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V-42R

Dual Band Collinear Gain Vertical
for 144-148 MHz and 436-450

INSTRUCTION MANUAL

GENERAL DESCRIPTION

The new Hy-Gain V-42R, dual band antenna is a collinear 5/8-wave omnidirectional vertical antenna for the 2 meter and 70 cm bands. The V-42R features sets of 1/4-wave radials which properly decouple the 5/8-wave radiators from the mast. It also features an enclosed coil that matches the antenna to a nominal 50 ohms on each band. The ruggedized V-42R is suitable for personal use, repeater, and packet BBS service.

The feedpoint is a type N connector that is protected from the weather within the lower radiator. The V-42R also features a mast-to-mast bracket that will accept up to a two inch O.D. mast.

The V-42R can also be used outside of the Amateur bands. Graphs are supplied so that the antenna can be set to any frequency between 143 and 153 MHz, and 436 to 455 MHz, independently.

SPECIFICATIONS

VSWR at Resonance.....	less than 1.5:1
2:1 VSWR Band Width.....	20 MHz on UHF. 5 MHz on VHF
Power Gain-	5dBd on UHF, 3 dBd on VHF
Antenna/Mast Isolation.....	20dB Power
Input.....	200 watts continuous
Lightning Protection.....	DC ground
Height (nominal).....	108 inches (2743 mm)
Wind Area	0.67 sq. ft. (.062 sq. m)
Maximum Mast O.D.	2 inches (51 mm)
Hardware	18-8 stainless steel except for U-bolts
Maximum Wind Survival without ice)	100 mph (162 kmph)
Net Weight	6.3 lbs (2.86 kg)

ASSEMBLY

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

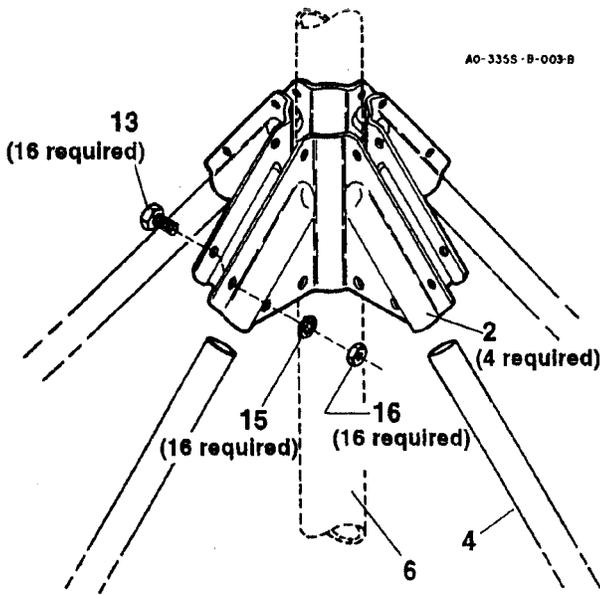
Select four of the VHF radial clamps and associated hardware and loosely assemble them as shown in Figure 1.

Repeat the previous step for the remaining four VHF radial clamps.

Set both assembled clamps upside down on a flat surface.

Select the eight (8) 7/16" x 17 1/8" radial tubes (Item No. 4), and insert them completely into the assembled radial clamps.

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



Item No.	Description
2	Radial Clamp, 45 degrees
4	Tube 7/16" x 17 1/8"
6	Tube, 1" O.D. x 60", slotted
13	Bolt, #10-24 x 1/2", hex head
15	Lockwasher, #10, internal
16	Nut, #10-24, hex

Figure 1 VHF Radial Clamp Assembly

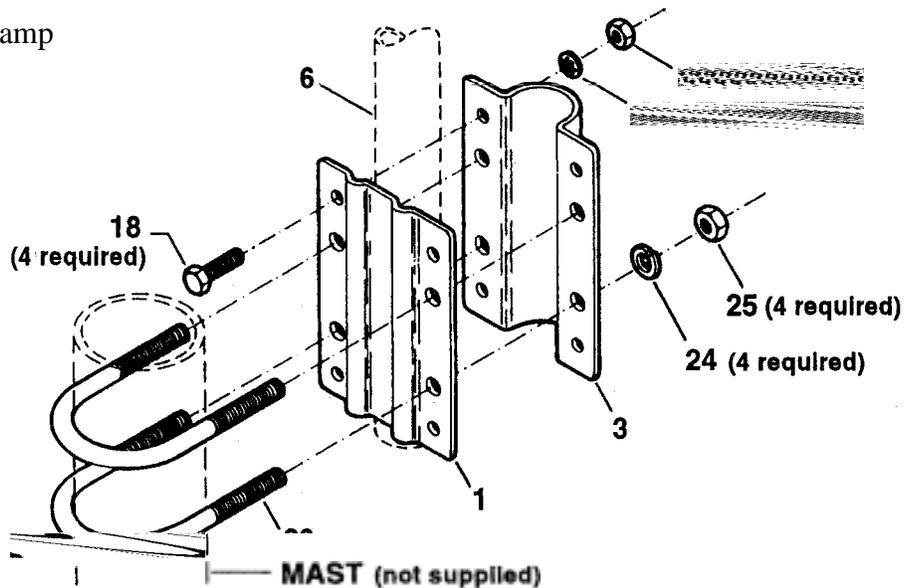
Select the 1" x 60" tube (Item No. 6).

Slip both radial assemblies over the bottom of the 60" tube and position as shown in Figure 4 and Detail A. The unslotted end of the 60" tube is the bottom. Determine the "B" dimension from Figure 7. For example, at 146 MHz, B = 23 1/2" (597 mm).

Tighten all screws 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 60" tube as shown in Figure 2 and securely tighten the four (4) 1/4"-20 x 3/4" bolts, nuts and lockwashers (Item Nos. 18, 20 & 21).



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 60", 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

NOTE: The end of the 1" x 60" tube (Item 6) should be even with the bottom of the mast-to-mast brackets (Item 1 and 3).

Figure 2 Mast-to-Mast Clamp

UPPER RADIATOR/COIL ASSEMBLY

Refer to Figure 3 and 4.

Select the V-42R Coil assembly. The coaxial cable will attach to this in a later step.

Select one No. 10 compression clamp (Item 11) and install over the slotted tube end of the coil assembly (Item 8).

Select the 7/8" O.D. x 31" tube (Item 7) and insert the plain end into the slotted tube of the coil assembly 2". Position the compression clamp as shown in Figure 5 and tighten securely. The exposed length of this tube should be 29" (737 mm).

Select one No. 6 compression clamp (Item 10) and place over the swaged/slotted end of the 7/8" tube (Item 7).

Select the 5/8" x 15" (Item 5) tube and insert either end into the 7/8" tube (Item 7).

Refer to Figure 4. Adjust the 5/8" x 15" tube so dimension "A" is equal to 45" for two meter operation. Tighten the No. 6 compression clamp (Item 6) securely.

NOTE: The tuning charts in this manual are accurate. However, due to variation in installations some minor adjustments may be required to resonate the antenna on the desired frequency.

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

UHF RADIAL ASSEMBLY

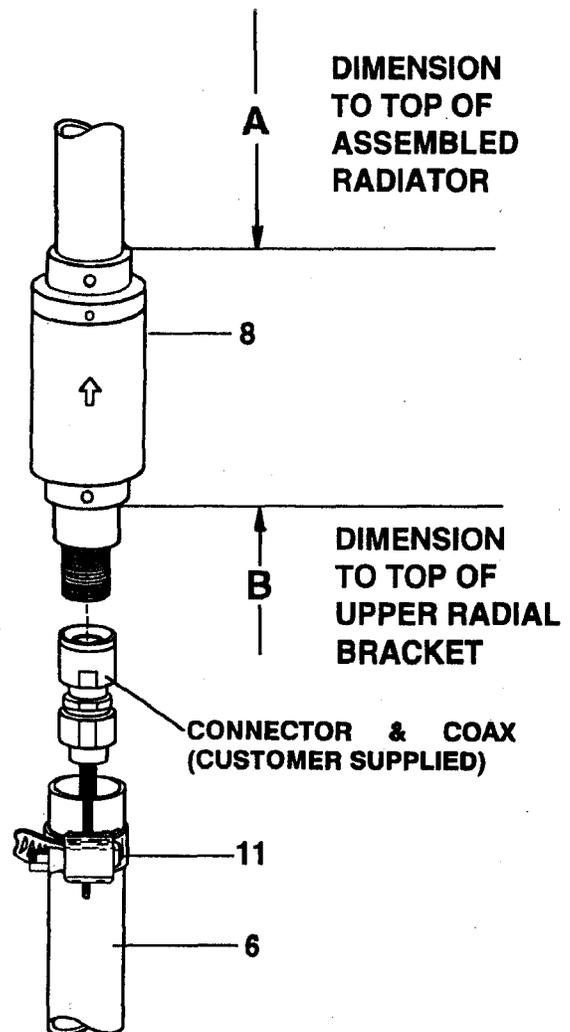
Refer to Figure 5.

Select the UHF radial brackets (Item 9) and UHF radials (Item 28) and associated hardware as shown in Figure 5.

Assemble the radials to the upper and lower radiator as shown. The loop in the end of each radial wire should be assembled so that when the nut is tightened, the loop is closed. The nuts should be tightened enough to hold each radial wire securely.

Install 1/8" caplugs on each radial wire.

NOTE: Dimension "A" is from the top of the coil form to the tip of the element. Dimension "B" is from the bottom of the plastic coil form to the top of the radial clamps (VHF).



Item No.	Description
6	Tube, 1" O.D. x 60", slotted
7	Tube, 7/8" x 24" swaged & slotted
8	Coil, 500 watt, VHF
10	Clamp, #6, Tubing
11	Clamp, #10, Tubing

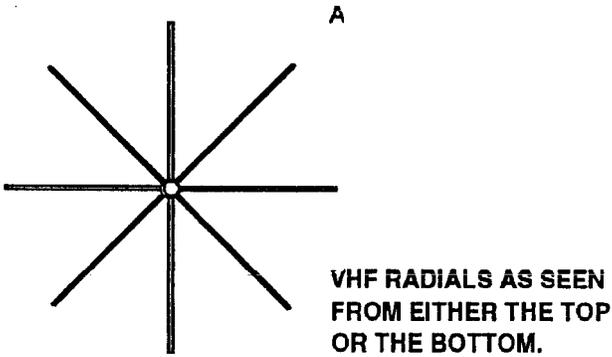
Figure 3
Upper Radiator/Coil Assembly

NOTE: At 14 MHz, A = 45" (1143 mm),
 B = 23 1/2" 597 mm).

G = 3" (See Detail B and C, Figure 5), (76 mm)

FINE TUNING

The spacings between the UHF radial tips and the tubing affects the VHF resonant frequency. This is dimension "G". Normally G=3". By increasing "G", the VHF resonance may be lowered slightly.



Detail A
 Top or Bottom View of Radials

Item No.	Description
5	Tube, 5/8" x 15"
6	Tube, 1" O.D. x 60", slotted
7	Tube, 7/8" x 31", swaged, & slotted
8	Coil, UHF, VHF
10	Clamp, #6, Tubing
11	Clamp, #10, Tubing
12	Caplug, 5/8", black

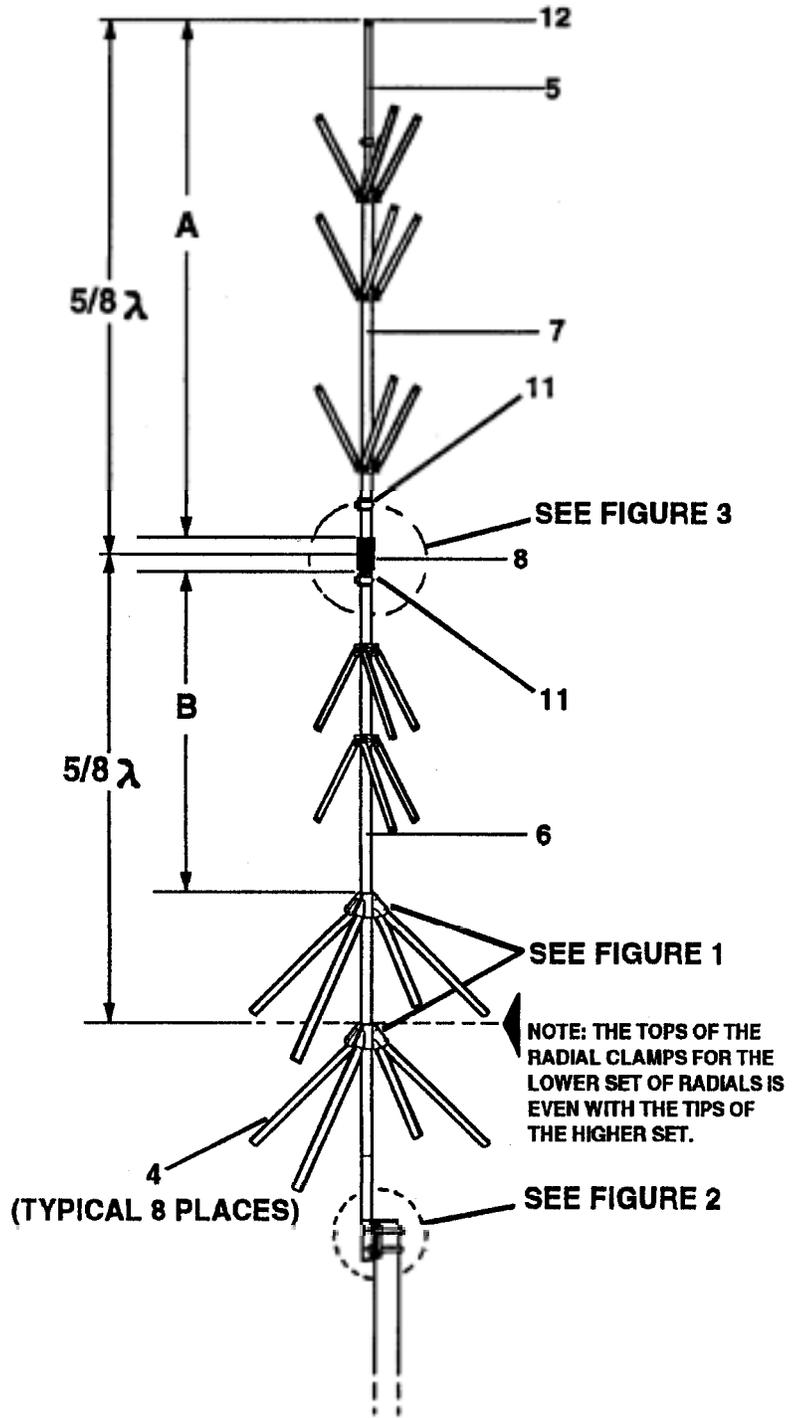
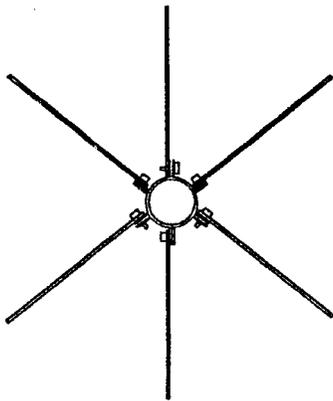


Figure 4
 Overall View-VHF Dimensions

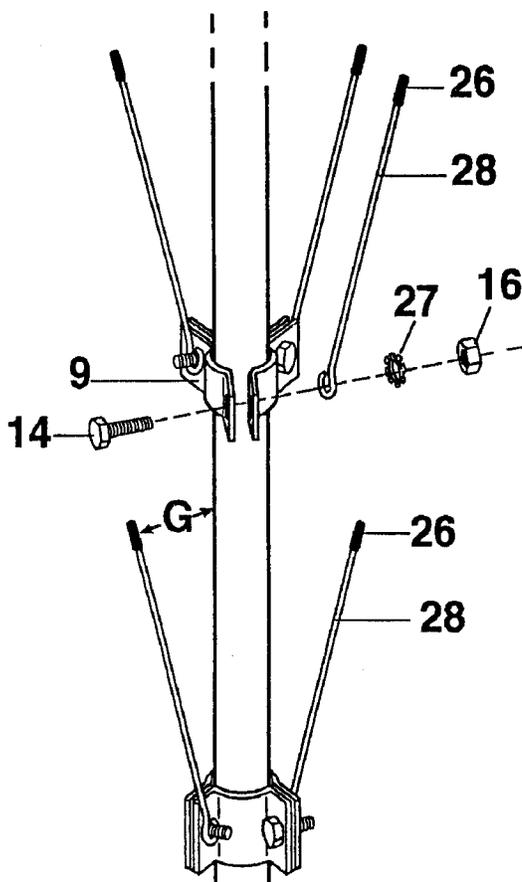


UHF Radials as seen from either the top or the bottom. Two adjacent sets are shown.

NOTE: At 445 MHz:

- C = 5 1/4" (133 mm)
- D = 17 3/4" (141 mm)
- E = 6 1/2" (165 mm)
- G = 3" (76 mm)

Detail A



Detail B

Item No.

- | Item No. | Description |
|----------|------------------------------|
| 5 | Tube, 5/8" x 15" |
| 6 | Tube, 1" O.D. x 60", slotted |
| 7 | Tube, 7/8" x 31", swaged |
| 8 | Coil, UHF, VHF |
| 9 | Radial Bracket, UHF |
| 10 | Clamp, #6, Tubing |
| 11 | Clamp, #10 Tubing |
| 12 | Caplug, 5/8", black |
| 14 | Screw, #10 x 1" |
| 16 | Nut, #10, hex |
| 26 | Caplug, 1/8", black |
| 27 | Lockwasher, #10, external |
| 28 | Radial, 1/8" x 6 3/8" |
| 29 | Flatwasher, #10 |

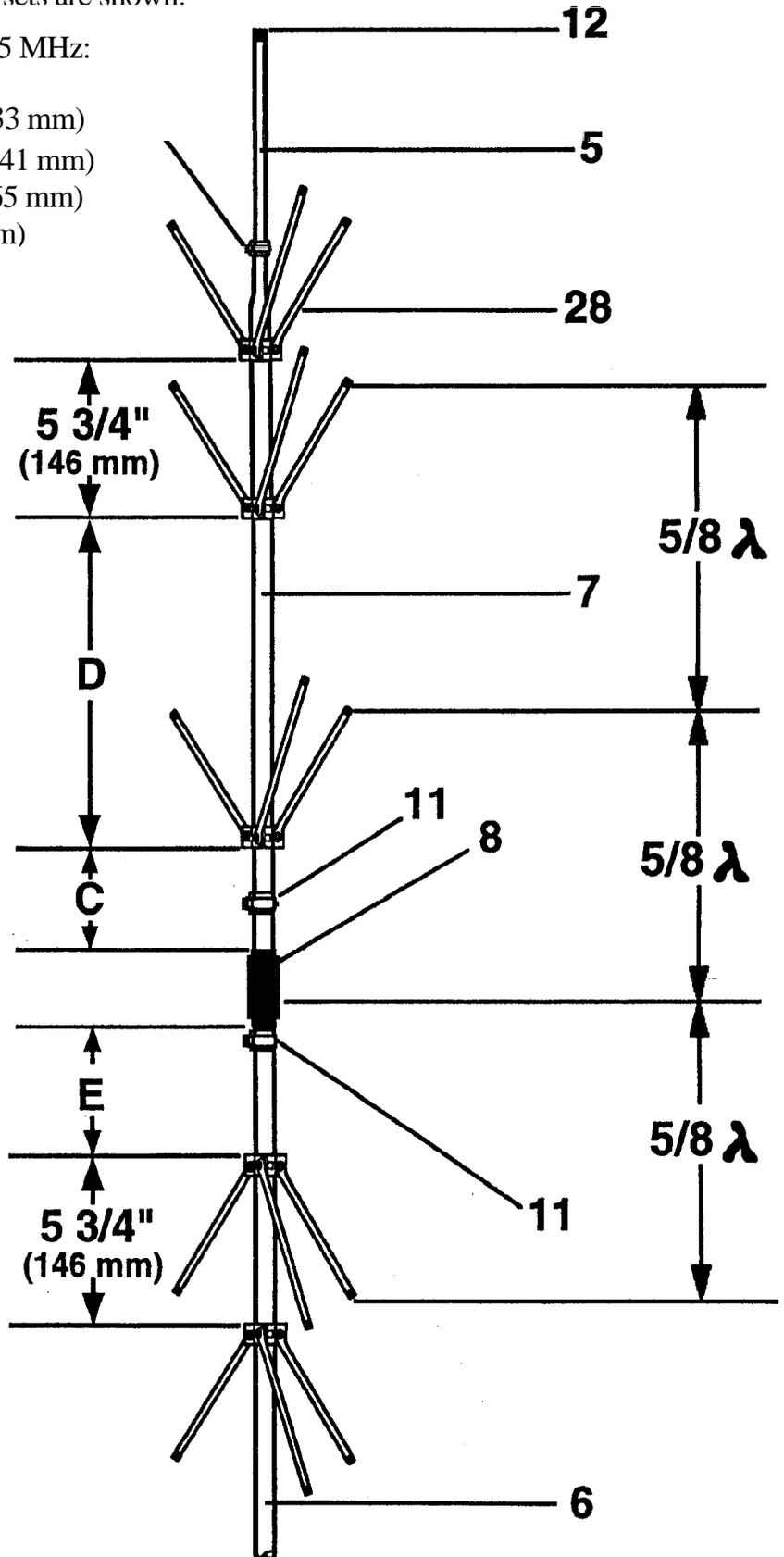


Figure 5
UHF Dimensions

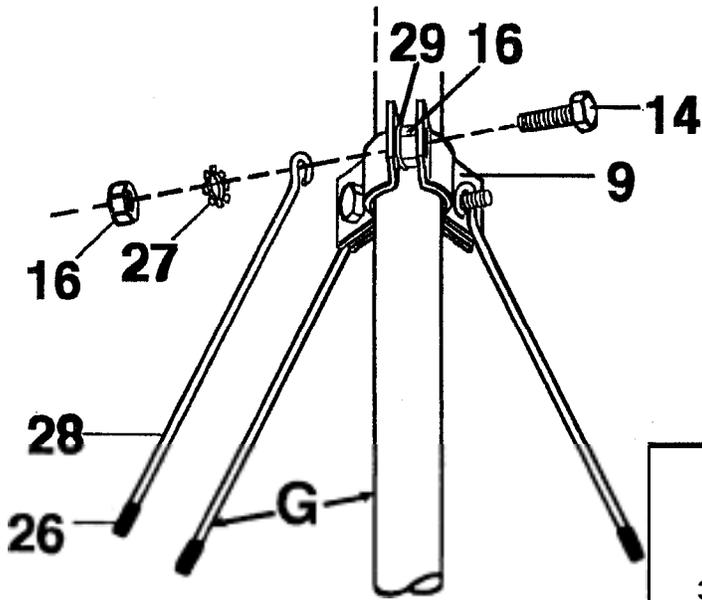
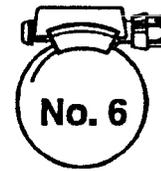


Figure 5 Detail

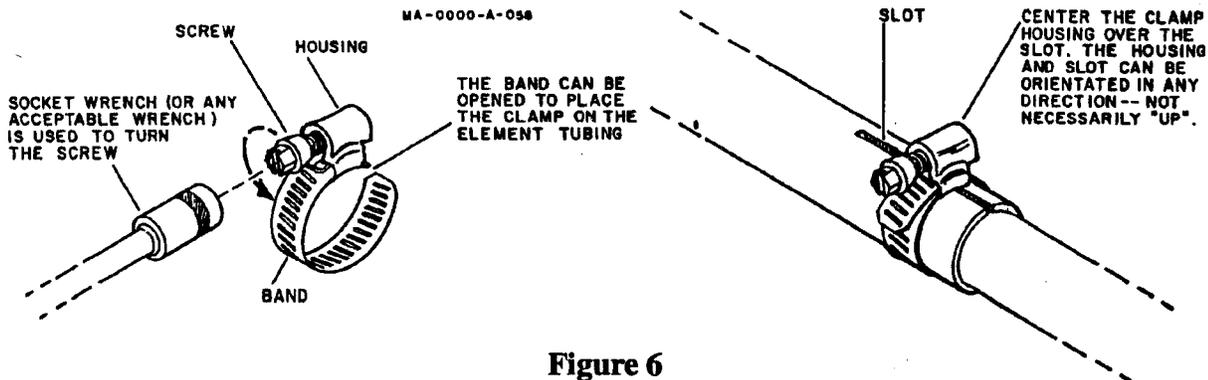
Insert nut (Item 16) and flatwasher (Item 29) between the radial brackets when mounting on the lower radiator. This prevents deforming the brackets when fully compressed. The brackets should be tightened enough so that the UHF radials do not twist on the bolt.



Part No.	Description	Fits Tubing Sizes
358756	Clamp, Size #6 all stainless steel	1/2" and 3/4"
Part No.	Description	Fits Tubing Sizes
358757	Clamp, Size #10 all stainless steel 5/16" hex head screw	1"

Select the proper size tube clamp as shown in Figure 6. When installing the clamps, place the clamp near the tube end with the top of the clamp over the slot in the tube as shown.

After adjustment of the tubing lengths, tighten the clamp with a 5/16 inch nut driver, socket, or open end wrench until the tubing will not twist or telescope.



**Figure 6
Compression Clamps**

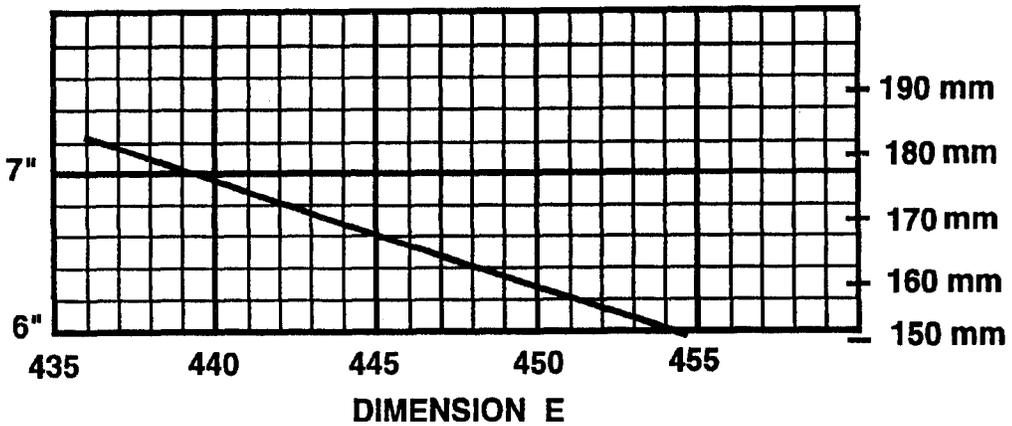
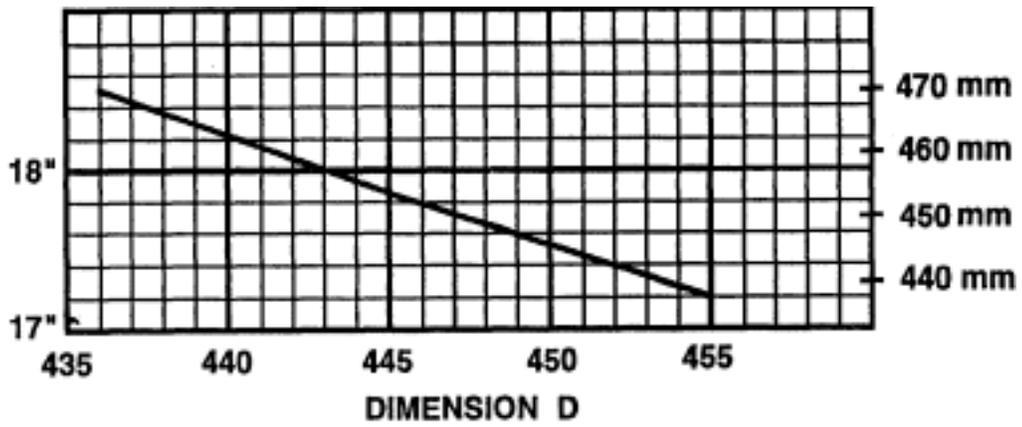
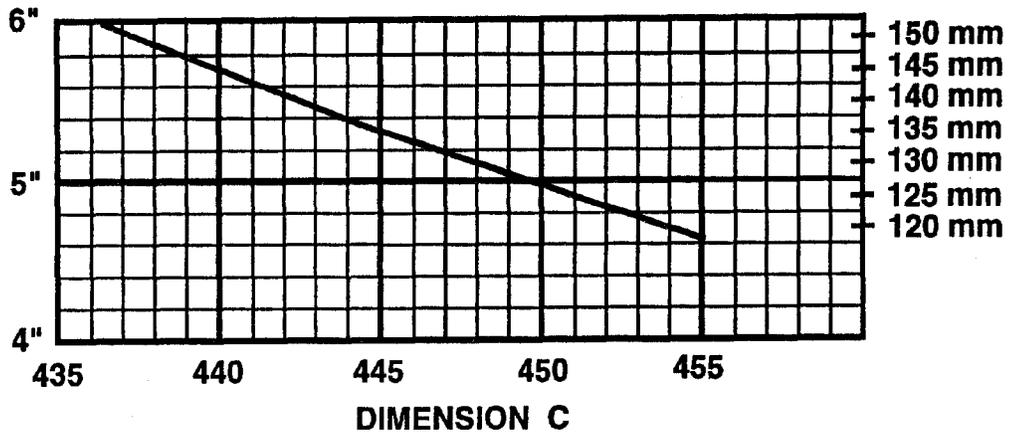
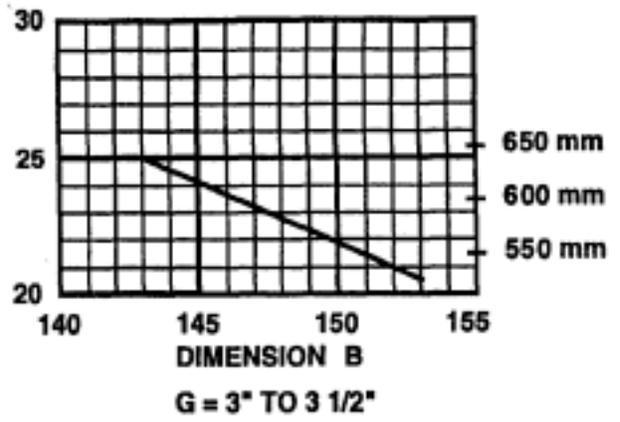
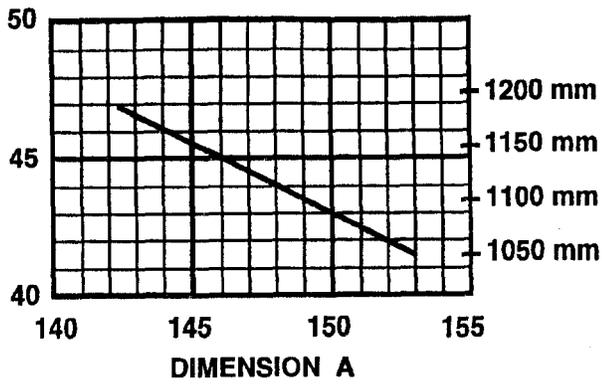


Figure 7
Dimension Graphs

Select the No. 10 tube clamp and slip it over the top end of the 1" x 60" tube. Position it as shown in Figure 3 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-42R 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 6 feet 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 V-42R.

Insert one end of the coax into the bottom of the 1" x 60" tube. Push the coax through until the connector emerges from the top of the tube.

Screw the coax connector onto the V-42R coil connector;

Push the coax cable into the top of the 1" x 60" 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 V-42R should be mounted above the other antenna for best performance. When side mounting the V-42R on a tower, it should be kept at least 20 inches away from the tower.

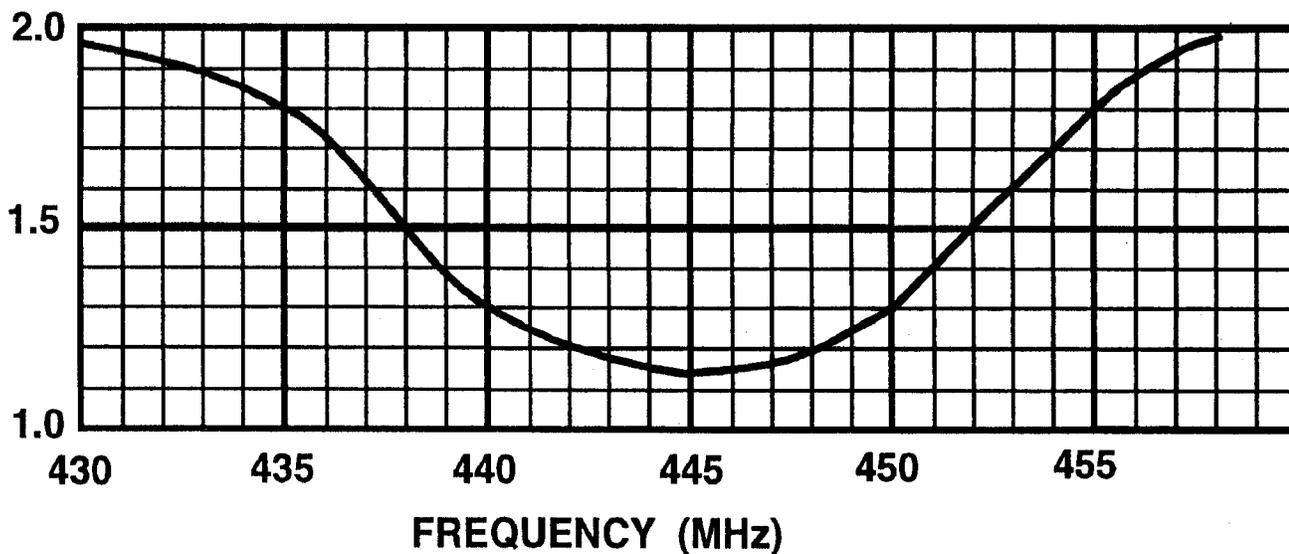
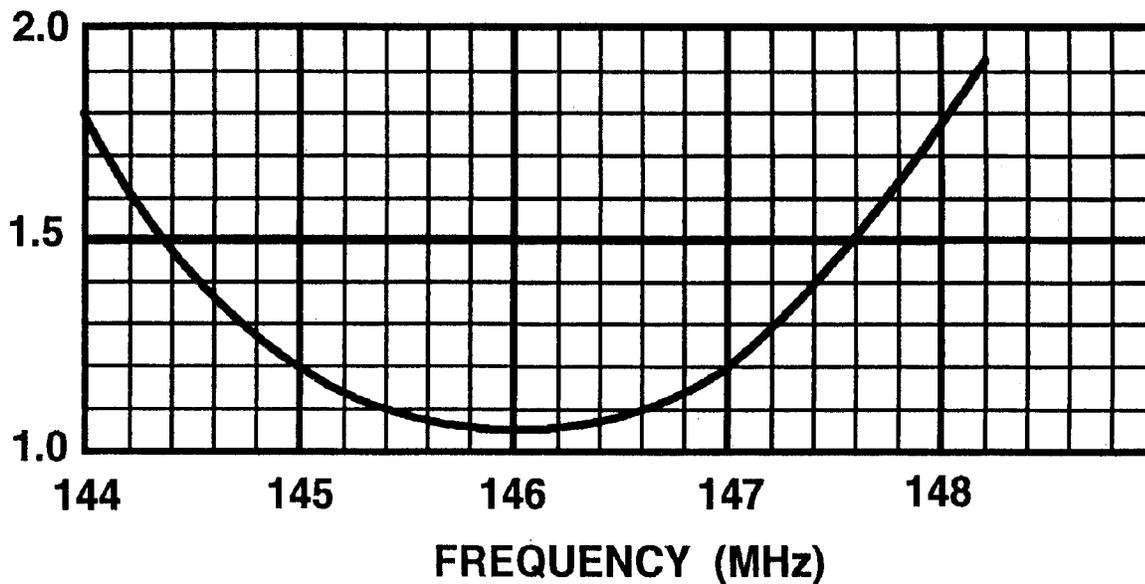


Figure 8
 Typical VSWR Curves with Antenna
 Set for 146 and 445 MHz.

Check the VSWR of your V-42R with a short length of RG-213/u coaxial cable with type N connectors. If UHF connectors (PL-259, SO-239) are used, the VSWR will be higher.

RG-58, RG-59 and RG-8X cables are not recommended for use with the V-42R antenna.

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, 11/8".....	1
4	170445	Tube, 7/16" O.D. x 17 1/8"	8
5	170615	Tube, 5/8" O.D. x 15"	1
6	191001	Tube, 1" O.D. x 60", slotted	1
7	190211	Tube, 7/8" x 31", swaged & slotted	1
8	870504	Coil, V42R	1
	870505	Parts Pack, 3315, Clamps	1
9	179850	Radial Bracket, UHF.....	15
10	358756	Clamp, #6 tube	1
11	358757	Clamp, #10 tube	2
	870506	Parts Pack, 331S, Hardware.....	1
12	450503	Caplug, 5/8", black.....	1
13	500158	Bolt, #10-24 x 1/2", hex head	33
14	504069	Bolt, #10-24 x 1, hex head	16
15	565697	Lockwasher, #10, internal	33
16	554071	Nut, #10-24, hex	55
18	505266	Bolt, 1/4"-20 x 3/4", hex head	4
20	562961	Lockwasher, 1/4", internal	5
21	554099	Nut, 1/4"-20, hex	4
23	540036	U-bolt, 5/16" x 2" x 211/16"	2
24	564792	Lockwasher, 5/16", split	4
25	555747	Nut, 5/16"-18, hex	4
26	455624	Caplug, 1/8, black	15
27	560075	Lockwasher, #10, external	16
28	179832	Radial 1/8" x 6 3/8".....	15
29	561165	Flatwasher, #10.....	7

NOTE: Some extra small parts are included as spares.

CONVERTING AMERICAN MEASUREMENTS TO METRIC

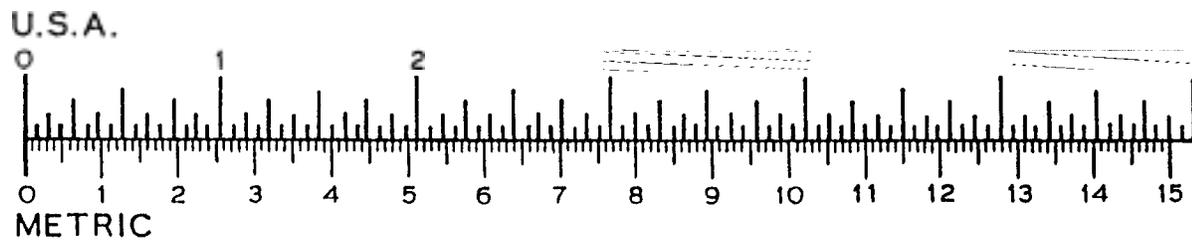
Use this scale to identify lengths of bolts, diameters of tubes, etc. The American inch (1") and foot (1') can be converted to centimeters in this way.

$$1 \text{ inch (1")} = 2.54 \text{ cm}$$

$$1 \text{ foot (1')} = 30.48$$

Example

$$42" \times 2.54 = 106.7 \text{ cm}$$



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.