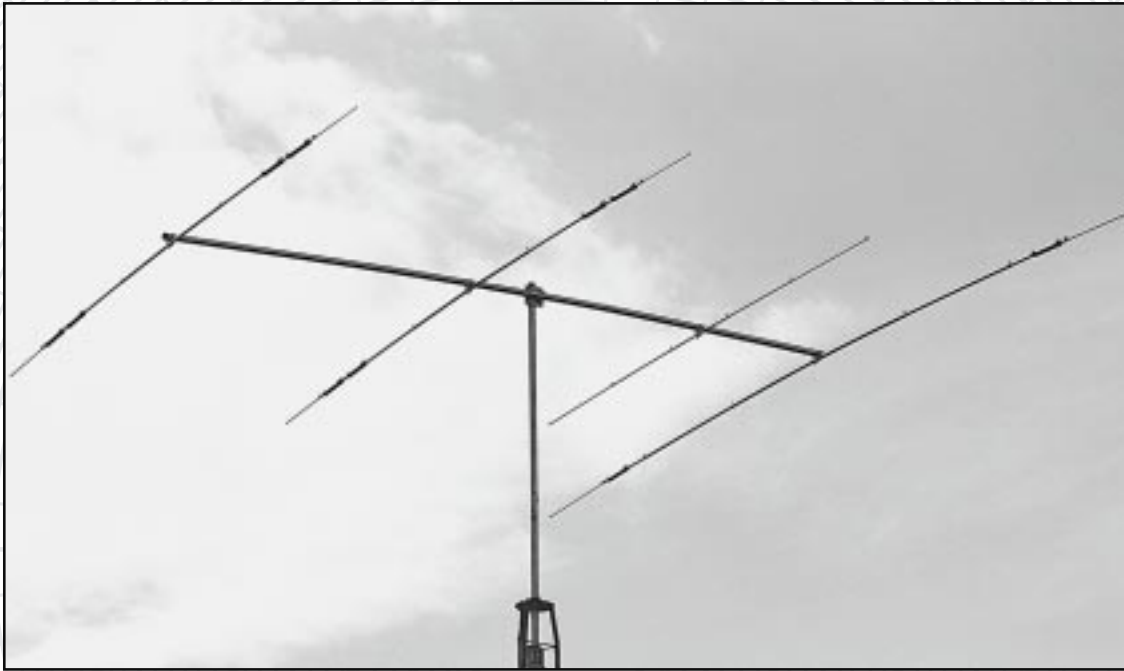


ASSEMBLY AND INSTALLATION INSTRUCTIONS



A4S

20 / 15 / 10 MeterBeam



WARNING

THIS ANTENNA IS AN ELECTRICAL CONDUCTOR. CONTACT WITH POWER LINES CAN RESULT IN DEATH, OR SERIOUS INJURY. DO NOT INSTALL THIS ANTENNA WHERE THERE IS ANY POSSIBILITY OF CONTACT WITH OR HIGH VOLTAGE ARC-OVER FROM POWER CABLES OR SERVICE DROPS TO BUILDINGS. THE ANTENNA, SUPPORTING MAST AND/OR TOWER MUST NOT BE CLOSE TO ANY POWER LINES DURING INSTALLATION, REMOVAL OR IN THE EVENT PART OF THE SYSTEM SHOULD ACCIDENTALLY FALL. FOLLOW THE GUIDELINES FOR ANTENNA INSTALLATIONS RECOMMENDED BY THE U.S. CONSUMER PRODUCT SAFETY COMMISSION AND LISTED IN THE ENCLOSED PAMPHLET.

Your Cushcraft A4S Yagi antenna is designed and manufactured to give trouble free service. This antenna will perform as specified if the instructions and suggestions in this manual are followed and care is used in the assembly and installation. When checking the components received in your antenna package use the parts listed beside each diagram. There is a master parts list on page 2. If you are unable to locate any tube or component, check the inside of all tubing. IMPORTANT: Save the weight label from the outside of the carton. Each antenna is weighed at the factory to verify the parts count. If you claim a missing part, you will be asked for the weight verification label.

PLANNING

Plan your installation carefully. If you use volunteer helpers be sure that they are qualified to assist you. Make certain that everyone involved understands that you are the boss and that they must follow your instructions. If you have any doubts at all, employ a professional antenna installation company to install your antenna.

LOCATION

Location of the antenna is very important. Surrounding objects such as trees, power lines, other antennas, etc. will seriously reduce efficiency. To minimize the effects of surrounding objects, mount the antenna as high and in the clear as possible. If metal guy wires are used, they should be broken with strain insulators. EXTREME CARE MUST BE USED FOR YOUR SAFETY. YOU MUST INSURE THAT WHILE THE A4S IS IN OPERATION NEITHER PEOPLE OR PETS CAN COME IN CONTACT WITH ANY PORTION OF YOUR ANTENNA. DEADLY VOLTAGES AND CURRENTS MAY EXIST. ALSO, SINCE THE EFFECTS OF EXPOSURE TO RF FIELDS ARE NOT FULLY UNDERSTOOD, LONG TERM EXPOSURE TO INTENSE RF FIELDS IS NOT RECOMMENDED. THERE IS A WARNING STICKER WHICH MUST BE ATTACHED TO THE BOOM AS SHOWN IN FIGURE I.

MOUNTING

The mast mount bracket will accommodate up to a 2" (5.1 cm) mast. A 1-1/2" OD (3.8 cm) or larger heavy wall tubing mast should be used. A good heavy duty antenna rotator will provide the best service and longest life. Often it is desirable to mount several antennas on one mast. To keep possible interaction to a minimum, place your antennas as far apart as you can.

SYSTEM GROUNDING

Direct grounding of the antenna, mast and tower is very important. This serves as protection from lightning strikes and static buildup, and from high voltage which is present in the radio equipment connected to the antenna. A good electrical connection should be made to one or more ground rods (or other extensive ground system) directly at the base of the tower or mast, using at least #10AWG ground wire and non-corrosive hardware. For details and safety standards, consult the National Electrical Code. You should also use a coaxial lightning arrester. Cushcraft offers several different models, such as LAC-1, LAC-2 and the LAC-4 series.

ASSEMBLY

Assemble your antenna by following the directions and illustrations in steps 1 through 5. After the antenna is completely assembled, verify dimensions and element spacings for accuracy. Then, return to the section below for final tuning.

TUNING PROCEDURE

Set the element lengths for the portion of the band you want to favor, by using Chart 1 and Figure B. Your A4S is now ready for use. Because of variations in trap caps, the overall dimensions D-1, 2, 3, 4 may vary as much as 1 inch from the individual dimensions. This will not affect performance. Always use the individual dimensions when adjusting your antenna.

You may check the VSWR in order to confirm assembly was done properly. The easiest place to check the antenna is likely to be in its final mounting configuration. Orient the antenna such that it is pointing straight up. The back of the antenna should be at least 2 feet (.6 m) off the ground.

Run the coax cable from your transmitter to the area in which the antenna is to be tested. The length of this cable or your feedline is not critical. Connect a good quality VSWR bridge to the end of this cable. Connect a short length of cable [10 ft. (305 cm) or less] from the VSWR bridge to the antenna under test. Set the transmitter to your center operating frequency and measure the VSWR while taking care not to effect the measurement with your body. A VSWR of 2:1 or less is satisfactory and will not degrade the performance. If the VSWR is greater than 2:1, check all dimensions and connectors.

ADD-ON KIT

Adding 30 or 40 meters to your A4S beam is a breeze with the spectacular A744 add on kit. You'll be on the air quickly operating on your new band because the A744 easily clamps to your A4S. You can operate on 40 meters or with a simple adjustment 30 meters.

The kit comes complete with reinforced insulator, teflon® protected high power traps, all hardware and non-stretch lamcord® support line. Cushcraft makes it easy to add more excitement to your hobby.

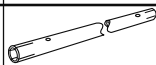
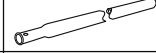
MASTER PARTS LIST

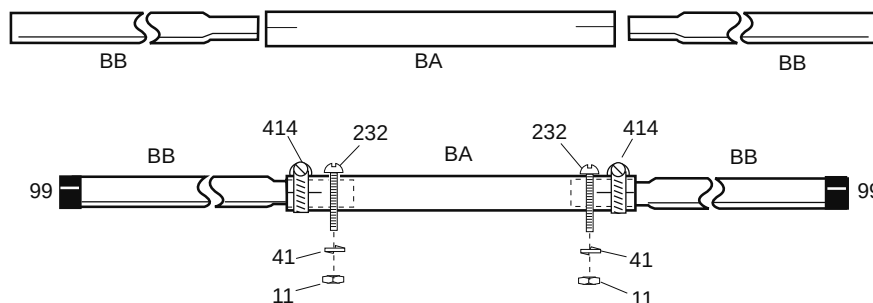
KEY	PART#	QTY	KEY	PART#	QTY
BA	Aluminum tubing 2" x 72" x .058 drilled and slotted both ends	1	TB	15 meter director trap	2
BB	Aluminum tubing 2" x 75-1/4" x .058 swagged and drilled one end	2	TC	15 meter driv. & refl. trap	4
EA	Aluminum tubing 1-1/8" x 72" (2.9 x 182.9 cm) drilled for U-bolt, slotted both ends.	1	TD	10 meter driv. trap	2
EB	Aluminum tubing 1-1/8" x 36" (2.9 x 91.4 cm) drilled one end, slotted both ends	2	TE	10 meter director trap	2
EC	Aluminum tubing 7/8" x 36" x .058 drilled for U-bolt slotted both ends	1	11	010011 #8-32 hex nut	6
ED	Aluminum tubing 1" x 65" (2.5 x 165.1 cm) slotted one end	2	27	050027 5/8" Black plastic cap	2
EE	Aluminum tubing 1" x 46-1/2" (2.5 x 188.1 cm) slotted one end	2	41	011941 #8 Split lock washer	6
EF	Aluminum tubing 1" x 5-1/4" (2.5 x 13.3 cm) slotted both ends	4	53	050053 1/2" Black plastic caps	6
EG	Aluminum tubing 1/2" x 35-7/8" (1.3 x 91.1 cm)	4	63	170063 2-1/2" Machined aluminum V-blocks	4
EH	Aluminum tubing 3/4" x 48" (1.9 x 121.9 cm) slotted one end	2	95	122095 1" x 10" O.D. Fiberglass insulator drilled for U-bolt and element screw	1
EJ	Aluminum tubing 5/8" x 48" (1.6 x 121.9 cm)	2	99	050099 2" Black plastic caps	2
EK	Aluminum tubing 1-1/8" x 24" (2.9 x 61.0 cm) drilled for U-bolt	1	118	010118 5/16" (.8 cm) hex nut	16
EL	Aluminum tubing 1-1/4" x 50" (3.2 x 127 cm) slotted both ends	2	119	010119 5/16" (.8 cm) lock washer	16
EM	Aluminum tubing 1-1/8" x 72" (2.9 x 182.9 cm) slotted one end	2	123	010123 #8-32 x 1-1/2" (3.8 cm) machine screw	2
EN	Aluminum tubing 1" x 24" (2.5 x 61.0 cm) slotted one end	2	130	190130 6" x 6" Aluminum mounting plate	1
EP	Aluminum tubing 1/2" x 48" (1.3 x 121.9 cm)	2	156	190156 2" x 1-1/8" Formed aluminum brackets	4
			232	010232 8-32 x 2-1/2" (6.4 cm) Round head slotted machine screw	2
			326	290326 Danger label	1
			404	010404 2 1/8" x 3" (5.4 x 7.6 cm) U-bolt	4
			405	010405 2 1/8" x 4" (5.4 x 10.2 cm) U-bolt	4
			409	030409 11/16" (1.7 cm) Worm clamp	8
			410	030410 1" (2.5 cm) Worm clamp	16
			411	030411 1-1/8" (2.9 cm) Worm clamp	8
			412	030412 1-1/2" (3.8 cm) Worm clamp	4
			414	030414 2-1/4" (5.7 cm) Worm clamp	2
			453	100453 Terminal	2

#1 - BOOM ASSEMBLY

Place worm clamps (414) over the slotted ends of tube BA. Slide both BB sections into BA (Figure A). Rotate them as required to align the holes for the 2-1/2" screws (232). Place the lock washer (41) and the hex nut (11) on the screws and tighten them. Tighten the worm clamps. Place the plastic caps (99) on the ends of the boom assembly.

**FIGURE
A**

KEY	P/N	DISPLAY	DESC	SIZE	QTY
BA			ALUM TUBE	2" x 72" (5.1 x 182.9 cm)	1
BB			ALUM TUBE	2" x 75-1/4" (5.1 x 191.1 cm)	2
99	050099		PLASTIC CAP	2" (5.1 cm)	2
11	010011		HEX NUT	8-32	2
41	011941		SPLIT LOCK WASHER	#8	2
232	010232		MACHINE SCREW	8-32 x 2-1/2" (6.4 cm)	2
414	030414		WORM CLAMP	2-1/4" (5.7 cm)	2



#2 Element Assembly

Assembly of elements is straight forward as shown in Figure B. Arrows on the traps point to the center of the element. Element #3 has a fiberglass insulator at its center which is joined to tubes EB with a worm clamp (411) and pinning screws (123) as shown in Figure C. Set dimensions to the desired band using Chart 1 and Chart 2. Tighten all clamps.

FIGURE B

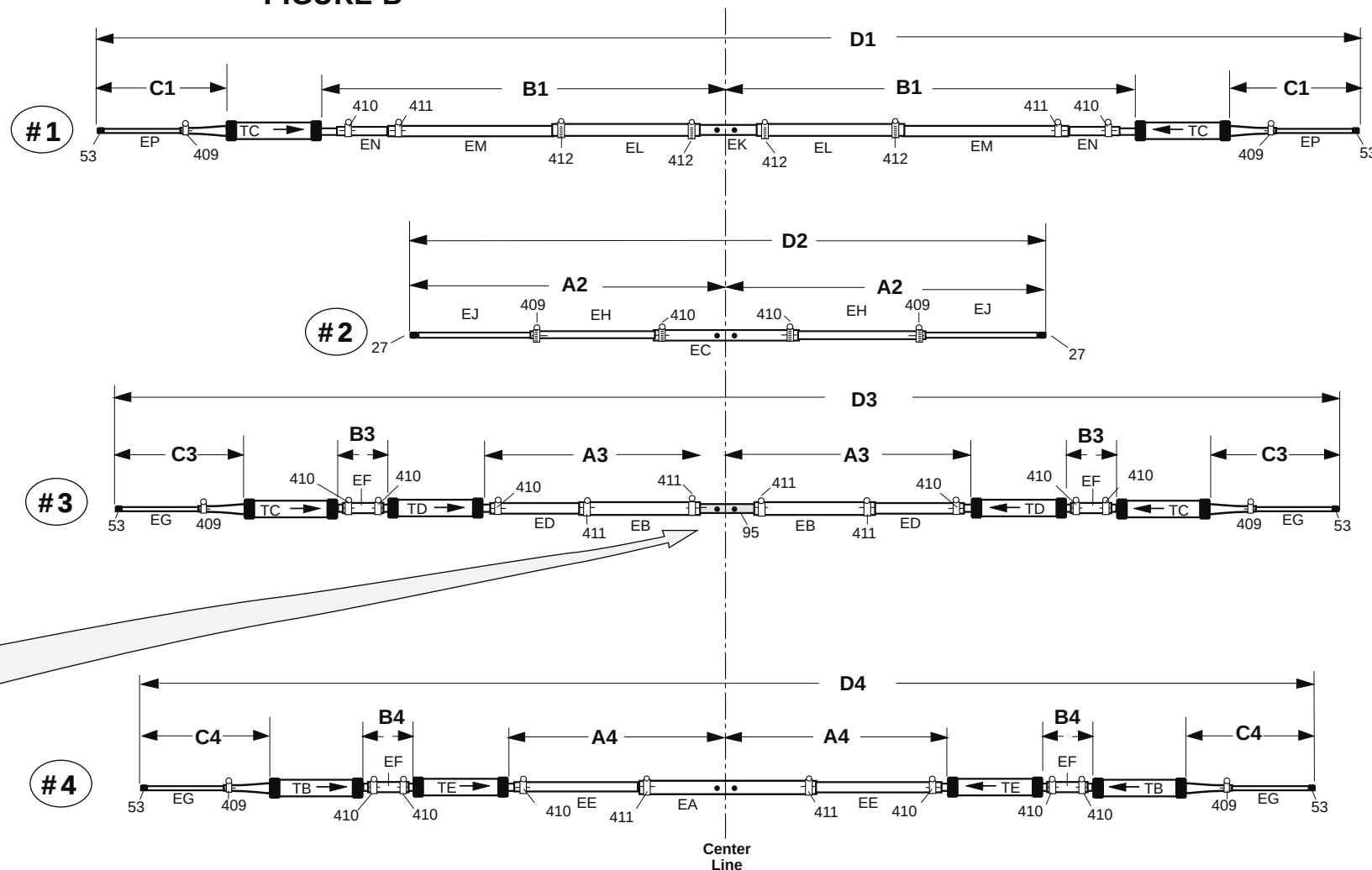


FIGURE C

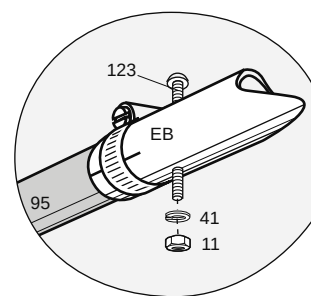
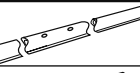
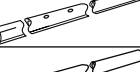
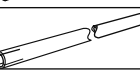
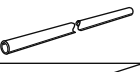
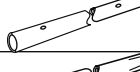
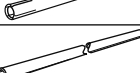
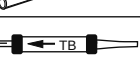
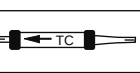
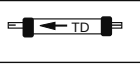
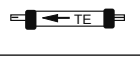
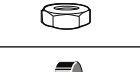
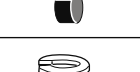
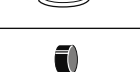
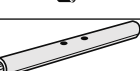
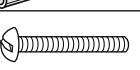
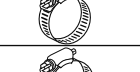
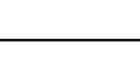


Chart 1

	#1 Reflector			#2 Reflector		#3 Driven Element				#4 Director			
	B1	C1	D1	A2	D2	A3	B3	C3	D3	A4	B4	C4	D4
Phone 	125-1/2" 3.188 m	46-1/2" 1.181 m	30' 8-1/4" 9.354 m	106-1/2" 2.705 m	17' 9" 5.41 m	78" 1.981 m	5-3/4" 14.6 cm	38-1/4" 97.2 cm	24' 2-1/2" 7.379 m	72-1/2" 1.842 m	7" 17.8 cm	34-3/4" 88.3 cm	22' 10-3/4" 6.979 m
Center 	128" 3.251 m	46-1/2" 1.181 m	31' 1-1/4" 9.481 m	107 1/2" 2.73 m	17' 11" 5.46 m	79" 2.007 m	5-3/4" 14.6 cm	38-1/4" 97.2 cm	24' 5-1/2" 7.455 m	74-1/2" 1.892 m	7" 17.8 cm	34-3/4" 88.3 cm	23' 3" 7.087 m
CW 	129-1/2" 3.289 m	46-1/2" 1.181 m	31' 4-1/2" 9.563 m	108-1/2" 2.756 m	18' 1" 5.51 m	82-1/2" 2.09 m	6-3/4" 17.1 cm	38-1/4" 97.2 cm	25' 1-1/2" 7.658 m	76-1/2" 1.943 m	7-1/2" 19.0 cm	34-3/4" 88.3 cm	23' 8" 7.214 m

Chart 2

BAND	20M	15M	10M
Phone	14.25	21.325	28.60
Center	14.170	21.275	28.40
CW	14.10	21.15	28.15
		Center Frequency (MHz)	

KEY	P/N	DISPLAY	DESC	SIZE	QTY
EA			ALUMINUM TUBING	1-1/8" x 72" (2.9 x 182.9cm)	1
EB			ALUMINUM TUBING	1-1/18" x 36" (2.9 x 91.4cm)	2
EC			ALUMINUM TUBING	7/8" x 36" (2.2 x 91.4cm)	1
ED			ALUMINUM TUBING	1" x 65" (2.5 x 165.1cm)	2
EE			ALUMINUM TUBING	1" x 46-1/2" (2.5 x 188.1cm)	2
EF			ALUMINUM TUBING	1" x 5-1/4" (2.5 x 13.3cm)	4
EG			ALUMINUM TUBING	1/2" x 35-7/8" (1.3 x 91.1cm)	4
EH			ALUMINUM TUBING	3/4" x 48" (1.9 x 121.9cm)	2
EJ			ALUMINUM TUBING	5/8" x 48" (1.6 x 121.9 cm)	2
EK			ALUMINUM TUBING	1-1/8" x 24" (2.9 x 121.9 cm)	1
EL			ALUMINUM TUBING	1-1/4" x 50" (3.2 x 127 cm)	2
EM			ALUMINUM TUBING	1-1/8" 72" (2.9 x 189.9 cm)	2
EN			ALUMINUM TUBING	1" x 24" (2.5 x 61.0 cm)	2
EP			ALUMINUM TUBING	1/2" x 48" (1.3 x 121.9 cm)	2
TB			DIRECTOR TRAP	15 METER	2
TC			DRIV & REFL TRAP	15 METER	4
TD			DRIV. TRAP	10 METER	2
TE			DIRECTOR TRAP	10 METER	2
11	010011		HEX NUT	#8-32	2
27	050027		BLK PLASTIC CAP	5/8" (1.6 cm)	2
41	011941		SPLIT LOCK WASHER	#8	2
53	050053		BLK PLASTIC CAP	1/2" (1.3 cm)	6
95	122095		FIBERGLASS INSULATOR	10" (2.54 cm)	1
123	010123		SS MACHINE SCREW	8-32 x 1-1/2" (3.81)	2
409	030409		SS WORM CLAMP	11/16" (1.7 cm)	8
410	030410		SS WORM CLAMP	1" (2.5 cm)	16
411	030411		SS WORM CLAMP	1-3/8" (3.5 cm)	8
412	030412		SS WORM CLAMP	1-1/2" (3.8 cm)	4

KEY	P/N	DISPLAY	DESC	SIZE	QTY
118	010118		SS HEX NUT	5/16" (.8 cm)	8
119	010119		SS LOCK WASHER	5/16" (.8 cm)	8
156	190156		ALUMINUM BRACKET	2" X 1-1/8" (5.08 X 2.86 cm)	4
405	010405		U-BOLT	2-1/8" x 4" (5.4 x 10.2cm)	4

#3 - ELEMENT MOUNTING

Attach elements according to Figures E and F. Check all dimensions for proper placement of elements on the boom. Level the elements and tighten all the nuts on the U-bolts that hold the elements on the boom. See Figure G for fine tuning the level of the elements. Check all traps to make sure that the arrows are pointed towards the boom and the drain holes are facing the ground so that moisture will not build up in the traps.

FIGURE D

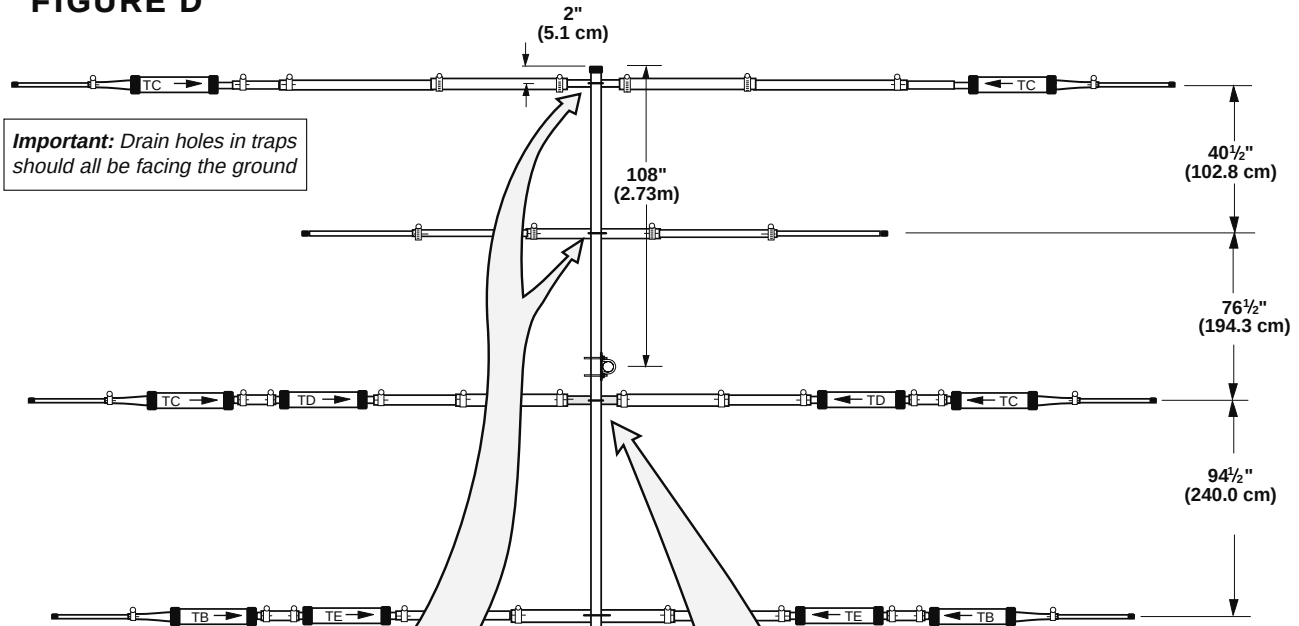


FIGURE E

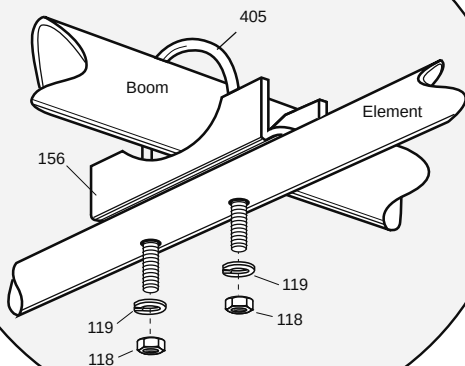


FIGURE F

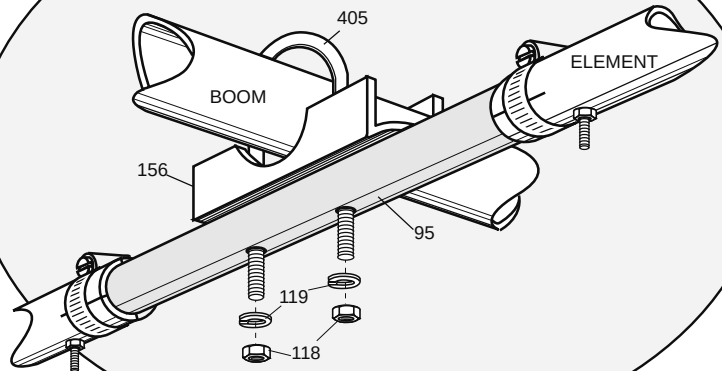
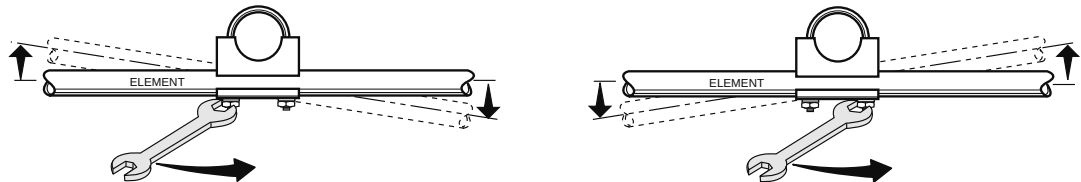


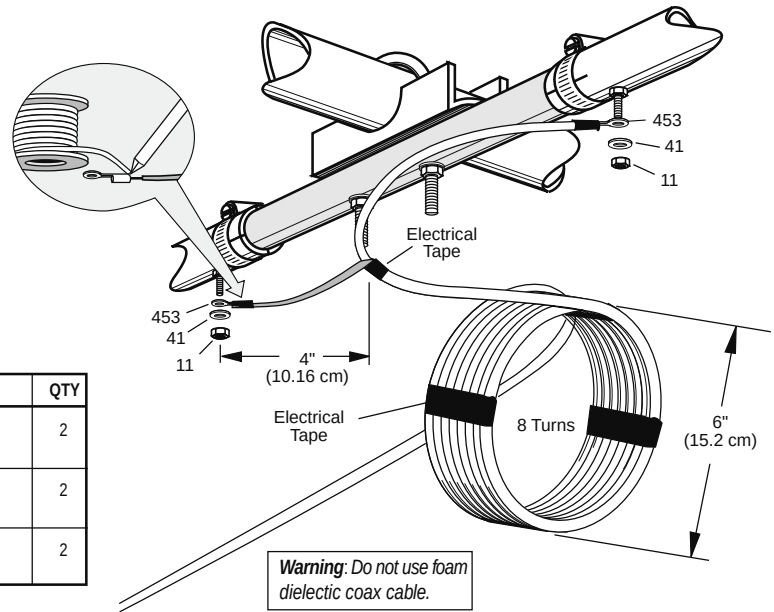
FIGURE G



#4 - RF CHOKE

A feedline should be prepared as shown in Figure H using the solder terminals (453) provided. A 1:1 balun may be installed at the feedpoint but it is not required. We recommend using an RF choke made from 8 turns of RG8U coaxial cable with 6 inch (15.2 cm) diameter. **Important-** Do not use foam dielectric coax for your RF Choke because when the coax is wound in a coil the center conductor may migrate away from the center and detune your choke. Attach the RF choke to the driven element using washers (41) and nuts (11) as shown in Figure H. Be sure to tape and seal the feedline against water at the point where the center dielectric and braid separate. Tape the feedline, between the feedpoint and the RF choke to the boom. Tape the RF choke to the mast. If you plan to install the antenna in a salty or corrosive environment, you may want to consider coating all elements with a clear marine varnish or its equivalent after it is assembled.

KEY	P/N	DISPLAY	DESC	SIZE	QTY
11	010011		HEX NUT	#8-32	2
41	011941		SPLIT LOCK WASHER	#8	2
453	100453		TERMINAL		2

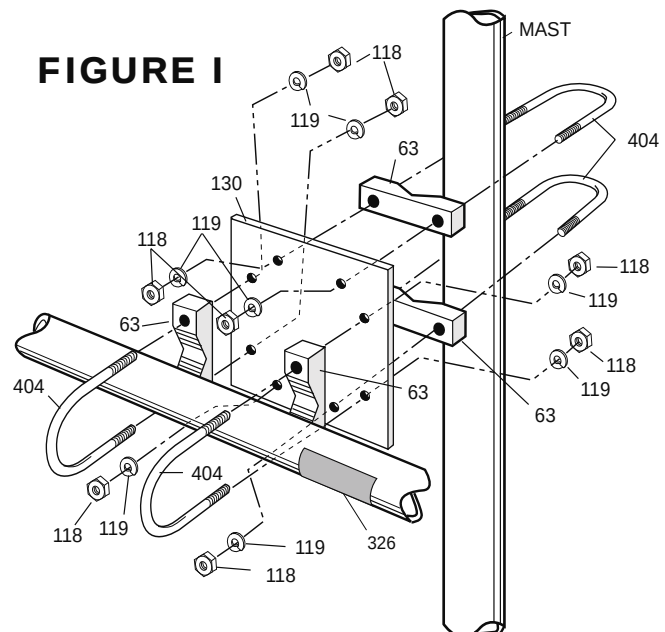


#5 - BOOM TO MAST ASSEMBLY

KEY	P/N	DISPLAY	DESC	SIZE	QTY
63	170063		V-BLOCK (fits 404 U-Bolt)	2" (5.1 cm)	4
118	010118		HEX NUT	5/16" (.8 cm)	8
119	010119		LOCK WASHER	5/16" (.8 cm)	8
404	010404		U-BOLT	2-1/8 x 3" (5.4 x 7.6 cm)	4
130	190130		MOUNTING PLATE	3/16" x 6" x 6" (.48 x 15.2 x 15.2 cm)	1
326	290326		DANGER LABEL		1

Attach the boom to your mast as shown in Figure I. First attach the mounting plate (130) to the BA section of the boom using U-bolts (404), washers (119), nuts (118), and V-blocks (63). Attach the mounting plate to the mast using the U-bolts (404), V-block (63), washers (119) and nuts (118). Return to the tuning section on page 1 for final checkout and tuning procedure.

FIGURE I



SPECIFICATIONS

Model	A4S
Frequency Ranges	28, 21, 14
Forward Gain, dBd	8.9
Front to Back Ratio, dB	25
2:1 Bandwidth KHz	>500
Power Rating, Watts PEP	2000
3 dB Beam Width, Deg. E Plane	58
Boom Length	18(5.48)
Boom Diameter, In (cm)	2 (5.10)
Longest Element, ft (m)	32 (9.75)
Element Center Dia, In (cm)	1.25 (3.18)
Turning Radius, ft (m)	18.4 (5.49)
Mast Size Range, In (cm)	1.25-2 (3.18-5.08)
Wind Load, ft ² (m ²)	5.50 (0.51)
Weight, lb (kg)	37 (16.8)

LIMITED WARRANTY

Cushcraft Corporation, P.O. Box 4680, Manchester, New Hampshire 03108, warrants to the original purchaser for one year from date of purchase that each Cushcraft antenna is free of defects in material or workmanship. If, in the judgement of Cushcraft, any such antenna is defective, then Cushcraft Corporation will, at its option, repair or replace the antenna at its expense within thirty days of the date the antenna is returned (at purchasers expense) to Cushcraft or one of its authorized representatives. This warranty is in lieu of all other expressed warranties, any implied warranty is limited in duration to one year. Cushcraft Corporation shall not be liable for any incidental or consequential damages which may result from a defect. Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damages, so the above limitation and exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This warranty does not extend to any products which have been subject the misuse, neglect, accident or improper installation. Any repairs or alterations outside of the Cushcraft factory will nullify this warranty.



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SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE