



Autopilot Servo Installation Guide

CAPSTAN

THIS PRODUCT IS NOT APPROVED FOR INSTALLATION IN TYPE CERTIFICATED AIRCRAFT

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CAPSTAN SERVO KIT – INSTALLATION INSTRUCTIONS

Dynon Part #	QTY	Part Description
100976-011	4	AN365-1032A Lock Nuts
100977-000	8	AN970-3 Large Washers
100981-003	4	AN3H-6A Bolts - 3/4"
101056-000	4	Cable Clamps
101113-000	1	Bridle Cable Assembly

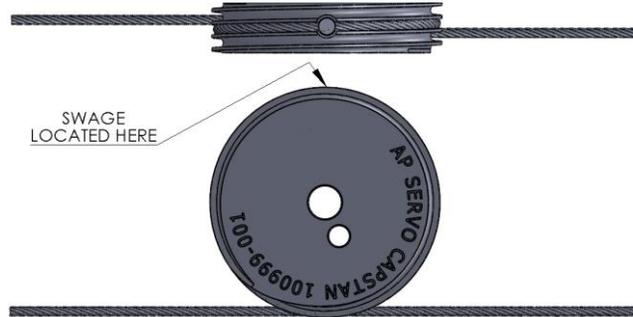
The capstan servo accessory kit includes the hardware necessary to attach one autopilot servo to one axis of the aircraft controls. This kit can be used in either pitch or roll applications that utilize pulley/cable driven controls (not suitable for use in pushrod linkage systems). Additional fasteners (not supplied by Dynon) will be required to mount the servo in the aircraft.

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 capstan to line up with the existing control cables such that the provided bridle cable can be attached at each end using the nylon clamps and ample room is available for the necessary motion of the system. The servo should also be mounted as close to the control cable as possible to reduce the angle between it and the bridle cable, but not so close as to rub during full range of control movement.

Once a suitable mounting location has been determined, the next step is to fabricate a bracket for the servo. Refer to the included servo dimensions below. We recommend that 4 AN3H-3A bolts be installed with MS35333-39 star washers (not provided). The 4 holes in the servo enclosure are fully threaded to facilitate ease of mounting from the top, bottom, or a combination of both. If necessary, removal of the capstan pulley and cable guard is permitted during fabrication of, and mounting into, a bracket. Remove and discard the cotter pin and unscrew the castle nut. Remove the wave washer, nylon washer, and finally the capstan pulley. Take care not to interfere with the installed **shear screw**, as it **cannot be removed without damage**. The provided cable guard screws are long enough to accommodate the cable guard being installed on top of a maximum of 1/16" bracket material. More than this will push the heads of the screw up to an elevation that will interfere with the reinstalled pulley. **Do not reinstall with different screws as they may protrude into the servo enclosure and damage internal components**. If the drive cable is not parallel to the servo, you may clock the cable guard to an orientation which allows the bridle cable to exit as required. Torque the #6-32 cable guard screws back to 8 in-lbs and reinstall the rest of the parts as they were removed. Torque the castle nut to 4.5 in-lbs, install and trim a new cotter pin.

Before final installation of the servo, assemble the capstan kit by removing the zip tie and unlooping the bridle cable. Remove the heat shrink from both ends of the cable. Locate the swage nest hole in the capstan pulley. The servo may need to be rotated to expose the hole if it is underneath one of the flanges of the installed cable guard. Do not bend the flanges of the cable guard away from the servo pulley; they are designed to keep the bridle cable from jumping grooves. Once the hole is located, pass one end of the cable underneath one of the cable guard flanges so that the cable will sit

in the center groove. Set the cable swage into the hole in the pulley and pass the other end of the bridle cable under the opposite flange. Feed both cable ends around the pulley and underneath the



CONFIGURATION 1:
1.0 wraps of the cable

next set of cable guard flanges following the grooves.

With the cable properly fed into the pulley, install the servo in the mount. Rotate the capstan until the installed swage sits on the opposite side of the pulley from where the bridle cable exits the servo (see figure 1). Set the control stick to neutral and then install the cable clamps using the provided AN3H-6A bolts, AN970-3 washers, and AN365-1032A lock nuts (see figure 2). The grooves in the cable clamps are designed to work with the provided bridle cable diameter of 1/16" (small groove) and aircraft control cable diameter of 1/8" (large groove). The bridle cable should be taught and have approximately 1" of cable protruding from the ends of the clamps. Torque them to 35 in-lbs to provide the appropriate clamp force on the cables.

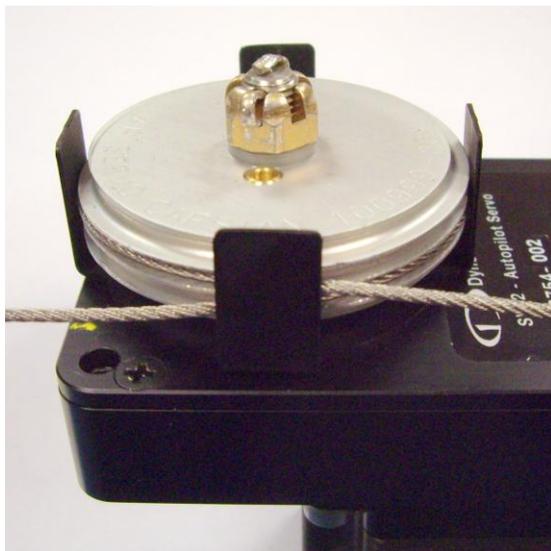


Figure 1

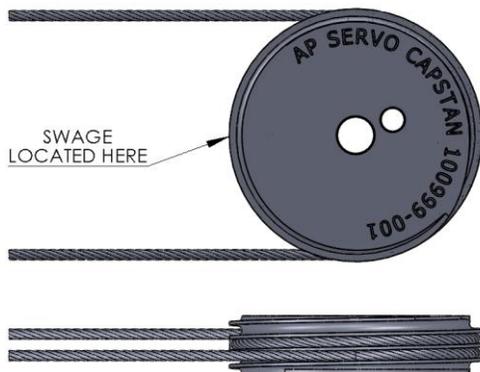


Figure 2

See figure 3 for an alternative configuration, with the two ends of the bridle cable exiting the pulley in the same direction on opposite sides of the pulley. In this configuration the ends of the bridle

cable would be attached to separate cables in the primary control system; ie the "up" and "down" cables for the elevator, or the "left" and "right" cables for the aileron. Note: the swaged index pin on the bridle cable should be positioned in the center of the pulley between the two bridle cables as they exit the pulley.

This second configuration is suitable for connection to elevator and aileron systems which function as "closed loops" in which it is not possible for any cable in the control linkage to experience slack in normal operation.



CONFIGURATION 2:
1.5 wraps of the cable



Figure 3

This configuration *****WOULD NOT***** be suitable for connection to a rudder cable system in which deflection of the rudder by the pilot could result in slack in any of the primary control cables or the attached bridle cable.

With the cable clamps attached, move the control stick fully in both directions several times. The servo action should translate to smooth and consistent feel at the control stick with no binding or rubbing. If there seems to be excessive friction, cable slop, or the cables have jumped a groove or fallen off the edge of the pulley, it must be reinstalled in a location that provides a better angle for interaction with the aircraft cable. Also verify the cable clamps do not come in contact with anything during full travel. The built-in control stops of the aircraft will limit the servo capstan rotation when installed correctly. It should never rotate more than 150 degrees in either direction from neutral.

For 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.

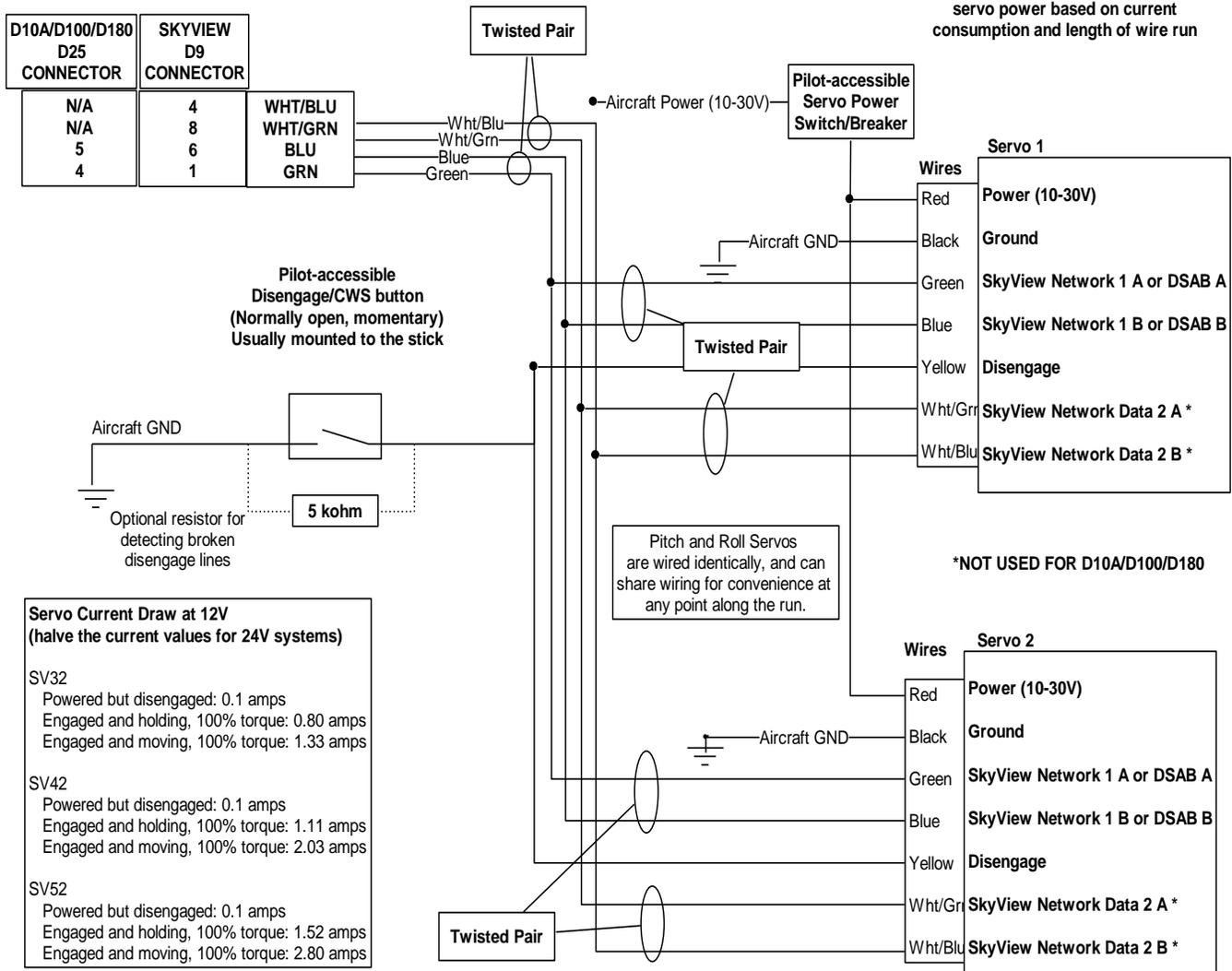


Wiring Overview

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. 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

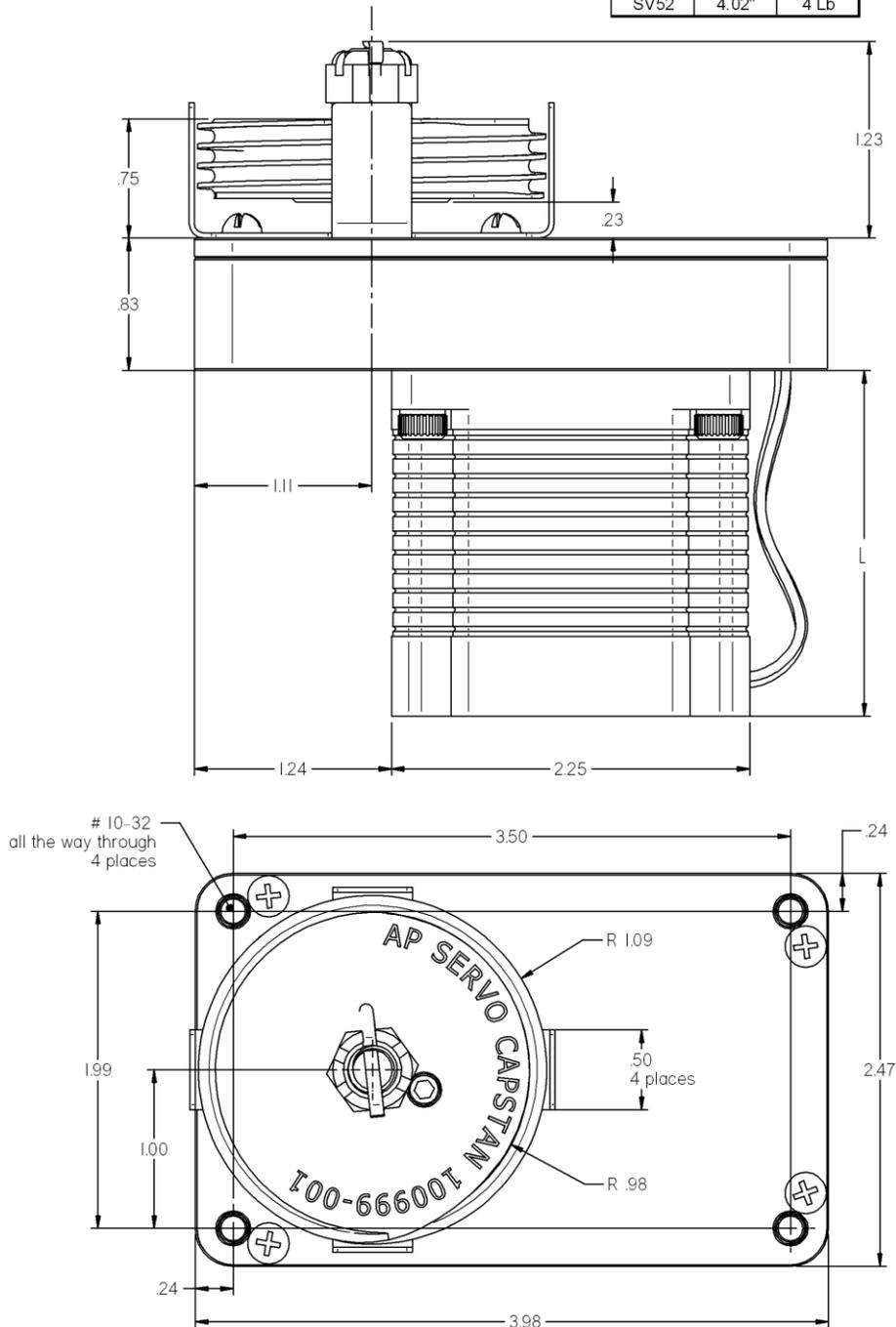




Servo Dimensions

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

	L	Weight
SV32	2.17"	2 Lb
SV42	3.10"	3 Lb
SV52	4.02"	4 Lb





- ! 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>.

