hy-gain MODEL 238

INSTALLATION & OPERATION INSTRUCTIONS

18 AVQ, 10-thru-80 meter vertical trapped antenna

HY-GAIN ELECTRONICS CORPORATION
N.E. Highway 6 at Stevens Creek • Lincoln, Nebraska 68501

GENERAL DESCRIPTION:

The Hy-Gain Model 18 AVQ is an omni-directional, trapped vertical radiator designed to operate on 10 through 80 meters. The antenna comes complete with three sets of guy ropes and is designed for ground mounting. The base assembly is designed to accept a 1 5/8" OD mast (not supplied). The antenna will handle 1 KW AM or 2 KW PEP. The input connector is at DC ground for lightning protection and to insure noise-free operation.

NOTE

If the terminals of the SO-239 input connector are checked with an ohmmeter they will show a direct short. THIS IS NORMAL! The coil in the antenna base assembly puts the entire antenna at DC ground but presents 52 ohms impedance to RF energy.

THEORY OF OPERATION:

Automatic band selection of the 18 AVQ is accomplished through the use of Hy-Q traps. The Hy-Q traps are parallel resonant circuits which effectively isolate the various sections of the vertical antenna to provide a perfect electrical 1/4 wave-length on all bands. The top-hat on the 18 AVQ shortens the overall height by top-loading.

VSWR AND THE FEEDLINE:

The Model 18 AVQ is designed for use with 50 ohm coaxial cable. RG-58/U or RG-8/U may be used. However, RG-8/U polyfoam type is recommended because of its lower losses and higher power handling capabilities. Due to the sharpness caused by trap loading, the antenna has five settings. These settings include three CW and two Phone positions. Refer to the resonant frequency chart contained on the inside pages of this manual to help you choose which mode of transmission covers that portion of the band you wish to favor. Any length of feedline may be used however, keep in mind that longer lengths of feedline will cause corresponding losses in amount of power to the antenna.

CAUTION

Once you have chosen your mode of transmission, use the same mode for all measurements. The traps are high Q and extremely selective, therefore, do not attempt to adjust one band for one mode of transmission and another band for a different mode of transmission or the antenna will not resonate at frequency shown on chart.

INSTALLATION:

The Model 18 AVQ is designed for ground mounting on a 1 5/8" OD mast. The antenna must be guyed at the levels as shown in the illustrations contained inside this manual. When raising the antenna vertical, extreme care must be exercised to prevent bending or damaging the tubing. Raise the antenna on a calm day when there is no wind blowing. Once the antenna is installed and securely guyed it will easily withstand winds up to 80 miles per hour.t

The antenna should be mounted in the clear away from all surrounding objects. Detrimental effects of surrounding objects is often underestimated in the average antenna installation. It should be pointed out in particular that power lines, downspouts and any other objects of considerable mass or length will deteriorate the performance of any antenna.

CAUTION

When unpacking your antenna, check the inside of all tubing for parts (clamps, insulators, smaller tubing, etc). To conserve space, these smaller articles are sometimes put inside larger pieces.

STEP-BY-STEP ASSEMBLY:

( ) Select the base assembly with 1 1/4" tube and a 1 1/4" compression clamp. Assemble the compression clamp and slip it over the 1 1/4" tube. Do not tighten at this time.
( ) Select the 1 1/8 x 28" piece of tubing and slip it into the 1 1/4" tube. Adjust the tube to dimension A for your mode of transmission then tighten the compression clamp securely.

NOTE

The compression clamps used in this antenna are a universal device and are used in many varied applications. Depending upon the application, the screw head may or may not contact the lockwasher or clamp body. DO NOT Over Tighten the clamps in an attempt to contact the clamp body with the screw head. To do so may result in clamp failure or tube failure caused by puncture.

( ) Install a 1 1/8" compression clamp onto the 1 1/8" tubing.
( ) Select the 1 x 10" section of tubing and slip it onto the 1 1/8" tubing. Adjust the tubing to dimension B for your mode of transmission then tighten the compression clamp securely.
( ) Install a 1" compression clamp onto the 1" piece of tubing.
( ) Select the 10 meter trap (877132) and slip it into the 1" tubing. Adjust dimension C for your mode of transmission and tighten the compression clamp securely.

NOTE

Install all traps as shown with open end facing down.

( ) If adjusting for CW select the 1 x 7" piece of tubing; if adjusting for Phone select the 1 x 8" piece of tubing. Place a 1" compression clamp on each end of the tube and slip the tube over the 10 meter trap. Insert the 15 meter trap (873908) into the 1" tubing. Adjust dimension D for your mode of transmission then tighten the compression clamps securely.
( ) If adjusting for CW select the 1 x 8" piece of tubing; if adjusting for Phone select the 1 x 7" piece of tubing and place a 1" compression clamp on each end. Slip the 1" tube over the 15 meter trap. Insert the 20 meter trap (873911) into the 1" piece of tubing. Adjust dimension E for your mode of transmission then tighten the compression clamps securely.

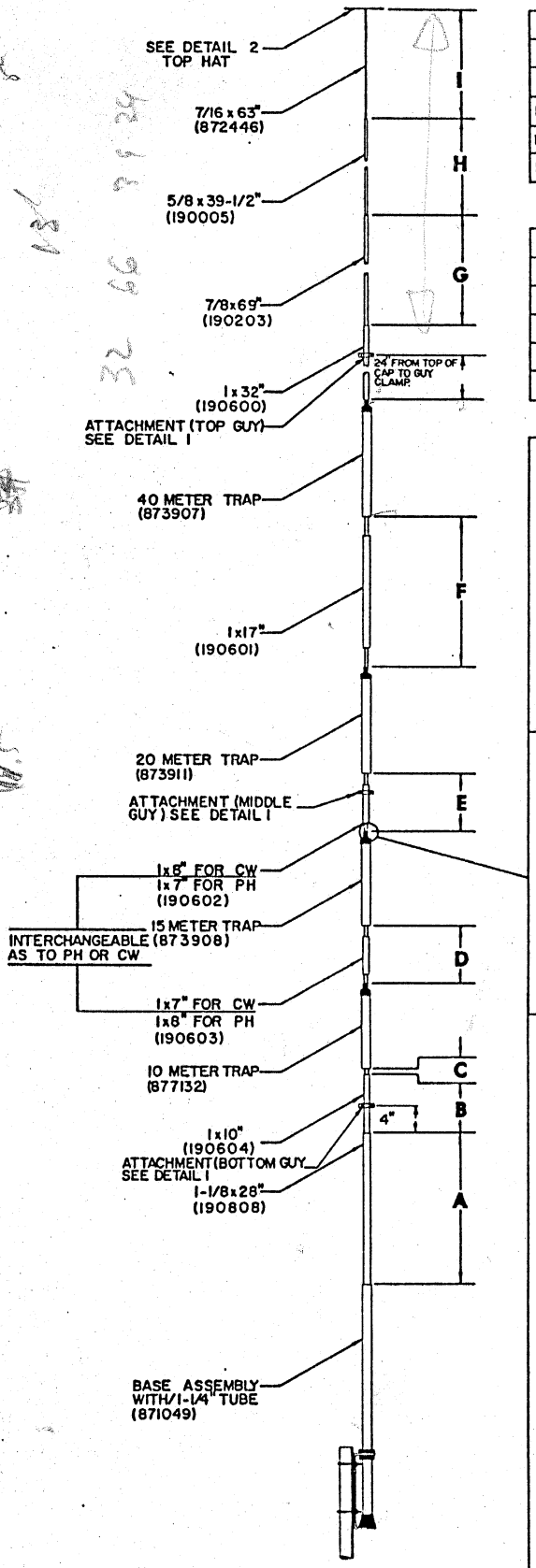


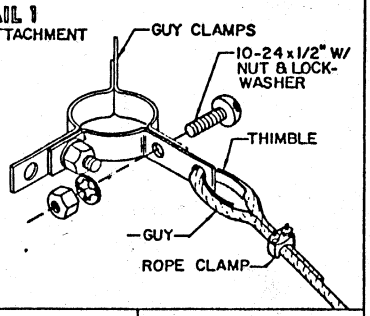
FIGURE 1

	A	B	C	D	E	F	G	H	I
LOW CW	25-1/2"	7-1/2"	1-3/8"	7-1/2"	8-1/2"	22-3/8"	66-1/2"	37"	60-1/2"
MED CW	25-1/2"	7-1/2"	1-3/8"	7-1/2"	8-1/2"	24"	66-1/2"	37"	42-3/8"
HIGH CW	25-1/2"	7-1/2"	1-3/8"	8-3/4"	8-1/2"	24"	66-1/2"	34"	24-1/2"
LOW PHONE	18-3/4"	7-1/2"	1-3/8"	10-1/4"	8-1/2"	18-1/2"	53-3/4"	35"	24-1/2"
HIGH PHONE	18-3/4"	7-1/2"	1-3/8"	10-1/4"	8-1/2"	20-1/2"	53-3/4"	25"	18-1/2"

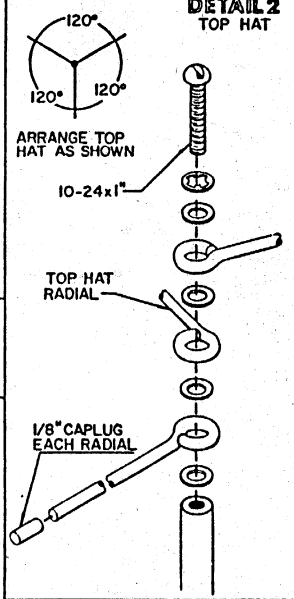
CHART FOR 2:1 OR LESS VSWR

BAND	HI PHONE	LOW PHONE	HI CW	MED CW	LOW CW
10 M	28.50-29.70	28.50 - 29.70	28.00-28.50	28.00-28.50	28.00-28.50
15 M	21.25-21.45	21.25 - 21.45	21.00-21.25	21.00-21.25	21.00-21.25
20M	14.20-14.35	14.20 - 14.35	14.00 14.20	14.00-14.20	14.00-14.20
40M	7.20-7.30	7.20 - 7.30	7.00-7.20	7.00-7.20	7.00-7.175
80M	3.90-4.00	3.80 - 3.90	3.70-3.80	3.60-3.70	3.50-3.60

DETAIL 1
GUY ATTACHMENT

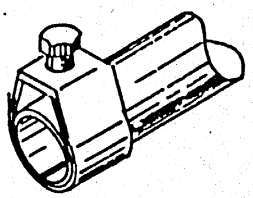


DETAIL 2
TOP HAT



DETAIL 3
TRAP MEASUREMENT

DETAIL 4
COMPRESSION CLAMP



PLACE COMPRESSION CLAMP SCREW 180° FROM SLOT IN TUBING

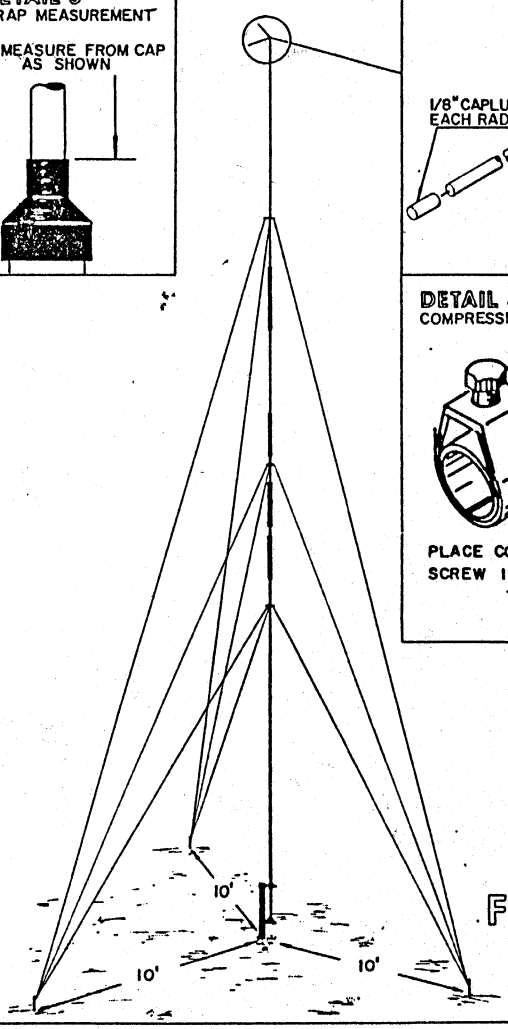


FIGURE 2

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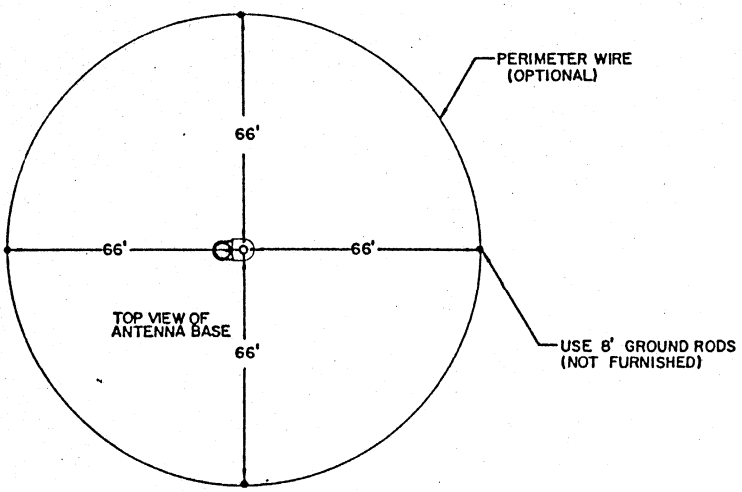
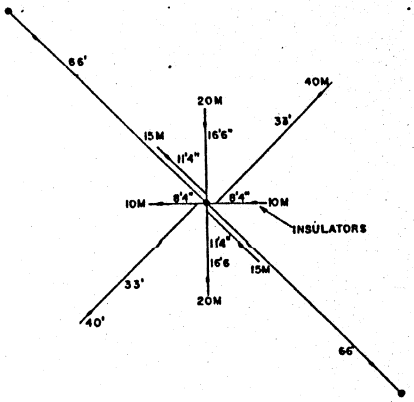
FIGURE 3, RADIAL SYSTEMS SEE ATTACHMENT DETAIL BELOW



GROUND MOUNT



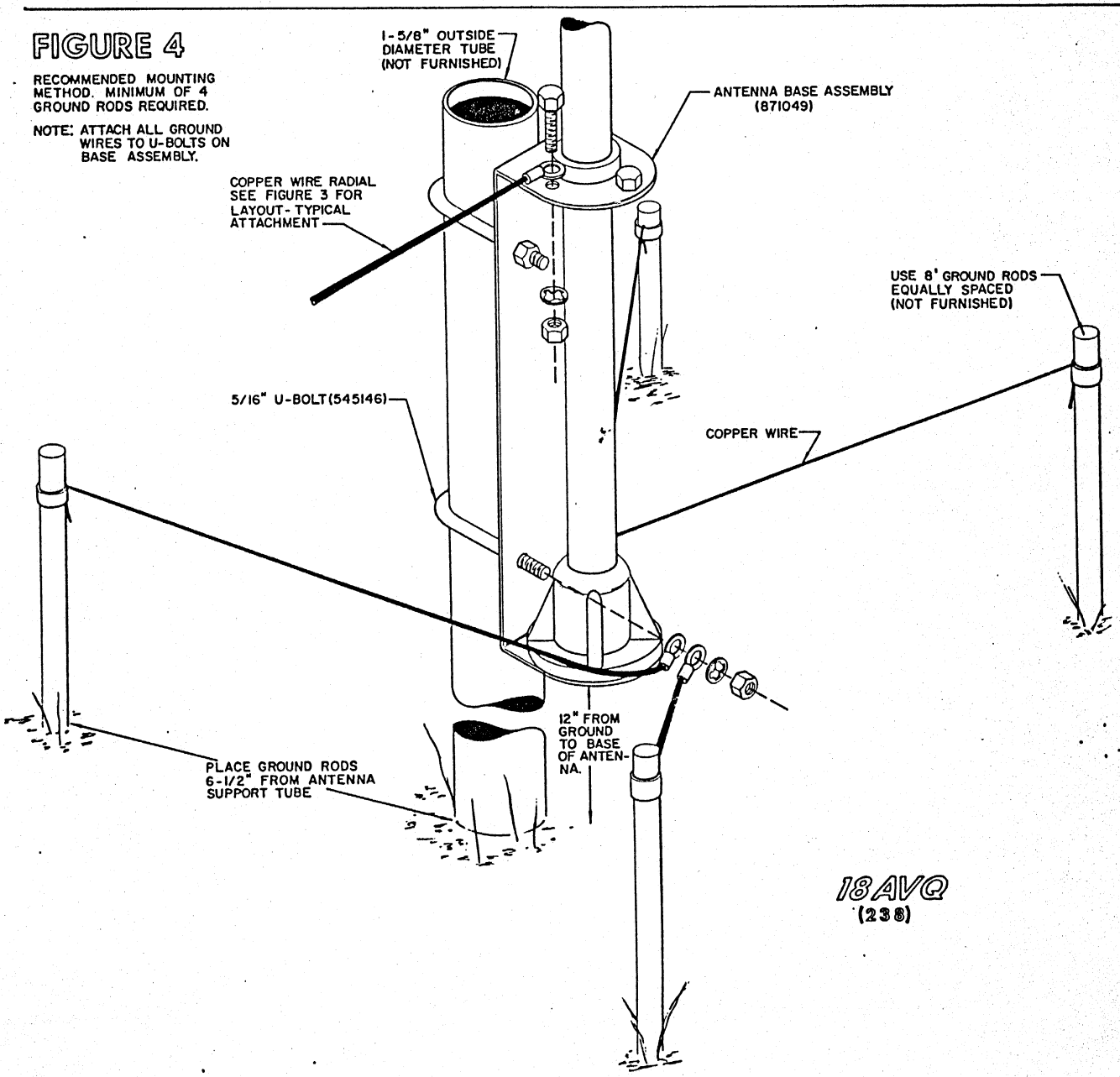
ROOF MOUNT

RADIAL SYSTEM FOR AREAS WITH POOR GROUND CONDUCTIVITY, 4 WIRES MINIMUM REQUIREMENT, 12 WIRES RECOMMENDED THIS SYSTEM CAN BE BURIED BELOW GROUND IF DESIRED

FIGURE 4

RECOMMENDED MOUNTING METHOD. MINIMUM OF 4 GROUND RODS REQUIRED.

NOTE: ATTACH ALL GROUND WIRES TO U-BOLTS ON BASE ASSEMBLY.



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( ) Select the 1 x 17" piece of tubing and install a 1" compression clamp on each end. Slip the 1" tubing over the 20 meter trap. Insert the 40 meter trap (873907) into the 1" tubing. Adjust dimension F for your mode of transmission then tighten the compression clamps securely.
( ) Select the 1 x 32" piece of tubing and install a 1" compression clamp on each end. Slip the 1 x 32" piece of tubing over the 40 meter trap until the edge of the tubing rests against the plastic trap cap. Tighten the bottom 1" compression clamp securely.
( ) Select the 7/8 x 69" piece of tubing and slip the unswaged end into the 1" tube. Adjust dimension G for your mode of transmission then tighten the compression clamp securely.
( ) Select the 5/8 x 39 1/2" section of tubing and slip the unswaged end into the 7/8" tube. Adjust dimension H for your mode of transmission and tighten the compression clamp securely.
( ) Select the 7/16 x 63" piece of tubing and note that one end has a threaded insert. Slip the other end of the 7/16" tube into the 5/8" tube. Adjust dimension I for your mode of transmission. Then tighten the compression clamp securely.
( ) Install the three top-hat radials as shown. Position them so they are approximately 120 degrees apart.
( ) Install a set of guy rope clamps approximately 5" below the 10 meter trap. Install the second set of guy rope clamps approximately 24" above the 40 meter trap cap, and the third set approximately 4" above 15 meter trap.
( ) Cut the 180' length of rope in three 15' sections, three 20' sections and three 25' sections. Install the 15' sections onto the lower set of guy rope clamps using the rope clamps and thimbles provided. Install the longer lengths of rope onto the upper guy brackets in the same manner.
( ) Raise the antenna vertical exercising extreme care to prevent damaging the tubing. Install the antenna on a 1 5/8" O.D. mast driven into the ground and securely guy the antenna as shown in the illustrations.
( ) Ground the antenna base in the manner shown in the illustrations. For optimum results (and low ohmic losses) it is recommended that you use four 5/8" x 8' ground rods installed 6" from the base. However, excellent results will be obtained even with only one ground rod. One ground rod is the absolute minimum required for proper operation of the antenna.
( ) Attach the ground rods to the antenna base using #8 or larger copper or aluminum wire. Attach the wire to the U-bolt on the antenna base assembly.

NOTE

Add radial system for areas with poor ground conductivity. Radials should consist of 66' lengths of aluminum wire grounded at perimeter with ground rods. A perimeter wire may be added for even greater effect. Attach the radials to antenna base assembly using the 1/4" screws installed in upper insulator.

If the 18 AVQ is not ground mounted, a ground radial system MUST be installed if the antenna is to operate properly. It is recommended that you obtain a Hy-Gain Model 14 RMQ roof mounting kit and add three 66 foot radials for 80 meter operation. The three 66 foot radials should be spaced equally about the antenna base in a manner similar to the radials supplied with the roof mounting kit. Aluminum wire is recommended to prevent harmful chemical action caused by dissimiliar metals.

CAUTION

A radial system MUST be added for proper operation when this antenna is mounted more than 24" above ground level.

The radials do NOT have to run in a straight line. They can be bent over the roof edge or zig-zagged in any manner, however, they MUST be insulated from the roof and they must not cross each other or be folded back upon themselves. If a high VSWR is indicated it may be necessary to alter radial placement to bring the VSWR down. This can be done only by the "trial and error" method.

Remember, if a ground radial system is to operate properly it MUST be grounded. To do this, attach a ground wire to a U-bolt on the antenna base. Run this ground wire by the most direct path to an 8 foot ground rod driven into the ground.

An alternate radial system, without the 14 RMQ, can be constructed using fifteen 66 foot radials. Once again aluminum wire is recommended.

NOTE

To prolong the life of this product in or around coastal areas, it is recommended that all hardware be encapsulated with a silicone rubber compouhd such as DOW-CORNING silastic rubber or G. E. silicone seal to prevent atmospheric deterioration.

PARTS LIST

Part No.	Description	Qty
872446	Top Element, 7/16 x 63" w/insert	1
190005	Tube, 5/8 x 39 1/2"	1
190203	Tube, 7/8 x 69"	1
190600	Tube, 1 x 32"	1
190601	Tube, 1 x 17"	1
190603	Tube, 1 x 8"	1
190602	Tube, 1 x 7"	1
190604	Tube, 1 x 10"	1
190808	Tube, 1 1/8 x 28"	1
873907	40 Meter Trap	1
873911	20 Meter Trap	1
873908	15 Meter Trap	1
877132	10 Meter Trap	1
871049	Base Assembly w/1 1/4" Tube	1
691135	Guy Rope, 180 Ft.	1
173499	Top Hat Radials, 1/8" Wire	3
873906	Parts Package	1
165123	Compression Clamp, 1/2"	1
165361	Compression Clamp, 3/4"	1
168682	Compression Clamp, 1"	9
168681	Compression Clamp, 1 1/8"	1
168680	Compression Clamp, 1 1/4"	1
505671	Screw, 10-24 x 5/16" RH	1
506520	Screw, 10-24 x 3/8" RH	1
555362	Nut, 10-24 Square	2
567125	Lockwasher, #10	11
541441	Screw, 1/4-20 x 3/8" HH	11
171507	Guy Bracket	9
506485	Screw, 10-24 x 1/2" RH	9
351700	Rope Thimble	9
359769	Rope Clamp	9
545146	U-Bolts, 5/16-18	2
556970	Nut, 10-24 Hex	9
506455	Screw, 10-24 x 1" RH	1
567130	Washer, #10 Flat	4
455624	Caplug, 1/8"	3
556945	Nut, 5/16-18 Hex	4
558685	Nut, 1/4-20 Square	11
567075	Lockwasher, 5/16"	4
506325	Screw, 1/4-20 x 3/4" HH	3
556960	Nut, 1/4-20	3
567110	Lockwasher, 1/4	3

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