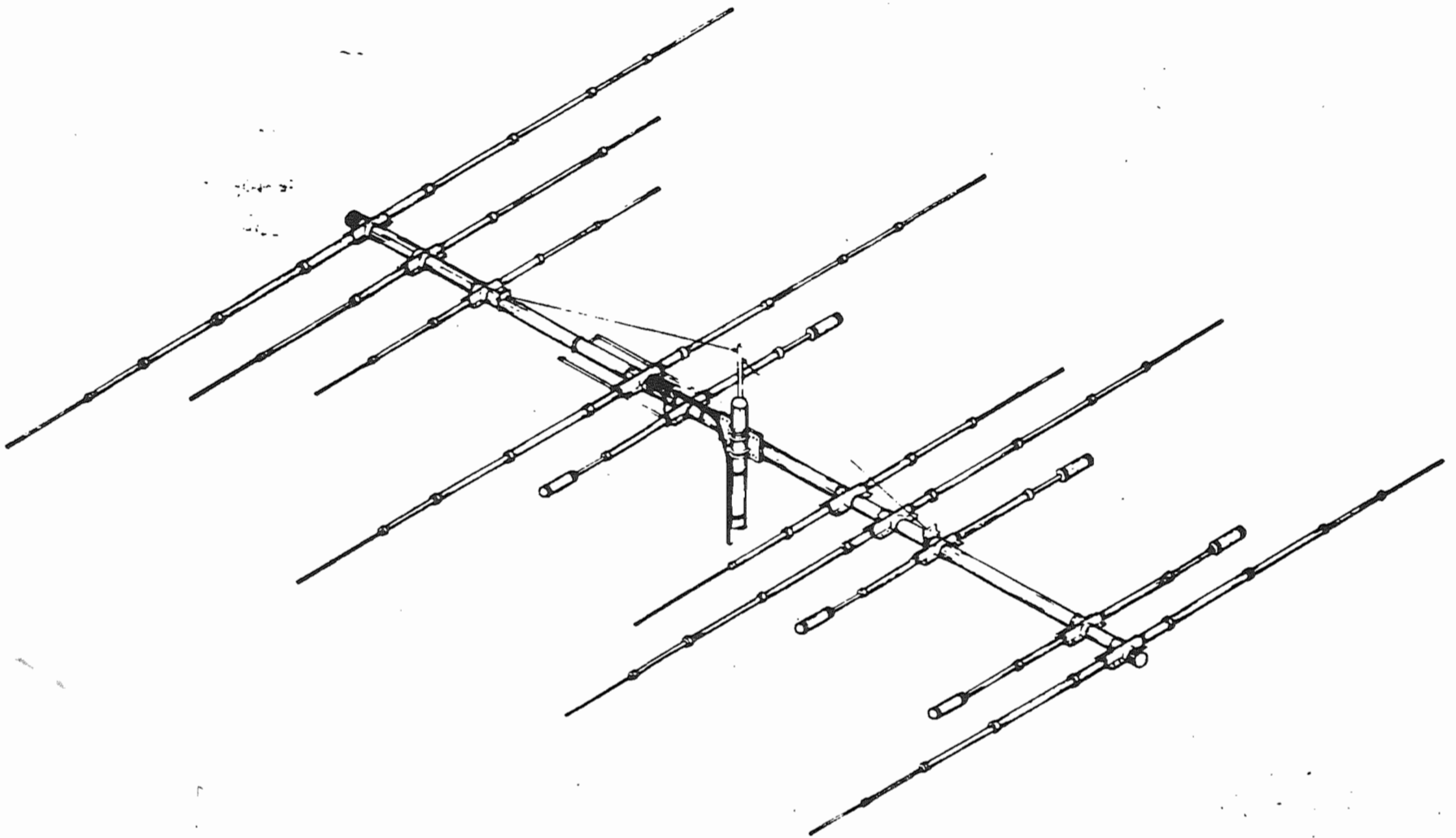


# ASSEMBLY INSTRUCTIONS

Box 393  
Robert Lee  
76945

## 10 Element Tribander 10, 15, 20 Meters



**SY40**

### "WARNING"

INSTALLATION OF THIS PRODUCT NEAR POWER  
LINES IS DANGEROUS. FOR YOUR SAFETY, FOLLOW  
THE INSTALLATION DIRECTIONS.

**W S I WILSON**  
SYSTEMS, INC.

4286 S. Polaris Ave., Las Vegas, Nevada 89103  
(702) 739-7401 - Toll-Free Order Number 800-634-6898

06-01-80

Congratulations!

You have just become the owner of one of the finest antennas available. Before beginning assembly, please check all parts against the Parts List (Page 2).

Before any antenna is put into stock at Wilson Systems, Inc., it goes through a complete quality control check. The final step in this process is a weight check to assure that all parts are present.

In each Hardware Bag, you will find a small tag with an inspector number. On the top of each antenna carton, you will find a date/weight stamp with date of packaging, weight and the weigher's initials.

In the unlikely event you receive an antenna with a defective or missing part, please contact our Customer Service Department. We will need the Quality Control information mentioned above to properly serve you and to correct any quality problems we may have.

After all parts are accounted for, you will need the following tools for assembly:

1. A pencil or other marker.
2. A carpenter's level.
3. A standard blade screwdriver.
4. A 3/8" wrench or ratchet with 3/8" socket.
5. (2) 7/16" wrenches or one 7/16" wrench and one ratchet with 7/16" socket.
6. A 1/2" wrench or ratchet with 1/2" deep socket.
7. A good metal tape measure at least 50 ft. long.

In this antenna kit, you will find a bag of Penetrox. This substance should be applied to all tubing which is telescoped into another section of tubing at points of contact. Before applying the Penetrox, roughen the surface to which the compound is to be applied with a fine grade of sandpaper or steel wool. Cut one corner off the bag and work the Penetrox into and out of this corner. Apply a thin film to the prepared tubing, then assemble as per the instructions. The Penetrox will prevent corrosion build-up between telescoped aluminum tubing.

All Wilson amateur antennas are supplied with Poly Rope to be installed inside the elements. When installed inside an element, the rope absorbs vibrations caused by continuous ground vibrations and winds. (Trapped elements do not require the rope since these vibrations are absorbed by the traps.)

We would like to know what you think of our antennas! Of prime importance to us is your valued opinion as to quality of materials used and workmanship. We would also appreciate your comments on performance. Towards the end of this manual you will find a graph for plotting SWR curves with room for any additional notes you may wish to make. You will also find a questionnaire. We would appreciate it if you would fill it out and return it to us. Remember! . . . We want to give you a top quality product at a good price and comments towards that end are always welcomed here at Wilson Systems, Inc.

## PARTS LIST

SY-40

PART	QTY.	O.D.	SIZE	LENGTH	DESCRIPTION	CHECK LIST
✓T52P	2	2"	.060"	80"	Alum. Tubing slotted one end	
T32P	2	2"	.050"	80"	Alum. Tubing swaged one end 4½" to fit itself ✓	
✓T53	1	1.845"	.060"	80"	Alum. Tubing	
T27P	2	1-1/4"	.050"	36"	Alum. Tubing slotted one end ✓	
✓T40P	6	1-1/4"	.047"	24"	Alum. Tubing slotted one end	
✓T20P	8	1-1/8"	.050"	54"	Alum. Tubing swaged and slotted one end to accept 7/8" O.D. Tubing	
T22P	6	1"	.049"	48"	Alum. Tubing slotted one end ✓	
T120P	4	7/8"	.050"	60"	Alum. Tubing slotted one end ✓	
T43P	2	7/8"	.050"	48"	Alum. Tubing slotted one end ✓	
✓T19P	10	7/8"	.050"	48"	Alum. Tubing swaged and slotted one end to accept 5/8" O.D. Tubing	
✓T102P	4	7/8"	.050"	24"	Alum. Tubing swaged and slotted one end to accept 5/8" O.D. Tubing	
T15P	2	5/8"	.047"	48"	Alum. Tubing slotted one end	
T14P	12	5/8"	.049"	36"	Alum. Tubing slotted one end ✓	
T02	8	1/2"	.042"	60"✓	Alum. Tubing ✓	
T03	6	1/2"	.041"	48"	Alum. Tubing ✓	
T99P	2	3/8"	.035"	24"	Alum. Tubing flattened and pierced one end ✓	
TA9P	2				Traps Driven Element ✓	
TA10P	2				Traps 10m Second Director✓ 15m First Director✓	
TA11P	2				Traps 10m Third Director✓ 15m Second Director✓	
✓P01P	1		1/4"x 6"	8"	Boom-to-Mast Plate	
✓V03P	1		1" x 1"	24"	Guy Support	
✓WD2P	1		6/18	25'	Steel Guy Cable	
BE6P	6				Boom-to-Element Mounts	
BE7P	12				Boom-to-Element Mounts ✓	
BE8P	2				Boom-to-Element Mounts ✓	
PR195	1		5/16"	195'	Polypropylene Rope ✓	
Z14P	1		1/2" x .063"	11"	Beta Rod Strap	
Z15P	6				Shorting Straps ✓	
Z16P	2		1/2" x .063"	23-1/2"	Beta Matching Straps ✓	
RFC40	1				RF Choke ✓	
✓SY40	1				Set Instructions	
PE3	1				Bag Penetrox (inside Instruction Envelope) ✓	
HARDWARE BAG NO. 1 ✓						
N01	30		5/16-18		Hex Nuts	
N21	83		1/4-20		Hex Nuts	
N25	16		12-24		Hex Nuts	
N06	3		10-24		Hex Nuts	
N02	26		5/16"		Lockwashers	
N22	83		1/4"		Lockwashers	
N14	16		No. 12		Lockwashers	
N12	3		No. 10		Lockwashers	
N26	5		No. 10		Flatwashers	
S49	83		1/4-20	7/8"	Hex Bolts	
S39	20		1/4-20	1/2"	Hex Bolts	
N18P	4		5/16-18	4"	Eye Bolts	
S32	16		12-24	3/4"	Machine Screws	
S27	42		12-24	1/2"	Machine Screws	
S46	2		10-24	3/4"	Machine Screws	
S21	15		10-24	1/2"	Machine Screws	
N23	20		1/4-20		Square Nuts	
N13	58		12-24		Square Nuts	
N11	14		10-24		Square Nuts	
LWL	1				Electrical Warning Label	

06-01-80

SY40

(2)

PART LIST  
SY40

PART	QTY.	O.D.	SIZE	LENGTH	DESCRIPTION	CHECK L
HARDWARE BAG NO. 2 ✓						
PL2	14		.437"		Plastic Caps, black ✓	
PL5	1		2"		Plastic Cap, black	
PL5R	1		2"		Plastic Cap, red	
F02	6		1-1/4" I.D.		Insulator Sleeves	
F013	4		7/8" I.D.		Insulator Sleeves	
F014	6		1" I.D.		Insulator Sleeves	
C19P	1		2"		Boom Strap	
C01	2		3/8"		Alum. Clamps — D6	
W14	14		1-1/4"		Alum. Clamps	
W10	20		1"		Alum. Clamps	
W78	10		7/8"		Alum. Clamps	
W34	14		3/4"		Alum. Clamps	
W58P	14		5/8"		Alum. Clamps	
W07P	2		No. 14		Insulated Wires with 1/4" Lugs	
HARDWARE BAG NO. 3 ✓						
S01	11		2"		Saddles	
BG2P	2		2"		Boom Guy Support Mounts	
HARDWARE BAG NO. 4 ✓						
U01	11		2"		U-Bolts	

When ordering replacement parts, always give part number and description.

NOTE: Check all Tubing for parts telescoped inside.

# **SY40** **10-15-20 METER TRIBANDER**

Band MHz:	14-21-28	Boom (O.D. x length):	2" x 26'0"
Maximum power input:	legal limit	No. elements:	10
Gain (dbd):		Longest Element:	36'
10m	11.5	Turning radius:	22'6"
15m	10	Maximum mast diameter:	2" O.D.
20m	10	Surface area:	12.1 sq. ft.
VSWR at resonance:	1.2:1	Wind loading at 80 mph:	309 lbs.
Impedence:	50 ohms	Assembled weight (approx.):	75 lbs.
F/B ratio:		Shipping weight (approx.):	84 lbs.
10m	25 db	Matching method:	Modified Beta
15m	20 db	Maximum wind survival:	100 mph
20m	25 db		

## **PRELIMINARY INSTRUCTIONS**

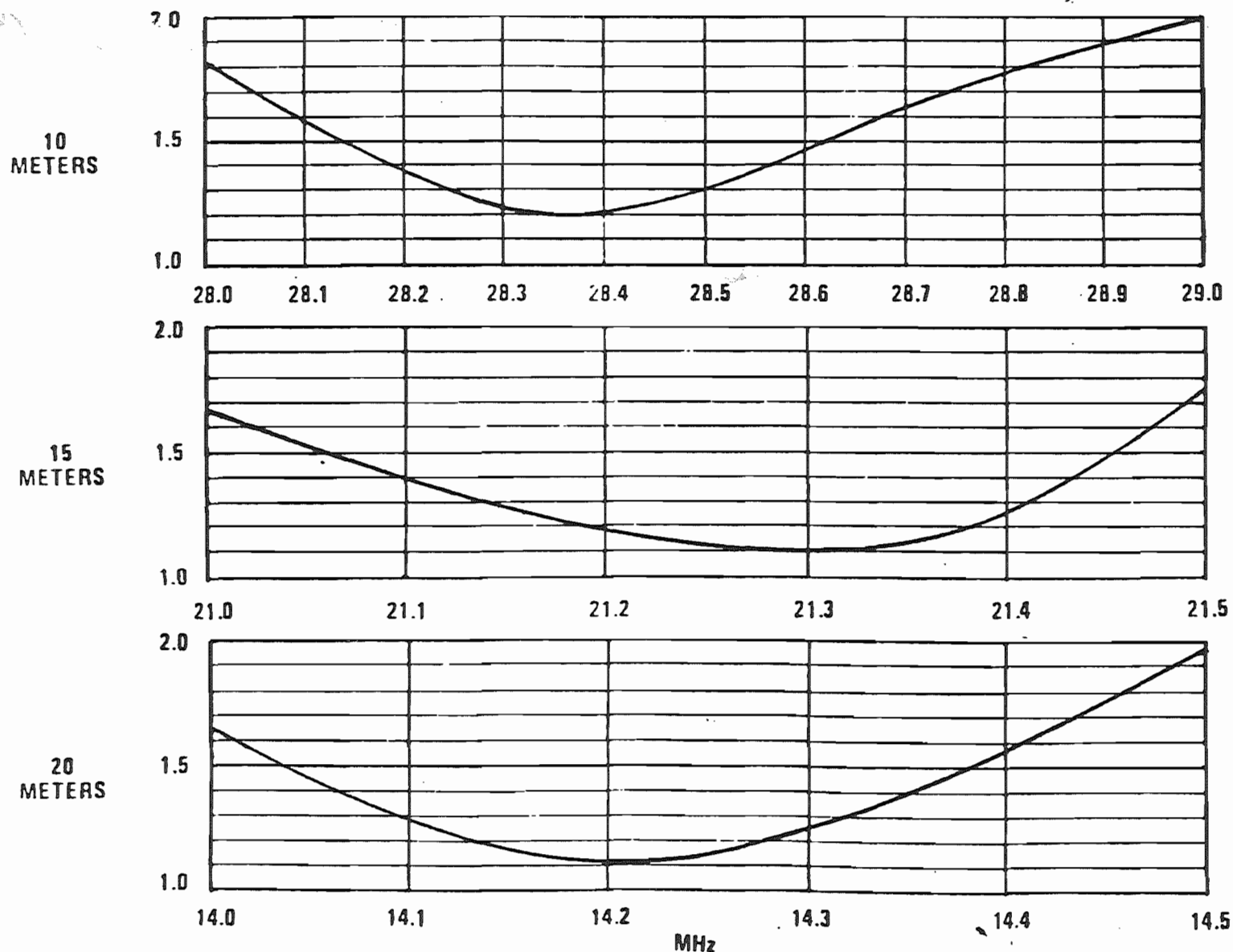
For the best results and the best use of your time, familiarize yourself with all parts and instructions before beginning assembly.

Begin assembly by unpacking everything and checking all your parts against the parts list. Do not proceed until you have determined that you have everything on the list, and each item in the quantity specified. If anything is missing, contact the Customer Service Dept. at Wilson Systems immediately, and tell us exactly what is missing. Do not begin assembling your antenna until you have all parts in hand.

Read your instructions completely, and be sure you understand them, before you start. Do not begin assembly until you are sure you have ample time to finish — a partially completed antenna is especially prone to damage, and parts scattered around are easily lost.

If you lose or damage any parts, or have any problems you cannot work out by yourself, call us! We have experienced dedicated people who understand your problems and are anxious to help you.

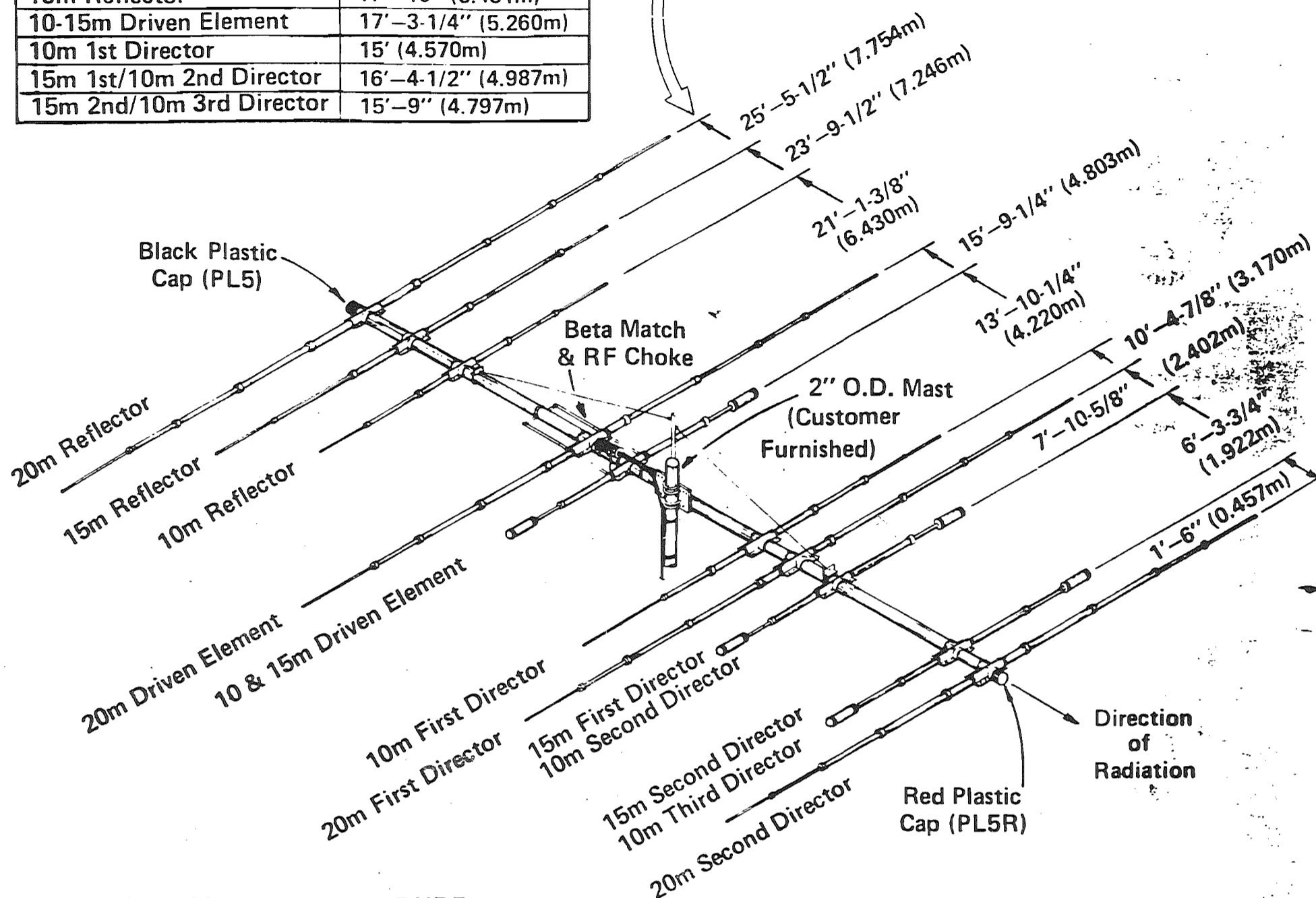
## **SWR CURVES**



OVERALL DIMENSIONS	
20m Reflector	36' (10.964m)
20m Driven Element	33'-5" (10.177m)
20m 1st Director	32'-4" (9.850m)
20m 2nd Director	31'-2-1/2" (9.505m)
15m Reflector	24'-1" (7.335m)
10m Reflector	17'-10" (5.431m)
10-15m Driven Element	17'-3-1/4" (5.260m)
10m 1st Director	15' (4.570m)
15m 1st/10m 2nd Director	16'-4-1/2" (4.987m)
15m 2nd/10m 3rd Director	15'-9" (4.797m)

NOTE: These dimensions are progressive starting from the 20m 2nd Director Element. Place the center of the director element 3" (0.076m) from the end of the boom.

For exact element dimensions see Figure 4



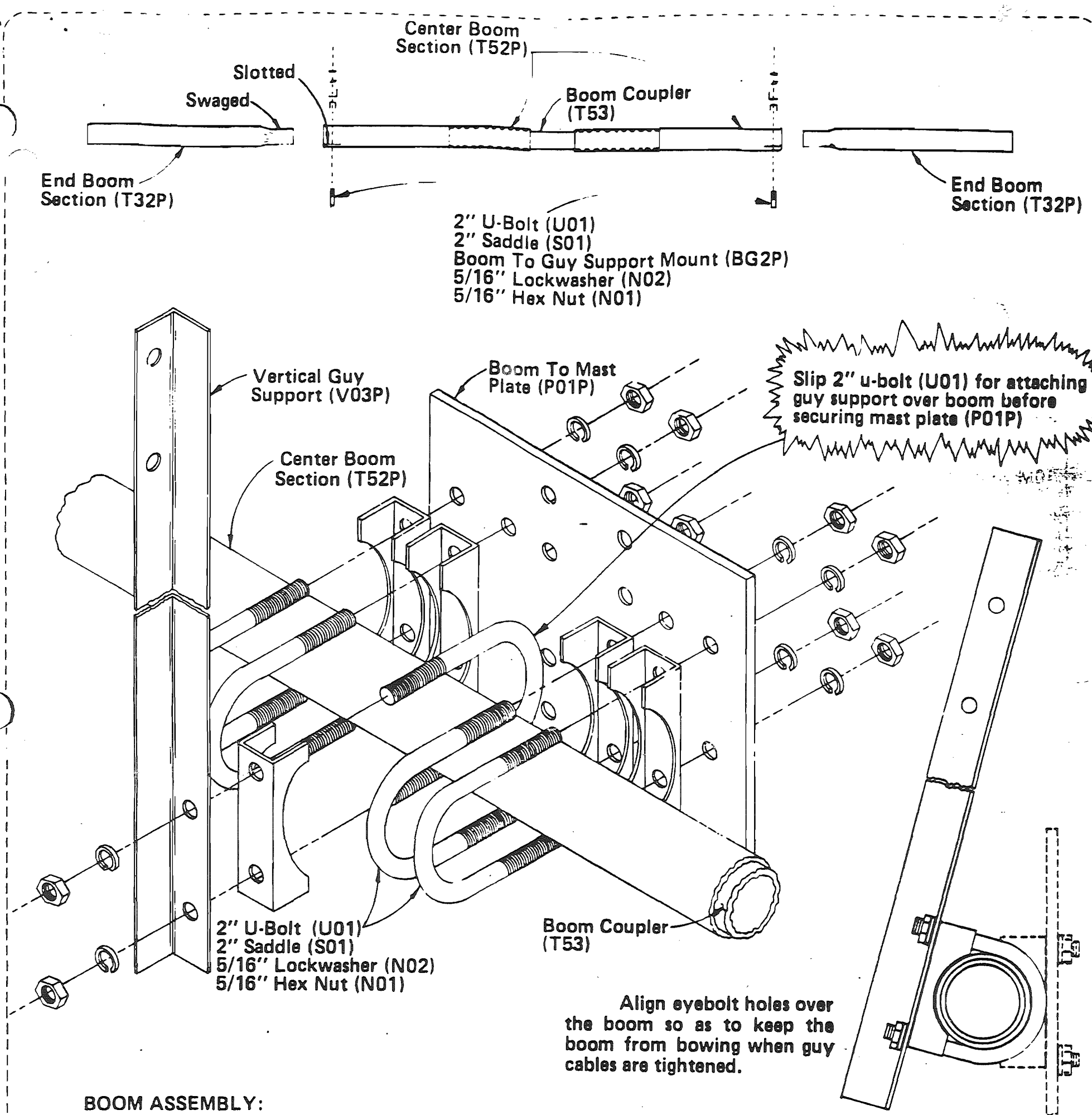
#### BASIC ASSEMBLY PROCEDURE:

This figure shows what the antenna should look like when assembled. Specific assembly details are shown on the following pages. Your basic order of assembly should be:

1. Put the boom together as shown in Figure 2.
2. Then assemble each element as shown in Figures 3, 4, and 5. Mount each element loosely on the boom as soon as it is assembled. Locate them only approximately, and do not put the plastic caps on the ends at this time.
3. After the elements are all in place, move them to their exact positions, set them square to the boom and parallel to each other, and tighten all bolts and clamps. Recheck all dimensions, and correct any errors. Be sure the W-clamps for attaching the shorting straps are installed as shown in Figure 6.
4. Assemble the beta match per Figure 7.
5. Install the guy cables per Figure 9.
6. Recheck all dimensions again, and check the tightness of all bolts and clamps. Coat all bolts, screws, and nuts with silicon sealant. Put plastic caps on the ends of boom and elements.
7. Attach your coaxial cable to the RF Choke as illustrated, and secure to the boom with tape.
8. Install the antenna on the mast per Figure 9. Dress your coaxial cable down the mast and secure in several places with tape.

FIGURE 1

**SY40**



**BOOM ASSEMBLY:**

First mark the center of the 80" (2.032m) alum. tubing (T53). Slide the unslotted ends of the center boom sections (T52P) over each end of the coupler so that they butt in the center. Attach the boom-to-mast plate (P01P) and the vertical guy support (V03P) at the boom center using 2" u-bolts, saddles and hardware as shown above. Be sure to slip the 2" u-bolt for attaching guy support over boom before securing mast plate.

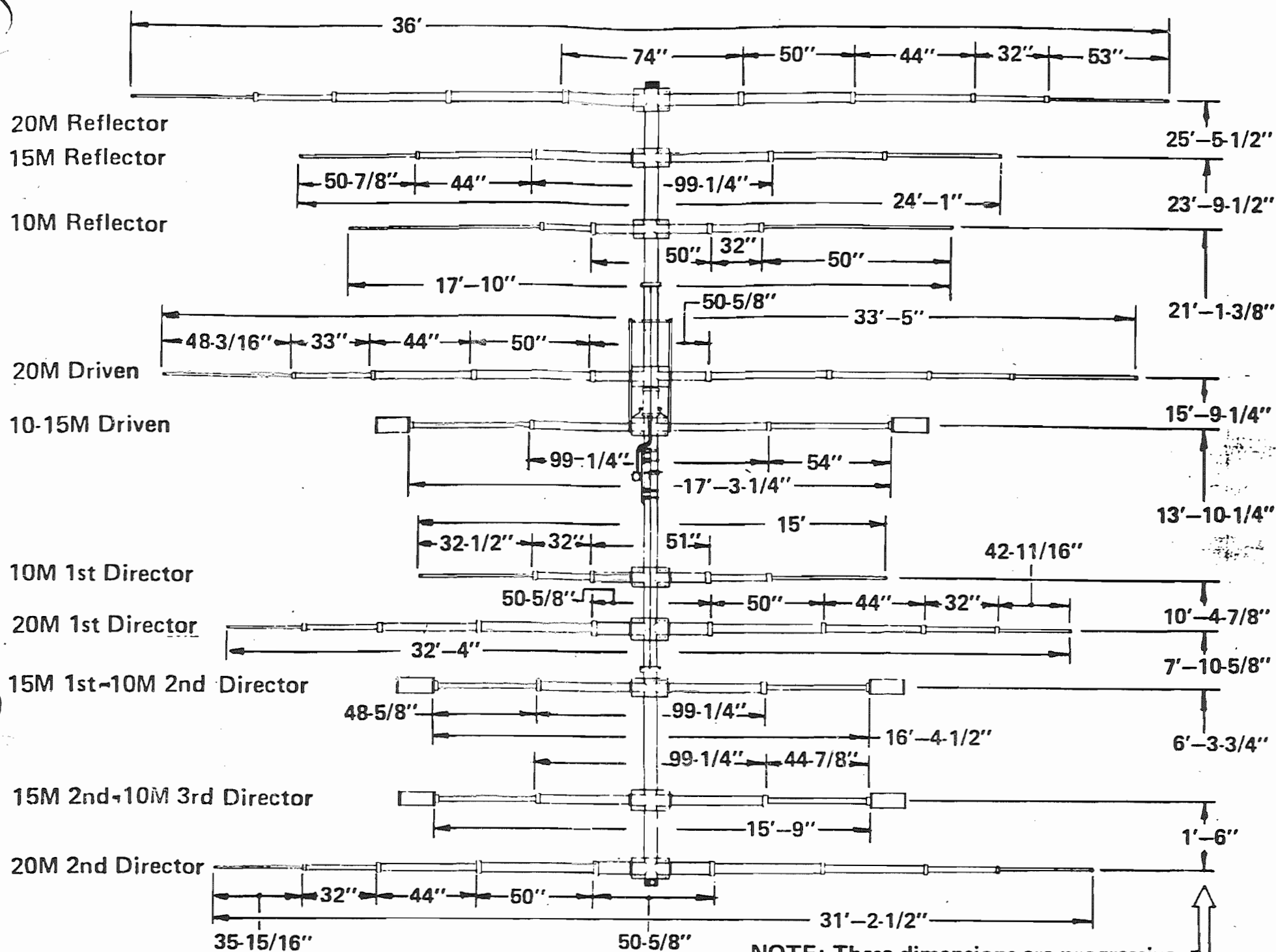
Slide the swaged ends of the end boom sections (T32P) 4" (0.101m) into the slotted ends of the center boom section and secure in the same manner as above. The overall length of the boom should be 26'0" (7.924m). If not adjust the end boom sections equally until it is.

**FIGURE 2**

DRAWN ETW  
APPROVED WT

**SY40**



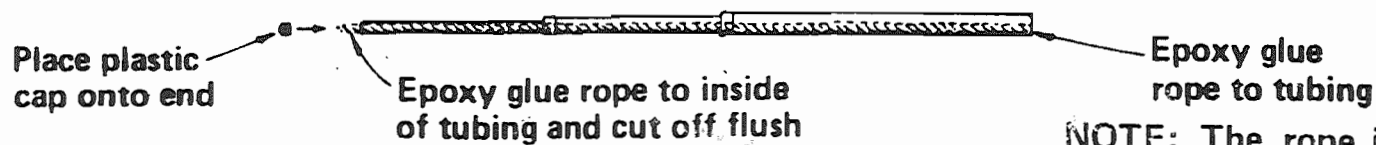


NOTE: These dimensions are progressive starting from the 20m 2nd Director Element.

After total assembly it is extremely important to measure the overall lengths of all elements. Adjust the tips of all full size elements equally on both sides to obtain the correct dimension and inside the traps on the trapped elements.

Vibrations in your antenna due to light winds will cause the elements to sing and harden. If the elements over-harden they will become brittle and crack. In order to increase the life of your antenna, we recommend the use of 5/16" polypropylene rope threaded through the elements as described below.

Thread the rope through the 7/8" O.D. tubing. Epoxy glue the rope to the inside of the tubing which will have the mounting plates attached. After the glue has set, thread each piece of the assembly onto the rope (clamp, tubing, clamp, tubing, etc.). When the entire element is assembled, dimensioned, and all hardware tightened, epoxy the other end of the rope to the end tube. Cut the end of the rope flush with the tube and place the plastic cap on the end.



NOTE: The rope is to be installed the full length of all full sized elements. Rope is not required in the trapped elements.

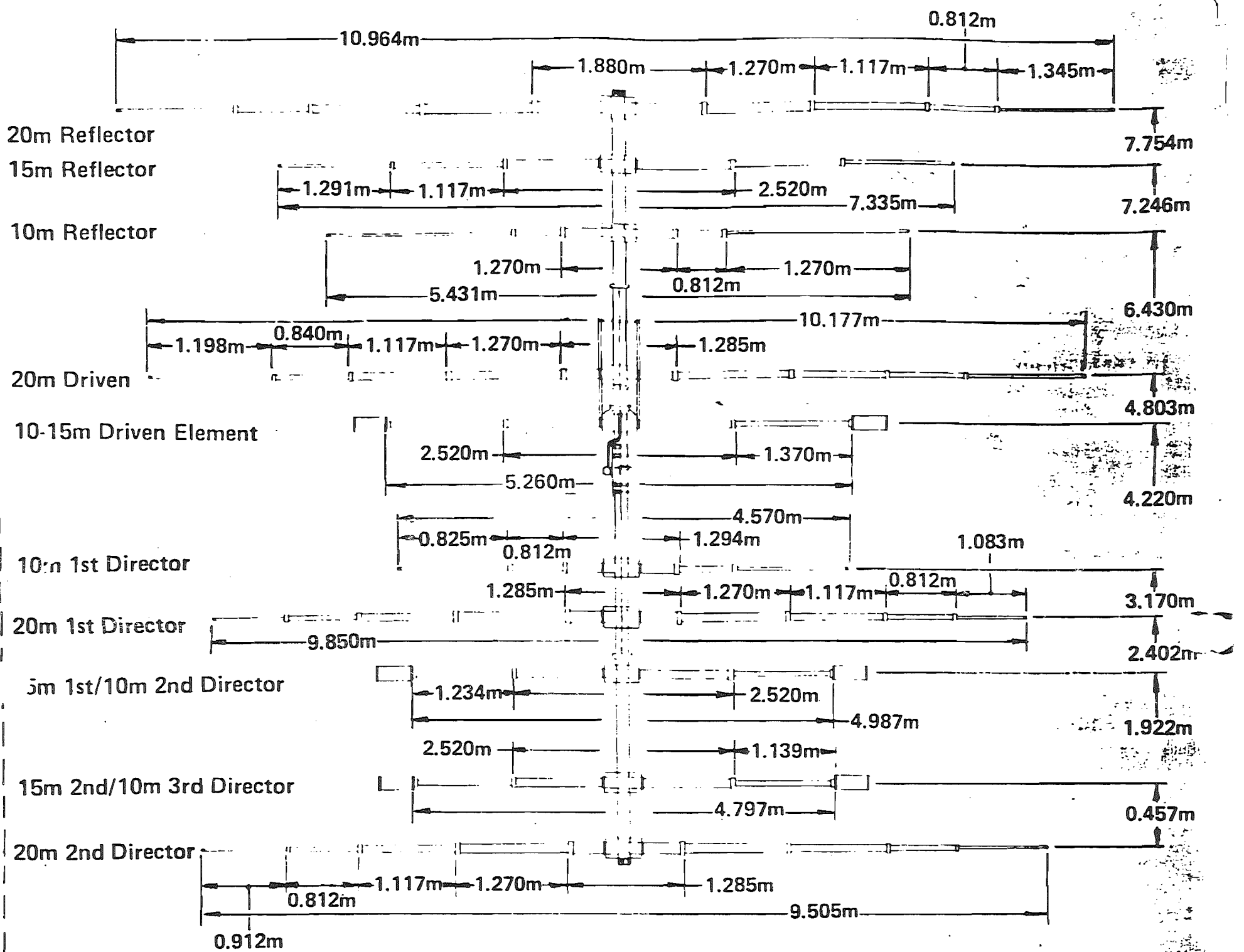
FIGURE 4

SY40

DRAWN ETW  
APPROVED ETW

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(8)



25.3125  
50.

75 5/16

50 5/8

51

150.625

50.000  
50.000  
50.625

25.3125  
50.625  
4  
3  
6

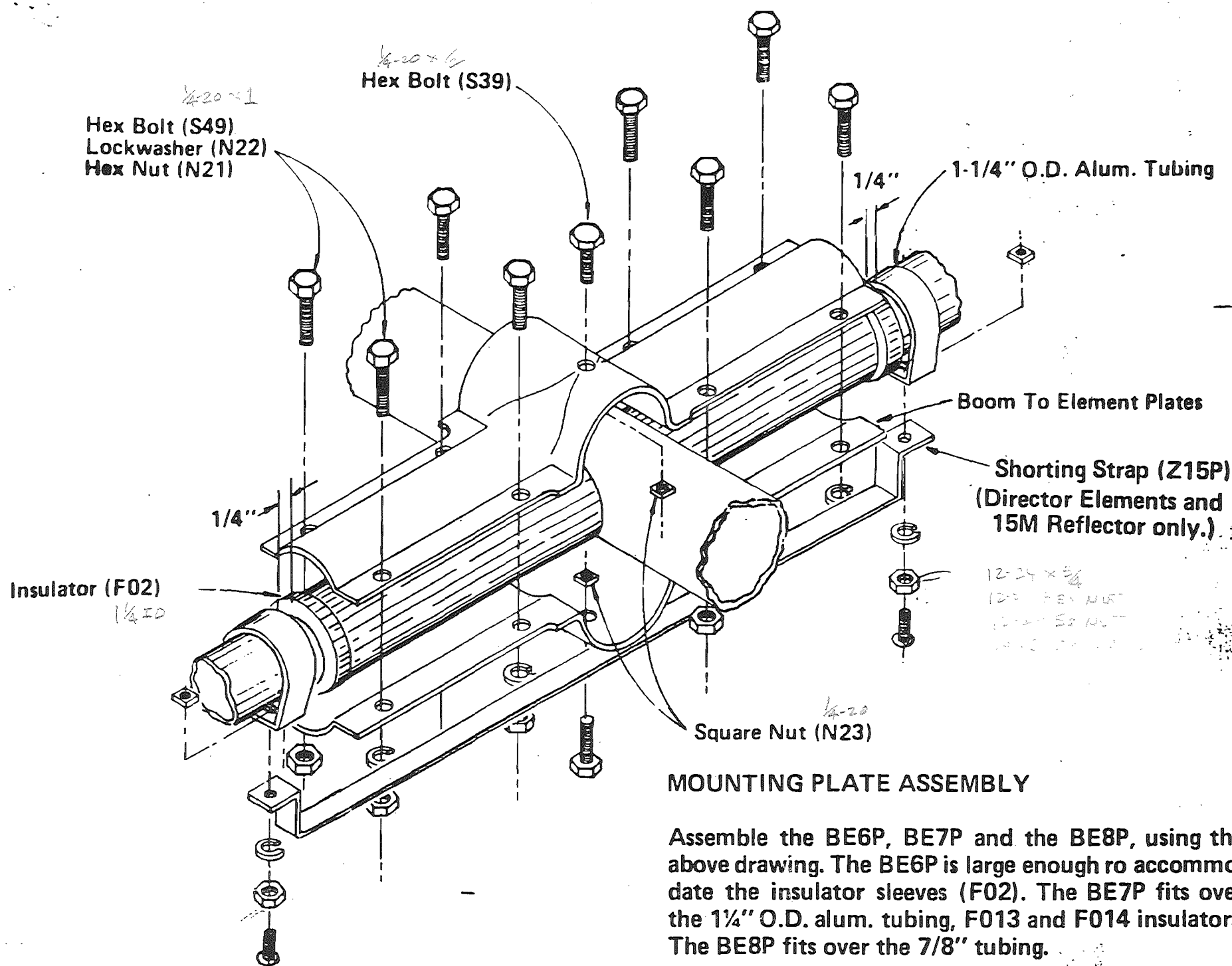
FIGURE 5

DRAWN ETW  
APPROVED WJ

**SY40**

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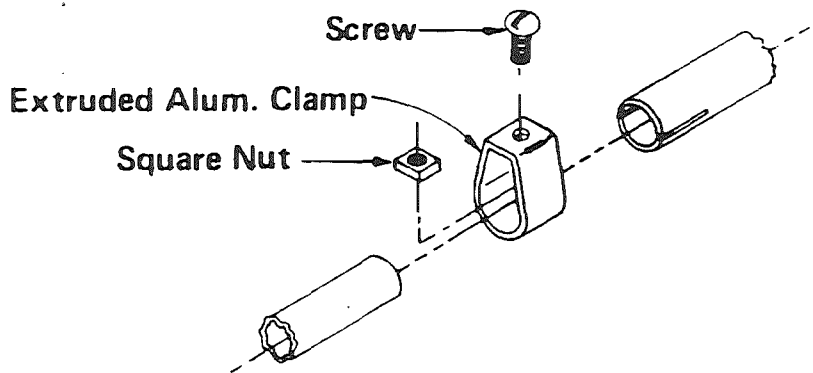
(9)



### MOUNTING PLATE ASSEMBLY

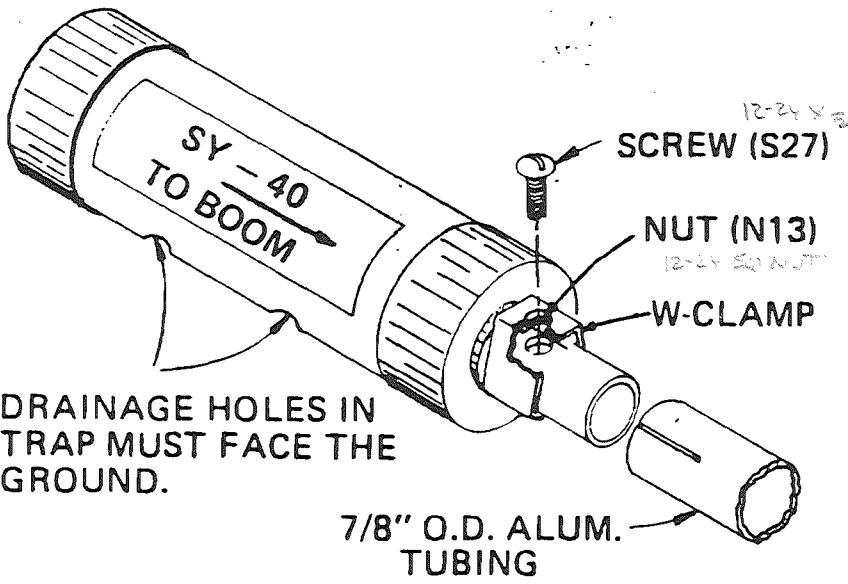
Assemble the BE6P, BE7P and the BE8P, using the above drawing. The BE6P is large enough to accommodate the insulator sleeves (F02). The BE7P fits over the 1/4" O.D. alum. tubing, F013 and F014 insulators. The BE8P fits over the 7/8" tubing.

### ELEMENT ASSEMBLY



W-Clamp (Typical)

Clamp	Screw	Nut
W14	12-24 x 1/2"	12-24
W10	12-24 x 1/2"	12-24
W78	12-24 x 1/2"	12-24
W34	12-24 x 1/2"	12-24
W58	10-24 x 1/2"	10-24



NOTE: DRAINAGE HOLES IN TRAP MUST FACE THE GROUND.

Assemble trap to element by inserting the machine screw through the hole in the trap.

### TRAP TO ELEMENT ASSEMBLY

FIGURE 6

DRAWN ETW  
APPROVED MT

**SY40**

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(10)

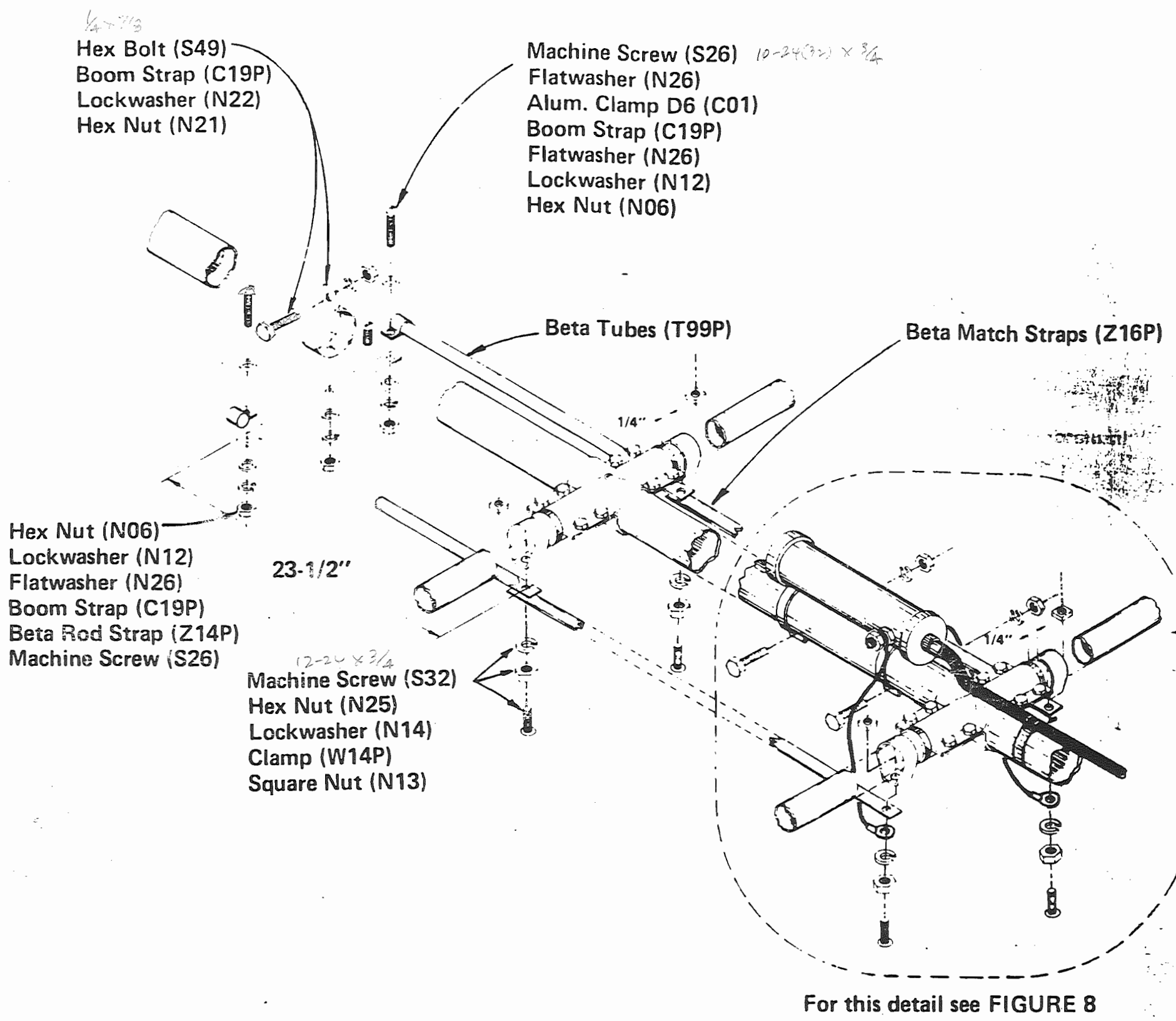


FIGURE 7

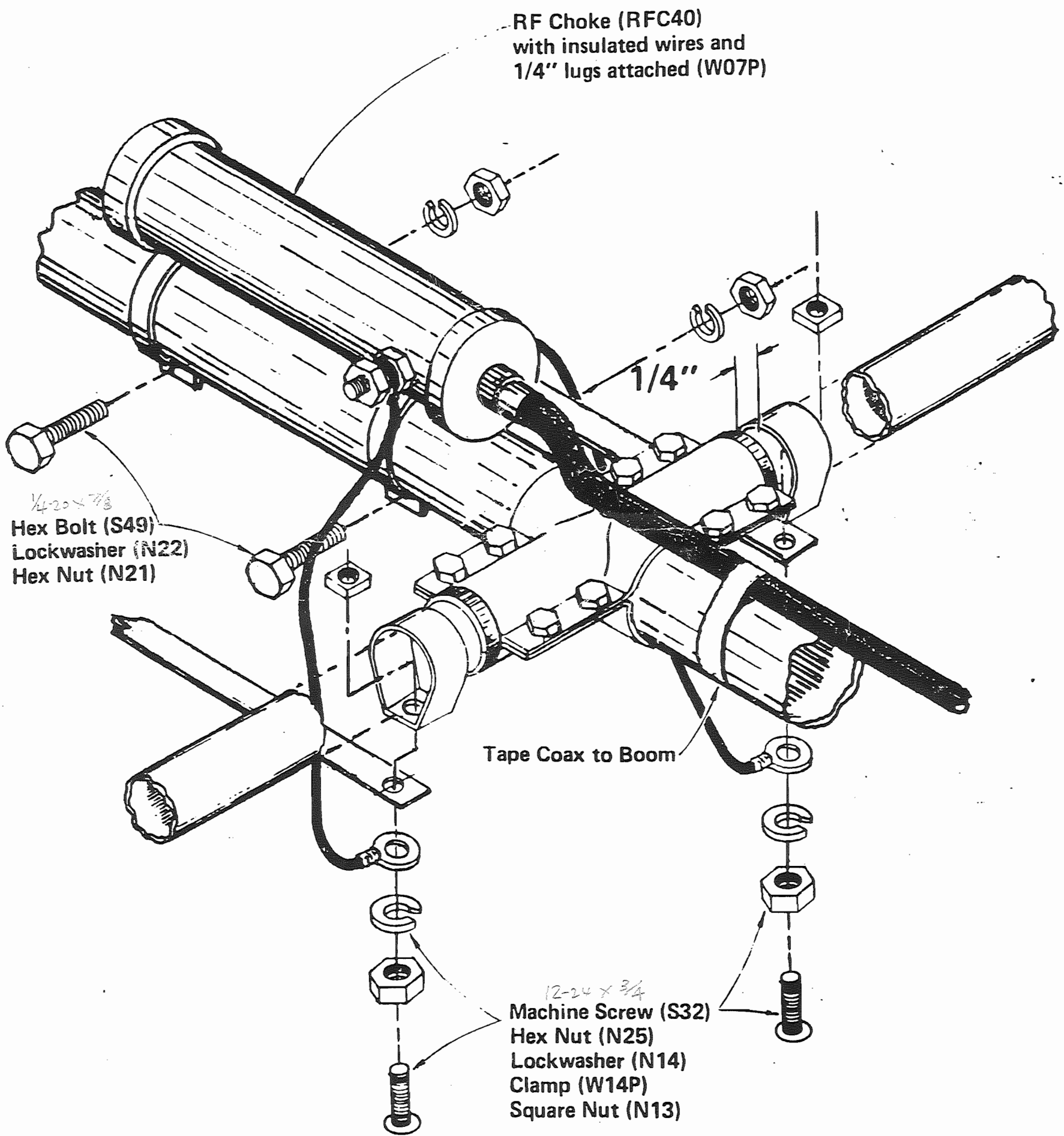
SY40

DRAWN ETW  
 APPROVED ETW

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(11)

FIGURE 8



DRAWN GTW  
APPROVED NT

**SY40**

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(12)

## ANTENNA MOUNTING:

The completed antenna mounts to a 2" O.D. mast (customer furnished) with 2" u-bolts, saddles, lockwashers and nuts, as shown.

NOTE: The large warning label enclosed is to be mounted at approximately eye level on your tower or supporting structure.

Assemble and tighten the two inner u-bolts before assembling the outer u-bolts.

Boom to Mast Plate (P01P)  
with boom attached

Eyebolt (N18P)

2" U-Bolt (U01)  
2" Saddle (S01)  
5/16" Lockwasher (N02)  
5/16" Hex Nut (N01)

2" O.D. Mast  
(Customer Furnished)

Vertical Guy  
Support (V03P)

Cut off excess

Wrap six or more times

Steel Guy Cable (WD2P)

Wrap six or more times

Guy Mounts (BG2P)

Secure with these  
nuts after tensioning

5/16" Hex Nut (N01)  
5/16" Lockwasher (N02)

Tension guys  
with these nu

Eyebolt (N18P)

Typical arrangement for all eyebolts

## GUY ASSEMBLY:

Cut two pieces of guy cable 8'8" (2.641m) long.

Assemble one 5/16" hex nut (N01) to each of the four eyebolts (N18P). Turn the nut all the way up to the eye - as far as it will go with light pressure only. These will be used to secure the eyebolts after guy tensioning.

Install two eye bolts in the top holes of the vertical guy support (V03P) - one eye in each direction. Install one eyebolt in the top hole of each of the two guy mounts (BG2P) - with the eyes towards the center of the boom. Install each bolt by inserting the end about 1/2" (12mm) through the hole, and threading a hex nut about six turns onto the end.

Install the guy cables between the eyes, as shown in this figure and in Figure 1. Allow approximately equal lengths of cable to extend through the eyes on each end, pull tight enough to remove the slack only, wrap six or more times, and cut off excess.

Tension the guys by tightening the nuts on the ends of the eyebolts. Tighten equally on both ends of each guy, and secure with the nuts on the opposite sides.

FIGURE 9

DRAWN ETW  
APPROVED in T

SY40

INSTRUCTIONS FOR DISASSEMBLING TRAP

IN THE EVENT IT IS EVER NECESSARY TO INSPECT THE TRAP ASSEMBLIES, PROCEED AS FOLLOWS:

REMOVE THE PLASTIC CAPS FROM ENDS OF TRAPS.  
REMOVE SCREWS FROM ENDS OF TRAPS.

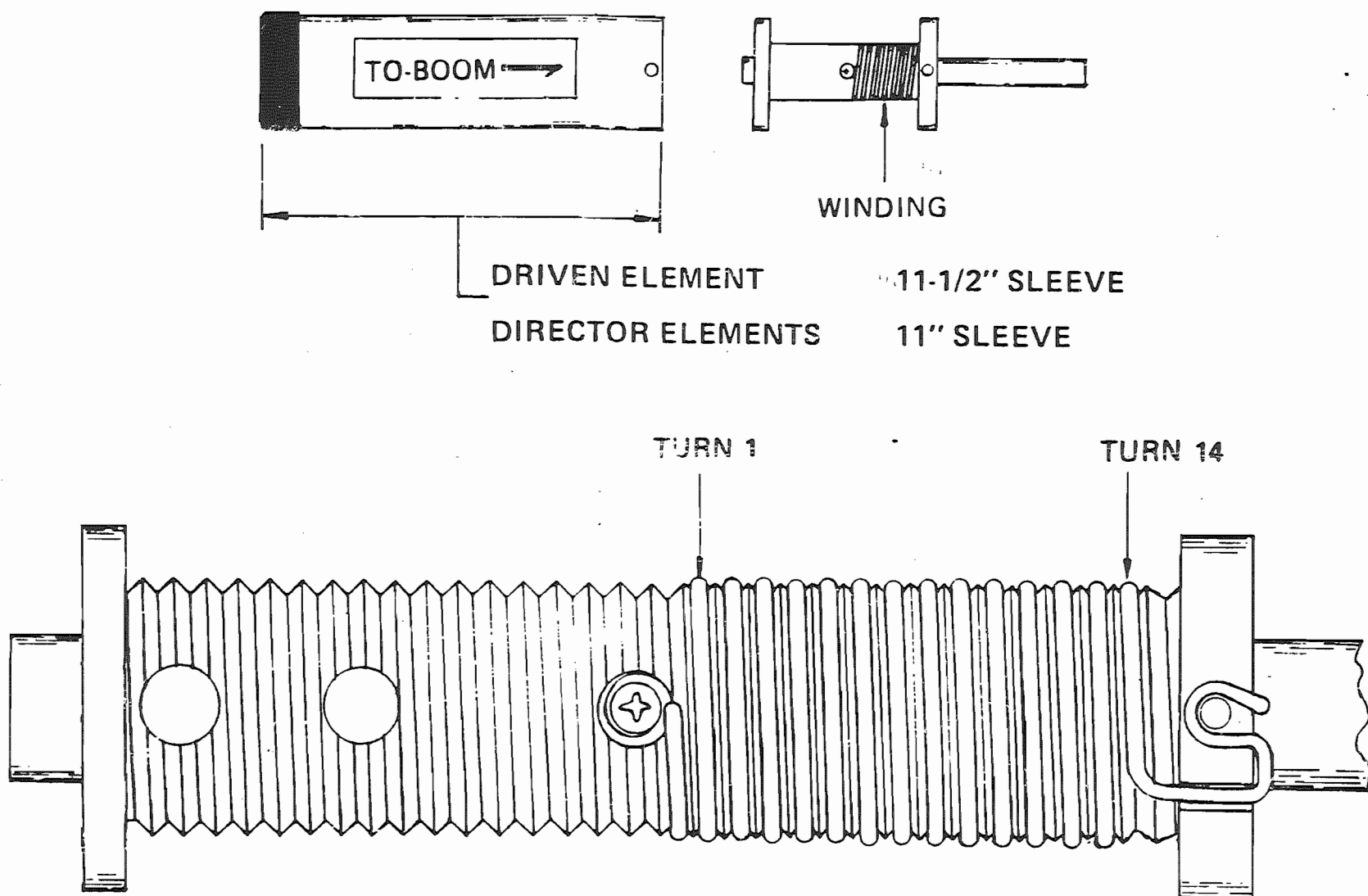


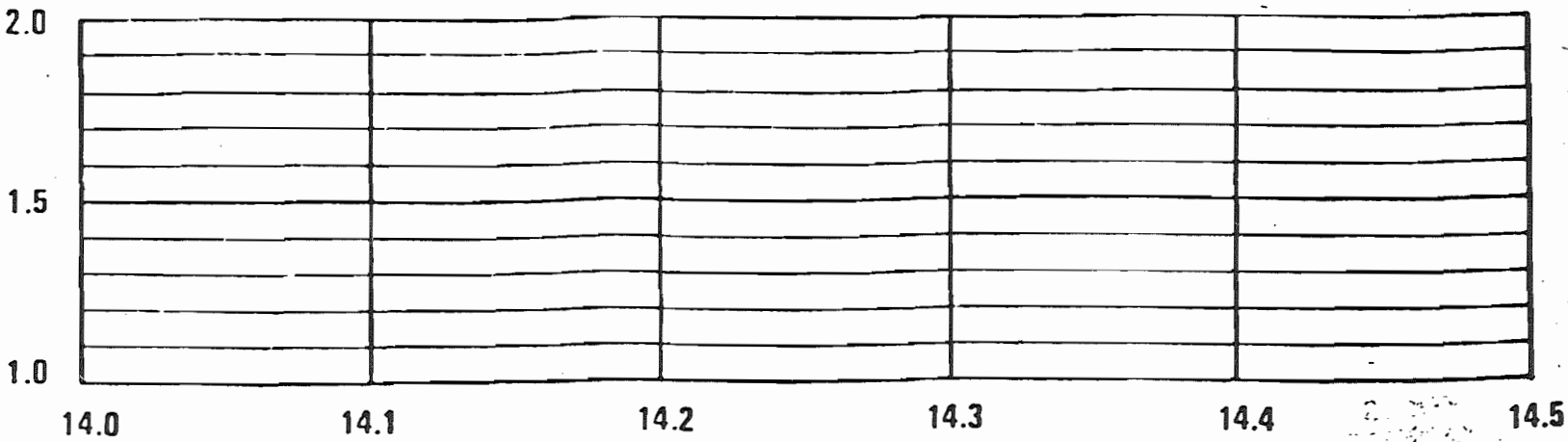
FIGURE 10

DRAWN ETW  
APPROVED W/I

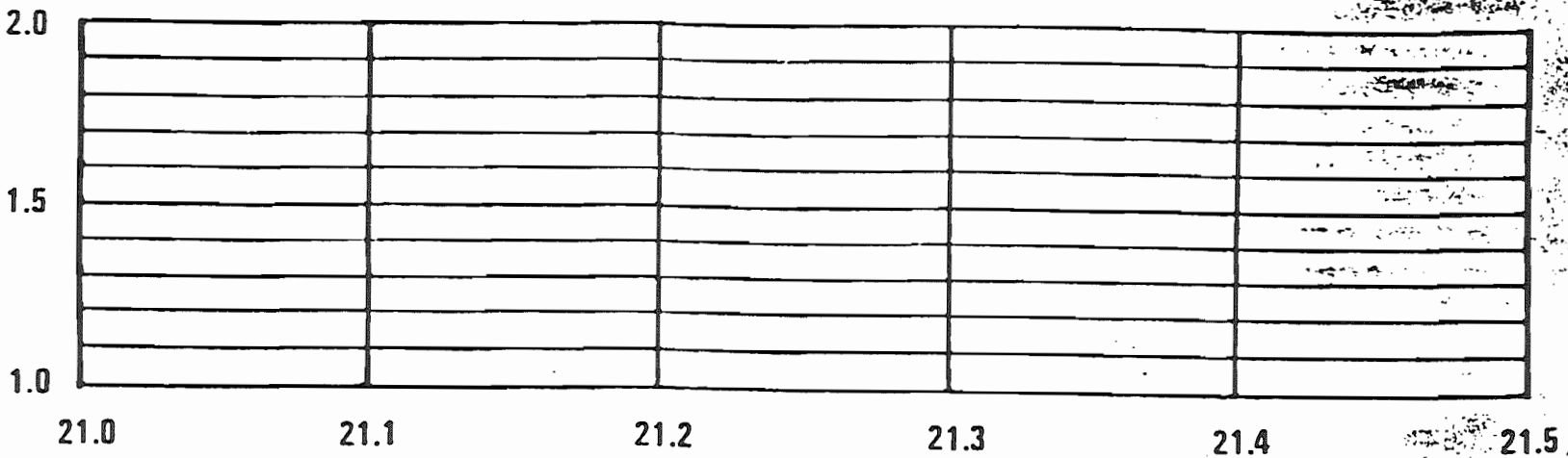
**SY40**

# SWR CHARTS

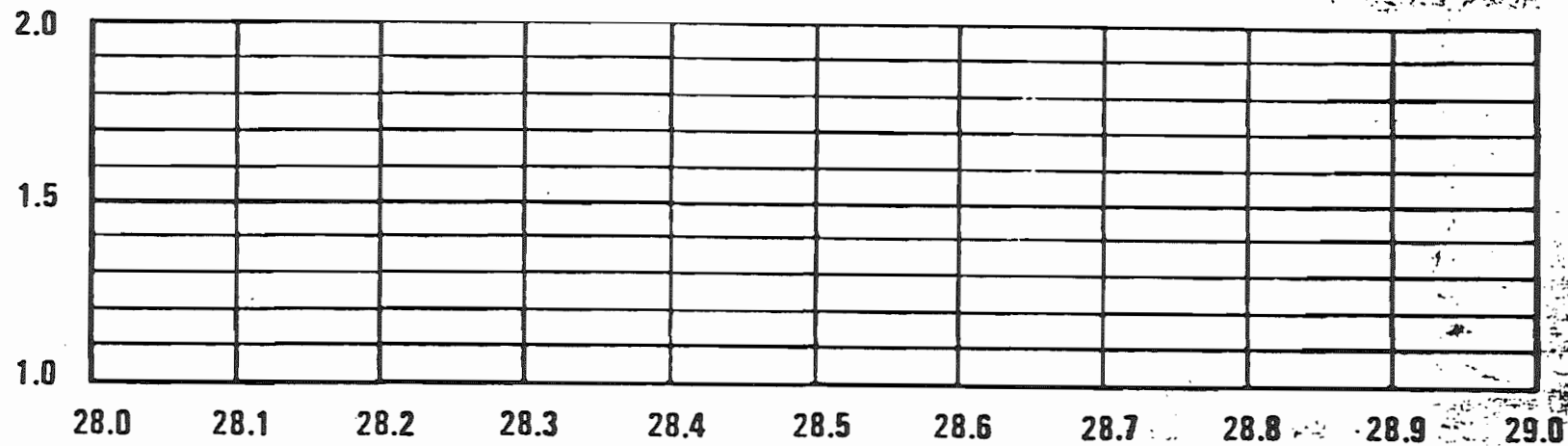
20  
METERS



15  
METERS



10  
METERS



MHz

NOTES:

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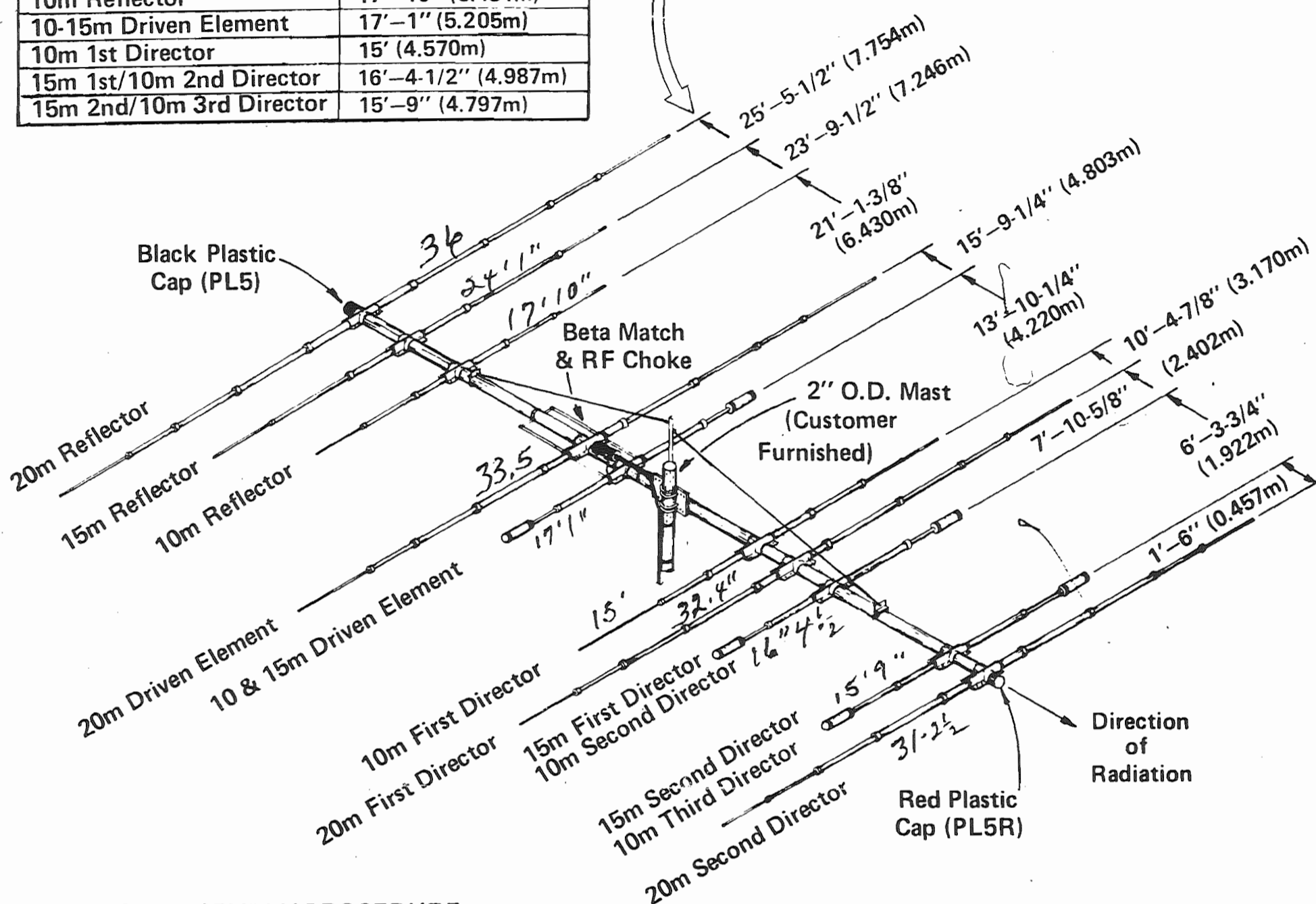
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OVERALL DIMENSIONS	
20m Reflector	36' (10.964m)
20m Driven Element	33'-5" (10.177m)
20m 1st Director	32'-4" (9.850m)
20m 2nd Director	31'-2-1/2" (9.505m)
15m Reflector	24'-1" (7.335m)
10m Reflector	17'-10" (5.431m)
10-15m Driven Element	17'-1" (5.205m)
10m 1st Director	15' (4.570m)
15m 1st/10m 2nd Director	16'-4-1/2" (4.987m)
15m 2nd/10m 3rd Director	15'-9" (4.797m)

NOTE: These Dimensions are progressive starting from the 20m 2nd Director Element. Place the center of the director element 3" (0.076m) from the end of the boom.

For exact element dimensions see Figure 4



#### BASIC ASSEMBLY PROCEDURE:

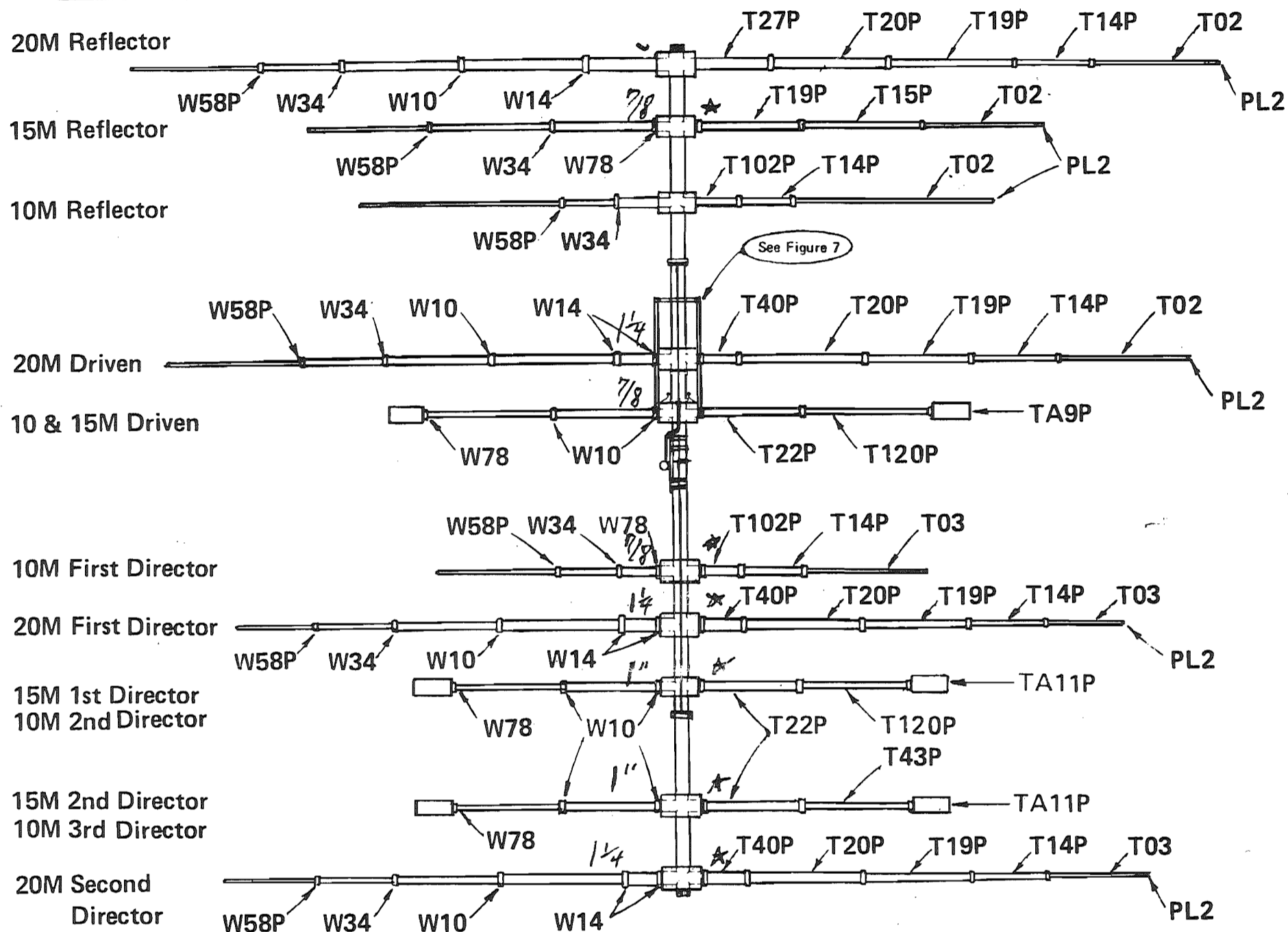
This figure shows what the antenna should look like when assembled. Specific assembly details are shown on the following pages. Your basic order of assembly should be:

1. Put the boom together as shown in Figure 2.
2. Then assemble each element as shown in Figures 3, 4, and 5. Mount each element loosely on the boom as soon as it is assembled. Locate them only approximately, and do not put the plastic caps on the ends at this time.
3. After the elements are all in place, move them to their exact positions, set them square to the boom and parallel to each other, and tighten all bolts and clamps. Recheck all dimensions, and correct any errors. Be sure the W-clamps for attaching the shorting straps are installed as shown in Figure 6.
4. Assemble the beta match per Figure 7.
5. Install the guy cables per Figure 9.
6. Recheck all dimensions again, and check the tightness of all bolts and clamps. Coat all bolts, screws, and nuts with silicon sealant. Put plastic caps on the ends of boom and elements.
7. Attach your coaxial cable to the RF Choke as illustrated, and secure to the boom with tape.
8. Install the antenna on the mast per Figure 9. Dress your coaxial cable down the mast and secure in several places with tape.

FIGURE 1

# SY40

ELEMENT	BOOM-to-ELEMENT PLATES	INSULATOR	SHORTING STRAP (Z15P)
20M Reflector	BE7P		
15M Reflector	BE7P	FO13	*
10M Reflector	BE8P		
20M Driven	BE6P	FO2 1 1/4	
10-15M Driven	BE7P	FO14	
10M 1st Director	BE7P	FO13 5/8 7/8	*
20M 1st Director	BE6P	FO2	*
15M 1st-10M 2nd Director	BE7P	FO14	1" *
15M 2nd-10M 3rd Director	BE7P	FO14	*
20M 2nd Director	BE6P	FO2	*



## PARTS IDENTIFICATION

**ELEMENT ASSEMBLY:**

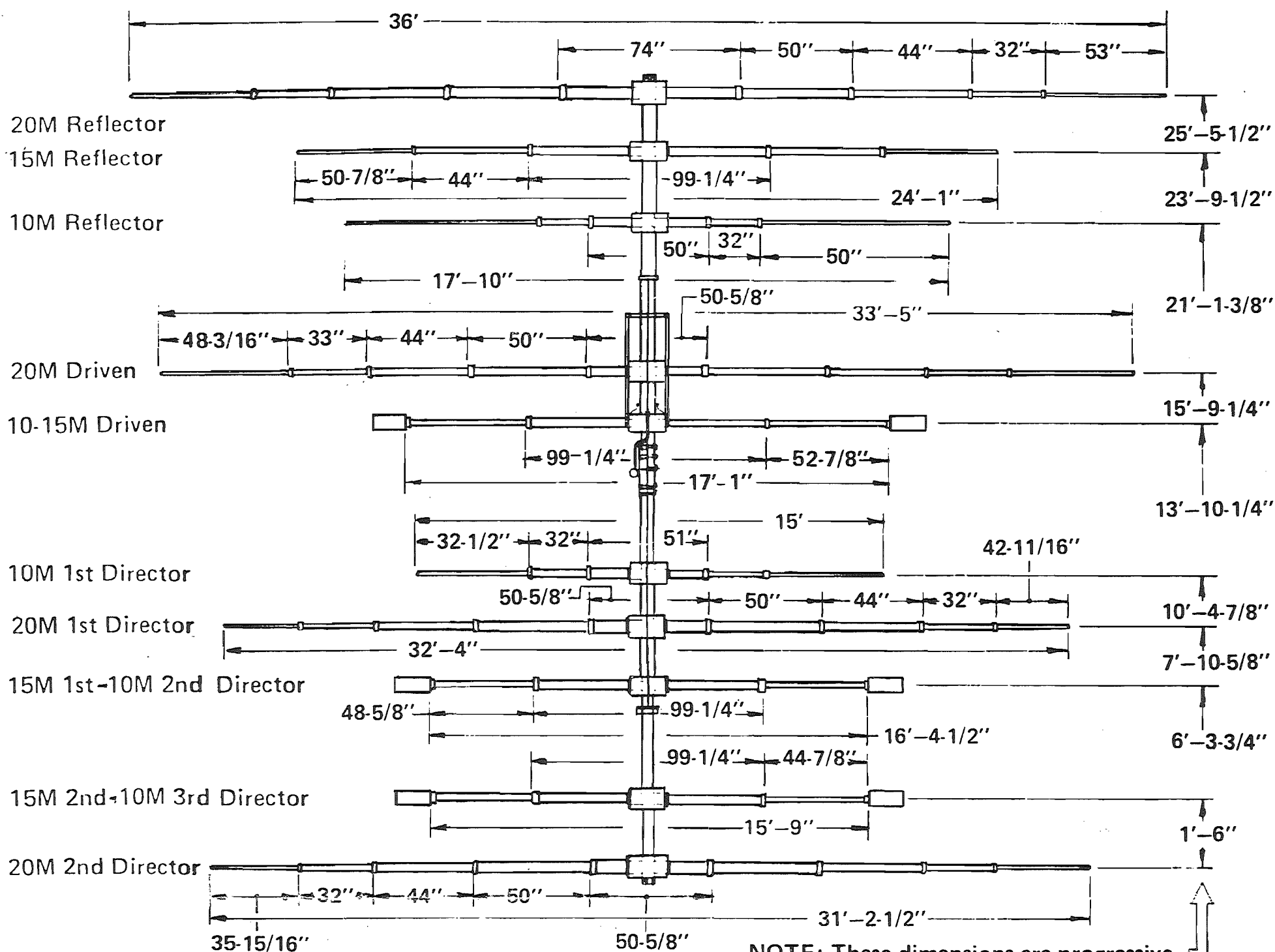
Figures 3 and 4 show a top view of the assembled antenna, and gives part numbers and principal dimensions for assembling and installing the elements. Refer to the parts list for complete descriptions and specifications and to Figures 6 – 8 for specific assembly details and hardware call outs.

All elements are symmetrical. Dimensions given are from end of tubing to end of tubing. See Figure 1 for the correct locations of the elements on the boom.

FIGURE 3

DRAWN ETW  
APPROVED WIT

SY40



NOTE: These dimensions are progressive starting from the 20m 2nd Director Element.

After total assembly it is extremely important to measure the overall lengths of all elements. Adjust the tips of all full size elements equally on both sides to obtain the correct dimension and inside the traps on the trapped elements.

Vibrations in your antenna due to light winds will cause the elements to sing and harden. If the elements over-harden they will become brittle and crack. In order to increase the life of your antenna, we recommend the use of 5/16" polypropylene rope threaded through the elements as shown below.

NOTE: The rope is to be installed the full length of all full sized elements. Rope is not required in the trapped elements.

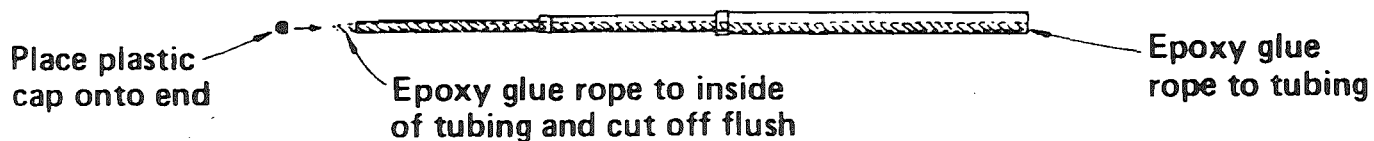


FIGURE 4

DRAWN ETW  
APPROVED u

**SY40**