

# hy-gain®

MODEL V3-PRO

Collinear Gain Vertical for 216-225 MHz

## INSTRUCTION MANUAL

### General Description

The new Hy-Gain V3-PRO VHF antenna is a collinear 5/8-wave omnidirectional vertical antenna for the 216-225 MHz frequency range. The V3-PRO 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 feedpoint is a female Type N connector that is protected from the weather within the lower radiator. The V3-PRO also features a mast-to-mast bracket that will accept up to a 2 1/4 inch O.D. mast.

Settings are supplied so that the antenna can be set to any frequency between 215 and 230 MHz.

### SPECIFICATIONS

VSWR at Resonance.....	less than 1.5:1
2:1 VSWR Band Width.....	12 MHz minimum
Power Gain.....	3 dBd (5.2 dBi)
Antenna/Mast Isolation.....	20 dB
Power Input.....	500 watts continuous
Lightning Protection.....	DC ground
Height at lowest Frequency.....	6 feet 9.5 inches (2.1 m)
Wind Area.....	0.5 sq. ft. (.05 sq. m)
Maximum Mast O.D.....	2 1/4 inches (57 mm)
Hardware.....	18-8 stainless steel
Maximum Wind Survival (without ice).....	175 mph (281 kmph)
Net Weight.....	7.75 lbs (3.5 kg)

### 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 12" radial tubes (Item No. 2), 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.

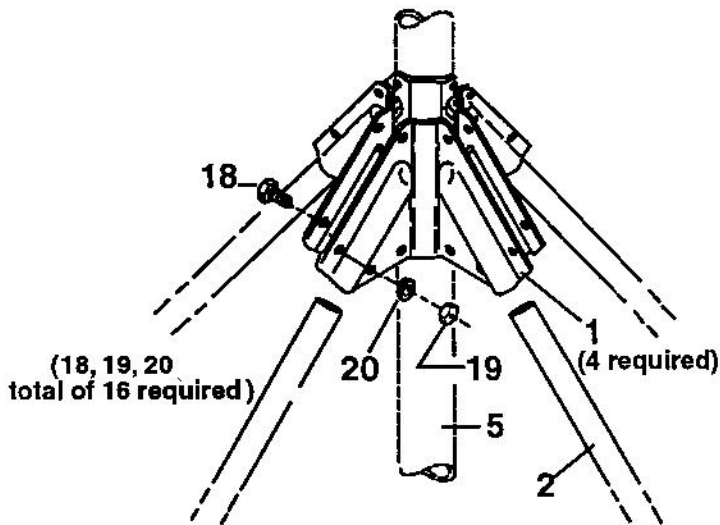
Select the 1" x 48" tube assembly (Item No. 5).

Slip both radial assemblies over the top of the 48" tube and position as shown in Figure 4 and Detail A. The slotted end of the 48" tube is the top. Determine the "B" dimension from Figure 7 or Table 1. For example, at 221 MHz, B= 16 1/2" (419 mm).

Tighten all screws in both radial assemblies securely and evenly.

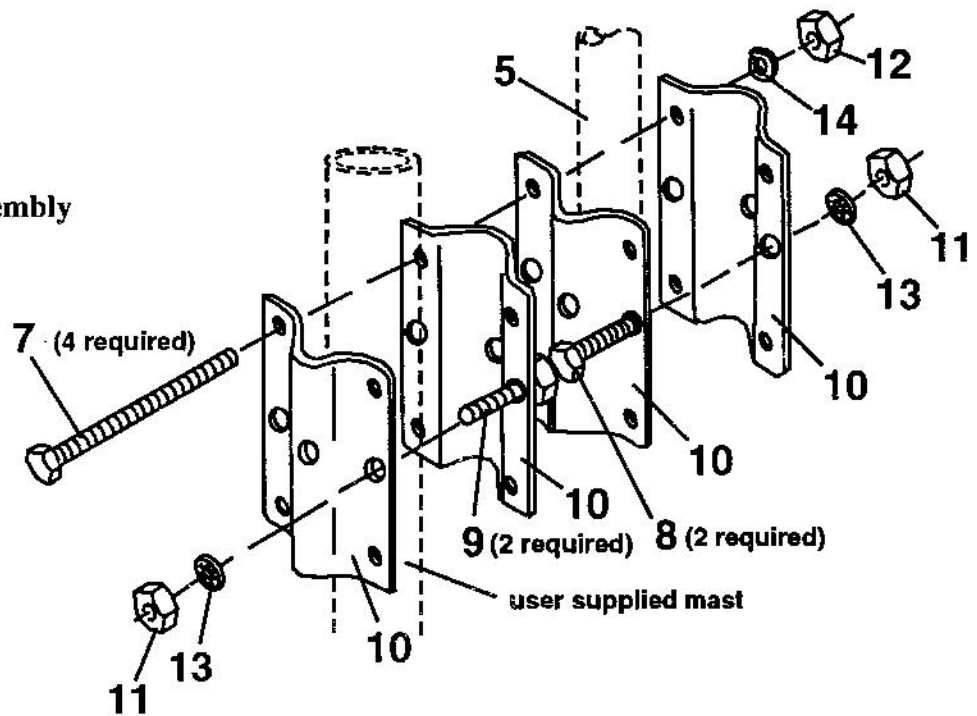
Select the mast-to-mast clamps and associated hardware and loosely assemble them as shown in Figure 2. Install the 1/4" hardware first.

Slide the assembled mast-to-mast clamp over the bottom end of the 48" tube as shown in Figure 2 and securely tighten the two (2) 1/4"-20 x 1" bolts, nuts and lockwashers (Item Nos. 8, 11 and 13).



Item No.	Description
1	Radial Clamp, 45 degrees
2	Tube 7/16" x 12"
5	Tube, 1" O.D. x 48", slotted
18	Bolt, #10-24 x 1/2", hex head
19	Nut, #10-24, hex
20	Lockwasher, #10, internal

**Figure 1**  
Radial Clamp Assembly



Item No.	Description
5	Tube, 1" O.D. x 48", slotted
7	Bolt, 5/16"-18 x 5", hex head
8	Bolt, 1/4"-20 x 1", hex head
9	Bolt, 1/4"-20 x 2" hex head
10	Mast-to-Mast Clamp
11	Nut, 1/4"-20, hex
12	Nut, 5/16"-18, hex
13	Lockwasher, 1/4", internal
14	Lockwasher, 5/16", split

**Figure 2**  
Mast-to-Mast Clamp

**NOTE:** The end of the 1" x 48" tube (Item 5) should be even with the bottom of the mast-to-mast clamps (Item 10).

## UPPER RADIATOR/COIL ASSEMBLY

Refer to Figure 3.

Select the V3-PRO Coil Assembly. The coaxial cable will attach to this in a later step.

Select one No. 10 compression clamp (Item 16) and install over the slotted tube end of the coil assembly (Item 6).

Select the 7/8" O.D. x 15" tube (Item 4) and insert the plain end into the slotted tube of the coil assembly 4 3/4 inches. Position the compression clamp as shown in Figure 5 and tighten securely.

Select one No. 6 compression clamp (Item 15) and place over the swaged/slotted end of the 7/8" tube (Item 4).

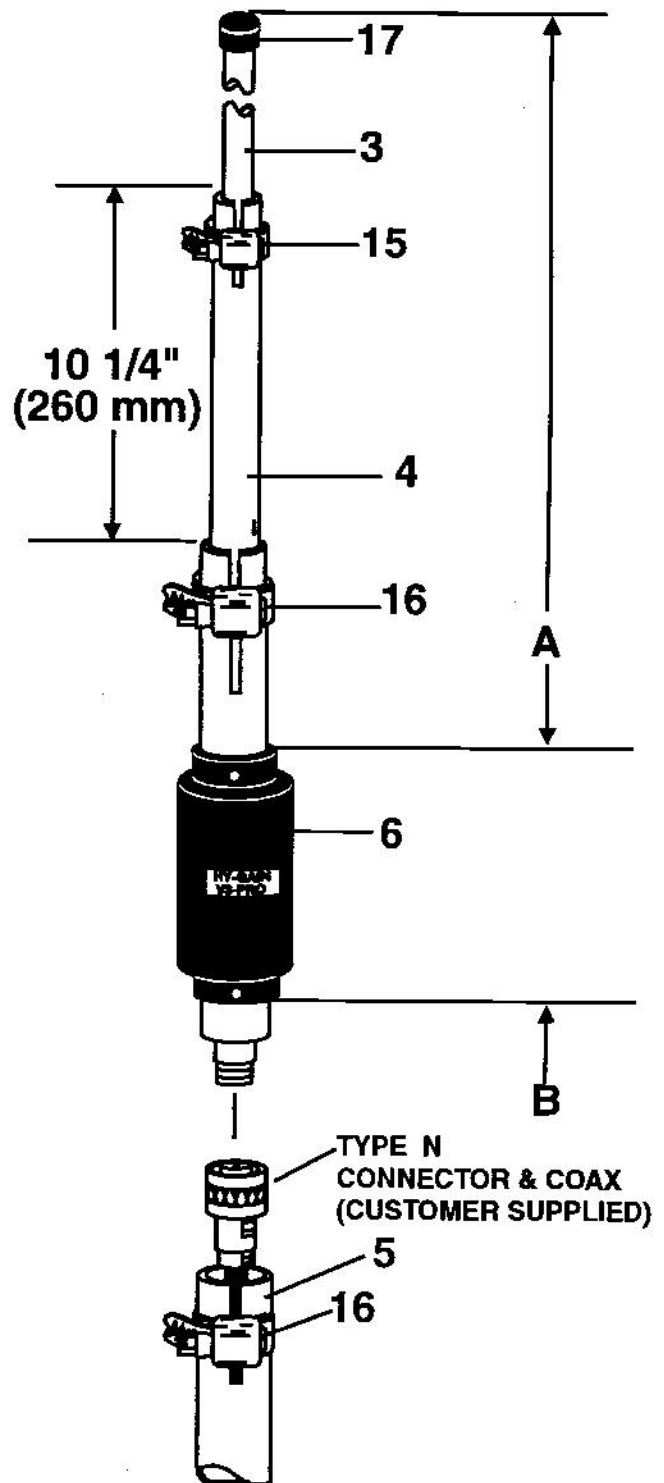
Select the 5/8" x 15" (Item 3) tube and insert either end into the 7/8" tube (Item 4).

Refer to Figure 4. Adjust the 5/8" x 15" tube so dimension "A" is set for the frequency of operation. For example, at 221 MHz, A= 27 1/2" (692 mm) See Table 1. Tighten the No. 6 compression clamp (Item 15) 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.

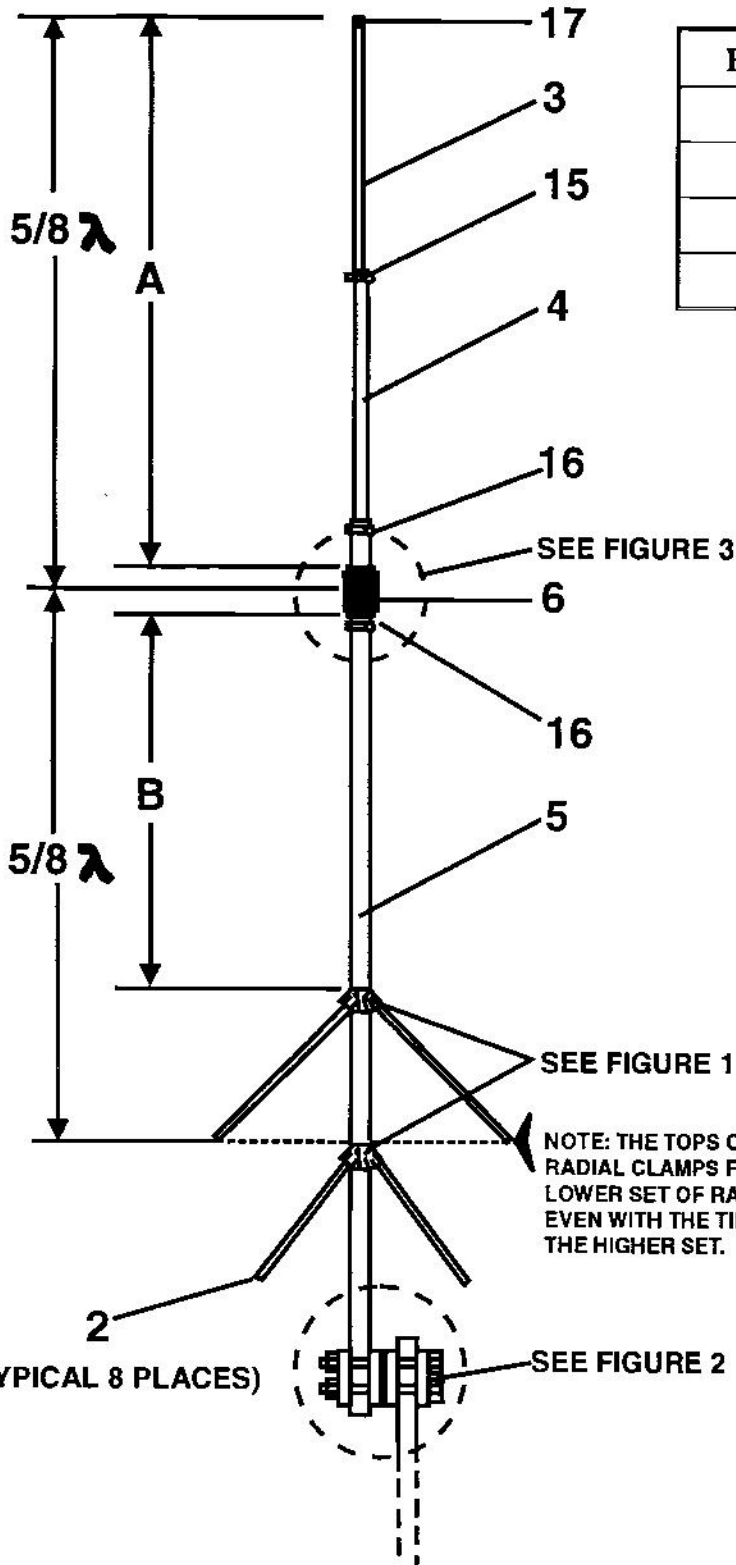
Select the 5/8" caplug (Item No. 17) and slip it over the end of the 5/8" tube.

**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 coil form to the top of the radial clamps.



Item No.	Description
3	Tube, 5/8" x 15"
4	Tube, 7/8" x 15" swaged & slotted
5	tube, 1" O.D. x 48" slotted
6	Coil, V3-PRO
15	Clamp, #6, Tubing
16	Clamp, #10, Tubing
17	Caplug, 5/8"

**Figure 3**  
Upper Radiator/Coil Assembly

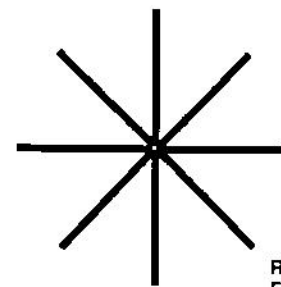


FREQUENCY	"A"	"B"
215	28 1/2"	17 3/4"
221	27 1/4"	16 1/2"
225	26 1/4"	15 1/2"
230	25 1/2"	14 3/4"

Table 1

- | Item No. | Description                       |
|----------|-----------------------------------|
| 3        | Tube, 5/8" x 15"                  |
| 4        | Tube, 7/8" x 15" swaged & slotted |
| 5        | Tube, 1" O.D. x 48" slotted       |
| 6        | Coil, V3-PRO                      |
| 15       | Clamp, #6, Tubing                 |
| 16       | Clamp, #10, Tubing                |
| 17       | Caplug, 5/8", black               |

Figure 4  
Overall View

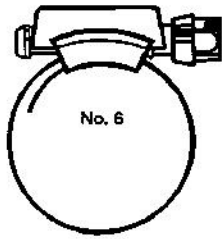


RADIALS AS SEEN FROM  
EITHER THE TOP OR THE  
BOTTOM.

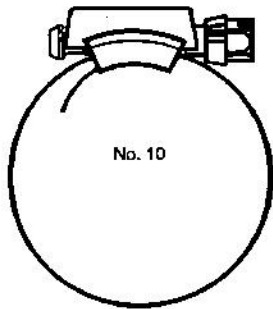
Detail A

Select the proper size tube clamp as shown in Figure 5. 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.

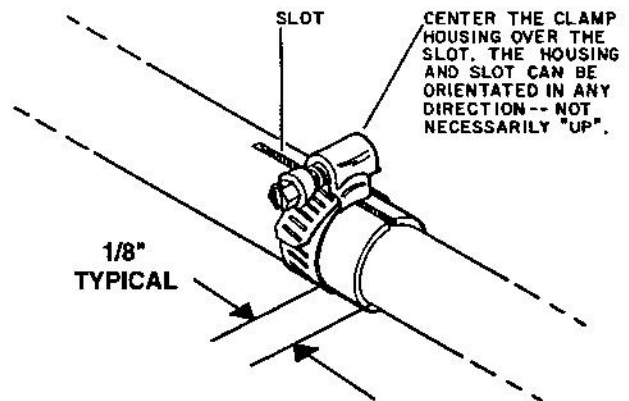
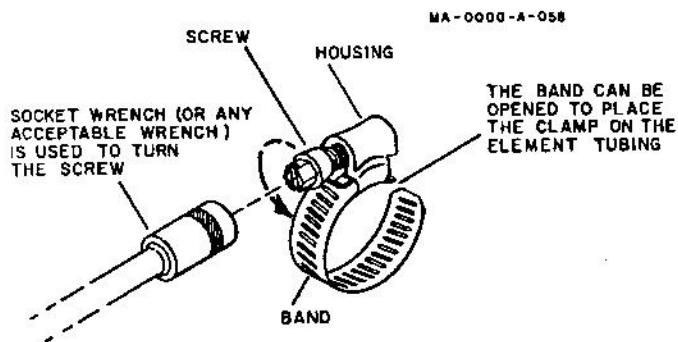
After adjustment of the tubing lengths, tighten the clamp with a 5/16 inch nut driver, socket, or open end wrench until the tubing will not twist or telescope.



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



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



**Figure 5**  
**Compression Clamps**

Select the No. 10 tube clamp and slip it over the top end of the 1" x 48" 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 V3-PRO 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 V3-PRO.

Insert one end of the coax into the bottom of the 1" x 48" tube. Push the coax through until the connector emerges from the top of the tube.

Screw the coax connector onto the V3-PRO coil connector.

Push the coax cable into the top of the 1" x 48" tube until the matching coil rests on the one inch tube. Tighten the No. 10 tube clamp.

The antenna can now be mounted on a mast (2 1/4" 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 V3-PRO should be mounted above the other antenna for best performance. When side mounting the V3-PRO on a tower, it should be kept at least 20 inches away from the tower. The ideal distance to achieve a near omni-directional radiation pattern is approximately 27 inches from the nearest tower leg or face.

### V3-PRO Parts List

Item No.	Part No.	Description	Qty
1	160012	Radial Clamp, 45 degree.....	8
2	170476	Tube, 7/16" O.D. x 12".....	8
3	170615	Tube, 5/8" O.D. x 15".....	1
4	190212	Tube, 7/8" O.D. x 15" swaged.....	1
5	878699	Tube Assembly, 1" x 48" reinforced.....	1
6	878698	Coil Assembly, V3-PRO.....	1
	878701	Parts Pack V3-PRO Base.....	1
7	500387	Bolt, 5/16"-18 x 5" hex head.....	4
8	502958	Bolt, 1/4"-20 x 1" hex head.....	2
9	505737	Bolt, 1/4"-20 x 2", hex head.....	2
10	5137000-1	Mast clamp, V-series.....	4
11	554099	Nut, 1/4"-20, hex.....	4
12	555747	Nut, 5/16"-18 hex.....	4
13	562961	Lockwasher, 1/4" internal.....	4
14	564792	Lockwasher, 5/16" split.....	4
	878700	Parts Pack V3-PRO Clamps.....	1
15	358756	Clamp, size #6 tube.....	1
16	358757	Clamp, size #10 tube.....	2
17	450503	Caplug, 5/8" black.....	1
18	500158	Bolt, #10-24 x 1/2" hex head.....	33
19	554071	Nut, #10-24 hex.....	33
20	565697	Lockwasher, #10 internal.....	33

**NOTE:** Some extra small parts are included for spares.

### Converting American Measurements to Metric

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

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

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

**Example:**

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