

Dynon Avionics Servo Shear Screw Replacement Instructions

In the event that a servo's original shear screw loosens, becomes damaged or breaks, action must be taken to service the screw. When followed properly, these instructions enable the customer to perform this task in the field. If the customer does not feel comfortable performing these actions, Dynon Avionics will be happy to inspect and/or repair servos as necessary.

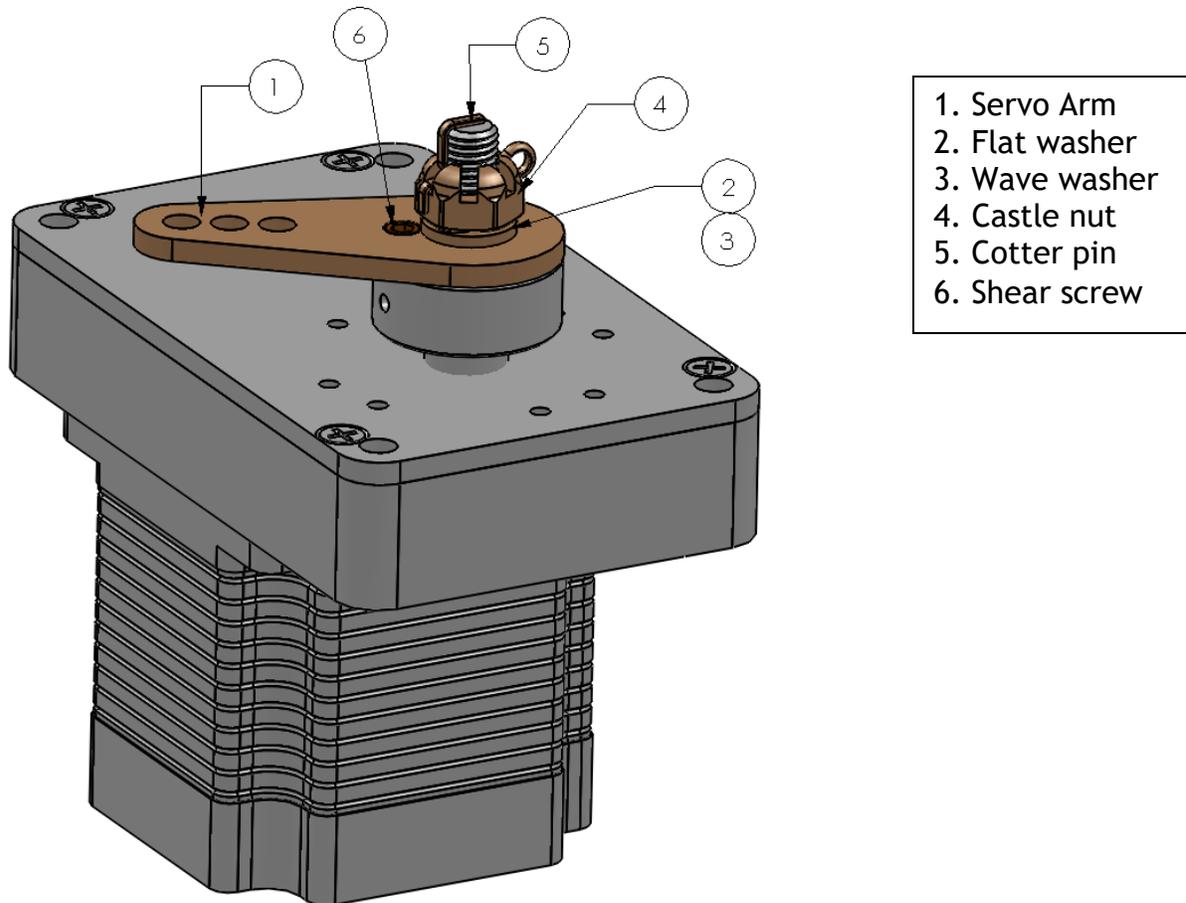


Fig 1



A shear screw is “loose” if the screw is no longer firmly seated in the threaded servo disc. This can be observed by holding the attachment disc completely still and attempting to rotate the arm/capstan. No movement should be possible. If there is any movement at all between these two parts, your shear screw is loose and should be repaired per the following instructions. However, slight movement of the ENTIRE arm/capstan/disc/shaft relative to the internal gearing is expected. This is inherent to the design and due to designed-in drive gear lash and tolerance of the shaft captured in the servo housing. Small amounts of movement here are normal and should not be confused with a loose arm/capstan or shear screw.



- ! Care should always be taken when reworking the safety mechanisms on the servos. These features were specifically designed to fail under certain conditions. Deviation from these instructions could result in property damage, injury, or death.

Removing Arm/Capstan

To fully access the shear screw the arm/capstan must be removed. To do this, the cotter pin must be removed from the castellated nut. Note that cotter pins should never be reused; **replace with a new pin**. Unthread the castellated nut, remove wave and nylon washers, and remove the arm or capstan. Put all these pieces aside - they will be reused.

Replacement of Broken or Loose Shear Screw

If the shear screw head has broken off, inspect the remaining threaded portion of the screw in the attachment disc. If the remaining threaded screw piece does not interfere with the arm - as is the case most of the time - it is not necessary to remove it as the threadlocker will keep it in place. However, if the broken neck tip of the screw protrudes past the face of the attachment disc hole or if the remaining screw portion seems loose, it must be removed. Clean the face of the attachment disc to remove any hardened threadlocker to prepare the area for the new hardware.

If the shear screw has loosened, simply unscrew it completely and remove as much residual threadlocker off the screw as possible and clean with isopropyl alcohol.

Clear the shear screw hole of any loose debris using compressed air.

Preparing/Installing Replacement Shear Screw

- ! This step requires **Loctite 271 or 263** red liquid threadlocker. **Substitutions are not permitted.**
- ! This step requires a torque wrench/driver that can measure 16 in-oz. (1 in-lb.) of force.

The servo attachment disc was designed with 3 threaded shear screw holes. This allows a new screw to be installed, in either of the two remaining threaded holes, even when the lower half of a previously sheared screw remains.

Apply a single drop of red Loctite 271 or 263 threadlocker to the threads of the replacement shear screw, **ensuring that the liquid wicks to all of the threads**. Install in any of the available servo disc holes. Tighten the shear screw to **16 in-oz (1 in-lb)**. **This torque value MUST NOT be exceeded** as it may fatigue or break the shear screw. Remember that in this application, it is the job of the threadlocker to keep the screw in place, not the stress of the screw's threads or head against the disc. Wipe excess threadlocker from around the head of the shear screw and allow it to cure for at least 24 hours at room temperature (colder temperatures may take longer) before the servo arm or capstan is reinstalled.

- ❗ Never “re-torque” or “re-tighten” the shear screw while it is installed in the servo. After the threadlocker has started to cure, it MUST be removed and reinstalled with fresh threadlocker per the above instructions.
- ❗ If you are experiencing several shear screw breaks contact Dynon Avionics Technical Support immediately as this may be an indication of other installation issues.

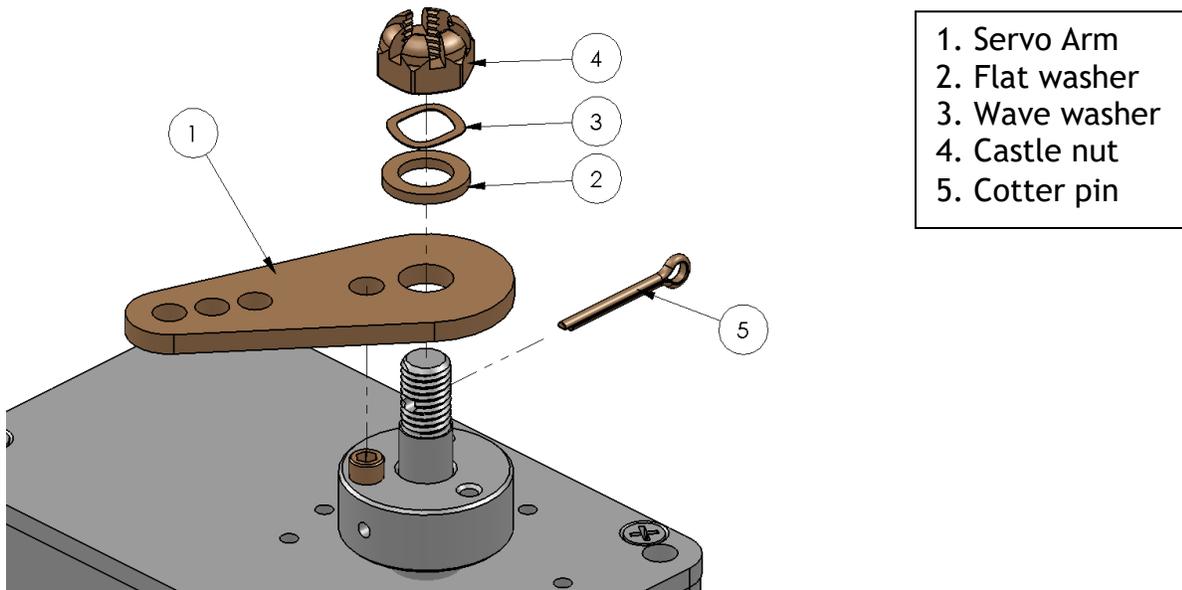


Fig 2

Reassembling the Arm/Capstan Stack

Once the threadlocker has cured, reverse the disassembly steps to install the remaining hardware. See Figure 2. Assembly order is:

1. Servo Arm/Capstan
2. Nylon Washer
3. Wave Washer
4. Castle Nut (AN310-5)
5. Cotter Pin (MS24665-210)

Tighten the castellated nut to finger tight, and then tighten until a slot in the nut lines up with the hole in the shaft for the cotter pin. **DO NOT EXCEED 72 in-oz. (4.5 in-lb.).**

Exceeding this torque specification will affect the yield torque of the safety shear screw, compromising the safety-enhancing intent of its design.

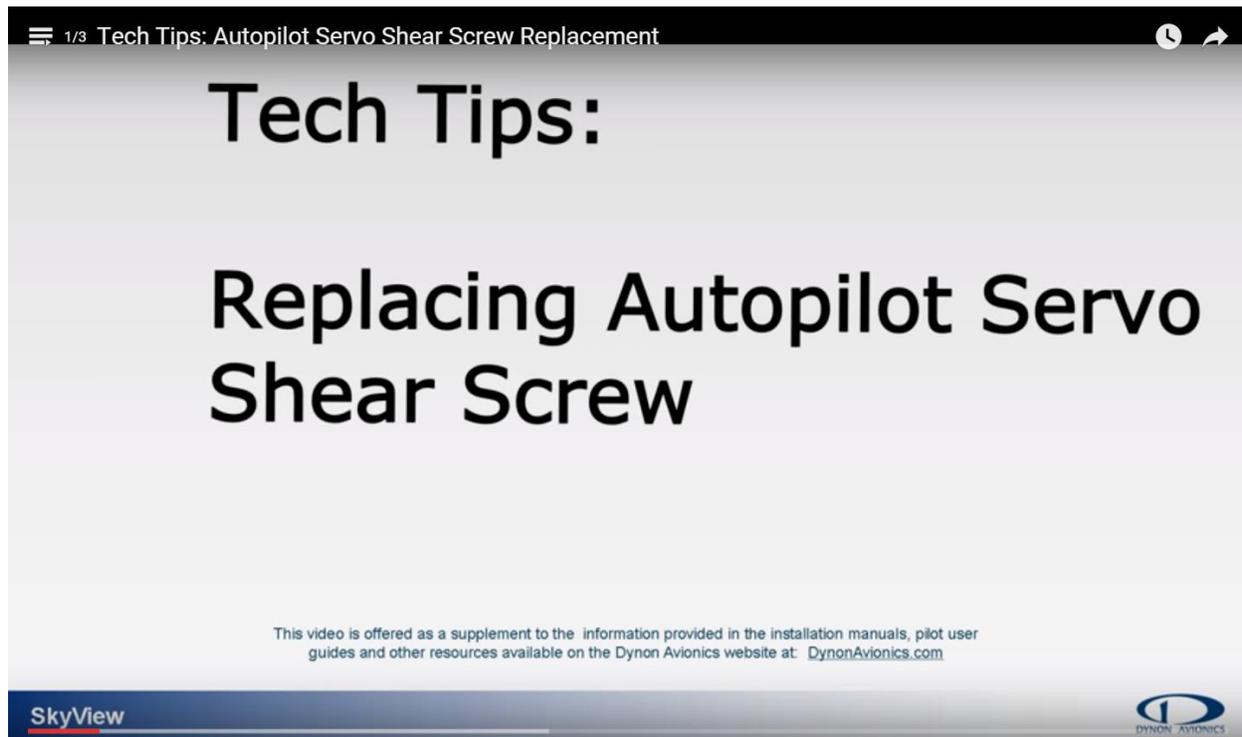
Install a new cotter pin, MS24665-210, following the standard method of trimming and bending the pin legs.

Servo arm/capstan rotation should be smooth. After the cure period, no movement should be observed between the arm/capstan and the attachment disc as described earlier.



Video Tutorial

In October, 2015, Dynon Avionics published a video tutorial by Dynon Avionics Engineer David Weber on how to replace a Dynon Avionics servo's shear screw.



This video can be found on The Dynon Channel (YouTube):

<http://dynonavionics.com/videos>

Short Link directly to this video:

<http://dynon.aero/shearscrewvideo>