Instructions

SKYHAWK 3X10 Rev C

Congratulations on the purchase of your Skyhawk 3X10. You now possess the finest computer optimized tri-bander on the market. The Skyhawk features low weight, zero mast torque, a balanced beam and high wind survival. Corrosion and UV resistant materials are used throughout its construction. Only stainless steel fasteners and rivets are used. Custom designed aluminum extrusions make assembly a snap. Multiple wall boom construction, eliminating the need for stays, coupled with ultra thin trap-free riveted elements significantly reduces wind load.

NOTE: ALL DIMENSIONS IS THIS INSTRUCTION ARE IN INCHES(MILLIMETERS) UNLESS OTHERWISE NOTED.

REQUIRED TOOLS

Rivet tool: POP Rivetool PRG 430, POP Rivetool PRGIII or equivalent
Flat blade screwdriver
Nut Driver: 11/32(9) and 3/8(10) nut driver
Wrench: 7/16(11) and 1/2(13)
Pair of saw horses or similar support
Permanent marker

BEFORE YOU START

WARNING: INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. FOR YOUR SAFETY FOLLOW THE INSTALLATION INSTRUCTIONS.

WARNING: AT NO TIME DURING ASSEMBLY, INSTALLATION, ADJUSTMENT, OR OPERATION SHOULD ANY PART OF THIS PRODUCT BE ALLOWED TO COME INTO CONTACT WITH ELECTRIC POWER LINES, NOR SHOULD THIS PRODUCT BE INSTALLED IN SUCH A WAY THAT ANY PART OF IT MAY CONTACT POWER LINES DURING NORMAL OPERATION OR IN THE EVENT OF STRUCTURAL FAILURE. FAILURE TO EXERCISE EXTREME CARE IN THIS MATTER CAN RESULT IN DAMAGE TO PROPERTY, PERSONAL INJURY OR DEATH.

Before you start assembling the antenna, read through the instructions completely, paying special attention to the diagrams. When you unpack the box, do so on a surface where you will not lose small parts. Check the parts against the PARTS LIST, identifying each part carefully.

NOTE: Check to see that all parts are present before beginning assembly.

INSTALLATION NOTES

CHOOSING AN INSTALLATION SITE: As with all directional antennas, care must be taken in the choice of an installation site for your Skyhawk 3X10. Select a place clear of power lines or other obstructions. The Skyhawk 3X10 should be mounted at least 30 ft (9.1 m) above the ground for proper operation. If the Skyhawk 3X10 is mounted a full-wave above ground, the takeoff angle is 14° with a minor lobe at 40° or so. For a 1/2-wave it's closer to 20°. At mounting heights below 1/2-wave the takeoff angle is much greater than 20°. There's no easy way to calculate it, but there are graphs for wave angles at heights of 1/4, 1/8 and so on in any edition of the A.R.R.L. Antenna Handbook. The Skyhawk 3X10 should be able to rotate without hitting anything. Finally, it should not be near any large masses of metal, like metal

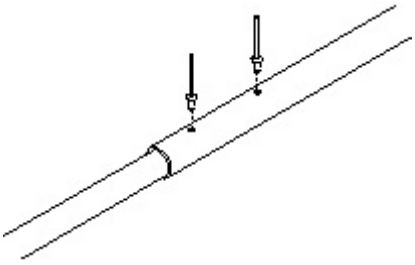
roofing or siding. Plan your installation so that metallic guy wires are broken up with compression insulators and no other antennas are nearby, i.e. dipoles mounted right under the beam.

MASTS AND GUYING: In order to avoid coupling between antenna elements and guy wires that can de-tune the antenna it may be necessary to break up the guy wires with insulators. If the separation between the antenna and the highest set of guys is less than 15' (4.6m) it would be a good idea to use insulators on each of the uppermost guys at intervals of 10' (3m). Place the first insulator on each guy AT THE MAST OR TOWER, for that too is a conductor that can be coupled to the antenna by any horizontal or near-horizontal guy wire connected to it.

RIVET ASSEMBLY

The elements of your Skyhawk 3X10 are assembled with two or three blind rivets per joint. Blind rivets were chosen to provide fast, strong, reliable, vibration proof assembly, with high grip and pull-up strengths. Open end stainless steel rivets are used because they provide better than 80% more shear and tensile strength than closed end aluminum rivets. Blind rivets are easily set by:

1. Line up the holes in each tube as shown in the diagram.
2. Insert a blind rivet in each hole.
3. Making sure the rivet is fully seated, set the rivet with rivet tool.
4. Repeat step 3 for the other rivets.



If for some reason you need to remove a blind rivet...

Blind rivets may easily be removed by drilling through them with a 1/8(3) drill bit. Be careful not to drill through the entire element and be sure to remove any remnants left from the removed rivet.

FASTENER ASSEMBLY

Installing and tightening fasteners is a simple procedure but one which is often done incorrectly. Tightening fasteners to the proper torque keeps bolts tight, increases joint strength, creates friction between parts to resist shear and improves the fatigue resistance of the connection. Unfortunately fasteners are usually over tightened causing them to fracture or at least causing thread damage making them impossible to disassemble.

It is strongly recommended that a lubricant such as Butter-It's-Not™ be used on the threads to reduce friction which allows the fastener to be properly tensioned.

The best way to properly tension a fastener is to tighten the nut until the lock washer is flat and then tighten it no more than an additional one quarter turn. This rule should be followed except for u-bolts and the 1/4 x 2-3/4(70) boom to saddle screw where one additional full turn is required.

TUBING ASSEMBLY

In order to decelerate oxidation and to improve electrical conductivity a high quality RF conductive anti-oxidizing compound should be used. A generous supply of Butter-It's-Not™ has been included for this purpose. Apply a thin layer to each metal to metal antenna connection with a brush or clean cloth. Be careful not to accumulate excess material on other parts or yourself as it's quite difficult to remove and virtually impossible to clean out of clothing.

PARTS LIST

Qty	Description	Size	Part No.
10 METER REFLECTOR			*00585SZC*
☐ 1	ELEMENT SECTION A 10M	3/4(19) X 28(711)	*00589RZC*
☐ 2	ELEMENT SECTION B 10M	5/8(16) X 35-7/8(911)	*00531BAC*
☐ 2	ELEMENT SECTION C 10M REFLECTOR	1/2(12) X 71-1/8(1,807)	*00533BAC*
10 METER DRIVEN			*00993SZC*
☐ 1	ELEMENT INSULATOR DRIVEN		*00985FAC*
☐ 2	ELEMENT SECTION A 10M DRIVEN	3/4(19) X 14(356)	*00974RZC*
☐ 2	ELEMENT SECTION B 10M DRIVEN	5/8(16) X 38(965)	*00986BAC*
☐ 2	ELEMENT SECTION C 10M DRIVEN	1/2(13) X 68-43/64(1,744)	*00987BAC*
10 METER DIRECTOR 1			*00587SZC*
☐ 1	ELEMENT SECTION A 10M	3/4(19) X 28(711)	*00589RZC*
☐ 2	ELEMENT SECTION B 10M	5/8(16) X 35-7/8(911)	*00531BAC*
☐ 2	ELEMENT SECTION C 10M DIRECTOR 1	1/2(13) X 63-23/32(1,618)	*00535BAC*
10 METER DIRECTOR 2			*00588SZC*
☐ 1	ELEMENT SECTION A 10M	3/4(19) X 28(711)	*00589RZC*
☐ 2	ELEMENT SECTION B 10M	5/8(16) X 35-7/8(911)	*00531BAC*
☐ 2	ELEMENT SECTION C 10M DIRECTOR 2	1/2(13) X 64-9/16(1,640)	*00536BAC*
15 METER REFLECTOR			*00580SZC*
☐ 1	ELEMENT SECTION A 15M	3/4(19) X 47-7/8(1,216)	*00581RZC*
☐ 2	ELEMENT SECTION B 15M	5/8(16) X 59-7/8(1,521)	*00530BAC*
☐ 2	ELEMENT SECTION C 15M	1/2(13) X 71-7/8(1,826)	*00532BAC*
☐ 2	ELEMENT SECTION D 15M REFLECTOR	3/8(10) X 28-15/32(723)	*00540BAC*
15 METER DRIVEN			*00994SZC*
☐ 1	ELEMENT INSULATOR DRIVEN		*00985FAC*
☐ 2	ELEMENT SECTION A 15M DRIVEN	3/4(19) X 23-7/8(606)	*00975RZC*
☐ 2	ELEMENT SECTION B 15M DRIVEN	5/8(16) X 59-7/8(1,521)	*00988BAC*
☐ 2	ELEMENT SECTION C 15M	1/2(13) X 71-7/8(1,826)	*00532BAC*
☐ 2	ELEMENT SECTION D 15M DRIVEN	3/8(10) X 23-5/8(600)	*00989BAC*
15 METER DIRECTOR			*00584SZC*
☐ 1	ELEMENT SECTION A 15M	3/4(19) X 47-7/8(1,216)	*00581RZC*
☐ 2	ELEMENT SECTION B 15M	5/8(16) X 59-7/8(1,521)	*00530BAC*
☐ 2	ELEMENT SECTION C 15M	1/2(13) X 71-7/8(1,826)	*00532BAC*
☐ 2	ELEMENT SECTION D 15M DIRECTOR	3/8(10) X 14-5/64(358)	*00542BAC*
20 METER REFLECTOR			*00576SZC*
☐ 1	ELEMENT SECTION A 20M	1(25) X 47-7/8(1,216)	*00577RZC*
☐ 2	ELEMENT SECTION B 20M	7/8(22) X 47-7/8(1,216)	*00524BAC*
☐ 2	ELEMENT SECTION C 20M	3/4(19) X 71-7/8(1,826)	*00526BAC*
☐ 2	ELEMENT SECTION D 20M	5/8(16) X 65-7/8(1,673)	*00529BAC*
☐ 2	ELEMENT SECTION E 20M	1/2(13) X 47-7/8(1,216)	*00537BAC*
☐ 2	ELEMENT SECTION F 20M REFLECTOR	3/8(10) X 47-7/32(1,199)	*00538BAC*

PARTS LIST

	Qty	Description	Size	Part No.
20 METER DRIVEN				
☐	1	ELEMENT INSULATOR 20M DRIVEN		*00521FAC*
☐	2	ELEMENT SECTION A 20M DRIVEN	1(25) X 23-7/8(606)	*00572RZC*
☐	2	ELEMENT SECTION B 20M DRIVEN	7/8(22) X 47-7/8(1,216)	*00525BAC*
☐	2	ELEMENT SECTION C 20M	3/4(19) X 71-7/8(1,826)	*00526BAC*
☐	2	ELEMENT SECTION D 20M	5/8(16) X 65-7/8(1,673)	*00529BAC*
☐	2	ELEMENT SECTION E 20M	1/2(12) X 47-7/8(1,216)	*00537BAC*
☐	2	ELEMENT SECTION F 20M DRIVEN	3/8(10) X 28-3/16(716)	*00990BAC*
20 METER DIRECTOR				*00579SZC*
☐	1	ELEMENT SECTION A 20M	1(25) X 47-7/8(1,216)	*00577RZC*
☐	2	ELEMENT SECTION B 20M	7/8(22) X 47-7/8(1,216)	*00524BAC*
☐	2	ELEMENT SECTION C 20M	3/4(19) X 71-7/8(1,826)	*00526BAC*
☐	2	ELEMENT SECTION D 20M	5/8(16) X 65-7/8(1,673)	*00529BAC*
☐	2	ELEMENT SECTION E 20M	1/2(13) X 47-7/8(1,216)	*00537BAC*
☐	2	ELEMENT SECTION F 20M DIRECTOR	3/8(10) X 10-1/2(267)	*00543BAC*
☐	1	BOOM SECTION A	2(51) X 71-7/8(1,826)	*00601BBC*
☐	1	BOOM SECTION B	2(51) X 71-7/8(1,826)	*00602BBC*
☐	1	BOOM SECTION C	2(51) X 71-7/8(1,826)	*00603BBC*
☐	1	BOOM SECTION D	2(51) X 71-7/8(1,826)	*00604BBC*
☐	1	BOOM SPLICE A	1-7/8(48) X 71-3/4(1,822)	*00605BBC*
☐	1	BOOM SPLICE B	1-7/8(48) X 71-3/4(1,822)	*00655SZC*
		ABOVE IS A DOUBLE WALLED TUBE		
☐	1	BOOM SPLICE C	1-7/8(48) X 71-3/4(1,822)	*00607BBC*
☐	1	ELEMENT COMPENSATOR	1.9(48) X 56(1,422)	*00562FAC*
HARDWARE				
☐	2	BUTTER-IT'S-NOT		*00061SZV*
☐	4	ELEMENT SADDLE 1-1/4		*00553EAC*
☐	10	ELEMENT SADDLE 1		*00554EAC*
☐	11	BOOM SADDLE		*00555EAC*
☐	1	MAST SADDLE		*00556EAC*
☐	1	INSTRUCTIONS SKYHAWK 3X10 REV B		*00997IZC*
BOOM/MAST PLATES				*00837SZC*
☐	2	1/4-20 HEX NUT 18-8 (7/16 X 7/32)		*00056JAV*
☐	2	1/4 SPLIT RING LW 18-8		*00057JAV*
☐	2	#10 SPLIT RING LW 18-8		*00133JZV*
☐	2	#10-32 X 3/8 PHIL RND HD MS 18-8		*00191JZV*
☐	1	MAST PLATE		*00551BAC*
☐	1	BOOM PLATE		*00552BAC*
☐	2	5/16-18 X 1 HEX WAS HD CS 18-8		*00567JAC*
☐	4	5/16-18 HEX NUT 18-8 (1/2 X 17/64)		*00568JAC*
☐	4	5/16 SPLIT RING LW 18-8		*00570JAC*
☐	2	1/4-20 X 2-3/4 PHIL RND HD MS 18-8		*00595JAC*
☐	2	5/16-18 X 2 X 3-1/8 U-BOLT 18-8		*00597JAC*
☐	2	U-BOLT SADDLE 2		*00598EAC*
☐	4	5/16 FLAT WASHER 18-8 (11/32 X 11/16 X 1/16)		*00600JAC*
☐	4	5/16-18 HEX SER FLNG NUT 18-8 (1/2 X 9/32)		*00834JZC*
☐	2	5/16-18 X 1-1/4 HEX HD CS 18-8		*00835JZC*

PARTS LIST

	Qty	Description	Size	Part No.
SY2 BALUN				*00838SZC*
☐	1	KONNEKTOR-KOTE (1 X 8)		*00050DZV*
☐	1	SY2 BALUN		*00723GZC*
☐	1	BUSHING		*00728FAC*
☐	1	BALUN CLAMP ASSEMBLY LARGE		*00731RZC*
☐	1	BALUN CLAMP ASSEMBLY SMALL		*00732RZC*
BOOM COMPENSATOR				*00839SZC*
☐	3	#10 SPLIT RING LW 18-8		*00133JZV*
☐	3	#10-24 HEX NUT 18-8 (3/8 X 1/8)		*00134JZV*
☐	3	#10-24 X 3/4 PHIL RND HD MS 18-8		*00226JZV*
☐	2	BOOM COMPENSATOR BRACKET		*00557BAC*
☐	1	BOOM COMPENSATOR		*00561FAC*
BOOM HARDWARE PACKAGE				*00991SZC*
☐	43	1/4-20 HEX NUT 18-8 (7/16 X 7/32)		*00056JAV*
☐	43	1/4 SPLIT RING LW 18-8		*00057JAV*
☐	2	1/4-20 X 2 X 2-11/16 U-BOLT 18-8		*00569JAC*
☐	28	1/4-20 X 5/8 PHIL RND HD MS 18-8		*00594JAC*
☐	11	1/4-20 X 2-3/4 PHIL RND HD MS 18-8		*00595JAC*
☐	2	PROTECTIVE CAP 2		*00980FZC*
DRIVEN ELEMENT BOOM HARDWARE PACKAGE				*00992SZC*
☐	12	1/4-20 HEX NUT 18-8 (7/16 X 7/32)		*00056JAV*
☐	12	1/4 SPLIT RING LW 18-8		*00057JAV*
☐	2	COMPRESSION CLAMP SMALL ADJUSTABLE		*00144JZV*
☐	12	1/4-20 X 5/8 PHIL RND HD MS 18-8		*00594JAC*
☐	4	ELEMENT SADDLE 1 DRIVEN		*00981EAC*
☐	2	ELEMENT SADDLE 1-1/4 DRIVEN		*00982EAC*
☐	2	ELEMENT SPACER		*00983FAC*
☐	2	FEED STRAP		*00984BAC*
ELEMENT HARDWARE PACKAGE				*00996SZC*
☐	6	# 8 SPLIT RING LW 18-8		*00080JZV*
☐	6	# 8-32 HEX NUT 18-8 (11/32 X 1/8)		*00081JZV*
☐	8	PROTECTIVE CAP 1/2		*00088FZV*
☐	12	PROTECTIVE CAP 3/8		*00089FZV*
☐	6	# 8-32 X 1-1/2 PHIL RND HD MS 18-8		*00114JZV*
☐	136	1/8 X 17/64 POP RIVET 18-8		*00575JZC*

ASSEMBLY
DRIVEN ELEMENTS

10DR	15DR	20DR	
☐	☐	☐	1. Locate the bag for the element you wish to assemble.
☐	☐	☐	2. Locate one of the B element sections and slide the side with one hole into one of the A element sections so all holes line up.

NOTE: If the holes don't line up exactly, rotate one or both of the elements 180°.

☐	☐	☐	3. Insert one end of the element insulator into the above assembly. Line up the holes and pass a # 8 x 1-1/2 in (38 mm) screw followed by a # 8 lock washer and hex nut. Hand tighten
☐	☐	☐	4. Slide the side with one hole of the other B element section into the remaining A element section so all the holes line up.
☐	☐	☐	5. Insert the other end of the element insulator into the above assembly. Line up the holes and pass a # 8 x 1-1/2 in (38 mm) screw followed by a # 8 lock washer and hex nut. Hand tighten
☐	☐		6. Locate one of the C element sections and insert the side with the two holes furthermost from the end into one of the B element sections. Line up all the holes and secure with two rivets.
☐			7. Place a large cap over each element tip
☐			8. Identify the completed 10 meter element section with a felt tip marker.
	☐		9. Locate one of the C element sections and insert the side with the three holes furthermost from the end into one of the B element sections. Line up all the holes and secure with three rivets.
	☐		10. Insert the other C element section into the other B element section as above and secure with three rivets.
	☐	☐	11. Locate one of the D element sections and insert the side with the two holes furthermost from the end into one of the C element sections. Line up all the holes and secure with two rivets.
	☐	☐	12. Insert the other D element section into the other C element section as above and secure with two rivets.
	☐		13. Place a small cap over each element tip.
	☐		14. Identify the completed 15 meter element section with a felt tip marker.
		☐	15. Locate one of the E element sections and insert it into one of the D element sections. Line up all the holes and secure with two rivets.
		☐	16. Insert the other E element section into the other D element section as above and secure with two rivets.
		☐	17. Locate one of the F element sections and insert it into one of the E element sections. Line up all the holes and secure with two rivets.
		☐	18. Insert the other F element section into the other E element section as above and secure with two rivets.
		☐	19. Place a small cap over each element tip
		☐	20. Identify the completed 20 meter element section with a felt tip marker.

ASSEMBLY
ELEMENTS

10D2	10D1	10R	15D	15R	20D	20R	
☐	☐	☐	☐	☐	☐	☐	1. Locate the bag for the element you wish to assemble.
☐	☐	☐	☐	☐	☐	☐	2. Locate one of the B element sections and insert the side with the three holes furthermost from the end into one side of the A element section. Line up all the holes and secure with rivets.
☐	☐	☐	☐	☐	☐	☐	3. Insert the other B element section into the other side of A element section as above and secure with rivets.
☐	☐	☐	☐	☐	☐	☐	4. Locate one of the C element or tip sections and insert the side with the two or three holes furthermost from the end into one of the B element sections. Line up the all the holes and secure with rivets.
☐	☐	☐	☐	☐	☐	☐	5. Insert the other C element or tip section into the other B element section as above and secure with rivets.
☐	☐	☐					6. Place a small cap over each element tip
☐	☐	☐					7. Identify the completed 10 meter element section with a felt tip marker.
			☐	☐	☐	☐	8. Locate one of the D element or tip sections and insert the side with the two holes furthermost from the end into one of the C element sections. Line up all the holes and secure with two rivets.
			☐	☐	☐	☐	9. Insert the other D element or tip section into the other C element section as above and secure with two rivets.
			☐	☐			10. Place a small cap over each element tip
			☐	☐			11. Identify the completed 15 meter element section with a felt tip marker.
					☐	☐	12. Locate one of the E element sections and insert it into one of the D element sections. Line up all the holes and secure with two rivets.
					☐	☐	13. Insert the other E element section into the other D element section as above and secure with two rivets.
					☐	☐	14. Locate one of the tip sections and insert it into one of the E element sections. Line up all the holes and secure with two rivets.
					☐	☐	15. Insert the other tip section into the other E element section as above and secure with two rivets.
					☐	☐	16. Place a large cap over each element tip.
					☐	☐	17. Identify the completed 20 meter element section with a felt tip marker.

ASSEMBLY
BOOM

Each boom has been assembled and each section numbered for easy reassembly. In the event that the numbers have worn off, each section may be identified using the dimensions given in the pictorial found on the pullout sheet.

☐ 1 Find boom section A which may be identified with the number “1” at one end and boom splice A which may be identified with the “1” and “2” in the center.

☐ 2 Place a saddle over the holes closest to the unidentified end of boom section A and secure with a 1/4 x 2-3/4(70) screw, lock washer and hex nut.

☐ 3 Slide the end identified with “1” of boom section A over the “1” side of boom splice A and line up the holes.

☐ 4 Place a boom saddle over the above set of holes and secure with a 1/4 x 2-3/4(70) screw, lock washer and hex nut.

☐ 5 Repeat the above for boom section B and boom splice B placing a boom saddle over each set of holes and securing with a 1/4 x 2-3/4(70) screw, lock washer and hex nut.

☐ 6 Slide the “4” end of boom section C over boom splice B and place boom saddles over the first two sets of holes and secure with 1/4 x 2-3/4(70) screws, lock washers and hex nuts.

☐ 7 Line up the four holes of the mast saddle with those in the tube above and secure with two 1/4 x 2-3/4(70) screw, lock washer and hex nut.

☐ 8 Attach, with the threaded holes up, the boom plate to the boom saddle using two #10 x 3/8(10) screws and lock washer.

☐ 9 Insert two 5/16 x 1(25) hex head screws and tighten.

☐ 10 Start a flange nut on each screw.

NOTE: The above flange nuts must kept loose enough to allow easy insertion into the mast plate.

☐ 11 Continue assembling boom splice C and boom section D adding boom saddles as above except for the second and third set of holes on the end of boom section D.

☐ 12 Line up the boom compensator brackets and boom compensator.

☐ 13 Insert a #10 x 3/4(19) screw through one of the holes, followed by a #10 lock washer and hex nut. Hand tighten

☐ 14 Repeat the above step for the remaining two holes.

☐ 15 Line up the holes of two boom saddles with the second and third set of holes from the end of boom section D.

☐ 16 Position the boom compensator over the two boom saddles and line up all four holes and secure with two 1/4 x 2-3/4(70) screw, lock washers and hex nuts.

☐ 17 Tighten the #10 hex nuts on the boom compensator.

☐ 18 Place a boom cap over each end of the boom.

This completes assembly of the boom.

NOTE: the end of the boom with the boom compensator is the *FRONT* of the antenna.

ASSEMBLY
DRIVEN ELEMENTS TO BOOM

In the following steps, each driven element will be assembled onto the boom. You will find that assembly will be much easier if the boom is supported by a saw horse or similar support at either end. Refer to the ELEMENT POSITION page at the end of this instruction for proper placement.

☐ 1 Rotate the boom so the flat portion of the boom saddles are facing down.

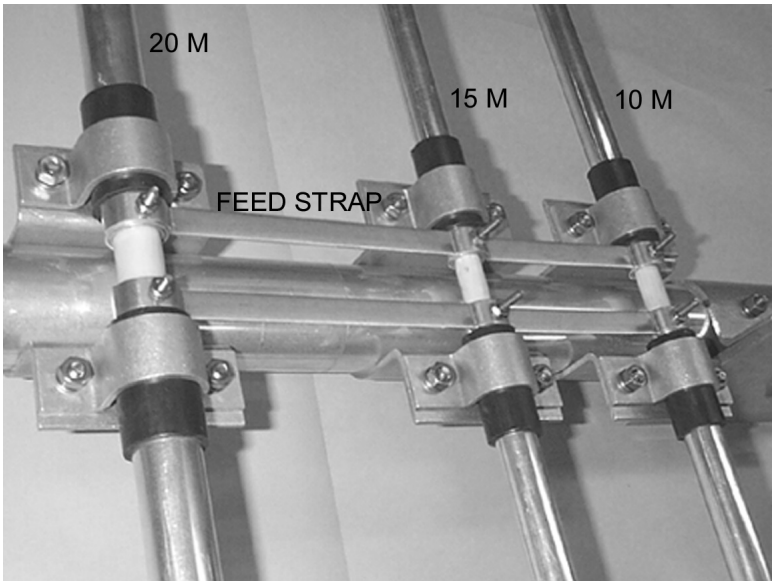
10DR 15DR 20DR

☐ ☐ ☐ 2. Insert a 1/4 x 5/8(16) screw through each hole on one side of the boom saddle.

☐ ☐ ☐ 3. Position an element saddle as shown followed by a 1/4 lock washer and hex nut. Tighten only enough so the nut won't fall off (two or three turns).

IMPORTANT! Driven element saddles are narrower than the others and are not interchangeable.

NOTE: The two large element saddles are used on 20 meter element while the four smaller saddles are for 10 and 15 meters.



Bottom View

☐ ☐ ☐ 4. Slide one side of a driven element through the element saddle.

☐ ☐ ☐ 5. Assemble an element saddle on the other side and secure with 1/4 x 5/8(16) screws, lock washers and hex nuts.

☐ ☐ ☐ 6. Center the element insulator and position the nut side of the screws *down*.

Repeat steps 2 through 6 for the remaining two driven elements.

☐ 7 Remove the #8 hex nuts and lock washers from each driven element.

☐ 8 Place one of the feed straps onto the driven elements as shown and secure with #8 lock washers and hex nuts. Do not tighten hex nuts at this time.

☐ 9 Place the remaining feed strap onto the driven elements and secure with #8 lock washers and hex nuts. Once again, do not tighten the hex nuts at this time.

☐ 10 Align all three center insulators.

☐ 11 Tighten the #8 hex nuts starting with the 15 meter driven element, followed by the 10 and then 20 meter driven elements.

☐ 12 Straighten the feed straps making sure they are parallel to the boom.

☐ 13 If necessary, realign the element insulators.

☐ 14 Tighten the 1/4 hex nuts on all of the driven element saddles.

ASSEMBLY
ELEMENTS TO BOOM

In the following steps, each element and the element compensator will be assembled onto the boom. You will find that assembly will be much easier if the boom is supported by a saw horse or similar support at either end. Refer to the pictorial on the pullout sheet and the ELEMENT POSITION page at the end of this instruction for proper placement.

NOTE: The elements may slid through both clamps after they are installed.

IMPORTANT: LARGE ELEMENT SADDLES ARE USED TO SECURE THE TWO 20 METER ELEMENTS TO THE BOOM. THE REMAINING ELEMENTS ARE SECURED WITH SMALL ELEMENT SADDLES.

20R	20D	15R	15D	10R	10D1	10D2	
☐	☐	☐	☐	☐	☐	☐	1. Insert a 1/4 x 5/8(16) screw through each hole on the boom saddle.
☐	☐	☐	☐	☐	☐	☐	2. Position an element saddle on one side followed by a 1/4 lock washer and hex nut. Tighten only enough so the nut won't fall off (two or three turns).
☐	☐	☐	☐	☐	☐	☐	3. Repeat the above procedure for the other side of the element saddle.
☐	☐	☐	☐	☐	☐	☐	4. Slide the element through both element saddles.
☐	☐	☐	☐	☐	☐	☐	5. Center the element insulator and position the rivet side of the element down. Securely tighten all four fasteners.

Repeat steps 1 through 5 for the remaining elements.

☐ 6. Insert a 1/4 x 2(51) u-bolt into the left hand pair of holes on the second boom saddle. Secure it with 1/4 lock washers and hex nuts

☐ 7. Insert a second 1/4 x 2(51) u-bolt into the right hand pair of holes on the same boom saddle. Secure it with 1/4 lock washers and hex nuts.

☐ 8. Insert the element compensator through the two u-bolts and center it.

☐ 9. Tighten the nuts on each u-bolt leg evenly.

NOTE: Do not over tighten the u-bolts as this will only deform the compensator and possibly break it.

☐ 10. Sight down the boom and make sure that the elements all line up.

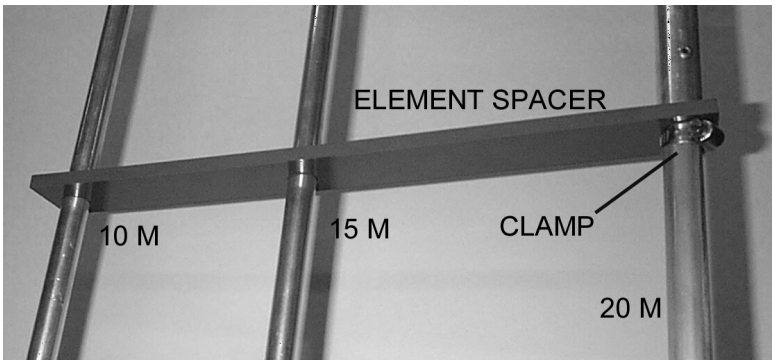
☐ 11. Straighten any out of line elements and re-tighten boom saddle screws as necessary.

ASSEMBLY
ELEMENT SPACER

The element spacers are designed to maintain the relationship between the three driven elements providing unchanging performance under a wide variety of operating conditions. They will be placed on element section 20D, 15C and 10DR.

☐ 1 Slide the large hole of one of the element spacers over the 20 meter driven element. As you approach the 15 meter driven element, slide it through the center hole followed by the 10 meter element through the end hole.

NOTE: Position the notched side of the holes to slide over the rivets.



Bottom View

☐ 2 Position the element spacer so it rests against the end of element 20C.

☐ 3 Slide one of the hose clamps over the 20 meter driven element until you reach the element spacer. Securely tighten the hose clamp leaving about a 1/16" of clearance between it and the spacer.

Repeat steps 1 through 3 for the remaining element spacer.

ASSEMBLY
BALUN

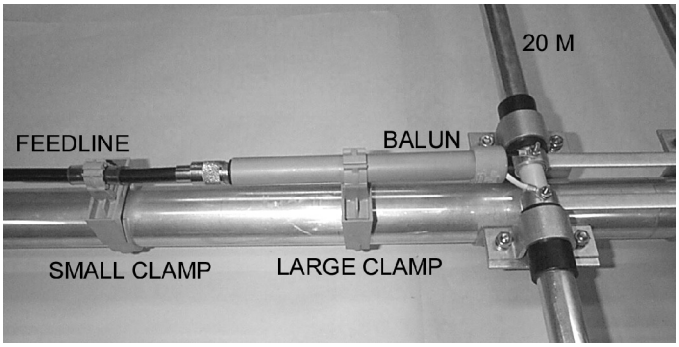
There are two clamp assemblies supplied. The small assembly can be identified by the ridges on the interior of the small clamp.

Clamps are easily attached by opening the clamp and sliding it around the tube. Continue to push on the assembly until two clicks are heard. To remove a clamp, place a screwdriver between the two halves and pry them apart.

☐ 1. Install the large clamp assembly to the rear of the 20 meter driven element as shown.

☐ 2. Insert the balun into the clamp with the leads facing the 20 meter driven element.

☐ 3. Attach one of the balun leads to one of the screws on the 20 meter driven element. Secure this lead with a # 8 lock washer followed by a # 8 hex nut previously installed.



Bottom View

☐ 4. Attach the remaining lead as above.

☐ 5. Install the small clamp assembly behind the balun as shown.

NOTE: The following three steps may completed after the antenna is installed on the tower.

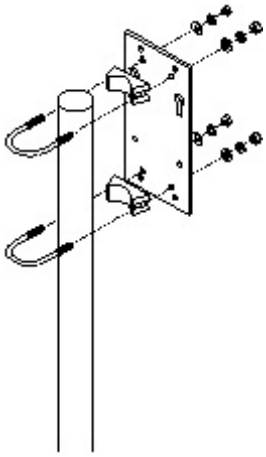
☐ 6. Connect the feed line to the balun

☐ 7. Slide the clear piece of tubing over the feed line and insert this assembly into the small clamp.

☐ 8. Seal the connection with the supplied Konnektor-Kote.

FINAL ASSEMBLY
MAST PLATE

The mast plate is supplied with hardware to mount to a 2(51) mast. Additional holes have been provided to accommodate a 2-3/8(60) mast with customer provided hardware.



☐ 1 Position a 2(51) u-bolt saddle over the second pair of holes from the top as shown.

☐ 2 Pass a 5/16 x 2(51) u-bolt through the 2(51) u-bolt saddle and mast plate. Secure with a 5/16 in flat washers, lock washers and hex nuts.

☐ 3 Position a 2(51) u-bolt saddle over the second pair of holes from the bottom as shown.

☐ 4 Pass a 5/16 x 2(51) u-bolt through the 2(51) u-bolt saddle and mast plate. Secure with a 5/16 in flat washers, lock washers and hex nuts.

☐ 5 Slide this assembly over the mast, with the top of the large end of the key hole facing up and securely tighten.

WARNING: IT IS EXTREMELY IMPORTANT THAT EACH NUT IS EVENLY TIGHTENED. APPLYING UNEQUAL AMOUNTS OF TORQUE TO THE U-BOLT LEGS MAY LEAD TO PREMATURE FAILURE

ASSEMBLY
BOOM TO MAST ASSEMBLY

☐ 1 Line up the two flange nuts located on the boom plate with large hole in each keyhole on the mast plate.

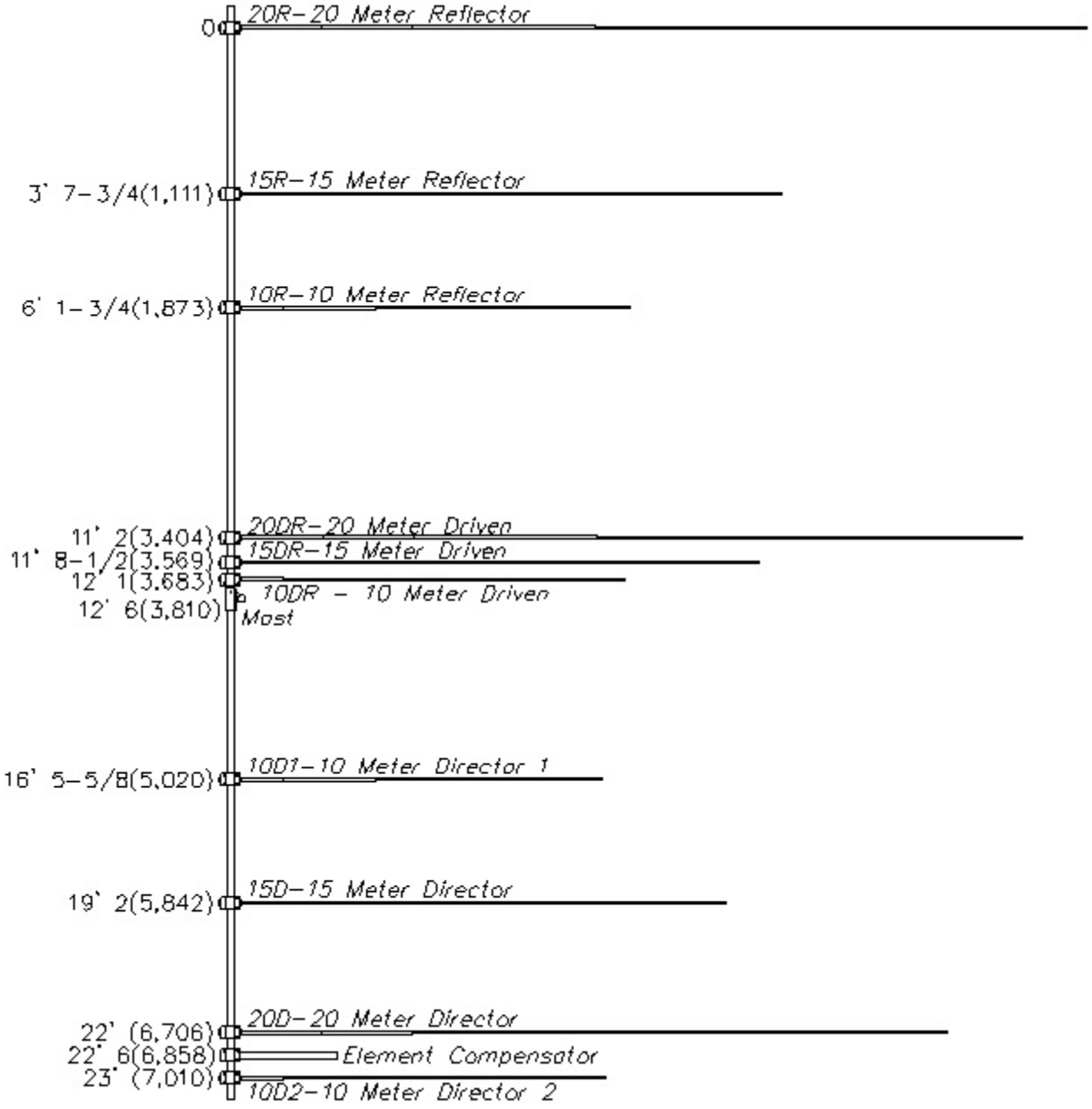
☐ 2 Pass the flange nuts through and let the screws drop into the slots.

☐ 3 Insert a 5/16 x 1(25) washer head screw through on of the lower holes. Tighten the bolt and secure with a flange nut.

☐ 4 Insert a 5/16 x 1(25) washer head screw through the remaining lower hole. Tighten the bolt and secure with a flange nut.

☐ 5 Securely tighten the upper flange nuts.

ELEMENT POSITION



LIMITED WARRANTY

Bencher, Inc. warrants on the terms hereof, to a Customer who has purchased a Product from a Seller, for a period of one year from the date of the purchase, that the Product was not Defective, but this warranty is void if the Product has been subjected to improper or abnormal installation or usage, or a serial number on the Product has been defaced or removed.

If a Customer believes that a Product is Defective, the customer may, within such one-year period, return the entire product to Bencher, Inc. at Bencher's factory, all shipping charges pre-paid by the Customer. If the Product was Defective, Bencher, Inc. will at its option and expense repair or replace the Product and will at its expense return the repaired or replaced Product to the customer, in a manner selected by Bencher, Inc., at the address from which the Customer sent the Product to Bencher, Inc..

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For instance, this warranty does not cover damage to or caused by an antenna (a) by reason of the antenna acting as a lighting rod, (b) by reason of corrosion or strain from exposure of an antenna to wind or weather, (c) from improper assembly, installation or use of an antenna, or (d) from failure periodically to inspect and maintain an antenna and its installation. The Customer is responsible to insure that installation and use of an antenna complies with applicable laws (such as zoning laws) and regulations (such as condominium regulations).

SOME LAWS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, AND IF THESE LAWS APPLY, THEN ALL EXPRESS AND IMPLIED WARRANTIES ARE LIMITED IN DURATION TO SUCH ONE-YEAR PERIOD. NO WARRANTIES OF ANY KIND APPLY AFTER THAT PERIOD.

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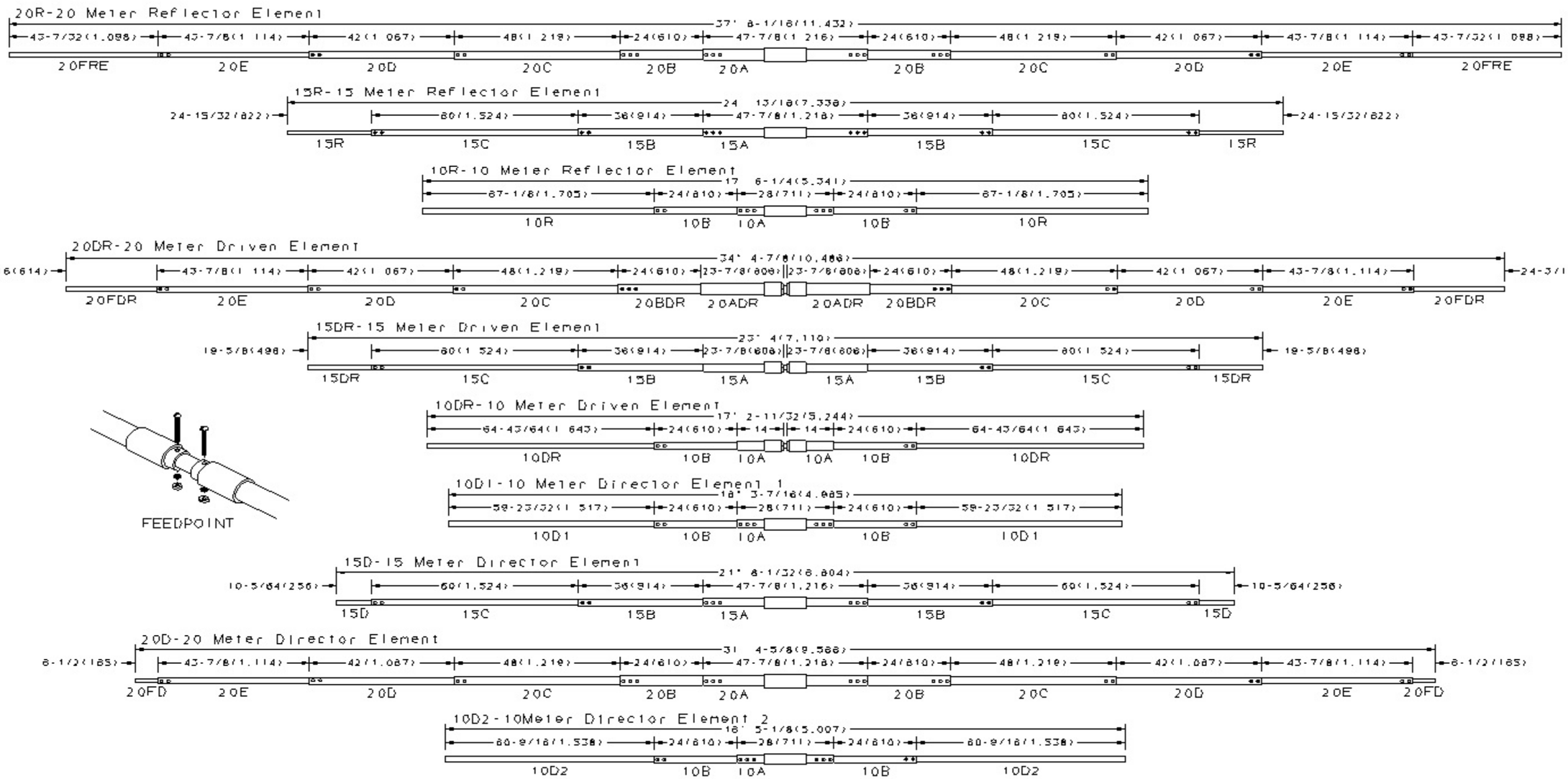
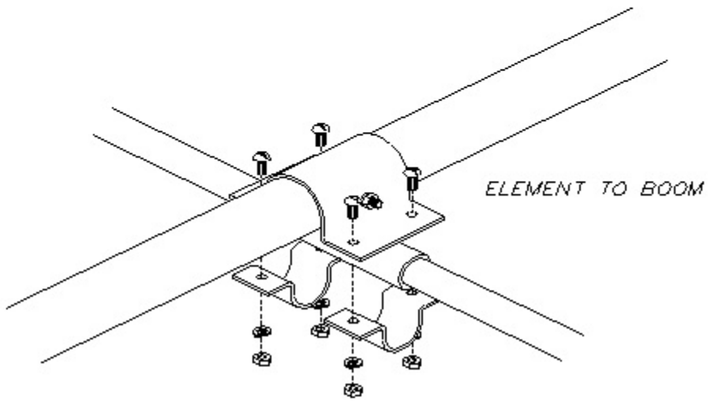
As used herein the *Customer* is the initial end-use purchaser of a Product from a Seller, a *Product* is an antenna or accessory therefor manufactured by Bencher, Inc., a Product is *Defective* if and only if the Product was not free of defects of material and workmanship when manufactured, and a *Seller* is Bencher, Inc. and any authorized Bencher, Inc. dealer.

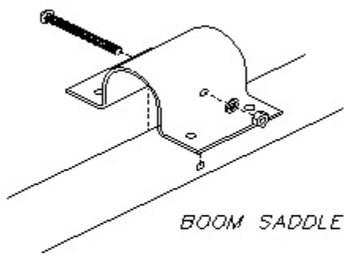
ELEMENT ASSEMBLY



NOTE: All dimensions are ±1/4(6)
Element section dimensions are reference only
Dimensions are in inches(millimeters) unless otherwise noted

BOOM AND ELEMENT TO BOOM ASSEMBLY




BOOM SADDLE

BOOM PLATE

BOOM COMPENSATOR

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