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Assembly and Maintenance Instructions for the NICKEL-CADMIUM RECEIVER BATTERY PACKS



DESCRIPTION

Each receiver battery pack consists of four series-connected cells, providing a nominal output of 4.8 volts DC, center-tapped at 2.4 volts. All units are encased in plastic housings. An OFF-ON switch is installed in the battery lead to switch both the positive and negative leads.

Two basic plug configurations are available: a standard 4-pin Brunner-type, and a smaller 4-pin Multi-con type (used with the Cannon Super-Flite system). In addition, an external charge receptacle is available (standard with Super-Flite), and allows charging of the receiver battery pack without disconnecting the battery.

MODELS COVERED

Instructions for the following models are included herein:

Model	Cell Type	Case Type	Size
T520-P500	Button	Cylindrical	1-1/2 dia x 1-7/8" lg
D526-P225	Hi-charge Pencil	Oval	13/16 x 1-7/16 x 1-7/16"
E530-P500	Sintered Pencil	Square	1-1/4 sq. x 2-3/16" lg
S540-P500	Sintered Pencil	Flat	11/16 x 2-3/16 x 2-5/16"

All packs are rated at 500 mah, except for the D526-P225 (225 mah). 500 mah packs weigh 4.1 ounces, last 3 to 4 hours per charge. High-charge-rate 225 mah pack weighs 2.3 ounces, and provides 1-1/2 to 2 hours of flight operation (with four servos). No special charger is needed. Charge rate is 40-50 mills for all packs.

PARTS LIST

Check kit parts against the following list before starting assembly.

QTY	ITEM	PRICE (ea)
1	Battery case	\$ 1.75
1	Cannon label	.25
4	Batteries - (single cell)	2.50
	(4-cell pack)	10.00
	(4 button cells)	6.00
1	Grommet (3/16 or 1/4")	.05
1	DPDT switch	1.00
1	Switch plate and screws	.25
1	Switch cover	.35
1	Solder, .031 dia, 12" lg	.10 ft
1	3/32" shrink tubing, 4" lg	.50 ft
1	4-pin male plug	.75
1 ea	No. 26, 19-strand insulated wire in following lengths and colors: 16" red, white, black	.50 ft
	or	
1	Servo plug and cable assy, 20" lg (Type MCS-4 for Super-Flite)	1.75
1	External charge receptacle (Type S540-RR for Super-Flite)	1.50

PREPARATION FOR ASSEMBLY

a. Read these instructions and the General Assembly Instructions over thoroughly before starting battery assembly.

NOTE: Kits are warranted only for completeness of parts. No parts exchange will be made after the part has been installed or soldered on. In no case will exchange be made on claimed defects unless original parts are returned first.

Receiver Battery Packs

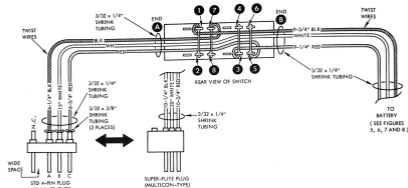


Figure 2. Switch and Plug Wiring

b. Choose a smooth, clean work area so parts are not easily lost.

c. The following tools are required:

1. Needlenose pliers, 4" long
2. Diagonal cutters, 4" long, flush-cutting
3. Wire strippers for No. 26 wire
4. Soldering iron, 30 to 47-1/2 watts
5. Pencil tip for soldering iron
6. Damp cellulose sponge for cleaning soldering iron
7. Rosin core solder, 60-40 type, .031 diameter (supplied in kit)
8. Cellulose tape

ASSEMBLING STANDARD SERVO CABLE

These instructions cover fabrication of the switch and cable assembly using the 4-pin Brunner-type plug.

1. Cut one wire each of the following lengths and colors from No. 26 insulated wire:

6-1/4" black	9-3/4" black
6-3/4" red	9-1/4" red
	15" white

2. Strip 1/8" insulation from both ends of all five wires. Tin wire ends.
3. Position switch as shown in figure 2. Slide the bare end of the 9-3/4" black wire through terminals ① and ②, and solder wire to both lugs. Be certain wire is connected to correct terminals.
4. In like manner, solder the 6-1/4" black wire to lugs ⑦ and ⑧.
5. Solder 9-1/4" red wire to lugs ③ and ④, and the 6-3/4" red wire to lugs ⑤ and ⑥.
6. Loop the 6-1/4" black wire around lug ⑦ as shown in figure 2, feed the wire under the soldered bars between lugs 1-2 and 7-8, and out end ⑨ of the switch.

7. Loop the other black wire around lug ①, under the soldered bars, and out end ⑩ of switch.
8. Repeat this process, first with the 6-3/4" red wire out end ⑨, then the other red wire out end ⑩.
9. Feed the white wire through the switch under the other wires. Adjust white wire position until ends are flush with other wires.
10. On each end of the switch, twist the three wires and slide them over the short cable extending from the switch. Do not shrink.
11. Cut two 1/4" sections of 3/32" shrink tubing and slide them over the short cable extending from the switch. Do not shrink.
12. Clamp 4-pin male plug in a small vise so that plug pins are held in the vise and plastic body sits flush on top of vise. Solder connections should be up.
13. Cut a 3/8" piece of 3/32" shrink tubing and slide it over the end of the 6-1/4" black wire only.
14. Insert .031" solder into cavity of pin "A" of plug (see figure 2). Apply tip of soldering iron to upper side of pin until solder melts and fills cavity. No overflow, please.
15. Insert end of 6-1/4" black wire into molten solder in cavity, then remove iron and allow to cool. Check that wire is securely soldered to pin. Caution: Do not overheat pin or plastic on plug may melt and pin may come out of seat.
16. Repeat above procedure and solder white wire and 6-3/4" red wire into pins "B" and "C" respectively of plug. Use 3/32" x 3/8" shrink tubing over each wire.
17. Slide the 3/8" tubing sections down until tubing covers the three plug pins fully. Apply heat and shrink the tubing tightly around wires and pins.
18. Position the 1/4" sections of shrink tubing on cable so that one fits as close to the switch and the other as close to the plug as possible. Shrink into place.

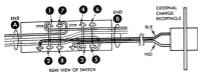


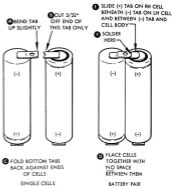
Figure 3. Charge Receptacle Installation

- 19. Install two 1/4" pieces of 3/32" shrink tubing over the longer switch cable. Shrink one tubing into place on cable as close to switch as possible. Locate and shrink the other tubing on cable end to fit battery being used (figures 5, 6, 7 or 8).
- 20. If external charge receptacle is used, connect as shown in figure 3. Be sure to route wires down center of switch and out end ⑧.
- 21. Clip protruding wire ends from switch lugs. Inspect switch connections carefully, then snap switch cover into position.

ASSEMBLING SUPER-FLITE CABLE

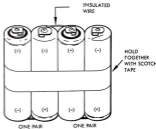
The following steps describe the method of fabricating the switch and cable assembly using the Multicon plug and the external charge receptacle. A prefabricated servo plug and cable assembly is furnished with Super-Flite servo kits. This cable must be wired to the switch and battery as follows:

- 22. If necessary, trim wires on cable end until all are the same length (20 inches). Then, cut a piece of black wire from the end of the servo cable exactly 9-3/4" long.
- 23. Cut a 9-1/4" piece of red wire from end of servo cable.
- 24. Strip 3/16" insulation from both ends of these two wires, and also from the ends of the red and black wires on the cable (total of 6 places). Tin wire ends.
- 25. Position switch as shown in figure 2. Slide 9-3/4" black wire through terminals ① and ②, and solder to both lugs. Be certain wire is fastened to correct terminals.
- 26. Slide end of 9-1/4" red wire through lugs ③ and ④. Solder both. Leave ends of both wires free.
- 27. On servo cable assembly, twist the unfinished portions of the red and black wires with the white wire to form a smooth, neat cable.
- 28. Cut two 1/4" sections of 3/32" shrink tubing and slide them over the cable. Do not shrink.
- 29. Working from end ① of switch (figure 2), slide the red, white and black wires on cable lengthwise through slot in switch. All wires must pass under the bars soldered between lugs 1-2 and 3-4, until red wire extends beyond end ⑧ of switch.
- 30. Bend end of cable red wire around and pass it through lugs ⑤ and ⑥. Solder to both lugs, taking extreme care that insulation on cable wires passing through switch slot is not heated or melted.
- 31. Pull on cable to remove wire slack. Red wire should bend tightly around lug ⑤.



SINGLE CELLS

BATTERY PAIR



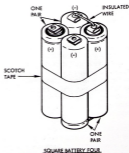
ONE PAIR

ONE PAIR

② MAKE 2 BATTERY PAIRS

③ TURN BOTH PAIRS UPSIDE DOWN, ADD JUMPER AND TAPE AS SHOWN.

FLAT BATTERY FOUR



SQUARE BATTERY FOUR

Figure 4. Making Battery Four-Cell Pack

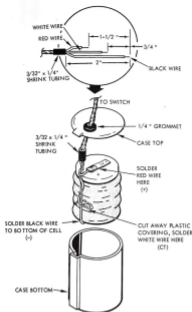


Figure 5. Battery Connections (T520-P500)

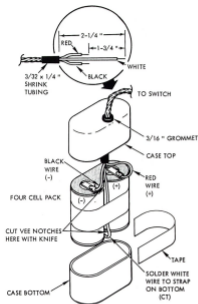


Figure 6. Battery Connections (D526-P225)

32. With needle-nose pliers, pull cable black wire out of slot, bend wire as shown in figure 2, pass it through lugs ① and ②, and solder in place. Be careful to avoid heat damage to insulation.
33. Bend 9-3/4" black wire around lug ①, slide it under the soldered bars as shown, and out through end ③ of the switch.
34. Likewise, slide 9-1/4" red wire around lug ②, under the bars, and out end ④ of switch. Dress wires as shown.
35. Twist the three wires from end ⑤ of switch to form a smooth, neat cable.
36. Cut white wire to same length as the other two wires. Strip 3/16" insulation from wire, and tin wire end.
37. Shrink the tubing into place on cable as shown in figures 2 and 9. Locate tubing on cable end to fit battery being used (figures 5, 6, 7 or 8).
38. If external charge receptacle is used, connect as shown in figure 3. Be sure to route wires down center of switch and out end ⑤.
39. Clip protruding wire ends from switch lugs. Inspect switch connections carefully, then snap switch cover into position.

BATTERY ASSEMBLY

T520-P500 and D526-P225 nickel-cadmium packs always come in welded fours, with no cell fabrication required. Batteries supplied with the E530-P500 and S540-P500 packs may consist of single cells, welded pairs of cells, or a welded pack of four cells.

Using batteries supplied, fabricate a four-cell pack, flat or square, as required. See figure 4 for assembly details. If no fabrication is needed, proceed directly to the steps of battery wiring.

BATTERY WIRING

Figures 5, 6, 7 and 8 illustrate how the four basic batteries are assembled and how the wires are connected. Procedures for assembly of all batteries are basically the same, as outlined below:

40. As mentioned in steps 19 and 37, be sure the shrink tubing on end of cable is spaced the correct distance from end of wires as shown in the illustration for the battery you are constructing. (See figure 5, 6, 7 or 8.)

Receiver Battery Packs

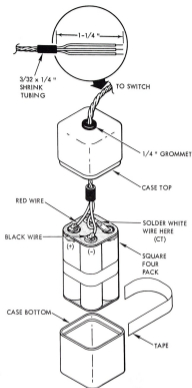


Figure 7. Battery Connections (E530-P500)

41. If necessary, cut wire lengths at cable end to match your battery requirement. Strip 3/16" insulation from wires cut, and tin wire ends.
42. Install proper size grommet in hole in case top.
43. On D526-225P pack, cut two "vee" notches in cardboard retainers as shown to permit proper routing of white wire.
44. On T520-P500 pack, use an X-acto knife to remove a small section of plastic from the side of the second cell from the bottom (minus end). This opening is to permit solder connection of white (CT) wire.
45. Slide cable through grommet in case top.
46. Solder red, black and white wires to batteries as shown in the related illustration. Be careful not to overheat cells, especially white wire

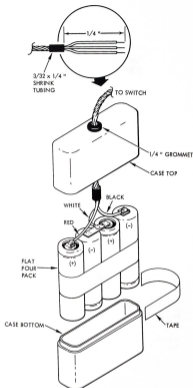


Figure 8. Battery Connections (S540-P500)

- attachment point to T520-P500 cells. Use of a rosin core solder flux at this point is recommended (or at any time when soldering directly to cells).
47. Double-check all solder connections, for good solder joints and correct wiring polarity.
48. Slide batteries into case bottom. On D526-P225, E530-P500 and S540-P500 batteries, slide case top into place. Use cellulose tape, preferably nylon filament type, around joint to hold case halves together.
49. On T520-P500, install case bottom, install a small piece of foam plastic on top of battery to prevent vertical movement, then install case top. Styrene cement is recommended to secure case top to case bottom. Clamp parts with rubber bands while cement dries.
50. Apply Cannon Label to side of pack.

Receiver Battery Packs

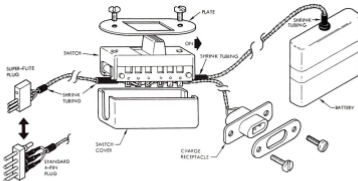


Figure 9. Complete Battery and Harness Assembly (S540-P500 shown)

- 51. With an appropriate charger, charge batteries initially for 24 hours (at 40-50 ma) before use. Check output voltages: Red - +4.8 to 5 volts, white - +2.4 to 2.5 volts, black - minus.

MAINTENANCE

Charge batteries overnight before each flying session. Operating life of battery depends primarily upon total current drawn from the battery during a flying session. Consequently, a system employing the maximum number of servos will provide a shorter operating life than when operating with fewer servos and lower overall current drain. Also, the fewer servo commands given, the longer the battery life.

Batteries are the major source of system problems, so they should be suspected first. Cells may be defective, open, shorted, or just worn out through long-time use.

Nominal cell voltage is 1.25 volts. On initial charge, this can run as high as 1.35 volts. When discharged, output (without load) will normally be 1.0 to 1.1 volts.

If battery problems are suspected, open the case, remove cells, and inspect very carefully for frayed or broken wires (at plug end also), poor solder connections, broken tabs, and visual cell defects such as dents or leaks, etc. Replace any cells which are physically damaged or show signs of leakage.

Note: If within warranty, do not try to replace individual cells in a welded pack, or your warranty is void. Instead, return entire cell pack to Cannon Electronics for replacement.

One bad cell can ruin the performance of the whole pack. The best way to locate a bad cell is to use the pack until system is non-operative, then open case and check voltage of each individual cell. Voltage on a bad cell will be considerably lower than on the others. In some cases, voltage polarity may be completely reversed. Replace any cells with low

voltage or reversed polarity.

In some cases a bad cell may not show up until a load is applied. One way to do this is to connect a low value resistor (5.6 to 10 ohms, 1/2 watt minimum) across the cell while checking voltage. The resistor will draw enough current to simulate a reasonable load and show up low voltage on a bad cell.

Don't expect nickel-cadmium batteries to last forever. After a couple of years use, keep a close check on battery condition. Replace at the first sign of malfunction.

Another word of caution: All nickel-cadmium batteries are not alike. Those supplied with our equipment are special-built, top-quality units. "Cheaper" available at your local electronic shop are most likely a different battery, and can not be expected to provide correct equipment operation or operational life.

ORDERING INFORMATION

On all parts orders under \$10.00, include .50 for cost of shipping and handling. Minimum order \$1.00 (+50). No C.O.D.'s.

REPAIR SERVICE

In event of trouble send unit direct to the factory, NOT to the dealer. Repairs are not priced for dealer discounts. Equipment will be serviced and returned within a few days. Be sure and include detailed information on the problem. After repair is completed, you will be notified regarding cost and shipping.

KITS ARE WARRANTED ONLY FOR COMPLETENESS OF PARTS. NO PARTS EXCHANGE WILL BE MADE AFTER THE PART HAS BEEN INSTALLED OR SOLDERED ON.

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