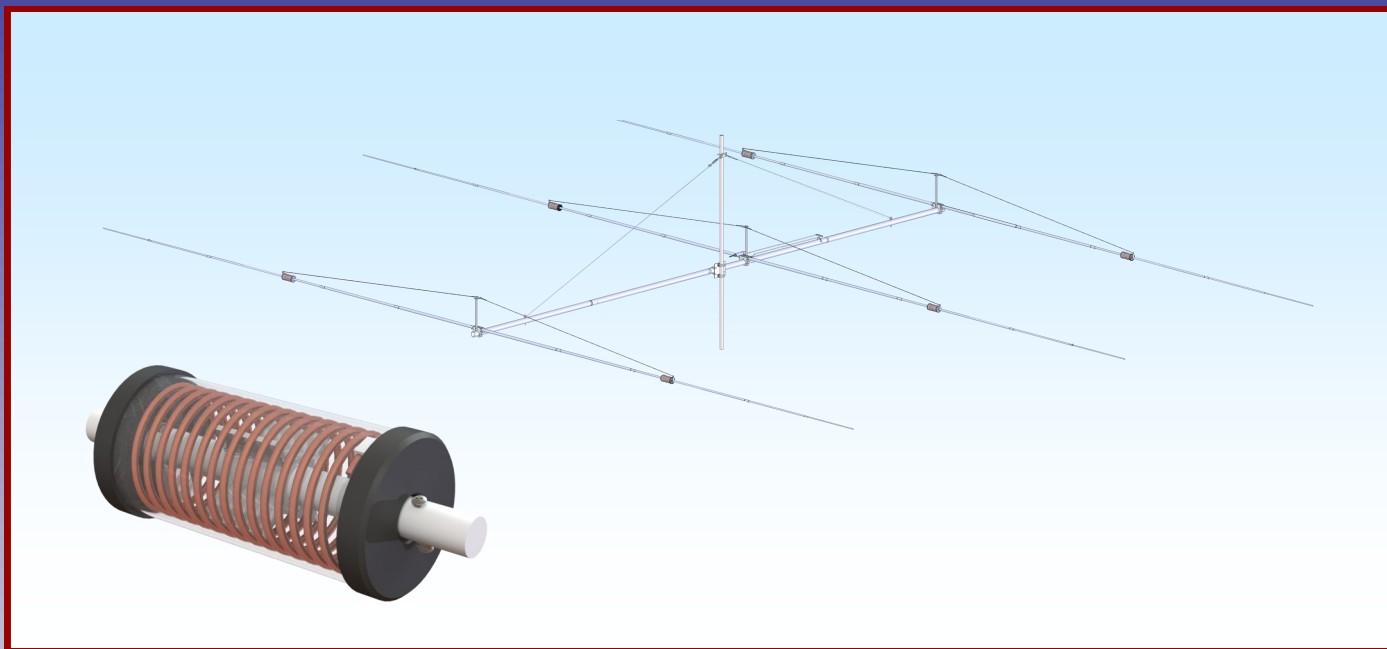




M2 Antenna Systems, Inc.

Model No: 40M3C

W/ FG17MAOK2



SPECIFICATIONS:

Model	40M3C	Front to back ratio 17M	30 dB typical
Frequency Range	7.0-7.3 MHz x 150 kHz	Beamwidth 17M.....	60°
Typical gain	7.2 dBi typical	Connector	SO-239, Other avl.
Front to back ratio 40M	24 dB typical	Power Handling	3 KW PEP, Higher avl.
Beamwidth 40M	74°	Boom Length / Dia.....	30' / 3" X .125
Feed type	HAIR PIN /1:1 Balun	Maximum Element Length.....	49'
Feed Impedance.	50 Ohms	Turning Radius:	28.5'
VSWR 40M/17M	1.3:1 typical, 2.0:1 max	Mast Size	2" or 3" Nom.
Frequency Range 17M.....	18.06-18.160 MHz	Wind area / Survival	13.0 Sq. Ft. / 100 MPH
Typical gain 17M	9.1 dBi typical	Weight / Ship Wt.....	152 Lbs. / 163 Lbs.

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

FEATURES:

The new 40M3C is a new exciting antenna. M² engineers developed a new coil using 3/16" copper wire with an aluminum core. The result is a lightweight inductor with great power handling and a Q near 1000. The coil has a weather cover made from PVC protecting the coil from birds, weather and snow build up. This allows for an almost lossless REDUCED SIZE element. Countless hours have been spent optimizing all of our 40 meter antennas using this new coil technique. The 40M3C uses simple element tip adjustments for optimizing performance for any part of the 40M band in 150 kHz steps. The 40M3C uses all of the same high quality hardware and machine parts that all of customers have come to know. The 40M3C also has an optional 17m add on kit that uses a single feed point for both 40M and 17M. Don't miss the best part of the cycle, contact M2 for some help today.

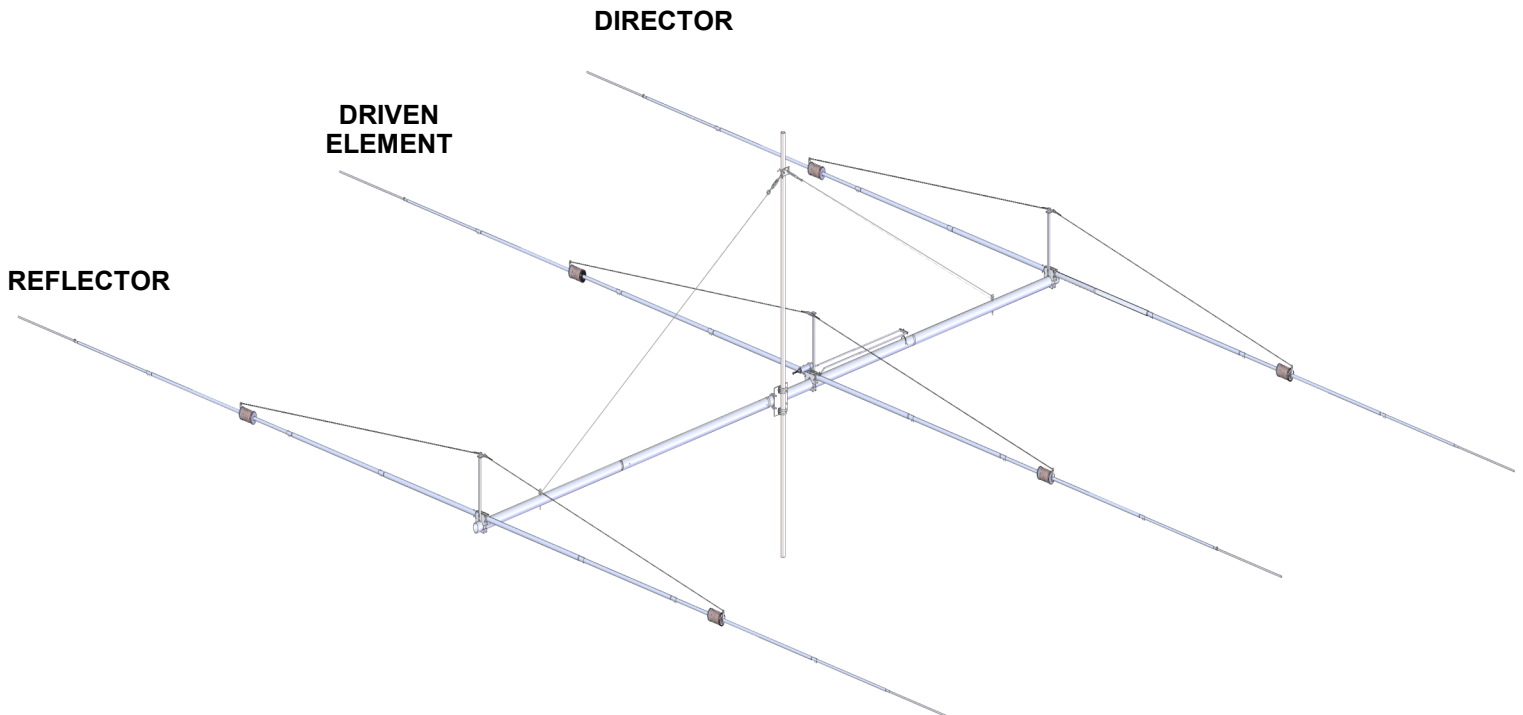
40M3C ANTENNA OVERVIEW

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.

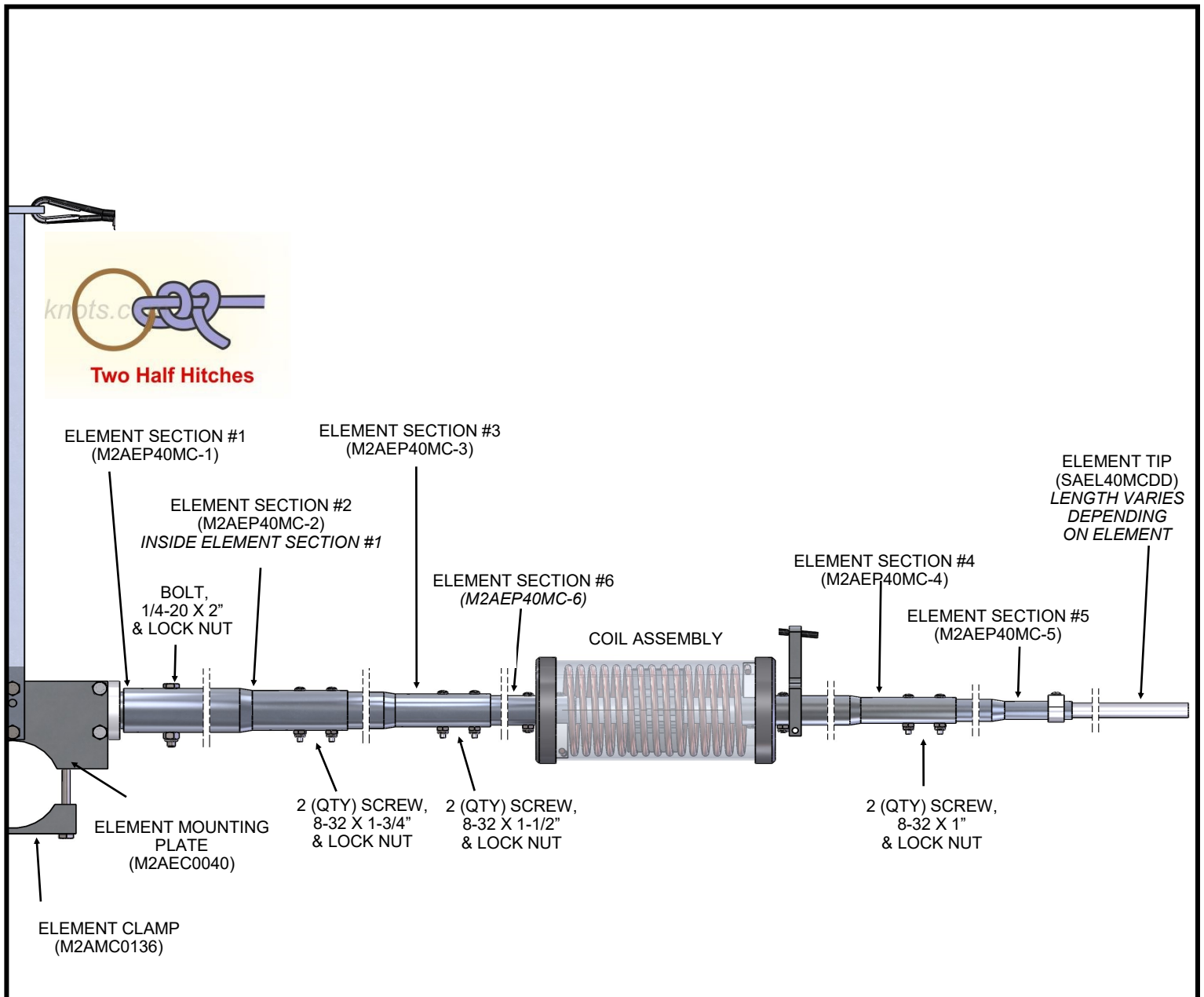
Note:

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.

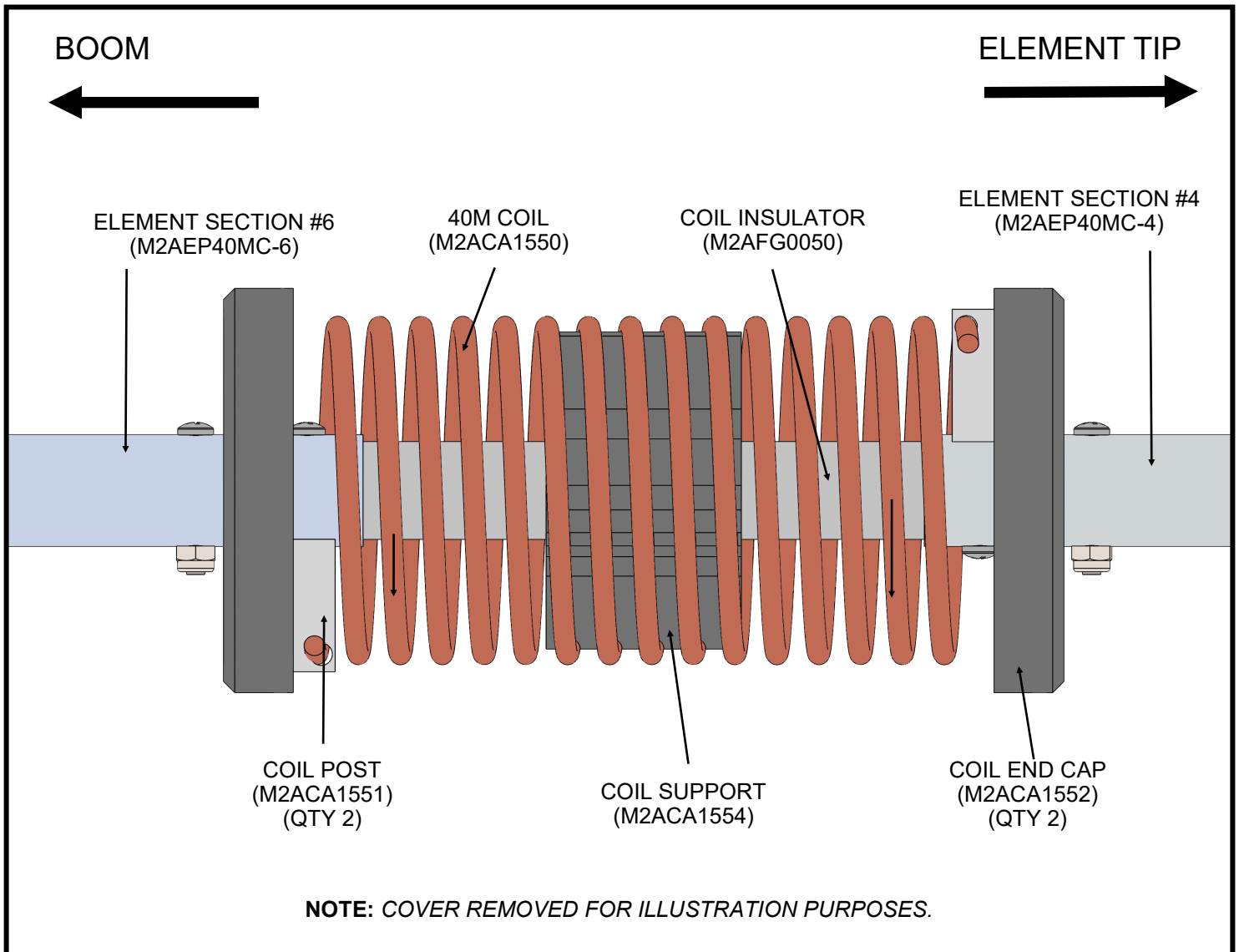
One container of zinc paste (Penetrox, Noalox, or equiv.) has been provided to enhance and maintain the quality of all mechanical and electrical junctions on this system. Apply a thin coat wherever two pieces of aluminum come in contact or any other electrical connections are made. It is also useful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



40M ELEMENT HALF OVERVIEW



40M COIL OVERVIEW



40M COIL ASSEMBLY INSTRUCTIONS

STEP 1:

The coil comes wound tight with 16 total turns from the factory, **When final assembled you will end with 15.5 total turns.** 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.

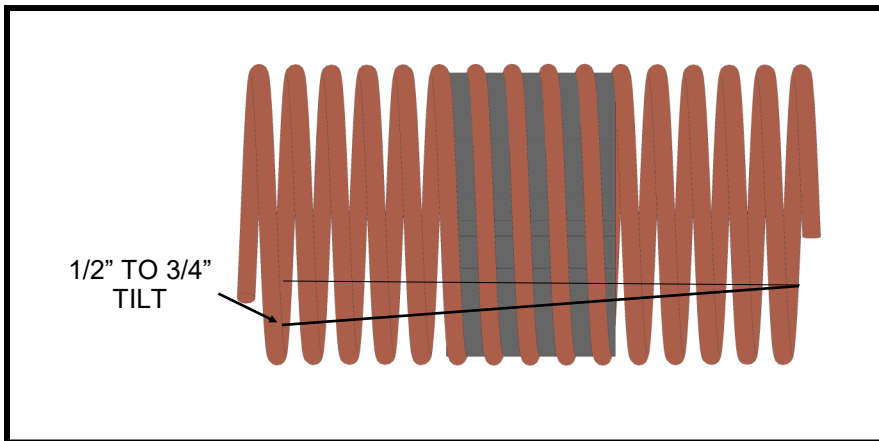


STEP 3:

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.

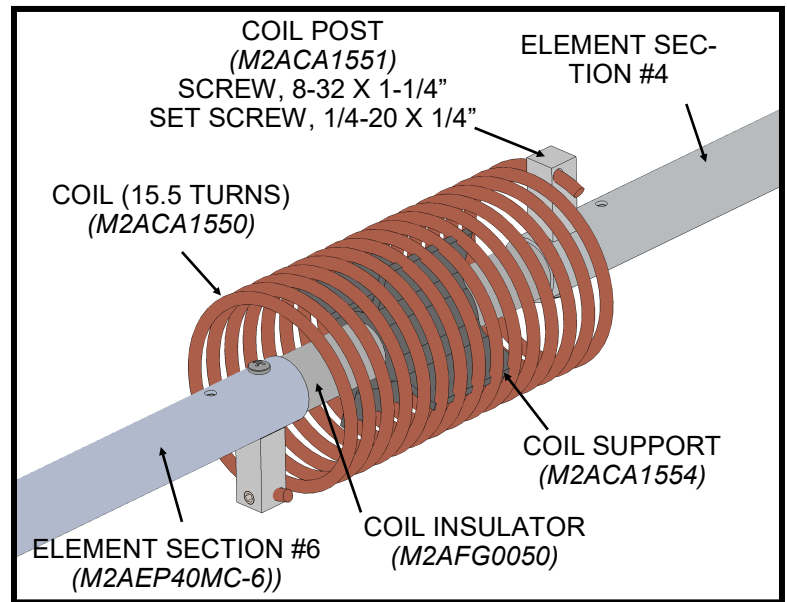
40M COIL ASSEMBLY INSTRUCTIONS

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 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". There should be about 1.5 to 2" of extra coil material past the post after adjusting that will be trimmed.

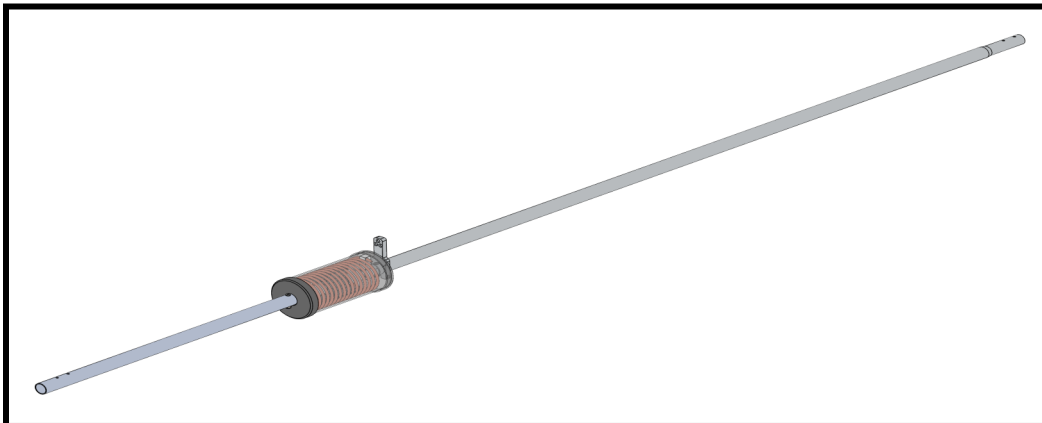
STEP 8:

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. Trim off excess coil material leaving 1/4 to 1/2" past the COIL POSTS.



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.



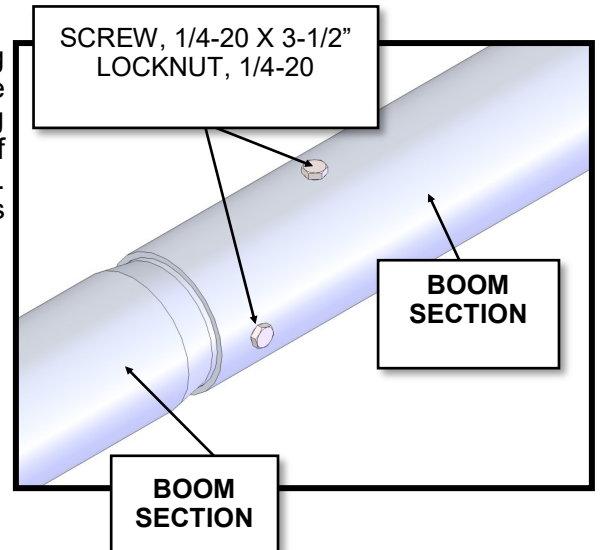
STEP 10:

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

40M3C BOOM ASSEMBLY INSTRUCTIONS

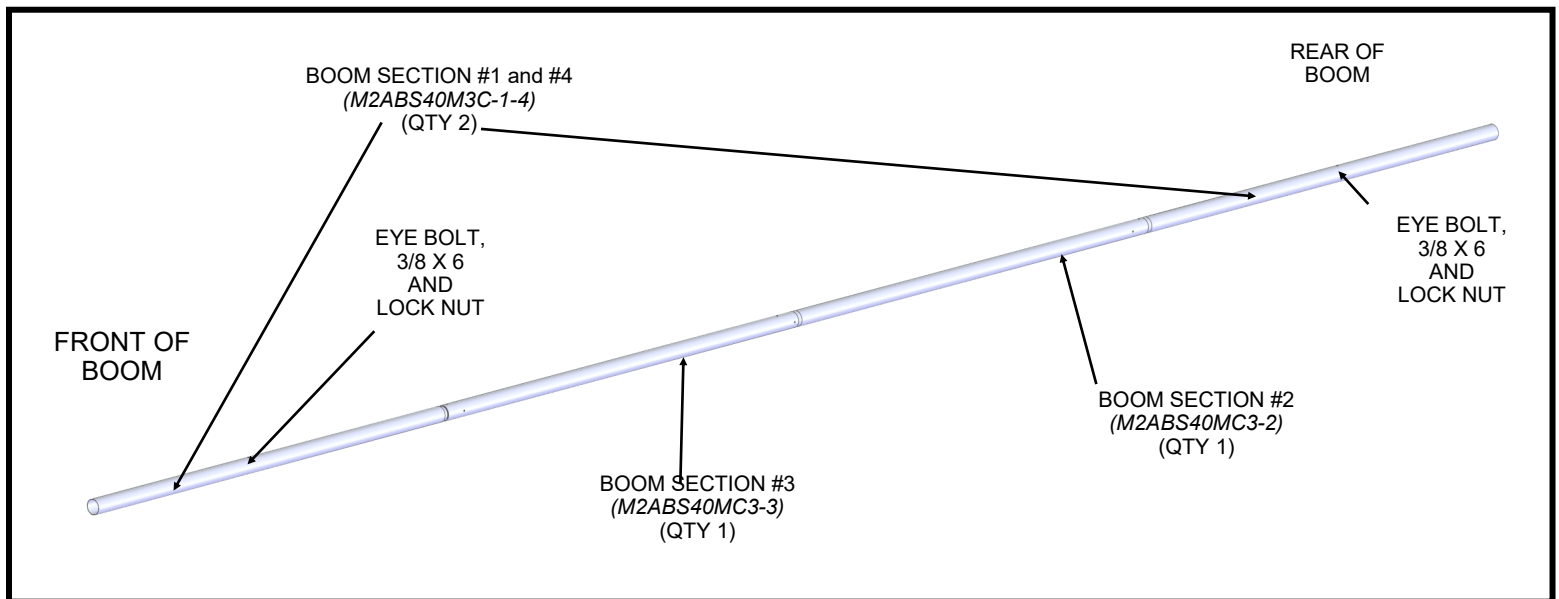
STEP 11:

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 swedged 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:

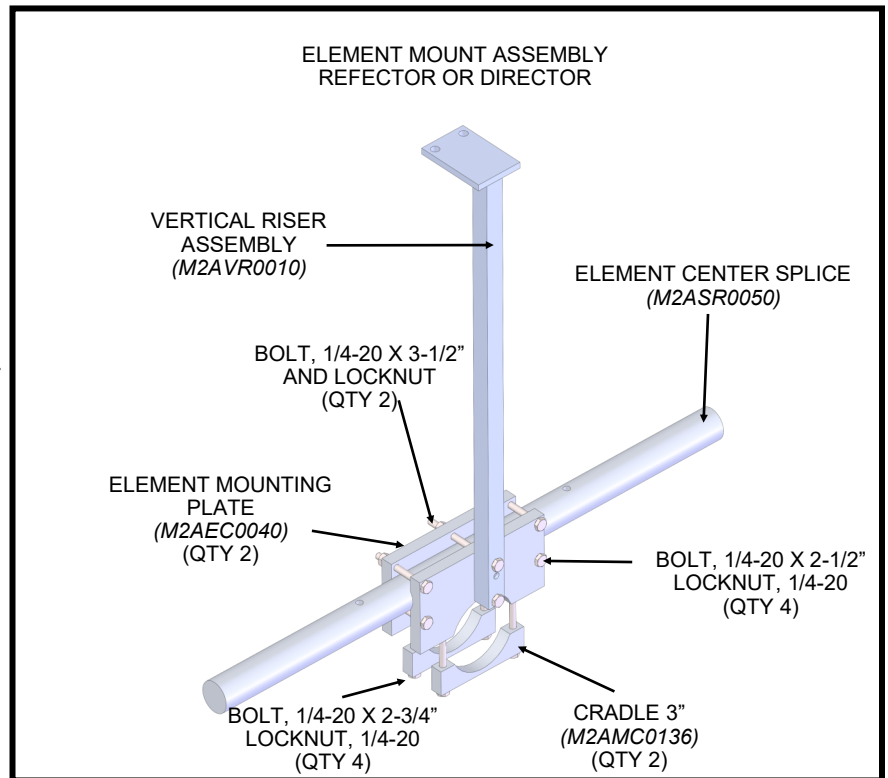
Add the eye bolts into the open hole on boom sections 1 # 4



40M3C ELEMENT MOUNT ASSEMBLY INSTRUCTIONS

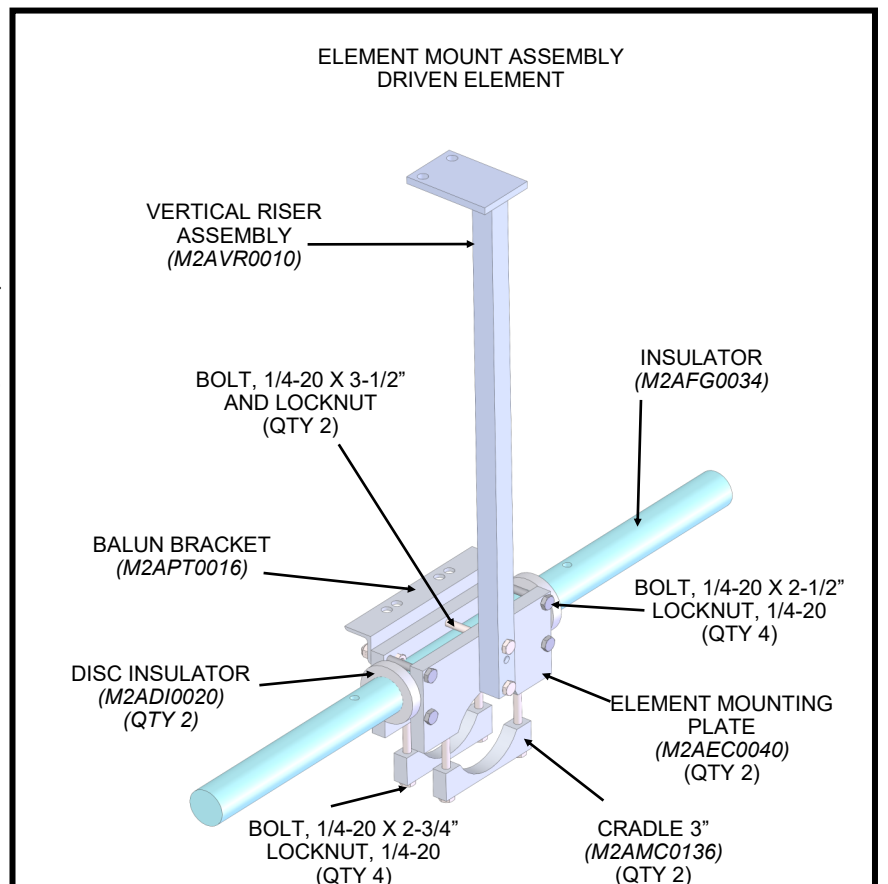
STEP 13:

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.



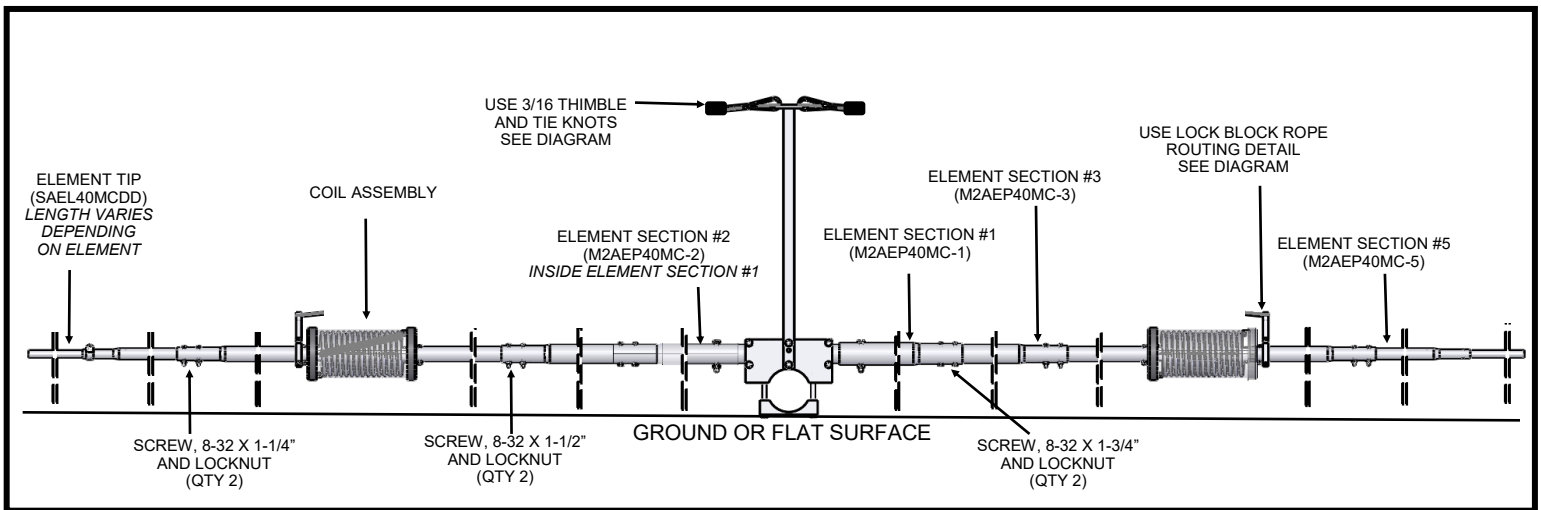
STEP 14:

Assemble the DRIVEN ELEMENT MOUNT assembly for the DRIVEN ELEMENT. Refer to the assembly drawing to aid in assembly. Be sure to center the INSULATOR and the hole 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.



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

40M3C ELEMENT FINAL ASSEMBLY INSTRUCTIONS



final adjustment of the ELEMENT OVER HEAD SUPPORT. *The ELEMENT HALVES are symmetrical on both sides. Do each of the following steps on both sides of the ELEMENT.*

STEP 15:

Slide ELEMENT SECTION #2 onto ELEMENT CENTER SPLICE or INSULATOR.

STEP 16:

Slide ELEMENT SECTION #1 onto ELEMENT SECTION #2. Insert hardware and tighten locknut. Attach VERTICAL RISER ASSEMBLY. For the driven element you need to add (4) CLAMP BLK, 3/8 (HAIRPIN) (M2AMC0261) and hardware. See drawings for hardware call out for the different elements.

STEP 17:

Insert ELEMENT SECTION #3 into the end of ELEMENT SECTION #1. Insert and tighten hardware.

STEP 18:

Insert the ELEMENT SECTION #6 of the COIL ASSEMBLY previous assembled in STEPS 1-10 into ELEMENT SECTION #3. Insert and tighten hardware.

STEP 19:

Insert ELEMENT SECTION #5 into the end of ELEMENT SECTION #4. Insert and tighten hardware.

STEP 20:

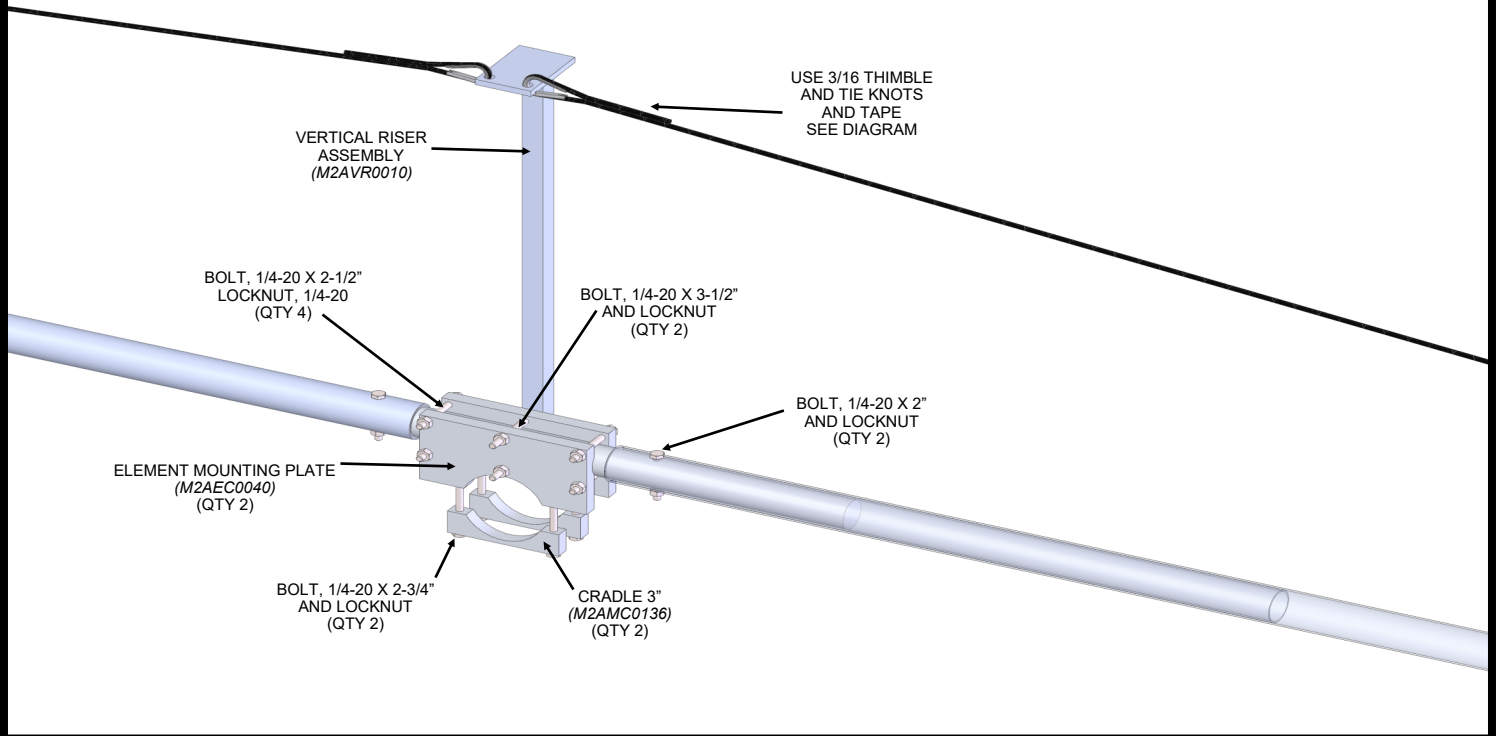
To be able to adjust the ELEMENT TIP, a COMPRESSION CLAMP is used. First thread on the hex nut to capture the screw in the CLAMP. Then slide the COMPRESSION CLAMP such the screw is lined up with the hole in ELEMENT SECTION #5. Use the DIMENSION SHEET and set the proper exposed length of the 1/2" ELEMENT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

STEP 21:

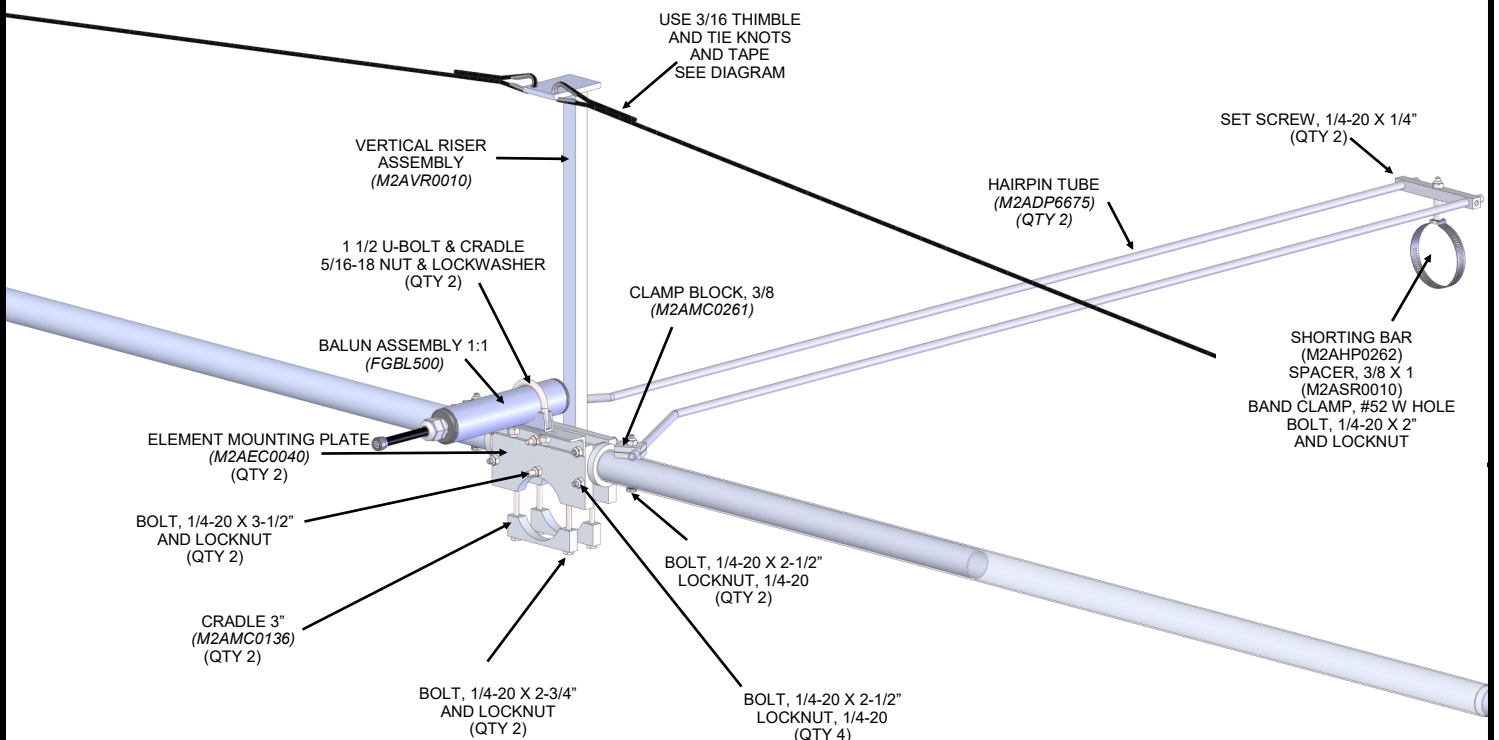
Tensioning the element over head guys: See the LOCK BLOCK AND KNOT DETAIL page. Familiarize your self with knots at the top of VERTICAL RISER, bend the thimbles open and insert them into the holes on the top plate of the VERTICAL RISER, then bend them back to there original shape. Follow the knot diagram and tie the upper section of rope, leave no more than 3" of excess rope and finalize by taping the short tail of rope down to the main portion of rope. Thread the opposite end of the rope through the ELEMENT OVERHEAD SUPPORT (M2APL0212) (See the LOCK BLOCK AND KNOT 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 bowed element. This finalizes the element construction.

40M3C ASSEMBLY DETAIL

ELEMENT ASSEMBLY REFLECTOR OR DIRECTOR ELEMENT

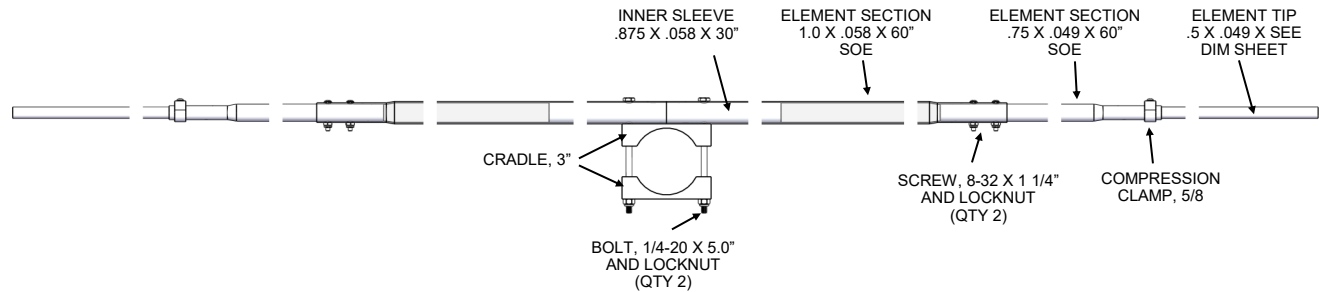


ELEMENT ASSEMBLY DRIVEN ELEMENT

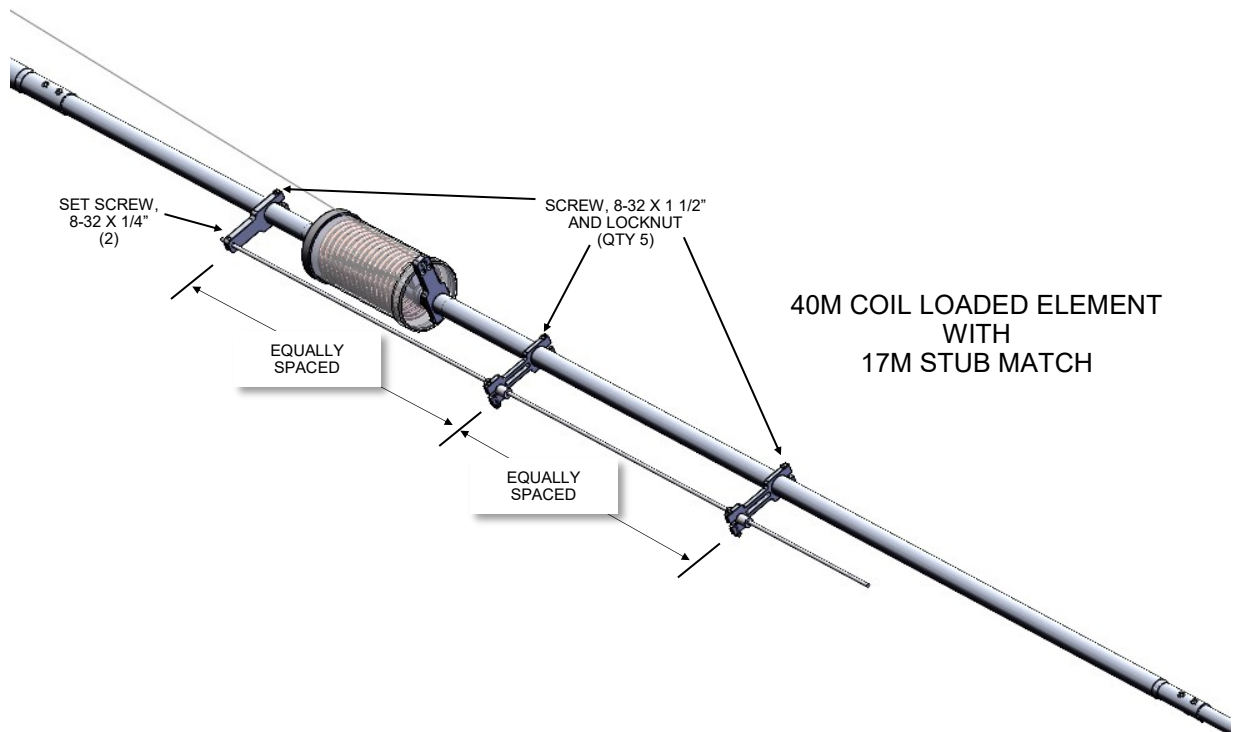
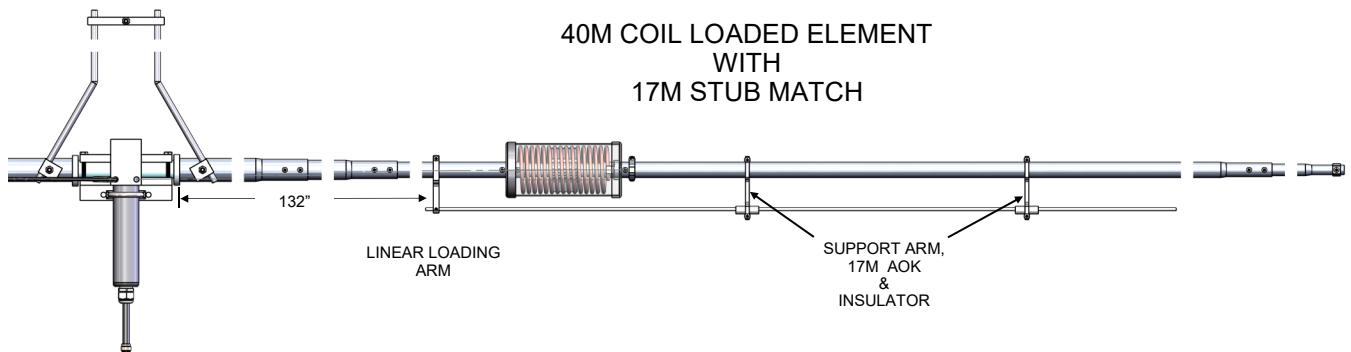


17M ELEMENT ASSEMBLY DETAIL

17M ELEMENT REFLECTOR OR DIRECTOR



40M COIL LOADED ELEMENT WITH 17M STUB MATCH



40M3C HAIR PIN AND BALUN ASSEMBLY INSTRUCTIONS

STEP 22:

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 23:

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

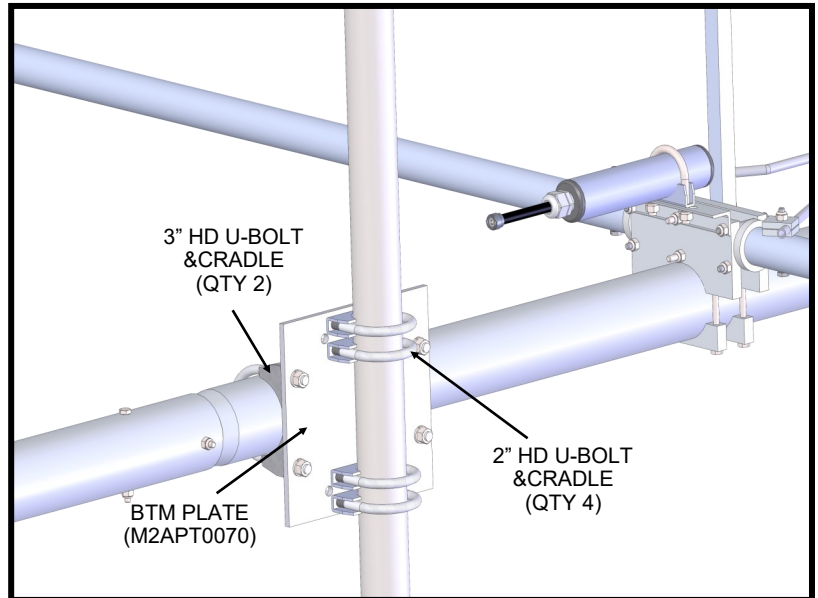
STEP 24:

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.

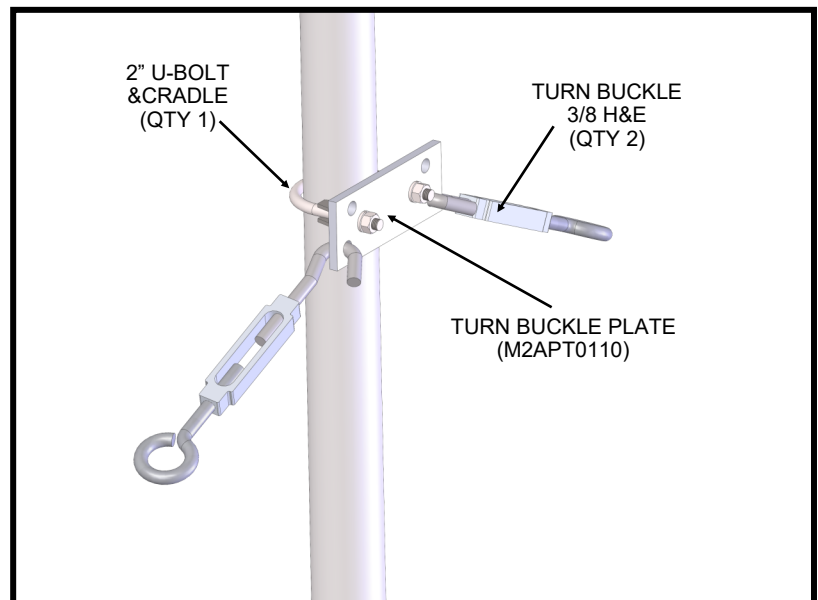
STEP 25:

Assemble the BALUN and feed system of the antenna. Refer to the dimension sheet and DRIVEN ELEMENT assembly drawings.

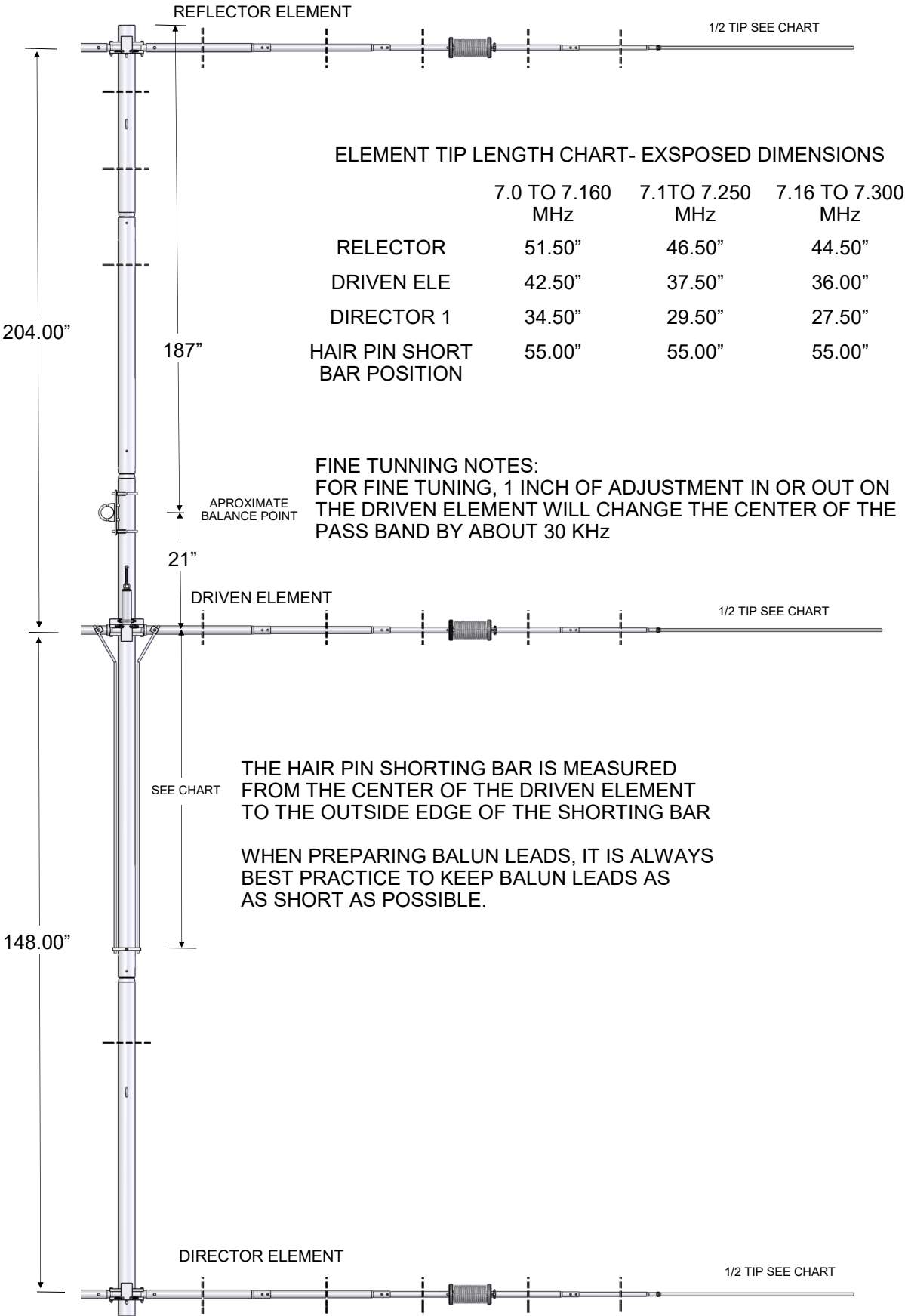
BOOM TO MAST PLATE
HARDWARE
ARRANGEMENT



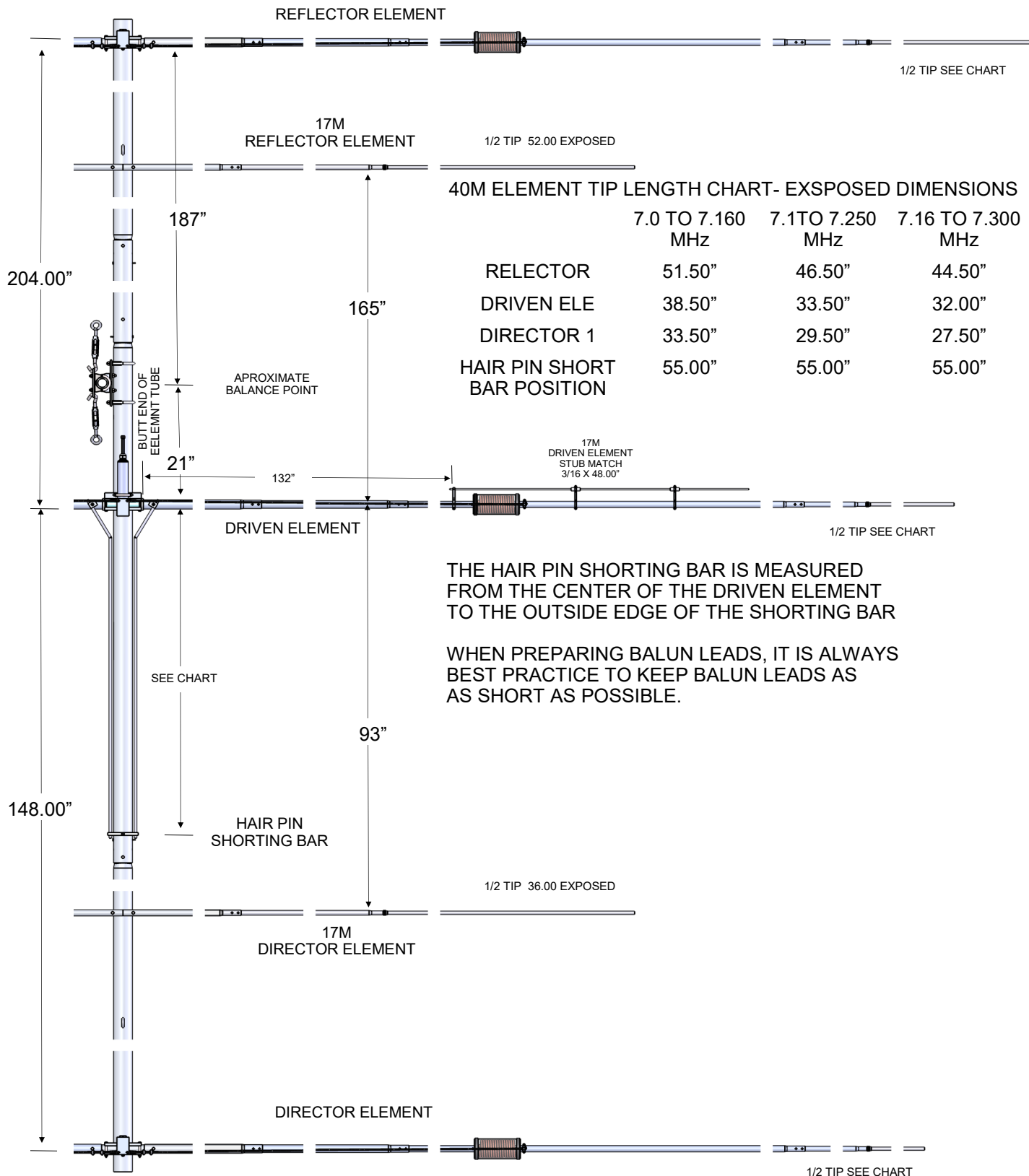
TURN BUCKLE PLATE
ARRANGEMENT



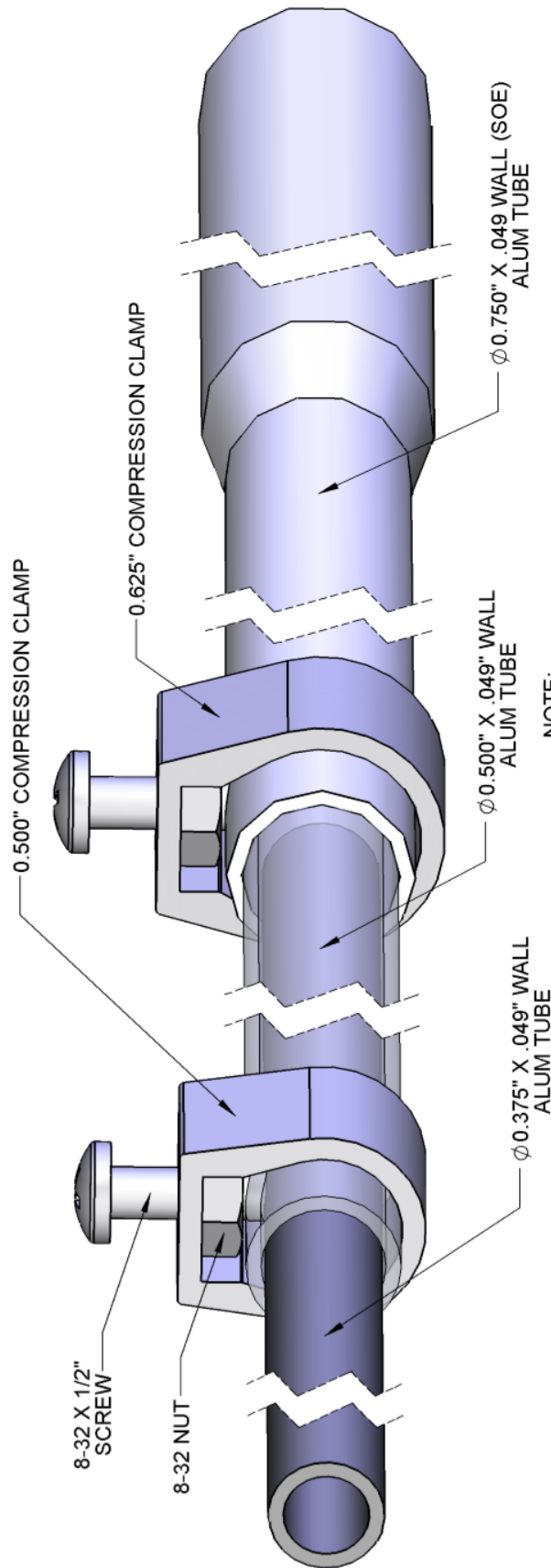
40M3C DIMENSION SHEET



40M3C W/ 17M3 ADD ON KIT DIMENSION SHEET



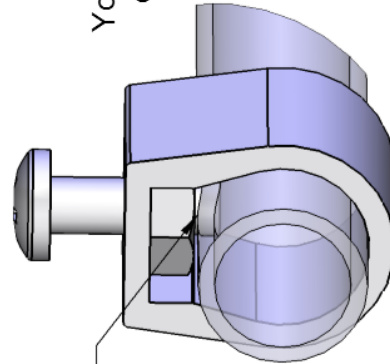
GENERIC COMPRESSION CLAMP DETAIL



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.

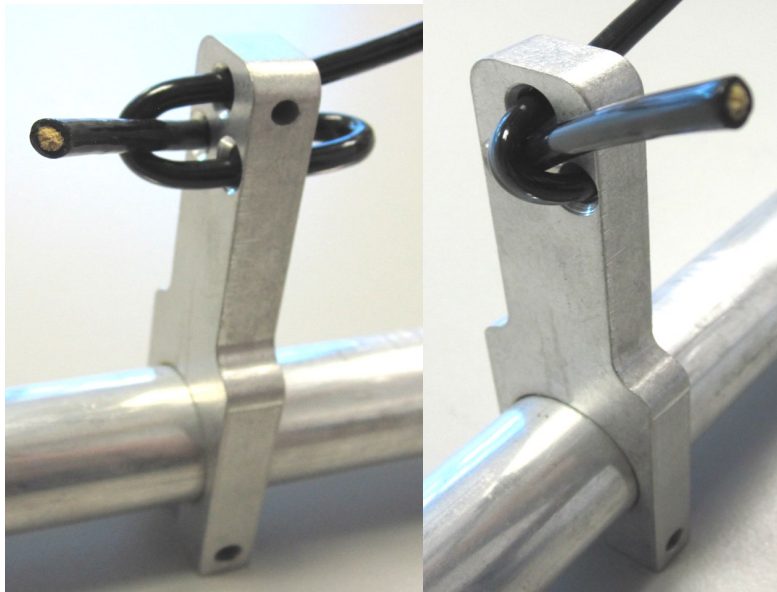


NOTE:
8-32 X 1/2" SCREW
PRESSES ON INNER TUBE

NOTE: INSIDE TUBE NOT SHOWN FOR CLARITY

LOCK BLOCK AND KNOT DETAIL

LOCK BLOCK ROPE ROUT DETAIL



After final adjustments of knots and lock blocks, use electrical tape to tape the excess rope down to the main rope as prevention for rope slippage.

40M3C PARTS & HARDWARE

DESCRIPTION	QTY
BOOM SECTION #1, #4, 3.0" X .065" X 95", SOE (M2ABS40M3C-1-4)	2
BOOM SECTION #2, 3.0" X .125" X 95" (M2ABS40M3C-2)	1
BOOM SECTION #3, 3.0" X .125" X 95" SOE (M2ABS40M3C-3)	1
ELEMENT SECTION #1: 1-1/2" X .058" X 60", SOE (M2AEP40MC-1)	6
ELEMENT SECTION #2: 1-3/8" X .058" X 23.812" (M2AEP40MC-2)	6
ELEMENT SECTION #3: 1-1/4" X .058" X 60", SOE (M2AEP40MC-3)	6
ELEMENT SECTION #4: 1" X .058" X 60", SOE (M2AEP40MC-4)	6
ELEMENT SECTION #5: 3/4" X .049" X 48", SOE (M2AEP40MC-5)	6
ELEMENT SECTION #6: 1" X .058" X 24", ALUMINUM (M2AEP40MC-6)	6
ELEMENT TIP ASSEMBLY, 1/2" X .049" X SEE DIMENSION SHEET	6
ELEMENT CENTER SPLICE, 1.25" X 24", ALUMINUM ROD (M2ASR0050)	2
INSULATOR, 1.25" X 24", FIBERGLASS ROD (M2AFG0034)	1
ELEMENT MOUNTING PLATE, 3" X 6" X .500", ALUMINUM (M2AEC0040)	6
CRADLE 3", 1" X 4" X .500", ALUMINUM (M2AMC0136)	6
DISC INSULATOR, POLYETHYLENE, 2" OD (M2ADI0020)	2
HAIR PIN TUBE, 3/8 X .049 X 58" BENT (M2ADP6675)	2
BALUN, 1:1 (FGBL500)	1
VERTICAL RISER ASSEMBLY (M2AVR0010)	3
DACRON ROPE, 5/16 X 32'	1
ELEMENT OVERHEAD SUPPORT, 1.250" X 3.750" X .375", ALUMINUM (M2APL0212)	6
DACRON ROPE, 3/16 X 28'	3
BOOM TO MAST PLATE, 8" X 8" X .250", ALUMINUM (M2APT0070)	1
PENETROX / ZINC PASTE CUP	1
ASSEMBLY MANUAL	1
BAG #1	
40M COIL, 15 1/2 TURNS (M2ACA1550)	6
COIL POST, .500" X .500" X 1.187", ALUMINUM (M2ACA1551)	12
COIL END CAP, 4.465" X .625", UMHV (M2ACA1559)	12
COIL COVER, 4.2" X 7.250", PVC TUBE (M2ACA1560)	6
COIL SUPPORT, 2.937" X 1.75", POLYETHYLENE (M2ACA1554)	6
COIL INSULATOR, .875" X 10.625", FIBERGLASS (M2AFG0050)	6
COIL SPREADING TOOL, 5/8" X 2", DELRIN (M2ACA1558)	1
BAG #2	
3" U-BOLT & CRADLE	2
2" U-BOLT & CRADLE, HEAVY DUTY	4
2" U-BOLT & CRADLE	1
1 1/2 U-BOLT & CRADLE	1
BAG #3	
TURNBUCKLE, 3/8"	2
THIMBLE, 5/16 LIGHT DUTY ZINC	4
EYEBOLT, 3/8" X 6"	2
THIMBLE, 3/16" ZINC LIGHT DUTY	6
TURN BUCKLE PLATE, 2" X 5" X .250", ALUMINUM (M2APT0110)	1
COMPRESSION CLAMP, 5/8" (M2AMC0145)	6
CLAMP BLK, 3/8 (HAIRPIN) (M2AMC0261)	4
SHORTING BAR, 1/2 X 5 (M2AHP0262)	1
SPACER, HF HAIR PIN, 3/8 X 1" ALUMINUM TUBE (M2ARS0010)	1
BAND CLAMP, #52 W/ HOLE	1
BALUN BRACKET 6" (M2APT0016)	1
BAG #4	
LOCK WASHER, 3/8", SS	12
NUT, 3/8-16", SS	12
LOCK NUT, 3/8-16, SS	2
LOCK WASHER, 5/16", SS	4
NUT, 5/16-18, SS	4
BOLT, 1/4-20 X 3-1/2", SS	12
BOLT, 1/4-20 X 2-3/4", SS	12
BOLT, 1/4-20 X 2-1/2", SS	14
BOLT, 1/4-20 X 2", SS	5
SET SCREW, 1/4-20 X .250", SS	16
LOCKNUT, 1/4-20, SS	34
BAG #5	
SCREW, 8-32 X 1-3/4", SS	12
SCREW, 8-32 X 1-1/2", SS	18
SCREW, 8-32 X 1-1/4", SS	24
SCREW, 8-32 X 1/2", SS	6
NUT, 8-32, SS	6
LOCKNUT, 8-32, SS	46
ALLEN HEAD WRENCH, 1/8"	1

17M3 ADD ON KIT PARTS & HARDWARE

DESCRIPTION	QTY
ELEMENT SECTION, 1.0 X.058 X 60" SOE.....	4
ELEMENT SLEEVE, 7/8 X .058 X 30"	2
ELEMENT SECTION, 3/4 X .049 X 60" SOE	4
ELEMENT TIP, REFLECTOR, 1/2 X.049 X 52.5.....	2
ELEMENT TIP, DIRECTOR, 1/2 X.049 X 39.25.....	2
DRIVEN ELEMENT ROD, 3/16 X 49.00	2
LINEAR LOADING ARM, (M2APL0255)	2
CRADLE, 3" (M2AMC0136).....	4
SUPPORT ARM, 17M AOK (M2APL0023)	4
LINEAR LOADING INSULATORS, (M2APL0038)	4
COPRESSION CLAMP, 5/8.....	4
HARDWARE	
BOLT, 1/4-20 X 5.0 SS	4
LOCK NUT, 1/4-20 SS.....	4
SCREW, 8-32 X 1.75 SS.....	8
SCREW, 8-32 X 1.5 SS	2
SCREW, 8-32 X 1.25 SS	8
SCREW, 8-32 X 0.5 SS	4
SET SCREW, 8-32 X 1/4 SS	4
HEX NUT, 8-32 SS.....	4
LOCK NUT, 8-32 SS	18