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VB-66DX

6-Meter 6-Element Beam

INSTRUCTION MANUAL

General Description

The Hy-Gain Model 66DX is a full sized 6-element, 6-meter beam. The elements are optimum spaced for maximum gain and the antenna is equipped with Hy-Gain's Beta Match and Balun to insure maximum transfer of electrical energy. The antenna is designed to fit a 1 1/4" to 2 1/2" O.D. mast.

Preparation For Assembly

NOTE: When unpacking your antenna, check the inside of all tubing for parts (clamps, insulators, small tubing, etc.) To conserve space, these smaller articles are sometimes put inside the larger pieces. Check all parts against the Parts List in the rear of the manual to ensure no parts are missing.

Specifications

Electrical

Gain	12.5 dBi (10.3 dBd)
Front-to-Back Ratio.....	20-25 dB
Maximum Power.....	1 kW AM/2 kW P.E.P.
Input Impedance.....	50 ohms
Lightning Protection.....	DC ground
-3 dB Beamwidth	47 degrees
Electrical Boom Length	1.2 wavelength

Mechanical

Longest Element.....	9'9" (2.97 m)
Element Diameter.....	7/16" (11.1 mm)
Boom Length.....	24' 5 3/4" (7.46 m)
Turning Radius	12'6" (3.81 m)
Boom Diameter	2" (50.8 mm)
Maximum Wind Survival.....	80 mph (129 kmph)
Net Weight.....	17 lbs. (7.7 kg)
Mast Diameter.....	1 1/4" to 2 1/2" (3.2 cm to 6.4 cm)
Wind Surface Area	1.8 sq. ft. (0.1674 sq. m)
*Effective Moment.....	213 ft.-lbs. (29 Kg m)
Wind Load (80 mph)	46.1 lbs. (20.9 kg)
Broadside Stacking Distance.....	15 to 17 ft. (4.57 m to 5.18 m)
Collinear Stacking Distance.....	18 to 20 ft. (5.49 m to 6.1 0 m)

*Effective Moment is defined as the product of the antenna weight and turning radius.

Make all measurements to the given dimensions, plus or minus, not more than 1/16 inch (1.5 mm). The assembly of this antenna will be easier if you read this manual completely through at least twice and follow the recommended directions. Allow at least 5 hours for assembly.

FOR OVERSEAS CUSTOMERS: If you use the Metric System, see the American-to-Metric conversion table in the rear of this manual. Most illustrations will provide both American and Metric dimensions.

TOOLS: The following tools are required for easy assembly of the 66DX beam antenna.

QTY	Tool Type
1	Tape Measure, 12 ft.
1	Nut Driver, 1/2 in.
1	Nut Driver, 7/16 in.
1	Nut Driver, 3/8 in.
1	Nut Driver, 5/16 in.

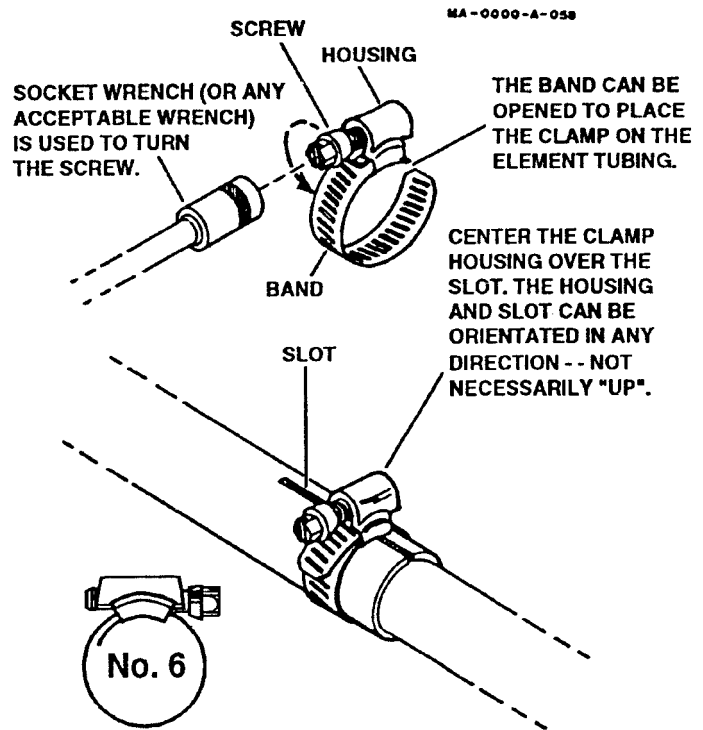
Standard wrenches or adjustable wrenches may

Choose a moderate-sized clear area to assemble the 66DX beam. You may wish to drive a 5' (1.5 m) length of mast material into the ground and attach the entire boom and boom-to-mast bracket to this mast temporarily during assembly. If you assemble this antenna over a grassy area, precautions should be taken so that hardware is not accidentally lost during assembly. Near a concrete driveway is an excellent area for assembly.

Tubing

Take care when measuring the tubing lengths for your frequency setting. Place the clamp near the end of the tube with the joint aligned with the slot in the tube. See Figure 1. Tighten the clamp until the inner tube cannot be turned in the outer tube.

DO NOT overtighten the tubing clamps.



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

Figure 1
Tubing Clamp

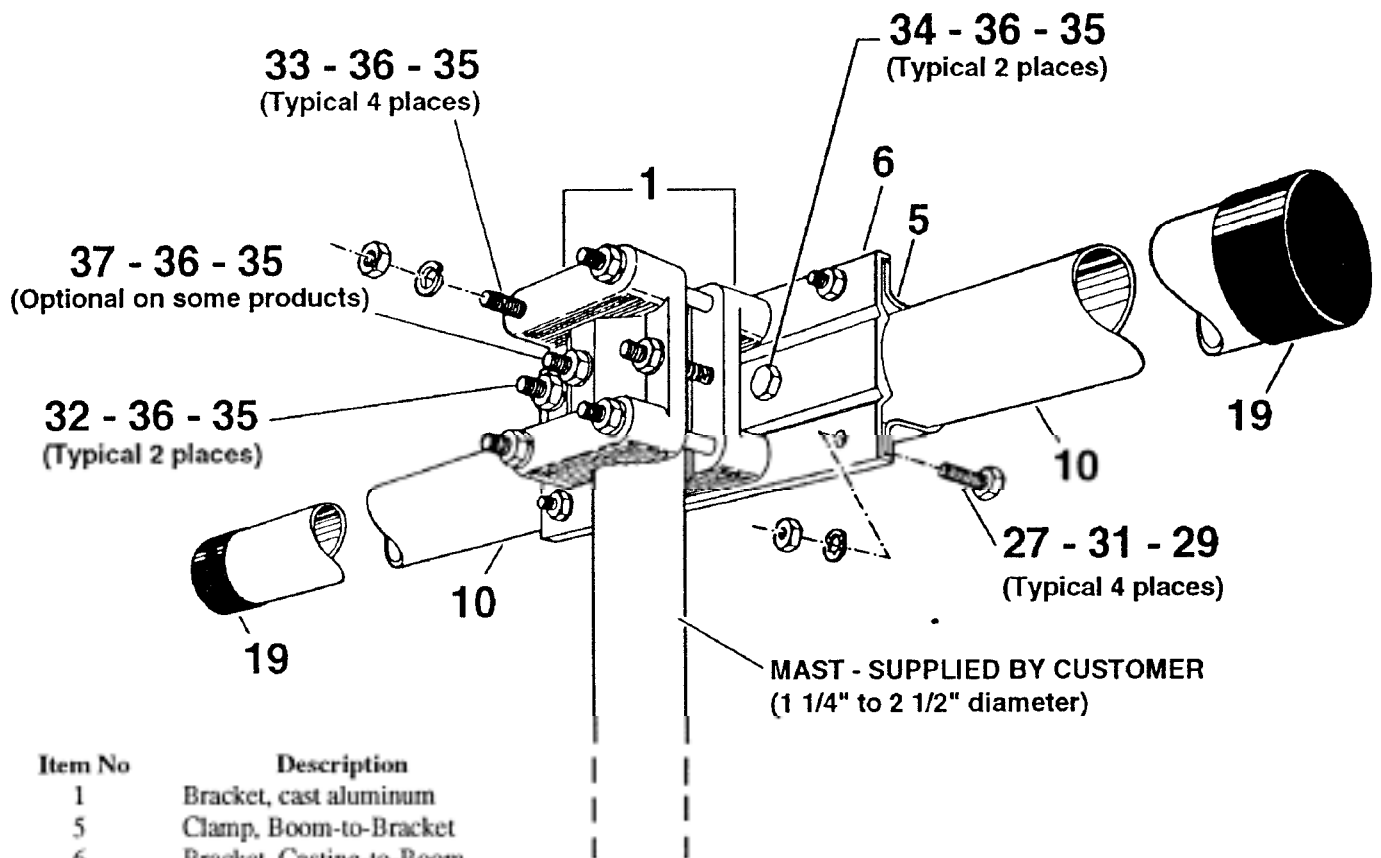
Step-by-Step Assembly

Assembly of the Boom: Select the cast aluminum brackets (Item No. 1), the casting-to-boom bracket (Item No. 6) and the boom-to-bracket clamp (Item No. 5). Assemble loosely as shown in Figure 2.

Select the two inside boom sections (Item No. 10) and insert the unswaged ends into the boom-to-mast brackets. Line up the holes in the boom with the holes in the boom-to-mast bracket and secure as shown in Figures 2 and 3.

Select the two outside boom sections (Item No. 7) and insert the drilled ends onto the swaged ends of the boom sections already assembled. Line up the holes and secure using the two (2) 1/4"-20 x 2 1/2" bolts, lockwashers and nuts (Item Nos. 28, 31, & 29), as shown in Figure 3.

Place a 2" caplug (Item No 19) on each end of the boom. See Figure 2.



Item No	Description
1	Bracket, cast aluminum
5	Clamp, Boom-to-Bracket
6	Bracket, Casting-to-Boom
10	Boom Section (Inside), 2" x 75"
19	Caplug, 2"
27	Bolt, hex head, 1/4"-20 x 3/4"
29	Nut, hex, 1/4"-20
31	Lockwasher, internal, 1/4"
32	Bolt, hex head, 5/16"-18 x 3"
33	Bolt, hex head, 5/16"-18 x 5"
34	Bolt, hex head, 5/16"-18 x 2 3/4"
35	Nut, hex, 5/16"-18
36	Lockwasher, split, 5/16"
37	Bolt, hex head, 5/16"-18 x 4"

Figure 2
Boom-to-Mast Bracket

Item No	Description
7	Boom Section (outside), 2" x 75"
10	Boom Section (Inside), 2" x 75"
19	Caplug, 2"
28	Bolt, hex head, 1/4"-20 x 2 1/2"
29	Nut, hex, 1/4"-20
31	Lockwasher, internal, 1/4"

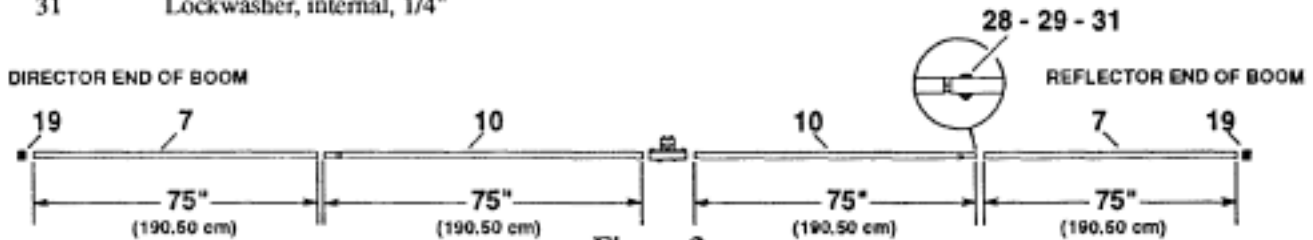
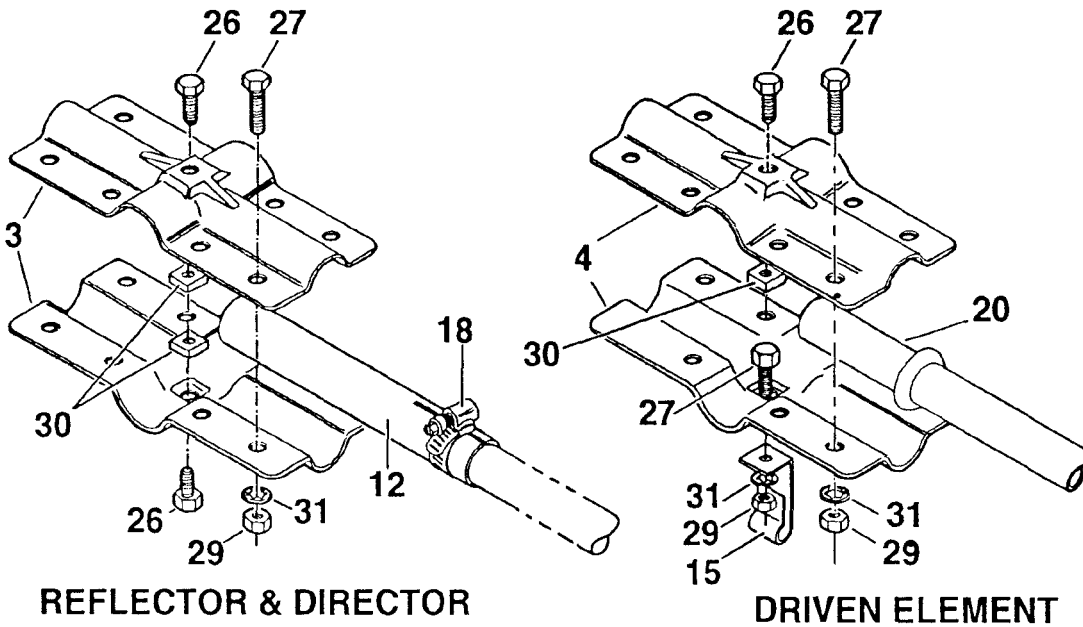


Figure 3
Boom Assembly

Assembly of the Elements: Select the element-to-boom brackets (the 10 small brackets, Item 3) and loosely assemble on the boom as shown in Figure 4 using 1/4"-20 x 3/4" bolts, lockwashers and nuts (Item Nos. 27, 31 & 29) and 1/4"-20 x 3/8" bolts (Item No. 26). Place the brackets in their appropriate position on the boom. Refer to Figure 5.

NOTE: Refer to Figure 4 for assembly of the element-to-boom brackets. **DO NOT** tighten the anchor bolts at this time, except the one attached to the beta match to bracket clamp!



Item No.	Description
3	Bracket, Parasitic Element-to-Boom (5/8" to 2")
4	Bracket, Driven Element-to-Boom (7/8" to 2")
12	Reinforcement Tubing, 5/8" x 7 1/2"
15	Clamp, Beta Match-to-Bracket
18	Compression Clamp, 1/2"
20	Insulator, Driven Element
22	Bolt, hex head, #10-24 x 1"

Item No.	Description
23	Nut, square, #10-24
26	Bolt, hex head, 1/4"-20 x 3/8"
27	Bolt, hex head, 1/4"-20 x 3/4"
29	Nut, hex, 1/4"-20
30	Nut, square, 1/4"-20
31	Lockwasher, internal, 1/4"

Figure 4
Element-to-Boom Brackets

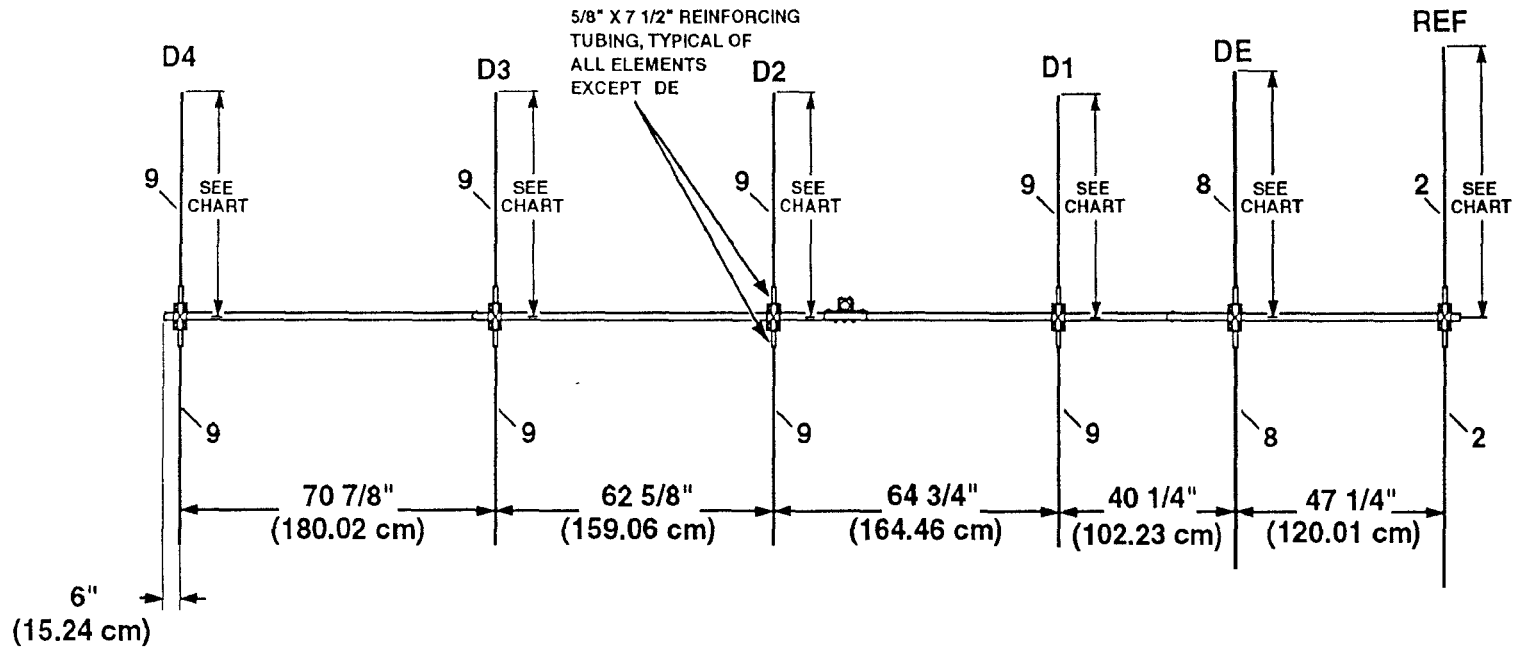
Item No.

Description

- 2 Reflector Element, 7/16" x 52"
- 8 Driven Element, 7/16" x 54 3/8"
- 9 Director Elements, 7/16" x 47"

NOTE: DE is tuned to lowest frequency. To operate on the higher frequencies, it will be necessary to cut the DE tubing. See Element Dimensions Chart.

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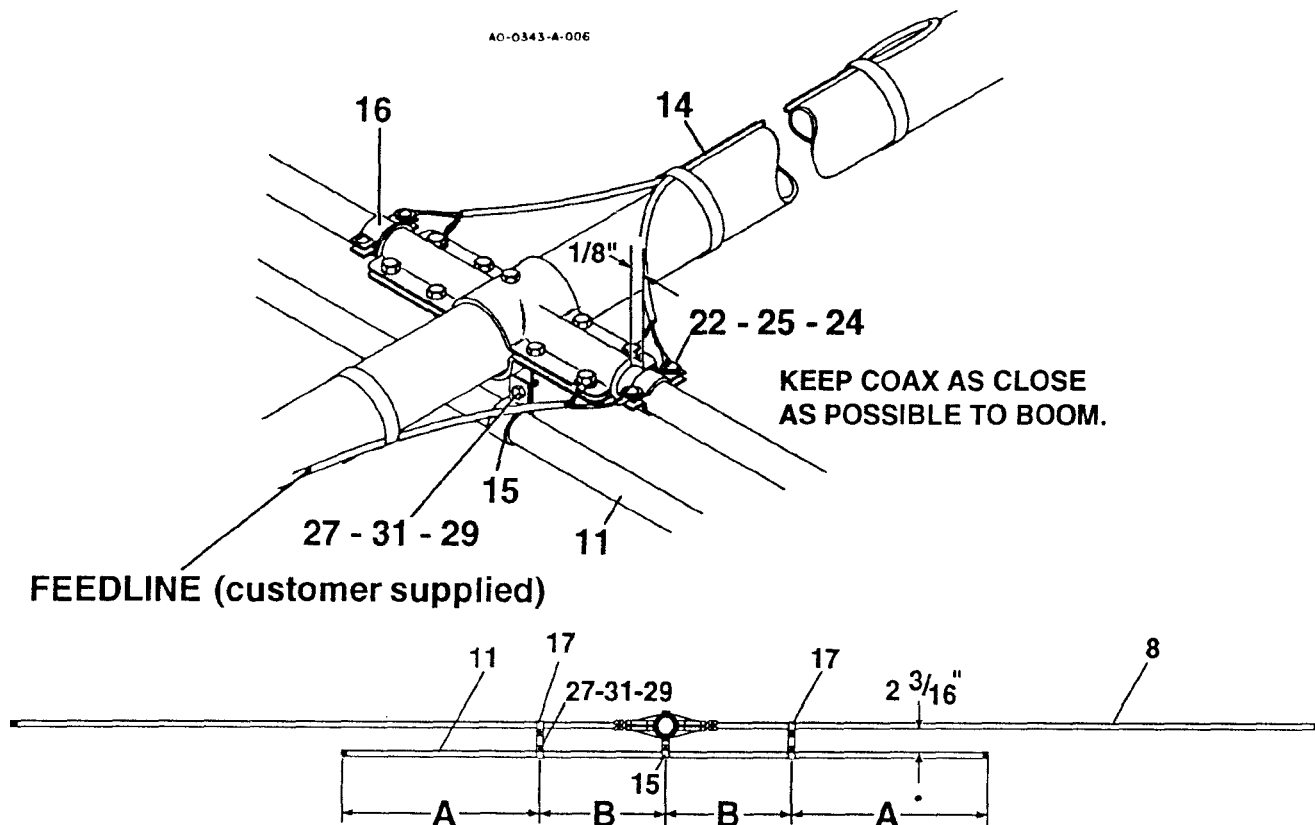
	D4	D3	D2	D1	DE	REF
Setting #1 (50.10 MHz)	52 ¹¹	51 1/8"	51 1/8"	52 1/2"	55 7/8"	59 1/16"
	(132.1 cm)	(129.9 cm)	(129.9 cm)	(133.4 cm)	(141.3 cm)	(150.0cm)
Setting #2 (51.75 MHz)	50 3/8"	49 7/8"	49 7/8"	51 1/8"	54 1/4"	57 5/8"
	(128.6 cm)	(126.7 cm)	(126.7 cm)	(129.9 cm)	(137.8 cm)	(146.4 cm)
Setting #3 (53.25 MHz)	49 1/4"	48 1/2"	48 1/2"	49 5/8"	51 7/8"	56"
	(125.1 cm)	123.2 cm)	(123.2 cm)	(126.0 cm)	(131.8cm)	(142.2 cm)

Element Dimension Chart

Figure 5 Element Assembly and Antenna Dimensions

Select the 5/8" x 7 1/2" reinforcement tubing (Item No. 12) and insert them into the brackets assembled on the boom. Tighten the 1/4"-20 x 3/4" bolts (Item 27) holding the tubing. The driven element does not require reinforcement tubing.

Select the reflector elements (Item No. 2) and the 1/2" compression clamps (Item No. 18). Install the compression clamps over the 5/8" x 7 1/2" tubing in the bracket on the reflector end of the boom. Insert the reflector elements into the reinforcement tubing, adjust to the desired dimensions (refer to Figure 5). Tighten the compression clamps using #10-24 x 1" bolts and nuts (Item Nos. 22 & 23).



FEEDLINE (customer supplied)

KEEP COAX AS CLOSE AS POSSIBLE TO BOOM.

NOTE: Beta Tube is tuned to lowest frequency. To operate on higher frequencies, it will be necessary to cut the beta tube.

Frequency Setting	Dim. "A"	Dim. "B"
Setting #1 (50.10 MHz)	17 1/4" (43.8 cm)	11" (27.9 cm)
Setting #2 (51.75 MHz)	17 1/4" (43.8 cm)	11" (27.9 cm)
Setting #3 (53.25 MHz)	16 3/4" (42.5 cm)	10 11/16" (27.1 cm)

Item No.	Description
8	Driven Element, 7/16" x 54 3/8"
11	Beta Tube, 7/16" x 56 1/2"
14	Balun Assembly, 6-Meter
15	Clamp, Beta Match-to-Bracket
16	Tubing Clamp, Balun and Coax Connection
17	Clamp, Beta-to-Element
22	Bolt, hex head, #10-24 x 1"
24	Nut, hex head, #10-24
25	Lockwasher, internal, #10
27	Bolt, hex head, 1/4"-20 x 3/4"
29	Nut, hex, 1/4"-20
31	Lockwasher, internal 1/4"

Figure 6 Beta Match Assembly

Select the driven element-to-boom brackets (the two larger brackets, Item No. 4). Assemble the beta match-to-bracket (Item 15) clamp to one of these brackets. See Figure 4. Loosely assemble both brackets to the approximate driven element location as shown in Figure 5. An installed view of the beta match is shown in Figure 6.

Locate all of the elements in the correct position on the boom, insure the elements are in a plane parallel to the earth when the antenna is erected. Tighten the anchors bolts securely. This will indent the boom, preventing the elements from twisting.

Select the rope (Item No. 13) and cut it into twelve equal lengths. Insert a length of rope into the end of each element. With about one-half inch of rope extending from the element end, separate the fibers and fold them back over the element. Refer to Figure 7. Now install a 7/16" caplug (Item No. 12) over the element and rope. The rope inside the element will prevent vibrations caused by wind.

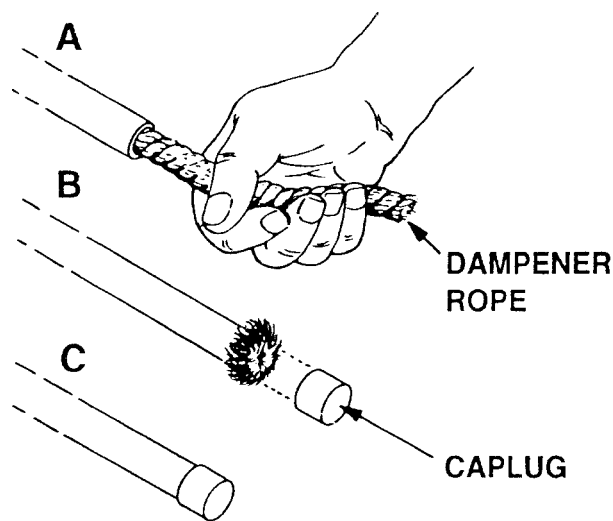


Figure 7 Rope Dampener

Assembly of the Beta Match and Balm: Select the beta match tube (7/16" x 56 1/2", Item No. 11) and the two beta supports (Item No. 17) and install on the driven element. See Figure 6.

Select the balun assembly (Item No. 14) and the balun-to-driven element clamps (Item No. 16) and attach the balun to the driven element as illustrated in Figure 6.

NOTE: The center conductors of the balun connect to the driven elements and the braid connects to the bracket as shown in the illustrations.

Securely tape the balun to the boom using waterproof tape. Weatherproof the balun connections with black tape, Coax Seal© or some similar substance.

Final AssemblyAnstallation: Connect the coax feedline (RG-213/u is recommended) to the driven element as shown in Figure 6. The center conductor of the coax connects to the driven element and the braid connects to the bracket.

Coax Seal© is a registered trademark of Universal Electronics.

Run the coax feedline to the mast taping it securely to the boom every 12 inches with waterproof tape. Weatherproof the coax connection with Coax Seal© or some similar substance.

Install the antenna on the mast at least 4 feet from other beams. To further insure that the boom-to-mast bracket will not slip, drill a 5/16" hole in the mast and pin the bracket using the 5/16"-18 x 4" bolt (Item No. 37). Refer to Figure 5. Tighten all boom-to-mast bracket bolts securely.

WARNING:

DO NOT ALLOW ANY PART OF THIS ANTENNA TO TOUCH POWERLINES. THIS COULD CAUSE SEVERE BURNS AND/OR FATAL INJURIES!

Lightning Protection

To properly protect the antenna the supporting structure **MUST** be grounded. A good ground will insure the most noise free reception possible. To ground the supporting structure, connect its base to a proper ground with copper braid or with #10 or larger (lower number) copper or aluminum wire.

A proper ground consists of one or more 1/2" x 8' copperclad steel ground rods driven into the earth at least 12 inches from any concrete. Eight feet (8') represents the minimum depth necessary for a good ground.

VSWR Charts

These VSWR curves are typical for this antenna mounted 70 feet above ground, horizontally polarized. Similar curves can be expected for this antenna mounted at least 25 feet above ground. *DO NOT try to tune this antenna for low VSWR at ground level.*

Service Information

If you are unable to resolve your problem or if you need to order replacement parts, you should contact the Hy-Gain Customer Service Department.

You should fully research your problem by going through the Troubleshooting Guides in Chapter 6 before you contact the Customer Service Department. You should also record your VSWR across all three bands before calling

You should retain your sales receipt or other proof of purchase for antennas that are still under warranty.

All requests, inquires, warranty claims, or for ordering replacement parts, contact:

Hy-Gain
308 Industrial Park Road
Starkville, Mississippi 39759
USA

Phone: 662-323-9538
FAX: 662-323-6551

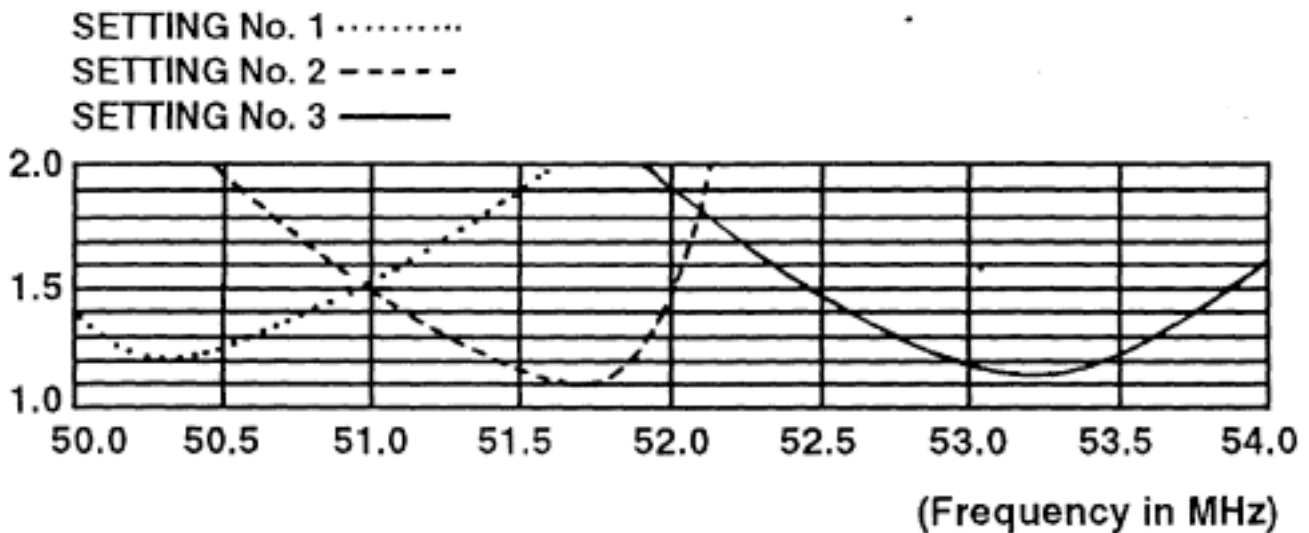


Figure 8 Typical
VSWR Curves

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.

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

$$1 \text{ foot (1') = 30.48 cm Example: } 42" \times 2.54 =$$



FRACTION AND METRIC EQUIVALENTS FOR ONE INCH			
Fractional Inch	Millimeters	Fractional Inch	Millimeters
1/16	1.588	9/16	14.288
1/8	3.175	5/8	15.875
3/16	4.700	11/16	17.463
1/4	6.350	3/4	19.050
5/16	7.937	13/16	20.638
3/8	9.525	7/8	22.225
7/16	11.112	15/16	23.813
1/2	12.700	1	25.400

PARTS LIST

Item No.	Part No.	Description	Qty
1	102734	Bracket, cast aluminum	2
2	175165	Reflector Element, 7/16" x 52"	2
3	161409	Bracket, Parasitic Element-to-Boom (5/8" to 2")	10
4	163764	Bracket, Driven Element-to-Boom (7/8" to 2")	2
5	172732	Clamp, Boom-to-Bracket	1
6	172735	Bracket, Casting-to-Boom	1
7	173754	Boom Section (outside), 2" x 75"	2
8	172802	Driven Element, 7/16" x 54 3/8"	2
9	172922	Director Elements, 7/16" x 47"	8
10	175661	Boom Section (Inside), 2" x 75"	2
11	175669	Beta Tube, 7/16" x 56 1/2"	1
12	190002	Reinforcement Tubing, 5/8" x 7 1/2"	10
13	691138	Rope, 5/32" Polyethylene, 12 feet	1
14	871740	Balun Assembly, 6-Meter	1

	872020	Parts Pack 343S, Stainless Steel	1
15	16271	Clamp, Beta Match-to-Bracket	1
16	165217	Tubing Clamp, Balun and Coax Connection	4
17	165641	Clamp, Beta-to-Element	2
18	358756	Tubing Clamp, #6	10
19	455625	Caplug, 2"	2
20	465216	Insulator, Driven Element	2
21	475639	Caplug, 7/16"	14
		#10 Hardware	
22	504069	Bolt, hex head, #10-24 x 1"	4
23		(Not Used)	
24	554071	Nut, hex, #10-24	5
25	565697	Lockwasher, internal, #10	15
		1/4" Hardware	
26	500156	Bolt, hex head, 1/4"-20 x 3/8"	12
27	505266	Bolt, hex head, 1/4"-20 x 3/4"	60
28	505734	Bolt, hex head, 1/4"-20 x 2 1/2"	2
29	554099	Nut, hex, 1/4"-20	62
30	551367	Nut, square, 1/4"-20	14
31	562961	Lockwasher, internal, 1/4"	62
		5/16" Hardware	
32	500392	Bolt, hex head, 5/16"-18 x 3"	2
33	500349	Bolt, hex head, 5/16"-18 x 5"	4
34	506968	Bolt, hex head, 5/16"-18 x 2 3/4"	2
35	555747	Nut, hex, 5/16"-18	9
36	564792	Lockwasher, split, 5/16"	9
37	5142400	Bolt, hex head, 5/16"-18 x 4"	1

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.