



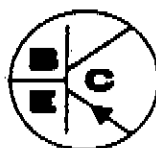
Instructions

Model HF5V-S

Butternut Electronics Co's Instruction Manual for:
Model HF5V-S — 1978

NOTE:

The HF5V-S Vertical antenna previously manufactured by Butternut Electronics Co. was discontinued in 1981. Parts are no longer available for these antennas. This instruction is made available as a reference.



BUTTERNUT ELECTRONICS CO.

ROUTE 1, LAKE CRYSTAL, MN 56055

ASSEMBLY AND INSTALLATION: MODEL HF5V-S

(August, 1978)

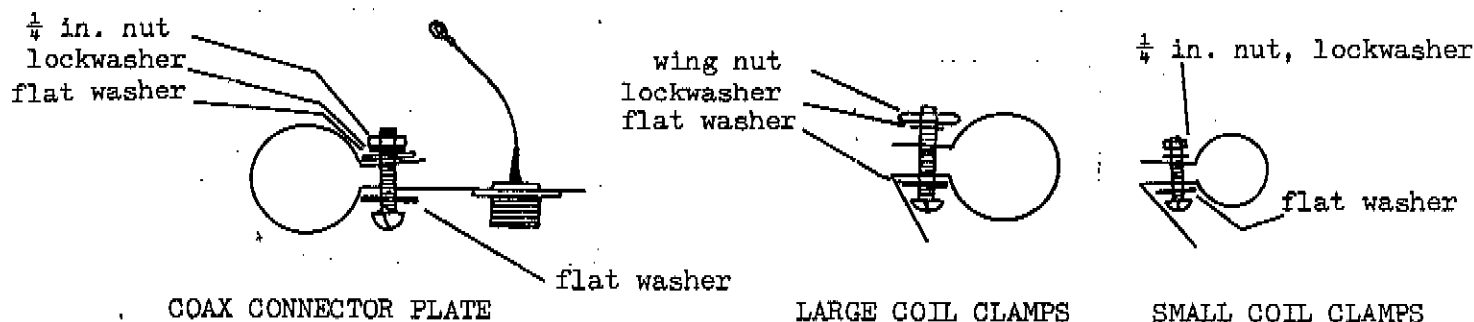
V100463Z—Page 2

During assembly and installation take care to avoid contacting power lines with the antenna. Do not mount the antenna in any location where it might blow into or fall upon power lines.

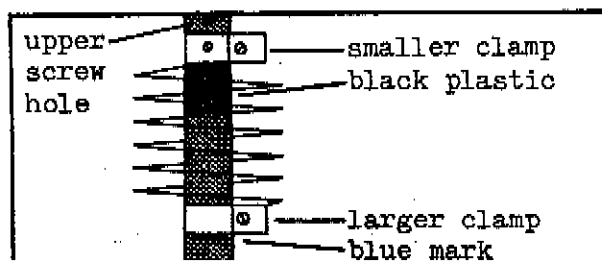
Tools recommended for assembly: standard blade screwdriver, 5/16 in. nutdriver, pliers, pocket knife.

Study the pictorial diagrams and proceed as follows:

1. Check to see that all parts are present. See the parts pictorial page.
2. Plant the mounting post (A) in a hole approximately 21 in. deep so that the upper end of the fiberglass insulator clears the ground by 5 or 6 in. Pack earth tightly around the tubing post to make sure that it remains vertical. Concrete is recommended for more strength. The post may be twisted slightly while the concrete is setting so that it may be removed easily at a later date, if desired. The post should not wobble in the hole. NOTE: Hammering the post into the ground may cause splintering of the fiberglass insulator. If the post must be hammered, protect the top with a block of wood.
3. Mount the coax connector plate (B) on post (A) by positioning (B) 1/4 in. above the screw in (A). The top of the plate should be even with the end of the aluminum tube. The plate should not extend over the fiberglass insulator. Secure with a 1/4 in. x 3/4 in. screw, two flat washers, a lockwasher, and a nut.



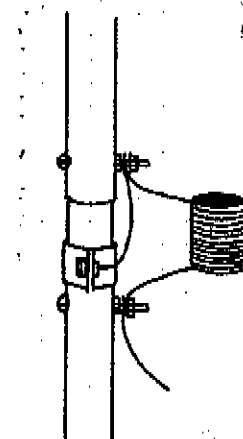
4. Note that the 80m resonator coil (D) has two clamps, one large and one small. Pass the top of (C) first through the larger clamp of (D), then through the smaller clamp. The larger clamp should be below the black plastic on (C).
5. Pass a 1/4 in. x 1 in. screw through a flat washer, then through the screw holes in the smaller clamp of (D). Line up the small screw hole in the curved part of the clamp with the lower screw hole in the top of (C). Tighten the 1/4 in. hardware, then put a #10-24 self tapping screw into the small hole and tighten, further securing the clamp to (C).
6. Pass a 1/4 in. x 1 in. screw through a flat washer, then through the holes in the larger clamp. Secure with a lock washer and a wing nut, but do not tighten, as the clamp will be moved in the next step.



HF5V-S page two

7. Slide the larger clamp of (D) down section (C) until the bottom of the clamp touches the blue mark on (C). Tighten the wing nut. This coil extension gives the preliminary 80m setting. Set assembly (C-D) aside.
8. Install the 40m resonator coil (F) on (E) in the same manner. Slide the larger clamp of (F) down section (E) until the bottom of the clamp touches the blue mark on (E). Tighten the wing nut. This gives the preliminary 40m setting.
9. Place one end of (G) over the top of (E). line up the screw holes and secure with a #10-24 self-tapping screw.
10. Place the large end of the 10m trap (H) over (G), line up the screw holes, and secure with a #10-24 self-tapping screw.
11. Place the end of (I) with the screw hole over the top of the 10m trap (H), line up the screw holes, and secure with a #10-24 self-tapping screw.
12. Place the large end of the 15m trap (K) over the end of (J) with the screw hole. Line up the screw holes and secure with a #10-24 self-tapping screw.
13. Place a large clamp (from the hardware packet) over the slotted end of (J). Telescope (J) over (I), adjusting the distance between the traps to 1 ft., 6 in. (Measure from the black plastic part of the traps.) Tighten the clamp.
14. Place the end of (L) with the screw hole into the top of the 15m trap (K), line up the screw holes, and secure with a #10-24 self-tapping screw.
15. Place a small clamp (from the hardware packet) over the slotted end of (L). Line up the screw holes in parts (M) and (N) and secure with a small self-tapping screw. Then telescope (M) into (L), adjusting the distance from the top of the 15m trap (K) to the top of the antenna to 6 ft., 11 in. and tighten the clamp. (Measure from the black plastic part of the trap.)

Detail: Steps 19 and 20.



The antenna will be raised in the next steps. WATCH OUT FOR POWER LINES!

NOTE: The entire antenna may be assembled before placing it on the mounting post, if desired.

16. Place the bottom of part (C) over the top of the mounting post (A). Line up the screw holes in (C) with those in the fiberglass insulator and secure with a 1-3/4 in. x #8 screw, a lockwasher, and a nut.
17. Raise sections (E-N) and place atop (C). Section (E) should slide over the top of (C). Line up the screw holes and secure with a # 10-24 self-tapping screw.

HF5V-S page three

18. Prepare the impedance matching/d.c. grounding coil (O). (See pictorial.)
19. Connect the wire from (B) and point 1 of coil (O) to the screw holding (C) onto the fiberglass. Be sure that the copper wire from (O) is between two flat washers. Secure with a lockwasher and nut.
20. Connect point 2 of coil (O) between two flat washers to the screw below the coax connector plate (B). Secure with a lockwasher and nut.
21. Connect point 3 of coil (O) to a ground rod. Radials, if used, may be connected to the same screw as point 2, to the ground rod, or soldered to point 3. The lead to the radial system should not be over 6 in. long. SEE RADIAL INFORMATION PAGE.
22. Feed the antenna with 50-53 ohm coaxial cable. Be sure that the transmitter is grounded/disconnected from the AC mains to avoid a possible shock hazard.

CHECKOUT AND ADJUSTMENT PROCEDURE: MODEL HF5V-S

The dimensions given should result in mid-band resonances on 15 and 20 meters, but some variation may be expected. Tuning on 40m and 80m is accomplished by adjusting the air-wound resonator coils. 10m is non-adjustable as resonance is very broad.

1. Determine the frequency of minimum SWR on 15 meters. To raise frequency, telescope the sliding sections between the 10m and 15m traps together. To lower frequency, slide them farther apart.
2. Determine the frequency of minimum SWR on 20 meters. To raise or lower frequency, adjust the total length of sections L-M-N by varying the amount of overlap between sections L and M a few inches at a time.
3. Determine the frequency of minimum SWR on 40 meters. Adjustment may be made by loosening the lower clamp of the 40m resonator coil and compressing or expanding the spacing between coil turns to lower or raise frequency, respectively. One half inch of travel will move f_r about 70 khz. When the proper setting has been found, tighten the clamp in place.
4. Determine the frequency of minimum SWR on 80 or 75 meters. Adjustment is made as in the previous step by repositioning the lower clamp on the 80/75 meter resonator coil. When the proper setting has been found, tighten the clamp and adjust the impedance matching coil at the base of the antenna by spreading the turns farther apart or squeezing them closer together until the SWR drops to a new minimum value. One adjustment of the impedance coil should suffice for operation over the band, provided that the necessary re-adjustments are made to the 80/75m resonator coil. In general, the 40m and 80/75m adjustments will not appreciably affect adjustments previously made for the 20m and 15m bands. If, however, the 80/75m tuning is readjusted for operation at a MUCH higher or lower frequency, it may be necessary to readjust the 40m tuning as in step 3 to maintain SWR of less than 2:1 at band edges.

Finally, it should be remembered that SWR will depend to some extent on losses in the ground connection and that low SWR readings do not necessarily mean that an antenna is operating efficiently.

HF5V-S page four

Note: Coil (0) is not strictly necessary for operation. If a better match on 80m is possible by removing the coil entirely, this may be done. A static discharge type of lightning arrestor should be used if the coil is not in place.

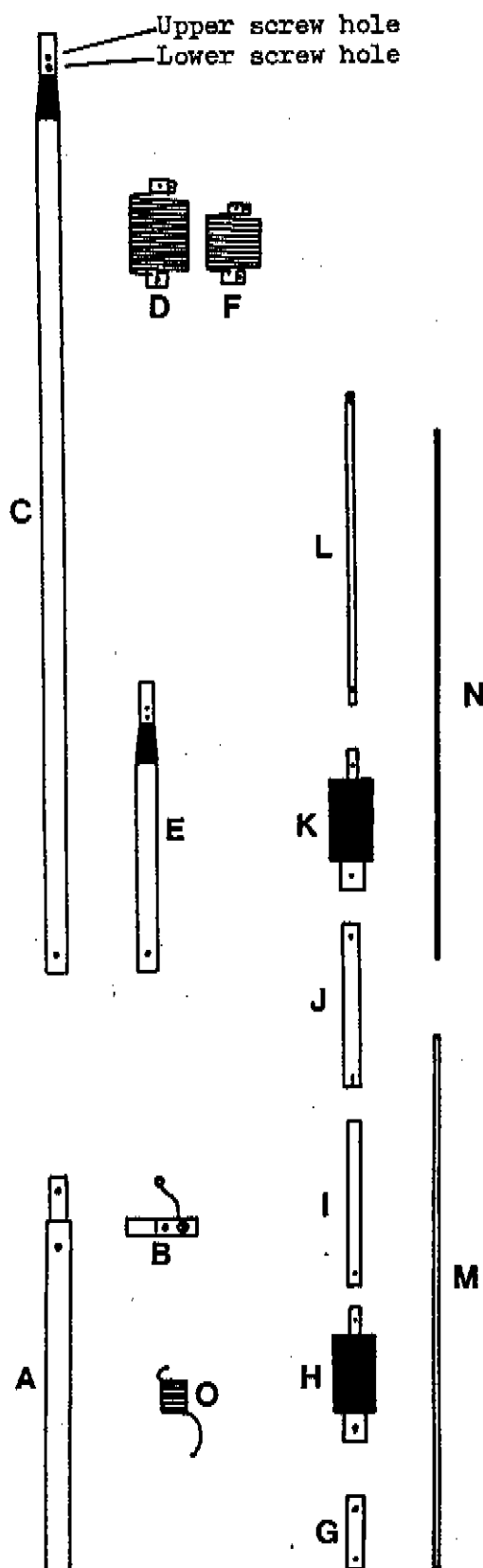
THEORY OF OPERATION

The HF5V-S operates as an electrical $1/4$ wave radiator on 10 and 15 meters using parallel-tuned decoupling traps. On 20 meters the entire antenna length is an active quarter-wave, resonated by the X_C of the 80/75 and 40 meter resonators and the X_L of the 10 and 15 meter traps. On 80/75 and 40 meters, the resonator circuits provide the X_L required for resonance, in series with the much smaller amounts of X_L introduced by the 10 and 15 meter traps.

SERVICE

In case of difficulty during installation or operation, please feel free to write or call for assistance.

HF5V-S PARTS PICTORIAL PAGE



PARTS LIST

- (A) Mounting post: 2 ft. x 1-1/8 in. tube with fiberglass insulator inserted.
- (B) Coax connector plate.
- (C) 80m resonator capacitor section: 5 1/2 ft.
- (D) 80m resonator coil: 16 turns.
- (E) 40m capacitor section: 1 ft., 8 in.
- (F) 40m resonator coil: 12 turns.
- (G) 6 in. x 1 in. tube with two screw holes.
TOP: screw hole 3/4 in. from end.
BOTTOM: screw hole 1-1/4 in. from end.
- (H) 10m trap.
- (I) 15 in. x 7/8 in. tube: screw hole at bottom.
- (J) 15 in. x 1 in. tube: bottom slotted.
- (K) 15m trap.
- (L) 2 ft. x 5/8 in. tube: top slotted.
- (M) 3 ft. x 1/2 in. tube: screw hole at top.
- (N) 3 ft. x 3/8 in. tube: top closed.
- (O) Impedance matching/DC grounding coil.

HARDWARE PACKET 1:

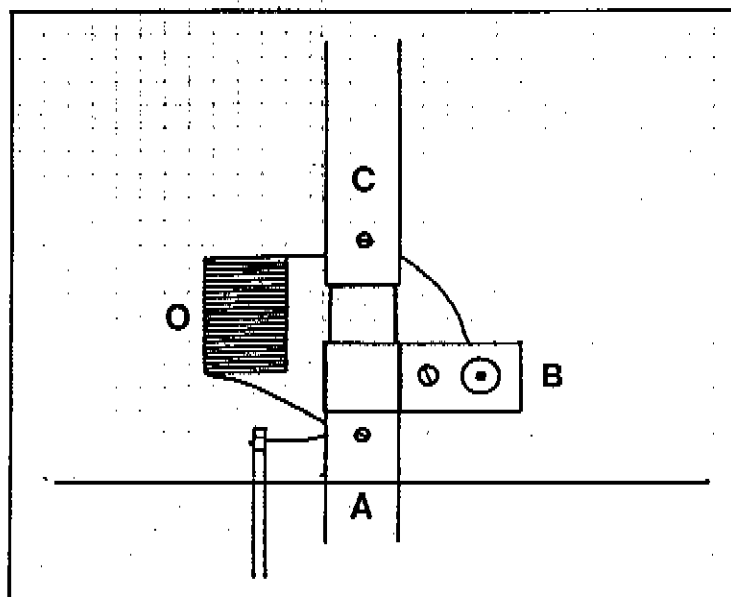
#8 hardware: 1 screw 1-3/4 in. long,
5 flat washers, 3 nuts, 3 lockwashers.
Self-tapping screws: 8 of #10-24, 1
#6 (small screw).
Clamps: 1 1 in. clamp, 1 5/8 in. clamp.

HARDWARE PACKET 2

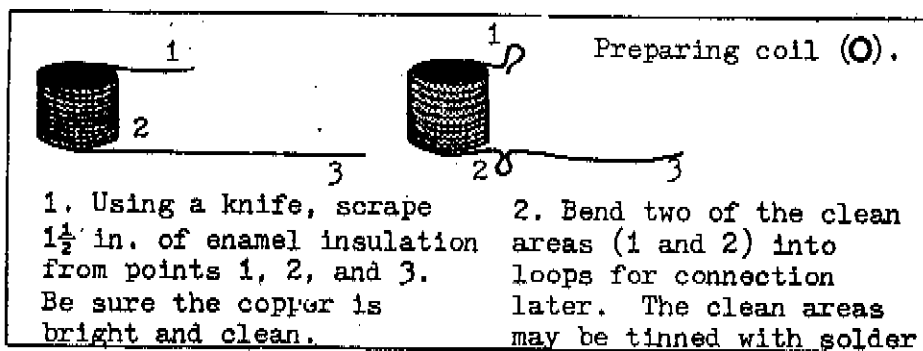
1/4 in. hardware: 1 3/4 in. screw, 4
1 in. screw, 3 nuts, 2 wing nuts, 6
flat washers, 5 lockwashers.

Route 1, Lk. Crystal, MN. 56055

Model HF5V-S



Remember that the transmitter chassis will be connected to the braid of the coaxial feedline. A good earth ground to the transmitter chassis will reduce the danger of shock when making adjustments at the antenna.



Warranty: Butternut will repair or replace defective parts for a period of 90 days following the date of purchase. Defective parts, if returned for repair or replacement, must be sent to the factory. The purchaser bears the cost of shipping to the factory; we pay the return shipping.

