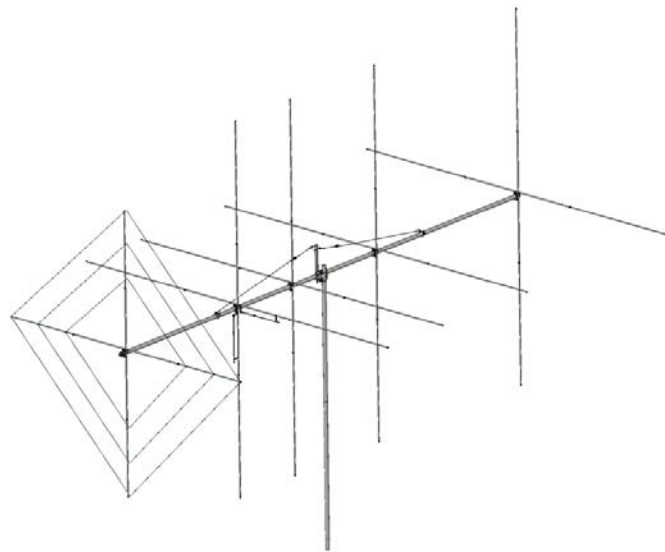


# Assembly Instructions



## ASTEROID

Switchable Polarity 10 Element  
10/11 Meter Beam



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# MACO ASTEROID

## PACKING LIST

<u>PART</u>	<u>QTY</u>	<u>OD</u>	<u>SIZE</u>	<u>LENGTH</u>	<u>DESCRIPTION</u>	<u>CHECKLIST</u>
T52	2	2"	.060"	80"	ALUM. TUBING SLOTTED ONE END	_____
T53P	1	1.845"	.060"	80"	ALUMINUM TUBING	_____
T32P	2	2"	.060"	80"	ALUM. TUBING SWAGED ONE END 6" (DIE #2-1.835")	_____
PO3P	1		¼"x6"	8"	PLATE 2" BOOM TO 2" MAST	_____
T11P	10	5/8"	.050"	72"	ALUM. TUBING SLOTTED BOTH ENDS	_____
T01	16	½"	.050"	72"	ALUMINUM TUBING	_____
FA2P	4	½"		48"	MULTISCREEN FIBERGLASS RODS	_____
V01P	1		1"x1"	18"	VERTICAL GUY SUPPORT	_____
WD2P	1		6/18	25'	STEEL GUY CABLE	_____
W05P	1			90'	COPPER WIRE	_____
G01P	2				GAMMA MATCH	_____
Z08P	4				GAMMA STRAPS F/COAX CONNECTORS	_____
S42	2				FEMALE COAX CONN. W/MOUNTING NUT	_____

### HARDWARE BAG #1

U01	21		2"		PLATED U-BOLTS	_____
S01	21		2"		PLATED SADDLES	_____
N03	44		5/16"		LOCK NUTS	_____

### HARDWARE BAG #2

BE2P	10		2"		BOOM TO ELEMENT MOUNTS	_____
W58P	20		5/8"		EXTRUDED ALUMINUM CLAMPS	_____
S21	25		10-24	½"	MACHINE SCREWS	_____
PL2	20		.437		PLASTIC CAPS – BLACK	_____
N11	25		10-24		SQUARE NUTS	_____
N18	2		5/16"		EYEBOLTS – WITH (4) NO1	_____
PL5R	1		2"		PLASTIC CAP – RED	_____
PL5	1		2"		PLASTIC CAP – BLACK	_____
EG3	4				EGG INSULATORS	_____
EZ-55	10		1/8"		CABLE CLAMPS	_____
N12	6		#10		LOCK WASHERS	_____
Z02P	4				GAMMA STRAPS	_____
FHK1	3				FIBERGLASS ROD HARDWARE KIT	_____
	1				TIP SHEET	_____
	1				WARRANTY SHEET	_____
	1				MACO FLYER	_____
	1				INSTRUCTIONS	_____

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### **Figure 1 – General Instructions**

This drawing shows a view of the antenna assembled. The dimensions at the top of the drawing are the spacing between your set of elements. Refer to Figures 2 through 5 for specific assembly details. The mounting plate for this beam requires a 2" OD heavy duty mast that you furnish. All hardware should be tightened securely before final installation and then coated with a silicone rubber sealant or similar compound to ensure that wind vibration does not cause it to work loose. Upon completion of assembly, install the red plastic cap (PL5R) on the director end of the antenna and the black plastic cap (PL5) on the reflector end.

### **Figure 2A, 2B, and 2C – Boom Assembly**

First mark the center of the boom coupler (T53), and then slide the unslotted ends of the boom sections (T52P) over each end of the coupler so they butt at the center mark.

Attach the boom-to-mast plate (P03P) and the vertical guy support (V01P) at the boom center using 2" U-bolts, saddles and hardware as shown in Figure 2B. Be sure to slip the 2" U-bolt for attaching the guy support over the boom before securing the mast plate (P03P).

Slide the swaged ends of the end booms (T53P) 5" into the slotted ends of the center boom section and secure as shown in Figure 2A. The overall length of the boom should be approximately 309". If not, adjust the end sections equally until the overall length is at least 309".

### **Figures 3A and 3B Element Assembly and Mounting**

Select a frequency in the center of the band of where you want to talk from the Chart on page 4 and follow across for element dimensions A and B. Do this for all elements except the reflector. To assemble the elements, slide a piece of 1/2" OD tubing (T01) into each slotted end of the 5/8" OD center section (T11P). Allow equal lengths (Dimension B) on each end to arrive at the specified overall length (Dimension A) as shown in Figure 3A. Verify the overall length – this is critical. See Figure 3C and the reflector assembly instructions below to install your multiscreen reflector wire.

Slide a boom-to-mast mount (BE2P) to the center of each element before securing the joints with clamps and hardware as shown in Figure 3A. Install elements on boom per dimensions given in Figure 1, with u-bolts, saddles and hardware as shown in Figure 3B. Mount the first reflector with the u-bolt facing the rear; mount its mate with the u-bolt facing the front of the beam. The horizontal and vertical elements should be set close together with a space of 5/16" separation as shown in Figure 3B. Do this for each set of elements. Install a black plastic cap on each end of the elements.

### **Figure 3C – Reflector Assembly**

**The length of the reflector wire is very critical. The fiberglass length is not critical.** Take the copper wire and unwind it on a flat surface, being careful not to kink it. Fasten one end around a nail and stretch the whole piece (this straightens it). Now mark off 19' from the nail to which one end is connected and drive another nail. This is one half the total wire length of 38' when finished. Now measure out 38'4" and cut this piece off. Put the rest of the wire away for now. Take the 38'4" of wire and run it around the

two nails which are 19' apart, stretch tight, and using the 4" overlap, splice the two ends together by twisting the wire ends together and then soldering the splice together. Remove one nail and remove the loop. Cut any excess wire off. You now have the wire ready for the outermost part of the reflector. Install as shown in Figure 3C and as described below.

Use the hardware provided to attach the wire to the fiberglass. Place the bolt and washers through the holes and wrap the wire around the bolt, in between the flat washers. Adjust length as shown.

Tighten 3 of the 4 clamps that hold the fiberglass rods and install the outside wire as shown. Tighten the wire by pulling the 4<sup>th</sup> fiberglass rod until the wire is the same tightness. The total length of this outer loop is critical, as is the length of each side.

When the outer wire is installed, then thread the inner wires, one at a time, through the holes in the fiberglass rod. Stretch these snug and splice.

### **Figure 4A – Guy Assembly**

Follow the diagram in Figure 4A for guy assembly. It is very important that you install the egg insulators as directed; otherwise the guy wires will couple with your antenna. Cut four pieces of guy cable, .762M (30") and two pieces 2.082M (82"). Assemble the 5/16" hex nuts (N01) onto each of the eyebolts (N18). Turn the nut all the way to the eye, as far as it will go with light pressure only. These will be used to secure the eyebolts after guy tensioning.

Install eyebolts into the top holes of the vertical guy support (V01P) – one eye each direction. Thread a hex nut about six turns onto each eyebolt.

Install an egg insulator (EG2) on one end of each .762 (30") guy cable and wrap it five more times. Take two of these cables and install one on each eyebolt leaving .304M (12") between the egg insulator and the eyebolt, wrap it five or more times and cut off the excess. Take the other two cables with insulators and wrap each end around the boom just in from the clamp as shown in figure 4A. Wrap and cut off the excess.

Using the remaining two pieces of cable, take one end and thread it through the top egg insulator. Wrap and cut off the excess. Thread the other end through the lower insulator and pull tight enough to remove slack only. Wrap and cut off the excess.

Tensions guys by tightening the nuts on the end of the eyebolts. Secure with the nuts on the opposite end near the eye.

Line the elements up with the use of a level of any other workable method. Double check the spacing dimensions and make sure the elements are centered in the boom-to-element clamps. Tighten all hardware taking care to line the elements up with a level. Check your measurements and make sure the elements are centered on the boom.

### **Figure 5 – Gamma Match Mounting**

Mount the 2 gamma matches (G01P) to the horizontal and vertical driven elements as shown in Figure 5. The back straps have been assembled for you – avoid taking these apart – there is a series of washers that must be put in a specific order to ensure proper functionality. Make sure that the back gamma straps (Z08P) are pushed up against the boom-to-element mount (BE2P) so they are touching. Attach your 50 ohm coaxial cables to the connectors (S42) and dress along the boom and down the mast.

### **Adjusting Standing Wave Ratio (SWR)**

Refer to Figure 5. The dimensions given are approximate and should be used as a starting point. First set your radio on Channel 20 or the middle of the band where you plan on operating. The following instructions cover the adjustment of one gamma match. To adjust the second gamma match, simply repeat this procedure.

The gamma match has two adjustments. The first is the capacitor adjust and the second is the slider adjust. **Do not move both at the same time.** Connect a SWR bridge to the coax between your transmitter and the antenna and check the SWR. If an adjustment is required, loosen the hose clamp on the gamma match first and move the capacitor adjustment first in one direction then the other until a minimum SWR reading is obtained. If the SWR is not satisfactory, loosen the screws holding the slider (Gamma Straps Z02P) and move the slider out 2" away from the boom. If the SWR reading has gone up, move the slider back to the original position and then 2" towards the boom. Now readjust the capacitor for minimum SWR if necessary. You should now be able to determine which direction to move the slider. Repeat the above procedure, moving the slider in small increments, until a satisfactory SWR reading is obtained. Tighten all hardware. Disconnect the SWR bridge and reconnect the coaxial cable.

# 11 METER BAND

Channel	Frequency	Reflector		Driven		1st Director		2nd Director		3rd Director	
		A	B	A	B	A	B	A	B	A	B
1-3	26.965-26.985	162	45"	211"	69.5"	202"	65"	200"	64"	198"	63"
4-7	27.005-27.035	162"	45"	211"	69.5"	202"	65"	200"	64"	198"	63"
8-11	27.055-27.085	162"	45"	211"	69.5"	202"	65"	200"	64"	197"	62.5"
12-15	27.105-27.135	162"	45"	210"	69"	201"	64.5"	199"	63.5"	197"	62.5"
16-19	27.155-27.185	162"	45"	210"	69"	201"	64.5"	199"	63.5"	197"	62.5"
20-25	27.205-27.245	162"	45"	209"	68.5"	201"	64.5"	199"	63.5"	196"	62"
26-29	27.265-27.295	162"	45"	209"	68.5"	200"	64"	198"	63"	196"	62"
30-34	27.305-27.345	162"	45"	208"	68"	200"	64"	198"	63"	196"	62"
35-39	27.355-27.395	162"	45"	208"	68"	200"	64"	197"	62.5"	195"	61.5"
40	27.405	162"	45"	208"	68"	199"	63.5"	197"	62.5"	195"	61.5"

Reflector dimensions are only preliminary. Change to get equal sides of 9'6".  
Fiberglass length is not critical, however equal wire lengths of 9'6" should be correct.

# 10 METER BAND

Frequency	Reflector		Driven		1st Director		2nd Director		3rd Director	
	A	B	A	B	A	B	A	B	A	B
PHONE 28.600 MHz	162"	45"	196"	62"	189"	58.5"	185"	56.5"	185"	56.5"
CW 28.100 MHz	162"	45"	200"	64"	192"	60"	188"	58"	188"	58"
FM 29.600 MHz	162"	45"	190"	59"	182"	55"	178"	53"	178"	53"

**Figure 1**

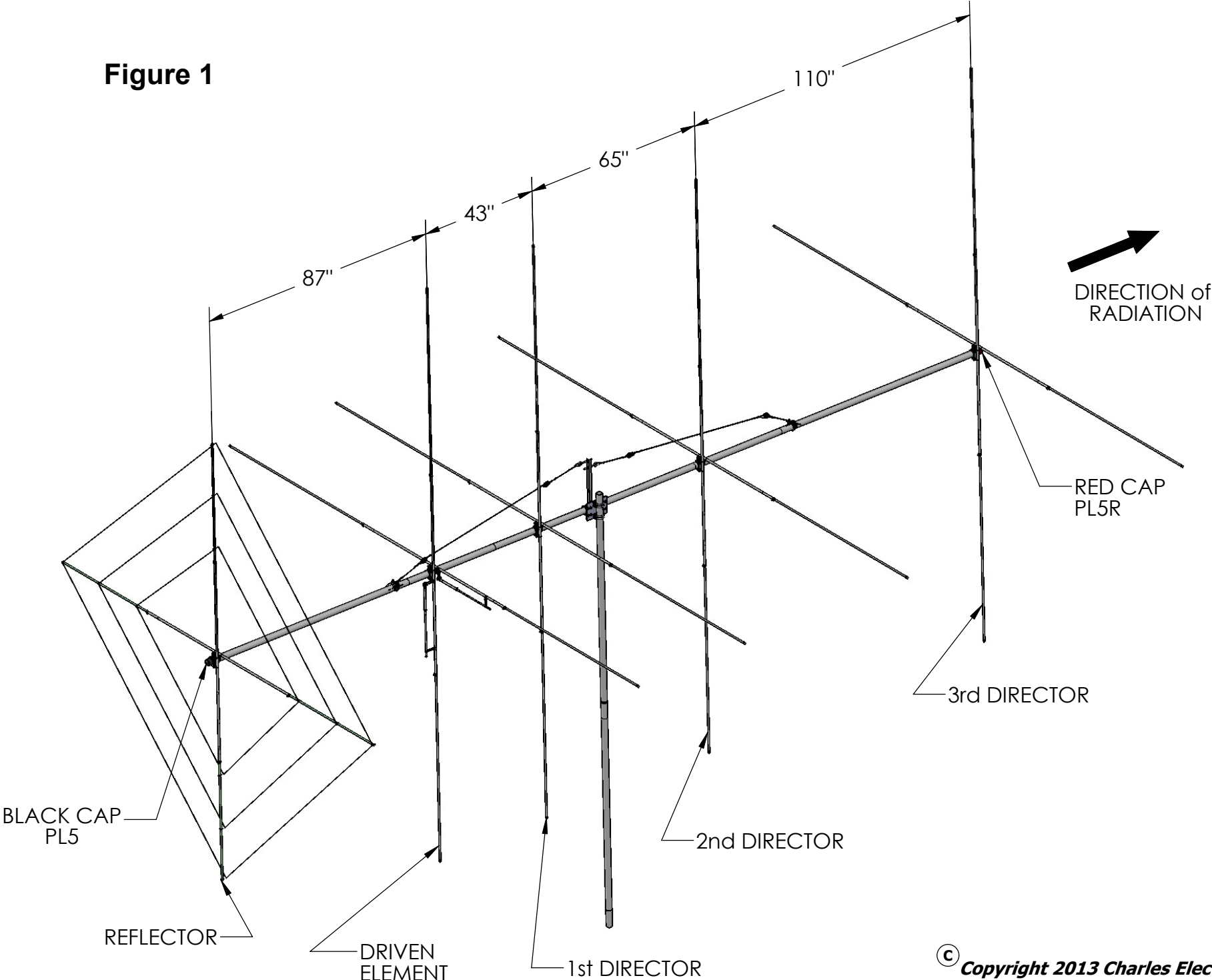
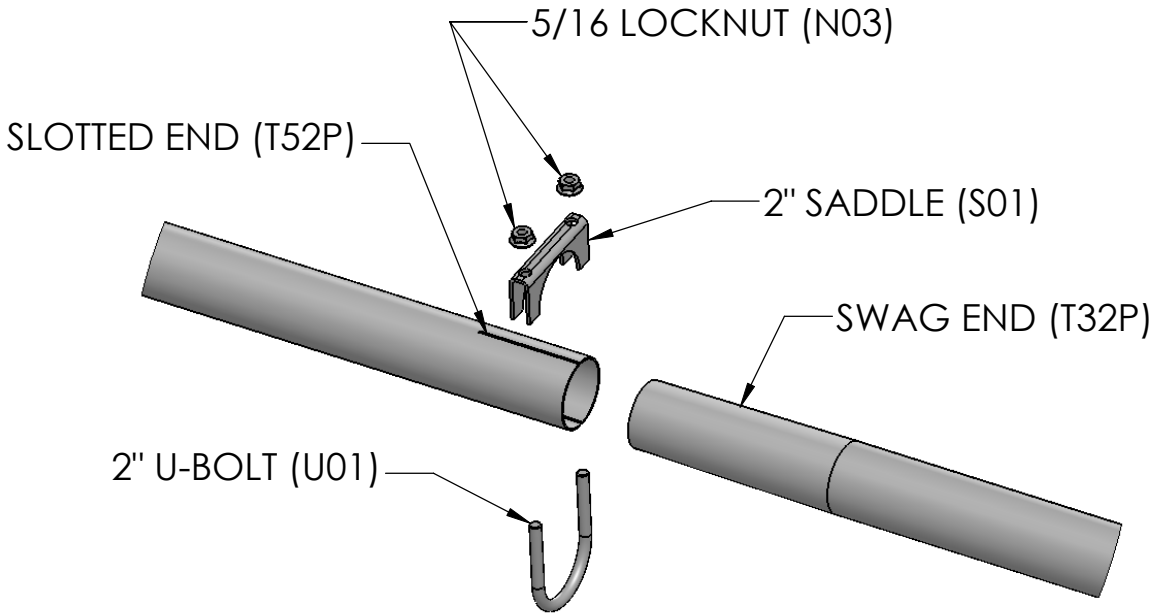
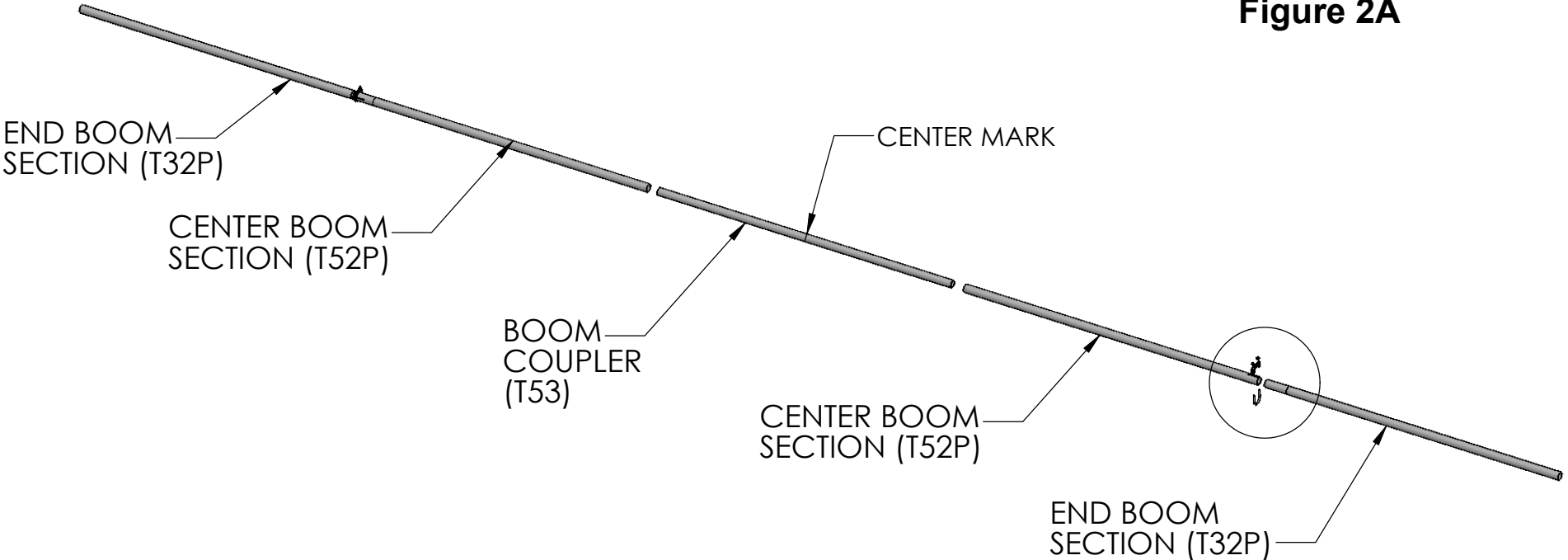
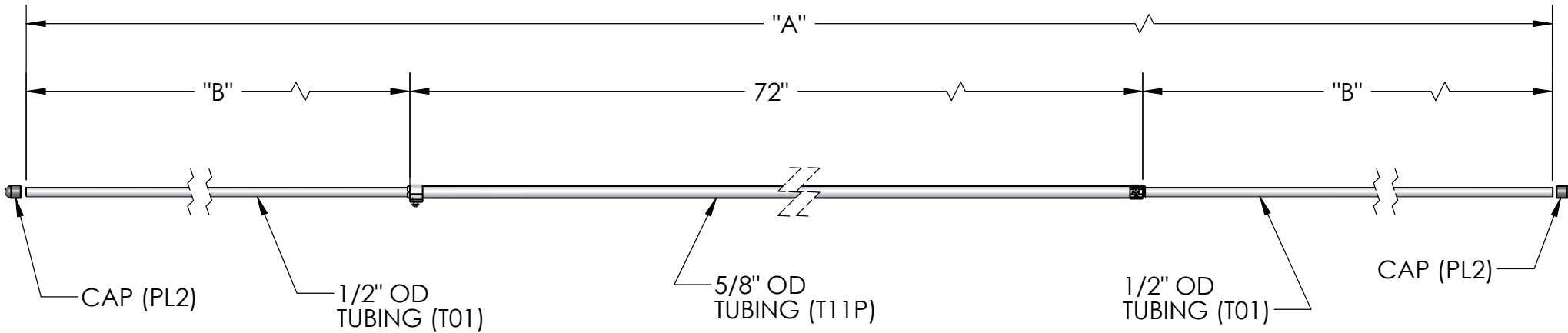
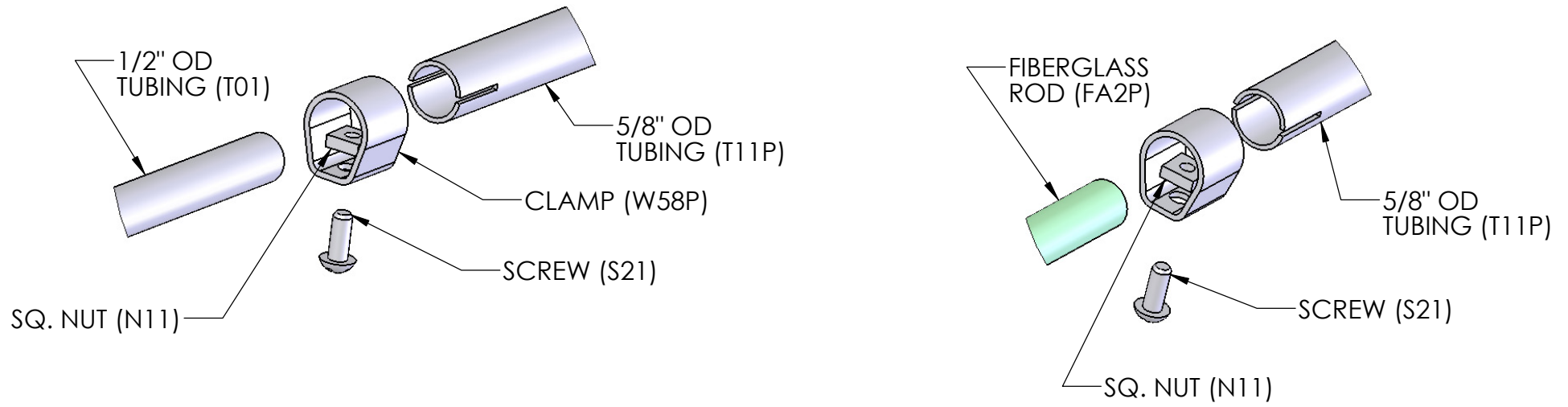


Figure 2A

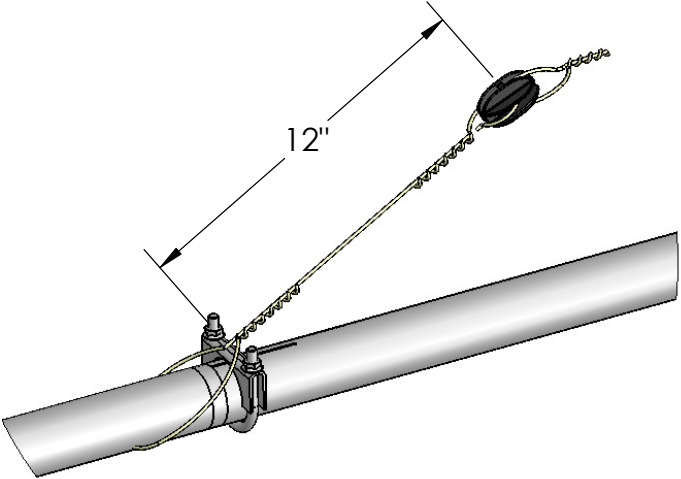
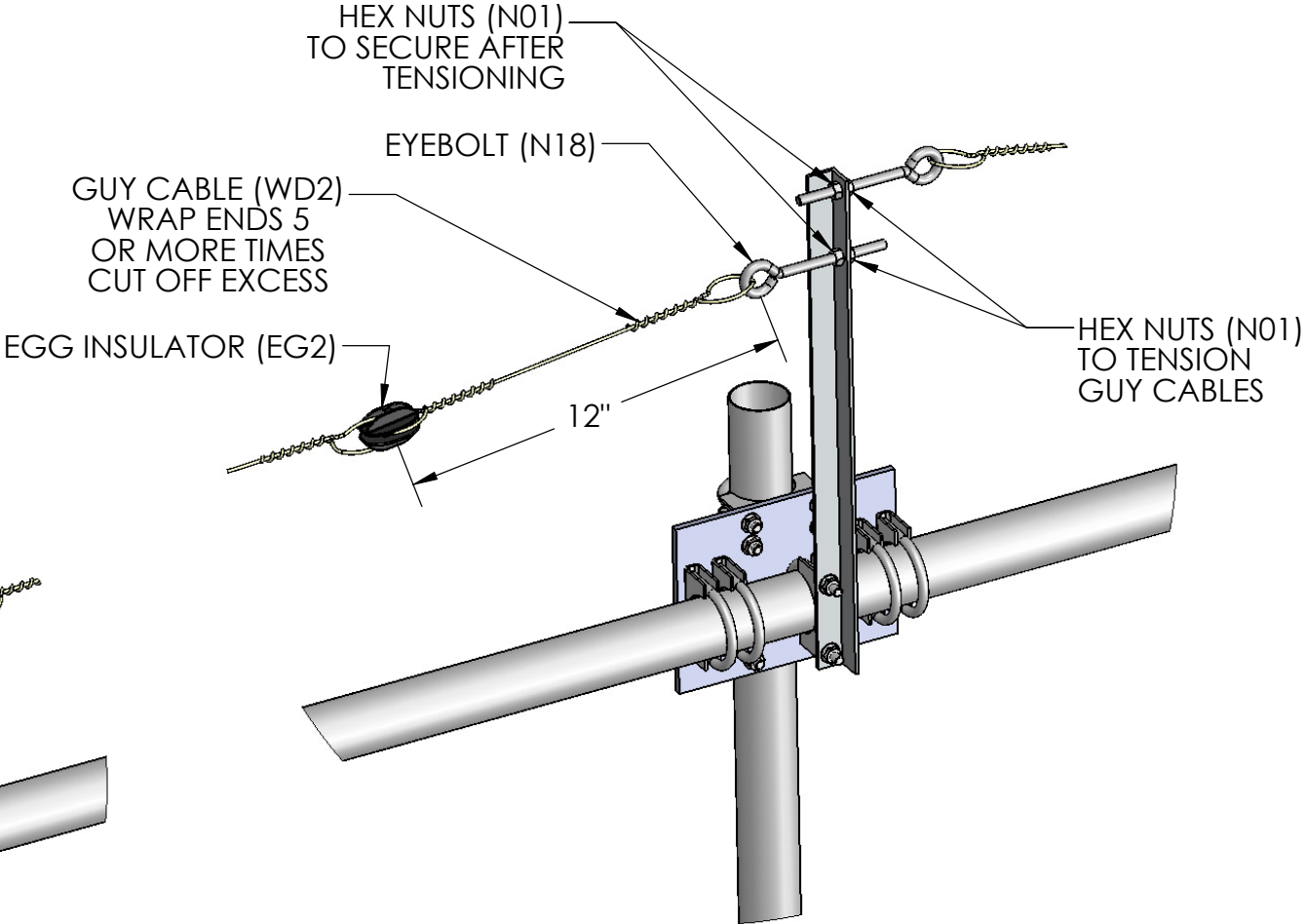




**Figure 3A**

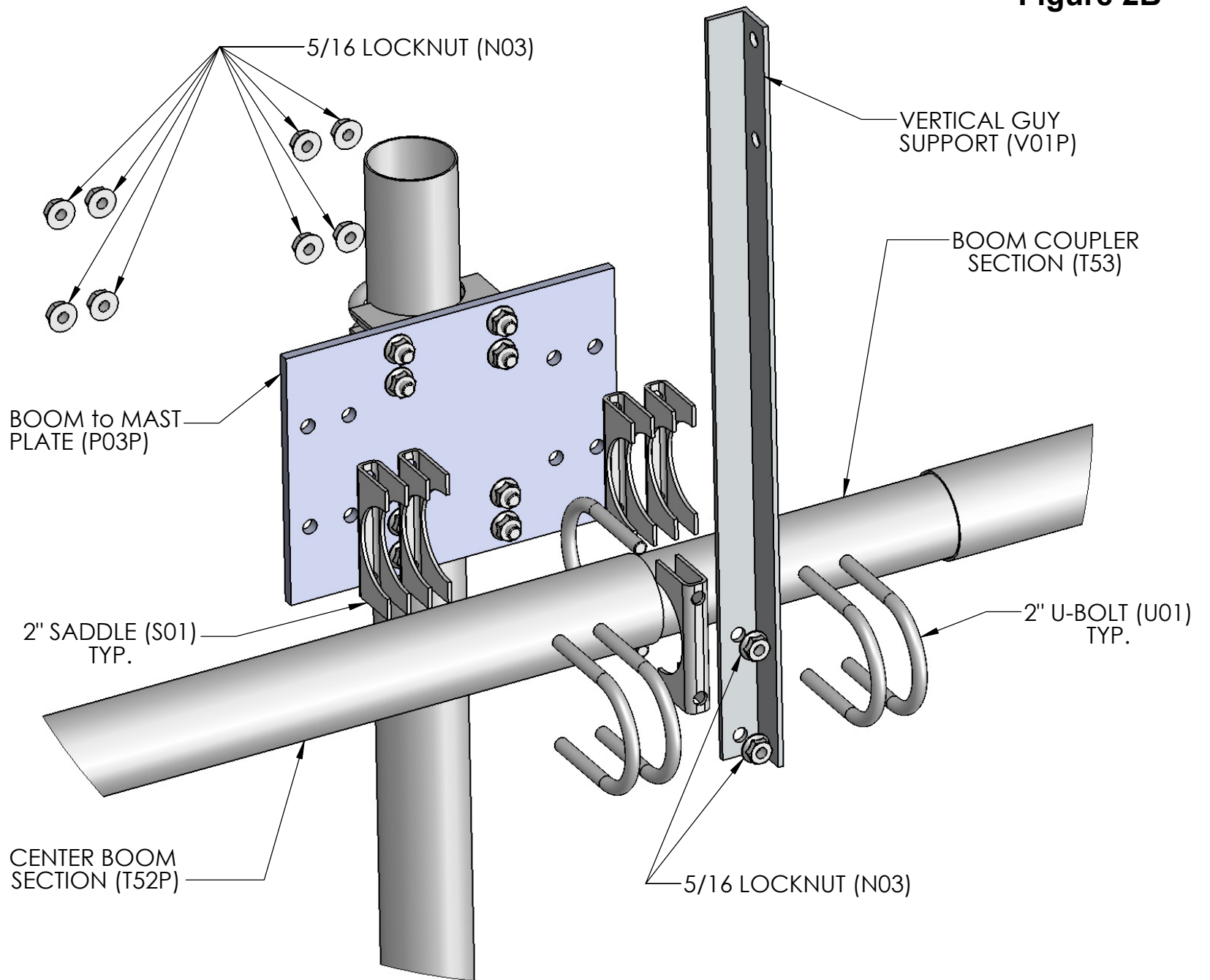


**Figure 4A**



**Figure 4B**

**Figure 2B**



**Figure 3B**

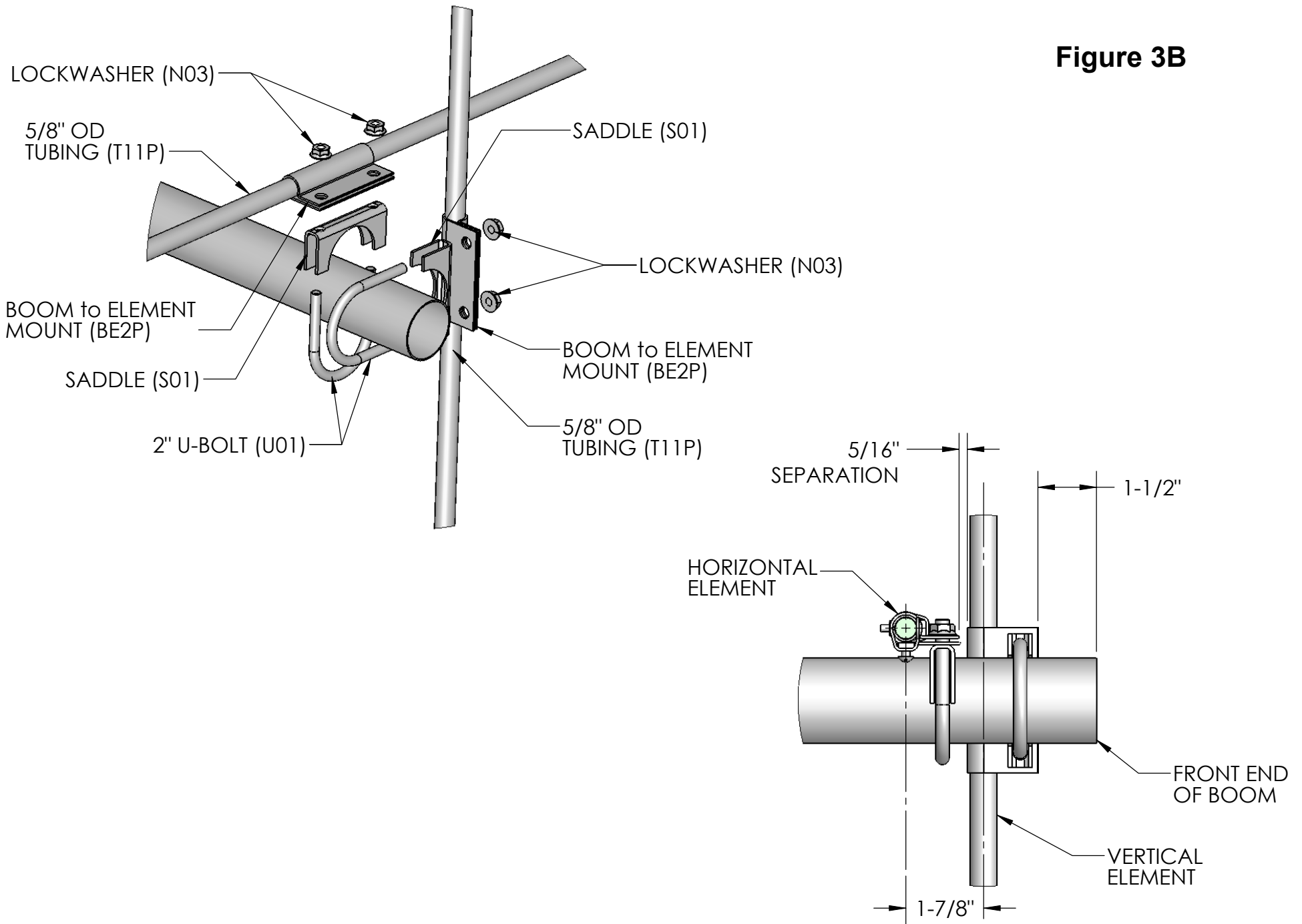
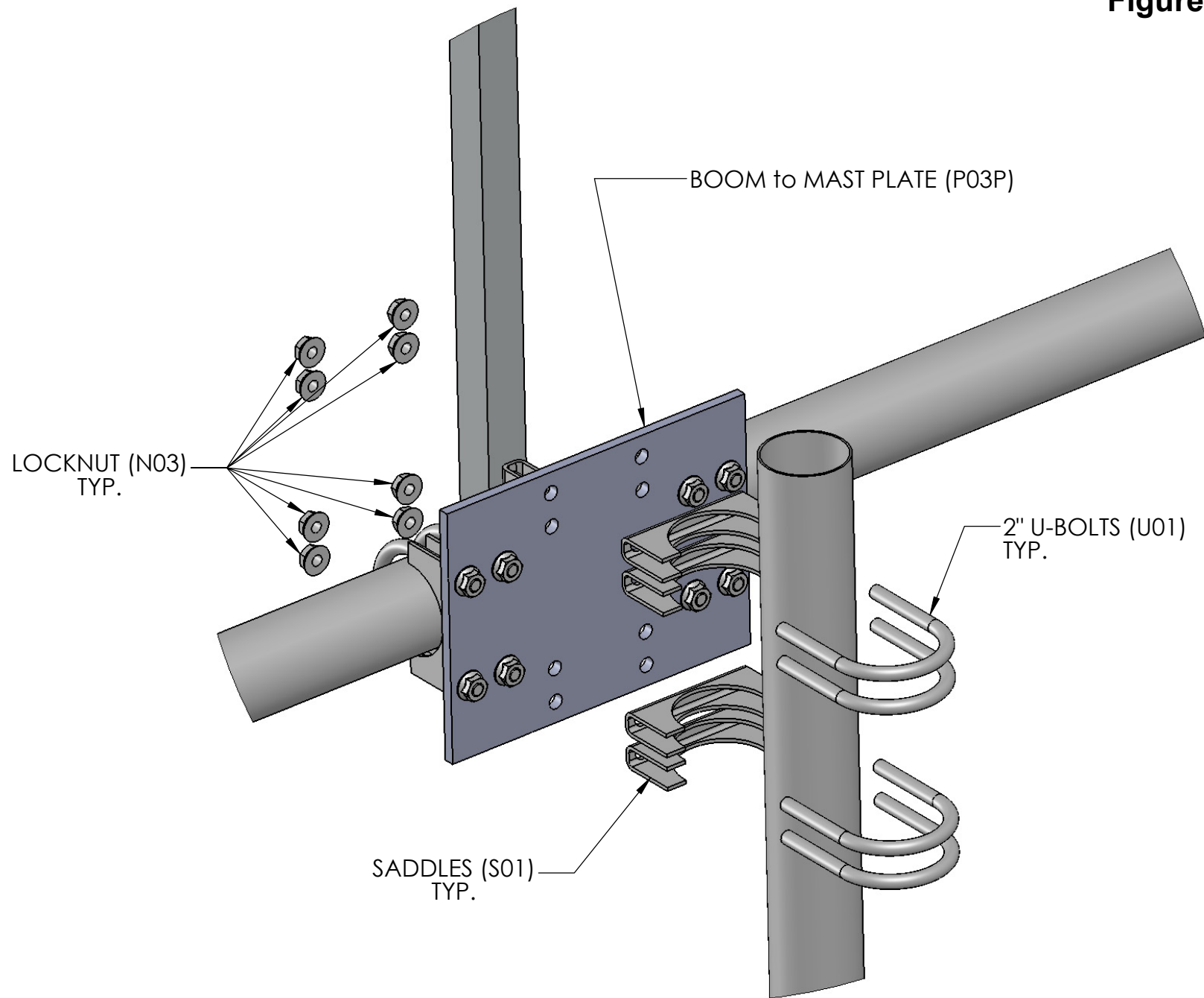
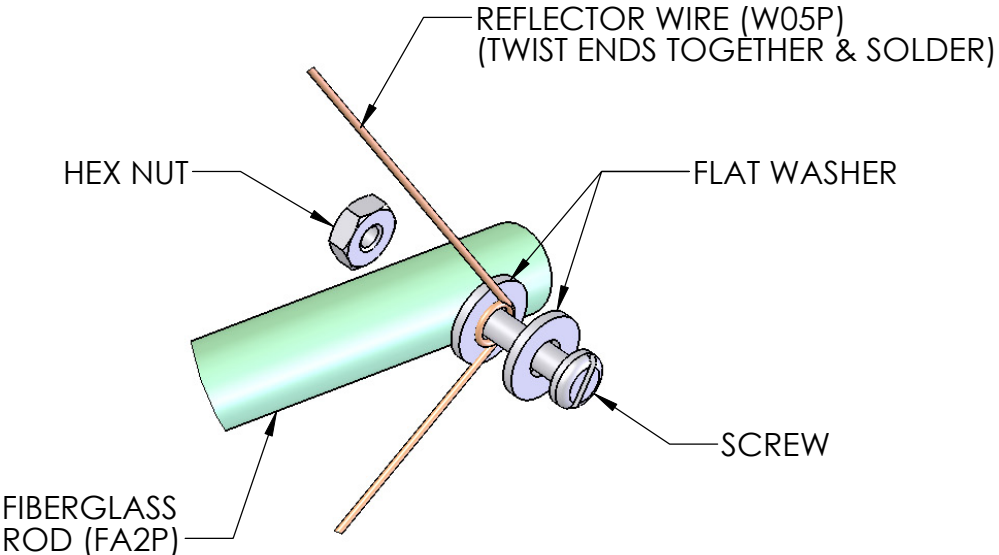
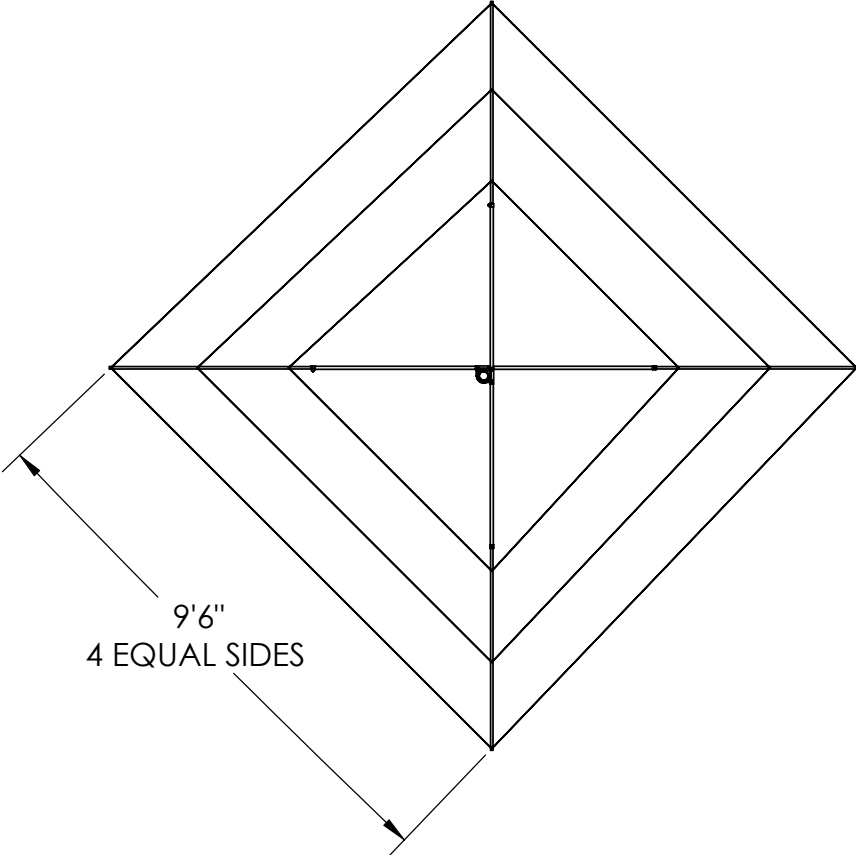


Figure 2C



**Figure 3C**



**Figure 5**

