

**C\*PT-MT-1L-B-CE29**  
 LAMINATED WOOD CROSSARM FOR 115KV H-FRAME  
 STRUCTURES TV-1HHSA  
 MID: 6000740760

CU FUNCTION: TL69 FOR 35KV & 46KV, TG69 FOR 69KV THRU 344KV, T345 FOR 345KV & GREATER.

FOR CORRECT CU: SUBSTITUTE 5 FOR NYSEG, 6 FOR CMP OR 9 FOR RG&E IN PLACE OF ASTERISK (C\*\_).

NOTE A: DRILLING: ALL HOLES - 15/16" DIAMETER UNLESS OTHERWISE NOTED

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Contact Engineering Standards - Transmission Section for the creation of new standards and CUs.

Drawing Scale: NTS

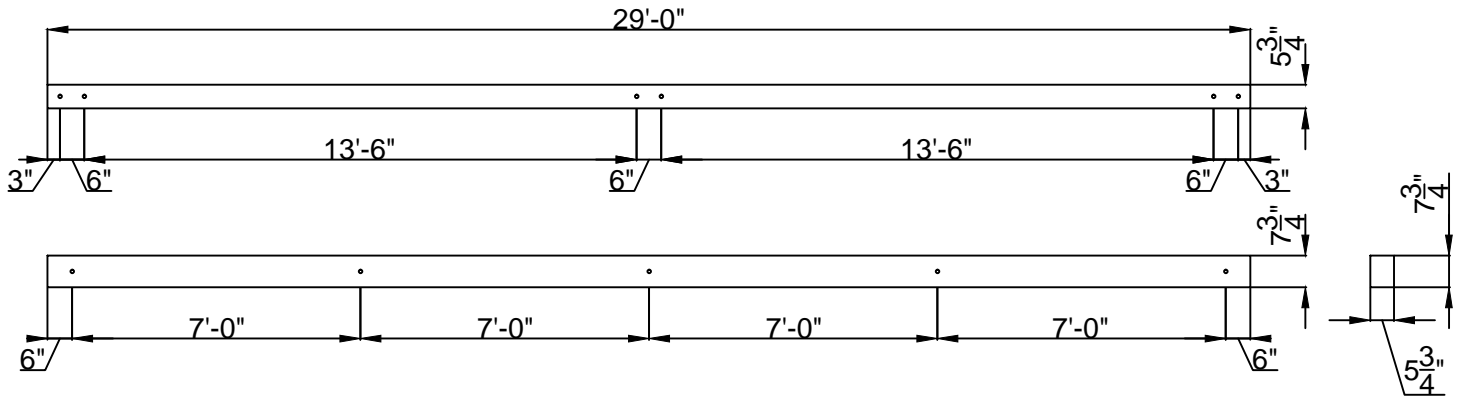


TRANSMISSION  
CONSTRUCTION  
STANDARDS  
MANUAL

TRANSMISSION STANDARDS - CROSSARMS  
115kV SINGLE CIRCUIT - H-FRAME - MAINTENANCE ONLY  
5-3/4" X 7-3/4" X 29' LAMINATED WOOD CROSSARM DETAILS  
MID 6000740760

REVISION
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DATE
5/21/2015

Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.MT-1L-B-CE29	Sheet 1
B. Franklin	10/07/2014	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014		



**C\*PT-MT-1L-C-CE29**  
 LAMINATED WOOD DOUBLE CROSSARM FOR 115KV H-FRAME  
 STRUCTURES TV-1HDSA  
 MID: 6000740762

CU FUNCTION: TL69 FOR 35KV & 46KV, TG69 FOR 69KV THRU 344KV, T345 FOR 345KV & GREATER.

FOR CORRECT CU: SUBSTITUTE 5 FOR NYSEG, 6 FOR CMP OR 9 FOR RG&E IN PLACE OF ASTERISK (C\*\_).

NOTE A: DRILLING: ALL HOLES - 15/16" DIAMETER UNLESS OTHERWISE NOTED

NOTE B: FOR DOUBLE ARM TANGENT SUSPENSION STRUCTURE.

NOTE C: THIS CU INCLUDES ONLY ONE (1) ARM. THEREFORE, 2 CUS MUST BE ORDERED TO COMPLETE THE STRUCTURE.

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Contact Engineering Standards - Transmission Section for the creation of new standards and CUs.

Drawing Scale: NTS

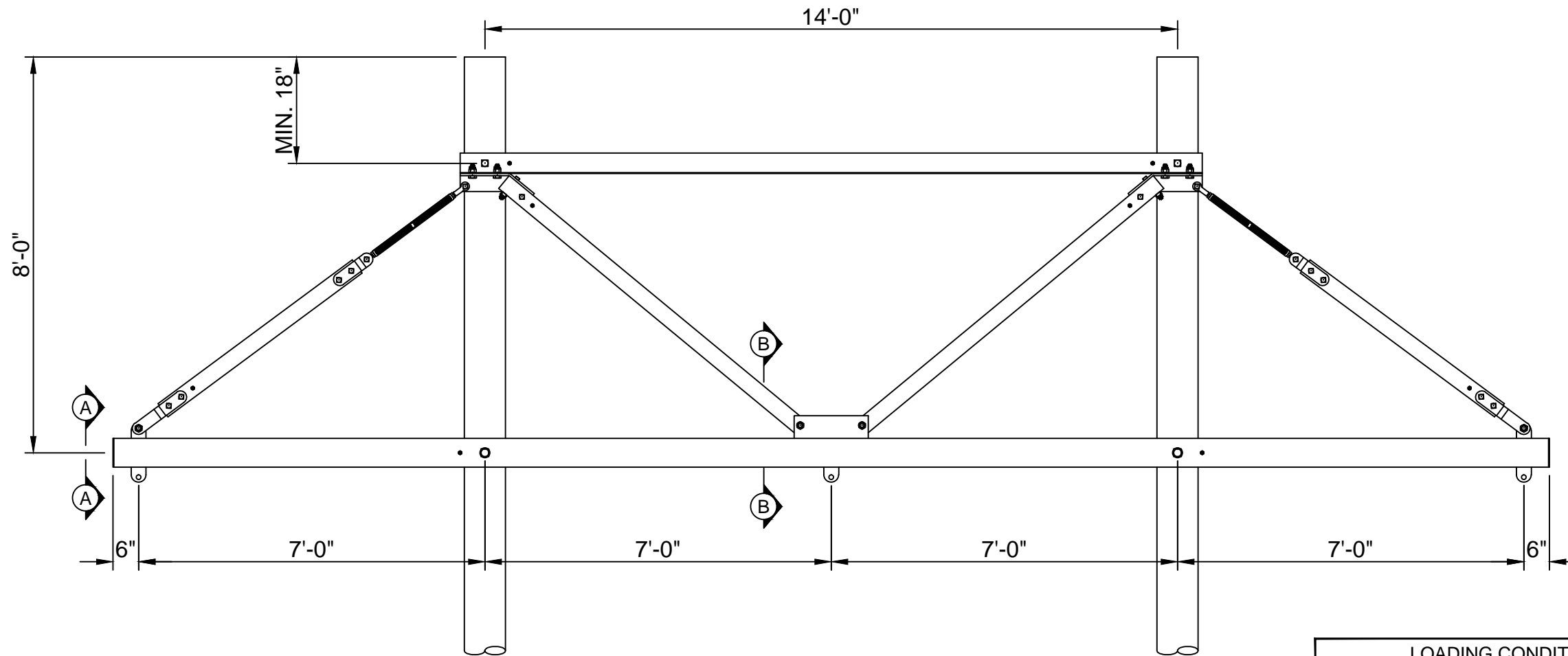


TRANSMISSION  
CONSTRUCTION  
STANDARDS  
MANUAL

TRANSMISSION STANDARDS - CROSSARMS  
115kV SINGLE CIRCUIT - H-FRAME - MAINTENANCE ONLY  
5-3/4" X 7-3/4" X 29' LAMINATED WOOD DOUBLE CROSSARM DETAILS  
MID 6000740762

REVISION
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DATE
5/21/2015

Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.MT-1L-C-CE29	Sheet 1
B. Franklin	10/07/2014	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014		



FOR CORRECT CU: SUBSTITUTE 5 NYSEG, 6 FOR CMP OR 9 FOR RG&E IN PLACE OF ASTERISK (C\*\_)

NOTE A: ASSEMBLED WEIGHT - 2200#.

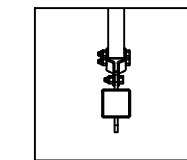
NOTE B: VANGS SHALL HAVE A MAXIMUM THICKNESS OF 3/4".

NOTE C: VENDOR SHALL INCLUDE ALL HARDWARE AND COMPONENTS REQUIRED FOR ASSEMBLY AND MOUNTING TO STRUCTURE.

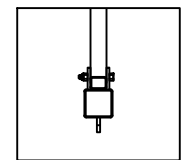
NOTE D: THIS ARM IS USED FOR IUSA STANDARD 115KV TN-1HHTB AND TN-1JHTB STRUCTURES.

NOTE E: PROVIDED LOADS ARE THE MINIMUM FACTORED LOADS THAT EACH CONDUCTOR VANG SHALL WITHSTAND.

NOTE F: LOADS ARE BASED ON A 2-CONDUCTOR BUNDLE OF 1590 KCMIL ACSR "FALCON" WITH A SPAN OF 1,000 FT.



Section 'A-A'  
END VANG DETAIL



Section 'B-B'  
CENTER VANG DETAIL

LOADING CONDITION	CONDUCTOR VANG LOADS IN POUNDS		
	VERTICAL	TRANSVERSE	LONGITUDINAL
NESC HEAVY (0°F, 4 PSF WIND, 1/2" ICE)	11,000	4,500	1,500
NESC HIGH WIND (60°F, 25.6 PSF WIND)	4,500	7,000	1,000
NESC RULE 250D (15°F, 4 PSF WIND, 1" ICE)	10,500	2,500	1,000
IUSA HEAVY ICE (0°F, 1-1/2" ICE)	15,500	0	1,500

**INSTALLATION INSTRUCTIONS FOR WOOD CROSSARM REPLACEMENT:**

- LAY OUT ALL COMPONENTS ON FLAT GROUND. PRE-ASSEMBLE ALL COMPONENTS INCLUDING BOLTING CROSS ANGLE TO BRACES. CONNECT TURNBUCKLES AND BRACES.
- INSTALL INSULATORS TO ASSEMBLED STEEL CROSSARM WHILE ASSEMBLY IS LAYING FLAT ON THE GROUND.
- PRIOR TO REMOVING THE EXISTING WOOD CROSSARM ASSEMBLY, ENSURE THAT POLES ARE PLUMB. OUT OF PLUMB POLES WILL NOT ALLOW A LEVEL STEEL ARM INSTALLATION.
- DISCONNECT CONDUCTOR PHASES AND TEMPORARILY SECURE TO THE POLES WITH STRAPPING AT A POINT BELOW THE LOWEST ATTACHMENT POINT OF THE STEEL CROSSARM ASSEMBLY DO NOT LOWER CONDUCTOR PHASES TO GROUND LEVEL.
- REMOVE EXISTING WOOD CROSSARM ASSEMBLY IN A PIECEMEAL FASHION USING A CHAIN SAW. DO NOT REMOVE THE UPPER CABLE STRAIN GUY AND MOUNTING BRACKETS.
- MEASURE DOWN FROM TOP OF ONE POLE AND DRILL HOLE FOR CROSS ANGLE 1A AT CENTER OF POLE. LEVEL ACROSS TO OPPOSITE POLE AND DRILL NEW HOLE AT POLE CENTER. A 14'-0" HOLE TO HOLE SPACING MUST BE MAINTAINED.
- USING A CRANE AND RIGGING, HOIST NEW STEEL ARM ASSEMBLY, WITH INSULATORS ATTACHED, AND CONNECT CROSS ANGLE 1A TO EXISTING POLE AT NEW BOLT HOLE LOCATIONS USING SUPPLIED BOLTING HARDWARE.
- REMOVE EXISTING CABLE STRAIN GUY AND MOUNTING BRACKETS FROM TOP OF POLE.
- RELAX RIGGING STRAPS AND ADJUST THE TURNBUCKLE ASSEMBLIES ATTACHED TO BRACES F1 IN ORDER TO CENTER CROSSARM CONNECTION HOLES TO CENTER OF POLES.
- DRILL NEW POLE HOLES USING CROSSARM TUBING SLEEVES AS DRILL BIT GUIDES. CONNECT CROSSARM USING SUPPLIED BOLTING HARDWARE. DO NOT ATTEMPT TO USE EXISTING CROSSARM HOLES FOR MOUNTING NEW CROSSARM.
- USE HYDRAULIC TOOLS TO SEAT ALL SPIKE GRIDS INTO POLES.
- CONNECT DOWN GROUNDS TO BONDING CLIPS - 4 LOCATIONS.
- REINSTALL CONDUCTOR PHASES.

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Contact Engineering Standards - Transmission Section for the creation of new standards and CUs.

Drawing Scale: 1/4" = 1'

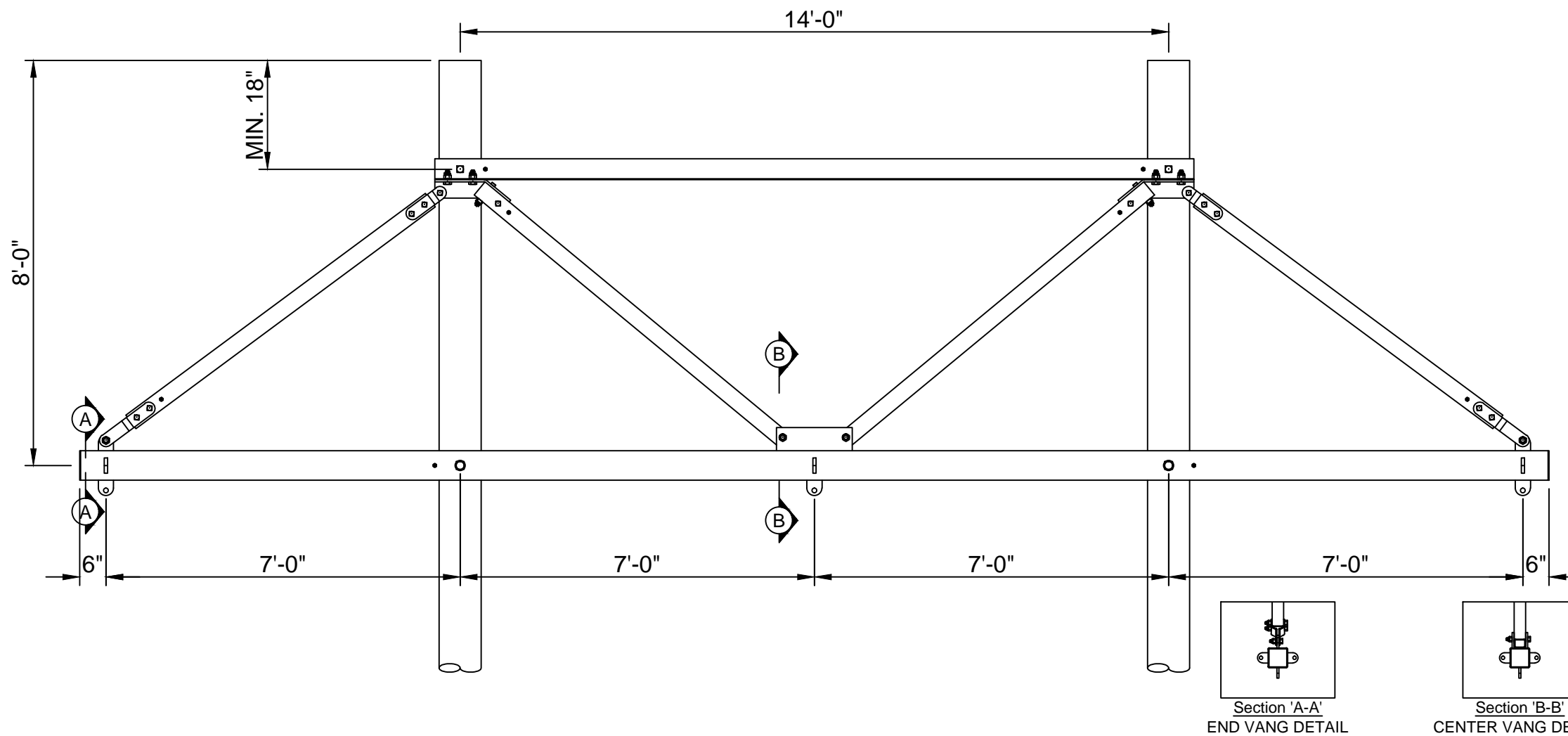


TRANSMISSION  
CONSTRUCTION  
STANDARDS  
MANUAL

TRANSMISSION CROSSARM DETAILS  
FOR 115KV APPLICATIONS - H-FRAME TANGENT SUSPENSION  
7" X 7" X 29'-0" STEEL CROSSARM ASSEMBLY  
MID 1036235429

REVISION
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DATE
5/21/2015

Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.TT-1S-A-FC29
B. Franklin	8/23/2013	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014	



FOR CORRECT CU: SUBSTITUTE 5 NYSEG, 6 FOR CMP OR 9 FOR RG&E IN PLACE OF ASTERISK (C\*\_)

NOTE A: ASSEMBLED WEIGHT - 2200#.

NOTE B: VANGS SHALL HAVE A MAXIMUM THICKNESS OF 3/4".

NOTE C: VENDOR SHALL INCLUDE ALL HARDWARE AND COMPONENTS REQUIRED FOR ASSEMBLY AND MOUNTING TO STRUCTURE.

NOTE D: THIS ARM IS USED FOR IUSA STANDARD 115KV TN-1HHUB, TN-1JHUB, TN-1HHXB, AND TN-1JHXB STRUCTURES.

NOTE E: THIS ARM SHALL BE INSTALLED ON THE FACE OF THE STRUCTURE THAT WILL EXPERIENCE THE LOWER CONDUCTOR LOAD. THIS SHALL BE INDICATED ON THE PLAN AND PROFILE DRAWINGS BY THE DESIGNER.

NOTE F: PROVIDED LOADS ARE THE MINIMUM FACTORED LOADS THAT EACH CONDUCTOR VANG SHALL WITHSTAND.

NOTE G: LOADS ARE BASED ON A 2-CONDUCTOR BUNDLE OF 1590 KCMIL ACSR "FALCON" @ 14,000# TENSION AT NESC HEAVY WITH A SPAN OF 1,000 FT.

NOTE H: ARM SHALL BE CAPABLE OF WITHSTANDING A -1200' WIND SPAN (UPLIFT).


NOTE I: THIS ARM SHALL BE DESIGNED WITH ALL CONDUCTORS INTACT (FALSE DE) NOT TO WITHSTAND ANY BROKEN CONDUCTOR CONDITION (FULL DE).

NOTE J: JUMPER STRING VANGS SHALL BE DESIGNED TO WITHSTAND A 1000# VERTICAL LOAD ONLY.

**INSTALLATION INSTRUCTIONS FOR WOOD CROSSARM REPLACEMENT:**

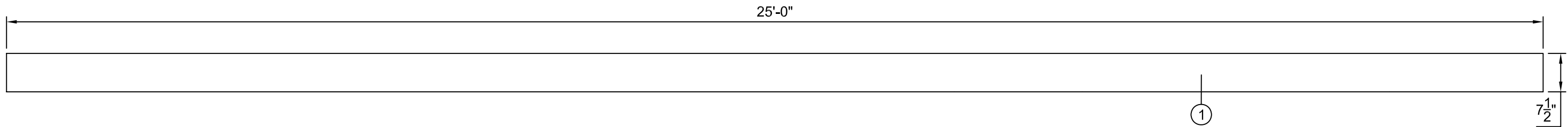
- LAY OUT ALL COMPONENTS ON FLAT GROUND. PRE-ASSEMBLE ALL COMPONENTS INCLUDING BOLTING CROSS ANGLE AND BRACES.
- INSTALL INSULATORS TO ASSEMBLED STEEL CROSSARM WHILE ASSEMBLY IS LAYING FLAT ON THE GROUND.
- PRIOR TO REMOVING THE EXISTING WOOD CROSSARM ASSEMBLY, ENSURE THAT POLES ARE PLUMB. OUT OF PLUMB POLES WILL NOT ALLOW A LEVEL STEEL ARM INSTALLATION.
- DISCONNECT CONDUCTOR PHASES AND TEMPORARILY SECURE TO THE POLES WITH STRAPPING AT A POINT BELOW THE LOWEST ATTACHMENT POINT OF THE STEEL CROSSARM ASSEMBLY. DO NOT LOWER CONDUCTOR PHASES TO GROUND LEVEL.
- REMOVE EXISTING WOOD CROSSARM ASSEMBLY IN A PIECEMEAL FASHION USING A CHAIN SAW. DO NOT REMOVE THE UPPER CABLE STRAIN GUY AND MOUNTING BRACKETS.
- MEASURE DOWN FROM TOP OF ONE POLE AND DRILL HOLE FOR CROSS ANGLE 1A AT CENTER OF POLE. LEVEL ACROSS TO OPPOSITE POLE AND DRILL NEW HOLE AT POLE CENTER. A 14'-0" HOLE TO HOLE SPACING MUST BE MAINTAINED.
- USING A CRANE AND RIGGING, HOIST NEW STEEL ARM ASSEMBLY, WITH INSULATORS ATTACHED, AND CONNECT CROSS ANGLE 1A TO EXISTING POLE AT NEW BOLT HOLE LOCATIONS USING SUPPLIED BOLTING HARDWARE.
- REMOVE EXISTING CABLE STRAIN GUY AND MOUNTING BRACKETS FROM TOP OF POLE.
- RELAX RIGGING STRAPS AND ADJUST THE TURNBUCKLE ASSEMBLIES ATTACHED TO BRACES F1 IN ORDER TO CENTER CROSSARM CONNECTION HOLES TO CENTER OF POLES.
- DRILL NEW POLE HOLES USING CROSSARM TUBING SLEEVES AS DRILL BIT GUIDES. CONNECT CROSSARM USING SUPPLIED BOLTING HARDWARE. DO NOT ATTEMPT TO USE EXISTING CROSSARM HOLES FOR MOUNTING NEW CROSSARM.
- USE HYDRAULIC TOOLS TO SEAT ALL SPIKE GRIDS INTO POLES.
- CONNECT DOWN GROUNDS TO BONDING CLIPS - 4 LOCATIONS.
- REINSTALL CONDUCTOR PHASES.

LOADING CONDITION	MAIN CONDUCTOR VANG LOADS (POUNDS)		
	VERTICAL	TRANSVERSE	LONGITUDINAL
NESC HEAVY (0°F, 4 PSF WIND, 1/2" ICE)	-6,000	2,200	46,000
NESC HIGH WIND (60°F, 25.6 PSF WIND)	-2,500	2,700	24,000
NESC RULE 250D (15°F, 4 PSF WIND, 1" ICE)	-6,300	1,200	37,000
IUSA HEAVY ICE (0°F, NO WIND, 1-1/2" ICE)	-9,300	0	48,000
IUSA UPLIFT (-20°F, NO WIND, NO ICE)	-2,500	0	18,000

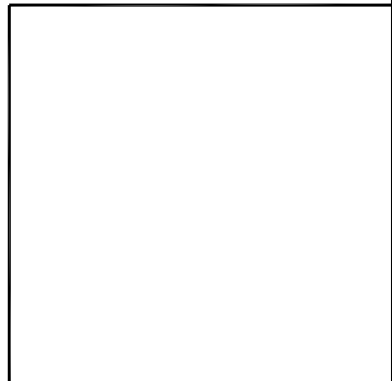
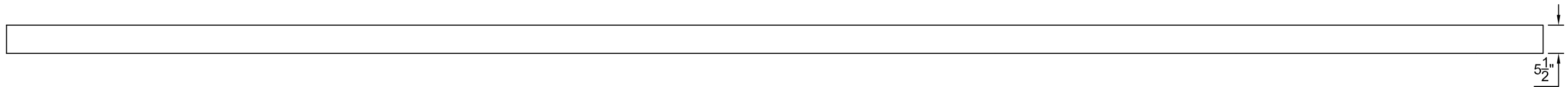
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Contact Engineering Standards - Transmission Section for the creation of new standards and CUs.					Drawing Scale: 1/4" = 1'
	TRANSMISSION CONSTRUCTION STANDARDS MANUAL	TRANSMISSION CROSSARM DETAILS FOR 115KV APPLICATIONS - H-FRAME TANGENT DEADEND 7" X 7" X 29'-0" STEEL CROSSARM ASSEMBLY			REVISION
		MID 1036235430			00
Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:
B. Franklin	12/24/2013	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014
TM2.23.TT-1S-F-FC29					Sheet 1


BILL OF MATERIAL				CU Type: UC_XARM
ITEM NO.	QTY	UOM	GLOBAL IUSA MID	CU: U*PT-TT-1W-U-RD25
1	1	ST	30923683	XARM WD 5-1/2X7-1/2X25F DF UNDR

FRONT VIEW



TOP VIEW



Contact Engineering Standards - Transmission for the creation of new standards and CUs.				Drawing Scale: 1" = 20	
	IBERDROLA USA TRANSMISSION CONSTRUCTION STANDARDS MANUAL	TRANSMISSION CROSSARM DETAILS FOR 115kV AND SPECIAL APPLICATIONS UNDRILLED 5-1/2" X 7-1/2" X 25'-0" WOOD CROSSARM GLOBAL IUSA MID: 30923683 OLD MID: 1004033550			Revision
					00
Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:
L.A. Best	6/24/2013	Shepard/Becken/Hart	/ /2014	Barry R. Hart	/ /2014
TM2.23.TT-1W-U-RD25					Sheet 1

CU Function: U\_TL69 for 35kV & 46kV, U\_TG69 for 69kV through 344kV, U\_T345 for 345kV & greater.

For correct CU: substitute 2 for NYSEG, 3 for CMP or 4 for RG&E in place of asterisk (U\*\_).

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ANSIB 11" X 17"

CU Type: UC\_XARM (up to 344kV) or UC\_XARM1 (345kV and greater) CUs limited to 17 characters

Transmission Insulator 'TT' CU Coding Format and Naming Convention

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
U	X1	P	T	-	T	T	-	X2	X3	-	X4	-	X5	X6	X7	

CU Function: U\_TL69 for 35kV & 46kV, U\_TG69 for 69kV through 344kV, U\_T345 for 345kV & greater.

For correct CU: substitute 2 for NYSEG, 3 for CMP or 4 for RG&E in place of asterisk (U\*\_).

X1	OpCo
2	NYSEG
3	CMP
4	RG&E

X2	Voltage
1	115kV
2	230kV
3	345kV
4	46kV
5	35kV
6	69kV
9	multiple use

X3	Material
S	Steel
W	Wood
L	Laminated
F	Fiberglass

X4	Qualifier
A	ASSEMBLY - TANGENT 2PHF SUSP
B	SINGLE ARM
C	DOUBLE ARM SUSP
D	DAVIT ARM-curved base
E	TANG SUSP
F	TANG DE
G	V-STRING
H	DAVIT ARM-flat base
I	
J	ASSEMBLY - TANGENT 2PHF DE
K	
L	
M	
N	
O	
P	
Q	
R	
S	
T	
U	UNDRILLED
V	
W	
X	MULTIPLE USE
Y	
Z	

X5	WIDTH
A	3-3/4"
B	4-3/4"
C	5-3/4"
D	5-5/8"
E	6-3/4"
F	7"
G	7-3/4"
H	10"
I	10-3/4"
J	11"
K	13-1/2"
L	
M	4"
N	3-1/2"
O	3-5/8"
P	4-1/2"
Q	5-1/8"
R	5-1/2"
S	6"
T	8"
U	
V	
W	
X	
Y	
Z	davit

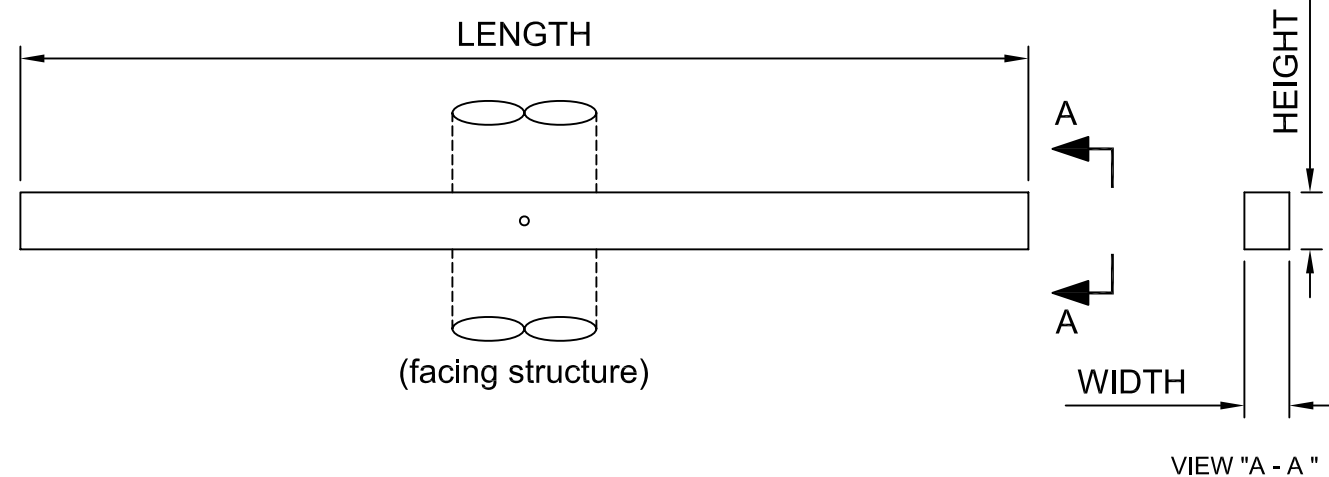
X6	HEIGHT
A	4-3/4"
B	5-3/4"
C	7"
D	7-1/2"
E	7-3/4"
F	9"
G	10"
H	10-3/4"
I	13-1/2"
J	18"
K	
L	
M	4"
N	4-1/2"
O	4-5/8"
P	
Q	
R	
S	6"
T	8"
U	8-1/2"
V	
W	
X	
Y	
Z	davit

X7	LENGTH
01	
02	
03	
04	4'-0"
05	5'-0"
06	6'-0"
07	7'-0"
08	8'-0"
09	9'-0"
10	10'-0"
11	11'-0"
12	12'-0"
13	13'-0"
14	
15	
16	
17	17'-0"
18	
19	
20	20'-0"
21	21'-0"
22	
23	23'-0"
24	24'-6"
25	25'-0"
26	26'-0"
27	
28	28'-0"
29	29'-0"
30	30'-0"
31	
32	32'-0"
33	32'-6"
34	34'-0"
35	
36	36'-0"
37	

X7	LENGTH
38	
39	
40	40'-0"
41	40'-6"
42	
43	
44	
45	
46	
47	
48	
49	
50	
51	
52	52'-0"
53	53'-0"
54	54'-6"
55	54'-9"
56	
57	
58	
59	
60	
61	61'-6"
62	
63	
64	
65	
66	
67	
68	
69	69'-6"
70	
71	71'-6"
72	
73	
74	

X7	LENGTH
75	
76	
77	
78	
79	79'-6"
80	
81	
82	
83	
84	4'-6"
85	5'-6"
86	5'-8"
87	6'-6"
88	6'-8"
89	53'-2 1/2"
90	
91	
92	
93	
94	
95	
96	
97	
98	
99	

CU Example:  
 C5CT-TT-9W-B-AA07 =  
 NYSEG MULTIPLE VOLTAGE  
 WOOD SINGLE ARM 3-3/4" width X 4-3/4" height X 7'-0" length



Contact Engineering Standards - Transmission for the creation of new standards and CUs.				Drawing Scale: N/A	
	IBERDROLA USA TRANSMISSION CONSTRUCTION STANDARDS MANUAL	TRANSMISSION CROSSARM INFORMATION STANDARD CU FORMAT AND NAMING CONVENTION			Revision
					00
Drwn. By: L.A. Best				Date Dr.: 5/14/2012	Checked By: Shepard/Becken/Hart
Date Ck.: 11/15/2012		Approved By: Barry R. Hart	Date App.: 12/13/2012	TM2.23.TT-CU	
					Sheet 1

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 ANSIB 11" X 17"