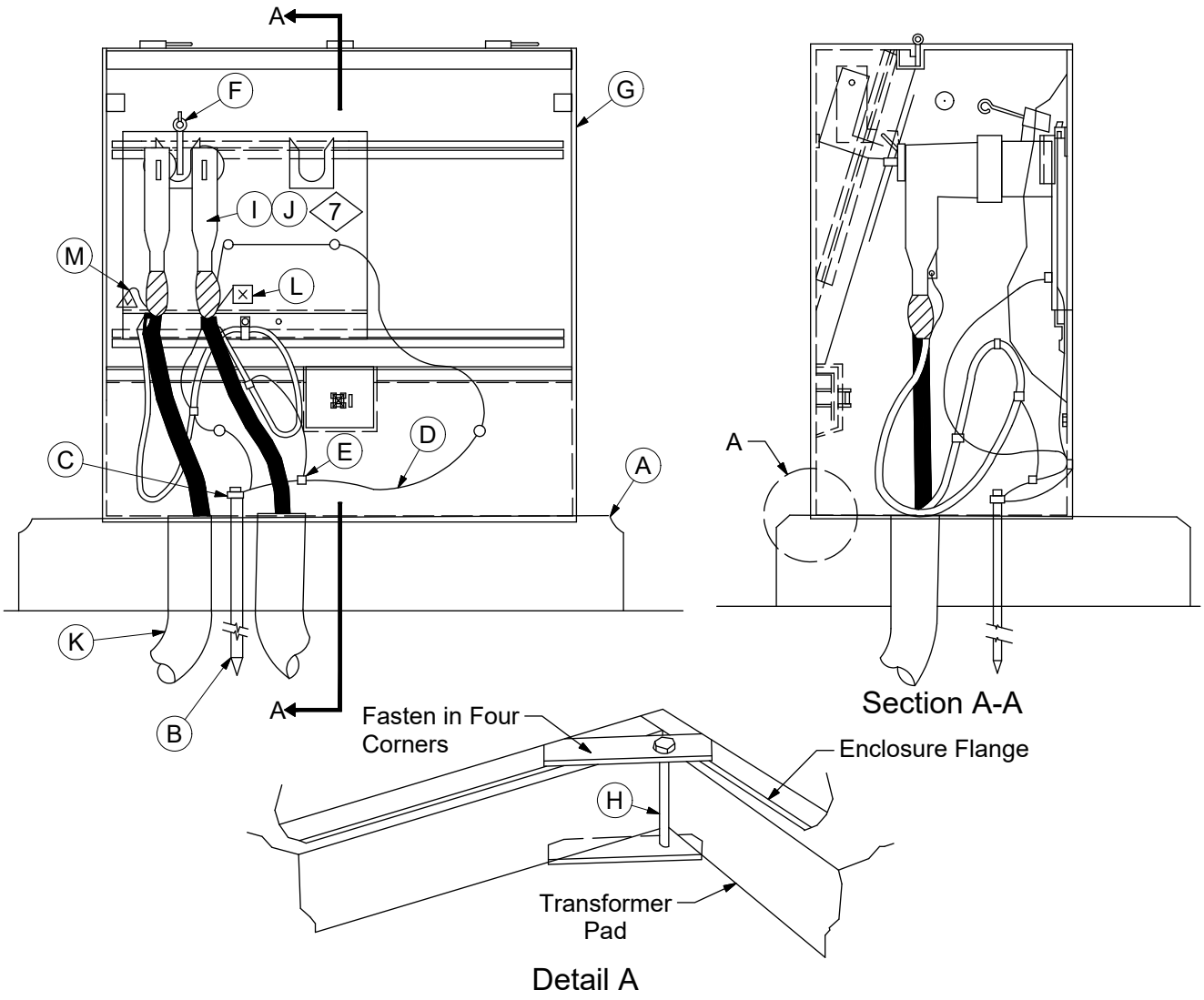
PRIMARIES UG EQUIPMENT 51



CONSTRUCTION NOTE(s):

1. Secure compartment to pad using hold down plates and hold down brackets. Hold down plates will be furnished with the composite pads and hold down brackets will be furnished with the compartments. If hold down brackets are missing or if additional brackets are required they may be ordered (Stock #23 56 041).

2. See DCS **34 21 05 ****** for the location of conduits.

3. Train cables so that elbows can be operated safely and easily. Ground as shown.

4. Remove the shipping caps from a feed thru bushing and wipe the surfaces clean. Apply silicone grease (Stock #31 51 050) before installing a loadbreak elbow, insulating cap, or elbow lightning arrester. Place the feed thru bushing into one of the parking stands provided. If more than two cable positions are required, use DCS **51 11 06 ****.

5. DO NOT ENERGIZE a feed thru bushing with a shipping cover in place. Covers are only intended to keep the bushing interfaces clean during shipping and handling. Use a high voltage insulating cap (Stock #17 55 227) to cover an unused position on the feed thru bushing.

6. A minimum clearance of 10' shall be provided at the front of the compartment.

7. Install elbow arrester if cable does not feed through this enclosure.

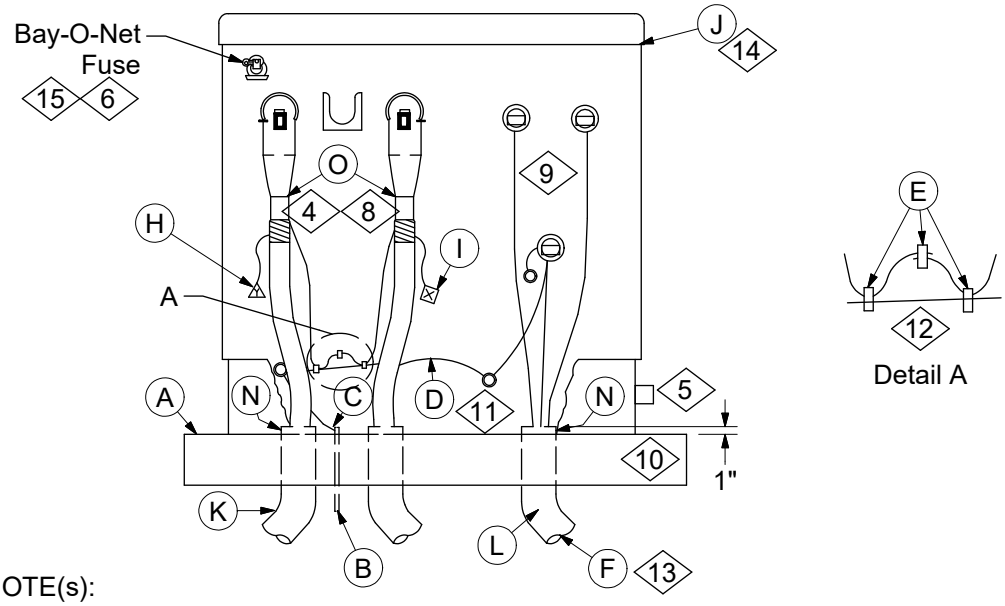
REV	DATE	ENG	DESCRIPTION
12	01/01/23	DG	Converted to new format
11	09/07/17	DG	

	ITEM	STK / DCS #	DESCRIPTION 51 11 02 **	01	02
8	A	12 06 198	Pad - Transf. 42” x 42” x 4”, Composite	1	-
	B	23 13 069	Rod - Grd. 5/8” x 8’	1	1
	C	17 52 032	Clamp - Grd. Rod. 5/8” for #8 -- 1/0	1	1
	D	18 52 025	Wire - Cu., # 2 S.D. (ft.)	10	10
	E	17 54 373	Connector - Split Bolt	3	3
	F	17 55 228	Bushing - Feed Thru	1	1
	G	54 07 235	Enclosure - Primary Pedestal	1	1
	H	23 56 041	Bracket - Hold Down	4	4
@	I	**42 34 62 01**	Termination - Elbow, #2	#	#
7 @	J	**54 11 01 01**	Arrester, 10kV Elbow	#	#
8 @	K	12 51 173	Bend - Plastic, 3”, 36” Rad	#	#
@	L	16 51 079	Tag - Letter X, Red Sq.	1	1
@	M	16 51 080	Tag - Letter Y, Blue Tri.	1	1

DESIGN NOTE(s):

8. In Missouri residential developments, the contractor will install the pad and bends. Use DCS **51 11 02 02**.

9. Faulted circuit indicators (Stock #60 55 001) may be installed on the out-going cables.



CONSTRUCTION NOTE(s):

1. Train cables and provide enough concentric neutral length to allow movement of the elbows from the bushings to the parking stand. Primary and secondary cables must have a minimum of 1" clearance to the enclosure walls.

2. Bolts and hold down plates for securing the transformer to the pad are provided with the pad.

3. See DCS **34 21 05 ****** for pad installation.

4. Order two elbows if in a loop, one elbow if at end of a radial feed. For 4/0 cable, substitute elbow termination with DCS **42 34 62 02**.

5. External provision for grounding - for use by communication companies.

6. Positions of bay-o-net fuses may vary.

7. For most Illinois transformer installations, Ameren will install the pad and bends-see DCS **51 11 04 04**. For Missouri residential and commercial developments the contractor will install the pad and bends - see DCS **51 11 04 02**. For some Missouri individual transformer installations, Ameren will install the pad and bends - see DCS **51 11 04 03**.

8. Elbow arresters should be installed at all open points including the last transformer in a radial feed - see DCS **54 11 01 01**.

9. Transformers are delivered with slip-fit set screw type lugs on each secondary bushing stud. The lugs have eight positions and will accommodate cables up to 500 kcmil. If larger cables are used, the lugs can be replaced with five position lugs that will accommodate cables up to 750 kcmil. For 75kVA and smaller transformers use Stock #17 55 230. For 100kVA and larger transformers use Stock #17 55 229.

10. If bends are cut off, apply a bell end coupling (O) over the end of each conduit.

11. Run continuous length of #2 bare CU ground wire to connect an open port of the X2 connector, to the two lower tank grounds, and to the ground rod. Ground rod can be located where most convenient in the pad opening to avoid the incoming and outgoing conduit elbows.

12. Grounding practices are different in Missouri and Illinois.
In Missouri - Connect cable concentric neutrals to the #2 bare CU ground and then end-to-end using 3 split bolt connectors as shown in this detail.
In Illinois - Cable Concentric neutrals may be single-point connected to the #2 bare CU ground using hot-line clamps or split bolt connectors.

REV	DATE	ENG	DESCRIPTION
22	01/01/23	DG	Converted to new format
21	01/01/20	DG	

DCS #	Description
51 11 04 01	Ameren Installed with Lightweight Pad
51 11 04 02	Contractor Installed with Heavy Pad
51 11 04 03	Ameren Installed with Heavy Pad
51 11 04 04	Ameren Installed with Lightweight Pad and Conduit ◇13◇

	ITEM	STK / DCS #	DESCRIPTION 51 11 04 **	01	02	03	04
7	A	**34 21 05 01**	Pad, Transformer, Lightweight	1	-	-	1
		34 21 05 02	Pad, Transformer, Heavy	-	C	1	-
	B	23 13 069	Rod, Ground, 5/8" x 8'	1	1	1	1
	C	17 52 032	Clamp, Ground Rod, 5/8" For #8 − 1/0	1	1	1	1
	D	18 52 025	Wire, Cu., #2 S.D. (ft.)	5	5	5	5
	E	17 54 373	Connector, Split Bolt	3	3	3	3
13 @	F	12 01 263	Conduit, 2−1/2", SCH 40 PVC, (200 A Service) (ft.)	-	-	-	#
		12 01 279	Conduit, 3" , SCH 40 PVC, (400 A Service) (ft.)	-	-	-	#
13 @	G	49 55 520	Marker, Buried Conduit, Red	-	-	-	#
@	H	16 51 080	Tag, Letter "Y", Blue Tri.	1	1	1	1
@	I	16 51 079	Tag, Letter "X", Red Sq.	1	1	1	1
14 @	J	MR- - -X	Transformer, 7200V or	1	1	1	1
		MZ- - -X	Transformer, 7200V or	1	1	1	1
		TR- - -X	Transformer, 7970V or	1	1	1	1
		WR- - -X	Transformer, 2400V x 7200V or	1	1	1	1
		SR- - -X	Transformer, 7620V or	1	1	1	1
		SZ- - -X	Transformer, 7620V or	1	1	1	1
		ZR- - -X	Transformer, 2400V x 7200V x 7620V or	1	1	1	1
		ZZ- - -X	Transformer, 2400V x 7200V x 7620V	1	1	1	1
@	K	12 51 173	Bend, Conduit, PVC, 3", 36" Rad. (Primary)	#	C	#	#
13 @	L	12 51 173	Bend, Conduit, PVC, 3", 36" Rad. (Secondary & 400A Service)	-	C	-	#
		12 51 331	Bend, Conduit, PVC, 1-1/2", 24" Rad. (Streetlight)	-	C	-	-
		12 51 264	Bend, Conduit, PVC, 2-1/2", 24" Rad. (200 A Service)	-	-	-	#
8 @	M	**54 11 01 01**	Arrester, 10kV Elbow or	#	-	#	#
		54 11 01 03	Arrester, 10kV Parking Stand	#	-	#	#
10 @	N	40 83 492	Coupling − Conduit, PVC, Bell End, 1-1/2"	#	C	#	#
		12 51 398	Coupling − Conduit, PVC, Bell End, 2-1/2"	#	#	#	#
		12 51 008	Coupling − Conduit, PVC, Bell End, 3"	#	C	#	#
4 @	O	**42 34 62 01**	Elbow, Termination, #2 Al.	#	#	#	#

"C" = Contractor Installed Materials (Missouri Only)

DESIGN NOTE(s):

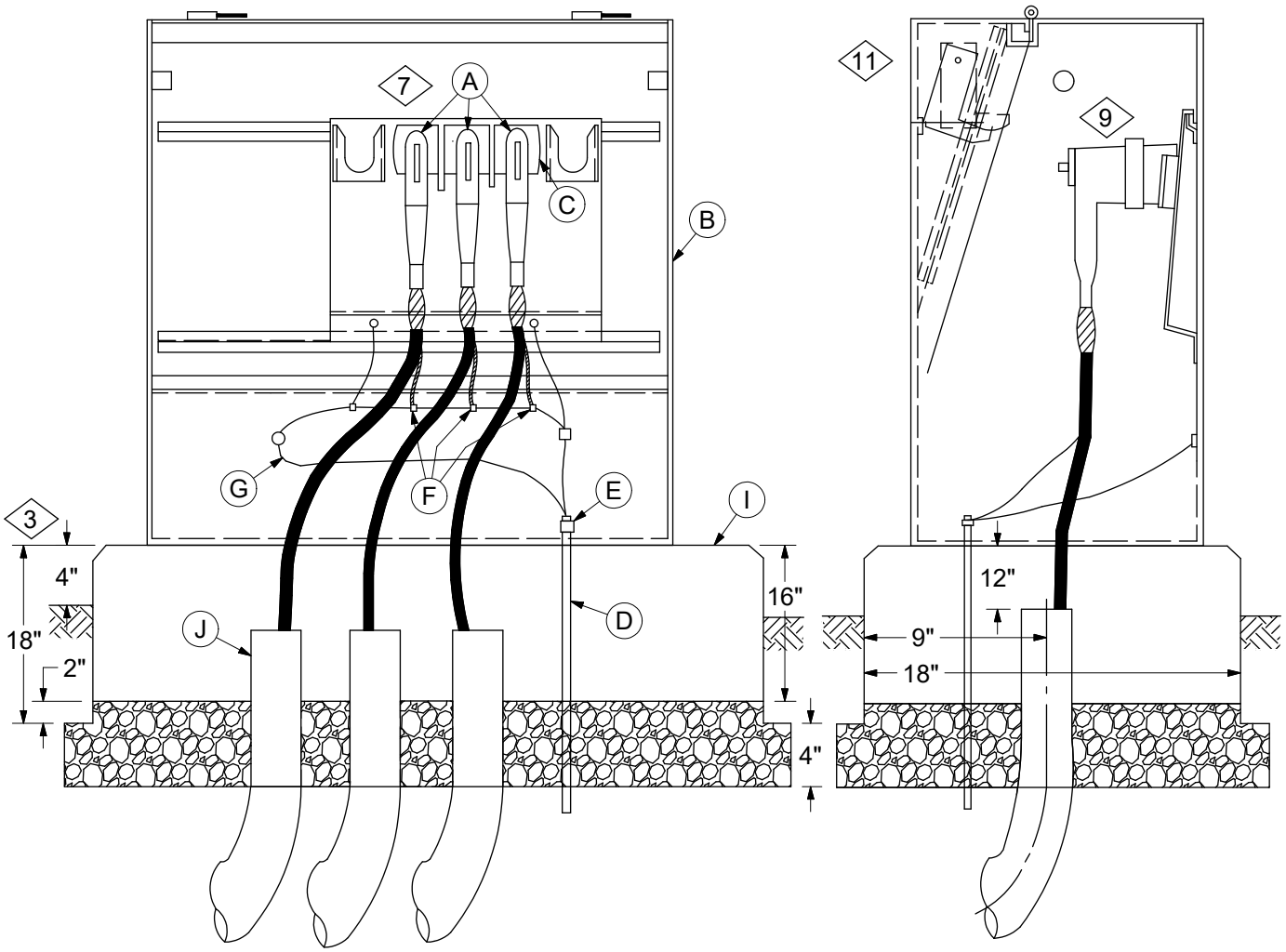
◇13◇ DCS **51 11 04 04** is required in Illinois for residential subdivision developments when the transformer is placed on the property line. Adder items F,G and L need to be ordered depending on the expected size (200 A or 400A) and quantity of services and secondary runs anticipated.

◇14◇ See DCS **13 00 01 02** for single-phase padmount transformer selection.
See DCS **13 00 04 01** for typical transformer dimensions, weight, and oil volumes.

OPERATING NOTE(s):

◇15◇ See DCS **59 51 53 40** for bay-o-net fuse operation and replacement.

REV	DATE	ENG	DESCRIPTION
22	01/01/23	DG	Converted to new format
21	01/01/20	DG	



FRONT VIEW

SIDE VIEW

CONSTRUCTION NOTE(s):

1. An initial depth of 18” shall be excavated and all loose soil shall be removed or tamped. The length and width of the hole should be sized to allow a minimum of 6” of clearance on all sides.

2. To install the 36” radius bends, an increase in the initial excavation depth will be required. After the bends have been installed, crushed stone screening shall be placed and tamped to the level shown.

3. The final depth should be adjusted to provide 4” of exposed ground sleeve pad at final grade.

4. Stabilize the ground sleeve pad over the conduits before backfilling so that there will be no shifting. Provide 12” of space between the load bearing surface of the ground sleeve pad and the end of each conduits.

5. To further stabilize the ground sleeve pad and the bends, place additional screening inside the ground sleeve pad and hand tamp in place.

6. Backfill with loose material, DO NOT backfill next to the ground sleeve pad with chunks of material or rocks. Pack loose backfill by foot tamping and do not tamp excessively close to the ground sleeve pad sides.

REV	DATE	ENG	DESCRIPTION
16	01/01/23	JMW	Converted to new format
15	09/14/17	JMW	

7. Drawing illustrates a 3-way Junction. To install 3-way or 4-way junctions, remove the mounting plate from the enclosure. Mount 3-way junctions using the two"U" straps and bolts furnished with the junctions. Mount 4-way junctions using the three "U" straps and bolts furnished with the junction. Mount the junctions so that the center line is approximately 24" from the top of the pad. After the junction is installed, replace the mounting plate. Secure the plate in a convenient location.

   NOTE: If only two cables will be installed, use a feed thru bushing. Place the feed thru bushing into one of the parking stands. If the installation is to be a dummy transformer, see DCS **51 11 02 01**.

8. Train cables so that elbows can be operated safely and easily. Ground as shown.

9. Remove the shipping covers from the junctions and wipe the surfaces clean. Apply silicone grease (Stock #31 51 050) before installing a loadbreak elbow, insulating cap, or lightning arrester.

10. CAUTION: If all junction positions are not used, a high voltage insulating cap (Stock #17 55 227) must be installed on the unused positions.
    DO NOT ENERGIZE a junction with a shipping cover in place. Covers are only intended to keep the bushing interfaces clean during shipping and handling.

11. 10’ minimum clearance shall be provided at the front of the primary pedestal.

12. Faulted circuit indicators should be installed on the elbows at the cable entrance. All concentric neutral wires must be outside of the faulted circuit indicator closed core CT. Faulted circuit indicators should be installed on the out-going cables.

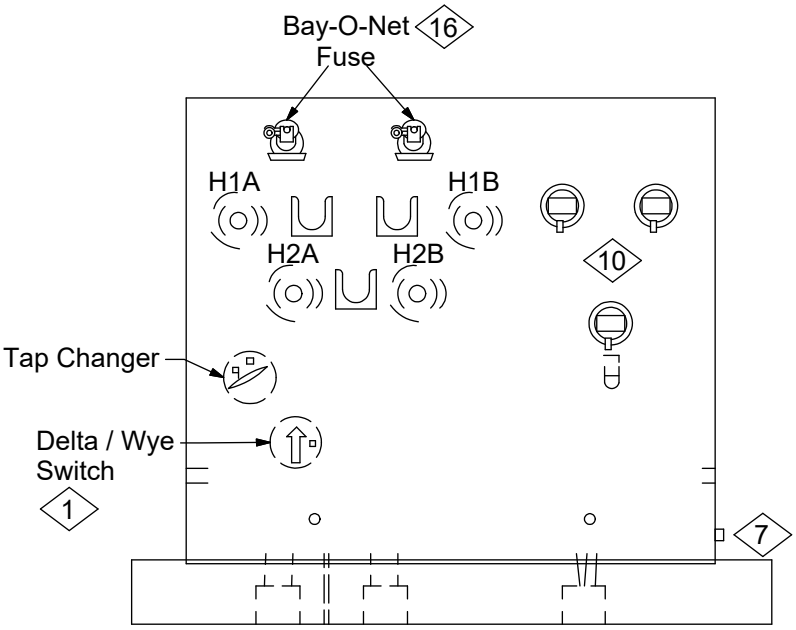
13. In Missouri residential developments, the contractor will install the sleeve and bends. See DCS **51 11 06 04** thru **51 11 06 06**.

14. Lightning protection should be installed at open points. See DCS **54 11 01 ****.

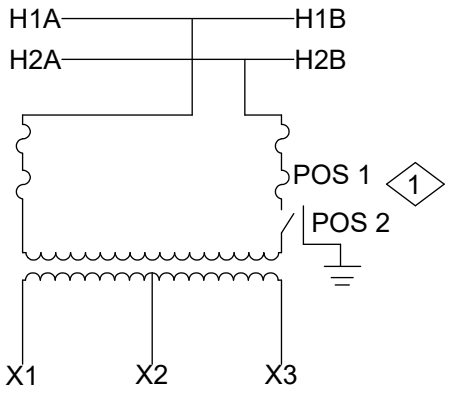
15. If bends are cut off apply a bell end coupling (M) over the end of each conduit.

	ITEM	STK / DCS #	DESCRIPTION 51 11 06 **	01	02	03	04	05	06
	A	**42 34 62 01**	Termination - Elbow, #2	2	3	4	2	3	4
	B	54 07 235	Enclosure - Primary Pedestal	1	1	1	1	1	1
	C	17 07 137	Junction - Load Break 3--way	-	1	-	-	1	-
		17 07 138	Junction - Load Break 4--way	-	-	1	-	-	1
	D	23 13 069	Rod - Grd. 5/8” x 8’	1	1	1	1	1	1
	E	17 52 032	Clamp - Grd Rod 5/8” For #8 -- 1/0	1	1	1	1	1	1
	F	17 54 373	Conector - Split Bolt	3	3	4	3	3	4
	G	18 52 025	Wire - Cu. #2 S.D. (ft.)	12	12	12	12	12	12
	H	17 55 228	Bushing - Feed Thru	1	-	-	1	-	-
	I	12 06 134	Pad - Ground Sleeve	1	1	1	-	-	-
@	J	12 51 173	Bend - Plastic, 3” 36” Rad	2	3	4	-	-	-
		12 51 176	Bend - Plastic, 4” 36” Rad	-	-	-	-	-	-
@	K	60 55 001	Indicator - Faulted Circuit	1	2	3	1	2	3
@	L	12 51 008	Coupling - Conduit, Plastic, Bell End, 3”	#	#	#	#	#	#
		12 51 254	Coupling - Conduit, Plastic, Bell End, 4”	#	#	#	#	#	#

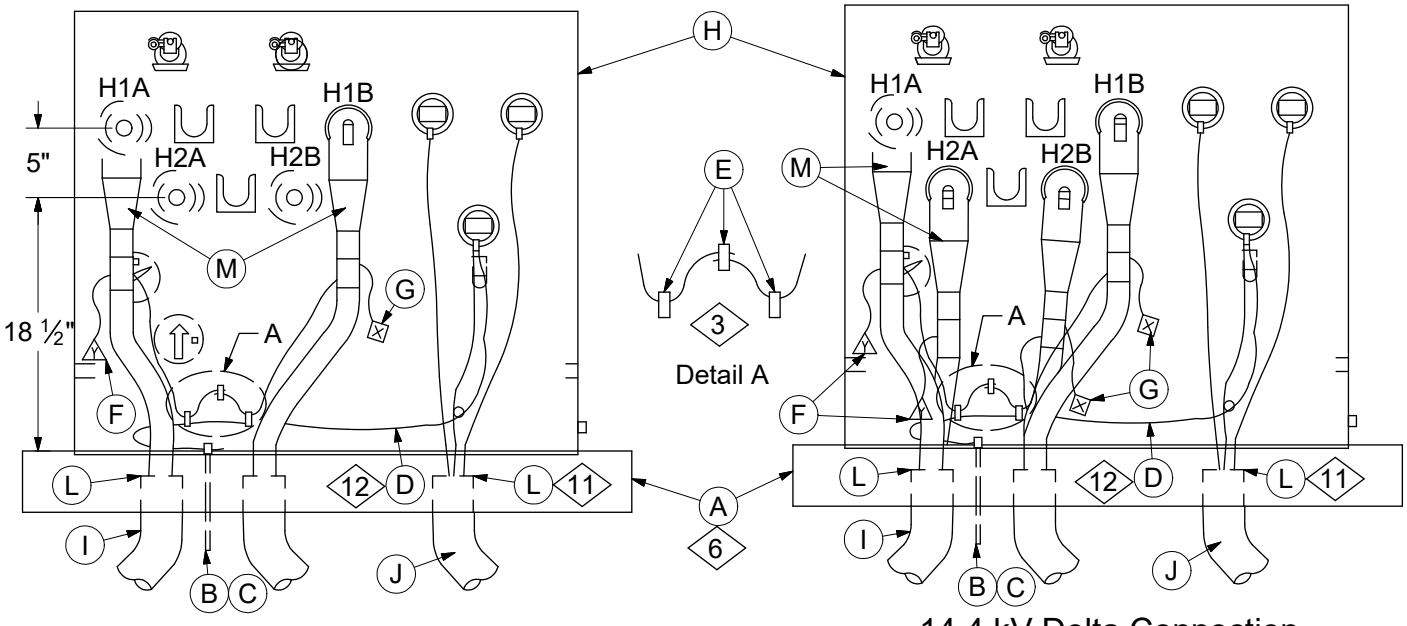
REV	DATE	ENG	DESCRIPTION
16	01/01/23	JMW	Converted to new format
15	09/14/17	JMW	



Transformer Face



Nameplate Diagram



24.9 GrdY/14.4 kV Connection
Operating Switch - Position 2
DCS **51 11 07 01**
DCS **51 11 07 02**
2

14.4 kV Delta Connection
Operating Switch - Position 1
DCS **51 11 07 03**
DCS **51 11 07 04**
2

REV	DATE	ENG	DESCRIPTION
0	01/01/23	DG	New Standard

CONSTRUCTION NOTE(s):

1. Delta / Wye Switch Setting - Prior to energizing transformer:
   a) If installing the transformer on a 14.4kV Delta circuit, set the Delta / Wye switch to Position 1.
   b) If installing the transformer on a 24.9 GrdY/14.4kV circuit, set the Delta / Wye switch to Position 2.

2. Primary Bushing Connections:
   a) If installing the transformer on a 14.4kV Delta circuit:
      i) If in loop-feed, all four of the H1 and H2 bushings are utilized. H1A and H2A for incoming cables. H1B and H2B for outgoing cables
      ii) If last transformer in radial-feed, only the H1A and H2A bushings are utilized for cable connections. 18kV arresters (Stock #10 01 267) are installed on the H1B and H2B bushings.
   b) If installing the transformer on a 24.9 GrdY/14.4kV circuit:
      i) If in loop-feed, only the H1A and H1B bushings are utilized for cable connections.
      ii) If last transformer in radial-feed, only the H1A bushing is utilized for cable connection. 18kV arrester (Stock #10 01 267) is installed on the H1B bushing.
   c) Insulating bushing caps (Stock #17 55 853) must be installed on all unused bushings.

3. Connect cable concentric neutrals to the #2 bare CU ground and then end-to-end using 3 split bolt connectors as shown in this detail. Transformers in loop-feed 14.4kV Delta circuits will have one of these neutral connections for the H1A to H1B concentric neutrals and a second for the H2A to H2B concentric neutrals.

4. Train cables and provide enough concentric neutral length to allow movement of the elbows from the bushings to the parking stand. Primary and secondary cables must have a minimum of 1" clearance to the enclosure walls.

5. Bolts and hold down plates for securing the transformer to the pad are provided with the pad.

6. See DCS **34 21 04 02** for pad installation.

7. External provision for grounding - for use by communication companies.

8. For some Missouri individual transformer installations, Ameren will install the pad and bends - use DCS **51 11 07 01** or **03**. For Missouri residential and commercial developments, the contractor will install the pad and bends - use DCS **51 11 07 02** or **04**.

9. Elbow arresters should be installed at all open points including the last transformer in a radial feed.

10. Transformers are delivered with slip-fit set screw type lugs on each secondary bushing stud. The lugs have eight positions and will accommodate cables up to 500 kcmil. If larger cables are used, the lugs can be replaced with five position lugs that will accommodate cables up to 750 kcmil. For 75kVA and smaller transformers, use Stock #17 55 230. For 100kVA and larger transformers, use Stock #17 55 229.

11. If bends are cut off, apply a bell end coupling (L) over the end of each conduit.

12. Run continuous length of #2 bare CU ground wire to connect an open port of the X2 connector, to the two lower tank grounds, and to the ground rod. Ground rod can be located where most convenient in the pad opening to avoid the incoming and outgoing elbows.

DCS #	DESCRIPTION	INSTALLED BY
51 11 07 01	24.9 GrdY/14.4 kV	Ameren
51 11 07 02	24.9 GrdY/14.4 kV	Contractor
51 11 07 03	14.4 kV Delta	Ameren
51 11 07 04	14.4 kV Delta	Contractor

	ITEM	STK / DCS #	DESCRIPTION 51 11 07 **	01	02	03	04
8	A	12 06 163	Vault, Box Pad, 42" x 48" x 18"	1	C	1	C
	B	23 13 069	Rod, Ground, 5/8" x 8'	1	1	1	1
	C	17 52 032	Clamp, Ground Rod, 5/8" For #8 − 1/0	1	1	1	1
	D	18 52 025	Wire, Cu., #2 S.D. (ft.)	5	5	5	5
	E	17 54 373	Connector, Split Bolt	3	3	6	6
@	F	16 51 080	Tag, Letter "Y", Blue Tri.	1	1	2	2
@	G	16 51 079	Tag, Letter "X", Red Sq.	1	1	2	2
15 @	H	RR- - - -X	Transformer, 14400V Delta x 24940 GrdY/14400V	1	1	1	1
@	I	12 51 173	Bend, Conduit, PVC, 3", 36" Rad. (Primary)	2	C	-	-
		12 51 176	Bend, Conduit, PVC, 4", 36" Rad. (Primary)	-	-	2	C
@	J	12 51 173	Bend, Conduit, PVC, 3", 36" Rad. (Secondary & 400A Service)	#	C	#	C
		12 51 331	Bend, Conduit, PVC, 1 1/2", 24" Rad. (Streetlight)	#	C	#	C
		12 51 264	Bend, Conduit, PVC, 2 1/2", 24" Rad. (200 A Service)	#	#	#	#
2,9 @	K	10 01 267	Arrester, 18 kV Elbow	#	#	#	#
11 @	L	40 83 492	Coupling − Conduit, PVC, Bell End, 1 1/2 "	#	C	#	C
		12 51 398	Coupling − Conduit, PVC, Bell End, 2 ½"	#	#	#	#
		12 51 008	Coupling − Conduit, PVC, Bell End, 3"	#	C	#	#
		12 51 254	Coupling − Conduit, PVC, Bell End, 4"	-	-	2	C
13,14 @	M	17 05 539	Elbow Termination, 25 kV, 1/0 AL, 360 MIL	#	#	#	#
2 @	N	17 55 853	Cap, Insulating, 25 kV	2	2	-	-

"C" = Contractor Installed Materials (Missouri Only)

DESIGN NOTE(s):

13. 1/0 AL, 35kV, 345 MIL insulated cabled is required to be used for RRxxxxX transformer installations.

14. For 24.9 GrdY/14.4 kV installation, order two elbows if in a loop, one elbow if at end of a radial feed.
For 14.4 kV Delta installation, order four elbows if in a loop, two elbows if at end of a radial feed.

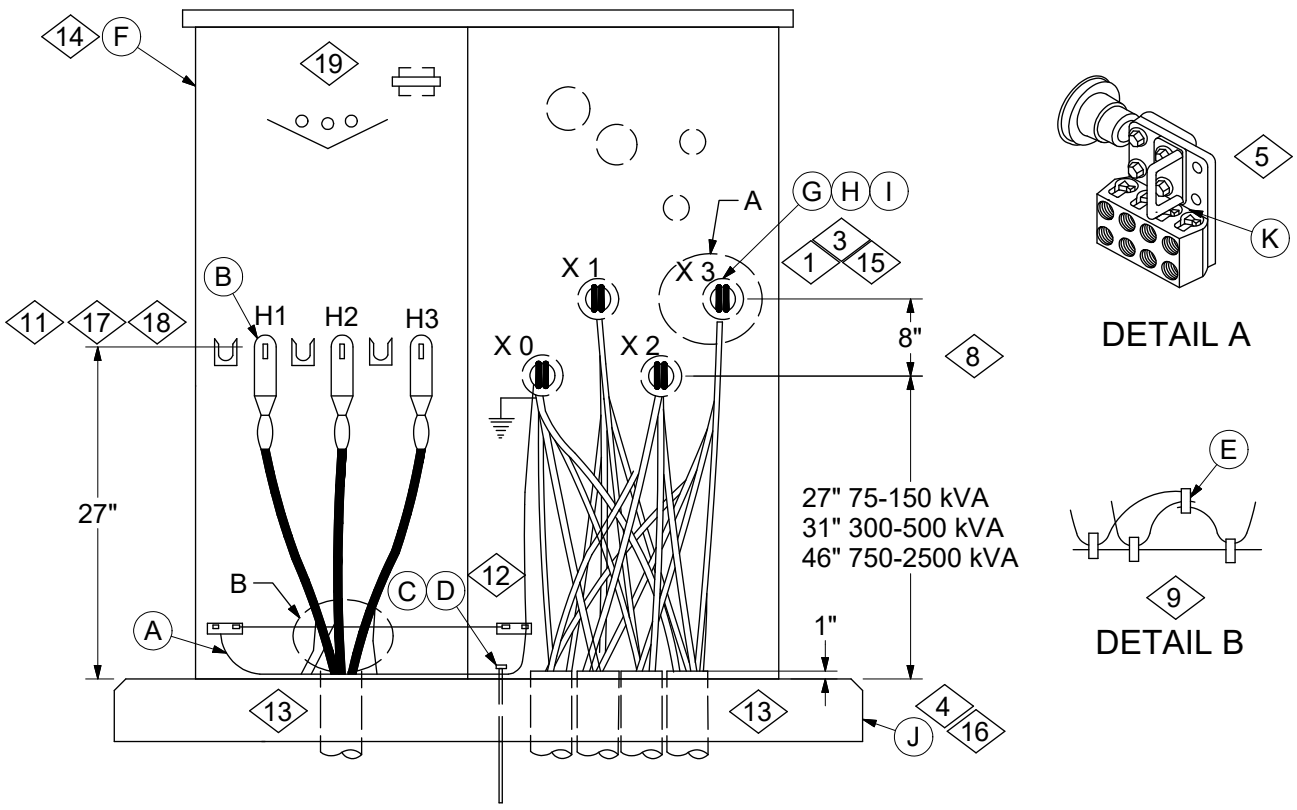
15. See DCS **13 00 01 02** for single-phase padmount transformer selection.
See DCS **13 00 04 01** for typical transformer dimensions, weight, and oil volumes.

OPERATING NOTE(s):

16. See DCS **59 51 53 40** for bay-o-net fuse operation and replacement.

17. Use grounding elbow (Stock #17 63 295) for grounding transformer. Use grounding elbow (Stock #17 63 295) with feed-thru bushing (Stock #17 05 577) for grounding cable.

REV	DATE	ENG	DESCRIPTION
0	01/01/23	DG	New Standard



CONSTRUCTION NOTE(s):

1. When installing secondary lugs use the maximum number of mounting holes that will align with the spade holes.

2. Provide enough concentric neutral length to attach to ground and also allow movement of the elbow from the bushing to the parking stand. Primary and secondary cables must have a minimum of 1" clearance to enclosure walls.

3. Stainless steel machine bolts and Belleville spring washers are required for bolting aluminum lugs to secondary terminals. Clean the lugs and terminals and apply inhibitor to the mating interfaces. See DCS **59 52 00 43** for Belleville washer installation instructions.

4. See DCS **34 21 05 04** or **34 21 05 05** for pad installations.

5. If the grounding stirrup is installed, longer bolts may be required. If used, stirrups are installed on X1, X2, and X3.

6. Install ground rod clamp 3” below top of rod to provide space for attaching ground set.

7. 480 Volt Three Wire Service From 480Y/277 Volt Four Wire Transformer
   CAUTION: DO NOT MAKE THIS CONVERSION ON WYE-WYE TRANSFORMERS WITH INTERNALLY CONNECTED PRIMARY AND SECONDARY NEUTRALS.

   A. If 480 volt three-wire grounded service is required, follow these steps to convert a 480Y/277 volt four-wire transformer.

      a. Remove the secondary neutral ground strap.

      b. Tape the secondary neutral terminal to prevent accidental contact and any misunderstanding as to which terminals are being used and the type service being provided.

c. Run a #2 copper lead from the ”A” phase secondary terminal to the tank ground connector. Ground the transformer tank to the driven ground rod and to the common system neutral (if present).

CAUTION: AFTER THE “A” PHASE SECONDARY TERMINAL IS ENERGIZED, THE TAPED NEUTRAL TERMINAL IS ENERGIZED.

d. Before connecting the customer’s cable, determine which cable the customer has grounded and connect that cable to the now grounded “A” phase secondary terminal.

B. If 480 volt three-wire ungrounded service is required, follow these steps to convert a 480Y/277 volt four-wire transformer:

a. Remove the secondary neutral ground strap.

b. Tape the secondary neutral terminal to prevent accidental contact and any misunderstanding as to which terminals are being used and the type of service being provided.

c. Ground the transformer tank to the driven ground rod and to the common system neutral (if present).

8. 150kVA and smaller transformers manufactured prior to mid-2010 will have 6” vertical spacing between secondary bushings.

9. Grounding practices are different in Missouri and Illinois.
In Missouri - Connect cable concentric neutrals to the #2 bare CU ground and then end-to-end using 4 split bolt connectors as shown in this detail.
In Illinois - Cable Concentric neutrals may be single-point connected to the #2 bare CU ground using hot-line clamps or split bolt connectors.

10. The Aluminum lugs can be used for Aluminum or Copper conductors.

11. Fault current indicators can be installed to aid in determining if a fault has occurred in the transformer or the cable feeding the transformer.

12. Loop the #2 CU ground bus from the ground rod, through the two transformer tank ground connectors, and back to the ground rod. Use a separate piece of #2 CU ground wire to connect from an open position of the X0 connector to the ground bus. The ground rod can be located where most convenient in the pad opening to avoid the incoming and outgoing conduit elbows.

13. If bends are cut off, bell end couplings are to be installed over the end of each conduit.

REV	DATE	ENG	DESCRIPTION
13	01/01/23	DG	Converted to new format
12	10/12/15	DG	

	ITEM	STK / DCS #	DESCRIPTION 51 12 00 **	02	04
12	A	18 52 025	Wire, Copper, #2 Solid, Soft Drawn	15	15
17	B	**42 34 62 01**	Termination, 15kV, #2 Elbow	3	-
		42 34 62 02	Termination, 15kV, #4/0 Elbow	-	3
	C	23 13 069	Rod, Ground, 5/8” x 8’	1	1
	D	17 52 032	Clamp, Ground Rod, 5/8” For #8 - 1/0	2	2
9	E	17 54 373	Connector, Split Bolt, #2 Str. CU.	3	3
		17 54 182	Connector, Split Bolt, #3 Str. CU.	1	1
14 @	F	**13 00 01 02**	Transformer, Three Phase, Dead Front, Radial Feed	1	1
3,5 @	G	21 56 078	Bolt, Machine, 1/2” x 2”, Stainless Steel	#	#
		21 54 316	Bolt, Machine, 1/2” x 2-1/2”, Stainless Steel	#	#
		21 56 075	Bolt, Machine, 1/2” x 1-1/2”, Stainless Steel	#	#
3 @	H	12 56 052	Washer, Belleville Spring, 1/2”, Stainless Steel	#	#
		12 56 053	Washer, Flat, 1/2”, Stainless Steel (2 ea. per Belleville)	#	#
1,10,15 @	I	17 55 190	Lug, Alum 1 - 1/0 to 1000 kcmil, Lay-In, 2 Hole	#	#
		17 55 289	Lug, Alum 2 - 1/0 to 1000 kcmil, Lay-In, 2 Hole	#	#
		17 55 209	Lug, Alum 3 - 1/0 to 1000 kcmil, Lay-In, 6 Hole	#	#
		17 55 233	Lug, Alum 6 - 1/0 to 500 kcmil, Lay-In, 10 Hole	#	#
		17 55 232	Lug, Alum 6 - 1/0 to 1000 kcmil, Lay-In, 12 Hole	#	#
		17 55 343	Lug, Alum 1 - 1/0 to 750 kcmil, 2 Hole	#	#
		17 55 344	Lug, Alum 2 - 1/0 to 750 kcmil, 4 Hole	#	#
		17 55 345	Lug, Alum 4 - 1/0 to 750 kcmil, 6 Hole	#	#
		17 55 346	Lug, Alum 5 - 1/0 to 750 kcmil, 8 Hole	#	#
		17 55 349	Lug, Alum 6 - 1/0 to 750 kcmil, 8 Hole	#	#
		17 55 350	Lug, Alum 8 - 1/0 to 750 kcmil, 8 Hole	#	#
16 @	J	12 06 123	Pad, Composite, 75 - 750 kVA	1	1
		12 06 124	Pad, Composite, 1000 - 2500 kVA	1	1
5 @	K	17 55 510	Stirrup, Grounding, Bolted	3	3
18 @	L	17 55 265	15kV Bushing Insert, 200A Feed-Thru	3	3
18 @	M	10 01 138	10kV Elbow Arrester	3	3
		10 01 244	10kV Bushing Well Arrester	3	3
11 @	N	60 55 001	Indicator, Fault Current, 1 Phase	3	3

DESIGN NOTE(s):

14. See DCS **13 00 01 02** for three phase padmount transformer selection.
See DCS **13 00 04 01** for typical transformer dimensions, weight, and oil volumes.
Radial-feed transformers with Type Code "A" have Bay-O-Net fuses.

15. Preferred number of secondary cables per terminal is six or less. In no case shall the number of cables per terminal exceed twelve.

16. See DCS **34 21 04 05** if vault is needed for cable training.

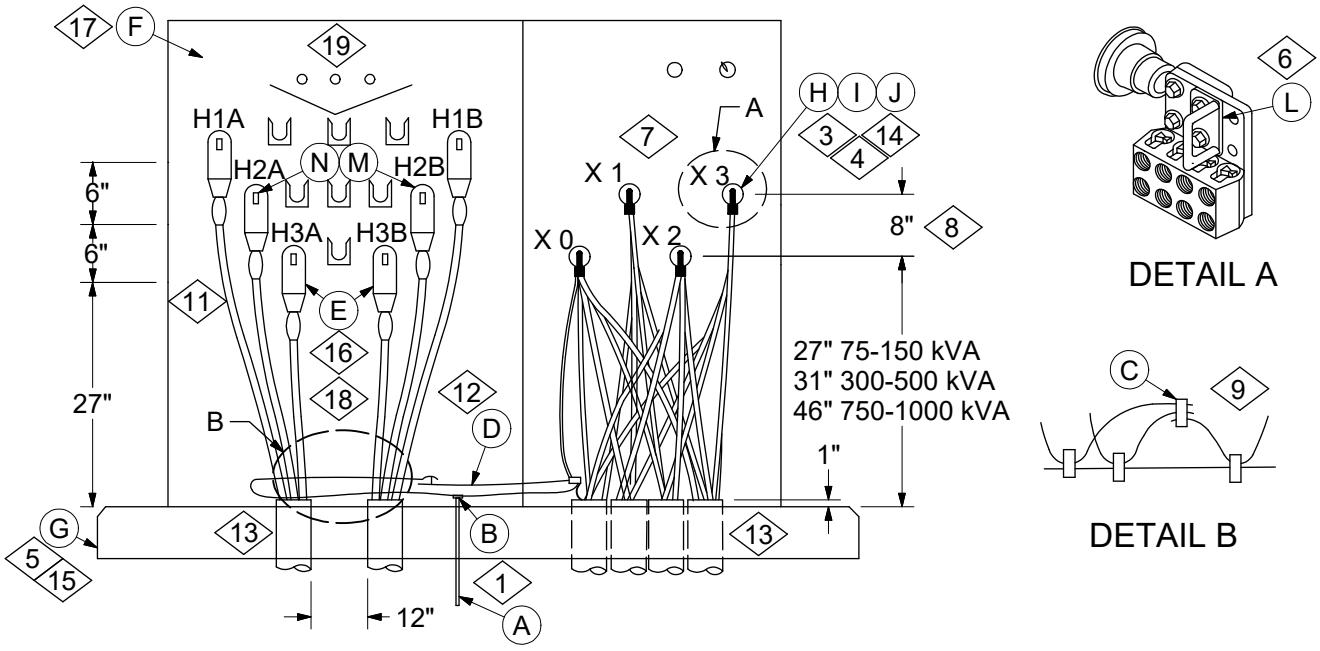
17. For non-standard primary cable sizes, see DCS **42 34 62 ****** for proper elbow termination. 4kV transformers 1500kV and larger require 600 amp non-load break terminations (DCS **42 34 64 ****).

18. Three-phase radial-feed padmount transformers connected to EPR insulated primary cable do not need arresters. If connected to XLPE insulated primary cable, replace the single-bushing inserts with double-bushing inserts and install elbow arresters (Stock #17 55 265 and #10 01 138), or install bushing well arrester (Stock #10 01 244).

REV	DATE	ENG	DESCRIPTION
13	01/01/23	DG	Converted to new format
12	10/12/15	DG	

OPERATING NOTE(s):

19. Radial-feed transformers with Type Code "A" have Bay-O-Net fuses. See DCS **59 51 53 40** for Bay-O-Net fuse operation and replacement.



CONSTRUCTION NOTE(s):

1. Install ground rod clamp 3” below top of rod to provide space for attaching ground set.

2. Provide enough concentric neutral length to attach to ground and also allow movement of the elbow from the bushing to the parking stand. Primary and secondary cables must have a minimum of 1" clearance to enclosure walls.

3. Stainless steel machine bolts and Belleville spring washers required for bolting aluminum lugs to secondary terminals. Clean lugs, terminals, and use inhibitor. See DCS **59 52 00 43** for Belleville washer installation instructions.

4. When installing secondary lugs use the maximum number of mounting holes that align with the spade holes.

5. See DCS **34 21 05 05** for pad installation.

6. If the grounding stirrup is installed, longer bolts may be required. If used, stirrups are installed on X1, X2, and X3.

7. 480 Volt Three Wire Service From 480Y/277 Volt Four Wire Transformer
CAUTION: DO NOT MAKE THIS CONVERSION ON WYE-WYE TRANSFORMERS WITH INTERNALLY CONNECTED PRIMARY AND SECONDARY NEUTRALS.

   A. If 480 volt three-wire grounded service is required, follow these steps to convert a 480Y/277 volt four-wire transformer:

      a. Remove the secondary neutral ground strap.

      b. Tape the secondary neutral terminal to prevent accidental contact and any misunderstanding as to which terminals are being used and the type service being provided.

      c. Run a #2 copper lead from the ”A” phase secondary terminal to the tank ground connector. Ground the transformer tank to the driven ground rod and to the common system neutral (if present).

REV	DATE	ENG	DESCRIPTION
16	01/01/23	DG	Converted to new format
15	09/22/15	DG	

CAUTION: AFTER THE “A” PHASE SECONDARY TERMINAL IS ENERGIZED, THE TAPED NEUTRAL TERMINAL IS ENERGIZED.

d. Before connecting the customer’s cable, determine which cable the customer has grounded and connect that cable to the now grounded “A” phase secondary terminal.

B. If 480 volt three-wire ungrounded service is required, follow these steps to convert a 480Y/277 volt four-wire transformer:

a. Remove the secondary neutral ground strap.

b. Tape the secondary neutral terminal to prevent accidental contact and any misunderstanding as to which terminals are being used and the type of service being provided.

c. Ground the transformer tank to the driven ground rod and to the common system neutral (if present).

8. 150kVA and smaller transformers manufactured prior to mid-2010 will have 6” vertical spacing between secondary bushings.

9. Grounding practices are different in Missouri and Illinois.
In Missouri - Connect cable concentric neutrals to the #2 bare CU ground and then end-to-end using 4 split bolt connectors as shown in this detail.
In Illinois - Cable Concentric neutrals may be single-point connected to the #2 bare CU ground using hot-line clamps or split bolt connectors.

10. The Aluminum lugs can be used for Aluminum or Copper conductors.

11. Fault current indicators can be installed to aid in determining if fault has occurred in the transformer or the cable feeding the transformer.

12. Loop the #2 CU ground bus from the ground rod, through the two transformer tank ground connectors, and back to the ground rod. Use a separate piece of #2 CU ground wire to connect from an open position of the X0 connector to the ground bus. The ground rod can be located where most convenient in the pad opening to avoid the incoming and outgoing conduit elbows.

13. If bends are cut off, bell end couplings are to be installed over the end of each conduit.

	ITEM	STK / DCS #	DESCRIPTION 52 12 02 **	01	02
	A	23 13 069	Rod, Ground, 5/8" x 8'	1	1
	B	17 52 032	Clamp, Ground Rod, 5/8" For #8 - 1/0	2	2
9	C	17 54 373	Connector, Split Bolt, #2 Str. CU	6	6
		17 54 182	Connector, Split Bolt, 3-#2 Str. CU	2	2
12	D	18 52 025	Wire, Copper, #2 Solid S.D.	15	15
18 @	E	**42 34 62 01**	Termination, Elbow #2	#	-
		42 34 62 02	Termination, Elbow 4/0	-	#
17 @	F	**13 00 01 02**	Transformer, Three Phase, Dead Front, Loop Feed	1	1
15 @	G	12 06 124	Pad, Composite, 1000 kVA & below	1	1
3,6 @	H	21 56 075	Bolt, Machine 1/2" x 1−1/2", Stainless Steel	#	#
		21 56 078	Bolt, Machine 1/2" x 2", Stainless Steel	#	#
		21 54 316	Bolt, Machine 1/2" x 2−1/2", Stainless Steel	#	#
3 @	I	12 56 052	Washer, Belleville Spring,1/2", Stainless Steel	#	#
		12 56 053	Washer, Flat, 1/2", Stainless Steel (2 ea. per Belleville)	#	#
4,10,14 @	J	17 55 190	Lug, Alum 1 - 1/0 to 1000 kcmil, Lay-In, 2 Hole	#	#
		17 55 289	Lug, Alum 2 - 1/0 to 1000 kcmil, Lay-In, 2 Hole	#	#
		17 55 209	Lug, Alum 3 - 1/0 to 1000 kcmil, Lay-In, 6 Hole	#	#
		17 55 233	Lug, Alum 6 - 1/0 to 500 kcmil, Lay-In, 10 Hole	#	#
		17 55 232	Lug, Alum 6 - 1/0 to 1000 kcmil, Lay-In, 12 Hole	#	#
		17 55 343	Lug, Alum 1 - 1/0 to 750 kcmil, 2 Hole	#	#
		17 55 344	Lug, Alum 2 - 1/0 to 750 kcmil, 4 Hole	#	#
		17 55 345	Lug, Alum 4 - 1/0 to 750 kcmil, 6 Hole	#	#
		17 55 346	Lug, Alum 5 - 1/0 to 750 kcmil, 8 Hole	#	#
		17 55 349	Lug, Alum 6 - 1/0 to 750 kcmil, 8 Hole	#	#
		17 55 350	Lug, Alum 8 - 1/0 to 750 kcmil, 8 Hole	#	#
16 @	K	**54 11 01 01**	Arrester, 10kV Elbow	#	#
@	L	17 55 510	Stirrup, Grounding, Bolted	3	3
@	M	16 51 079	Tag, Letter "X", Red Sq.	3	3
@	N	16 51 080	Tag, Letter "Y", Red Sq.	3	3
11 @	O	60 55 001	Indicator, Fault Current, 1 Phase	3	3

DESIGN NOTE(s):

14. Preferred number of secondary cables per bushing is six or less. In no case shall the number of cables per bushing exceed twelve.

15. See DCS **34 21 04 05** if vault is needed for cable training.

16. Elbow arresters should be installed at all open points. DCS **54 11 01 ****** shows a single-phase elbow arrester. installation. Make adjustments for three-phase use.

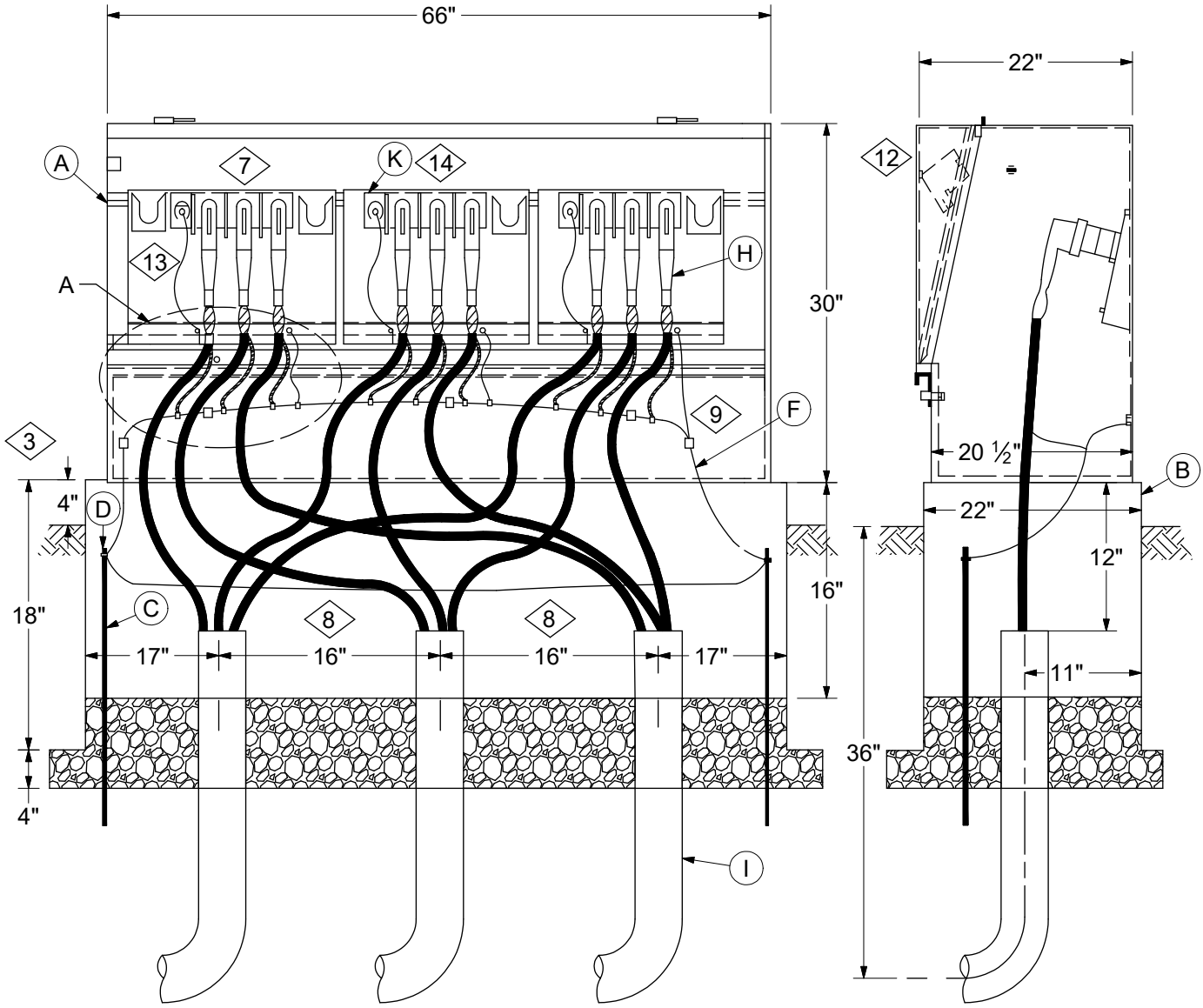
17. See DCS **13 00 01 02** for three-phase padmount transformer selection.
See DCS **13 00 04 01** for typical transformer dimensions, weight, and oil volumes.

18. For non-standard primary cable sizes, see DCS **42 34 62 ****** for proper elbow termination.

OPERATING NOTE(s):

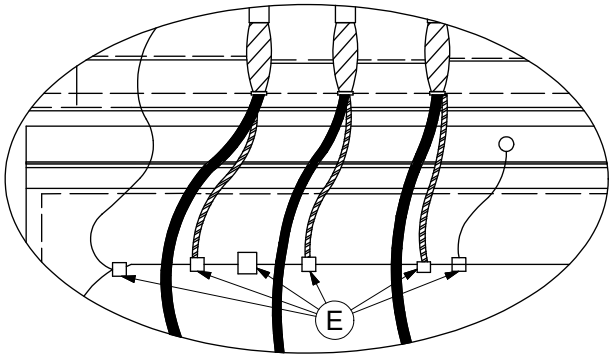
19. See DCS **59 51 53 40** for bay-o-net fuse operation and replacement.

REV	DATE	ENG	DESCRIPTION
16	01/01/23	DG	Converted to new format
15	09/22/15	DG	



FRONT VIEW

SIDE VIEW



Detail "A"

REV	DATE	ENG	DESCRIPTION
14	01/01/23	JMW	Converted to new format
13	09/07/17	JMW	

CONSTRUCTION NOTE(s):

Excavation and Placement of Fiberglass Ground Sleeve Pad

1. An initial depth of 18” shall be excavated and all loose soil shall be removed or tamped. The length and width of the hole should be sized to allow a minimum of 6” of clearance on all sides.

2. To install the 36” radius bends, an increase in the initial excavation depth will be required. After the bends have been installed, crushed stone screenings shall be placed and tamped to the level shown in Figure 1.

3. The final depth should be adjusted to provide 4” of exposed ground sleeve pad at final grade.

4. Stabilize the ground sleeve pad over the conduits before backfilling so that there will be no shifting. Provide 12” of space between the load bearing surface of the ground sleeve pad and the end of each conduit. See Figure 2.

5. To further stabilize the ground sleeve pad and the bends, place additional screenings inside the ground sleeve pad and hand tamp in place.

6. Backfill with loose material, DO NOT backfill next to the ground sleeve pad with chunks of material or rocks. Pack loose backfill by foot tamping and do not tamp excessively close to the ground sleeve pad sides. NOTE: Hydraulic tamping is not recommended.

7. Illustration shows 3-Way. If used as 4-Way, reduce space between conduit bends to 12"-13".

8. If bends are cut off apply a bell end coupling (L) over the end of each conduit.

This installation will not withstand pulling long cable lengths through the bends. If restrained bends are needed, refer to DCS **31 47 01 ****.

Accessory Installation

9. Connect concentric neutral wires from each cable to the #2 copper wire connected to the ground rods. Also attach the #2 copper wire to each ground connector in the primary pedestal.

10. Install elbows as required.

11. All exposed bushings must be covered with insulating caps, elbows, or elbow arresters.

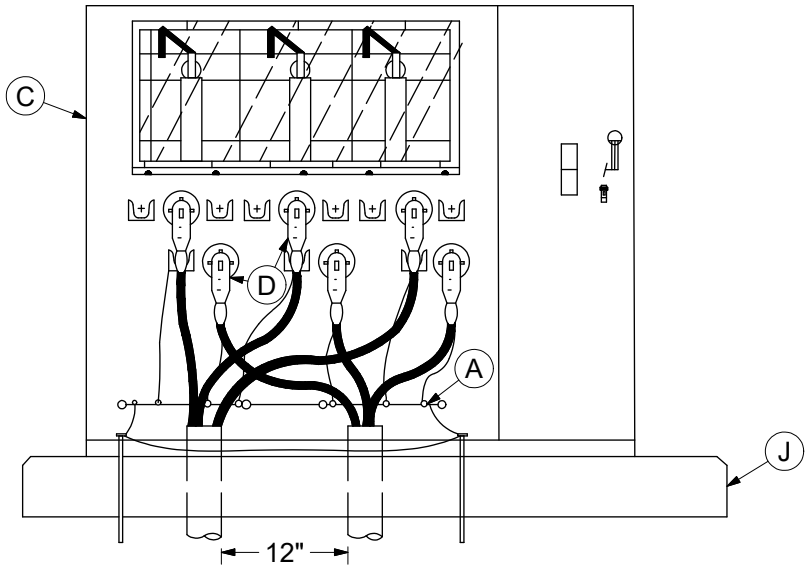
12. 10’ minimum clearance shall be provided at the front of the primary pedestal.

13. Faulted circuit indicators should be installed at the elbows below the cable entrance. All concentric neutral wires must be outside of the faulted circuit indicator closed core CT. Faulted circuit indicators should be installed on the out-going cables.

14. Cover any open positions with an insulating cap.

	ITEM	STK / DCS #	DESCRIPTION 53 12 03 **	01
	A	54 07 297	Enclosure - Primary Pedestal 3	1
	B	12 06 120	Pad - Ground Sleeve	1
	C	23 13 069	Rod - Ground, 5/8” x 8’	2
	D	17 52 032	Clamp - Ground Rod, 5/8” For #8 -- 1/0	2
	E	17 54 373	Connector - Split Bolt	15
	F	18 52 025	Wire - Cu, #2 S. D. (Ft.)	20
	G	-	Screenings	#
	H	**42 34 62 01**	Termination - #2 Elbow	#
@		**42 34 62 02**	Termination - 4/0 Elbow	#
		42 34 62 05	Termination - 1/0 Elbow	#
@	I	12 51 176	Bend - Plastic, 4” 36” Rad.	3
5,@	J	60 55 001	Indicator - Faulted Circuit	#
6,@	K	17 55 227	Cap - Insulating, 15kV	1
8,@	L	12 51 254	Coupling - Conduit, Plastic, Bell End, 4”	3

REV	DATE	ENG	DESCRIPTION
14	01/01/23	JMW	Converted to new format
13	09/07/17	JMW	



CONSTRUCTION NOTE(s):

1. Insure that the concentric neutral wires and the cable is long enough to allow movement of the elbow from bushing to parking stand. Some of the elbows must be raised to the level of the parking stands.

2. Most banks are radial fed. If loop fed, position bends as shown.

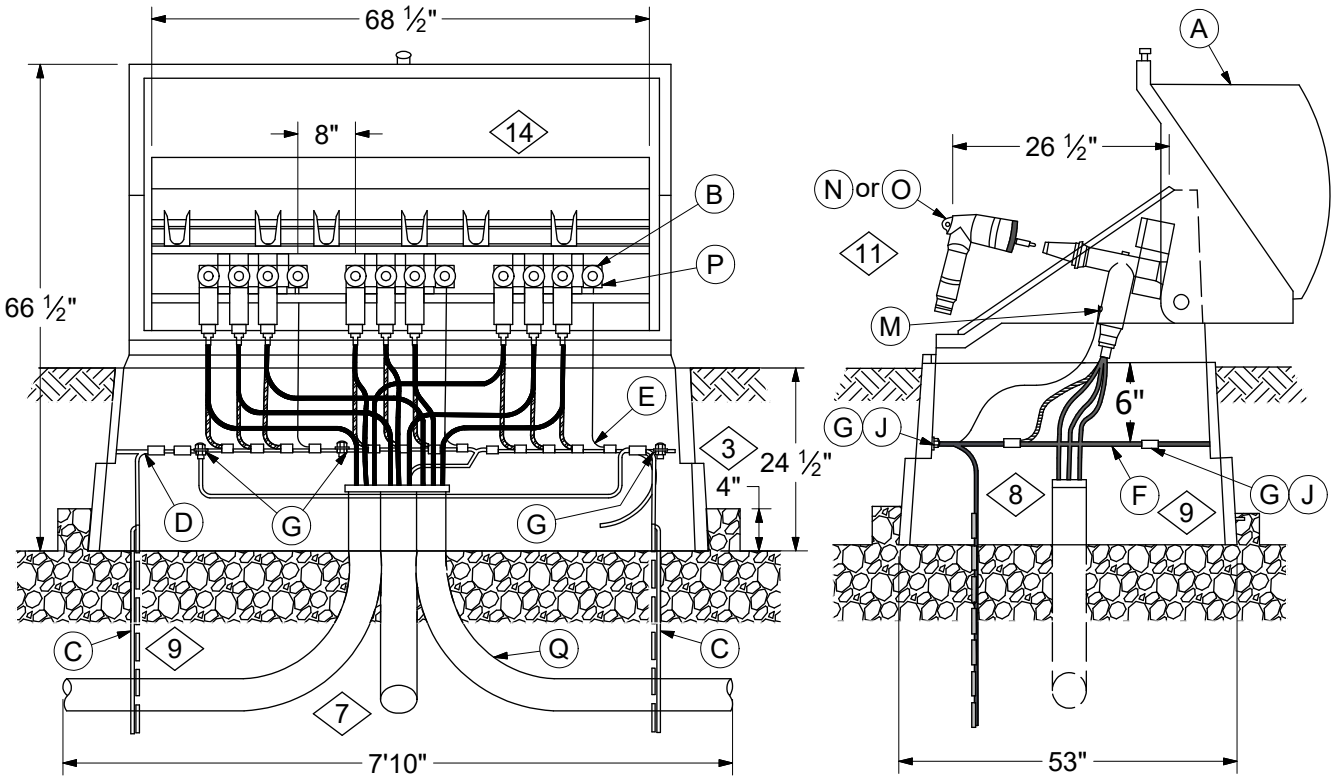
3. All padmounted capacitors are supplied with the required fusing plus an extra set of refills. Fuses listed in this standard are for replacement only. Check the nameplate of the unit to determine the proper fusing.

4. Open switches to capacitor cells before removing elbows.

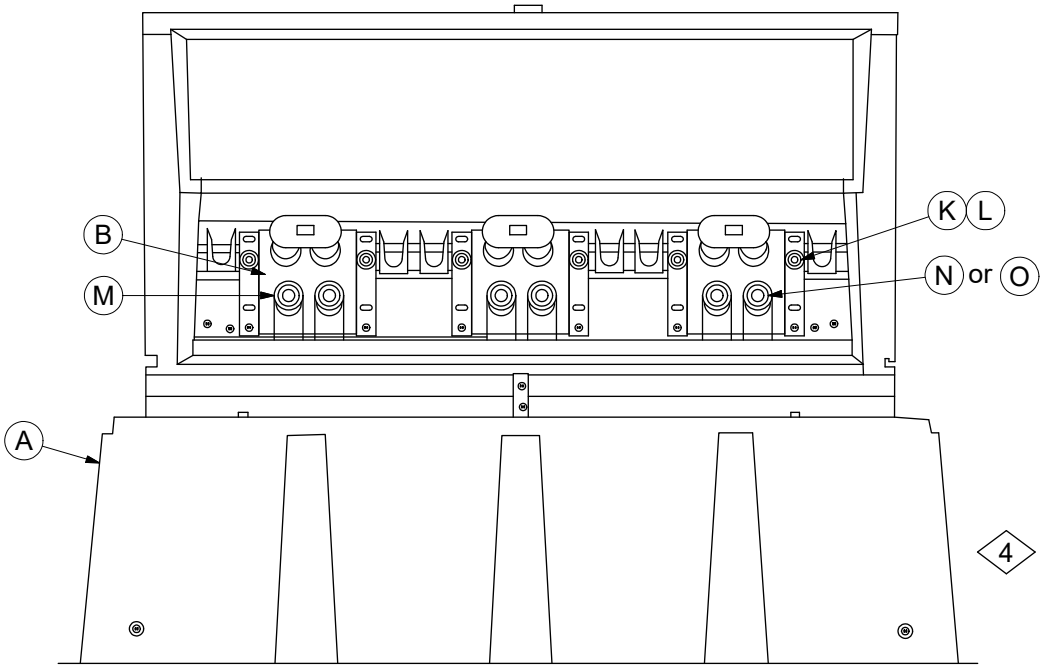
DCS #	DESCRIPTION
51 12 04 02	600 kVAR
51 12 04 04	1200 kVAR
51 12 04 06	1800 kVAR

	ITEM	STK / DCS #	DESCRIPTION 51 12 04 **	02	04	06
	A	17 54 132	Connector - Two Bolt, #8-350 kcmil	8	8	8
	B	18 52 025	Wire - Copper, #2 Solid S.D.	10	10	10
	C	69 11 198	Capacitor - 12kV, 600 kVAR, Padmount	1	-	-
		69 11 200	Capacitor - 12kV, 1200 kVAR, Padmount	-	1	-
		69 11 199	Capacitor - 12kV, 1800 kVAR, Padmount	-	-	1
@	D	**42 34 62 02**	Termination, 15kV, #2 Elbow	6	6	6
		42 34 62 02	Termination, 15kV, 4/0 Elbow	6	6	6
3 @	E	20 04 527	Fuse - 65A, Type NX	-	-	-
		20 04 852	Fuse - 1.5A, Type NX	-	-	-
		20 04 853	Fuse - 50A, Type NX	-	-	-
3 @	F	20 04 480	Fuse - 65A, Type NXC	-	-	-
3 @	G	20 04 486	Fuse - 40A, Type NXC	-	-	-
@	H	69 11 307	Control, Capacitor	1	1	1
@	I	69 11 304	Sensor - Neutral Current (Used With Control)	1	1	1
@	J	**34 21 04 05**	Pad for Capacitor Bank	1	1	1

REV	DATE	ENG	DESCRIPTION
7	01/01/23	JMW	Converted to new format
6	09/14/17	JMW	



DCS #	DESCRIPTION
51 12 05 01	Dead-Break Junction - 3 Way
51 12 05 02	Dead-Break Junction - 4 Way



DCS #	DESCRIPTION
51 12 05 03	Load-Break Junction - 2 Way CLEER Type

REV	DATE	ENG	DESCRIPTION
1	01/01/23	JMW	Converted to new format
0	11/17/17	EJB	

CONSTRUCTION NOTE(s):

Excavation and Placement of Fiberglass Ground Sleeve Pad

1. An initial depth of 18” shall be excavated and all loose soil shall be removed or tamped. The length and width of the hole should be sized to allow a minimum of 6” of clearance on all sides.

2. To install the 36” radius bends, an increase in the initial excavation depth will be required. After the bends have been installed, crushed stone screenings shall be placed and tamped to the level shown in Figure 1.

3. The final depth should be adjusted to provide 4” of exposed ground sleeve pad at final grade.

4. Stabilize the ground sleeve pad over the conduits before backfilling so that there will be no shifting. Provide 12” of space between the load bearing surface of the ground sleeve pad and the end of each conduit.

5. To further stabilize the ground sleeve pad and the bends, place additional screenings inside the ground sleeve pad and hand tamp in place.

6. Backfill with loose material, DO NOT backfill next to the ground sleeve pad with chunks of material or rocks. Pack loose backfill by foot tamping and do not tamp excessively close to the ground sleeve pad sides. NOTE: Hydraulic tamping is not recommended.

7. Illustration shows 3-Way. If a 4-way is used, additional bend will be installed.

8. If bends are cut off apply a bell end coupling (R) over the end of each conduit.

This installation will not withstand pulling long cable lengths through the bends. If restrained bends are needed, refer to DCS **31 47 01 ****.

Accessory Installation

9. Connect concentric neutral wires from each cable to the #2 copper wire connected to the ground rods. Also attach the #2 copper wire to each ground connector in the primary pedestal.

10. Install elbows as required.

11. All exposed bushings must be covered with insulating caps, elbows, or elbow arresters.

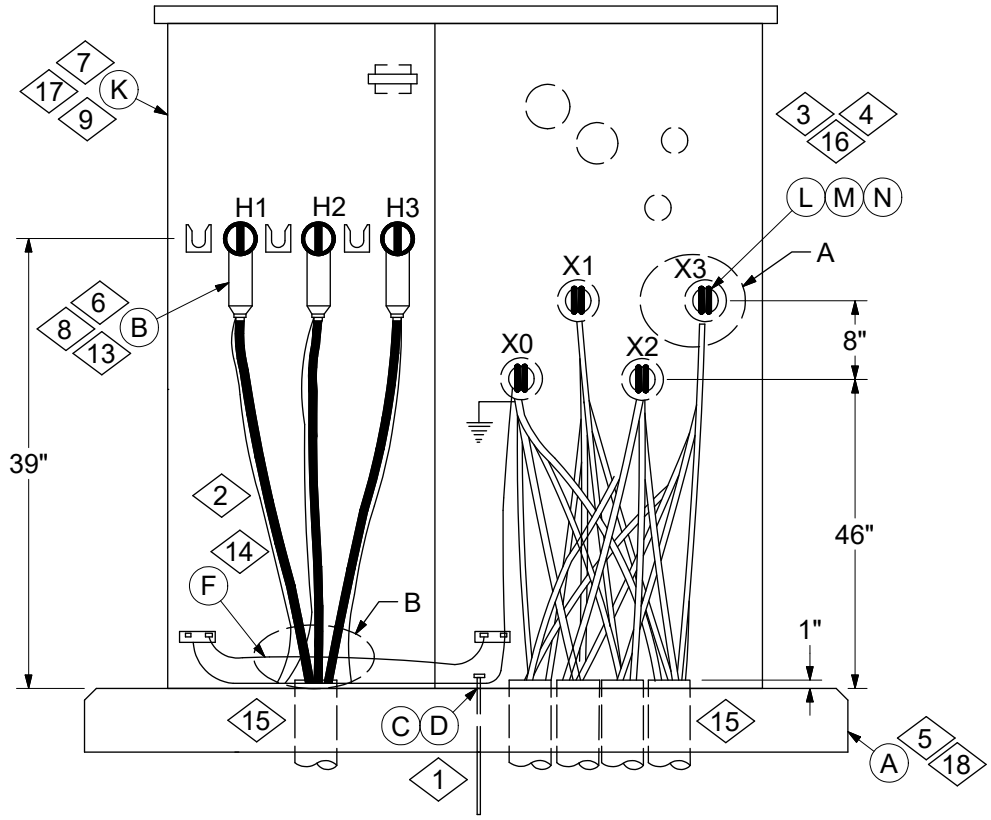
12. 10’ minimum clearance shall be provided at the front of the primary pedestal.

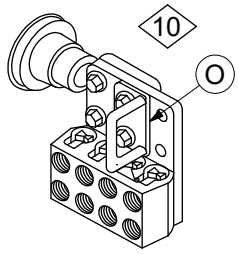
13. Faulted circuit indicators should be installed at the elbows below the cable entrance. All concentric neutral wires must be outside of the faulted circuit indicator closed core CT. Faulted circuit indicators should be installed on the out-going cables.

14. Cover any open positions with an insulating cap.

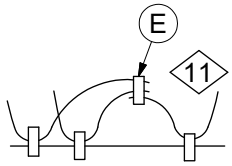
	ITEM	STK / DCS #	DESCRIPTION 51 12 05 **	01	02	03
	A	54 07 498	Enclosure - Primary Cable Junction, 15 kV, 600 A, 3ph	1	1	1
	B	17 07 239	Junction - 15 kV, 600 Amp, Bolted, 3-Way w/ U Straps	3	-	-
		17 07 242	Junction - 15 kV, 600 Amp, Bolted, 4-Way w/ U Straps	-	3	-
		17 07 256	Junction - 15 kV, 600 Amp, Load-break, 2 Position Square	-	-	3
	C	23 13 069	Rod - Ground, 5/8” x 8’	2	2	2
	D	17 52 032	Clamp - Ground Rod, 5/8”, For #8 to 1/0	2	2	2
	E	17 54 132	Connector - Wire, 8-350 kcmil, CU	11	14	11
	F	18 52 025	Wire - #2, S. D. (Ft.)	9	9	9
	G	17 54 435	Connector - Grounding, #8 to 2/0	8	8	-
	H	17 05 513	Bushing - Standoff, Double, 15 kV, 600 Amp,	-	-	3
	I	17 55 835	Cap - Insulating, 15 kV, 600 Amp, Load-break	-	-	6
	J	21 61 007	Nut - Hex, ½”, 13 TPI, Everdur	8	8	8
	K	21 56 078	Bolt - Hex, ½”, Stainless, w / Nut	-	-	6
	L	21 75 105	Washer - ½”, Stainless, 1 ¼” OD	-	-	6
@	M	**42 34 64 ** **	Termination - 15 kV, 600 Amp, 4/0 AWG - 750 kcmil	-	-	6
@	N	10 01 138	Arrester - Lighting, Elbow, 10 kV	-	-	-
11,@	O	17 55 227	Cap - Insulating, 15 kV, 200 Amp, Load-break	-	-	-
11,@	P	17 55 386	Cap - Insulating, 15 kV, 600 Amp, Load-break	-	-	-
@	Q	12 51 176	Bend, Plastic, 4", 36" Rad.	3	3	3
@	R	12 51 254	Coupling, - Conduit, Plastic, Bell End, 4"	#	#	#
@	S	60 55 001	Indicator - Faulted Circuit	#	#	#

REV	DATE	ENG	DESCRIPTION
1	01/01/23	JMW	Converted to new format
0	11/17/17	EJB	





DETAIL A



DETAIL B

CONSTRUCTION NOTE(s):

1. Install ground rod clamp 3” below top of rod to provide space for attaching ground set.

2. Provide enough concentric neutral length to attach to ground and also allow movement of the elbow from the bushing to the parking stand. Primary and secondary cables must have a minimum of 1" clearance to the enclosure walls.

3. Stainless steel machine bolts and belleville spring washers are required for bolting aluminum lugs to secondary terminals. Clean the lugs and terminals and apply inhibitor to the mating interfaces. See DCS **59 52 00 43**.

4. When installing secondary lugs use the maximum number of mounting holes that align with the spade holes.

5. See DCS **34 11 00 00** for poured-in-place radial-feed pad instructions.

6. The 200A loadbreak reducing tap plug on the end of the 600A nonloadbreak elbow will be covered with a 35kV elbow arrester (Stock #10 01 163). Construction personnel are to install an elbow arrester on each elbow.

7. Transformer will be equipped with a storage rack inside the primary cable compartment for storing grounding elbows. Construction personnel are to leave three grounding elbows on the storage rack. Coil the leads and leave the interfaces covered.

8. If the 600A nonloadbreak elbows are removed from the transformer bushings, they must be placed on 35kV, 600A standoff bushings (Stock #17 05 323). Construction personnel are to install a standoff bushing in each parking stand.

9. Construction personnel are to leave an elbow installation tool (Stock #85 36 281) in the storage pocket.

10. If the grounding stirrup is installed, longer bolts may be required. If used, stirrups are installed on X1, X2, and X3.

REV	DATE	ENG	DESCRIPTION
7	01/01/23	DG	Converted to new format
6	09/07/17	JMW	

11 Grounding practices are different in Missouri and Illinois.
In Missouri - Connect cable concentric neutrals to the #2 bare CU ground and then end-to-end using 4 split bolt connectors as shown in this detail.
In Illinois - Cable Concentric neutrals may be single-point connected to the #2 bare CU ground using hot-line clamps or split bolt connectors

12. The Aluminum lugs can be used for Aluminum or Copper conductors.

13 Fault current indicators can be installed to aid in determining if fault has occurred in the transformer or the cable feeding the transformer.

14 Loop the #2 CU ground bus from the ground rod, through the two transformer tank ground connectors, and back to the ground rod. Use a separate piece of #2 CU ground wire to connect from an open position of the X0 connector to the ground bus. The ground rod can be located where most convenient in the pad opening to avoid the incoming and outgoing conduit elbows.

15 If bends are cut off, bell end couplings are to be installed over the end of each conduit.

	ITEM	STK / DCS #	DESCRIPTION 51 12 34 **	01
5	A	**34 11 00 00**	Pad, Concrete,1500-2500 kVA, Radial-Feed	1
2,6	B	**42 44 13 01**	Termination, 35kV, 600A Deadbreak Elbow	3
	C	23 13 069	Rod, Ground, 5/8” x 8’	1
	D	17 52 032	Clamp, Ground Rod, 5/8” For #8 - 1/0	2
11	E	17 54 373	Connector, Split Bolt, #2 Str. CU.	3
		17 54 182	Connector, Split Bolt, 3-#2 Str. CU.	1
14	F	18 52 025	Wire, Copper, #2 Solid, Soft Drawn	15
7	G	17 63 295	Ground, Elbow, 35kV	3
6	H	10 01 163	Arrester, Lightning, 35kV	3
8	I	17 05 323	Bushing, Standoff, 35kV	3
9	J	85 36 281	Tool - Elbow Installation (Elastimold)	1
17 @	K	QF____M	Transformer, Three-Phase, Dead Front	1
	L	21 56 078	Bolt, Machine, 1/2” x 2”, Stainless Steel	#
3 @		21 54 316	Bolt, Machine, 1/2” x 2-1/2”, Stainless Steel	#
		21 56 075	Bolt, Machine, 1/2” x 1-1/2”, Stainless Steel	#
3 @	M	12 56 052	Washer, Belleville Spring, 1/2”, Stainless Steel	#
		12 56 053	Washer, Flat, 1/2”, Stainless Steel (2 ea. per Belleville)	#
4,12,16 @	N	17 55 190	Lug, Alum, 1 - 1/0 to 1000 kcmil, Lay-In, 2 Hole	#
		17 55 289	Lug, Alum, 2 - 1/0 to 1000 kcmil, Lay-In, 2 Hole	#
		17 55 209	Lug, Alum, 3 - 1/0 to 1000 kcmil, Lay-In, 6 Hole	#
		17 55 233	Lug, Alum, 6 - 1/0 to 500 kcmil, Lay-In, 10 Hole	#
		17 55 232	Lug, Alum, 6 - 1/0 to 1000 kcmil, Lay-In, 12 Hole	#
		17 55 343	Lug, Alum, 1 - 1/0 to 750 kcmil, 2 Hole	#
		17 55 344	Lug, Alum, 2 - 1/0 to 750 kcmil, 4 Hole	#
		17 55 345	Lug, Alum, 4 - 1/0 to 750 kcmil, 6 Hole	#
		17 55 346	Lug, Alum, 5 - 1/0 to 750 kcmil, 8 Hole	#
		17 55 349	Lug, Alum, 6 - 1/0 to 750 kcmill, 8 Hole	#
		17 55 350	Lug, Alum, 8 - 1/0 to 750 kcmill, 8 Hole	#
10 @	O	17 55 510	Stirrup, Grounding	3
13 @	P	60 55 001	Indicator, Fault Current, 1 Phase	3

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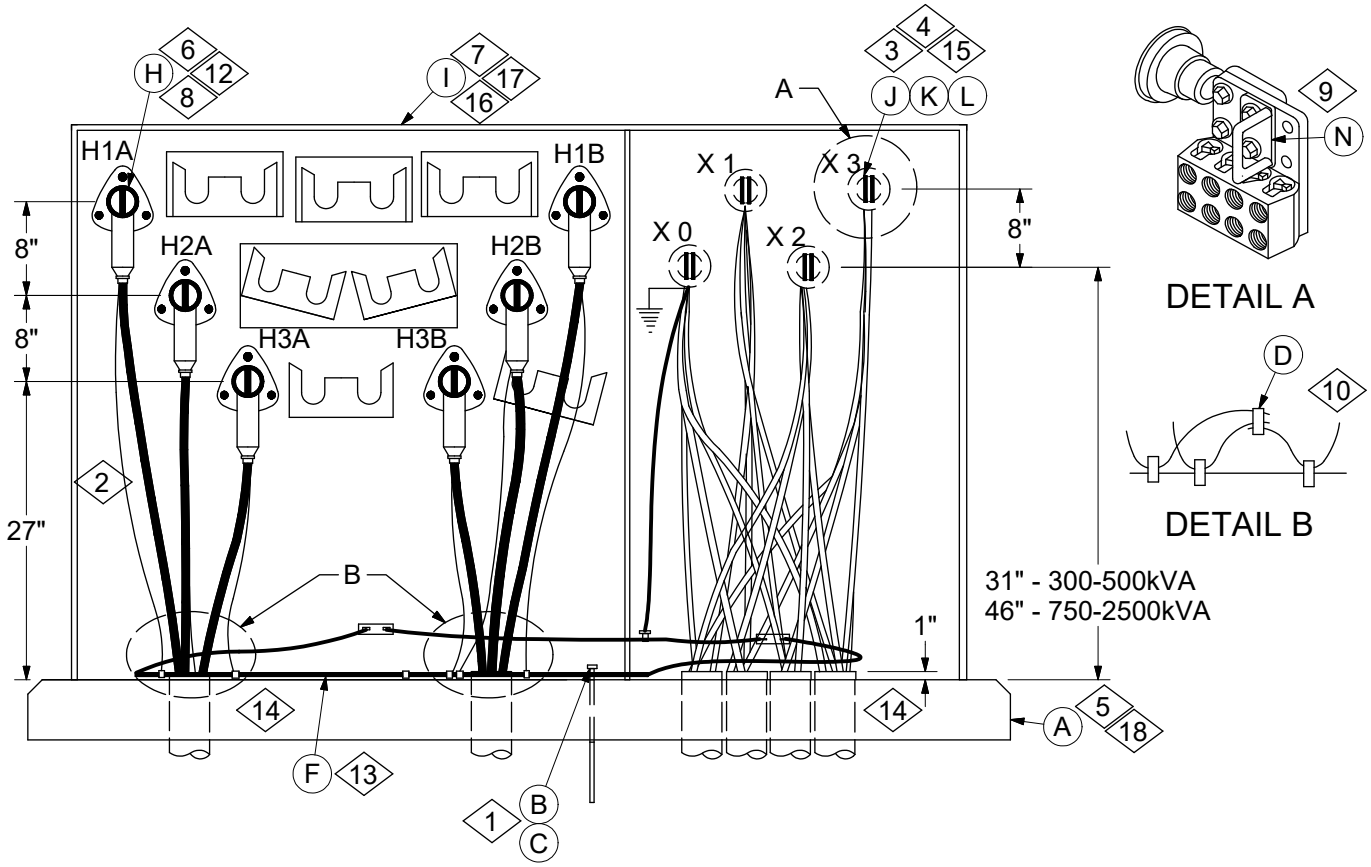
7	01/01/23	DG	Converted to new format
6	09/07/17	JMW	

DESIGN NOTE(s):

16. Preferred number of secondary cables per terminal is six or less. In no case shall the number of cables per terminal exceed twelve.

17. See DCS **13 00 01 02** for three-phase padmount transformer selection.
See DCS **13 00 04 01** for typical transformer dimensions, weight, and oil volumes.

18. See DCS **59 81 51 (10 &11)** for minimum clearances from the edge of the transformer pad to protective barriers/fences or other obstructions.



CONSTRUCTION NOTE(s):

1. Install ground rod clamp 3” below top of rod to provide space for attaching ground set.

2. Provide enough concentric neutral length to attach to ground and also allow movement of the elbow from the bushing to the parking stand. Primary and secondary cables must have a minimum of 1" clearance to the enclosure walls.

3. Stainless steel machine bolts and belleville spring washers are required for bolting aluminum lugs to secondary terminals. Clean the lugs and terminals and apply inhibitor to the mating interfaces. See DCS **59 52 00 43**.

4. When installing secondary lugs use the maximum number of mounting holes that align with the spade holes.

5. See DCS **34 11 00 00**, for poured-in-place loop-feed pad instructions.

6. If transformer is used as open point in the cable loop, install elbow arresters (Stock #10 01 177) in the open bushings and install feed-thru bushing stand-offs (Stock #17 63 245) with elbow arresters for the open cable termination.

7. Transformer will be equipped with a storage rack inside the primary cable compartment for storing grounding elbows. Construction personnel are to leave three grounding elbows on the storage rack. Coil the leads and leave the interfaces covered.

8. If the 200A loadbreak elbows are removed from the transformer bushings, they must be placed on 35kV, 200A standoff bushings (Stock #17 63 246). Construction personnel are to install three standoff bushings in each transformer.

9. If the grounding stirrup is installed, longer bolts may be required. If used, stirrups are installed on X1, X2, and X3.

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3	08/18/17	JMW	

10. Grounding practices are different in Missouri and Illinois.
In Missouri - Connect cable concentric neutrals to the #2 bare CU ground and then end-to-end using 4 split bolt connectors as shown in this detail.
In Illinois - Cable concentric neutrals may be single-point connected to the #2 bare CU ground using hot-line clamps or split bolt connectors.

11. The Aluminum lugs can be used for Aluminum or Copper conductors.

12. Fault current indicators can be installed to aid in determining if fault has occurred in the transformer or the cable feeding the transformer.

13. Loop the #2 CU ground bus from the ground rod, through the two transformer tank ground connectors, and back to the ground rod. Use a separate piece of #2 CU ground wire to connect from an open position of the X0 connector to the ground bus. The ground rod can be located where most convenient in the pad opening to avoid the incoming and outgoing conduit elbows.

14. If bends are cut off, bell end couplings are to be installed over the end of each conduit.

	ITEM	STK / DCS #	DESCRIPTION 51 12 34 **	02
5	A	**34 11 00 00**	Pad, Concrete, Poured-in-Place, Loop-Feed	1
	B	23 13 069	Rod, Ground, 5/8” x 8’	1
	C	17 52 032	Clamp, Ground Rod, 5/8” For #8 - 1/0	2
10	D	17 54 373	Connector, Split Bolt, #2 Str. CU.	8
		17 54 182	Connector, Split Bolt, 3-#2 Str. CU.	2
7	E	17 63 296	Ground, Elbow, 35kV, Large Interface	3
13	F	18 52 025	Wire, Copper, #2 Solid, Soft Drawn	10
8	G	17 63 246	Bushing, Standoff, 35kV, Large Interface	3
2,6 @	H	17 05 228	Termination, 35kV, 200A Loadbreak Elbow, Large Interface	#
16,17 @	I	QC____L	Xfmr, 3-Phase, 35kVΔ-208Y/120, Loopfeed	1
		QF____L	Xfmr, 3-Phase, 35kVΔ-480Y/277, Loopfeed	1
		VC____L	Xfmr, 3-Phase, 35kV Grd Y-208Y/120, Loopfeed	1
		VF____L	Xfmr, 3-Phase, 35kV Grd Y-480Y/277, Loopfeed	1
3,9 @	J	21 56 078	Bolt, Machine, 1/2” x 2”, Stainless Steel	#
		21 54 316	Bolt, Machine, 1/2” x 2-1/2”, Stainless Steel	#
		21 56 075	Bolt, Machine, 1/2” x 1-1/2”, Stainless Steel	#
3 @	K	12 56 052	Washer, Belleville Spring, 1/2”, Stainless Steel	#
		12 56 053	Washer, Flat, 1/2”, Stainless Steel (2 ea. per Belleville)	#
4,11,15 @	L	17 55 190	Lug, Alum 1 - 1/0 to 1000 kcmil, Lay-in, 2 Hole	#
		17 55 289	Lug, Alum 2 - 1/0 to 1000 kcmil, Lay-In, 2 Hole	#
		17 55 209	Lug, Alum 3 - 1/0 to 1000 kcmil, Lay-In, 6 Hole	#
		17 55 233	Lug, Alum 6 - 1/0 to 500 kcmil, Lay-In, 10 Hole	#
		17 55 232	Lug, Alum 6 - 1/0 to 1000 kcmil, Lay-In, 12 Hole	#
		17 55 343	Lug, Alum 1 - 1/0 to 750 kcmil, 2 Hole	#
		17 55 344	Lug, Alum 2 - 1/0 to 750 kcmil, 4 Hole	#
		17 55 345	Lug, Alum 4 - 1/0 to 750 kcmil, 6 Hole	#
		17 55 346	Lug, Alum 5 - 1/0 to 750 kcmil, 8 Hole	#
		17 55 349	Lug, Alum 6 - 1/0 to 750 kcmil, 8 Hole	#
		17 55 350	Lug, Alum 8 - 1/0 to 750 kcmil, 8 Hole	#

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4	01/01/23	DG	Converted to new format
3	08/18/17	JMW	

	ITEM	STK / DCS #	DESCRIPTION 51 12 34 **	02
6 @	M	10 01 177	Arrester, Lightning, 35kV, Large Interface	#
9 @	N	17 55 510	Stirrup, Grounding	3
6 @	O	17 63 245	Bushing, Standoff, Feed-Thru, 35kV	3
12 @	P	60 55 001	Indicator, Fault Current, 1 Phase	3

DESIGN NOTE(s):

15. Preferred number of secondary cables per terminal is six or less. In no case shall the number of cables per terminal exceed twelve.

16. VC and VF transformers should only be used for like-kind replacement if QC or QF transformers will not work due to phase angle conflicts.

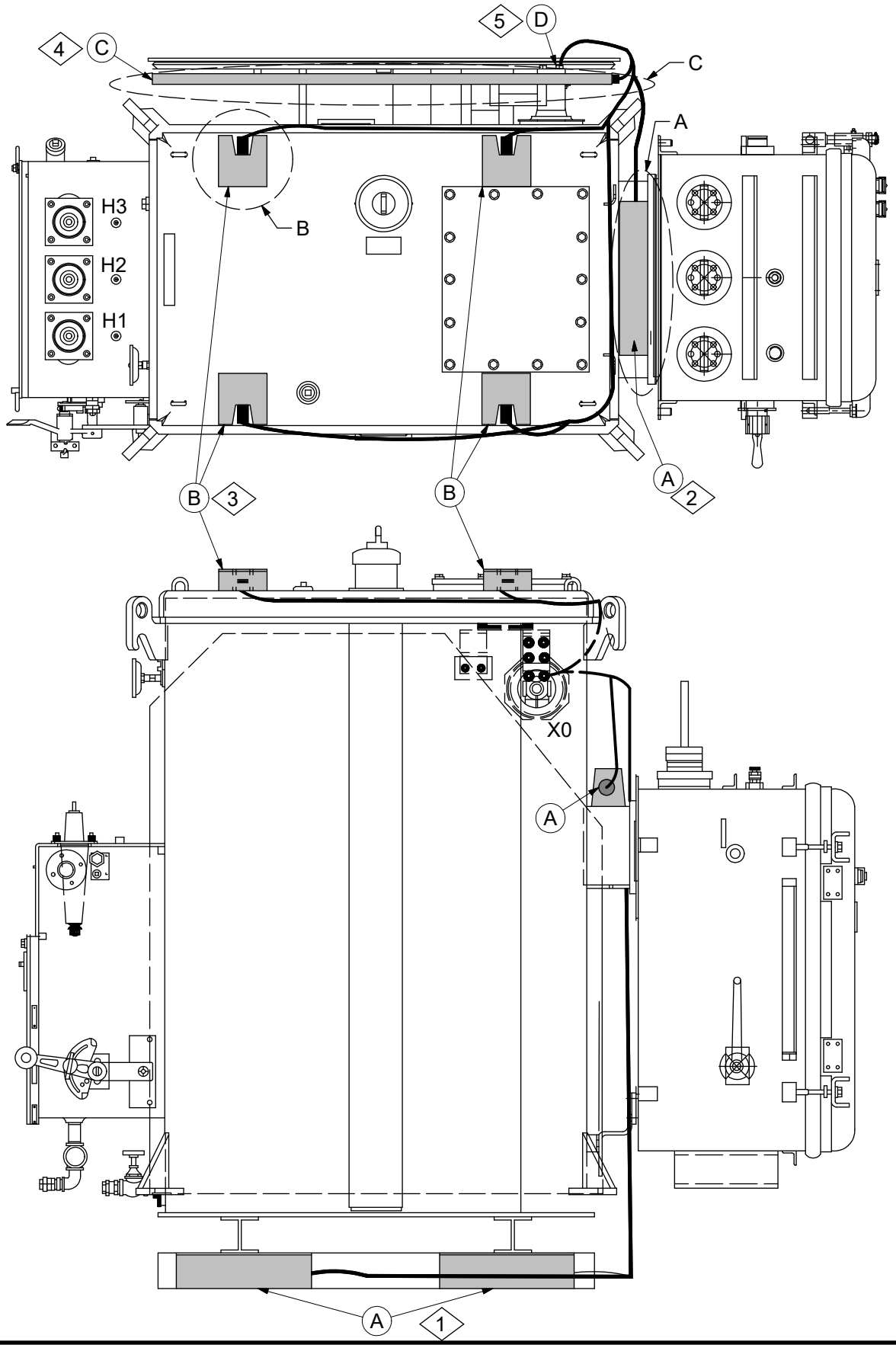
17. See DCS **13 00 01 02** for three-phase padmount transformer selection.
See DCS **13 00 04 01** for typical transformer dimensions, weight, and oil volumes.

18. See DCS **59 81 51 (10 & 11)** for minimum clearances from the edge of the transformer pad to protective barriers/fences or other obstructions.

OPERATIONS NOTE(s):

19. Contact Distribution Standards for replacement fuse stock #.

REV	DATE	ENG	DESCRIPTION
4	01/01/23	DG	Converted to new format
3	08/18/17	JMW	



REV	DATE	ENG	DESCRIPTION
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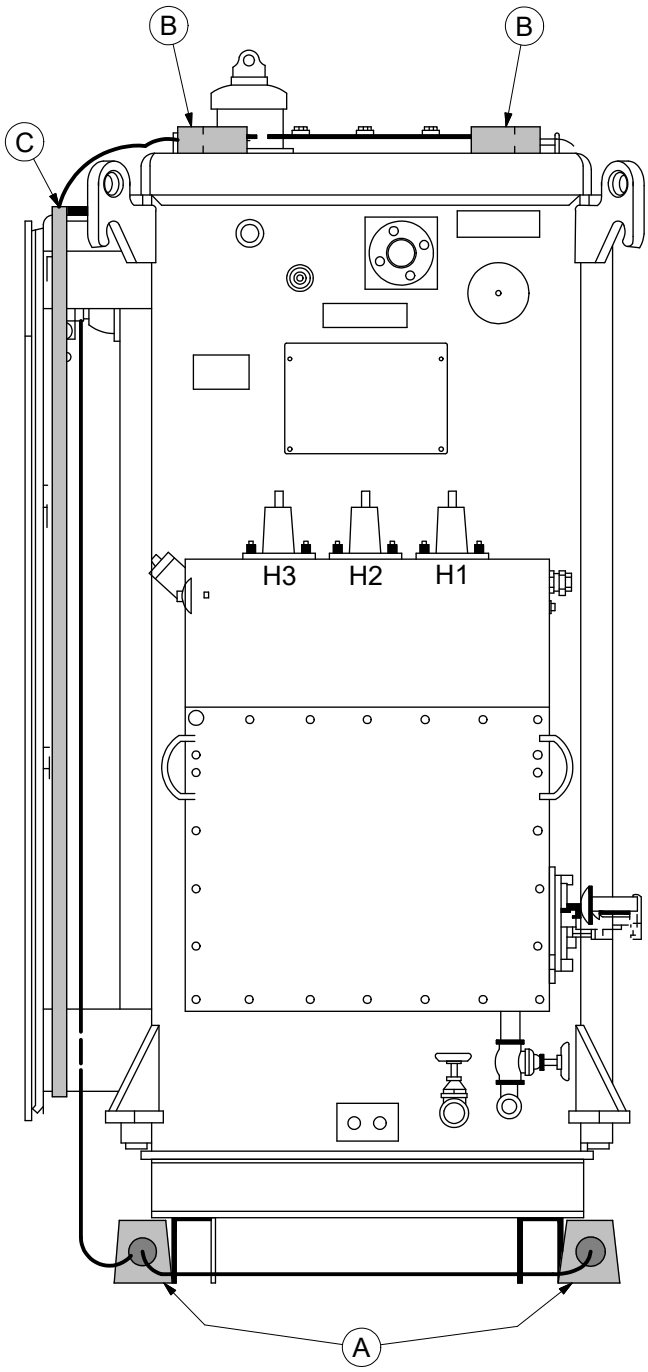
0	10/01/19	DT	



REV	DATE	ENG	DESCRIPTION
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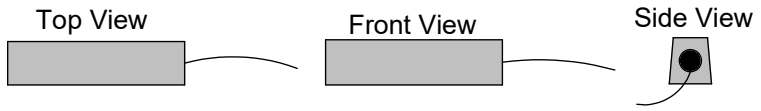
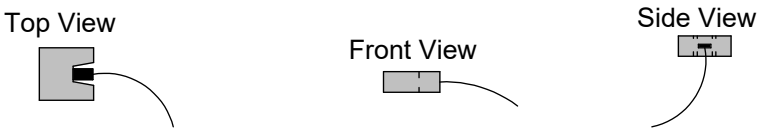
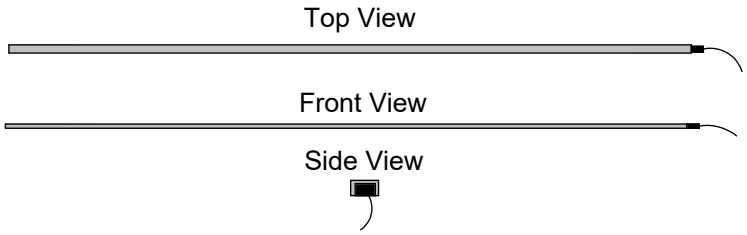
0	10/01/19	DT	



DETAIL A



DETAIL B



DETAIL C

CONSTRUCTION NOTE(s):

1. Four 17 lb. magnesium anodes shall be placed on the floor next to U-channel under the transformer.

2. One 17 lb. magnesium anode shall be placed on the network protector throat. The anode shall be secured with a small bead of silicone caulk, approximately one inch long, on both ends of the anode. A continuous bead of silicone shall not be applied around the base of the anode and no silicone shall be applied to the mating surface of the anode.

3. Four 3 lb. magnesium anodes shall be placed on the top surface of the transformer. Each anode shall be secured to the transformer with 4 small beads of silicone caulk at the corners of the anode. Each bead shall be approximately one inch long. Do not use a continuous bead of caulk around the anode or apply any silicone caulk to the mating surface of the anode.

4. One 7 ft. long magnesium anode ribbon shall be shaped and positioned on the transformer cooling panel brackets. The anode shall be secured with a small bead of silicone caulk that shall be applied on the side of the anode where it contacts the cooling panel bracket. Do not use a continuous bead of caulk around the anode or apply any silicone caulk to the mating surface of the anode.

5. Each individual wire for all ten anodes shall be routed and bonded to the transformer X0 bushing with connector.

ITEM	STK / DCS #	DESCRIPTION 51 13 02 **	01
A	40 54 490	17 Lb. Magnesium anode with 20’ #10 CU	5
B	40 54 491	3 Lb. Magnesium anode with 15’ #10 CU	4
C	40 54 492	7’ Ribbon Magnesium anode with 13.5’ #10 CU	1
D	17 51 114	Lug, Bolted, #8-2/0	1

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1	01/01/23	DT	Converted to new format
0	10/01/19	DT	