

MOSLEY TRAP ANTENNA SYSTEMS

CHECKING, MAINTENANCE AND REPAIR

One of the wishes an Amateur Radio Operator has for his antenna system is that it work forever without repair. Mosley Antennas are well designed, but, as with all electro-mechanisms, failures do occur. When they do occur, the trouble must be located and repairs made as soon as possible. It is hoped that the test procedures set forward here will help you maintain and repair your Mosley trap-type antenna system. The procedures described will apply to any Mosley Dipole, Beam, or Vertical Antenna system.

Your Mosley Trap Antenna consists of a series of $1/4$ wave elements. In the case of a vertical antenna, there is basically only one $1/4$ wave element. In the case of a dipole or beam, there are two $1/4$ wave elements joined together to make a $1/2$ wave element.

In the vertical, beam, or dipole, the $1/4$ wave element may be effectively broken at predetermined intervals. This may be done with insulators, by terminating the tubing, or by installing parallel resonant circuits. Only in the last case can you construct an antenna system that will automatically change bands. In Mosley Antenna systems these resonant circuits are called "Trap Assemblies". These highly efficient assemblies usually have two parallel resonant circuits within them. The resonant circuit operating on the highest frequency, i.e. 28.0 Mhz. is nearest the base of the vertical. In the case of a dipole or beam, it is nearest the antenna center or closest to the boom. On the opposite end of this assembly another trap is found that operates on the next highest frequency. This trap usually works at about 21.0 Mhz. Individual traps cannot be checked by a grid-dip meter.

Due to the circuitry of trap-type antennas, it will be found that any malfunction of the antenna system on 10 meters will also cause the antenna system to operate incorrectly on 15 and 20 meters. It is possible that the 10 meter portion of the antenna may work properly and the 15 and 20 meter portion of the antenna may not work properly. In very rare cases, we find that only the 10 and 15 portion of the antenna will work properly and the 20 meter portion will not work properly.

A very good check of the antenna is to check the standing-wave ratio on all the bands on which the antenna is designed to operate. A malfunction on any of the bands will be indicated by higher than normal SWR readings. When checking SWR, be sure of the accuracy of your measuring instrument and that the proper connection is used. Nothing should be installed between the SWR instrument and the antenna except the connecting transmission line. Filters, relays etc. may cause incorrect readings when installed between the SWR bridge and the antenna. Be sure the transmitter is operating on the correct frequency and no serious harmonics are present. When you are making these tests, use low power. Some SWR instruments do not indicate minimum SWR at the true resonant frequency.

In the cases where a high SWR is indicated on all bands of operation, and if all components, other than the antenna, are known to be functioning correctly, check all the following:

Transmission line and its connections. Check the overall antenna lengths up to the 10 meter trap, which is the portion of the trap assembly nearest the boom on a beam or the portion of the vertical nearest the ground. Count the number of turns on each 10 meter coil form. Overall lengths and number of turns are usually indicated on the instruction sheet pertinent to the antenna being used.

In the cases where a high SWR is obtained on 15 and 20 meters and a normal SWR is obtained on 10 meters, the indications are that something is wrong with the 15 meter traps. These traps are located on the outboard ends of the trap assemblies and are on the other end of the trap assemblies containing the 10 meter trap.

In the rare cases where only the 20 meter portion of a 10, 15 and 20 meter antenna is operating incorrectly, it is advisable that the element lengths be checked. This length would consist of the element from the 15 meter trap to the tip of the antenna element.

In vertical antenna systems, it is possible that more than one trap assembly will be used. These systems incorporate 20 and 40 meter traps. These traps may not necessarily be in the same assembly as noted for 10 and 15 meter traps. Use of the traps is the same and defective assemblies may be located by noting at what band a high SWR is first located. The frequency band at which the high SWR is first located (going from highest band to lowest band) indicates that the defective component is used on this band and is affecting the lower bands.

Trap assemblies can be visually inspected. Before disassembly, note that color coding is still on all components or devise some method to insure reassembly of the trap onto the antenna in the correct position.

We have been asked frequently by BEAM users how to correctly install the traps when the color coding has weathered off. The following system of color coding is used on all trap assemblies used on BEAMS:

Both coils used to make one trap assembly are color coded with the SAME color. On the coil, which is placed closest to the boom, the code will appear on the tubing and will be visible when the plastic trap seals are installed.

On the Junior series beams, the outboard coil is coded on the short end of the tubing extending beyond the coil form. To inspect for this code, it is necessary to remove the coils from the trap assembly.

On the Senior series of beams, the outboard coil is color coded on the plastic coil form. It is not necessary to remove this coil for inspection. This color code will be covered by the trap seals. The outboard color code is not used for assembly when assembly is performed as stated in the assembly instructions.

To disassemble the trap assembly, begin by pulling the trap seals from the ends of the trap assemblies. These seals can be removed without damaging them. The removal of these seals will expose a wire which is terminated to the end of the outside metal cover. Remove the other screw terminating this wire. Place one hand on the cover, or largest tube. Place the other hand around the small tubing and the thumb of this hand on the wire. Pull the assembly apart using the thumb to keep the wire from unwinding. Tape this unterminated wire to the plastic coil form and inspect the coil form. Damage may be noted by shorted turns, deformed coil forms, melted plastic form and other abnormalities. It is important that these coils have the correct number of turns. The instructions pertinent to the antenna being inspected usually gives these turns and overall antenna lengths.

When reassembling the antenna, note that the wire on each coil form is tight because loose wires will detune these coils and cause additional troubles. Be sure screw is pulled down tightly and wire and screw are clean.

Frequently it is asked, "How can I clean my Mosley Antenna system?", or "How can I remove Mosley Weather-Guard from my antenna?". Mosley Weather-Guard can only be removed with sandpaper or steel wool. When the trap type antennas are sanded or steel wool used, care should be exercised to see that small bits of aluminum dust or wool bits do not get into the trap coils and short them out. Mosley Weather-Guard, when properly applied, is a permanent protection and seldom needs to be removed. Usually a good cleaning will remove dirt.

A good cleaning agent that can be used is Tri-Sodium Phosphate, (1/2 cup per gallon of water). This is a high detergent cleaning agent. Care should also be exercised to keep this out of the trap assemblies. When finished, thoroughly rinse with clean water ALL portions of the antenna. BE CAREFUL TO KEEP SOLUTION OUT OF TRAP ASSEMBLIES.

A Mosley anti-corrosion compound (Penetrox) is available and should be used on all electrical connections. It is very effective and, when used properly, will prevent corrosion or oxidation of metals.

Instructions for all Mosley Antennas may be obtained by writing directly to the factory. It is recommended that all replacement parts be ordered by Part Number, Color Coding, Description and the Form Number of the instructions used. This will insure that you receive the proper parts. Prices for replacement parts will be given on request.

Prepared in the Interest of Radio Amateurs By:

Mosley Electronics, Inc.