Manual: CSP-HMI-2, Handbook of Maintenance Instructions
Models: 369D/E/FF - 500/600N Helicopters
Issued: 31 October 1990
Revision 32: 18 March 2002

FILING INSTRUCTIONS:

(1) Before inserting this change, ensure the manual is current.
Check the existing List of Effective Pages in the manual to ensure all prior revisions are inserted.
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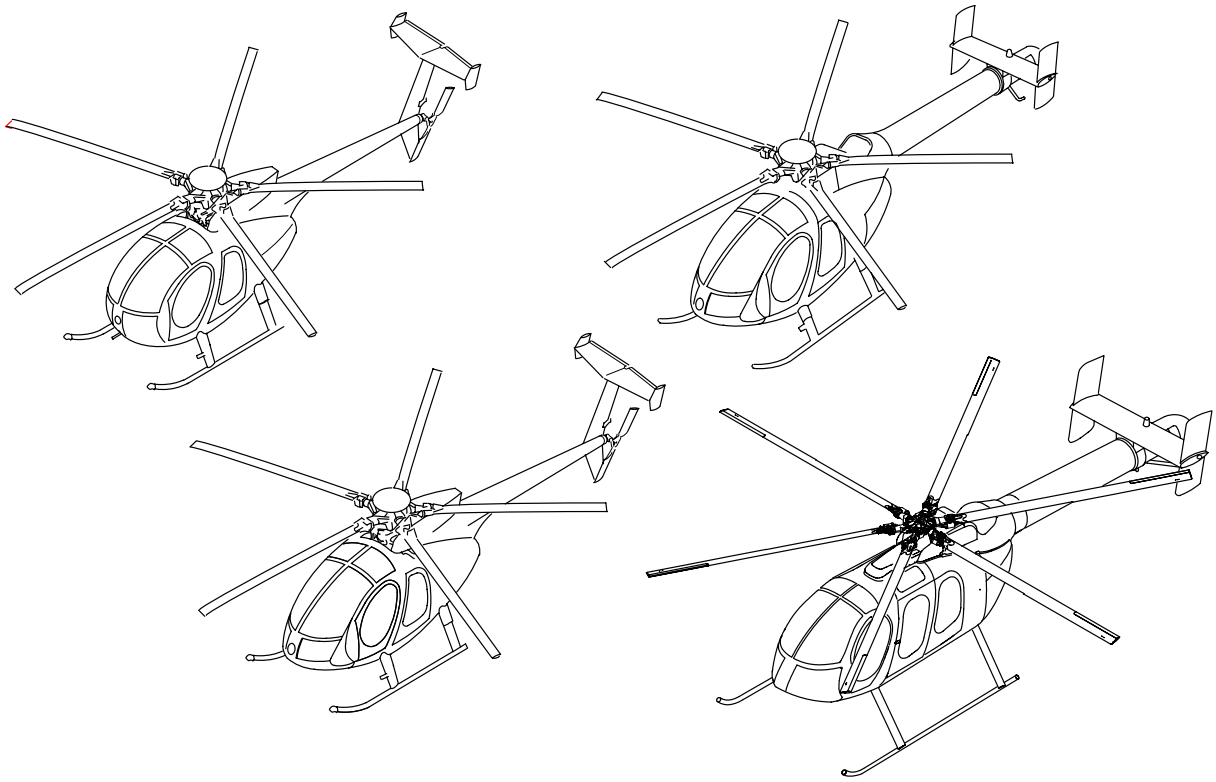
MDHI MODEL HELICOPTERS

MODELS 369D/E/FF – 500/600N

Basic Handbook of Maintenance Instructions

(CSP–HMI–2)

SERVICING AND MAINTENANCE



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Issued: 31 October 1990
Revision No. 32: 18 March 2002

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MD Helicopters, Inc.
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MD HELICOPTERS INC.

RECORD OF TEMPORARY REVISIONS

MANUAL TITLE: CSP-HMI-2 MAINTENANCE MANUAL

REV. NO.	DATE INSERTED	BY	DATE REMOVED	BY	REV. NO.	DATE INSERTED	BY	DATE REMOVED	BY
02–001			Removed by						
and			Incorporating						
02–002			Revision 32						

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Revision 23 . . . . . 1 June 1999
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601/(602 blank)	Revision 22
801/(802 blank)	Revision 22
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901 thru 905/(906 blank)	Revision 22
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201 thru 205/(206 blank)	Revision 22
CHAPTER 75	
i/(ii blank)	Revision 22

Table 1. ACTIVE SERVICE BULLETINS (Cont.)

369D	369E	369F	500N	600N	SUBJECT	DATE
				013R1	Low Fuel Level Warning Light	4–15–98
	090R1	077R1	017R1	014R1	Socket Contact Assembly Inspection	9–25–98
				015	Engine Fuel Control Box Replacement	4–23–99
				016R1	Audio Warning System Replacement	9–19–00
				017	FADEC Manual Switch Guard Modification	10–6–98
				018R1	Torque Pressure Transducer High Intensity Radiated Fields (HIRF) Protection Modification	2–7–00
				019	FADEC Wire Harness Standoff Installation/Inspection	4–23–99
				020R1	Electromagnetic Compatability Test (EMC) for Optional Equipment Effects on the FADEC Control	2–22–00
				021R1	Inspection/Reidentification/Serialization of Cyclic Control Stick Sockets and Left Hand Command (Co–Pilot) Cyclic Tube	3–11–99
197	091		018		Engine Fuel Pressure Switch Replacement	2–23–99
198	092				Tail Rotor Fork Inspection, Four–Bladed	5–10–99
				022	Torque Transducer Replacement	4–23–99
				023R1	Cyclic Stick Replacement	7–30–99
				024R1	Link Assembly Replacement	4–6–99
				025	Fuel System Inspection	7–2–99
199	093		019		Turbine Outlet Temperature (TOT) Indicating System, One Time Inspection	1–11–00
				026	Turbine Outlet Temperature (TOT) Indicating System, One Time Inspection	1–11–00
			020R2	027R2	Forward and Center Thruster Control Cables, Conduit Cap Relief Area, Inspection	4–24–00
			021	028	Forward and Center Thruster Cables, Conduit Cap at Telescopic Swivel End, Inspection	11–19–99
200	094	078	022		Landing Gear Strut Inspection and Fairing Modification	4–7–00
				029	Motive Flow Restrictor Removal	1–10–01
				030R1	Inspection of Vertical Stabilizer and Torque Tube and Replacement of Attaching Hardware	5–25–01
201R1	095R1	079R1	023R1	031R1	Main Rotor Blade Torque Event Inspection	7–24–01
				032	Turbine Outlet Temperature (TOT) Indicator Replacement	12–13–01
				033	Main Rotor Drive Shaft Life Reduction	12–13–01
				034	Torque Transducer Electrical Connector One Time Inspection	12–13–01
			024	035	Fan Pitch Control Aft Tube Assembly One Time Inspection	10–23–01
				036	Tailboom Assembly Attach Fitting One Time Inspection and Repair	11–2–01

4. Cancelled or Superceded Service Information Notices

(1). Table 2 a list of Service Information Notices that have been cancelled or superceded.

(2). Updated information, pertinent to the Notice, has been incorporated into the appropriate manuals.

(3). If the Notice is superceded by another Notice, it will be noted in the Subject column after the description.

5. Scope

The following is an explanation of how to read Table 2.

(1). **DN**-369D Model Helicopters
EN-369E Model Helicopters
FN-369F and 369FF Model Helicopters
NN-500N Model Helicopters.

(2). **Subject** - A brief description of the Notice.

(3). **Date** - Date the Notice was cancelled or superceded.

Table 2. CANCELLED OR SUPERCEDED SERVICE INFORMATION NOTICES

369D	369E	369F	500N	600N	SUBJECT	DATE
2.3					Main Rotor Strap Pack Lamination Inspection (Superceded by DN–154)	1–15–88
4.1					Main Rotor Blade Phasing, Tracking and Balancing	8–2–93
5					600–Hour Periodic Inspection – Model 369D Cyclic Control System	8–2–93
7					Installation of 369D21008 Main Rotor Pitch Control Rod Assembly, Upper and Lower Rod End Bearings	8–2–93
15					Periodic Inspection of 369D26300 and 369D26301 Landing Gear Damper Assemblies	8–2–93
28					Field Modification of 369D29919 Main Rotor Blade Phasing Kit to new 369D29919–501 Configuration	8–2–93
29.3					Periodic Replacement of 369H5655–3 and –5 Oil Cooler Blower Fan Bearings; Inspection of Pulley Attach Hardware and Driveshaft Couplings; Inspection and Adjustment of Fan Drive Belt; Driveshaft Compression Check	8–2–93
32					New Periodic Inspection Intervals – Battery Overtemperature Warning System	8–2–93
33.1					Replacement of 369A1602 Tail Rotor Drive Fork Hinge Bolt and 369A1603 Nut; New Assembly Procedure for Tail Rotor Hub and Drive Fork Unit; Periodic Check of Flapping Hinge Bolt Preload	8–2–93
38					Daily Inspection of 369H5307 Tail Rotor Stop and 369D21724–3 Support	8–2–93
41.1					Operational Check of Engine Fuel Pump Filter Pressure (Bypass) Switch Assembly	8–2–93
	2				Inspection of Spare Main Rotor Blade Root Fitting Assemblies; Inspection of Main Rotor Hub Lead–Lag Link Assemblies (Superceded by EN–42)	11–13–87
		2			Inspection of Main Rotor Hub Lead–Lag Link Assemblies (Superceded by FN–31)	11–13–87
53.1					100–Hour Periodic Inspection of Fuel Tank Sending Unit and Fuel Low Warning Light Indicating System	8–2–93
57					Field Repair of 369D21300 Pitch Housing Assembly, Main Rotor Hub	8–2–93
61.2					Periodic Check of 369D21400–502 and M50452 Main Rotor Elastomeric Damper Assemblies	8–2–93
64					Pilot/Operator Check of 369D21210–501 Main Rotor Hub Strap Pack Assembly (Superseded by DN–154)	1–15–88
74					Un–Assigned	
75.1					Procedure for Installation of Tail Rotor Drive Shaft (Superceded by DN–95)	9–27–82
77.1					Main Rotor Strap Pack Lamination Inspection (Superceded by DN–154)	1–15–88

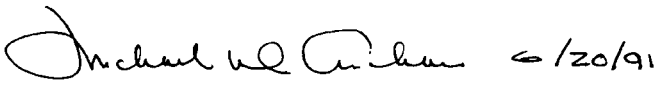
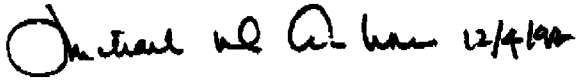
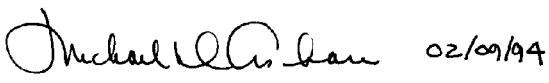
AIRWORTHINESS LIMITATIONS

Type Certificate No. H3WE

FAA Approved Airworthiness Limitations for MD Helicopters, Inc., Models 369D/E/F/FF and 500/600N.

1. General

The Airworthiness Limitations section is FAA approved and specifies maintenance required under FAR 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

REVISION:	DATE	FAA SIGNATURE AND DATE
Original Issue:	October 31, 1990	Not FAA approved
Revision 1:	March 29, 1991	Not FAA approved this revision
Revision 2:	May 10, 1991	
TR 91–001	August 12, 1991	
Revision 3:	September 9, 1991	
TR 91–002	November 5, 1991	
Revision 4:	January 20, 1992	
TR 92–004	May 20, 1992	
Revision 5:	August 24, 1992	
TR 92–005	November 20, 1992	
Revision 6:	December 21, 1992	
Revision 7:	June 1, 1993	Section 04–00–00 Not Affected This Revision
TR 93–002	May 27, 1993	
Revision 8:	July 23, 1993	
TR 94–001	January 21, 1994	

REVISION:	DATE	FAA SIGNATURE AND DATE
Revision 9:	April 22, 1994	James Lang ACTING MGR. 3-23-94
Revision 10:	September 26, 1994	Section 04–00–00 Not Affected This Revision
TR 94–002	October 24, 1994	Michael W. Adams 10/24/94
Revision 11:	January 18, 1995	Michael W. Adams 01/23/95
Revision 12:	October 6, 1995	Section 04–00–00 Not Affected This Revision
TR 96–002:	April 24, 1996	Michael W. Adams 04/24/96
Revision 13:	May 31, 1996	Michael E. O'Neil acting Mgr ANM-120L 6/12/96
Revision 14:	September 13, 1996	Michael W. Adams 09/09/96
Revision 15:	November 15, 1996	Section 04–00–00 Not Affected This Revision
Revision 16:	January 6, 1997	Section 04–00–00 Not Affected This Revision
Revision 17:	February 24, 1997	Michael W. Adams 02/20/97
TR 97–001:	July 2, 1997	Michael W. Adams 07/02/97
TR 97–002:	August 19, 1997	Michael W. Adams 08/19/97
Revision 18:	October 17, 1997	Section 04–00–00 Not Affected This Revision T/R 97–001 and 97–002 Previously Signed
Revision 19:	December 16, 1997	Michael W. Adams 12/19/97
TR 98–001:	March 25, 1998	Michael W. Adams 03/25/98
Revision 20:	June 1, 1998	Section 04–00–00 Not Affected This Revision T/R 98–001 Previously Signed
TR 98–002:	June 22, 1998	ACTING MGR. 7/10/98
TR 98–003:	3 August 1998	Michael W. Adams 8/3/98
Revision 21:	24 August 1998	Section 04–00–00 Not Affected This Revision T/R 98–002 and 98–003 Previously Signed

REVISION:	DATE	FAA SIGNATURE AND DATE
Revision 22:	10 March 1999	Section 04–00–00 Not Affected This Revision
Revision 23:	1 June 1999	Section 04–00–00 Not Affected This Revision
Revision 24:	7 December 1999	Maurice P. Cook ACTING MGR 12/30/99
Revision 25:	28 April 2000	Section 04–00–00 Not Affected This Revision
Revision 26:	17 August 2000	8/11/00
Revision 27:	9 October 2000	Section 04–00–00 Not Affected This Revision
Revision 28:	30 November 2000	Section 04–00–00 Not Affected This Revision
Revision 29:	11 May 2001	5/4/01 Richard E. Okel 5/14/01
Revision 30:	11 July 2001	Section 04–00–00 Not Affected This Revision
TR 01–001:	10 August 2001	8/8/01
Revision 31:	5 November 2001	Section 04–00–00 Not Affected This Revision T/R 01–001 Previously Signed
TR 02–002:	30 January 2002	1/23/02
Revision 32:	18 March 2002	3/15/02

This document conforms to Main Rotor Stress Analysis 369D/E, Rev. H.

This document conforms to Stress Analysis 369FF, Rev. N.

This document conforms to Service Life Analysis 500N, Rev. R.

This document conforms to Service Life Analysis 600N, Rev. L.

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AIRWORTHINESS LIMITATIONS

2. Component Mandatory Replacement

The Airworthiness Limitation Replacement Schedule specifies the mandatory replacement time, structural inspection interval and related structural inspection procedures approved per the certificate basis of the Type Certificate Data Sheet No. H3WE and CAR 6 (6.250, 6.251) and FAR 27.571 for models 500/600N unique components only. At the listed finite–life hours, components or assemblies must be removed from the helicopter and permanently retired from service. At the listed inspection interval, the components or assemblies must be inspected in accordance with the Handbook of Maintenance Instructions (HMI). The title of the task and section of the HMI are referred to which provide the inspection procedures and criteria.

(1). A “limited–life” item is a physical component of the helicopter to which a maximum number of allowable operating hours is assigned. Certain assemblies and components on the helicopter have a limited hourly life established by MDHI and approved by FAA Engineering. For example, a part with an assigned limit of 1000 hours, may accumulate 1000 hours of operation in service. Upon completion of the 1000 hours of operation, useful life of the part is ended. The number of hours assigned to different parts varies according to engineering fatigue tests, part experience, etc. The items listed in this section must be removed from the helicopter at the number of hours indicated.

(2). All parts not having an assigned life or stated to be of unlimited life, have a life of not less than 20,000 hours.

(3). When a limited–life item or an assembly that incorporates a limited–life item is installed on a new or used helicopter, the nomenclature, part number, serial number and current helicopter hours are recorded in the Log Book for the helicopter. Whether the limited–life item is new or used, the remaining number of useful life hours and previous inspection time, if applicable, for the item is added to the existing helicopter time. The total helicopter hours obtained then denotes the subsequent time at which the item must be removed from the helicopter or inspected.

(4). If a limited–life item is part of an assembly, the assembly must be removed from the helicopter when the time expires. The assembly may be overhauled and restored to maximum number of hours of useful life by installing new limited–life parts plus all other parts specified in the overhaul instructions (Refer to Component Overhaul Manual).

(5). If interchanged between different model helicopters (for instance, Model 369D to 369FF or vice versa), any component having a limited life or overhaul schedule must be restricted to the lowest service life or TBO schedule indicated for the helicopter models and serial numbers affected.

(6). Refer to the appropriate Allison Operation and Maintenance Manual for engine component replacement requirements.

3. Component Mandatory Inspections

Some components with mandatory inspection intervals require inspections to be completed in accordance with procedures detailed in other sections of this maintenance manual. The appropriate inspection procedures are referenced in the **Notes** flagged to each component to be inspected. All maintenance manual procedures which are referenced in the FAA Approved Airworthiness Limitations Component Mandatory Replacement Schedule are FAA approved procedures which cannot be changed without FAA review and approval of the proposed changes.

4. Retirement Index Number (RIN)

(1). A Retirement Index Number (RIN) is a number that accounts for different usage spectra in assigning the retirement time for a component.

The RIN is calculated as the sum of an adjustment factor times flight hours

plus another adjustment factor times Torque Events.

When a component reaches 1,000,000 RIN's, it has reached it's maximum life and is to be scrapped.

5. Torque Event (TE)

A Torque Event (TE) is defined as:

The transition to a hover from forward flight.

Any external lift operation.

NOTE: An external lift can either be on the cargo hook, external hoist or in external baskets.

For external lift operators, an external load is recorded as two (2) TE's (pick-up and drop-off).

Hover taxi with no external load will typically result in no TEs.

6. External Lift and Torque Event (TE) Requirements

The 369D/E/F/FF - 500/600N helicopters are multi-use helicopters. If the helicopter is used primarily for external lifts or training flights (high TE flights), there may be a reduction in inspection intervals of some components.

CAUTION For safe operation of the helicopter, TE's must be recorded in the Rotorcraft Log Book. Each external lift will be recorded as two (2) TE's.

(1). Determine the number of TE's and external lifts the helicopter accumulates per hour of flight time.

(2). Record all TE's in Rotorcraft Log Book and continue to record all TE's.

(3). Perform required TE inspections.

Table 1. Airworthiness Limitations Schedule

Component (1)	Model	Part Number (2)	Finite Life Hours (1)	Mandatory Inspection Hours
Main Rotor System				
Blade assembly, main rotor	369D/E(5)(6)	369D21100	3530 (37)	25 (11)(20)
		369D21100–516	3530 (37)	100 (20)
		369D21100–517	2500 (31)	25 (22)
		369D21100–517	3530 (37)	100 (20)
		369D21120–501	3530 (37)	100 (20)
		369D21100–523	4000 (37)	100 (20)
	369F/FF (6)	369D21102	3430 (37)	25 (11)(20)
		369D21102–503	3430 (37)	100 (20)
		369D21102–517	2500 (31)	25 (22)
		369D21102–517	3430 (37)	100 (20)
		369D21121–501	3430 (37)	100 (20)
		369D21102–523	4000 (37)	100 (20)
	500N (6)	369D21102–503	3430 (37)	100 (20)
		369D21102–517	2500 (31)	25 (22)
		369D21102–517	3430 (37)	100 (20)
		369D21121–501	3430 (37)	100 (20)
		369D21102–523	4000 (37)	100 (20)
	600N	369D21102–517 (21)	1900 (32)(37)	100 (20)
		369D21102–523	3200 (33)(37)	100 (20)
Folding pin, main rotor blade attach	369D/E/F/FF	369A1004	2850	
		369A1004–3	2850	
		369A1004–5	7600	
	500/600N	369A1004–5	7600	
Hub subassembly, main rotor	369D/E/F/FF 500N	369D21201	8900	
Pitch housing assembly, main rotor hub	369D	369D21300	9100	
		369D21300–501	9100	
	369E/F/FF 500N	369D21300–501	9100	
Retention strap assembly, main rotor hub	369D	369D21210	2770	100 (4)
		369D21210–501	2770	100 (4)
	369E/F/FF	369D21210–501	2770	100 (4)
	500/600N	369D21210–501	2770	100 (4)
Bolt – lead–lag hub, main rotor	369D	369A1220	6120	
	369D/E/F/FF 500N	369D21220	6120	
	600N	369D21220	5400 (34)	

Table 1. Airworthiness Limitations Schedule (Cont.)

Component (1)	Model	Part Number (2)	Finite Life Hours (1)	Mandatory Inspection Hours
Link assembly – lead lag hub, main rotor	369D/E	369H1203–BSC (39) 369H1203–21 (39) 369H1203–31 (39) 369H1203–51 (39) 369H1203–53 (40) 369H1203–61 (39)	5762 5762 5762 11080 11080 11080	25 (23) 25 (23) 25 (11)
	369F/FF	369H1203–21 (39) 369H1203–31 (39) 369H1203–51 (39) 369H1203–53 (40) 369H1203–61 (39)	5762 5762 11080 11080 11080	25 (23) 25 (11)
	500N	369H1203–51 (39) 369H1203–53 (40) 369H1203–61 (39)	11080 11080 11080	
	600N	369H1203–51 (39) 369H1203–53 (40)	11080 11080	
Lead lag damper – main rotor	369D	369D21400–501 M50452	6060 On Cond.	(16)
	369D/E/F/FF 500/600N	369D21400–503	On Cond.	(16)
Drive shaft, main rotor	369D/E	369D25510	5020	300 (8)
	369F/FF	369D25510	3675	300 (8)
	500N	369D25510–21	3260	300 (15)
	369D/E	369F5510	5020	
	369F/FF	369F5510	3675	
	500N	369F5510	3260	
	600N	600N5510	14000 (35)	
Mast assembly, main rotor	369D/E/F/FF 500N	369D22014	10450	
	600N	369D22014	3500	
Drive Shafts, Couplings and Clutches				
Drive shaft, main rotor transmission	369D/E/F	369A5510	3790	
Coupling, main transmission drive shaft	369D/E/F/FF	369H5660	4300	
	500N	369H5660	3200	
Overrunning clutch assembly	369D/E/F/FF 500/600N	369F5450–501	On Cond.	100 (24)
Sprag assembly, overrunning clutch	369D/E/F/FF	369A5364 369D25351	(3)	300 (10)
	500N	369D25351	(3)	300 (10)
	369D/E/F/FF 500/600N	369F5456	(3)	300 (17)

Table 1. Airworthiness Limitations Schedule (Cont.)

Component (1)	Model	Part Number (2)	Finite Life Hours (1)	Mandatory Inspection Hours
Drive shaft, fan	500N	500N5200	2620	
	600N	500N5200	1200 (36)	
Drive shaft, tail rotor	369D/E	369D25518	13900	
	369F/FF	369DSK152–11	13900	
		369D25518–503	14610	
Coupling – tail rotor drive shaft (Bendix) (**NOTE**: Not certified on 369FF Model) (9)	369D/E/F	369A5501	4980	
		369H92564 (7)	4980	
Anti–Torque System				
Gearshaft assembly, tail rotor input	369D/E	369D25434	12000	
	369F/FF	369D25434	3365	
Gearshaft, tail rotor output pinion	369D/E/F/FF	369D25430	7290	
Blade assembly, tail rotor	369D/E	369D21613	5200	
		369D21613–11	5140	
		369D21613–31	5140	
		369D21613–41	5140	
		369D21613–51	5140	
		369D21613–61	5140	
		369D21613–71	5140	
		369D21640 (38)	5140	
	369F/FF	369D21606	5140	
		369D21642 (38)	5140	
Blade assembly, tail rotor (optional 4–blade)	369D/E	369D21615	10000	
		369D21641 (38)	10000	
Hub, tail rotor	369D/E/F/FF	369A1725	3450	
Retention strap assembly, tail rotor	369D/E/F	369A1706	5100	
	369FF	369A1706–507	5100	
		369A1706–509	5100	
Blade assembly, NOTAR fan	500N	500N5310–15	7500	
		500N5310–19	7500	
	600N	500N5310–19	12500	
Hub, fan	500N	500N5352–7	7500	
		500N5352–9	7500	
	600N	500N5352–9	7500	
Shaft, NOTAR fan support	600N	500N5357–13	4000	
Pitch plate assembly	500/600N	500N5363–7	7500	
Tube assembly, fan pitch	500N	500N7113–3	600 (18)	
Rotating cone assembly	500N	500N3740–1	10000	
		500N3740–41	10000	
	600N	500N3740–61	10000	
Tailboom				
Bolts, tailboom attach	369D/E/F/FF	MS21250–06014	21950	

Table 1. Airworthiness Limitations Schedule (Cont.)

Component (1)	Model	Part Number (2)	Finite Life Hours (1)	Mandatory Inspection Hours
Tailboom assembly	369D/E	369D23500	10300	
	369F/FF	369D23500–507	10300	
	500N	500N3500–19	10000	100 (14)
		500N3500–29	10000	
		500N3500–501	10000	
		500N3600–501	2400 (19)	
	600N	600N3500–503	2500 (25)	
		600N3500–505	5900	
Empennage fittings	600N	500N3530–7/8	On Cond.	100 (26)
		500N3530–9/10	On Cond.	100 (26)
Vertical stabilizer assembly	369D/E	369D23600	12700	
	369F/FF	369D23600–505	3388	
Torque tube, horizontal stabilizer	500N	500N3950–5	5000	
	600N	500N3950–7	3000	
		600N3950	1000 (19)	
Horizontal stabilizer assembly (12)	369D	369D23601	7700	
	369E	421–087–505	7700	
		421–087–905 (13)	7700	
	369F/FF	421–087–503	7700	
		421–087–903	7700	
Controls				
Longitudinal idler bellcrank assembly	369D	369A7301	6500	
		369A7301–501	6500	
	369E/F/FF	369A7301–501	6500	
	500N	369A7301–501	2870	
Idler assembly, longitudinal pitch mixer	369D/E/F/FF	369A7603	13600	
	500N	369A7603	6050	
Longitudinal control rod	500N	369A7011–13	7740	
		369A7011–15	7740	
Socket, cyclic stick	600N	369A7141	1000	8 (27)
Cyclic tube assembly	600N	369D27132–503	1200	8 (27)
Housing, collective stick	600N	369A7347	450	
Tube, collective pitch control	600N	369A7348	400	
Tube assembly, collective pitch (pilot)	600N	369H7354–3	600	
Socket, cyclic stick	600N	369A7802	1000	8 (27)
Tube, collective pitch (co–pilot)	600N	369A7809	1800	
Housing, collective stick	600N	369A7820	450	
Housing, collective stick	600N	369H7837	450	
Tube assembly, collective pitch (co–pilot)	600N	369H7838–3	1000	
Fuselage Sta. 75 controls support bracket	600N	369N2608–11	6000	

Table 1. Airworthiness Limitations Schedule (Cont.)

Component (1)	Model	Part Number (2)	Finite Life Hours (1)	Mandatory Inspection Hours
Airframe				
Landing gear brace	600N	600N6010–17/19	5900 (28)	
Landing gear strut	600N	600N6022–7/8	696 (29)	
Landing gear foot	600N	600N6043–3	3900 (30)	
Floats				
Squib cartridge, used on Emergency float kit 369D292473–5, –6, –9, –10, –11, –12 **NOTE:** Life is based from original date of manufacture.	369D/E/F/FF 500N	12552–1 (Holex, Inc.) 281993 (Walter Kidde) 12754–1 (Holex, Inc.) 5003527 (Tavco)	5 years 5 years 5 years 5 years	
Stabilizer support, utility float	369D/E	369D292036 369DSK66	3190 3190	

NOTES:

(1) Life–limited components interchanged between models or configurations must be restricted to the lowest service life indicated for the models or configurations affected. Life–limited components removed at retirement are to be destroyed or conspicuously marked to prevent inadvertent return to service. Parts are applicable only on models under which a service life is listed.

(2) Service life shown for the basic (no dash number) part numbers apply to all dash numbered versions unless otherwise indicated.

(3) With no cargo hook attached: – No retirement life assigned (Ref. Sec. 05–10–00, Component Overhaul or Recommended Replacement Schedule).
With cargo hook attached and no separate log: – 1800 hours.
With cargo hook attached and with separate log: – 1800 hours of external load operating time when logged separately.
(For 369D/E/F/FF helicopters with 369A5364 or 369D25351 sprag assembly, Refer to AD 90–19–02.)

(4) Inspect in accordance with Main Rotor Strap Pack Lamination Inspection at 100–hour intervals, or 25–hour intervals if 2 laminates have failed in any one leg or tongue area of any strap assembly. A single cracked laminate between the shoes at the outboard end of a strap pack is cause for rejection of the hub assembly 369D/E/FF – 500N: (Ref. Sec. 62–20–00, Main Rotor Strap Pack Lamination Inspection).
600N: (Ref. Sec. 62–20–60, Main Rotor Strap Pack Lamination Inspection).
(For 369D/E/F/FF helicopters, refer to AD 89–02–01.)

(5) The 369D21100–513, –515, 516, 517 and –523 main rotor blades are not interchangeable with any earlier configuration blades (Basic, –505 or –509); however, the –505 and –509 blades are interchangeable and the –513 and –515 blades are interchangeable. The –505 and –509 configuration blades may be modified to the –513M configuration, which is fully compatible with the –513 blade. (For information concerning modification, contact MDHI Customer Service Department.)

(6) The 369D21120–501 main rotor blade has all the same inspections and interchangeability as the 369D21100–517 main rotor blade.
The 369D21121–501 main rotor blade has all the same inspections and interchangeability as the 369D21102–517 main rotor blade.

(7) Used with 369H90123 Rotor Brake Kit.

(8) Inspect main rotor drive shaft every 300 hours (Ref. Sec. 63–10–00, Main Rotor Drive Shaft Inspection (300 Hour)) (Reference AD 81–26–01).

(9) Failsafe device, P/N 369D25530 bolt and 369D25531 socket, must be used at both ends of tail rotor driveshaft in accordance with Tail Rotor Drive Shaft Installation with Bendix Couplings (Reference AD 86–20–07).

(10) For helicopters equipped with a cargo hook, inspect overrunning clutch sprag assembly P/N 369D25351, clutch inner race P/N 369A5353 and outer race 369A5352 every 300 hours (Ref. C.O.M., Sec. 63–10–10, Overrunning Clutch Sprag Inspection (300 Hour)). To establish time in service, either clutch total time with hook attached or a separate and permanent log of external load operating time per FAR 91.417, may be used.
(For 369D/E/F/FF helicopters with 369A5364 or 369D25351 sprag assembly, Refer to AD 90–19–02.)

(11) Inspect main rotor blade root fittings and main rotor lead–lag link assemblies every 25 hours in accordance with Main Rotor Blade Upper and Lower Root Fitting Attach Lug and Lead–Lag Link Attach Lug Inspection (25 Hour) and every 100 hours in accordance with Main Rotor Blade Upper and Lower Root, Fitting Attach Lug and Lead–Lag Link Attach Lug Inspection (100 Hour) (Ref. Sec. 62–10–00) (Reference AD 95–03–13).

(12) Tip plates, tip weights (where applicable) and attaching hardware have no retirement life and may be reused on replacement horizontal stabilizers.

(13) 421–087–903 and –905 require addition of tip plates, tip weights and attaching hardware before installation.

(14) Inspect the three upper slot bridges for cracks (Ref. Sec. 05–20–00).

(15) Inspect main rotor drive shaft every 300 hours (Ref. Sec. 63–10–00, Main Rotor Drive Shaft Inspection (300 Hour)).

(16) Inspect for deterioration every 600 hours up to a total time of 4200 hours and every 300 hours thereafter until deterioration is sufficient to retire assembly
369D/E/FF – 500N: (Ref. Sec. 62–20–00, Main Rotor Damper and Attachments Inspection)
600N: (Ref. Sec. 62–20–60, Main Rotor Damper and Attachments Inspection).

(17) For helicopters equipped with a cargo hook, inspect overrunning clutch sprag assembly P/N 369F5456, clutch inner race P/N 369F5455 and outer race 369F5453 every 300 hours. To establish time in service, either clutch total time with hook attached or a separate and permanent log of external load operating time may be used.

(18) 500N7113–11 tube assembly, fan pitch is an On–Condition item and replaces the 500N7113–3 tube assembly.

(19) Interim hours: life extension testing in progress.

(20) Inspect upper and lower blade root fittings every 100 hours in accordance with Main Rotor Blade Upper and Lower Root, Fitting Attach Lug and Lead–Lag Link Attach Lug Inspection (100 Hour) (Ref. Sec. 62–10–00)
(For 369D/E/F/FF – 500N helicopters, Reference AD 96–10–09).

(21) Main rotor blades, P/N 369D21102–517 with S/N 1976 thru 2100, 2106 thru 2115 are not to be installed on 600N helicopter (Reference Service Bulletin SB600N–007R2) (Reference AD 98–15–26).

(22) Inspect main rotor blades with 600 or more hours of operation every 25 hours of helicopter operation with a 10X magnifying glass for cracking of the lower surface of the blade emanating from the root fitting and doubler at the inboard end of the blade and to detect debonding between the blade root end fitting and doubler if missing or cracked adhesive or paint is observed. (Reference Service Bulletins SB369D–195R3, SB369E–088R3, SB369F–075R3, SB500N–015R3) (Reference AD 98–15–26).

(23) Perform Main Rotor Blade Upper and Lower Root, Fitting Attach Lug and Lead–Lag Link Attach Lug Inspection (25 Hour) up to a total time of 500 hours and every 15 hours thereafter and every 100 hours in accordance with Main Rotor Blade Upper and Lower Root Fitting, Attach Lug and Lead–Lag Link Attach Lug Inspection (100 Hour) (Ref. Sec. 62–10–00) until retirement of 369H1203–BSC and –21 Lead–Lag Link Assembly. (Reference AD 95–03–13).

(24) Inspect clutch retainer and bearing carrier for evidence of spinning and/or wear (Ref. Sec. 05–20–20).

(25) The 600N3500–503 tailboom may be reworked to a 600N3500–505 tailboom by modifying the attachment fittings to all–steel fittings.

(26) (Ref. Sec. 05–20–00) Using a flashlight and 10X magnifying glass, inspect horizontal stabilizer mounting brackets for cracks (pay particular attention to the forward inboard legs) (Ref. Tailboom Inspection).

(27) Sockets must be inspected for cracks every eight hours after the initial 100 hour inspection.

(28) Log all landings: Brace life is limited to 35400 logged landings or 5900 hours flight time if landing are not logged (assumed six landings per one hour of flight time).

(29) Log all landings: Strut life is limited to 4170 logged landings or 696 hours flight time if landing are not logged (assumed six landings per one hour of flight time).

(30) Log all landings: Foot life is limited to 23780 logged landings or 3900 hours flight time if landing are not logged (assumed six landings per one hour of flight time).

(31) The following main rotor blades have a finite life of 2,500 hours or 15,000 torque events*, whichever occurs first;
P/N 369D21100–517 with S/N H664, H665, H667, H669, H671, H672, H674, H676, H679, H680, H683 thru H724, H726 thru H999 and J000 thru J039, J041 thru J055 and
P/N 369D21102–517 with S/N 1976 thru 2100, 2106 thru 2115.
* TORQUE EVENT (TE) – A TE is recorded for every transition from forward flight to a hover (Reference Service Bulletins SB369D–195R3, SB369E–088R3, SB369F–075R3, SB500N–015R3).

(32) RIN = (200 x Hrs.) + (52 x TE).

(33) RIN = (160 x Hrs.) + (24 x TE).

(34) RIN = (153 x Hrs.) + (3 x TE).

(35) RIN = (50 x Hrs.) + (3 x TE).

(36) RIN = (768 x Hrs.) + (11 x TE).

(37) After accumulation of 750 flight hours and 13,720 TE, perform Main Rotor Blade Torque Event Inspection (Ref. Sec. 62–10–00) every 35 flight hours or 200 TE's (whichever occurs first).

(38) The 369D21640 tail rotor blade has all the same inspections and interchangeability as the 369D21613 tail rotor blade.
The 369D21641 tail rotor blade has all the same inspections and interchangeability as the 369D21615 tail rotor blade.
The 369D21642 tail rotor blade has all the same inspections and interchangeability as the 369D21606 tail rotor blade.

(39) The 369H1203–BSC, –11, –21, –31, –51 and –61 lead lag link assemblies can only be installed using the 369H1235–BSC bearing.

(40) The 369H1203–53 lead lag link assembly can only be installed using the 369H1235–1 bearing.

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CONTINUED AIRWORTHINESS
100–HOUR OR ANNUAL INSPECTION CHECKLIST

1. 100–Hour or Annual Inspection

This check sheet is designed to be used when performing 100-Hour or Annual inspections as defined under FAR, Part 43, Appendix D. This checklist, when completed, should be kept as a permanent part of the helicopter's records. Adherence to Maintenance Manual information is required, and the manual should be consulted when using the checklist.

NOTE:

- The Chap/Sect column of the following table is for reference unless a specific inspection requirement is called out. If there is only two numbers in the column, it refers to the Chapter. If there is three numbers, it refers to the Section the inspection is found.
- Refer to applicable Allison engine inspection check list for required engine maintenance.

Table 1. 100–Hour or Annual Inspection

Registration No._____ **Serial No.**_____
Helicopter Hours_____ **Torque Events**_____

Model	Requirement	Chap/Sect	Initial
	GENERAL		
ALL	Thoroughly clean helicopter and engine prior to start of inspection.	20	
ALL	Remove trim panels, covers and access panels as necessary.	52–50–00	
ALL	Ensure all placards and markings are installed.	11–00–00	
ALL	Ensure compliance with component mandatory retirement schedule.	04–00–00	
ALL	Calculate and record TE's or RIN's, of all affected components, in Table 2.	04–00–00	
ALL	Ensure compliance with component overhaul schedule.	05–10–00	
ALL	Ensure compliance with all applicable airworthiness directives, service bulletins and special inspections.	N/A	
ALL	Review aircraft maintenance records for recorded discrepancies and correct discrepancies as applicable.	N/A	
ALL	Refer to related manufacturer's publications for detailed requirements on inspection of engine, starter/generator, battery and all installed STC equipment.	01–00–00	
	EXTERIOR		
ALL	* Air intake for cleanliness and foreign matter. * Visible portion of engine compressor inlet for foreign object damage.	71	
CAUTION:	Ensure that compressor cover is installed to prevent FOD.		
ALL	Engine air plenum chamber for: * Damage and cleanliness. * Wear and security of internal components. * Particle separator mounting structure for cracks or damage.	71 53	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____			
Helicopter Hours _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
ALL	Fuselage upper surfaces for: * Damage and condition. * Mast base drain holes clean and free of debris (blow air thru holes to ensure no clogging). * Engine air inlet fairing free from damage. No delamination noted. Bypass door operationally checked. Seals free from damage. * Engine access doors for proper operation of latches and closure, distortion, damage, cracks and security.	52 53	
ALL	Fuselage for: * Damage and condition. * Compartment fresh air vents in doors and front of canopy for easy of operation and security. * Fuel cell vent fairings free of obstructions and obvious damage. * Pilot's and passenger/cargo compartment doors for condition of door glass, vents and proper operation of latching and locking mechanisms. * Door hinges and pins for play or wear. Ensure door pin locking tab is engaged with slot in frame. * No evidence of oil leakage around fuselage drain holes. * Aft fuselage internal skin surface, located directly above engine compartment, for evidence of cracks. Observe area through tail rotor control bellcrank access door.	52 53	
369D/E/FF	Sta. 142.0 tail rotor control bellcrank support for cracking or damage, use bright light and mirror (Ref. Upper Fuselage and Tailboom Control Linkage Inspection).	67–20–10	
500/600N	Anti–torque fan inlet for: * Screen for cleanliness and damage. * Attaching hardware for security. * Interior of fan inlet for cleanliness and damage. * Driveshaft cover for damage.	53	
ALL	* Check for no gap between tailboom and fuselage at attach points. * Check tailboom skin around stabilizer fittings for cracks. * Tailboom attachment–to–fuselage for security, evidence of corrosion or cracks, loose rivets or buckling.	53	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____			
Helicopter Hours _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
500/600N	* Thruster cones and tip cap (500N only) for damage and security. Inspect for wear between thruster cones and tailboom at points of contact. * Using a flashlight and 10X magnifying glass, inspect horizontal stabilizer mounting brackets for cracks (pay particular attention to the forward inboard legs) (Ref. Tailboom Inspection). * Using a bright flashlight, inspect fore and aft radii of the lower portion of the three upper slot bridges for cracks, illuminate area under the flap. The flap may be raised slightly, using finger pressure only, to aid in checking this area (Ref. Tailboom Inspection). * Using a bright light and 10X magnifying glass, inspect the four tailboom attachment lugs for cracks and fiber damage. Pay particular attention to area on top of the lug from the radius block to 2 inches aft (Ref. Tailboom Inspection). * Tailboom closeout fairings for security of attachment hardware. Inspect for damage and chafing between closeout fairing and tailboom.	53–40–30 53–50–30	
369D/E/FF	Horizontal stabilizer for: * Skin damage and loose rivets. * Tip plates for damage. Check for secure attachments (Ref. Horizontal Stabilizer and Tip Plates Inspection).	53–50–10	
500/600N	Horizontal stabilizer for: * Skin damage and loose rivets. * Mounting fittings for cracks and security. * Stabilizer attach bolts for security.	53	
369D/E/FF	Vertical stabilizer for: * Damage to leading and trailing edges and damaged stressed side panels (no repair of side panels permitted). * Mounting fittings for cracks and security. * Tail skid for obvious damage and security (Ref. Vertical Stabilizer Inspection).	53–50–10	
500/600N	Vertical stabilizers for: * Damage to leading or trailing edges and damaged side panels. * Mounting fittings for cracks and security. * Stabilizer attach bolts for security. * Stabilizer mount bushings for wear. * Excess play in control linkage, bearings and security of attaching hardware.	53	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____			
Helicopter Hours _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
	LANDING GEAR		
ALL	Landing gear skid tubes and fairings for: * Wear and damage in excess of permissible limits. * Upper fairing fillets for freedom of movement and general condition. * Strut attachment points for security and pivot (swivel) bearings for excessive play. * Landing gear dampers for correct extension, security of attachment and for signs of fluid leakage. Pivot bearings for excessive play. * Passenger steps for security and damage.	32	
369D/E/FF 500N	Remove landing gear fairing fillets and visually inspect landing gear strut assemblies for cracks and damage.		
369D/E/FF 500N	For aircraft 369D; 001 & subs, 369E; 0001 thru 0528, 369FF; 0001 thru 0114 and 500N; 001 thru 077: Remove plug button from inboard of fairing assembly. Using a bright light and 10X magnifying glass, inspect rivet hole in underside of strut for cracks. If crack is found, strut must be scrapped.		
	CABIN		
ALL	Compartment heat and anti–icing valve controls for: * Easy and correct operation and rigging. * Heating system heat diffusers for security.	21	
ALL	* Seat belts for condition and security. * Inertia reels for condition and proper extension/retraction.	25	
ALL	Pilot/copilot controls for: * Wear, looseness and general condition of control rods and rod end bearings. * Quick–release pins for condition. * Cyclic, collective and anti–torque controls for free movement. * Cyclic trim actuators for security. * Collective torque tube, support bracket and bungee support bracket for evidence of cracks, gouges or other visible damage in attach lug and bungee support bracket attach areas; gaps between bracket and cradle cap of collective torque tube (use bright light and mirror). * N_1 power controls for obvious damage. * Check for minimum cyclic friction adjustment (resistance to turning spring with fingers). * Flight control system one–way lock (Uniloc) for oil leakage, condition and security. Fluid reservoir 1/2 – 3/4 full; replenish if low.	67 76	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____			
Helicopter Hours _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
NOTE: With main rotor blades stationary, some friction drag is felt in the cyclic. The collective also has some drag, plus resistance of the collective bungee spring. Heavy drag is an indication of droop stop deformation caused by droop stop pounding.			
ALL	Engine N_1 and N_2 (N/A 600N) power controls for: * Free movement, full travel, security, obvious damage and proper rigging. * Pilot's and copilot's throttle rigging checks at **FULL**, **GROUND IDLE** and **CUTOFF** positions.	76	
	MAIN ROTOR		
ALL	Main rotor mixer control push–pull rods, links, scissors and bellcranks for excessive bearing play, bent rods or links, worn bushings and cracked bellcranks or brackets; all rodends centered.	62 67	
ALL	Main rotor pitch control rod assemblies, upper and lower rod end bearing for evidence of axial play and for any extrusion, displacement or damage to the bearing teflon liner. Check that all rodends are centered and security of lockwire (Ref. Pitch Control Rod Inspection).	62–30–00 62–30–60	
ALL	Swashplate for evidence of galling or corrosion of spherical bearing, and seals for deterioration and evidence of grease leakage. Upper and lower dust boots free from damage and security. Swashplate interrupters and magnetic pick–up secure.	62	
ALL	Main rotor hub retention strap assemblies for breaks or cracks in strap pack laminations. Check visible portions of both lead and lag legs of pack in each pitch housing (Ref. Main Rotor Strap Pack Lamination Inspection).	62–20–00 62–20–60	
ALL	Outboard ends of main rotor hub retention strap assemblies for gaps between pack laminates (Ref. Main Rotor Strap Pack Lamination Inspection).	62–20–00 62–20–60	
ALL	* Main rotor hub feathering bearings for excessive wear (Ref. Main Rotor Hub Inspection). * Main rotor droop stop ring for corrosion, dents and scratches. * Main rotor droop stop striker plate rollers for play and excessive wear.	62–20–00 62–20–60	
ALL	Main rotor blade damper assemblies for obvious damage, security and excessive play in blade and pitch housing bearings, bonding of elastomeric material and corrosion (Ref. Main Rotor Damper and Attachments Inspection).	62–20–00 62–20–60	
ALL	Using bright light and 5X magnifying glass, inspect all main rotor hub assembly lead–lag links for corrosion, discoloration, pitting, intergranular cracks or stress corrosion cracks. Any discoloration or pitting is evidence of more than superficial corrosion, and the main rotor hub must be removed for replacement of lead–lag links (Ref. Main Rotor Hub Inspection).	62–20–00 62–20–60	
ALL	Main rotor hub bearings for roughness by rotating main rotor assembly several times by hand and listening for unusual noise (Ref. Main Rotor Hub Inspection).	62–20–00 62–20–60	
NOTE: Do not confuse with normal no–load transmission and overrunning clutch noise.			
ALL	Main rotor blade and damper attach pins tight and levers properly locked.	62	
ALL	Entire trailing edge and tabs for nicks, scratches and cracks generating from trailing edge (Ref. Main Rotor Blade Inspection).	62–10–00	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____			
Helicopter Hours _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
WARNING: Using a bright light and 5X to 10X magnifying glass, inspect root fitting, attach lugs and doublers for cracks and security.			
ALL	Inspect main rotor blade root fittings, attach lug and lead–lag link attach lug every 100 hours in accordance with Main Rotor Blade Upper and Lower Root Fitting, Attach Lug and Lead–Lag Link Attach Lug Inspection (100 Hour). Pay particular attention to the lower side of the root fitting.	62–10–00	
ALL	Using a bright light and 10X magnifying glass, inspect main rotor blade abrasion strips for security of bonding on lower and upper surfaces, and by tapping at bond lines. Any blisters, bubbling or lifting of abrasion strip indicates a void (Ref. Main Rotor Blade Inspection).	62–10–00	
ALL	Tip area of main rotor blades for evidence of corrosion; pay particular attention to mating area of blade skin–to–tip weight interface; verify integrity of sealant coating (Ref. Main Rotor Blade Forward Tip Cap Inspection and Corrosion Protection).	62–10–00	
ALL	Drain holes in main rotor blade aft tip cap and vent holes in lower skin for clogging. Main rotor tip caps for security and evidence of corrosion.	62	
369D/E/FF 500N	Main rotor hub fairing for cracks, damage and security.	62	
	DRIVE TRAIN		
ALL	Main transmission lubrication and cooling system for: * Main transmission case and cooling installation for evidence of leakage and security of attachment. * Oil cooler blower, mount, ducting and hardware for security and damage. * Oil lines for chafing damage. * Clamps attached to oil lines for evidence of cushion wear or deterioration (if noted, remove clamp and inspect tube under clamp for chafing damage). * Pressure switch for security and deterioration; wiring for chafing.	63	
369D/E/FF 500N	Tach generator for security and deterioration; wiring for chafing.	63	
ALL	Rotor brake for: * Pucks and disc for wear and general condition. * Hydraulic lines for security and leaks. * Master cylinder for leaks. * Air in system (spongy feel at brake actuating handle when force is applied).	63	
ALL	Overrunning clutch for: * Evidence of oil leakage. * Proper operation: turn rotor in forward direction by hand – engine must decouple; turn rotor in reverse direction – engine must rotate (listen for turbine noise during reverse rotation). Rotor brake disc should not drag.	63	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____ **Helicopter Hours** _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
NOTE: Normal seal drag may be sufficient to rotate engine at low rpm.			
369D/E/FF 500N	With 369A5350 overrunning clutch installed, regrease clutch splines.	63	
ALL	Engine–to–main transmission drive shaft couplings and shaft for condition and security of attachment. Bendix couplings only: inspect shaft coupling diaphragms for scratches, nicks or cracks (Ref. Main Transmission Drive Shaft Inspection (Bendix)).	63–10–00	
500/600N	* Main transmission–to–fan transmission drive shaft for dents, bulkhead chafing and obvious damage. * Inter–Connect drive shaft for dents and obvious damage. * Free movement of control rod thru interconnect drive shaft.	63	
369D/E	Bendix couplings only: Check tail rotor blade tip movement in excess of 0.75 inch, without main rotor blade movement, when tail rotor blades are rocked back and forth in plane of rotation.	63	
369D/E/FF	Tail rotor drive shaft for: * Evidence of buckling, dents, bulkhead chafing and obvious damage. * Align aft coupling index stripe with corresponding tail rotor transmission stripe and verify that bulkhead–to–drive shaft index stripes align (Ref. Tail Rotor Drive Shaft Twist Inspection).	63–15–10	
ANTI–TORQUE			
Tail Rotor System			
369D/E/FF	Tail rotor transmission for: * Corrosion, excessive oil leakage, cracks and other damage. * Check torque of mounting nuts (also tailboom extension hardware on 369FF helicopters) (Ref. Tail Rotor Transmission Installation).	63–25–10	
369D/E/FF	Tail rotor pitch control assembly for: * Binding and unusual sounds (teeter blades to check for binding). * Teeter bearings for axial or radial play (no play allowed). * Control rod, pitch control links, hub and drive fork for play or damage. * Boots for installation and deterioration. * Retaining nut and lockwasher secure (no broken tangs noted and nut has not rotated). * Pitch control for evidence of seal rotation or loss of grease.	64	
369D/E/FF	Drive fork for; * Elastomeric bearing elements for bond failure. * Apply teetering force by hand (stop–to–stop) to rotor blades and inspect elastomers for radial–molded ridges on each bearing face. Discontinuity in molded ridges indicates bearing failure. There should by no apparent motion between the cage and fork, observed motion indicates bond failure.	64	
NOTE: Light swelling, pock marks and crumbs are surface conditions and do not indicate bearing failure.			
369D/E	If equipped with conical–type teetering bearings, torque check teeter bolt.	64	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No._____ **Serial No.**_____

Helicopter Hours_____ **Torque Events**_____

Model	Requirement	Chap/Sect	Initial
369D/E/FF	Tail rotor blades for: * Evidence of damage, including leading edges, trailing edges, skin. * Open vent and drain holes. * Loose or damaged tip caps. * Rivets securing tip cap for installation and condition. * Abrasion strips free of damage, no excessive erosion noted and no separation in bond around edges or at tip end of blade (Ref. Tail Rotor Blade Inspection). * While holding hub stationary, check tail rotor blade pitch bearings for lead–lag play in excess of 0.250 inch (6.35 mm) at blade tip. If excess play is found, remove blades, replace pitch bearings and inspect hub–to–pitch bearing contact surface of hub (Ref. COM).	64–10–00	
369D/E/FF	Perform Tail Rotor Balance.	18	
	NOTAR® Anti–Torque System		
500/600N	* Rotate rotor system and check for unusual noises. * Fan assembly for cleanliness and damage. * Fan blades for excessive play. * Fan seal for cleanliness, cracks, damage and corrosion. * Check gap between fan blades and tip seal. * Check gap between fan blades and hub.	64	
NOTE: If any of these gaps for any blade exceeds the average gap of the other blades by more than 0.10 inch (2.54 mm), remove and inspect the tension–torsion strap for that blade.			
500/600N	Perform Fan Blade Inspection (100–Hour).	64–25–30	
500/600N	Fan Transmission for corrosion, excessive oil leakage, cracks, damage and security on mounting frame. Drain line for cracks and security.	63	
500/600N	Rotating cone control tubes and cables for freedom of movement and unusual sounds.	67	
	ELECTRICAL		
NOTE: When possible, use auxiliary power source, not battery, during **POWER ON** inspection.			
ALL	**XMSN OIL TEMP, FUEL FILTER** and **CHIPS** warning lights; electrical circuits for continuity to lamps by connecting jumper wire from each sender or chip detector terminal stud to an unpainted grounding surface; check each light for illumination (Ref. Caution/Warning System Operational Check).	95–00–00	
ALL	Push **PRESS TO TEST** switch: all caution and warning lights **ON**; depress instrument light rheostat knob; verify **CAUTION** lights dim.	95	
369D/E/FF 500N	Conduct operational check of automatic reignition system; igniter noise heard and reignition indicator light functions. Reset as required.	PFM	
CAUTION: Do not leave landing light **ON** for more that one minute during next check; lamp will overheat and lamp life will be shortened.			
ALL	Exterior lighting (landing, position and anti–collision lights) for proper operation; all switches **OFF** after check.	96	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____			
Helicopter Hours _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
WARNING: Do not leave pitot heater ON for more than one minute during next check; severe burns to personnel may result.			
ALL	**PITOT HTR** switch **ON** for a few seconds. Heated pitot tube will feel warm to the touch; turn switch to **OFF** after check.	95	
600N	Apply power to aircraft and disconnect CIT sensor (Ref. CIT (Compressor Inlet Temperature) Sensor Replacement); Verify ECU FAIL light illuminates. Re–connect CIT sensor.	76–00–00	
ALL	Clean battery and inspect for: * Connector pins for evidence of corrosion. * Leakage (if battery is leaking (wet), remove and replace battery). * Battery case for cracks in support flanges. * Dc wiring for chafing caused by wiring rubbing against battery case. * Deep cycle charge (recondition) battery every 100 hours or on conditional basis at operator's discretion.	96	
ALL	Functionally check and inspect all installed avionics, auxiliary or optional systems and equipment. Do not actuate hoist guillotine or emergency floats.	97	
	ENGINE COMPARTMENT		
ALL	Exhaust stack(s) and exhaust supports for cracks, defects and improper attachment.	78	
ALL	Engine compartment plumbing and electrical relay installation on left or right side oleo (landing gear damper) support fitting for good condition and security of mounting. Diodes for broken terminals and wires. Diode bracket for security and corrosion.	96	
ALL	Entire engine for: * Loose bolts; loose or broken connections. * Accessories for security and broken or missing lockwire. * Fuel and oil lines for chafing and kinking. * Fuel drain line valve for leakage. * Oil cooler and cooler deflector for security and obvious damage. * Accessible areas for obvious damage; evidence of fuel and oil leaks. * Engine mounts for cracks and play in mounting hardware at engine and airframe (retorque any loose mounting bolts). * Fuel control and compressor exterior for condition and security.	71 75 76	
369D/E/FF 500N	RPM governor lever control rod (replace if aluminum).	76–10–00	
369D/E/FF 500N	Clean and lubricate drive splines of starter–generator drive shaft, and female splines in engine accessory gear case on dry spline installations.	96	
369D/E/FF 500N	Anti–ice air tubes and compressor scroll for cracks or breaks at the anti–ice air valve and bleed port. If cracks exist, check engine for possible vibration causes (Ref. Engine Anti–icing System and applicable Allison Engine Operation and Maintenance Manual).	75–10–00	

Table 1. 100–Hour or Annual Inspection (Cont.)

Registration No. _____ **Serial No.** _____			
Helicopter Hours _____ **Torque Events** _____			
Model	**Requirement**	**Chap/Sect**	**Initial**
	AFTER INSPECTION		
ALL	Touch–up all damaged paint and exterior markings, as necessary.	20	
ALL	Ensure all fluid levels are correct; service as required.	12	
ALL	Perform operational check of particle separator filter (Ref. Scavenge Air Operational Check).	71–10–10	
ALL	Install or close all stressed panels, covers and trim panels removed or opened for inspection. Check closure, fit and security. All loose equipment for proper stowage.	52–50–00	
CAUTION: Helicopter must not be flown unless controls access panel and fuel cell access panels in cargo compartment are securely installed. These are stressed panels.			
	POST INSPECTION RUN UP		
See applicable Pilot's Flight Manual for cockpit check and engine starting procedures. For troubleshooting procedures, refer to applicable section of this manual.			
	100–HOUR OR ANNUAL INSPECTION CERTIFICATION		
It is certified that this helicopter has been thoroughly inspected as required by FAR, found to be airworthy, and appropriate entries made in the helicopter log book. It is further certified that the helicopter conforms to FAA specifications, that all FAA Airworthiness Directives and Manufacturer's Service Notices and Maintenance Manual data have been complied with, and the helicopter records are in proper order			

Signature _____

Rating Type or Certificate No. _____

Date _____

2. Retirement Index Numbers Attachment

Table 2 is to be used for calculating and recording the Retirement Index Number (RIN) or Torque Events (TE) of components that are affected by Torque Events (TE).

This record of RINs/TE's should be kept as a permanent record.

Refer to Section 04–00–00 for components requiring calculation of RIN's/TE's and information pertaining to calculation of RIN's/TE's.

Component must be scrapped when it reaches 1,000,000 RIN's or maximum TE's (Ref. Sec. 04–00–00).

Table 2. Permanent Record of Retirement Index Numbers/Torque Events

Component	Part No.	Serial No.	Hours	TE's	RIN's	Signature

Table 2. Permanent Record of Retirement Index Numbers/Torque Events

Component	Part No.	Serial No.	Hours	TE's	RIN's	Signature

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CONTINUED AIRWORTHINESS

SPECIAL INSPECTIONS

1. Special Inspection Hourly and Calendar

This table is a schedule of time–phase inspections that are contingent upon elapsed flight time or calendar time. These inspections require a Log Book entry. Adherence to Maintenance Manual information is required, and the manual should be consulted when using this checklist.

NOTE:

- The Chap/Sect column of the following table is for reference unless a specific inspection requirement is called out. If there is only two numbers in the column, it refers to the Chapter. If there is three numbers, it refers to the Section the inspection is found.
- Refer to applicable Allison engine inspection check list for required engine maintenance.

Table 1. Special Inspections Hourly

Model	What to Inspect	Chap/Sect
AFTER INSTALLATION OF NEW 369F5100 MAIN ROTOR TRANSMISSION		
ALL	Perform transmission run–in (Ref. Main Transmission Run–In Procedure)	63–20–25
2 – 10 HOURS AFTER INSTALLATION OF TAIL ROTOR TRANSMISSION		
369D/E/FF	Using drag torque previously recorded, apply a torque load of **95 ±3 inch–pounds (10.73 ±0.34 Nm) plus the noted drag torque** (noted for each individual nut) to each mounting nut of the transmission (Ref. Tail Rotor Transmission Installation).	63–25–10
EVERY 15 HOURS		
369D/E/FF	For 369H1203–BSC or 369H1203–21 lead–lag link assemblies with at least 500 hours, perform Main Rotor Blade Upper and Lower Root Fitting Attach Lug and Lead–Lag Link Attach Lug Inspection (25 Hour) and every 100 hours in accordance with Main Rotor Blade Upper and Lower Root Fitting Attach Lug and Lead–Lag Link Attach Lug Inspection (100 Hour) until retirement of 369H1203–BSC or–21 Lead–Lag Link Assembly. (Reference AD 95–03–13).	62–10–00
25 HOURS AFTER REPLACING TAIL ROTOR DRIVE FORK HINGE BOLT		
369D/E/FF	Check rotational torque of bolt by applying **125 inch–pounds (14.12 Nm)** with torque wrench. If 125 inch–pounds (14.12 Nm) torque does not rotate bolt, preload is correct (Ref. COM, Hub and Fork Assembly).	64–20–10 64–20–20
25 HOURS AFTER INSTALLATION OF OIL COOLER BLOWER		
ALL	With two pounds of force applied, check belt tension for 0.17 to 0.20 inch (4.32 – 5.08 mm) deflection. Check pulley (Ref. Cooling Blower Belt Tension Check and Adjustment). Check oil cooler blower driven pulley retaining nut for minimum torque of **160 inch–pounds (18.08 Nm)**. If loss of torque is noted, remove pulley nut and inspect pulley shaft and splines for condition. Reinstall nut and torque to **160 – 190 inch–pounds (18.08 – 21.47 Nm) plus drag torque**.	63
EVERY 25 HOURS WITH 2 FAILED LAMINATES IN MAIN ROTOR STRAP ASSEMBLY		
ALL	Inspect in accordance with Main Rotor Stap Pack Lamination Inspection at 25–hour intervals if 2 laminates have failed in any one leg or tongue area of any strap assembly. A single cracked laminate between the shoes at the outboard end of a strap pack is cause for rejection of the hub assembly (Ref. Main Rotor Strap Pack Lamination Inspection).	62–20–00 62–20–60

Table 1. Special Inspections Hourly (Cont.)

Model	What to Inspect	Chap/Sect
EVERY 25 HOURS		
NOTE: This inspection does not apply to 369D21100–516, –517, –523 and 369D21102–503, –517, –523 main rotor blades or the 369H1203–51 and –61 lead–lag links.		
369D/E/FF	Visually inspect exposed portion of all installed main rotor blade upper and lower root fitting attach lugs and main rotor hub lead–lag link attach lugs for broken or cracked lugs, corrosion or other damage to the lug areas (Ref. Main Rotor Blade Upper and Lower Root Fitting Attach Lug and Lead–Lag Link Attach Lug Inspection (25–Hour)).	62–10–00
600N	Perform Tailboom Attach Fitting Inspection.	53–30–30
EVERY 50 HOURS		
369D/E/FF 500N	On models equipped with Rotorcraft Litter Kit: visually inspect litter doors for condition and security of quick–release fasteners. Rubber gasket between window glass and door for proper sealing.	CSP–026
EVERY 50 HOURS IF CRACKS ARE FOUND IN FAN LINER		
NOTE: If cracks protrude into Felt Metal Seal, replace seal.		
500/600N	Inspect fan liner to ensure cracks do not protrude into Felt Metal Seal (Ref. Anti–Torque Fan Liner (Felt Metal Seal) Inspection).	64–25–30
EVERY 100 HOURS		
ALL	If installed, floats and associated components for condition and security.	32
ALL	With 369F5450–501 overrunning clutch installed, remove clutch assembly and inspect clutch retainer, bearing carrier and housing at pin and shoulder for evidence of spinning and/or wear. If spinning and/or wear is observed, replace clutch assembly.	63
EVERY 300 HOURS OR ONE YEAR (Whichever occurs first)		
ALL	For 369D25100 main transmission serviced with MIL–L–23699 oil, drain main transmission oil system; Flush with sufficient new oil to remove sludge accumulation. Replace filter and refill with new oil.	12
EVERY 300 HOURS OR TWO YEARS (Whichever occurs first)		
600N	Main rotor upper thrust bearing assembly must be relubricated every 2 years or 300 hours, whichever occurs first (Ref. Main Rotor Hub Upper Bearing Grease Repack, Inspection and Replacement).	62–20–60
EVERY 300 HOURS		
ALL	For 369D21400–503 (369D/E/FF – 500/600N) or M50452 (369D/E/FF – 500N) lead–lag dampers with at least 4200 hours, inspect for deterioration until deterioration is sufficient to retire assembly (Ref. Main Rotor Damper and Attachments Inspection and Main Rotor Damper Weight Loading and Extension Check).	62–20–00 62–20–60
NOTE: The following inspection does not apply to 369D25100–505 and –507 transmissions.		
369D/E/FF	Visually inspect upper surface of main transmission output shaft assembly (ring gear carrier) for bulging or raised surfaces. Using 10X magnifying glass, inspect upper surface of shaft for cracks. (Ref. COM, Output Drive Shaft Visual Inspection)	63–20–00
369D/E 500/600N	Replace anti–ice/airframe fuel filter element (if installed) (Ref. Anti–Ice Fuel Filter Replacement).	28–25–00

Table 1. Special Inspections Hourly (Cont.)

Model	What to Inspect	Chap/Sect
ALL	Mist eliminator and access door for proper installation (attaching hardware for security).	71
ALL	Hoist installation (if installed) for condition and security.	25
EVERY 600 HOURS OR ONE YEAR (Whichever occurs first)		
ALL	For 369D25100 main transmission serviced with Mobil SHC 626 oil and 369F5100 main transmission, drain main transmission oil system; Flush with sufficient new oil to remove sludge accumulation. Replace filter and refill with new oil.	12
369D/E/FF 500N	For 369F5510 Main Rotor Drive Shaft, perform Main Rotor Drive Shaft Inspection.	63–10–00
600N	For 600N5510 Main Rotor Drive Shaft, perform 600N5510 Main Rotor Drive Shaft Inspection (Ref. 600N5510 and 369F5510 Main Rotor Drive Shaft Inspection).	63–10–00
EVERY 600 HOURS		
ALL	Cyclic control system for excessive slack or free play. Cyclic control stick, at grip, for play in excess of 3/8 inch (9.53 mm) (Ref. Main Rotor Flight Control System 600–Hour Inspection).	67–10–00
ALL	For 369D21400–503 (369D/E/FF – 500/600N) or M50452 (369D/E/FF – 500N) lead–lag dampers with less than 4200 hours, inspect for deterioration until deterioration is sufficient to retire assembly (Ref. Main Rotor Damper and Attachments Inspection and Main Rotor Damper Weight Loading and Extension Check).	62–20–00 62–20–60
EVERY 1200 HOURS		
ALL	Test battery over temperature sensor unit for proper operation and accuracy (Ref. Battery Temperature Sensing Equipment Operational Check).	96–05–00
500/600N	Perform visual inspection, using a 10x magnifying glass, on horizontal stabilizer mounting brackets (pay particular attention to the forward inboard legs).	53
500N	Regrease YSAS actuator (Ref. YSAS Actuator Regrease Procedure).	67–20–30
EVERY 1200 HOURS OR 2 YEARS (WHICHEVER OCCURS FIRST)		
500/600N	Clean, inspect and relubricate (repack) fan support and pitch plate bearings (Ref. Anti–Torque Fan Bearing Regreasing).	64–25–30
500/600N	Perform Anti–Torque Fan Inspection.	64–25–30
500/600N	Check pitch bearing retainer for cracks or damage.	64
EVERY 2700 HOURS OR 2 YEARS (WHICHEVER OCCURS FIRST)		
600N	Main rotor lower thrust bearing assembly must be relubricated every 2 years or 2700 hours, whichever occurs first.	62–20–60
600N	Clean, inspect and relubricate (repack) main rotor swashplate bearings.	62–30–60
EVERY 2770 HOURS OR 2 YEARS (WHICHEVER OCCURS FIRST)		
369D/E/FF 500N	Clean, inspect and relubricate (repack) main rotor swashplate bearings and main rotor hub tapered bearings (Ref. Main Rotor Hub Tapered Bearing Replacement).	62–20–00
369D/E/FF	Clean, inspect and relubricate (repack) tail rotor swashplate bearings (Ref. Tail Rotor Swashplate Bearing Regreasing).	64–30–00

Table 1. Special Inspections Hourly (Cont.)

Model	What to Inspect	Chap/Sect
EVERY 100 HOURS AFTER 6000 HOURS FLIGHT TIME		
600N	Remove interior trim from aft side of Sta. 78.50 bulkhead and tunnel control boot. Inspect interface between 369H2564 tunnel beams and 369D22508–7 web	25
EVERY 6000 HOURS		
369D	Replace the 369H6414 Edgelighted Panel (Ref. Instrument Panel Lights Description and Replacement).	96–40–00

Table 2. Special Inspections Calendar

Model	What to Inspect	Section
(DAILY) BEFORE FINAL SHUTDOWN IN CORROSIVE ENVIRONMENT		
ALL	It is recommended that before shutdown from the last flight of the day, for helicopters operating in a corrosive environment, a Tri–Flow wash be preformed on the main rotor hub and strap pack assembly (Ref. Main Rotor Hub Corrosion Prevention (Tri–Flow Wash Procedure)).	20–40–00
(DAILY) AFTER FINAL SHUTDOWN IN CORROSIVE ENVIRONMENT		
500N	It is recommended that after shutdown from the last flight of the day, for helicopters operating in a corrosive environment, the splitter bungee spring be sprayed with Tri–Flow.	20
EVERY 6 MONTHS OR 5 INFLATIONS		
ALL	Inflate emergency floats to 4.5 psi (0.3164 kg/cm^2) for one hour. Check for leaks and condition. Continue inflation to 5.5 psi (0.3867 kg/cm^2) and check that chamber pressure relief valves operate. Pressure–test float compartments (Ref. Float Compartments Pressure Test).	32–82–00
AFTER COMPRESSOR WATER WASH/RINSE WITH PARTICLE SEPARATOR INSTALLED		
ALL	During engine run after compressor water wash with particle separator installed, it is recommended that scavenge air switch be switched on to remove any moisture that has accumulated in the solenoid air valve.	RFM
BEFORE OPERATION OF BREEZE HOIST SYSTEM		
ALL	Prior to daily hoisting operations: unreel and inspect entire length of hoist cable for broken strands (cluster of 7 wires), excessive broken wires, corrosion, and security of attachment to cable drums and swivel hook. Replace cable if broken strand or excessive broken wires are noted. (Refer to hoist manufacturer's handbook, Table 201.)	01

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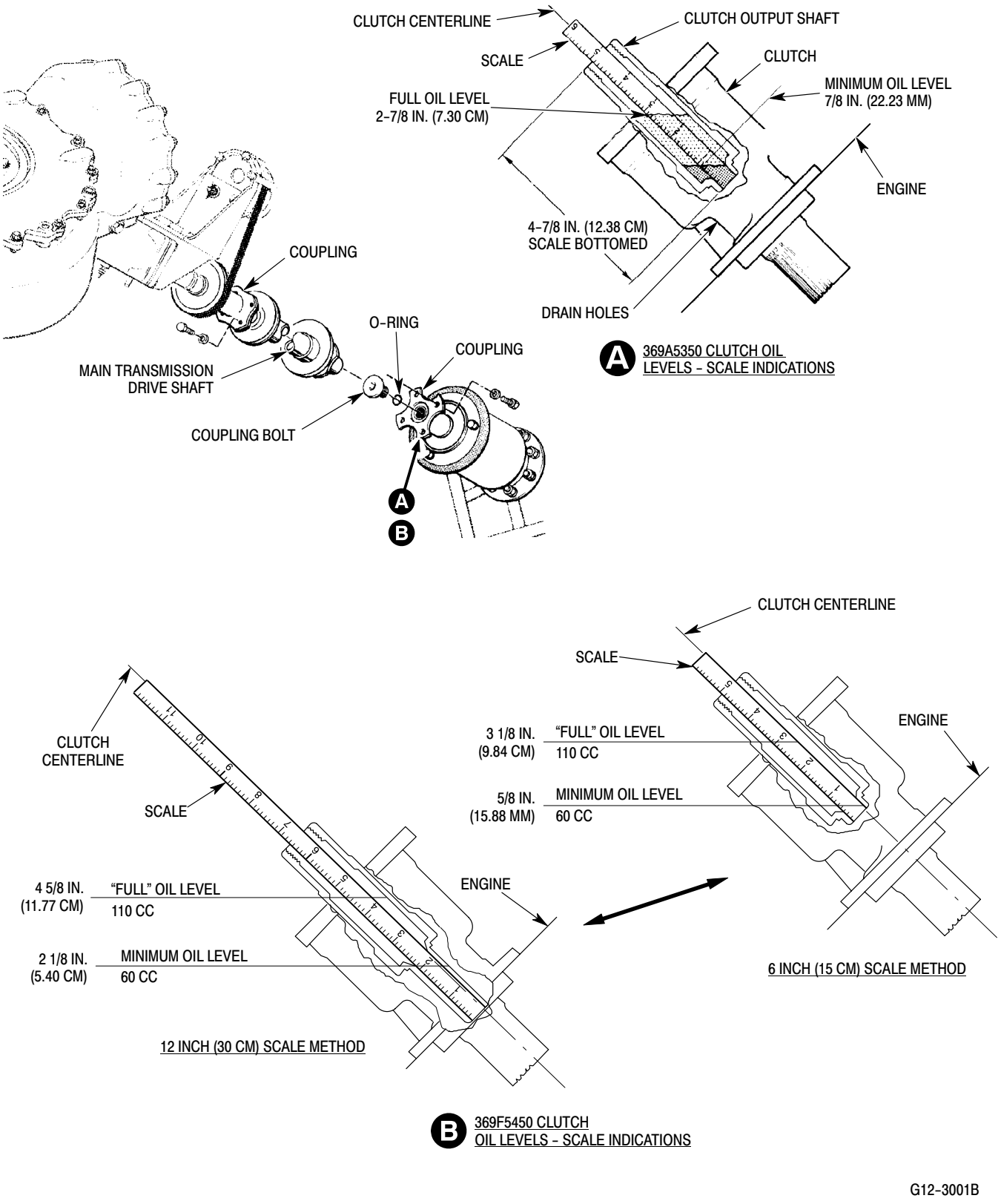


Figure 303. Checking Oil Level – Overrunning Clutch

(8). If coupling shimming was disturbed, shim coupling so that there is 0.035–0.055 inch (0.889–1.397 mm) O–ring gap. (Ref. Sec. 63–10–00 for clutch installation and shimming requirement details.)

CAUTION When installing clutch coupling bolt in next step, installation torque on the bolt must not be less than **250 - 300 inch-pounds (28.25 - 33.90 Nm) plus drag torque**. Torquing to lower value reduces clutch bearing clamp–up and may result in bearing race spinning.

(9). Coat bolt threads with oil (CM112). Install coupling bolt and O–ring (Drag torque for bolt self–locking serviceability is **25 inch-pounds (2.82 Nm) minimum, 200 inch-pounds (22.60 Nm) maximum**). Torque bolt to **250 - 300 inch-pounds (28.25 - 33.90 Nm) plus actual drag torque**.

(10). Position main rotor transmission drive shaft between drive couplings. Install four bolts and washers each end of drive shaft and torque bolts to **50 - 75 inch-pounds (5.65 - 8.47 Nm)**.

(11). Reinstall blower access door and trim.

10. Miscellaneous Component Servicing

A. Rotor Brake Servicing

(Ref. Sec. 63–22–00 for information on adding hydraulic fluid to the rotor brake master cylinder and bleeding the hydraulic system.)

B. Landing Gear Damper Servicing

Servicing of the landing gear damper is performed by overhauling the damper assembly, or if equipped with schrader valve, servicing with nitrogen if it does not meet the minimum extension requirements (Ref. 32–10–00).

C. Component Lubrication Chart

(Ref. Figure 304 for required lubrication points, lubricants to be used, and lubrication intervals.)

CAUTION Use extreme care when applying any type of lubrication (grease, oil, dry–film, etc) in vicinity of teflon bearings. Most lubricants allow a dirt–retaining film to form or have other detrimental effects that can cause rapid deterioration of bearing surface.

D. Tail Rotor Swashplate Dual Bearings Repack

Check ball bearing for excessive loss of grease and serviceability and relubricate (repack) (Ref. Sec. 64–30–00).

E. Main Rotor Swashplate Bearing Repack

Check seals for evidence of deterioration and grease leakage. Inspect bearing assembly for serviceability and repack (Ref. COM, Sec. 62–30–10).

F. Main Rotor Hub Tapered Bearings

Clean, inspect, and relubricate (repack). (Ref. Sec. 62–20––00).

G. Ground Handling Wheels Bearing Repack

Consumable Materials (Ref. Section 91–00–00)

Item	Nomenclature
CM111	Grease, aircraft

At regular intervals, repack wheel bearings with grease (CM111).

11. Overrunning Clutch Subassembly Bearing Repack

For 369A5350 overrunning clutch, repack bearing per CSP–COM–5, Sec. 63–10–10.

For 369F5450 overrunning clutch, repack bearing per CSP–COM–5, Sec. 63–10–15.

12. Component Fluid Leak Analysis

A. Main Rotor Transmission or Anti–Torque Transmission Oil Leaks

Oil leakage, seepage, or capillary wetting at oil seals or assembly joint lines of main or anti–torque transmissions are permissible if leakage rate does not exceed 2 cc per hour (one drop per minute). An acceptable alternate rate of leakage from either transmission is, if oil loss is not more than from the full to the add mark on the sight gauge within 25 flight hours (Repair leaks according to instructions in Component Overhaul Manual).

NOTE:

- On gearbox oil seals with less than 2 hours of operation, some seepage or wetting of adjacent surfaces is normal until seal is wetted and worn–in (seated). If seepage continues at rate of one drop per minute or less, seal may be continued in service. Check transmission oil level and observe seepage rate after every 2 hours of operation. Shorter inspection periods may be required if seal leakage appears to be increasing.
- If excessive gearbox oil seepage occurs, check breather filler for proper installation and operation (Ref. Component Overhaul Manual for cleaning procedures).

B. Engine Oil Leaks

(Ref. Applicable Allison Engine Operation and Maintenance Manual (Ref. Table 201, Sec. 01–00–00) for definition of permissible engine oil leakage.

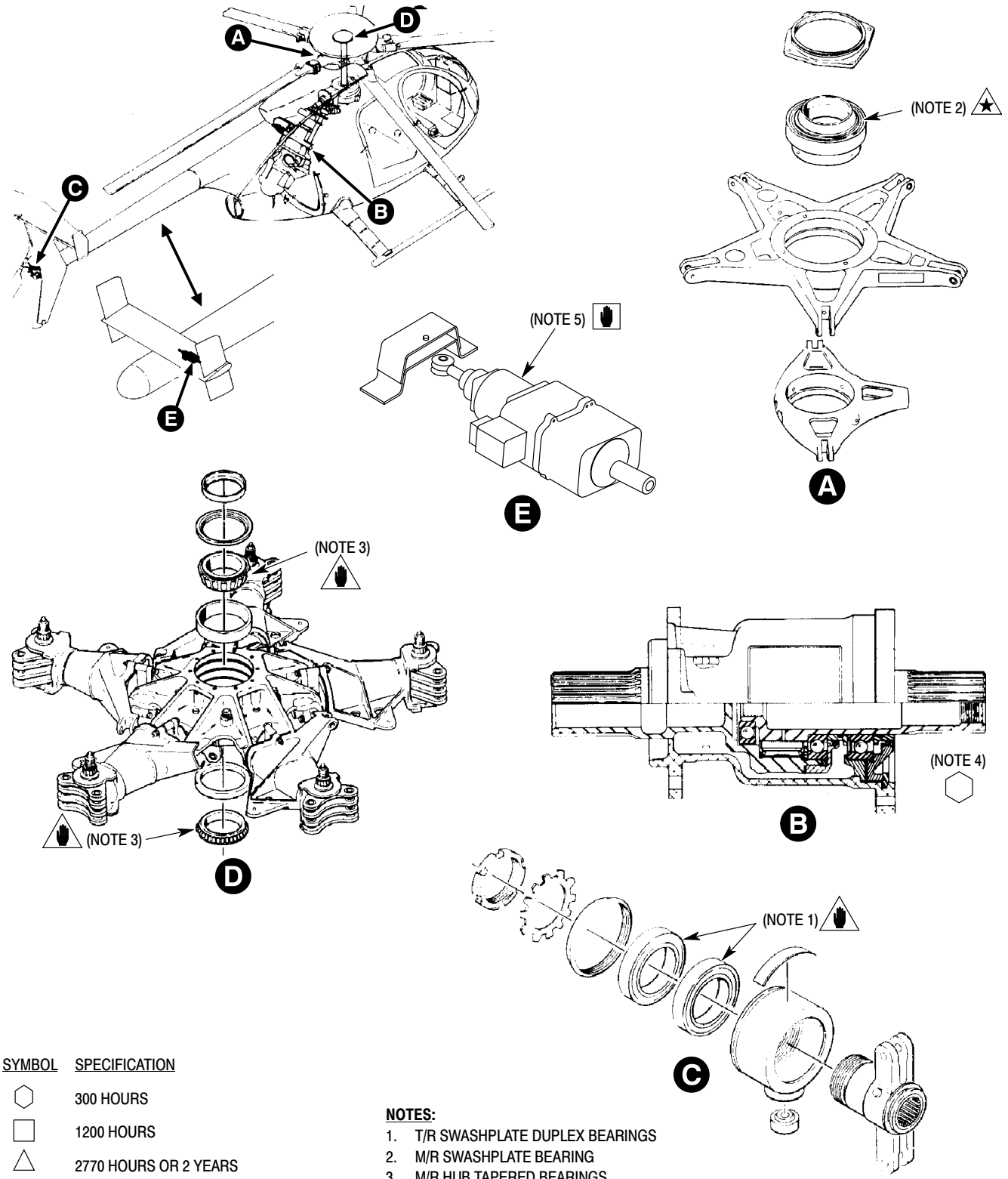
C. Landing Gear Damper Hydraulic Fluid Leak

Hydraulic fluid leakage from any of landing gear dampers is not permissible. If leakage is present, damper assembly should be overhauled (Ref. Component Overhaul Manual) as required and a serviceable unit installed. If leaking landing gear damper is not replaced when leakage is noticed, continuation of damper in service can result in unequal and/or unacceptable dampening and/or ground resonance.

NOTE: It is normal for a thin hydraulic oil film to remain on damper piston as a result of wiping contact with piston seal. Newly installed dampers may also have slight oil seepage from oil trapped in end cap threads during damper assembly. Neither of these should be considered damper leakage or cause for damper replacement.

D. One–Way Lock Hydraulic Fluid Leak

Hydraulic fluid leakage from any part of one–way lock is not permissible. When leakage is observed, assembly should be overhauled (Ref. Component Overhaul Manual) as required and a serviceable unit installed. If leaking one–way lock is not replaced when leakage occurs, continuation in service may result in mechanical malfunction that could be hazardous to flight safety.



SYMBOL	SPECIFICATION
⬡	300 HOURS
□	1200 HOURS
△	2770 HOURS OR 2 YEARS
✋	HAND PACK
★	SPECIAL TOOL RECOMMENDED

NOTES:

1. T/R SWASHPLATE DUPLEX BEARINGS
2. M/R SWASHPLATE BEARING
3. M/R HUB TAPERED BEARINGS
4. OVERRUNNING CLUTCH ASSEMBLY UPPER BEARINGS
5. YSAS ACTUATOR

G12–0003A

Figure 304. Lubrication Chart

TORQUE

MAINTENANCE PRACTICES

1. Torque Wrenches

Torque wrenches should be of good quality and calibration should be verified at regular intervals to verify accuracy. Torque wrench accuracy at room temperature, 70°F (22 °C) must be within following limits.

(1). From zero through 19 percent of torque wrench range, error may not exceed ±7 percent of load applied.

(2). From 20 thru 79 percent of torque wrench range, error may not exceed ±4 percent load applied.

(3). From 80 to 100 percent of torque wrench range, error may not exceed ±5 percent of load applied.

2. Application of Torque Wrench Loads

(Ref. Table 201 thru Table 204) Recommended tightening torque values and minimum drag torque values for fine and coarse thread nuts, and minimum breakaway torque for used self–locking bolts or screws are listed in Table 201 and Table 202. Requirements governing application of torque loads follow. These requirements apply throughout this manual except where otherwise specifically indicated.

(1). Values apply to cadmium–plated bolts, cadmium–plated nuts coated with molybdenum disulfide (MoS_2).

(2). Manufacturer applied lubricant must not be removed nor additional lubricant added.

(3). Bolts, nuts and surfaces they bear on must be clean, dry and free of lubricant except as stated in requirement above.

(4). Turning (drag) torque required to install self–locking nut or bolt up to point of final tightening must always be added to final torque value specified or the maintenance instruction, as applicable.

(5). Torque values specified in this manual are special torque values that apply instead of those listed.

(6). If adapters are used such that adapter and torque wrench are not at right angles (90 degrees) to each other, wrench or indicator reading must be corrected.

(7). Any reuse of self–locking nuts over 3/8 inch is governed by values listed in Table 203.

(8). Bolt must not be rotated during application of torque to mating nut.

3. Bearings Installation, Staking or Swaging Force

The following procedure explains how to convert from a given 'Force' which is required to perform a task to a proper hydraulic pressure reading.

(1). Determine the diameter of the ram (staking or swaging contact surface) on the hydraulic press to be used.

NOTE: The hydraulic press to be used must have a pressure gauge.

(2). Divide the ram diameter by two to get the radius.

(3). Multiply 3.14159 (pi) times the Radius squared (R^2). This will give the area of the ram.

(4). Divide the force required for the task by the area of the ram. This gives the actual PSI reading for the hydraulic press pressure gauge needed to perform the task.

EXAMPLE:

Ram Diameter = 2.65 in. (6.731 cm)

Ram Radius (R) = 1.325 in. (3.366 cm)

Radius squared (R^2) = 1.756 $in.^2$ (8.548 cm^2)

R^2 X 3.1416 = 5.517 in. (26.854 cm) (Area of ram)

Force required = 7500–8500 lbs. (3402–3856 kg) (variable)

7500–8500 lbs. (3402–3856 kg)/5.517 in. (26.854 cm) = 1359–1540 PSI (9370–10618 kPa)

PSI required =1359 PSI (9370 kPa) Min. 1540 PSI (10618 kPa) Max.

Force needed/(R^2) X 3.1416 = Pressure Gauge Reading

4. Control Tube Jam Nut Torquing

(1). Tighten jam nuts against control rods by holding rod end with wrench.

NOTE: Do not tighten with rod end against fitting.

(2). Ensure rod ends are not preloaded after torquing jam nuts.

5. Standard Hardware Torque Values

The following tables list torque values for standard hardware by part number.

NOTE: If unsure of hardware type, refer to CSP–IPC–4.

(1). Table 201 lists self–locking tension–type nut torque values.

(2). Table 202 lists shear–type nut torque values.

(3). Table 203 lists minimum self–locking nut drag (run–on) torque values.

(4). Table 204 lists self–locking bolt and screw minimum breakaway torque values.

CAUTION Table 203 lists only self–locking nut run–on torque values, i.e.; torque required to overcome the friction of the self–locking feature of a nut on bolt threads prior to clamp–up and final tightening. Any self–locking nut that can be run down with the fingers after the locking feature engages bolt threads must be replaced. Determine final nut torque value by adding the run–on torque to the specified final clamping torque. Final clamping torque values are listed in Table 201 and Table 202.

NOTE: Minimum breakaway torque will be the minimum torque required to start removal (turning) of the bolt or screw from the installed position. The installed position is after the self–locking device of the bolt or screw has been completely engaged plus two or three turns of engagement.

FUEL SYSTEM
MAINTENANCE PRACTICES

1. Fuel Cell Cleaning – General

(1). Fuel cells are susceptible to fungus growth after contact with contaminated fuel. Fungus trapped in the fuel filters indicates fuel tank contamination. Remove, inspect, clean or replace filter elements per applicable Allison Engine Operation and Maintenance Manual. Where installed, service anti-ice (airframe) filter (Ref. Sec. 28-25-00).

(2). Periodic incorporation of an FAA approved anti-fungal fuel additive will kill and prevent new fungus growth.

2. Engineered Fabrics Corp. Fuel Cell Cleaning

CAUTION Do not steam clean Engineered Fabrics Corp. fuel cells. Steam cleaning may cause irreparable damage.

(1). Clean cell exterior and interior surfaces with warm soapy water and clean lint free cloth. Rinse away all soap residue and wipe dry.

3. Fuel Cell Handling, Storage and Shipping

CAUTION Do not use cell fittings as hand holds. Do not store fuel cells uncrated or exposed to direct sunlight, ozone, dirt, moisture, solvents, chemicals, or extremes of heat and humidity.

(1). Store and ship cells in a suitable protective container.

(a). Apply protective tape over all cell machined fittings.

(b). Use packing material to keep the cell from shifting in transit.

(c). Suspended self-sealing cells to maintain cell shape.

4. Fuel Cell Preservation and Storage (Engineered Fabrics Corp. Cells)

(1). Thoroughly clean cell with warm soapy water. Wipe completely dry.

(2). If a fuel cell that has previously contained fuel is to be stored for longer than three days, coat inside of cell with a light coating of #10 weight, non-synthetic engine oil.

CAUTION

- Engineered Fabrics Corp. cells removed from service must not be left dry for more than 3 days without the application of oil as a plasticizing agent. The cell liner will loose pliability if left dry for extended periods and subsequent flexing may cause the material to crack.
- Do not work on fuel cell in ambient temperatures below 70°F (21°C).

(a). Fold cell over protective wadding as loosely as possible and with a minimum number of folds.

(b). Wrap the cell in a protective cover.

(c). Put cell in a suitable storage/shipping container. Use wadding as required to prevent movement. Do not stuff cell into an undersized container.

(d). Store cell at 70°F (21°C) away from sunlight and moisture.

5. Fuel System Air Bleed (Model 250–C47 Engine Installation)

WARNING **Fuel/air vapor discharged during bleeding is a fire hazard. Prevent fuel vapor accumulation, ignition and fire. Perform work in an open, well ventilated area away from all potential ignition sources. Attach helicopter to an approved electrical ground. Wear approved eye protection.**

(1). Helicopters with C47 engines and standard fuel supply systems are not equipped with a start pump.

(2). Helicopters equipped with an airframe mounted fuel filter are equipped with an airframe mounted fuel pump inside the left fuel cell and can be primed using the same procedure as helicopters with the 250-C20 Series engines.

(3). The standard helicopter fuel system only has an engine driven self priming pump that will fill the fuel system when the engine is motored with the starter. Motor engine per the appropriate Pilot's Flight Manual.

(4). Bleed air out of helicopter engine fuel controls per Rolls-Royce Engine Operation and Maintenance Manual.

(5). If fuel system fails to bleed properly, proceed as follows:

(a). Field fabricate a primer bulb assembly (Ref. Figure 201).

(b). Disconnect fuel line between CEFA and HMU at HMU side.

(c). Disconnect fuel line from fuel nozzle.

(d). Install primer bulb assembly in line between HMU GEAR INLET and the CEFA.

(e). Open fuel shutoff valve.

(f). Open throttle to ground idle position.

(g). Squeeze primer bulb until fuel comes out of fuel line.

NOTE: When reinstalling fuel lines, refer to appropriate Rolls-Royce Operation and Maintenance Manual for proper torques.

(h). Remove primer bulb assembly from fuel line and reconnect fuel line to HMU.

(i). Crank engine for approximately 15 seconds to verify fuel to fuel nozzle is free of air in the system.

(j). Repeat above procedure as required.

(k). Reinstall fuel line to fuel nozzle.

(l). Close throttle.

(m). Close fuel shutoff valve.

NOTE: Check fuel supply system for leakage with vacuum (Ref. Fuel System Vacuum Leak Inspection).

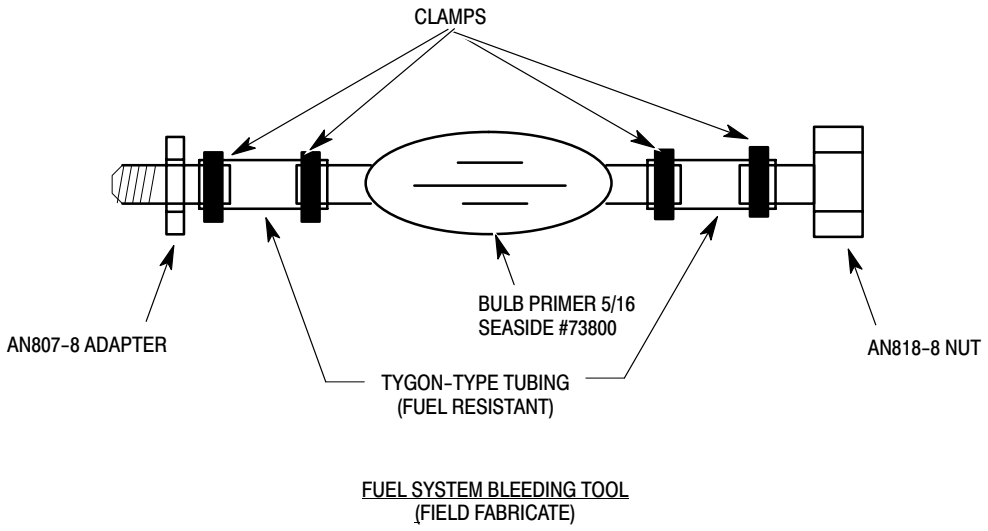


Figure 201. Field Fabricated Fuel System Bleeding Tool

STABILIZER

MAINTENANCE PRACTICES

1. Stabilizers Description

The tail surfaces consist of two verticals and a horizontal stabilizer. The tail surfaces (empennage) stabilize the helicopter and maintain it in a relatively contain level attitude and heading during autorotation and forward flight.

A. Horizontal Stabilizer Description

The horizontal stabilizer is constructed of laminated fiber glass composite ribs and skin, bonded to a formed graphite composite spar. The horizontal stabilizer includes a non–structural leading and trailing edges. hollow core spar, sparbox fittings, access panels, torque tubes, bellcranks and control rods.

On the 500N and optional on the 600N, a stability augmentation system (S.A.S.) is attached to the right–hand vertical stabilizer, the early 600N does not have a S.A.S system.

The horizontal stabilizer mounts atop the tailboom. Four eye bolts from the horizontal attach to clevis attachment points on the tailboom. Access plates are attached to the ends caps of the horizontal stabilizer and at center line for access to the control rods, S.A.S. and bellcranks. Two control rods, S.A.S. and bellcranks are routed in the center aft of the sparbox. The angle of incidence of the horizontal stabilizer is preset at -2°. An anti–collision light is mounted in the top center of the stabilizer. Position lighting provisions are provided on both ends of the stabilizers.

On the 600N without S.A.S., gurney flaps were added to the trailing edge of the horizontal for the purpose of increasing lift without increasing the stabilizer area or weight.

Refer to Section 96–40–00 for information on exterior lights and Section 67–20–30 for rigging requirements.

B. Vertical Stabilizers Description

The vertical stabilizers (upper and lower) are constructed of laminated fiber glass composite ribs and skin, bonded to a formed fiberglass composite spar. The vertical stabilizers include a hollow core spar, retainer fittings and nonstructural leading and trailing edges.

The differences on the 600N are that the vertical stabilizers are slightly longer, the skin is thicker and on standard 600N helicopters, are both controlled by the directional control pedals. The lower vertical stabilizer angle of attack is eight degrees clockwise relative to the upper vertical stabilizer. Refer to Section 67–20–30 for flight controls linkage details.

The left vertical stabilizer is mounted to the horizontal on a torque tube fitting assembly and has approximately 6.5 inches (16.51 cm) of travel.

On the 500N and S.A.S. equipped 600N, the right vertical stabilizer, also mounted on a torque tube, is controlled by the stability augmentation system. From the fully extended to the fully retracted position on the S.A.S. actuator, the tip of the right vertical stabilizer trailing edge will travel a minimum of 2.70 inches (6.86 cm). The amount of travel is determine by the S.A.S. computer and gyro.

NOTE: The anti–torque control system must be re–rigged immediately after removal or replacement of control rods, linkages, and components or if helicopter operation reveals a rigging deficiency.

2. Vertical Stabilizer Replacement

(Ref. Figure 201 and Figure 202)

A. Vertical Upper and Lower Stabilizer Removal

(1). Remove nuts, washers, and bolts. Remove by lifting vertical stabilizer off torque tube.

B. Vertical Upper and Lower Stabilizer Installation

(1). Installation with Standard Hardware:

(a). Install stabilizer onto torque tube fittings.

(b). Install bolts, washers and nuts. Torque to **30 - 40 inch-pounds (3.39 - 4.52 Nm) plus drag torque**.

(2). Installation with Expandable Bolts: (Ref. Figure 203)

(a). Install bolt with washer under bolt head and thick washer under nut.

NOTE:

- Do not remove any expanding elements from bolt.
- If 600N2012–5 spacers are not present, up to two spacers may be added to achieve proper installation.

(b). Remove one (1) or two (2) 600N2012–5 spacers, as required) to obtain 0.005–0.035 inch (0.127–0.889 mm) gap between the washers and the vertical stabilizer, equal on each side.

(c). Install nut and note drag torque.

(d). Perform a break in cycle by torquing the nut to **20 - 25 inch-pounds (2.26 - 2.82 Nm)** plus drag torque.

(e). Back off nut until bolt moves freely in hole.

CAUTION Do not over–torque nut. Over–torquing nut can crack vertical stabilizer fitting.

(f). Torque nut to **20 inch-pounds (2.26 Nm)** plus drag torque.

(g). Check for equal gap of 0.005–0.035 inch (0.127–0.889 mm) between the washers and the vertical stabilizer.

NOTE: NAS1149C0332R or NAS1149C0363R washers may be added under the nut for adequate cotter pin engagement.

(h). If necessary, tighten nut until cotter pin hole aligns with castillation in nut.

(i). Install cotter pin.

3. Horizontal Stabilizer Replacement

(Ref. Figure 201 and Figure 202)

NOTE: Horizontal stabilizer can be removed with vertical stabilizers installed. Support stabilizer during removal.

A. Horizontal Stabilizer Removal

(1). Remove seven screws securing center access plate to horizontal stabilizer.

(2). Disconnect position light electrical interconnect.

(3). On 500N, disconnect S.A.S. electrical interconnect.

(4). Remove cotter pin, nut, washer and bolt from center bellcrank shaft. Index mark bellcrank with grease pencil in relationship to shaft. Disconnect bellcrank.

(5). Remove nuts, washers and expandable bolts securing horizontal stabilizer to tailboom attachment clevis fittings. Remove horizontal stabilizer.

B. Horizontal Stabilizer Installation

NOTE: When installing horizontal stabilizer it may be necessary to loosen eye bolts and nuts to align with clevises, if so, install mounting expandable bolts first and torque per step (2). below, then torque clevis nuts to **80 - 120 inch-pounds (9.04 - 13.56 Nm).**

(1). Position horizontal stabilizer on tailboom attach fittings.

(2). Install expandable bolts, washers and nut. Torque to **30 - 40 inch-pounds (3.39 - 4.52 Nm)**. Install cotter pin.

(3). Connect position light/strobe light electrical connector.

(4). On 500N, connect S.A.S. electrical interconnect.

CAUTION When installing bellcrank on center bellcrank shaft it is possible to be one spline tooth off in either direction, install bellcrank centered on shaft (Ref. Sec. 67–20 –30).

(5). Connect bellcrank to center bellcrank shaft and install bolt, washers and nut. Torque nut to **30 - 40 inch-pounds (3.39 - 4.52 Nm)** and install cotter pin.

(6). Install center access plate with seven screws and washers.

SWASHPLATE AND MIXER INSPECTION/CHECK

1. Swashplate Inspection

Consumable Materials (Ref. Section 91–00–00)

Item	Nomenclature
CM217	Isopropyl alcohol

CAUTION When cleaning swashplate for inspection, prevent solvent from entering either spherical ball bearing or double row ball bearing. Use cloth moistened in alcohol (CM217) to wipe clean spherical ball, ball bore liner and exterior of double row ball bearing.

NOTE:

- Stationary swashplate may be constructed of either magnesium or aluminum alloy. For corrosion control and identification of magnesium and aluminum alloys (Ref. Sec. 20–40–00).
- In the following inspection, the rotating and stationary swashplates must be disconnected (Ref. Swashplate and Mixer Removal/Installation).

(1). Inspect swashplate bearing assembly (Ref. Figure 403 for evidence of binding in either radial or axial movement.

(2). Inspect teflon liners for condition.

(3). Ensure that all flexible rubber seals enclosing ball bearing races are in place; inspect for deterioration and indication of grease leakage. (For bearing maintenance information (including lubrication), Ref. COM).

NOTE: New swashplate bearing assembly normally shows some signs of grease leakage for first 10–15 hours of operation after installation.

(4). Inspect swashplate spherical ball and double row ball bearing for radial or axial play.

(a). Maximum radial play between sliding surface liner and stationary mast is 0.020 inch (0.508 mm).

(b). Maximum axial play between spherical ball and teflon liner is 0.010 inch (0.254 mm).

(c). If play is suspected in double row ball bearing, turn rotating swashplate until arms line up with those of stationary swashplate and check motion between arms at control bolt in stationary swashplate.

(d). Maximum total vertical movement of 0.015 inch (0.381 mm) is allowable.

(e). If movement limit is exceeded replace double row ball bearing (Ref. COM).

(5). Inspect swashplate spherical and double row ball bearings for condition.

(a). Nicks and dents that do not deform ID chamfered edge of hard anodized ball, and not more than 0.10 inch (0.254 mm) deep along spherical ball surface from edge are allowed.

(b). Scratches, any length, on OD of spherical ball are allowed if they are no deeper than 0.010 inch (0.254 mm) or wider than 0.060 inch (1.524 mm).

(c). Not more than two scratches are permitted in a one inch wide area.

(6). Check existing preload on spherical bearing.

(a). Hook spring scale over one of the bolts securing stationary swashplate to the bearing flange.

(b). With stationary swashplate in motion, drag should be no more than **30 pounds (13.61 kg)**. (Use average of four readings taken 90 degrees apart).

(c). If readings are more than **30 pounds (13.61 kg)**, clean spherical bearing with isopropyl alcohol and recheck drag.

(d). Repair damage or replace bearings (Ref. COM).

(7). Check double row ball bearing for serviceability, with seals in place and unbroken.

(a). Check for correct operation and lubrication.

(b). Bearing must rotate smoothly, without roughness. Binding or catching should not exist when bearings are rotated 360°.

(c). Replace defective double row ball bearings (Ref. COM).

(8). Perform careful visual inspection of stationary and rotating swashplate for cracks, wear in bolt and bushing bores, and fork inner surfaces; and for corrosion, nicks and dents.

(9). Perform dye penetrant check on questionable areas.

(10). Check that counterweights are securely bonded in rotating swashplate.

2. Mixer Controls Inspection

(Ref. Figure 402)

(1). Inspect all bushings for security of fit.

(2). Inspect longitudinal link, support bracket, longitudinal control mixer link, mixer links, longitudinal pitch idler, longitudinal pitch mixer bellcrank, lateral bellcrank and collective pitch mixer bellcrank for scratches, cracks, corrosion and similar surface defects. For components that are questionable, perform fluorescent dye penetrant inspection.

(3). Inspect spherical, teflon (or equivalent) lined, bearings in longitudinal link, mixer link, and longitudinal control mixer link for binding, play in link bore and wear. Wear limit is 0.008 inch (0.203 mm) radially and 0.040 inch (1.016 mm) axially. Replace complete mixer link if bearings are faulty. Inspect bearings in other linkage for binding and looseness in mating bores.

3. Scissors Inspection

(Ref. Figure 401)

WARNING **Any evidence of failure, damage, or deformation of crank or link is justification for replacement of either crank, link, or complete scissors assembly. Failure of any of these components in flight can result in failure of movable flight controls, loss of helicopter, and possible injury or loss of life.**

(1). Inspect crank and link for evidence of impact damage and deformation. If condition is questionable, perform fluorescent dye penetrant inspection.

(2). Inspect bearings for binding, looseness in bore and wear. Maximum wear limits are 0.010 inch (0.254 mm) radial and 0.020 inch (0.508 mm) axial.

4. Pitch Control Rod Inspection

(Ref. Figure 401)

CAUTION Ensure that rod end bearings are centered and do not contact attach clevis.

(1). Visually inspect upper and lower rod end bearings for evidence of excessive axial play, 0.040 inch (1.016 mm) maximum; and for any extrusion, displacement or damage to the bearing teflon liner.

(2). Replace rod end bearing if discrepancies are noted.

SWASHPLATE AND MIXER INSPECTION/CHECK

1. Swashplate Inspection

Consumable Materials (Ref. Section 91–00–00)	
Item	Nomenclature
CM217	Isopropyl alcohol

CAUTION When cleaning swashplate for inspection, prevent solvent from entering either spherical ball bearing or double row ball bearing. Use cloth moistened in alcohol (CM217) to wipe clean spherical ball, ball bore liner and exterior of double row ball bearing.

NOTE:

- Stationary swashplate may be constructed of either magnesium or aluminum alloy. For corrosion control and identification of magnesium and aluminum alloys (Ref. Sec. 20-40-00).
- In the following inspection, the rotating and stationary swashplates must be disconnected (Ref. Swashplate and Mixer Removal/Installation).

(1). Inspect swashplate bearing assembly (Ref. Figure 403 for evidence of binding in either radial or axial movement.

(2). Inspect teflon liners for condition.

(3). Ensure that all flexible rubber seals enclosing ball bearing races are in place; inspect for deterioration and indication of grease leakage. (For bearing maintenance information (including lubrication), Ref. COM).

NOTE: New swashplate bearing assembly normally shows some signs of grease leakage for first 10–15 hours of operation after installation.

(4). Inspect swashplate spherical ball and double row ball bearing for radial or axial play.

(a). Maximum radial play between sliding surface liner and stationary mast is 0.020 inch (0.508 mm).

(b). Maximum axial play between spherical ball and teflon liner is 0.010 inch (0.254 mm).

(c). If play is suspected in double row ball bearing, turn rotating swashplate until arms line up with those of stationary swashplate and check motion between arms at control bolt in stationary swashplate.

(d). Maximum total vertical movement of 0.015 inch (0.381 mm) is allowable.

(e). If movement limit is exceeded replace double row ball bearing (Ref. COM).

(5). Inspect swashplate spherical and double row ball bearings for condition.

(a). Nicks and dents that do not deform ID chamfered edge of hard anodized ball, and not more than 0.10 inch (0.254 mm) deep along spherical ball surface from edge are allowed.

(b). Scratches, any length, on OD of spherical ball are allowed if they are no deeper than 0.010 inch (0.254 mm) or wider than 0.060 inch (1.524 mm).

(c). Not more than two scratches are permitted in a one inch wide area.

(6). Check existing preload on spherical bearing.

(a). Hook spring scale over one of the bolts securing stationary swashplate to the bearing flange.

(b). With stationary swashplate in motion, drag should be no more than **30 pounds (13.61 kg)**. (Use average of four readings taken 90 degrees apart).

(c). If readings are more than **30 pounds (13.61 kg)**, clean spherical bearing with isopropyl alcohol and recheck drag.

(d). Repair damage or replace bearings (Ref. COM).

(7). Check double row ball bearing for serviceability, with seals in place and unbroken.

(a). Check for correct operation and lubrication.

(b). Bearing must rotate smoothly, without roughness. Binding or catching should not exist when bearings are rotated 360°.

(c). Replace defective double row ball bearings (Ref. COM).

(8). Perform careful visual inspection of stationary and rotating swashplate for cracks, wear in bolt and bushing bores, and fork inner surfaces; and for corrosion, nicks and dents.

(9). Perform dye penetrant check on questionable areas.

(10). Check that counterweights are securely bonded in rotating swashplate.

2. Mixer Controls Inspection

(Ref. Figure 402)

(1). Inspect all bushings for security of fit.

(2). Inspect longitudinal link, support bracket, longitudinal control mixer link, mixer links, longitudinal pitch idler, longitudinal pitch mixer bellcrank, lateral bellcrank and collective pitch mixer bellcrank for scratches, cracks, corrosion and similar surface defects. For components that are questionable, perform fluorescent dye penetrant inspection.

(3). Inspect spherical, teflon (or equivalent) lined, bearings in longitudinal link, mixer link, and longitudinal control mixer link for binding, play in link bore and wear. Wear limit is 0.008 inch (0.203 mm) radially and 0.040 inch (1.016 mm) axially. Replace complete mixer link if bearings are faulty. Inspect bearings in other linkage for binding and looseness in mating bores.

3. Scissors Inspection

(Ref. Figure 401)

WARNING **Any evidence of failure, damage, or deformation of crank or link is justification for replacement of either crank, link, or complete scissors assembly. Failure of any of these components in flight can result in failure of movable flight controls, loss of helicopter, and possible injury or loss of life.**

(1). Inspect crank and link for evidence of impact damage and deformation. If condition is questionable, perform fluorescent dye penetrant inspection.

(2). Inspect bearings for binding, looseness in bore and wear. Maximum wear limits are 0.010 inch (0.254 mm) radial and 0.020 inch (0.508 mm) axial.

4. Pitch Control Rod Inspection

(Ref. Figure 401)

CAUTION Ensure that rod end bearings are centered and do not contact attach clevis.

(1). Visually inspect upper and lower rod end bearings for evidence of excessive axial play, 0.040 inch (1.016 mm) maximum; and for any extrusion, displacement or damage to the bearing teflon liner.

(2). Replace rod end bearing if discrepancies are noted.

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- Do not use clutch coupling shims under transmission input coupling. Inside diameter of clutch coupling shims, 1.260–1.270 inches (3.2004–3.2258 cm), is approximately 0.070 inch (1.778 mm) larger than inside diameter of shims used at transmission coupling. Incorrect diameters can cause an improperly seated shim, misalignment and cocked coupling.

NOTE: Transmission input coupling shims are laminated stock. Each lamination is 0.002 inch (0.051 mm) thick. Peel to thickness required.

(4). Add sufficient shims to get a measurement of 0.010 inch (0.254 mm) minimum between bolt seating surface on coupling and transmission input shaft.

(5). Lubricate input shaft splines with grease (CM111). Coat bolt threads with anti–seize compound (CM112). Reinstall coupling and bolt. Check coupling bolt for minimum drag of **25 inch-pounds (2.82 Nm)**. Torque bolt to **250 - 300 inch-pounds (28.25 - 33.90 Nm) plus drag torque**.

(6). Attach drive shaft to clutch coupling with four bolts and washers. Torque bolts to **50 - 70 inch-pounds (5.65 - 7.91 Nm)**.

(7). Manually align drive shaft and transmission input coupling flanges:

(8). Using feeler gage, measure gap between flanges. Gap should be 0.010 inch (0.254 mm) gap to 0.020 inch (0.508 mm) compression.

(a). If gap is 0.010 inch (0.254 mm) or less, attach upper end of drive shaft to transmission input coupling with four bolts and washers. Torque bolts to **50 - 70 inch-pounds (5.65 - 7.91 Nm)**.

(b). If gap exceeds 0.010 inch (0.254 mm), repeat step (3). thru (5). above, except install thickness of shims equal to measured gap, plus thickness that results in not more than 0.010 inch (0.254 mm) gap between coupling and drive shaft nor more than 0.020 inch (0.508 mm) compression of flexible couplings. Install four bolts and washers and torque bolts to **50 - 70 inch-pounds (5.65 - 7.91 Nm)**.

(9). Install access door and sound insulation over main transmission drive shaft.

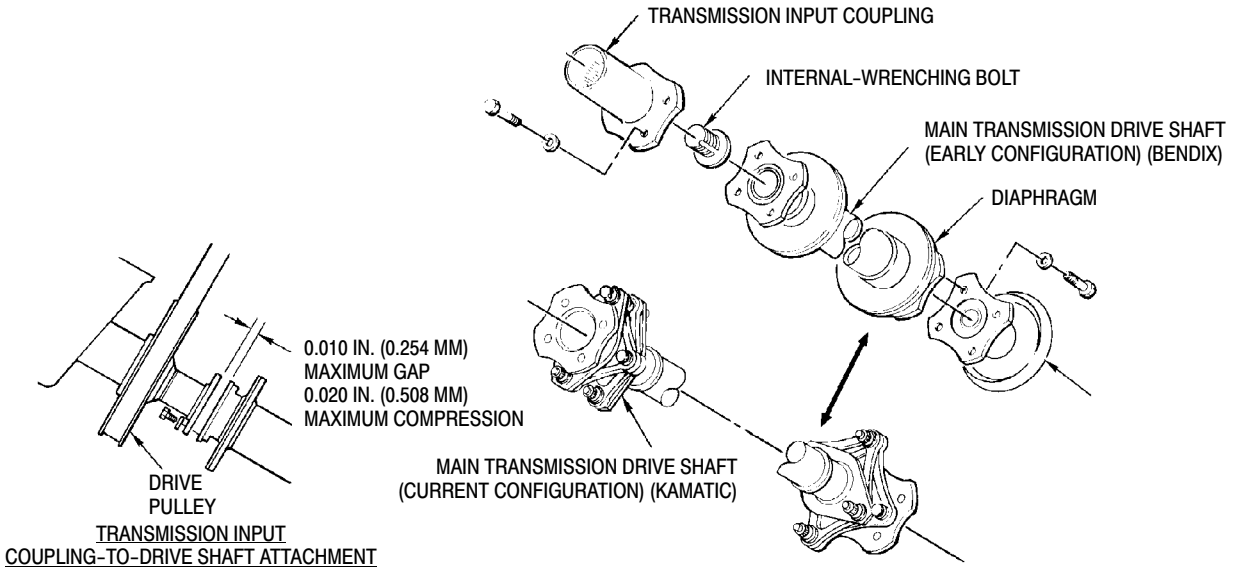


Figure 402. Main Transmission Drive Shaft Installation

5. Overrunning Clutch

The overrunning clutch transmits power from the engine to the main transmission drive shaft. The clutch disengages the engine from the remainder of the drive system in case of engine failure and during autorotations.

The clutch contains a sprag unit that disengages automatically when N_2 rpm is less than corresponding main rotor rpm.

Repair and overhaul information for the overrunning clutch can be found in COM.

6. Overrunning Clutch Replacement

(Ref. Figure 403 or Figure 404)

A. Overrunning Clutch Removal

Consumable Materials (Ref. Section 91–00–00)	
Item	Nomenclature
CM208	Barrier material

NOTE: For removal of only the internal clutch subassembly as an alternative to complete clutch removal, refer to Overrunning Clutch Subassembly Removal.

(1). Remove engine.

(2). Remove bolts, washers, nuts and engine shaft firewall seal from clutch.

NOTE: Removal of clutch coupling from clutch is unnecessary unless clutch is being replaced.

(3). Remove coupling bolt, packing, clutch coupling and coupling shim(s). Keep shim(s) with coupling for reuse. Reinstall bolt and packing to prevent spillage of lubricating oil from clutch housing during final steps of removal.

(4). On 369F5450 clutch, remove output shaft cover plate from back of engine accessory drive to gain access to clutch bolt.

(a). Insert tool (Ref. Figure 405) to engage bolt in back of clutch.

(b). Insert a long 3/8 inch (9.525 mm) hex wrench, approximately 10 inches (25.4 cm) long, through tool and into back of clutch assembly.

(c). While holding internal hex wrench [3/8 inch (9.525 mm)], turn external hex wrench [1.00 inch (2.54 cm)] counter-clockwise to remove bolt from back of clutch.

(5). Remove nuts and washers that secure overrunning clutch; remove clutch.

(6). If clutch is being replaced, install spare coupling bolt and O-ring or suitable plug in output shaft (clutch inner race bore) to prevent contamination during clutch handling, shipping or storage.

NOTE: Operating lubricant is an approved preservative for shipping or storage.

(7). Wrap clutch in barrier material (CM208) to protect splined areas of shafts.

B. Overrunning Clutch Installation

Consumable Materials (Ref. Section 91–00–00)	
Item	Nomenclature
CM111	Grease, aircraft
CM112	Anti-seize compound high temperature
CM125	Oil
CM126	Oil, turbine

(1). If clutch is new, (369A5350 clutch only) drain preservative oil. Trapped oil can be removed by inverting clutch a minimum of three times. Add lubricating oil (CM125 or CM126) (Ref. Sec. 12-00-00). Temporarily install coupling bolt and packing.

NOTE: Relubricate splines on clutch input shaft and splines inside engine power and accessory gearbox with grease (CM111) prior to reinstalling overrunning clutch.

(2). Coat clutch splines and internal splines of engine power accessory gearbox with lubricant (CM111). Insert overrunning clutch outer-race spline into engine and install six washers and nuts. Torque nuts to **15 - 20 inch-pounds (1.69 - 2.26 Nm) plus drag torque**.

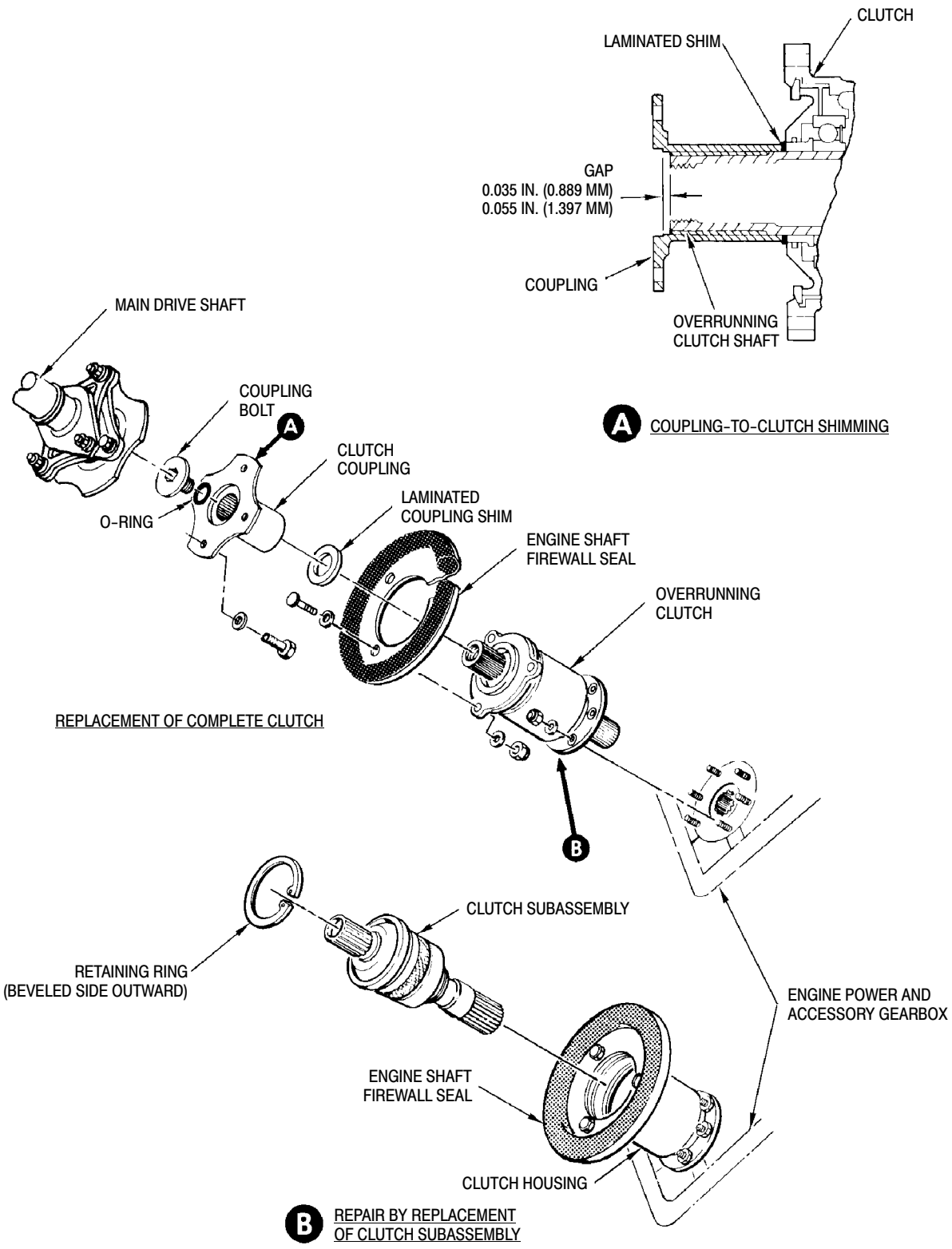
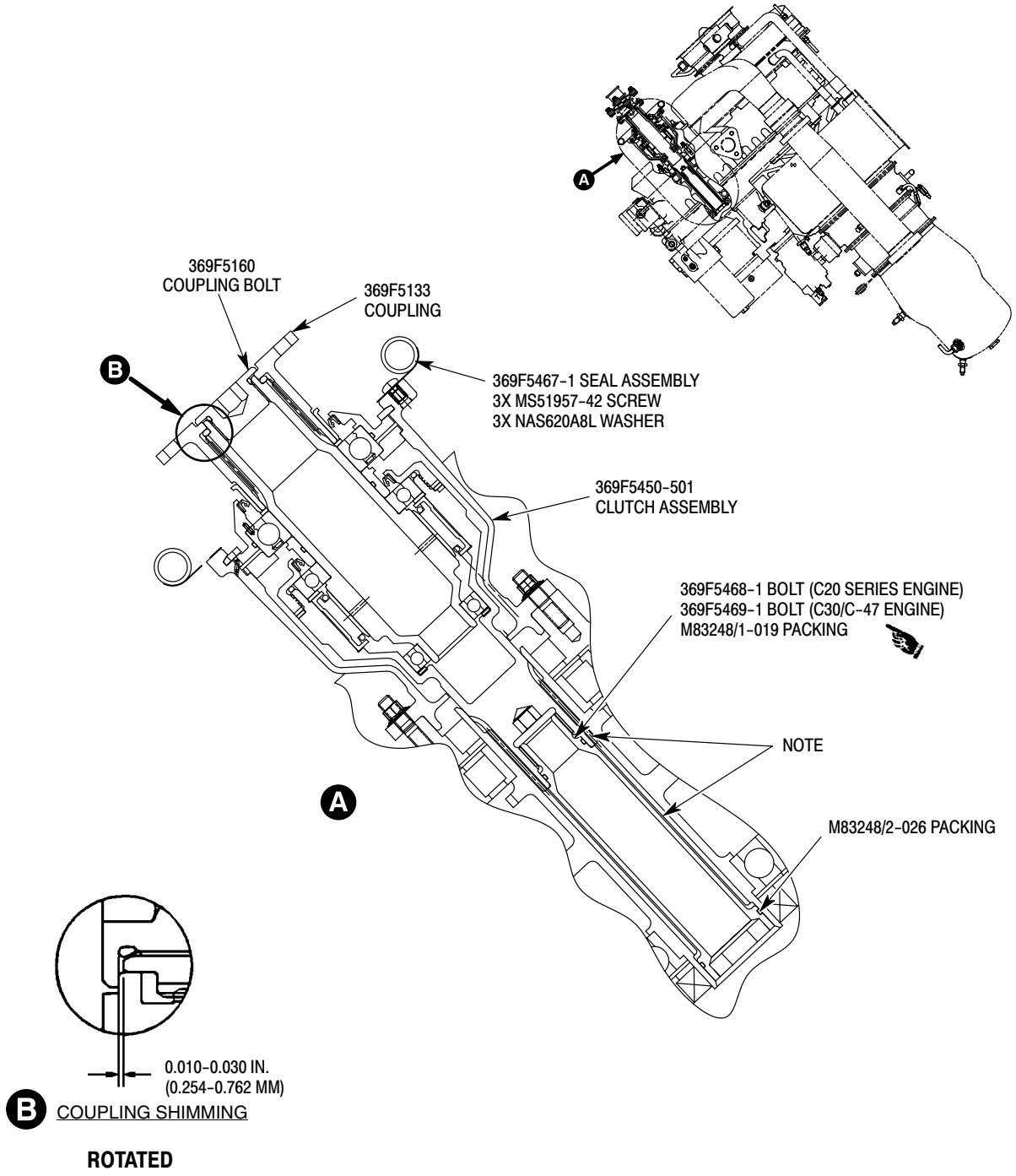


Figure 403. 369A5350 Overrunning Clutch Installation



NOTE: LUBRICATE SPLINES BEFORE ASSEMBLY WITH GREASE (CM111). PACK ALL VOIDS AND GAPS BETWEEN THE OUTSIDE OF BOLT AND INSIDE OF ENGINE POWER OUTPUT SHAFT.

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Figure 404. 369F5450 Overrunning Clutch Installation

(3). For 369F5450 clutch installation:

(a). Remove power output shaft cover plate from back of engine (Ref. Sec. 01-00-00, Allison Engine Operation and Maintenance Manual).

(b). Install O-rings on 369F5469 (C30/C47 engine) or 369F5468 (C20 series engines) bolt (Ref. Figure 404).

NOTE: Fill all voids and gaps between the outside of bolt and inside of engine shaft with grease.

(c). Lubricate internal spline area of engine output shaft with grease (CM111).

(d). Lubricate bolt threads with anti-seize compound (CM112) and insert through engine into overrunning clutch assembly.

(e). Using bolt removal tool (Ref. Figure 405) either hold output coupling to prevent overrunning clutch from turning or insert hex wrench through bolt to engage and hold clutch.

(f). Torque bolt to **250 - 300 inch-pounds (28.25 - 33.90 Nm) plus drag torque**.

(g). Using existing hardware, reinstall power output shaft cover plate on back of engine (Ref. Sec. 01-00-00, Allison Engine Operation and Maintenance Manual).

(4). Shim coupling on 369F5450 clutch assembly as follows:

(a). Remove output coupling bolt and coupling.

(b). Shim coupling to achieve 0.010-0.030 inch (0.254-0.508 mm) step above clutch output shaft.

(5). Shim coupling on 369A5350 clutch assembly as follows:

(a). Remove output coupling bolt and coupling.

(b). Shim coupling to achieve 0.035-0.055 inch (0.889-1.397 mm) step above clutch output shaft.

CAUTION When installing clutch coupling bolt, installation torque on the bolt must be **not less than 250 - 300 inch-pounds (28.25 - 33.90 Nm)** for the 369A5350 clutch or **not less than 315 - 365 inch-pounds (35.59 - 41.24 Nm)** for the 369F5450 clutch. Torquing to lower value reduces clutch bearing clamp-up and can result in bearing race spinning.

(6). Coat clutch-to-coupling splines with grease (CM111); install shim(s) and clutch coupling. Coat coupling bolt threads with anti-seize compound (CM112); install bolt with new O-ring. Check for bolt self-locking drag torque of **25 inch-pounds (2.82 Nm) minimum to 200 inch-pounds (22.60 Nm) maximum**. Replace bolt if torque values are exceeded.

(a). For 369A5350 clutch, torque coupling bolt to **actual drag torque plus 250 - 300 inch-pounds (28.25 - 33.90 Nm)**.

(b). For 36F5450 clutch, torque coupling bolt to **actual drag torque plus 315 - 365 inch-pounds (35.59 - 41.24 Nm)**.

(7). Install engine shaft firewall seal, bolts, washers, and nuts.

(8). Reinstall engine.

7. Overrunning Clutch Subassembly Replacement

(Ref. Figure 403 or Figure 404)

A. Overrunning Clutch Subassembly Removal

(1). Remove main transmission drive shaft.

(2). For 369F5450 clutch installation:

(a). Remove power output shaft cover plate from back of engine (Ref. Sec. 01-00-00, Allison Engine Operation and Maintenance Manual).

(b). Insert tool (Ref. Figure 405) to engage bolt in back of clutch.

(c). Insert a long 3/8 inch (9.525 mm) hex wrench, approximately 10 inches (25.4 cm) long, through tool and into back of clutch assembly.

(d). While holding internal hex wrench [3/8 inch (9.525 mm)], turn external hex wrench [1.00 inch (2.54 cm)] counter-clockwise to remove bolt from back of clutch.

(3). Remove coupling bolt, clutch coupling and shims.

(4). Remove retaining ring from clutch housing. Then pull complete clutch subassembly out of housing.

B. Overrunning Clutch Subassembly Installation

Consumable Materials (Ref. Section 91–00–00)

Item	Nomenclature
CM111	Grease, aircraft
CM125	Oil
CM126	Oil, turbine

(1). Remove shipping plug and O-ring from end of shaft in replacement clutch subassembly.

(2). Drain preservative oil from clutch subassembly by inverting it several times. Add lubricating oil (CM125 or CM126) (Ref. Sec. 12-00-00).

(3). Coat clutch splines with grease (CM111).

(4). Using care to avoid oil spillage, insert clutch subassembly into clutch housing and install retaining ring with beveled side outward.

(5). Check fluid level of clutch assembly before installing clutch coupling (Ref. Sec. 12-00-00).

(6). For 369F5450 clutch installation:

(a). Remove power output shaft cover plate from back of engine (Ref. Sec. 01-00-00, Allison Engine Operation and Maintenance Manual).

(b). Install O-rings on 369F5469 (C30/C47 engine) or 369F5468 (C20 series engines) bolt (Ref. Figure 404).

NOTE: Fill all voids and gaps between the outside of bolt and inside of engine shaft with grease.

(c). Lubricate internal spline area of engine output shaft with grease (CM111).

(d). Lubricate bolt threads with anti-seize compound (CM112) and insert through engine into overrunning clutch assembly.

(e). Using bolt removal tool (Ref. Figure 405) either hold output coupling to prevent overrunning clutch from turning or insert hex wrench through bolt to engage and hold clutch.

(f). Torque bolt to **250 - 300 inch-pounds (28.25 - 33.90 Nm) plus drag torque**.

(g). Using existing hardware, reinstall power output shaft cover plate on back of engine (Ref. Sec. 01-00-00, Allison Engine Operation and Maintenance Manual).

(h). Lubricate coupling bolt threads with anti-seize compound (CM112).

(7). Install clutch coupling, shims and coupling bolt.

(8). Install main transmission drive shaft.

8. Overrunning Clutch–to–Firewall Seal

The overrunning clutch-to-firewall seal consists of a stamped steel backing and a seal bonded to the cupped diameter of the backing.

9. Overrunning Clutch–to–Firewall Seal Replacement

(Ref. Figure 403)

(1). Remove engine.

(2). Remove three bolts, six washers and three nuts that attach firewall seal to overrunning clutch.

(3). Position replacement clutch-to-firewall seal assembly on flange of clutch with

seam orientated at the 6 o'clock position and secure with attaching hardware.

10. Main Transmission Drive Shaft Couplings

The main transmission drive shaft couplings connect the overrunning clutch to the drive shaft and the drive shaft to the main transmission.

11. Main Transmission Drive Shaft Coupling Replacement

(Ref. Figure 402)

A. Main Transmission Drive Shaft Coupling Removal

(1). Remove drive shaft; use care to keep it from striking any object.

(2). Remove coupling bolt from main transmission and overrunning clutch. Retain shim(s) with couplings for reinstallation.

B. Main Transmission Drive Shaft Coupling Installation

Consumable Materials
(Ref. Section 91–00–00)

Item	Nomenclature
CM111	Grease, aircraft
CM112	Anti-seize compound high temperature

CAUTION

- The 0.010 inch (0.254 mm) minimum measurement between the bolt seating surface and the input shaft must be obtained to ensure proper clamp up. Warped shims or foreign material could provide a false 0.010 inch (0.254 mm) minimum measurement and improper clamp up could result during normal operation which may damage the main transmission input shaft.
- Do not use clutch coupling shims under transmission input coupling. Inside diameter of clutch coupling shims, 1.260–1.270 inches (3.2004–3.2258 cm), is approximately 0.070 inch (1.778 mm) larger than inside diameter of shims used at transmission coupling. Incorrect diameters can cause an improperly seated shim, misalignment and cocked coupling.

NOTE: Transmission input coupling shims are laminated stock. Each lamination is 0.002 inch (0.051 mm) thick. Peel to thickness required.

(1). Install previously removed shims or refer to Main Transmission Drive Shaft Installation for shim thickness calculation.

(2). Lubricate drive shaft splines with grease (CM111) and install in place. Coat bolt threads with anti-seize compound (CM112) and install.

(3). Torqued coupling bolt to **actual drag torque plus 250 - 300 inch-pounds (28.25 - 33.90 Nm)**. If bolt is not seated and/or existing torque is found to be less than **250 - 300 inch-pounds (28.25 - 33.90 Nm)**, ensure self-locking drag torque is not less than **25 inch-pounds (2.82 Nm)** before torquing bolt.

(4). Reinstall main transmission drive shaft, main transmission access cover and sound insulation.

12. Tail Rotor Drive Shaft Coupling Replacement

A. Tail Rotor Drive Shaft Coupling Removal

(1). Remove tail rotor drive shaft (Ref. Sec. 63-15-10).

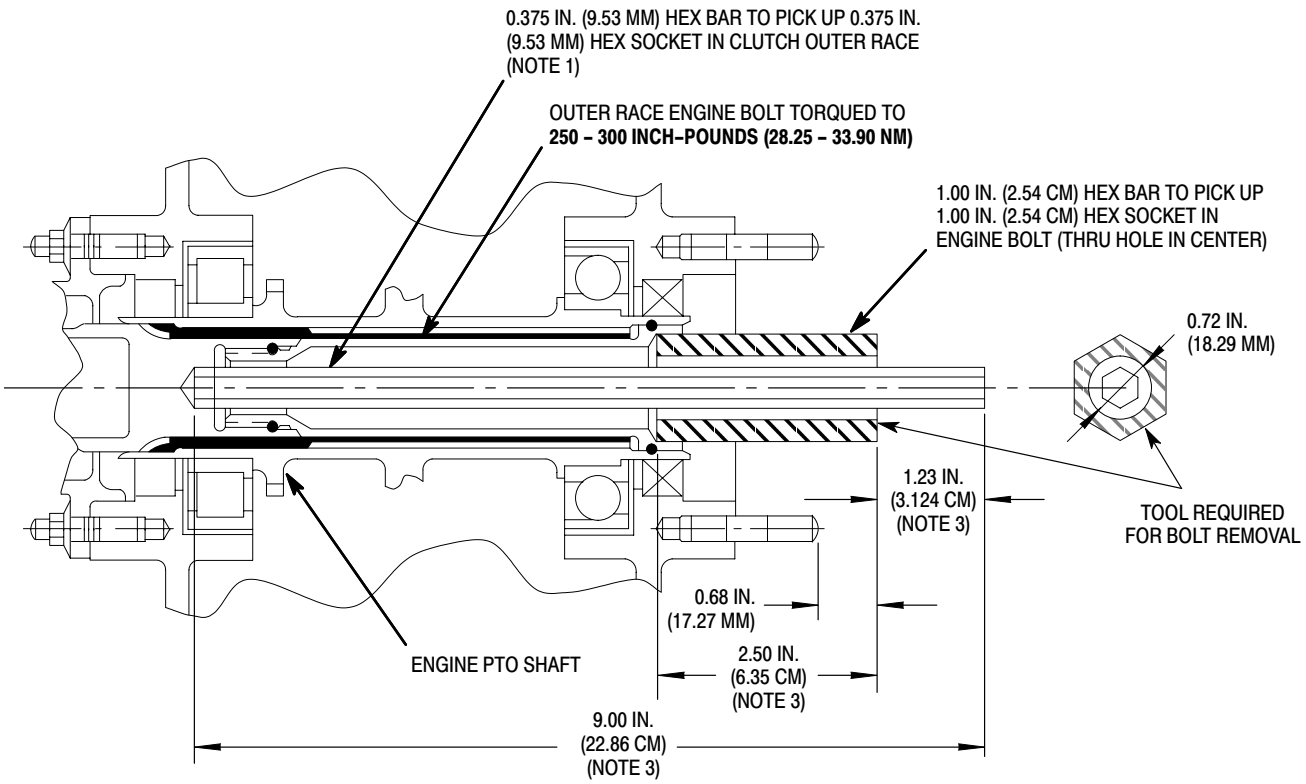
NOTE: With Bendix coupling installed, remove socket from main transmission coupling only if visual inspection reveals signs of contact between coupling bolt and socket.

(2). Remove couplings from main and tail rotor transmissions. Retain shims with couplings for reinstallation.

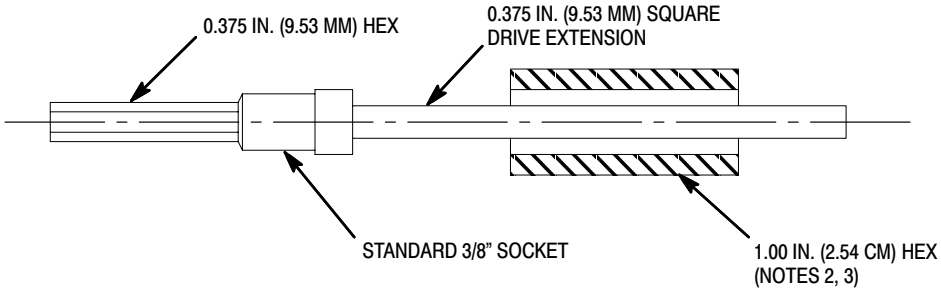
CAUTION Do not immerse Bendix flexible couplings in fluid or cleansers such as magnetic particle, fluorescent penetrant, visible dye etc. Do not apply corrosion protection fluids unless coupling has been cleaned with solvent or detergent. Apply any corrosion protection very sparingly to outside only.

B. Tail Rotor Drive Shaft Coupling Installation

According to type of coupling installed, installation of tail rotor shaft requires shimming of couplings, and in some instances, tail rotor gearbox-to-tailboom shimming (Ref. Sec. 63-15-10, Tail Rotor Drive Shaft Installation).



369F5450 CLUTCH ASSEMBLY



369F5468/5469 BOLT REMOVAL TOOL

NOTES:

1. HOLD HEX BAR STEADY WHEN TORQUEING BOLT.
2. TOOL TO BE A MINIMUM OF 2.5 INCHES IN LENGTH TO CLEAR STUDS ON ENGINE.
3. THIS IS MINIMUM LENGTH, TOOL MAY BE MADE LONGER FOR EASE OF MAINTENANCE.

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Figure 405. 369F5468/5469 Bolt Removal Tool

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any balance washers or weight from blade.

NOTE: Remove old primer from mating surfaces and attaching hardware prior to reassembly.

(6). To install blade, remove any protective covering from strap pack extending from hub trunnion.

(7). Install O-ring and slide blade on hub with blade leading edge facing in counterclockwise direction. Use care to keep blade correctly aligned so that hub trunnion slides into blade pitch bearings. Do not use force.

(8). Align bolt holes in root fitting with hole through bushing in outboard shoes of strap pack.

(9). Coat contacting surfaces of bushings, washers, nuts and bolts with unthinned primer (CM318) and immediately perform following steps.

(10). Assemble and install bolt, bushings and washers in sequence (Ref. Figure 201). Make certain that direction of bolt is opposite to that of opposing blade. Do not force bolt; it must have an easy but snug fit through blade, shoes and bushings.

NOTE: It is recommended that the MS 21250 bolt be replaced with any of the alternate bolts with the higher torque at the operators earliest convenience.

(11). If an MS 21250 bolt is installed, install nut and torque to **600 - 650 inch-pounds (67.79 - 73.44 Nm)** while primer is wet. If an HS5482-6, HS4441-6, or an LWB22-6 bolt is installed, torque nut to **750 - 775 inch-pounds (84.74 - 87.56 Nm)**.

CAUTION After blade is secured to strap pack assembly, do not allow blade pitch travel from neutral to exceed 30 degrees in either direction. Rotating blade to excessive pitch angles may result in undetected damage to strap assembly.

(12). Check that bolthead is flat against bushing. No gap is permitted. If gap is found, replace bolt and bushing.

(13). Install pitch control links (Ref. Sec. 64-30-00).

NOTE: If same blade that was removed is being reinstalled, install same number of balance washers on pitch arm bolt that were present prior to removal of blade. For different blade, install balance washers required for static chordwise balance of assembled tail rotor which have been determined with a balance fixture.

(14). Balance tail rotor (Ref. Sec. 18-20-00).

6. Tail Rotor Abrasion Strip Riveting

(Ref. Figure 204) The following procedure is for adding rivets at the outboard ends of the abrasion strip to provide a secondary failsafe method of attachment.

This procedure is effective on tail rotor blades:
369A1613-7, -503, -505,
369D21606-BSC,
369D21613-11, -31, -41, -51,
369D21615-BSC, -21,
421-088

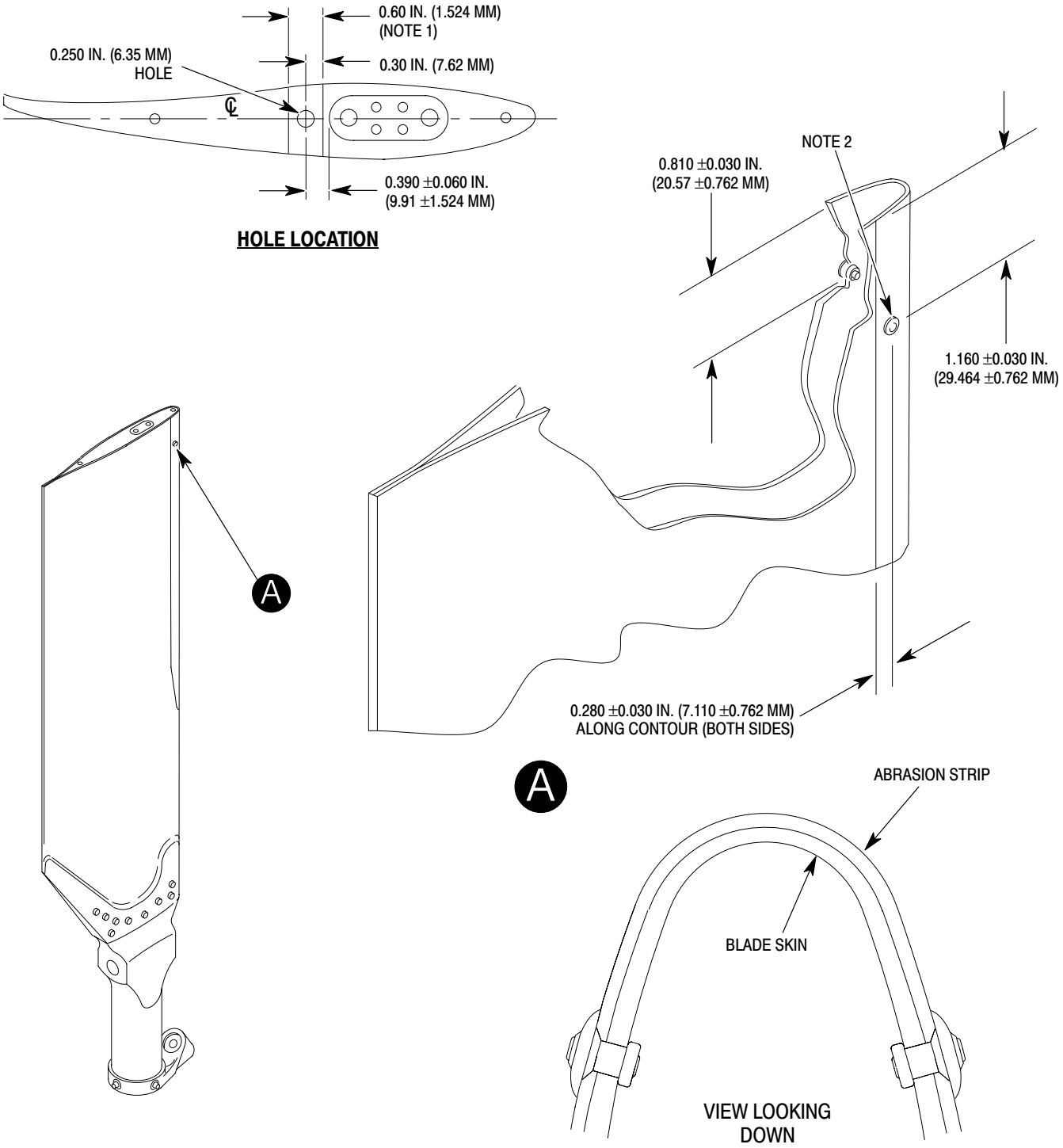
Consumable Materials
(Ref. Section 91–00–00)

Item	Nomenclature
CM222	1,1,1-Trichloroethane
CM318	Primer
CM804	Emery cloth, fine
N/A	Fiberglass cloth, No. 120
N/A	Epoxy resin, Spec. 3135A and B or any 2 part (1:1) clear epoxy resin

CAUTION Do not attempt to perform this procedure with the tail rotor blades installed on the helicopter. Failure to comply with this caution may result in defective rivet installation and possible blade damage.

(1). Remove tail rotor blades from helicopter (Ref. Tail Rotor Blade Replacement Procedure).

(2). Using a 10X magnifying glass, perform a visual inspection of the tail rotor blade abrasion strip bond lines for debonding.



NOTE:

1. FIBERGLASS THIS AREA. DO NOT PLACE FIBERGLASS CLOTH OVER OPENING FOR BALANCE WEIGHTS.
2. COUNTERSINK HOLE 100°, DEPTH 0.009-0.011 IN. (0.229-0.2794 MM).

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Figure 204. Tail Rotor Blade Abrasion Strip Riveting

ENGINE IGNITION CONTROL SYSTEM

INSPECTION/CHECK

1. Automatic Re–ignition System Check (with Ground/Air Switch)

369E	384 - 508
369FF	076 - 091
500N	001 - 044

NOTE: Helicopters equipped with the ground/air switch can be modified to eliminate the switch (Ref. Sec. 96-10-00, Generator Control Unit Upgrade to Eliminate Squat Switch).

(1). The RE-IGN TEST switch (S11) provides for an OFF and two test positions; GND (up) and FLT (center).

(2). Both horn and audible warnings are disabled by ground/air switch (S522) when the helicopter is on the ground, except when RE-IGN TEST switch is placed in the GND position.

(3). The FLT position provides a complete in-flight systems test by simulating a fault of the N_1 input to the EPO.

(4). Both on-ground and in-flight tests can be accomplished by selecting GND position.

(5). On-ground test requires RE-IGN TEST switch in the GND position.

(a). With power applied, the ENG OUT indicator should be flashing.

(b). Press the press-to-test button and all warning lights should illuminate momentarily.

(c). Set RE-IGN TEST switch to GND.

(d). Verify horn, audio warning, RE-IGN P RST indicator is illuminated and engine igniter firing.

(e). Return switch to OFF, the system should reset.

NOTE: Conducting test with engine motoring will require pushing the RE-IGN P RST indicator to reset the system (Refer to appropriate PFM for in-flight test of system).

A. Normal Start

Verify system operation of normal starting circuit by performing a normal start as described in appropriate Pilot's Flight Manual.

2. Automatic Re–ignition System Check (without Ground/Air Switch)

369E	509 & subs
369FF	092 & subs
500N	045 & subs

Verify system operation of automatic re-ignition circuit as follows:

(1). Set BATTERY/OFF/EXT PWR (master) switch to OFF.

(2). Connect external 28 Vdc power.

(3). Set master switch to EXT PWR.

(4). Close ENG OUT circuit breaker.

NOTE: Closing ENG OUT circuit breaker provides power at re-ignition relay K104.

(5). Set RE-IGN TEST switch to ON.

(6). Verify audible spark across engine igniter gap.

(7). Verify Re-ignition indicator lights.

(8). Set RE-IGN TEST switch to OFF.

(9). Press Re-ignition indicator. Verify indicator lamps go out.

(10). Open ENG OUT circuit breaker.

(11). Set master switch to OFF.

(12). Disconnect external power.

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Table 1. Consumable Materials (Cont.)

Item No.	Material	Specification No. (1) Type Class Grade	Commercial Name/No. (2)	Vendor (Table 2)
CM433	Ethylene chloride (ethylene dichloride, EDC)	MIL–E–10662		(3)
CM434	Thread sealant		P412	MS60
CM435	Tetrahydrofuran (THF)			MS51
CM436	Plastic steel		Devcon A	MS20
CM437	Sealing compound		Permabond 102	MS43
			Loctite 414	MS60
				MS45
				MS87
CM438	Adhesive, Epoxy	HMS16–1068 12	EA9321	MS21
CM439	Adhesive	HMS16–1149 5		MS75
	Composite Materials			
CM501	Fiberglass cloth (0.022, 2 ply)	SAE–AMS–C–9084 No. 181		(3)
CM502	Sleeving, fiberglass (No. 4, 0.214 in. ID x 4.0 in.)	MIL–I–3190 . . . . . HA–1		(3)
CM503	Fiberglass repair kit		Cordokit RK–10	MS29
CM504	Epoxy resin with catalyst (low pressure laminating)	MIL–R–9300 1		(3)
CM505	Polyester laminating resin	MIL–R–7575		(3)
CM506	Resin, fiberglass		Epon 828	MS72
CM507	Resin, filler		Epon 960F	MS72
CM508	Resin, filler		#RP1257–3	MS66
	Rubber Material			
CM601	Insulation sleeving, electrical (vinyl tubing; size as notes)	MIL–I–631 F . . . . . 1 . . . . . A Form U, Category 1		(3)
CM602	Insulation sleeving, electrical, fiberglass (size as notes)	MIL–I–3190		(3)
CM603	Patching material (inside/outside)		#5200/5187/5194	MS82
CM604	Patching material (outside only)		#5218 or #5241/5241	MS82
CM605	Fuel cell repair kit		RK3CL	MS82
CM606	Rubber cement	MIL–A–5092		(3)
CM607	Cement	MIL–S–9117	EC–678	MS82
CM608	Cement		Uniroyal #3230	MS80
CM609	Repair kit (non–self– sealing cell)		Uniroyal #RK–10–34	MS80

Table 1. Consumable Materials (Cont.)

Item No.	Material	Specification No. (1) Type Class Grade	Commercial Name/No. (2)	Vendor (Table 2)
CM610	Patch material (self- sealing cell, exterior)		Uniroyal #5241/5241 sandwich	MS80
CM611	Tubing, vinyl clear		PVC tubing, 2 GA, clear 105C	MS71
CM612	Tube, silicone		No. 4 (H.A.I.)	MS83
CM613	Sleeve, vinyl		No. 2 Resinite	MS13
CM614	Sleeving, heat-shrink (class, type or diameter as noted)	MIL-I-23053	RNF100X3/8 RNF100X1/2 RNF100 .125 ID	MS65
	Lockwire, Fasteners and Tape			
CM701	Lockwire CRES	MS20995C20		(3)
CM702	Lockwire CRES	MS20995C32		(3)
CM703	Tie strap (size as noted)	MS3367-*-*		MS78
CM704	Tie strap, nylon	MS17821-1-9	TY-RAP	(3)
CM705	Tie, cable		SST2	MS18
CM706	Tie strap base		TC112	MS78
CM707	Tape, fastener (nylon hook and pile)		Velcro	(3)
CM708	Tape		#850	MS86
CM709	Tape		CT93C	MS42
CM710	Tape, high temperature (thickness as noted)		Temp-R	MS16 MS39
CM711	Tape, pressure sensitive (waterproof for packaging and sealing, width and thickness as noted)	PPP-T-60 1 1		MS60 MS86
CM712	Tape, pressure sensitive (width as noted)		#41	MS86
CM713	Tape, pressure sensitive		#471	MS86
CM714	Tape, pressure sensitive (width as noted)		#4104	MS86
CM715	Tape, pressure sensitive (width as noted)		#4508	MS86
CM716	Tape, pressure sensitive (adhesive, filament reinforced)	PPP-T-97		(3)
CM717	Tape, pressure sensitive, (polyurethane, width as noted)		#Y8560	MS86
CM718	Tape, double-faced		E-706	MS8
CM719	Tape, vinyl plastic		#330	MS76
CM720	Tape and activator, vinyl		Scotch Cal #45 Scotch Tite A-2	MS86
CM721	Tape, aluminum foil		#425	MS86
CM722	Tape, polyethylene		#483	MS86