



308 Industrial Park Road

Starkville, MS 39759 USA,

Ph: (662) 323-9538 FAX: (662) 323-651

# Model V-4R Collinear Gain Vertical for 420-450 MHz

## INSTRUCTION MANUAL

### General

The new Hy-Gain V-4R 70cm antenna is a collinear, dual 5/8-wave, omnidirectional, vertical antenna for the 420-450 MHz amateur band. The V-4R features two sets of 1/4-wave radials which properly decouple the lower 5/8-wave radiator from the mast. It also features a 500 watt enclosed coil that matches the antenna to a nominal 50 ohms. The ruggedized V-4R is suitable for personal use, repeater, and packet BBS service.

The feedpoint is a high quality "N" type connector that is protected from the weather within the lower radiator. The V-4R also features a mast-to-mast bracket that will accept up to a two inch O.D. mast.

The V -4R can be used outside of the 70cm amateur band. Graphs are supplied so that the antenna can be set to any frequency between 400 and 470 MHz.

### SPECIFICATIONS

VSWR at Resonance .....	less than 1.5:1
2:1 VSWR Band Width.....	27 MHz minimum
Power Gain.....	3 dBd (5.2 dBi)
Antenna/Mast Isolation.....	20 dB
Power Input .....	500 watts continuous
Lightning Protection .....	DC ground
Height (nominal).....	46 inches (1.17 m)
Wind Area .....	0.31 sq. ft. (0.03 sq.m)
Maximum Mast O.D. ....	2 inches (5.08 cm)
Hardware .....	18-8 stainless steel except for U-bolts
Maximum Wind Survival (no ice) .....	230 mph (370.15 kmph)

### Assembly

Unpack the antenna and check the parts against the Parts List and drawings.

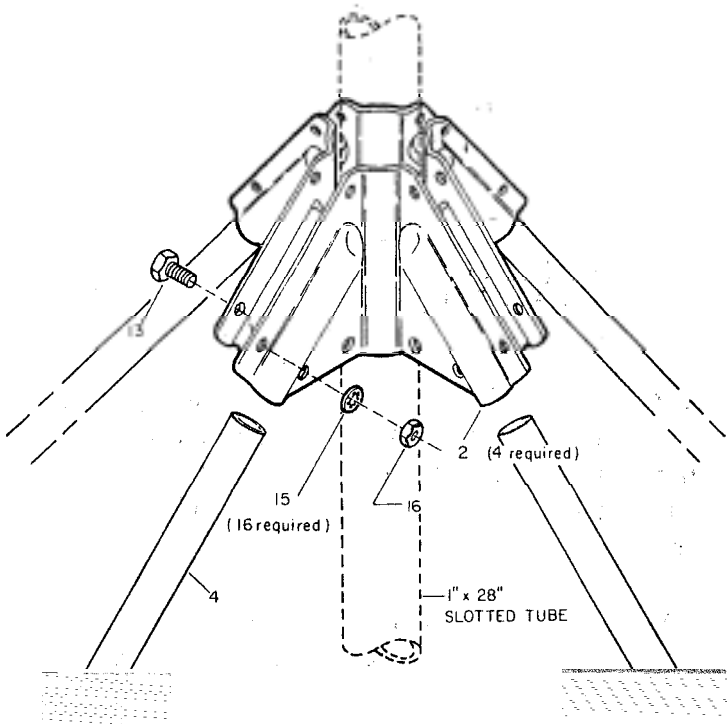
Select four of the radial clamps and associated hardware and loosely assemble them as shown in Figure 1.

Repeat the previous step for the remaining four radial clamps.

Set both assembled clamps upside down on a flat surface.

Select the eight (8) 7/16" x 6" radial tubes (Item No. 4), and insert them completely into the assembled radial clamps.

Tighten the outer eight (8) bolts of each assembly just enough to hold the radial tubes in place. These bolts will be securely tightened in a later step.



No.	Description
2	Radial Clamp, 45 degrees
4	Tube, 7/16" O.D. x 6"
6	Tube, 1" O.D. x 28", slotted
13	Bolt, #10-24 x 1/2", hex head
15	Lockwasher, #10, internal
16	Nut, #10-24, hex

Figure 1 Radial Clamp Assembly

Item No.	Description
1	Mast-to-Mast Bracket Plate, 1 1/8"
3	Mast-to-Mast Bracket Clamp, 1 1/8"
6	Tube, 1" O.D. x 28", slotted
18	Bolt, 1/4"-20 x 3/4", hex head
20	Lockwasher, 1/4", internal
21	Nut, 1/4"-20, hex
23	U-bolt, 5/16" x 2" x 2 11/16"
24	Lockwasher, 5/16", split
25	Nut, 5/16"-18, hex

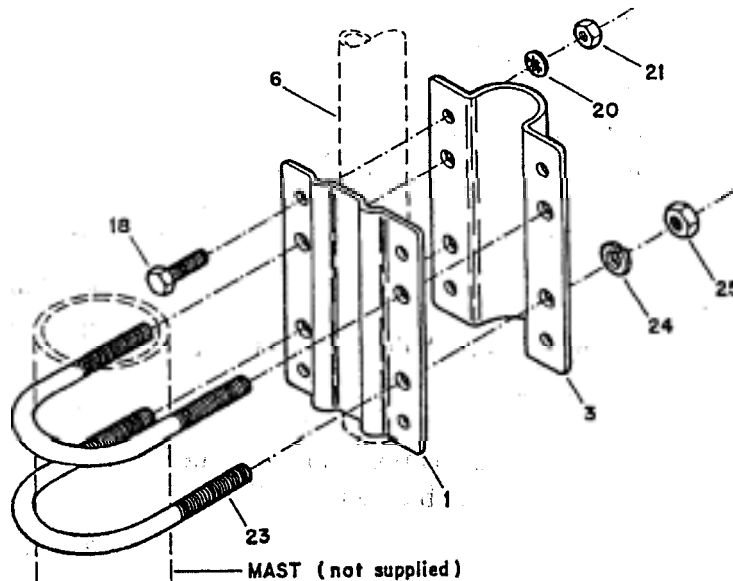


Figure 2 Mast-to-Mast Clamp

Select the 1" x 28" tube (Item No. 6).

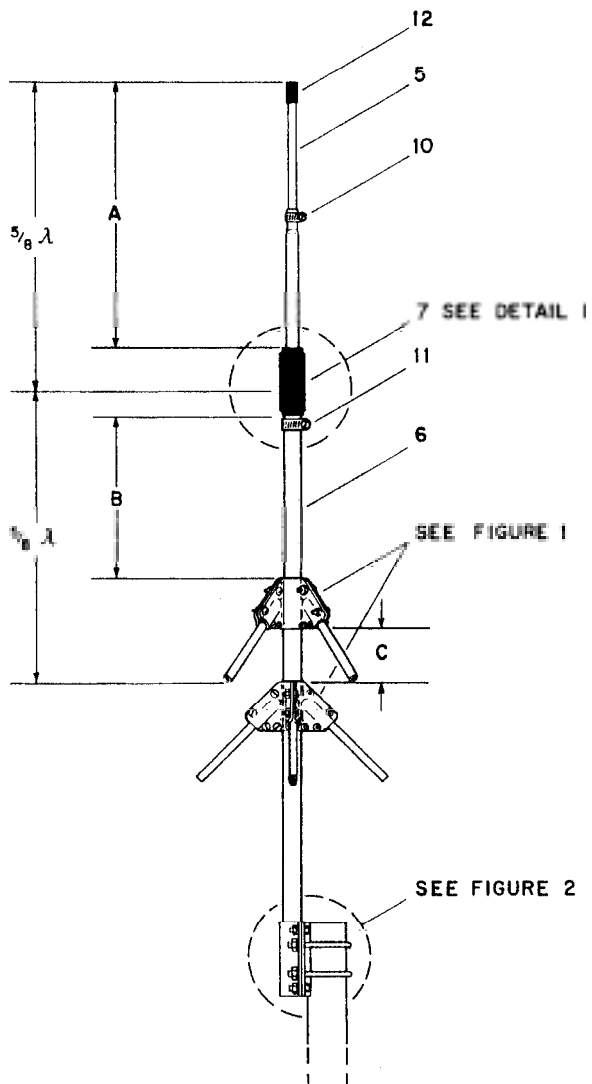
Slip both radial assemblies over the bottom of the 28 inch tube and position as shown in Figure 3. The unslotted end of the 28 inch tube is the bottom. Determine the "B" dimension from Figure 6. For example, at 445 MHz, B = 6 3/8" (162 mm). Determine the "C" dimension from Figure 7. At 445 MHz, C = 2 1/4" (57 mm). Tighten all bolts in both radial assemblies securely and evenly.

Select the mast-to-mast clamp, plate, and associated hardware and loosely assemble them as shown in Figure 2.

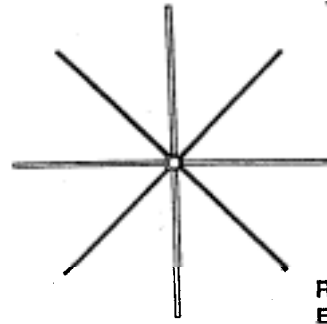
Slide the assembled mast-to-mast clamp over the bottom end of the 28" tube as shown in Figure 2 and securely tighten the four (4) 1/4"-20 x 3/4" bolts, nuts and lockwashers (Item No.s 18, 20, & 21).

Select the V-4R coil assembly. The coaxial cable will attach to this in a later step.

NOTE: The end of the 1" x 28" tube (Item 6) . should be even with the bottom of the mast-to-mast brackets (Items 1 and 3).

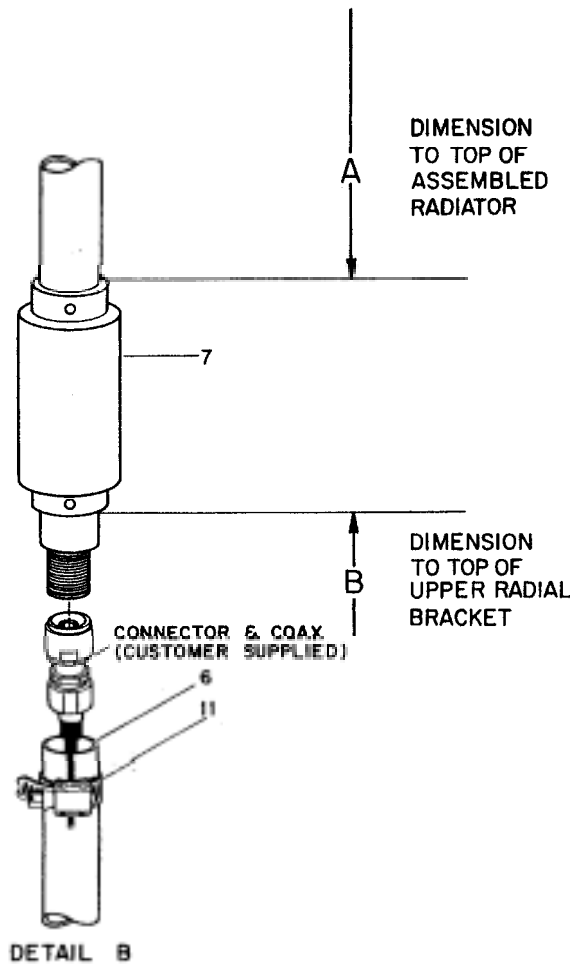


Item No.	Description
5	Tube, 5/8" x 9 1/2"
6	Tube, 1" O.D. x 28", slotted
7	Coil, 500 watt, UHF
10	Clamp, #6 tubing
11	Clamp, #10 tubing
12	Caplug, 5/8", black



RADIALS AS SEEN FROM EITHER THE TOP OR THE BOTTOM.

Detail A  
Top or Bottom View of Radials



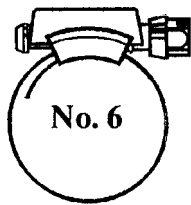
DETAIL B  
Connecting Coax to Coil

Figure 3  
Overall View

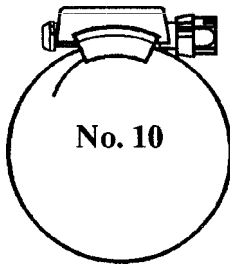
Select the No. 6 clamp (Item 10) and slide over the swaged end of the 7/8" tubing attached to the coil assembly. Insert the 5/8" x 9 1/2" tube into the 7/8" tube.

Check all measurements for accuracy prior to the installation of your antenna. Refer to the tuning charts for additional resonant frequency settings.

Adjust dimension "A" to the desired setting per the graph in Figure 5. For example, at 445 MHz, A = 12 1/2" (318 mm). Tighten the tubing clamp securely, until the tubing will not twist or telescope.



Part No.	Description	Fits Tubing Sizes
358756	Clamp, Size #6 all stainless steel 5/16" hex head screw	1/2" & 3/4"



Part No.	Description	Fits Tubing Sizes
358757	Clamp, Size #10 all stainless steel 5/16 hex head screw	1"

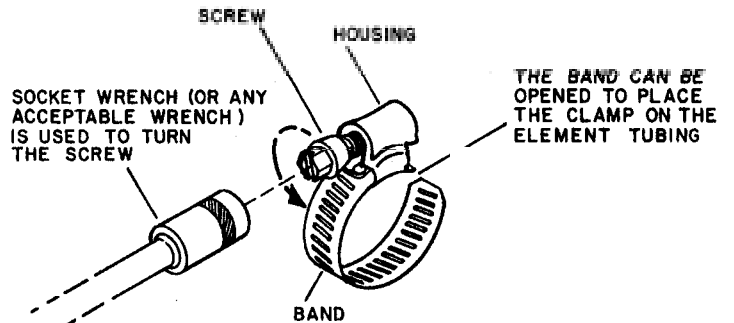
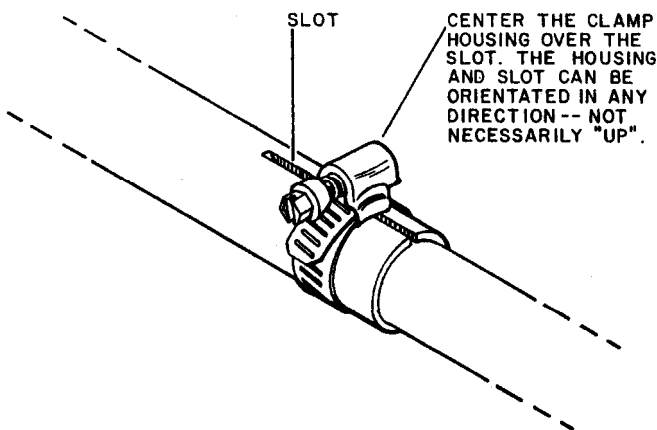


Figure 4  
Compression Clamps

V-4R UHF  
 420-450 MHz  
 COLLINEAR VERTICAL

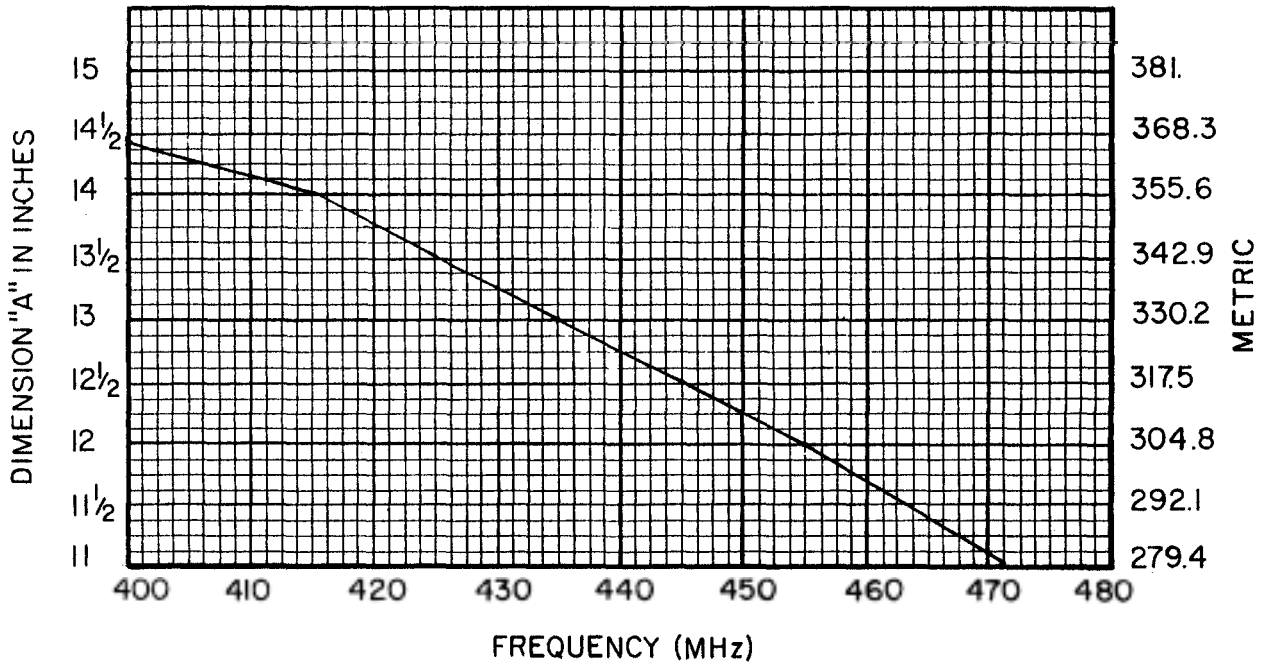


Figure 5  
 Dimension "A" Chart

V-4R UHF  
 420-450 MHz  
 COLLINEAR VERTICAL

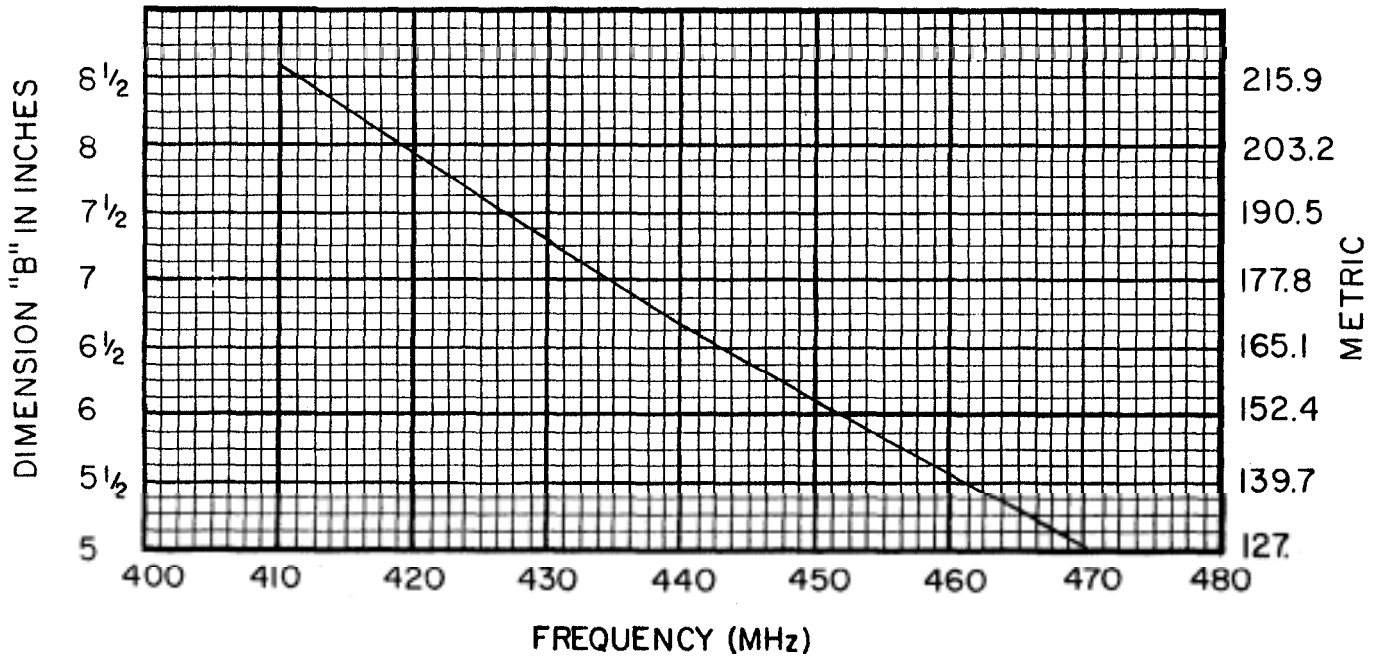


Figure 6 Dimension  
 "B" Chart

V-4R UHF  
420-450 MHz  
COLLINEAR VERTICAL

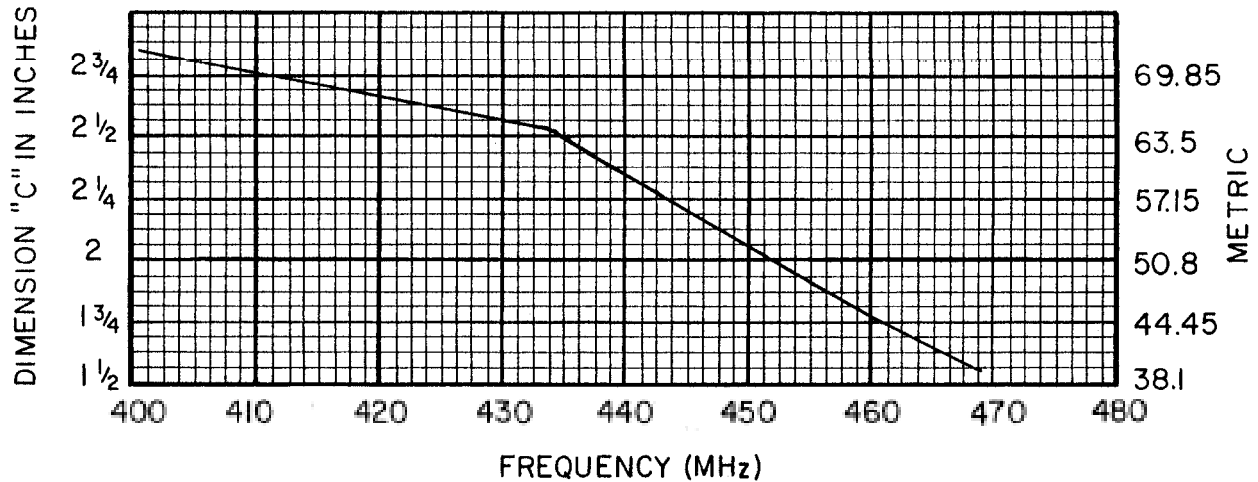


Figure 7  
Dimension "C" Chart

Tighten the tube clamp securely.

Select the 5/8" caplug (Item No. 12) and slip over the end of the 5/8" tube.

Select the No. 10 tube clamp and slip it over the top end of the 1" x 28" tube. Position it as shown in Figure 4 and tighten it just enough to prevent it from sliding down the tube.

### Installation

There are two ways to attach your coax to the V-4R antenna. The first method involves attaching a short length of coax to the antenna before attaching the antenna to the supporting mast.

The remaining length of coax can then be attached and routed to the radio. The short length of coax must be at least three feet (3') long, so the connection between coax lengths can be made below the mast-to-mast bracket.

The second method involves attaching the complete length of coax to the antenna before attaching the antenna to the supporting mast. In this method, the antenna and entire coax length must be carried up the tower or mast.

Choose one of the suggested methods of attaching the coax to the V4R.

Insert one end of the coax into the bottom of the 1" x 28" tube. Push the coax through until the connector emerges from the top of the tube.

Screw the connector onto the V-4R coil assembly.

Push the coil assembly into the top of the 1" x 28" tube until the matching coil rests on the one inch tube. Tighten the one inch compression clamp securely.

The antenna can now be mounted on a mast (2" O.D. max.). For adequate lightning protection, the antenna supporting structure must be well grounded.

### WARNING

Installation of this product near power lines is dangerous. For your safety, follow the installation directions.

Several antennas may be mounted on the same mast. Your V4R should be mounted above the other antenna for best performance. When side mounting the V4R on a tower, it should be kept at least 10 inches away from the tower.

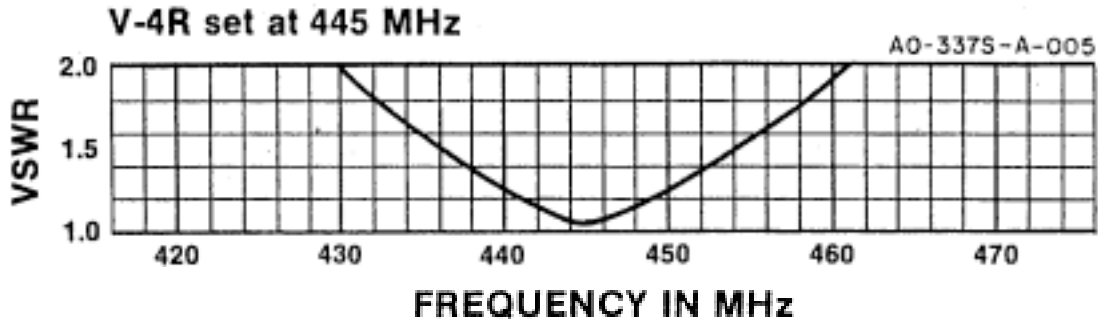


Figure 8  
VSWR Chart

PARTS LIST

Item No.	Part No.	Description	Qty
1	160011	Mast-to-Mast bracket plate, 1 1/8"	1
2	160012	Radial clamp, 45 degrees	8
3	160047	Mast-to-mast bracket clamp, 1 1/8"	1
4	170474	Tube, 7/16" O.D. x 6"	8
5	179803	Tube, 5/8" x 9 1/2"	1
6	191003	Tube, 1" O.D. x 28", slotted	1
7	878646	Coil, 500 watt, UHF	1
	878647	Parts Pack, V -4R Stainless Steel	1
8		(Not Used)	
9		(Not Used)	
10	358756	Clamp, #6 tube	1
11	358757	Clamp, #10 tube	1
12	450503	Caplug, 5/8", black	1
13	500158	Bolt, #10-24 x 1/2", hex head	33
14		(Not Used)	
15	565697	Lockwasher, #10, internal	33
16	554071	Nut, #10-24, hex	33
17		(Not Used)	
18	505266	Bolt, 1/4"-20 x 3/4", hex head	4
19		(Not Used)	
20	562961	Lockwasher, 1/4", internal	5
21	554099	Nut, 1/4"-20, hex	4
22		(Not Used)	
23	540036	U-bolt, 5/16" x 2" x 2 11/16"	2
24	564792	Lockwasher, 5/16", split	4
25	555747	Nut, 5/16"-18, hex	4

NOTE: Some extra small parts are included to replace lost parts during

## **hy-gain**® LIMITED WARRANTY

**Hy-Gain** Warrants to the original owner of this product, if manufactured by **Hy-Gain** and purchased from an authorized dealer or directly from **Hy-Gain** to be free from defects in material and workmanship for a period of 12 months for rotator products and 24 months for antenna products from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original or machine reproduction of such proof of-purchase to **Hy-Gain** at the time of warranty service. **Hy-Gain** shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.
2. **Hy-Gain** agrees to repair or replace at **Hy-Gain's** option without charge to the original owner any defective product under warranty, provided the product is returned postage prepaid to **Hy-Gain** with a personal check, cashiers check, or money order for \$8.00 covering postage and handling.
3. Under no circumstances is **Hy-Gain** liable for consequential damages to person or property by the use of any **Hy-Gain** products.
4. Out-of-warranty Service: **Hy-Gain** will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.
5. This warranty is given in lieu of any other warranty expressed or implied.
6. **Hy-Gain** reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
7. All **Hy-Gain** products to be serviced in-warranty or out-of-warranty should be addressed to **hy-gain, 308 Industrial Park Road, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
8. This warranty gives you specific rights, and you may also have other rights which vary from state to state.