



Manual: CSP-COM-5, Component Overhaul Manual
Models: 369D/E/F/FF - 500/600N Helicopters
Issued: 17 August 1991
28 July 2007
25 March 2009

FILING INSTRUCTIONS:

1. Before you put this temporary revision in the manual, make sure the manual contains all the revisions from before. Look at the last revision List of Effective Pages.



Do not put this temporary revision in the manual, if the manual does not contain all the revisions from before.

2. To include this temporary revision in the manual, remove old pages and put in new pages as shown below.

Temporary Revision Number/Date	Section	Page	Page Revision
TR07-001/14 November 2007	63-20-00	517 and 518	TR 07-001
		305 and 306	TR 07-001
		401 and 402	TR 07-001
		511 thru 514	TR 07-001
		705 thru 708	TR 07-001
	63-25-10	509 and 510	TR 07-001
TR08-001/02 October 2008	63-25-20	709	Revision 17
		710	TR08-001
TR09-001/25 March 2009	63-25-10	707 thru 709	TR09-001
		710	Revision 17
		905	TR09-001
		906	Revision 4
		1003 thru 1005	TR09-001
		1006	Revision 14

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- (9). Apply light coat of gear marking dye (15) to several teeth on each gearshaft.

6. Final Reassembly

After no-load static wipe test is accomplished and correct contact pattern and backlash are established, accomplish final reassembly as follows:

- (1). Assemble output cover (19, Figure 1) and associated components into a single unit as follows:
 - (a). Apply light coat of sealing compound (7, Table 902) to outer mating surfaces of oil seal (23) Press seal into output cover (34) using suitable arbor press and adapter. Avoid distorting case of oil seal. Remove excess sealing compound.
 - (b). Lubricate O-ring (24) with petrolatum (5, Table 902). Place O-ring in groove of output cover.
 - (c). Remove outer race of bearing (25, Figure 1); apply locking compound primer and locking compound (29, Table 902) to faying surface of outer bearing race and bearing liner (26, Figure 1) in housing assembly (33). Fully seat outer bearing race in bearing liner. (Record rubber cure date on Overhaul Check Sheet).
- (2). Remove input bearing cover (7, Figure 2) from input shaft retainer assembly (1), and assemble retainer and associated components into a single unit as follows:
 - (a). Lubricate O-rings (5, 8) with petrolatum; install O-rings in grooves of input bearing cover.
 - (b). **369D25421-BSC, -3, and -5** - Apply light coat of sealing compound (7, Table 902) to outer mating surface of oil seal (6, Figure 2). Press oil seal into oil seal retainer (4) using arbor press and suitable adapter. Avoid distorting case of oil seal. Remove excess sealing compound.

- (c). **369D25421-7** - Press oil seal (6) into oil seal retainer (4) using arbor press and suitable adapter. Avoid distorting case of oil seal.
- (d). Lubricate O-ring (12, Figure 1) with petrolatum; install O-ring on input shaft cover assembly (10).
- (e). Lubricate O-ring (7) with petrolatum; install O-ring on liquid level plug (6). Install liquid level plug (6) in housing assembly (33); torque plug to **50 - 60 inch-pounds (5.65 - 6.78 Nm)**.

NOTE: If alignment of window markings does not conform to Figure 401, clean window and apply new level markings according to (Ref. Markings).

- (f). Lubricate O-ring (5, Figure 1) with petrolatum (5, Table 902), place O-ring on breather-filler assembly (3, Figure 1); install breather-filler assembly in housing assembly (33). See Figure 703 for installation diagram. Breather hole must be directed rear-ward as shown. If required, install washer(s) (4) (maximum of two) between breather flange and O-ring. Torque breather-filler to **45 - 55 inch-pounds (5.08 - 6.21 Nm)**.

NOTE: Locating vent hole at any angle aft of output gear shaft centerline (viewed from above) adequately directs vent rearward.

- (3). Lubricate O-ring (2) with petrolatum. Install O-ring on drain valve and chip detector (1) Install drain valve and chip detector in housing assembly. Torque valve body to **50 - 60 inch-pounds (5.65 - 6.78 Nm)**. Torque chip detector to **40 - 50 inch-pounds (4.52 - 5.65 Nm)**.
- (4). Install output shaft and retainer assembly as follows:
 - (a). Lubricate O-ring (5, Figure 3) with petrolatum and install on bearing retainer (3) of assembled output shaft and retainer assembly (21, Figure 1).

CAUTION When reinserting output shaft assembly into housing, carefully align race rollers of bearing (6, Figure 3) on output shaft (10) with outer bearing race (25, Figure 1), remaining in bearing liner (26) inside housing (33). Inner bearing race (7, Figure 3) should slide smoothly into outer race and rollers (6). If smooth fit does not occur, remove output shaft assembly and visually align rollers.

- (b). Heat output bore of housing assembly (33, Figure 1); install contact pattern shim (22), output shaft and retainer assembly (21) into housing assembly (33).

NOTE: An output gearshaft seal installation thimble may be fabricated as shown in Figure 903.

- (c). Apply light coat of petrolatum to outer surface of seal installation thimble and place thimble over splined portion of output gearshaft assembly (21).

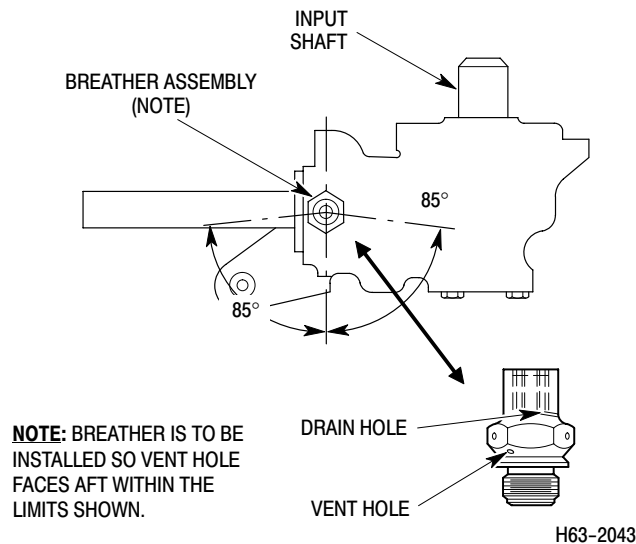


Figure 703. Breather-Filler - Installation

- (d). Apply light coat of petrolatum to lip and faces of oil seal (23); install output cover assembly (19) and clamp-up shim (20) over seal installation thimble and gearshaft (10, Figure 3). Remove seal installation thimble.

- (e). Install washers (18, Figure 1) and bolts (17). Torque bolts to **65 - 75 inch-pounds (7.34 - 8.47 Nm)**.

CAUTION Before installing bolts in the following step, position the TOP mark on the retainer up. This will position the oil passage correctly.

- (f). Install input shaft and retainer assembly (15) and backlash shim (16) with washers (14) and bolts (13); torque bolts to **65 - 75 inch-pounds (7.34 - 8.47 Nm)**.

CAUTION Rotate output shaft while tightening input shaft retainer bolts to check that input and output gearset do not bind.

- (5). Install input shaft cover assembly (10) with input cover shim (11) as follows:

- (a). Place input shaft cover shim against housing assembly (33) with input gear bearing (36) on end of input shaft and retainer assembly (15) squarely inserted into bearing retainer (27) in cover assembly.

CAUTION Press cover assembly against input shaft and retainer assembly (15) carefully. If excessive force is applied, bearing may be damaged.

- (b). Install washers (9) and bolts (8) finger tight, while manually applying force against external portion of input shaft and retainer assembly (15) to press input gear bearing (12, Figure 2) into bearing liner of input shaft cover assembly. Torque bolts to **22 - 27 inch-pounds (2.49 - 3.05 Nm)**.

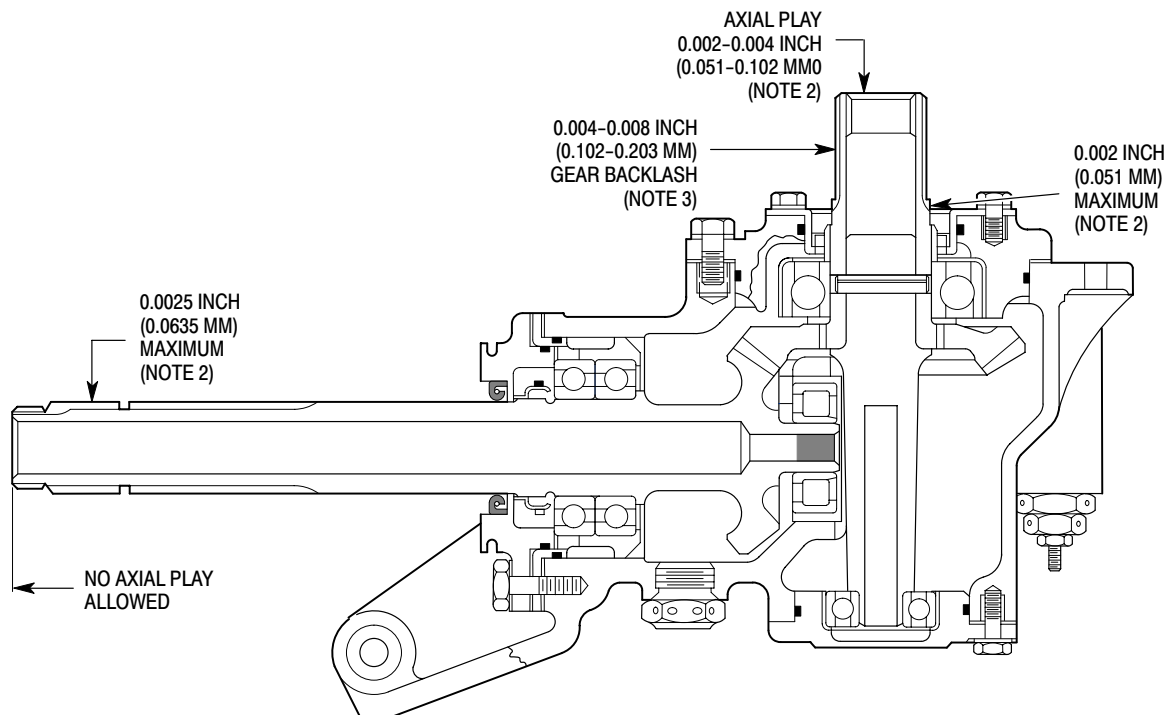
- (6). Install input bearing retainer assembly (1, Figure 2) as follows:

NOTE: An input gear shaft seal installation tool may be fabricated as shown in Figure 904.

- (a). Apply light coat of petrolatum (5, Table 902) to outer surface of input seal installation tool and install tool over input gearshaft assembly (11, Figure 2). Place thick portion of tool firmly against sleeve spacer (9).

- (b). **369D25421-BSC, -3 and -5** - Apply light coat of petrolatum to lip of oil seal (6); install oil seal retainer assembly (4) over input gear shaft oil seal installation tool and into input bearing cover (7). Press oil seal retainer firmly against input bearing cover. Remove input gearshaft seal installation tool.
- (c). **369D25421-7** - Fill space between inner and outer lips of oil seal (6) with grease (38, Table 902). Apply light coat of grease to sealing surface of input gearshaft assembly (11). Install oil seal retainer assembly (4) over input gear shaft oil seal installation tool and into input bearing cover (7). Press oil seal retainer firmly against input bearing cover. Remove input gearshaft seal installation tool.
- (d). Install washers (3) and bolts (2). Torque bolts to **22 - 27 inch-pounds (2.49 - 3.05 Nm)**.
- (e). Safety wire bolts and accessories as follows:
 - (f). Safety wire three output cover bolts (17, Figure 1) together. Run twisted safety wire around cover boss:
 - (g). Safety wire three input shaft cover bolts (8) together.
 - (h). Safety wire three input bearing cover bolts (13) in pairs with closest seal retaining bolts (2, Figure 2).
 - (i). Safety wire liquid level plug (6, Figure 1), drain valve and chip detector (1) and breather-filler assembly (3) to adjacent housing.
 - (j). Inspect reassembled transmission according to Figure 704 and Table 701.

NOTE: A run-in and test procedure (Ref. Run-In and Test) must be accomplished after performance of no-load wipe test (Ref. Final Reassembly) and completion of final reassembly.



NOTES:

1. MEASUREMENTS TAKEN AT POINTS INDICATED BY ARROWS.
2. TOTAL INDICATOR READING.
3. PULL OUT ON INPUT SHAFT WHEN CHECKING GEAR BACKLASH.

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Figure 704. Backlash, Runout and Axial Play Limits

Table 701. Final Inspection

Inspect	Method of Inspection	Remarks
Lockwire for security	Visual	Replace lockwire as required.
Housing for chipped paint	Visual	(Ref. Painting)
Gearshafts for freedom of movement	Rotate shafts by hand	Investigate malfunction if shaft or shafts bind.
For excessive noise when shafts are rotated (evidence of scraping or binding)	Rotate shafts by hand	Investigate malfunction if noisy.
Output gearshaft for 0.0025 inch (0.0635 mm) total indicator reading maximum runout on spline OD outboard of ring groove.	Rotate shafts by hand with indicator against shaft on spline OD (Figure 704)	Investigate if output shaft runout exceeds 0.0025 inch (0.0635 mm) total indicator reading.
Input gearshaft for 0.002 inch (0.051 mm) total indicator reading maximum runout	Rotate shafts by hand with indicator against shaft (Figure 704)	Investigate if input shaft runout exceeds 0.002 inch (0.051 mm) total indicator reading.
Input and output shafts for axial play	Apply axial load and use indicator.	See Figure 704.

7. Run-In and Test Check

The following contains run-in inspection procedures for the tail rotor transmission. The run-in inspection must be performed following final reassembly. The procedure may be performed with the transmission installed in a helicopter or in a test stand.

A. Special Run-In Options

NOTE: Certain units in the transmission have a direct relationship to establishing or changing the positioning of one gear to another. If the transmission housing and associated covers, gears, bearings or mounting distance shims and spacer that position the gears are not changed during overhaul, the contact pattern and backlash of the gears should also remain the same. If the contact pattern and backlash are within tolerance for USED GEAR PATTERN as shown in Figure 503 and Figure 507, perform a wipe test and, if satisfactory, run the transmission to check for correct temperature and pressure; if correct, the transmission can be continued in service on the helicopter.

- (1). Check of gear contact pattern following run-in can be eliminated on certain qualifying transmissions with a

resultant reduction in overhaul man-hours. During disassembly and overhaul, use the qualification checklist provided (Ref. Overhaul Check Sheet), see Figure 701 and steps (2). thru (4). below, to determine the status of the transmission.

- (2). Before disassembly, measure and record backlash.
- (3). During transmission disassembly, carefully record and tag all shims and spacers for shims thickness and location in the transmission.
- (4). Examine all gears for serviceability and contact pattern.

B. Run-In on Helicopter

Run-in and inspect reassembled transmission on helicopter as follows:

CAUTION Tail rotor rigging must be checked per CSP-HMI-2 prior to starting run-in of overhauled transmission.

- (1). Install tail rotor transmission on helicopter per CSP-HMI-2.
- (2). Service transmission with lubricating oil (2, Table 902) per CSP-HMI-2.

Table 902. Repair Materials (Cont.)

Item No.	Material	Specification No.	Name/No.	Manufacturer
36	Solvent, Cleaning Trichlorotrifluoroethane	MIL-C-81302D	Freon R-11, R-13 or R-112	Approved Engineering Test Labs 5320 West 104 th St. Los Angeles, CA 90045
37	Corrosion Preventative	MIL-C-81309 Type II	Corrosion X Fluid Film	Corrosion Technologies Corp. Eureka Chemical Co.
38	Grease, Aircraft	MIL-PRF-81322	Mobil Grease 28 Aero Shell 22	Mobil Oil Corp. 3225 Gallows Road Fairfax, VA 22037 Shell Oil Company 910-T Louisiana St. Houston, TX 77002

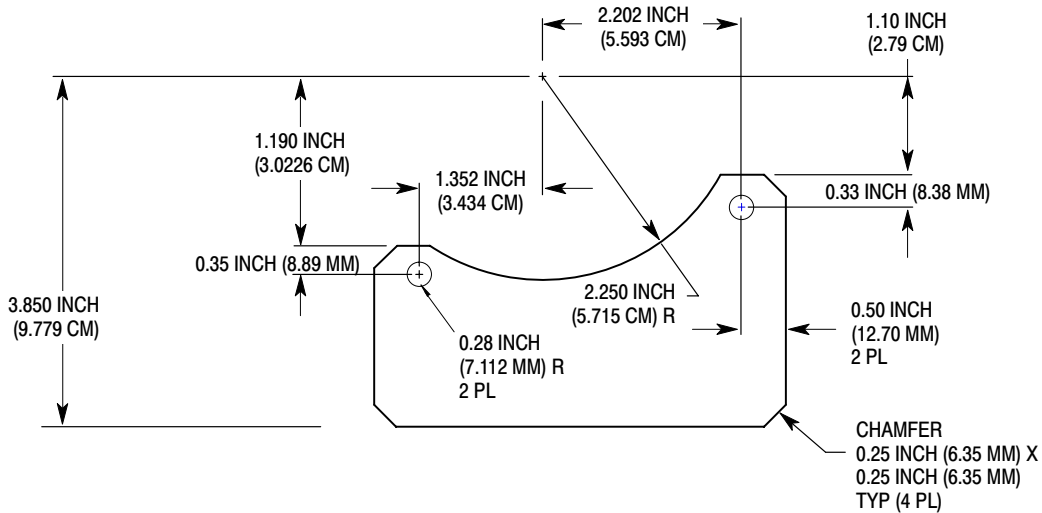
NOTES:

- (1) Numbers are U. S. A. Specifications and Standards. The prefix symbols are defined as follows:
 AMS – American Material Standard; MS – Military Standard; MIL – Military Specification; single, double or triple alpha prefix of the same letter – Federal Specification; AN – Air Force-NavyAeronautical Standard; NAS – National Aerospace Standard.
- (2) Primary selection. Any equivalent material may be used as an alternate selection.
- (3) Use the best equivalent commercial grade material when the conformity of available materials of the same type with the listed U. S. A. Specification No. cannot be determined.
- (4) Acceptable alternate materials for item 25 must have a melting point not to exceed 300°F (150°C).

Table 903. 369D25400 Tail Rotor Transmission Assembly Special Torques

Item	Index No.	Torque	
		(In.-Lb.)	(Nm)
Drain Valve and Chip Detector	1, Figure 1	50 – 60	5.65 – 6.78
Valve body Detector		40 – 50	4.52 – 5.65
Breather-Filler Assembly	3, Figure 1	45 – 55	5.08 – 6.21
Liquid Level Plug	6, Figure 1	50 – 60	5.65 – 6.78
Input Bearing Retainer Bolts	13, Figure 1	65 – 75	7.34 – 8.47
Input Shaft Cover Bolts	8, Figure 1	22 – 27	2.49 – 3.05
Output Cover Bolts	17, Figure 1	65 – 75	7.34 – 8.47
Locknut	2, Figure 3	800 – 1000	90.39 – 112.98

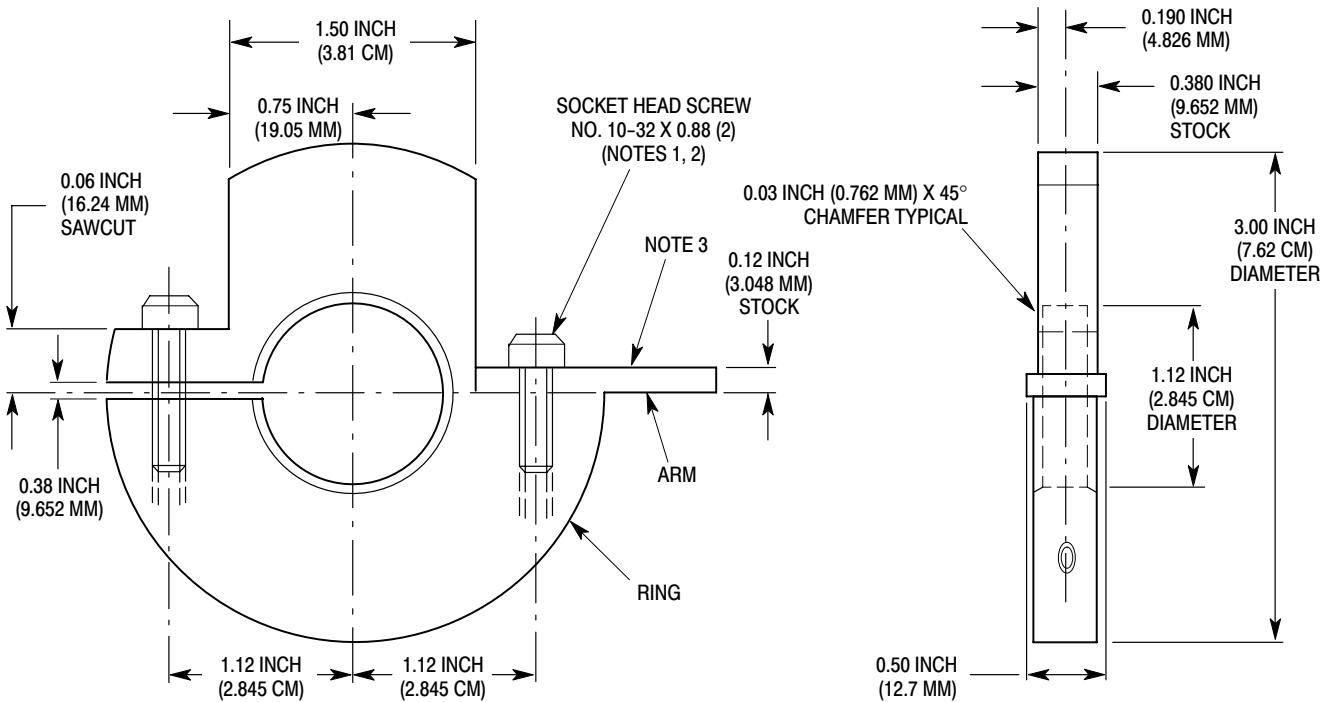
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MATERIAL: ALUMINUM ALLOY QQ-A-250
 SIZE: 0.25 INCH (6.35 MM) X 2.75 INCH (6.985 CM) X 5.00 INCH (12.7 CM)

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Figure 901. Assembly Stand – Fabrication



NOTES:

1. DRILL AND TAP NO. 10-32 THRU RING.
2. DRILL NO. 5 CLEARANCE HOLES FOR SCREWS THRU ARM AND THRU RING ABOVE SAWCUT.
3. MARK 1.745 INCH (4.432 CM) RADIUS ON ARM FOR 0.004-0.008 INCH (0.102-0.203 MM) BACKLASH CHECKPOINT.

ARM

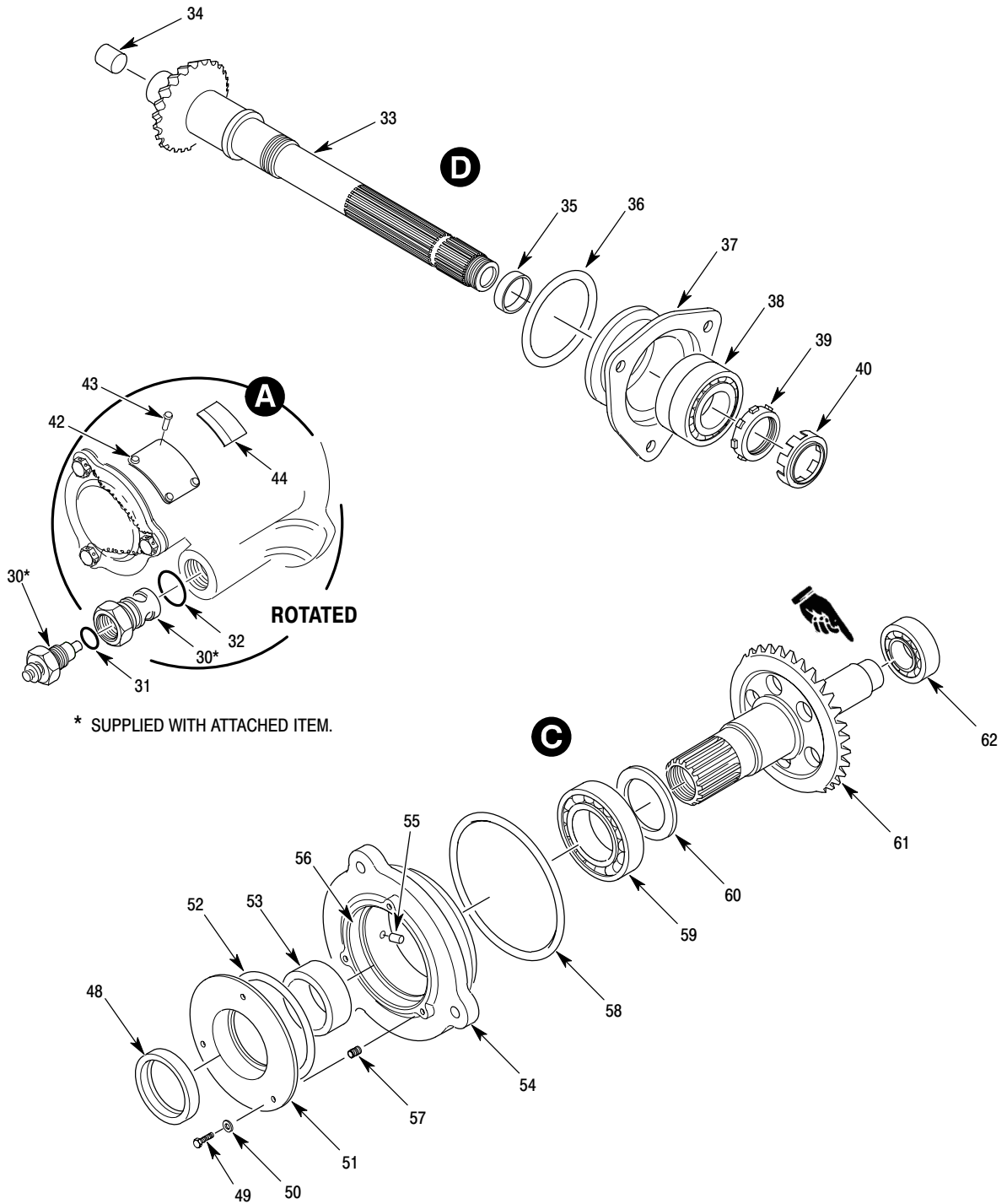
MATERIAL: ALUMINUM ALLOY QQ-A-250
 SIZE: 0.12 INCH (3.048 MM) X 0.50 INCH (12.7 MM) X 1.50 INCH (3.81 CM).

RING

MATERIAL: ALUMINUM ALLOY QQ-A-200
 SIZE: 3.00 INCH (7.62 CM) DIAMETER X 0.38 INCH (9.652 MM)

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Figure 902. Input Gearshaft Backlash Check Adapter – Fabrication



H63-2579-2A

Figure 1001. Tail Rotor Transmission (Two Bladed) (Sheet 2 of 2)

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Fig. & Index	Part Number	Description	Qty. per Assy.
1001-	369D25400	Transmission Assy, Tail Rotor	REF
1	369D25401	• Housing Assy	1
2	NAS1394C4	• • Insert	6
3	NAS1394C3	• • Insert	3
5	369D25414	• Shim	1
7	369D25427	• Spacer	1
6	369D25419	• Bearing, Output Pinion	1
8	369A5429-3	• Breather Assy	1
9	AN960PD1016L	• Washer	AR
9	NAS1149D1016J	• Washer	ALTN
10	3-907-47-071	• Packing, O-Ring	1
11	S53HK	• Plug, Liquid Level	ALTN
11	S53H	• Plug, Liquid Level	1
		For Replacement Order PS53B	
11	PS53B	• Plug, Liquid Level	1
12	369H5018	• • Decal, Oil Level Plug	1
13	NAS617-8	• Packing	1
14	NAS1303-3H	• Bolt	3
15	NAS620A10L	• Washer	3
16	369D25403	• Cover Assy, Input Shaft	1
17	369D25411	• • Liner	1
18	369D25416	• Shim, Cover Input Shaft	1
19	2-033-47-071	• Packing	1
20	NAS1304-5H	• Bolt	3
21	NAS620A416L	• Washer	3
22	369D25436	• Shim	1
23	NAS1304-6H	• Bolt	3
24	NAS620A416L	• Washer	3
25	369D25404	• Cover, Output	1
27	2-035-47-071	• Packing	1
28	369D25414	• Shim, Output	1
29	369D25422	• Seal, Oil	REPL
29	369D25422-3	• Seal, Oil	REPL
29	369D25422-5	• Seal, Oil	1
		Recommended With Addition Of Mobil SHC 626	
30	369A5160	• Detector, Valve And Chip, Electric	1
31	MS29561-111	• Packing	1
32	NAS617-8	• Packing	1
33	369D25430	• Gearshaft	1
34	23420-082	• • Cork	1
35	084957	• • Sleeve, Speedi	1
36	2-037-47-071	• Packing	1
37	369D25409	• Retainer	1
38	369D25420	• Bearing	1

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Fig. & Index	Part Number	Description	Qty. per Assy.
39	SL61N7F	• Locknut	1
40	SL61W7F	• Lockwasher	1
41	369F5175-1	• Decal (Service With Mobil SHC 626) Not Illustrated	1
42	369D25426-5	• Name Plate, Identification	1
43	AN535-00-2	• Screw	4
44	369A5014	• Plate, Warning	1
48	369D25421	• Seal, Oil Input Shaft	REPL
48	369D25421-3	• Seal, Oil Input Shaft	REPL
48	369D25421-5	• Seal-Oil Input Shaft Recommended With Addition Of Mobil SHC 626	REPL
48	369D25421-7	• Seal-Oil Input Shaft Recommended With Addition Of Mobil SHC 626	1
49	NAS1303-1H	• Bolt	3
50	NAS620A10L	• Washer	3
51	369D25413	• Retainer, Oil Seal	1
52	2-032-47-071	• Packing, O-Ring	1
53	369D25425	• Sleeve, Spacer, Input Bearing	1
54	369D25402-11	• Cover Assy, Input Bearing	1
55	NAS607-2-4	• • Pin	1
56	369D25410	• • Liner, Bearing	1
57	KN1032FSY	• • Insert	3
57	NAS1394-3	• • Insert	ALTN
58	2-152-47-071	• Packing	1
59	369D25417	• Bearing, Input	1
60	369D25435	• Spacer, Input	1
61	369D25434	• Gearshaft Assy, Input	1
62	369D25418	• Bearing, Input Shaft	1

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