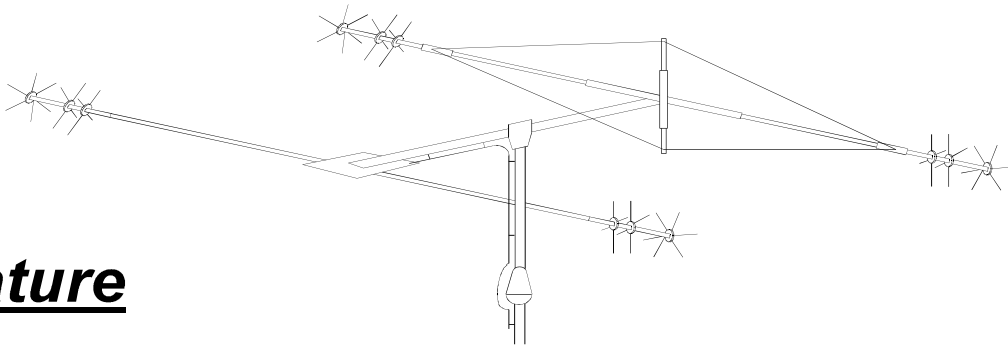


# MQ-1



## Miniature

## Four band Hybrid Quad Antenna

Most antennas are large heavy structures requiring heavy towers ,rotors and lots of extra muscle during installation and lots of extra dollars before the job is done.

We believe this Hybrid to be the ultimate in a four band two element antenna, with a reflector design which results in a unique super hi-performance radiating system.

This principle of loading contains no magic whatsoever, by simply reducing the element length by eliminating the least useful portion, the ends, and retain the center which is the primary current or radiating portion, that plus a super Hi-Q Reflector diamond shape for maximum signal capture, and properly phased, puts all your signal out front where it does the most good.

Performance is excellent- low SWR, low radiation angle, broad band, excellent gain and a front to back ratio far better than most two element beams on the market today.

The Hybrid Quad is a sensible designed, built from high quality materials and mounts with standard TV hardware and rotor. It's small size gathers very little ice and wind which allows you to spend more time on the air, not in the air.

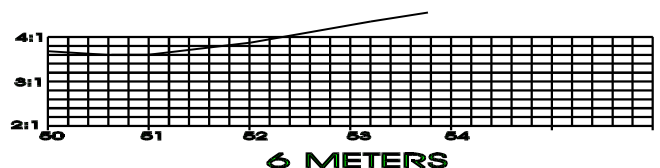
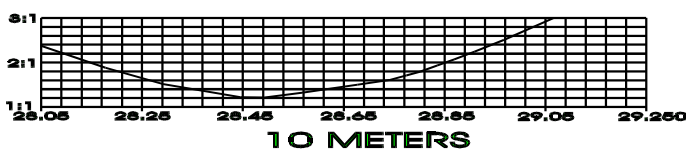
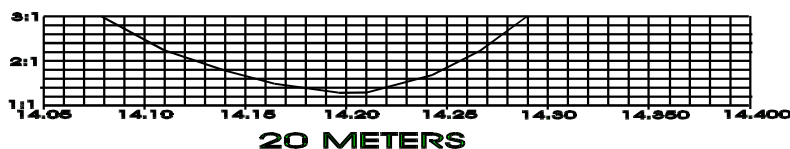
### Mechanical Spec.

Element Length - 11 feet  
Boom Length- 4 1/2 feet  
Turning Radius- 6 Ft. 2 in.  
Weight- 15 lbs.  
Mast (not inc'l)- up to 2 1/8"  
Wind Loading- 1.5 Sq. Ft.  
Wind Survival- 75 MPH.  
Overall Quad Reflector Height- 48 in.

### Electrical Spec.

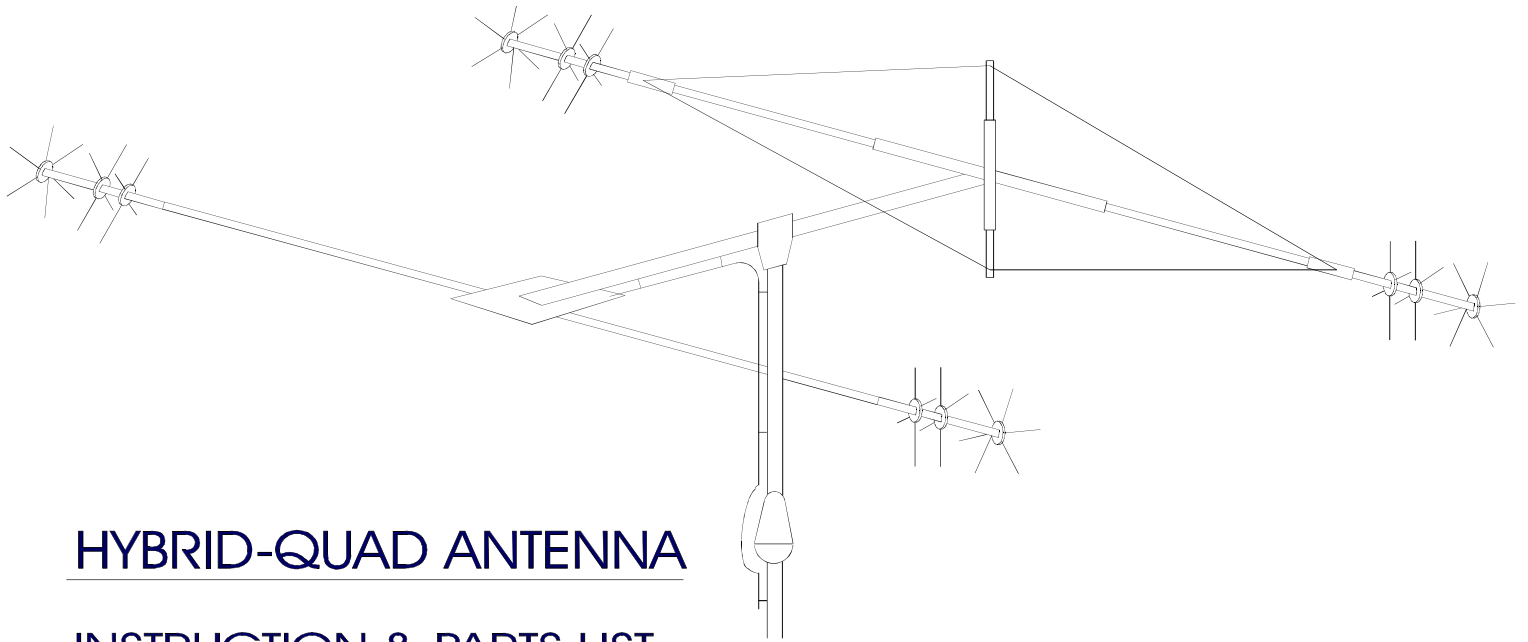
Operating Bands -6-10-15-20 Meters  
Forward Gain (Ret. Dipole) 6M-6.5 dB,  
10M-6.0 dB, 15M-5.5 dB ,  
20M-4.4 dB.  
SWR @ Resonance- See curves  
Front to Back Ratio- 12 to 17 dB.  
Power Rating- 1200 Watts P.E.P.  
Input Impedance- Single 50 OHM Feedline

**SWR vs FREQUENCY FOR MODEL MQ-1**



NOTE: Above curves typical -Resonance may be adjusted up or down.

**T.G.M. Communications 121 Devon St. Stratford ON. N5A2Z8**  
**Tel (519) 271-5928 Fax (519) 271-5928 tgmc@sympatico.ca**



# Safety Precautions

Warning! You can be killed if the antenna, feedline or the equipment used to install the antenna accidentally contacts any utility lines, Never install an antenna near power lines!

1. Be careful while climbing and carrying the antenna. It is heavy enough to cause you to lose your balance if it is handled too casually or if the capacitance spokes are snagged on a gutter, ladder, tree limbs and so forth.
2. Mount the antenna high enough so that it is out of reach. The ends of the capacitance spokes can cause eye injury, serious RF burns or both.
3. Make sure that the mast is sturdy enough to support the 15 pounds weight and the wind load of approximately 2 square feet.

## CHOOSING A LOCATION FOR THE ANTENNA

The best performance on receiving and transmitting will be obtained by mounting the antenna in a clear location above or away from buildings, towers, feedlines, utility wires and other antennas. While your own ingenuity and particular circumstances will determine the final mounting method, we'll pass along a few ideas for both permanent installation and portable operation.

Never mount this antenna in a location that permit unsuspecting people to come in contact with the loading spokes or any other part of the antenna.

Never mount this antenna where a mechanical failure might allow the antenna to contact power lines or other utility wires.

Always ground the feedline at the point it enters a building to a good earth ground or directly bury the cable in the earth for several feet before it enters the building for lightning protection. The coaxial cable should be totally disconnected from the station during threatening weather conditions for maximum lightning protection.

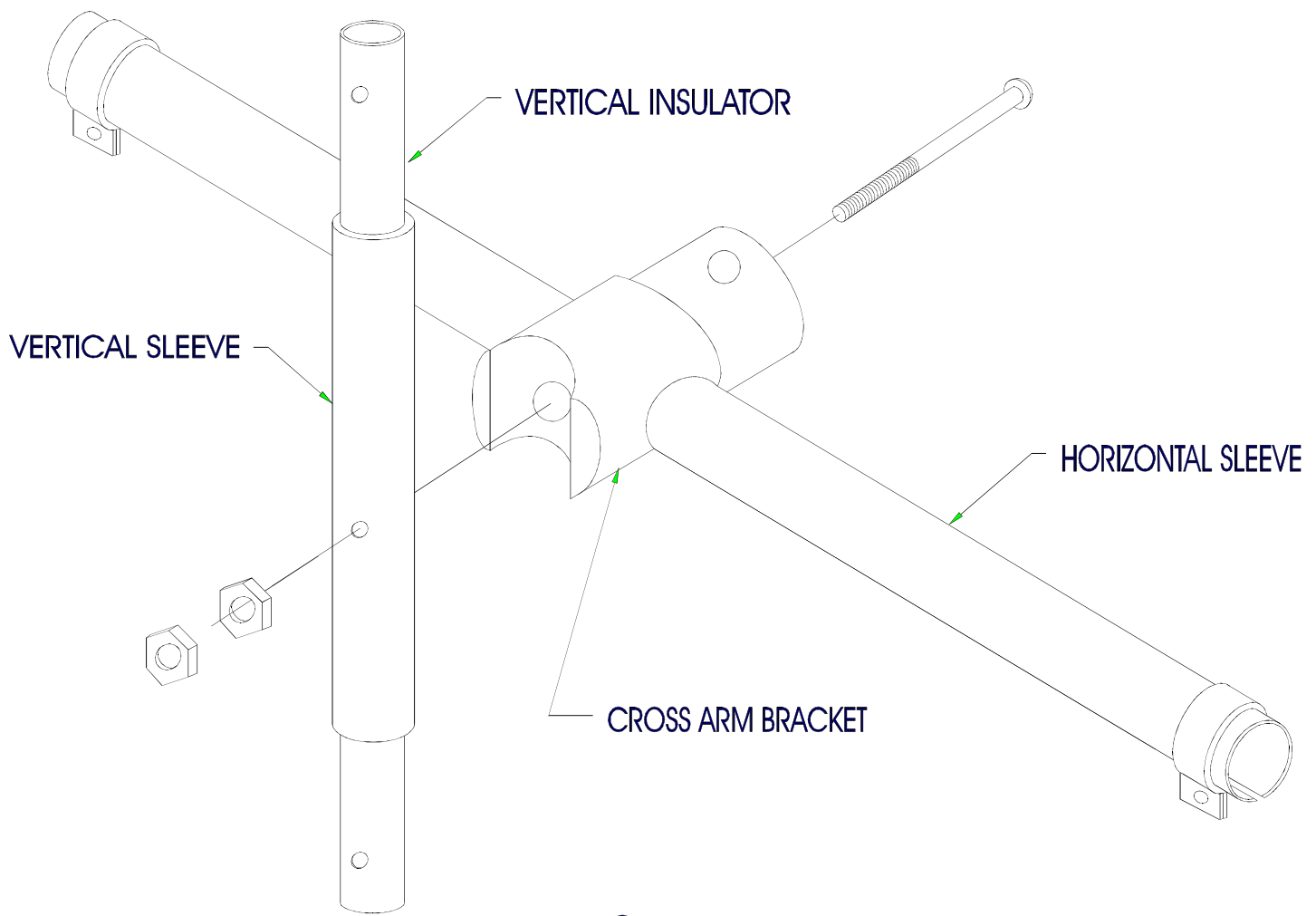
Note: Wear safety glasses whenever working near or on this antenna!

# ASSEMBLY INSTRUCTIONS FOR HYBRID QUAD

Please read these instructions over before attempting to assemble your antenna.

Page one shows the component parts and their description. These components will be referred to by the description in the following instructions.

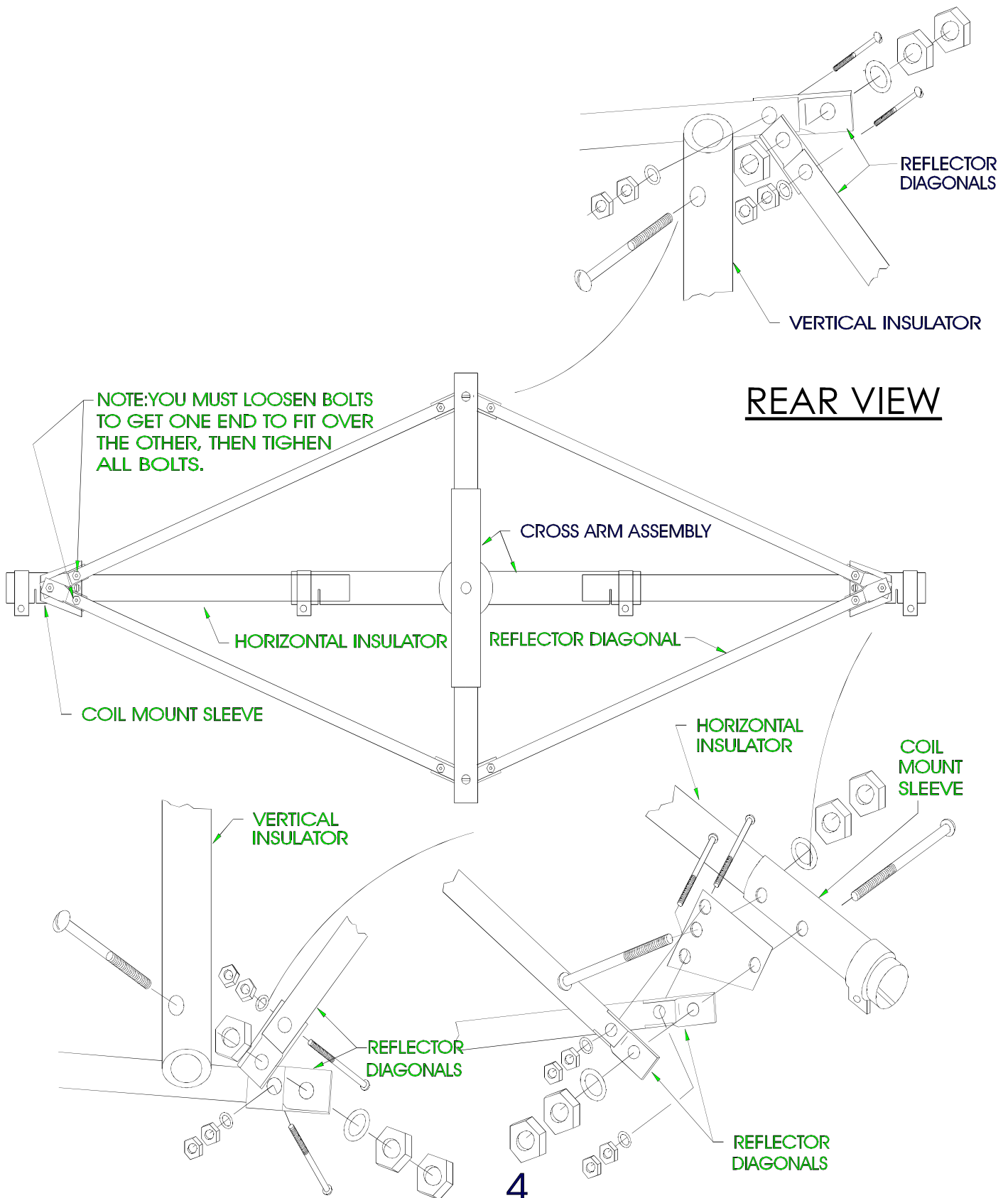
1. Choose a cleared area to proceed with assembly such as a garage floor , patio, etc.
2. Remove loading coils and spoke package; set them aside while performing the hardware assembly. The coils are the last step performed in these instructions.
3. Cross Arm Assembly. Assemble horizontal sleeve, vertical sleeve and vertical insulator to cross arm bracket; align holes, insert 2 1/2" long screw; secure with nut and nut. Attach clamps to horizontal sleeve. Refer to picture below.



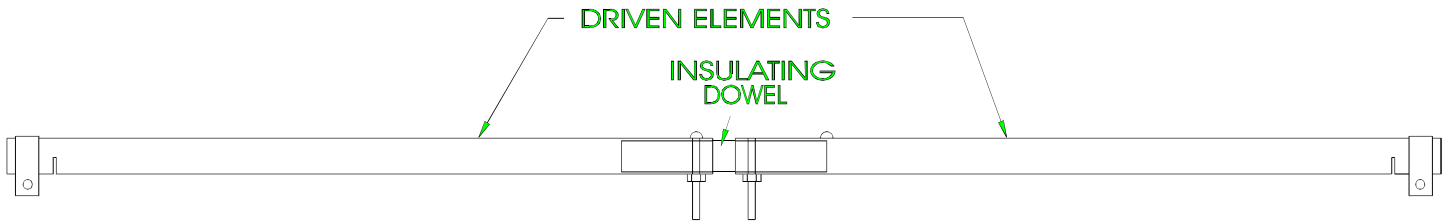
Reflector Element. Insert horizontal insulators in ends of horizontal sleeve. Do not tighten clamps yet.

Assemble 2" screw and nut to the vertical ends of cross frame and tighten securely.

Assemble coil mount sleeves to ends of horizontal insulators. Insert 2" screws through the holes provided and fasten securely with nut. Place four 1/2" diameter aluminum diagonals over the protruding 2" screw ends. Put on washers and nuts but do not tighten. Align by sliding insulator in or out of horizontal sleeve. Tighten down all connections including clamps on horizontal sleeve. Refer to drawings below.

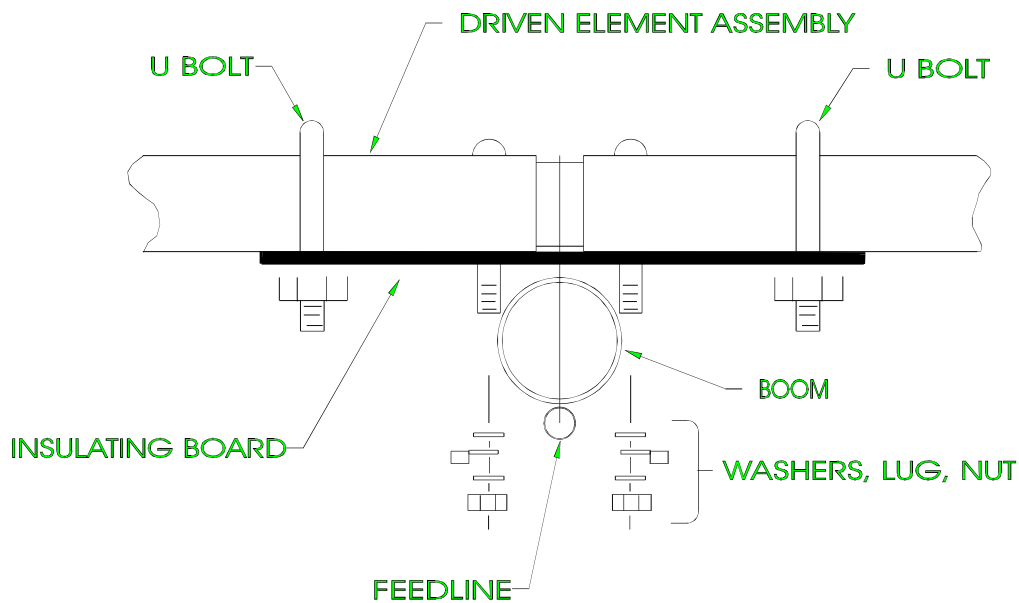


Driven Element. Assemble driven elements and insulating dowel with 2" long bolts and nuts as shown in picture below. This is a heavy current point, nuts must be pulled down to ensure a good contact.



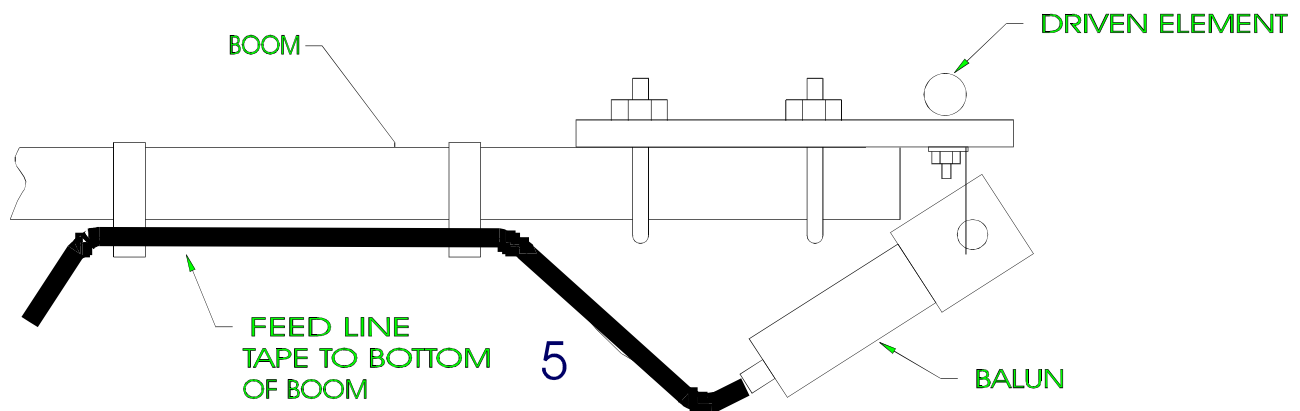
6. Attach driven elements to insulating board on side opposite boom; secure with "U" bolts, nuts and washer. Counter bored holes in board provide clearance for driven element nuts. Assemble washer, lugs and nuts to driven element screws protruding through board. Refer to picture below.

Note: Only tighten U'Bolts until insulating board begins to bend.



7. Feedline Assembly (52 OMH). Feedline attachment may be performed after the antenna is completely assembled, but it is more convenient if attached at this point of assembly. Crimp and solder the leads of the transmission line to the two solder lugs on the driven element screw. Check to make certain there is no possibility that either the braid or the center conductor will short out to the boom. Tape feedline to underside of boom as shown in picture for step 6.

Note: The antenna will work fine with direct feed, however, to eliminate skewing and for the best front to back a 1:1 50 ohm balun is recommended. If a balun is used it should be located close to the antenna terminals as shown and connecting leads made as short as possible.

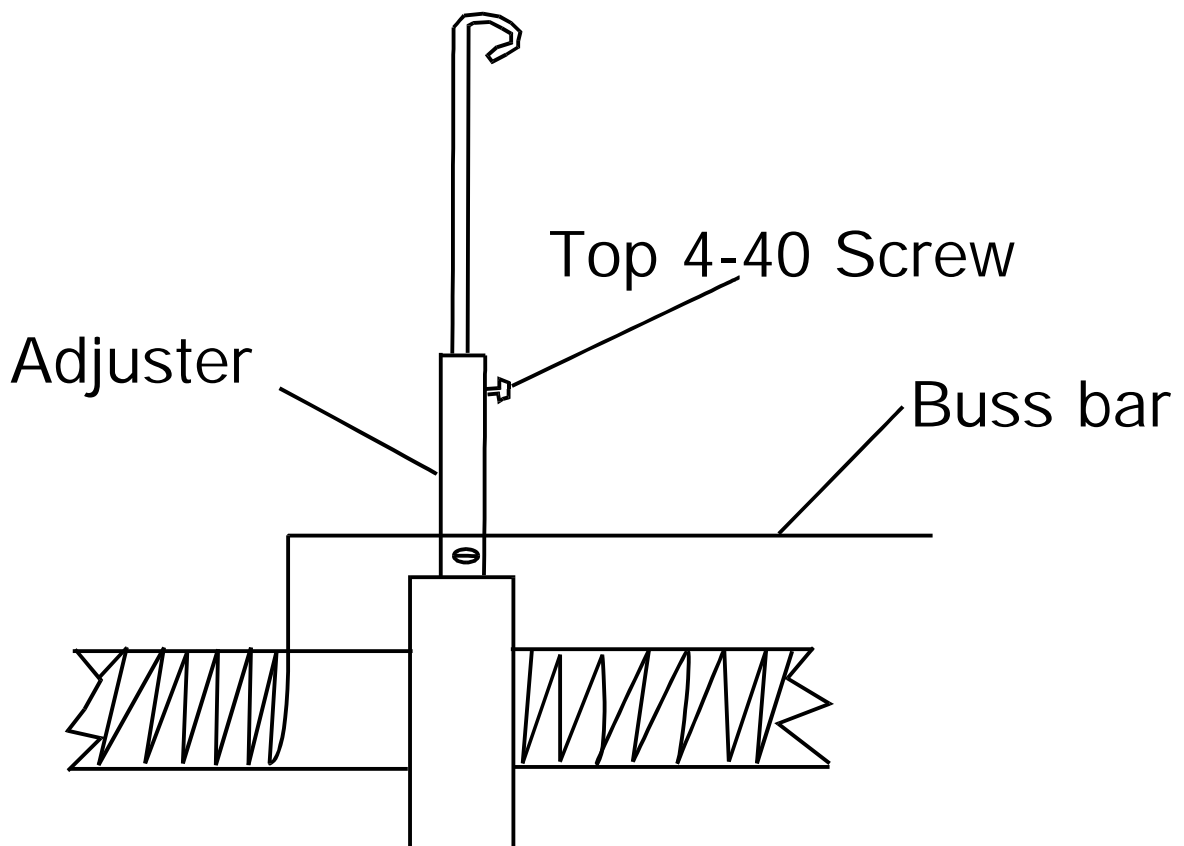


Note : This antenna comes with the boom mounted to the insulating board, this is installed to show position and the how tight the u'bolts should be tightened. The best way to properly align the reflector to the driven element ,is to lay the assembled reflector on the ground and temporarily install the boom and driven elements to the reflector. without the coils installed. The boom should be vertical to the ground. Then check to see if the reflector and the driven element is in line, any free play should be equalized by loosening the insulating plate from the boom ,set in place and retighten u' bolts till plate just begins to bend.

# Adjustable Tuning Spokes

This antenna has adjustable tuning spokes included with it to make tuning easier. By loosening the top 4-40 screw the spoke can be lengthen by up to  $1 \frac{5}{16}$  of an inch longer thereby lowering the frequency. If you need to raise the frequency push the spoke back into the adjuster, if the spoke is already all the way in the adjuster you will be required to cut the spoke shorter according to the chart in this manual. A large pair of pliers with the cutter on the side will shear the spoke off squarely, but you will still be required to file the burrs off, so the spoke will fit back into the adjuster.

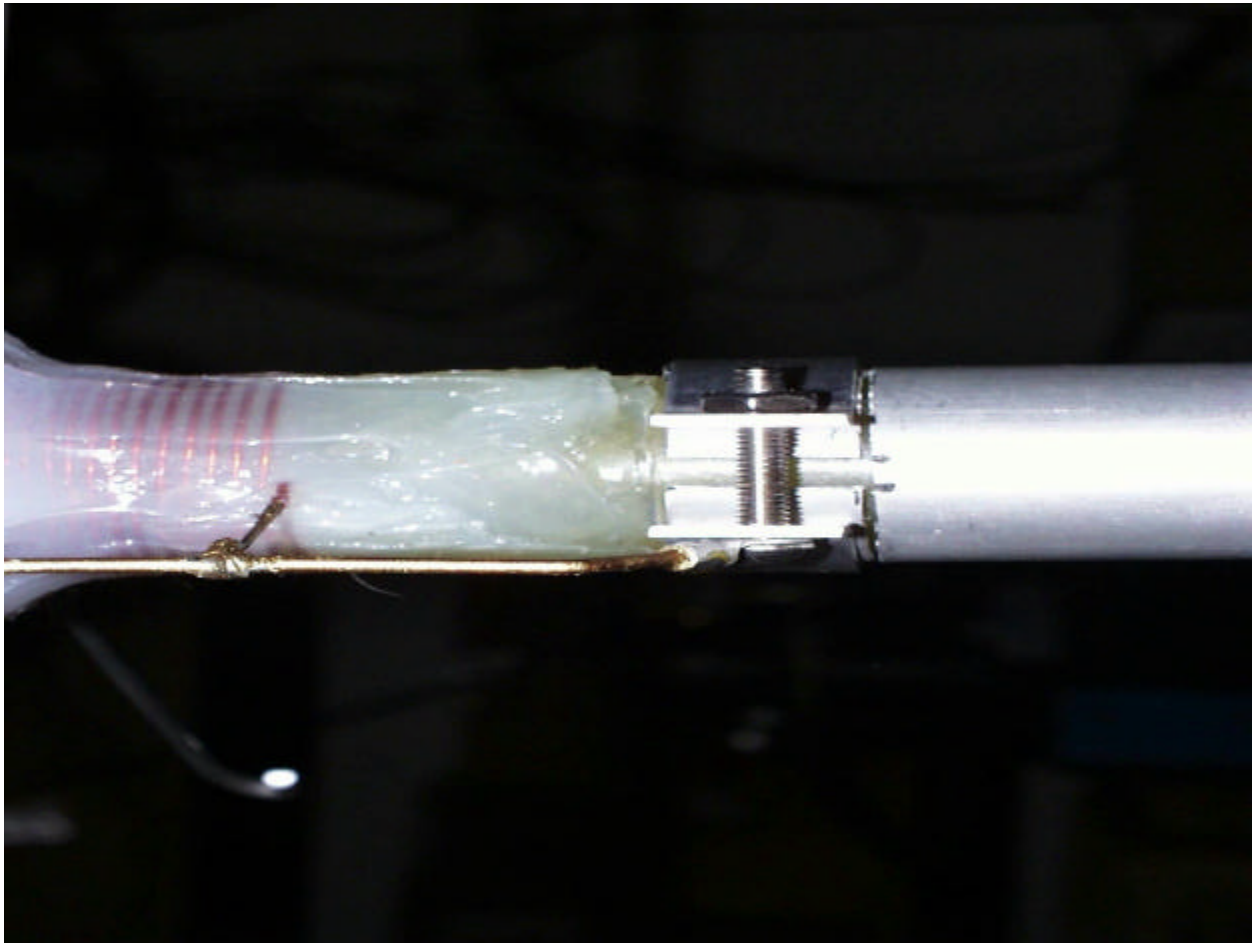
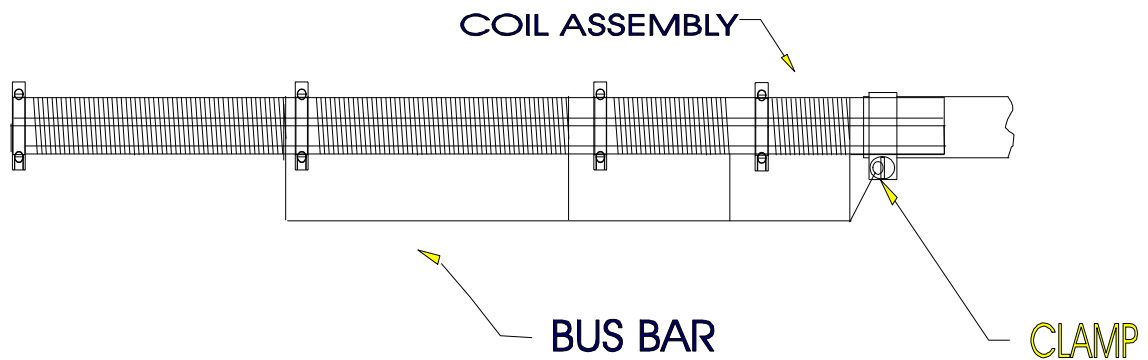
These adjustable tuning spokes can be placed along the buss bar on the same side of all four loading coils to make them easy to locate.





## Antenna should be checked and tuned on the ground

It is recommended to prepare a ground level mast that will permit easy initial testing and adjustment with antenna at about six feet above the ground. The balun should be installed and if possible the coaxial cable you are going to use. The SWR can be measured by using a transmitter and SWR bridge or an SWR Analyzer. Always start tuning the antenna from the the lowest frequency to the highest frequency. It is recommended to resonate each frequency appoximately 20 KHZ below the desired operating frequency.



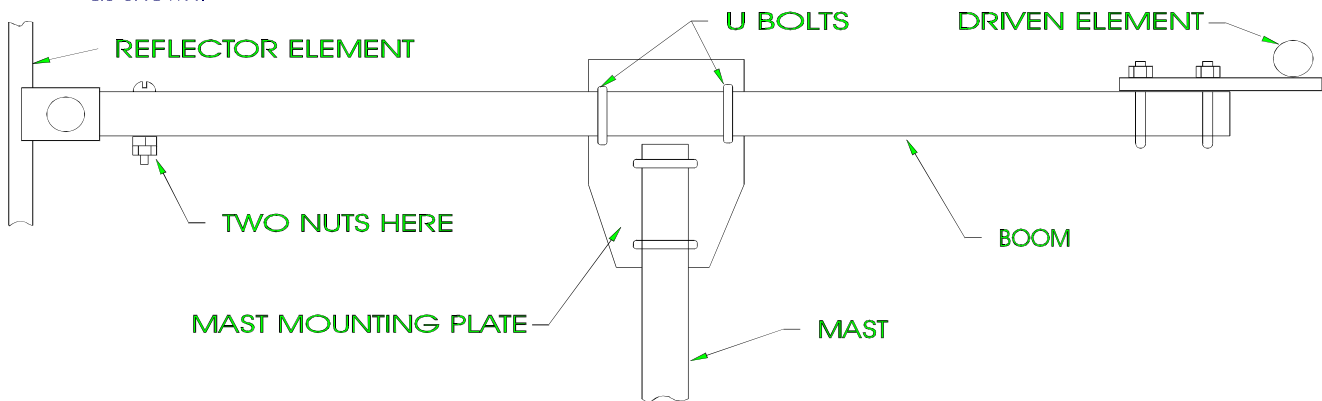
Proper connection of lug on buss bar to clamp  
and clamps to end of antenna elements.

**VERY IMPORTANT**

Buss bar , clamp and wide slot must face down to drain any moisture.

Note: For tower mounting this antenna , we recommend installing boom and driven element on the tower first, then take reflector assembly up the tower and push cross arm bracket into the end of the boom , install 2 " bolt as described.

8. Assemble reflector element to boom and align with driven element. Fasten plastic cross arm bracket to boom with the 2 inch #10 bolts and nuts provided. Place two nuts as shown below to insure reliability. The first nut should be tightened securely before the second nut is tightened down. Mast mounting plate should be assembled approximately mid way between reflector and driven element as shown.

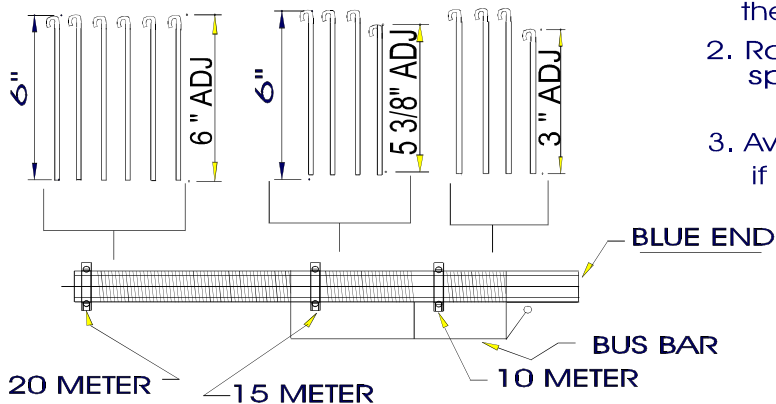


### THIS COMPLETES THE HARDWARE ASSEMBLY OF YOUR ANTENNA

9. Coil Assembly and Frequency Adjustments for 10, 15, and 20 Meters.

The drawing below shows one reflector coil and one driven coil. Also shown is the spoke distribution and the various rings which affect operating frequencies for 10, 15, and 20 meter sections.

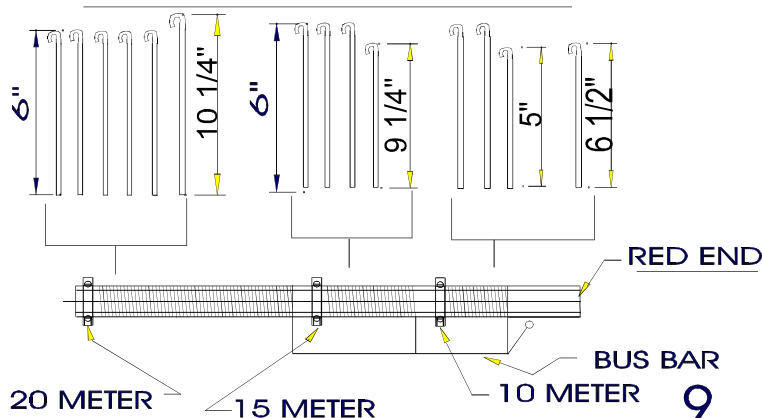
### DRIVEN COIL



#### NOTE:

1. Spoke length is measured from the the top of the bend to the tip of the spoke.
2. Radial position of longer or shorter spokes in the rings is not critical.
3. Avoid bending bus bars; straighten if necessary.

### REFLECTOR COIL



Antenna as received from factory and using spokes as supplied resonates at approximately 50 KHz of the following frequencies: 10 Meter Band - 28.450 MHz Approx.

20 Meter Band - 14.200 MHz      Approx.

Adjustment of one band does not affect the resonant frequency of other bands as is sometimes the case with other multi-band antennas.

Bands	Effect of adding or removing 1/2" from <u>one</u> spoke for <u>each</u> coil
10 Meters	Increases 250 KHz
15 Meters	Increases 150 KHz
20 Meters	Increases 100 KHz

The values for removal of 1/2" spoke length shown in the table are to be considered typical. The relationship is basically linear ie., if 1/4" is removed the frequency increase is about one half the value shown in the table and if 1" is removed the frequency increase is twice the value shown in the table.

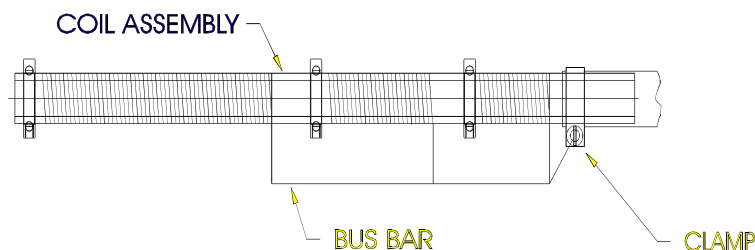
Example: You wish to raise the frequency of the 20 meter section by 100 KHz.  
Choose one spoke from each 20 meter driven ring, remove 1/2" from each spoke,  
return the shortened spokes to the 20 meter driven rings, one shortened spoke per ring.

Note: Remember, the adjustment is made on one spoke from each driven coil for that band you wish to change. All shortened spokes should have the rounded end left on to prevent corona . The position of the shortened spoke in its respective ring is not critical.

**NOTE: Only the driven element is tuned.**

10. Spoke Installation. Insert the spokes into their respective rings to the bottom of the holes, then tighten the locking screw snugly . Failure to tighten spokes properly will result in irregular antenna operation.

11. Assemble reflector coils (red color end) to reflector element and driven coils (blue color end) to driven element. Eye of coil bus bar is secured to clamps under head of clamp bolt , on ends of the elements.



CONGRATULATIONS! YOU'RE FINISHED.

Six Meter Band. The 50 to 54 Mhz six meter band is resonated at the more popular low end of the band.

The antenna has good gain and extremely good front to back on this band.  
The use of a balun is recommended to improve antenna performance and front to back.

Array Solutions makes a balun that covers to 52 Mhz  
Model W1JR-50-3 , 1:1 balun [www.arraysolutions.com](http://www.arraysolutions.com).

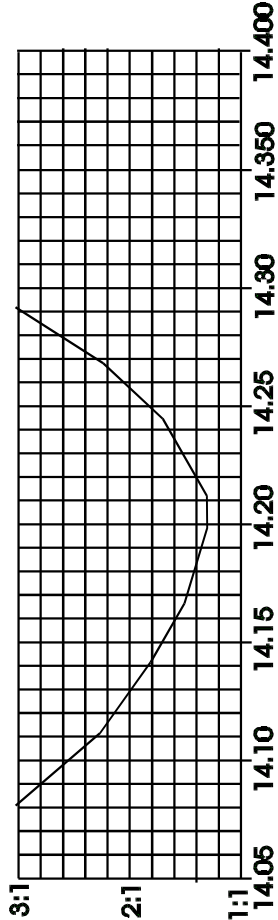
#### GENERAL NOTES

The general information below is somewhat random in nature and has been included in this special section.

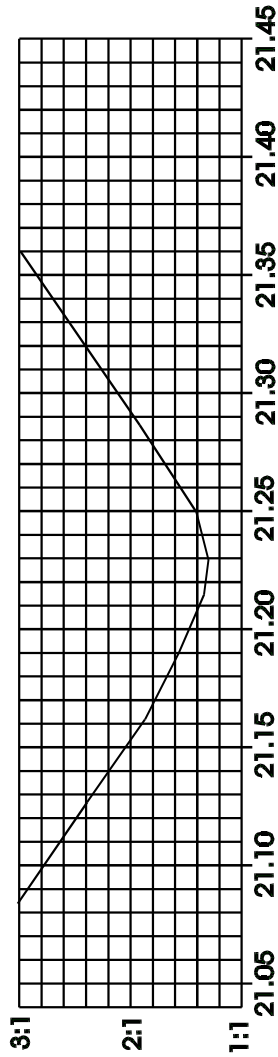
1. If it is desired to decrease the resonant frequency of your antenna, it is only necessary to lengthen adjustor spokes. using the extra spokes included with the antenna.  
Longer spokes are available from the factory or use 1/8 diameter aluminum welding rod.
2. The Model MQ-1 is intended for mounting with an 2 1/8 OD mast (not included).  
A standard TV type rotor is normally adequate for rotation.
3. When operating the MQ-1, the input power to the final must be limited to 1200 watts P.E.P.  
During tune-up and when operating in the key down or CW mode, dc input must be limited to 500 watts and 40% duty cycle.
4. Replacement or spare parts are available if required. Address requests for information to:

T. G. M. Communications  
Tom McKay VE3 KVD  
121 Devon St.  
Stratford Ont.  
N5A 2Z8 Tel-(1-519-271-5928)

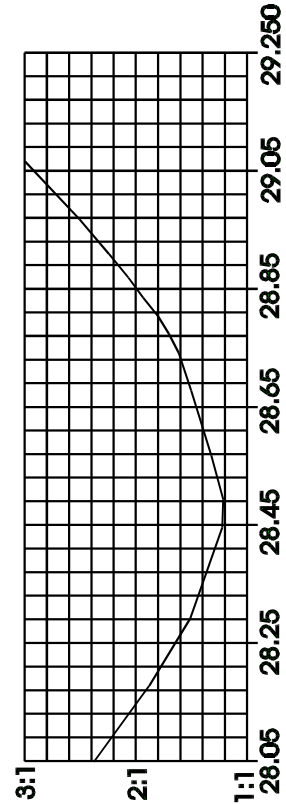
SWR vs FREQUENCY FOR MODEL MQ-1



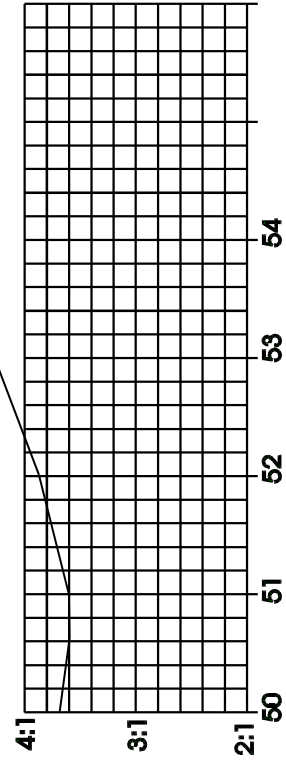
20 METERS



15 METERS



10 METERS



6 METERS

NOTE: Above curves typical -Resonance may be adjusted up or down.