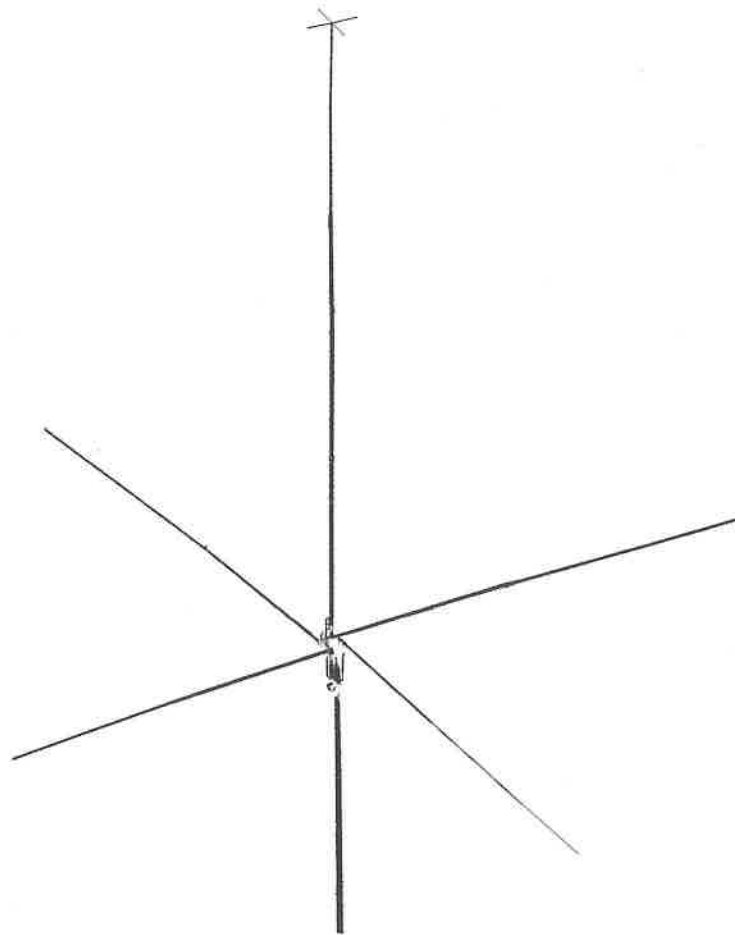


hy-gain®

MODEL SPT-500 SUPER PENETRATOR

10/12 Meter Vertical

INSTRUCTION MANUAL



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Starkville, MS 39759 USA
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Made in USA

General Description

The Penetrator is a full-size 5/8 wave, omnidirectional antenna. A full-sized radiator with a lower radiation angle concentrates power closer to the ground. It can be fed by any standard 50 ohm coaxial cable such as RG-8/U and RG-58/U. For runs over 50 feet, RG-8/U or RG-213/U is recommended.

The penetrator fits any masting material up to 1-5/8" O.D. A 1-1/4 plumbers pipe is highly recommended for a mast due to its low cost and high strength.

Specifications

Gain.....5.3 dB
Height.....22feet
SWR.....less than 1.2:1
Radial length.....8'9"
Nominal input impedance.....50ohms
Wind (survival).....80 mph
Lightning protection.....DC ground
Accepts mast.....1-1/4 to 1-5/8

WARNING

**INSTALLATION OF THIS PRODUCT NEAR
POWER LINES IS DANGEROUS. DO NOT
INSTALL THE ANTENNA WHERE IT CAN
FALL INTO OR TOUCH ANY TYPE OF
POWER OR SERVICE LINE.**

Installation Instructions

Unpack the antenna and refer to the parts list for identification.

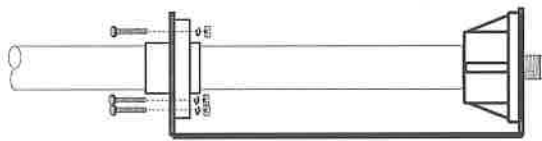
Select the base assembly and the two radial plates. Refer to Figure 1 and loosely assemble these parts as shown, using the 1/4"x1" bolts, washers and nuts. Do not tighten at this time.

Referring to Figure 2, assemble the 5/8" x 55 tubes into the brackets. Align the holes and fasten with 1/4 x 1-1/4" bolts, nuts and lock washers. Do not tighten at this time.

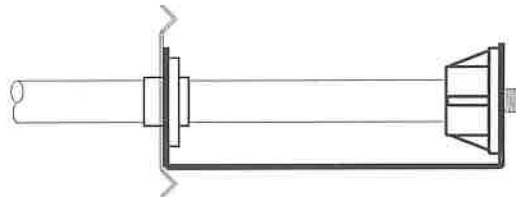
Tighten the 1/4 x 1" bolts holding the base bracket and radial plates.

Attach the rod support insulator to the base assembly using the two phillips head screws. Use the two pre-drilled holes in the base for the mounting location. Attach the matching rod to the base as shown. The two rods should run parallel to each other. The matching rod should not touch the radial bracket or any other part of the antenna except the two points at the bottom where it is bolted to the feed point and the radiator.

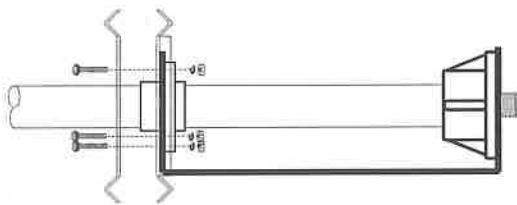
Attach the DC grounding rod from the feed point to the radial bracket as shown. This is a direct DC short to ground and does not affect the operation of the antenna. This DC ground prevents static buildup in the antenna which can damage your transceiver and helps prevent damage in the event of a lightning strike.



The base assembly will have the top insulator pre-installed. Remove the three 1/4 -20 nuts, bolts and split washers.



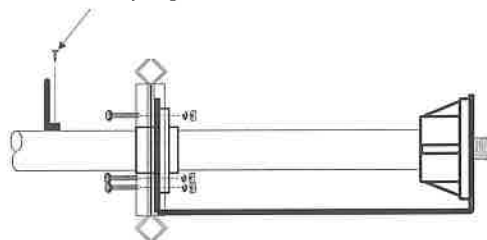
Place one of the radial brackets on the base and align the holes so that the bracket is square with the base.



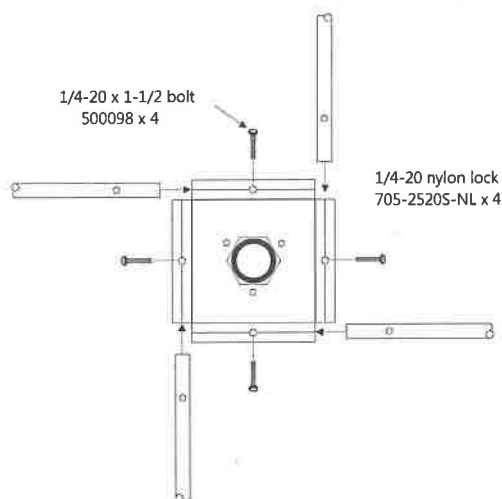
Place the other bracket on top of the first and align the holes. Insert the bolts that you removed from the base.

Reinstall the split washers and nuts but do not tighten them at this time.

#8 self tapping

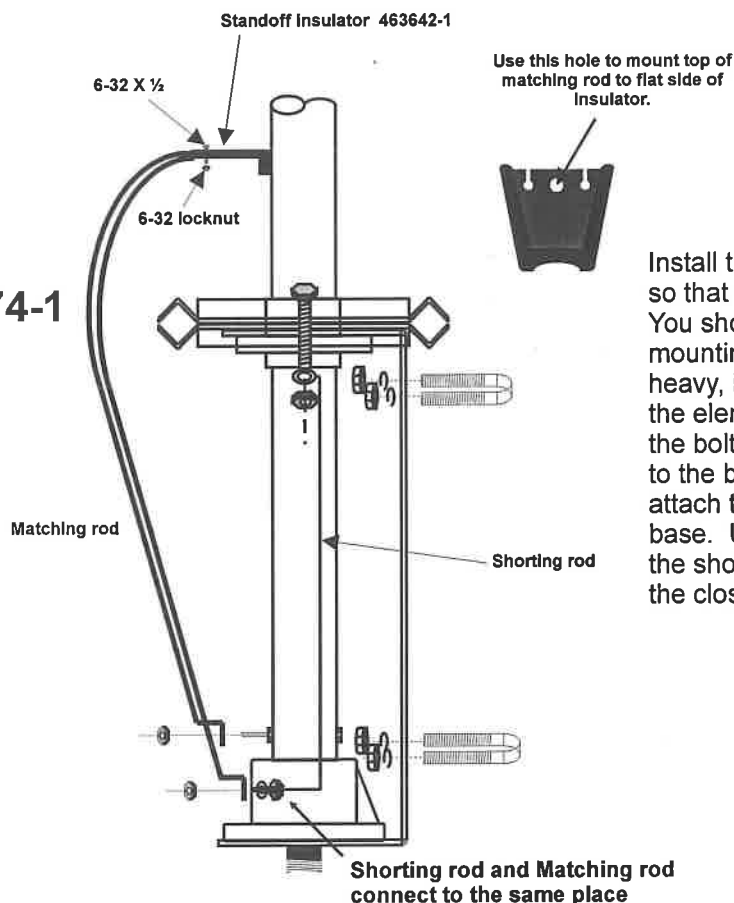


Install the two standoff insulators in the pre-drilled holes using the #8 self tapping screws. Orientation of the insulators is not important.



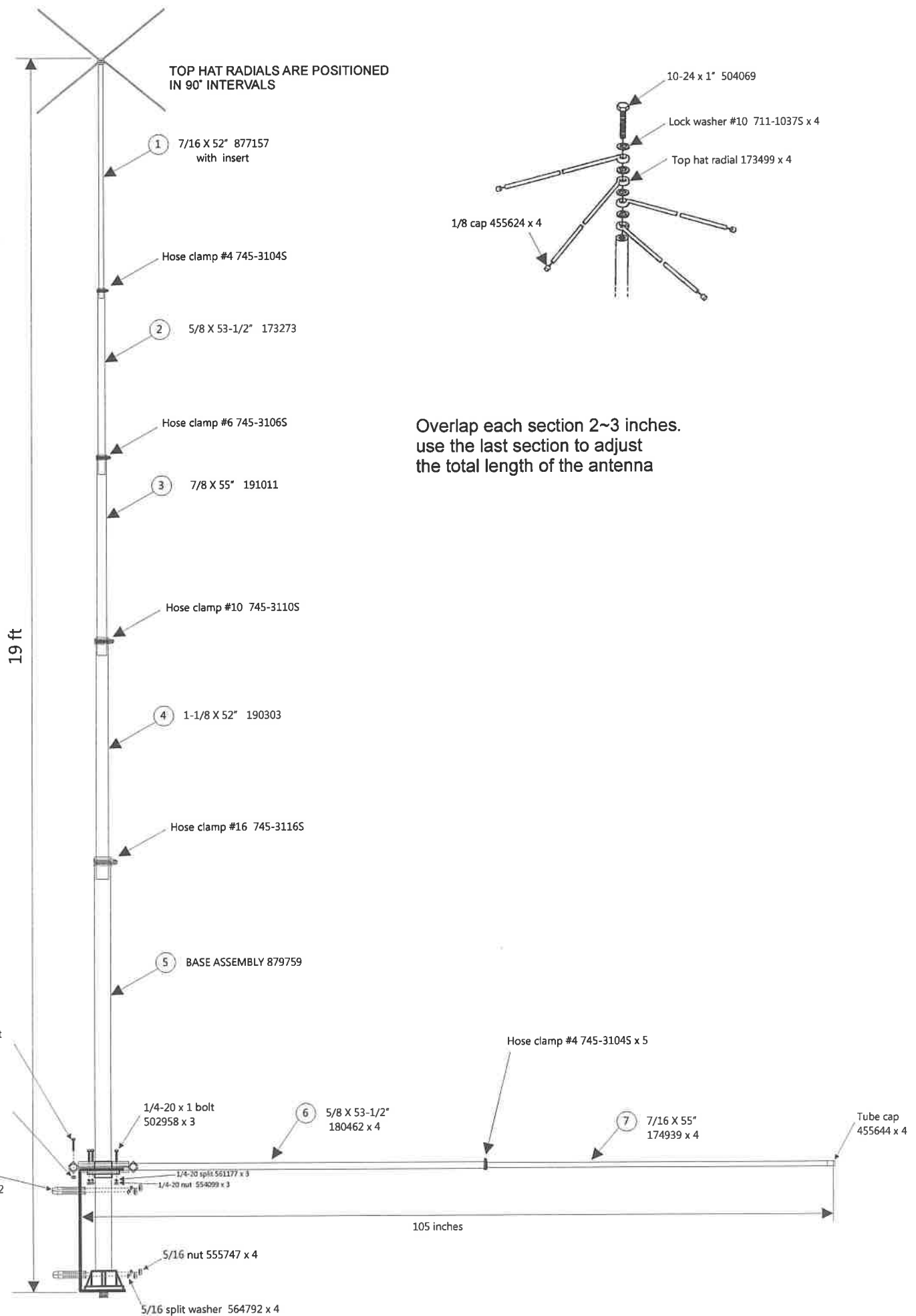
Install the four 5/8" tubing that have the hole 2 inches from the large end. Align the hole with the bracket and insert the 1/4-20 bolt. After all bolts are inserted you may install the four nylon lock nuts and tighten them all, including the three nuts on the insulator.

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Install the u-bolts in the back of the mounting bracket loosely so that you can support the antenna on a temporary mast. You should have a friend help support the antenna when mounting or moving it around. Although the antenna is not heavy, it is very large in size and could injure someone or bend the elements if it were to fall over. Connect the matching rod to the bolts at the bottom of the base. The short side should connect to the bolt in the 1-1/4 main radiator tube. The longer one will attach to the bolt that protrudes from the black insulator on the base. Use the pre-installed nuts and lock washers. Also Connect the shorting rod from the base insulator to the 1/4-20 nut that hold the closest radial in place.

Install the rest of the vertical elements as shown in the diagram on the next page. Do this before the rest of the radials are attached as it will be easier to tilt the antenna without the radials at their full length. A saw horse or step ladder will be helpful in holding the antenna on its side for access. Overlap each section about three inches and insert the top section until the total length of the antenna is 19 ft. See the next page for a diagram. Use the supplied hose clamps to secure the tubing. Large clamps for the big tubing and small clamps for the smaller sections. Install the top hat onto the 7/16 tubing that contains a threaded insert at one end. Space the elements so that they are 90 degrees apart from each other. Use the diagram on the next page for reference. Return the antenna to vertical and install remaining sections of radial tubing so that they are 105 inches long. Install a tubing cap at the tip of each radial. Remember that the mounting location of the antenna will affect the tuning point and may cause the center frequency of the antenna to shift. The SWR should be checked with an antenna analyzer such as the MFJ-259 or a suitable swr wattmeter before the antenna is installed on the tower. Test the antenna just a few feet off the ground in an open area away from large metal objects. This will identify any problems before the antenna is up and will allow the user to fine tune it to the operating frequency they prefer. If the lowest swr point is below the desired operating frequency then the antenna is too long and needs to be shortend. If the lowest swr point is above the desired operating frequency, then the antenna is too short and needs to be lengthened. If you can't find a dip in the swr anywhere then something is assembled incorrectly, you have bad coax, or your not getting a correct SWR reading. The antenna will read a direct short at the feed point when using a multimeter and the shorting rod is installed. This is normal and should not be viewed as a problem. Once everything is tuned, check that all hardware is tight and mount the antenna on your mast or tower. Always ask a friend for help as it is dangerous for you to attempt to install this antenna by yourself.



PARTS LIST

1	877157	7/16 x 52" with insert	1
2	173273	5/8 x 53-1/2"	1
3	191011	7/8 x 55"	1
4	190303	1-1/8 x 52"	1
5	879759	Base Assembly	1
6	190462	5/8 x 53-1/2" With hole	4
7	174939	7/16 x 55"	4
8	173499	TOP HAT ROD	4
9	160042	RADIAL PLATE	2
10	170774-1	MATCHING ROD	1
11	170775	SHORTING ROD	1

P= Parts pack item 872019

B= Pre-installed on base assembly

P1	455644	TUBE CAP	4
P2	745-3104S	#4 HOSE CLAMP	5
B3	502958	1/4-20 X 1" BOLT	3
B4	561177	1/4-20 SLIT WASHER	3
B5	554099	1/4-20 NUT	3
P6	555747	5/16 NUT	4
P7	564792	5/16 SPLIT WASHER	4
P8	543792	U-BOLT	2
P9	705-2520S-NL	1/4-20 NYLON LOCK NUT	4
P10	500098	1/4-20 X 1-1/2 BOLT	4
P11	745-3116S	#16 HOSE CLAMP	1
P12	745-3110S	#10 HOSE CLAMP	1
P13	745-3106S	#6 HOSE CLAMP	1
P14	455624	1/8 ROD CAP	4
P15	711-1037S	#10 LOCK WASHER	4
P16	504069	10-24 X 1" BOLT	1
P17	463642-1	STANDOFF INSULATOR	1
P18	515852	#8 SELF TAP SCREW	2
P19	656-0500S	6-32 X 1/2SCREW	1
P20	705-0632S-K	6-32 LOCK NUT	1

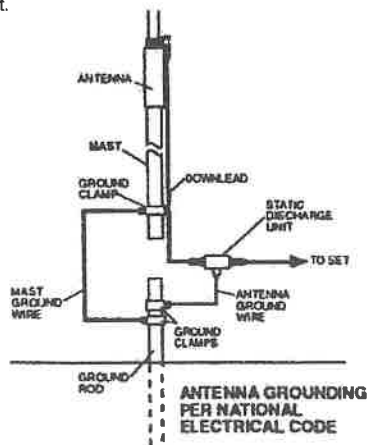
GENERAL INSTALLATION INSTRUCTIONS FOR MAST MOUNTED ANTENNAS

1. Assemble your new antenna on the ground at the installation site. Keep separate assembly instructions that come with it. Large CB and Amateur beams may have to be finally assembled on the tower or mast.
2. On the ground, clamp the antenna to mast and connect the coaxial cable to the antenna.
3. To insure that the mast does not fall the "wrong way" it should get away during the installation or takedown, durable non-conductive rope should be secured at each two foot level as the mast is raised. The boss stands in a position where he can yank or pull the ropes if the need arise to deflect the falling mast away from hazards (such as power lines) into a "safe fall" (such as a yard or driveway). The ropes are tied taut at the base of the mast after installation and in place at the various levels.
4. Install selected mounting bracket.
5. If you are going to use guy wire installation instead of a mounting bracket:
 - install guy anchor bolts
 - estimate length of guy wire and cut
 - attach a mast using guy ring
6. Carefully take antenna and mast assembly to mounting bracket and insert. Tighten camp bolts. In case of guyed installation, it will be necessary to have at least a second person hold the mast upright while the guy wires are attached and tightened to the anchor bolts.
7. Install self-adhering "DANGER" label packaged in antenna hardware kit at eye level on your mast.
8. Install ground rod to drain off static electricity build-up and connect ground wire to mast and ground rod. Use special ground rods, not a spare piece of pipe.

EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE INSTRUCTIONS

1. Use No.10 AWG copper or No. 8 AWG or larger copper-clad steel or bronze wire, as ground wires for both mast and lead-in. Securely clamp the wire to the bottom of the mast.
2. Secure lead-in wire from antenna to antenna discharge unit and mast ground wire to house with stand-off insulators spaced from 4 feet (1.2 meters) to 6 feet (1.8 meters) apart.
3. Mount antenna discharge unit as close as possible to where the lead-in wire enters the house.
4. Drill a hole in wall (CAREFUL! There are wires in that wall.) near your set just large enough to permit entry of cable.
5. Push cable through hole and form a rain drip loop close to where it enters the house.
6. Put small amount of caulking around cable where it enters house to keep out drafts.
7. Install static electricity discharge unit.
8. Connect antenna cable to the set.

You should not attempt to raise a mast in excess of 30 feet in height/length (not including the antenna proper) in a fully-extended condition. Thirty to fifty foot tubular masts must be elevated, a section at a time, with the base or outer section secured in place with guy wires. GET PROFESSIONAL HELP.



WARNING

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

HOW TO INSTALL YOUR OUTDOOR ANTENNA SAFELY IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE U.S. CONSUMER PRODUCT SAFETY COMMISSION

YOU, YOUR ANTENNA, AND SAFETY

Each year hundreds of people are killed, mutilated or receive severe permanent injuries when attempting to install an antenna. In many of these cases, the victim was aware of the danger of electrocution, but did not take adequate steps to avoid the hazard.

For your safety, and to help you achieve a good installation, please **READ AND FOLLOW** the safety precautions below. **THEY MAY SAVE YOUR LIFE!**

1. If you are installing an antenna for the first time, please, for your own safety as well as others, seek **PROFESSIONAL ASSISTANCE**. Consult your dealer. He can explain which mounting method to use for the size and type antenna you are about to install.
2. Select your installation site with safety, as well as performance, in mind. (Detailed information on Site Selection appears in a separate section of this booklet.) **REMEMBER: ELECTRIC POWER LINES AND PHONE LINES LOOK ALIKE. FOR YOUR SAFETY, ASSUME THAT ANY OVERHEAD LINES CAN KILL YOU.**
3. Call your electric power company. Tell them your plans and ask them to come look at your proposed installation. This is a small inconvenience considering **YOUR LIFE IS AT STAKE.**
4. Plan your installation procedure carefully and completely before you begin. Successful raising of a mast or tower is largely a matter of coordination. Each person should be assigned to a specific task, and should know what to do and when to do it. One person should be designated as the "boss" of the operation to call out instructions and watch for signs of trouble.
5. When installing your antenna, **REMEMBER:**
DO NOT use a metal ladder. **DO NOT** work on a wet or windy day. **DO** dress properly -shoes with rubber soles and heels, rubber gloves, long sleeve shirt or jacket.
6. If the assembly starts to drop, get away from it and let it fall. Remember, the antenna, mast, cable and metal guy wires are all excellent conductors of electrical current. Even the slightest touch of any of these parts to a power line complete an electrical path through the antenna and the installer-**THAT'S YOU!**
7. If any part of the antenna system should come in contact with a power line-**DON'T TOUCH IT OR TRY TO REMOVE IT YOURSELF. CALL YOUR LOCAL POWER COMPANY.** They will remove it safely.

If an accident should occur with the power lines call for qualified emergency help immediately.

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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 12 months for antenna products from date of purchase provided the following terms of this warranty are satisfied.

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.

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.

Under no circumstances is hy-gain liable for consequential damages to person or property by the use of any hy-gain products.

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.

This warranty is given in lieu of any other warranty expressed or implied.

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.

All hy-gain products to be serviced in-warranty or out-of-warranty should be addressed to hy-gain, 308 Industrial Park Road, Starkville, 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.

This warranty gives you specific rights, and you may also have other rights which vary from state to state.