



# Autopilot Servo Installation Guide

## **Sonex/Waiex-Roll**

*This product is not approved for installation in type certificated aircraft*

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**SERVO MOUNTING INSTRUCTIONS – SONEX/WAIEX ROLL KIT**

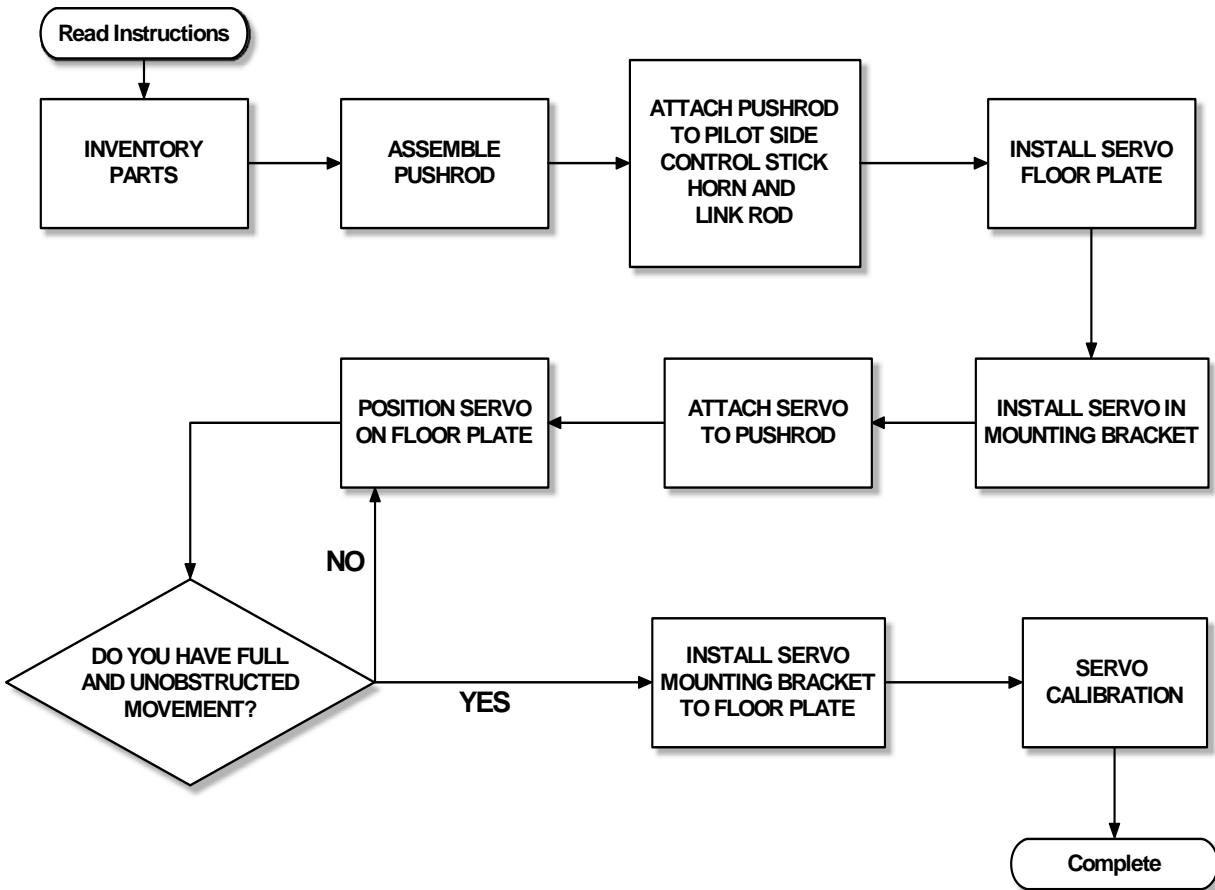
Kit Contents		
Dynon Part #	QTY	Part Description
100836-000	2	Male Rod End 3/16" ID
100866-000	1	Servo Mount bracket
100899-001	1	Castle nut AN310-3
100904-002	1	Cotter Pin MS24665-132
100966-012	1	Tube Aluminum Pushrod - 20"
100975-002	2	AN315-4R Jam Nut
100976-007	4	AN365-832A Nylon Insert Locknut
100976-011	1	AN365-1032A Nylon Insert Locknut
100977-000	4	AN970-3 Large Flat Washer
100978-002	4	AN960-8 Small Flat Washer
100978-003	6	AN960-10 Small Flat Washer
100979-002	4	MS35333-39 #10 Internal Star Washer
100981-000	4	AN3H-3A Bolt - 3/8"
100981-005	1	AN3H-10A Bolt - 1"
101613-000	1	Roll Servo Floor Plate
101844-007	1	AN3-12 Bolt - 1 1/4" Drilled Shank
101877-000	6	Cherry N Rivets - CCP-42
101880-000	4	Screw Washer Head AN525-832R8



### SERVO INSTALLATION AND CONFIGURATION

The Sonex/Waiex roll servo mounting kit includes a servo mounting bracket, fuselage floor doubler, connecting hardware, and push rod required to complete the installation of the Dynon SV-42EL servo into a dual control Sonex/Waiex aircraft. All Dynon-supplied parts are shaded to distinguish them from existing aircraft hardware and structure. If the builder is attempting to install the servo in an aircraft configuration other than that shown, modifications to the kit may be required.

### SUGGESTED INSTALLATION PROCEDURE



All AN bolts supplied by Dynon have drilled heads for use with safety wire. With the servo in place, torque all fasteners to installation specifications and add safety wire where needed.

To prevent the possibility of the servo arm going over-center, the servo arm must **not** travel more than a total of  $\pm 60^\circ$  from neutral throughout the control system's range of travel. Most installations use the outer most hole on the servo arm, due to variations in mounting plate and servo bracket installation locations, each install varies. The linkage should be installed such that adequate force is applied to the pilot side control stick horn with the pushrod perpendicular to both the servo and the link rod. Changing the location of the pushrod mounting on the servo arm will affect servo torque output, servo arm travel, control surface resolution, and the amount of force required to shear the safety screw, the installer should have an understanding of these implications. See Fig 2 which illustrates the linear travel and available force for each mount point on extra-long-arm servos.

The distance between the servo arm and the control system attachment point must allow for the angle between the servo arm and the push rod to be at approximately  $90^\circ$  when the controls are at neutral. Use the adjustability in the rod ends to achieve this, and then tighten the jam nuts to lock the rod ends in place. Installers should always keep in mind the range of motion of the servo. Total servo arm travel is limited, but verify the arm/linkage do not interfere with anything during the full motion of the control stick. The built in control stops of the aircraft will limit the servo arm travel when installed correctly. We recommend the use of the optional Range of Motion Limiting Bracket, supplied with the servo to eliminate the chance of the servo arm going over-center. This bracket should not be used as a normal stop; the aircraft's built-in stops should always be the primary range limit.



**The SV42EL Servo arm must not come into contact with the aircraft seat pan at any time during its rotation or when seat is occupied.**

For the latest documentation on all Dynon products go to [dynonavionics.com](http://dynonavionics.com). Please read through that documentation to understand the wiring and configuration process for your Autopilot system. We also maintain a collaborative set of this documentation, which is often updated with new information by both Dynon and fellow builders. Visit [wiki.dynonavionics.com](http://wiki.dynonavionics.com) to view and contribute to the latest version of these documents.

You can also visit [forum.dynonavionics.com](http://forum.dynonavionics.com) to discuss and share installation notes, pictures, and suggestions with other builders.



**Neglecting to properly install and/or use Dynon autopilot hardware may result in failures which could cause loss of aircraft control resulting in aircraft damage, personal injury or death.**

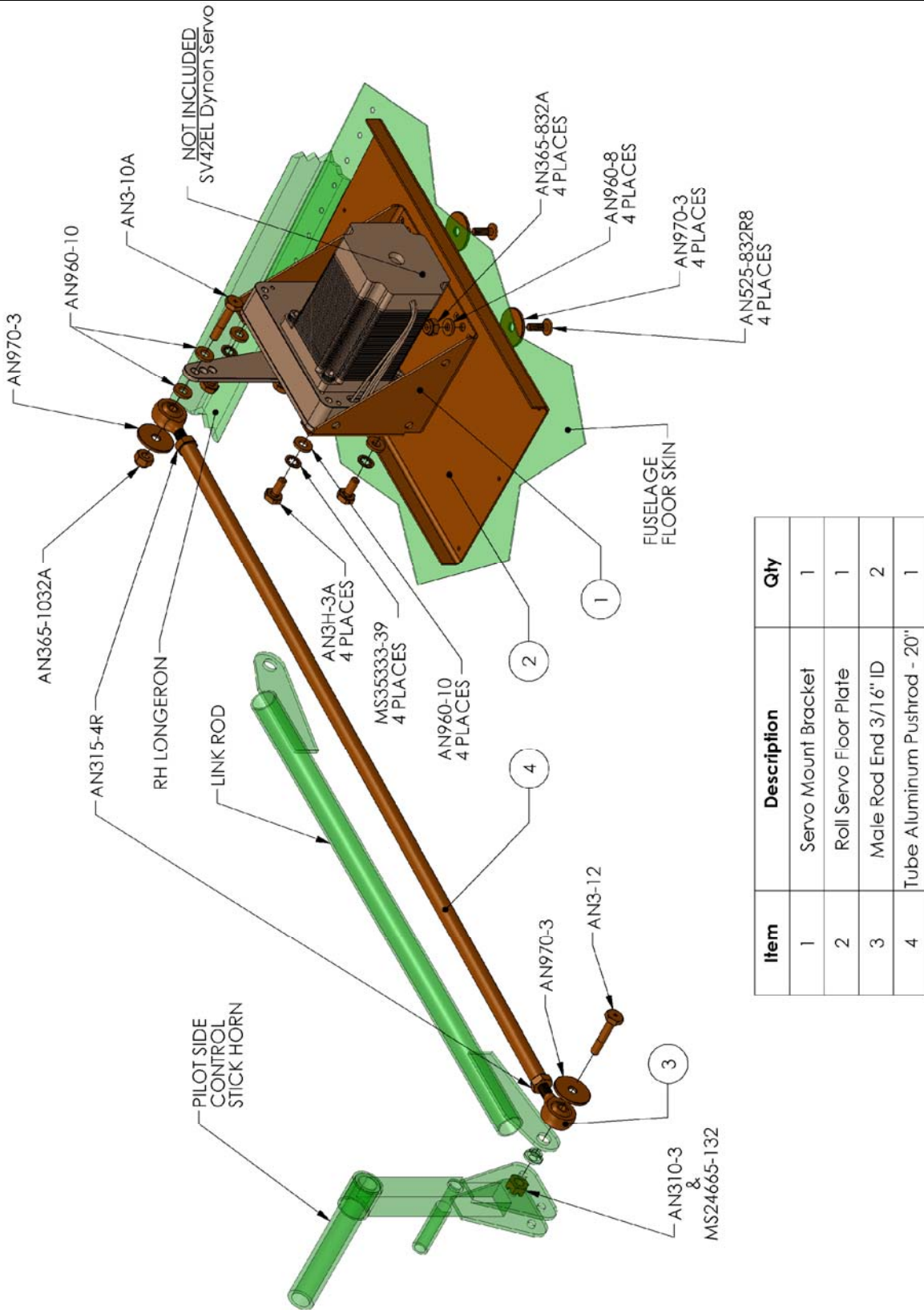
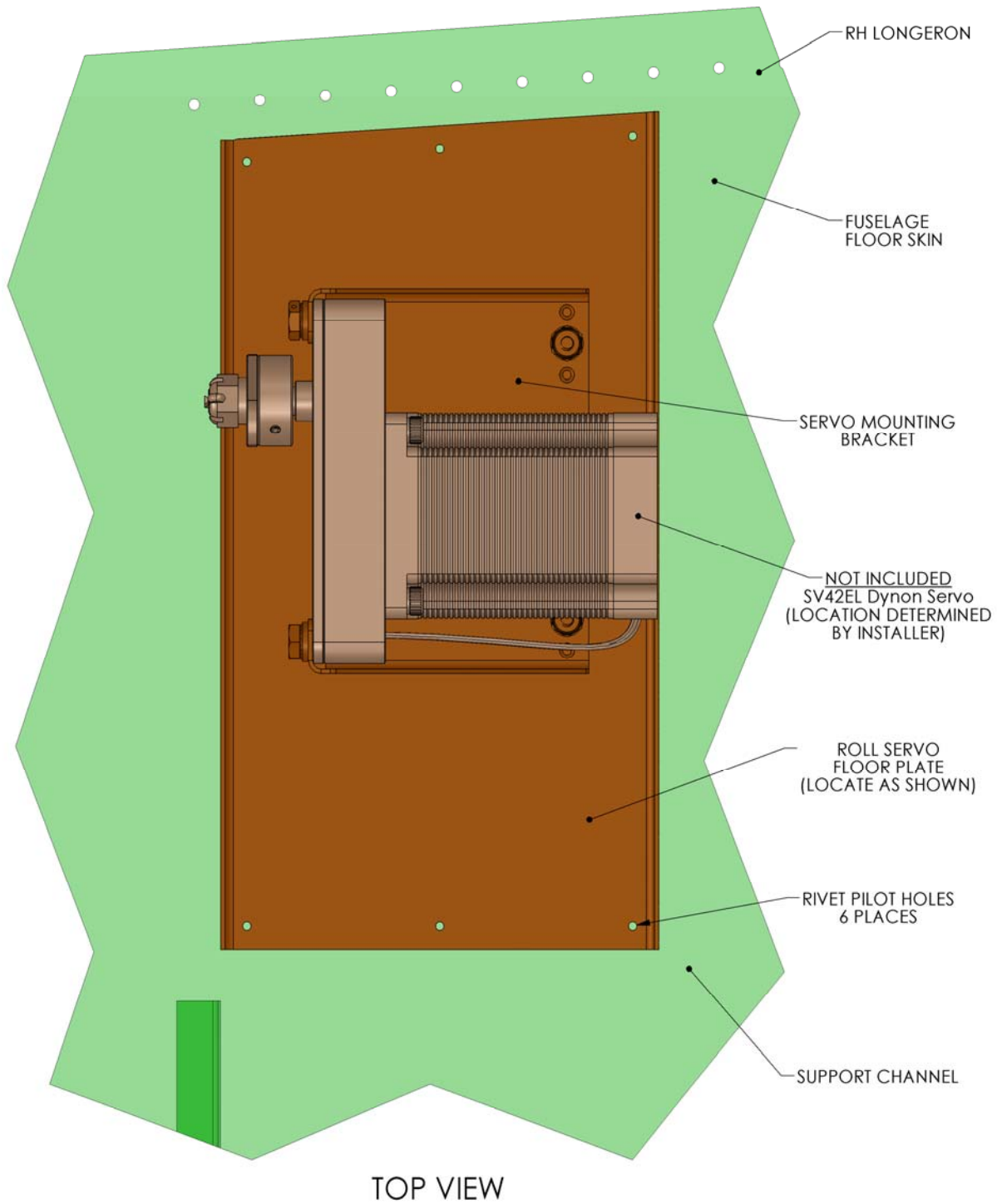


Fig 1

**SERVO INSTALLATION DETAIL****Fig 2**

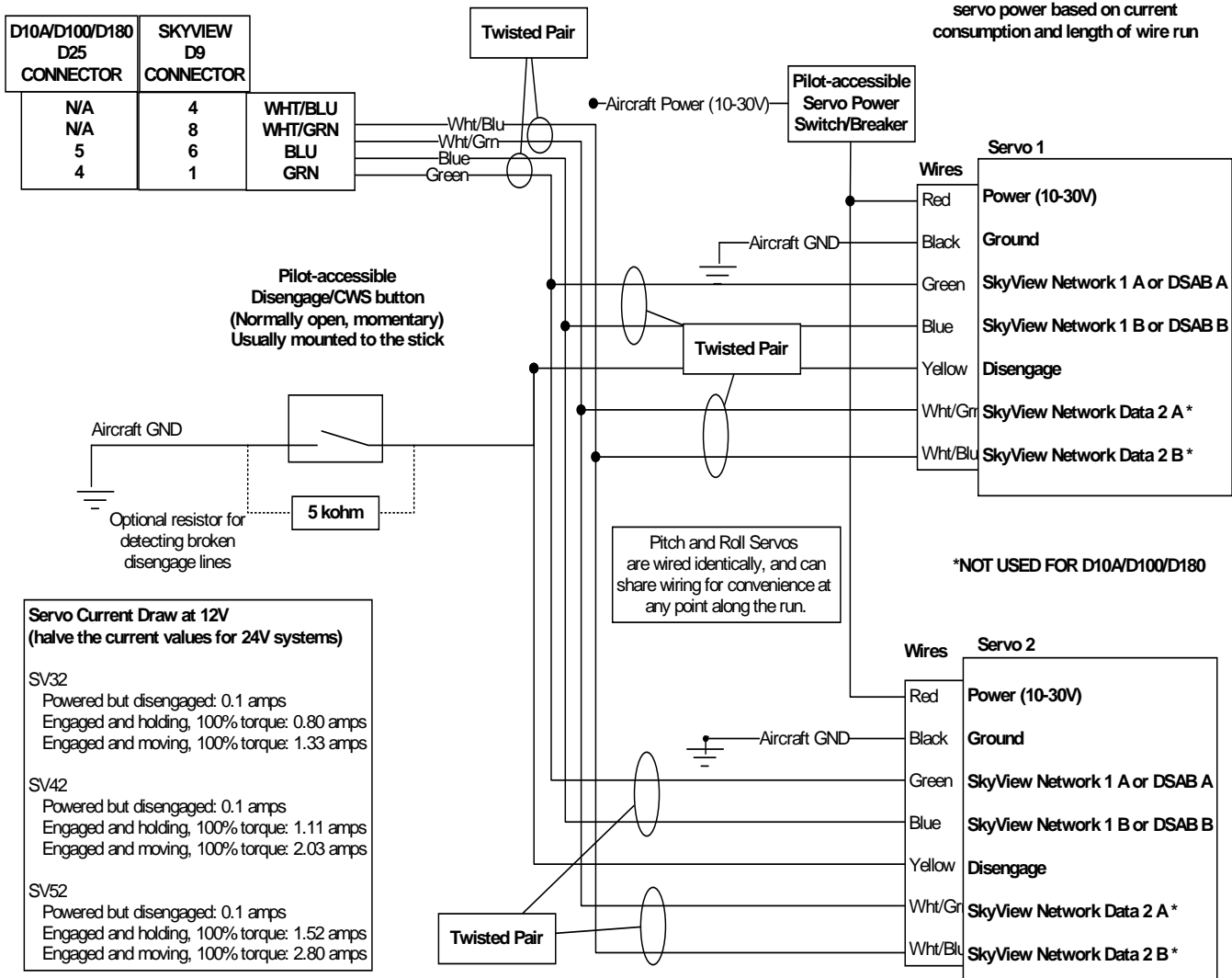


# Wiring Overview

The following diagram provides an overview of the autopilot-specific wiring installation. For the complete set of wiring and configuration instructions, please see the latest Installation Guide for your Dynon EFIS product. For a SkyView system please reference the **Autopilot Servo Installation, Configuration, and Calibration** chapter of your SkyView System Installation guide. For EFIS-D10A, EFIS-D100 or FlightDEK-D180 please reference the **Autopilot Installation and Configuration** chapter of each respective Installation Guide.

Use 22 AWG wire for SkyNet and Disengage signals.

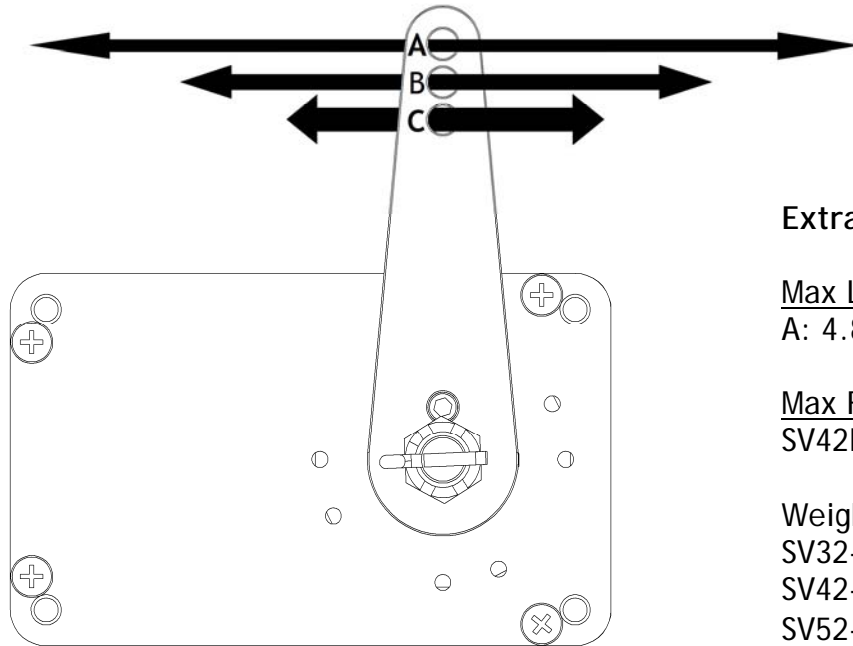
Use appropriate wire gauge for servo power based on current consumption and length of wire run





## Linkage mount position force and travel

The diagram below illustrates the maximum travel and force available at each linkage mounting point. As can be seen, the closer you mount the linkage to the shaft, the more force the servo can deliver. However, this also means the travel of the arm is shorter. Again, ensure that the servo arm is nowhere near going over-center throughout the entire range of the control system. Modify mount position with caution and take all precautions to ensure that a near over center condition cannot occur.



### Extra Long Arm

#### Max Linear Travel

A: 4.8", B: 4.4", C: 3.9"

#### Max Force @ 100% Torque

SV42L - A: 20lb, B: 22lb, C: 24lb

#### Weight:

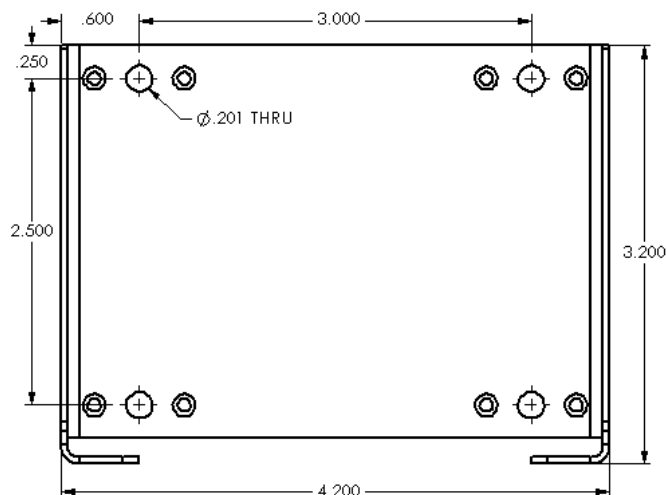
SV32-2lbs

SV42-3lbs

SV52-4lbs

**FIG 3**

## SERVO MOUNTING BRACKET DETAIL





- ! The autopilot safety shear screw should **NEVER** be removed or adjusted during this operation. If the shear screw has broken and needs replacement, there is specific documentation available for this purpose at <http://docs.dynonavionics.com>.

