



THE ENSTROM HELICOPTER CORPORATION
TWIN COUNTY AIRPORT, P.O. BOX 490, MENOMINEE, MICHIGAN 49858

SERVICE INFORMATION LETTER

SERVICE INFORMATION LETTER NO. 0115

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Date: March 9, 1981

Subject: Improved Main Rotor Blade Damper

Models: All Models, F28A, F28C, 280 and 280C

Effectivity: All Serial Numbers

An improved damper design has been incorporated into current production helicopters and is available for retrofit to all model helicopters. The new damper (P/N 28-14375) incorporates more reliable pressure relief valving into the reservoir and the working orifice into the piston.

The changes in this damper will improve its reliability and increase the operational time between normal maintenance intervals. The older model (P/N 28-14264) damper can be reworked to the new configuration by Enstrom Customer Service.

NOTE

The 28-14375 dampers MUST be used in sets of three, only. DO NOT intermix with 28-14264 series dampers.

It is recommended that all owners and operators update their old dampers to the new configuration not later than at their next overhaul cycle. Contact Enstrom Customer Service for more details on the exchange program for reworked dampers.

Malfunction, servicing, disassembly and assembly instructions for the new 14375 damper are attached.

MALFUNCTION INDICATIONS

1. Forward flight

- a. A one per rev. vertical bounce.
- b. After sudden power or collective changes an undamped vertical bounce develops.

2. Ground check

- a. Undamped motion in lead-lag operation.

NOTE

Damper malfunction is caused by internal leakage due to scoring of internal surfaces, faulty “O” rings or a leaking relief valve.

LEAD-LAG CHECK

- 1. Raise blade off of its droop stop.
- 2. Move blade slowly fore and aft to cycle the damper.

NOTE

The damper should offer resistance through the complete cycle no undamped motion.

SERVICING and BLEEDING PROCEDURE

NOTE

These dampers can be serviced on or off of the aircraft.

- 1. Remove reservoir plugs (19).
- 2. Fill reservoir ports with L-45 Grade 20 silicone fluid by Union Carbide.
- 3. Replace reservoir plugs (19).
- 4. Cycle damper slowly a minimum of four times.

SERVICING and BLEEDING PROCEDURE Cont'd

NOTE

- a. Dampers on the aircraft are cycled by slow fore and aft movement of the rotor blade.
 - b. Cycling dampers off the aircraft can be done in the T-0051 damper cycling fixture.
5. Remove reservoir plugs (19).
 6. Check fluid level.
 - a. Full fluid level indicates damper is serviced, proceed to step 7.
 - b. Low fluid level - repeat steps 2 thru 6.
 7. Install reservoir plugs (19).
 8. Safety wire.

DISASSEMBLY (Ref. Fig 1)

1. Remove damper from helicopter.
2. Disengage locking feature on the rod end (1).
 - a. Straighten locking washer (3) tabs on -1 dampers.
 - b. Remove safety wire from lock (3) on -3 dampers.
3. Hold piston (10) shaft with tool T-0015.
4. Loosen lock nut (2).
5. Remove rod end (1).
6. Remove all safety wire.
7. Remove reservoir plugs (15) and (19).
8. Remove reservoir bolts (21) and washers (20).
9. Remove reservoir (13).

DISASSEMBLY Cont'd (Ref. Fig 1)

10. Remove sleeves (18) and “O” rings (17).
11. Pour fluid from reservoir (13).
12. If trouble shooting indicates malfunctioning relief valves, remove relief valves (25) using tool T-0091.

CAUTION

Field disassembly of relief valves (25) is not permitted. Relief valve setups and adjustments are critical and require special equipment.

Return valves to Enstrom Customer Service.

13. Remove bolts (22) and washers (23) from housing end cap (4).
14. Rotate end cap (4) approximately 45°, using soft mallet.
15. Remove end cap (4) by tapping outward on its corners.

NOTE

Remove all burrs from piston shaft to prevent damage to brass sleeve (5) during end cap removal.

16. Remove fluid.
17. Tap piston (10) out of housing (16) with a nylon drift.
18. Remove “O” ring (11) from piston (10).
19. Remove brass sleeve assemblies (5) from end cap (4) and housing (16) by heating the assemblies and press the brass sleeves out using tool T-0094.
20. Remove seal (7), “O” ring (6) and backup rings (8) from sleeves (5).
21. Inspect brass sleeve (5) inside diameter for scoring; replace if I.D. exceeds .753” or scores in excess of .001 are evident on all lands.

DISASSEMBLY Cont'd (Ref. Fig 1)

22. Discard "O" rings and seals.
23. Clean parts for inspection.
24. Remove bushing (27) from housing by pressing it out using a suitable size drift and tool T-0095.
25. Inspect face of bushings (26) for fretting and wear. DO NOT remove unless bushings need to be replaced. Upon replacement, bushings must be reamed with a 1/2" line reamer.

ASSEMBLY

1. Install MS 28774-116 back-up ring (8), MS 28775-116 "O" ring (6), MS 28774-116 back-up ring (8) and 1250075O-25OB seal (7) into brass sleeves (5).

NOTE

Trimming off the angled ends of the MS 28774-116 backup ring, as supplied will ease installation and should not affect their function.

2. Install brass sleeve assemblies (5) into end cap (4) and housing (16) by heating housing and end cap before pressing brass sleeve assemblies into position using tool T-0094.
3. Place housing (16) upright in a vise.
4. Check edges of housing for burrs. Remove burrs by light sanding with 320 grit abrasive if necessary

NOTE

- a. Insure components are free of dirt or other contaminants prior to assembly.
- b. Use ONLY L-45 Grade #20 Silicone fluid.
5. Lube inside of housing with silicone fluid.
6. Lube 2-326 N304-75 "O" ring (11) with silicone fluid and install on piston (10).
7. Install piston (10) in housing (16).

ASSEMBLY Cont'd

8. Fill housing with silicone fluid.
9. Lube 2-137 N304-75 "0" ring (12) with silicone fluid and install in housing (16) recess.
10. Lube "0" rings in brass sleeve (5) with silicone fluid and tap end cap (4) on piston (10) until seated on housing (6).
11. Install bolts (22) and washers (23) securing end cap to housing. Torque to 55-75 in-lbs.
12. If relief valves were removed for replacement, install present relief valves (25) obtained from Enstrom Customer Service in reservoir (13). Install valves using tool T-0091. Torque to 70-90 in-lbs.
13. Reposition damper to horizontal in vise.
14. Install MS 28778-2 "0" ring (17) into recess in reservoir (13).
15. Install sleeves (18) through "0" rings (17) in reservoir.
16. Install reservoir (13) on housing (16) with bolts (21) and washers (20). Torque to 55-75 in-lbs.
17. Install 3-10 N304-75 "0" rings (14) and plugs (15). Safety plugs and reservoir attach bolts.
18. Reposition damper in vise with reservoir ports up. Move damper piston approximately 1/2 inch off bottomed position.
19. Fill reservoir with silicone fluid.
20. Install MS 28778-2 "0" rings (24) and plugs (19).
21. Install locking hardware on rod end.
 - a. Nut (2) and locking washer (3) on -1 dampers.
 - b. Nut (2) and lock (3) on -3 dampers.
 - c. Apply Vibra-Tite (by The Oakland Company) to rod end threads.
22. Install rod end in position
 - a. Distance from center of rod end to top of jam nut is 1.000/.950.

ASSEMBLY Cont'd

23. Torque nut (2) to 290-410 in-lbs.
24. Secure rod end.
 - a. Bend locking washer (3) tabs over rod end (1) flats and nut (2) flats on -1 dampers.
 - b. Safety wire lock (3) to nut (2) on -3 dampers.
25. Bleed damper in T-0057 damper cycling fixture. (Ref. Servicing and Damper Bleeding procedures)
26. Safety wire all remaining bolts and plugs.
27. If required, install flanged bushings (26) utilizing an arbor press to seat each bushing.

CAUTION

Place tool T-0095 between “ears” on housing to prevent collapsing during press operation.

28. Press in bushing (27).

<u>ITEM</u>	<u>QUANTITY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	1	01-691-08	Rod End - Fiberglide (-1 Ass'y)
1	1	MXKJR-8R	Rod End - Heim (-3 Ass'y)
		MSSKR88-20BAC	Rod End - Helm (-3 Ass'y, Alternate)
2	1	AN316-8R	Nut (-1 Assembly)
2	1	NAS-509-8	Nut (-3 Assembly)
3	1	28-14248-1	Washer (-1 Assembly)
3	1	NAS-559-3	Type A Lock (-3 Assembly)
4	1	28-14265-1	End Cap
5	2	28-14356	Sleeve
6	2	MS28775-116	"0" Ring
7	2	12500750-250B	Seal
8	4	MS28774-116	Back-up Ring
9	2	2-25	"0" Ring - Parker
*10	1	28-14267-1	Piston (-1 Assembly)
*10	1	28-14370-15 (Pref)	Piston (-3 Assembly)
*10	1	28-14370-13 (Alt)	Piston (-3 Assembly)
*10	1	28-14267-13 (Alt)	Piston (-3 Assembly)
11	1	2-326	"0" Ring - Parker
12	1	2-137	"0" Ring - Parker
13	1	28-14366-1	Housing
14	2	3-10	"0" Ring - Parker
15	2	28-14368-1	Plug
16	1	28-14357-1	Housing
**16	1	28-14266	Housing (see Note)
17	2	MS28778-2	"0" Ring
18	2	28-14369-1	Sleeve
19	2	AN814-2DL	Plug
20	2	AN960PD10	Washer
21	2	AN4A-H14A	Bolt

<u>ITEM</u>	<u>QUANTITY</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
22	4	AN4-H10A	Bolt
23	4	AN960-416	Washer
24	2	MS28778-2	“O” Ring
25	2	28-14367-1	Relief Valve
26	2	28-14276-1	Flanged Bushing
27	1	28-14277-1	Bushing

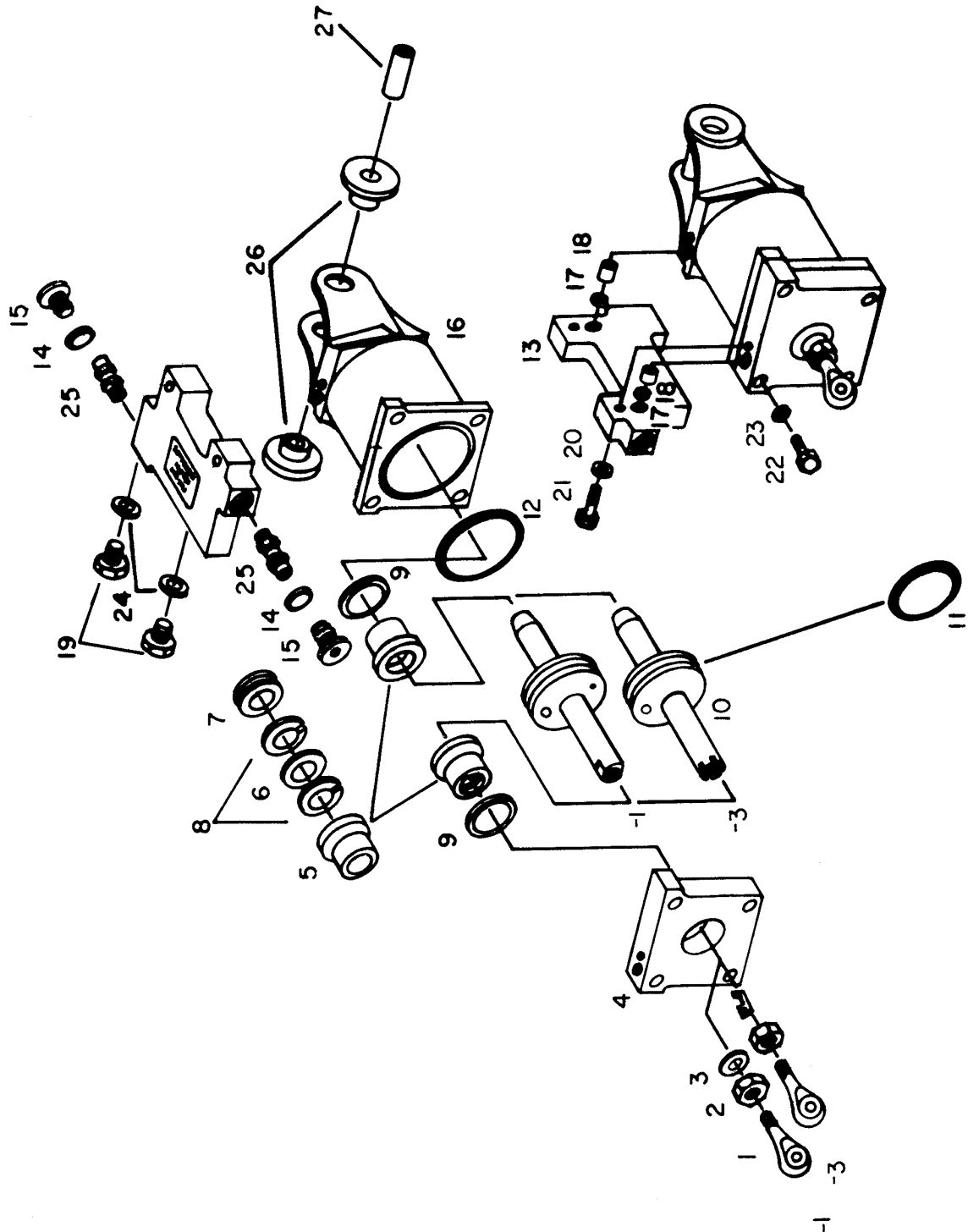
*NOTE: 28-1470-15 } Piston Req. { (1) 28-14372-1 Restrictor
-13 } { (1) 28-14371-1 Set Screw

28-14267-1 } Piston Req. { (1) 28-14372-1 Restrictor
-13 } { (1) 28-14371-1 Set Screw
(1) 5/16-24-1/4 lg Set Screw

**NOTE: Housing 28-14266 is used only with damper assemblies designated 28-14375-1RA or -3RA

SPECIAL TOOLS PARTS LIST

<u>TOOL NO.</u>	<u>FUNCTION</u>
T-0015	Piston shaft retention
T-0051	Damper cycling fixture
T-0091	Relief valve removal
T-0094	Brass sleeve assembly removal and installation
T-0095	Bushing installation



28-14375-1 & -3 DAMPER ASSEMBLY
FIG . 1