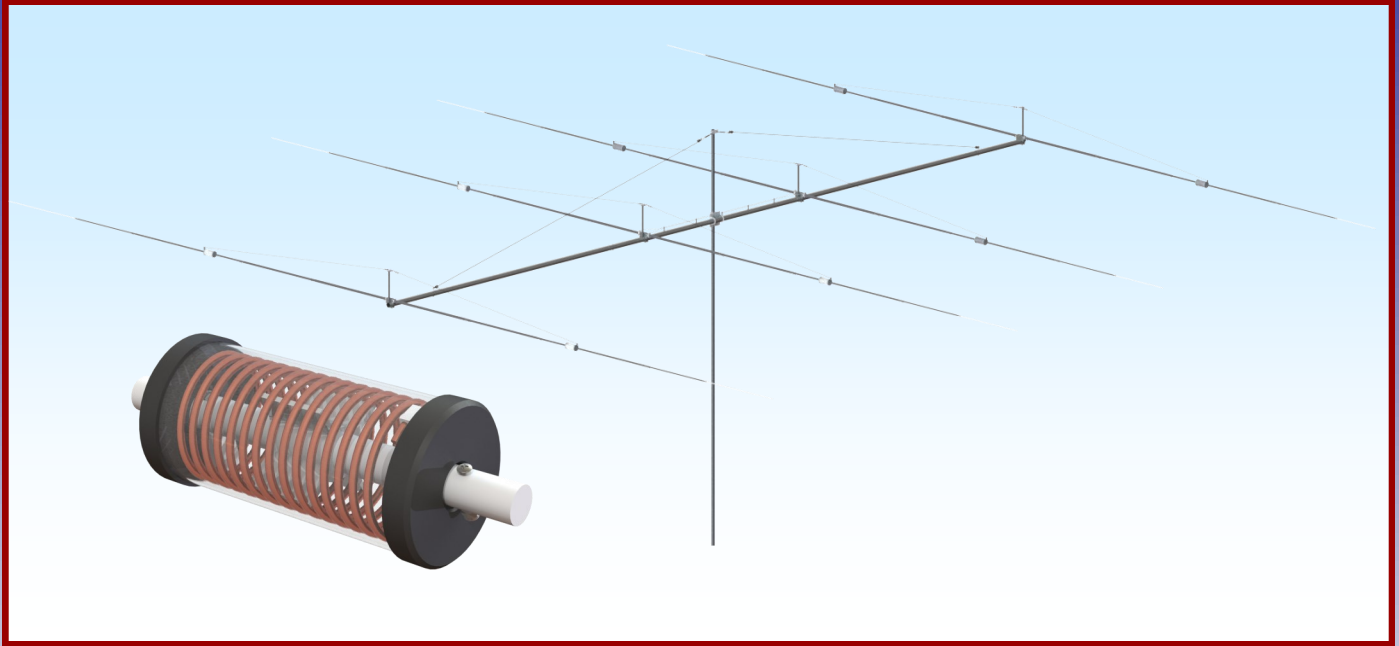




M2 Antenna Systems, Inc. Model No: 6.9-4CDD-125



SPECIFICATIONS:

Model	6.9-4CDD-125	Connector	SO-239, Other avl.
Frequency Range	6.8 –6.980 MHz cont.	Power Handling	3 Kw, Higher avl.
Typical gain	12.3 @ 100' dBi typical	Boom Length / Dia.....	42' / 3" X .125
Front to back ratio	21 dB typical	Maximum Element Length.....	49'
Beamwidth	75°	Turning Radius:	34'
Feed type / Balun	SO-239, 1:4 Balun	Mast Size	2" or 3" Nom.
Feed Impedance.	200 Ohms	Wind area / Survival	13.0 Sq. Ft. / 100 MPH
VSWR.....	1.2:1 typical, 2.0:1 max	Weight / Ship Wt.....	450 Lbs. / 500 Lbs.

***Subtract 2.14 from dBi for dBd / FS = Free Space**

FEATURES:

Recently, M2 engineers developed a new way to make coils using CNC tooling. The result is a precision inductor increasing Q and lowering loss to new levels. A coil loaded Yagi design was computer optimized, and not one single change was required on the finished Yagi. This design gets the bandwidth and maintains performance across the band like no other Yagi. Gain, Front to Back and VSWR are maintained nearly flat across the 6.8 to 6.980 MHz band section. Mechanically it is easy to assemble. Only the tips of each element are different as all the coils are the same for each element. The coils themselves float in air minimizing dielectric loss. They are fully covered with a polyethylene cover. This antenna has been designed to meet your needs and give you years of reliability.

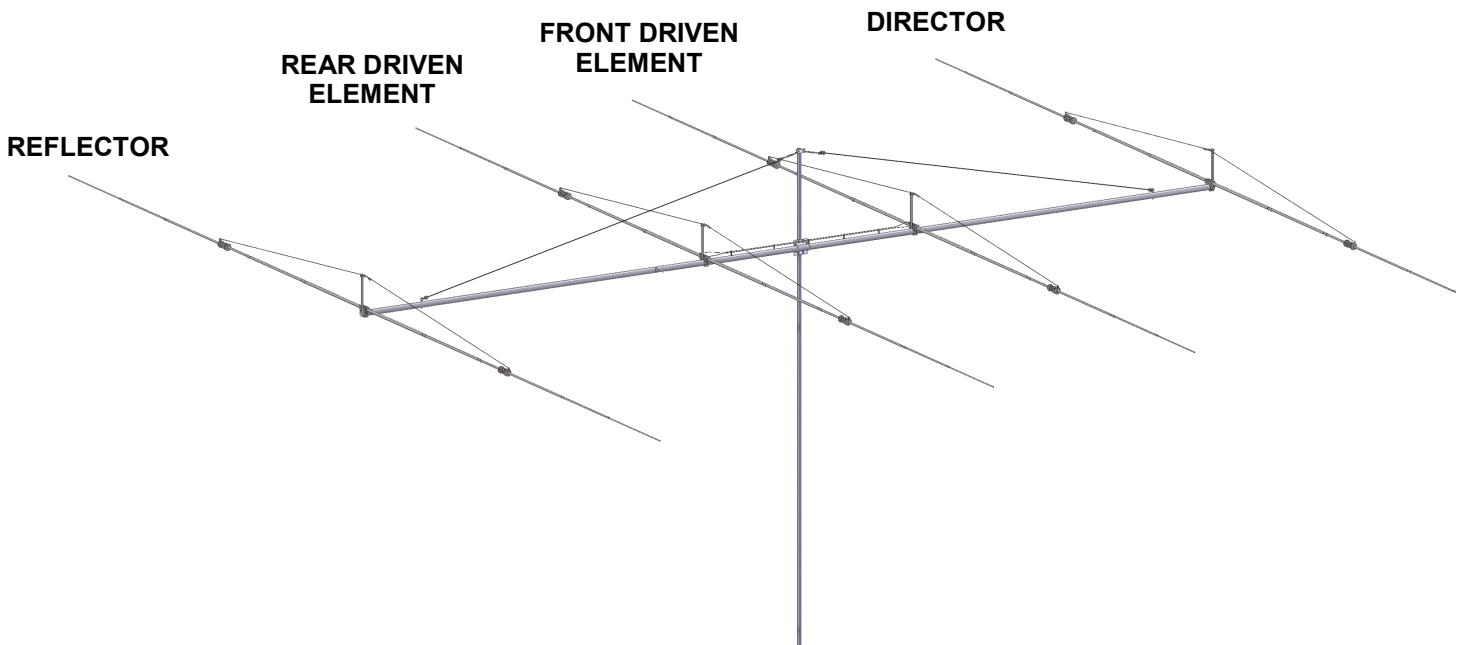
6.9-4CDD-125 ANTENNA OVERVIEW

BEFORE YOU BEGIN: Look over all the DRAWINGS to get familiar with the various parts and assemblies in the system. Tools handy for assembly process: screwdriver, 11/32", 7/16", 1/2", 9/16" and 5/8" spin-tites, end wrenches and/or sockets, and a measuring tape.

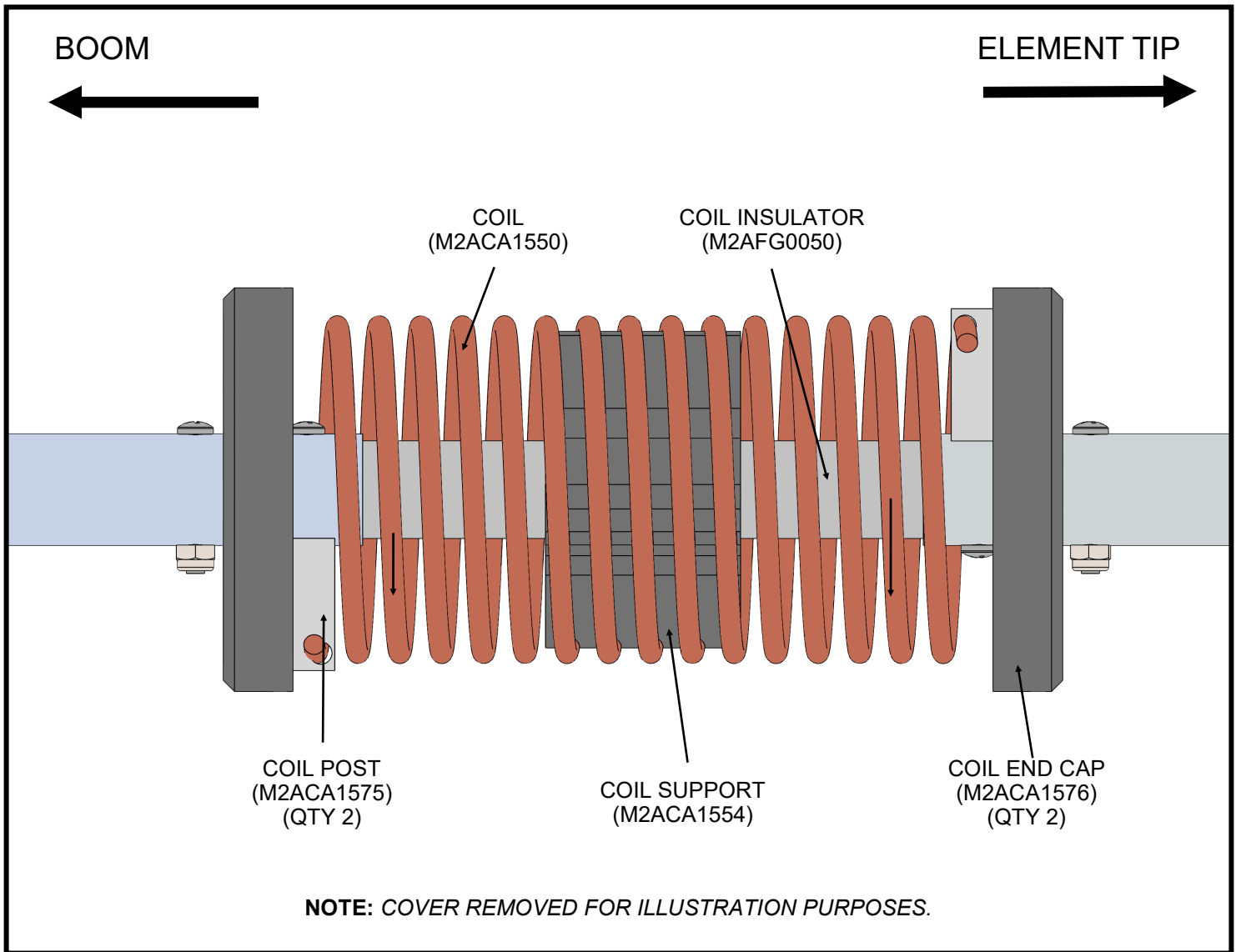
Note:

All installations are unique in some way, which means it's OK to preassemble certain hardware, or rearrange the assembly process to meet specific site requirements. A quick review of the assembly drawings should help firm up the appropriate strategy. Please remember to double-check all hardware for tightness BEFORE it becomes inaccessible.

One container of zinc paste (Penetrox, Noalox, or equiv.) has been provided to enhance and maintain the quality of all mechanical and electrical junctions on this system. Apply a thin coat wherever two pieces of aluminum come in contact or any other electrical connections are made. It is also useful on screws and bolt threads as an ANTI SEIZE compound.



6.9 COIL OVERVIEW



6.9 COIL ASSEMBLY INSTRUCTIONS

STEP 1:

The coil comes wound tight with 16 total turns from the factory. The excess material will be trimmed off after the coil is in its final position. Using a permanent marker, draw a straight line from one end of the coil to the other. This will help later to determine if your coil has grown in diameter during assembly. After final positioning of the coil no more 3/4 of an inch of line tilt is allowed. A larger coil will cause the inductance to change which can cause your antenna to be off frequency.

STEP 2:

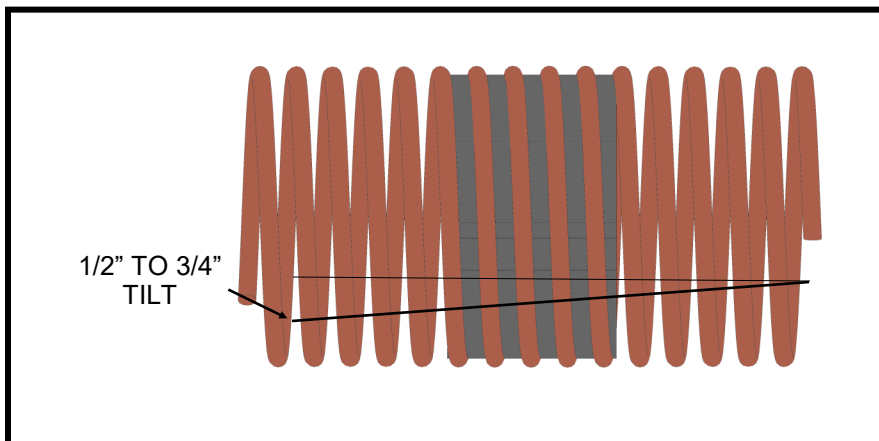
The COIL is wound tight at the factory to prevent damage during shipping. Use the COIL SPREADING TOOL provided, and carefully insert it into the first turn of the COIL. Now gently push or roll the tool through all 16 turns of the COIL. Now the COIL is nearly in its final shape and is ready to be threaded onto the COIL SUPPORT. Note the reference line drawn earlier, it will have a slight tilt after spreading.

STEP 3:

On one end, use pliers to gently straighten the last 1/2" of the COIL and file off any burrs.

STEP 4:

Begin threading the COIL onto one end of the COIL SUPPORT. **BE CAREFUL** to not deform the COIL during this process. The COIL should thread smoothly. Continue until about 5-1/2 turns are past the COIL SUPPORT or close to the center. Exact centering is not important. Again, note your reference line.



NOTE: PENETROX PASTE FOR LUBRICATING SCREW THREADS AND TUBING JOINTS HAS BEEN SUPPLIED. USE A VERY SMALL AMOUNT ON EACH SCREW THREAD AND UNDER THE COIL POSTS DURING THE NEXT OPERATION.

STEP 5:

Insert the COIL INSULATOR (M2AFG0050) into your COIL SUPPORT (M2ACA1554). Rotate the COIL and the COIL SUPPORT so the leading end of the COIL goes over and just past the inner hole in the COIL INSULATOR. Now slide on one COIL POST on to one end of the COIL so it is right over the first hole. Next, carefully slide on the ELEMENT SECTION #6 (M2AEP40MC-6) and align it so both holes in the tube match the two holes in the COIL INSULATOR.

STEP 6:

Insert hardware through the ELEMENT SECTION #6 and the COIL INSULATOR and begin threading it into the COIL POST. Tighten hardware. Thread the SET SCREW into the top of the COIL POST and with about 1/2" of wire protruding past the COIL POST, tighten the SET SCREW gently. Use supplied ALLEN WRENCH to tighten the SET SCREW.

STEP 7:

The second COIL POST is mounted on the OPPOSITE SIDE of the COIL INSULATOR so 15 1/2 turns of the COIL are used. The extra 1/2 turn COIL should pass over the COIL INSULATOR hole. Slide on the second COIL POST and align

6.9 COIL ASSEMBLY INSTRUCTIONS

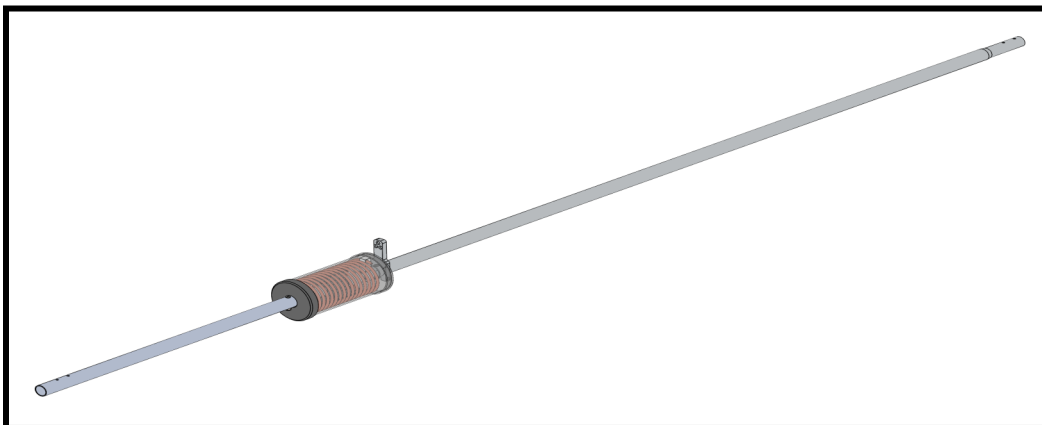
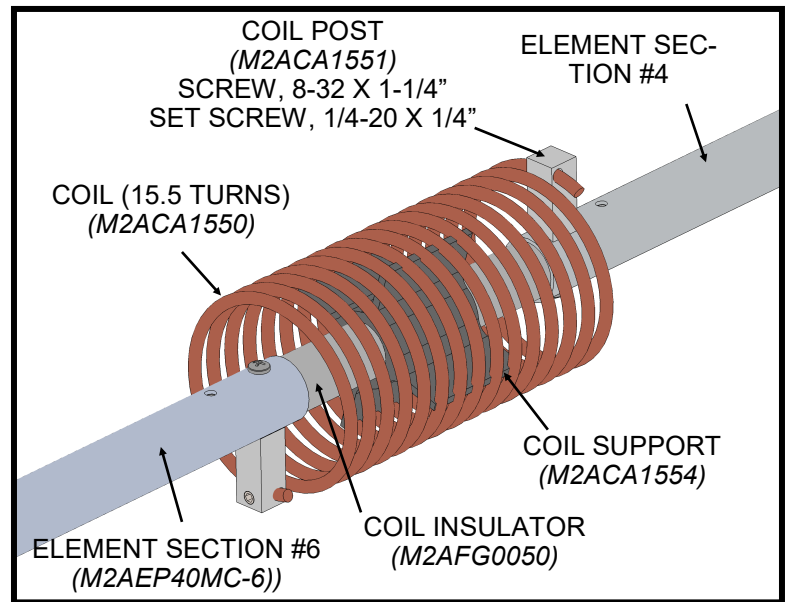
it over the hole. Slide on ELEMENT SECTION #4 (M2AEP40MC-4) and fasten the COIL POST to the tubing assembling using the supplied hardware. Use your reference line and adjust the coil so the line has no more tilt than 3/4"

STEP 8:

Insert the SET SCREW into the COIL POST and tighten gently. Adjust the COIL and COIL SUPPORT location for equally spaced turns. The distance between each turn should be the same as the COIL wire diameter. Once the COIL is straight and aligned, tighten the final SET SCREW securely.

STEP 9:

Slide COIL COVER and COIL END CAPS onto COIL ASSEMBLY. Secure COIL END CAPS into position by securing hardware through TUBE ASSEMBLIES on both ends of the COIL ASSEMBLY. Slide ELEMENT OVERHEAD SUPPORT onto ELEMENT SECTION until it reaches the head of the screw holding on the COIL COVER. Clamp ELEMENT OVERHEAD SUPPORT in place with screw and locknut.



STEP 10:

Assemble all the remaining COIL ASSEMBLIES by repeating steps 1-9. Set COIL ASSEMBLIES aside for future use.

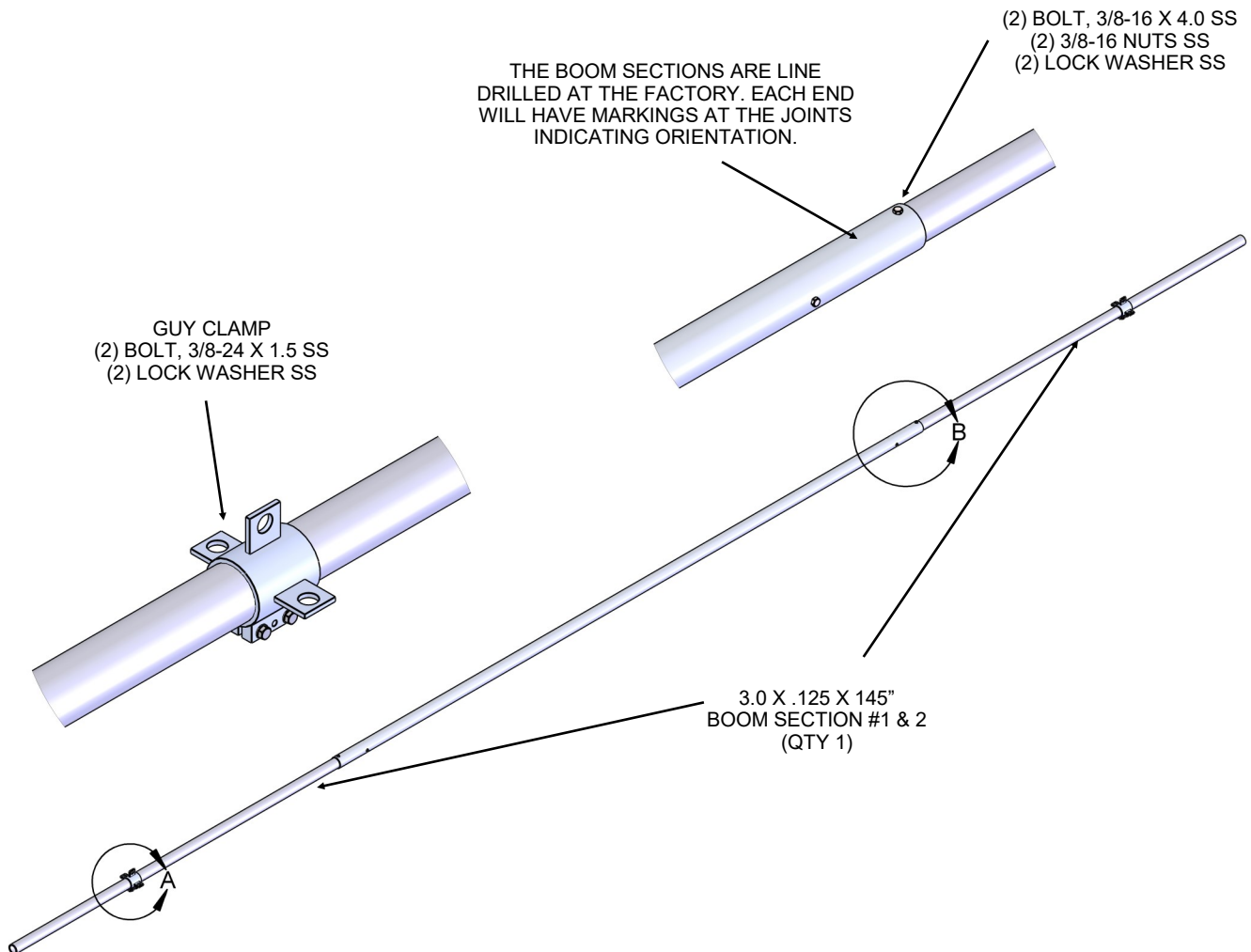
6.9-4CDD-125 BOOM ASSEMBLY INSTRUCTIONS

STEP 11:

At this point it will be helpful to perform the remaining assembly steps with the BOOM ASSEMBLY elevated off the ground (about 3 feet). This can be accomplished by using sawhorses or something similar. Wipe off the ends of each BOOM SECTION and apply a small amount of PENTROX. Refer to the drawing below and assemble BOOM SECTIONS as shown. Insert hardware and tighten.

STEP 12:

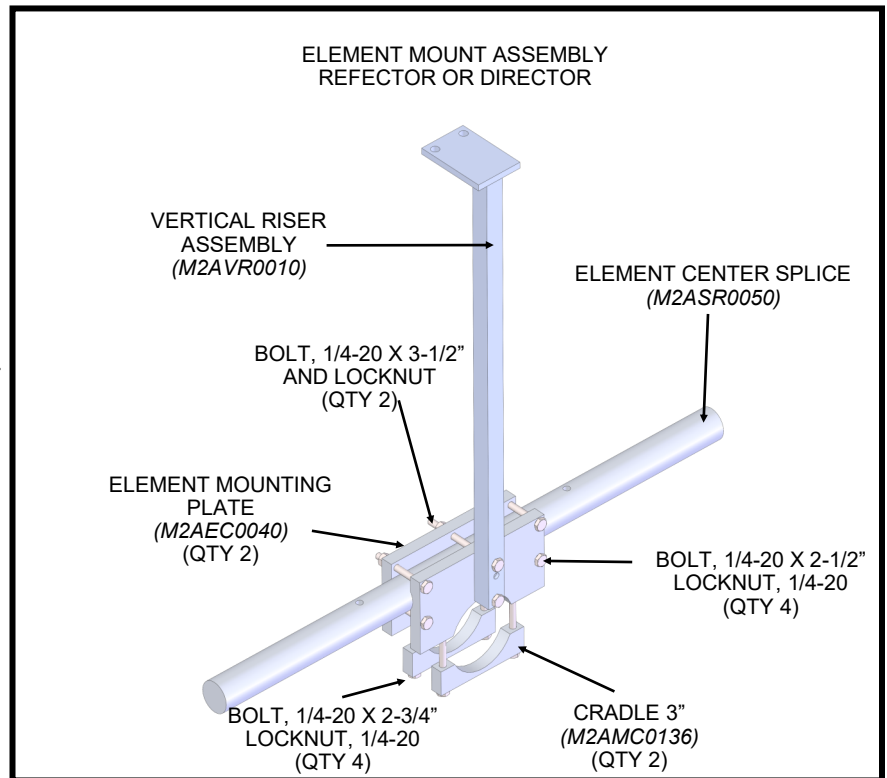
Add the guy clamps to boom sections 1 # 3, see dimension sheet for location.



6.9-4CDD-125 ELEMENT MOUNT ASSEMBLY INSTRUCTIONS

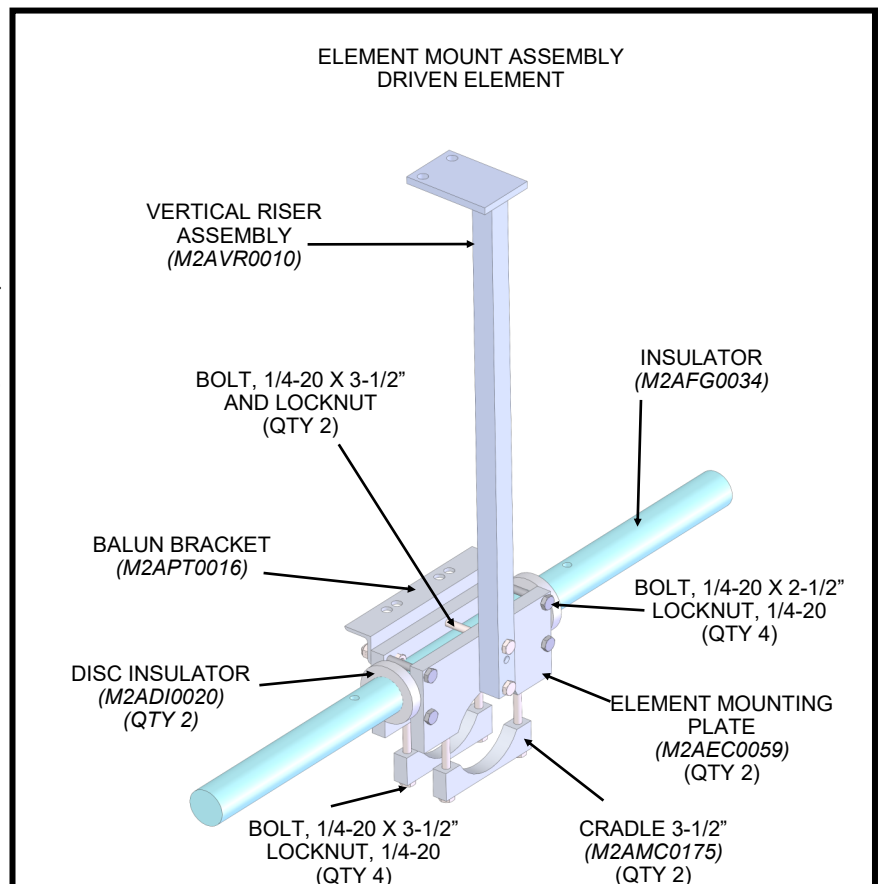
STEP 13:

Assemble the ELEMENT MOUNT assemblies for the reflector and front director element. Refer to the assembly drawing to aid in assembly. Be sure to center the ELEMENT CENTER SPLICE and the holes are in the vertical position.

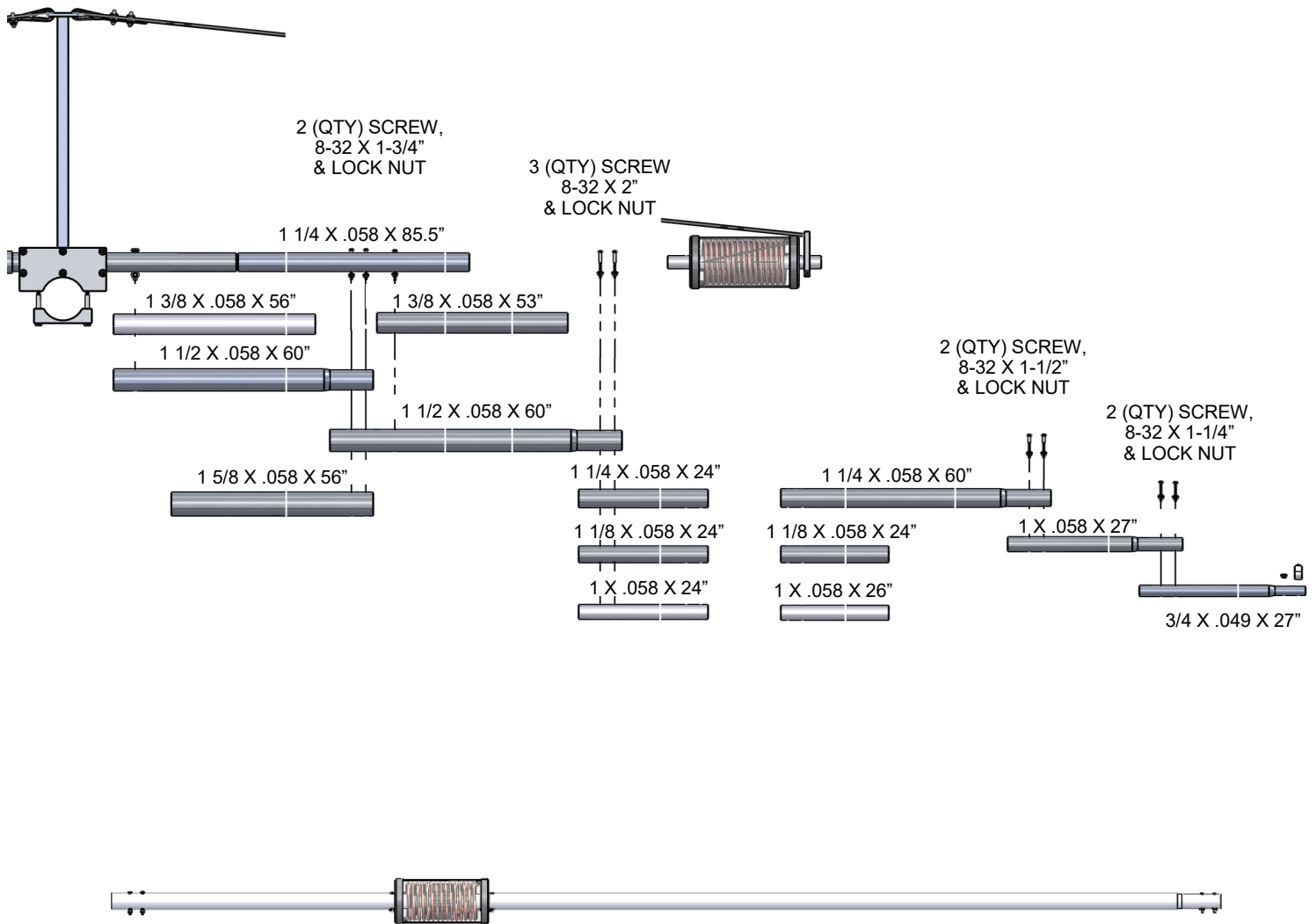


STEP 14:

Assemble the DRIVEN ELEMENT MOUNT assembly for the DRIVEN ELEMENTS. Refer to the assembly drawing to aid in assembly. Be sure to center the INSULATOR and that the holes are in the vertical position. The DISC INSULATORS are a press fit. Heating them with a heat gun or hot water will help in assembly.

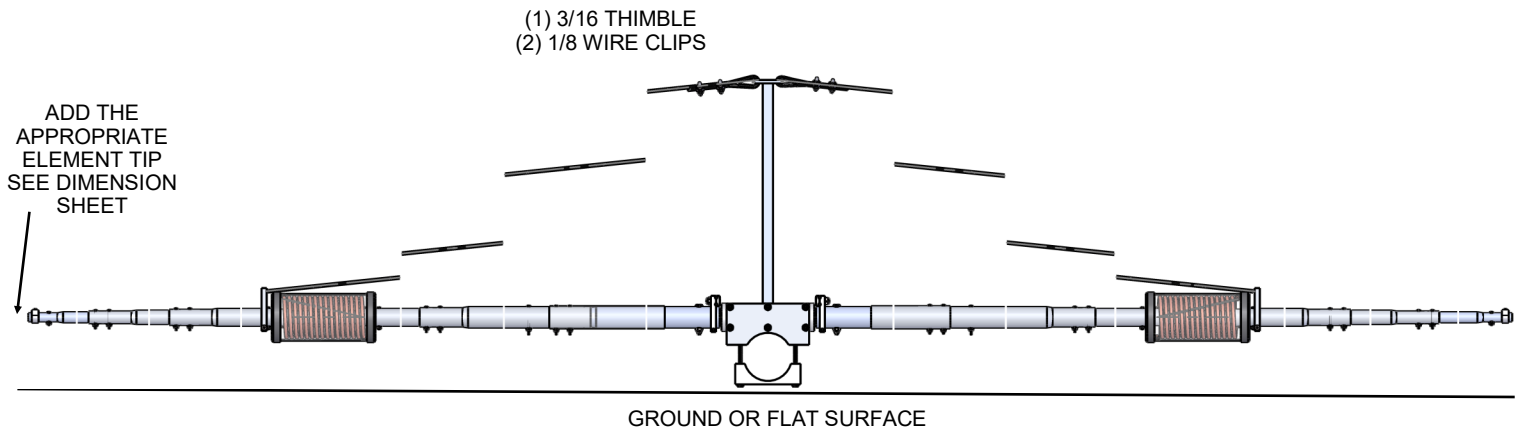


6.9-4CDD-125 ELEMENT ASSEMBLY DETAIL



IN SOME CASES THE COILS MAY BE PRE ASSEMBLED. IF YOUR COILS ARE PRE-ASSEMBLED, SKIP THE COIL ASSEMBLY STEPS.

ELEMENT FINAL ASSEMBLY INSTRUCTIONS



NOTE: For the final assembly on all the elements, it is best to perform the next steps on the ground or long flat surface. This will aid during final adjustment of the ELEMENT OVER HEAD SUPPORT. *The ELEMENT HALVES are symmetrical on both sides EXCEPT FOR THE ELEMENT TIP.*

STEP 15:

Use the ELEMENT ASSEMBLY DETAIL to assemble each element half. Add the element halves to the to the pre-assembled element mount assemblies.

STEP 16:

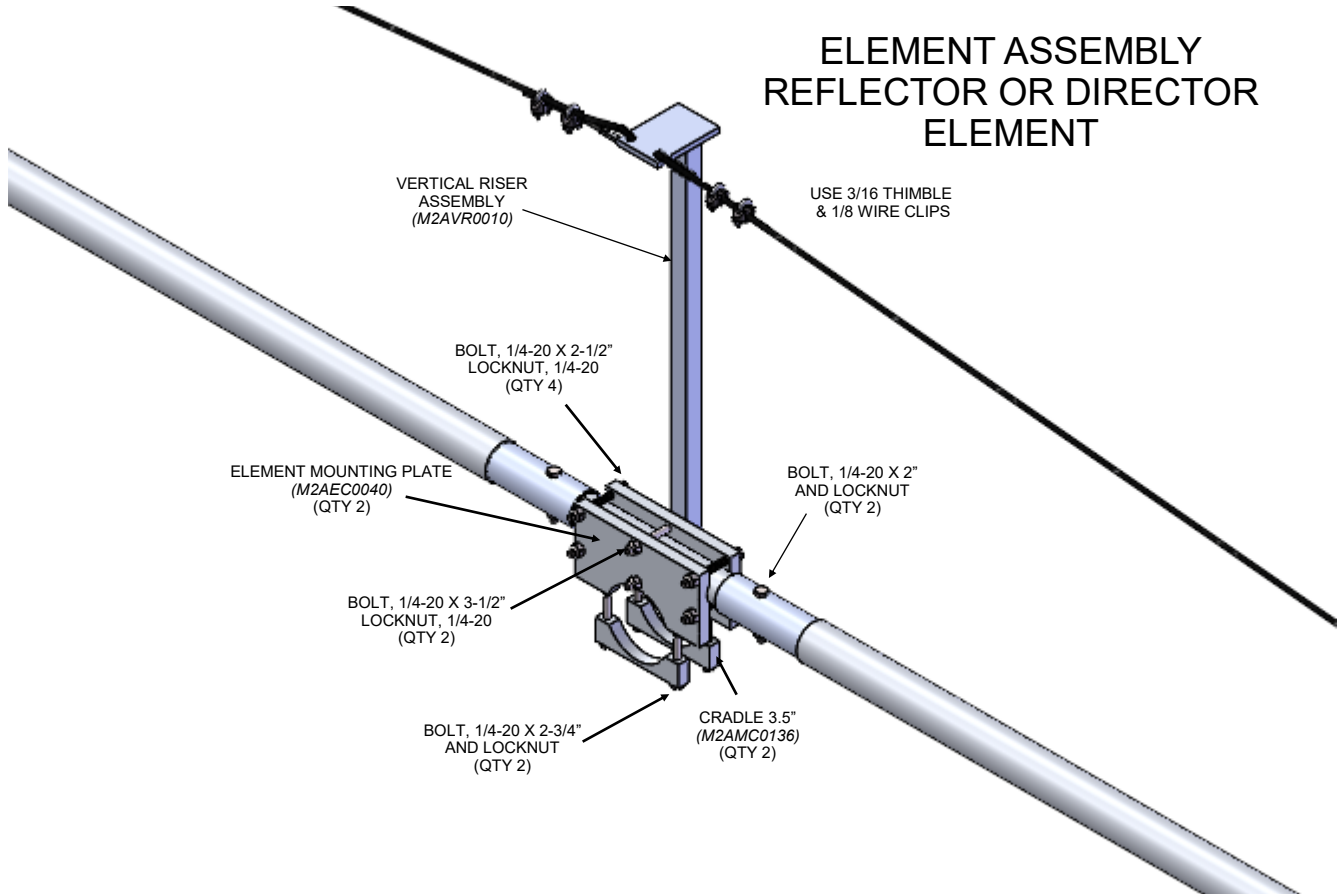
To adjust the ELEMENT TIP, a COMPRESSION CLAMP is supplied for use during tune up. First thread on the hex nut to capture the screw in the CLAMP. Then slide the COMPRESSION CLAMP so that the screw is lined up with the hole in ELEMENT SECTION #5. Use the DIMENSION SHEET and set the proper exposed length of the 1/2" ELEMENT TIP for the appropriate element, then mark the element assembly to avoid confusion later. See GENERIC COMPRESSION CLAMP DETAIL page for more detail.

STEP 17:

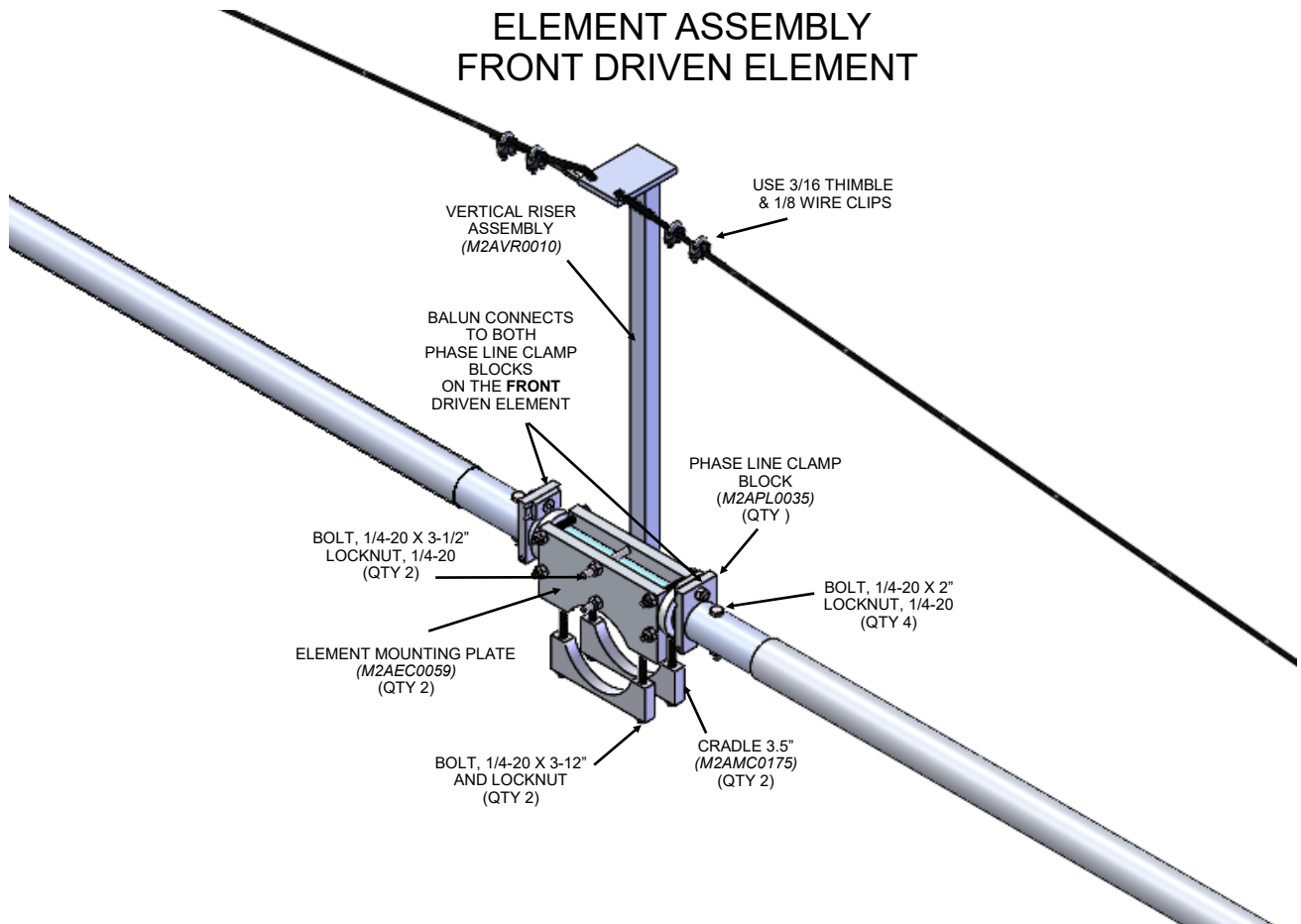
Tensioning the element overhead guys: Start at the VERTICAL RISER and bend the thimbles open and insert them into the holes on the top plate of the VERTICAL RISER, then bend them back to there original shape. Cut the HPTG-1200 in half and Loop the Philystran cord thru the thimble, add qty (2) 1/8 wire clip and leave 3" of excess Philystran past the wire clip and tighten, finalize by taping the short tail of Philystran cord down to the main portion of Philystran. Thread the opposite end of the cord through the ELEMENT OVERHEAD SUPPORT (M2APL0211) (See the LOCK BLOCK DETAIL page) and tension the rope so the element is in a level or neutral position. It is always best to have the element in a level or neutral position or with a slight sag downward. Over tensioning can lead to a upward bowed element causing instability. This finalizes the element construction.

6.9-4CDD-125 ASSEMBLY DETAIL

ELEMENT ASSEMBLY REFLECTOR OR DIRECTOR ELEMENT



ELEMENT ASSEMBLY FRONT DRIVEN ELEMENT



6.9-4CDD-125 PHASING LINE AND BALUN ASSEMBLY INSTRUCTIONS

STEP 18:

Refer to the dimension sheet for element placement. With the boom elevated on sawhorses or equivalent, using a long tape measure and a permanent marker lay the boom out by marking the centers of each element. Equalize the amount of extra boom at both ends on the antenna.

STEP 19:

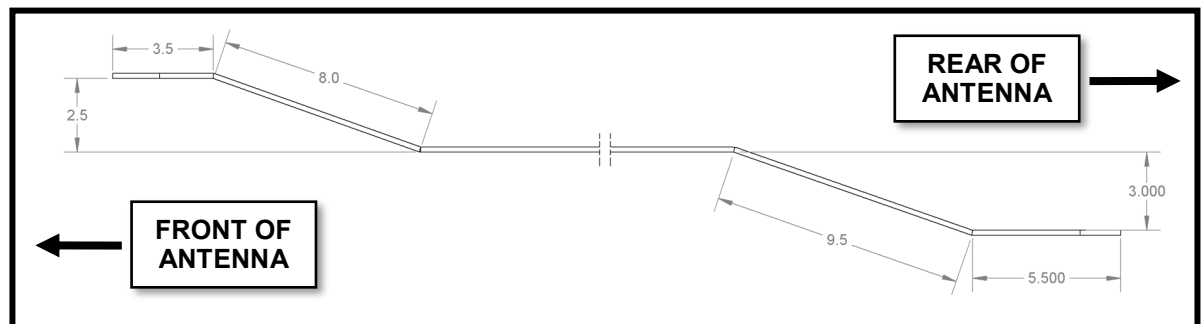
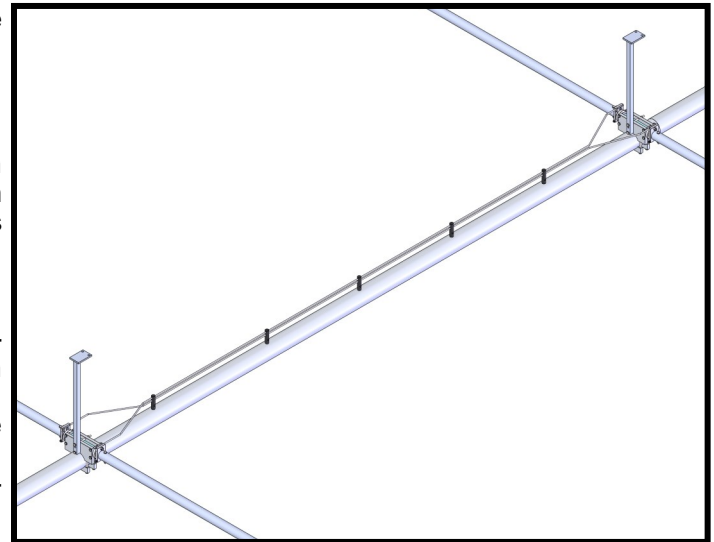
Install each element at the marks on the boom. Be sure the guy clamp in each end of the boom are in the up position. Double check the positions of each element and lightly tighten.

STEP 20:

Standing at one end of the antenna, sight down the boom and reference each element to one another making sure each element is parallel to one another, make small adjustments as needed and tighten.

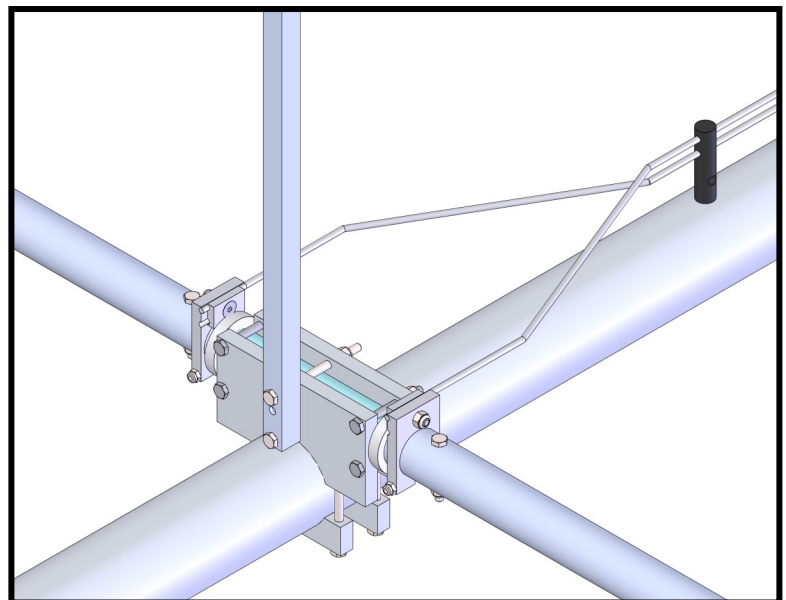
STEP 21:

The PHASING LINES are two 3/16" aluminum rods equally spaced apart with Delrin STANDOFFS. Slide the two aluminum PHASING LINES into the 5 Delrin PHASING LINE STANDOFFS. If you bend the PHASING LINES first you will not be able to slide on the STANDOFFS. Zip tie the STANDOFFS to the BOOM equally spaced between the FRONT and REAR DRIVEN ELEMENTS.



STEP 22

Bend PHASING LINES using drawing as an approximate guide.



STEP 23

Insert PHASING LINES into THE REAR DRIVEN ELEMENT MOUNTS. Tighten nuts.

6.9-4CDD-125 ASSEMBLY INSTRUCTIONS

STEP 24

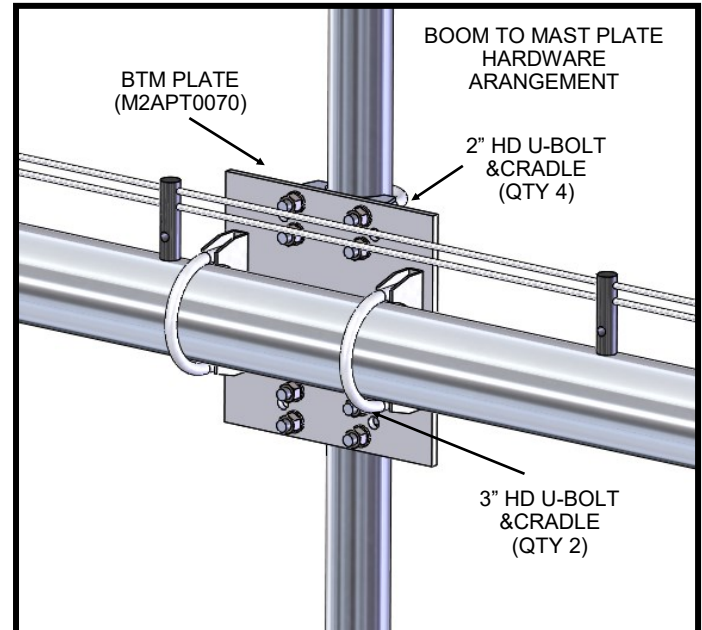
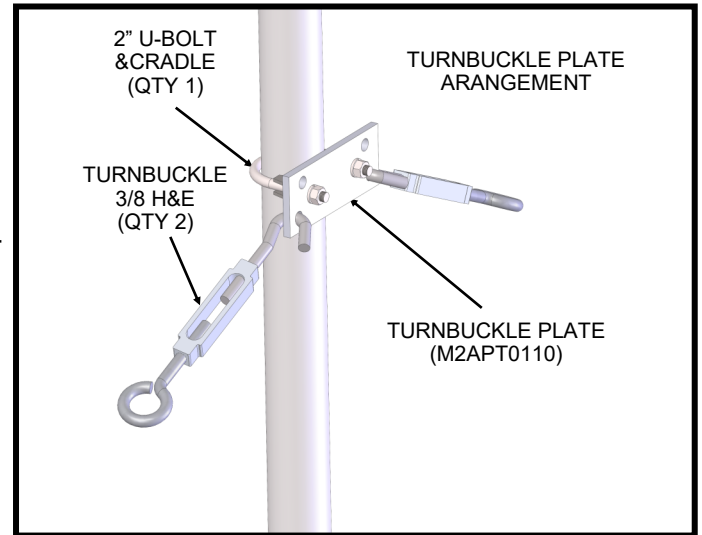
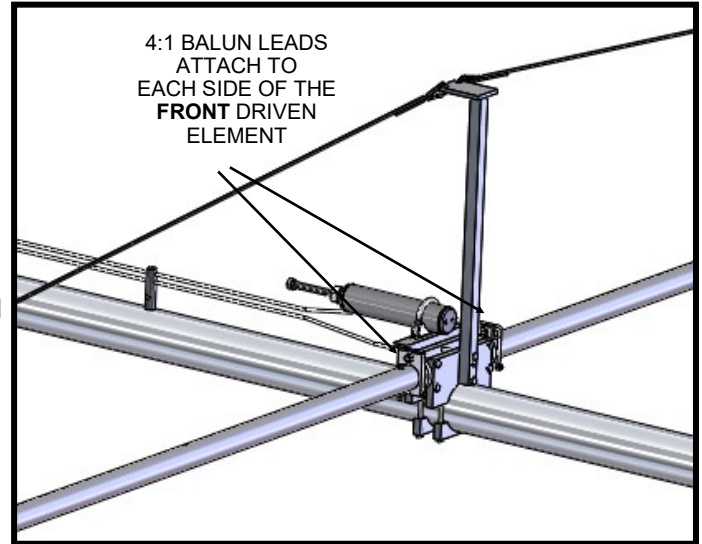
Insert PHASING LINES into THE PHASE LINE CLAMP BLOCK. Attach the balun leads to each side under the nuts that tighten the phase line clamps.

STEP 25

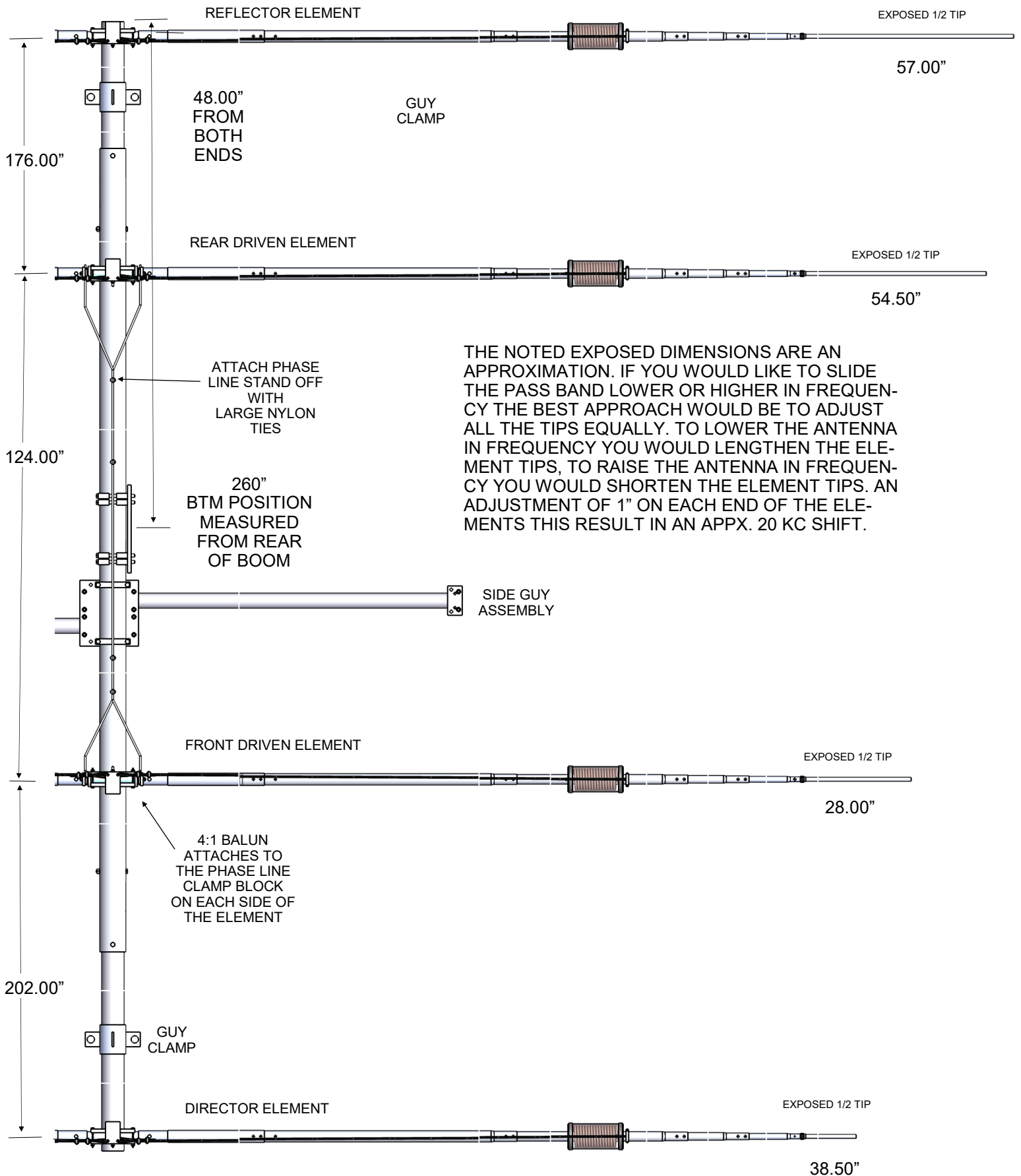
Installing a temporary mast while the antenna is still on the ground will help set up the main boom overhead support rope to ease installation on the tower. Find a 2" x 84" pcs. of tubing and install it to the boom to mast plate as shown in the boom to mast plate hardware arrangement. See the dimension sheet for antenna balance point. Add the turn buckle plate about 12" to 24" above the BTM plate. Find the 5/16" Dacron rope and tie each end to the eye bolt (see the knot diagram) at each end of the boom. Cut the rope leaving equal lengths of rope past the mast on each side. Pull the rope tight, and tie each end to the turnbuckles leaving as little slack as possible. Now loosen the U-bolt and raise the turnbuckle plate until the boom straightens. Let this stay tight for at least overnight allowing the rope to stretch and take a set. Be sure to tape the rope ends down to the tensioned side of the rope to prevent knots from coming loose.

STEP 26

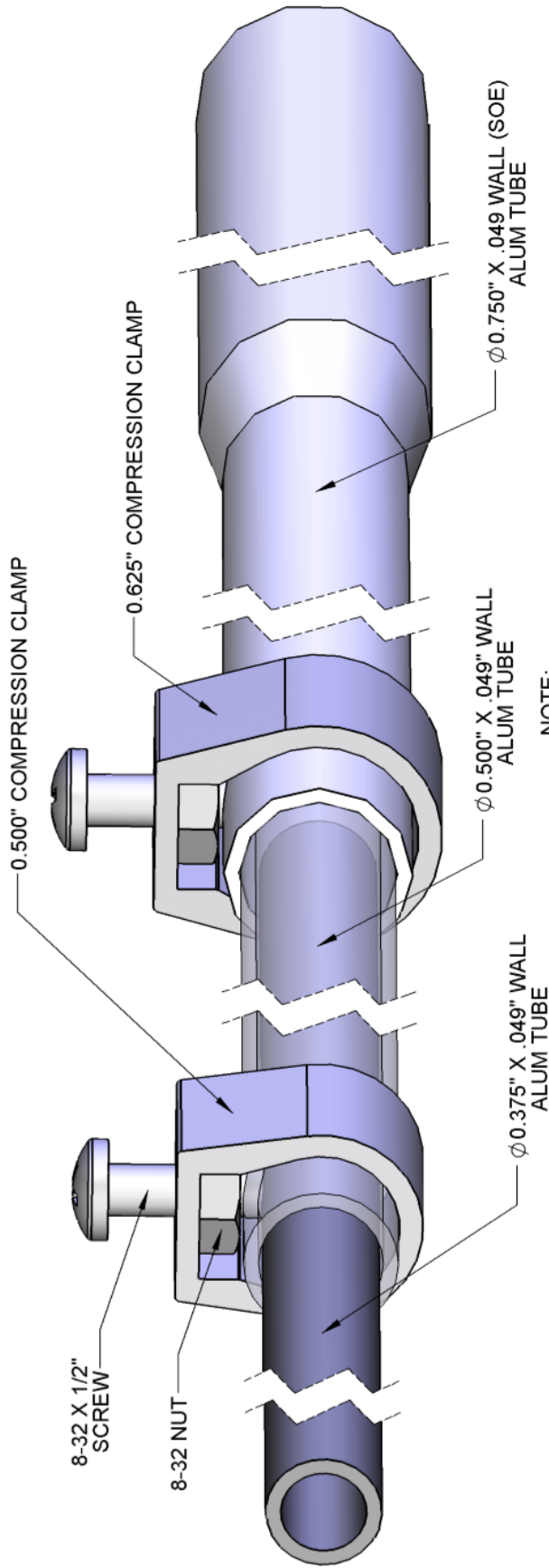
Before tower installation be sure to check all hardware for tightness, check all elements overhead rope supports for tight knots and review the droop of each element, adjust as needed. Loosen the turnbuckle plate and lower the plate releasing tension from the ropes. Remove the turnbuckles from the turnbuckle plate and tape them to the boom for easy access during tower installation. After final installation be sure to safety wire the turnbuckles to avoid the turnbuckles from loosening while under vibration. Be sure to use good quality coax with a quality connectors for final installation.



6.9-4CDD-125 DIMENSION SHEET



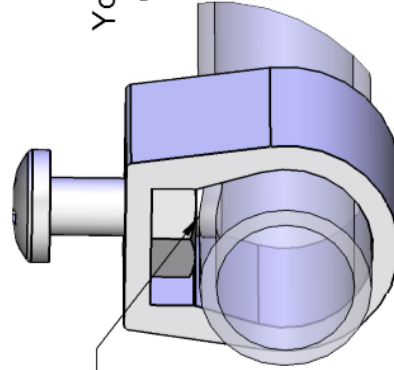
GENERIC COMPRESSION CLAMP DETAIL



NOTE:
TUBES SHOWN TRANSPARENT
TO SHOW MORE DETAIL

NOTE:

Generic layout to show
how compression clamps work.
Your antenna may have one or the other
or may even have both compression
clamp sizes.

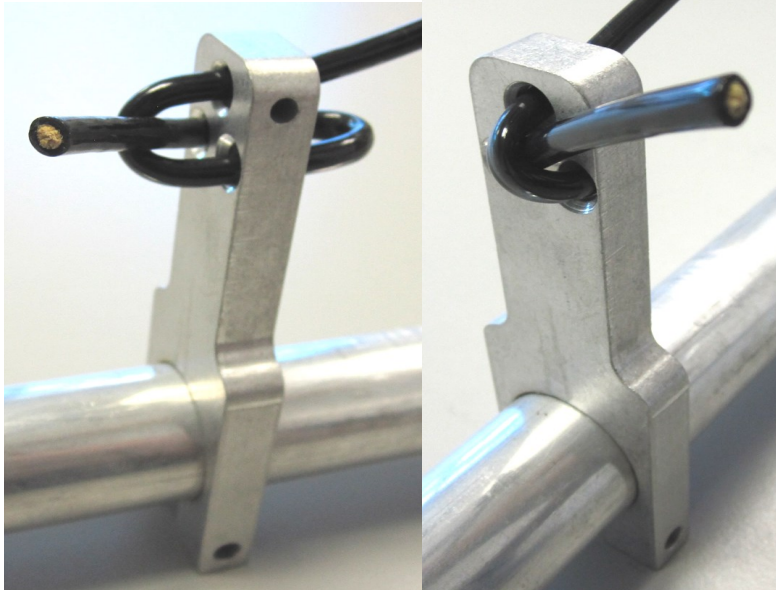


NOTE:
8-32 X 1/2" SCREW
PRESSES ON INNER TUBE

NOTE: INSIDE TUBE NOT SHOWN FOR CLARITY

LOCK BLOCK DETAIL

LOCK BLOCK ROPE ROUTE DETAIL



6.9-4CDD-125 PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION #1-3, 3.0" X .125" X 145", (M2ABS6.94CDD125-1-3)	2
BOOM SECTION #2, 3" SCHED 40 X 240" (M2ABS6.94CDD125-2)	1
ELEMENT SECTION #1: 1-5/8" X .058" X 56" (M2AEP7915KT9-1)	8
ELEMENT SECTION #1: 1-1/2" X .058" X 60", SOE (M2AEP7915KT9-2)	8
ELEMENT SECTION #1: 1-1/2" X .058" X 60", SOE (M2AEP7915KT9-4)	8
ELEMENT SECTION #2: 1-3/8" X .058" X 56" (M2AEP7915KT9-3)	8
ELEMENT SECTION #2: 1-3/8" X .058" X 53" (M2AEP7915KT9-5)	8
ELEMENT SECTION #3: 1-1/4" X .058" X 85.5" (M2AEP7915KT9-6)	8
ELEMENT SECTION #3: 1-1/4" X .058" X 24" (M2AEP7915KT9-7)	8
ELEMENT SECTION #3: 1-1/4" X .058" X 60" SOE (M2AEP7915KT9-10)	8
ELEMENT SECTION #3: 1-1/8" X .058" X 24" (M2AEP7915KT9-8)	8
ELEMENT SECTION #3: 1-1/8" X .058" X 26" (M2AEP7915KT9-11)	8
ELEMENT SECTION #4: 1" X .058" X 24" (M2AEP7915KT9-9)	8
ELEMENT SECTION #4: 1" X .058" X 26" (M2AEP7915KT9-12)	8
ELEMENT SECTION #4: 1" X .058" X 27" SOE (M2AEP7915KT9-13)	8
ELEMENT SECTION #5: 3/4" X .049" X 27", SOE (M2AEP7915KT9-14)	8
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 67.00" (M2AEP6.94CDD125-2) REF	2
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 63.25" (M2AEP6.94CDD125-3) RD	2
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 53" (M2AEP6.94CDD125-4) FD	2
ELEMENT TIP ASSEMBLY, 1/2" X .049" X 45.50" (M2AEP6.94CDD125-5) D1	2
PHASE LINE ROD, 3/16 X 132" (M2AEP40M4CDD-11)	2
SIDE GUY TUBE, 2.0 X .065 X 95" (M2AEP6.94CDD125-1)	2
ELEMENT CENTER SPLICE, 1.25" X 24", ALUMINUM ROD (M2ASR0050)	2
INSULATOR, 1.25" X 24", FIBERGLASS ROD (M2AFG0034)	2
ELEMENT MOUNTING PLATE, 3" X 6" X .50", ALUMINUM (M2AEC0040)	4
CRADLE 3", 1" X 4" X .500", ALUMINUM (M2AMC0136)	4
ELEMENT MOUNTING PLATE, 3" X 6" X .50", ALUMINUM (M2AEC0059)	4
CRADLE 3.5", 1" X 4" X .500", ALUMINUM (M2AMC0175)	4
DISC INSULATOR, POLYETHYLENE, 2" OD (M2ADI0020)	4
PHASE LINE CLAMP (M2APL0035)	2
PHASE LINE CAP (M2APL0067)	2
PHASE LINE STAND OFF (M2ASO0050)	5
BALUN, 4:1 MAYBE NOT SUPPLIED	1
VERTICAL RISER ASSEMBLY (SAVR0010)	4
PHYISTRAN, HPTG-4000 X 40 FT	2
ELEMENT OVERHEAD SUPPORT, 1.250" X 3.750" X .375", ALUMINUM (M2APL0211)	8
PHYISTRAN, HPTG 1200 X 28'	4
GUY CLAMP, 3" (SABS3000)	2
SIDE GUY PLATE, (M2APT0091)	1
TURN BUCKLE PLATE (M2APT0100)	2
2" U-BOLT & CRADLE	6
TURNBUCKLE, 3/8 X 6" E & J FORGED	4
THIMBLE, 5/16 LIGHT DUTY ZINC	4
WIRE CLIP, 1/4 MALLEABLE IRON	16
THIMBLE, 3/16" ZINC LIGHT DUTY	8
WIRE CLIP, 1/8 MALLEABLE IRON	24
COMPRESSION CLAMP, 5/8" (M2AMC0145)	8
PENETROX / ZINC PASTE CUP	1
ASSEMBLY MANUAL	1
ASSEMBLED COILS	
40M COIL, 15 1/2 TURNS (M2ACA1550)	8
COIL POST, .500" X .500" X 1.06", ALUMINUM (M2ACA1575)	16
COIL END CAP, 3.625" X .625", UMHW (M2ACA1576)	16
COIL COVER, 3.290" X 7.250", POLYETHYLENE TUBE (M2ACA1553)	8
COIL SUPPORT, 2.937" X 1.75", POLYETHYLENE (M2ACA1554)	8
COIL INSULATOR, .875" X 10.625", FIBERGLASS (M2AFG0050)	8
COIL SPREADING TOOL, 5/8" X 2", DELRIN (M2ACA1558)	1

6.9-4CDD-125 PARTS & HARDWARE

HARDWARE

BOLT, 3/8-16 X 4-3/4 SS	4
BOLT, 3/8-16 X 4-1/2 SS	4
BOLT, 3/8-24 X 1-1/2 SS	4
LOCK WASHER, 3/8", SS	12
NUT, 3/8-16", SS	8
NUT, 5/16-18, SS	12
LOCK WASHER, 5/16", SS	12
BOLT, 1/4-20 X 3-1/2", SS	16
BOLT, 1/4-20 X 2-3/4", SS	8
BOLT, 1/4-20 X 2-1/2", SS	8
BOLT, 1/4-20 X 2", SS	8
BOLT, 1/4-20 X 1.0", FLAT ALLEN HEAD, SS	4
SET SCREW, 1/4-20 X .250", SS	16
LOCKNUT, 1/4-20, SS	45
SCREW, 8-32 X 2.0", SS	28
SCREW, 8-32 X 1-3/4", SS	24
SCREW, 8-32 X 1-1/2", SS	48
SCREW, 8-32 X 1-1/4", SS	16
SCREW, 8-32 X 7/8 SS	16
SCREW, 8-32 X 1/2", SS	8
NUT, 8-32, SS	8
LOCKNUT, 8-32, SS	100
ALLEN HEAD WRENCH, 1/8"	1
NYLON TIE 12"	10