

# ADAMS manufacturing co.

## BABY

Users' Instructions for  
Adams Proportional Magnetic Actuators

Protected by one or  
more of the following  
patents, other patents  
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2,771,572  
3,299,381  
3,304,526

ACE R/C, INC.  
Higginsville, Mo. 64037

NOW  
Manufactured By

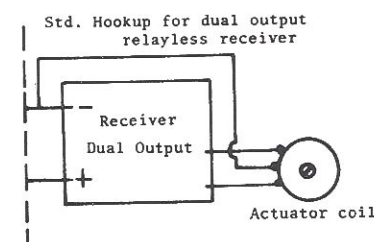
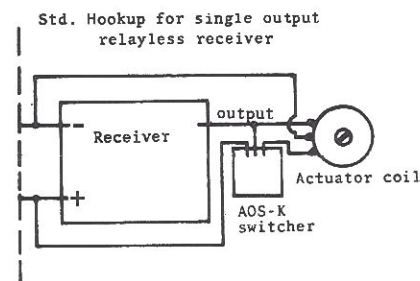
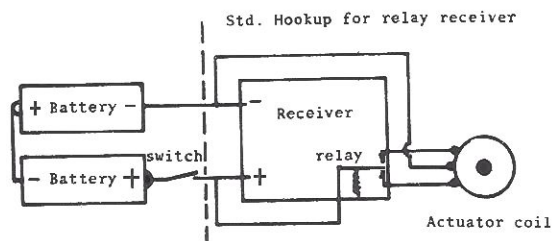
The dual coil winding in the coils of all models and configurations of Adams Actuators provide internally for rotation of the output shaft in both clockwise and counter-clockwise directions from one common battery supply. Relayless receivers of the dual output type will drive both coils of the actuator, and the receiver, actuator combination may be operated from a common battery supply. Relayless receivers of the single output type may be operated in the same manner by the simple addition of ACE R/C's Add On Switcher (AOS-K). Magnetic actuators of proper design, combined with solid state switching circuitry, represent the purest form of 'electrically and electro-mechanically quiet' control systems. There are no relays or motor brushes to cause interference in this type of system package which makes for very reliable operation.

Two coil configurations are available. C-LV is a low voltage coil designed for 2.4 to 3.6 volt operation, nicads only, in either the single or twin rotor actuator. C-HV is a higher voltage coil designed for operation at 3.0 to 7.2 volts using either zinc carbon or nicad cells. Nicads, though higher in initial cost, are the least expensive in the long run since they are rechargeable and are the most reliable by far. Zinc carbon cells may be used but the voltage potential starts dropping as soon as the load is applied. At higher drains they may well drop below a safe operating level for the actuator in a very short time. Voltage applied to the system may be at full potential, but there is a drop across the switching transistors, usually .2 to .4 volts, so apply enough voltage to begin with to make up for the voltage drop and get enough to the actuator for reliable operation. Both the single and the twin actuator are voltage sensitive in the respect that undervoltage will fail to swing the rotor from one stop to the other. One sided, short arc pulsing is a sure indication of low voltage or too high a pulse rate. If the user wishes to forego the full 35° to 45° travel either side of neutral and restrict rotation to about 10° each side, the units may be operated at lower voltage but with a resultant lower torque output for smaller and lighter airplanes. In like manner, over-excitation of the actuator with higher voltages will result in more torque and more potential travel either side of neutral before reaching a 'point of no return'. The tables give weights of equipment, battery recommendations, and stalled and pulsed drain for given voltages. This permits the user to choose equipment and design his package before starting actual construction.

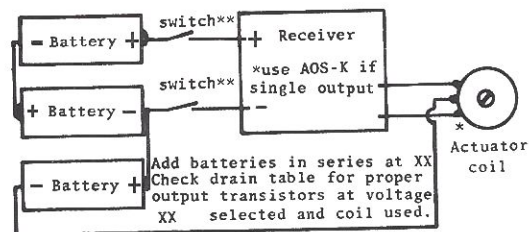
Coils C-LV and C-HV are interchangeable in either the single or twin actuator. Simply remove the through bolt holding the whole assembly together, slip out the installed coil, insert the new coil and replace the through bolt. Tighten the through bolt quite firmly to get complete closure of the magnetic circuit. On reassembly, the nylon tube torque link between the two rotors of the twin actuator may be replaced with the new molded plastic torque link provided. This will provide a direct hookup to a push rod when the actuator is properly mounted in the airplane per the installation drawings. In torque rod installations, mechanical stops may be built in by epoxying a small rubber servo grommet at the middle of the nylon tube torque link so it will bump into the nylon coil headers at either extreme of travel. Do not use the molded torque link when operating in 'torque rod' configuration as it may flop over on its side and limit rotation or even jam the actuator unless the link is stabilized by attachment to a push rod.

The inductive kick from the actuator coil may be used to good advantage as a signal to a rate sensitive detector circuit for operation of auxiliary controls such as sequence motor control. ACE R/C kits this circuit, their designation is HPR.

The Testor Radio Control system package uses the 2R-LV actuator. Extra actuators may be purchased from your dealer for installation in spare airplanes into which the Testor receiver, battery module may be wired. Specify Adams #2R-LV.

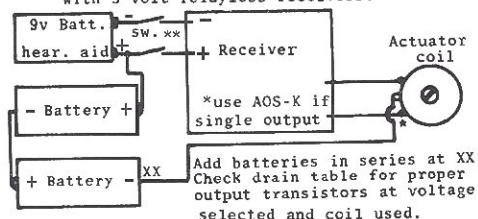


Over excitation hookup for more output torque

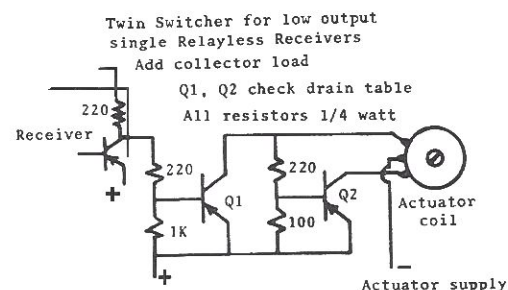


\*\*Note: Two switches are necessary in any hookup where a tapped batt. supply or separate batt. supplies are used.

Under excitation hookup for use with 9 volt relayless receivers.



\*\*Note: Two switches are necessary



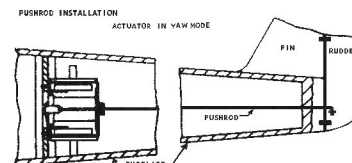
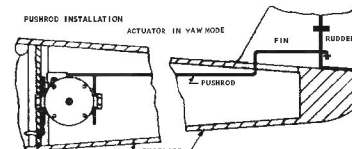
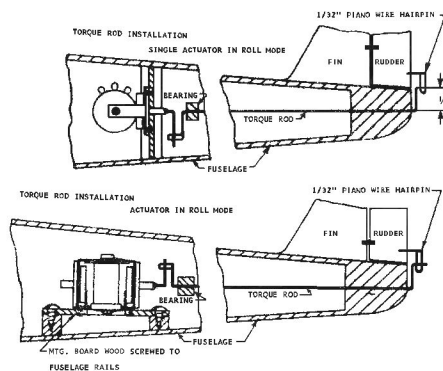
# SUPPLEMENTARY INFORMATION FOR THE ADAMS BABY ACTUATOR

The Adams Baby Actuator is a miniaturized version of the standard low voltage single rotor actuator which has been on the market for the last three years. It is expressly designed for use in the ultra small, ultra light .01 and .02 size radio control aircraft. The 'Baby' weighs 9/16 oz. and is designed to operate at 2.4 volts furnished by .225 nicads of the Deac button cell type. When used with the Testor Superhet receiver and the above batteries, the flying weight of the equipment is approximately 2-5/8 oz. with an operation time of 1 1/2 hours per charge on the nicads. In areas where super regen receivers are practical, the Ace K3V or the Controaire 5 with the Ace Add on Switcher work very well at 2.4 volts to make a slightly smaller and lighter equipment package. Pencil cells at 3.0 volts have proved very unsatisfactory. Only nicads should be used.

The Actuator should be firmly mounted to a 1/16" plywood bulkhead. Use button and carpet thread to sew it to the wood through the holes in the brass eyelets of the actuator and through holes drilled in the wood directly outside the outer diameter of the actuator and in line with the brass eyelets. Liberally coat the sewed areas with glue for greater firmness in mounting. The output arm is bent in such a manner that the unit should be mounted in the airplane with the coil verticle and the arm pointing downward into the airplane. With the actuator mounted in this position, it is possible to install rails vertically in the sides of the fuselage to permit the mounting board to be slid in and out from the top, thus making it possible to use the actuator in more than one airplane. A three pin segment of a Deans male connector may be soldered to three wires and attached to the three lugs of the coil to facilitate plugging into the three output wires of a dual output receiver (Testor) or into the output wires of a single output receiver with Ace Add on Switcher (see wiring diagrams).

Torque rod installation is necessary (per diagram) to get the most out of the available torque of the unit. Push rod installations have a tendency to pulse unevenly and overload the 'Baby Actuator'. The white dot on the rotor lines up with the white dot on the red bearing for neutral. Rotation of the rotor should be restricted with stops, either at the actuator or at the rudder, to prevent the rotor from rotating more than 35° each side of neutral. Too high a pulse rate will cause uneven pulsing or galloping of the rudder. The pulse rate should be as slow as practical for the best proportional control response. Rate should be just high enough to prevent the airplane from yawing back and forth with each rudder movement in flight. .045" music wire has been used for a torque rod in most installations tested. When using Superhet receivers, make sure to insulate all metal parts from each other to prevent interference with the receiver operation. This is best accomplished by putting a small piece of shrink tubing or similar thin walled plastic tubing on the output arm of the actuator and on the output crank of the torque rod at the rudder end. Super regen receiver are not as susceptible to metal to metal electrical noise so the insulation may be eliminated.

It is extremely important that every part of the control system be free moving in order to use all the output torque of the actuator. Nylon or dacron thread may be used for sewn, figure 8 hinges on the rudder. The torque rod must be free to rotate in its front and rear bearings and must not drag on any of the internal structure of the fuselage. Make sure that the actuator shaft is aligned with the center of the torque rod and that there is no bind or tightness where the output arm slips into the loop on the torque rod. Also make sure that the hairpin on the rudder is open enough to prevent any drag on the output crank of the torque rod.



PARTIAL EQUIPMENT TABLE

Unit	Weight	Description
Testor 2510 Complete	6 oz.	Relayless, Super Het, dual output with nicads & actuator.
C'Aire SH100 Relayless	1.12 oz.	Super Het, single output, use ACE AOS-K switcher
Cit'ship SSH Relayless	1.12 oz.	Super Het, single output, use ACE AOS-K switcher
F & M Pioneer Relayless	1.12 oz.	Super Het, single output, use ACE AOS-K switcher
ACE AOS-K Switcher	Less than .25 oz.	Circuit to convert single output to dual.
ACE HPR	Approx. .50 oz.	Rate detector for auxiliary control.
ADAMS 1R-HV	1.16 oz.	Actuator for 3.6 - 7.2 volt opp. 1/8A, 1/4A, 1/2A.
ADAMS 1R-LV	1.48 oz.	Actuator for 2.4 volt opp. thru 1/2A. May be used with Testor module for saving ax. 1/2 oz. less torque than 2R-LV
ADAMS 2R-HV	1.69 oz.	Actuator for 3.6 - 7.2 volt opp. 1/4A to .19
ADAMS 2R-LV	2.04 oz.	Actuator for 2.4 volt opp. for 1/4A to .15 - .19 (Direct substitute for Actuator in Testor 2510.) May also be used at 3.6 volt for larger ships, potential unknown at present. Use only 750 mah or, better yet, 1.2 ah cells. Use only with 500 mil or higher rated transistor for output. GC4008 or GE 4JX1c1132A, 2N1038, etc.
500 mah penceil nicad	0.846 oz.	For HV and LV actuators at prescribed voltage
600 mah penceil nicad	0.95 oz.	Ditto
750 mah cell nicad	1.16 oz.	For LV actuators at 3.6 volts
1.2 ah Sub C nicad	1.55 oz.	Ditto but longer flying time
Adams Baby	.563 oz.	Actuator for .01-.02 airplanes 2.4 volt opp. only

## Do's

- Do mount the actuator firmly as shown. Bed in glue, tie with button thread and glue thoroughly to 3/32" Ply Slide.
- Do make sure all linkage is free.
- Do use a light 25 to 40 watt soldering pencil. Use only ersin or rosin core solder.
- Do counter balance the weight of the push rod in push rod installations of the single actuator. Balance with ship nose down vertically.
- Do reverse the wiring to the outer two coil lugs if Transmitter right does not agree with Actuator right.
- Do strain relieve all wiring to prevent wire breakage from vibration.
- Do avoid metal to metal contact in linkage, causes interference in Super Hets, not in Super Regens.

## Don'ts

- Don't use an instant heat solder gun on or near the actuator. The AC field will kill the magnetic rotor.
- Don't use too much heat in soldering to the output arm. Bearing damage can result.
- Don't use a lot of heat soldering to coil lugs. Nylon header will melt.
- Don't use acid core solder.
- Don't apply more than 3.6 volts to the 1V coil. Magnetic circuit is saturated at 3.6. More voltage and current will give you nothing.
- Don't leave dirt on rotors of actuator. Small particles of metal, filing, and dust will short the magnetic circuit. Blow off with air or pick off with masking tape or type cleaner of the putty type.

ACTUATOR MOUNTING BOARD LAYOUT

