



EXEC 162F MAINTENANCE MANUAL

The RotorWay EXEC 162F Maintenance Manual has been designed to provide the owner-operator the lowest operating cost possible while maintaining the flight characteristics and safety of their helicopter.

WARNING

The construction and operation of "Home-Built Aircraft" of this type is demanding and could inflict serious injury and possible death. No such operation, construction or undertaking should be initiated unless thorough and complete knowledge, preparation and instruction are available and utilized. The seller (and its agents, servants, employees, contractors, successors, and assigns) makes no warranties express or implied regarding the clarity or correctness of the plans, ease of construction or operation nor the safety of this aircraft or any part thereof. Furthermore, buyer (and his heirs, administrators and assigns) releases and holds said seller (and its agents, servants, employees, contractors, successors, and assigns) harmless from any and all liability, damages, and causes of action which may be incurred by buyer or any third party as a result of the purchase, use, construction and/or operation of said aircraft (or any part thereof) or plans for same. Buyer assumes all risk and responsibility relative to the construction and/or operation of said aircraft. Seller admits no liability by publication of this warning.

INTRODUCTION

In this Maintenance Manual, the components of the helicopter have been divided into 20 sections. Each of these sections begins with a brief description of the component, followed by an "Inspection Chart". This chart shows the Inspection Interval, Recommended Change Out time (R.C.O.), and a Service Reference for each part. The Service Reference directs the builder to the procedure to be followed for each inspection. In most cases, a Service Note (found on the following page), a footnote, or a Construction Manual section will be referenced.

Many parts listed are given a specific lifetime to be replaced as specified in the Inspection Charts. In order to extend the lifetime, these parts could require extensive inspection. Visual inspection of certain items may show the part to be serviceable, but they may have a fatigue life that requires their replacement. This policy provides each part with a safety factor to enable its replacement before failure.

The R.C.O. time represents the lifetime of a component as recommended by the manufacturer. A phrase called "on condition" or O.C. is also utilized in this manual. This means the part should be monitored and replaced if suspect prior to the R.C.O. time of the component. Common examples of parts that qualify for O.C. replacement are bearings and belts. When these parts are not correctly installed or not cleaned properly, they may fail prematurely.

Even though close quality control procedures are adhered to, a part may fail prematurely due to a variety of reasons. Incorrect manufacturing procedures, builder errors, environmental conditions and storage conditions may all contribute. Because premature failures can happen, it is important to monitor all major components during pre- and post-flight inspections.

Clearances and tolerances for proper inspection will be noted in the section, if applicable, for part replacement. Other data such as crankshaft tolerances, rod clearance and cam dwell, etc., is proprietary information. If the need arises for the builder to have this information, a technical representative from the factory should be contacted.

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Section 1: Airframe

The airframe is constructed of various size tubes consisting of geometric shapes which will allow the airframe to flex at key areas during operation and still maintain a high structural integrity. The tubing is aircraft industry standard 4130 chrome-moly. Where tubing requires bending, a mandrel bender is used and tubes are scribed, cut, and coped to a tolerance of .062 inch. The oxygen acetylene gas method of welding is used and all weldments are air cooled to retain the original strength of the alloy.

Reference prints: E10-2000, E13-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E10-1001	EXEC 162F Airframe	100 HR	2000 HR/OC	1-1
E00-2415	AN4-24A (1/4 x 2-1/2) Bolt	100 HR	2000 HR/OC	Torque
E00-2601	AN6-10A (3/8 x 1) Bolt	100 HR	2000 HR/OC	Torque
E11-9010	Rear Landing Gear	100 HR	2000 HR/OC	1-2
E13-3121	Engine Mount Rubber Ring	50 HR	2000 HR/OC	1-3
E00-2507	AN5-10A (5/16 x 1) Bolt	100 HR	2000 HR/OC	Torque
E11-3130	Landing Gear Skid (Pilot)	500 HR	2000 HR/OC	1-4
E11-3131	Landing Gear Skid (Passenger)	500 HR	2000 HR/OC	1-4

SERVICE NOTES:

1. Remove all inspection panels including the two upper panels that are held on by nut plates. Using a flashlight or a suitable source of illumination and a mirror, inspect for cracks on the round and square tubes, paying close attention to the welded areas. If a small hairline crack appears, remove the paint from the airframe at that position to further verify the crack. It may be necessary to apply a pressure or load in such a manner as to help open up the crack to verify. If close inspection verifies the crack, contact the factory for further assistance. If verification is negative, repaint the suspect area and reassemble.
2. Remove skid pants. Inspect the rear landing gear, gear gusset, the area 6 inches above and below the landing gear step, and the rear landing gear attachment bracket. These are critical inspection areas. Approximately 80% of the total aircraft weight is transferred on the rear gear. After inspection, reinstall the skid pants.

The rear landing gear may spread with age or after a hard landing. The gear should be replaced if the distance between rear landing gear shoes, measured inside, is greater than 62 inches.

3. Removal of the two rear lower fiberglass body panels (part no. E32-7130 and E32-7140) will allow you access for a visual inspection of the Engine Mount Rubber Ring, part no. E13-3121. This part must be kept clean from oil and grease. Allowing the part to become contaminated will deteriorate the rubber over a short period of time, changing the alignment of the secondary to engine height. If in question, check secondary and engine alignment. The tolerance is plus or minus 1/8". Refer to the engine installation section of the Construction Manual for further assistance.
4. Because the helicopter can be operated in many different terrains and will experience a variety of landing conditions, the landing gear skid will remain an on-condition inspection item. Lift the front skid off the ground approximately 10 inches and block it up with a 2x4 board. Look for a flat wear area across the bottom of the skid. If a flat area appears and measures more than 1/2" in width, replace the skid tube. Keeping the helicopter in the upright condition, remove the two (2) front skid shoe bolts (part no. E00-2414) on the right front skid shoe and drop the skid 3" below the shoe. This will allow an inspection on top of the skid which is normally hidden by the shoe. Check the holes for an oblong condition and for any cracks in the skid tube. Also, inspect the bolts for wear prior to reinstalling the skid on the landing gear shoe.

Section 2: Tail Boom

The main purpose of the tail boom in all conventional helicopters is to provide a mounting location for the anti-torque system or tail rotor. Its secondary purpose is to mount the vertical and horizontal trim fins which are used to stabilize the aircraft in forward flight, opposing aerodynamic forces from the windscreen and body.

The material used for the tail boom skin is aircraft industry standard, grade T-3 aluminum and is .025 thick. The sheet is rolled in a cone shape to provide structural integrity.

Reference prints: E09-2000, E09-2001

INSPECTION CHART				
PART NO.		INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E09-9000	Tail Boom	100 HR	2000 HR/OC	2-1
E09-9010	Vertical Trim Fin	100 HR	2000 HR/OC	Rivet inspection
E09-9021	Horizontal Trim Fins	100 HR	2000 HR/OC	Rivet inspection
E09-3252	Vertical Trim Fin Bracket	100 HR	2000 HR	2-2
E00-2300	AN3-4A (3/16 x 1/2) Bolt	50 HR	2000 HR	Torque
E00-2301	AN3-5A (3/16 x 5/8) Bolt	100 HR	2000 HR	Torque
E00-2303	AN3-6A (3/16 x 3/4) Bolt	50 HR	2000 HR	Torque
E00-2305	AN3-11A (3/16 x 1-1/8) Bolt	100 HR	2000 HR	Torque
E00-2306	AN3-12A (3/16 x 1-1/4) Bolt	50 HR	2000 HR	Torque
E00-2307	AN3-13A (3/16 x 1-3/8) Bolt	50 HR	2000 HR	Torque
E00-2308	AN3-15A (3/16 x 1-5/8) Bolt	50 HR	2000 HR	Torque
E00-2309	AN3-17A (3/16 x 1-7/8) Bolt	100 HR	2000 HR	Torque
E00-2414	AN4-23A (1/4 x 2-3/8) Bolt	100 HR	2000 HR	Torque
E00-2432	AN4-12A (1/4 x 1-1/4) Bolt	50 HR	2000 HR	Torque

SERVICE NOTES:

1. The tail boom is subject to most of its stress during take off and landing. The skin and its associated parts are subject to high frequency vibrations that can cause stress cracks and generate loose rivets and bolts.
 - A. Stress cracks: Upon inspection of the tail boom skin, if you find that stress cracks have started, drill a small hole at the very end of the crack. This hole will stop any further migration of the crack. The size of the drilled hole will depend on the severity of the crack.
 - B. Loose rivets: Using the appropriate sized drill bit (depending upon the size and head diameter of the rivet), drill out the head of the rivet by rotating the drill in an elliptical manner. This will remove the head without drilling through the rivet hole. Then use a rivet shank or a small punch to knock out the remainder of the rivet. Clean the area and deburr the hole if necessary. Replace the rivet using the original type and size.

2. Inspect the Vertical Fin bracket at bend areas for cracks. Also inspect the mounting holes outward to the edge of the bracket.

Section 3: Body

The body of the EXEC 162F helicopter consists of several separate panels that when assembled make up a solid egg shape structure. This provides for a very efficient and aerodynamic airflow. Each panel is made using the hand lay-up squeeze method to give the piece the maximum strength to weight ratio. A gel coat is applied to the mold prior to the fiberglass lay-up so that the parts are ready for light sanding and paint.

Reference print: E32-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
	Body	100 HR	OC	3-1
E32-7210	Eyebrow Window, Pilot	100 HR	OC	3-2
E32-7220	Eyebrow Window, Passenger	100 HR	OC	3-2
E32-7231	Windscreen	100 HR	OC	3-2
E32-1301	Seat Upholstery	100 HR	OC	3-3
	Skid Pants	100 HR	OC	3-4
E32-1111	Cyclic Boot	100 HR	OC	
E32-3131	Floor Pan/Instrument Pod	100 HR	OC	
E32-6111	Seat Bulkhead	100 HR	OC	
E32-7102	Bottom Tub	100 HR	OC	
E32-7111	Fuselage (Right Front)	100 HR	OC	
E32-7113	Fuselage (Right Rear)	100 HR	OC	
E32-7122	Fuselage (Left Rear)	100 HR	OC	
E32-7123	Fuselage (Left Front)	100 HR	OC	
E32-7130	Fuselage (Lower Right)	100 HR	OC	
E32-7140	Fuselage (Lower Left)	100 HR	OC	
E32-7152	Doghouse (Front)	100 HR	OC	
E32-7160	Bracing Panel	100 HR	OC	
E32-7170	Bracing Panel	100 HR	OC	
E32-7180	Roof Panel	100 HR	OC	
E32-7272	Doghouse (Rear)	100 HR	OC	
E54-4010	Push/Pull Cable	100 HR	OC	Oil (20 W)

SERVICE NOTES:

- Care of the body panels is very minimum. However, two factors which may damage them are heat and prolonged exposure to gas and oil from lack of cleaning. When doing pre- and post-flight inspections, avoid exposing any removed panels to excess heat or direct sunlight. Stand the panels upright and avoid placing them in an abnormal position. Prolonged exposure to excessive heat or sunlight in an abnormal position could result in a deformed panel.

Fiberglass is resistant to most chemicals; however, panels that are exposed to gas and oil over long periods of time will eventually be weakened. Wipe off oil and gas with a dry cloth. Then clean off any remaining residue using a cloth moistened with acetone. Use **CAUTION** when working with acetone because of its high flammability.

Check to make sure that all metal parts protruding through the fiberglass have a minimum of 1/4" clearance. If the clearance requires enlarging, this process can be done by using a round or flat file or an air or electric grinder.

- Care and cleaning of Plexiglass parts:
 - Cleaning: A mild soap and water solution on a cloth can be used to remove dirt and fingerprints. A plastic cleaner such as Meguiar's #2 can be used to remove overspray and oxidation and #9 should be used to preserve and protect the windscreen and to bring up a high gloss.

- B. Care should be taken so that the windscreen screws are not over tightened (see “Working With Plexiglass” in the Standard Construction Procedures of the Construction Manual). This could cause stress cracks that may result in a major crack down or across the windscreen. If a stress crack appears, stop drill the crack with the appropriate size drill bit.
 - C. If a cover is used while trailering, make sure the cover has a soft inside lining and fits tight enough to the body to avoid flapping.
3. Use any commercially available upholstery cleaner on the seats or cabin interior if they become soiled. Carefully read the instructions on the cleaner to obtain desirable results. This will help prevent any shrinkage from occurring.
 4. Check to make sure that the skid pants do not chafe against the body tub or the landing gear. If contact is present, file the fiberglass to make clearance between the two parts.

Section 4: Tail Rotor Drive

The tail rotor drive of the EXEC 162F utilizes a V-belt design, rather than a drive shaft with gear boxes, to transmit power to the tail rotor. This design provides a simple and effective drive train with low maintenance.

Reference print: E09-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E18-6130	Idler Pulley Mounting Scissors	250 HR	2000 HR	4-1
E18-1131	Idler Pulley Bearing Assembly	250 HR	250 HR/OC	4-2
E18-2012	Tail Rotor Idler Pulley	100 HR	2000 HR/OC	4-3
E18-1150	Tail Rotor Belt	Pre/post flight	250 HR/OC or 2 yrs	4-4
E18-1160	Tail Rotor Belt	Pre/post flight	250 HR/OC or 2 yrs	4-4

SERVICE NOTES:

1. Remove the two bolts (part no. E00-2405) that attach the idler pulley assembly to the tail boom and slide the idler pulley mount scissors down and out of the tail boom. (See note 2 below for inspection of idler pulley assembly.) Place a small amount of grease on each of the mating surfaces and reinstall the pulley in its original position. Tighten the nuts on the bolts only enough to hold the part firmly. The part should not swing loosely but require slight pressure to move it. (Refer to Construction Manual.)

2. Tail Rotor Idler Pulley Assembly (part no. E18-2012)
 - A. Remove the pulley by removing bolt part no. E00-2604.
 - B. Remove two (2) snap rings.
 - C. Heat the pulley in an oven or other appropriate means to 225-275 degrees F. **CAUTION:** Do not exceed 300 degrees F or the heat treatment of the pulley will be affected.
 - D. Using appropriate tools, fixtures, and presses, press out the old bearing.
 - E. Let the pulley air cool, then clean the inner mating service with acetone.
 - F. Clean the outer surface of the bearing with acetone and position the bearing ready for reinstallation.
 - G. Apply a thin even film of Loctite #609 to the outer surface of the bearing only. (Do not use your fingers.)
 - H. Install one snap ring.
 - I. Heat the pulley to 225-275 degrees and drop the bearing in place. If a press is necessary, use light pressure to insure contact of the bearing to the snap ring. (When using a press, press only on the outer race of the bearing and not the inner race.) Wipe off remaining Loctite.
 - J. Install the second snap ring and let the assembly cool.
 - K. Check to see that both snap rings have seated completely and that there is no play between the bearing and the pulley.
 - L. Install the pulley, make sure the spacers are in their proper place and torque the bolt.
 - M. Rotate the pulley on its new bearing and check the feel with your fingers for smoothness and ease of rotation.

3. Inspect for wear and anodizing on the pulley. Also inspect for cables and wires that may have shifted or come loose in the tail boom, allowing them to rub on the pulley.

4. Visually inspect and check tension of the tail rotor drive belts at every pre-flight and post-flight inspection. Detailed procedures regarding proper installation, tension and maintenance of these belts are given in the Flight Manual and in Section 25 of the Construction Manual (Rigging Procedures). Thoroughly inspect the condition of the belts every 100 hours.

Replace the tail rotor drive belts at 250 hours of operation, or at 2 years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the belts have not been exposed to the environment and have not been affected by aging. Conditional replacement includes damage resulting from excessive slipping, oil absorption, cracking, glazing, abnormal wear, or any other damage.

Section 5: Tail Rotor

The tail rotor's function is to counter the torque of the power plant and keep the aircraft from rotating. It also provides the ability to turn the aircraft while hovering by adjusting the pitch of the tail rotor blades through use of the directional controls. Note: Refer to the Construction Manual for replacement details of these components.

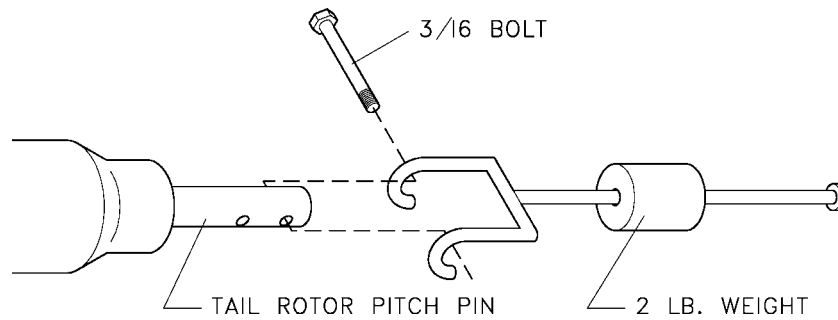
Reference prints: E17-2000, E17-2001

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E17-1260	FS3 PP Bearing	100 HR	500 HR/OC	5-1
E17-1290	Snap Ring	100 HR	500 HR	
E00-2604	AN6-24A (3/8 x 2-1/2) Bolt	100 HR	500 HR/OC	
E17-6126	Carriage Slider Assembly	25 HR	1000 HR/OC	5-5
E17-1300	Carriage Slider Bearing	100 HR	500 HR/OC	
E17-1210	Rod End 5/16 Teflon	100 HR	1000 HR/OC	
E17-6000	Tail Rotor Blade Assembly	100 HR	500 HR/OC	5-2
E17-5120	Pitch Actuator Arm Pivot Casting	100 HR	2000 HR	5-3
E17-1340	Bearing Assembly	100 HR	250 HR/OC	
E17-5110	Pitch Horn	100 HR	500 HR	
E17-9010	Slider/Actuator Arm Clevis	100 HR	2000 HR	
E17-6150	Tail Rotor Shaft	100 HR	2000 HR/OC	
E17-1360	Bearing Plate Slider Rail	100 HR	2000 HR	
E17-5101	Tail Rotor Pulley	100 HR	2000 HR/OC	
E16-1200	Female Rod End	100 HR	1000 HR/OC	
E17-1270	Alignment Bearing Assembly	50 HR	500 HR/OC	5-4
E17-1280	Thrust Bearing Assembly	50 HR	500 HR/OC	5-4
E17-6100	Tail Rotor Barrel	50 HR	2000 HR/OC	5-4

SERVICE NOTES:

1. Remove bolt (part no. E00-2604) from the tail rotor barrel. Using a knife or a tool with a sharp edge, pry under the lip of the bearing (part no. E17-1260) removing the bearing from the barrel. Replace with new bearings and insert the bolt, tightening it just enough so that the head of the bolt can be rotated slightly with your fingers. Check end play by using your hand and fingers, pushing the barrel from side to side to confirm proper end play.
2. Use the following procedure to remove tail rotor blades (part no. E17-6000) and pitch pins (part no. E17-6173):
 - A. First, mark each blade and pitch horn assembly as A and B. Indicate identity on the tail rotor barrel so reassembly will be the same. This will maintain tail rotor balance.
 - B. Remove the two bolts that hold the blade to the pitch pin (part no. E00-2305 and E00-2308).
 - C. Carefully grasp the tail rotor blade and barrel with your hand and rotate while pulling outward.
 - D. Remove the snap rings and deburr the snap ring hole if needed. **CAUTION:** Be careful while doing this procedure not to mark or scratch the inner surface of the tail rotor barrel.
 - E. Grasp the pitch pin and pull it out of the barrel. It may be necessary to insert a bolt in the tail rotor pin to lightly tap on for removal. NOTE: A slide hammer may be fabricated to facilitate the removal of the pitch pin. See drawing on the next page.
 - F. After removal of the pitch pin, remove the alignment bearing assembly (part no. E17-1270) and the thrust bearing assembly (part no. E17-1280). Immerse the parts in a solvent to clean and remove the grease. After inspection of parts, reassemble according to original procedures as outlined in the Construction Manual and on prints E17-2000 and E17-2001.

NOTE: When changing out the tail rotor blades, refer to the tail rotor balancing procedures in the Construction Manual.



3. Remove bolt (part no. E00-2311) and two washers. Then slide the actuator arm to one side and place a small amount of grease on the bolt hole in the pivot casting. Reassemble the actuator arm, install bolt, and check the nut with cotter pins for security.
4. Every 50 hours, add grease to the fitting on the tail rotor barrel until the grease comes out near the pitch horns, and wipe off excess. Drill a 3/16 inch hole in each blade tip cap so that grease thrown out by centrifugal force will not build up inside the blade.
5. Slowly inject one shot of Mystik JT-6 grease while moving the slider back and forth to spread the grease evenly. Add grease again every 25 hours of operation or as needed.

Section 6: Control Assemblies

The Control Assemblies of the EXEC 162F helicopter transfer control inputs from the pilot and passenger to the associated location on the helicopter. The four areas that require control inputs are:

- A. Directional Controls
- B. Cyclic Controls
- C. Collective Controls
- D. Throttle Controls

Coordinated inputs of these controls allow the pilot to maintain control of the helicopter throughout all maneuvers.

Reference prints: E14-2000, E15-2000, E16-2000, E17-2000, E17-2001, E49-2002

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
Directional Control				
E16-6131	Cross Shaft Bushing	1000 HR	2000 HR	6-1
E16-6130	Scissor Mount Bushing	1000 HR	2000 HR	6-2
E16-1200	3/16" Female Rod End	100 HR	1000 HR/OC	6-3
E16-1130	1/4" Male Rod End	100 HR	1000 HR/OC	6-4
E16-1140	1/4" Female Rod End	100 HR	1000 HR/OC	6-4
E16-1212	Directional Control Cable	100 HR	2000 HR/OC	6-5
Cyclic Control				
E14-6131	Cross Shaft Bushing	1000 HR	2000 HR	6-6
E14-1241	Nylon Bushing	1000 HR	2000 HR	6-7
E14-1150	5/16" Male Rod End	100 HR	2000 HR/OC	6-8
E14-1211	Cyclic Control Cable	100 HR	2000 HR/OC	6-9
E14-1221	Cyclic Control Cable	100 HR	2000 HR/OC	6-9
Collective Control				
E15-6131	Cross Shaft Mount Bushing	1000 HR	2000 HR	6-10
E15-1230	5/16" Male Rod End	100 HR	2000 HR/OC	6-11
E15-6130	Collective Rod End Plug	100 HR	2000 HR/OC	
E49-1400	Collective Control Rod	100 HR	2000 HR/OC	
Throttle Control				
E15-3150	Pilot Throttle Shaft	1000 HR	2000 HR	6-12
E15-3170	Transfer Shaft	1000 HR	2000 HR	6-13
E15-9021	Throttle Shaft Weldment	1000 HR	2000 HR	6-14
E15-1150	1/4" Male Rod End	100 HR	2000 HR/OC	6-15
E24-7531	Throttle Cable Assembly	100 HR	500 HR/OC	

SERVICE NOTES:

1. Remove the cross shaft bushing (part no. E16-6131) by clipping the safety wire from the bolt (part no. E00-2501) and then removing the bolt. Drill out the rivets that attach the bushing to the bracket on the airframe. Lift up on the end of the foot pedal cross shaft (part no. E16-3101) just enough to remove the cross shaft bushing. Clean the bushing, apply a small amount of grease and reassemble. Re-torque and safety wire the bolt, and pop rivet the bushing to the bracket. Perform this procedure for both pilot and passenger sides.
2. Remove the scissor mount bushing (part no. E16-6130) by removing bolt (part no. E16-2406). Lower the bushing away from the scissor beam (part no. E16-3120). Clean, grease lightly, and reassemble. Check clearance between head of bolt (part no. E16-2406) and front airframe tube. There should be a minimum of 1/16" clearance. If proper clearance cannot be obtained, shim under nylon scissor beam pivot bushing (part no. E16-6120) to achieve clearance.

3. Remove bolt (part no. E00-2305) rod end (part no. E16-1200) and jam nut. Then count the number of turns to remove, and install the new rod end with the same number of turns. Tighten the locking nut, replace the bolt and verify the cable travel. Refer to the Construction Manual for detailed procedures.
4. Remove bolts (part no. E00-2406) and remove both rod ends. Using calipers, measure and note the distance from center to center. Reinstall the new rod end with the same measurement. Refer to the Construction Manual for detailed procedures.
5. **CAUTION:** Under no conditions should any type of lubrication or oil be used on the sliding inner cable.
6. Grease the cross shaft pivot bushing. Refer to the Construction Manual for detailed procedures.
7. Remove bolt (part no. E00-2414) and the two large fender washers. Place a small amount of grease (Mystik JT-6) on the bolt, bushing and mating surfaces. Reinstall the bolt and two fender washers. Tighten the bolt enough to hold firmly while still allowing the cyclic clevis to move easily without any end play.
8. Remove bolt (part no. E00-2510) and pull the rod end away from clevis. Loosen the locking nut and on the rod end and unscrew it, counting the number of turns. Install the new rod end with the same number of turns. Tighten locking nut and install bolt. Refer to the cyclic control section and rigging procedures for the elastomeric rotor hub in the Construction Manual to verify adjustments.
9. **CAUTION:** Under no conditions should any grease or lubricant be used on the sliding inner cable.
10. Cut safety wire and remove bolt (part no. E00-2501). Drill out the rivets that attach the bushing to the bracket. Lift the collective control shaft (part no. E15-3120) enough to remove the cross shaft mounting bushing (part no. E15-6131). Clean and lightly grease with Mystik JT-6 grease. Reassemble the bushing, position the collective control shaft in the bracket and insert the bolt. Torque and safety wire the bolt, then pop rivet the bushing to the bracket.
11. Refer to prints E49-2002 and E15-2001.
 - A. Remove the bolt (part no. E00-2516) that holds the rod end to the collective actuator fork.
 - B. Remove the rod end spacer (part no. E49-1410) and spring bracket (part no. E49-1470). Relax spring tension.
 - C. Remove bolt (part no. E00-2514) from the "G" control arm. Remove the collective control rod (part no. E49-1400) from the helicopter.
 - D. Measure and remove the old rod ends from the collective control rod, counting the number of turns it takes to remove them.
 - E. Reinstall the new rod ends using the same number of turns as in step D, then confirm this position by measurement.
 - F. Reconnect the lower rod end first and torque the bolt.
 - G. Inspect the upper bolt (part no. E00-2516) then reassemble the spring bracket and rod end spacer and align the hole in the rod end to the hole in the actuator fork.
 - H. Pull the spring assembly and insert the bolt. Reinstall the remaining rod end spacer and torque the bolt.
 - I. Reconfirm collective pitch setting by reviewing collective rigging procedures in the Construction Manual.
 - J. Make sure rod end lock nuts are firmly in place.
12. Remove bolt (part no. E00-2306). Remove "B" control arm (part no. E15-5110). Remove washer (part no. E00-4600) and slide pilot throttle shaft (part no. E15-3150) out toward the front of the helicopter. Lightly grease the throttle shaft where the nylon bushing makes contact on the shaft. Reassemble by inserting the throttle shaft through the bushing. Replace the washer and "B" control arm in their respective positions. Reinstall the bolt in the control arm casting and torque.
13. Remove bolt (part no. E00-2306). Remove both "B" control arm castings (part no. E15-5110), marking their position. Remove washer (part no. E00-4600) and slide the transfer shaft (part no. E15-3170) out toward the front of the helicopter. Lightly grease the transfer shaft where the nylon makes contact on the shaft. Reassemble by inserting the transfer shaft back through the bushing the washer and both "B" control arm castings in their respective positions. Insert bolts back through the castings and torque.

14. Removal of the throttle grip is easily done by placing an air hose nozzle into the hole on the front of the rubber grip and blowing air into the grip at a high velocity. The grip will expand and can be pulled off. Note: Do not cut off any length of the rubber grip. The part of the grip that extends past the throttle and onto the non-rotating part of the collective stick will help act as a friction lock for the throttle. Removal of the throttle shaft is done by removing the bolt (part no. E00-2306) and the "B" control arm castings (part no. E15-5110). Slide the throttle shaft completely out of the pilot collective stick. Place a small amount of grease on the throttle shaft (part no. E15-3150) and also on the plastic bushings. Re-install the throttle shaft back in the collective stick and rotate several times until the throttle moves freely. Finish assembly.
15. Remove bolts (part no. E00-2407). Measure center of rod ends on Throttle Connector (part no. E15-3160). Loosen lock nuts and count the number of turns to remove the rod ends(part no E15-1150). Install new rod ends using the same number of turns and check center line measurement. Confirm throttle settings by referring back to the Construction Manual.

Section 7: Oil System

The oil sump/heat exchanger is a combined sump tank and oil cooler. Oil is drawn from the sump tank into the oil pump. From the oil pump it circulates through the oil filter, then through the engine. It then drains back into the sump tank and flows over the heat exchanger, where it is cooled by circulating engine coolant.

A dipstick is attached to the oil filler cap as a means of easily checking the oil level. Engine oil and oil filter should be changed every 25 hours. Refer to the engine manual for these procedures.

Reference prints: E13-2000, E30-2000, E37-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E28-7150	Oil Sump/Heat Exchanger	100 HR	OC	7-1
E28-1192	Valve Cover Drain Hose	100 HR	500 HR/OC or 5 yrs	7-2
E28-1230	Main Oil Drain Hose	100 HR	500 HR/OC or 3 yrs	7-2
E28-1110	Oil Filter	25 HR	25 HR/OC	
E28-6112	Hose Assembly	100 HR	2000 HR/OC	7-3
E28-6122	Hose Assembly	100 HR	2000 HR/OC	7-3
E28-6142	Hose Assembly	100 HR	2000 HR/OC	7-3

SERVICE NOTES:

1. **CAUTION:** Do not overfill the oil sump. If too much oil is added, the sump must be drained and then re-filled to the proper level. If any oil is spilled, it must be cleaned up before flight.
2. Rubber hoses used in the oil system should normally be replaced at 500 hours, the specified number of years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the hoses have not been exposed to the environment and have not been affected by aging.
3. **NOTE:** THE STEEL BRAIDING ON THE OIL HOSES IS EXTREMELY ABRASIVE. THE HOSES MUST BE POSITIONED SO THAT THEY DO NOT CONTACT OR RUB ON ANYTHING ELSE.

CAUTION: Teflon lined steel braided hoses have a tendency to “set” after being exposed to heat and pressure. Attempting to change the curvature of a hose after it has set may cause the lining to crack.

Section 8: Cooling System

The RI 162F power plant is a liquid cooled engine. The water pump circulates coolant from the engine through the radiator. A fan is located over the closed radiator system to force cooler outside air across the radiator for effective cooling.

Utilization of a liquid cooled system (as opposed to air cooled) allows the operating temperature of the power plant to be maintained at a constant level, providing consistent horsepower and power plant longevity.

Reference prints: E30-2000, E31-2000, E37-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E30-1161	Radiator	100 HR	2000 HR/OC	8-1
E34-1180	Radiator Cap	100 HR	500 HR/OC or 5 yrs	
E34-1300	Hose	50 HR	250 HR/OC or 5 yrs	
E34-1310	Hose	50 HR	250 HR/OC or 5 yrs	
E34-1320	Hose	50 HR	250 HR/OC or 5 yrs	
E34-1330	Hose	50 HR	250 HR/OC or 5 yrs	
E34-1340	Hose	50 HR	250 HR/OC or 5 yrs	
E34-1350	Hose	50 HR	250 HR/OC or 5 yrs	
E34-1360	Hose	50 HR	250 HR/OC or 5 yrs	
E34-1370	Hose	50 HR	250 HR/OC or 5 yrs	
E29-1001	Water Pump Assembly	100 HR	2000 HR/OC	8-2
E29-5150	Water Pump Pulley	100 HR	2000 HR/OC	
E29-1131	Water Pump/Alternator Belt	100 HR	500 HR/OC or 5 yrs	
E34-5000	Thermostat	250 HR	250 HR/OC or 5 yrs	8-3

NOTE: Rubber hoses used in the cooling system should normally be replaced at 250 hours, 5 years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the hoses have not been exposed to the environment and have not been affected by aging.

The Water pump/alternator belt should normally be replaced at 500 hours, or at 5 years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the belt has not been exposed to the environment and has not been affected by aging. Conditional replacement includes damage resulting from excessive slipping, oil absorption, cracking, glazing, abnormal wear, or any other damage.

SERVICE NOTES:

1. **IT IS EXTREMELY IMPORTANT** to follow the cooling system bleeding procedures outlined in the Engine Manual, and to use **ONLY** the recommended type of coolant. **NEVER** use tap water or well water in the cooling system. Failure to follow these guidelines could result in overheating and corrosion problems that may severely damage the engine and cooling system.

To clean the outer surfaces of the radiator, spray it with a mild soapy water solution using soft to medium pressure. A hard stream of water may damage the fins.

2. If the helicopter is stored for a long period of time without operation, place a small amount of oil (#10W non-detergent) on the water pump shaft seal. For replacement of the water pump, refer to the Construction Manual and prints E30-2000 and E31-2000. For replacement of the water pump seal and bearings, follow these procedures:
 - A. Remove the water pump.
 - B. Remove the water pump pulley (part no. E29-5150). Deburr the bolt hole as necessary.
 - C. Remove the impeller housing by removing the 7 bolts on top of the water pump body.

- D. Place the pulley end of the shaft in a soft jaw vise. Using a belt wrench or appropriate tool, turn the impeller counter clockwise to remove it from the shaft. **BEFORE REMOVING THE IMPELLER, NOTE HOW THE SEAL IS INSTALLED SO THAT THE REPLACEMENT CAN BE REINSTALLED IN AN IDENTICAL MANNER.** Be careful not to damage the impeller or shaft. (A bolt may be inserted into the pulley bolt hole of the shaft to help keep the shaft from rotating.)
 - E. Determine if the bearings need replacement by checking the smoothness of operation and the side-end play. Also examine the condition of the shaft itself checking for excessive corrosion or other damage. The shaft and bearings are an assembly and are replaced as such. If you determine the shaft assembly to be bad, it must be replaced using water pump shaft and bearing, part no. E29-2100. Before removing the shaft, measure the distance from the "face" of the water pump body to the end of the shaft where the impeller "bottoms" when installed. Record this number for use when installing the replacement shaft assembly. Proceed to step F below if the shaft assembly is to be replaced. If the shaft assembly appears to be in good condition, proceed to step H.
 - F. Place the water pump body in an oven and heat to 250-275 degrees F. **CAUTION: DO NOT EXCEED 300 DEGREES F.** Remove the water pump body and place it on a surface where the shaft assembly can be pressed out of the casting. Do not use excessive force as it could damage or crack the aluminum casting. (The seal will be pressed out with the shaft assembly.)
 - G. Install the new shaft assembly by first cleaning the water pump body thoroughly. Pre-coat the bearing O.D. and the body I.D. with a light film of Anti-seize. The shaft must be reinstalled by using light pressure **ONLY**. You will need to fabricate a bushing which allows you to press **ONLY** on the outer race of the bearing. Do not install by pressing on the shaft itself. Press the shaft assembly in until the height dimension recorded in step F is matched. Proceed to step I.
 - H. Using fine emery cloth or equivalent, sand and deburr the shaft eliminating any corrosion and burrs. Hold the water pump body in a vise and carefully tap out the seal assembly using a punch and hammer. (Be careful not to damage the shaft or water pump body.)
 - I. Before installing the new seal (part no. E29-1150), thoroughly clean the shaft and water pump body. Put a light coat of silicone on the seal surface which will contact the body. Install the seal until the outer flange of the seal bottoms and sets flat. Wipe off excess silicone.
 - J. The shaft, seat counter bore, and rubber members of the seat should be lubricated with a light oil or grease. Check seal surfaces to be sure they are free of any dirt or grit. **CAUTION: Do not damage seal contact surfaces.**
 - K. Carefully position and align the two mating seal pieces.
 - L. Fill the threads of the impeller with silicone. Screw the impeller on clockwise until tight; check for proper alignment of the seal during this process. It must remain centered on the shaft as the impeller is installed. Using a belt wrench, tighten the impeller and wipe off any excess silicone. (Be careful not to damage or scratch the impeller.)
 - M. Place a new gasket (part no. E29-1140) on the body and install the impeller housing using four bolts only. Fabricate a shim by cutting and bending a strip of shim stock to measure the clearance between the impeller and impeller housing. This clearance should be .015" to .025". If the clearance is out of tolerance, special thickness gaskets are available to achieve the proper clearance. Call a factory service representative for assistance. **NOTE: Have current gasket thickness and the assembled impeller clearance measurements at hand when you call.**
 - N. Prior to installing the remaining three bolts, apply a coating of silicone to the threads, then install and torque to 120 in. lbs. Remove the four bolts initially installed for taking the clearance measurement and reinstall them using the same procedure as used on the last three bolts.
 - O. Install the water pump pulley and tighten the bolt.
 - P. Install the water pump assembly. Refer to the Construction Manual for installation details.
 - Q. Install water pump/alternator belt.
3. Replace the thermostat, engine coolant, and hose clamps when changing the hoses. **CAUTION: Use ONLY a RotorWay supplied thermostat for replacement.** The correct type of thermostat was determined after many hours of testing at the factory. Use of the wrong thermostat could damage the engine and cooling system.

Section 9: Engine and Exhaust System

The RI 162F Engine has been designed specifically for the RotorWay Helicopter. RotorWay International manufactures the entire engine. Refer to the Engine Manual for further information.

Reference prints: E25-2000, E27-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E24-9710	Exhaust Gasket	100 HR	500 HR/OC	9-1
E24-9840	Heat Wrap	100 HR	2000 HR/OC	
E24-9011	Muffler/Tailpipe	100 HR	2000 HR/OC	
E24-9001	Header Weldment	100 HR	2000 HR/OC	
E24-1251	Spring, Exhaust Knuckle	100 HR	1000 HR/OC	
E24-9831	Heat Shield	100 HR	2000 HR	
E27-1160	Rod End	100 HR	1000 HR/OC	
E27-1240	Rubber Insert	100 HR	2000 HR/OC or 3 yrs	
E27-9000	Torque Link Weldment	100 HR	2000 HR/OC	9-2
A24-162F	R.I. 162F Engine	25 HR		
E24-9950	Spark Plug Wires	100 HR	500 HR	
E24-9948	Spk.Plug Wire Separator	100 HR	500 HR	
E24-9740	Spark Plug	50 HR	100 HR	
E24-7560	Air Filter W/Clamp	25 HR	OC	
A24-1601	Main Drive Pulley Assembly	50 HR	1000 HR	9-3
	ACIS Components (Optional)			
E38-3000	Supercharger Assembly	100 HR	OC	
E38-5010	Stepper Motor	100 HR	OC	
E38-6010	Air Filter	25 HR	OC	
E38-6300	Mounting Bracket Weldment	100 HR	2000 HR/OC	
E38-6420	Oil Drain Hose	100 HR	500 HR/OC or 5 yrs	9-4
E38-6430	Oil Drain Hose	100 HR	500 HR/OC or 5 yrs	9-4
E38-6600	ACIS Oil Cooler	100 HR	2000 HR/OC	
E38-6610	Hose Assembly, Engine to Oil Cooler	100 HR	2000 HR/OC	9-5
E38-6620	Hose Assembly, Oil Cooler to Supercharger	100 HR	2000 HR/OC	9-5
E38-6640	Belt	100 HR	500 HR/OC or 5 yrs	9-6

SERVICE NOTES:

1. Check around exhaust gasket for leaks when engine is idling. Failure to replace a leaky gasket can result in water hose failure and other engine related items. Remove the header flange bolts (part no. E00-2532) and hold the header flange up high enough to slip a new gasket in place. Reinstall and re-torque the bolts.

WARNING: All four gaskets should be replaced at the first hint of flange leakage. Any type of exhaust system leak may allow carbon monoxide fumes to enter the cabin area. Exposure to these fumes can be fatal and any indication of leakage must be corrected before operation is continued.

2. Remove the bolt (part no. E00-2517) that holds the torque link and remove the rod end bolt (part no. E00-2513). Remove the torque link assembly and inspect for cracks. If replacing rubber insert (part no. E27-1240), remove the aluminum insert (part no. E27-6160). Remove old rubber and insert new rubber around the aluminum insert and press it back into torque link. Reinstall the torque link and tighten and torque the bolts. Verify for correct engine clearance on the pilot side near the valve cover oil drain fitting.
3. Check engine pulley for anodizing wear. (See Engine Manual for greasing and replacement information.)

4. The rubber oil drain hoses should normally be replaced at 500 hours, five years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the hoses have not been exposed to the environment and have not been affected by aging.
5. NOTE: THE STEEL BRAIDING ON THE OIL HOSES IS EXTREMELY ABRASIVE. THE HOSES MUST BE POSITIONED SO THAT THEY DO NOT CONTACT OR RUB ON ANYTHING ELSE.

CAUTION: Teflon lined steel braided hoses have a tendency to “set” after being exposed to heat and pressure. Attempting to change the curvature of a hose after it has set may cause the lining to crack.

6. The supercharger belt should normally be replaced at 500 hours, or at 5 years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the belt has not been exposed to the environment and has not been affected by aging. Conditional replacement includes damage resulting from excessive slipping, oil absorption, cracking, glazing, abnormal wear, or any other damage.

Section 10: Drive Train

The drive train is a series of reduction pulleys and sprockets that transmit power from the engine to the main rotor system. No transmissions, gear boxes or drive shafts are used. The system is simple to monitor and maintain.

Reference prints: E23-2000, E27-2000, E33-2000, E49-2001

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
	Primary			
E49-6172	Main Sprocket	100 HR	1000 HR/OC	10-1
E49-7010	Sprocket Hub	100 HR	1000 HR/OC	10-1A
E00-2608	AN176H (3/8 x 3-1/8) Bolt	500 HR	2000 HR	Torque
E00-2450	AN4H12 (1/4 x 1-1/4) Bolt	100 HR	500 HR	Torque
E00-3410	Thin Locknut	100 HR	500 HR	Torque
E00-9028	Hose Clamp	500 HR	2000 HR	
E24-5110	Upper Engine Mount Clevis	500 HR	2000 HR/OC	
E24-5100	Upper Engine Mount Cup	500 HR	2000 HR/OC	
	Secondary			
E23-1002	Secondary Pulley Assembly	100 HR	1000 HR/OC	10-2
E23-5001	Upper Bearing Assembly	50 HR	500 HR/OC	10-2A
E23-6125	Secondary Shaft	100 HR	500 HR/OC	10-2
E23-2552	Lower Bearing	100 HR	100 HR/OC	10-3
E23-1210	Main Drive Belts	50 HR	500 HR/OC or 5 yrs	10-4
E23-7141	High Temp Fan	100 HR	2000 HR/OC	10-5
E23-1170	Snap Ring	500 HR	2000 HR	
E23-3001	Fan Pulley Assembly	500 HR	2000 HR/OC	10-6
E23-1221	Fan Pulley Bearing	100 HR	100 HR/OC	10-2B, 10-7
E23-6191	Retainer Plate	1000 HR	2000 HR	
	Oil Bath			
E33-7101	Top Rear Cover	100 HR	OC	
E33-7121	Lower Oil Bath Pan	100 HR	OC	
E33-7111	Top Front Cover	100 HR	OC	
E33-1170	Rear Oil Seal Assembly	100 HR	500 HR/OC	10-8
E33-1140	Tension Spring	100 HR	2000 HR	
E33-3000	Rain Shield	100 HR	2000 HR	
	Chain			
E49-1290	Drive Chain W/Link	25 HR	100 HR/OC	10-9
	Clutch Idler Assembly			
E27-6100	Idler Pulley Assembly	100 HR	2000 HR/OC	10-10
E27-1231	Idler Pulley Bearing	100 HR	500 HR/OC	10-10
E27-1160	Rod End	100 HR	2000 HR/OC	
E27-1210	Idler Spring	100 HR	1000 HR	Grease
E27-2160	5/16 Rod End	100 HR	2000 HR	
E27-9020	Clutch Tube Weldment	100 HR	2000 HR/OC	10-11
E27-9010	Pulley Arm Weldment	100 HR	2000 HR	10-12
E27-5100	Clutch Arm Casting	100 HR	2000 HR/OC	
E00-2522	AN5-30A (5/16 x 3) Bolt	100 HR	2000 HR	

SERVICE NOTES:

1. Inspect the main drive sprocket for any noticeable wear around the teeth. First indication of wear will be an abnormal amount of aluminum flakes and dust in the oil bath and oil lubrication. Contact the factory for further inspection and instructions.
 - A. Check sprocket hub for backlash against the main drive shaft. This can be done by grabbing the main rotor shaft and applying pressure against the standard rotation of the rotor system. Monitor the relationship of the main rotor shaft to the sprocket hub for any movement. If any movement is apparent, contact the factory.
2. The secondary unit comes as a complete assembly and should not be tampered with or opened at any time. A visual inspection and a lock up inspection of the overrunning clutch should be done during the pre-flight inspection. Any other adjustments or work performed must be done by the factory service center at RotorWay, with the exception of the following:
 - A. The upper bearing assembly (part no. E23-5001) should have 1 shot of Mystik JT-6 grease every 50 hours.
 - B. At the 100 hour inspection intervals, inspect the lower secondary shaft. This requires removal of the fan pulley, tail rotor drive pulley and lower mount bearing from the secondary shaft. Both the fan pulley bearing and the lower mount bearing should have been Loctited to the shaft during construction. A gear puller and heat will be needed to remove these bearings. Excessive heat should be avoided, which may damage the shaft or other components (the shaft can be damaged if shaft temperatures exceed 400 degrees Fahrenheit). Bearings should not be reused on reassembly. The shaft should be visually inspected for surface imperfections and also by using a dye penetrant, looking for surface cracks. Recommended penetrant inspection kits are Met-L-Check Penetrant Kit or Magnaflux Spotcheck Test Kit, available from suppliers such as Aircraft Spruce. Either kit will last for many years. Your local FBO may also be able to supply the kit or inspect the shaft.
3. The lower bearing, part no. E23-2552, is removed at 100 hour intervals for lower secondary shaft inspection. The bearing must be replaced at 100 hours; do not re-use the old bearing. See Service Note 10-2B above.
4. Replace the main drive belts at 500 hours of operation, or at 5 years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the belts have not been exposed to the environment and have not been affected by aging. Conditional replacement includes damage resulting from excessive slipping, oil absorption, cracking, glazing, abnormal wear, or any other damage.

The main drive belts are replaced by following the procedures listed below. Pay close attention because you will follow the reverse procedures for reassembly. See also Service Note 10-2B above.

- A. Clean the new belts with a clean rag lightly saturated with acetone.
- B. Cut old belts off with aviation shears or a sharp knife. Be careful not to damage any of the parts.
- C. Remove the radiator assembly (refer to print E30-2000 and E37-2000). Remove the radiator hoses from the radiator. Plug all water openings. Place the assembly out of the way until reinstallation.
- D. Index the fan to the fan pulley assembly and remove the fan from the pulley. Remove the fan pulley assembly from the shaft by loosening the set screws, removing the snap ring and lowering the pulley. The bearing was installed with Loctite; use a puller and if necessary apply heat to the bearing to release it from the shaft. **CAUTION:** Too much heat can damage the shaft or other components. See Service Note 10-6 for bearing replacement. Remove any burrs on the shaft caused by the set screws, then remove the tail rotor drive pulley.
- E. Remove the two bolts that hold the lower bearing flange to the square drive tube. Then remove the two bolts that hold the lower bearing flanges together so you can lower the bottom flange, and move it from the square drive tube.
- F. Disconnect the torque link. Loosen the belt tension by backing out the all thread adjustment bolt (part no. E00-2525) on the upper engine mount clevis. Remove bolts (part no. E00-2524) and lower the upper engine mount cup (part no. E24-5100) into the upper engine pulley.
- G. Remove bolts (part no. E00-2531 and E00-2416). Remove the upper engine mount clevis.
- H. Take one of the four belts and slip the belt between the secondary unit and the square drive frame tube. Pull the belt forward, up and over the pulley. **CAUTION:** Do not damage the belts. Repeat this procedure with the remaining three belts. Align all belts in the correct order on both the engine and secondary unit pulleys.
- I. Reassemble all parts by following the above procedure in reverse. Follow the belt tensioning procedures shown in the Construction Manual.

5. Check the high temp fan for stress cracks on blades. Do not confuse stress cracks with excess resin cracks. Stress cracks will penetrate the fiberglass and resin cracks will be on the surface only.
6. Check pulley for wear of anodizing and for chip or sand erosion. For bearing replacement do the following:
 - A. Remove the fan pulley assembly by loosening the set screws, removing the snap ring and lowering the pulley. It may be necessary to use a puller, as the pulley was originally assembled using Loctite. If necessary, use a file or fine sandpaper to remove the burrs on the shaft from the set screws.
 - B. Remove snap rings on both sides of the pulley bearing.
 - C. Heat the pulley in oven at 250 to 275 degrees F. **CAUTION:** Do not exceed 300 degrees.
 - D. Note which end of the bearing has the set screws, so that the new bearing will be installed in the same position. Lightly press out the old bearing with a press or vise.
 - E. Clean the pulley inner surface with acetone and then clean the new bearing.
 - F. Again reheat the pulley to 250-275 degrees F.
 - G. Insert snap ring into the pulley groove and make sure it is seated.
 - H. Place the pulley on a flat surface and apply a thin coat of Loctite #609 to the inner surface of the pulley and the outer surface of the bearing.
 - I. With the bearing in the correct position, lightly press the bearing into the pulley until the bearing contacts and sits against the snap ring. **CAUTION:** If a press is required, make sure you press against the outer race of the bearing and not the inner race.
 - J. Replace the second snap ring in the pulley and let air cool. **NOTE:** Use Loctite upon final assembly of this part to the secondary shaft assembly.
7. The fan pulley bearing, part no. E23-1221, is removed at 100 hour intervals for lower secondary shaft inspection. The bearing must be replaced at 100 hours; do not re-use the old bearing. See Service Note 10-2B and 10-6 above.
8. For removal of rear oil seal:
 - A. Remove chain and secondary shaft.
 - B. With heat gun or propane torch, heat surrounding area where glue exists. **CAUTION:** Use only enough heat to pop the seal out with a screwdriver.
 - C. Clean the lower oil bath pan with acetone and lightly sand any glue or uneven protrusions from the pan.
 - D. Sand mating surface of the seal with 400 grit paper and clean with acetone. **CAUTION:** Do not touch the rubber seal with sand paper.
 - E. Mix blade glue at the proper ratios and apply to both parts.
 - F. Place a little oil on the rubber seal and shaft.
 - G. Slide the oil seal down (correct side up) pressing down with light finger pressure until the seal seats on the oil bath. Oil seal pressure must be applied evenly.
 - H. Wipe off excess glue with a dry rag. Let the glue cure for 12 hours.
9. Refer to print E49-2001 and chain installation instructions in the Construction Manual. Chain tension should be set to 1/2 inch movement at 10 pounds pull with a spring scale midway between sprockets. Re-check chain tension at every 25 hour inspection. Some stretching of the chain normally occurs after the first 25 to 30 hours of operation. A shim (no more than .025 inch) may be added between the lower mainshaft bearing flange and the airframe tube to achieve the correct chain tension. The shim should be removed upon installation of a new chain. **NOTE:** Shims should **ONLY** be added between the lower mainshaft bearing flange and airframe to correct for chain stretching. Initial chain tension is achieved by adding shims at the secondary shaft bearing mount locations.
10. Refer to Service Note 10-6 for bearing removal procedure. Also refer to the Construction Manual and print E27-2000.
11. Inspect at every 100 hours. Grease at every 500 hours. Remove pop rivets on the end of the clutch spring tube and unbolt the rod end from the clutch arm casting (part no. E27-5100). Remove the clutch tube piston (part no. E27-6131). Make a visual inspection for wear. Grease the piston and clutch spring tube. Compressing the piston a slight amount, install two pop rivets in the existing rivet holes. Reconnect the clutch arm casting and check for smoothness of operation.
12. Remove the pulley mounting arm bolt (part no. E00-2522). Place a thin film of grease on the bolt and mating surfaces. Reinstall the bolt and tighten it enough to allow the swing arm to pivot.

Section 11: Fuel System

The RI 162F engine is equipped with RotorWay's FADEC electronic fuel injection system. In this system, gasoline is delivered to the injectors at a very high pressure (up to 60 PSI). Braided stainless steel hoses and high quality fittings are used throughout the system.

Reference prints: E25-2000, E25-2001, E37-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
	Directional Control			
E25-2101	Fuel Cap	100 HR	2000 HR/OC	11-1
E25-4011	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4020	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4030	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4040	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4050	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4061	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4071	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4080	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4110	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4121	Hose Assembly	100 HR	2000 HR/OC	11-2
E25-4570	Fuel Valve Cable	100 HR	2000 HR/OC	
E25-4600	Fuel Pump	100 HR	1000 HR/OC	
E25-4630	Fuel Filter	100 HR	100 HR/OC	11-3
E25-4640	Fuel Pressure Regulator	100 HR	1000 HR/OC	
E25-4660	Shut-off Valve/Filter	100 HR	2000 HR/OC	11-4
E25-6102	Fuel Tank, Pilot	100 HP	2000 HR/OC	
E25-6112	Fuel Tank, Passenger	100 HR	2000 HR/OC	
E25-6130	Fuel Gauge (W/light)	100 HR	OC	
E25-6122	Fuel Gauge Sending Unit	100 HR	OC	11-5

SERVICE NOTES:

1. The fuel tank caps are vented. If the vent becomes stuck or plugged, the engine may be starved for fuel and the fuel tanks may partially collapse. Remove the cap and inspect the plastic valve in the underside of the cap. To restore venting, heat a piece of welding rod or wire and push it through the valve.
2. Check routing and security of all hoses. They should be routed so that they curve smoothly without being kinked or sharply bent. The steel braided hoses are **EXTREMELY ABRASIVE**. When the engine is running, vibrations will cause the braid to wear through whatever it comes in contact with, just like a file. Verify that all braided hoses are positioned so that they do not contact or rub against anything else. Inspect all hoses and fittings for leaks. Run your finger under each connection to verify that fuel is not slowly leaking out.

After performing any maintenance that requires hoses or fittings to be uncoupled, perform a pressurized leak check. To do this, tighten all fittings, turn on the fuel pumps and check carefully for leaks. **CAUTION:** The fuel system operates at a VERY high pressure. When performing this check, wear eye protection and have a fire extinguisher at hand. Check the system regularly in the first few hours of operation. Refer to the Engine Manual for further details.

CAUTION: Teflon lined steel braided hoses have a tendency to "set" after being exposed to heat and pressure. Attempting to change the curvature of a hose after it has set may cause the lining to crack.

3. Replace the fuel filter every 100 hours or OC. Check for fuel contamination by cutting the used filter in half and inspecting the inlet side of the filter element. If the element is contaminated, inspect and clean the pre-filter in the fuel shut-off valve/filter assembly (see note 4 below). When installing the new filter, be sure to replace the two crush washers (12MM part no. E25-4740, 14MM part no. E25-4750) and note proper flow direction.
4. After the first 25 hours of operation, check the pre-filter for any particles or debris that may have washed out of the fuel tanks. Clean as necessary. Every 500 hours, disassemble, clean and inspect the fuel shut-off valve/filter assembly. Replace O-rings as necessary. Refer to the Engine Manual for complete procedures.
5. If the needle on the fuel gauge stays above the full mark when the tank is not full, check the following: water in fuel tank, meter not grounded properly, sender wire is touching negative terminal or wiring, center rod of the sender is touching the outside tube, or sender is not calibrated. If the needle stays at empty, check the following: no power to sender, no power to gauge, sender not connected to gauge. If the needle fluctuates, check for loose or corroded wiring connections.

Section 12: Fan Drive

The fan drive system is a series of pulleys and belts providing the proper speed reduction for the fan design.

Reference print: E31-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E31-1120	Bearings	100 HR	500 HR/OC	12-1
E31-1130	Belt (Upper)	100 HR	500 HR/OC or 5 yrs	12-2
E31-1141	Belt (Lower)	100 HR	500 HR/OC or 5 yrs	12-2
E31-5100	Pulley (Upper)	100 HR	2000 HR/OC	
E31-5120	Pulley (Lower)	100 HR	2000 HR/OC	
E31-6100	Shaft	500 HR	2000 HR/OC	

SERVICE NOTES:

- Remove the fan assembly from the helicopter.
 - Loosen set screws from the locking collar, tap with hammer and punch in the opposite direction from the original set position.
 - With a torch or heat gun, lightly heat the bearing so the Loctite will release the bearing from the shaft.
 - Clean the shaft and install new bearings (part no. E31-1120) on the shaft in the correct position. Loctite the new bearings to the shaft, allowing time for the Loctite to cure before tightening the lock rings and set screws.
 - Reassemble the fan assembly on the helicopter following the procedures in the Construction Manual and print E31-2000.
- New belts should be cleaned with acetone and properly tensioned following the procedures outlined in the Construction Manual.

Replace the fan drive belts at 500 hours of operation, or at 5 years, or on condition, whichever comes first. Shelf life, or time before entering service, is not included if the belts have not been exposed to the environment and have not been affected by aging. Conditional replacement includes damage resulting from excessive slipping, oil absorption, cracking, glazing, abnormal wear, or any other damage.

Section 13: Main Rotor Blades

The main rotor blades are one of the key components of the helicopter. Proper maintenance and care of the main rotor blades will increase their longevity.

The main rotor blades are made from aluminum alloys, and are constructed from 3 pieces: the main spar (C section) and an upper and lower aluminum skin. The spar is an aluminum alloy extrusion with a series of various heat treatments. The skins are of T6 aluminum and are bonded to the spar with a high strength adhesive, then riveted. After construction, the blades are quality inspected and measured at specific intervals. This allows two blades with identical airfoils to be matched and sold as a pair.

Reference prints: E20-2000, E49-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E20-3000	Retention Strap Assembly	25 HR	1500 HR/OC	
E20-9010	Asymmetrical Rotor Blade	25 HR	1500 HR/OC	13-1
E20-9011	Asymmetrical Rotor Blade	25 HR	1500 HR/OC	13-1
E00-2800	NAS1309-54 (9/16 x 4-1/4) Bolt	100 HR	1000 HR/OC	13-2
E00-3800	AN365-918A (9/16-18) Fiberlock Nut	100 HR	1000 HR/OC	13-3
E20-1400	Elastomeric Thrust Bearing	100 HR	OC or 10 yrs	13-4
E20-1401	Elastomeric Thrust Bearing	100 HR	OC or 10 yrs	13-4
E20-3170	Tip Weight	25 HR	1500 HR	13-5
E20-6000	Aligner Block Assembly	100 HR	1000 HR/OC	13-6
E20-6180	Pitch Horn Clevis	100 HR	1500 HR	
E20-6190	Pitch Horns	500 HR	1500 HR	
E00-2522	AN5-30A (5/16 x 3) Bolt	100 HR	1500 HR	Torque
E00-2523	AN5-32A (5/16 x 3-1/4) Bolt	100 HR	1500 HR	Torque
E20-1220	Aligner Block Bearings	100 HR	200 HR/OC	13-6

SERVICE NOTES:

1. Check for blade skin delamination using the tap test hammer. Tap along the rivet line (the seam where the skin is bonded to the spar) the full length of the blade on both the upper and lower skins. You should notice a solid sound resonating from the blade. Tap repeatedly along the seam listening for noticeable sound changes. If the sound changes from a solid to hollow sound, the blade skin may have delaminated from the spar at that location and the factory should be notified.

The tap test should be performed once every 25 hours, every three months, or after flying in violent weather conditions. A low rotor RPM on the helicopter can cause a wrinkling of the blade skins to the outboard side of the fiberglass doublers. If these conditions have occurred, contact the factory for further information.

Blade fatigue is very difficult for a new and low time pilot to sense. Listed are some symptoms of blade fatigue:

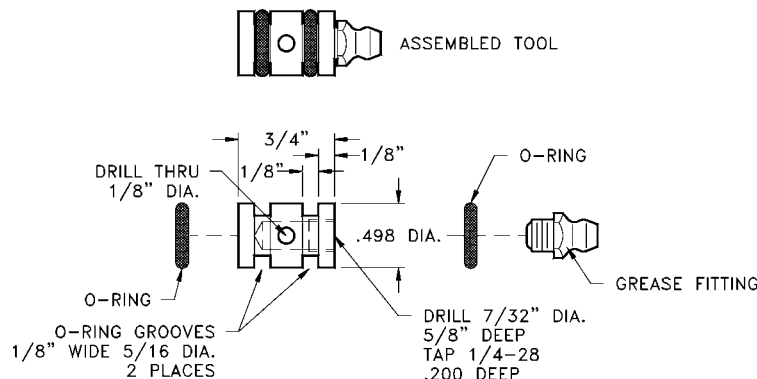
- A. Change in blade droop (while in its static position) from previous inspection.
- B. Flight response controls seem sluggish and insensitive.
- C. During an autorotation flare the blade will develop a shake that will not stop until collective pitch can be reduced.
- D. Blade tracking seems to keep moving in and out and cannot stabilize.

CAUTION: Blade fatigue is a dangerous condition and can result in a serious incident if left undetected.

Newly painted blades can develop paint blisters or have blade paint erosion due to the type of conditions the helicopter is flown in. This can cause out of tracking conditions or a vibration in the rotor system. Keeping the leading edge smooth can be done by wet sanding the edge of the blade with 400 grit wet and dry sand paper and feathering the paint to a smooth edge. Tracking and vibration should return to a normal condition.

2. It is important to keep this bolt torqued to 65-70 ft. lbs.

3. After the nut has been removed four or more times, it should be replaced with a new nut (part no. E00-3800). Torque to specs.
4. The elastomeric bearings (part no. E20-1400 and 1401) are comprised of thin layers of rubber and metal sandwiched together. Inspect for signs of any delamination or separation. These bearings must be kept dry and free from grease, oil and solvents. Many factors determine how long the bearings will last, such as age, hours used, climate, etc. As the bearings deteriorate and the rubber loses its elasticity, the controls will lose smoothness, require more pressure to move, and may not completely return to their original position. If any question exists as to the condition of the bearings, the factory should be contacted.
5. Check tip weight bolts (part no. E00-2404) for tightness every 25 hours. It is not necessary to remove the end plug from the blade unless the bolts become loose.
6. A simple tool can be made to add grease to the aligner block bearings (part number E20-1220) as shown in the drawing below. This tool will enable you to grease the bearings with the blades removed and the aligner blocks in place on the blade straps. Make the tool from steel or aluminum. Using this tool at the 100 hour maintenance interval will allow you to increase the recommended change out time of the bearing from 100 hours to 200 hours or on condition.



Insert the tool into the bearing. Pump the grease until it visibly comes out of the bearing, purging out the old grease. Wipe away the excess grease, then rotate the inner race of the bearing (using a deep socket on the grease fitting) to spread the new grease and to make sure the bearing turns freely.

Removal of aligner block bearing (part no. E20-1220) is as follows:

- A. Remove the blades from the helicopter.
- B. Remove the aligner block bolts (part no. E00-2523). Loosen the adjustment bolt (part no. E00-2417) two to three turns counter clockwise and remove the aligner block assembly.
- C. Place in oven and heat to 225-250 degrees F. **CAUTION:** Do not exceed 300 degrees F.
- D. Place on a press and press out the bearing with light pressure. Do not back out the adjustment bolt more than 2 or 3 turns because of damage to aluminum block threads.
- E. Clean bearing hole in the aligner block with acetone.
- F. Clean the new bearing (part no. E20-1220) with acetone and prepare to reinstall bearing into aligner block.
- G. Place a small amount of Loctite on the outer race of the bearing with a Q-tip. Press the bearing into the block with light pressure, leaving the bearing protruding .050" from the face of the block. (Check for all thread bolt clearance of bearing.)
- H. Let the block assembly air cool. Then reinstall the block on the blade according to the directions in the Construction Manual.

ADDITIONAL NOTES: Check the lead-lag pin on the root end of the main rotor blades. If this pin is deformed and shows signs of the lead-lag bolts being over torqued, contact the factory for further information.

Section 14: Electrical System

The Electrical System of the EXEC 162F requires little maintenance if inspected properly. The three most common problems are corrosion, vibration of connectors, and chafing of wires.

Reference prints: E31-2000, E35-2000, E35-2001

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E24-9760	12 Volt Battery	100 HR	OC	14-1
E35-4000	Digital Display Monitor	100 HR	2000 HR/OC	14-2
E35-4011	Engine Control Unit (ECU)	100 HR	2000 HR/OC	14-2
E35-4030	Ignition Module	100 HR	2000 HR/OC	14-2
E35-4060	Man/Baro Pressure Sensor	100 HR	2000 HR/OC	14-2
E35-4080	9 Pin Cable	100 HR	2000 HR/OC	
E35-8231	Fuse Holder	100 HR	2000 HR/OC	14-4
E35-8240	Toggle Switch	100 HR	2000 HR/OC	14-5
E35-8321	Fuses	100 HR	2000 HR/OC	
E35-8410	Battery Terminal Eyelet	100 HR	2000 HR/OC	14-6
E35-8520	Starter Relay	100 HR	2000 HR/OC	14-7
E35-8540	Push Button Switch	100 HR	2000 HR/OC	
E35-8596	LED Indicator Light	100 HR	2000 HR/OC	
E35-9002	Airframe Wiring Harness	100 HR	2000 HR/OC	14-8
E35-9013	Overhead Wiring Harness	100 HR	2000 HR/OC	14-8
E35-9022	Instrument Wiring Harness	100 HR	2000 HR/OC	14-8
E35-9031	FADEC Wiring Harness	100 HR	2000 HR/OC	14-3
E42-2021	Voltage Regulator	100 HR	2000 HR/OC	14-9
E42-1002	Alternator Assembly	100 HR	2000 HR/OC	14-10

SERVICE NOTES:

1. Replace the battery when it will not take or hold a charge. Check acid level periodically to insure battery plates are covered. Keep terminal posts clean and free from corrosion and dirt.
2. The digital display monitor, engine control units (ECUs), ignition modules, and man/baro pressure sensors are NOT user serviceable. Refer to the Engine Manual for information on these parts. If these components malfunction, contact the factory.
3. Inspect the FADEC wiring harness for security and corrosion. Inspect all wires and plugs. Refer to the Engine manual for further information. If a problem with this wiring harness is suspected, contact a factory service representative before attempting to make repairs.
4. The fuse holders on the overhead switch panel and throughout the wiring harness can develop corrosion, resulting in poor connections. Remove the fuse from the holder and make a visual inspection. If corrosion is found, clean or replace the fuse holder and fuse.
5. Check the toggle switch by first disconnecting the power leads from the battery terminals. Then actuate the toggle switch on and off. The switch should have a good solid snap action in both directions. If in doubt, check the switch with an ohm meter.
6. Check the top and bottom of the battery and ground cable eyelets for corrosion and clean as necessary. Poor contact will cause excessive heat buildup and could result in hard starting.

7. Check spade connections on the starter relay for corrosion and poor connections. Check relay by unplugging the spade terminal that goes to the starter solenoid and activate the starter button. The relay should have a small clicking action (be sure the battery is connected and the key switch is on). If the relay chatters, check the voltage going to the relay. Voltage should be a strong 12 volts from the battery. Then check to see if the relay is properly grounded. If a problem still exists, replace the starter relay.
8. Inspect all wiring harnesses and cable assemblies to make sure there are no loose wires or connectors. Check that all wires are secured away from moving parts, and that no wires are chafing against other components. Plugs, pins, wires and other components may be replaced individually if necessary.
9. To check the voltage regulator for normal operation, monitor the voltage meter during a normal run-up of the helicopter. If the regulator is working, a voltage jump will be noticed on the meter during the run-up procedure. If the meter does not show a positive voltage charge, check the following:
 - A. Alternator switch is on.
 - B. Volt meter is working.
 - C. Water pump/alternator belt is on and turning.
 - D. Fuse is not blown on output side or field side.

If all of the procedures above are determined to be in normal operating condition, replace the voltage regulator. If a problem still continues, it is possible the alternator is defective. See Note 14-10.

10. Check the alternator output with the helicopter in full operating condition and with the alternator switch on. The output should be 13.5 to 15.0 volts, with a 16 volt maximum. If proper output cannot be achieved, the alternator will need to be removed and serviced or repaired.

NOTE: This alternator is reworked at the factory to achieve our specifications and requirements. Replace only with a RotorWay supplied part.

Section 15: Instrumentation

Instrumentation on the EXEC 162F is normally maintenance free. It is, however, extremely important to keep it in perfect operating condition. The instrumentation provides the pilot continuous information on all the helicopter systems conditions.

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E36-1100	Hour Meter	100 HR	OC	
E36-1120	Water Temperature Gauge	100 HR	OC	15-1
E36-1160	Oil Temperature Gauge	100 HR	OC	15-1
E36-3110	Oil Pressure Gauge	100 HR	OC	
E36-3120	Oil Pressure Sender	100 HR	OC	
E36-1220	Volt Meter	100 HR	OC	
E36-3002	Dual Engine/Rotor Tach	100 HR	OC	
E36-4010	Altimeter	100 HR	OC	
E36-4020	Vertical Speed Indicator	100 HR	OC	
E36-4030	Air Speed Indicator	100 HR	OC	
E36-4040	Compass	100 HR	OC	
E36-4050	Manifold Pressure Gauge	100 HR	OC	
E36-4111	Full Range Tach	100 HR	OC	
E36-3050	Fuel Pressure Gauge	100 HR	OC	
E25-4940	Fuel Pressure Sender	100 HR	OC	
E36-1230	Secondary Temp Gauge	100 HR	OC	
E36-1240	Secondary Temp Gauge Sensor	100 HR	OC	

NOTE: If a transponder is used, a static air port must be incorporated into the system. (Check transponder installation information.)

SERVICE NOTES:

1. To check the water temp or oil temp sender:
 - A. Make certain all connections are clean and secure.
 - B. Disconnect the sender leads from the gauge, cool or heat the probe to a known temperature then check the resistance. See the chart below.

32	deg f = 9800 ohms
70	deg f = 3570 ohms
100	deg f = 740 ohms
212	deg f = 212 ohms
 - C. To test the operation of the gauge, disconnect the sender leads from the gauge and substitute the sender with a resistor of the appropriate value that you wish to check from the list above (i.e. 615 ohms is 150 deg f.)
 - D. If sender lead goes to ground, meter should peg full scale.
 - E. If sender lead is open (broken) or sender is open internally meter should peg hard to the left. Slight needle movement to the left is normal when the temperature is below the starting point of the gauge.

Section 16: Ground Handling Wheels

The Ground Handling Wheels for the EXEC 162F were designed for the sole purpose of ground handling the helicopter when the rotors are not turning. This system allows you to handle the helicopter on asphalt, concrete and grass.

Reference print: E37-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E37-4090	Wheel and Tire	500 HR	2000 HR/OC	16-1
	Tire Track	100 HR	OC	16-2

SERVICE NOTES:

1. Refer to tire for inflation information. If handling over rough ground, reduce tire pressure to help absorb the shock being transmitted to the rotor system.
2. Tire track is important for maintaining longevity of the rear landing gear. If the tires track outward, this will put abnormal stress on the landing gear which can result in landing gear failure. Check tracking every 500 hours. At NO time ground handle the helicopter fully grossed out or with anyone in the cabin.

Section 17: Ballast Weight

The ballast weight and ballast weight transport system was designed to keep the helicopter within its operating limitations during solo and dual flight configurations.

Reference print: E22-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E22-9000	Support Tube Weldment	100 HR	2000 HR/OC	17-1
E22-9010	Mount Tube Weldment	100 HR	2000 HR/OC	17-1
E22-9020	Ballast Weight Tube	100 HR	2000 HR/OC	17-1
E22-9030	Ballast Weight Pin	100 HR	2000 HR/OC	17-1
E22-4120	Safety Clip	25 HR	100 HR	

NOTE: For proper location of the ballast weight, refer to the Flight Manual.

SERVICE NOTES:

1. **CAUTION:** All weldments should be inspected thoroughly. If a weldment fails and causes the ballast weight to depart the ship during flight, the weight and balance of the helicopter could move outside the operating limitations.

Section 18: Paint

The choice of paint is left up to the owner/builder of the helicopter. Any maintenance required should follow the paint manufacturers recommendations.

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
	Paint	100 HR	OC	18-1

SERVICE NOTES:

1. The body panels on the helicopter are manufactured with a gel coat finish. We recommend the use of a 2 part paint that will give you years of trouble free and very low maintenance operation.

NOTE: The lighter the color of paint used, the less heat will be absorbed into the cabin and engine compartment, resulting in cooler operating conditions. The shades we found best are light colors such as white, light blue, and tan.

Section 19: Rotor Hub

The rotor hub system is comprised of three sub-assemblies: the rotor hub assembly, the swash plate and the main shaft. It comes from the factory as a completed assembly.

Reference prints: E23-2000, E49-2000, E49-2001 E49-2002

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
	Rotor Hub Assembly			
E49-6141	Rotor Hub Plate	100 HR	1000 HR	19-1
E49-5100	Teeter Block Assembly	100 HR	1000 HR/OC	19-2
E49-5110	Teeter Block Bearing	100 HR	500 HR	19-2
E49-6281	Delrin Shim	100 HR	OC	19-1,3
E49-6341	Stainless Steel Shim	100 HR	OC	19-1,4
E00-2607	AN176-22A (3/8 x 2-1/4) Bolt	100 HR	2000 HR/OC	Torque
E49-6301	Main Rotor Drive Pin	100 HR	250 HR/OC	19-1,5
E00-4802	Thin Washer	100 HR	1000 HR	
E49-5131	Snap Ring	100 HR	100 HR/OC	
E49-6200	Thrust Blocks (M-S)	100 HR	2000 HR/OC	
E49-6210	Thrust Washer	100 HR	2000 HR	
E49-1340	Thrust Block Alignment Bearing	100 HR	100 HR/OC	19-6
E49-1360	Thrust Block Liner	100 HR	2000 HR/OC	
E49-1170	Rod End (Left Hand)	100 HR	1000 HR/OC	
E49-1190	M/R Blade Pitch Link	100 HR	1000 HR/OC	
E00-9300	Set Screws 1/4 x 1/4	100 HR	1000 HR	Torque
E00-9301	Set Screws 1/4 x 5/8	100 HR	1000 HR	Torque
E00-9305	Set Screws 1/4 x 3/16	100 HR	1000 HR	Torque
E49-6310	Pitch Pin (Outboard)	100 HR	100 HR/OC	19-7
E49-6320	Pitch Pin (Inboard)	100 HR	100 HR/OC	19-7
E00-2417	NAS-428-4-20 (1/4 x 2) Bolt, Full Thread	100 HR	1000 HR/OC	19-8
E00-2523	AN5-32A (5/16 x 3-1/4) Bolt	100 HR	1000 HR/OC	19-9
E49-7000	Main Shaft	100 HR	1000 HR/OC	19-10
E49-5140	Grease Fitting	25 HR	2000 HR	19-11
E49-1331	Dust Cap	100 HR	2000 HR	
	Swash Plate Assembly			
E49-3610	Non-Rotating Swash Plate	100 HR	2000 HR/OC	F
E49-3520	Swash Plate Bearing	100 HR	2000 HR/OC	F
E49-3541	Snap Ring, Non-Rotating Swash Plate	100 HR	2000 HR/OC	F
E49-3510	Rotating Swash Plate	100 HR	2000 HR/OC	F
E49-3230	Slider Ball Adjustment Collar	100 HR	2000 HR/OC	19-12
E49-4010	Cyclic Cable Mount	100 HR	2000 HR/OC	F
E49-4100	Cyclic Mount Bearing	100 HR	2000 HR/OC	F
E49-4110	Snap Ring Cyclic Mount	100 HR	2000 HR/OC	F
E49-3531	Snap Ring, Rotating Swash Plate	100 HR	2000 HR/OC	F
E49-3210	Collective Slider Ball	100 HR	1000 HR/OC	19-13
E49-3220	Spherical Bushing	100 HR	1000 HR/OC	
E49-1530	Slider Ball Clamp	50 HR	2000 HR/OC	19-13
E49-1520	Slider Ball O-ring	100 HR	1000 HR/OC	F
E49-3240	Snap Ring, Slider Ball	100 HR	1000 HR	F
E00-9302	Set Screw (10-32)	100 HR	2000 HR	Torque

F = Factory Service Item

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E49-4610	Swash Plate Scissor	100 HR	2000 HR	F
E49-4710	Scissor Clevis	100 HR	2000 HR	F
E49-4720	Male Rod End 5/16 x 3/8	100 HR	1000 HR/OC	
E49-4810	Nylon Scissor Bushing	100 HR	1000 HR/OC	19-14
E49-4210	Collective Actuator Fork	100 HR	2000 HR	F
E49-4310	Collective Scissor	100 HR	2000 HR	F
E49-1380	Collective Scissor Mount	100 HR	2000 HR	19-15
E14-6120	Control "T"	100 HR	2000 HR	
E14-1150	5/16 Male Rod End	100 HR	1000 HR/OC	
E49-4510	Counter Balance	100 HR	2000HR/OC	F
E15-1230	5/16 Male Rod End	100 HR	1000 HR/OC	
E49-1410	Rod End Spacer	100 HR		
E49-1470	Spring Bracket	100 HR		
E49-1430	Tension Spring	100 HR	2000 HR/OC	
E49-4800	Delrin Washer (Scissor)	100 HR	1000 HR/OC	
E49-4830	Scissor Spacer 1-1/2"	100 HR	2000 HR	
E49-1180	Male Rod End 5/16"	100 HR	1000 HR/OC	
E49-1510	Dust Boot	100 HR	1000 HR/OC	F
E49-1500	Rubber Shaft Protector	100 HR	2000 HR/OC	F
	Main Rotor Shaft Assembly			
E49-1220	Main Thrust Bearing	100 HR	1000 HR/OC	19-16
E49-1230	Main Bearing Flange	100 HR	1000 HR	19-17
E49-1260	Main Shaft Safety Spacer	100 HR	1000 HR	
E49-1251	Lower Main Shaft Bearing (Bearing Only)	100 HR	500 HR	
E49-9100	Lower Main Shaft Bearing Weldment (Flange Only)	100 HR	1000 HR	

F = Factory Service Item

SERVICE NOTES:

- Although the hub plate appears to be a very substantial and solid part, it can be damaged. **CAUTION** should be taken to prevent gouges, nicks, and scratches to the hub plate.
Check hub alignment every 100 hours. (Refer to pages 56-58, photos #8-13 and accompanying text.) The hub must be re-shimmed if measurements are not within the following limits:
 - Hub centered within .001 T.I.R.
 - Hub pressure 8 to 12 lbs. using spring scale
 The entire shimming procedure is covered later in this section.
- The teeter block (part no. E49-5100) has a grease fitting that should have 4 shots of Mystik JT-6 grease every 25 hours. The grease should come through the bearing and be visible on the outer race of the bearing. Wipe off the excess grease to prevent it from being thrown onto the blades during operation.
- Check hub alignment every 100 hours. If the alignment falls within the prescribed limits, it is not necessary to re-shim the hub.

The delrin shims as supplied are ready to install on the main drive pin. During final assembly of the hub to the main rotor shaft, if you find the allowable tolerance is impossible to achieve, you may lightly sand the delrin shim with 400 grit wet and dry sand paper to remove .0005 to .001 inch of material. This final adjustment will allow you to shim the hub within the .001 T.I.R. (total indicated reading) on final assembly. (Refer to the rotor hub shimming procedure later in this section.)

4. Check hub alignment every 100 hours. If the alignment falls within the prescribed limits, it is not necessary to re-shim the hub. The stainless steel shims come in a variety of thicknesses, each with its own part number. When ordering replacement shims, order the shim kit, part no. E49-6330. This kit contains 10 stainless steel shims (2 each of the sizes listed below) plus 4 delrin shims, part no. E49-6281. This will give you a variety of sizes so that the exact combination of shims can be chosen. (Refer to the rotor hub shimming procedure later in this section.)

<u>PART NO.</u>	<u>THICKNESS</u>
E49-6344	.021"
E49-6346	.023"
E49-6347	.024"
E49-6348	.025"
E49-6353	.030"

5. Check hub alignment every 100 hours. If the alignment falls within the prescribed limits, it is not necessary to re-shim the hub. However, the main drive pin must be removed and inspected carefully for grooves caused by contact with the stainless steel shims. To remove the main drive pin without removing the shims, follow these procedures:
- Remove the blades from the hub.
 - Remove the four (4) set screws located on the main shaft knuckle. (There are two set screws in each hole.)
 - Remove the snap rings (part no. E49-5131) and thin washers (part no. E00-4802) from both sides of the hub.
 - Carefully support the hub plate and drive out the main drive pin with a hammer and drift punch. Do not remove the shims.
 - Inspect the main drive pin. If any grooves or scratches are present, the pin must be replaced with a new one. Otherwise, it may be re-used for up to 250 hours total time.
 - Place a small amount of grease in the hole and re-install the drive pin, thin washers, snap rings, and set screws.
 - Upon re-assembly, check to make sure that the hub is centered within .001 T.I.R. and that the hub pressure is 8 to 12 lbs.
6. Replacement of alignment bearing is as follows:
- Remove thrust block assembly from the hub. **CAUTION:** Make sure all parts are marked before disassembly to insure they are reassembled in their original location.
 - Remove the elastomeric bearing and thrust block liner.
 - Remove the dust cap (part no. E49-1331).
 - Press the old bearing out of the thrust block with a small press. **CAUTION:** The inner steel sleeve, not the outer aluminum block, must be supported when pressing the bearing. The two pieces should not be moved relative to each other. Failure to support the sleeve may cause it to press out of the block.
 - Clean the service area where the bearing makes contact with the thrust block.
 - Making sure the steel sleeve is supported as described above, press the new bearing (part no. E49-1340) into the thrust block until it is even with the thrust block shoulder. (Refer to the rotor hub shimming procedure later in this section.)
 - Replace the dust cap, liner, and elastomeric bearing.
7. Removal of Inboard and Outboard Pitch Pins:
- Remove bolts part no. E00-2422 and part no. E00-2424.
 - Grasp outboard pitch pin (part no. E49-6310) with a pair of pliers and a soft cloth to prevent damaging the outer surface of the pin. Pull directly outward removing the pin from the hub. **NOTE:** The pin should normally slide out with very little pulling force, however, sometimes a light tapping motion with a plastic mallet must be used.
 - Tip the hub so it is at a 30 degree angle to the main shaft.
 - Insert a long punch and tap the inboard pin out. **CAUTION:** Try not to tap the thrust washer out at the same time. If the washer does come out, clean all mating surfaces with acetone, apply Loctite and put the thrust washer back in place. (It may be necessary to tap with a mallet to insure seating.)
 - Before installing the new pins, insure the holes in the hub are clean and free from dirt and grit. **NOTE:** Inboard and outboard pitch pins are not interchangeable. The inboard pins are longer.
 - Lightly grease the pitch pins and insert the inboard pitch pin into the inboard hub hole. Keeping the flats of the pin upward, insert the pin to .785 (\pm .005 inch) from the thrust washer. Reinstall bolt (part no. E00-2424) and torque. Tighten locking nut securely.
 - Re-insert the outboard pin using the same procedure as the inboard pin but hold a tolerance of .750 (\pm .005 inch) from the outboard edge of the hub. Tighten bolt (part no. E00-2422) and lock the locking nut. Torque as required.
 - Re-check distances: Inboard pitch pin = .785 (\pm .005). Outboard pitch pin = .750 (\pm .005).

8. If this bolt requires replacement before the R.C.O. time of the aligner block assembly, follow these procedures:
 - A. Remove the aligner block assembly from the blades.
 - B. Clamp the aligner block in a vise using wood shims to prevent damage to the block.
 - C. Use a small die grinder or a high speed sanding disc to grind the tip of the all thread bolt completely off, about 1/4" from the tip.
 - D. Dressing up the threads with a good file or sand paper, back the all thread bolt completely out of the aligner block. Some friction will be felt, however, if the pressure is too great, damage to the aluminum block and threads will occur.
 - E. Clean the threaded hole and pass a tap through the hole to clean up the threads. (Be sure to use a fair amount of thread cutting oil.) Blow out the hole with air.
 - F. Install the new all thread bolts (part no. E00-2417) with a light film of all purpose grease. After the final adjustment has been made, torque to 7-9 ft. lbs.
9. Aligner block bolts (5/16 x 3 1/4 part no. E00-2523) should be loosened and re-torqued only 3 or 4 times before replacement. Torque requirement on these bolts is 20-22 ft. lbs.
10. See the Construction Manual for replacement of the rotor system and shaft. **CAUTION:** Under NO condition attempt to change, alter, modify or fabricate a main rotor shaft for this helicopter.
11. Part no. E49-5140 requires 3-4 shots of grease every 25 hours. Refer to Service Note 19-2.
12. See pages 60-61 for complete instructions on the slider ball adjustment collar (part no. E49-3230). This procedure may have to be done occasionally if the helicopter is exposed to severe or radical temperature changes.
13. Place a small amount of grease on slider ball clamp (part no. E49-1530) and on the lower ears of the collective slider ball (part no. E49-3210). Remove the set screw on the slider ball and add 2 shots of grease, using a grease gun and the main drive pulley grease tool (part no. E38-6700). Replace the set screw and tighten it securely. Remove the plastic wire ties on the boot above the rotating swash plate and move the boot aside. Grease the upper end of the mainshaft. Move the collective up and down several times to insure that the grease coats all related surfaces. Return the boot to its original position and secure it with wire ties.
14. See instructions on page 61 for replacement of the nylon scissor bushings (part no. E49-4810). These should be replaced on condition when the lateral play exceeds 1/8" total travel and cannot be taken up by tightening the bolts (part no. E00-2516 and E00-2427). **CAUTION:** Do not exceed two flats past the position you can turn the nut with your fingers.
15. Check for cracks at the base of the 90 degree bends on the collective scissor mount (part no. E49-1380).
16. This bearing (part no. E49-1220) should be checked for side play at every 100 hour interval. With a dial indicator on a magnetic base, measure the amount of side play by first mounting the magnetic base to the steel hood bracket and centering the indicator on the upper steel race of the main bearing. Using a spring scale, pull 20 pounds toward the passenger side of the helicopter and mark the dial indicator reading. Using the same method, pull 20 pounds toward the pilot side and mark the reading. Total the two readings. The maximum amount of travel allowed is .010 of an inch. If your measurement is greater than .010, replace the main thrust bearing. This bearing is an On Condition item and should be monitored on pre and post flight inspection for condition and temperature.
17. **WARNING:** Under NO condition should the main bearing flange (part no. E49-1230) be heated up in an oven or with an oxygen/acetylene torch.

ROTOR HUB SHIMMING PROCEDURES

The EXEC 162F Rotor System will require hub shimming at different intervals depending upon how smoothly you keep the rotor system adjusted. This section uses the "See-Do" concept like the Construction Manuals for clarification of the maintenance to be performed.

SERVICE NOTES:

1. The following tools are required to preform the hub shimming procedures:
 - 3/8" torque wrench in ft. lbs. capable of 30-35 ft. lbs.
 - micrometer in thousandths of an inch
 - 3/8" drive ratchet with 9/16" socket
 - 9/16" box and open end wrench
 - 1/4" punch with a 3" shank
 - steel hammer and/or plastic hammer
 - snap-ring pliers that will fit the holes on the snap rings
 - spring scale
 - set of allen wrenches or at least one 1/4" and one 1/8" allen wrench
 - a clamp that spans the distance across the teeter blocks and has 4" jaws minimum
 - one rotor hub shimming fixture. See page 59 in this manual for a drawing of the fixture with dimensions and specifications. This fixture is also available from RotorWay, part number E08-6000.
 - one dial indicator with a 4" reach that reads in thousandths.

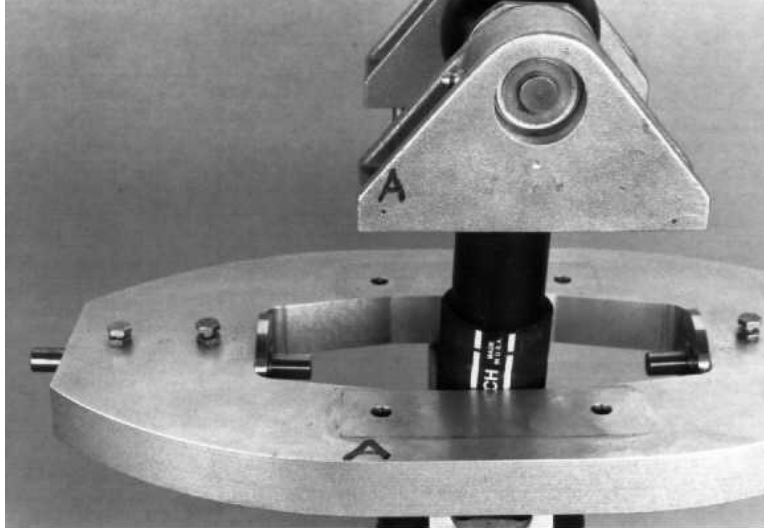
Photo #1: Tools required.



2. Start by removing the blades from the helicopter. Set the blades on their sides or on the leading edge. (Never set the blades on the trailing edge.)
3. Turn the hub so that the numbers stamped on the hub plate are on the pilot side and the hub is aligned fore and aft to the helicopter. It makes no difference which side of the helicopter the numbers are on, but it is good practice to establish a normal and routine procedure.
4. Next, mark the hub and pitch links with a marker pen so they can be put back on exactly the way they were removed. Mark the pitch links indicating which blade (master or slave) they attach to and also the up or down position. Then set aside.

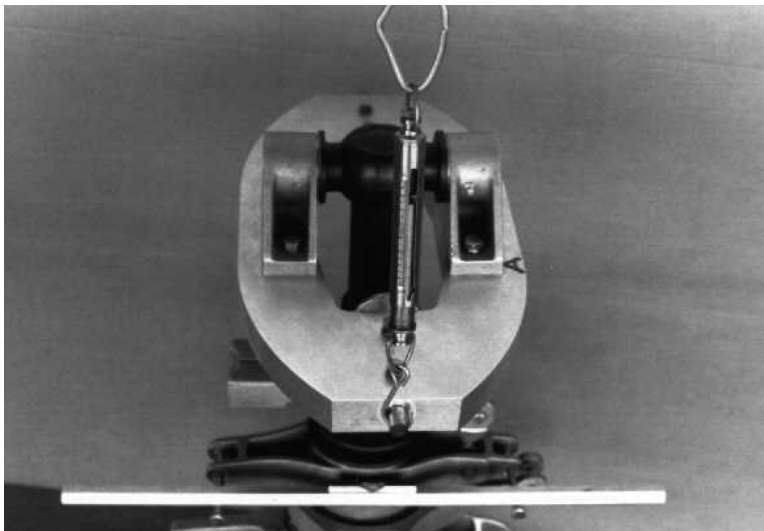
5. Next using the same marking on the hub, mark the shaft in relation to the hub and the teeter blocks. See photo #2.

Photo #2: Mark the hub plate, shaft and teeter blocks.



6. Place the spring scale on the outboard pin and pull up or down until the hub plate starts to move. Read the scale and record the reading for later reference. See photo #3.

Photo #3: Measuring hub pressure with spring scale.

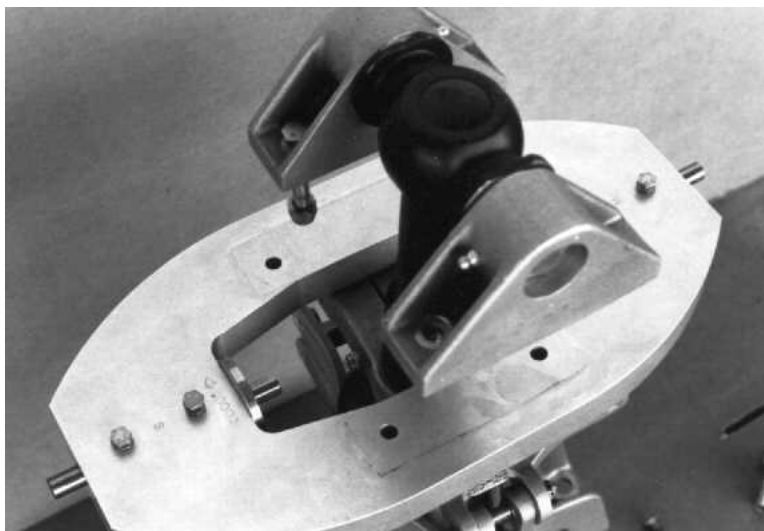


7. Place the "C" clamp across the teeter blocks so that the jaws clamp at the base, close to the center of the block (photo #4). Using the 9/16" socket wrench and open end wrench, remove the locking nut from the bolt. After the nut has been removed and washers taken off, place the box wrench on the teeter block bolts. Turn the wrench so that when you tighten the "C" clamp slightly, the wrench will begin to move easily. Tighten the clamp down by feel so that you find the spot where the wrench will move the easiest. Place a small amount of grease on the bolt threads and drive the bolts out through the hub plate with the hammer and punch. **CAUTION:** If the teeter block bolts do not move easily, some of the aluminum will be galled out of the hub plate holes. After the teeter block bolts have been removed, remove the "C" clamp. Remove the two remaining teeter block bolts from the other teeter block and set the hub plate on the counter balance just below the shaft knuckle. Be careful not to scratch or damage the hub plate. See photos #4 and #5.

Photo #4: Drive out the teeter block bolts.

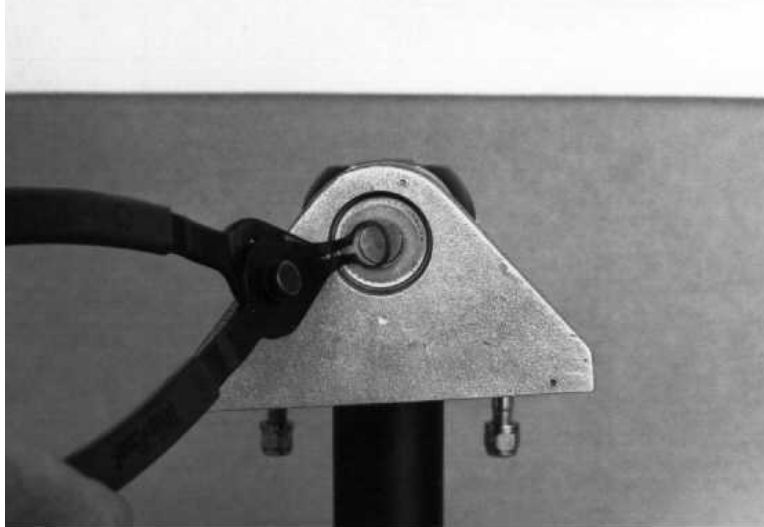


Photo #5: Rest the hub plate on the counter balance.



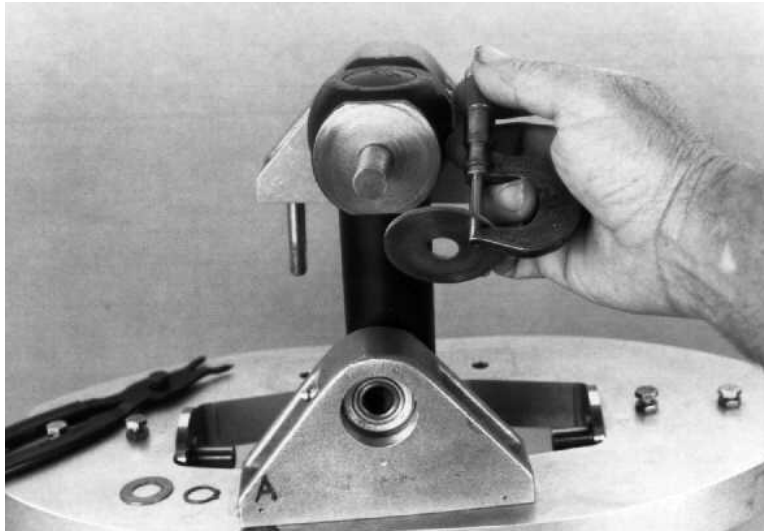
8. Next remove the two snap rings and the large thin washer from the main drive pin. See photo #6.

Photo #6: Remove snap rings.



9. Deburr the edge of the snap ring grooves and edge of the pin with 400-600 wet and dry sandpaper.
10. With hand pressure or a light tap from a plastic mallet, remove the teeter blocks from the main drive pin. **CAUTION:** If shims come off with the teeter block, carefully put them back on the drive pin in exactly the same way they came off. Inspect the teeter block for any cracks and galling the shims may have caused.
11. If the bearing replacement is necessary in the teeter blocks either by R.C.O. time or On Condition, follow the next steps. If the bearing is OK, skip the next sequence and go to step 12.
 - A. Clean teeter block in acetone or equivalent solution.
 - B. Heat block to 250 degrees in an oven and press the old bearing out of the block. The bearing should come out with light pressure.
 - C. Clean all mating bearing surfaces and place a small amount of Loctite #609 on both the outer race of the bearing and the inner hole of the teeter block. **CAUTION:** Do NOT let the Loctite get into the greased holes in the center of the bearing.
 - D. Reheat to 250 degrees and press the new bearing in place using a tool or spacer that will allow you to press on the outer race of the bearing and not the inner race.
 - E. Keeping on a flat surface, press the bearing until flat with the inside of the teeter block. Let cool and check the bearing for smoothness with your fingers.
 - F. Give the bearing 3-4 shots of grease through the grease fitting on the teeter block and wipe off excess grease. Repeat process for the other teeter block.
 - G. Remove the hub plate, inspect the condition and clean. Do not remove your identification markings.
12. Next, carefully remove the steel and delrin shims from the main drive pin. Find a smooth spot on these parts and measure all shims together with a micrometer. (Remember not to mix the pilot and passenger side shims.) See photo #7.

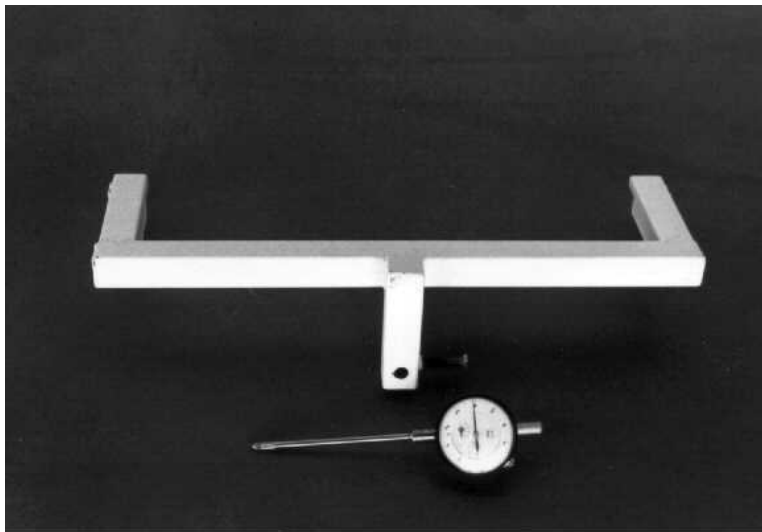
Photo #7: Measure the shims.



13. Remove the four (4) allen set screws on top of the shaft knuckle. NOTE: There are two (2) screws in each hole. Failure to remove all four set screws will result in damage to the main drive pin. Lightly tap the pin out with a plastic hammer.
14. Inspect the shaft knuckle hole and clean with acetone.
15. After cleaning all parts, align them in sequence for re-assembly as shown on print E49-2000.
16. Place a light coat of grease on the main drive pin and in the shaft knuckle hole. Install the new drive pin in the knuckle with the flats in the up position. Position pin so there is equal pin on either side of the knuckle. DO NOT insert allen set screws at this time.
17. Place the delrin shims on both sides of the appropriate stainless steel shim and measure with a micrometer. You should choose shims that will give you the same thickness as measured in step 12. Place a thin coat of grease on the outer surface of the shaft knuckle and on all shims.
18. Place the steel and delrin shims on the main drive pin. All shims should have a light coat of grease on every side. Do this to shims on both sides of the hub knuckle. Refer to print E49-2000.
19. Place the clean hub plate back on the shaft in the correct position according to your earlier marks. Refer to photo #2.
20. Place one teeter block on the main drive pin with the bearings closest to the knuckle. Checking to insure that the reassembly is the same as the disassembly (check your identification marks), align the holes with the hub plate and insert the bolts through the teeter blocks and through the hub plate. Torque the bolts to 24 ft. lbs.
21. Place the other teeter block on the main drive pin following the same assembly procedures.
22. Replace the clamp on the teeter blocks and tighten slightly as in Note 7 and photo #4. Replace the bolts through the holes with grease and using the clamp, align the holes. Use a plastic hammer to drive the bolts through the holes. (If the bolts drive hard, adjust the clamp pressure so that they go in with ease.)
23. Torque the bolts down to 24 ft. lbs. and remove the "C" clamp.

24. Rock the hub back and forth 15 to 20 times to set the shims and grease in their respective positions.
25. After reassembly, two objectives must be reached:
 - A. The hub must be on center of the main shaft.
 - B. The hub pressure must be between 8 to 12 lbs.
(This process is difficult to achieve on the first attempt).
26. Measure the hub pressure. Place a spring scale on the outboard pitch pin and pull up or down very slowly until the hub breaks loose and moves. Note the poundage of pull required.
27. Measure the hub to shaft center position by using the hub fixture shown in photo #8. See drawing on page 59.

Photo #8: Hub alignment fixture and dial indicator.



This fixture is easy to fabricate and will give you very accurate results. Place the fixture on the hub. Push the fixture up against the outboard pitch pins and hold the fixture down on the 3 rivet point contacts located on the bottom. Securely hold the fixture on the hub and rock the hub slightly back and forth until the needle on the indicator stops moving in a central position. Then zero the indicator. Carefully remove the fixture and place it on the other side of the hub using the same procedures. Repeat the steps and determine how far the hub is off center, if any, and which direction it needs to move. If all procedures were done correctly, you should not be any more than .002 to .004 off center and hub pressure will still be within tolerance. Make a note on paper and determine which teeter block should be removed to center the hub on the shaft. Change the stainless steel shims as necessary, following the procedures as previously outlined. The tolerance and specs that must be achieved are:

- A. Hub centering is within .001 T.I.R.
- B. Hub pressure should be 8 to 12 lbs.

When the hub is correctly centered and hub pressure is within the limits specified, final assemble the hub. See photos #9 through #13.

Photo #9: Hub alignment fixture.

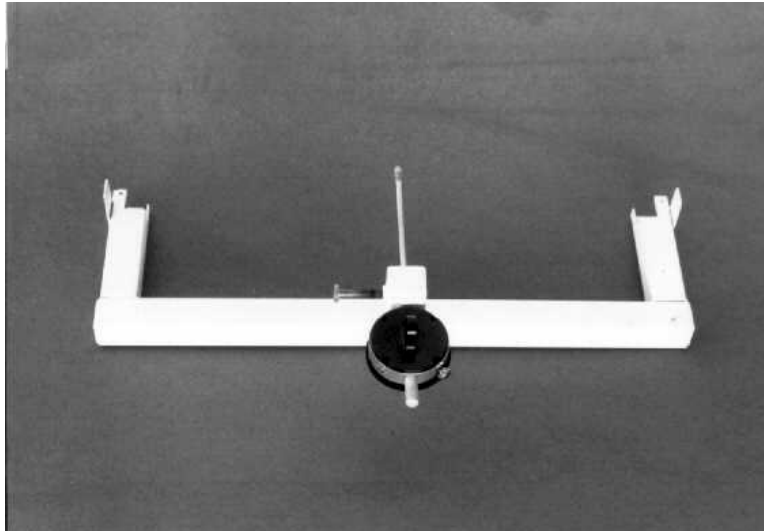


Photo #10: Hub fixture located on hub.

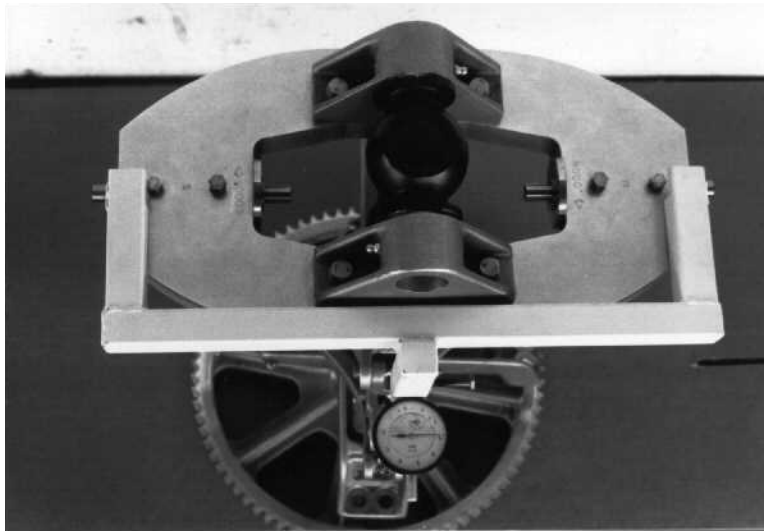


Photo #11: Proper placement of hub fixture.

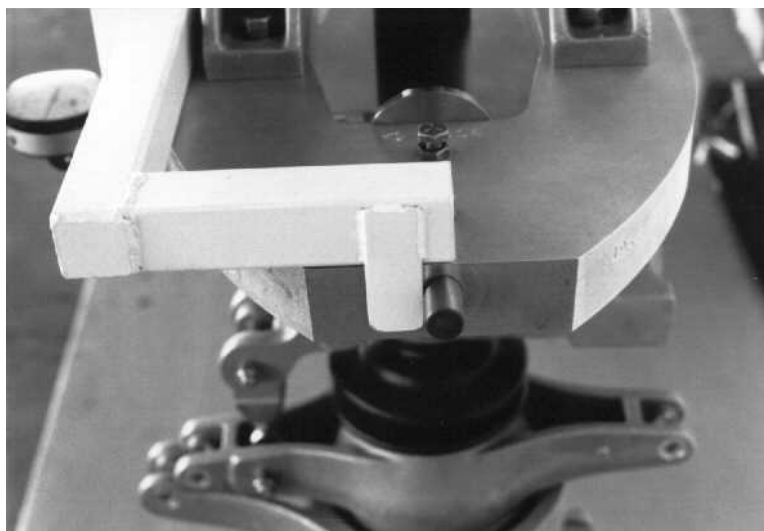
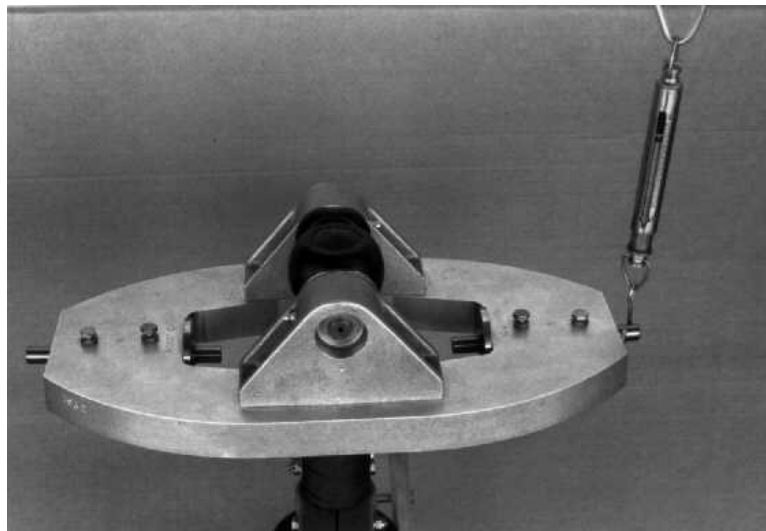


Photo #12: Dial indicator reading on center of main shaft.

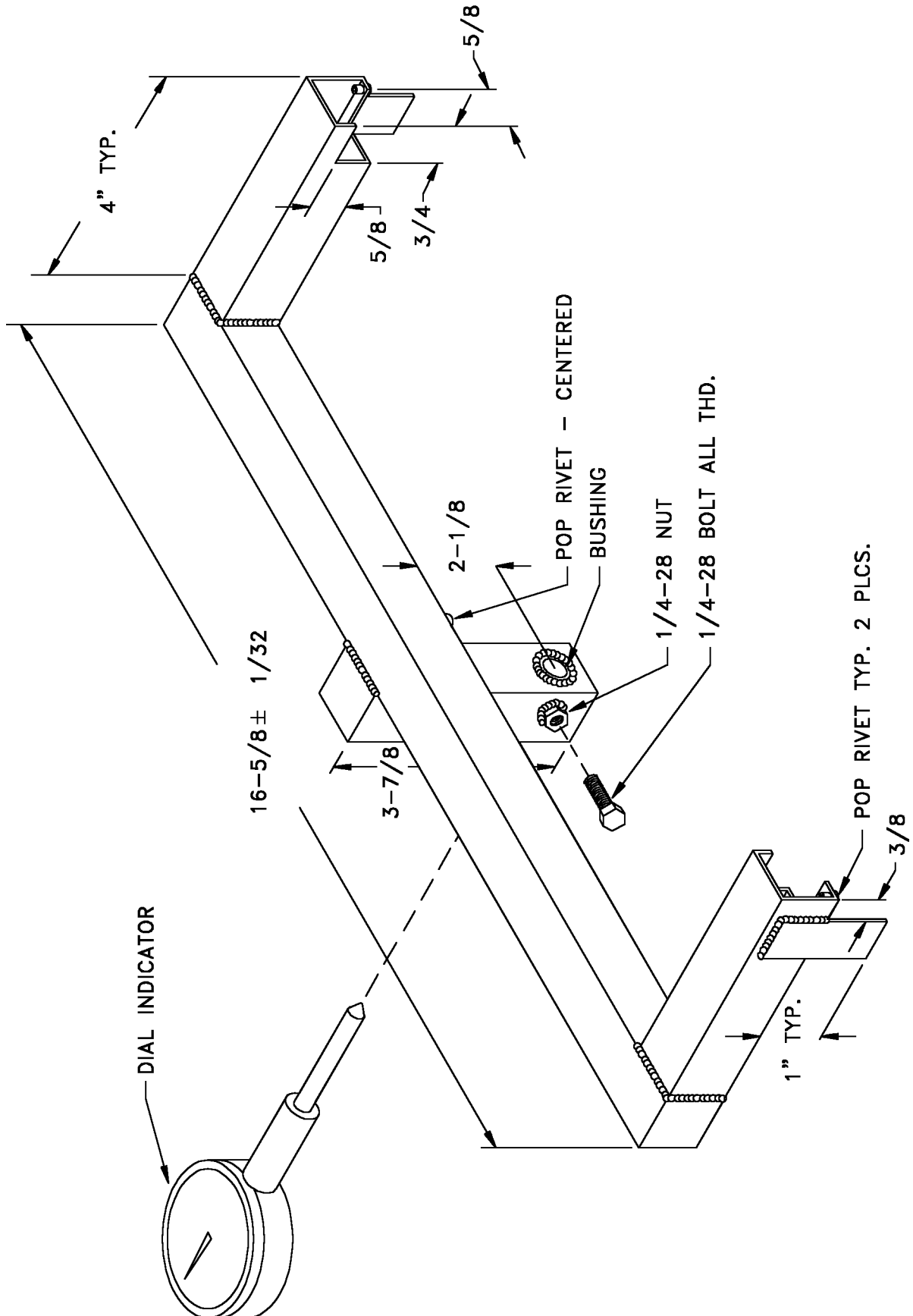


Photo #13: Reading poundage pull on hub.



28. Replace new large flat washers and snap rings on the main drive pin. **CAUTION:** Be sure you place the correct side of the snap ring towards the outside of the pin. Refer to the Construction Manual Tail Rotor section for the correct snap ring procedures.
29. After rocking the hub back and forth 10 to 15 times, replace the 4 set screws on the top of the knuckle. Tighten the first set screws against the main drive pin and the second set of screws against the first set of screws as a safety lock. (Do NOT use Loctite on these screws.)
30. Recheck the torque on the teeter block bolts and recheck the hub centering.

HUB SHIMMING FIXTURE DRAWING



ROTOR HUB: SLIDER BALL ADJUSTMENT COLLAR

The Slider Ball Adjustment Collar (part no. E49-3230) is adjusted and set on the swash plate assembly at the factory. However, it may need to be re-adjusted occasionally if the helicopter is exposed to severe or radical temperature changes.

1. Using a protractor level, set the swash plate perpendicular to the main shaft. Rotating the blades may help you in achieving the fore and aft angles. If a protractor level is not available, centering the cyclic stick should place the swash plate at a relative perpendicular angle to the shaft. Loosen the two set screws (part no. E00-9302, Ref. 16 on print E49-2002) three full turns. With your fingers, loosen the adjustment collar approximately 2 full turns in a counter clockwise direction, until it can be turned easily. Again using your fingers, turn the collar in a clockwise direction until it comes to a stop. Make an index mark on the adjustment collar and non-rotating swashplate with a pencil or marker. Back off the adjustment collar counter clockwise 1/2". Then tighten the two set screws. See photos #14-16. Note: Use silicone on the set screws to help lock them in position and prevent them from backing out. Do NOT use loctite.

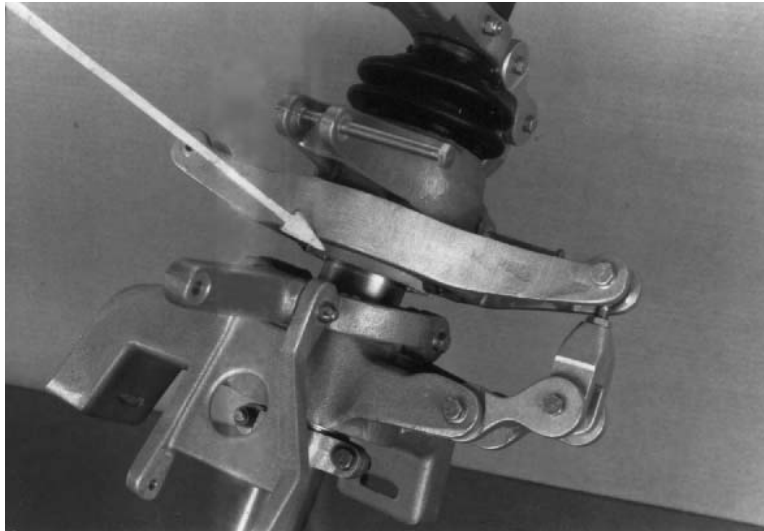
Photo #14: Placing an index mark.



Photo #15: View after the collar has been backed off.



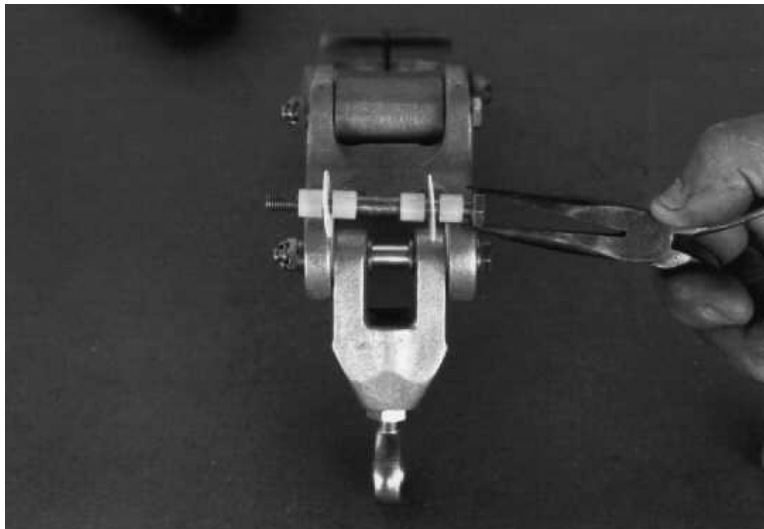
Photo #16: Tighten set screws in collar.



If incorrectly adjusted, the slider ball adjustment collar will produce a feedback through the cyclic controls that feels like the cyclic wants to travel in any one direction independent of any input from the pilot. The amount of feedback felt by the pilot indicates how much the collar is incorrectly adjusted. (Feedback usually means the collar is too tight rather than too loose). If feedback through the cyclic continues, you may back off the adjustment collar another 1/4", for a total 3/4" maximum from the starting index mark. If an undesirable condition still exists, contact the factory.

Photo #17 illustrates the positioning of the nylon bushings in the swash plate assembly. To determine if the castings need new bushings, measure the lateral deflection of the parts. If a total of .125 inch or greater is indicated, the nylon bushings should be replaced. The maximum the castellated nut should be tightened is two flats past finger tight. Further tightening may damage the aluminum castings.

Photo #17: Position of bushings.



Section 20: Doors

The EXEC 162F can be operated with the doors either on or off depending upon the weather and pilots discretion.

Reference prints: E41-2000

INSPECTION CHART				
PART NO.	DESCRIPTION	INSPECTION INTERVAL	R.C.O.	SERVICE REFERENCE
E41-7120	Door (Pilot)	100 HR	OC	
E41-7130	Door (Passenger)	100 HR	OC	
E41-7140	Door Stiffener	100 HR	OC	
E41-7150	Door Stiffener	100 HR	OC	
E41-3110	Door Hinge	100 HR	OC	
E41-3120	Body Hinge	100 HR	OC	
E00-2300	AN3-4A (3/16 x 1/2) Bolt	100 HR	OC	20-1
E00-2302	AN507-1032R10 (3/16 x 5/8) Countersunk Screw	100 HR	OC	20-1
E00-2304	AN3-7A (3/16 x 7/8) Bolt	100 HR	OC	20-1
E54-4050	Vents	100 HR	OC	

SERVICE NOTES:

1. Check bolts (part no. E00-2300, E00-2302 and E00-2304) for tightness.

CAUTION: If the doors were to come off in flight, serious damage could occur to the helicopter.

Section 21: Torque Requirements

The following torque requirements are standard for “AN hardware” and should be used throughout the helicopter.

BOLT SIZE	INCH LBS.	FT. LBS.
6-32	7 - 10	
8-32	12 - 15	
AN3 3/16-32 (10-32)	32 - 50	
AN4 1/4-28	50 - 70	5 - 7
AN5 5/16-24	100 - 140	9 - 12
AN6 3/8-24	160 - 190	14 - 16
AN9 9/16-18	800 - 1,000	65 - 82

Torque values for engine components can be found on page 7 of the Engine Manual.

Some parts have specific torque requirements that may differ from these standard values. These are listed below. Consult the relevant section of the manuals for further instructions.

PART NO.	DESCRIPTION	TORQUE	REFERENCE
E00-2608	Sprocket Hub to Main Rotor Shaft Bolts (3/8 x 3-1/8)	18 ft. lbs.	Construction Manual Sec. 11
E00-2450	Sprocket to Hub Bolts (1/4 x 1-1/4)	7 ft. lbs.	Construction Manual Sec. 11
E00-2800	Main Rotor Blade Retention Bolts (9/16 x 4-1/4)	70 ft. lbs.	Construction Manual Sec. 24 Maintenance Manual p. 35
E00-2522	Main Rotor Blade Strap Bolts (5/16 x 3)	14 ft. lbs.	Construction Manual Sec. 24 Print E20-2000
E00-2523	Main Rotor Blade Strap Bolts (5/16 x 3-1/4)	14 ft. lbs.	Construction Manual Sec. 24 Print E20-2000
E00-2523	Aligner Block Bolts (5/16 x 3-1/4)	22 ft. lbs.	Construction Manual Sec. 24 Maintenance Manual p. 50 Print E20-2000
E00-2417	Aligner Block Adjusting Bolts (1/4 x 2)	7 ft. lbs.	Construction Manual Sec. 24 Maintenance Manual p. 50 Print E20-2000
E00-9301	Aligner Block Set Screws (1/4 x 5/8)	7 ft. lbs.	Construction Manual Sec. 24
E00-2607	Teeter block bolts (3/8 x 2-1/4)	24 ft. lbs.	Maintenance Manual P. 55
E00-2901	Secondary Locking Ass'y. Bolts (6 x 20 mm)	10 ft. lbs.	Construction Manual Sec. 11
E00-2532	Exhaust Manifold Bolts (5/16 x 5/8 12pt.)	10 ft. lbs.	Construction Manual Sec. 17
E00-2528	Water Pump Body Bolts (5/16-18 x 5/8)	120 in. lbs.	Maintenance Manual p. 24
E00-2441	Ignition Module Bolts (1/4 x 1-3/4 Btn. Hd.)	75 in. lbs.	Construction Manual Sec. 21

Section 22: Inspection Guide for Hard Landings, Tail Rotor Strike, or Roll Overs

After any type of accident, roll over, main and/or tail rotor strike, hard landing, etc. it is very important to thoroughly inspect any areas that may have been damaged or subjected to excessive stress. It is impossible to anticipate all the consequences of every accident, therefore individual inspections of your aircraft will depend on yourself. Non-destructive inspections (NDI) may be available locally, however RotorWay will also perform these services for you on parts or components you return to the factory. Listed below are some of the major areas of concern in case of an accident.

1. **MAIN ROTOR BLADES:** Damaged rotor blades can not be repaired. Associated components such as retention straps, pitch horns, and retention hardware will most likely have been subjected to undue stress and are not recommended for reuse.
2. **ROTOR SYSTEM:** In cases where main blades contacted the ground or other objects, several items require inspection. Elongation of pitch pin holes in the hub plate or gouges in the hub plate surface require the hub plate to be replaced. The main shaft may be bent, and any bending requires replacement. The slider ball may be damaged depending upon the location of the bent main shaft. All casting pieces should be Zygo inspected, though if no stoppage has occurred between rotating and non-rotating parts, damage should not have occurred.

Thrust blocks should have no sign of deformity or cracking. Control rods and rod ends should be replaced if bent. Teeter blocks and sprocket hub hardware should be replaced. The main rotor drive pin and teeter block bearings require replacement.

3. **CONTROLS:** Replacement of cyclic cables is required in case of a blade strike. Inspection of cyclic and collective controls is required in the event of a blade strike or swash plate stoppage.
4. **SECONDARY DRIVE:** If a roll over accident or blade strike occurs, the secondary unit should be returned to the factory. The secondary unit is not a field serviceable assembly. The chain requires replacement in case of a roll over.
5. **TAIL ROTOR:** If the tail rotor blades are damaged, the pivot pins must also be replaced. The tail rotor shaft must be inspected for any bending. The thrust bearing container should be inspected for cracks, paying close attention to snap ring groove locations. A tail rotor strike also requires replacement of the tail rotor drive belts and inspection of the lower secondary shaft (see Section 10, Service Note 2B).
6. **TAIL BOOM:** Location and amount of damage will determine if repair or replacement is necessary.
7. **AIRFRAME:** When a blade strike occurs, impact forces are transmitted throughout the airframe. After a complete teardown, inspect the airframe for deformation and cracks, primarily in the drive system area. If damage occurs in the hood bracket area or to the square drive tubes, a new airframe may be required.

In case of a hard landing, landing gear skids may be damaged. Repair of landing gear should not be done. All landing gear attachment points and brackets associated with landing gear attachment require inspection.

8. **POWER PLANT:** Inspection required will depend upon the power applied during the mishap. The condition of the engine will depend on impact damage and possible damage from power applied at the time of the blade impact. Obviously more internal damage could occur if the engine was forced from full power and full RPM to a full stop in just a few revolutions. Crankshaft end play needs to be checked in case of a hard landing. The valve train needs to be inspected and freedom of the engine to be rotated by hand should be accomplished.

Note: Log Book entries are required for inspection or rebuild of a damaged aircraft. If reusing a part or component, a log book entry needs to be made stating that the part has been inspected and found to be okayed for service.

Section 23: Hourly Service Charts

**HOURLY SERVICE CHART EXEC 162F
 REFERENCE SECTION 1: AIRFRAME**

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E10-1001	EXEC 162F Airframe			I						R
E00-2415	AN4-24A (1/4 x 2-1/2) Bolt			I						R
E00-2601	AN6-10A (3/8 x 1) Bolt			I						R
E11-9010	Rear Landing Gear			I						R
E13-3121	Engine Mount Rubber Ring		I							R
E00-2507	AN5-10A (5/16 x 1) Bolt			I						R
E11-3130	Landing Gear Skid (Pilot)						I			R
E11-3131	Landing Gear Skid (Passenger)						I			R

I INSPECT
 R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 2: TAIL BOOM

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E09-9000	Tail Boom			I						R
E09-9010	Vertical Trim Fin			I						R
E09-9021	Horizontal Trim Fins			I						R
E09-3252	Vertical Trim Fin Bracket			I						R
E00-2300	AN3-4A (3/16 x 1/2) Bolt		I							R
E00-2301	AN3-5A (3/16 x 5/8) Bolt			I						R
E00-2303	AN3-6A (3/16 x 3/4) Bolt		I							R
E00-2305	AN3-11A (3/16 x 1-1/8) Bolt			I						R
E00-2306	AN3-12A (3/16 x 1-1/4) Bolt		I							R
E00-2307	AN3-13A (3/16 x 1-3/8) Bolt		I							R
E00-2308	AN3-15A (3/16 x 1-5/8) Bolt		I							R
E00-2309	AN3-17A (3/16 x 1-7/8) Bolt			I						R
E00-2414	AN4-23A (1/4 x 2-3/8) Bolt			I						R
E00-2432	AN4-12A (1/4 x 1-1/4) Bolt		I							R

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 3: BODY

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
	Body			I						
E32-7210	Eyebrow Window, Pilot			I						
E32-7220	Eyebrow Window, Passenger			I						
E32-7231	Windscreen			I						
E32-1301	Seat Upholstery			I						
	Skid Pants			I						
E32-1111	Cyclic Boot			I						
E32-3131	Floor Pan/Instrument Pod			I						
E32-6111	Seat Bulkhead			I						
E32-7102	Bottom Tub			I						
E32-7111	Fuselage (Right Front)			I						
E32-7113	Fuselage (Right Rear)			I						
E32-7122	Fuselage (Left Rear)			I						
E32-7123	Fuselage (Left Front)			I						
E32-7130	Fuselage (Lower Right)			I						
E32-7140	Fuselage (Lower Left)			I						
E32-7152	Doghouse (Front)			I						
E32-7160	Bracing Panel			I						
E32-7170	Bracing Panel			I						
E32-7180	Roof Panel			I						
E32-7272	Doghouse (Rear)			I						
E54-4010	Push/Pull Cable			I						

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 4: TAIL ROTOR DRIVE

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E18-6130	Idler Pulley Mounting Scissors					I				R
E18-1131	Idler Pulley Bearing Assembly					R				
E18-2012	Tail Rotor Idler Pulley			I						R
E18-1150	Tail Rotor Belt ¹					R				
E18-1160	Tail Rotor Belt ¹					R				

I INSPECT
R REPLACE

¹ Visually inspect and check tension of the tail rotor drive belts at every pre-flight and post-flight inspection.

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 5: TAIL ROTOR

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E17-1260	FS3 PP Bearing			I			R			
E17-1290	Snap Ring			I			R			
E00-2604	AN6-24A (3/8 x 2-1/2) Bolt			I			R			
E17-6126	Carriage Slider Assembly	I						R		
E17-1300	Carriage Slider Bearing			I			R			
E17-1210	Rod End 5/16 Teflon			I				R		
E17-6000	Tail Rotor Blade Assembly			I			R			
E17-5120	Pitch Actuator Arm Pivot Casting			I						R
E17-1340	Bearing Assembly			I		R				
E17-5110	Pitch Horn			I			R			
E17-9010	Slider/Actuator Arm Clevis			I						R
E17-6150	Tail Rotor Shaft			I						R
E17-1360	Bearing Plate Slider Rail			I						R
E17-5101	Tail Rotor Pulley			I						R
E16-1200	Female Rod End			I				R		
E17-1270	Alignment Bearing Assembly		I				R			
E17-1280	Thrust Bearing Assembly		I				R			
E17-6100	Tail Rotor Barrel		I							R

I INSPECT
 R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 6: CONTROL ASSEMBLIES

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E16-6131	Cross Shaft Bushing							I		R
E16-6130	Scissor Mount Bushing							I		R
E16-1200	3/16" Female Rod End			I				R		
E16-1130	1/4" Male Rod End			I				R		
E16-1140	1/4" Female Rod End			I				R		
E16-1212	Directional Control Cable			I						R
E14-6131	Cross Shaft Bushing							I		R
E14-1241	Nylon Bushing							I		R
E14-1150	5/16" Male Rod End			I						R
E14-1211	Cyclic Control Cable			I						R
E14-1221	Cyclic Control Cable			I						R
E15-6131	Cross Shaft Mount Bushing							I		R
E15-1230	5/16" Male Rod End			I						R
E15-6130	Collective Rod End Plug			I						R
E49-1400	Collective Control Rod			I						R
E15-3150	Pilot Throttle Shaft							I		R
E15-3170	Transfer Shaft							I		R
E15-9021	Throttle Shaft Weldment							I		R
E15-1150	1/4" Male Rod End			I						R
E24-7531	Throttle Cable Assembly			I			R			

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 7: OIL SYSTEM

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E28-7150	Oil Sump/Heat Exchanger			I						
E28-1192	Valve Cover Drain Hose			I			R			
E28-1230	Main Oil Drain Hose			I			R			
E28-1110	Oil Filter	R								
E28-6112	Hose Assembly			I						R
E28-6122	Hose Assembly			I						R
E28-6142	Hose Assembly			I						R

I INSPECT
 R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 8: COOLING SYSTEM

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E30-1161	Radiator			I						R
E34-1180	Radiator Cap			I			R			
E34-1300	Hose		I			R				
E34-1310	Hose		I			R				
E34-1320	Hose		I			R				
E34-1330	Hose		I			R				
E34-1340	Hose		I			R				
E34-1350	Hose		I			R				
E34-1360	Hose		I			R				
E34-1370	Hose		I			R				
E29-1001	Water Pump Assembly			I						R
E29-5150	Water Pump Pulley			I						R
E29-1131	Water Pump/Alternator Belt			I			R			
E34-5000	Thermostat					R				

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 9: ENGINE AND EXHAUST SYSTEM

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E24-9710	Exhaust Gasket			I			R			
E24-9840	Heat Wrap			I						R
E24-9011	Muffler/Tailpipe			I						R
E24-9001	Header Weldment			I						R
E24-1251	Spring, Exhaust Knuckle			I				R		
E24-9831	Heat Shield			I						R
E27-1160	Rod End			I				R		
E27-1240	Rubber Insert			I						R
E27-9000	Torque Link Weldment			I						R
A24-162F	R.I. 162F Engine	I								
E24-9950	Spark Plug Wires			I			R			
E24-9948	Spk.Plug Wire Separator			I			R			
E24-9740	Spark Plug		I	R						
E24-7560	Air Filter W/Clamp			I						
A24-1600	Engine Pulley		I					R		
	ACIS Components (Optional)									
E38-3000	Supercharger Assembly			I						
E38-5010	Stepper Motor			I						
E38-6010	Air Filter	I								
E38-6300	Mounting Bracket Weldment			I						R
E38-6420	Oil Drain Hose			I			R			
E38-6430	Oil Drain Hose			I			R			
E38-6600	ACIS Oil Cooler			I						R
E38-6610	Hose Assembly, Engine to Oil Cooler			I						R
E38-6620	Hose Assembly, Oil Cooler to Supercharger			I						R
E38-6640	Belt			I			R			

I INSPECT
 R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 10: DRIVE TRAIN

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E49-6172	Main Sprocket			I				R		
E49-7010	Sprocket Hub			I				R		
E00-2608	AN176H (3/8 x 3-1/8) Bolt						I	R		
E00-2450	AN4H12 (1/4 x 1-1/4) Bolt			I			R			
E00-3410	Thin Locknut			I			R			
E00-9028	Hose Clamp						I			R
E24-5110	Upper Engine Mount Clevis						I			R
E24-5100	Upper Engine Mount Cup						I			R
E23-1002	Secondary Pulley Assembly			I				R		
E23-5001	Upper Bearing Assembly		I				R			
E23-6125	Secondary Shaft			I			R			
E23-2552	Lower Bearing	I		R						
E23-1210	Main Drive Belts		I				R			
E23-7141	High Temp Fan		I							R
E23-1170	Snap Ring						I			R
E23-3001	Fan Pulley Assembly						I			R
E23-1221	Fan Pulley Bearing			R						
E23-6191	Retainer Plate							I		R
E33-7101	Top Rear Cover			I						
E33-7121	Lower Oil Bath Pan			I						
E33-7111	Top Front Cover			I						
E33-1170	Rear Oil Seal Assembly			I			R			
E33-1140	Tension Spring			I						R
E33-3000	Rain Shield					I				R
E49-1290	Drive Chain W/Link	I		R						
E27-6100	Idler Pulley Assembly			I						R
E27-1231	Idler Pulley Bearing			I			R			
E27-1160	Rod End			I						R
E27-1210	Idler Spring			I					R	
E27-2160	5/16 Rod End			I						R
E27-9020	Clutch Tube Weldment			I						R
E27-9010	Pulley Arm Weldment			I						R
E27-5100	Clutch Arm Casting			I						R
E00-2522	AN5-30A (5/16 x 3) Bolt			I						R

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 11: FUEL SYSTEM

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E25-2101	Fuel Cap			I						R
E25-4011	Hose Assembly			I						R
E25-4020	Hose Assembly			I						R
E25-4030	Hose Assembly			I						R
E25-4040	Hose Assembly			I						R
E25-4050	Hose Assembly			I						R
E25-4061	Hose Assembly			I						R
E25-4071	Hose Assembly			I						R
E25-4080	Hose Assembly			I						R
E25-4110	Hose Assembly			I						R
E25-4121	Hose Assembly			I						R
E25-4570	Fuel Valve Cable			I						R
E25-4600	Fuel Pump			I				R		
E25-4630	Fuel Filter			R						
E25-4640	Fuel Pressure Regulator			I				R		
E25-4660	Shut-off Valve/Filter			I						R
E25-6102	Fuel Tank, Pilot			I						R
E25-6112	Fuel Tank, Passenger			I						R
E25-6130	Fuel Gauge (W/light)			I						
E25-6122	Fuel Gauge Sending Unit			I						

I INSPECT
 R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 12: FAN DRIVE

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E31-1120	Bearings			I			R			
E31-1130	Belt (Upper)			I			R			
E31-1141	Belt (Lower)			I			R			
E31-5100	Pulley (Upper)			I						R
E31-5120	Pulley (Lower)			I						R
E31-6100	Shaft						I			R

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 13: MAIN ROTOR BLADES

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E20-3000	Retention Strap Assembly	I							R	
E20-9010	Asymmetrical Rotor Blade	I							R	
E20-9011	Asymmetrical Rotor Blade	I							R	
E00-2800	NAS1309-54 (9/16 x 4-1/4) Bolt			I				R		
E00-3800	AN365-918A (9/16-18) Fiberlock Nut			I				R		
E20-1400	Elastomeric Thrust Bearing			I						
E20-1401	Elastomeric Thrust Bearing			I						
E20-3170	Tip Weight	I							R	
E20-6000	Aligner Block Assembly			I					R	
E20-6180	Pitch Horn Clevis			I					R	
E20-6190	Pitch Horns						I		R	
E00-2522	AN5-30A (5/16 x 3) Bolt			I					R	
E00-2523	AN5-32A (5/16 x 3-1/4) Bolt			I					R	
E20-1220	Aligner Block Bearings ¹			I	R					

I INSPECT
R REPLACE

¹ Replace aligner block bearings at 200 hours if greased at 100 hour interval. See Section 13 note 6.

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 14: ELECTRICAL SYSTEM

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E24-9760	12 Volt Battery			I						
E35-4000	Digital Display Monitor			I						R
E35-4011	Engine Control Unit (ECU)			I						R
E35-4030	Ignition Module			I						R
E35-4060	Man/Baro Pressure Sensor			I						R
E35-4080	9 Pin Cable			I						R
E35-8231	Fuse Holder			I						R
E35-8240	Toggle Switch			I						R
E35-8321	Fuses			I						R
E35-8410	Battery Terminal Eyelet			I						R
E35-8520	Starter Relay			I						R
E35-8540	Push Button Switch			I						R
E35-8596	LED Indicator Light			I						R
E35-9002	Airframe Wiring Harness			I						R
E35-9013	Overhead Wiring Harness			I						R
E35-9022	Instrument Wiring Harness			I						R
E35-9031	FADEC Wiring Harness			I						R
E42-2021	Voltage Regulator			I						R
E42-1002	Alternator Assembly			I						R

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 15: INSTRUMENTATION

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E36-1100	Hour Meter			I						
E36-1120	Water Temperature Gauge			I						
E36-1160	Oil Temperature Gauge			I						
E36-3110	Oil Pressure Gauge			I						
E36-3120	Oil Pressure Sender			I						
E36-1220	Volt Meter			I						
E36-3002	Dual Engine/Rotor Tach			I						
E36-4010	Altimeter			I						
E36-4020	Vertical Speed Indicator			I						
E36-4030	Air Speed Indicator			I						
E36-4040	Compass			I						
E36-4050	Manifold Pressure Gauge			I						
E36-4111	Full Range Tach			I						
E36-3050	Fuel Pressure Gauge			I						
E25-4940	Fuel Pressure Sender			I						
E36-1230	Secondary Temp Gauge			I						
E36-1240	Secondary Temp Gauge Sensor			I						

I INSPECT
 R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 16: GROUND HANDLING WHEELS

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E37-4090	Wheel and Tire						I			R
	Tire Track			I						

I INSPECT

R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 17: BALLAST WEIGHT

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E22-9000	Support Tube Weldment			I						R
E22-9010	Mount Tube Weldment			I						R
E22-9020	Ballast Weight Tube			I						R
E22-9030	Ballast Weight Pin			I						R
E22-4120	Safety Clip	I		R						

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 18: PAINT

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
	Paint			I						

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 19: ROTOR HUB

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E49-6141	Rotor Hub Plate			I				R		
E49-5100	Teeter Block Assembly			I				R		
E49-5110	Teeter Block Bearing			I			R			
E49-6281	Delrin Shim			I						
E49-6341	Stainless Steel Shim			I						
E00-2607	AN176-22A (3/8 x 2-1/4) Bolt			I						R
E49-6301	Main Rotor Drive Pin			I		R				
E00-4802	Thin Washer			I				R		
E49-5131	Snap Ring			R						
E49-6200	Thrust Blocks (M-S)			I						R
E49-6210	Thrust Washer			I						R
E49-1340	Thrust Blk. Align Bearing			R						
E49-1360	Thrust Block Liner			I						R
E49-1170	Rod End (Left Hand)			I				R		
E49-1190	M/R Blade Pitch Link			I				R		
E00-9300	Set Screws 1/4 x 1/4			I				R		
E00-9301	Set Screws 1/4 x 5/8			I				R		
E00-9305	Set Screws 1/4 x 3/16			I				R		
E49-6310	Pitch Pin (Outboard)			R						
E49-6320	Pitch Pin (Inboard)			R						
E00-2417	NAS-428-4-20 (1/4 x 2) Bolt, Full Thread			I				R		
E00-2523	AN5-32A (5/16 x 3-1/4) Bolt			I				R		
E49-7000	Main Shaft			I				R		
E49-5140	Grease Fitting	I								R
E49-1331	Dust Cap			I				R		
E49-3610	Non-Rotating Swash Plate			I				R		
E49-3520	Swash Plate Bearing			I				R		
E49-3541	Snap Ring, Non-Rotating Swash Plate			I				R		
E49-3510	Rotating Swash Plate			I				R		
E49-3230	Slider Ball Adjustment Collar			I				R		
E49-4010	Cyclic Cable Mount			I				R		

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 19: ROTOR HUB CONTINUED

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E49-4100	Cyclic Mount Bearing			I						R
E49-4110	Snap Ring, Cyclic Mount			I						R
E49-3531	Snap Ring, Rotating Swash Plate			I						R
E49-3210	Collective Slider Ball			I				R		
E49-3220	Spherical Bushing			I				R		
E49-1530	Slider Ball Clamp		I							R
E49-1520	Slider Ball O-ring			I				R		
E49-3240	Snap Ring Slider Ball			I				R		
E00-9302	Set Screw (10-32)			I						R
E49-4610	Swash Plate Scissor			I						R
E49-4710	Scissor Clevis			I						R
E49-4720	Male Rod End 5/16 x 3/8			I				R		
E49-4810	Nylon Scissor Bushing			I				R		
E49-4210	Collective Actuator Fork			I						R
E49-4310	Collective Scissor			I						R
E49-1380	Collective Scissor Mount			I						R
E14-6120	Control "T"			I						R
E14-1150	5/16 Male Rod End			I				R		
E49-4510	Counter Balance			I						R
E15-1230	5/16 Male Rod End			I				R		
E49-1410	Rod End Spacer			I						
E49-1470	Spring Bracket			I						
E49-1430	Tension Spring			I						R
E49-4800	Delrin Washer (Scissor)			I				R		
E49-4830	Scissor Spacer 1-1/2"			I						R
E49-1180	Male Rod End 5/16"			I				R		
E49-1510	Dust Boot			I				R		
E49-1500	Rubber Shaft Protector			I						R
E49-1220	Main Thrust Bearing			I				R		
E49-1230	Main Bearing Flange			I				R		
E49-1260	Main Shaft Safety Spacer			I				R		
E49-1251	Lower Main Shaft Bearing (Bearing Only)			I			R			
E49-9100	Lower Main Shaft Bearing Weldment (Flange Only)			I				R		

I INSPECT
R REPLACE

HOURLY SERVICE CHART EXEC 162F
REFERENCE SECTION 20: DOORS

PART NO.	DESCRIPTION	25	50	100	200	250	500	1000	1500	2000
E41-7120	Door (Pilot)			I						
E41-7130	Door (Passenger)			I						
E41-7140	Door Stiffener			I						
E41-7150	Door Stiffener			I						
E41-3110	Door Hinge			I						
E41-3120	Body Hinge			I						
E00-2300	AN3-4A (3/16 x 1/2) Bolt			I						
E00-2302	AN507-1032R10 (3/16 x 5/8) Countersunk Screw			I						
E00-2304	AN3-7A (3/16 x 7/8) Bolt			I						
E54-4050	Vents			I						

I INSPECT
R REPLACE

Section 24: Grease Requirements

Using the correct type of grease is essential to proper performance. The recommended grease to be used on the Exec 162F helicopter is Mystik JT-6 Multi-Purpose Hi-Temp Grease. Mystik JT-6 is a product of Cato Oil and Grease Company.

If flight operating conditions are regularly BELOW 0° F, use Ronex MP, an Exxon product. This grease is only recommended for continuous low temperature operations. Do not use Ronex MP if ambient air temperatures above 80° F are regularly encountered.

One “shot” of grease equals one full stroke from a standard 14 oz. cartridge, lever action grease gun. The approximate shot dimension is .25 inch diameter by 1.5 inches long.

To facilitate maintenance, some parts of the helicopter are equipped with grease fittings, listed below. Please consult the service reference for specific instructions on adding grease to these components.

GREASE SCHEDULE					
PART NO.	DESCRIPTION	SHOTS	GREASE INTERVAL	PAGE NUMBER	SERVICE REFERENCE
A24-1611	Main Drive Pulley	3	25 HR	Engine Manual p. 9	
E17-6100	Tail Rotor Barrel	*	50 HR	Maint. Manual p. 16	5-4
E17-6126	Tail Rotor Carriage Slider Ass'y.	1	25 HR	Maint. Manual p. 16	5-5
E23-5001	Secondary Upper Bearing Housing	1	50 HR	Maint. Manual p. 28	10-2A
E20-1220	Aligner Block Bearings	*	100 HR	Maint. Manual p. 36	13-6
E49-5100	Teeter Blocks	4	25 HR	Maint. Manual p. 48	19-2
E49-3210	Slider Ball	2	100 HR	Maint. Manual p. 50	19-13

* Add grease until it comes out around the bearings, then wipe off excess.