

INSTALLATION INSTRUCTIONS FOR:

T2-7A-TS, T2-10A-TS, and T3-12A-TS TRIM SYSTEMS

ABOUT THE RAY ALLEN SERVO

NOTE: The T2-7A servo has .7" (17mm) travel, the T2-10A servo has 1" (26mm), and the T3-12A servo has 1.2" (31mm).

Ray Allen servos are constructed of a material called Minlon 22C, made by Dupont. Minlon 22C contains a nylon base with minerals and glass fibers added for strength and durability. Some of these glass fibers may appear as white smudges on the outside surface of the servo. This is caused by the injection molding process and, while not very pretty, the fiber content makes for a very strong material.

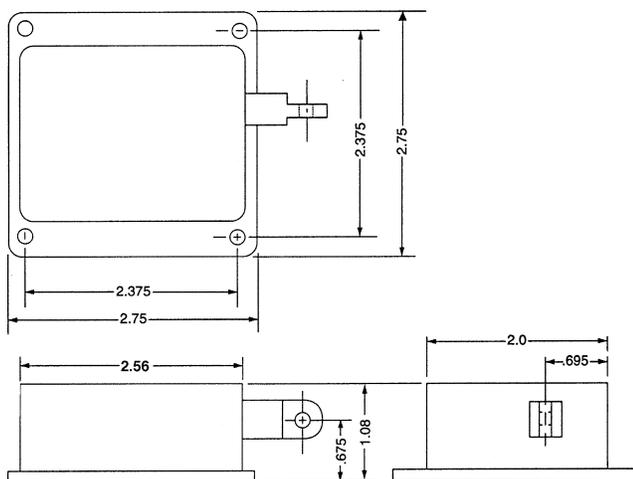
The motor that powers a Ray Allen servo runs on 12-14 volts DC. A lesser voltage can be used, but will result in less power and slower speed. When activated, the servo will continue to run until the power is shut off or the output shaft reaches the end of its travel. Since the thrust is generated by means of a geared jackscrew, the output shaft will lock in any position when the power is shut off. The servos will not operate unless power is manually switched on by the pilot, no electronics are utilized. Voltage polarity determines the direction of travel.

INSTALLING THE SERVO

For most aircraft designs, the trim servo will be installed inside the control surface. Sometimes, however, the servo is used to adjust springs connected to a pushrod. Consult the manufacturer of your kit, or the designer of your aircraft, for any information about installing electric trim. We cannot possibly describe all the various installations of Ray Allen servos, but what follows are a few general guidelines.

The mounting holes in the servo flange are 1/8" diameter. If you plan on securing the servo with 6-32 screws, you will have to carefully enlarge the flange holes. The servo should not be mounted with any larger diameter screws than 8-32.

You can test your servo by touching the two white leads across a 12 volt car battery. Switch the wires between positive and negative to reverse the direction of travel. A 9 volt transistor radio battery or a battery pack from a cordless drill is very useful for testing the servo during the installation process. The servo will operate slower and have less power than when using 12 volts, but performance will be adequate for testing purposes. (Note: While servos may be tested at lower voltages, Ray Allen relay decks, if installed, require 12-14 volts to operate reliably). See page 4 for servo wiring details.



It's very important that the servo does not bind up throughout its full length of travel. This includes making room for the leadscrew on the T3-12A servo when the output shaft is fully retracted.



CAUTION!! The output shaft on your servo is drilled for a 1/8" diameter clevis pin. Do not enlarge the 1/8" hole to accommodate a larger diameter pin.

Warning: Installation and use of Ray Allen Company products is the responsibility of the aircraft designer and manufacturer. Use of Ray Allen products in any application which will exceed their capability can cause failure leading to injury or death.

ABOUT THE RC8-7 CLEVIS/PUSHROD KIT

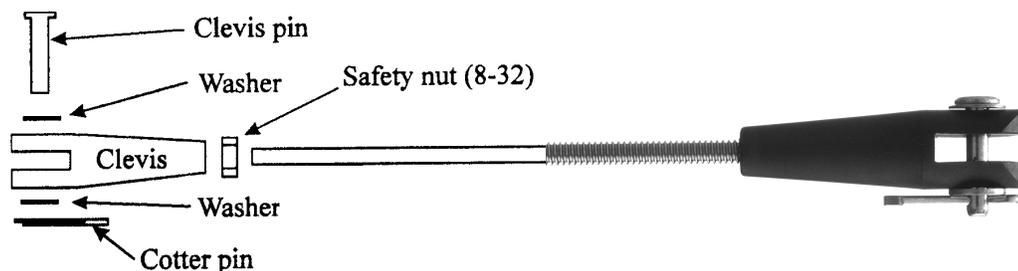
Provided with your trim system are two clevises and a 7" length of 8-32 threaded stainless steel rod. The clevises are made from the same Minlon 22C material as the servo. We have drilled the clevises to accept a 1/8" clevis pin. The clevis pin should be a snug fit in the clevis to prevent slop in your trim system.

CAUTION!! Do not drill out the clevis to accept a larger diameter clevis pin! Nor should you grind off any of the clevis material to enable it to fit in a smaller space. Both these actions will result in a drastic weakening of the clevis and possible failure!

INSTALLING THE CLEVIS/PUSHROD KIT

The 7" long stainless steel pushrod can be shortened to suit your installation. If you intend to use a longer pushrod, do not use all-thread rod. Instead, make a pushrod from a thick wall aluminum tube, with threaded rod ends riveted into both ends.

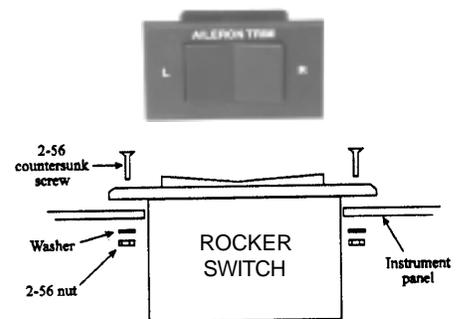
CAUTION!! Do not make any sharp bends in the 8-32 stainless steel pushrod. This will greatly reduce the pushrod's strength and possible failure could result.



ABOUT THE RS2 ROCKER SWITCH

The rocker switch (Part No. RS2) provided with your Ray Allen trim system is designed to electrically short the servo motor to ground (-) when released. This stops the output shaft without any coasting, allowing precise positioning when trimming your aircraft. The switch is rated at 1 amp.

NOTE: If you intend to use a different switch to actuate the servo, refer to Figure 2 or Figure 3 on page 4 for wiring methods. You must use either a DPDT switch or two SPDT pushbutton switches as shown.

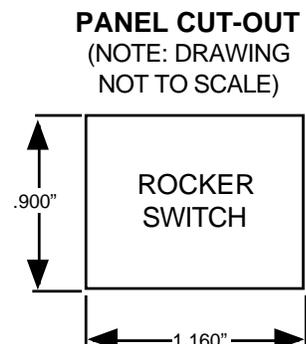


INSTALLING THE ROCKER SWITCH

Use the dimensions shown at right to cut the mounting hole for the rocker switch. The rocker switch can be mounted in any position using the two 2-56 countersunk screws, washers and nuts provided. See Figure 1 on page 4 for rocker switch wiring instructions.

Wires as small as 28 gage may be used. Ray Allen has color coded 5 wire cable available. Wiring connectors are not included. Use any type desired or simply solder all connections and insulate with heat shrinkable sleeving. A 1 amp fuse or circuit breaker is recommended (and can be shared with the trim position indicator).

Notice that the self adhesive label (if used) for the rocker switch will cover the mounting screws. Don't apply the label until you are sure the rocker switch will not be removed. Make sure the label is centered properly and not rubbing on the sides of the rocker.



ABOUT THE POSITION INDICATORS

The standard position indicator supplied with your Ray Allen trim system is the LED type (Part No. RP2). It uses ten LED lights to show you the position of the servo output shaft. Although built with some of the brightest LED lights available, direct sunlight will still affect your ability to see the active light. Because of this, the position indicator should be mounted somewhere in the shade on your panel, preferably just under the sun shield.

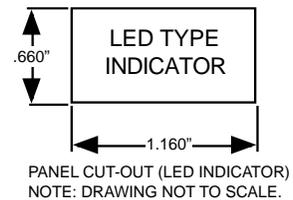
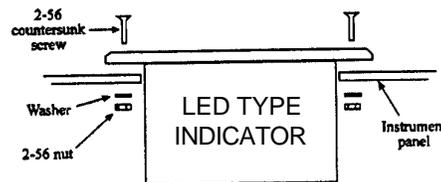
For night flight, the bright LEDs can be dimmed when your panel lights are turned on (see Figure 4 on page 4 for wiring instructions). The dimming function is OPTIONAL and does not have to be used (just cut off the white wire).

CAUTION!! DO NOT connect 12V+ to the orange wire and DO NOT use the LED type indicator with an alternator, rectifier or a battery charger without a battery in line. This will damage the integrated circuit inside. It is for this reason that we suggest wiring the indicator into the avionics side of your aircraft's electrical system.

INSTALLING THE (RP2) LED TYPE POSITION INDICATOR

Use the dimensions shown below to cut the mounting hole for the indicator. The LED indicator is mounted with the two 2-56 countersunk screws, nuts, and washers provided. See Figure 4 on page 4 for wiring instructions.

Wires as small as 28 gage may be used. Ray Allen has color coded 5 wire cable available. Wiring connectors are not included (see suggestion in rocker switch instructions). Use any type desired, or simply solder all connections and insulate with heat shrinkable sleeving. A separate 1 amp fuse or circuit breaker is recommended (and can be shared with the rocker switch). The self-adhesive label (if used) should not be applied to the indicator face until you are sure the indicator will not be removed again.



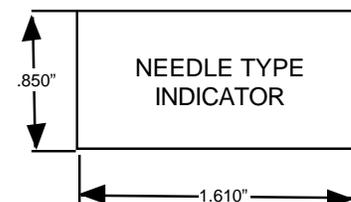
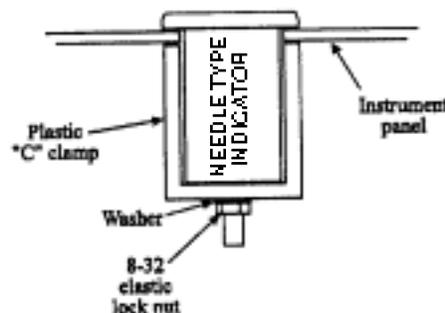
INSTALLING THE (RP3) NEEDLE TYPE POSITION INDICATOR

Use the dimensions shown below to cut the mounting hole for the needle type indicator. The indicator is mounted with the "C" shaped clamp provided. See Figure 5 for wiring instructions on page 4.

Because of the delicate balance on the registering needle, the indicator must be mounted with its "TOP" label towards the..uh..top. The indicator's needle balance is set at the factory and should not require any further adjustments. However, there is a small adjustment capability where the needle stops at the far end of the display. To adjust where the needle stops, carefully insert a small #1 screwdriver in the hole in the back of the indicator and twist to put the needle where you desire. Make sure the servo is in the fully extended position when adjustments are made.

If, after wiring your indicator the needle moves in the opposite way you desire, DO NOT flip the needle indicator upside down: simply reverse the orange and blue wires that connect it to the servo. If the needle needs adjusting after the orange and blue wires are reversed, do it with servo in the fully retracted position.

CAUTION!! Do not connect the orange wire of the RP3 needle type indicator to 12V+. This damages the internal wiring.



PANEL CUT-OUT (NEEDLE INDICATOR)
NOTE: DRAWING NOT TO SCALE.



FIGURE 1 RAY ALLEN ROCKER SWITCH

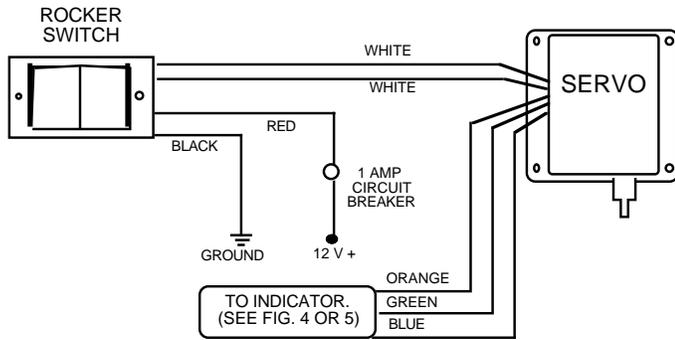


FIGURE 2 TWO SPDT PUSHBUTTON SWITCHES

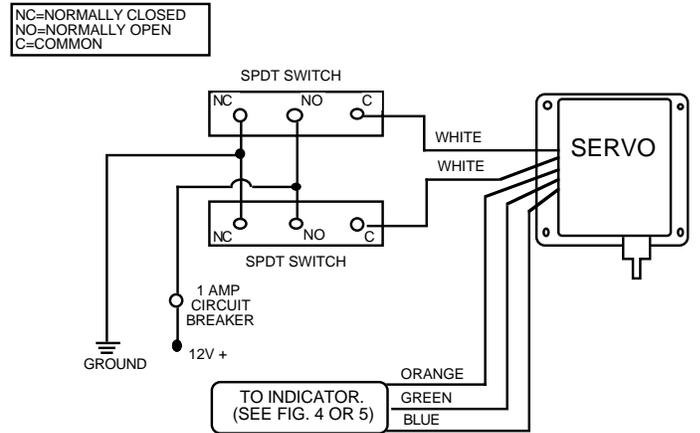


FIGURE 3 DPDT SWITCH

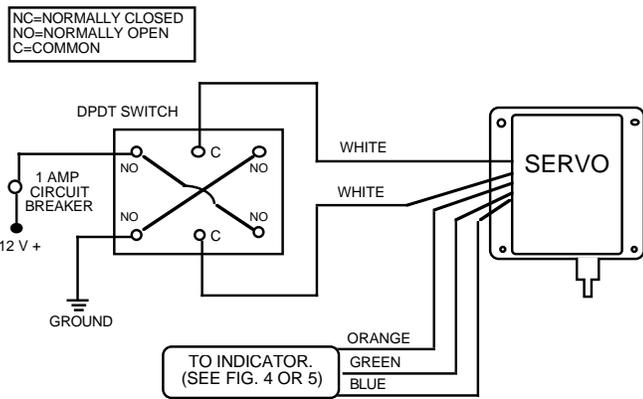


FIGURE 4 LED TYPE POSITION INDICATOR

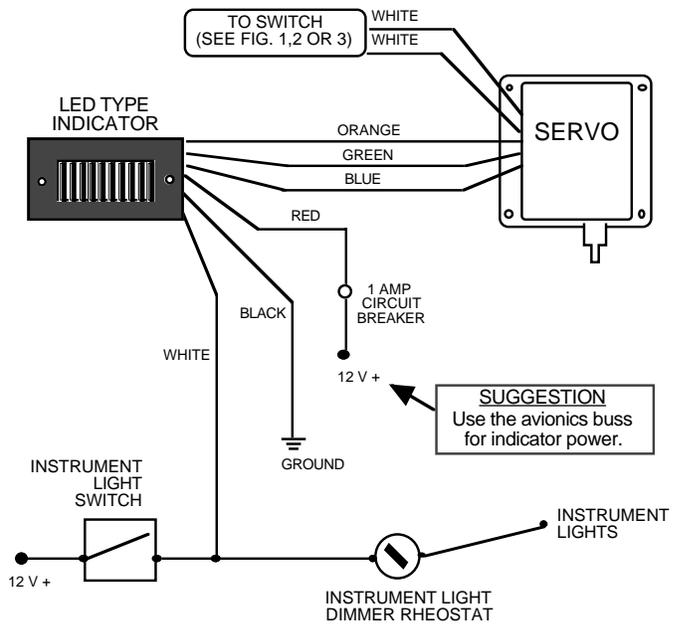
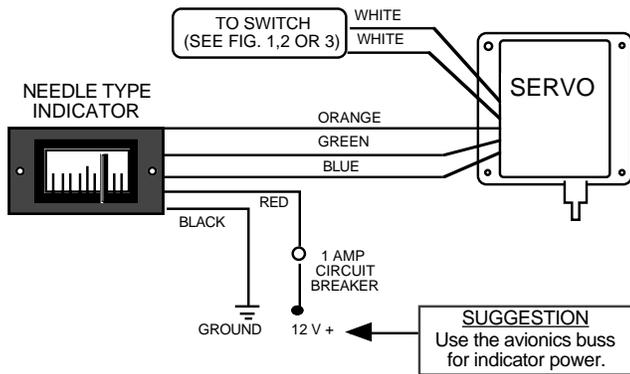


FIGURE 5 NEEDLE TYPE POSITION INDICATOR



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CAUTION!

Ray Allen Company, Inc. does not recommend that servos be installed in an aircraft to operate any apparatus or control surface that, if failure were to occur, could result in mechanical damage or control malfunction. When a servo is installed in an aircraft, all weight and balance, including that of the control surface, will be affected. Servos should not be installed unless you have full knowledge of the effects of this change on weight and balance or flight characteristics.

WARRANTY INFORMATION

All Ray Allen Company, Inc. products are warranted for one year from date of purchase. If you should have problems within that period, return the product to Ray Allen. We will repair it at no cost to you if it is determined that the failure occurred through normal use and not due to abusive treatment or faulty electrical wiring.

Warning: Installation and use of Ray Allen Company products is the responsibility of the aircraft designer and manufacturer. Use of Ray Allen products in any application which will exceed their capability can cause failure leading to injury or death.