

**RINGO RANGERS**  
**ARX-2**  
**ARX-220 ARX-450**



951289  
TA5FA

PARTS LIST ARX-2

DESCRIPTION	QUANTITY
Base section with brackets and connector -----	1
5/8" x 15" .049 Wall aluminum tubing -----	1
1/2" x 21" .049 Wall aluminum tubing -----	1
1/2" x 24" .049 Wall aluminum tubing with insulator - -----	1
3/8" x 35" .028 Wall aluminum tubing -----	1
10-1/2" formed aluminum phasing stub -----	1
5" round x 1/4" rod base ring -----	1

PARTS PACKAGE ARX-2, ARX-220

PART #	DESCRIPTION	QUANTITY
9	8-32 x 5/8" SS machine screws -----	2
10	#8 Internal tooth lockwashers-----	3
11	8-32 Hex SS nuts -----	4
47	1/4" - 20 x 3/4" R.H. steelmachine screw -----	1
67	Tuning rod clamp -----	1
77	3/8" Plastic cap -----	1
94	1/4" - 20 Steel lock nut -----	1
96	8-32 x 3/8" R.H. SS machine screws-----	2
97	3/16" x 5" formed tuning rod -----	1
G-6	1/2" Telescope clamp -----	1
G-7	5/8" Telescope clamp -----	1
G-8	3/4" Telescope clamp -----	1

PARTS LIST ARX-220

DESCRIPTION	QUANTITY
Base section with brackets and connector -----	1
5/8" x 15" .049 Wall aluminum tubing -----	1
1/2" x 12" .049 Wall aluminum tubing -----	1
1/2" x 12" .049 Wall aluminum tubing with insulator -----	1
3/8" x 24" .028 Wall aluminum tubing -----	1
6-3/4" Formed aluminum phasing stub -----	1
5" round x 1/4" rod base ring -----	1

PARTS LIST ARX-450

DESCRIPTION	QUANTITY
Preassembled base and ring assembly -----	1
Preassembled 3/8" x 28-3/4" section, with phasing stub-----	1

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## INSTALLATION SUGGESTIONS

Your Cush Craft Ringo Ranger is designed and manufactured to give top performance and trouble-free service. It will perform as specified, if the assembly and installation instructions are carefully followed.

**MASTING:** The ARX-2 and ARX-220 will take up to a 1-3/8" O.D. mast. For most installations, a 1-1/4" television type tubing will be satisfactory. The ARX-450 will take up to a 1" O.D. mast.

**MOUNTING:** Mount the antenna as high and in the clear as possible. The Ringo Ranger 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 Ringo Rangers, keep them at least 1/4 wavelength out from the tower.

**LOCATION:** This is very important. Surrounding objects such as trees, power lines, other antennas etc., will seriously reduce efficiency. To minimize the effect 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 to eliminate resonances.

**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 the 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 lock washer 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.

**ARX-2:** (1) Insert the 1/2" x 21" tubing into the insulator on the 1/2" x 24" tubing, and align the holes properly. Insert the ends of the 10-1/2" formed phasing stub through the insulator holes. Turn the 8-32 x 5/8" stainless steel machine screw, from the parts package, into the threaded insulator hole, so that it threads the hole in the aluminum tubing. The screw may turn hard as it self-taps through the tubing. (2) Adjust the stub length for your operating frequency, Dimension C, Chart 1. Tighten securely with both 8-32 x 5/8" stainless steel machine screws. (3) Slide the marked end of the 5/8" x 15" tubing section into the 3/4" base section as far as the single black line. Tighten securely with the 3/4" telescope clamp. (4) Slide the non-slotted end of the 1/2" tubing phasing stub section into the 5/8" section, to the correct length for your operating frequency, Dimension A, Chart 1 (see illustration). Estimate the dimension, if your frequency is between those listed on the chart. Tighten securely with the 5/8" telescope clamp. (5) Slide the 3/8" tubing section into the 1/2" section, to the correct length for your operating frequency, Dimension B, Chart 1. Tighten securely with the 1/2" telescope clamp. Press the 3/8" plastic cap onto the end of the 3/8" section. Slide the lock nut into the indentation in the mast mount, with the points toward the mast. Thread the 1/4" - 20 round head screw through the hole in the mast mount and lock nut. Slide the mast into the mount, tighten the bolt and nut securely against the mast, figure 1.

**ARX-220:** The assembly procedure for the ARX-220 is the same as that for the ARX-2, but do not use Chart 1. Set Dimension A to 33-1/8", Dimension B to 32", and Dimension C to 5-3/4". The antenna will cover the entire 220 MHz band.

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ARX-450: Slide the uncapped end of the 3/8" tubing section into the 1/2" base section, and adjust so that Dimension A is 17". Tighten securely with the 1/2" telescope clamp. Adjust the phasing stub, Dimension C, to 3" (see diagram inset). The antenna will cover the entire frequency range from 435 to 450 MHz. For operation from 450 to 470 MHz set the lower Dimension A to 16-1/2", and the stub Dimension C to 2-7/8". Tighten the stub securely with the two 6-32" x 3/8" stainless steel machine screws.

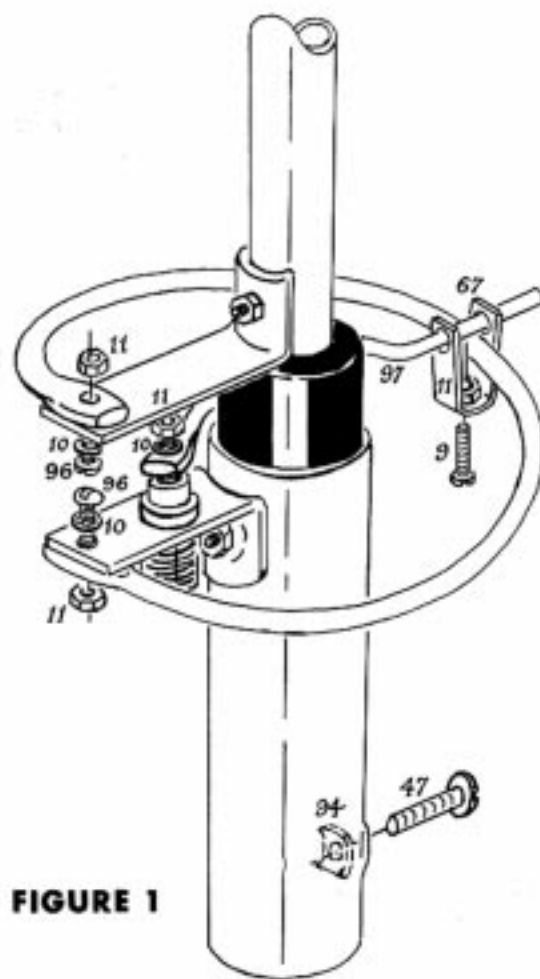
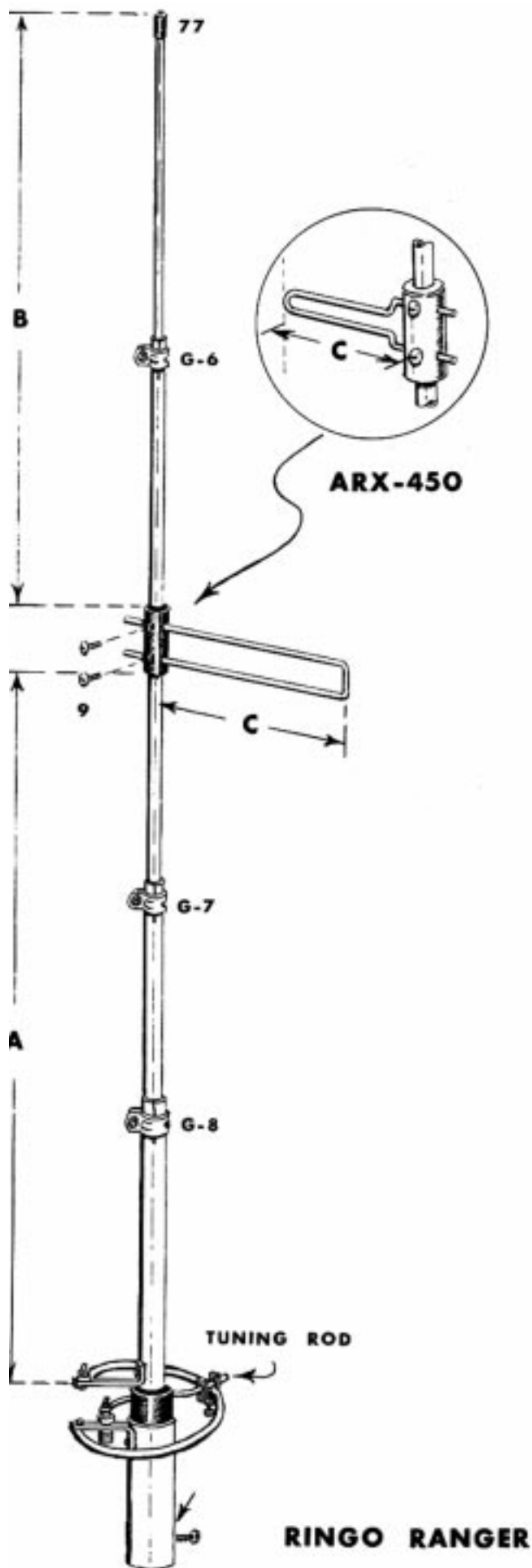
#### TUNING INSTRUCTIONS:

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.

ARX-2 and ARX-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.

ARX-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.



**FIGURE 1**

**CHART 1**

Freq. MHz	Dimension A	Dimension B	Dimension C
135	59-1/2"	54-1/2"	9-3/4"
137	58-3/4"	53-3/4"	9-1/2"
140	57-1/2"	52-1/2"	9-1/4"
142	56-3/4"	51-3/4"	9-1/8"
145	55-1/2"	50-1/2"	9"
147	54-3/4"	49-3/4"	8-7/8"
150	53-1/2"	48-3/4"	8-3/4"
152	52-3/4"	48"	8-5/8"
155	51-3/4"	47"	8-1/2"
157	51"	46-1/4"	8-3/8"
160	50"	45-1/2"	8-1/4"

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**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 BULDINGS. 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 EN-CLOSED PAMPHLET.

**LIMITED WARRANTY**

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