

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

NOTE A: ASSEMBLED WEIGHT - 2600#.

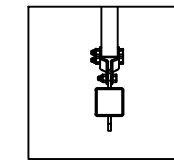
NOTE B: VANGS SHALL HAVE A MAXIMUM THICKNESS OF 3/4".

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

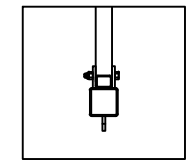
NOTE D: THIS ARM IS USED FOR IUSA STANDARD 230KV TN-2HHTB AND TN-2JHTB STRUCTURES.

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 1,200 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)	13,000	5,500	2,000
NESC HIGH WIND (60°F, 25.6 PSF WIND)	5,000	8,000	1,000
NESC RULE 250D (15°F, 4 PSF WIND, 1" ICE)	12,500	3,000	1,000
IUSA HEAVY ICE (0°F, 1-1/2" ICE)	19,000	0	2,000

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 19'-6" 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'

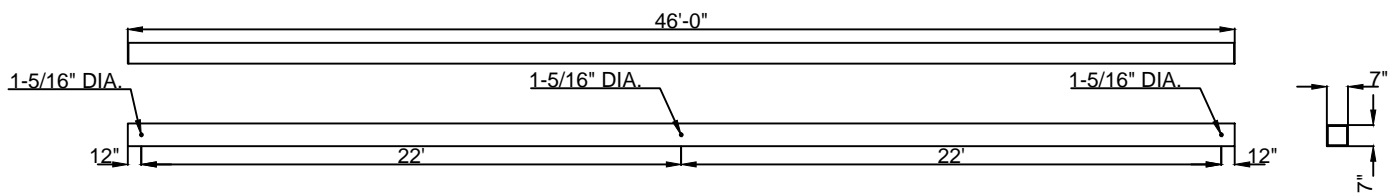


TRANSMISSION
CONSTRUCTION
STANDARDS
MANUAL

TRANSMISSION CROSSARM DETAILS
FOR 230KV APPLICATIONS - H-FRAME TANGENT SUSPENSION
7" X 7" X 40'-0" STEEL CROSSARM ASSEMBLY
MID 1036235440

REVISION	00
DATE	5/21/2015

Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.TT-2S-A-FC40	Sheet 1
B. Franklin	8/27/2013	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014		



C*PT-TT-2S-B-FC46
 CROSSARM FOR RUNNING ANGLE 230KV H-FRAME STRUCTURE TN-2HA9B/TN-2JA9B
 WALL THICKNESS: 5/16"
 STEEL: A500 GRADE B HOT-DIPPED GALVANIZED
 MID: 1036235420

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 - 1-5/16" DIAMETER UNLESS OTHERWISE NOTED

NOTE B: ARMS SHALL BE SUPPLIED WITH EXPANDED METAL OR METAL MESH END CAPS FROM THE MANUFACTURER.

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

Drawing Scale: 1" = 10'

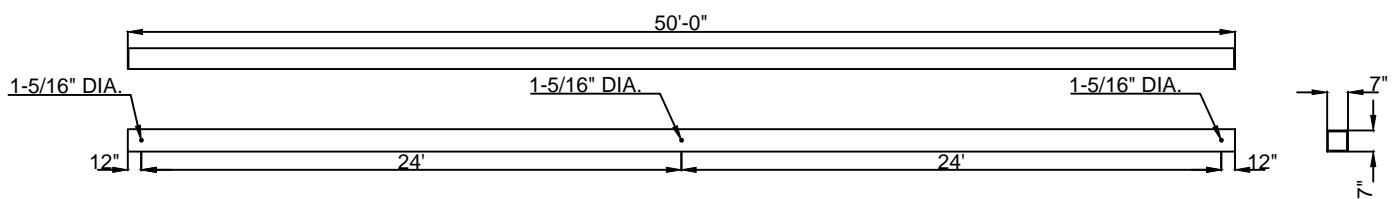


TRANSMISSION
CONSTRUCTION
STANDARDS
MANUAL

TRANSMISSION STANDARDS - CROSSARMS
230KV SINGLE CIRCUIT - RUNNING ANGLE H-FRAME 20° TO 30°
GALVANIZED STEEL CROSSARM DETAILS
MID 1036235420

REVISION
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DATE
5/21/2015

Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.TT-2S-B-FC46	Sheet 1
B. Franklin	8/30/2013	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014		



C*PT-TT-2S-B-FC50
 CROSSARM FOR RUNNING ANGLE 230KV H-FRAME STRUCTURE TN-2HA0B/TN-2JA0B
 WALL THICKNESS: 5/16"
 STEEL: A500 GRADE B HOT-DIPPED GALVANIZED
 MID: 1036235426

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 - 1-5/16" DIAMETER UNLESS OTHERWISE NOTED

NOTE B: ARMS SHALL BE SUPPLIED WITH EXPANDED METAL OR METAL MESH END CAPS FROM THE MANUFACTURER.

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

Drawing Scale: 1" = 10'

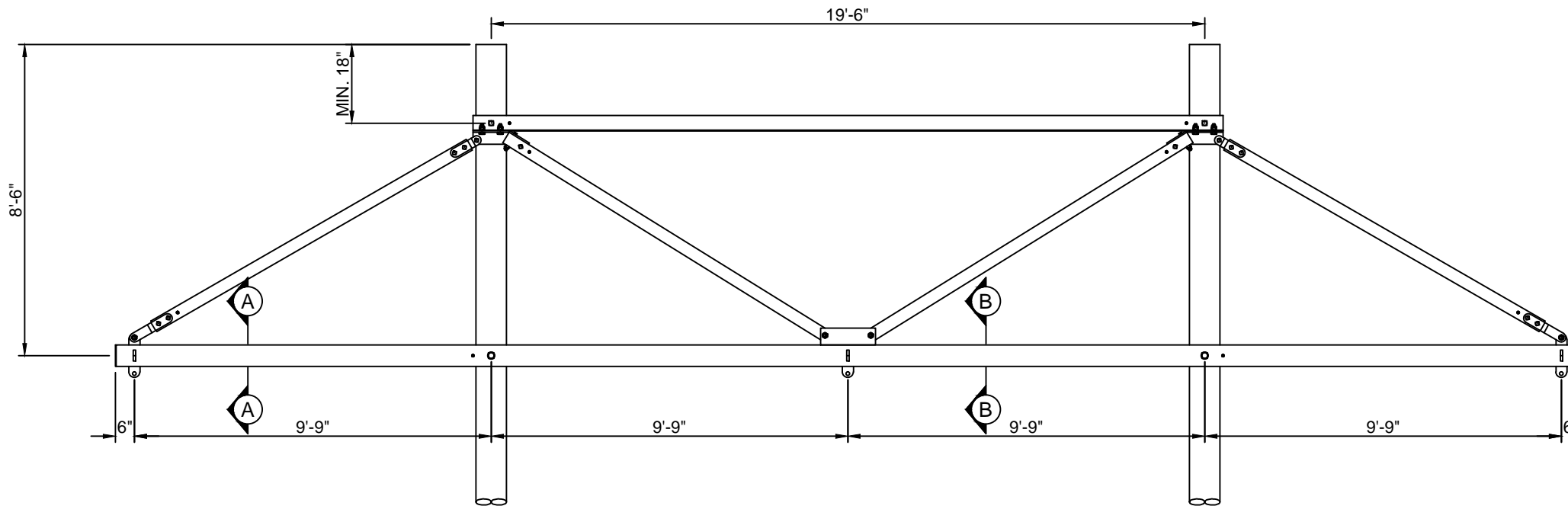


TRANSMISSION
CONSTRUCTION
STANDARDS
MANUAL

TRANSMISSION STANDARDS - CROSSARMS
230KV SINGLE CIRCUIT - RUNNING ANGLE H-FRAME 30° TO 45°
GALVANIZED STEEL CROSSARM DETAILS
MID 1036235426

REVISION
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DATE
5/21/2015

Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.TT-2S-B-FC50	Sheet 1
B. Franklin	8/30/2013	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014		



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

NOTE A: ASSEMBLED WEIGHT - 2600#.

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

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

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

NOTE E: THIS ARM IS USED FOR IUSA STANDARD 230KV TN-2HHUB, TN-2JHUB, TN-2JHXB, AND TN-2JHXB STRUCTURES.

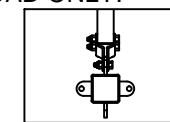
NOTE F: THIS ARM SHALL BE INSTALLED ON THE FACE OF THE STRUCTURE THAT WILL EXPERIENCE THE LOWER CONDUCTOR LOAD. THIS SHALL BE INDICATED ON THE PLAN AND PROFILE DRAWINGS BY THE DESIGNER.

NOTE G: LOADS ARE BASED ON A 2-CONDUCTOR BUNDLE OF 1590 KCMIL ACSR "FALCON" @ 14,000# TENSION AT NESC HEAVY WITH A SPAN OF 1,200 FT.

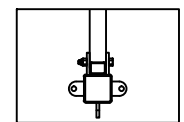
NOTE H: ARM SHALL BE CAPABLE OF WITHSTANDING A -1500' WIND SPAN (UPLIFT).

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

NOTE I: JUMPER STRING VANGS SHALL BE DESIGNED TO WITHSTAND A MINIMUM OF 1000# LOAD ONLY.



Section 'A-A'
END VANG DETAIL



Section 'B-B'
CENTER VANG DETAIL

INSTALLATION INSTRUCTIONS FOR WOOD CROSSARM REPLACEMENT:

- LAY OUT ALL COMPONENTS ON FLAT GROUND. PRE-ASSEMBLE COMPONENTS INCLUDING BOLTING CROSS ANGLE 1A TO BRACES E1 AND D1. CONNECT BRACES F1 TO BRACE D1 AND E1.
- 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.
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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.

MAIN CONDUCTOR VANG LOADS (POUNDS)

LOADING CONDITION	VERTICAL	TRANSVERSE	LONGITUDINAL
NESC HEAVY (0°F, 4 PSF WIND, 1/2" ICE)	-7,500	2,700	46,000
NESC HIGH WIND (60°F, 25.6 PSF WIND)	-3,100	3,300	24,000
NESC RULE 250D (15°F, 4 PSF WIND, 1" ICE)	-7,900	1,500	37,000
IUSA HEAVY ICE (0°F, NO WIND, 1-1/2" ICE)	-11,600	0	49,000
IUSA UPLIFT (-20°F, NO WIND, NO ICE)	-3,100	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 230KV APPLICATIONS - H-FRAME TANGENT DEADEND 7" X 7" X 40'-0" STEEL CROSSARM ASSEMBLY MID 1036235445		REVISION			
		00					
DATE	5/21/2015						
Drwn. By:	Date Dr.:	Checked By:	Date Ck.:	Approved By:	Date App.:	TM2.23.TT-2S-F-FC40	Sheet 1
B. Franklin	12/24/2013	Becken/Hart	12/24/2014	Barry R. Hart	12/24/2014		