ADAMS MAGNETIC ACTUATORS

[✓]	No. 14K15—Adams Baby Actuator	7.95
[ ]	No. 14K58—Adams Baby Twin Actuator	10.95
[ ]	No. 14K173—Adams Standard Single Actuator (1RLV)	7.95
[ ]	No. 14K121—Adams Stomper Twin Actuator (2RLV)	10.95
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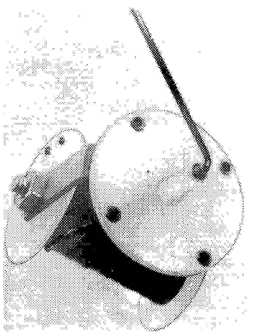


PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS: 2,771,572; 3,299,381; 3,304,526. OTHER PATENTS PENDING.

I. OPERATIONAL CONCEPTS

Adams Magnetic Actuators offer the greatest versatility of any of the simple rudder actuating devices. They weigh much less than any comparable gear. Being electro-mechanical, they have only one moving part, and "noise"-free. Easy to install and maintain. No electronics to burn out. The design has evolved so that they are probably the most rugged of any device used for moving your airborne surfaces.

The Adams Magnetic Actuators are designed for simple channel, rudder-only, pulse proportional. Two coils are wound together and provide for clockwise and counterwise rotation of the magnetic rotor which, in turn, through the crank, activates the rudder of the aircraft, boat or car.

This rotation occurs when current flows through either of the coils--one direction when it is through one coil and in the opposite direction when it is through the other coil. When hooked up properly, the actuator will bang back and forth from right to left as the transmitter sends a pulsing tone--on and off--to the receiver. Current flows through one coil when the tone is on, and through the other coil when the tone is off. If the tone is on as long as it is off (50/50 width ratio), then the actuator moves equally to the left and to the right, and gives an effective neutral. This should occur when the transmitter stick is in the neutral position. As the transmitter stick is moved to the right or left, this pulse width of 50/50 will vary and thus cause the actuator to drive more in the right or left position, and results in turning the aircraft.

To get the fullest control from your actuator, this pulse width should vary from 5% on/95% off to 95% on/5% off when the control stick is in the extreme left and right positions.

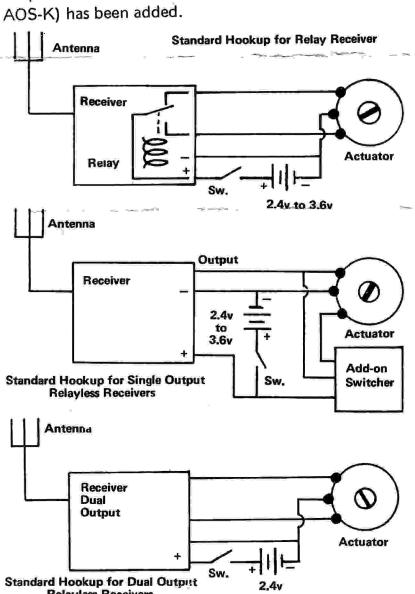
Adjustment may be necessary if your transmitter is a Galloping Ghost transmitter. Check the manufacturer's instructions for adjustment procedures. Some GG transmitters do not have the facility for adjustment. In this case some flyers have used the GG transmitter successfully by using the control stick for straight flying and gentle turns; when a full turn is needed, the motor control push buttons are used to give full tone off or full tone on, thus causing the actuator to be full right or left. This may require repositioning of these full on and full off in the positions you require for left and right.

The speed or rate that the pulsing occurs should be fast enough to cause the airplane to fly straight without "wagging". It should be slow enough to allow positive back and forth action of the actuator--this is approximately 3 to 4 pulses per second.

Some people are alarmed at the rudder banging back and forth, but this is nothing to worry about. This is the normal operation of the actuator and is inherent in the concept of pulse proportional with magnetic actuators. When properly adjusted, it doesn't affect the flight of the airplane and is soul satisfying to see and hear the rudder wagging, because you know the system is working properly. Also, if you fly in tall grass, you can't beat the banging as an aid to tracking your airplane by sound if you happen to land it a little far from yourself.

II. HOOKUP

The actuator has to receive almost full potential voltage of 2.4 or 3.6 in one coil when the receiver gets a tone, and the same in the other coil when the tone is off. To obtain this, you need either a double ended receiver (Ace Commander DE), a receiver with a relay, or a single output receiver to which a transistor switcher (Ace AOS-K) has been added.



The use of nickel cadmium rechargeable batteries is most highly recommended. Any other types have proven impractical because of the amount of current drain the actuators employ. While they have been used successfully, in most instances they have given problems because they do not have the capacity of the nickel cadmiums, and they require replacement quite frequently and therefore in the long run prove much more expensive.

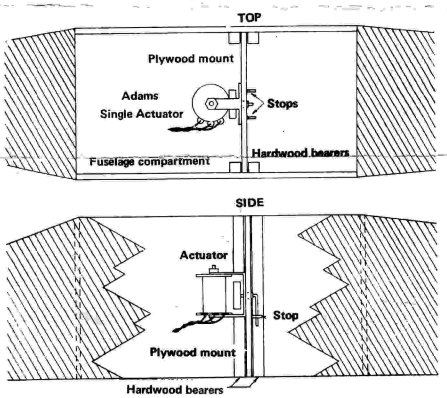
Be careful when soldering to the lugs on the actuator; excess heat will deform the Delrin header and possibly cause a contact to open. Also, never use a soldering gun--not only is this too large, but the magnetic field induced from the gun may ruin the actuator by demagnetizing the rotor.

Before installing the system in your airplane, hook everything up on the bench and make sure it works properly.

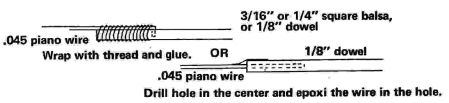
III. INSTALLATION

Care, patience, and planning must be used when installing your Adams actuator for best and trouble-free results.

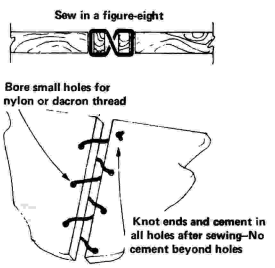
So it can be easily removed, the actuator may be mounted in the middle of or to the rear of the fuselage compartment on a 3/32" plywood plate that can slide in and out of the airplane by means of hardwood bearers.



Motion of the actuator is carried to the rudder by means of a torque rod. At the rudder the torque is converted to right-left movement by a yoke fastened to the rudder. The rod should be light and rigid; construction can be of small dowel or square balsa stock with .045 piano wire on the ends. The piano wire is fastened to the dowel or balsa by wrapping with heavy thread and glueing. In smaller aircraft, the torque rod may simply be a piece of .045 music wire if the length is only around 6-10".



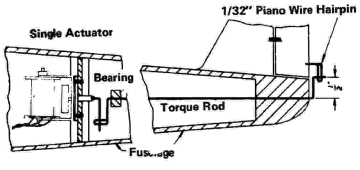
No bind or friction can occur in the system--the rudder must be hinged completely free, (see example)

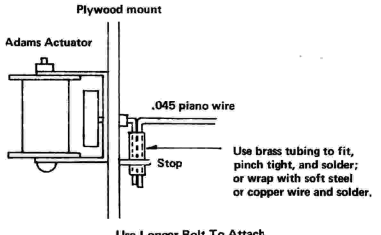


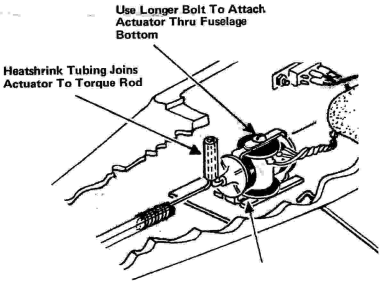
and the hook up between the actuator must work without friction. The actuator is designed to operate the rudder, not working at overcoming extraneous problems with the linkages.

Avoid any metal to metal contact to prevent the possibility of electrical noise. This may be done by covering the music wire with heat shrink tubing wherever contact is made.

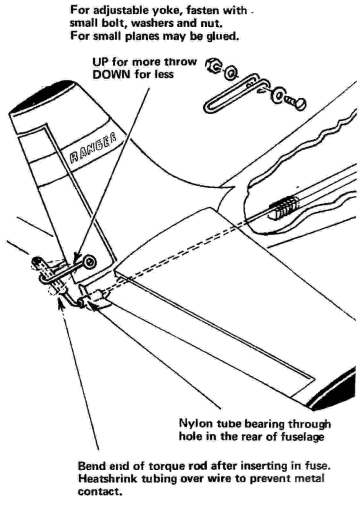
The following illustrates several methods of torque rod installations.

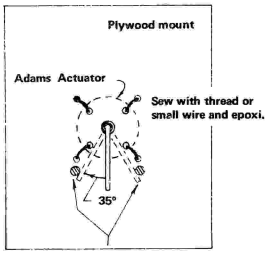






The torque rod is connected to the rudder by means of a yoke. A piece of small diameter music wire bent in a hairpin type U and fastened to the rudder by glue, or a bolt and nut, serves as an excellent yoke. A bolt and nut allows the amount of rudder throw to be adjustable by moving the yoke up and down. (See illustration) Make sure there is no bind when the torque rod rotates to the extreme limits. An alternate method would be to bend the torque rod itself into a hairpin U and have a straight piece of wire extending from the rudder.





Stops to limit the throw of the actuator to 35° on either side. Make out of small dowel and glue in hole drilled into the plywood mount. A round toothpick works well.

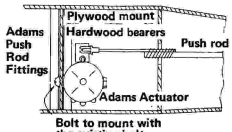
Stops to limit the throw of the actuator to 35 degrees--or less--on either side of center are absolutely necessary. These can be made out of small dowel and glued in holes drilled into the plywood mount. Round toothpicks work well also. The stops are necessary because unless they are used the actuator will "hunt" neutral, and give you all sorts of erratic operation. The stops are musts.

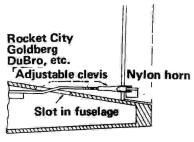
When the installation is complete, turn the system on and check for proper operation. The rudder should be banging back and forth equally right and left with no hesitation or bang-ups. Double check the freedom of the linkages--most problems occur here. (We must also mention again that the stops are absolutely essential)

If the rudder moves in the opposite direction than the one in which it is commanded, it is a simple matter to reverse the two outside leads on the actuator coil. This will then result in having the actuator and the stick movement coincide. If the rudder doesn't noticeably go to the right or left, when commanded, you probably do not have enough pulse width spread in your transmitter. Adjust transmitter according to the manufacturer's instructions.

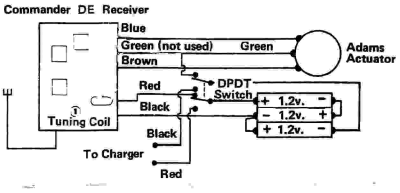
IV. SPECIAL NOTES

A. With the Stomper Twin a pushrod may be used if desired. Special fittings are furnished with each Stomper kit and are also available separately through Ace. These will facilitate the pushrod installation. The following drawings illustrate installation techniques:





B. If you want more push out of your actuator and can afford the weight of another nicad you can increase the voltage to the coils from 2.4 to 3.6, when using the Commander DE receiver and hooking it up as follows:



C. The following charts summarize the uses for the actuators and some do's and don'ts to follow are given when using these devices.

ADAMS ACTUATOR COMPARISON CHART

	Gram Wt.	Milliamp Drain 2.4 v	3.6 v	Size Less shaft	Recommended Use	Recommended Batteries (Nickel Cads)
Baby	17	110	*	1 x 1 1/8 x 3/4	.010-.020 & 36" Gliders	2 225 ma
Twin Baby	22	110	*	1 x 1 3/8 x 3/4	Hot .010-.020 & 54" Gliders	2 225 ma
Single Standard	29	220	330	1 1/4 x 1 3/8 x 1	.049 to .10	2 500 ma
Twin Stomper	43	220	330	1 1/4 x 1 3/4 x 1	Hot .049-.23	2 500 ma

* NOT RECOMMENDED FOR USE AT THESE VOLTAGES

NOTE: The batteries recommended are minimum capacity--size may be increased if weight is no problem, and more flying time per charge is desired. As listed, flying time is approximately 90 to 120 minutes per charge, with the batteries shown.

DO'S

Do mount the actuator firmly as shown. Bed in glue, tie with button thread and glue thoroughly to 3/32" Ply Slide. Or make sure that the bolt that is used is ample and that it is mounted in plywood.

Do make sure that all linkages are free.

Do use a light 25 to 40 watt soldering pencil. Do use ersin or rosin core solder.

Do use stops of 35 degress or less, either side of neutral.

Do reverse the wiring to the outer two coil lugs if the transmitter right does not agree with the actuator right.

Do strain relieve all wiring to prevent wire breakage from vibration.

Do avoid metal to metal contact in linkage which causes interference in superhet receivers and can't give glitches.

DON'TS

Don't use an instant heat solder gun on or near the actuator. The AC field will kill the magnetism in the rotor.

Don't use too much heat when soldering to the output arm. Bearing damage can result.

Don't use excessive heat when soldering to coil lugs. The header may melt.

Don't use acid core solder.

Don't apply more than 3.6 volts. The magnetic circuitry is completely saturated at 3.6 and more voltage will give you a higher current drain without any increase in power, and will gain you nothing.

Don't leave dirt on rotor(s) of the actuator. Small particles of metal, filings, and dust will short the magnetic circuit. Blow off with air or pick off with masking tape or type cleaner of the putty type.