

# DIAMOND ANTENNA

## MV3A Mobile Antenna System

### General Information

MV3A has 4 band capability—2m/6m, plus 2 HF bands though use of loading coils. The MV3A is supplied with HVC28 (10m) loading coil. There are four optional HF coils available: HVC7 (40m), HVC14 (20m), HVC18 (17m), and HVC21 (15m). The MV3A has a fold-over structure which allows for entrance into parking structures (i.e. garages, buildings, etc.). Use DIAMOND model MX62M Duplexer for single antenna operation with ICOM IC-706, Yaesu FT100 or for combining HF & VHF transceivers.

Bands Supplied  
Power, PEP:  
Mount Connection:  
Length:  
VSWR:  
Frequency:  
(Nominal BW)

### Specifications

10m/6m/2m  
HF 120 watts / VHF 200 watts  
UHF  
58" (with the HVC7 installed, total length is 80")  
1.5:1 Nominal—MV3A (10m/6m/2m)  
2m: 144.5-148 MHz; 6m: 52-54\* MHz;  
10m Loading Coil: 28-29 MHz ( $\pm 300$  Khz)  
HVC7 (40m): ( $\pm 28$  Khz)  
HVC14 (20m): ( $\pm 60$  Khz)  
HVC18 (17m): ( $\pm 140$  Khz)  
HVC21 (15m): ( $\pm 180$  Khz)  
\*6MSSB-EXT (6m SSB) ( $\pm 500$  Khz)  
5/8 $\zeta$  2m, 1/4 $\zeta$  6m  
Diamond K400C or K600M  
Diamond MX62M

Element Phasing:  
Recommended Antenna Mounts:  
Recommended Duplexer:

### Installation Instructions

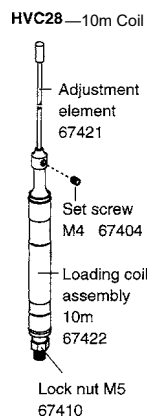
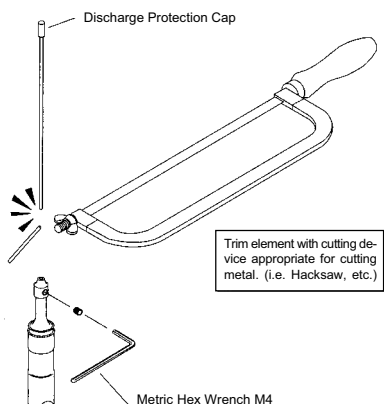
#### PRECAUTIONS:

- (1) The MV3A requires vehicle ground.
- (2) If installing HVC7 (40m) loading coil, install on top (vertical position) only. Some installations may require a nylon cable to relieve stress on vehicle mount.
- (3) The MV3A 6m/2m tuning assumes that at least one loading coil is mounted at the top end. VSWR may be out of specification without the coil(s).

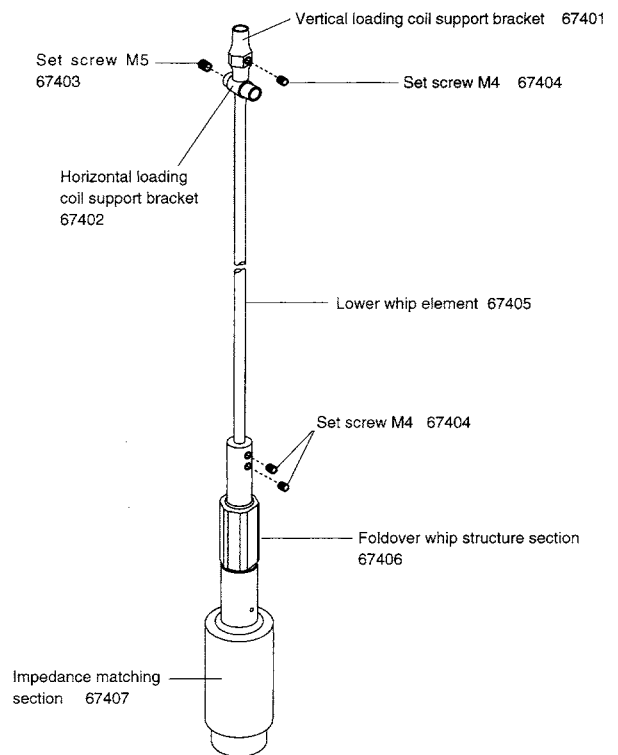
(1) Choose desired mounting location to insure maximum strength of mount, best performance of antenna, and proper vehicle ground.

(2) Assemble MV3A with desired loading coil (HVC28 10m coil is included in package) and install on vehicle mount. NOTE: Metric Hex wrenches are enclosed.

(3) With quality VSWR meter, check VSWR on all bands to insure proper tuning of antenna. The loading coil rods may require adjusting or trimming to reach best VSWR. If it is necessary to trim coil rods, do so in 1/8" increments only, until lowest VSWR is obtained at desired center frequency. Shortening coil rods will have the effect of raising the resonant frequency. Check both the high and low bandwidth edges before cutting.



### MV3A Parts List



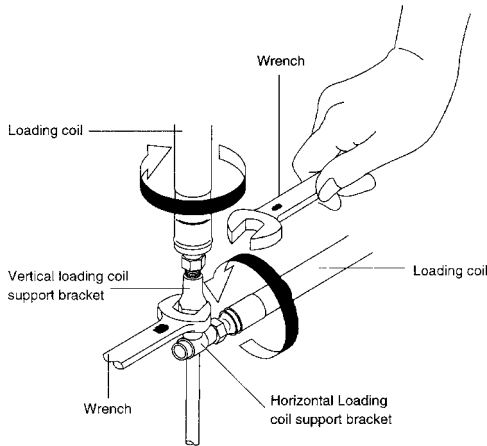
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(4) When tuning optional loading coils (HVC7, HVC14, HVC18, HVC21 and HVC28-10m coil), install on the top (vertical position) and proceed to tune the coils by adjusting or trimming coil rods. (NOTE: HVC Tuning Coils have a limited tuning range—refer to “frequency” under specifications for bandwidth). Choose your desired center frequency as a guide for tuning range and adjust for best VSWR at center frequency.

**Adjustment element length versus frequency change on each frequency band.**

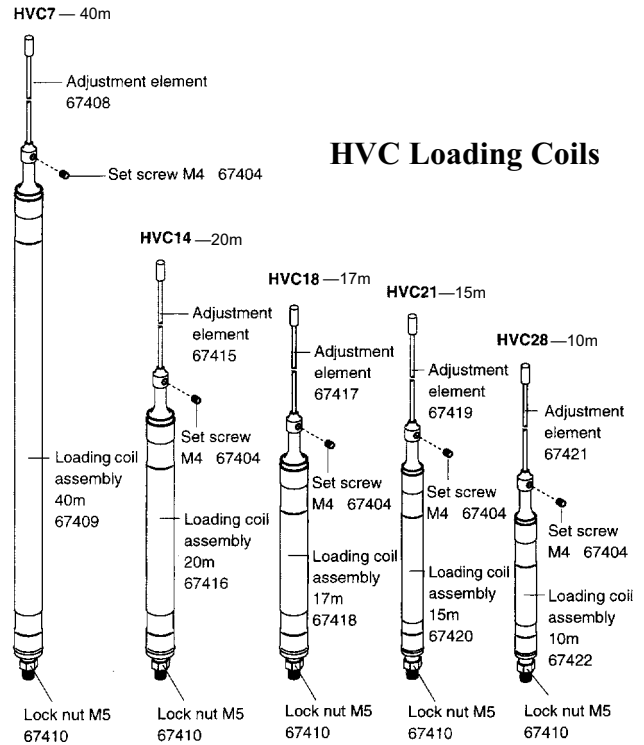
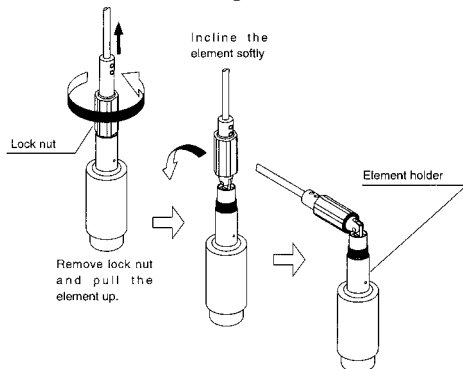
Frequency	change
40m	approx. 40kHz per 1cm
20m	approx. 70kHz per 1cm
17m	approx. 220kHz per 1cm
15m	approx. 250kHz per 1cm
10m	approx. 360kHz per 1cm

(5) Once you have adjusted all coils for best VSWR in the vertical position, you may assemble one optional coil horizontally. All coils can work horizontally except the HVC7 (40m); it must be in the vertical position due to its size. The VSWR will change slightly by adding a coil horizontal; therefore, it is best to check your VSWR readings to verify tuning.



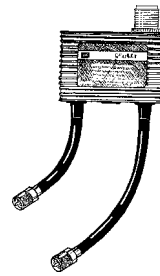
(6) To replace loading coils, simply unscrew coil from coil support bracket and replace with another coil (see illustration). Be sure loading coils are fastened securely so they don't loosen from vehicle and road vibration.

(7) The MV3A has a fold-over structure for situations where the antenna height is a problem (see illustration). Simply unscrew the fold-over lock, lift up, and tilt over 90°. Care should be taken when folding over, not to damage vehicle or any loading coils. Do not drive with antenna in the folded position.



## HVC Loading Coils

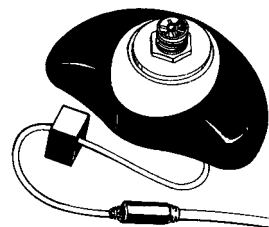
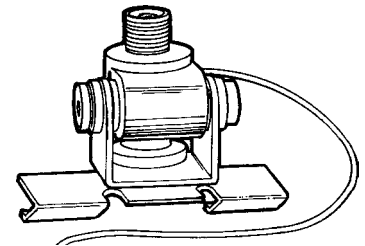
## MV3A Accessory Items



**MX62M Duplexer**  
LPF 1.6-56; HPF 76-470  
Power; 200w CW, 600w PEP  
Connectors: Mix-UHF(F);  
Ports-UHF(M)  
w/12" cable

### K400C Trunk/Hatchback Mount

Deluxe UHF type base  
Dual-axis adjustable  
6½" RG316 Teflon Coax  
w/PL-259.  
Use Diamond Model C110  
for front radio installations.



**K600M  
Trunk Mount**  
Deluxe trunk mount.  
16.5' RG188 and 7mm 5D Coax.  
Tilt Angle (0-9°)

# **DIAMOND ANTENNA**

## **HF Mobile Installation Tips**

With all the different types of installations possible, there are many unique problems that can occur. We have compiled some additional notes on specified areas.

- (1) **GROUNDING ANTENNA:** Obtaining a good ground is very important to any HF mobile installation. No matter where your antenna is mounted, it is highly recommended you run a heavy copper strap or braid (1" to 3") between body and frame of your vehicle. (NOTE: Copper wire is not sufficient!) If you have ignition noise problems, it is also recommended to ground the end of your tail pipe to the frame.<sup>1</sup>
- (2) **OPTIMUM MOUNTING LOCATION:** You should always mount your antenna as high on your vehicle and as far away horizontally from other metal objects as possible. The center of your roof is the best location; however, this is not always practical or possible for most HF antenna installations. The next best location is in the center of the driver's side of the trunk (side mounted on driver side to avoid low hanging curbside branches or objects). The DIAMOND K400C and K600M series mounts work well with the MV3A. The front or rear bumper is another possible mounting location; however, due to high ground loss, this should be last choice. If you must use a bumper mount, it is recommended to use a base extension to raise bottom of antenna to equal height of top of trunk. Grounding of this extension will become important.
- (3) **TRUNK LID MOUNTING:** Probably the best mounting location for most vehicles. Usually, adding one or two copper straps from the hinge area to car body will improve grounding (and thereby antenna tuning). It is necessary that at least two of the four sockethead screws on mount penetrate paint to metal for proper grounding. (A little clear nail polish or other acrylic paint may be used to seal around mounting screws.)
- (4) **COAX:** If you use an antenna mount other than DIAMOND ANTENNA models K400C or K600M, it is very important to use a quality 52 ohm coax (RG8U, RG58U, RG213, Teflon Coax, etc. with at least 95% shield and stranded center conductor). Do not use foam coax or coaxes with solid center conductors. Foam coax can deform in heat and absorb moisture, solid center conductor coaxes have less flexibility and may become brittle and break in mobile applications.
- (5) **EMI:** Electromagnetic Interference is the single greatest concern for HF mobile applications. Route your cable as far from the vehicles ECM (Engine Control Module) and vehicle's electrical systems as possible. Sometimes a ferrite choke may be required on coax near mount. There are many books on the subject of interference, refer to endnotes for additional information.<sup>2</sup>

1. J. Seybold, "HF Mobile Installation Tips", December 1995 QST, pg. 58-60.

2. ARRL, Radio Frequency Interference Tips: How to find it and fix it., The book is available from your favorite amateur radio dealer or ARRL headquarters.

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## 6MSSB-EXT SSB extension rod for MV3A

The 6MSSB-EXT lowers the 6m resonant frequency of MV3A for 50.1 operation.

**NOTE:** With 6MSSB-EXT installed, you will lose 2m capability of MV3A.

**Installation:** (You have two installation options.)

- (1) If using one HF coil, simply install in horizontal loading coil support bracket #67402. Follow tuning instructions below.
- (2) If using two HF coils, remove set screw #67403 from horizontal loading coil support bracket #67402. Attach 6MSSB-EXT and fasten lock nut. Follow tuning instructions below.

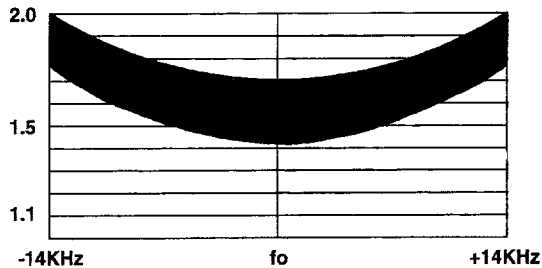
**Tuning Instructions:** With quality VSWR meter, check VSWR on lower portion of 6M (approx. 50.125 MHz). The extension rod may require adjusting or trimming to reach best VSWR. If trimming is required, do so in 1/8" increments only, until lowest VSWR is obtained. Shorting extension rod will have the effect of raising the resonant frequency. Check both the high and low bandwidth edges before cutting.

## WARNINGS:

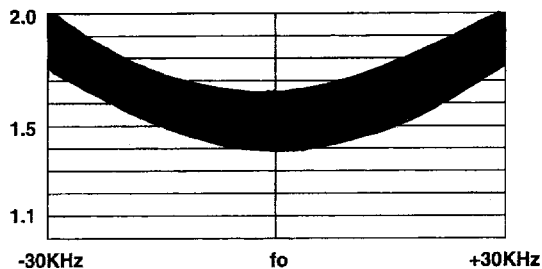
- (1) Bolts and set screws on antenna and mounting bracket may loosen from vehicle and vibration. Be sure to check periodically to ensure they are fastened securely.
- (2) Avoid obstacles such as tree branches or low overpasses; impact with these obstacles will cause antenna to break.
- (3) The MV3A is not recommended for either magnet type mounts or installation on large GVW vehicles.
- (4) Avoid touching antenna while transmitting.
- (5) Do not scratch or remove rubber covering on loading coil sections.
- (6) Avoid driving with antenna in folded position.

### VSWR Charts

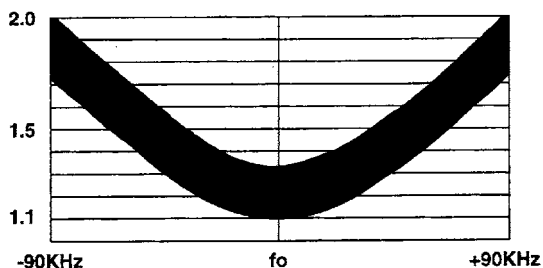
<40m> HVC7



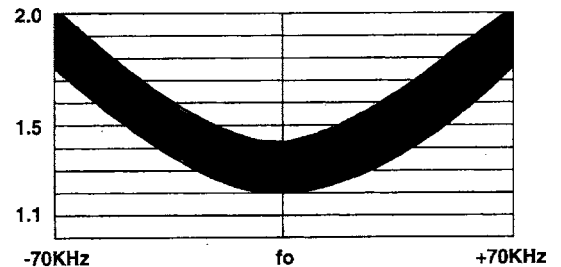
<20m> HVC14



<15m> HVC21



<17m> HVC18



<10m> HVC28

