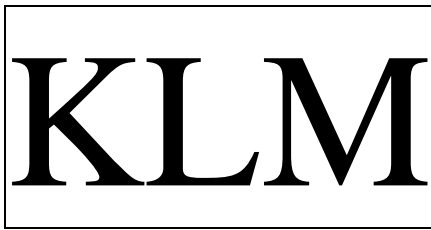


SERIAL NUMBER: 286795

KLM

ANTENNAS, INC.

160V



160-V

ANTENNAS, INC.

Welcome to the antenna line of KLM communications family. Your antenna kit features hi-grade materials and workmanship. It requires no additional drilling or machine work. The design has been optimized for maximum performance and durability. Altering or modifying the antenna is not recommended.

This packet contains basic assembly instructions for the KLM 160-V antenna.

Also included are the specific dimension sheet, assembly drawing and parts list for the particular model KLM antenna listen above.

I. PREASSEMBLY

Select an assembly area large enough to accomodate element

Lengths. A shallow box is handy for holding and sortine the small

Hardware. The following tools are required: tape measure, screwdriver, spintites, socket or end wrenches. Common nut size are:

1/2" 5/16-18 hdwe. U-bolts

11/32" 8/32 hdwe Element, insulator assembly

7/16" 1/4-20 hdwe – U-bolts

PLEASE NOTE: With the exception of U-bolts, most small nuts and Screws can be considered “tightened securely” when moderately hand Tightened with screwdriver or spintite. When using tools with Additional leverage, care must be taken not to overtighten and Damage components.

For the best results and the best use of your time, we strongly Recommend familiarizing yourself with all parts and instructions Before beginning assembly.

I. ASSEMBLY INSTRUCTIONS

Thoroughly unpack shipping box and check all components and Hardware against the attached Parts List supplied for your particular Antenna model. In the event a difference is apparent, please check For a factory “up-date/changes” list accompanying this instruction Sheet prior to contacting your KLM dealer or the factory.

Attach the 1 1/4” dia. X64” tubing to the mounting bracket using two 1 1/2” U-bolts and insulating sleeves. See Assembly Pictorial keep drilled butt end of tubing at least 1/4” from bottom of bracket.

ASSEMBLY PICTORIAL

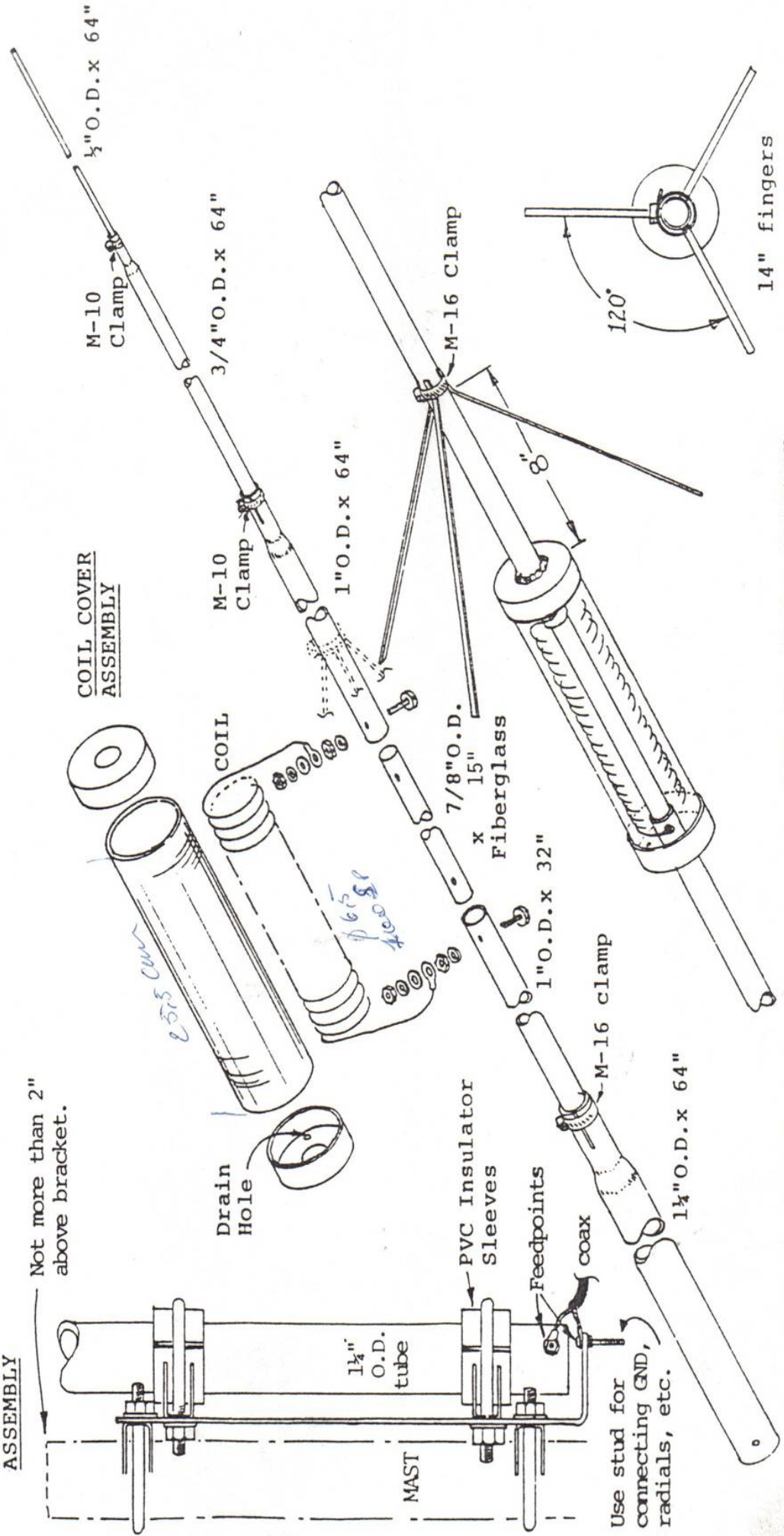
KLM 160 V

HARDWARE
ARRANGEMENT
ONLY

NOT
TO
SCALE

MOUNTING
BRACKET
ASSEMBLY

Not more than 2"
above bracket.



ELEMENT ASSEMBLY

COIL AND FINGER ASSEMBLY

3. Insert undrilled end of 1" O.D. x 32" tubing three inches into swaged end of 1 1/4" section. Secure with M-16 clamps 1/16" from end of swaged (reduced) area.
4. Slide the lower coil –cap (with drain hole), coil cover Tube (12"), and coil just past the drilled hole at end of the 32 Inch tubing.
5. Slide the 7/8 O.D. x 15" fiberglass section about 1 1/2" into the 1" O.D. x 32 tubing and align screw holes. Secure with 8-32 x 1 1/2" screw, lockwasher, and nut. Screw is extra long to provide mounting stud for coil leads.
6. Slide the upper coil cover cap onto the drilled end of the 1" O.D. x 64" tubing and then add tubing to the other end of the fiberglass section. Secure as in (5) above.
7. Bend coil leads as necessary to reach mounting studs and secure each lug with an additional 8-32 lockwasher, flatwasher and nut.
8. Slide the coil cover caps onto the cover tube. Centering assembly over the coil.
9. Add the 3/4" and 1/2" O.D. tubing sections to the 1" O.D. x 64" section. Overlap each joint 3" and secure with M-10 clamps 1/16" from end of swaged (reduced) area. Add 1 1/2" vinyl cap to antenna tip.
10. Attach the three 14" capacitance fingersto the 1" x 64 tubing sections, eight inches above top of coil cap. Orient them at 120° intervals and secure with M-16 clamp.
11. Assembly is complete. Check components and hardware against Assembly pictorial to make sure they are correctly placed and secure. Antenna may now be mounted via racket to mast (2" U-bolts supplied) or other suitable structure. See in installation Ideas on following page.

FEEDLINE INSTALLATION

1. For permanent installations, the feed coax should have lugs soldered to shield and center conductor. Direct connections of the feedline to the feedpoint studs on the vertical, properly waterproofed with plastic tape or RTV, etc, will greatly reduce problems from damp weather.
2. For temporary installations, field days, etc, an SO-239 connector and mounting screws have been provided. Use of this type of feed connection is recommended for good weather only. The SO-239 connector, and its male counterpart (PL-259), are not Designed to resist moisture.

KLM 160-V
INSTALLATION & OPERATION
FOR 160, 80, & 40 METERS

I. MOUNTING

The antenna may be mounted almost anywhere; round, roof, tower, etc. remember the support structure should be a 1-1/2" to 2" steel or heavy gauge aluminium pipe and must be capable of supporting the antenna in high wind. Light nylon, dacron, mylar or polypropylene rope may be used to guy the vertical if required.

II. GROUNDING

Grounding and round radials are an important part of getting a good match performance. KLM's experience and recent field studies indicate 1/8 wave radials are the best for 160 metres and are entirely satisfactory for 80 and 40 meter performance too. However, if only four are installed, the mounting racket should also be grounded via a stake or other suitable source.

If the radials must be installed above round such as a roof, the at least two 1/4 wave radials are suggested for each band in use.

The use of radials is strongly recommended but when they cannot be used, it is essential to round the mounting racket either through the support post (if its round is good) or a round wire.

III. TUNING & MATCHING

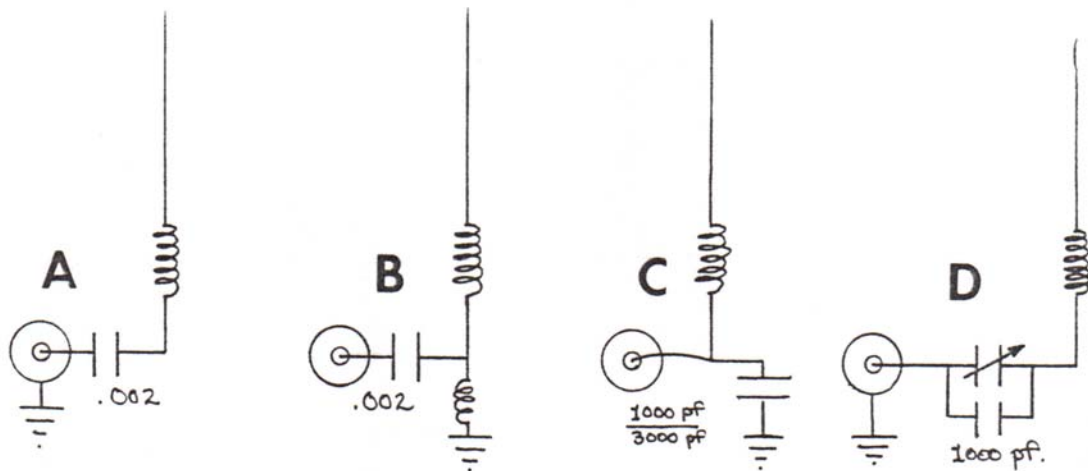
During the initial tune-up, permanent connections and very short leads are just fine and no significant change should occur when the antenna is put into its final working configuration.

1. 160 Meters: Once the antenna is mounted, it must be adjusted for the preferred frequency of operation. The coil

Provided will allow operation below 1.8 MHz so some of the Coil will have to be shorted out. With the coil cover slid up to expose some of a few turns and make a VSWR measurement. Continue this procedure until you have found the point of best match (not necessarily 1:1)

In the event your round system is less than optimum, several matching techniques can be used.

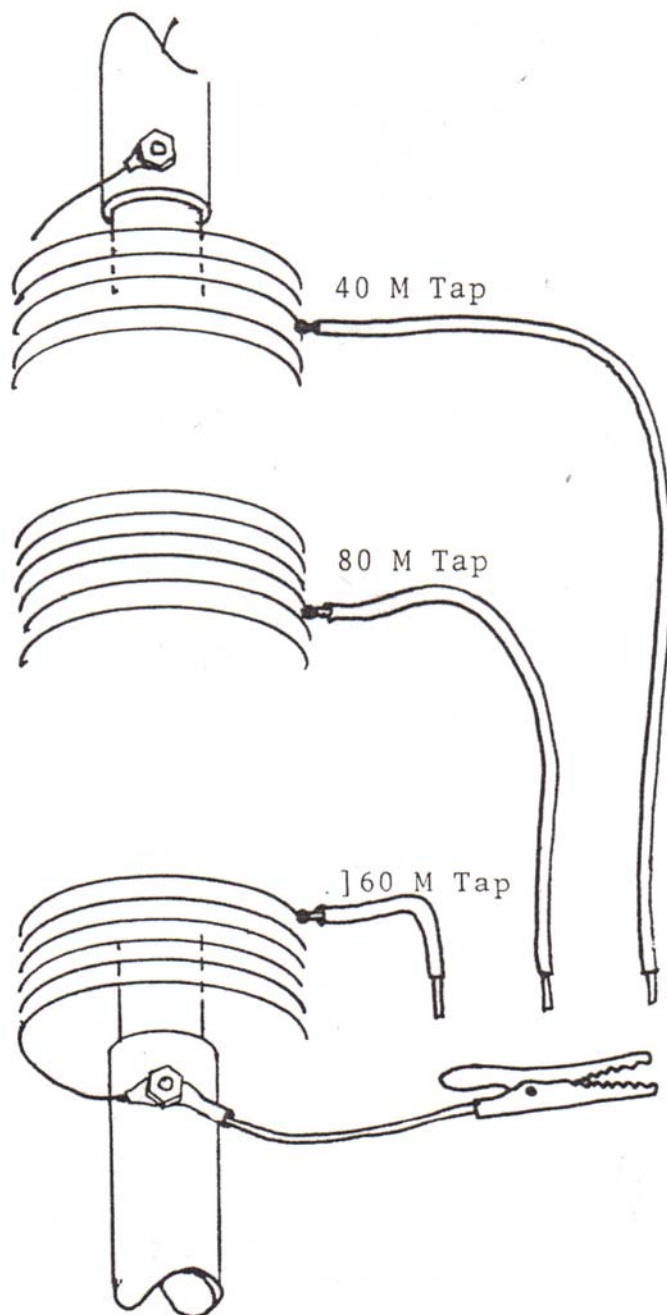
- A) A .002 MFD mica capacitor replacing the 4 – inch pig-tail lead to the antenna is the easiest to try.
- B) Adding a coil from antenna to base round along with the .002 cap in “A” is another method to try, Use coil stock similar to the coil in the vertical and 8 – 10 turns should be adequate.



- C) Leave the 4 – inch pigtail feeling the antenna base And use a .002 or lager cap shunted to round from Feed point.
- D) By using a variable cap in series feed a large Frequency range can be covered by simply tuning the Cap for the best match. Use a fixed cap of 1000 pf in Parallel with a large broadcast type variable.
- E) Upward frequency shifts of approximately 25 KHz at a time are possible by removing one capacity finger At time for each 25 KHz shift desired. This should Give little or no effect on SWR or performance.

2. 80 Meter Adjustment: In most installations, approximately $\frac{1}{2}$ of the coil is used for 80 meter operation. If 160 Meter has been set up previously, start your 80 meter tap Point at $\frac{1}{2}$ of the remaining coil above the 160 meter tap point. Run a VSWR check across the band every 50 KHz or 100 KHz and find the match point. Move the tap up to in –

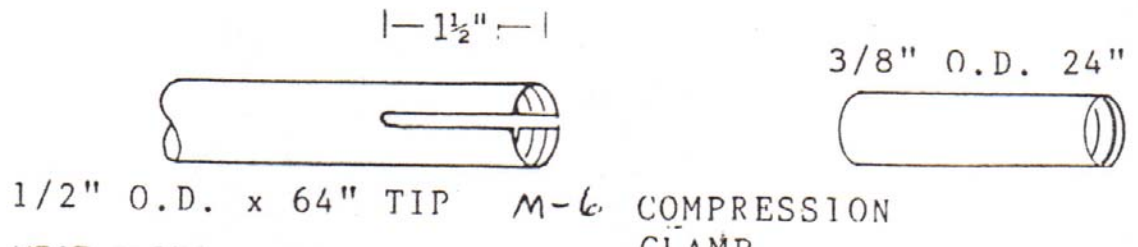
KLM 160V
TYPICAL TAP LOCATIONS



crease the match point. Down to lower it. If difficulty is encountered in matching, use the same techniques as on 160 but limit the capacitance to 1000 pf (.001MFD).

3. 40 Meter Adjustment: The amount of center loading required for 40 meter is very small since the 160V is already 24 feet long and the $\frac{1}{4}$ wave is 33 feet full size. As in the 80 meter adjustment, 40 meter tap point will be about $\frac{1}{2}$ of the coil used of 80 or less. Start your 40 Meter tap point and run a VSWR check across the 40 meter Band. Remember, the 160 V will be fairly broad due to its nearly full size. As with 160/80, operation, radials are strongly suggested to permit a good match and performance, but 40 is less critical than either of the other two bands. If the resonance is set for 7.1 MHz $\frac{3}{4}$ wave, operation will be possible on 15 meters at 21.3 without further adjustment. Usually the match will not require any feed modifications as on the 160/80 set-up unless the round system is very Poor.
4. Variable Frequency Tuning: Variable frequency tuning on all bands is possible by setting the resonance low in frequency; 1,750 for 1,800, 3.7 for 3.8, 7.0 for 7.2, and use "D" arrangement with a large 2000 pf variable capacitor at full mesh. As the capacitance is lowered toward minimum, the electrical length of the antenna will be shortened. If all the tap points are insulated and brought out through the bottom cap and short jumper clip lead is used from the bottom of coil, band change may be accomplished by merely selecting the desired tap wire with the clip lead. The variable cap in "D" may be manually or motor driven for fine frequency adjustment.
5. Resonance Frequency Adjustment: When roof/tower mounting the Resonant frequency may be higher than desired. The frequency May be lowered by adding the $\frac{3}{8}$ " O.D. x 24" tubing to the tip of the whip portion of the antenna. Initially, 18" of $\frac{3}{8}$ " tube should show. Adjust as required.

SLIT END OF TUBE WITH HACKSAW



IV. FINAL WEATHERPROOFING

After final tuning and all adjustments have been made on the 160V, it is recommended that the too end cap over the coil Be sealed where the one inch tube comes through. This will in No way affect performance, except to extend the useful lifetime and reduce the maintenance of 160V.

CAUTION!

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

I. INFORMATION CONCERNING THE RISK OF ELECTROCUTION

Power lines that connect electric service to your house carry more than enough voltage required to kill a person by electrocution. Most often these electric lines run overhead along property to point on, or near, the roof of your house. In some cases power lines may also be buried in the ground. Every year many careless people are killed, or seriously injured, even though they are aware of the hazard of touching or allowing something they are holding to touch electric wires. Many of these accidents involve people who are installing (or removing) some type of antenna which is often mounted on a log metal supporting pipe that has several guy wires and cables attached to it. These assemblies are cumbersome and, therefore, difficult and unsafe for inexperienced people to handle even under the best conditions. The slightest wind, rain, too bright sunlight, too little light, a sloping roof, or other unsafe footing, and other characteristics of the installation site along with many other factors can serve to greatly increase the hazard of possible contact with power lines.

FOR YOUR SAFETY, GET PROFESSIONAL HELP WITH YOUR ANTENNA INSTALLATION AND READ AND OBSERVE THE SAFETY PRECAUTIONS OUTLINED BELOW.

II. TYPES OF SUPPORT STRUCTURES

KLM antennas are designed to attach to a mast or pipe not supplied with the antenna.

The types and sizes are given in most assembly instructions for each model.

SITE SELECTION

A. It is recommended that the following guidelines be used for SAFETY in selecting a site for the installation.

1. Figure the height of the total antenna assembly including supporting structures.
2. Select a site for the base of structure that is a distance at least twice the total height away from the nearest power line. a site which meets these safety criteria may not be practical either because performance of the antenna may be impaired. **IF THIS SITUATION OCCURS, DO NOT ATTEMPT TO INSTALL ANTENNA YOURSELF. GET A PROFESSIONAL INSTALLER TO DO IT FOR YOU**

B. There are several different mounting methods used in antenna installations.

Recommendations for best performance appear in some of instructions. Covering specific models of KLM antennas. Common locations include:

- | | | |
|------------|---------------------|-------------|
| 1. Roof | 3. Side of building | 5. Tower or |
| 2. Chimney | 4. free standing | Mast |

The characteristics of your particular site and the type of antenna involved must be considered to determine which is most suitable. Since a determination based on performance may not be compatible with the SAFETY CRITERIA of "A" above, it is recommended that a professional select the site and make the antenna installation.

IV. A. If you are not experienced in installing antennas, you are advised to **SEEK PROFESSIONAL ASSISTANCE**.

B. Select the location to install your antenna with safety in mind. Again you are urged to obtain professional help for a safe installation, as well as for best performance. More information concerning site selection is contained in a previous section.

C. Call your electric power company. Advise them of your installation plans. **FOR YOUR SAFETY**. Ask them to provide assistance and shut-off power temporarily during the installation or removal process.

D. Plan your procedure carefully so that anyone helping knows what he is supposed to do and when. You cannot afford confusion with a cumbersome assembly half way up or down. A few tips that may be helpful are:

1. Install your antenna only in good weather and in daylight. Remember, a small amount of wind or rain or poor visibility greatly increases the possibility of an accident.

2. Assemble your antenna following individual assembly instructions and attach it to the mast, if used, on the ground near the location planned for mounting base. Attach the necessary length of coaxial feed cable.

3. If antenna is to be mounted on a mast of one or more sections of metal tubing or pipe, the assembly should be guyed using three guy wires per level at about 10-foot intervals starting just below the attachment point of antenna. Estimate lengths needed and attach one end of each guy wire to the mast and lay along the mast on the ground. When all are attached, temporarily tie them in a bundle along with the coax cable near the base of the mast to keep them from flopping about during erection.

4. A non-conductive rope can be attached near the top of the mast to be held by a person standing away from those erecting the assembly and used to guide it away from power lines in the event the assembly starts to fall.

5. Before you raise the antenna, install the mounting bracket and, if the antenna is to be guyed, any anchor bolts at calculated guying points.

E. If the antenna starts to fall and you can't control it, let go fast. Don't hang on trying to recover, let it fall. Remember, should the antenna, mast, cable (even though insulated for low voltage) or guy wires contact a power line, the whole assembly will become charged with voltage and anyone touching it can provide an electrical path to ground and be instantly electrocuted.

F. Should the assembly accidentally come in contact with power lines, **DON'T TOUCH IT, CALL THE POWER COMPANY IMMEDIATELY**.

G. If someone comes in contact with the electric power, **DON'T TOUCH HIM OR YOU ALSO BE ELECTROCUTED**. **FIRST**, remove the victim from contact with the Electricity. Use a DRY board, stick, or rope. Call for medical help and Apply artificial respiration if the victim is not breathing.

160-V PARTS LIST

PART #	QTY	SIZE	DESCRIPTION
T1140	1	1-1/4" o.d. X 64	SWAGED TUBING
T1000	1	1" O.D. X 64"	SWAGED TUBING
T1000	1	1" O.D. X 32"	TUBING
T0340	1	3/4" O.D. X 64"	SWAGED TUBING
T0120	3	1/2" O.D. X 64"	TUBING
S0120	1	1/2" O.D. X 14"	ALUM FINGER STRAP
T0380	1	3/8" O.D. X 24"	ALUM TUBING

BAG #1

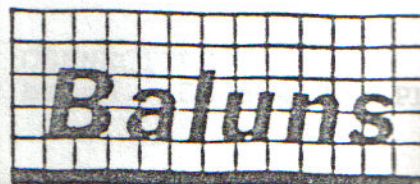
28015	3	8-32 X 1-1/2"	SCREWS
28202	5	8-32	NUTS
28352	5	#8	LOCKWASHERS
28302	2	#8	FLATWASHERS
28022	1	10-32 X 1-1/4"	SCREW
28203	4	10-32	NUTS
28353	4	#10	LOCKWASHERS
28303	4	#10	FLATWASHERS
28206	8	5/16-18	NUTS
28356	8	5/16	LOCKWASHERS
28037	4	4-40 X 1/2"	SCREW
28220	4	4-40	NUTS
28362	4	4-40	LOCKWASHERS

LARGE BAGS

28200	1	6-M CLAMP	COMPRESSION CLAMP
	1	SO-239 CONN.	(WITH #14 X 4 WIRE & CLUE LUGS)
28477	2	M-16	HOSE CLAMPS
66132	2	1-1/4" I.D. X 1-3/8"	PVC INSULATORS SLEEVES
28488	2	M-10	HOSE CLAMPS
FO780 1		7/8" O.D. X 15"	FIBERGLASS
66140	1	3" O.D. X 12"	LEXAN TUBE
18001	1		COIL (WITH TWO SOLDER LUGS)
	2	3"	PLASTIC CAPS (1 W/DRAIN HOLE)
18002	1	1 1/2" X 10 1/2"	MOUNTING PLATE
28402	2	2"	U-BOLTS & CRADLES
28401	2	1-1/2"	U-BOLTS & CRADLES
66126	1		ASSEMBLY MANUAL

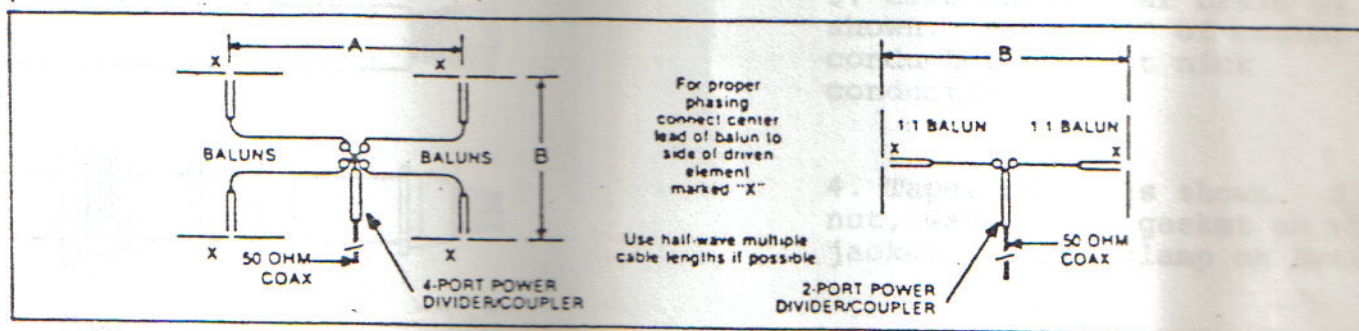


ANTENNAS, INC.

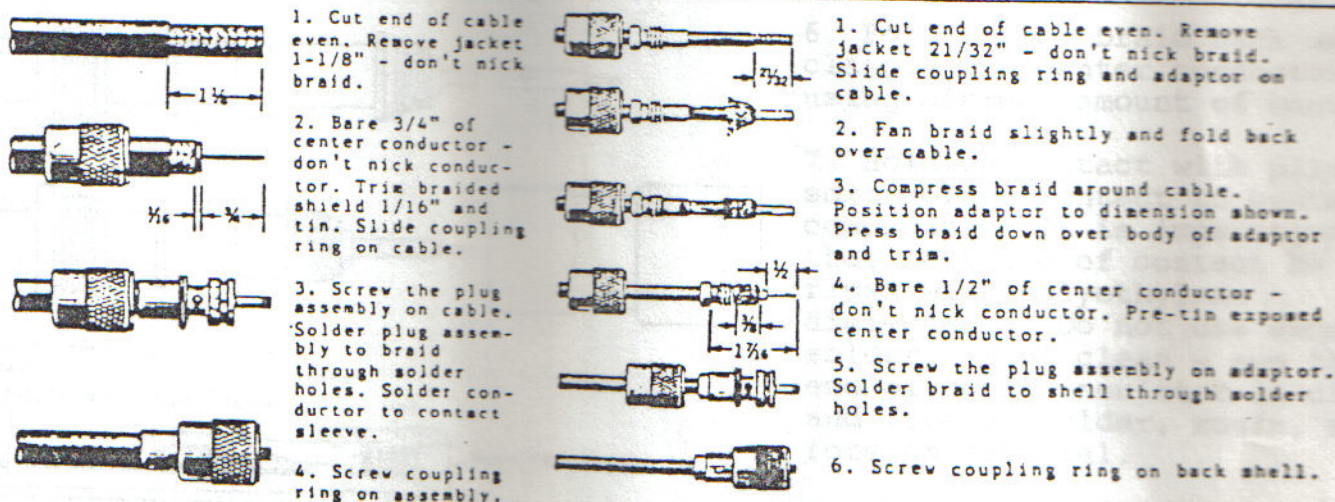


Your KLM ANTENNAS balun has been fully tested, both electrically and physically, before leaving the factory. To maximize the performance and efficiency of your balun, please note the following recommendations.

1. Keep the lead lengths from balun to feedpoints as short as possible. Unnecessary length can upset VSWR, bandwidth, etc. Solder lugs are a good idea too.
2. Be sure studs on HF balun are at least $3/8"$ from other antenna hardware.
3. When stacking two or more antennas, use balun stud identified with black dot on hot side on HF or center lead (VHF/UHF) as key for proper phasing (see sketch below).



4. KLM HF/VHF BALUNS ARE NORMALLY SUPPLIED WITH SO-239 TYPE CONNECTORS. USE ONLY PL-259 CONNECTORS WITH THEM. ASSEMBLY OF PL-259 CONNECTORS (FOR TWO TYPES OF COAX) ARE SHOWN BELOW.



IMPORTANT NOTE: IF YOUR BALUN IS SUPPLIED WITH TYPE "N" CONNECTORS (HF/VHF OPTION-UHF STANDARD), PLEASE READ ON....

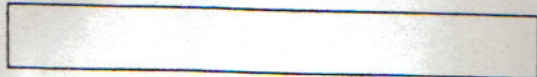
Type "N" connectors are noted for their low loss and good weather seal characteristics, but they must be carefully mated and only to other cleaned and carefully assembled type "N" connectors.

KLM ANTENNAS 90 day materials and workmanship warranty does not cover type "N" center pins bent or broken during installation or field use, so please read the following application notes carefully. (See reverse page).

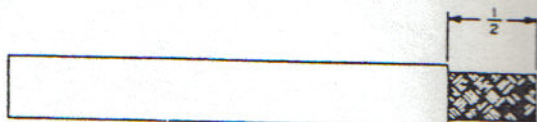
RG-8/U Cable Assembly to Connectors

FOR BALUNS WITH TYPE "N" CONNECTORS

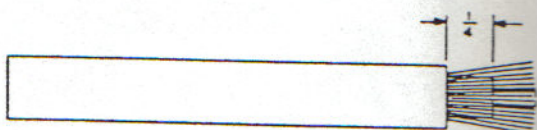
1. Use only type "N" connectors with your balun. Do not use PL-259 (S0239) type connectors. They will ruin it.
2. Carefully mate Type "N" connectors straight on. Jamming them together at angles will damage or break the center pins.
3. Carefully assemble your own type "N" connectors. See below for step-by-step details.



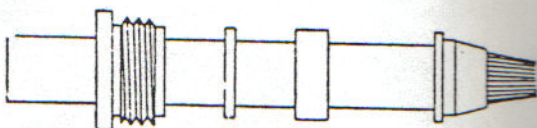
1. Cut end of cable even.



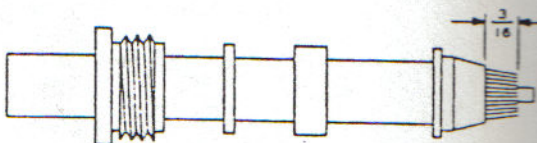
2. Remove vinyl jacket 1/2" don't nick braid.



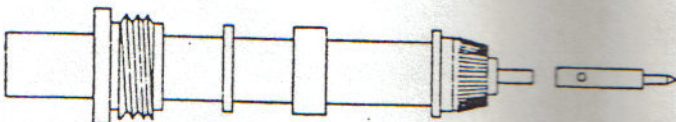
3. Comb out copper braid as shown. Bare 1/4" of center conductor - don't nick conductor.



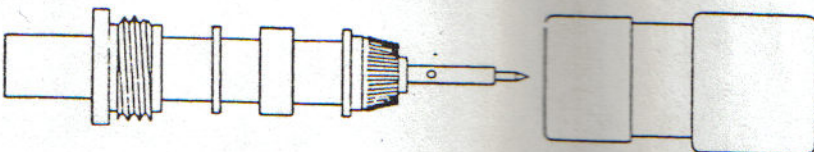
4. Taper braid as shown. Slide nut, washer and gasket on vinyl jacket. Slide clamp on braid.



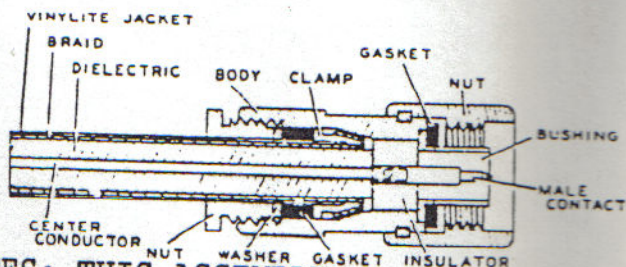
5. With clamp in place, trim braid as shown.



6. Fold copper braid back on clamp. Tin center conductor, using minimum amount of heat.



7. Holding contact with pliers, soft solder contact to center conductor. It is imperative that back end of contact be flush with polyethylene dielectric. Do not use excess solder. Wipe clean - see that end of cable insulator is clear and free of solder, rosin, and foreign material.



NOTES: THIS ASSEMBLY PROCEDURE APPLIES TO TYPE "N" PLUGS. THE PROCEDURE FOR JACKS IS THE SAME EXCEPT FOR THE USE OF A FEMALE CONTACT AND A JACK BODY.

8. Slide body into place carefully so that center conductor enters hole in insulator. Face of cable dielectric must fit flush against insulator. Properly tighten body and nut with wrenches.