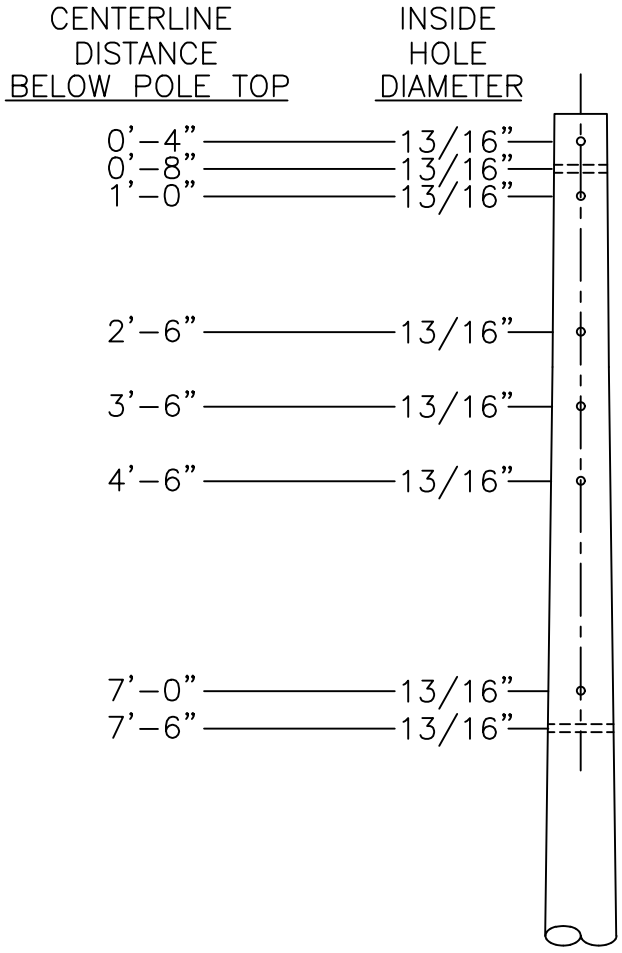

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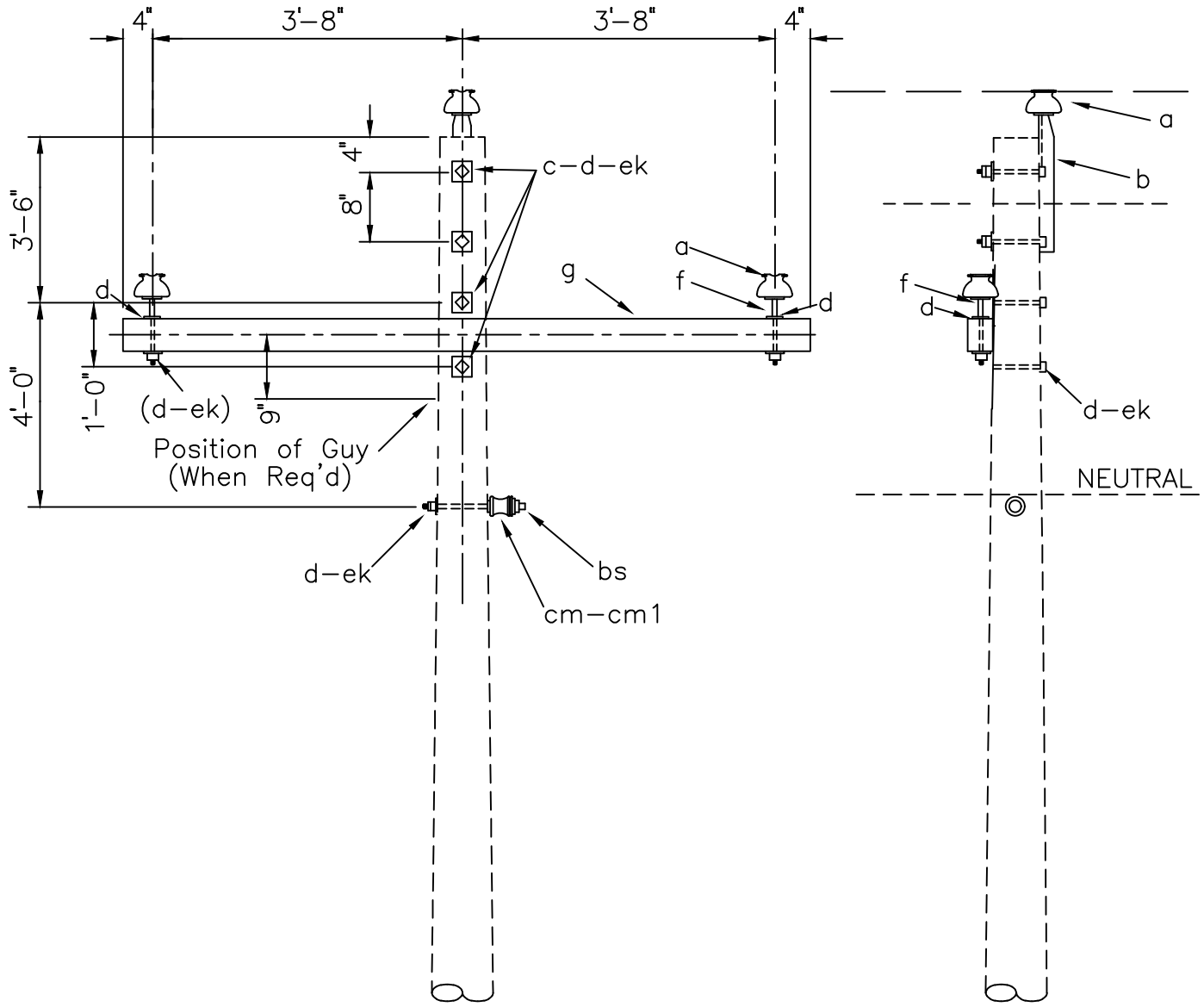
POLE DRILLING GUIDE

OCTOBER 2018	3 – PHASE PRIMARY	DRILLING GUIDE
EEC	12.47/7.2 kV	



ITEM	QTY	MATERIAL
a	3	Insulator, pin type, (12.47/7.2 kV)
b	1	Pin, pole top, 20"
c	4	Bolt, machine, 5/8"x req'd length
d	5	Washer, square, 3", curved
d	2	Washer, square, 2 1/4"
f	2	Pin, crossarm, steel, 5/8"x11 1/2"
g	1	Crossarm, tangent fiberglass 8'
bs	1	Bolt, single, upset x req'd length
cm	1	Insulator, spool, 3"
ek	7	Locknuts
cm1	1	Wire tie

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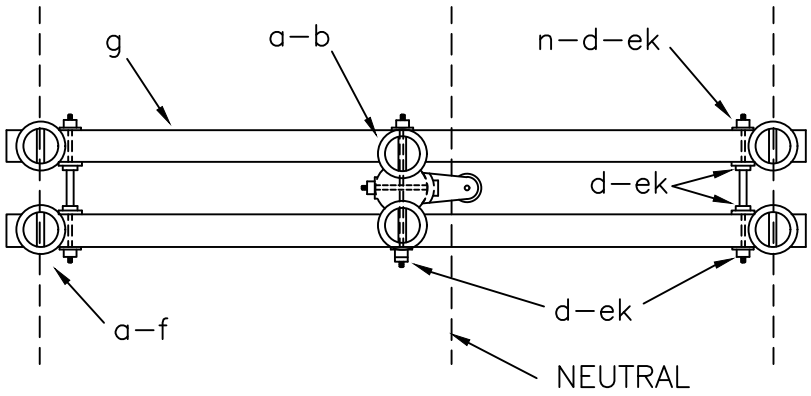
DESIGN PARAMETERS:

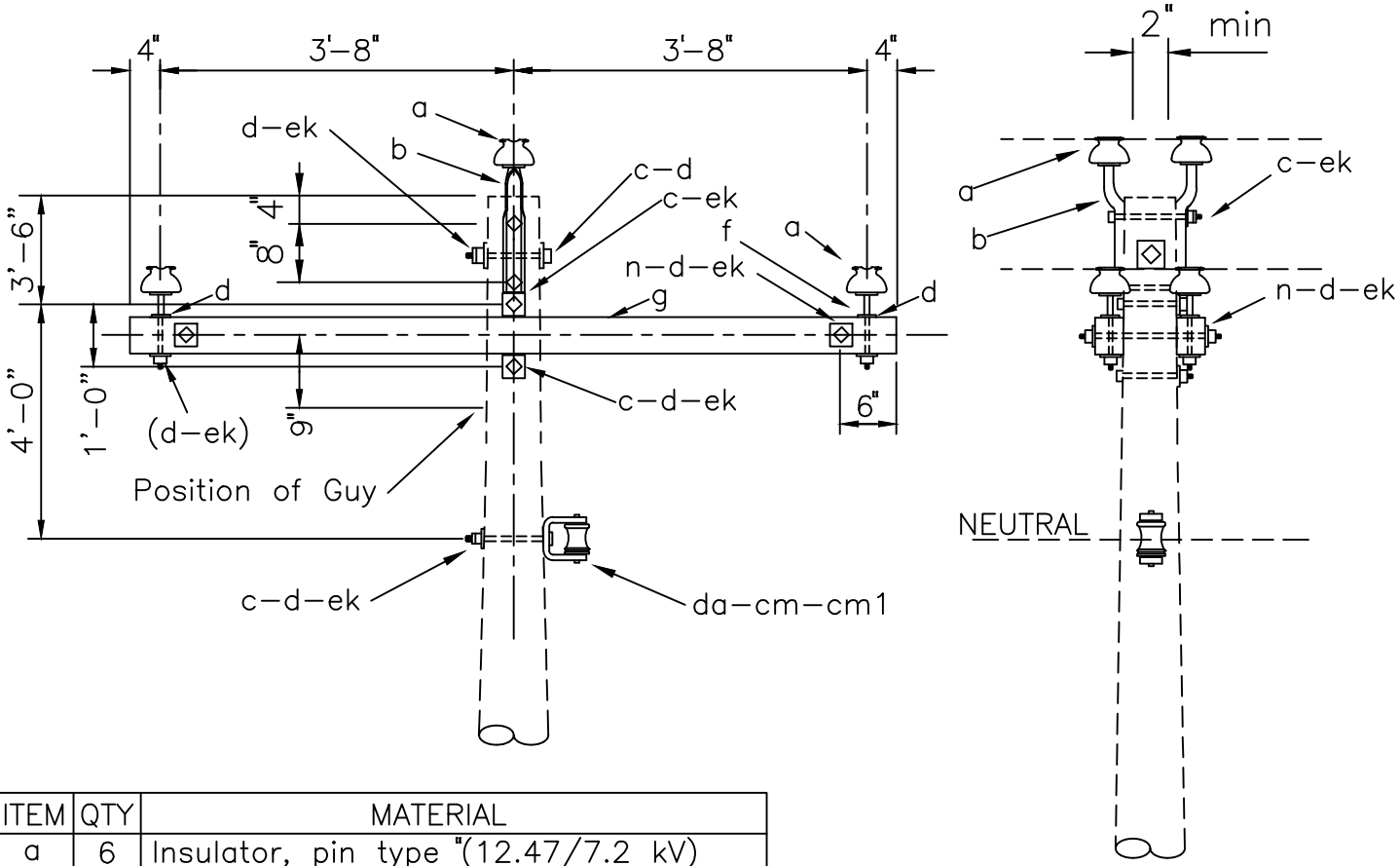
MAXIMUM LINE ANGLES:
5° – Small Conductors
2° – Larger than #1/0

SINGLE SUPPORT ON CROSSARM (TANGENT)

OCTOBER 2018	3 – PHASE PRIMARY	C1.11
EEC	12.47/7.2 kV	(C1)



PLAN



ITEM	QTY	MATERIAL
a	6	Insulator, pin type "(12.47/7.2 kV)
b	2	Pin, pole top, 20, straight or offset
c	6	Bolt, machine, 5/8 x req"d length
d	3	Washer, square, 3", curved
d	12	Washer, square, 2 1/4
f	4	Pin, crossarm, steel, 5/8 x 11 1/2"
g	2	Crossarm, tangent fiberglass 8'
n	2	Bolt, double arming, 5/8"xreq'd length
da	1	Bracket, insulated
ek	18	Locknuts
cm1	1	Wire tie
cm	1	Insulator, Spool, 3"

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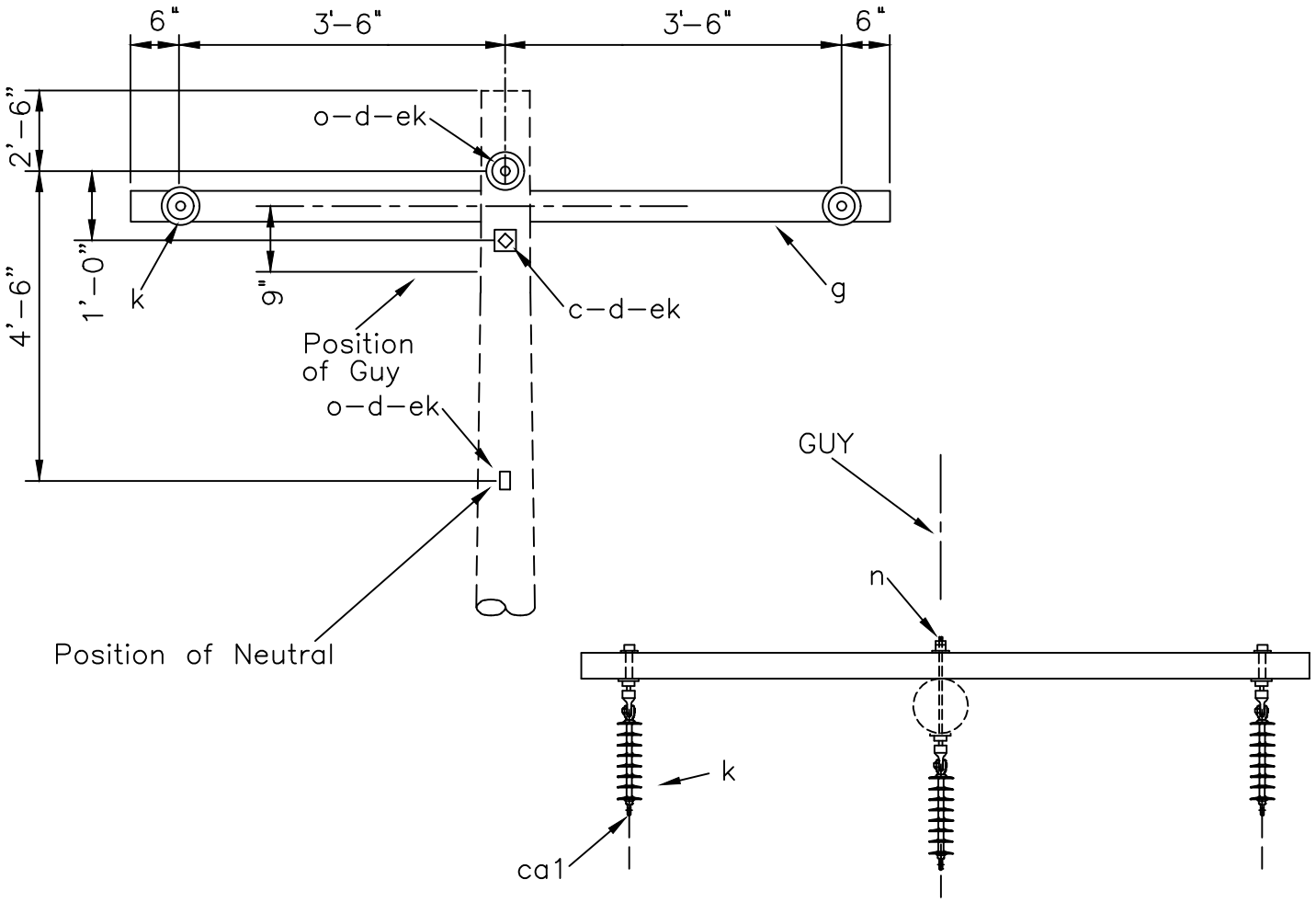
DESIGN PARAMETERS:

See RUS Bulletin 1728F–804
TABLE III (Exhibit 1)

Maximum transverse load=
1,000lbs / Conductor

DOUBLE SUPPORT ON CROSSARMS

OCTOBER 2018	3 – PHASE PRIMARY	C2.21
EEC	12.47/7.2 kV	(C2)



PLAN

ITEM	QTY	MATERIAL
c	1	Bolt, machine, 5/8"x req'd length
d	4	Washer, square, 3", curved
g	1	Crossarm, deadend, fiberglass 8'
k	3	Insulator, suspension
o	2	Bolt, eye, 5/8" x req'd length
ek	3	Locknuts
ca1	4	Clamp, deadend

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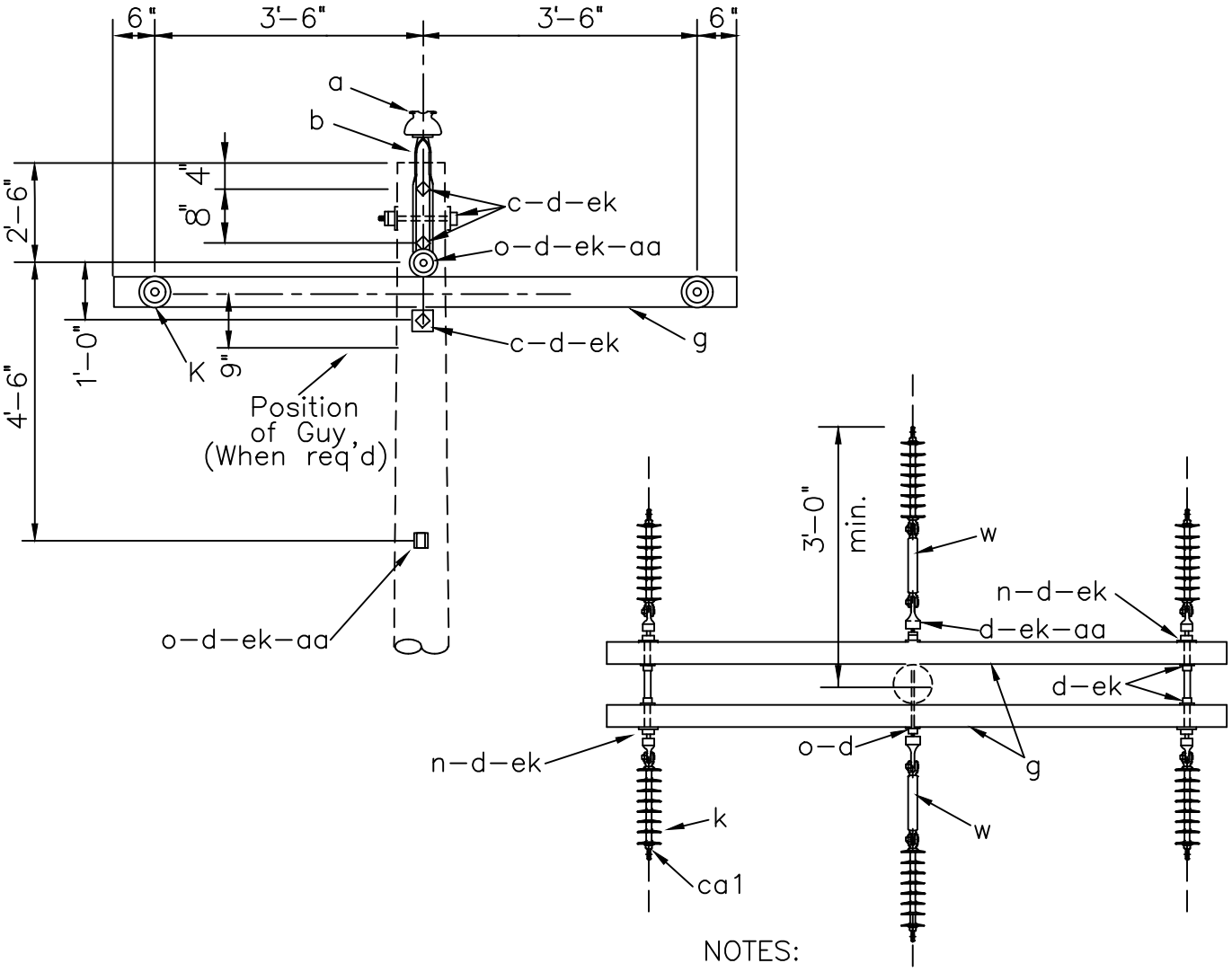
DESIGN PARAMETERS:

PERMITTED UNBALANCED CONDUCTOR TENSION:

See RUS Bulletin 1728F–804 Table A (Exhibit 2)

SINGLE DEADEND ON CROSSARMS

OCTOBER 2018	3 – PHASE PRIMARY 12.47/7.2 kV	C5.21 (C7)
EEC		



NOTES:

1. Maximum line angle may be increased to 15 by installing anchor shackles, item "bo", to (horizontal) eye nuts and installing side guys as req'd.

ITEM	QTY	MATERIAL
a	1	Insulator, pin type, (12.47/7.2kV)
b	1	Pin, pole top, 20"
c	4	Bolt, machine, 5/8"x req'd length
d	6	Washer, square, 3", curved
d	8	Washer, square, 2 1/4"
g	2	Crossarm, deadend, fiberglass, 8'
k	6	Insulator, suspension
n	2	Bolt,double arming,5/8" x req'd length
p	–	Connectors, as req'd
aa	2	Nut, eye, 5/8"
av	–	Jumpers, as req'd
ek	13	Locknuts
ca1	8	Clamp, deadend
o	2	Bolt, eye 5/8"x req'd length
w	2	Guy strain insulator

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DESIGN PARAMETERS:

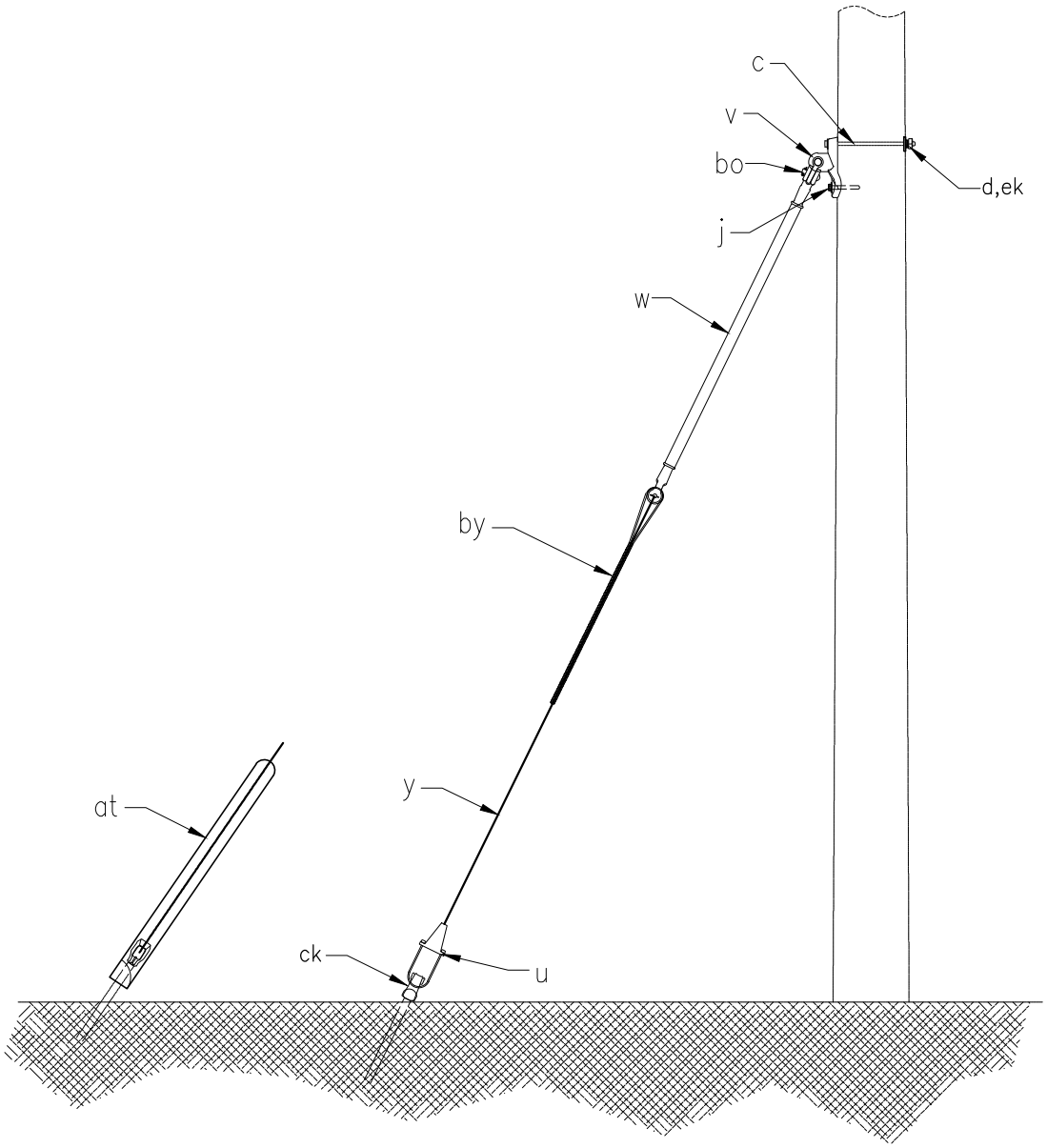
PERMITTED UNBALANCED CONDUCTOR TENSION:

See RUS Bulletin 1728F–804 Table A (Exhibit 2)

MAXIMUM LINE ANGLE = 5°
(See Note 1)

DOUBLE DEADEND ON CROSSARMS

OCTOBER 2018	3 – PHASE PRIMARY	C6.21
EEC	12.47/7.2 kV	(C8)



ITEM	QTY	MATERIAL
c	1	Bolt, machine, 5/8" x req'd length with nut
ck	1	Clamp, anchor bonding
d	1	Washer, 3", square, curved
j	1	Screw, lag, 1/2" x req'd length
u	1	Deadend, guy strand–vice (See Note 1)
v	1	Guy, attachement (See Note 1)
y	–	Guy, wire, 3/8" EHS Steel (See Note 2)
w	1	Guy, Strain Insulator
at	1	Guy, marker
ek	1	Locknut
bo	1	Shackle, anchor
by	1	Clamp, deadend, premformed

NOTES:

1. Other accepted and equivalent guy deadend (item "u") and attachment (item "v") material may be substituted for the parts shown.
2. Specify required length.

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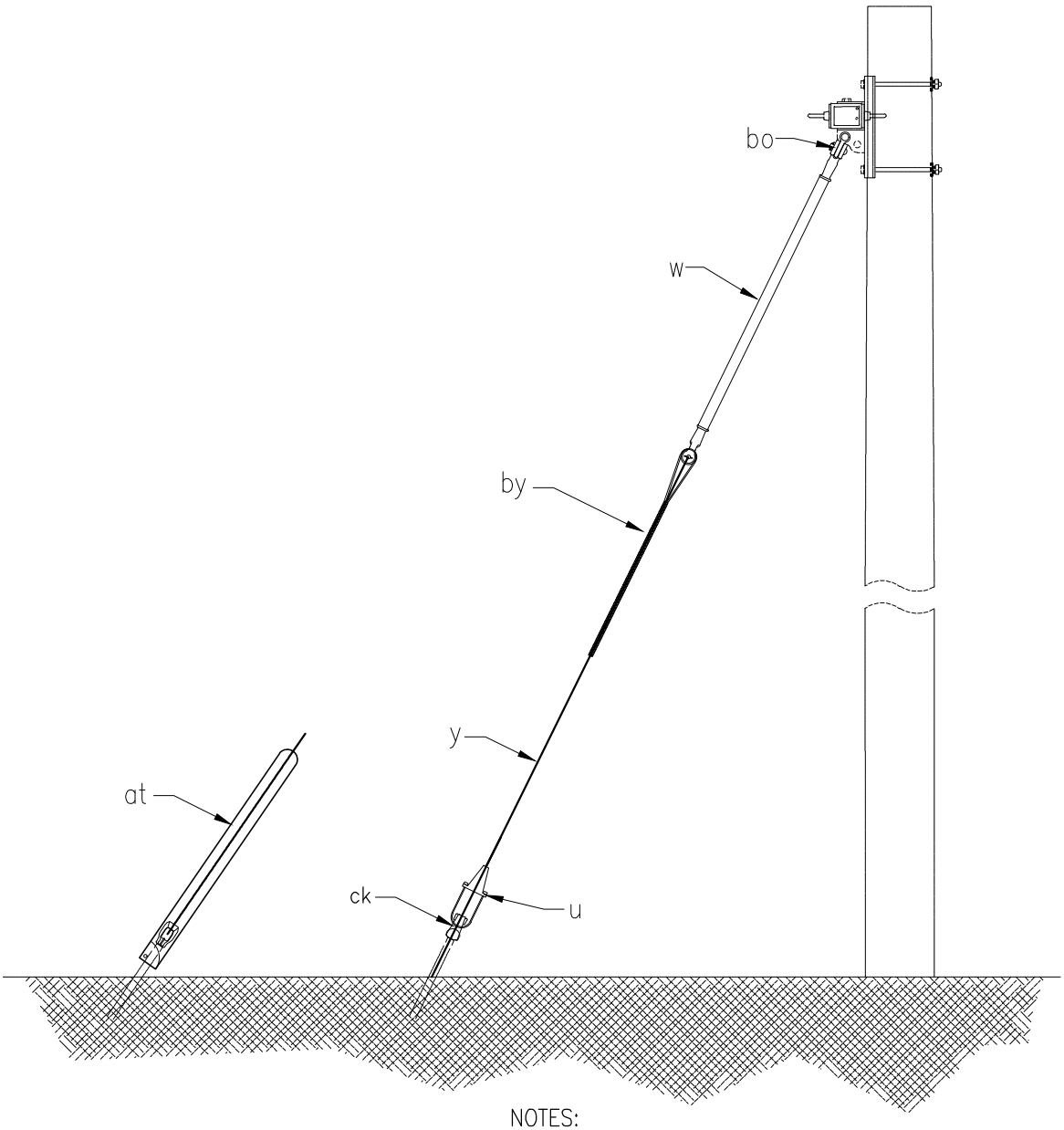
DESIGN PARAMETERS:

PERMITTED LOAD IS 90% of RATED BREAKING STRENGTH OF GUY WIRE

SINGLE DOWN GUY
GUY HOOK & THROUGH BOLT

OCTOBER 2018		E1.1A
EEC		



NOTES:

1. Other accepted and equivalent guy deadend (item "u") material may be substituted for the parts shown.
2. Specify required length.

ITEM	QTY	MATERIAL
ck	1	Clamp, anchor bonding
u	1	Deadend, guy strand–vice (See Note 1)
y	–	Guy, wire, 3/8" EHS Steel (See Note 2)
w	1	Guy, Strain Insulator
at	1	Guy, marker
bo	1	Shackle, anchor
by	1	Clamp, deadend, pre–formed

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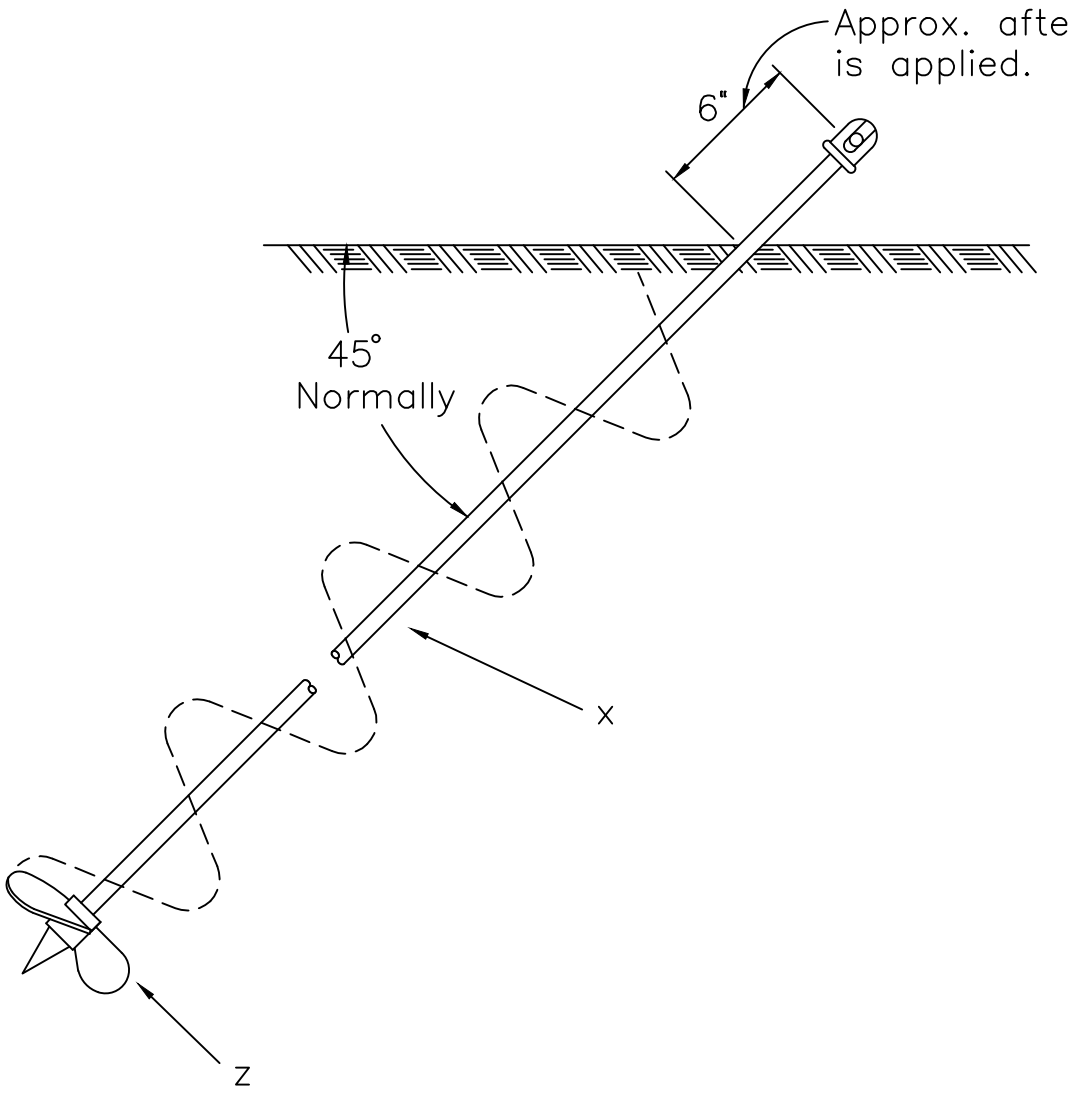
DESIGN PARAMETERS:

PERMITTED LOAD IS 90% of RATED BREAKING STRENGTH OF GUY WIRE

SINGLE DOWN GUY CROSSARM (PUPI) ATTACHMENT

OCTOBER 2018		E1.1B
EEC		



NOTE: Designated maximum holding power rating assumes proper installation in class 5 soil.

ASSEMBLY: F2		.6	.8	.10	.12
	Minimum Area (sq. in.)	90	100	120	135
ITEM	MATERIAL	QTY	QTY	QTY	QTY
x	Rod, anchor, thimble eye, 5/8" x 7'0"	1	1		
x	Rod, anchor, twin eye, 3/4 X 8'0			1	1
z	Anchor, screw type, power installed	1	1	1	1

ASSEMBLY NUMBERS	
NEW	(OLD)
F2.6	(F1–1S)
F2.8	(F1–2S)
F2.10	(F1–3S)
F2.12	(F1–4S)

DESIGN PARAMETERS:
DESIGNATED MAXIMUM HOLDING POWER (lbs.)

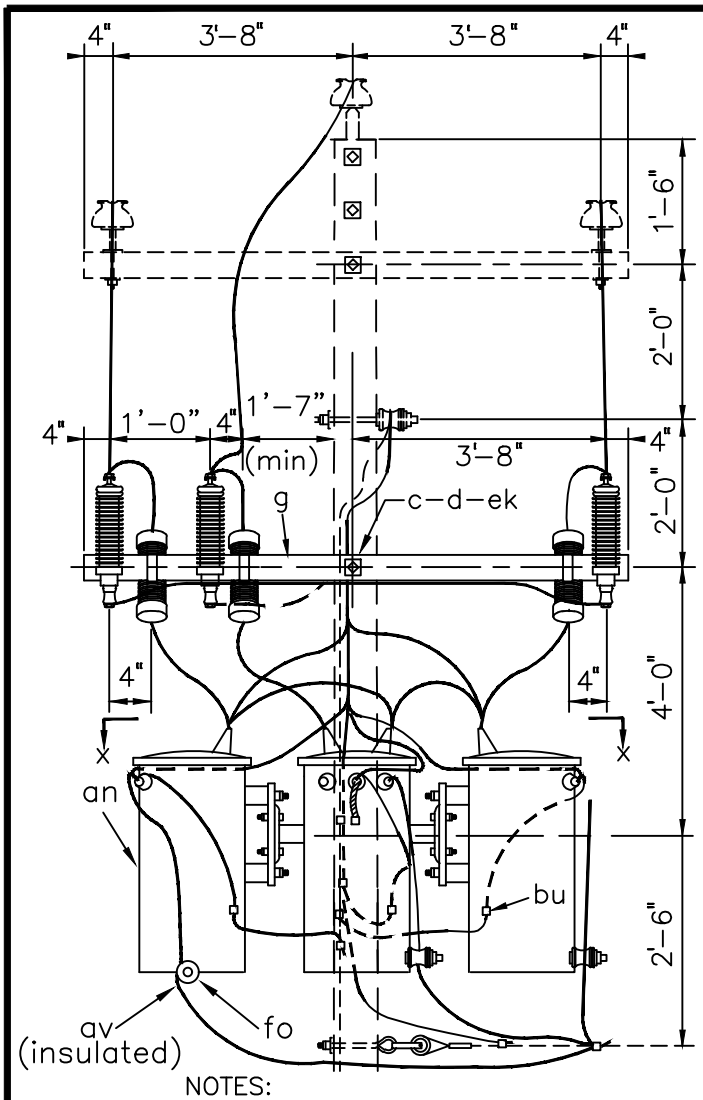
F2.6:	6,000
F2.8:	8,000
F2.10:	10,000
F2.12:	12,000

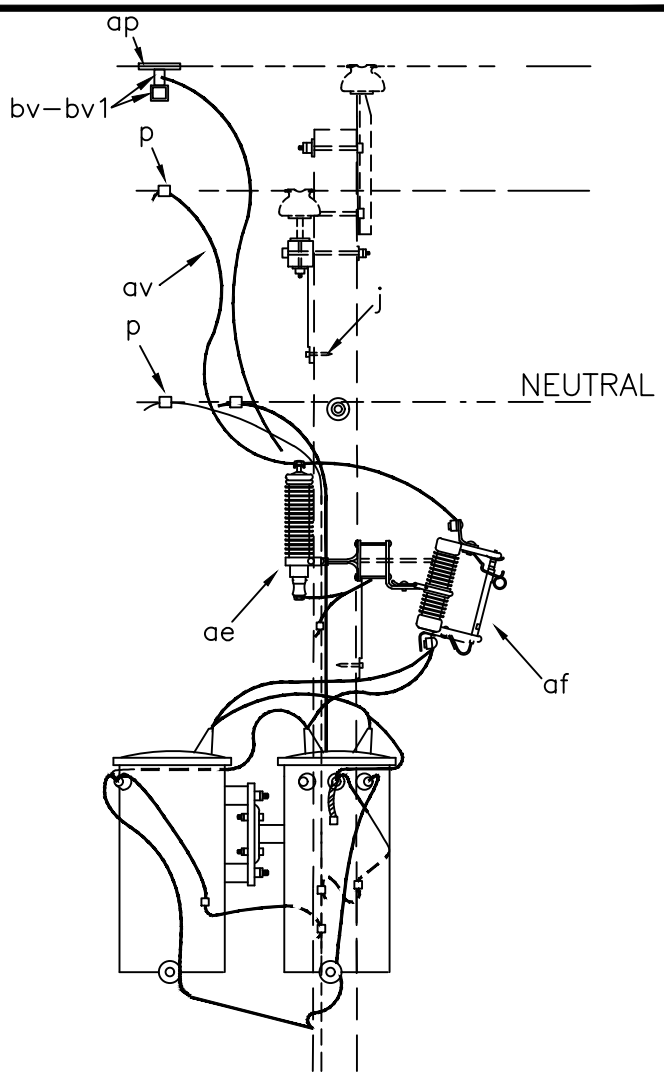
SCREW ANCHORS, (POWER INSTALLED)

APRIL 2005

RUS

F2.6, F2.8, F2.10, F2.12

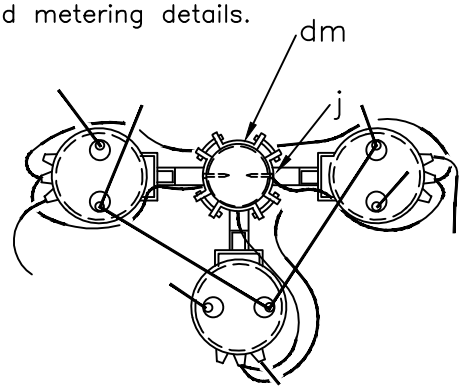




NOTES:

1. See Drawing "Q3.3" for additional connection and metering details.

ITEM	QTY	MATERIAL
ap	–	Armor rod as req'd
bu	3	Connector, transformer grounding
bv	3	Clamp, hotline
bv1	3	Stirrup, hotline
c	2	Bolt, machine, 5/8"x req'd length
d	2	Washer, square, 3", curved
g	1	Crossarm, tangent, fiberglass 8'
j	1	Screw, lag, 1/2" x 4" as req'd
p	–	Connectors, as req'd
ae	3	Arrester, surge, (9 kV)
af	3	Cutout, dist. open (15 kV)
an	3	Transformer, 12.47 kV, conventional
av	–	Jumpers, bare, stranded, as req'd
av	–	Jumpers, service, as req'd
dm	1	Bracket, transformer, cluster with
		adapter plates as req'd
ek	2	Locknuts, 5/8"
fo	3	Bracket, transformer, insulated



SECTION X–X

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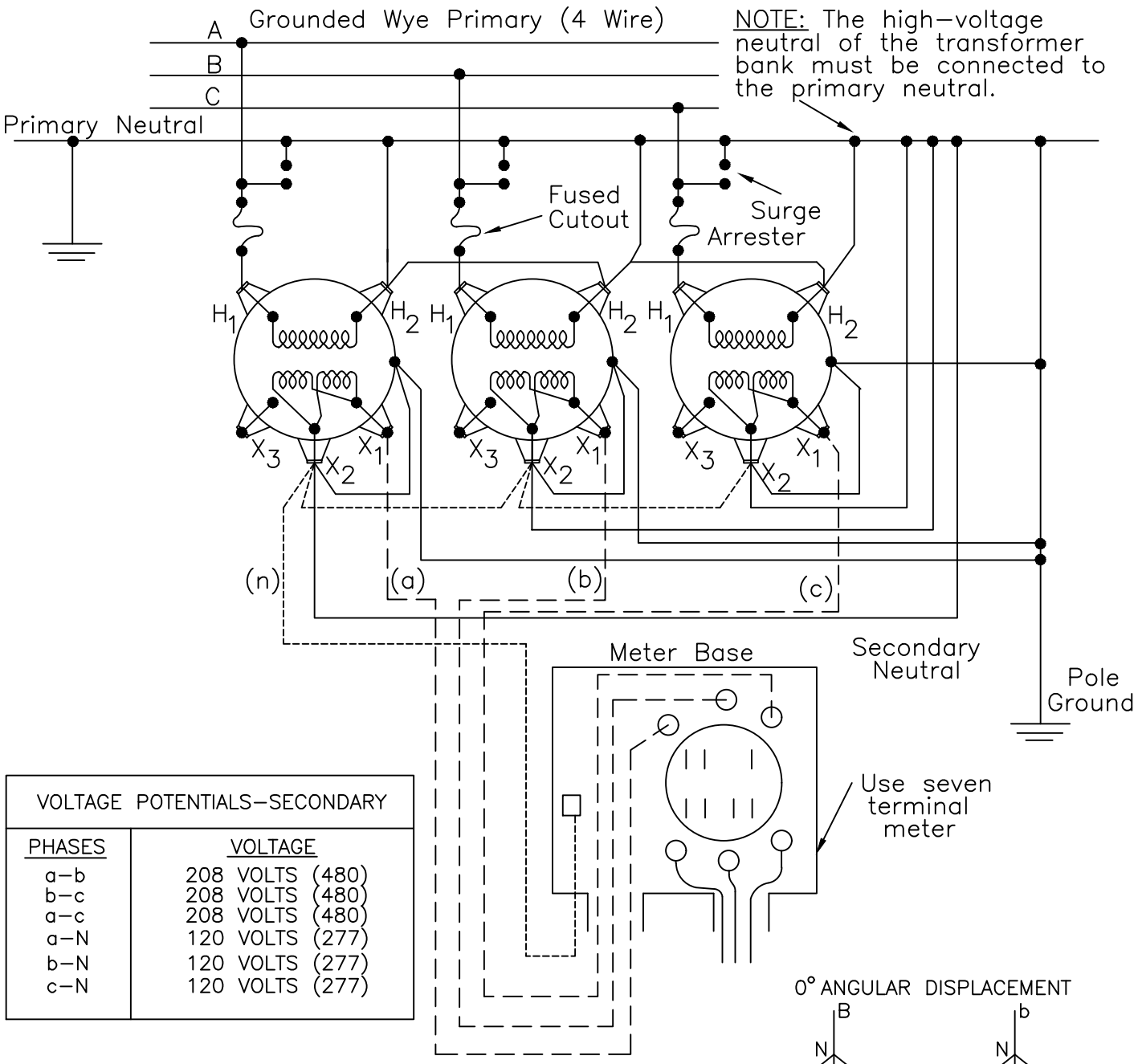
DESIGN PARAMETERS:

See Guide Drawing "G3.3G"

THREE–PHASE TRANSFORMER BANK
GROUNDED – WYE PRIMARY
GROUNDED – WYE, 4 WIRE SECONDARY

OCTOBER 2018	3 – PHASE PRIMARY	G3.3
EEC	12.47/7.2 kV	



VOLTAGE POTENTIALS–SECONDARY	
PHASES	VOLTAGE
a–b	208 VOLTS (480)
b–c	208 VOLTS (480)
a–c	208 VOLTS (480)
a–N	120 VOLTS (277)
b–N	120 VOLTS (277)
c–N	120 VOLTS (277)

(Additive Polarity–
See TRANSFORMER SPECIFICATIONS)

APPLICATION: Used to supply 120/208 volt single–phase and 208 volt, three–phase power loads.

See drawing "G3.3" or "VG3.3" for construction details. Reconnect secondary windings of transformers as shown. Matched (impedance and kVA) transformers are usually used.

BANK RATING: Each unit will supply 1/3 of the three–phase load and all of the single–phase load connected to it.

CAUTION: The primary and secondary neutrals must be firmly tied together and grounded or else excessive secondary voltages may develop.

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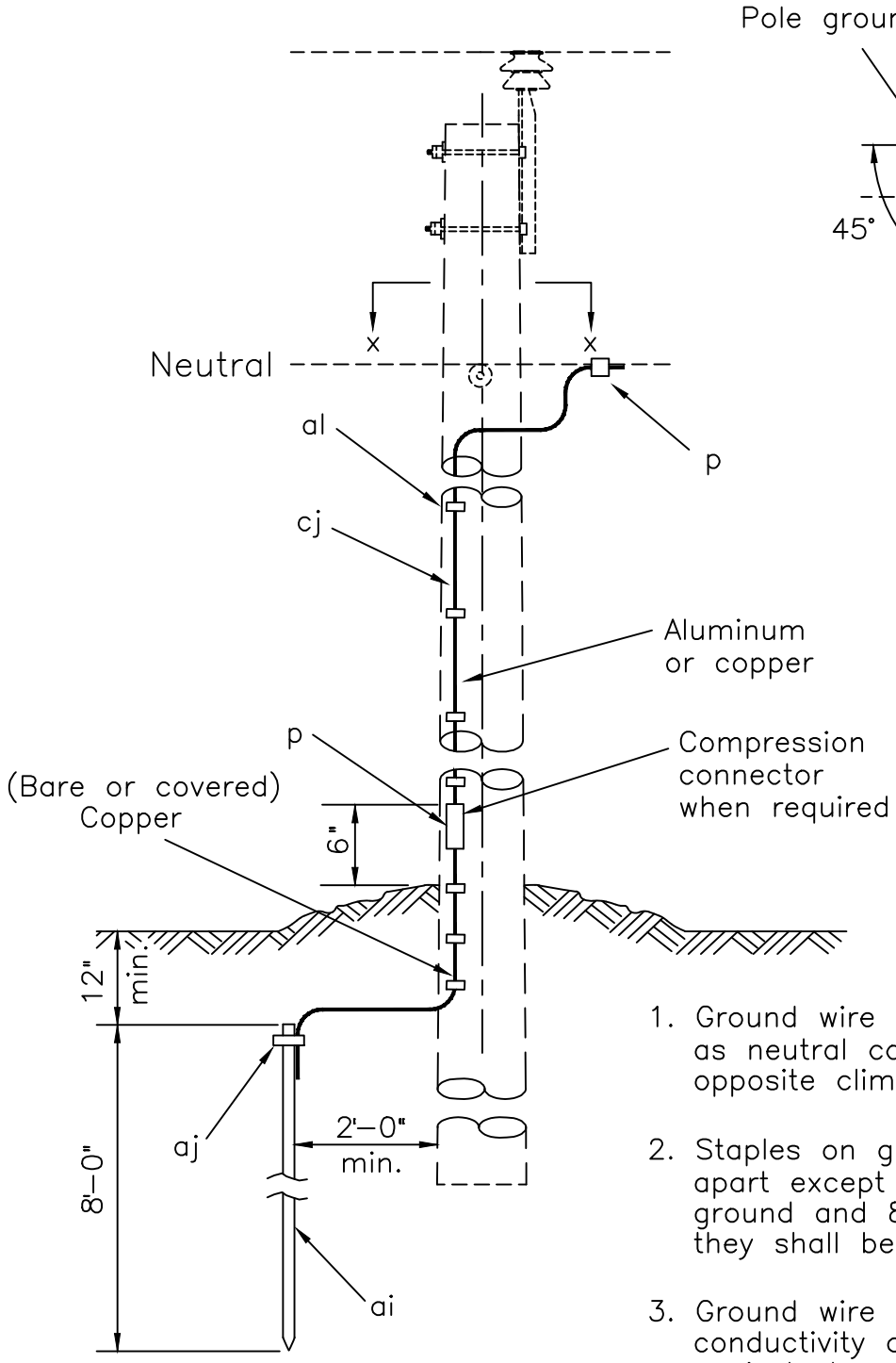
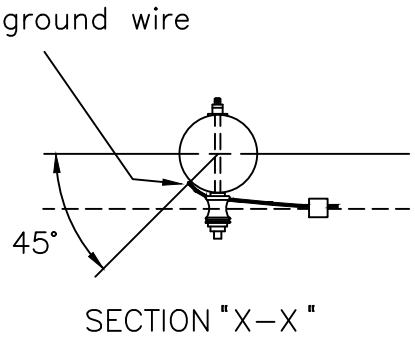
TRANSFORMER/METER CONNECTION GUIDE
GROUNDED WYE – GROUNDED WYE
FOR 120/208 VOLT (277/480) POWER LOADS

OCTOBER 2018	3 – PHASE PRIMARY	
EEC		G3.3G





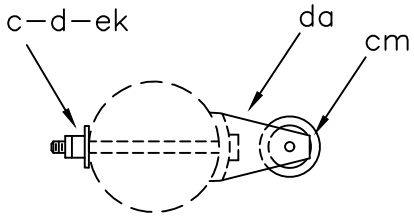
NOTES:

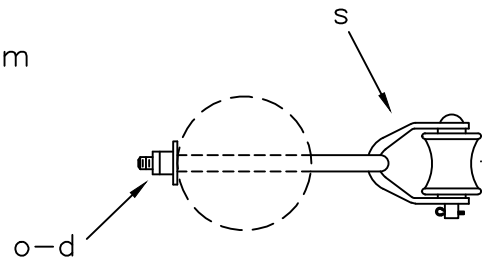
1. Ground wire to be located on same side as neutral conductor and in quadrant opposite climbing space or pole top pin.
2. Staples on ground wire shall be 2'–0" apart except for a distance of 8' above ground and 8' from top of pole where they shall be 6" apart.
3. Ground wire ("cj") to have minimum conductivity of No. 6 Copper or equivalent.
4. Use copper plated ground rod, copper ground wire and staples, OR, use galvanized steel ground rod, staples and aluminum ground wire.

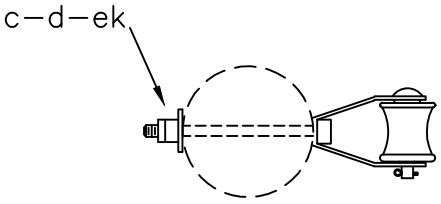
ITEM	QTY	MATERIAL
p		Connector, compression, as req'd
ai	1	Rod, ground, 5/8" min. diameter
aj	1	Clamp, ground rod
al		Staple, ground wire, as req'd
cj		Wire, pole ground, as req'd

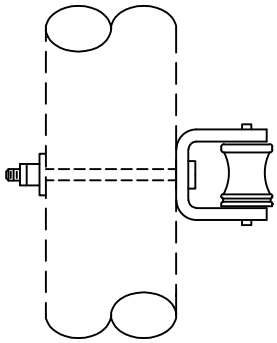
GROUNDING ASSEMBLY – GROUND ROD TYPE

DEC 1998		
RUS		H1.1

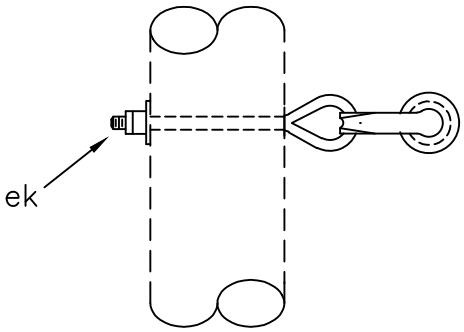




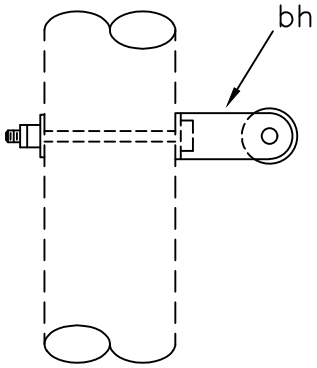




K1.1



K1.2



K1.3

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ASSEMBLY: K1		.1	.2	.3
ITEM	MATERIAL	QTY	QTY	QTY
c	Bolt, machine, 5/8" X req'd length	1		1
cm	Insulator, spool, 3"	1	1	1
d	Washer, square, 3", curved	1	1	1
o	Bolt, eye, 5/8" X req'd length		1	
s	Clevis, secondary, swinging, insulated		1	
bh	Clevis, service, deadend, insulated			1
ek	Locknuts	1	1	1
da	Bracket, insulated	1		

ASSEMBLY NUMBERS	
NEW	(OLD)
K1.1	(K14C)
K1.2	(K11C)
K1.3	(K14)
	(K14L)

DESIGN PARAMETERS:

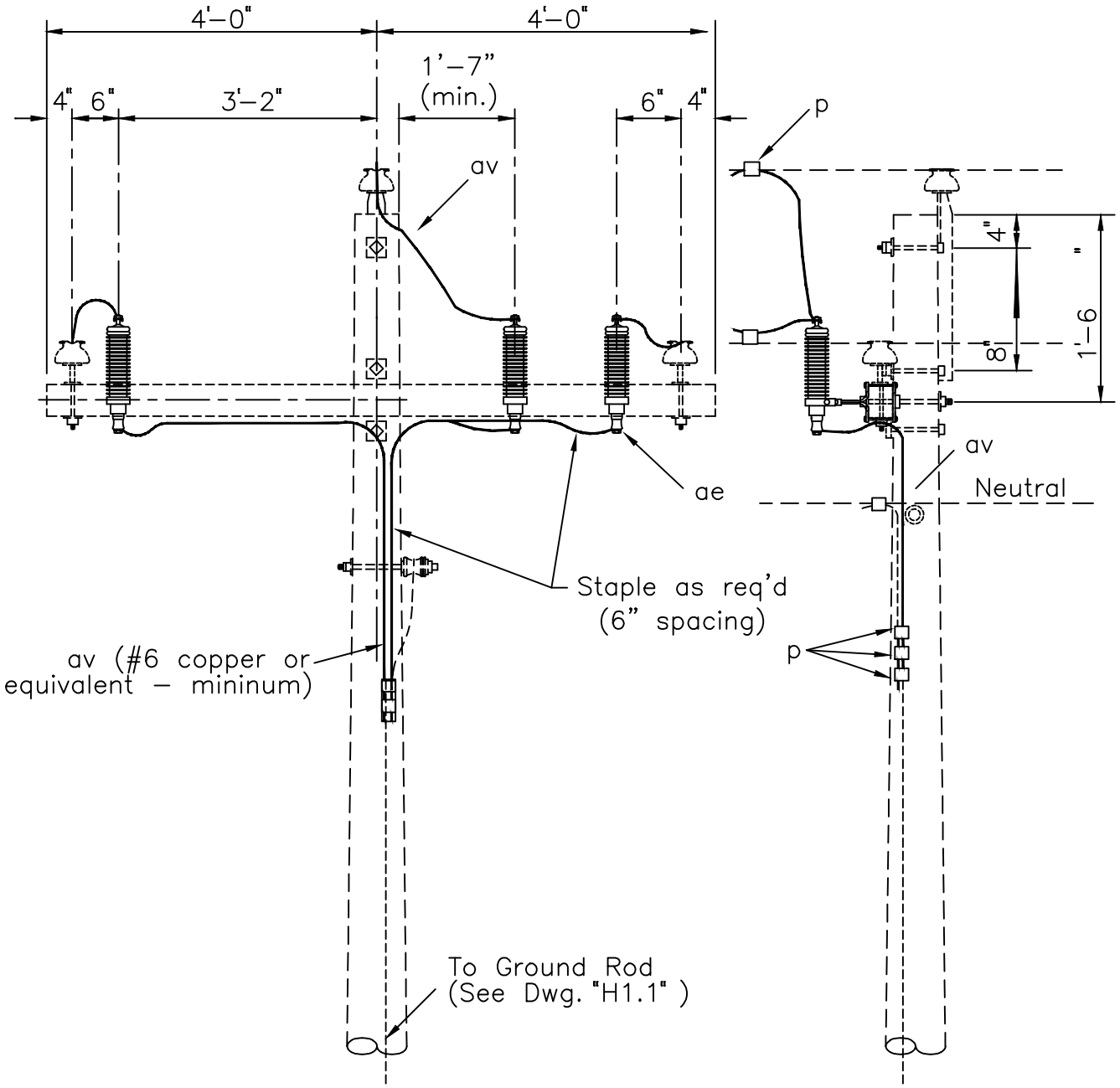
PERMITTED LONGITUDINAL LOADING:
1,500 lbs. (ANSI Class 53–2 Insulator)
2,250 lbs. (ANSI Class 53–4 Insulator)

SERVICE ASSEMBLIES (POLE MOUNTED)

OCTOBER 2018

EEC

K1.1,K1.2,K1.3



ITEM	QTY	MATERIAL
p		Connectors, as req'd
ae	3	Arrester, surge, (9 kV)
av		Jumpers, as req'd

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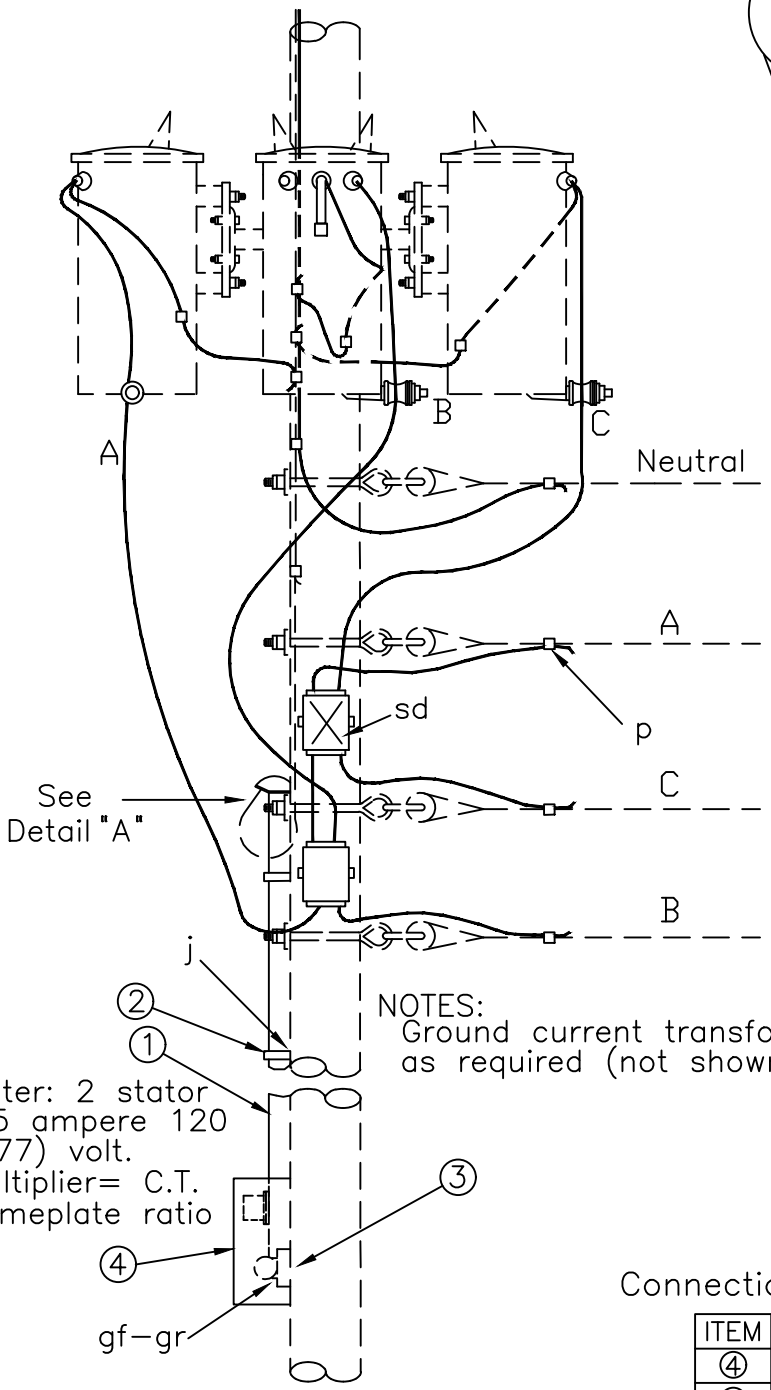
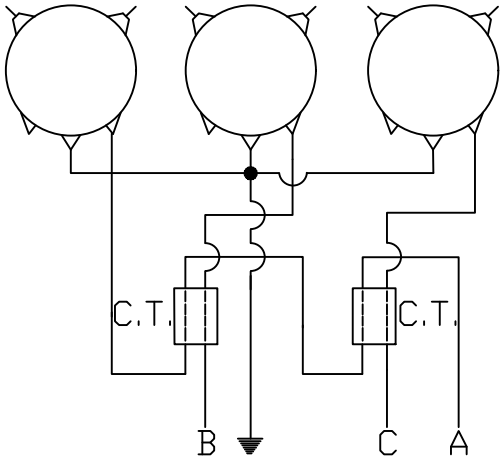
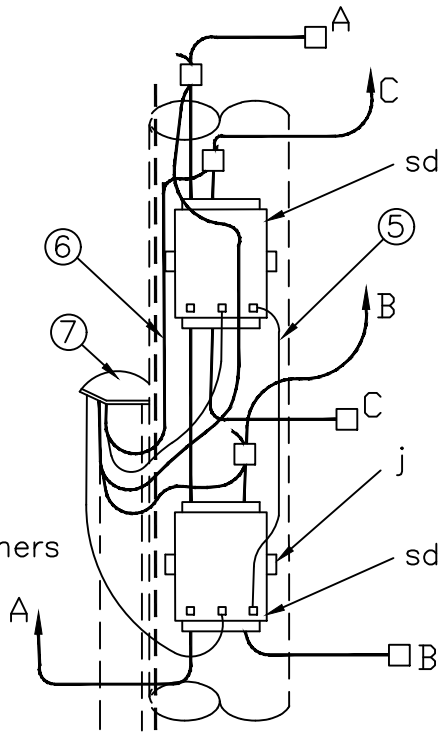
SURGE ARRESTERS – 3 SINGLE PHASE

OCTOBER 2018	3 – PHASE PRIMARY 12.47/7.2 kV	
EEC		P1.3





WIRING DIAGRAM



DETAIL "A"

Connections from C.T.'s to Service Head

ITEM	QTY	MATERIAL
j	4	Screw, lag, 1/2" x 4"
j	4	Screw, lag, 3/8" x 3" as req'd
p	–	Connectors, as required
gf	1	Insulated bushing, 1–1/4"
gr	1	Conduit locknuts, 1–1/4"
sd	2	Transformer, Current
①	–	Conduit, 1–1/4" as required
②	–	Straps, conduit, as required
③	1	Condulet, type "LB"

ITEM	QTY	MATERIAL
④	1	Meter box, meter and test block
⑤	–	Wire, No. 12, insulation for current
⑥	–	Wire, No. 14, insulation for potential
⑦	1	Weatherhead

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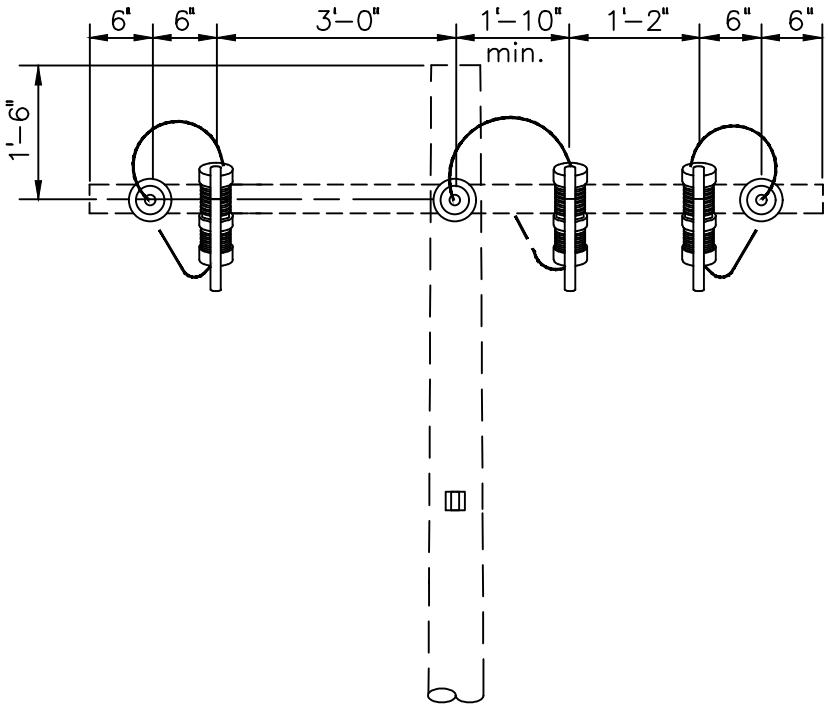
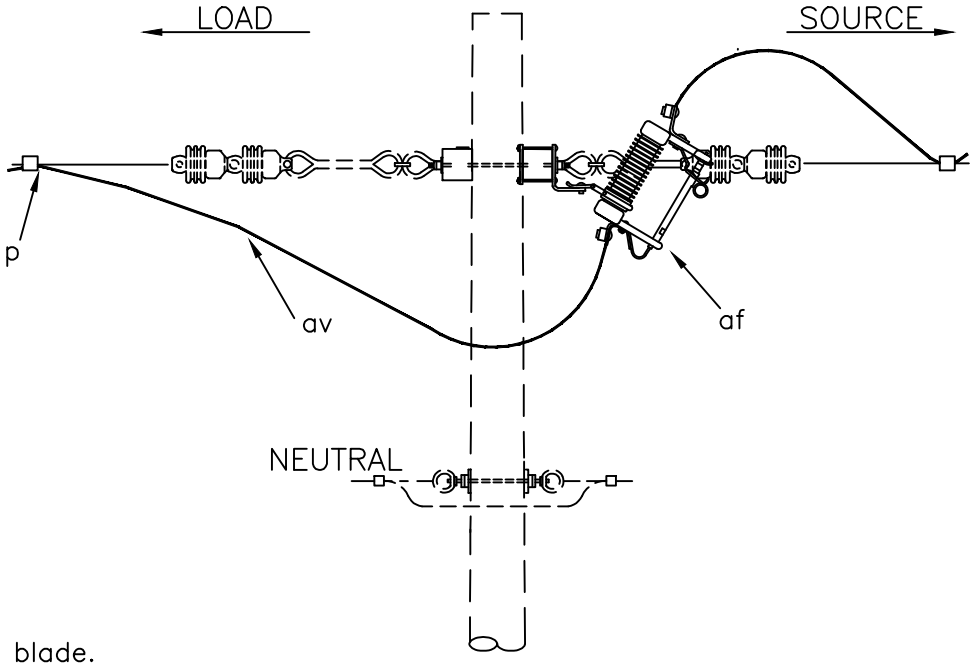
SECONDARY METERING
THREE PHASE, 120/208 VOLTS (277/480)
(4 WIRE GROUNDED WYE)

OCTOBER 2018		
EEC		Q3.3





NOTES:
1. Specify fuse size or solid blade.
2. Mount cutouts so that blades face climbing face of pole.

ITEM	QTY	MATERIAL
p	6	Connector, compression type
af	3	Cutout, distribution open (15 kV)
av		Jumpers, as req'd

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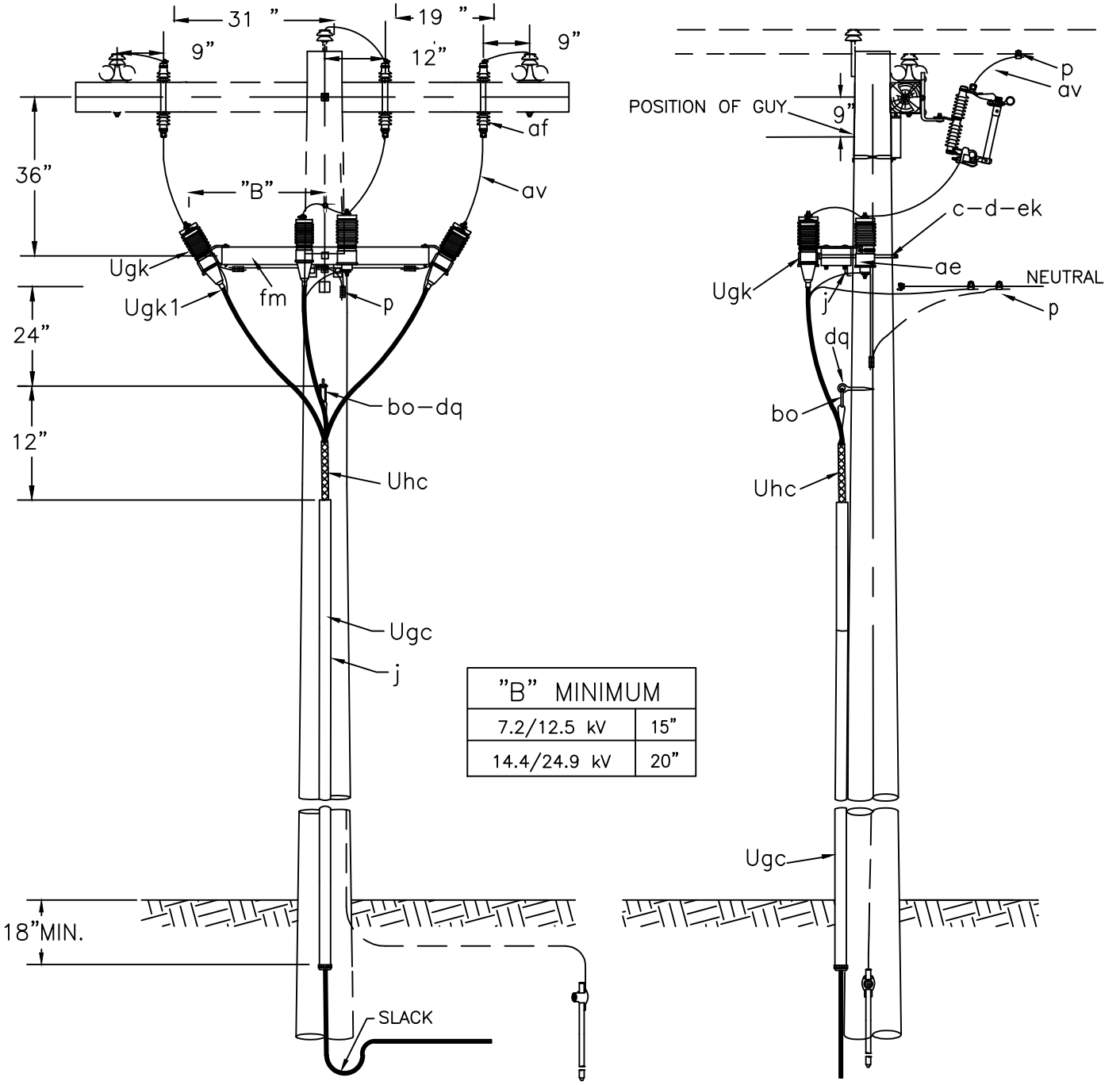
CUTOUTS
(THREE SINGLE–PHASE)

OCTOBER 2018		
EEC	12.47/7.2 kV	S1.3



"B" MINIMUM	
7.2/12.5 kV	15"
14.4/24.9 kV	20"

ITEM	QTY.	MATERIAL
c	2	Bolt, machine, 5/8" x required length.
d	2	Washer, square, 3", curved
j	3	Screw, lag 1/2" x 4"
j	–	Screw, lag 3/8" x 3", as req'd
p	–	Connectors, as required.
Ugk1	3	Cable positioner
af	3	Cutout
av		Jumpers, as required.
bo	1	Anchor, shackle.
dq	1	Eye screw, elliptical or drive hook.
ek	2	Locknuts, as required.
fm	1	Mounting bracket.
ae	3	Surge arrester
Ugc	1	Cable riser shield. Length as required.
Ugk	3	Cable termination.
Uhc	3	Cable support.

NOTES:

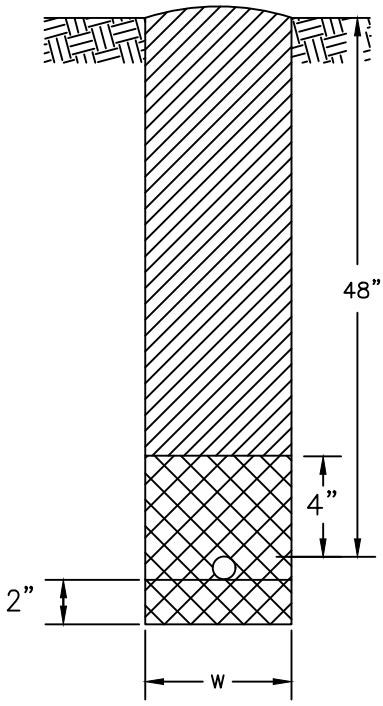
1. TOTAL ARRESTER LEAD LENGTH MUST BE UNDER 3'.
2. NO BENDS PERMITTED WITHIN 6" OF CABLE TERMINAL BASE.
3. ALLOW MINIMUM CABLE SLACK OF 24" AT BOTTOM OF RISER.

CITY OF Mitchell

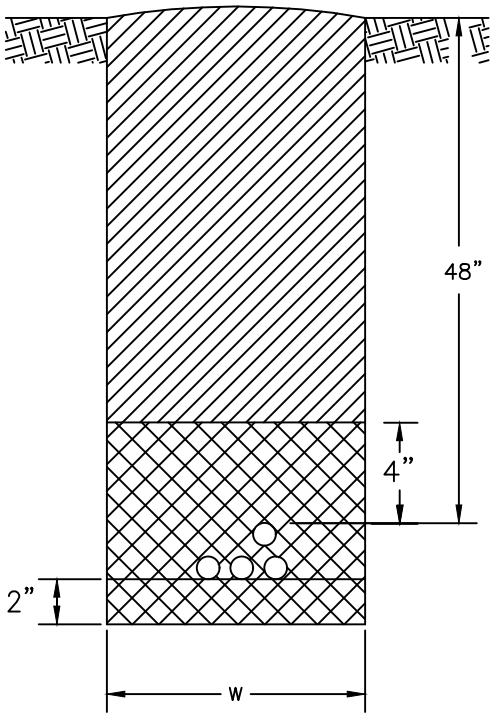
Exponential Engineering Company
111 East 2nd Street
Ogallala, NE 69153
Phone: 308/284-7799
Fax: 970/207-9657

THREE PHASE CABLE TANGENT TERMINAL POLE

OCTOBER 2018	2000	UC2–2



UR2 (D x W)
TRENCHING UNIT
ONE CABLE OR
CABLE ASSEMBLY



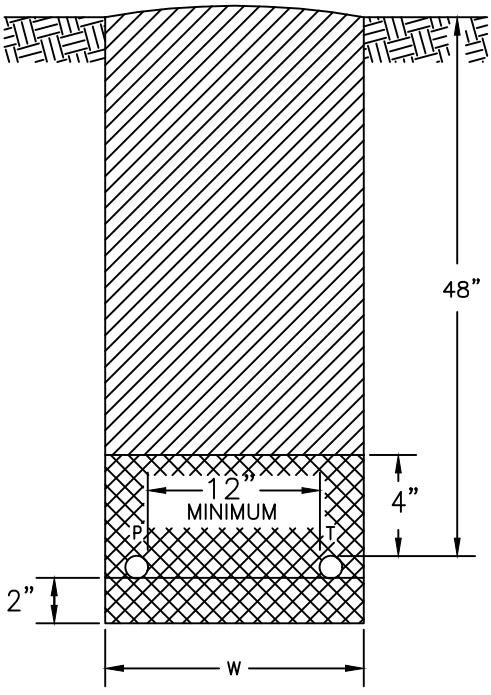
UR2–1 (D x W)
TRENCHING UNIT
MULTIPLE POWER CABLES
PRIMARY, SECONDARY OR SERVICE

LEGEND

SAND OR CLEAN SOIL

COMPACTED BACKFILL UNLESS OTHERWISE SPECIFIED

UNDISTURBED EARTH



UR2–2
TRENCHING UNIT
POWER AND TELEPHONE CABLE

NOTES:

1. WIDTH (W) AS REQUIRED.
2. DEPTHS SPECIFIED ARE TO FINISHED GRADE.
3. OVER–EXCAVATE TRENCHES AS NECESSARY TO ALLOW FOR (a) SAND BEDDING OR (b) LOOSE SANDY SOILS OR (c) WHERE MORE THAN ONE CABLE WILL INSTALLED IN TRENCH AND LAYING FIRST CABLE MAY CAUSE TRENCH DAMAGE AND REDUCTION IN DEPTH.
4. SAND BEDDING IS NOT PART OF THESE UNITS AND WILL BE SPECIFIED AS NEEDED.
5. BACKFILLING IS PART OF ALL TRENCHING UNITS INCLUDING JOINT–USE TRENCHES.
6. OPTIONAL WARNING TAPE IS RECOMMENDED TO BE PLACED ABOVE THE INSTALLED CABLE.

	TRENCHES FOR DIRECT BURIAL CABLES	
	2000	UR2 TO UR2–2