



Instructions

Model CPK

The CPK Capacitive Counterpoise Kit is a simulated ground system that allows the Butternut HF6V, HF9V and related models to operate with low SWR on the bands for which they are designed. It may also be used with conventional (trapped) quarter-wave verticals for low SWR operation on most bands, although it was not designed with these types in mind and no information is available concerning its compatibility with specific models. The CPK is not a substitute for a system of radial wires because it is only partially effective in reducing the earth losses that can turn vertical antennas into inefficient radiators. It is, rather, an electrical substitute for the "missing" half of a dipole antenna in that the conductors of the counterpoise system in conjunction with the matching section of transmission line provided contribute enough reactance to resonate the entire structure as an electrical halfwave.

WARNING: THERE IS VERY LITTLE RADIATION FROM THE CPK BUT HIGH RF VOLTAGES CAN APPEAR ON IT ESPECIALLY WHEN HIGH POWER IS USED AND THE POSSIBILITY ALWAYS EXISTS THAT POWER LINE VOLTAGES CAN APPEAR ON UNLESS THE ASSOCIATED STATION EQUIPMENT IS CONNECTED TO A GOOD EARTH GROUND. THEREFORE THE ANTENNA MUST BE PLACED HIGH ENOUGH ABOVE THE EARTH SO THAT NO PART OF IT CAN COME INTO CONTACT WITH PASSERS-BY AND THAT ANY SUPPORTING METAL STRUCTURE SUCH AS A TOWER OR A MAST BE CONNECTED TO A GOOD EARTH GROUND.

Neither the antenna proper nor the counterpoise assembly (which will be insulated from its supporting structure) should be placed at DC ground potential during normal operation.

ASSEMBLY

Refer to your antenna assembly instructions. Only tube w/insulator (A) need to be considered during the assembly phase of the counterpoise installation.

- G** 1. Insert the insulator end of tube w/insulator (A) into the bottom of tube (AA). Pass a 1-1/4" screw through both parts and secure with a lock washer and hex nut.

NOTE: Coil (Q) base matching is NOT to be used for the CPK. Save it for possible future use.

- G** 2. Slide reinforcing tube (AB) around tube (AC).
- G** 3. Insert the end of tube (AD) with the hole furthest from the end into one side of tube (AC). Pass a 1" screw through both parts and secure with a lock washer and hex nut.
- G** 4. Repeat step 3 for the other end of tube (AC).
- G** 5. Insert the end of tube (AE) with the hole furthest from the end into tube (AD). Pass a 3/4" screw through both parts and secure with a lock washer and hex nut.

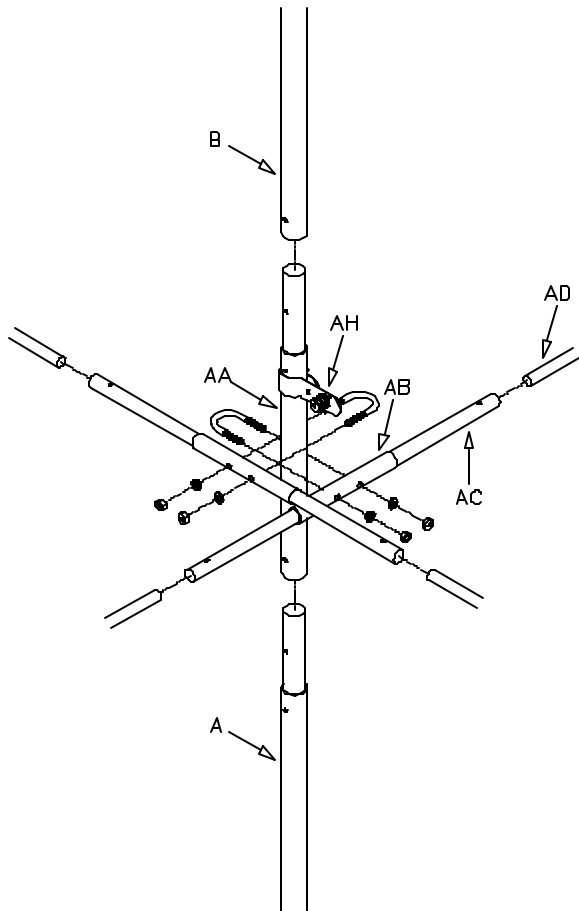
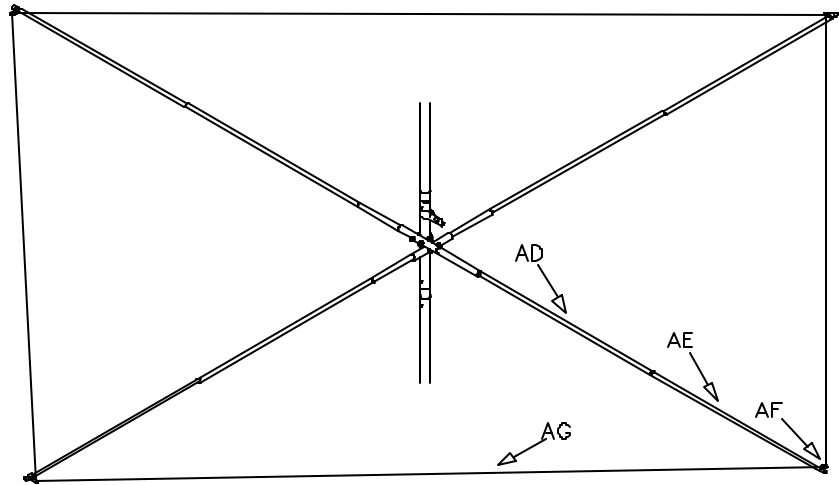
CROSS ARM ASSEMBLY

- G** 6. Repeat step 5 for the end of the CPK cross arm

Repeat steps 2 thru 6 for and assemble the second cross arm.

FINAL ASSEMBLY

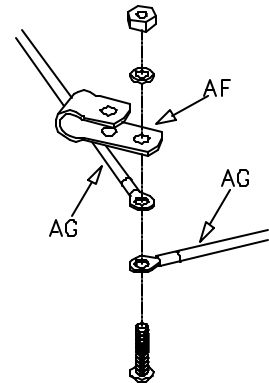
- G** 7. Place one u-bolt around the middle of tube (AA) as shown and pass the ends through the holes of reinforcing (AB) and tube (AC) of one of the cross arms. Secure finger tight with a lock washer and hex nut
- G** 8. Repeat step 7 with the remaining cross arm.



- G** 9. Position the cross arms so they are 90° to one another. Securely tighten the hex nuts on both cross arms.

NOTE: DO NOT OVER TIGHTEN THE U-BOLTS AS THEY WILL CUT INTO THE TUBING AND WEAKEN THE ASSEMBLY.

- G** 10. Place a wire clamp (AF) on the of each cross arm tube (AE). Secure each with 3/4" screw, lock washer and hex nut.
- G** 11. Place a plastic protective cap 3/8" over the end of each cross arm.
- G** 12. Insert a 3/4" screw through wire clamp (AF). Place the lugs from two spreader wires (AG) over the screw and secure with a lock washer and hex nut.
- G** 13. Repeat step 12 for the remaining wire clamps.
- G** 14. Attach connector assembly (AH) around the top of tube (AA). Secure with a 1-1/4" screw, lock washer and hex nut.



Tighten any loose hardware but do NOT over tighten the u-bolts. The CPK is light enough to remain in place even in strong winds and you don't want to crush tube (AA). Allow a little slack in the connecting wire so that the cross arms remain straight and unbowed.

INSTALLATION CONSIDERATIONS

NOTE: DO NOT USE U-BOLTS TO ATTACH TUBE W/INSULATOR (A) TO A MAST, TOWER ETC. U-BOLTS WILL EVENTUALLY CUT INTO THE TUBING AND WEAKEN THE INSTALLATION. If U-bolts must be used, place a larger diameter metal tube, such as the MPS Mounting Post Sleeve over tube w/insulator (A). Similar precautions should be observed when using TV style towers with locking bolts. Tube w/insulator (A) may be slid into a mast of suitable diameter, preferable up to the insulator. A hole may be drilled through the mast and tube w/insulator (A) to hold the two together.

INSTALLATION AND ADJUSTMENT

The HF6V/HF9V is sufficiently balanced that it may be manhandled into place over the rod insulator atop tube (AA) by one person of average height, even in a fairly stiff breeze.

- G** 1. Wiggle the antenna slightly until the holes in the lower tube can be aligned with the holes in the rod insulator, insert a screw from the antenna hardware and secure with a lock washer and hex nut

Hint: disconnect one or more of the clamps and attached wires from the counterpoise if you have to stand close to the antenna as it's raised or lowered.

- G** 2. Connect the wire from connector assembly (AH) to the screw securing tube (B) to the insulator on top of tube (AA). Secure with a lock washer and hex nut.

ADJUSTMENTS/MODIFICATIONS TO THE HF6V/HF9V FOR USE WITH CPK

Refer to CHECKOUT AND ADJUSTMENT found in the HF6V/HF9V instruction manuals. The following modifications may be useful in adjusting antenna tuning for operation with the CPK.

- G** 1. The short 75-ohm matching line that is packed with the antenna is not used. Store it away for possible future use, but remove the PL-258 double-female connector.
- G** 2. Connect the coil support tube 30 meter L bracket (O1) around the fourth turn of the 40 meter coil on coil assembly 80/40 meter (C).
- G** 3. The placement of the 12 meter circuit is not especially critical but it may be found that SWR at the lower heights (below about seven feet) can be improved by sliding the whole 12 meter unit to a higher position on the antenna.
- G** 4. Adjust tube (J) so that 24 in (61 cm) extends from the slotted end of tube (I).

With this setting, SWR will be lowest over the upper end of the 10 meter band. If operation over the lower 500 kHz of the band is contemplated attach the capacitive hat.

- G** 5. Using the adjustable compression clamp, attach the capacitance hat 12 in (30.5 cm) from the top of tube (E) on tube (F).
- G** 6. Starting 6 in (15.2 cm) from one end of the coax matching line, place ten marks spaced 37-43/64 in (95.8 cm). Coil the coax, lining up each mark until you have 9-1/2 turns. Using tape or cable ties, bind the coil in at least four places.

NOTE: The coax coil should not be held in a helical form like the 80 and 40 meter coils are.

ADJUSTMENTS/MODIFICATIONS TO THE HF6V/HF9V FOR USE WITH CPK

- G** 7. Connect the PL-259 at the end of the long lead to the SO-239 on the antenna.
- G** 8. Tape or otherwise secure the coil to the supporting mast in at two places and attach the PL-258 to the PL-259 at the other end of the cable.

A 50-ohm cable of any convenient length may be used past this point to connect the antenna to the station equipment.

FINAL TUNING AND ADJUSTMENT (REFER TO ANTENNA TUNING INSTRUCTIONS)

- G** 1. Feed a few watts into the antenna and note the SWR across the 80/75 meter band. If SWR is 1.5 or less at some point within the range, adjust the 80 meter circuit of the antenna for lowest SWR at the center of the usual operating range.

It is possible that even lower values of SWR can be attained by adding or removing a full or a half-turn from the coiled up matching line, but rely upon the antenna tuning to control frequency, as modifying the matching cable can affect matching on other bands.

- G** 2. Proceed, following the antenna tuning instructions for the other bands while noting the preliminary modifications as noted above.

PARTS LIST

A	00283SZV	TUBE AA CPK W/INSULATOR	1
A			
AC	00333SZV	TUBE AC CPK (INCLUDES REINFORCING TUBE AB)	2
AD	00291BAV	TUBE AD CPK	4
AE	00292BAV	TUBE AE CPK	4
	00289SZV	COAX	1
AH	00293RZV	CONNECTOR ASSEMBLY	1
	00301BAV	STRIP CAPACITANCE HAT	2
	00303SZV	WIRE PACKAGE	
A	00211RZV	WIRE	4
G			
	00288SZV	HARDWARE PACKAGE	
	00052JZV	1/4-20 X 1-1/8 X 2 U-BOLT 18-8	2
	00056JAV	1/4-20 HEX NUT 18-8 (7/16 X 7/32)	4
	00057JAV	1/4 SPLIT RING LW 18-8	4
	00077JZV	# 8-32 X 3/4 PHIL RND HD MS 18-8	12
	00078JZV	# 8-32 X 1 PHIL RND HD MS 18-8	5
	00079JZV	# 8-32 X 1-1/4 PHIL RND HD MS 18-8	4
	00080JZV	# 8 SPLIT RING LW 18-8	18
	00081JZV	# 8-32 HEX NUT 18-8 (11/32 X 1/8)	18
	00089FZV	PROTECTIVE CAP 0.375	3
	00195JZV	COMPRESSION CLAMP LARGE ADJUSTABLE	1
AF	00290BAV	WIRE CLAMP 0.375	4