# "Flip-Flap"

## Universal Flap Actuator

## Instruction Manual

Please read these instructions thoroughly before attempting installation.

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## *INTRODUCTION*

Your new "Flip-Flap" flap actuator has been designed to be a universal device ideally suited for use on any home built, light, ultralight or experimental aircraft. As such it has been provided with simple adjustable stroke length and convenient flexible mounting. In addition, it requires only a 12 Volt 2 Amp power source and can be mounted in any position. This device, however, is not FAA approved, and should not be used where such approval is required.

Great care has been taken in engineering and the manufacture of your "Flip-Flap" flap actuator. Quality components and craftsmanship assure a product that will provide reliable service for many years.

As the Pilot of your aircraft, when using your "Flip-Flap" actuator, you will enjoy the convenience of the set-and-forget feature, which will not distract you from the task of flying the airplane! In addition, you will find the transition from "clean" to full flaps will be gradual, allowing for a smooth flight path.

In the hands of an aircraft homebuilder with average skills, installation should be quick and easy. Follow the next few simple steps and you'll be up and flying, in style, in a short time.

## *LET'S GET ACQAINTED*

For the purpose of this text we will give each of the six sides of the actuator housing a name. As we do so, we will describe the various parts and functions.

- The end cover, with the product label on it, we will call the ***front***.
  Thru this end you will find the power leads. (Black is negative, Red is positive.) The product label has the model and serial numbers. These numbers should be recorded in your record for reference when contacting the factory.

- The opposite end cover, which we will call the ***rear***, is where the actuator arm is located. This arm will connect to the flaps control linkage.

- Now, with the actuator arm facing you, and the control lever facing up, the top we will call (guess what?) the ***top***. On this surface is a long slot, part of which is covered with a bracket that limits the movement of the control lever. This bracket is needed on aircraft that require very short control movement. In applications where control movement is between 1.5" and 3", this bracket may be removed and discarded. The actuator arm is provided with friction drag, set at the factory, to prevent shifting due to vibration. Graduation markings and/or a detent are left to the installer, since the requirements of each pilot/aircraft will be different. Two 8-32 tapped holes at each end of the lever slot are provided for this purpose.

- Looking at the unit as above, to the right, is the ***right*** side. On this side you will find a vertical slot, about 1/8" wide. When the control lever is set to 90 degrees to the housing, an Allen socket screw will be visible inside the slot. Using a 3/32" Allen wrench to loosen this screw 1/2 to 1 turn will allow the screw to move up or down the slot. This is your stroke length adjustment and will be set later. CAUTION! Never loosen this screw more than one turn. Doing so may cause components to shift out of place causing improper function or disabling the unit completely.

- Opposite the ***right*** side is, of course, the ***left*** side. This side is without features.

- Opposite the ***top*** side is, of course, the ***bottom*** side, also without features.

NOTE: The housing extends beyond the end cover plates on both ends. This extension is provided as mounting flanges and may be drilled as necessary.

## *INSTALLATION*

**STEP 1** Mounting position is limited to the location of your aircraft's flap/flaperon control tube. Your actuator must be mounted in reasonable axial alignment to this tube. Never allow an angle greater than 10 Deg., between the actuator arm and the control tube in your aircraft, to be exceeded. This requirement usually fixes the location of your actuator vertically and longitudinally. Fore and aft position is generally more flexible, and should therefore be selected to allow easy access by the pilot. Keep in mind that the length of flap/flaperon control tube may have to be adjusted to reach the actuator. End result, for most aircraft, mounting ends up in one of four positions. 1) Over the overhead "root tube". 2) Under the overhead "root tube". 3) On the cockpit floor in front of the pilot's seat. 4) On a side cockpit wall next to the pilot seat. Select the location and mark its' position.

**STEP 2** Next, the exact control pitch or length of movement for proper flap control must be determined. This information can come from your aircraft's blueprints or a careful measurement can be taken from the existing manual control devise. Take this measurement at the flap control push rod/tube at the point where you intend to connect your actuator.

**STEP 3** Once you know how much pitch you will need, it is time to set the actuators' stroke. If your aircraft requires a pitch of less than 1 1/2", the control lever travel limit bracket must remain installed. If the pitch requirement is 1 1/2" to 3" then remove the travel limit bracket and discard it.

To set the actuator stroke, first position the control lever to a position somewhere at midrange. Connect the unit to a 12 Volt DC power source. Be careful when making this connection since reversing polarity can damage the unit. Connect Negative to Black and Positive to Red. The actuator arm should move momentarily and then stop. Now move the control lever to the full forward position. The actuator arm will move to its fully retracted position. Move the control lever to its full aft position. The actuator arm will move to its fully extended position. Repeat this as necessary and take measurements at the control arm to determine the current stroke setting.

To reset the stroke, first set the control arm to 90 Deg. from the unit's housing. A socket head Allen screw should be visible thru the vertical slot on the right side of the unit. Using a 3/32" Allen wrench, loosen this screw. Remember; <u>DO NOT LOOSEN MORE THAN ONE TURN</u>. Now you should be able to slide the screw up and down the slot. To lengthen the stroke, slide this screw up towards the control lever. To shorten the stroke, slide this screw down towards the bottom of the unit. Tighten the screw, remove the Allen wrench and check the stroke again. This procedure may have to be repeated a few times until the stroke is exactly as needed. When this is accomplished, check the screw again and make sure it is locked securely since this adjustment will be permanent. Disconnect from the power source.

**STEP 4** Attach the unit to the airframe in it's predetermined position by first drilling the necessary mounting holes on the mounting flanges of the actuator. These holes should be drilled to a center distance of 1/4" from the edge of the mounting flanges. Drill 3/16"Dia. for AN3 bolts or 1/4" Dia. for AN4 bolts. Place the actuator in position on the aircraft and trace the mounting holes to the mating surface. Drill these holes same size as on the actuator. Using the selected bolts, secure the unit in place.

**STEP 5** At this time, it's a good idea to permanently connect the actuator to its power source. Use 18Ga. wire, Black and Red, and watch polarity! You're almost there..... Don't kill it now! Negative to Black and Positive to Red. It is recommended you fuse this circuit with a 3Amp. Fuse. Your master switch should power down your actuator. Dress all wiring to prevent chafing and/or damage from vibration.

**STEP 6** The last step in the installation is connecting the actuator to the control tube. This will require the greatest care and accuracy.

We highly recommend the installation of a 3/16 or 1/4 inch ID bearing type rod end, with a screw adjustment, on the control tube for attachment to the actuator. This will provide the necessary swivel connection to the actuator and facilitate fine length adjustment of the control tube. CAUTION... Never apply twisting forces to the actuator output arm.

Cut, extend or replace the control tube as necessary so that flap/flaperon function is as specified by the aircraft manufacturer.

**CAUTION! NEVER ALLOW THIS ACTUATOR TO OPERATE FLAPS OR FLAPERONS OUTSIDE THE AIRCRAFT MANUFACTURERS' RECOMMENDED UPPER AND LOWER LIMITS.**

Attach the bearing rod end to the actuator using an AN bolt to match the rod end. If using an AN3 bolt, you will find the actuator drilled for this size. If the rod end requires an AN4 bolt, then the actuator rod end must be drilled to 1/4" Dia. Be sure to install a suitable steel washer between the swivel and the actuator aluminum rod end.

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***CHECK, CHECK, CHECK***

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**Before attempting flight, check your work thoroughly such as bolts and nuts tightened, safety wired or nylocks.**

**Wiring: good connections, dressed to prevent chafing and vibration damage.**

**Turn on master switch and check flap control for proper deflection and smooth operation. If equipped with flaperons, check for proper aileron deflection with full flap extension.**

**When you're done checking, check it one more time! Think SAFETY.**

(Continue on next page)

## *PRE-FLIGHT*

**Good preflight practice requires full flap extension at the start of your walk-around. Flaps/ Flaperons should be checked visually in their fully extended position Retract the flaps at the end of your walk-around. Do this before each and every flight, and fly for many years to come.**

# Happy Flying!

## *CARE AND MAINTENANCE*

**The Flip-Flap actuator requires no internal maintenance. Care should be taken not to expose this unit to weather, such as rain, snow, ice or extreme dust. Any liquid or foreign matter entering the housing could cause a malfunction. If any of this should occur, do not fly the aircraft! Contact the factory for advice.**

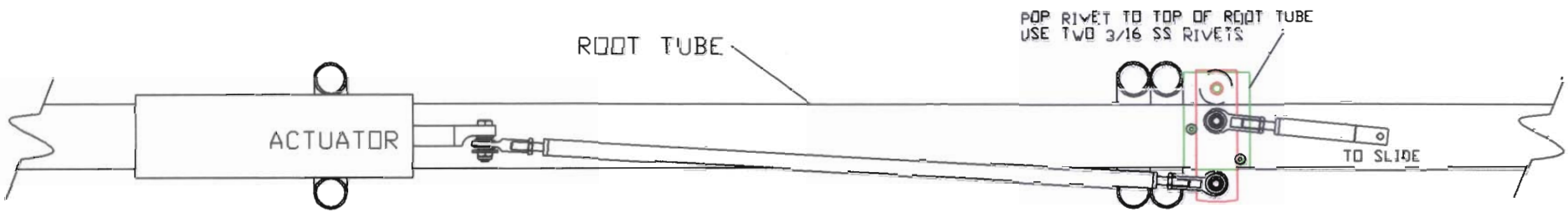
**Periodically, visually check the units' mounting hardware and all other associated hardware and control linkage for signs of wear or looseness.**

**Your Flip-Flap actuator is not a user serviceable device. Do not attempt to disassemble under any circumstances. When service is required, contact the factory at the number below.**

**BASIC SOLUTIONS CORP.**
**Call anytime for service, questions and general help.**
**(309) 235-3624**

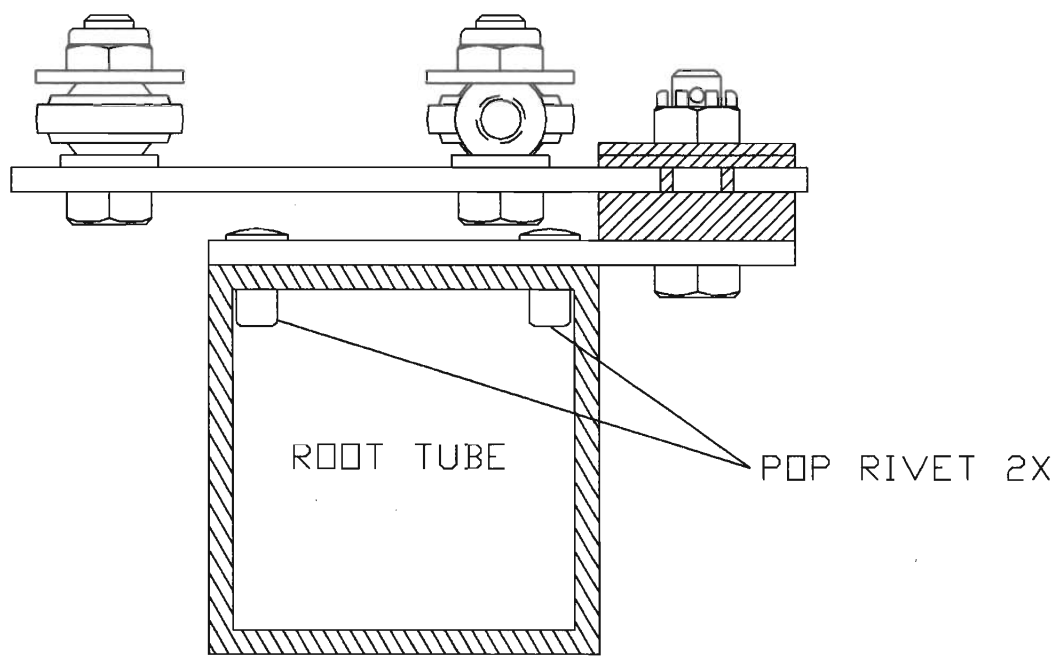
TOP VIEW

FRONT OF AIRCRAFT



# VIEW FROM REAR

RIGHT SIDE OF AIRCRAFT



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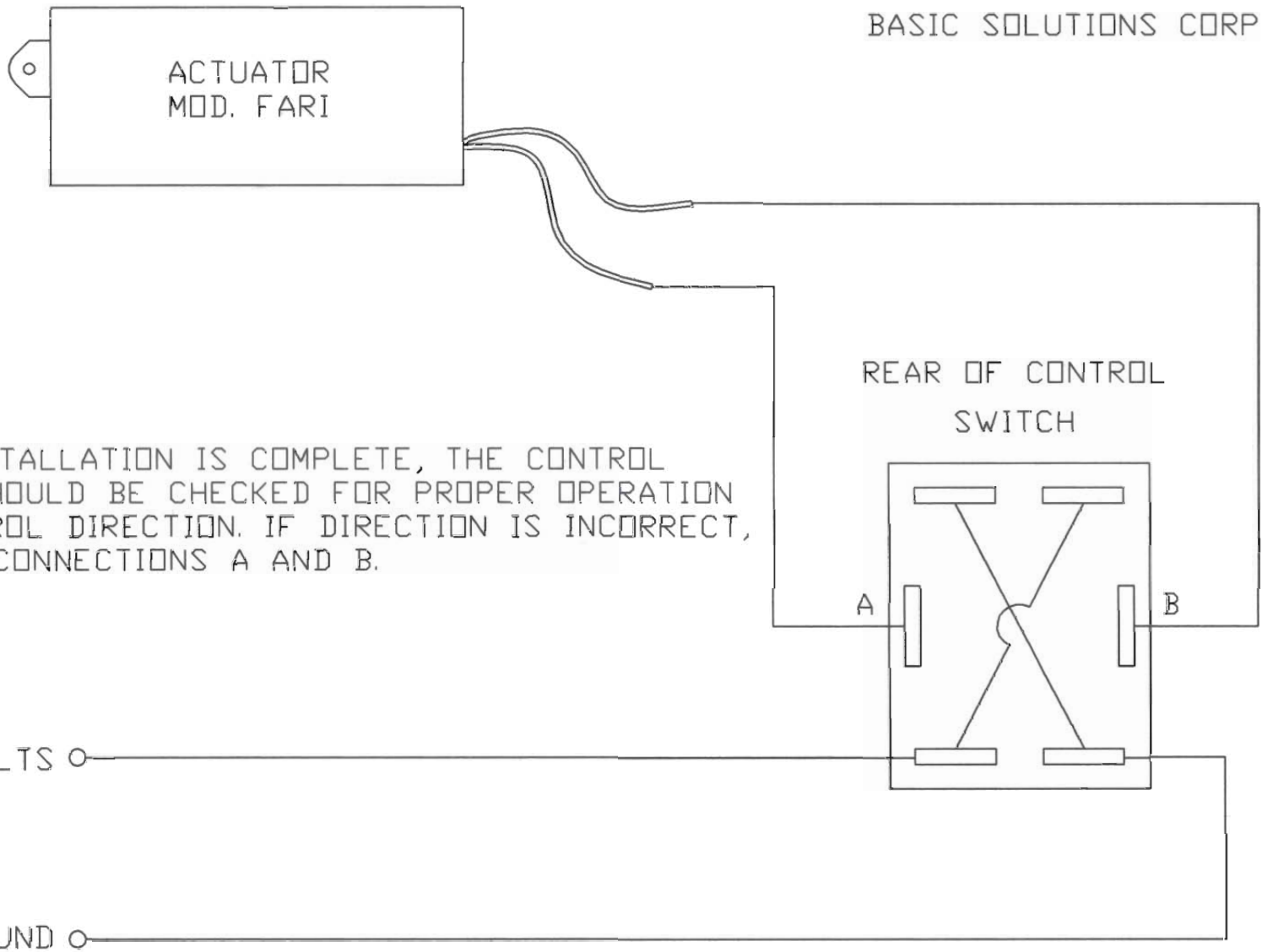


AFTER INSTALLATION IS COMPLETE, THE CONTROL SWITCH SHOULD BE CHECKED FOR PROPER OPERATION AND CONTROL DIRECTION. IF DIRECTION IS INCORRECT, REVERSE CONNECTIONS A AND B.

## *SPECIFICATIONS*

| | |
|---|---|
| Size | 2 9/16" X 3 3/8" X 8 ½" |
| Mounting | Flanges on each side (4) of each end of housing |
| Adjustable output arm stroke (linear) | 15/16" to 3" |
| Max. Push/Pull Force | 80 lbs. |
| Max. Recommended Load (for long life) | 40 lbs. |
| Speed | 4"/min. |
| Power Required | 12 Volt 2 Amp. Nominal |
| Weight | 40 oz. |

## *REGISTER YOUR PURCHASE*

Register your Flip-Flap so we may contact you in the event you need to be notified of pertinent information regarding your specific unit. Fill out this form and mail it to:

BASIC SOLUTIONS CORPORATION
812 36th AVE
EAST MOLINE, IL 61244

Name_____

Address_____

_____

City_____ State_____ Zip_____

Telephone:_____

Date of purchase_____Purchased fron:_____

Flip-Flap model_____S/N_____

Will use in (type of aircraft)_____

Aircraft model_____

Flap/Flaperon control linkage stroke (if known at this time)_____

Comments you wish kept in our records. _____

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