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**Model VB-25FM**  
**2-Meter 5 Elements Beam**

# INSTRUCTION MANUAL

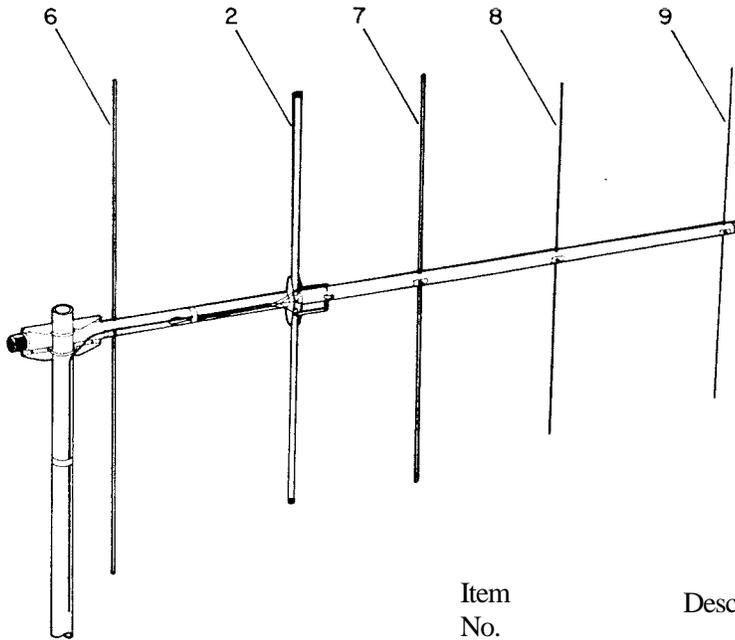
## General Description

This antenna is a 5-element, 2-meter beam optimum spaced on a 75" boom. It features high forward gain and an excellent front-to-back ratio. The antenna is end mounted giving it the advantage of no mast decoupling and a broad frequency response. This antenna now uses stainless steel hardware in most locations except for the U-bolts. Also, this antenna now features a NEW boom-to-mast bracket that fits up to a mast diameter of 2 1/16 inches.

## SWR and Feedline

The 25FM antenna has an input impedance of 200 ohms. The supplied balun matches the input to 50 ohms. If you are using transmission line with a characteristic impedance other than 50 ohms or 200 ohms, a matching device must be made. Refer to any current Amateur Handbook for information on constructing a matching device.

<b>Specifications</b>	
<i>Mechanical</i>	
Boom Length	75" (1905 mm)
Longest Element	39 5/8" (1006 mm)
Net Weight	2.9 lbs (1.3 kg)
Turning Radius (Max)	73" (1854 mm)
Wind Survival	80 mph (129 kmph)
Mast Diameter	1 5/8" to 2 1/16" O.D. (41mm to 52mm)
Boom Diameter	1 1/4" O.D. (32mm)
Wind Area	0.585 sq. ft (.054 m <sup>2</sup> ) (horizontal)
	0.740 sq. ft (.0688 m <sup>2</sup> ) (vertical)
<i>Electrical</i>	
Gain (Average)	11.3 dBi (9 dBd)
Front-to-Back Ratio	20 dB
Maximum SWR	2:1
Band Width	4 MHz
Maximum Power	250 Watts continuous, 500 Watts P.E.P
Impedance	50 ohms (with balun)
Half-Power Beam Width	60 degrees (vertical polarization)
	45 degrees (horizontal polarization)
Stacking Distance	82" (2083 mm) minimum



Item No.	Description
2	Tube, Driven Element, aluminum, 7/16" x 17 1/4"
6	Tube, R1, aluminum, 3/16" x 39 5/8"
7	Tube, D1, aluminum, 3/16" x 36 7/8"
8	Tube, D2, aluminum, 3/16" x 35 3/4"
9	Tube, D3, aluminum, 3/16" x 35 3/8"

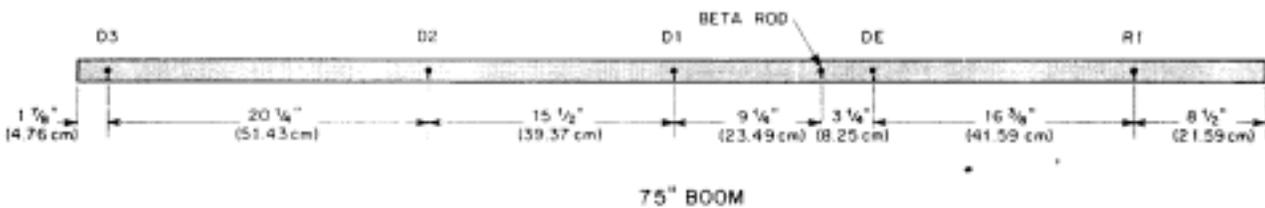


Figure 1 Overall View and Boom Detail

### Tuning

NOTE: The Driven and Parasitic Elements are adjusted independently in the following manner:

**Parasitic Elements:** This antenna is pretuned for maximum gain and best radiation pattern at 146 MHz. This setting will give optimum performance over the entire 144-148 MHz band.

If you wish to optimize the antenna for a frequency higher than 146 MHz, cut 1/4" off of the total element lengths for each MHz higher than 146.

**Driven Element:** SWR can be lowered to less than 1.2:1 at a desired frequency by carefully trimming the driven element. Keep The element symmetrical by cutting the same amount from each side. Typical SWR curves are shown in Figure 2A, and a cutting chart is shown in Figure 213. Each installation is slightly different, so cut the driven element for the lowest SWR at your particular location. Measure the SWR as close to the antenna as you can for accurate results.

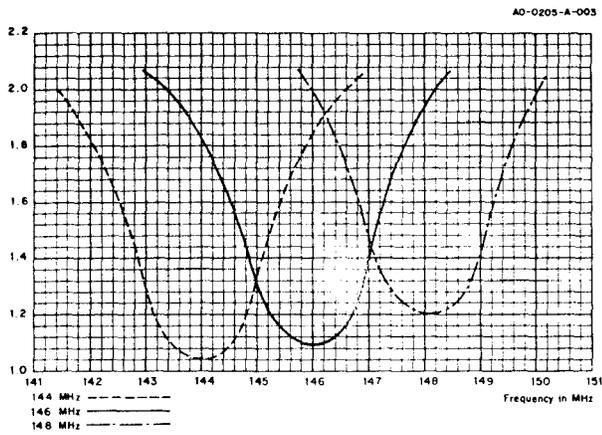


Figure 2A VSWR for Both Vertical and Horizontal Polarization

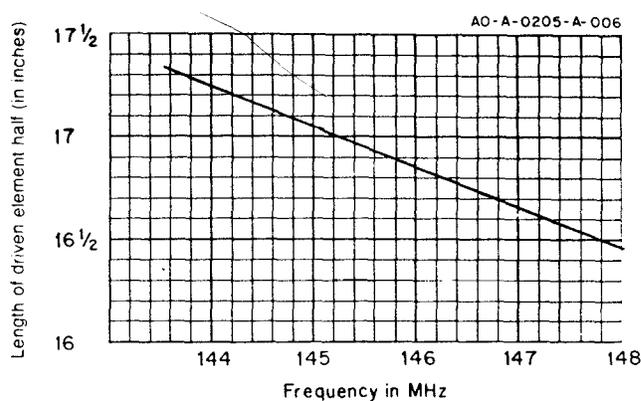


Figure 2B Driven Element Cutting Chart

### Stacking

This antenna can be easily stacked for approximately 3 dB more gain each time the number of yagi is doubled. Refer to Figure 3 for stacking and phasing harness cutting information.

The two phasing lines coming from the two antennas to the "T" connector can be any odd multiple of 1/4 wavelength in the 75 ohm transmission line. See Figure 4.

NOTE: When phasing two antennas, the Driven Element halves that are connected directly to the phasing lines should be on the same side of the array.

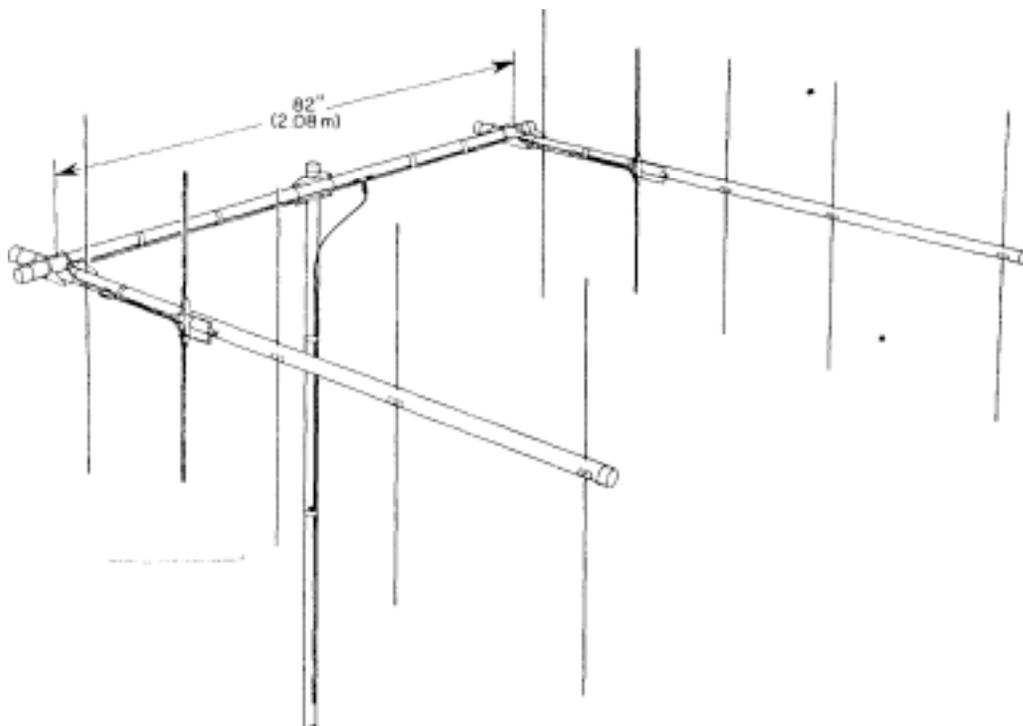


Figure 3 Stacking Two (2) Antennas

The feedline impedance is for 50 ohms (RG-213/U). For detailed information on stacking more than two yagis, please consult a current Amateur Handbook.

NOTE: The boom-to-mast bracket may be placed between the Driven Element and D1 when stacking two antennas.

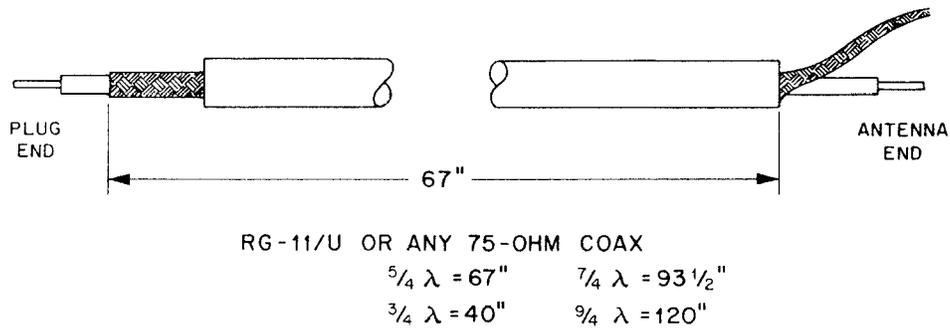


Figure 4 Phasing Line Cutting  
Dimensions

## Installation

This antenna fits a 2" mast. A 2" O.D. pipe is recommended for a sturdy mast.

Mount the antenna in the clear. Surrounding objects-particularly power lines and other objects of considerable mass or length-are detrimental to the performance of the antenna.

### WARNING

Do not allow any part of the antenna to touch power lines. This could cause severe burns or fatal injuries.

When mounting two dissimilar antennas on the same mast, be sure they are separated by at least three feet (1 m).

The antenna can be mounted either vertically or horizontally for FM or SSB/CW respectively. Circular polarization can be obtained by using two yagis. For information about which polarization is best, consult local Amateurs who use the frequencies you desire.

## Step-by-Step Assembly

Remove the parts from the carton and check them against the parts list and the illustrations.

Select the boom-to-mast backup plate (Item No. 5), the boom-to-mast clamp (Item No. 4) and the four (4) 1/4"-20 x 3/4" bolts, lockwashers and nuts (Item Nos. 16, 26, and 23).

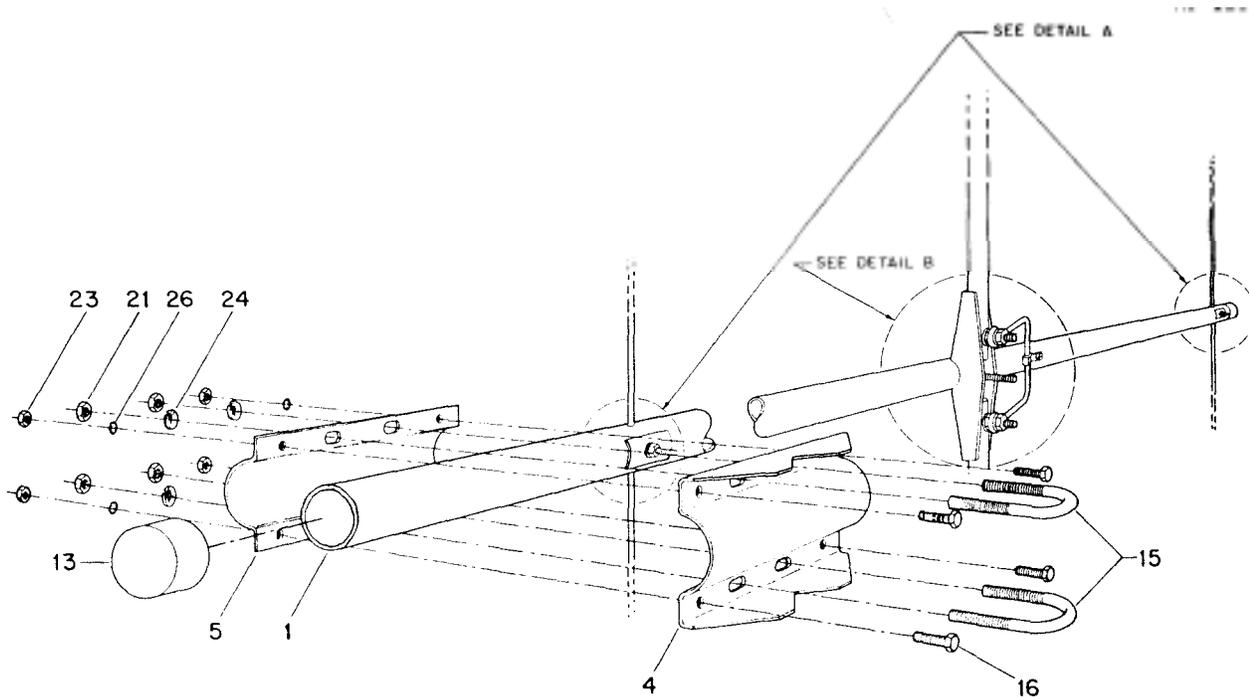
## Converting American Measurements to Metric

1 inch (1") = 2.54 cm

1 foot (1') = 30.48 cm

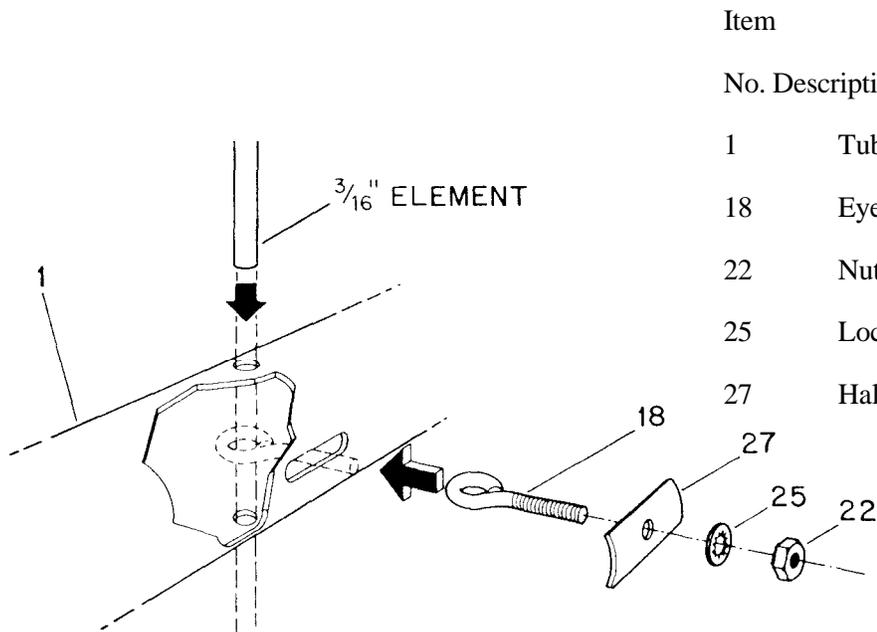
Example:

42" x 2.54 = 106.7 cm



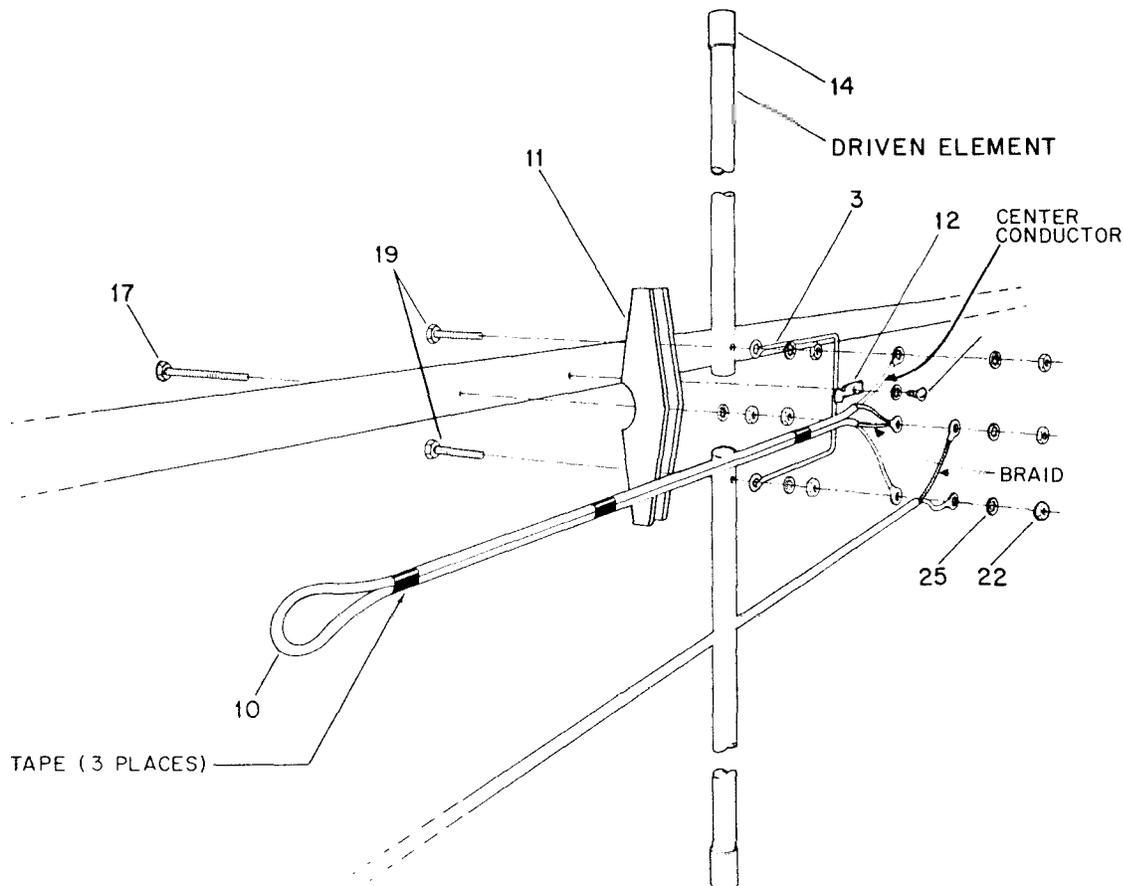
Ite No.	Description	Item No.	Description
1	Tube, Boom, aluminum, 1 1/4" x 75"	16	Bolt, hex head, 1/4"-20 x
4	Clamp, Boom-to-Mast	21	Nut, hex, 5/16"-18
5	Backup Plate, Boom-to-Mast	23	Nut, hex, 1/4"-20
13	Caplug, 1 1/4"	24	Lockwasher, split, 5/16"
15	U-Bolt, 5/16"-18 x 3 5/8"	26	Lockwasher, internal, 1/4"

Figure 5 Boom-to-Mast Clamp Assembly



Item No.	Description
1	Tube, Boom, aluminum, 1 1/4" x 75"
18	Eyebolt, 5/16", #10-24 x 1 1/2"
22	Nut, hex, #10-24
25	Lockwasher, internal, #10
27	Half-Washer, aluminum

Figure 5 - Detail A Parasitic Element Attachment



Item No.	Description	Item No.	Description
3	Beta Rod, 3"	17	Bolt, hex head, #10-24 x
10	Balun Assembly	19	Bolt hex head, #10-24 x 11/2"
11	Insulator (Driven Element-to-Boom)	22	Nut, hex, #10-24
12	Beta Clip	25	Lockwasher, internal, #10
14	Caplug, 7/16"		

Figure 5-Detail B Driven Element, Beta Match and Balun Assembly

Place the boom-to-mast clamp on the boom as shown in Figure 5. Use the 1/4"-20 x 3/4" bolts in the outside holes. Leave the inside holes for the two U-bolts, which will be used later for mounting the mast. Select either the vertical or horizontal mounting position. Adjust the boom accordingly before tightening the bolts securely.

Select the 3/16" x 39 5/8" R1 tube (Item No. 6), use pencil to place a mark at the center of the rod (19 13/16" from either end) and place two more marks 5/8" from each side of the center mark.

Place a #10-24 x 11/2" eyebolt (Item No. 18) into the R1 slot as shown in Figure 5, Detail A. Slide the R1 through the holes and the eyebolt until the outer two marks on the R1 are visible on each side of the boom. Slip on an aluminum half washer, a lockwasher and a #10 nut (Item Nos. 27, 25, and 22). Tighten it just enough to hold the rod securely. **DO NOT OVER TIGHTEN.**

Select the element-to-boom insulator (Item No. 11), two sections of the Driven Element (7/16" x 17 1/4") tubing (Item No. 2) and beta rod (Item No. 3).

NOTE: If 50 ohm coaxial cable is used to feed the antenna, select the supplied balun at this time.

Use the # 10-24 x 2 1/2" bolt (Item No. 17) to fasten the element-to-boom insulator to the boom. Refer to Figure 5, Detail B.

Use the two (2) #10-24 x 1 1/4" bolts (Item No. 19) to assemble the Driven Element as shown in Figure 5, Detail B. Pay particular attention to the connections of the beta rod, balun and feedline.

Waterproof the connection with neoprene, Krylon, or some similar substance.

Install caplugs on the ends of the boom and the Driven Element.

Use the #10 x 3/8" screw (Item No. 20) to fasten the beta rod shorting clip over the beta rod, as shown in Figure 5, Detail B.

Select the following rods: D1 (36 7/8" long) (Item No. 7), D2 (35 3/4" long) (Item No. 8) and D3 (35 3/8" long) (Item No.9). Mark the center point on each rod, then make two more marks 5/8" on either side of the center mark. Secure the elements to the boom as shown in Figure 1 and Figure 5, Detail A. Be sure they are oriented as shown.

Slip the two (2) U-bolts into the boom-to-mast bracket and fasten it to the mast securely. Tape the coax feedline to the boom and to the mast. Be sure to insulate any connections from the boom or the mast. This completes your installation.

## PARTS LIST

Item No.	Part No.	Description	Qty
1	170386	Tube, Boom, aluminum, 1 1/4" x 75".....	1
2	175157	Tube, Driven Element, aluminum, 7/16" x 17 1/4".....	2
3	160040	Beta Rod, 3" .....	1
4	385142-	Clamp, Boom-to-Mast.....	1
5	385144-	Backup Plate, Boom-to-Mast .....	1
6	160036	Tube, R1, aluminum, 3/16" x 39 5/8".....	1
7	160016	Tube, D1, aluminum, 3/16" x 36 7/8".....	1
8	160019	Tube, D2, aluminum, 3/16" x 35 3/4".....	1
9	160021	Tube, D3, aluminum, 3/16" x 35 3/8".....	1
10	871704	Balun Assembly .....	1
11	465420	Insulator (Driven Element-to-Boom) .....	1
	872073-	Parts Pack 2058-1, Stainless Steel.....	1
12	16326	Beta Clip.....	1
13	45563	Caplug, 1 1/4 " .....	2
14	47563	Caplug, 7/16" .....	2
15	54006	U-Bolt, 5/16"-18 x 3 5/8" .....	2
16	50526	Bolt, hex head, 1/4"-20 x 3/4".....	4
17	50016	Bolt, hex head, #10-24 x 2 1/2".....	1
18	54006	Eyebolt, 5/16", #10-24 x 1 1/2 ".....	4
19	50015	Bolt, hex head, # 10-24 x 1 1/2".....	2
20	51067	Screw, pan head, Type A, #10 x 3/8" .....	1
21	55574	Nut, hex, 5/16"-18 .....	4
22	55407	Nut, hex, #10-24 .....	11
23	55409	Nut, hex, 1/4"-20 .....	4
24	56479	Lockwasher, split, 5/16" .....	4
25	56569	Lockwasher, internal, #10 .....	12
26	56296	Lockwasher, internal, 1/4.....	5
27	17037	Half Washer, aluminum .....	4

## **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.