INSTRUCTIONS FOR OPERATION

OF

CITIZEN-SHIP MODEL TCB AND TLB SERVOS

DESCRIPTION AND PURPOSE

CITIZEN-SHIP Actuator Model Numbers TCB and TLB are intended for use with multi-channel relayless reed-type receivers such as CITIZEN-SHIP ZR-10, RL-6, WR and BR-6. The amplifier is a new design that requires no bias battery, unlike competitive models requiring an extra cell. Also, there is no connection to the receiver battery, making this unit compatible with any relayless reed receiver regardless of the receiver voltage requirements.

This actuator is available in two models. The TCB features a cam action type of output motion which is relatively slow near neutral and progressively faster toward each end of travel. This allows very smooth flying, but still gives full control in a short period of time. This model is intended for use on aileron, elevator and rudder control.

Model TLB has linear (constant speed) output motion, and the travel time is slower, making it ideal for use on motor control and elevator trim. This type of output can also be used on the other controls if slow actuator motion is desired. Both models can be made trimmable (non self-neutralizing).

WARRANTY

The parts of your Servo are warranted by the manufacturer to be free from defects as shipped. The transistors have been tested and are known to be operating, and we cannot guarantee them against damage by incorrect voltages.

Any Servo failing to operate within thirty days after date of purchase will be repaired or replaced free of charge upon being returned to the factory. This warranty does not apply to failure of operation due to exhausted or improper batteries. Any defective unit should be returned to the factory, not to the dealer or distributor.

If your Servo is damaged in shipment, you should file a claim with the carrier immediately upon noting the damage.

This warranty does not apply if, in our judgement, the Servo has been tampered with or received abusive treatment beyond that encountered in normal usage.

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810 EAST 64TH STREET
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BATTERY REQUIREMENTS

Total battery requirement consists of four nicads or four pencells.

The current drain of these actuators, unlike most others, is moderate, allowing the use of ordinary pencells. However, energizer types, such as Eveready #1015, have greater life.

If nicad cells are used, they should have 450 MA.HR. rating or better, such as Eveready N46. See wiring diagram Figure 1. These 4 batteries alone power all of the actuators in the model.

Replace or recharge batteries when voltage of any one cell is down to 1.1 Volt with servo running.

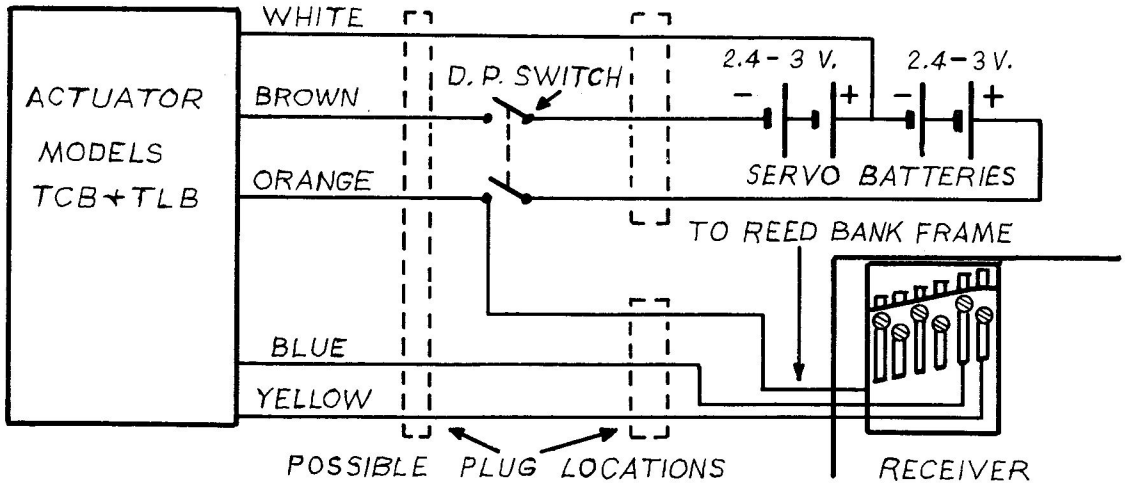


FIG.- 1

To reverse direction of actuator motion, interchange yellow and blue wire connections to reed wires. When the reed connected to the blue wire is vibrated, output arm moves toward the center of the case.

If Model TCB or TLB Actuators are to be used with CITIZEN-SHIP Receiver Models WR, XR, BR-6 and some ZR-10 and RL-6 Receivers, the receiver will need to be changed as is outlined in the receiver instructions under "Operation with other brand servos". This modification disconnects the reed bank frame from the receiver battery supply and adds the reed bank frame wire. Then proceed to hook up as shown in Figure 1.

RL-6 Receivers sold in combination with Model TCB and TLB Actuators will be properly wired when purchased, as will all RL-6 and ZR-10s shipped from the factory after introduction of the Model TCB and TLB Actuators.

MOUNTING AND OUTPUT ATTACHMENT

These Actuators 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 actuator 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 Actuator case and the plywood to raise the actuator 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 2.

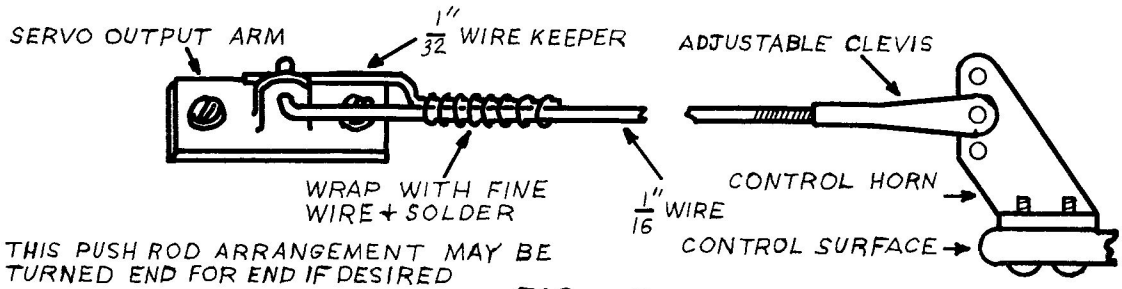


FIG.- 2

TRIMMABLE OPERATION

Either model can be made trimmable by removing the cover and cutting one printed circuit lead on the amplifier board at the place indicated by the arrow. (See Figure 3). Make the cut about 1/32" wide. If if is desired to use self-neutralizing operation again, the cut can be soldered across.

Trimmable operation allows the actuator to stop at any point along its travel and is used for motor control and elevator trim.

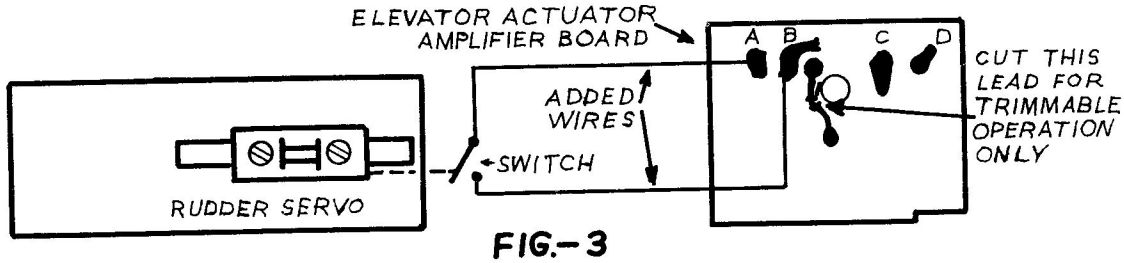


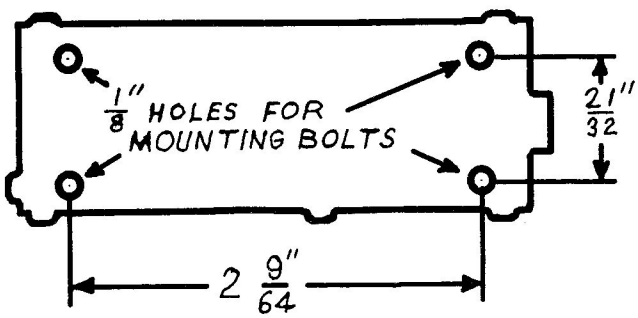
FIG.-3

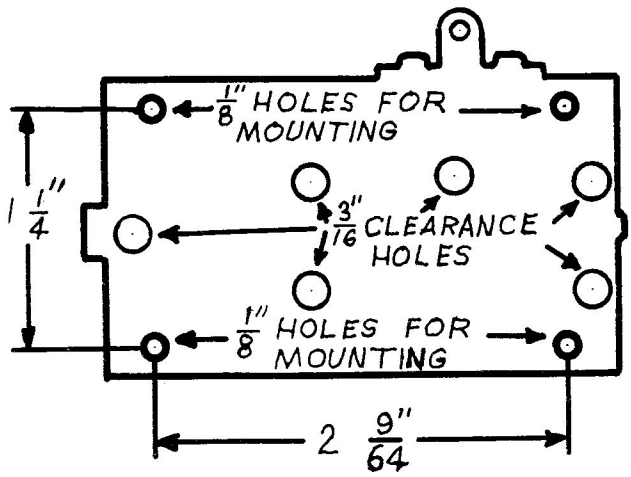
TRAVEL OPTION

Provision has been made on the switcher board to effectively speed up the operation of the actuator for those desiring faster response. Actually, the actuator moves at the same speed, but does not travel as far. The linkage between actuator and control surface is then arranged so that full control movement is obtained in a shorter length of time.

To make this change, proceed in the following manner: Remove cover. Remove the screw from the bottom of the actuator case that holds the motor. Melt the solder on both motor electrical contacts where they are soldered to the amplifier board and at the same time pull the motor out the end of the case. Remove two screws holding amplifier board and gently remove amplifier from case. (See Figure 5). Next cut two printed circuit leads on the switcher board at the arrows as shown in Figure 4. Reassemble actuator, being particularly careful not to bend the contact fingers. The actuator output arm will now only move about 3/4 of its normal travel in each direction.

FIG.-4





MOUNTING TEMPLATES

The travel option can also be used to obtain additional up-elevator for spins when rudder is held. This is only of value to contest flyers for consistently making true spins. The elevator actuator is modified as outlined above for reduced motion. In addition, two additional wires must be soldered to the amplifier board at "A" and "B", or "C" and "D". See Figure 3. Where to connect the wires depends on which direction the actuator output arm moves to give up-elevator.

These added wires are run outside the elevator actuator case to a switch or contact mounted on the rudder actuator as shown in Figure 3.

A Micro switch could be used for this purpose. The switch is arranged so that it is closed by the rudder actuator output arm at the extreme end of its travel. Closing the switch completes the circuit to the elevator actuator and it runs to its normal limits. Linkage is arranged so that the amount of up-elevator obtained with limited actuator travel is correct for loops and other maneuvers. Then the additional "up" will only be used for spins which use rudder with elevator.

OUTPUT CONVERSION

As was stated before, this actuator is available in two models. However, either can be converted to the other by rearranging parts. This is done by turning upside-down both the output gear and the rack and cam block. The fingers on the rack and cam block must be removed (by pushing out the eyelets) and reassembled on the opposite side. Note the relative position of the parts for the two types of output as shown in Figure 5.

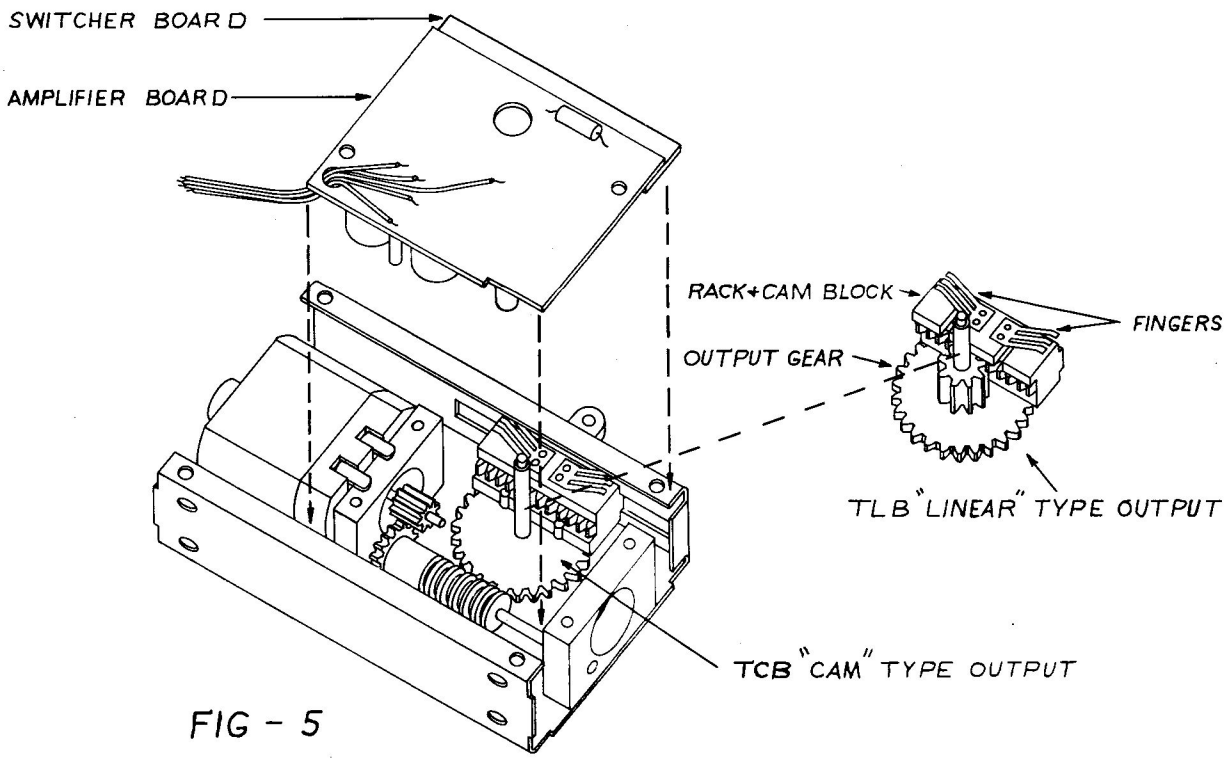


FIG - 5