

INSTRUCTIONS FOR OPERATION
OF
MODEL APC & APM SERVO

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INSTRUCTIONS FOR OPERATION OF MODEL APC & APM SERVO

1. DESCRIPTION OF APC & APM SERVO

The CITIZEN-SHIP APC & APM Servos were designed for use with the CITIZEN-SHIP AP Series Proportional Control Systems, but may be used with any analog proportional system meeting the input voltage requirement.

The Model APC Servo is a feedback proportional actuator featuring small size, rugged construction, very low electrical noise, and linear output. Intended use is to move the control surfaces of a model aircraft, car, or boat upon command of an analog proportional receiver.

Input Voltage Requirement + and $\pm .65V$ for full travel
Total Output Arm Movement $5/8''$ Linear
Battery Requirement Two 4.8 to 6 Volt supplies, center tapped

The Model APM Servo was designed to give trimmable (not proportional) motor control from the CITIZEN-SHIP AP Series Proportional System. This means that the servo is not supplied with a continuous input signal and moves only when a motor control signal is received. A short signal (blip) moves the servo a very short distance while a longer signal of approximately 1 second gives full travel. Positive input voltage runs servo to one end, negative to the other. See Figure 6.

In the CITIZEN-SHIP AP System, this positive or negative voltage is obtained from a pulse omission detector.

Input Voltage Requirement + and $\pm .75$ to 3 Volts
Total Output Arm Movement $5/8''$ Linear
Battery Requirements One 4.8 to 6 Volt Supply center tapped

2. MOUNTING AND OUTPUT ATTACHMENT

These Servos can be mounted to a plywood board on either the large back surface or the narrow edge by moving the flat Tinnerman nuts to whichever surface is desired. The furnished 4-40 X $1/4''$ Machine Screws are then inserted through holes in the plywood and then into the Tinnerman nuts. (See Mounting Template). If the Servo is mounted on its large back surface, the plywood must be recessed or have holes drilled to clear the screw heads in the case bottom as shown on the Mounting Template. An alternate method is to use spacers between the Servo case and the plywood to raise the Servo above the surface of the plywood.

Attachment to the output arm can be accomplished by use of adjustable Clevis links sold at hobby shops, or by $1/16''$ wire as shown in Figure 4. Hobby shops stock a device which replaces the $1/32$ wire in Figure 4 and eliminates soldering. Push rods should not be metal along their entire length. Wood or other insulating material should be used with wire ends.

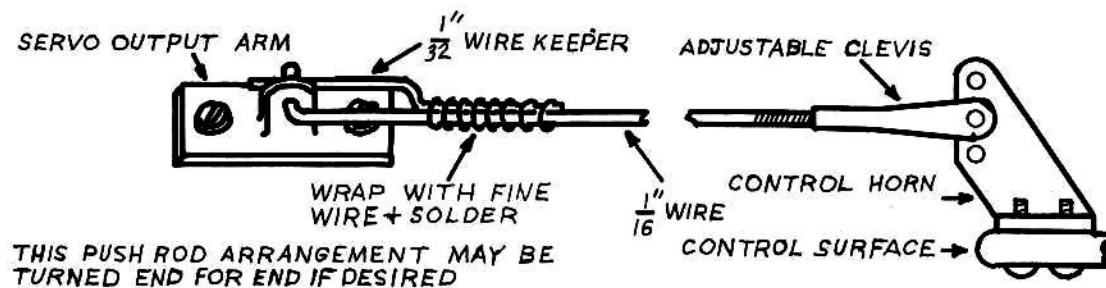


Figure 4

Limit switches are incorporated which cut the power to the motor before the servo reaches its mechanical limit of travel. The linkage must not prevent the servo from running to these limits. This difficulty is most often encountered on the throttle control linkage as the throttle has definite stops.

3. WIRING

If the Servos are used with CITIZEN-SHIP APR Receiver, refer to the wiring diagram (Figure 1) in the System Instructions. This diagram shows the complete system and indicates how the servos should be wired to connectors for use with the AP Printed Circuit Wiring Board. Soldering instructions for the connectors are also included in the System Instructions.

If the servos are not used with the APR Receiver, refer to Figure 5 for the battery hookup.

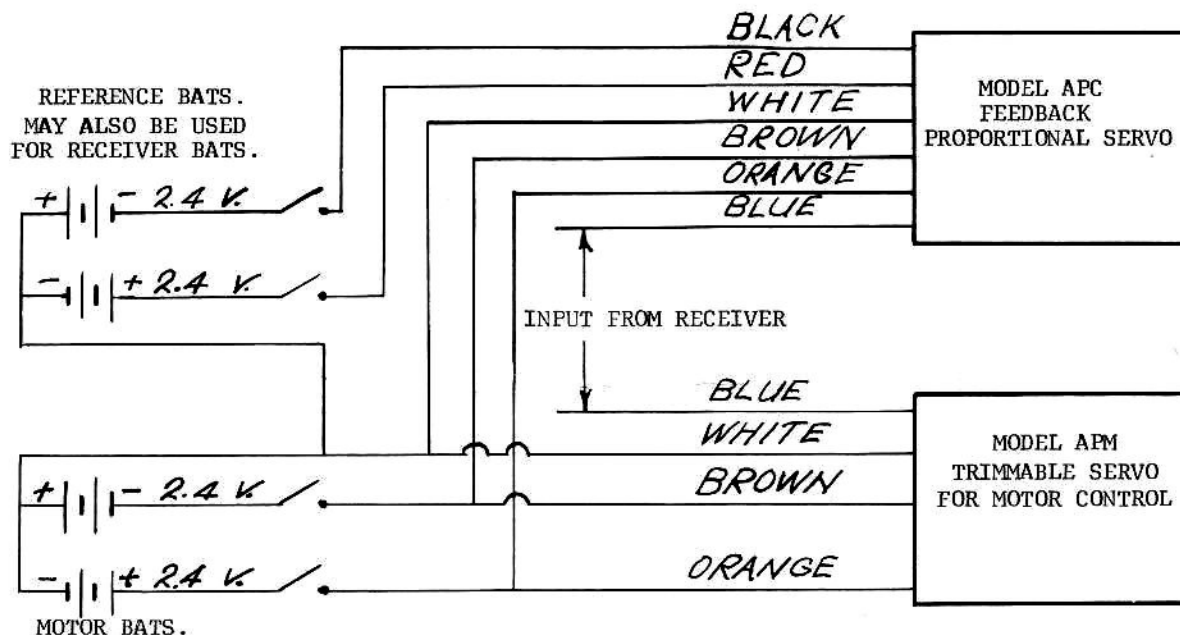


Figure 5

4. BATTERIES

Nicads are recommended although energizer pencils can be used. As the diagrams show, two center tapped power supplies are required for the APC Servos. Each of these consist of four 1.2 to 1.5 volt cells. One supply powers the motors and the other supply, called reference batteries, operate the front section of the servo amplifiers. The cells that power the motors should be 450 MAH rating or better, although 225 MAH cells can be substituted in small planes - but with reduced flying time between battery charges. With the CITIZEN-SHIP AP System, the Servo reference batteries also power the receiver, and cells of 450 MAH are recommended. Again, cells of 225 MAH rating can be used in light weight installations. If the Servos are used with a system in which the reference batteries power only the Servos, they can be even smaller. The APM Servo power is supplied only by the motor batteries.

5. ADDITIONAL INFORMATION

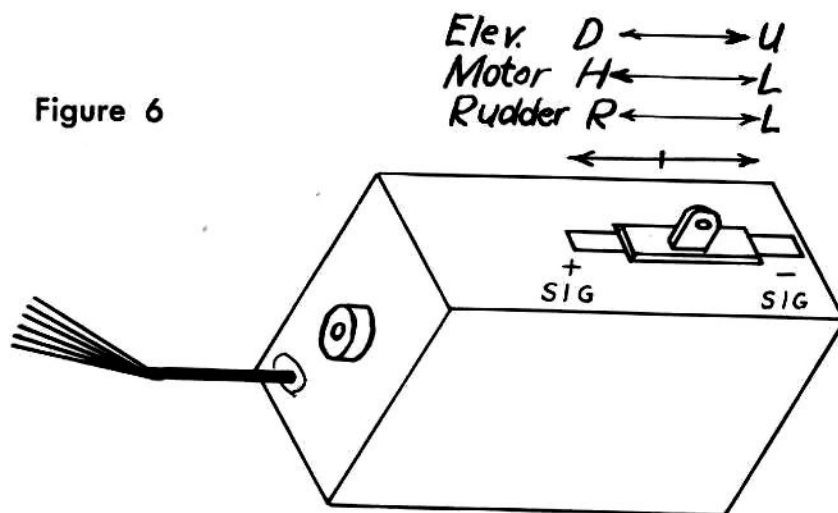
Care should be taken to prevent dirt, grit, balsa dust, or any foreign substance from entering the servo case, as erratic operation may result due to bad contact between the switcher plate or feedback potentiometer and the contact fingers.

Servos are skillfully constructed and carefully tested. If difficulty should be encountered, it is suggested that they be serviced only at the factory.

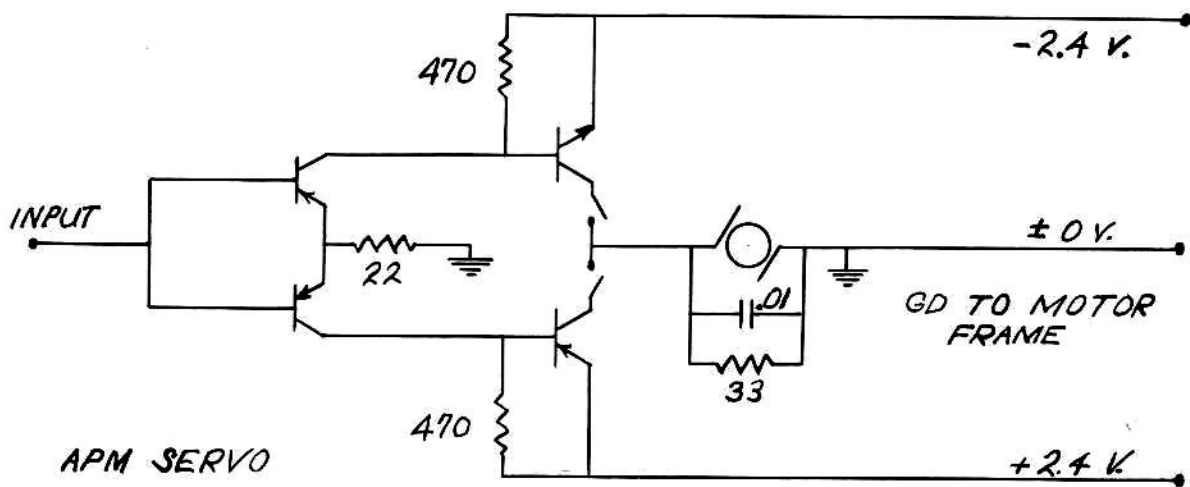
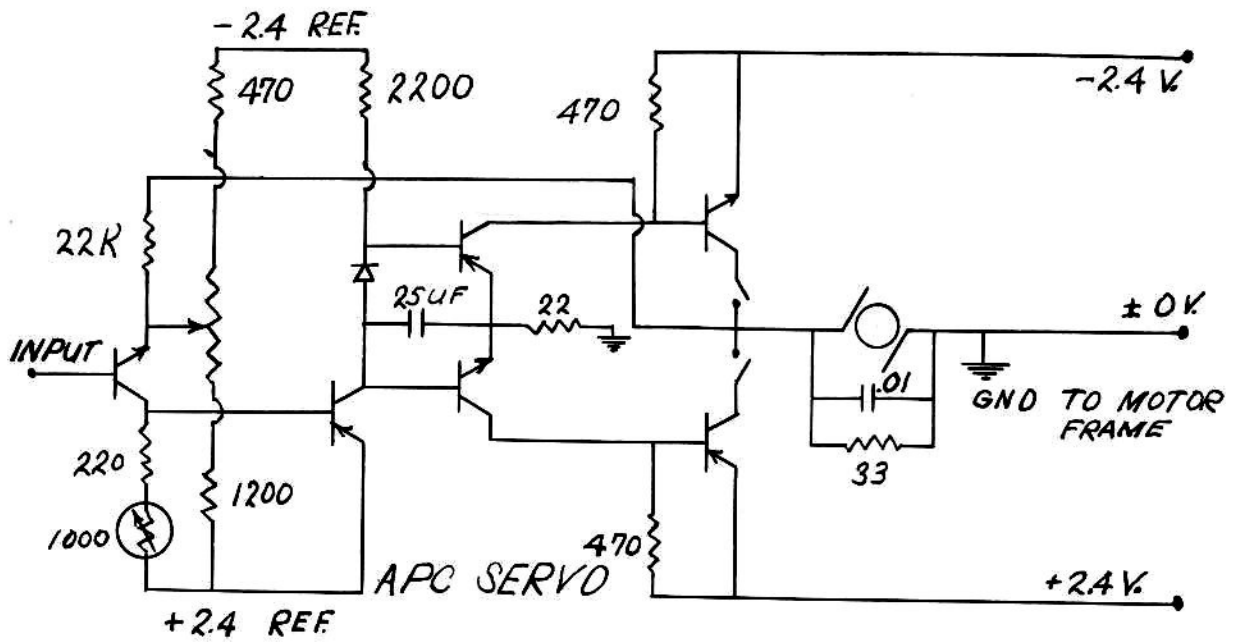
The amplifier board, limit switches, and carbon feedback potentiometer are assembled into one unit. This eliminates all interconnecting wires inside the Servo, preventing failures from wire breakage. The Servo direction of travel cannot be changed, so it is necessary to mount the Servos and control horns correctly to get the desired control direction from transmitter stick motion. Figure 3 (System Instructions), and Figure 6 show direction the servos move for various control functions.

The limit switch fingers and printed circuit tracts are factory lubricated with an electronic contact lubricant. The carbon feedback potentiometer should NOT be lubricated.

Care should be taken to keep the APR Receiver case from contacting servo cases, as the receiver case is grounded to +2.4 Volts and the servos are connected to Battery center tap. Touching of the two cases will short circuit the battery supply.



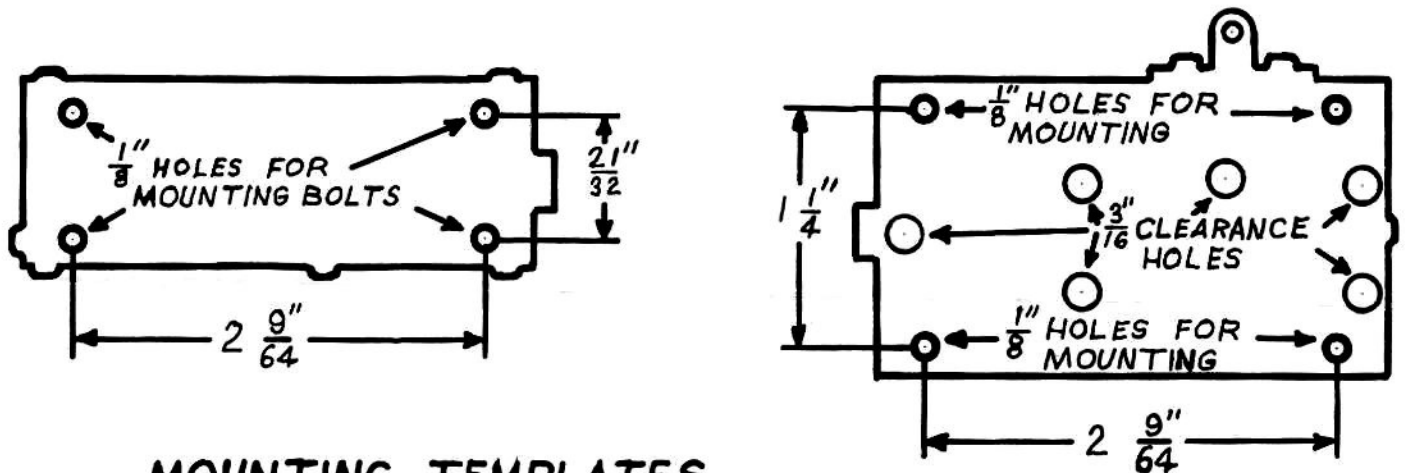
SERVO SCHEMATICS



WARRANTY

Your CITIZEN-SHIP APC and APM Servos are warranted by the manufacturer to be free from defects in material and workmanship. Any unit failing to operate within 30 days after date of purchase will be repaired or replaced free of charge upon being returned directly to the factory by the owner. DO NOT return the unit to the dealer for service. This warranty does not apply to failure of operation due to improper installing of connectors.

If, in our judgment, the equipment has been tampered with or received abusive treatment beyond that encountered in normal usage, this warranty does not apply.



MOUNTING TEMPLATES

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