SERVO MOUNTING INSTRUCTIONS – GENERIC PUSH-PULL KIT

Kit Contents		
Dynon Part #	**QTY**	**Part Description**
100836-000	2	Large Male Rod End
100982-006	1	Aluminum Tube - 8" (untapped)
100975-002	2	AN315-4R Jam Nut
100976-011	1	AN365-1032A Nylon Insert Lock Nut
100977-000	2	AN970-3 Large Flat Washer
100978-003	2	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"

The generic servo push-pull mounting kit includes some of the basic hardware to mount a servo and connect to the aircraft controls. This kit can be used in either pitch or roll applications that use a servo with an output arm (not suitable for use with pulley/cable servos). Some additional fasteners (not supplied by Dynon) will be required depending on the installation method chosen.

When installing the servo, you must first determine a mount location for proper interaction with the existing control system. This spot must allow the servo arm and associated linkage to move freely through the entire range of travel. To prevent the possibility of the servo arm going over center, the servo arm must **not** travel more than a total of +/-60° from neutral throughout the control system's range of travel.

Once a mounting location has been determined, the next step is to fabricate a mount for the servo to attach to the aircraft. Generally this will be a bracket made of sheet metal or corner stock. We recommend using 6061 T6 aluminum with a minimum thickness of 0.050” for the best balance of strength to weight.

When fabricating a mounting bracket, refer to the included servo dimensions. Leave ample room for the arm and attached linkage to move through a complete range of motion without interference. We recommend that all 4 of the included AN3H-3A bolts be installed with the MS35333-39 star washers and AN960-10 flat washers to secure the servo to a mounting bracket. All AN bolts supplied by Dynon have drilled heads for use with safety wire. It is up to the installer to decide the attachment method for mounting the bracket/servo to the aircraft.

Before the linkage can be installed, the included tube needs to be trimmed to length and tapped. 8" of tubing is supplied, and a small amount of this tubing can be used as spacer(s) if needed. Spacers can be used to reduce the offset angle between the servo end of the rod and the control system. The inner diameter of this tube is 0.213"; this is the required diameter for both the #1/4-28 tap at both ends of the push-pull rod, as well as for a #10 bolt through a trimmed spacer. Spacers used to alleviate linkage angles should be limited to a maximum length of 1.0" to reduce excess flexing in the control system.

When cutting the push-pull rod to size, take into account the extra length provided by the unthreaded portion of each rod end. 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° when the controls are at neutral. With the measurements taken, cut the tube down to the correct length and tap both ends to a depth of 1" using a plug type tap. Once the push-pull rod has been cut and tapped, follow standard practices for threading both rod ends into the tube with jam nuts installed. Thread the supplied AN315-4R jam nuts onto the rod ends. Screw at least half of the threads on each rod end into the push rod. Adjust length as needed, and then tighten jam nuts.

When using the generic mounting kit, we suggest first installing the linkage at the outer-most hole of the servo arm. Changing this location will affect servo torque output, servo arm travel, control surface resolution, and the amount of force required to shear the safety screw, and should only be changed if the installer has an understanding of these implications. See the diagram on the following page which illustrates the linear travel and available force for each mount point on the standard and long-arm servos.

Standard mounting of the linkage to the servo arm will include the AN3H-10A bolt, AN970-3 large diameter flat washer (for capturing the rod end bearing), 2 AN960-10 flat washers on each side of the servo arm itself, and the AN365-1032A lock nut. If an alternate stack-up is required (which may include a spacer trimmed from the supplied tubing), substitute the AN3H-10A with a longer bolt. It is recommended that the rest of the stack-up remain the same, using the large diameter flat washer as a safety device to capture the rod end bearing.

There will be a variety of methods used to install the other end of this control linkage to the existing mechanicals of the aircraft. Some systems will use a bell crank that will need a hole drilled at an appropriate location. Others will use an attachment to an existing linkage. Others may attach directly to the control stick itself. It is up to the installer to decide which method is best in terms of safety and autopilot functionality.

Installers should always keep in mind the range of motion of the servo. Total servo arm travel needs to be limited to prevent an over center situation. Take this into account when selecting the mounting location and linkage attachment point for any servo installation. The built-in control stops of the aircraft will limit the servo arm travel when installed correctly. We recommend you use 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.

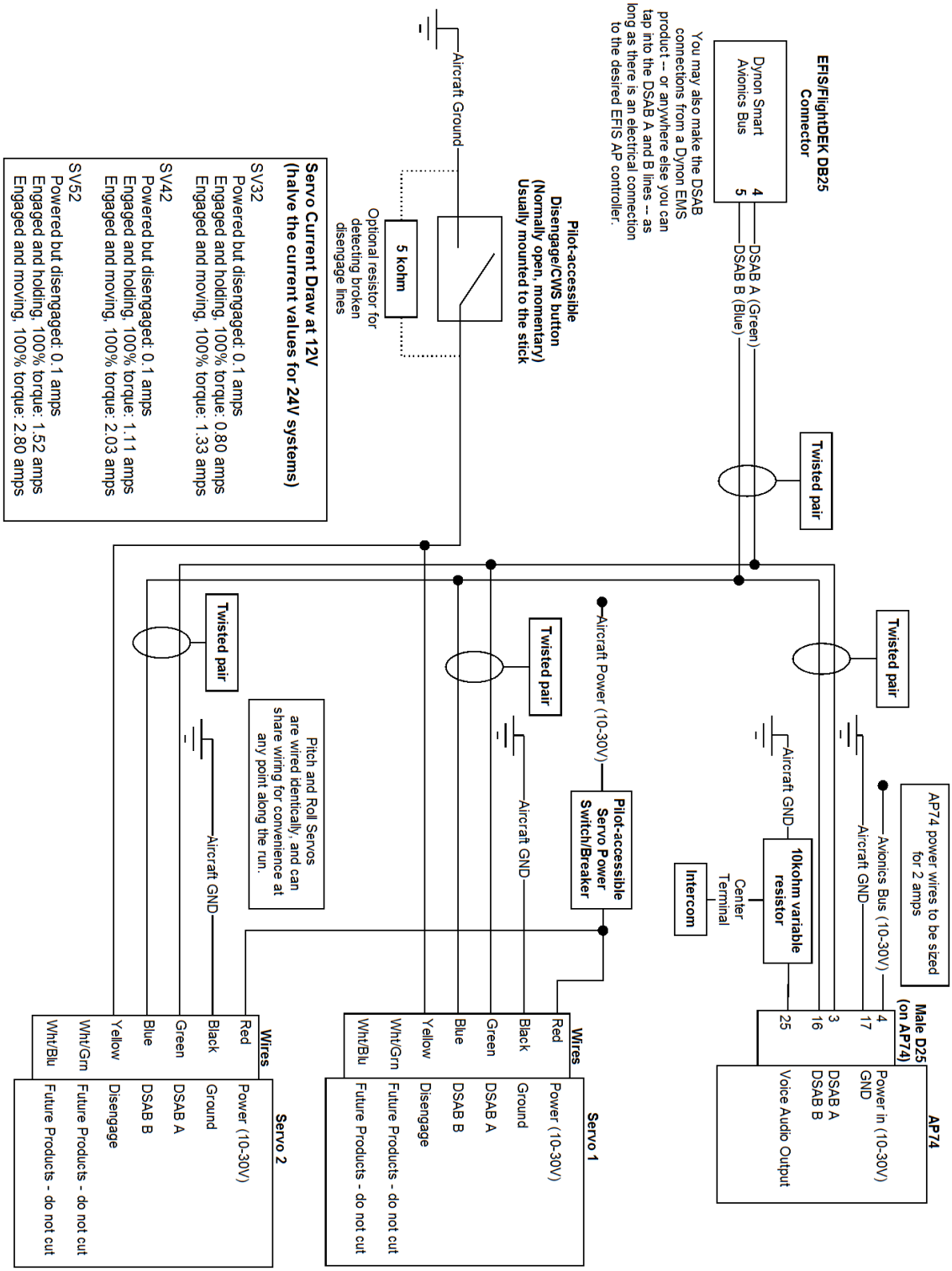
Your servo(s) and AP74/76 (if ordered) came with a CD containing the latest documentation for all Dynon products (also available at dynonavionics.com). Please read through that documentation to understand the wiring and configuration process for your Autopilot system. We also maintain a collaborative set of this documentation, which is often updated with new information by both Dynon and fellow builders. Visit wiki.dynonavionics.com to view and contribute to the latest version of these documents.

You can also visit 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.

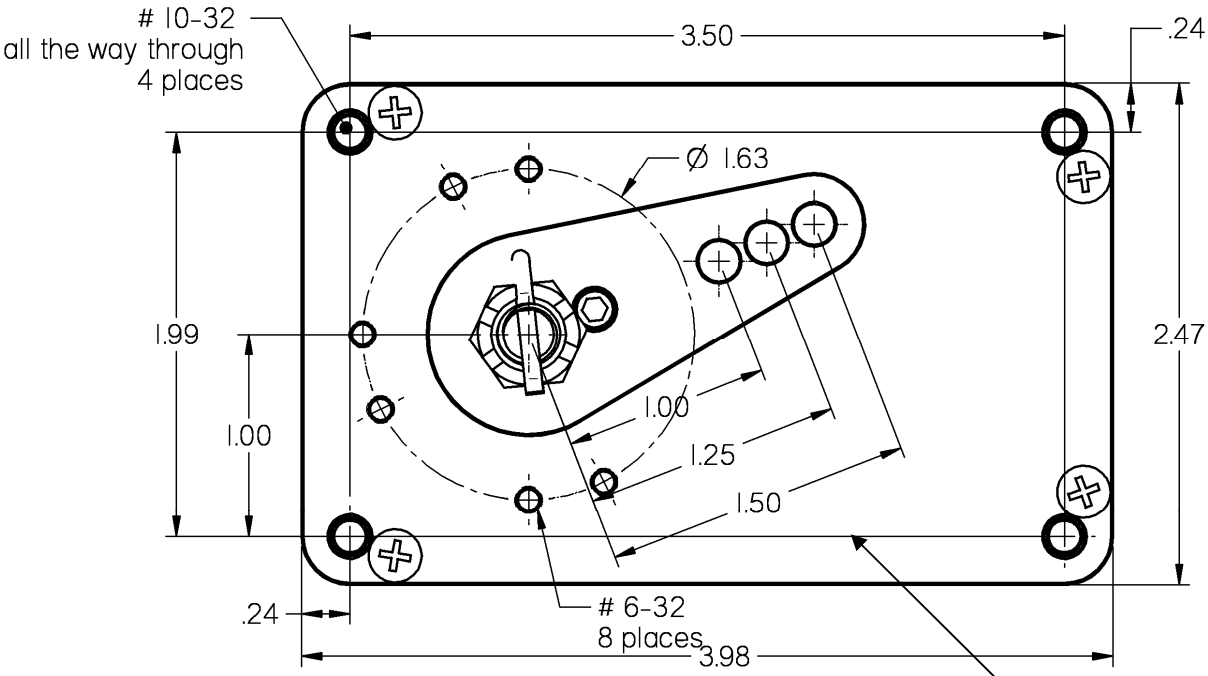
Wiring Overview

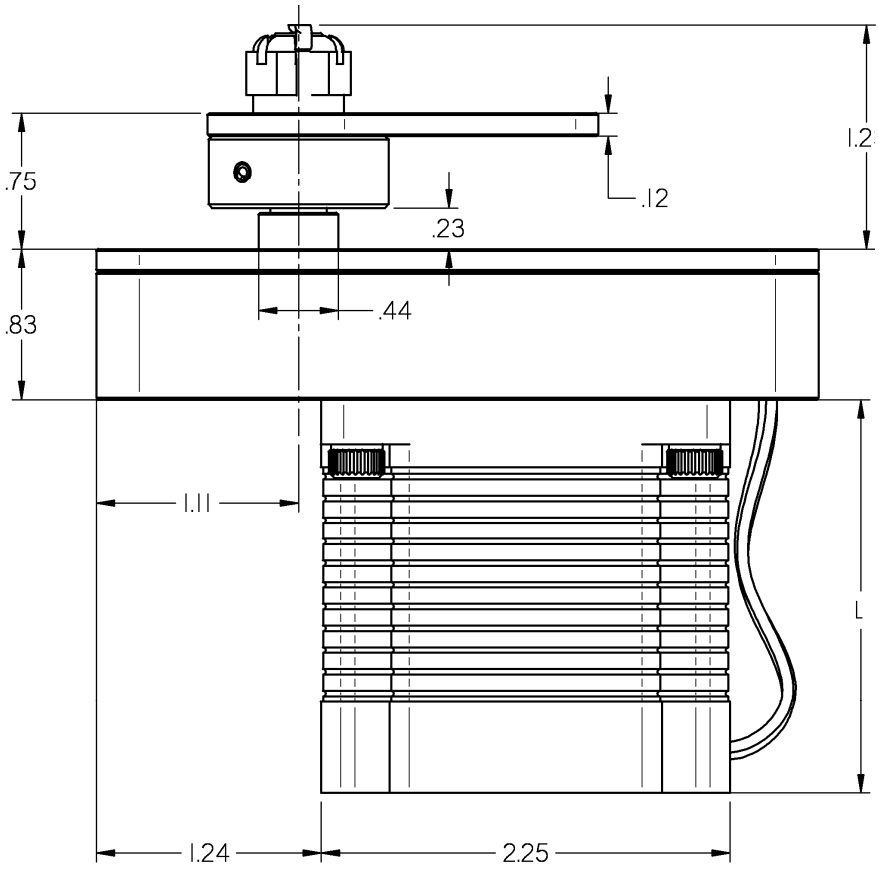
The following diagram provides an overview of the autopilot-specific wiring installation. For the complete set of wiring and configuration instructions, please see the latest Installation Guide for your Dynon EFIS product.



Servo Dimensions

Use the following dimensions (in inches) for reference when planning and implementing your installation.



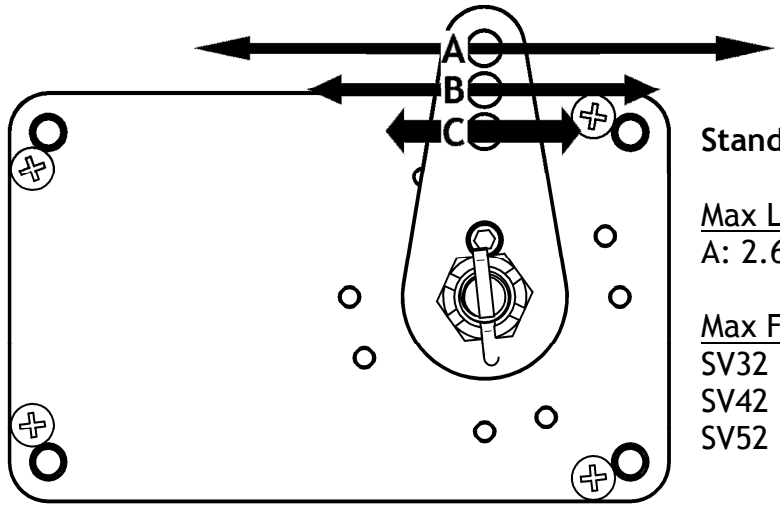


Long-arm variants (not needed in most installations)have linkage mount holes at 1.5”, 1.75”, and 2.0”

	L	Weight
SV32	2.17”	2 lb
SV42	3.10”	3 lb
SV52	4.02”	4 lb

Linkage mount position force and travel

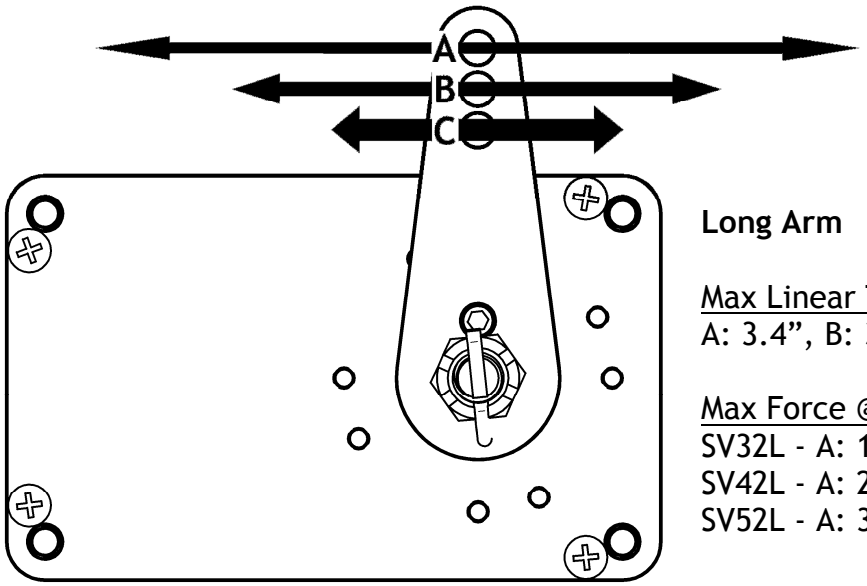
The two diagrams below illustrate the maximum travel and force available at each linkage mounting point. As can be seen, the closer you mount the linkage to the shaft, the more force the servo can deliver. However, this also means the travel of the arm is shorter. Again, ensure that the servo arm is nowhere near going over-center throughout the entire range of the control system.



Standard Arm

Max Linear Travel
A: 2.6”, B: 2.2”, C: 1.8”

Max Force @ 100% Torque
SV32 - A: 24lb, B: 29lb, C: 36lb
SV42 - A: 36lb, B: 44lb, C: 55lb
SV52 - A: 48lb, B: 58lb, C: 72lb



Long Arm

Max Linear Travel
A: 3.4”, B: 3.0”, C: 2.6”

Max Force @ 100% Torque
SV32L - A: 18lb, B: 20lb, C: 24lb
SV42L - A: 27lb, B: 31lb, C: 36lb
SV52L - A: 36lb, B: 41lb, C: 48lb