnect box.
4. For capacitor bank wiring schematic, refer to DCS **16 00 05 00**. For capacitor control wiring schematic with current sensor, refer to DCS **16 00 26 00**. For capacitor control wiring schematic without current sensor, refer to DCS **16 00 24 00**.
5. For installations with a current sensor, the current sensor will be installed in place of an insulator, the current sensor stud shall be bonded to pole ground and the sensor cable shall be secured with a staple, refer to Figure 1. If current sensor is installed on fiberglass crossarm, the current sensor cable and current sensor ground wire shall be trained to the bottom of the crossarm using 6 groundwire clips, Stock #23 68 746.
6. Low voltage wires from line post current sensor should be connected in the junction box on the bank before the primary wire is energized on the sensor. However, if the primary on the sensor is energized, as long as the base of the sensor is grounded the sensor wires are safe to connect (low output current and voltage).
7. Neutral current sensor output can reach 40V if sensor wires are not terminated when current is present on wires routed through sensor. Neutral current sensors are not required on delta wired cap banks. For material and connection in the junction box; for installations without current sensor refer to DCS **16 00 24 00**, with current sensor refer to DCS **16 00 26 00**. The neutral current sensor, if equipped, shall be mounted below the bank. All connections between the cap bank neutral or cap bank ground, including any equipment installed on the capacitor rack frame, and the pole ground or neutral shall pass through the neutral current sensor in the same direction to capture all the neutral current. No other wires should pass through the sensor. The sensor shall be installed on the wires between the capacitor rack and their connections to pole ground and the distribution system neutral using a staple to secure a wire above and below the sensor. If a 1kVA transformer is installed on the cap bank frame, the neutral and ground wires from the transformer must also pass through the neutral current sensor. If transformer is mounted on pole, the transformer neutral and ground wires do not need to be routed through sensor unless it's ground connection is made between sensor and cap bank frame. The sensor cable should be routed to the junction box. See Detail A.
8. The junction box, disconnect box, capacitor rack, capacitor control, and current sensor, if equipped, must be connected to pole ground.
9. Bond between pole ground and neutral shall only be made when neutral is common to primary and/or static.
10. If capacitor controller will be powered off secondary, connect #10 white conductor to distribution neutral and #10 black conductor to 120V supply. If 1kVA transformer is being installed on cap bank; route #10 white conductor and connect to #4 neutral lead connected to X2, route #10 black conductor and connect to #4 supply lead connected to X1.
11. If a 120V voltage source for the controller is not available from the circuit the capacitor bank is being installed on, refer to DCS **16 15 05 01** for 1kVA transformer installation.
12. Pole wrap comes in 100 ft. roll.

REV	DATE	ENG	DESCRIPTION
12	10/01/23	DT	Updated Drawing, Updated BOM, New Note 9, 10, 12, 14, & 16
11	4/1/19	DT	



CAPACITORS AND REGULATORS

Switched Cap Bank Installation
Three Phase - Communicating

16 15 03 **

5, 15kV

5 of 6

ITEM	STK / DCS #	DESCRIPTION	16 15 03 **	01	02	03	04	05	06	07	08	11	12	09	10
A	69 11 225	Cap. Bank - Sw. 1200kVAR 13.2kV		-	-	-	-	-	-	-	-	-	1	-	-
	69 11 071	Cap. Bank - Sw. 600kVAR 13.8kV		-	-	-	-	-	-	1	-	-	-	-	-
	69 11 084	Cap. Bank - Sw. 300kVAR 14.4kV, Delta		-	-	-	-	-	-	-	-	-	-	1	-
	69 11 074	Cap. Bank - Sw 1200kVAR 13.8kV		-	-	-	-	-	-	-	1	-	-	-	-
	69 11 031	Cap. Bank - Sw. 300kVAR 4kV		1	-	-	-	-	-	-	-	-	-	-	-
	69 11 226	Cap. Bank - Sw. 600kVAR 13.2kV		-	-	-	-	-	-	-	-	1	-	-	-
	69 11 077	Cap. Bank - Sw. 600kVAR 14.4kV, Delta		-	-	-	-	-	-	-	-	-	-	-	1
	69 11 019	Cap. Bank - Sw. 300kVAR 12kV		-	-	1	-	-	-	-	-	-	-	-	-
	69 11 032	Cap. Bank - Sw. 600kVAR 12kV		-	-	-	1	-	-	-	-	-	-	-	-
	69 11 058	Cap. Bank - Sw. 1200kVAR 12kV		-	-	-	-	1	-	-	-	-	-	-	-
	69 11 086	Cap. Bank - Sw. 300kVAR 13.8kV		-	-	-	-	-	1	-	-	-	-	-	-
	69 11 036	Cap. Bank - Sw. 600kVAR 4kV		-	1	-	-	-	-	-	-	-	-	-	-
B	18 51 025	Wire, #4 Cu Poly, Riser		24	24	24	24	24	24	24	24	24	24	24	24
C	54 07 208	Switch, Fused, 100A, 15kV		3	3	3	3	3	3	3	3	3	3	3	3
D	17 58 054	Bracket, Switch, Arrester		3	3	3	3	3	3	3	3	3	3	3	3
E	23 17 411	Wildlife Guard - Cover Cutout		3	3	3	3	3	3	3	3	3	3	3	3
F	20 53 089	Link, Fuse - 25T		-	-	-	-	-	-	3	-	-	-	-	3
	20 53 084	Link, Fuse - 12T		-	-	-	-	-	3	-	-	-	-	3	-
	20 53 090	Link, Fuse - 65T		-	-	-	-	3	-	-	-	-	3	-	-
	20 53 087	Link, Fuse - 30T		-	-	-	3	-	-	-	-	3	-	-	-
	20 53 085	Link, Fuse - 15T		-	-	3	-	-	-	-	-	-	-	-	-
	20 53 200	Link, Fuse - 80T		-	3	-	-	-	-	-	-	-	-	-	-
	20 53 088	Link, Fuse - 40T		3	-	-	-	-	-	-	3	-	-	-	-
G	23 52 097	Bolt - Mach. 3/4" x 12"		2	2	2	2	2	2	2	2	2	2	2	2
H	23 66 031	Washer, Curved, Square, 3/4"		2	2	2	2	2	2	2	2	2	2	2	2
I	18 51 021	Wire, Cu, #6 S.D., Poly Covered		10	10	10	10	10	10	10	10	10	10	10	10
J	23 66 135	Lock Washer - 3/4" Double Coil		2	2	2	2	2	2	2	2	2	2	2	2
K	23 65 042	Lock Nut - 3/4" Square		2	2	2	2	2	2	2	2	2	2	2	2
L	23 52 065	Bolt, Mach., 5/8" x 12" w/ square nut		2	2	2	2	2	2	2	2	2	2	2	2
M	23 66 207	Washer, Curved, Square, 5/8"		2	2	2	2	2	2	2	2	2	2	2	2
N	23 66 134	Lock Washer - 5/8" Double Coil		2	2	2	2	2	2	2	2	2	2	2	2
O	23 65 043	Lock Nut - 5/8" Square		2	2	2	2	2	2	2	2	2	2	2	2
@ P	07 00 25 00 @	Clamp - Parallel Groove, PG*		4	4	4	4	4	4	4	4	4	4	4	4
12, @ Q	23 17 473	Animal Guard - Pole Wrap		#	#	#	#	#	#	#	#	#	#	#	#
14, @ R	04 00 20 03	Crossarm, w/ Brace 10'		1	1	1	1	1	1	1	1	1	1	1	1
	04 00 41 16	Crossarm, FG, 10' Tangent		1	1	1	1	1	1	1	1	1	1	1	1
@ S	12 00 10 02	Grounding Unit - Ground Rod		1	1	1	1	1	1	1	1	1	1	1	1
	12 00 10 01	Grounding Unit - Ground Coil		1	1	1	1	1	1	1	1	1	1	1	1
@ T	07 00 21 00 @	Clamp - Hot Line, HLC*W		3	3	3	3	3	3	3	3	3	3	3	3
	07 00 25 00 @	Clamp - Parallel Groove, PG*		3	3	3	3	3	3	3	3	3	3	3	3
@ U	16 00 24 00 @	Control, Time, Temp, Volt, Beckwith		1	1	1	1	1	1	1	1	1	1	1	1
	16 00 26 00 @	Control, Capacitor, Current or VAR		1	1	1	1	1	1	1	1	1	1	1	1
5, @ V	23 68 746	Grounding Clips		#	#	#	#	#	#	#	#	#	#	#	#

DISTRIBUTION CONSTRUCTION STANDARDS

REV	DATE	ENG	DESCRIPTION
12	10/01/23	DT	Updated Drawing, Updated BOM, New Note 9, 10, 12, 14, & 16
11	4/1/19	DT	



CAPACITORS AND REGULATORS

Switched Cap Bank Installation
Three Phase - Communicating

16 15 03 **

5, 15kV

6 of 6

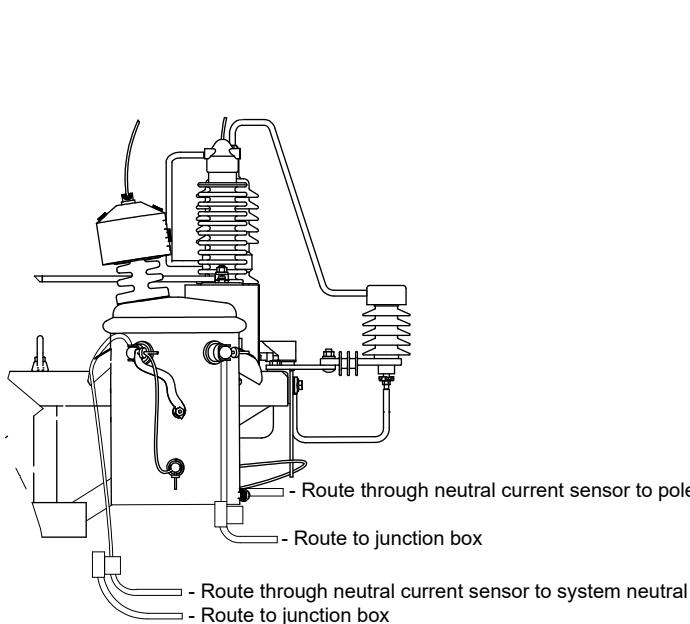
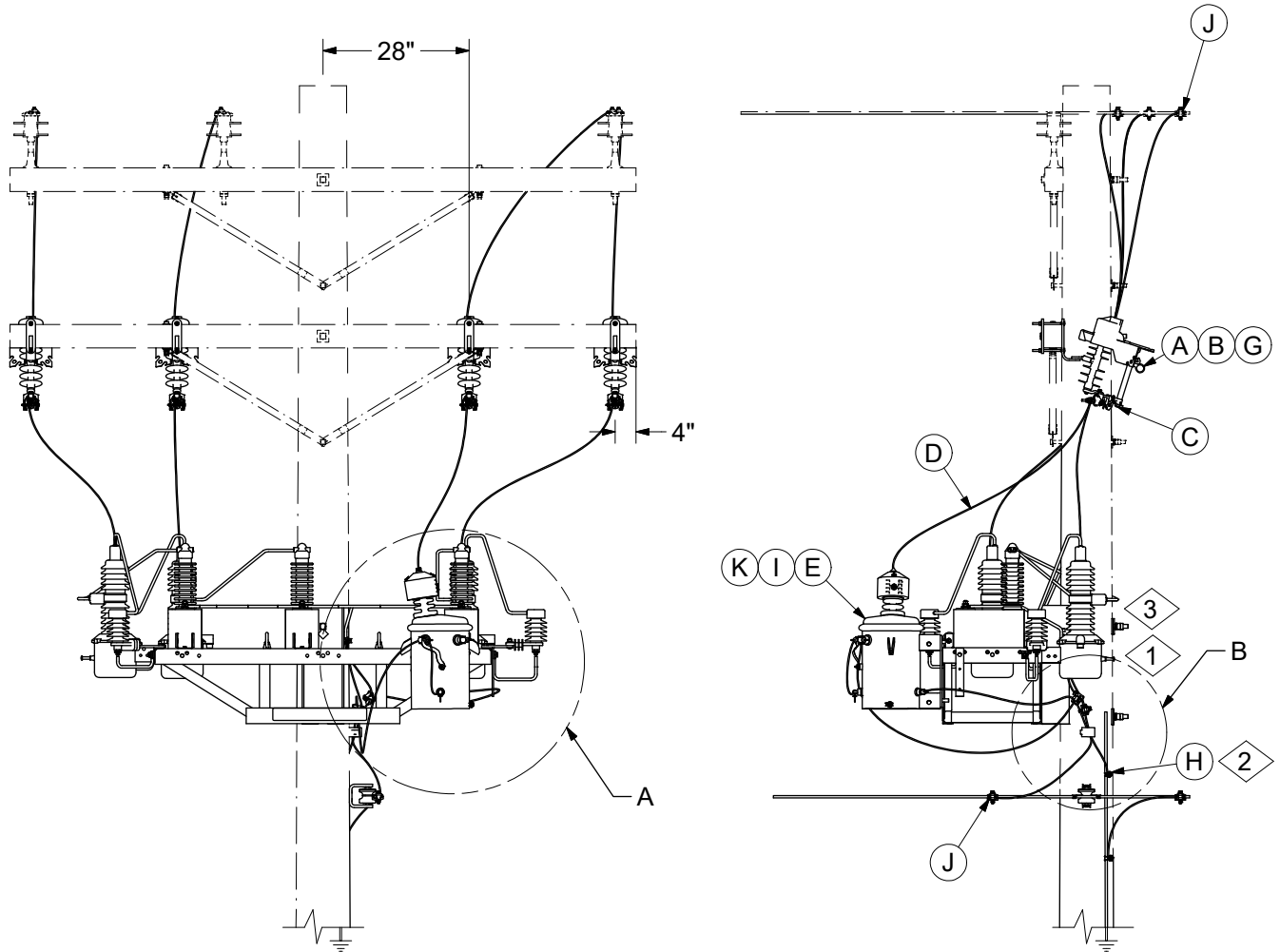
DESIGN NOTE(s):

- 13. Capacitor control settings or SCADA may require source and load to be reversed from configuration shown for current or VAR controlled schemes.
- 14. Grounded wye cap banks shall only be installed on circuits with a continuous primary neutral and/or static from substation.
- 15. 8'-0" Crossarms may be substituted when required.
- 16. Communicating cap bank controller can be used in non-communicating applications with local settings.

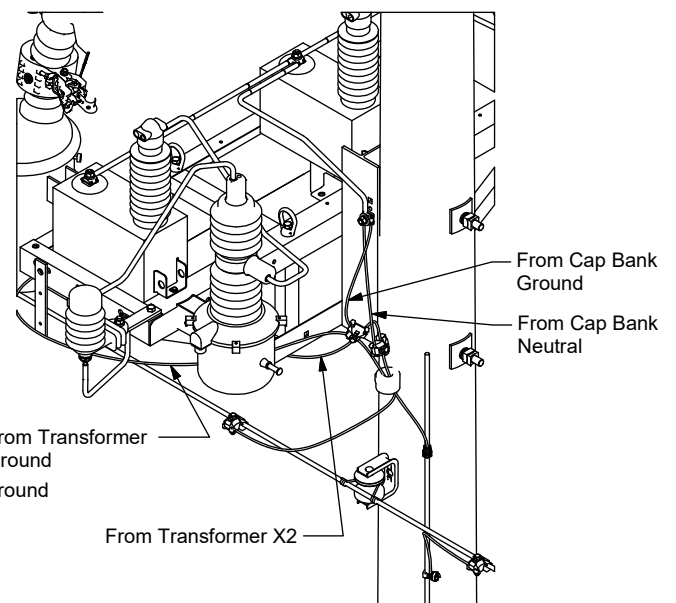
OPERATIONS NOTE(s):

- 17. Loadbreak tool, Stock #83 38 028, must be used to open cutout switches. Capacitor bank oil/vacuum switches should be primary method used to operate bank.

REV	DATE	ENG	DESCRIPTION
12	10/01/23	DT	Updated Drawing, Updated BOM, New Note 9, 10, 12, 14, & 16
11	4/1/19	DT	



Detail A



Detail B



CAPACITORS AND REGULATORS

Installation of 1kVA Transformer
Capacitor Bank

16 15 05 01

15kV

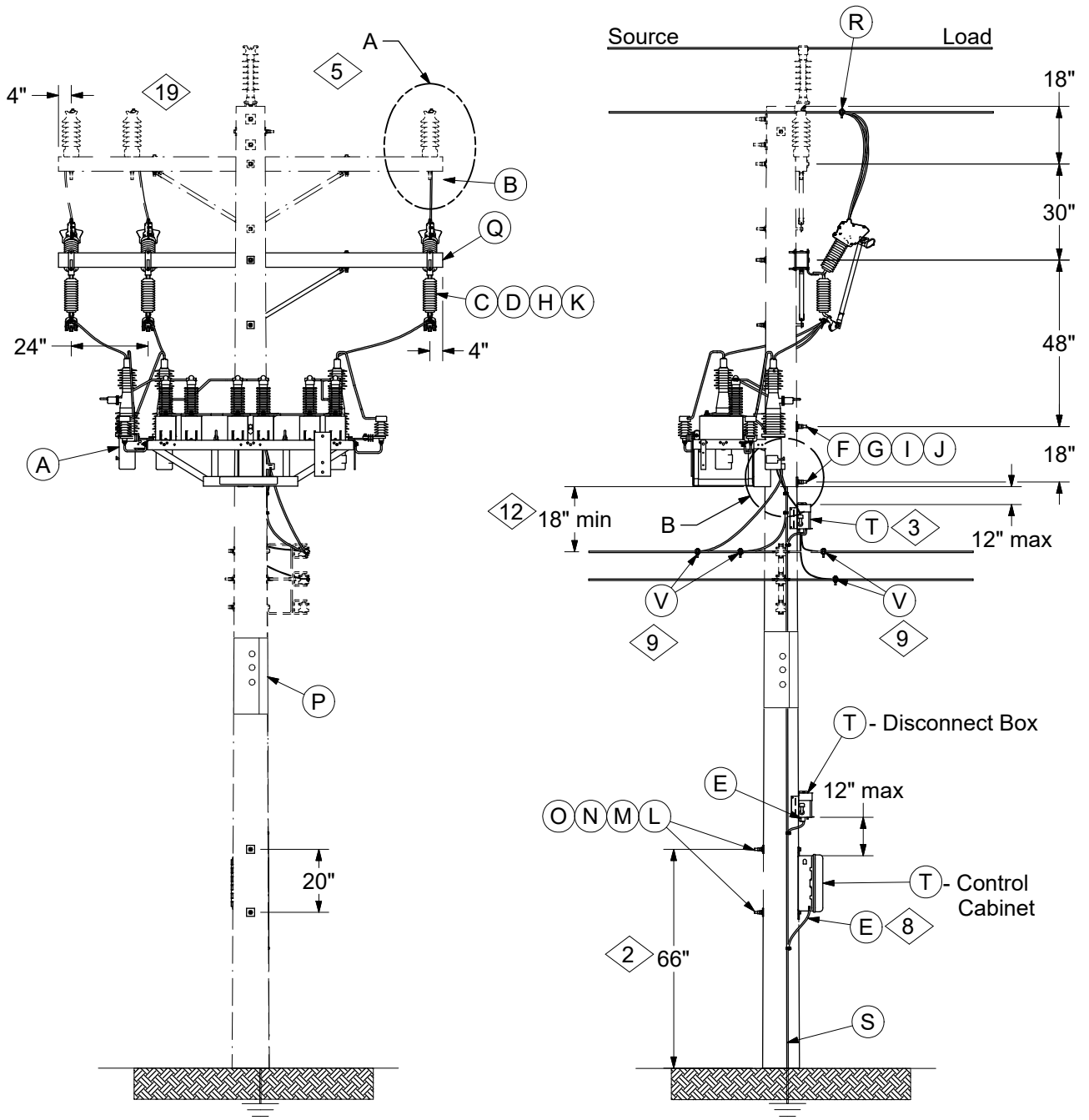
2 of 2

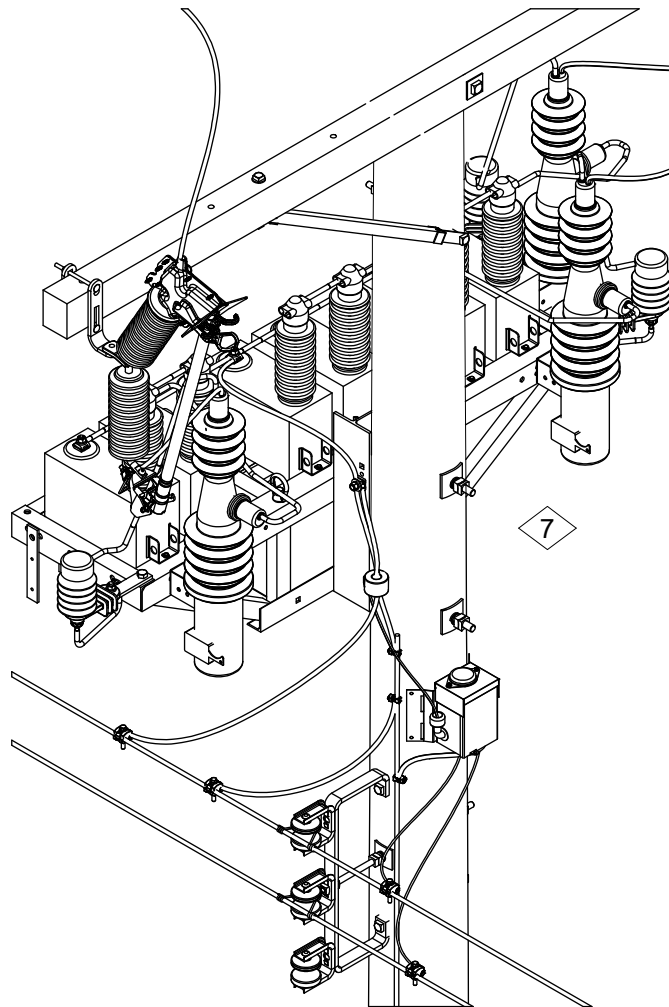
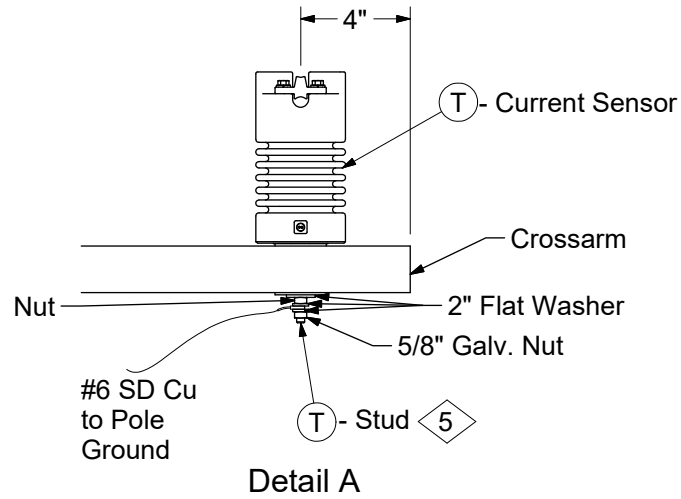
CONSTRUCTION NOTE(s):

1. Typical mounting location is shown. Transformer may be mounted in other positions where mounting bracket is provided.
2. The transformer shall have two ground connections; one ground connection should be between the transformer ground and pole ground and one should be between X2 and the system neutral. The transformer shall have a ground strap between X2 and transformer ground. The capacitor bank shall have a ground between the capacitor rack and pole ground, the capacitor bank neutral should connect to the system neutral.
3. From junction box, route #10 white conductor and connect to #4 neutral lead connected to X2, route #10 black conductor and connect to #4 supply lead connected to X1.
4. For capacitor bank wiring diagram, refer to DCS **16 00 05 00**. For capacitor control wiring diagram with current sensor, refer to DCS **16 00 26 ****. For capacitor control wiring diagram without current sensor, refer to DCS **16 00 24 ****. For capacitor bank installation, see DCS **16 15 03 ****.

	ITEM	STK / DCS #	DESCRIPTION	16 15 05 **	01
	A	54 07 208	Switch, Fused, Open Type		1
	B	17 58 054	Bracket, Switch, Arrester		1
	C	20 53 197	Link, Fuse, 0.75X		1
	D	18 51 025	Wire, #4 Riser (ft)		16
	E	23 52 049	Bolt, Mach., 5/8" x 2" w/ square nut		2
	F	40 59 156	Tie, Nylon, Black		3
	G	23 17 411	Wildlife Guard - Cover Cutout		1
	H	17 54 182	Connector - Split Bolt, #4 Str. to 1/0 Str.		3
	I	23 65 043	Locknut, 5/8"		2
@	J	07 00 25 00 @	Clamp, Parallel Groove, PG*		2
@	K	MK0001F	Transformer, 7200V, 1kVA		1
		SK0001F	Transformer, 7620V, 1kVA		1

REV	DATE	ENG	DESCRIPTION
2	10/01/23	DT	Updated drawing, Updated BOM, New Note 4
1	4/01/19	DT	





Detail B



CAPACITORS AND REGULATORS

Switched Cap Bank Installation
Three Phase - Communicating

16 34 02 **

35kV

3 of 5

CONSTRUCTION NOTE(s):

1. Minimum clearance from the ground to the bottom of the capacitor rack shall be 15 feet.
2. Clearance from the ground to the top of the control cabinet shall be 5'-6" from the ground. The bottom of disconnect box shall be installed 1'-0" max above the top of control cabinet. The next hand or foot hold shall be 8'-0" or greater above the top of the disconnect box.
3. The top of the junction box shall be mounted a maximum of 1'-0" below the capacitor bank frame. Leads to the capacitor switches shall be secured to the frame of the bank with tie wire. The junction box/meter socket kit includes 35' of pre-wired liquid-tight conduit. The liquid-tight must be stapled every 2'-0". Excess liquid-tight shall be coiled with tie wire and secured to the pole between the junction box and the disconnect box.
4. For capacitor bank wiring schematic, refer to DCS **16 00 05 00**. For capacitor control wiring schematic with current sensor, refer to DCS **16 00 26 00**. For capacitor control wiring schematic without current sensor, refer to DCS **16 00 24 00**.
5. For installations with a current sensor, the current sensor will be installed in place of an insulator, the current sensor stud shall be bonded to pole ground and the sensor cable shall be secured with a staple, refer to detail A. If current sensor is installed on fiberglass crossarm, the current sensor cable and current sensor ground wire shall be trained to the bottom of the crossarm using 6 groundwire clips, Stock #23 28 746.
6. Low voltage wires from line post current sensor should be connected in the junction box on the bank before the primary wire is energized on the sensor. However, if the primary on the sensor is energized, as long as the base of sensor is grounded, the sensor wires are safe to connect (low output current and voltage).
7. Neutral current sensor output can reach 40V if sensor wires are not terminated when current is present on wires routed through sensor. For material and connection in the junction box; for installations without current sensor refer to DCS **16 00 24 00**, with current sensor refer to DCS **16 00 26 00**. The neutral current sensor, shall be mounted below the bank. All connections between the cap bank neutral or cap bank ground, including any equipment installed on the capacitor rack frame, and the pole ground or neutral shall pass through the neutral current sensor in the same direction to capture all the neutral current. No other wires should pass through the sensor. The sensor shall be installed on the wires between the capacitor rack and their connections to pole ground and the distribution system neutral using a staple to secure a wire above and below the sensor. The sensor cable should be routed to the junction box. See Detail B.
8. The junction box, disconnect box, capacitor rack, capacitor control, and current sensor, if equipped, must be connected to pole ground.
9. Bond between pole ground and neutral shall only be made when neutral is common to primary and/or static.
10. Connect #10 white conductor to neutral and #10 black conductor to 120 V supply.
11. The 120V voltage source for the controller shall come from a transformer on the circuit the capacitor bank is being installed on.
12. The minimum distance from the capacitor bank frame to the secondary line conductor is 18". If underbuild on pole, bank lower mounting bolt must be 24" or more above the underbuild line conductor.
13. Pole wrap comes in 100 ft. rolls.

REV	DATE	ENG	DESCRIPTION
7	10/01/23	DT	Updated drawing, Updated BOM, Updated Notes
6	07/30/16	WYW	



CAPACITORS AND REGULATORS

Switched Cap Bank Installation
Three Phase - Communicating

16 34 02 **

35kV

4 of 5

Size	DCS#
2400kVAR	16 34 02 02
4500kVAR	16 34 02 04

ITEM	STK / DCS #	DESCRIPTION	16 34 02 **	02	04
A	69 11 301	Capacitor Bank - Switched 4500kVAR 34.5kV	-	1	
	69 11 302	Capacitor Bank - Switched 2400kVAR 34.5kV	1	-	
B	18 51 025	Wire, #4 Cu, Poly Covered	25	25	
C	54 06 052	Switch, Fused, SMD-20, 34kV	3	3	
D	20 04 355	Refill, Fuse, SMU 80E Slow	-	3	
	20 04 343	Refill, Fuse, SMU 50K	3	-	
E	18 51 021	Wire, Cu, #6 S.D., Poly Covered	20	20	
F	23 52 219	Bolt, Mach., 3/4" x 14" w/ square nut	2	2	
G	23 66 031	Washer, Curved, Square, 3/4"	2	2	
H	17 58 054	Bracket, Arrester/Cutout Mounting	3	3	
I	23 66 135	Lock Washer - 3/4" Double Coil	2	2	
J	23 65 042	Lock Nut - 3/4" Square	2	2	
K	23 17 532	Bird Guard, 34kV SMD20	3	3	
L	23 52 068	Bolt, Mach., 5/8" x 16" w/ square nut	2	2	
M	23 66 207	Washer, Curved, Square, 5/8"	2	2	
N	23 66 134	Lock Washer - 5/8" Double Coil	9	2	
O	23 65 043	Lock Nut - 5/8" Square	2	2	
13,@ P	23 17 473	Wildlife Protection - Pole Wrap	#	#	
16,@ Q	04 00 41 16	Crossarm, FG, 10'	1	1	
	04 00 20 03	Crossarm, Wood, 10'	1	1	
@ R	07 00 21 00 @	Clamp, Hotline, HLC*W	3	3	
	07 00 25 00 @	Clamp, Parallel Groove, PG*	3	3	
@ S	12 00 10 10 @	Grounding Unit - Ground Rod	1	1	
	12 00 10 09 @	Grounding Unit - Ground Coil	1	1	
@ T	16 00 26 00 @	Control, Capacitor, Current or VAR	1	1	
	16 00 24 00 @	Control, Capacitor, Time, Temp Voltage	1	1	
19,@ U	23 17 526	Wildlife Cover, Pin Insulator	#	#	
@ V	07 00 25 00 @	Clamp, Parallel Groove, PG	4	4	
5,@ W	23 68 746	Grounding Clip	#	#	

DISTRIBUTION CONSTRUCTION STANDARDS

REV	DATE	ENG	DESCRIPTION
7	10/01/23	DT	Updated drawing, Updated BOM, Updated Notes
6	07/30/16	WYW	



CAPACITORS AND REGULATORS

Switched Cap Bank Installation
Three Phase - Communicating

16 34 02 **

35kV

5 of 5

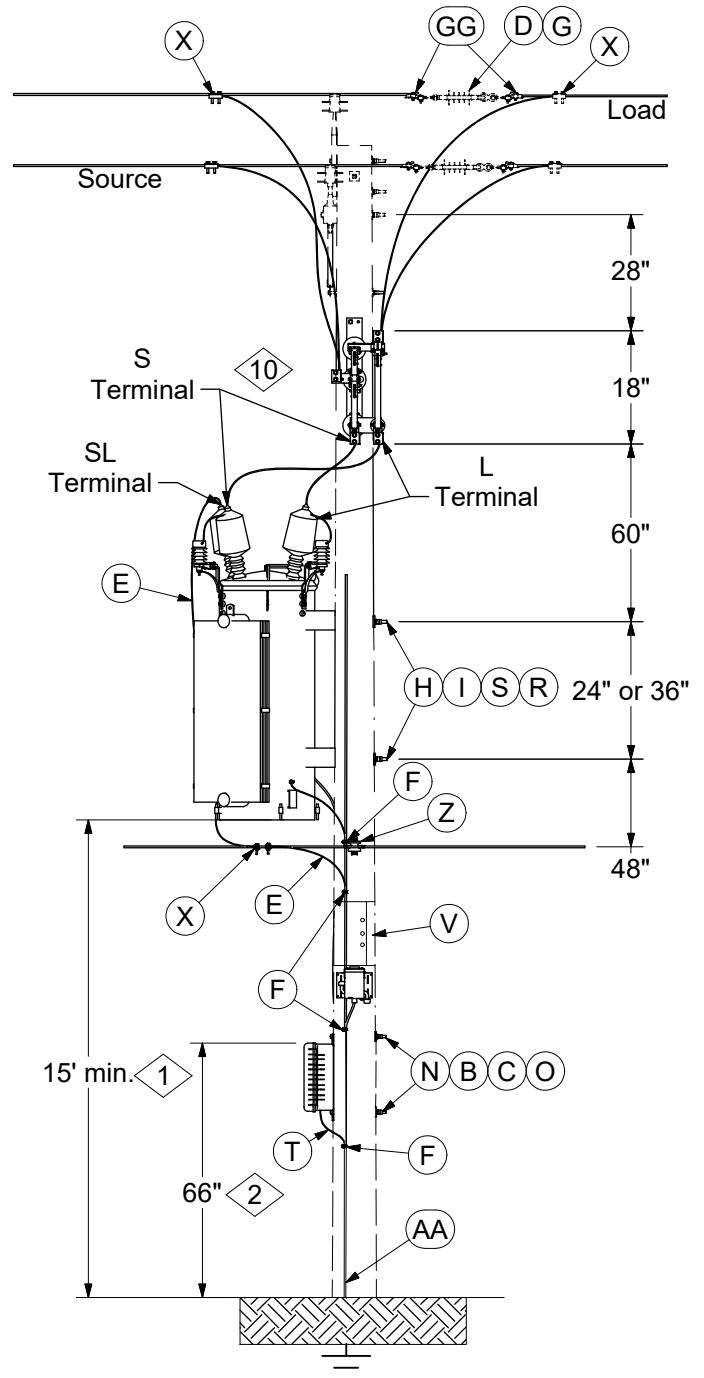
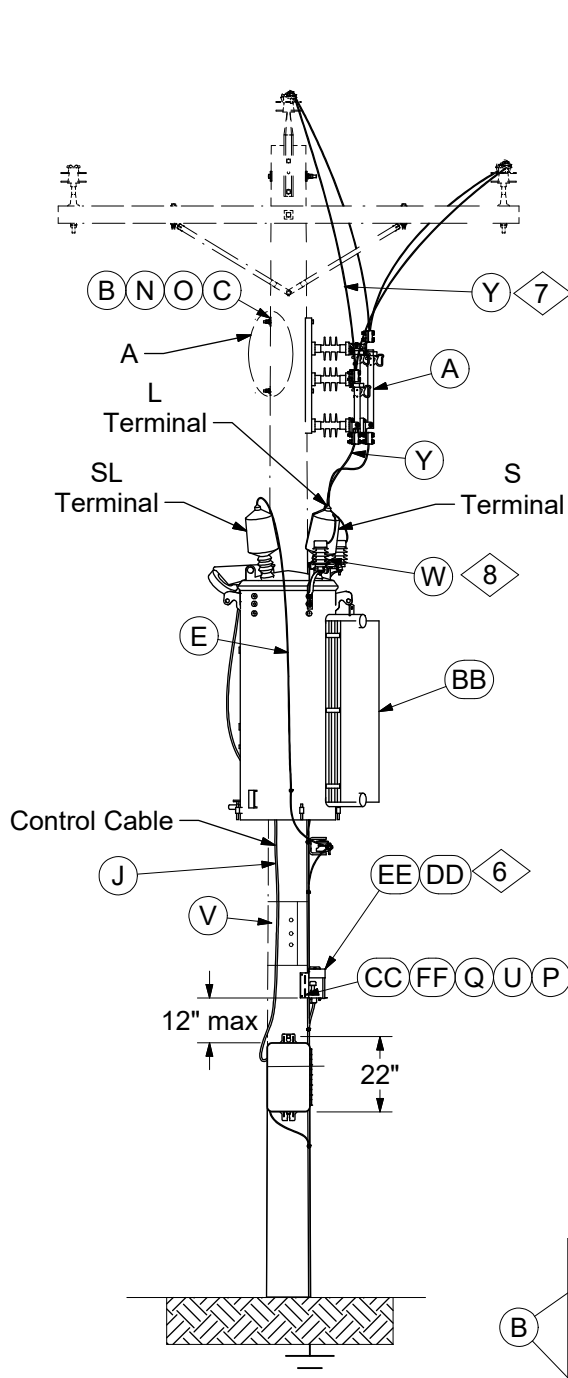
DESIGN NOTE(s):

14. Capacitor control settings or SCADA may require source and load to be reversed from configuration shown for current or VAR control schemes.
15. Grounded wye cap banks shall only be installed on circuits with a continuous primary neutral and/or static from substation.
16. 8'-0" crossarms may be substituted when required.
17. Communicating cap bank controller can be used in non-communicating applications with local settings.
18. If static is present, maintain 8'-0" separation between static wire and upper bolt of phase crossarm.
19. If middle phase is on crossarm, pin insulator cover required for center phase. If current sensor is installed on crossarm for middle phase, install pin insulator cover over outer phase on same side of pole.

OPERATIONS NOTE(s):

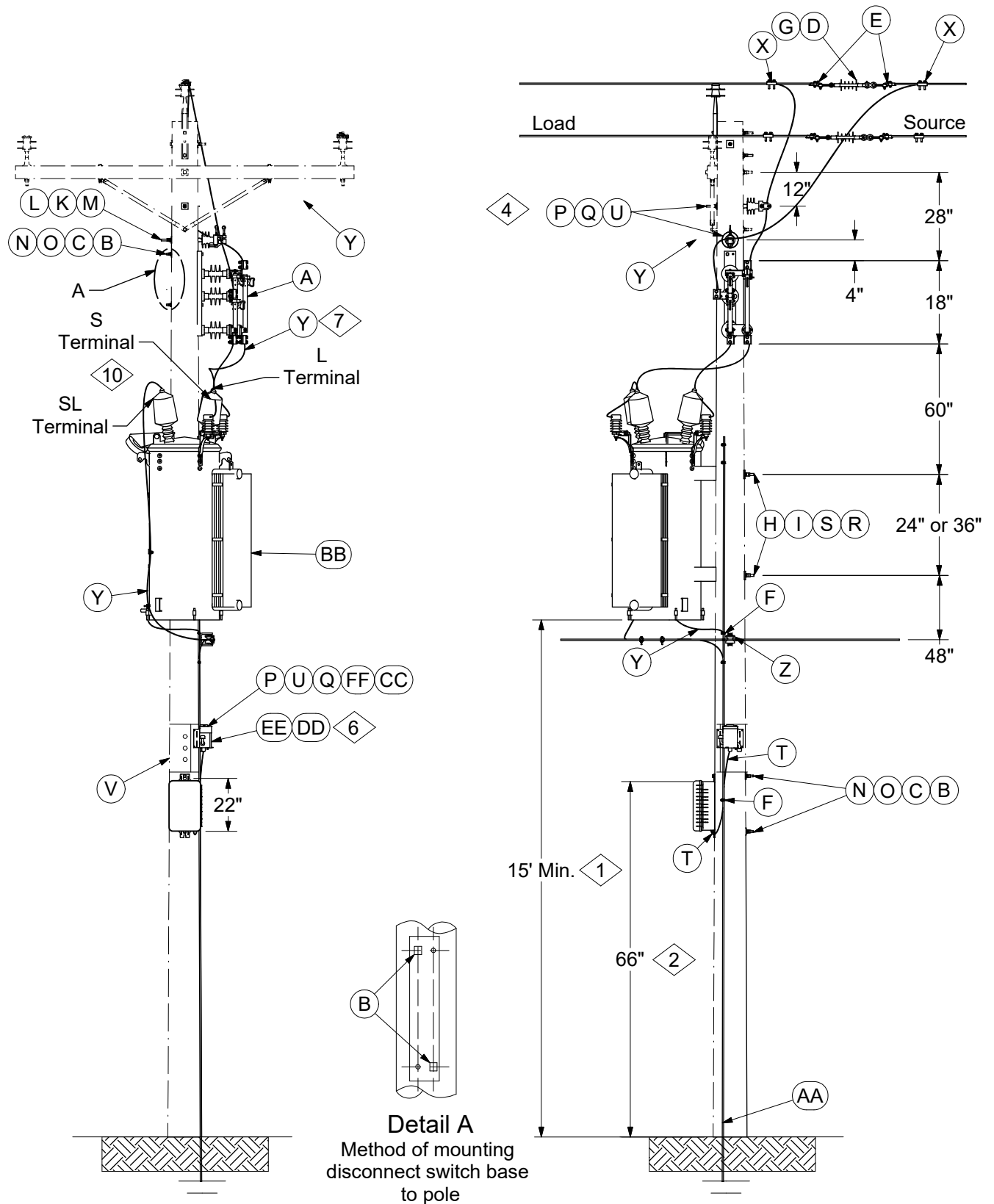
20. Loadbreak tool (Stock #84 26 042) must be used to open cutout switches. Cap bank oil/vacuum switches should be primary method used to operate bank.

REV	DATE	ENG	DESCRIPTION
7	10/01/23	DT	Updated drawing, Updated BOM, Updated Notes
6	07/30/16	WYW	



Detail A
Method of mounting disconnect
switch base to pole

16 80 01 01
Option 1



16 80 01 02 - Near & Center Phase

16 80 01 03 - Far Phase

Option 2



CAPACITORS AND REGULATORS

Regulator
Pole Mounted Single Phase

16 80 01 **

5, 15kV

3 of 5

CONSTRUCTION NOTE(s):

1. Minimum clearance from the ground to the bottom of the regulator tank shall be 15'-0".
2. Clearance from ground to the top of the control cabinet shall be 5'-6" from the ground. If a communications box is present, there shall be a maximum of 1'-0" between the top of control cabinet and bottom of comm box. The next hand or foot hold shall be 8'-0" or greater above the control cabinet, or comm box.
3. 7620V regulators come set for 7200V, 2500V come set for 2400V. If a different voltage is required, the appropriate tap must be selected by moving a connector on the terminal strip under the hand hole on top of the regulator.
4. Install a vice top insulator to train the wire from the right side of the switch to the far phase.
5. When practical, tap change position indicator should be located on street side of pole.
6. For Illinois VO only. If required, the communications box shall be mounted to the pole by bolting an H bar bracket to the pole with a 5/8" bolt for the top and bottom of the cabinet. 3/8" bolts shall be used to mount the cabinet to the T slot of the H bar. The maximum vertical separation between regulator control cabinet and communication box shall be 12". The communications box shall be bonded to pole ground.
7. Maximum conductor size for regulator leads, between bypass switch and regulator, shall be 1/0 for 100 and 150 amp regulators. Leads between bypass switch and line conductor shall be sized based on line conductor.
8. Use 10kV arresters for 7620V regulator. Use 3kV arresters for 2500V regulator.
9. Pole wrap comes in 100 ft. rolls.
10. See Figure 1 for regulator wiring schematic.

REV	DATE	ENG	DESCRIPTION
8	10/01/23	DT	Updated Drawing, Updated BOM, New Notes 3, 7-10, 12, & 13
7	4/01/19	DT	



CAPACITORS AND REGULATORS

Regulator
Pole Mounted Single Phase

16 80 01 **

5, 15kV

4 of 5

Regulator Table					
Stock Number - Regulator Line	Voltage	Amps	kVA	Weight in lbs. Eaton	Weight in lbs. GE
69 09 078	2500	200	50	1200	-
69 09 125	2500	400	100	2526	-
69 09 126	2500	668	167	2509	-
69 09 005	7620	100	76.2	1270	1499
69 09 007	7620	150	114.3	1585	1613
69 09 006	7620	219	167	1975	1905

ITEM	STK / DCS #	DESCRIPTION	16 80 01 **	01	02	03
A	54 07 455	Switch, By-Pass, 600A		1	1	1
B	23 52 309	Bolt, Mach., 1/2" x 16" w/ square nut		4	4	4
C	23 66 118	Washer, Square, 1/2"		4	4	4
D	25 06 052	Insulator, Susp. 15kV		1	1	1
E	18 51 025	Wire, #4 Cu Poly, Riser		12	12	12
F	17 54 005	Connector - Split Bolt, #2 Solid to #6 Solid		4	4	4
G	23 59 064	Link Figure 8		1	1	1
H	23 52 219	Bolt, Mach., 3/4" x 14" w/ square nut		2	2	2
I	23 66 031	Washer, Curved, Square, 3/4"		2	2	2
J	23 64 001	Staple - Ground Wire, Serrated Cu Clad		16	16	16
4 K	25 05 143	Insulator, Vice Top, 12kV		-	1	2
L	23 62 128	Adapter Pin for Vice Top Insulator		-	1	2
M	23 53 002	Bolt, DA, 5/8" Dia x 16" w/ 4 Square Nuts		-	1	2
N	23 65 056	Lock Nut - 1/2" Square		4	4	4
O	23 66 133	Lock Washer - Double Coil 1/2"		4	4	4
P	23 65 043	Lock Nut - 5/8" Square		2	4	6
Q	23 66 134	Lock Washer - 5/8" Double Coil		2	3	4
R	23 65 042	Lock Nut - 3/4" Square		2	2	2
S	23 66 135	Lock Washer - 3/4" Double Coil		2	2	2
T	18 51 021	Wire, Cu, #6 S.D., Poly		6	6	6
U	23 66 207	Washer, Curved, Square, 5/8"		2	4	6
9,@ V	23 17 473	Animal Guard - Pole Wrap		#	#	#
8,@ W	10 01 145	Arrester - Lightning, 10kV		1	2	2
	10 01 256	Arrester - Lightning, 3kV		2	2	2
@ X	07 00 25 00	@ Clamp - Parallel Groove, PG*		4	4	4
7,@ Y	07 00 80 00	@ Wire, Poly, S.D. (ft.), PLW*W		50	50	50
@ Z	03 01 00 00	@ Secondary Configuration		1	1	1
@ AA	12 00 10 01	Grounding Unit, 7#10CW, Ground Coil		1	1	1
	12 00 10 02	Ground Unit, 7#10CW, Ground Rod		1	1	1
@ BB	Regulator Table	Regulator		1	1	1
11,@ CC	62 51 563	Bracket, H Bar (VO Only)		2	2	2
11,@ DD	69 59 004	Kit, Communications (VO Only)		1	1	1
11,@ EE	69 59 003	Radio, GE Orbitz, ECR, Single Port (VO Only)		1	1	1
11,@ FF	23 52 068	Bolt, Mach., 5/8" x 16" w/ square nut		2	2	2
@ GG	07 00 11 00	@ Clamp, Deadend, DEC*W		2	2	2

DISTRIBUTION CONSTRUCTION STANDARDS

REV	DATE	ENG	DESCRIPTION
8	10/01/23	DT	Updated Drawing, Updated BOM, New Notes 3, 7-10, 12, & 13
7	4/01/19	DT	

DESIGN NOTE(s):

11. Stock #s 62 51 563, 69 59 004, 69 59 003, and 23 52 068 are only for Illinois VO project.
12. 7620V regulators have taps for 2400V, 4160V, 7200V, 7620V, and 7970V. 2500V regulators have taps for 2400V and 2500V. Regulator kVA ratings are based on nameplate circuit voltage rating and will change based on circuit voltage. Nameplate current ratings remain the same when installed on different circuit voltages.
13. Regulators shall only be installed line to ground on grounded wye distribution circuits with a continuous neutral.
14. Use Option 1 or 2 that places the switch in the most favorable position to operate (road side if no other preference).

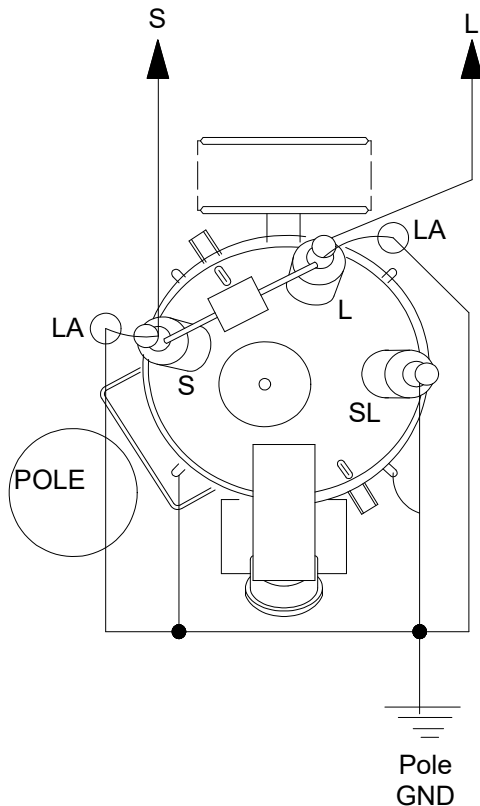


Figure 1
Regulator Wiring Schematic

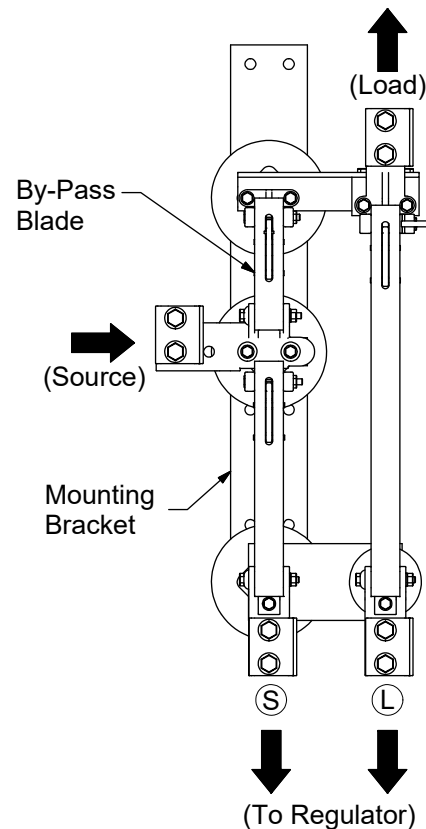
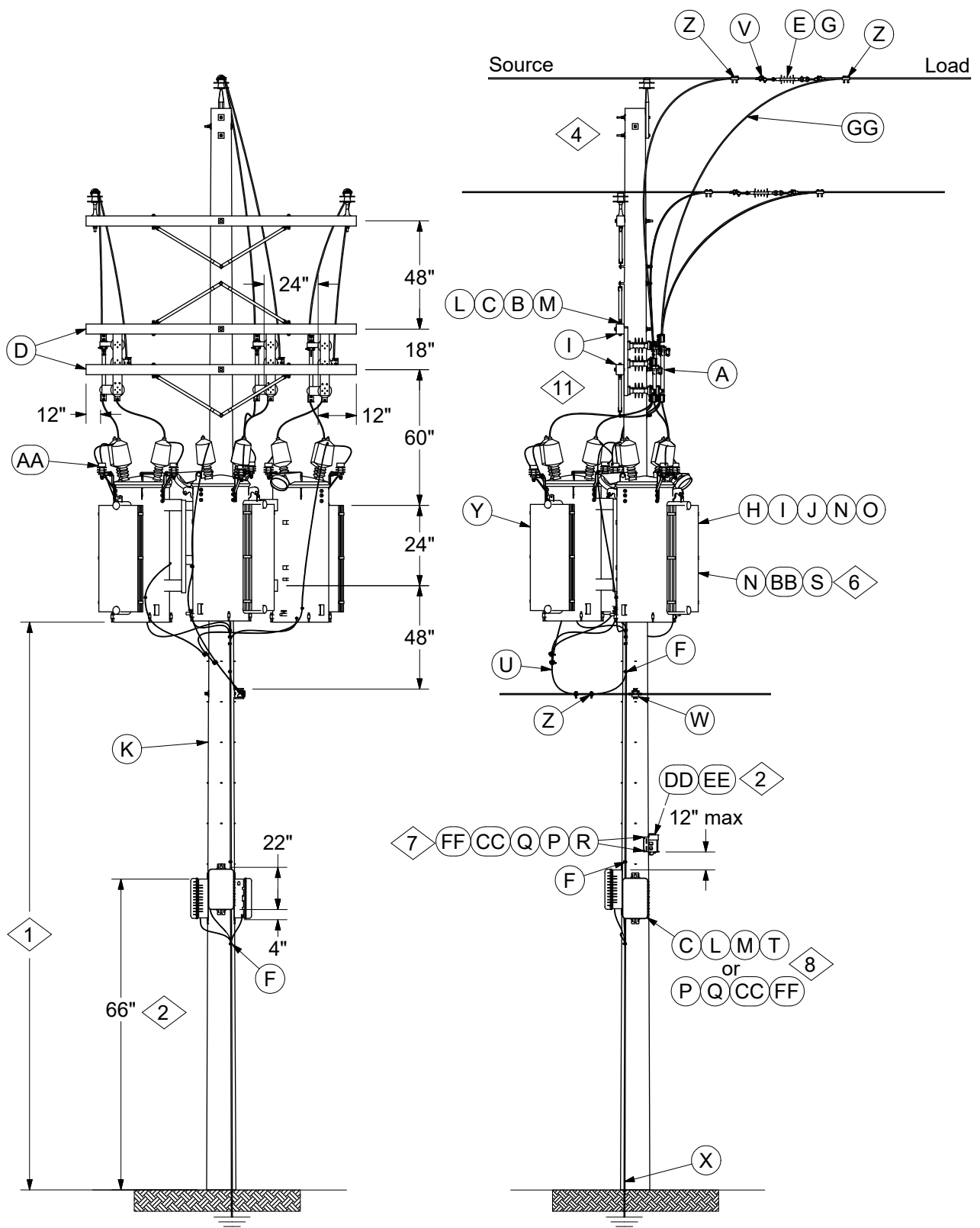


Figure 2
By-Pass Switch

OPERATING NOTE(s):

15. To by-pass regulator: See Figure 2
 - A. Set regulator on neutral position. (Follow appropriate procedures to verify regulator is on neutral)
 - B. Close the short by-pass blade.
 - C. Open the source and load blades.
16. To re-energize regulator: See Figure 2
 - A. With by-pass blade closed, set regulator on neutral position.
 - B. Close the source side blade only to test the regulator.
 - C. Close the source and load blades to the regulator.
 - D. Open the short by-pass blade.
 - E. Place regulator in service.





CAPACITORS AND REGULATORS

Regulator
Pole Mounted, Three Phase

16 80 03 01
5, 15 kV
2 of 5

CONSTRUCTION NOTE(s):

1. Minimum clearance from the ground to the bottom of the regulator tank shall be 15'-0".
2. Clearance from ground to the top of the control cabinet shall be 5'-6" from the ground. If a communications box is present, there shall be a maximum of 1'-0" between the top of the control cabinet and bottom of comm box. The next hand or foot hold shall be 8'-0" or greater above the control cabinet.
3. 7620V regulators come set for 7200V, 2500V regulators come set for 2400V. If a different voltage is required, the appropriate tap must be selected by moving a connector on the terminal strip under the hand hole on top of the regulator.
4. Maximum conductor size for regulator leads, between bypass switch and regulator, shall be 1/0 for 100 and 150 amp regulators. Leads between bypass switch and line conductor shall be sized on line conductor.
5. Use 10kV arresters for 7620V regulator. Use 3kV arresters for 2500V regulator.
6. Each Eaton 219A regulator requires an adapter plate (Stock #69 58 127) and two 3/4" x 2" machine bolts and two 3/4" lock nuts. GE 219A regulators do not require adapter plate.
7. For Illinois VO only. If required, the communications box shall be mounted to the pole by bolting an H bar bracket to the pole with a 5/8" bolt for the top and bottom of the cabinet. 3/8" bolts shall be used to mount the cabinet to the T slot of the H bar, two 5/8" bolts and two H bars are required. The maximum vertical separation between regulator control cabinet and communication box shall be 12". The communications box shall be bonded to pole ground.
8. For installations without enough space to mount control cabinets directly to pole with 1/2" bolts, control cabinet may be mounted to the pole by bolting an H bar bracket to the pole with a 5/8" bolts for the top and bottom of the cabinet. 3/8" bolts would then be used to mount the cabinet to the T slot of the H bar. A total of four 5/8" bolts, locking hardware and six H bars would be required.
9. Bond between pole ground and neutral shall only be made if neutral is common to primary.
10. Pole wrap comes in 100 ft roll.
11. For regulator wiring schematic, see Figure 2.

REV	DATE	ENG	DESCRIPTION
11	10/01/23	DT	Updated Drawing, Updated BOM, New Notes 3, 4, 9, 10, 11, 13, & 14
10	04/01/19	DT	



CAPACITORS AND REGULATORS

Regulator
Pole Mounted, Three Phase

16 80 03 01
5, 15 kV
3 of 5

Regulator Table					
Regulator-Stock #	Voltage	Amps	kVA	Weight (lbs) Per Unit	Weight (lbs) per unit
				Eaton	GE
69 09 078	2500	200	50	1200	-
69 09 125	2500	400	100	2526	-
69 09 126	2500	668	167	2509	-
69 09 005	7620	100	76.2	1270	1499
69 09 007	7620	150	114.3	1585	1613
69 09 006	7620	219	167	1975	1905

ITEM	STK / DCS #	DESCRIPTION	16 80 03 **	01
A	54 07 455	Switch, By-Pass, 600A		3
B	23 52 038	Bolt, Mach., 1/2" x 6" w/ square nut		12
C	23 66 118	Washer, Square, 1/2"		16
D	04 00 20 03	Crossarm w/ Brace 10'		2
E	25 06 052	Insulator, Susp. 15kV		3
F	17 54 005	Connector - Split Bolt		10
G	23 59 064	Link Figure 8		3
H	23 52 219	Bolt, Mach., 3/4" x 14" w/ square nut		2
I	23 66 031	Washer, Curved, Square, 3/4"		2
J	23 17 202	Mounting Unit, 3 Pos. Heavy (Three 75kVA to 167kVA Trans.)		1
K	23 64 028	Staple		48
L	23 65 056	Lock Nut - 1/2" Square		16
M	23 66 133	Lock Washer - Double Coil 1/2"		16
N	23 65 042	Lock Nut - 3/4" Square		8
O	23 66 135	Lock Washer - 3/4" Double Coil		2
P	23 65 043	Lock Nut - 5/8" Square		6
Q	23 66 134	Lock Washer - 5/8" Double Coil		6
R	23 66 027	Washer, Flat, Square 5/8"		6
S	23 52 321	Bolt, Mach., 3/4" x 2" w/ square nut		6
T	23 52 310	Bolt, Mach, 1/2" x 18"		4
U	18 51 025	Wire #4, Cu Poly Riser		36
@ V	07 00 11 00	@ Clamp, Deadend DEC*W		6
@ W	03 01 ** **	@ Secondary Configuration		1
@ X	12 00 10 02	Grounding Unit - Ground Rod , 7#10		1
	12 00 10 01	Grounding Unit - Ground Coil, 7#10		1
@ Y	Regulator Table	Regulator		3
@ Z	07 00 25 00	@ Clamp - Parallel Groove		8
5,@ AA	10 01 145	Arrester, Lightning, 10kV		6
	10 01 256	Arrester, Lightning, 3 kV		6
6,@ BB	69 58 127	Adapter, Mounting Plate 36" to 24" Lug Spacing		3
7,8,@ CC	62 51 563	Bracket, H Bar		8
7,10,@ DD	69 59 004	Kit, Communications (VO only)		1
7,10,@ EE	69 59 002	Radio, GE Orbitz, MCR, 4 Port (VO Only)		1
7,8,@ FF	23 52 068	Bolt, Mach., 5/8" x 16"		6
4,@ GG	07 00 80 00	@ Wire, Poly, S.D. (ft.) PLW*W		150
10,@ HH	23 17 473	Pole Wrap, Animal Guard		#

DISTRIBUTION CONSTRUCTION STANDARDS

REV	DATE	ENG	DESCRIPTION
11	10/01/23	DT	Udated Drawing, Updated BOM, New Notes 3, 4, 9, 10, 11, 13, &14
10	04/01/19	DT	

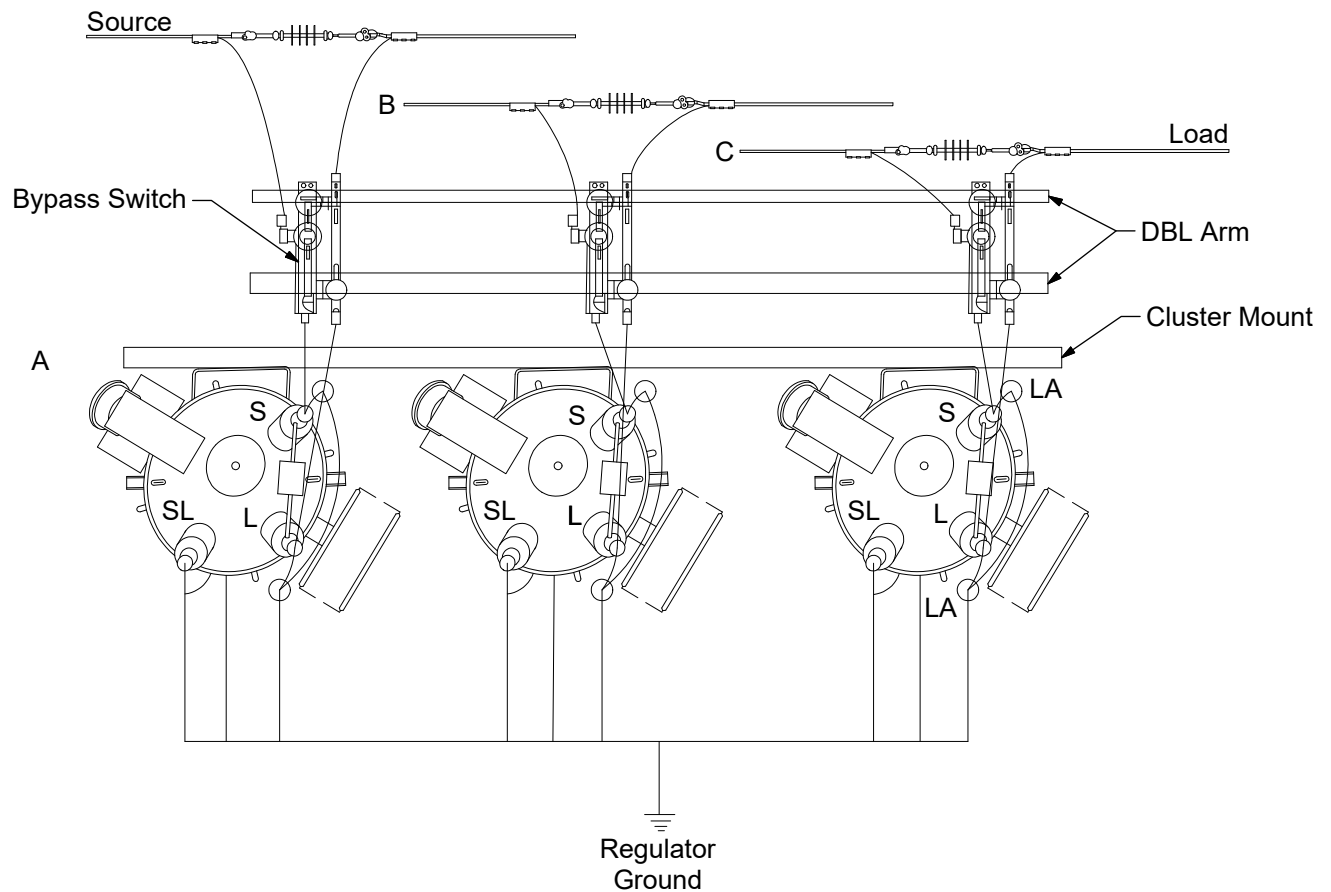


Figure 1
Regulator Wiring Schematic
Grounded Wye

DESIGN NOTE(s):

12. Stock #69 59 004 and Stock #69 59 002 are only for Illinois VO project.
13. 7620V regulators have taps for 2400V, 4160V, 7200V, 7620V, and 7970V. 2500V regulators have taps for 2400V and 2500V. Regulator kVA ratings are based on nameplate circuit voltage rating and will change based on circuit voltage. Nameplate current ratings remain the same when installed on different circuit voltages.
14. Regulators may only be installed in a wye configuration when there is a continuous distribution neutral and/or static from the substation.

OPERATIONS NOTE(s):

15. To By-Pass Regulator, See Figure 2
 - A. Set regulator on neutral position. (Follow appropriate procedures to verify regulator is on neutral.)
 - B. Close the short by-pass blade.
 - C. Use load-buster tool and open the load blade.
 - D. Open the source blade.
16. To Re-Energize Regulator, See Figure 2
 - A. With by-pass blade closed, set regulator on neutral position.
 - B. Close the source side blade only to test the regulator.
 - C. Close the source and load blades to the regulator.
 - D. Open the short by-pass blade.
 - E. Place regulator in service.

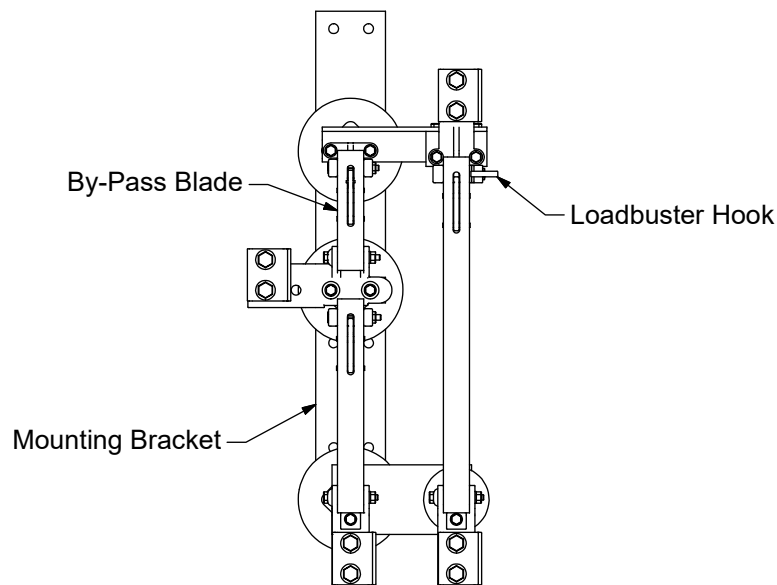


Figure 2
Bypass Switch