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**RINGO ANTENNAS**

**AR-2**

**AR-220 AR-450**



951284(5/82)

PARTS PACKAGE AR-2, AR-220

PART #	DESCRIPTION	QUANTITY
9	8 - 32 x 5/8" R H stainless steel machine screw -----	1
10	#8 Internal tooth Lockwashers -----	3
11	8 - 32 Hex Stainless Steel Nuts -----	4
47	1/4" - 20 x 3/4" R H Steel machine screw -----	1
74	Tuning Rod Clamp -----	1
27	5/8" Plastic cap -----	1
94	1/4" - 20 Steel Lock Nut -----	1
96	8 - 32 x 3/8" R H Stainless Steel machine screws -----	2
97	3/16" x 5" Formed Tuning Rod -----	1
G-8	3/4" Telescope Clamp -----	1

PARTS LIST AR-2, AR-220

DESCRIPTION	QUANTITY	
	AR-220	AR-2
Base assembly with insulator and coax fitting -----	1	1
5/8" x 15" .049 wall aluminum tubing -----	1	1

INSTALLATION SUGGESTIONS

Your Cushcraft Ringo is designed and manufactured to give top performance and trouble free service. It will perform as specified if the assembly and installation suggestions are followed.

**MASTING:** The AR-2 and AR-220 will take up to a 1 1/4" O.D. mast. For most installations, a 1 1/4" television type tubing will be satisfactory. The AR-450 will take up to a 7/8" O.D. mast.

**MOUNTING:** Mount the antenna as high and in the clear as possible. The Ringo may be mounted on the top of the center support of a stacked array such as the 22 element Power Pack. When tower side mounting any of the Ringos, keep them at least 1/4 wavelength out from the tower.

**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. **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. CONSULT THE NATIONAL ELECTRICAL CODE FOR FURTHER DETAILS.**

The following assembly instructions apply to the AR-2 and AR-220 antennas. The AR-450 antennas are preassembled so require only adjustment and tuning to frequency.

**RING ASSEMBLY:** attach one end of the base ring to the top of the upper bracket and the opposite end to the bottom of the lower bracket, figure 1. Assemble the 8 - 32 x 5/8" machine screw and 8 - 32 hex nut to the tuning rod clamp. Slide the clamp over the ring and tuning rod through the hole in the clamp. Attach the flattened end of the tuning rod to the top of the coax fitting with a #8 lockwasher and 8 - 32 hex nut, figure 1. With the base brackets pointing toward you, the tuning rod should be on the left side of the assembly as shown in figure 1.

Slide the 5/8" tubing section into the 3/4" base section to dimension A. CHART 1 is for the AR-2 CHART 2 is for the AR-450, the 3/8" section should be adjusted to dimension A. Estimate the dimension if your frequency is between those listed on the chart. Adjust the AR-220 dimension A to 25".

### TUNING INSTRUCTIONS:

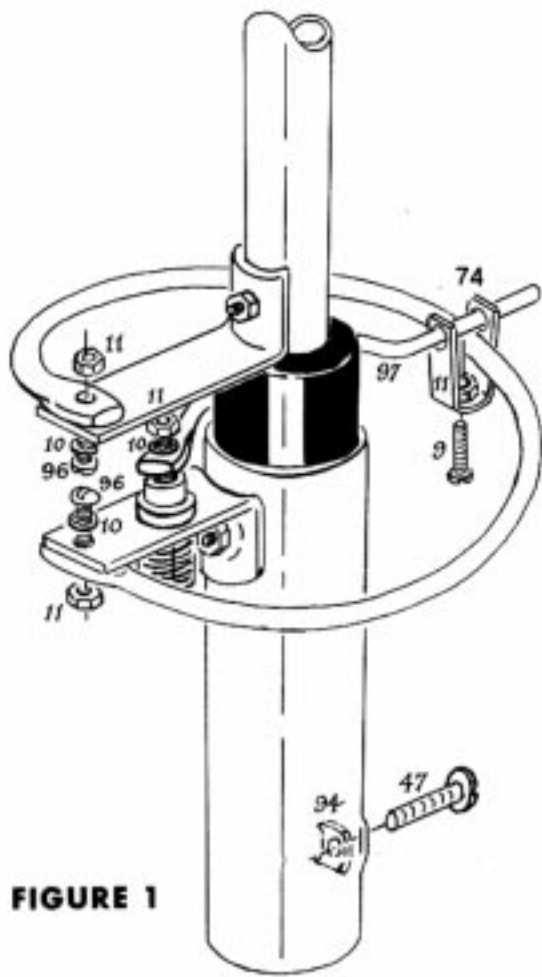
Use a good quality 52-ohm coaxial cable with a PL-259 connector. When tuning, mount the antenna as high and in the clear as possible. Use a good quality standing wave ratio bridge. It is preferable to mount the bridge at the antenna for tuning. Set the transmitter to your center operating frequency. Adjust the transmitter and bridge for maximum forward power. Check the standing wave ratio or reflected power with the bridge in the reverse position. Move away from the antenna when making measurements.

**AR-2 and AR-220:** If the SWR is high, loosen the tuning rod clamp and adjust the rod slightly in either direction. If the SWR increased, move the rod back to its original position and adjust in the opposite direction. If the SWR dropped, repeat the adjustment procedure until there is little or no reflected power indicated on the bridge. Tighten the tuning rod clamp securely.

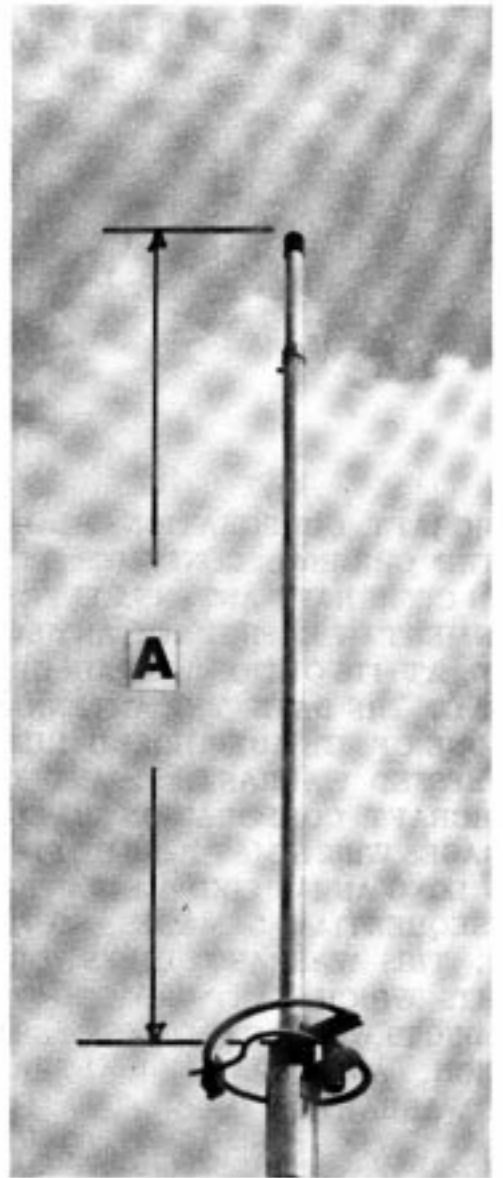
**AR-450:** If the SWR is high, loosen the 1/2" telescope clamp on the lower section, and adjust the 3/8" section slightly in either direction. If the SWR increased, move the 3/8" section back to its original position and adjust in the opposite direction. If the SWR dropped, repeat the adjustment procedure until there is little or no reflected power indicated on the bridge.

When the antenna is completely assembled and tuned, tape the feed line and tuning rod to ring connections, and coat with a clear acrylic spray or equal. Run the coaxial feed line down the mast and use tape to hold it in position.

CHART #1		CHART #2	
Freq. MHz	Dim. A	Freq. MHz	Dim. A
135	41 1/2"	420	13 1/2"
140	39 1/2"	440	12 1/2"
145	38 1/2"	460	12"
150	37"	470	11 1/2"
155	35 3/4"		
160	34 3/4"		
165	33 3/4"		
170	32 3/4"		
175	31 3/4"		
180	30 3/4"		



**FIGURE 1**



" LIMITED WARRANTY "

USHCRAFT CORPORATION, P. O. BOX 4680, MANCHESTER, NEW HAMPSHIRE 03108 WARRANTY  
TO THE ORIGINAL CONSUMER PURCHASER FOR ONE YEAR FROM DATE OF PURCHASE THAT  
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JUDGMENT OF CUSHCRAFT, ANY SUCH ANTENNA IS DEFECTIVE, THEN CUSHCRAFT CORPORATION  
WILL, AT ITS OPTION, REPAIR OR REPLACE THE ANTENNA AT ITS EXPENSE WITHIN THIRTY  
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THIS WARRANTY.



P.O. BOX 4680, MANCHESTER, N.H. 03108

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