

its hinge points, while gently guiding the push/pull cable into the elevator as it goes into place. While placing the elevator, it will be necessary to screw the cable into the 7/16" nut of the WD-415. Don't be concerned yet about how far to screw the cable into the nut of the WD-415. -- Note: there is no need for any other nuts or lock washers on the 7/16" threads of the cable. You just need to screw the cable into the nut of the WD-415 without a jamb nut. It will not move when installation is complete.-- For now, you may want to just pin the elevator with the hinge bolts without the nuts to make it easy to remove later.

The next step is to block the elevator into its neutral position while installing and adjusting the servo and cable length. You may easily do this by placing blocks of wood, on top and bottom of the elevator and the outboard end of the horizontal stabilizer. Lightly clamp the blocks sandwiching the elevator and horizontal stabilizer. Be careful to not deform the structure with the clamp.

Install one of the Special #10-32 cable clevis to the rear end of the cable, with the cable screwed into the clevis half way. Attach the clevis to the trim tab control horn with the clevis pin in place. It might be a good idea to also insert the cotter pin into the clevis pin to keep it from falling out while you are doing other things. Install the other Special #10-32 clevis end provided in this kit to the forward end of the cable. Again, the cable should be screwed half way into the clevis.

Find some scrap aluminum sheet .040 thick and make a 3 inch square piece which will be used to hold the servo. As per the MAC instructions, you may very carefully drill out the 4 mounting holes in the servo to a size no larger than that needed for a #6 screw. Drill out these 4 holes to accept a #6 screw by using a #29 drill bit. Center the servo on the 3" square piece and drill out the mounting holes through the aluminum using the servo and its mounting holes as a guide, with the #29 drill bit. Cut a scrap piece of angle aluminum .125 x 1 x 1 x 6. Note figure #1 in these instructions for the photo of the installation on how the pieces go together.

The MAC servo must now be put into its neutral position. Get the installation instructions that came with the servo and on the back page of the instructions you will find figure #2, showing how to connect the servo, LED position indicator, and rocker switch. Temporally connect these together as shown. Attach a small 12 volt battery to the circuit. The LED indicator will light up showing the current position of the servo. Run the servo to its exact center position indicated by the LEDs. Note: at the exact center of travel, the TWO centermost LEDs will be lit. The servo is now centered and in a neutral position.

Attach the servo to the 3 x 3 piece using the #6-32 x 3/8" screws and the 2 lock nuts in this kit. Attach the forward clevis, now attached to the cable, to the servo using the clevis pin. Hold the angle piece and the plate that is attached to the servo together and move them around on the deck to see where would be the best place to attach the angle to the deck. Make sure the cable has a straight line to avoid any binding. Mark the angle for the 2 mounting holes to hold it to the deck in a place that will bridge the lighting hole. Drill these 2 holes in the angle, for a #8 screw by using a #19 drill bit. Mark the bottom two holes in the servo and square mounting plate to the angle, remove and drill the bottom two holes through the angle using the plate as a guide. Attach the 2 #6-32 nut plates to the angle to hold the bottom of the servo. Screw the servo to the angle using the 2 #6-32 x 1/2" screws provided.

As a unit, move the servo, the mounting plate, and the angle to a point where you can again re-attach the clevis on the cable to the servo. Move the unit around to find the exact spot where the servo will be able to extend and retract without hitting anything and the cable will not bind up. Note that the brass screw going through the servo will move back and forth. Make sure this screw will not hit anything! Now, mark the 2 holes to be drilled in the deck through the angle piece. Drill these 2 holes, and install the 2 #8-32 nutplates. Attach the servo unit with its parts to the deck using 2 #8-32 x 1/2 screws. Find a good spot for attaching the Adel clamp around the cable to the web of the horizontal stabilizer rib. Drill the mounting hole for the #10-32 screw into the web. Dimple the nutplate

provided with this kit and also the nutplate mounting holes in the web. Pop rivet the nutplate to the web using countersunk poprivets. If necessary when installing the clamp, space the clamp out from the web with washers to maintain the cable as straight as possible. Note: Due to the geometry of the cable attachment in the elevator, there will be a very small amount of fore and aft travel (about 1/16-1/8") of the cable sheath. This is normal. Both my method of installation and Van's with the long manual cable do this. You must protect the cable sheath from this small movement everywhere the sheath touches anything. Also, you must NOT tighten the Adel clamp down tight against the cable sheath, but rather allow the cable sheath to move fore and aft through the cushioned clamp. It will be a good idea to inspect these points for excess wear during you annual inspections. You may now re-attach the wires to the servo and run the trim tab to make sure there is no binding and you get good motion to the trim tab.

You will now want to attach the long MAC multiconductor wire to the servo and route to the front of your aircraft and attach to the switches of your choice. Note: It is my opinion that there is no need to install a servo variable speed control to you system. You will get use to the speed of the servo and adjust to it. If, when flying, you still think it necessary, it can be added later.

Enjoy the ease of use of your electric trim system.

Please tell others about this kit. Check out the other products provided by Gretz Aero on our webpage. Note the address below.

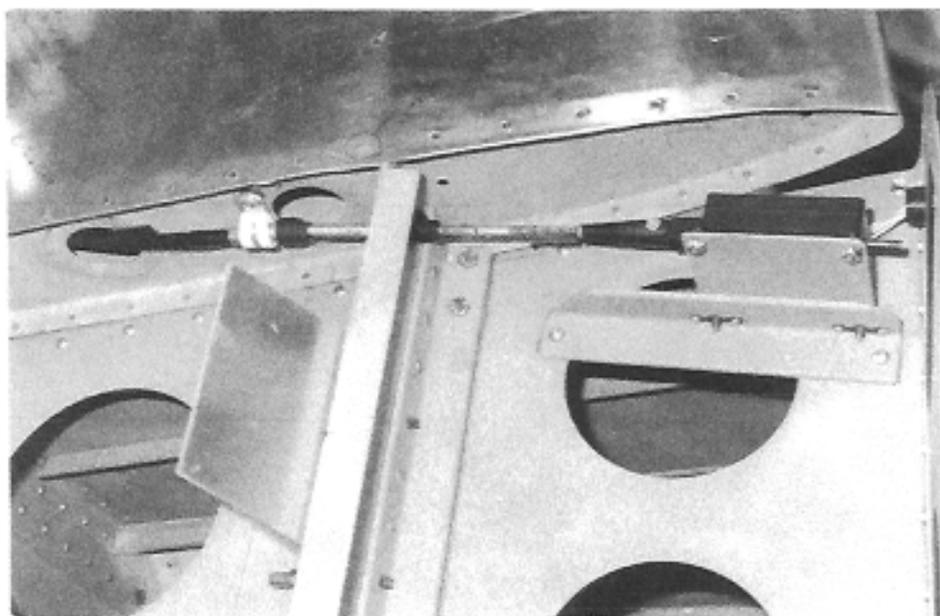
Thank you.

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(Figure 1)



## *Gretz Aero*

### Installation Instructions

for cable mounted electric MAC Servo elevator trim for RV-4, RV-6/6A RV-7 and RV-8/8A

**Note: Installation not yet verified for use on other RV's, but may work!**

#### Kit contents:

Installation instructions--

Push/Pull cable, custom--

Bag of hardware containing:

SS Weldment like WD-415--(Not a Van's made part)

Special MAC clevis, 2 ea --(#10-32 female thread, clevis pin, cotter pin, 2 washers)

Nutplate, 2 ea #6-32

Nutplate, 2 ea #8-32

Nutplate, 1 ea #10-32

Screw SS, 2 ea #6-32 x 3/8"

Screw SS, 2 ea #6-32 x 1/2"

Screw SS, 2 ea #8-32 x 1/2"

Screw SS, 1 ea #10-32 x 1/2"

Lock nut SS, 2 ea #6-32

#### Additional items needed, that is not supplied in this Gretz Aero kit:

Ray Allen Servo Motor T3-12A kit with LED indicator, and rocker switch (Contact Gretz Aero for this)

Multi-Conductor wire for Servo (Contact Gretz Aero for this)

Optionally, Ray Allen Relay Deck to allow for trim control from more than one switch (Contact Gretz Aero)

Adel cushioned clamp, 1 ea. MS21919DG5- 5/16" ID

Aluminum plate .040 3" x 3" (use scrap)

Aluminum angle .125 1" x 1" x 6" (use scrap)

Plastic hole bushings, as used elsewhere in construction, for cable and wire protection

This kit is not to be installed on "Certified" aircraft. Install only on "Experimental" aircraft!

This kit provides an alternative way of installing an elevator electric trim servo. This will eliminate having the servo inside the elevator, which adds weight, and has to be balanced out with lead. It also moves the weight farther forward. The servo is mounted inside of the fiberglass fairing which covers over the junction of the horizontal and vertical stabilizer. Figure 1 shows the location of the servo and its mounting bracket mounted to the rear deck of the fuselage, between the left horizontal stabilizer and the vertical stabilizer.

Follow Van's instructions and plans for the preparation of the elevator trim tab, elevator, and horizontal stabilizer for installation of the manual trim tab system as if you were using the long manual cable. This will cause you to have the holes, cutouts and trim tab control horn properly prepared for the installation of this kit. You will need to drill the WD-415 supplied in this kit to the elevator in the location shown on plans # 5A. After drilling in place, pop rivet the WD-415 to the elevator. There is a need to have holes in the fuselage bulkheads to pass the multi-conductor wire forward from the servo to the trim switch, or switches. Plan on using grommets or bushings to protect the wire from chaffing against anything the wire passes through.

Start the installation of the push/pull cable before the elevator is in place. After getting the general routing of the cable through the rib webs and through the rear spar as shown in plans # 3A, carefully place the left elevator into