




ENSTROM
HELICOPTER CORPORATION

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Menominee, Michigan P 906-863-1200
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Aircraft Series: Piston and 480

Effectivity: All S/N

Model (S): All

Customer Support Work aid Document

Bleeding Dampers

BACKGROUND:

Dampers are like oleos; the most important thing is that the three of them must have similar dampening characteristics. As they gain hours, the o-rings wear, softening the stroke, and as they age the o-rings harden also changing the stroking characteristics. If you change seals or valves in only one damper, the characteristics will no longer be the same between them. This will aggravate ground rock.

Many times, if you suspect damper problems, it is quite easy to get a quick idea as to the condition of a set of dampers.

Grasp the end of the blade, (there is no reason to lift it up) and give it a gentle shake back and forth.

All three of the dampers should feel the same. They can be stiff or soft but they must feel the same, in both directions. A low time damper should feel stiff and crisp, and older one with hours on it may feel squishy.

Then give it a brief hard pull, first in one direction and then in the other. You should feel the relief valve un-port (open) and then close again. The action of all six valves needs to feel the same. If you have one damper that feels different from the other two, this is the damper causing the problem.

A damper in good condition will normally run about 75 hours before it needs to be bled. (Assuming fairly normal temperatures and if the helicopter is not being used for auto rotation training). If the dampers are bled at the 50 hr. and 100 hr., the pilot will normally not experience any damper problems.

If a damper is pressurizing or taking on air, it is leaking fluid! The exception is if the damper is bled in the cold and then moved to a warmer environment. There is no way air can displace fluid unless the fluid is leaking out.

There are three styles of hydraulic dampers installed on Enstrom helicopters. Those with no ports on the top of the reservoirs, one port, and two ports. The latest style, which has two ports, actually has two reservoirs.

Current damper designs use a ruby orifice and a special two-piece rectangular piston seal. They have much more consistent stroke rates which helps tame the ground rock, especially if the landing gear oleo universal block drag is set properly.





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BLEEDING PROCEDURES:

Single Port Dampers:

If the damper has one bleed port on the top of the reservoir, the cap must be on and tight to bleed it. Hold one blade, (or tie it to the tail cone) and holding the tip of one of the other blades cycle it until both dampers have hit the stops. Then cycle the third damper to its stop. Do not cycle the dampers back and forth, this just scrambles the air and forces it all through the damper. Remove all three caps, top off the reservoirs, and replace and tighten the caps.

Then cycle the blades in the other direction, to the end of the damper stroke, remove the caps and top off the reservoirs again. Repeat this bleeding procedure a few times until the SF96-20 (Formerly L-45) level in the reservoirs stays full when the caps are removed. This procedure will also work on the latest two-cap style reservoirs in the absence of damper bleeding syringes, but it is necessary to remove all six caps to service the reservoirs.

Double Port Dampers:

To bleed the two-reservoir type dampers,(two caps on each damper), use the damper bleeding syringes(T-2896-1) for best results. Fill the syringes about ½ full of SF96-20 silicone oil, and then screw them into the damper reservoir. Give one of the syringes a gentle squirt, just until the air bubbles stop coming out of the damper into the other syringe. Then cycle the other syringe almost all the way to the bottom. The SF96-20 oil will cycle back into the first syringe, pushing one plunger up as the other is depressed.

The reason for the initial short burst is to prevent the air in the reservoirs from being forced all the way into the damper cylinder. Cycle the syringes back and forth three or four times or until the air bubbles stop coming out of the damper.

Install the inboard cap first; make sure the reservoirs are full before installing caps.

If you have to bleed dampers more than once in 50 hours, (the exception is a ship that is doing a lot of autos) there is a rule of thumb as to whether to repair or to overhaul.





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Repair or overhaul?

If the dampers have been in use for less than 5 years or 500 hours since the last overhaul, just replace the leaking seal and continue use. If the dampers have been in use for more than 5 years or 500 hours, overhaul all three dampers.

If the dampers have been in use more than a few years, do not replace valves in only one damper, do them all!

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