SECTION 1

GENERAL

SECTION 1

GENERAL

1.000 INTRODUCTION

This manual contains reference material necessary for the proper servicing, maintenance, and handling of the R44-series helicopter. This manual is to be used in conjunction with the R44 and R44 II Pilot's Operating Handbooks (POH), R44 Illustrated Parts Catalog (IPC), R44 Service Bulletins, R44 Service Letters, Lycoming O-540/ IO-540 Operator's Manuals and engine maintenance publications, and applicable technical data supplied by component manufacturers.

As necessary, Service Bulletins are issued by Robinson Helicopter Company (RHC), Lycoming, and component manufacturers. Service Bulletin compliance is mandatory. Recent R44 Service Bulletins (SB) and Service Letters (SL) are available on the internet at www.robinsonheli.com. Recent Lycoming Service Bulletins are available at www.lycoming.textron.com and recent Teledyne Continental Motors (TCM) ignition systems Service Bulletins are available at www.tcmlink.com.

Always read instructions completely before beginning a task.

1.001 Manual Notations

The following notations will be found throughout the manual:

WARNING

Personal injury or death can result if a WARNING is not followed.

CAUTION

Equipment damage can result if a **CAUTION** is not followed.

NOTE

A NOTE provides emphasis or supplementary explanation.

1.002 Manual Revisions

Before using this manual, be sure it includes all current revisions. A list of all applicable revisions is contained in Section 17.000. If a new manual is purchased, be sure to complete and mail the revision service application found in the front of the manual; this will insure that you receive revisions for a one-year period. A list of all current Robinson publication revisions can be accessed on the internet at www.robinsonheli.com.

1.003 Maintenance Authorization

Only appropriately certificated mechanics that have successfully completed a factory-sponsored maintenance course, or are under direct supervision of such mechanic, may perform maintenance, repairs, or inspections described in this manual. The daily preflight may be accomplished by the above-stated mechanics or pilot/owner after careful study of the appropriate sections of the Pilot's Operating Handbook. Some preventive maintenance may be performed by the pilot after receiving appropriate instructions in accordance with the Pilot's Operating Handbook and applicable Federal Aviation Regulations.

1.004 Overhaul Authorization

Only appropriately certificated mechanics that have completed special RHC factory courses for overhauling specific components and possess special tools and technical data supplied by RHC are authorized to disassemble and overhaul or repair major components as required by Section 3.

1.005 Customer Support

Telephone: (310) 539-0508 - Main Switchboard
Fax: (310) 539-5198

Technical Support:

E-mail: customerservice@robinsonheli.com
Extension: 212 Pat Cox, ts1@robinsonheli.com
214 Daniel Huesca (habla español), ts2@robinsonheli.com
208 Chris Sennett, ts3@robinsonheli.com

Include the following information when contacting Technical Support:

Helicopter model
Helicopter serial number
Helicopter total time (TT)
Helicopter time since overhaul (TSOH)
Component name
Component part number
Component time since repair or since overhaul

Parts Ordering:

E-mail: spares@robinsonheli.com - parts and accessory ordering
Extension: 211 Cathy Obando (habla español), cs2@robinsonheli.com
216 Lea Bass, cs3@robinsonheli.com
222 Jackie Gasparo, cs4@robinsonheli.com
207 Jeanne Shaw, cs5@robinsonheli.com
245 Sandra Aure, cs6@robinsonheli.com
204 Sandy Nuñez, cs7@robinsonheli.com

Returned Parts:

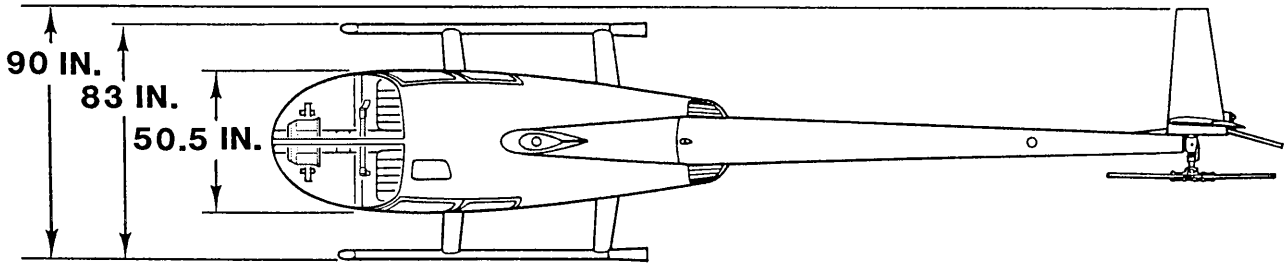
All parts returned to Robinson Helicopter Company must have an attached Component Return Authorization form (RSF 205) to avoid delays in processing. A copy of the form is included in the front of this manual. Return parts to:

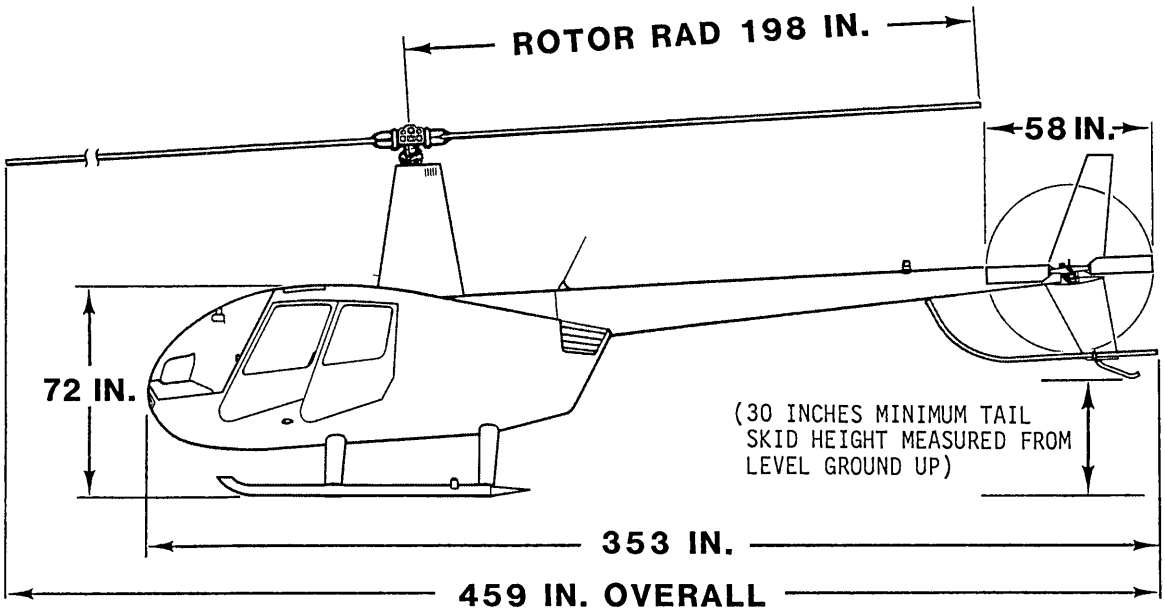
Attn: Repair Station
Robinson Helicopter Company
2901 Airport Drive
Torrance, California 90505-6115
UNITED STATES

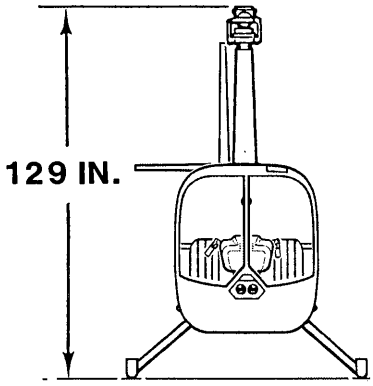
Subscriptions and Factory Maintenance Training Courses:

E-mail: ad1@robinsonheli.com
Extension: 209 Mallory Kohler

1.006 EXTERNAL DIMENSIONS





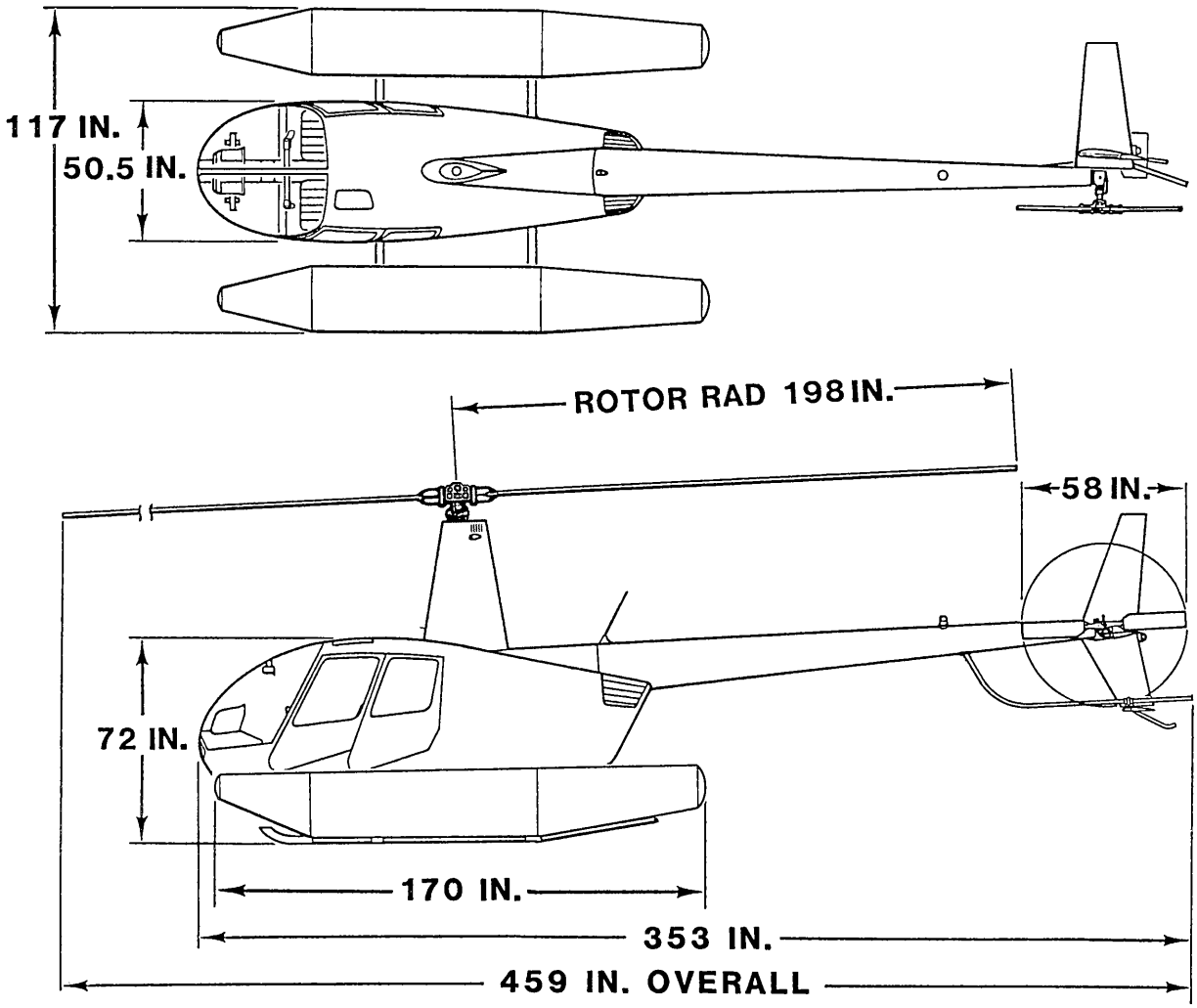


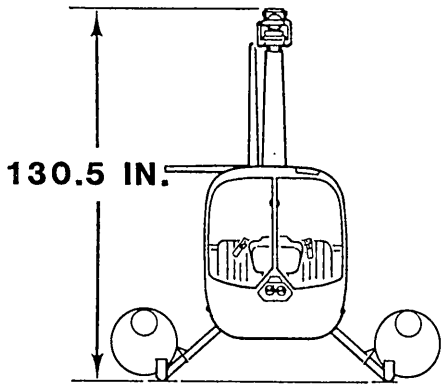
(129 IN. STANDARD LANDING GEAR.
130.5 IN. FLOAT OR HIGH (EXTENDED) LANDING GEAR)

R44 & R44 II

EXTERNAL DIMENSIONS

1.006 EXTERNAL DIMENSIONS (CONT'D)





R44 Clipper

&

R44 Clipper II

(shown with fixed utility floats)

EXTERNAL DIMENSIONS

1.007 Version Description (also see Type Certificate Data Sheet in Section 3)

R44, "Astro": 4-digit serial numbers 0002, 0004 thru 0760. Textron Lycoming O-540-F1B5 engine derated to 205 horsepower maximum horsepower; 225 horsepower 5-minute takeoff rating. Manual controls (electric automatic trim and ground-adjustable collective trim). Gross weight 2400 pounds. 14-volt electrical system standard; 28-volt optional. Optional hydraulic cyclic & collective controls.

R44 "Clipper", "Clipper I": Based on "Astro". Fixed or pop-out float landing gear. Additional corrosion protection. Auxiliary horizontal stabilizer installed at base of lower vertical stabilizer. Drain valves installed in chin. Additional navigation lights atop mast fairing on fixed float versions. Marine radio package optional. Optional hydraulic cyclic & collective controls.

R44, "Raven", "Raven I" Hydraulic cyclic & collective controls standard. Adjustable pilot-side pedals. Serial number 0761 and higher.

WARNING

R44 II (fuel injected) helicopters require two A205-7 forks, A600-6 manifold pressure gage, two C005-8 main rotor blade & spindle assemblies (two C016-5 main rotor blades & two C157-2 pitch horns), C006-5 main rotor gearbox, C008-4 tail rotor assembly (two C029-2 tail rotor blades), two C016-5 main rotor blades, C017-4 swashplate, three C121-31 push-pull tubes, two C203-5 yokes, C204-2 arm (stainless steel, lower), C204-3 arm (stainless steel, upper), C792-4 dual tachometer, D201-5 support weldment (forward hydraulic servos), and D204-8 support weldment (aft hydraulic servo).

R44 II, "Raven II": 5-digit serial numbers 10001& later. Longer chord main rotor blades. Textron Lycoming IO-540-AE1A5 fuel-injected engine derated to 205 horsepower maximum continuous power; 245 horsepower 5-minute takeoff rating. Gross weight 2500 pounds. 28-volt electrical system. Solid-state magneto start booster. Second oil cooler. Rounded tip main and tail rotor blades.

R44 II, "Clipper II": Similar to R44 "Clipper", but based on "Raven II"

Instrument Trainer: R44 or R44 II configuration with 10-hole instrument panel. VMC operations only.

E.N.G. (Electronic News Gathering): R44 or R44 II configuration. 28-volt electrical system. Nose-mounted gyro-stabilized camera with tailcone-mounted battery. Standard microwave capability.

Police: R44 or R44 II configuration. 28-volt electrical system. Includes searchlight, police radio package, and nose-mounted gyro-stabilized infrared-capable camera with tailcone-mounted battery. Optional microwave capability.

1.100 HELICOPTER SERVICING

1.101 Scheduled Maintenance and Inspections

Some helicopters require further maintenance and inspections in addition to the following minimum requirements for new helicopters. Consult aircraft maintenance records, Service Bulletins (SB), aviation regulations, Airworthiness Limitations, and Airworthiness Directives (AD) for specific applicability. Publications listed are subject to revision.

Flight Time

First 29 hours:	Change oil and filter and inspect oil suction screen and filter per Lycoming SB480E. Check alternator belt tension per Lycoming Service Instruction (SI)1129B.
Every 50 hours:	Inspect and service engine per Lycoming Operator's Manual, SI1080C, and (as required) AD 2008-06-51. Change oil, oil filter, and inspect oil suction screen and removed filter per Lycoming SB480E.
First 100-hour Inspection:	Drain and flush gearboxes per Sections 1.120 & 1.130. Check engine exhaust valve guide clearance per Lycoming SB388C.
Every 100 hours:	Inspect per Section 2.400. Inspect and service engine per Lycoming Operator's Manual, SB366, SI1080B, SI1129B, and SB342E (IO-540 only). As required, inspect and service TCM ignition components per TCM SB643B.
Every 300 hours:	Lubricate C181-3 bearing per Section 1.140. Replace hydraulic filter per Section 1.170. Inspect valves and check engine exhaust valve guide clearance per Lycoming SB301B, SB388C, and Operator's Manual.
Every 500 hours:	Drain and flush gearboxes per Sections 1.120 & 1.130. Clean gearbox chip detectors per Section 1.115. Verify magneto drive cushion pliability. Service collective spring assembly (manual controls only) per Section 8.221. As required, inspect and service TCM ignition components per TCM SB658 and SB663A.
Every 2200 hours:	Overhaul helicopter per Section 2.700.

Calendar (in addition to preceding requirements)

Every 4 months:	Change oil, oil filter, and inspect oil suction screen and removed filter per Lycoming SB480E.
Every 12 months:	Inspect per Section 2.400. Clean gearbox chip detectors per Section 1.115. Inspect emergency locator transmitter (ELT) per 14 CFR Part 91.207. Inspect optional pop-out floats per Section 5.630.
Every 24 months:	Test and inspect transponder per 14 CFR Part 91.413.
Every 3 years:	Lubricate C181-3 bearing per Section 1.140. Inspect optional pop-out floats per Section 5.640. Hydrostatic test pressure cylinder.
Every 4 years:	Overhaul TCM magnetos per TCM SB643B. Verify magneto drive cushion pliability.
Every 12 years:	Perform 12-year inspection and limited overhaul per Section 2.600, or overhaul per Section 2.700.

1.105 Calibration of Tools

The dimensions and tolerances given in this maintenance manual are critical. RHC recommends measuring tools be calibrated at least once a year. This includes torque wrenches, micrometers, calipers, dial indicators, spring scales, protractors and balancing equipment.

WARNING

Proper torque is critical. Always use calibrated wrenches and undamaged, properly lubricated (where applicable) hardware. Ensure all clamping surfaces are clean, and clamp only bare metal or wet-primed surfaces. Improper torque or dirty or painted clamping surfaces may result in loss of clamp-up, hardware or part damage, and premature failure.

1.110 Lubrication - General

Most bearings in the R44 are sealed or self-lubricated and do not require periodic lubrication; bearings with specific lubrication intervals are noted in Section 1.101. Engine lubrication requirements are contained in the Pilot's Operating Handbook, Lycoming Operator's Manual and Lycoming Service Instruction No. 1014 (current revision). Main and tail rotor gearboxes require additional oil when indicated by sight plug reading.

WARNING

The only approved lubricant for use in the main rotor and tail rotor gearboxes is Robinson A257-2 lubricant.

When a new or overhauled gearbox is installed, it must be drained and flushed after the first 4 hours of flight or first chip light, whichever occurs first, and again at the next 100-hour inspection after installation. Thereafter, drain and flush gearboxes at intervals per Section 1.101. Additionally, change gearbox oil and clean sight plug glass whenever oil becomes so dirty that its level cannot be determined.

1.115 Chip Detector Cleaning

During normal gearbox operation, an insulating film of varnish can accumulate on a chip detector's magnetic probe and prevent gearbox chip warning light illumination. Clean chip detector by:

1. Remove and discard safety wire (if applicable) securing chip detector. Disconnect chip detector wiring at quick-disconnect located several inches from chip detector. For tail rotor gearbox, place container beneath to catch oil. Remove chip detector from gearbox.

2. Clean and scrub chip detector with a toothbrush and cleaning solvent, followed by drying with compressed air or a lint-free cloth.

3. Check chip detector circuit function by connecting chip detector electrical wiring, turning MASTER switch on, and grounding detector's central magnetic probe to airframe. Verify appropriate gearbox chip warning light illuminates. Turn MASTER switch off.

4. Install chip detector. Torque threaded-type chip detector per Section 1.330 and safety wire. Ty-rap chip detector electrical wiring as required.

5. Turn on MASTER switch. Check chip detector circuit function by grounding detector's center terminal and verifying appropriate gearbox chip warning light illuminates. Turn MASTER switch off.

1.120 Main Rotor Gearbox Drain And Flush

To drain and flush main rotor gearbox:

1. Ground run helicopter two to five minutes at 60-70% RPM to warm main rotor gearbox oil.

2. Disconnect chip detector wiring at quick-disconnect located approximately 10 inches from chip detector. Cut safety wire securing chip detector to main rotor gearbox sump attach bolt (not applicable to quick-release chip detectors).

3. Remove chip detector. Do not remove chip detector housing.

> NOTE
>
> After removing chip detector, check for oil leaking from chip detector housing. Leakage indicates housing is defective and must be replaced. If leakage occurs, immediately install main rotor gearbox drain assembly to minimize oil spillage.

1.120 Main Rotor Gearbox Drain and Flush (cont'd)

4. Drain oil by installing main rotor gearbox drain assembly in chip detector housing with drain hose overboard into a suitable container. Slide wedge under drain assembly to open valve (see Figure 1-2).

5. Remove drain assembly. Remove and discard safety wire securing gearbox filler plug. Remove plug.

6. Fill gearbox with SAE30, SAE40, SAE50, or SAE20W50 straight mineral engine oil to level indicated by decal adjacent to sight gage.

7. Install filler plug, tighten, but do not safety wire.

8. Ground run helicopter for approximately five minutes at 60-70% RPM.

9. After shutting down helicopter, drain gearbox using drain assembly.

10. Remove drain assembly. Remove and discard safety wire on chip detector housing. Remove chip detector housing and immediately place a small container under gearbox to catch any residual oil.

11. Clean chip detector with a toothbrush and cleaning solvent per Section 1.115. Compressed air or masking tape may also be used to remove debris but scrubbing with solvent is mandatory to remove any varnish accumulation. Do not use a magnet to remove debris. Clean and visually inspect chip detector housing.

12. Verify chip detector function by connecting electrical leads, turning Master switch on, and touching detector's central magnetic probe to horizontal firewall. MR CHIP warning light should illuminate. Disconnect electrical wires.

13. Install chip detector housing into main rotor gearbox. Torque per Section 1.330, and safety wire.

14. Install chip detector into chip detector housing. Torque threaded-type chip detector per Section 1.330 and safety wire. Connect chip detector electrical wires and ty-rap.

15. As required, remove sight gage and clean with solvent. Reinstall sight gage, torque per Section 1.330, and safety wire.

16. Remove filler plug. Fill gearbox with Robinson A257-2 lubricant to level indicated on decal. Rotate rotor system by hand several revolutions and pull down tailcone several times. Recheck gearbox oil level. Adjust as necessary.

17. Torque filler plug per Section 1.330 (safety wire not required).

1.120 Main Rotor Gearbox Drain and Flush (cont'd)

18. Turn on MASTER switch. Check chip detector operation by grounding detector's center terminal and verifying MR CHIP warning light illuminates. Turn off MASTER switch.

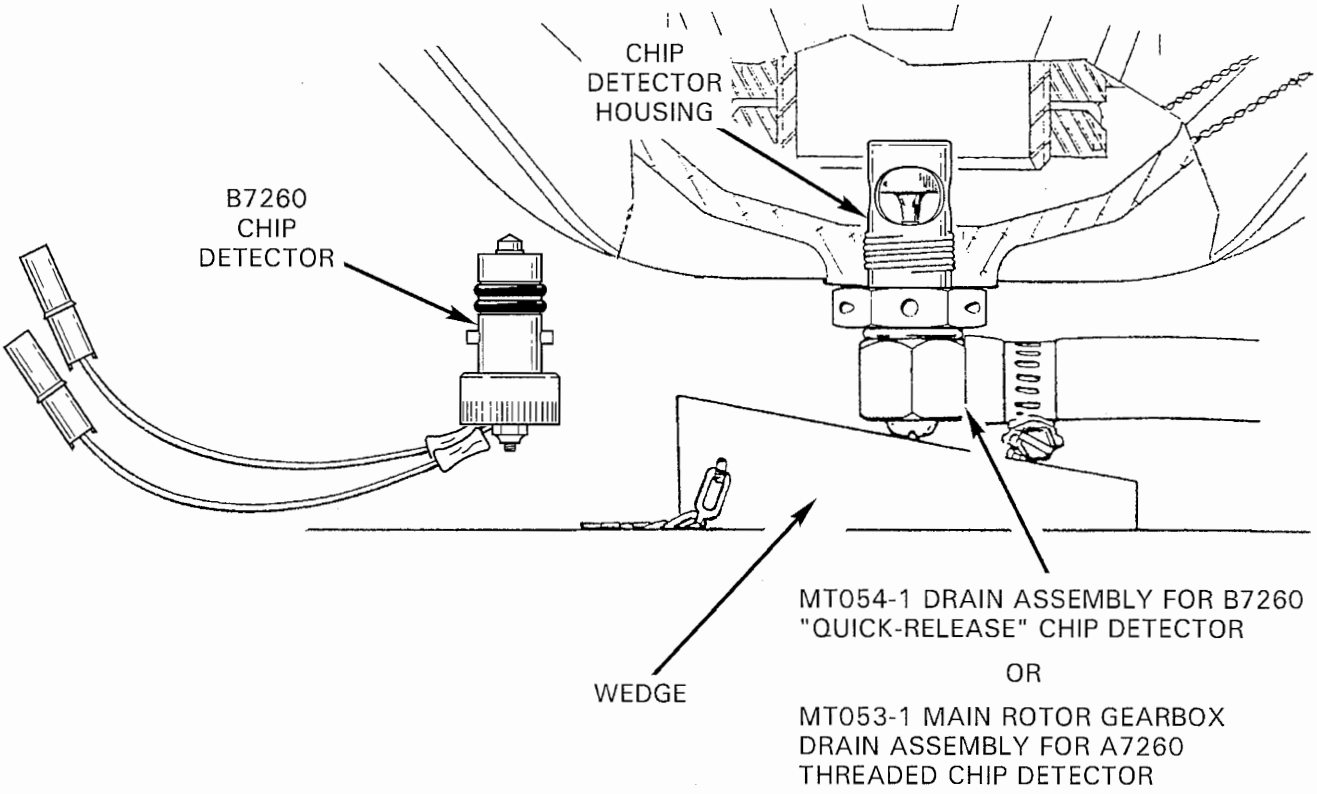


FIGURE 1-2 DRAINING MAIN ROTOR GEARBOX

1.130 Tail Rotor Gearbox Drain and Flush

1. Ground run helicopter for approximately five minutes at 60-70% RPM to warm tail rotor gearbox oil.
2. Disconnect chip detector wiring at quick-disconnect located approximately 11 inches from chip detector.
3. Remove and discard safety wire securing chip detector to sight gage.
4. Place a container under tail rotor gearbox to catch oil and remove chip detector.
5. Remove and discard safety wire securing filler-vent plug to sight gage. Remove filler-vent plug.
6. Install chip detector, torque per Section 1.330, but do not safety wire. Add approximately five ounces of SAE30, SAE40, SAE50, or SAE20W50 straight mineral engine oil.
7. Install filler plug, tighten, but do not safety wire.
8. Ground run helicopter at 60-70% RPM for approximately five minutes.
9. After shutting down helicopter, remove chip detector and drain mineral oil.
10. Clean and scrub chip detector with a toothbrush and cleaning solvent. Compressed air or masking tape may also be used to remove debris but scrubbing with solvent is mandatory to remove varnish accumulation. Do not use a magnet to remove debris.
11. Connect chip detector wiring. Turn on Master switch. Check chip detector operation by grounding detector's center terminal; TR CHIP warning light should illuminate. Turn off Master switch and disconnect chip detector wiring.
12. Install chip detector, torque per Section 1.330, and safety wire. Connect chip detector wiring and secure with Ty-raps® as required.
13. As required, remove sight gage and clean with solvent. Reinstall sight gage, torque per Section 1.330, and safety wire.

> **CAUTION**
>
> Tail rotor gearbox sight plug glass must indicate correct oil level when aircraft is on level ground.

14. Fill gearbox with Robinson A257-2 lubricant to level indicated by sight glass decal. Install filler-vent plug, torque per Section 1.330, and safety wire.
15. Turn on Master switch. Check chip detector operation. Turn off Master switch.

1.140 Clutch Actuator Lower Bearing Lubrication

NOTE

Syringe suitable for the following procedure is included in kit KI-115, available from RHC Customer Service.

1. Fill syringe with 4-5 grams of A257-12 grease (commercially available, see Section 1.470). Note: 5 grams of grease fills a 1.0 inch (25 mm) long space inside a syringe body with a 0.63 inch (16 mm) inner diameter.

2. Remove screw from left side of C181-3 bearing housing. Screw may be covered by Telatemp; remove Telatemp as required to access screw. It is not necessary to replace Telatemp. Note: aft cowling may be removed to ease bearing access.

3. Using syringe, inject grease through screw hole.

4. Install B289-3 self-sealing cross-head screw, or thoroughly clean set screw and screw hole threads and then install set screw using B270-20 sealant, wet epoxy primer, or wet zinc-chromate primer on threads. Tighten set screw only until screw is flush with bearing housing.

CAUTION

Set screw hole is through to bearing housing cavity. Tightening set screw further than flush-with-housing can result in set screw contacting and damaging internal bearing assembly components.

5. Ground run helicopter at 102% RPM for two minutes, shut down, inspect bearing, and clean off any escaped grease.

6. Install aft cowling, if removed.

1.150 Defueling

WARNING

Defueling must be done in a well-ventilated area. No smoking within 100 feet of helicopter during defueling.

NOTE

Low-fuel sender check (see Section 12.270) may be performed when defueling helicopter.

1. Turn fuel valve off and disconnect flexible fuel line at carburetor.

2. Place end of fuel line in a suitable container. Ground container to helicopter and turn fuel valve on.

3. Turn fuel valve off when the container is full and repeat as necessary to complete draining.

4. Attach fuel line to carburetor, torque per Section 1.330, and torque stripe.

1.160 Storage

For long-term (greater than 30 days) storage:

1. Defuel aircraft per Section 1.150.
2. Clean aircraft per Section 8 of R44 Pilot's Operating Handbook.
3. Paint or wax bare metal areas of main and tail rotor blades.
4. Apply suitable non-drying corrosion preventative compound to C166 clutch shaft adjacent to seals (where shaft enters and exits upper sheave).
5. Preserve engine in accordance with Lycoming Service Letter L180 (current revision).
6. Remove battery and periodically check and adjust, as required, battery charge status. Check fluid level and specific gravity of non-sealed batteries.
7. Store aircraft in a protected, dry (dehumidified) environment.
8. Periodically inspect aircraft for corrosion and correct as required.

1.170 Hydraulic Reservoir Filter Replacement

CAUTION

Cleanliness of hydraulic fluid is vital to proper system operation. Use only clean fluid from sealed containers and avoid contamination from dirty funnels, tubing, etc.

1. Remove and discard safety wire from filter cap. Remove filter cap from bottom of hydraulic reservoir.
2. Remove filter and examine. If debris is found, use a magnet to determine if ferrous or non-ferrous.

NOTE

Ferrous debris may indicate pump damage. Replace filter again after one flight hour. If more ferrous debris is found, replace hydraulic pump per Section 8 and flush hydraulic system per Section 1.180.

3. Clean filter cap and replace O-ring packing. Lubricate new O-ring with A257-15 fluid (see Section 1.470).
4. Lubricate O-ring in new filter with A257-15 fluid and install filter in reservoir. Install filter cap, torque per Section 1.330, and safety wire.
5. Adjust reservoir fluid level as required. Install filler-vent and torque per Section 1.330. Safety wiring filler-vent is not required.

1.180 Draining and Flushing Hydraulic System (see Figure 8-1A)

CAUTION

Cleanliness of hydraulic fluid is vital to proper system operation. Use only clean fluid from sealed containers and avoid contamination from dirty funnels, tubing, etc.

NOTE

Drain and flush hydraulic system if oil turns dark, or emits bad odor.

1. Remove reservoir filler-vent.

2. Place a one-liter container for contaminated fluid beneath D500-1 hydraulic pump at main rotor gearbox. Remove caps from pump suction and pressure T-fittings. Allow fluid in reservoir to drain through suction line into container. Pour small amount of clean A257-15 fluid (see Section 1.470) into reservoir to purge suction line. Pressure line will drain in following step when filter cap is removed.

3. Replace hydraulic reservoir filter per Section 1.170.

4. See Figure 1-2A. Connect MT384 (or similar) 0.8-1.2 gpm hydraulic test pump to T-fittings on D500-1 pump. Fittings are different sizes to ensure correct connection.

5. Dispose of drained, contaminated hydraulic fluid. Fill reservoir with A257-15 fluid.

6. Disconnect servo return line at reservoir forward elbow and place end in empty container for contaminated hydraulic fluid. Cap elbow on reservoir assembly (use cap from pump T-fitting).

7. Activate hydraulic test pump and inspect hydraulic system for leakage.

8. Simultaneously fully raise collective and move cyclic fully forward. Then simultaneously fully lower collective and move cyclic fully aft. Monitor reservoir fluid level and fill as required. Repeat procedure until return line fluid into container is clean.

WARNING

Stay clear of moving flight controls. Hydraulic forces can cause injury.

9. Simultaneously fully raise collective and move cyclic fully aft then simultaneously fully lower collective and move cyclic fully forward. Monitor reservoir fluid level and fill as required. Repeat procedure until return line fluid into container is clean.

10. Connect servo return line to reservoir forward elbow. Torque B-nut per Section 1.330 and torque stripe.

11. Bleed hydraulic system per Section 1.190.

12. Remove and inspect filter. If debris is found, repeat drain and flush procedure. If filter is clean, reinstall per Section 1.170, steps 4 & 5.

1.190 Bleeding Hydraulic System (see Figure 1-2A)

1. Disconnect cap on D500-1 hydraulic pump pressure (aft) T-fitting and connect pressure line from MT384 hydraulic test pump (or similar 0.8-1.2 gpm unit). Pressure and suction fittings are different sizes to assure correct connection.

2. Remove reservoir filler-vent and cover hole with finger to prevent fluid loss. Disconnect cap on hydraulic pump suction (forward) T-fitting and connect hydraulic test pump suction line. Fill reservoir as required.

3. Activate hydraulic test pump and inspect for leakage.

4. Simultaneously fully raise collective and move cyclic fully forward then simultaneously fully lower collective and move cyclic fully aft. Repeat procedure ten times.

WARNING

Stay clear of moving flight controls. Hydraulic forces can cause injury.

5. Simultaneously fully raise collective and move cyclic fully aft then simultaneously fully lower collective and move cyclic fully forward. Repeat procedure ten times.

6. Shut off hydraulic test pump. Verify no leaks in hydraulic system.

7. Cover reservoir filler-vent hole with finger to prevent fluid loss. Disconnect hydraulic test pump suction line from D500-1 pump forward T-fitting and install cap. Torque cap per Section 1.330 and torque stripe.

8. Disconnect hydraulic test pump pressure line from D500-1 pump aft T-fitting and install cap. Torque cap per Section 1.330 and torque stripe.

9. Adjust reservoir fluid level as required. Install filler-vent and torque per Section 1.330. Safety wire is not required.

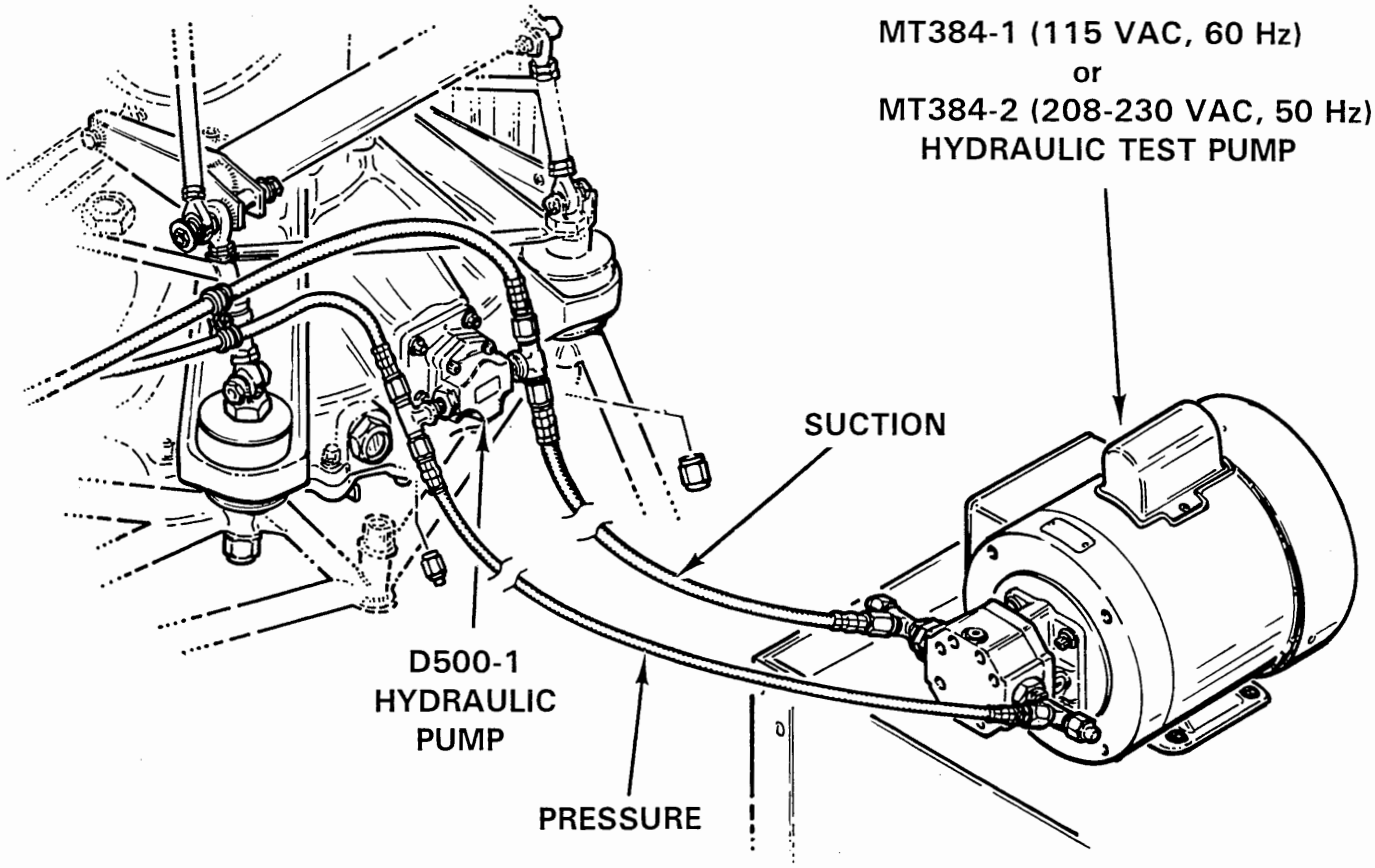


FIGURE 1-2A

MT384 HYDRAULIC TEST PUMP CONNECTION

1.200 HANDLING, JACKING, HOISTING, LEVELING, AND WEIGHING

1.210 Ground Handling

1.211 Ground Handling Wheels Installation

a) Extend the handle by depressing the handle locking pin and sliding the handle out until the pin snaps into the outer hole. Hold handle and wheel with the protruding spindle in its lowest position. Insert spindle into support mounted on skid (see Figure 1-3).

NOTE

If helicopter has not settled on its skids completely, the spindles may not go in all the way. In this case, pull down on the tail cone to spread the gear enough to allow installation.

b) Make sure that the protruding spindle is all the way in with the widened end completely past the inside of the support (see Figure 1-3A).

c) Pull handle over center to raise helicopter and lock wheel in position (see Figure 1-4).

CAUTION

When lowering the helicopter, the handle has a tendency to snap over.

NOTE

70 psi maximum tire inflation pressure.

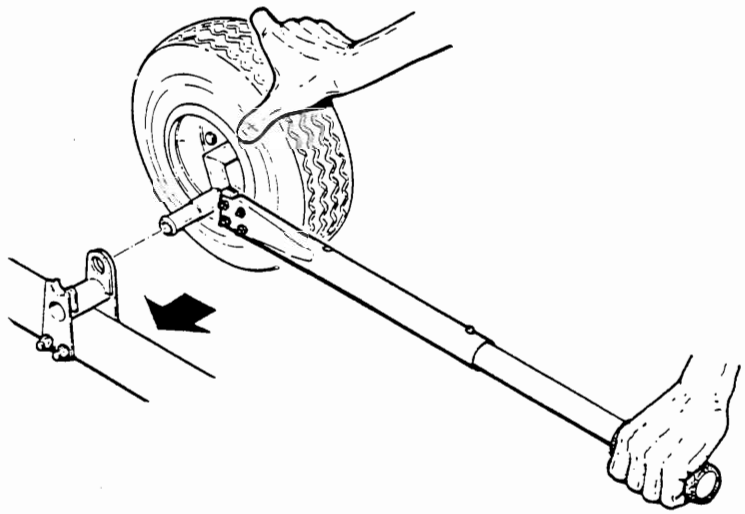


FIGURE 1-3

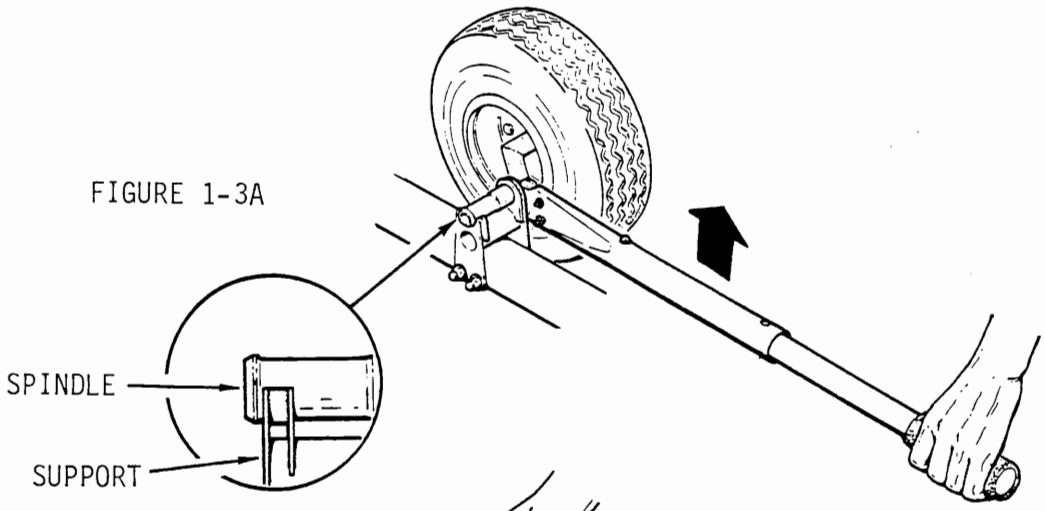


FIGURE 1-3A

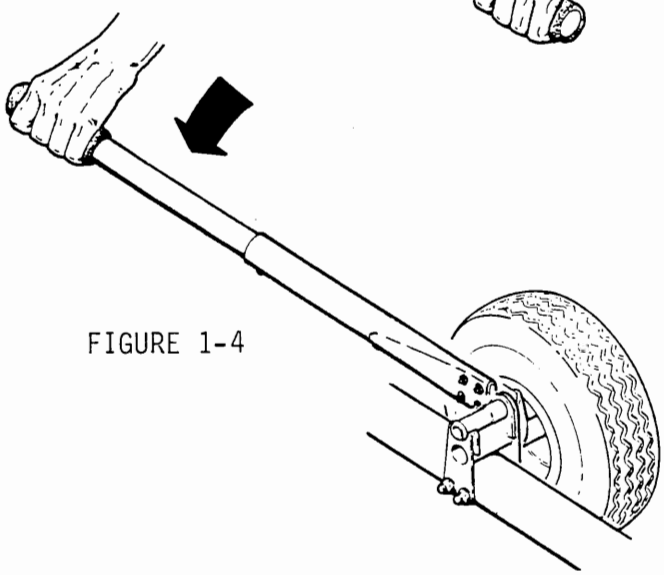


FIGURE 1-4

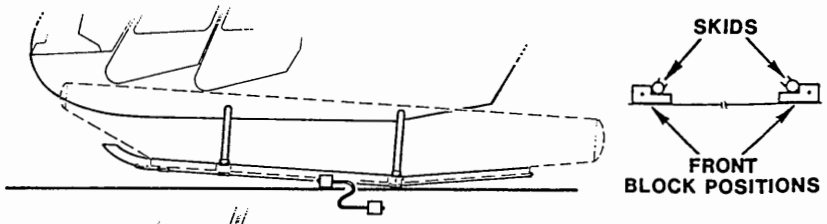
1.210 Ground Handling (cont'd)

1.212 Ground Handling Wheels - Float Ship Landing Gear

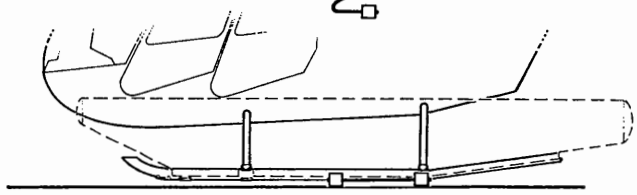
INSTALLATION:

Align aft blocks adjacent to mark on skid tube and position forward blocks to remove cord slack.

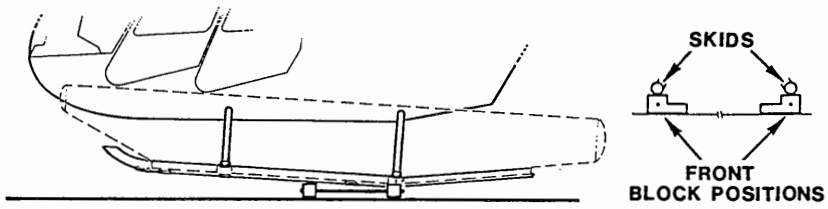
a) Pull tail down. Insert forward blocks at their lower height under both skids.



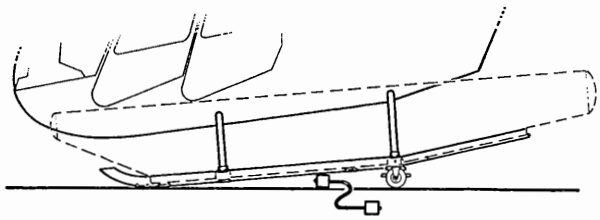
b) Push tail up. Insert rear blocks at their lower height under both skids at marks.



c) Pull tail down. Move forward blocks inward to their upper height under skid tubes.



d) Push tail up. Slide rear blocks out (upper height of rear blocks is not used) and insert wheels under skids at rear marks.



NOTE

Wheels may be placed a few inches forward to reduce force required to pull tail down.

e) Pull tail down and remove forward blocks.

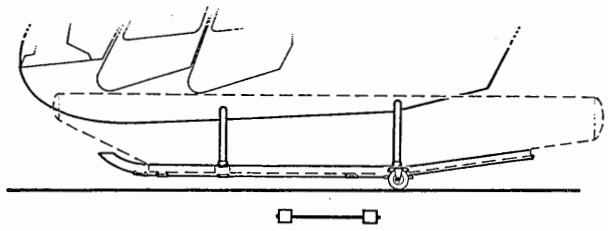
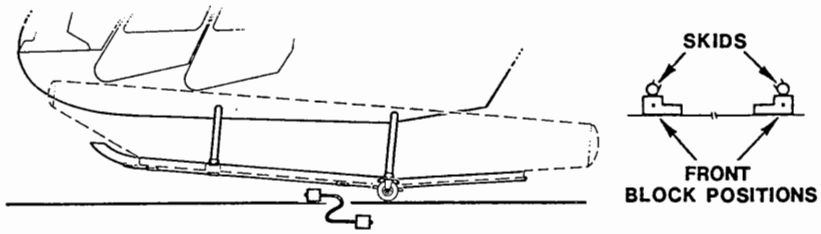


FIGURE 1-3B FLOAT SHIP GROUND HANDLING WHEELS INSTALLATION

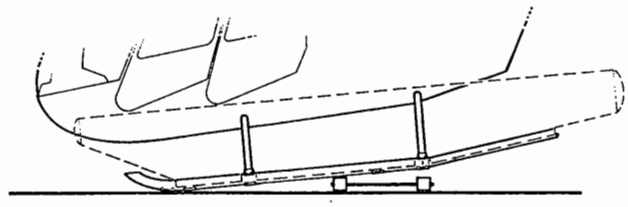
1.212 Ground Handling Wheels - Float Ship Landing Gear (cont'd)

REMOVAL:

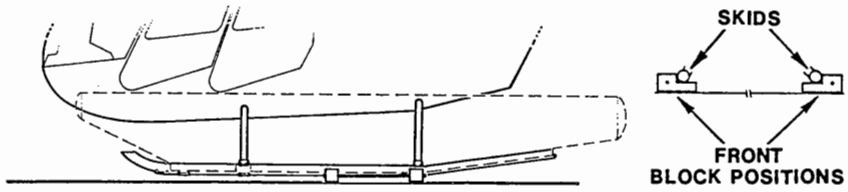
a) Pull tail down. Insert forward blocks at their upper height at forward marks under skids.



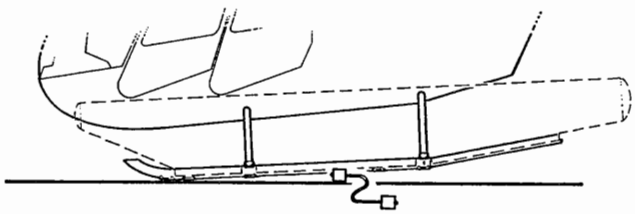
b) Push tail up. Remove wheels and insert rear blocks at their lower height (upper height on rear blocks is not used) at marks.



c) Pull tail down. Position forward blocks under skids at their lower height.



d) Push tail up. Remove rear blocks.



e) Pull tail down. Remove front blocks.

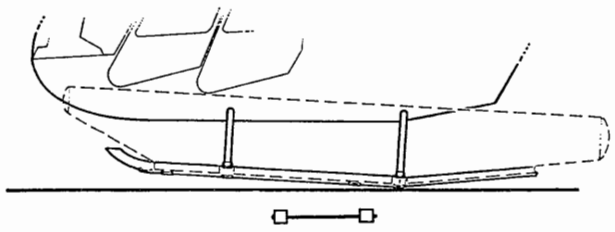


FIGURE 1-3C FLOAT SHIP GROUND WHEELS REMOVAL

1.213 Moving the Helicopter on Ground Handling Wheels

Moving the helicopter on ground handling wheels requires two people: one person to hold the tail down and steer by holding the tail rotor gearbox and another person to push on primary structure. The steel tube frame inside the aft cowl door may be used as a hand hold for pushing. Keep feet clear of skid tubes during ground handling.

CAUTION

Do not move helicopter by gripping tail rotor guard, outboard portion of horizontal stabilizer, tail rotor, or tail rotor controls.

1.214 Main Rotor Blade Tie-Downs

Install MT290-2 main rotor blade tie-downs as shown in Figure 1-5. Tie-down straps are installed by removing slack from lines to prevent blade movement.

CAUTION

Overtightening tie-down straps can damage main rotor blades.

1.215 Parking

Refer to Section 8 of the R44 Pilot's Operating Handbook for parking procedures.

1.216 Trailering

Trailering the R44 is not normally recommended. Most trailers large enough to accomodate the helicopter are designed for much heavier loads; the trailer's springs and shock absorbers will not function properly when lightly-loaded. If trailering is unavoidable the following precautions should be observed:

1. Load trailer with ballast until it is at the average weight it is designed to carry.

2. Support tailcone, taking care to prevent chafing or abrasion at the support point.

3. Remove main rotor blades. If not practical to remove, support the main rotor blades so they will not bear on droop stops. Locate supports about 5 feet in from blade tips. Supports must be cushioned to prevent blade damage.

4. Restrain tail rotor to prevent teetering.

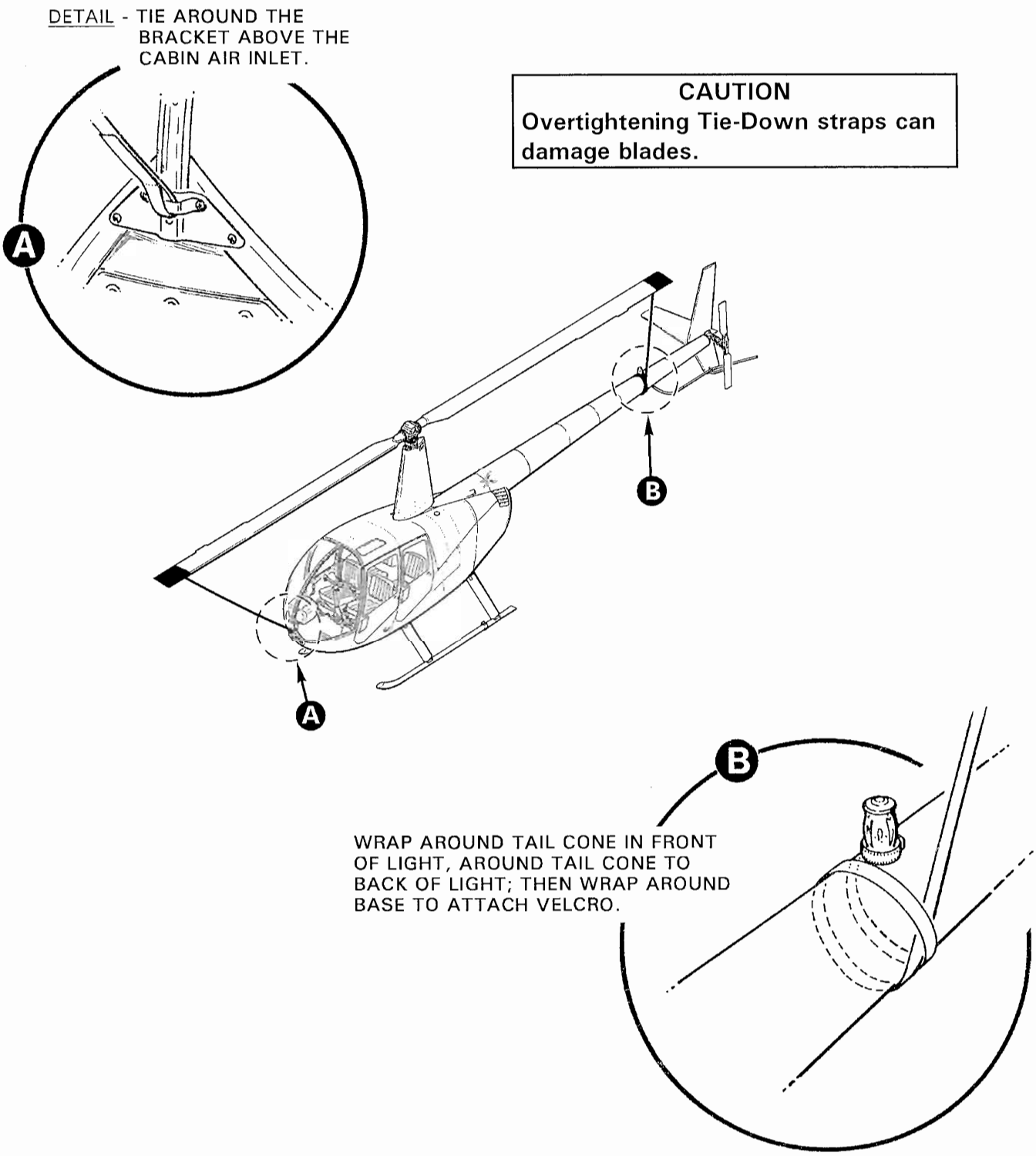


FIGURE 1-5 MAIN ROTOR BLADE TIE-DOWN INSTALLATION

1.216 Trailering (cont'd)

e) Protect helicopter's windshield, tail rotor and other vulnerable parts from highway debris damage.

f) After trailering, thoroughly inspect aircraft for possible damage, with particular attention to the steel tube structure and rotor systems.

1.220 Jacking, Hoisting and Leveling

1. Helicopter jacking is accomplished by placing a jack under each end of the aft cross tube 1 inch inboard of elbow fittings.

CAUTION
Care must be taken to prevent the helicopter from becoming dislodged from jacks.

2. Hoist helicopter using MT527-1 helicopter lifting fixture as shown in Figure 1-6A, or by passing one-inch diameter soft nylon rope through the lightening holes in main rotor hub and forming a double loop per Figure 1-6B. Rope must have a minimum tensile strength of 2,500 lb.

3. Level helicopter using either of the following methods:

   a. Leveling using tailcone and aft landing gear cross tube:

      1) Place a propeller protractor on top of forward bay of tailcone. When tailcone is 0.7 degrees nose down ship is leveled longitudinally.

      2) Level helicopter longitudinally by placing shims under landing gear skid tubes.

      3) Verify aft cross tube is not bent. Place a bubble level in center of aft cross tube.

      4) Level helicopter laterally by placing shims under landing gear skid tubes.

      5) Recheck longitudinal level per steps 1) and 2) above. Repeat steps 1) through 4) as required.

NOTE
Jacks may be used under aft cross-tube 1 inch inboard from elbows.

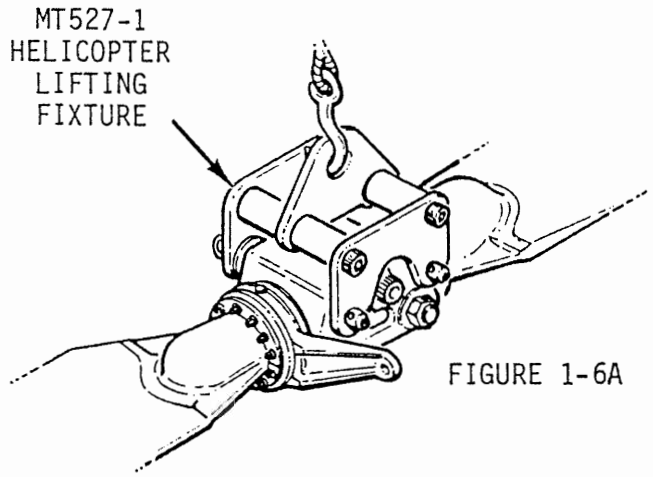


FIGURE 1-6A HELICOPTER HOISTING

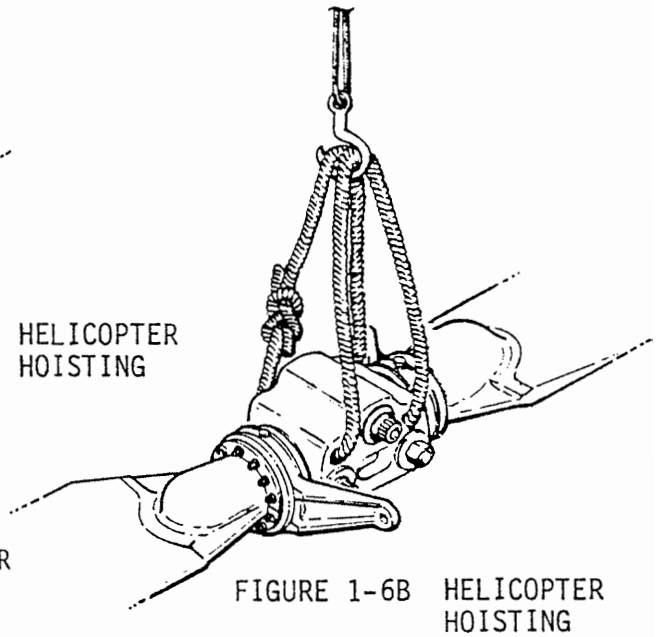


FIGURE 1-6B HELICOPTER HOISTING

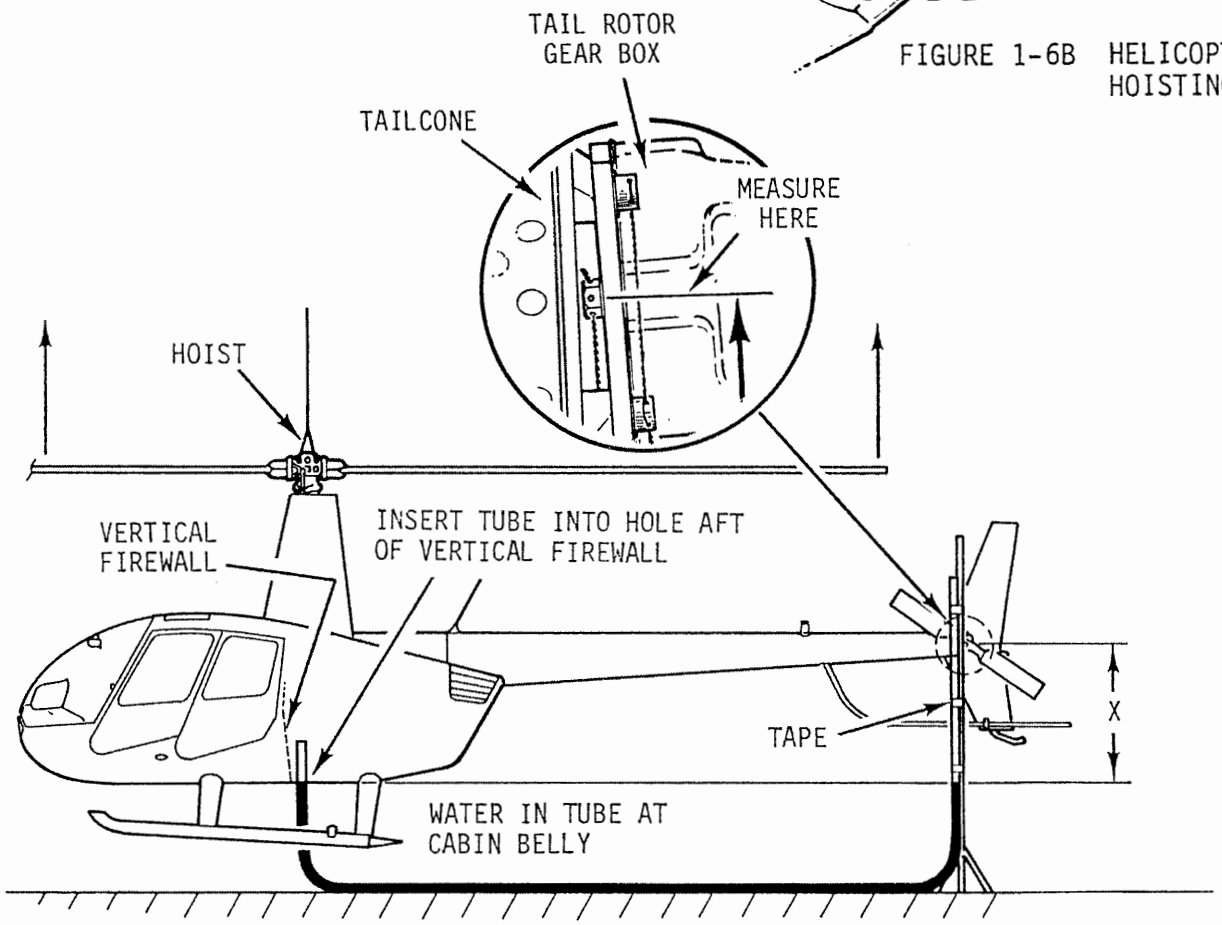


FIGURE 1-7

HELICOPTER C.G. DETERMINATION

1.220 Jacking, Hoisting, and Leveling (cont'd)

b. Leveling at the main rotor hub:

1. Rotate main rotor until teeter hinge bolt is aligned with longitudinal axis of helicopter. Place a bubble level at location marked "level here".

NOTE
Level must be on top of main rotor hub and parallel to teeter hinge bolt.

2. Level helicopter longitudinally by placing shims under landing gear skid tubes.

3. Rotate main rotor until teeter hinge bolt is aligned with lateral axis of helicopter.

4. Level helicopter laterally by placing shims under landing gear skid tubes.

NOTE
Jacks may be used under aft cross tube 1 inch from elbow.

5. Recheck longitudinal level per preceding steps. Repeat steps as required to level helicopter.

1.230 Weighing and C.G. Calculation

NOTE

The Equipment List/Weight and Balance Data form in the Pilot's Operating Handbook must be used to maintain a continuous record of the helicopter's weight and balance.

NOTE

Level must be on top of main rotor hub and parallel to teeter hinge bolt.

1.231 Helicopter Weighing Procedure

1. Drain all fuel, including gascolator and both fuel tank sumps.

2. Fill engine oil, hydraulic fluid (if applicable), and gearboxes to full marks.

3. Install and secure all doors.

4. Position main rotor blades fore/aft and approximately level and center cyclic stick.

5. Be sure all checked items on Equipment list/Weight and Balance Data form are installed in their proper locations. Correct form as required.

6. Be sure aircraft is clean and remove any foreign items such as charts, tools or rags.

7. Hoist aircraft per Section 1.220. Have one person hold tail of helicopter while it is being hoisted to stabilize aircraft.

8. With main rotor blades oriented approximately fore and aft, raise both blades off droop stops to allow hub to freely teeter.

9. With aircraft hanging freely and steadily, use a water level and measure difference in vertical height between centerline of tail rotor gearbox and cabin belly at vertical firewall. Refer to Figure 1-7.

   Record height difference to nearest tenth of inch: _____ inches (no ballast)

1.231 Helicopter Weighing Procedure (cont'd)

10. Determine uncorrected longitudinal center of gravity:

114.34 – [0.32 x (difference in height, from Step 9)] = _____ inches

11. Place a 1000-pound capacity scale under each skid. Locate center of scales approximately six inches forward of ground handling wheel mount centerline.

12. Lower aircraft until it rests entirely on scales. Aircraft must be well balanced on scales before releasing tail. Be sure aircraft is level laterally by placing level on center of aft landing gear cross tube.

13. Determine uncorrected empty weight:

Right Scale indication		_____ lb
plus Left Scale indication	+	_____ lb
minus Tare (such as lifting fixture, if installed)	–	_____ lb
Uncorrected Empty Weight	=	_____ lb

14. Determine CG with full fuel and 150 lb pilot:

$$\frac{[(\text{CG from Step 10}) \times (\text{empty weight from Step 13})] + 38840}{(\text{empty weight from Step 13}) + 451.2} = \_\_\_\_\_ \text{ inches}$$

15. If CG from Step 14 is greater than 102.5 inches, determine required nose ballast as follows:

$$\frac{[(\text{CG from Step 10} - 102.5) \times (\text{empty weight from Step 13})] - 7408}{95.5} = \_\_\_\_\_ \text{ lb}$$

Round ballast weight up to nearest 0.25 lb and install nose ballast per Section 1.240.

Record actual nose ballast installed: _____ lb

Repeat steps 7 thru 15 and revise measurements and calculations.

1.231 Helicopter Weighing Procedure (cont'd)

16. Adjust weight and balance to correct for drained unusable fuel:

ITEM	WEIGHT (lb)		CG (inches from datum)		MOMENT (in.-lb)
Ship as weighed	_____ (from Step 13)	X	_____ (from Step 10)	=	_____
Add unusable fuel	+7.2	X	96.0	=	+691
Helicopter basic empty weight and CG (includes unusable fuel and full oil)	_____	X	_____ *	=	_____

*CG location (arm) is determined by dividing total moment by total weight.

Datum is located 100 inches forward of main rotor centerline

CAUTION

Following any modification which moves empty CG aft, calculate weight and balance with 150 lb pilot and full fuel. If calculation shows CG aft of aft limit, fixed ballast must be installed in nose to comply with minimum solo pilot weight limitation in Section 2 of the Pilot's Operating Handbook.

17. Determine lateral center of gravity using step 13 data:

$$\text{Lateral C G Arm} = \frac{(\text{Right Scale} - \text{Left Scale})}{(\text{Right Scale} + \text{Left Scale})} \times 41.20 = \_\_\_\_\_ \text{ inch}$$

1.240 Fixed Ballast Installation

1. Remove screws securing upper console and open console.

2. Remove landing light retainer and landing lights.

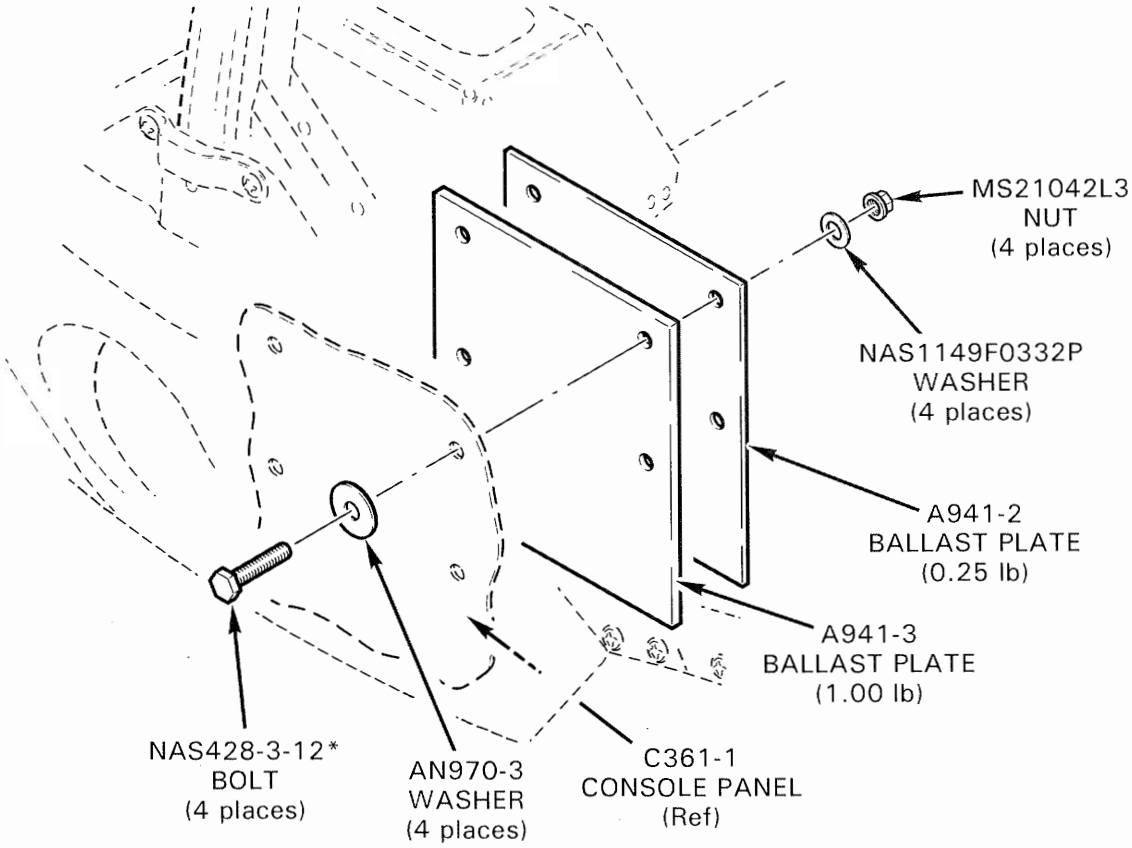
3. If required by Section 1.231, install appropriate ballast per Figure 1-8, 1-8A, or 1-8B, as applicable.

NOTE
Maximum allowable ballast is 10 pounds.

4. Torque bolts per Section 1.320 and torque stripe per Figure 2-1.

5. Close and secure upper console.

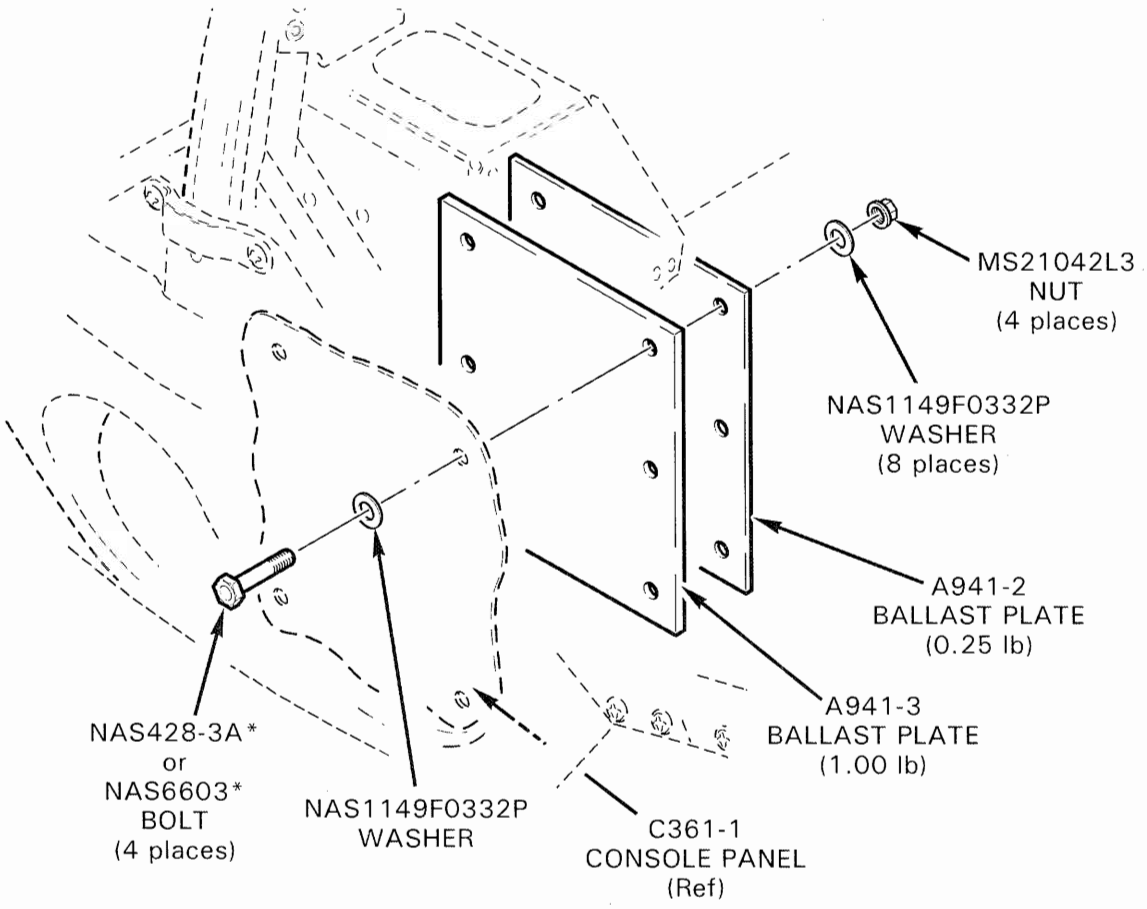
6. Reinstall landing lights and retainer. Function check landing lights.



*2 threads minimum beyond nut.

FIGURE 1-8 FIXED BALLAST INSTALLATION
(with 4-hole ballast plates)

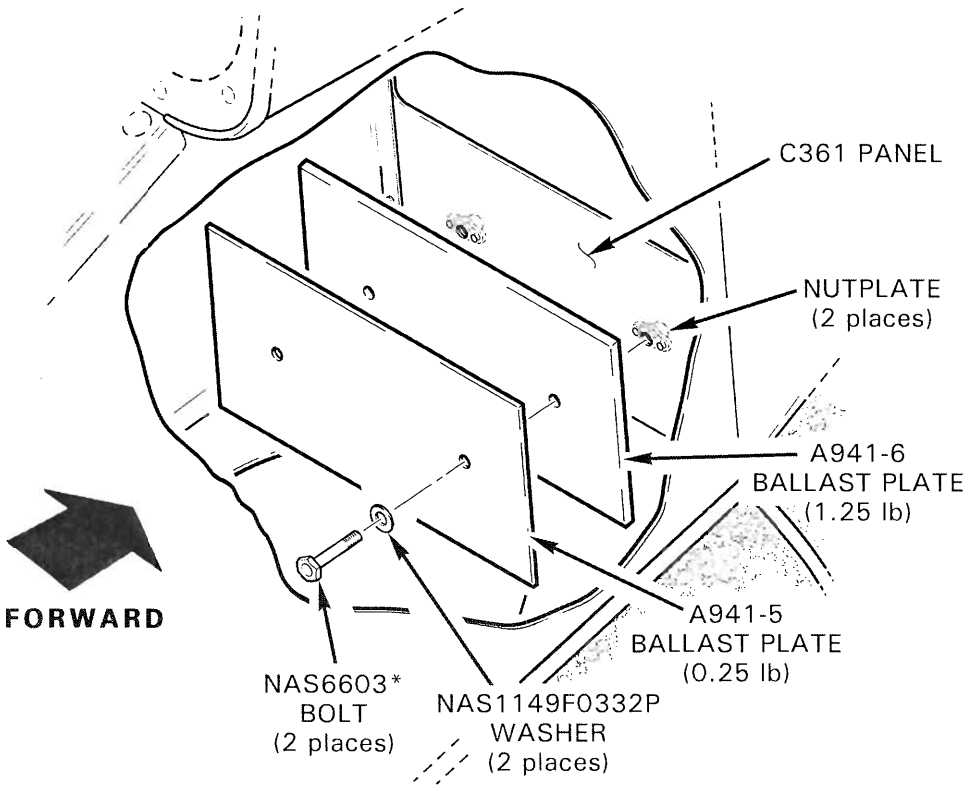
1.240 Fixed Ballast Installation (cont'd)



*Select NAS428-3A bolt length as required for 2 threads minimum beyond nut.
Select NAS6603 bolt length as required for 2 to 4 threads beyond nut.

FIGURE 1-8A FIXED BALLAST INSTALLATION
(with 6-hole ballast plates)

1.240 Fixed Ballast Installation (cont'd)



*Bolt length as required for 2-4 threads beyond nutplate.

FIGURE 1-8B FIXED BALLAST INSTALLATION
(with 2-hole ballast plates, required with H.I.D. landing lights)

1.300 FASTENER TORQUE REQUIREMENTS

WARNING

Proper torque is critical. Always use calibrated wrenches and undamaged, properly lubricated (where applicable) hardware. Ensure all clamping surfaces are clean, and clamp only bare metal or wet-primed surfaces. Improper torque or dirty or painted clamping surfaces may result in loss of clamp-up, hardware or part damage, and premature failure.

1.310 General

Fasteners shall be torqued to standard dry values listed in Section 1.320 unless otherwise specified. If torque is applied by rotating bolt, increase torque value by 10% to account for higher friction at bolthead and shank.

For example, the torque wrench setting for an NAS1305 bolt used with an NAS1068 nutplate is determined as follows:

NAS1305 bolt (5 indicates 5/16 inch size) dry torque per Table 1	240 in.-lb
Add 10% because torque must be applied at bolt head	24 in.-lb
Torque wrench setting	264 in.-lb

A secondary locking mechanism is required on all critical fasteners. B330 stamped nuts (palnuts) serve as secondary locking mechanisms in most areas on the helicopter, and are torqued per Table 1. The IPC lists secondary locking mechanisms for specific fasteners.

WARNING

Assembly of flight controls is critical and requires inspection by a qualified person. If a second person is not available, the installer must take a 5-minute break prior to inspecting flight control connections he has assembled.

CAUTION

Never substitute AN bolts for NAS bolts. NAS bolts have higher tensile strength.

NOTE

A critical fastener is one which, if removed or lost, would jeopardize safe operation of the helicopter. This includes joints in the primary control system, and non-fail-safe structural joints in the airframe, landing gear, and drive system.

Torque seal (paint) is applied to all critical fasteners after palnut installation in a stripe extending from the fastener's exposed threads across both nuts onto the component (reference Figure 2-1). Any subsequent rotation of the nut or bolt can be detected visually. Approved source for torque seal is given in Section 1.460.

Any nut damaged due to handling or whose nut drag has deteriorated appreciably must be replaced.

1.310 General (cont'd)

WARNING

Two threads minimum must be exposed beyond nut on any installation to insure proper locking of fastener. Four threads maximum may be exposed. More than four threads exposed may allow nut to seat against bolt shank, resulting in insufficient joint clamping.

Torquing requirements:

1. Bolt and nut are to be clean and dry except when assembly procedure specifies anti-seize or thread-locking compound.
2. If chattering or jerking occurs, disassemble and re-torque fastener.
3. If special adapters which change effective length of torque wrench are used, final torque value must be calculated using formula below.
4. Proper thread engagement requires 2-4 threads beyond primary self-locking nut (palnuts excepted).
5. Torque wrenches must be calibrated annually, when dropped, or when a calibration error is suspected.

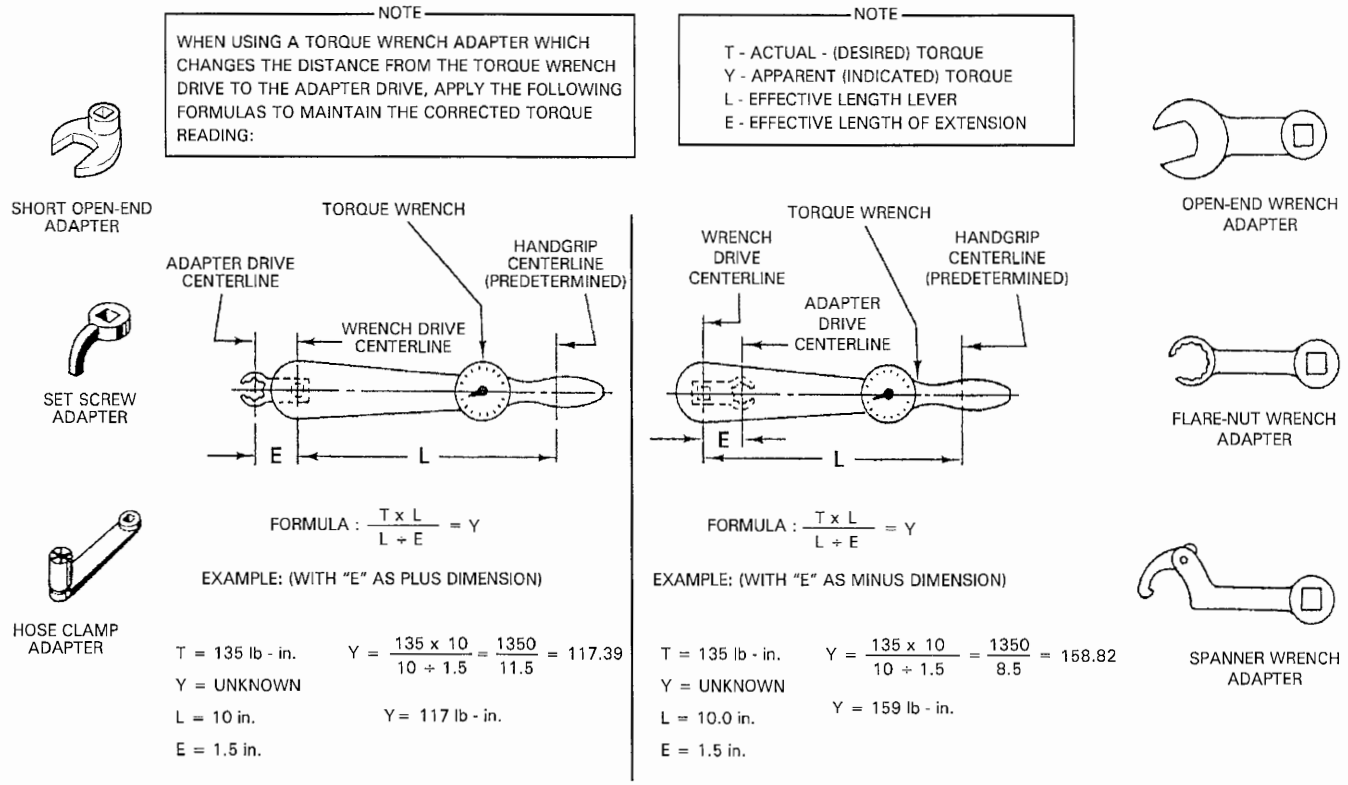


FIGURE 1-9 CALCULATING TORQUE ADJUSTMENT FOR EXTENSION

1.320 Standard Torques

STANDARD WRENCHING TORQUES

FASTENER SERIES	SIZE	EXAMPLE FASTENER	DRY TORQUE (IN.-LB)	WET TORQUE (IN.-LB)
NAS 1300 Bolts NAS 6600 Bolts NAS 600 THRU 606 Screws NAS 623 Screws NAS 1351 Screws NAS 1352 Screws	10-32	NAS6603	50	N/A
	1/4-28	NAS6604	120	N/A
	5/16-24	NAS6605	240	N/A
	3/8-24	NAS6606	350	N/A
	7/16-20	NAS6607	665	N/A
	1/2-20	NAS6608	995	N/A
AN3 Bolts AN4 Bolts AN6 Bolts AN8 Bolts AN502 Screws AN503 Screws AN509 Screws AN525 Screws MS24694 Screws MS27039 Screws	10-32	AN3	37	N/A
	1/4-28	AN4	90	N/A
	3/8-24	AN6	280	N/A
	1/2-20	AN8	795	N/A
STAMPED NUTS (PALNUTS)	10-32	B330-7 (MS27151-7)	6 to 15	N/A
	1/4-28	B330-13 (MS27151-13)	11 to 25	N/A
	5/16-24	B330-16 (MS27151-26)	20 to 40	N/A
	3/8-24	B330-19 (MS27151-19)	29 to 60	N/A
	7/16-20	B330-21 (MS27151-21)	42 to 85	N/A
	1/2-20	B330-24 (MS27151-24)	54 to 110	N/A
TAPERED PIPE THREADS	1/8-27	N/A	60	N/A
	1/4-28	N/A	85	N/A
	3/8-18	N/A	110	N/A
	1/2-14	N/A	160	N/A
	3/4-14	N/A	230	N/A
ROD END JAM NUTS (AN315 and AN316)	10-32	AN315-3	15	N/A
	1/4-28	AN316-4	40	N/A
	5/16-24	AN316-5	80	N/A
	3/8-24	AN316-6	110	N/A

Notes:
1. Values include nut self-locking torque
2. Increase values 10% if torqued at bolt head
3. For elbow and tee fittings which require alignment, torque to indicated value, then tighten to desired position
4. Values ± 10% unless range is specified
5. Unless otherwise specified, thread sizes 8-32 and smaller are not used for primary structure and do not require control of torques.

1.330 Special Torques

These torques are non-standard and supersede those in Section 1.320.

AREA	FASTENER	TORQUE
AIR CONDITIONING	(2) AN824-8D nuts on D792-2 and D793-2 lines at firewall	150
	D799-2 high pressure cutout switch	90
	D799-3 low pressure cutout switch	90
	MS21042L6 nut, compressor drive pulley retaining	300
	nut, D792-2 line assy-to-evaporator	150 wet w/ A257-20
	nut, D793-2 line assy-to-evaporator	210 wet w/ A257-20
	nut, D794-1 hose assy-to-D793-2 line assy	210
	nut, D794-1 hose assy-to-D777-1 compressor assy	300 wet w/ A257-20
	nut, D810-1 hose assy-to-D777-1 compressor assy	210 wet w/ A257-20
	nut, D810-1 hose assy-to-D783-1 condenser	150 wet w/ A257-20
	nut, D811-1 hose assy-to-D783-1 condenser	150 wet w/ A257-20
	nut, D811-1 hose assy-to-D793-2 line assy	150
	(4) valve cores (on servicing and cutout switches fittings)	1
CABIN	(2) NAS1351-6H20P bolts securing B253-2 anchor	150
CYCLIC STICK	(2) NAS1352-3H14 screws, C683-4 damper (manual-controls)	40
DRIVE SYSTEM	C182-1 nut (2-inch socket) on C007-5 shaft assembly Note: Shaft assemblies with smaller nuts are obsolete	450-550 ft-lb wet
	(6) NAS6608-42H bolts, lower sheave	900
EMPENNAGE	(8) NAS6604-5 bolts, vertical stabilizer attach	170
FANWHEEL	C182-1 nut - see DRIVE SYSTEM (above)	
	(16) NAS6603-6 bolts, cone-to-fanwheel	70
	(8) NAS6605-12 or -13 bolts, hub	290-310
FLOATS, EMERGENCY POP-OUT	(10) inlet check valve base	75-85
	(10) inlet check valve pivot (hose fitting) retainer	110-120
	(22) nuts on D674-1, -2, -3, -4, -5, & -6 hoses	230-260
	(4) nuts on D674-7 hoses	110-130

Continued on next page

Notes:

1. Values in inch-pounds unless otherwise specified.
2. Values include nut self-locking torque.
3. Increase values 10% if torqued at bolt head
4. Wet indicates threads lubricated with A257-9 Anti-Seize
5. For elbow and tee fittings which require alignment, torque to indicated value, then tighten to desired position
6. Values ± 10% unless range is specified
7. Unless otherwise specified, thread sizes 8-32 and smaller are not used for primary structure and do not require control of torques.

1.330 Special Torques (cont'd)

These torques are non-standard and supersede those in Section 1.320.

AREA	FASTENER	TORQUE
FUEL SYSTEM	(16) AN805 nuts, fuel primer lines (O-540)	20-30
	clamp, electric fuel pump (IO-540)	100, wet with B270-10 adhesive
	fuel control inlet reducer (IO-540)	150
	(2) fuel hose nuts, engine-driven fuel pump-to-fuel control inlet tee (IO-540); (2) fuel hose nuts, fuel control inlet tee-to-relief valve (IO-540); (2) fuel hose nuts, fuel control-to-flow divider (IO-540)	135-150
	(2) fuel hose nuts, gascolator-to-carburetor (O-540)	110-130
	(2) fuel line nuts, auxiliary-to-main tank; (2) fuel line nuts, main tank-to-fuel valve; (2) fuel line nuts, relief valve-to aux tank outlet tee (IO-540)	110-130
	(2) fuel line nuts, fuel valve-to-gascolator	270-300
	(5) fuel quantity sender bolts, self-sealing	37
	fuel quantity sender center stud terminal nut	10-12
	jam nut, electric fuel pump inlet elbow (IO-540); jam nut, electric fuel pump outlet tee (IO-540)	150
	jam nut, low-fuel warning sender	150
	tee, fuel control inlet (IO-540)	135-150
	inlet adapter, engine-driven fuel pump (IO-540)	150
	(4) bolts, airbox-to-carburetor (O-540)	25-35
	gascolator drain valve	54-66, wet with B270-6

Continued on next page

Notes:
1. Values in inch-pounds unless otherwise specified.
2. Values include nut self-locking torque.
3. Increase values 10% if torqued at bolt head
4. Wet indicates threads lubricated with A257-9 Anti-Seize
5. For elbow and tee fittings which require alignment, torque to indicated value, then tighten to desired position
6. Values ± 10% unless range is specified
7. Unless otherwise specified, thread sizes 8-32 and smaller are not used for primary structure and do not require control of torques.

1.330 Special Torques (cont'd)

These torques are non-standard and supersede those in Section 1.320.

AREA	FASTENER	TORQUE
HYDRAULIC HOSES & FITTINGS	(4) B330-19 palnuts, reservoir pressure elbow (if installed) & servo pressure T-fittings	30
	(2) B330-21 palnuts, reservoir pressure inlet elbow & pump pressure T-fitting (if installed)	45
	(4) B330-21 palnuts, return elbows (if installed) & T-fittings	45
	(2) B330-25 palnuts, pump suction T-fitting & reservoir suction elbow (if installed)	75
	cap, pump pressure T-fitting	60
	cap, pump suction T-fitting	120
	(4) D452-3 jam nuts, servo pressure elbows (if installed) & servo return T-fittings	60
	(2) D452-4 jam nuts, pump pressure T-fitting & reservoir pressure inlet elbow (if installed)	90
	(4) D452-4 jam nuts, return elbows (if installed) & T-fittings	90
	(2) D452-6 jam nuts, pump suction T-fitting & reservoir suction elbow (if installed)	150
	(2) nuts, pump-to-reservoir pressure hose	135-150
	(6) nuts, pressure hoses to servos (except pump)	95-105
	(2) nuts, reservoir-to-pump suction hose	190-210
	(6) nuts, return hoses from servos	135-150
HYDRAULIC PUMP	Hydraulic pump-to-gearbox mounting nuts (see MAIN ROTOR GEARBOX)	
HYDRAULIC RESERVOIR	(4) attach bolts, reservoir-to-frame	60
	filler-vent	100
	filter cap	150
	sight gage	150
HYDRAULIC SERVOS	MS27039C0806 screw attaching D200-2 scissors	25
	B330-6 palnut on above screw	5-10
LANDING GEAR	(8) clamps, strut fairings	100 wet with B270-10 thread locking adhesive
	(4) NAS6604 bolts, ground handling wheel supports	70

Continued on next page

Notes:
1. Values in inch-pounds unless otherwise specified.
2. Values include nut self-locking torque.
3. Increase values 10% if torqued at bolt head
4. Wet indicates threads lubricated with A257-9 Anti-Seize
5. For elbow and tee fittings which require alignment, torque to indicated value, then tighten to desired position
6. Values ± 10% unless range is specified
7. Unless otherwise specified, thread sizes 8-32 and smaller are not used for primary structure and do not require control of torques.

1.330 Special Torques (cont'd)

These torques are non-standard and supersede those in Section 1.320.

AREA	FASTENER	TORQUE
MAIN ROTOR BLADE	(2) B289-2 bolts, self-sealing	60-80
	(2) C722-3 screws, tip balance weight	55
MAIN ROTOR GEARBOX	(4) A650-4 fittings, gearbox mounting or (4) NAS1291-10 nuts	90 ft-lb, dry, torqued from bolt head or nut
	AN320-8 nut, gearbox pinion (retains C908 yoke)	35-45 ft-lb
	chip detector housing	Approximately 150
	chip detector (threaded type)	Approximately 75
	filler plug	150
	(4) NAS1291-4 nuts, hydraulic pump-to-gearbox (or cover)	40
	(6) NAS1352-4 screws, end cover	120
	(6) NAS1352-4H16P screws, sump-to-housing	120 at head
	sight gage	150
MAIN ROTOR HUB	(1) NAS634-105 bolt, teeter hinge and (2) NAS634-105 bolts, coning hinges	New bolt: 0.021-0.022 inch elongation, wet Used bolt: 0.020-0.022 inch elongation, wet, and cotter pin holes must align
PITCH LINKS	(2) 21FKF-813 self-locking jam nuts, main rotor pitch links	300
POWERPLANT	(1) AN818 nut, manifold pressure line	25 to 30
	(4) or (6) AN818 nuts, oil cooler lines	450 to 500
	(2) bolts, engine-to-ground strap	96
	(4) bolts, intake manifold-to-sump (IO-540)	90-100, torque center bolts first
	(1) nut, A462 fitting on carburetor mixture control arm	25-30
	(4) nuts, carburetor-to-engine (O-540)	96 initial, 204 final, torque in crisscross pattern
	(12) nuts, exhaust flange	200-220
	(12) spark plugs	420, wet with A257-10 spark plug thread lubricant
	(4) bolts, airbox-to-carburetor	25-35

Notes:
1. Values in inch-pounds unless otherwise specified.
2. Values include nut self-locking torque.
3. Increase values 10% if torqued at bolt head
4. Wet indicates threads lubricated with A257-9 Anti-Seize
5. For elbow and tee fittings which require alignment, torque to indicated value, then tighten to desired position
6. Values ± 10% unless range is specified
7. Unless otherwise specified, thread sizes 8-32 and smaller are not used for primary structure and do not require control of torques.

1.330 Special Torques (cont'd)

These torques are non-standard and supersede those in Section 1.320.

AREA	FASTENER	TORQUE
STEEL TUBE FRAME	(2) C722-2 5/8-inch internal-wrenching screws	120 to 125 ft-lb wet
	(2) S14119 screw and A31007 nut	8 to 10
SWASHPLATE	(18) AN503-8-8 fillister-head screws	17
	(26) NAS1352-08H8P socket-head screws	30
	(1) NAS6605-8 bolt clamping C203-1 yoke	190 (opposite clamping bolt must be torqued first)
TAIL ROTOR	NAS6606-53 bolt, elastomeric teeter (delta) hinge	380
TAIL ROTOR GEARBOX	(4) bolts, input cap	60
	(8) bolts, input housing and output cap	100
	chip detector	100
	filler-vent plug	100
	input yoke retaining nut	35-45 ft-lb
	MS21042L5 nut, pitch control housing stud	240
	(4) NAS1352-5H12P drilled-head bolts, gearbox-to-tailcone attaching	200
	(4) NAS1352-5-12P bolts (undrilled), gearbox-to-tailcone attaching	240
	sight gage	150

Notes:
1. Values in inch-pounds unless otherwise specified.
2. Values include nut self-locking torque.
3. Increase values 10% if torqued at bolt head
4. Wet indicates threads lubricated with A257-9 Anti-Seize
5. For elbow and tee fittings which require alignment, torque to indicated value, then tighten to desired position
6. Values ± 10% unless range is specified
7. Unless otherwise specified, thread sizes 8-32 and smaller are not used for primary structure and do not require control of torques.

1.400 APPROVED MATERIALS LIST

The following items are available from the noted manufacturer(s) or their distributor(s). Check with appropriate regulatory authority(s) for allowable usage of primers, solvents, cleaners, fillers, putty, strippers, and paints.

CAUTION

Follow product manufacturer's instructions for handling and storage.

1.410 Paint Strippers

PRODUCT	MANUFACTURER/SUPPLIER	APPLICATION
Cee-Bee Stripper A-292	McGean-Rohco Cee-Bee Division 9520 Cee Bee Drive Downey, CA 90241 Tel: 562-803-4311 Fax: 562-803-6701	Metal parts, except blades and flex plates
Plastic Media Blasting System	Pauli & Griffin Co. 907 Cotting Lane Vacaville, CA 95688 Tel: 707-447-7000 Fax: 707-447-7036	Metal parts except blades and unsupported sheet metal less than 0.040 inch thick

1.420 Solvents and Cleaners

PRODUCT	MANUFACTURER/SUPPLIER	APPLICATION
QSOL 220	Safety-Kleen Systems, Inc. Plano, TX	General use for cleaning and prior to applying primer, adhesive or sealant
Benzene, 1-Chloro-4 (Trifluoromethyl) PCBTF	Any	" "
Acetone	Any	" "
Lacoline (Aliphatic Hydrocarbon)	Any	Acrylic plastic cleaner only
Dupont Lacquer & Enamel Cleaner 3939S or Kwik Clean 3949S*	Dupont Los Angeles, CA	Cleaning, degreasing, and removing sanding dust prior to priming or top coat
Presolve	LPS	Clean hydraulic components only.
Tetrachloroethylene (Perchloroethylene)	Federal Spec O-T-236	Vapor degreaser
815 GD	Brulin Corporation Indianapolis, IN	Imersion/ultrasonic cleaning

*contains water; do not use on steel.

1.430 Fillers and Putty

PRODUCT	MANUFACTURER/SUPPLIER	APPLICATION
2290S Putty 2291S (Hardener)	Dupont Los Angeles, CA	Minor surface imperfections
051144-05960 Acryl-Green Spot Putty	3M St Paul, MN	" "
10010 Easy White (Body filler with hardener)	US Chemical & Plastics Canton, OH	" "

1.440 Torque Seal

PRODUCT	MANUFACTURER/SUPPLIER	APPLICATION
F-900White	Organic Products Co. P.O. Box 428 Irving, TX 75060	Torque Seal-White

1.450 Primers

PRODUCT	MANUFACTURER/SUPPLIER	APPLICATION
Gray epoxy CA 7501 with CA 7501B activator	Desoto Aerospace Coatings, PRC-Desoto Int., Inc. Glendale, CA	Unlimited
Gray epoxy 44-GY-79 with 44-GY-79 activator	Deft, Inc. Irvine, CA	Aluminum parts and assemblies, and fiberglass components
Aviation Primer, Green, A902* (Aerosol)	Valspar Corporation Medina, OH	Limited or touch-up use only.

* shelf life two years

1.455 Powder Coat (steel parts only)

For powder-coating steel parts, RHC uses either of the following primers, electrostatically applied with coating thickness of 0.001 to 0.003 inch:

PRODUCT	MANUFACTURER
13-7004 Covel Zinc-Rich Grey Epoxy Powder	Morton International Reading, PA
81-2158 Vitralon Zinc-Rich Grey Epoxy Powder	Pratt and Lambert Chemical Coatings Buffalo, NY

For topcoating, RHC uses electrostatically applied with total coating thickness of 0.003 to 0.006 inch (primer and topcoat):

PRODUCT	MANUFACTURER
Series 49-RAL 7043 High Gloss Grey Polyester Weather Resistant Powder.	Tiger Drylac USA Rancho Cucamonga, CA
39-80040 Semi Gloss Black Polyester Weather Resistant Powder	Tiger Drylac USA

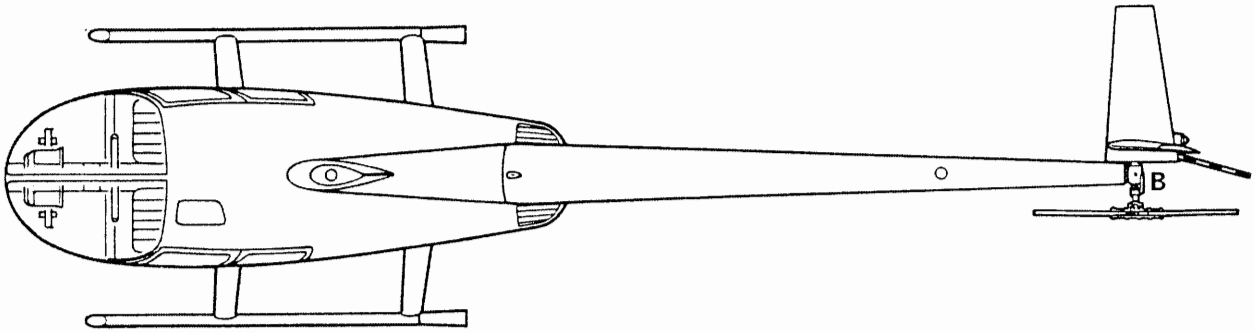
Each step is baked for 10-15 minutes. Curing temperature for all of the above must not exceed 400 degrees F.

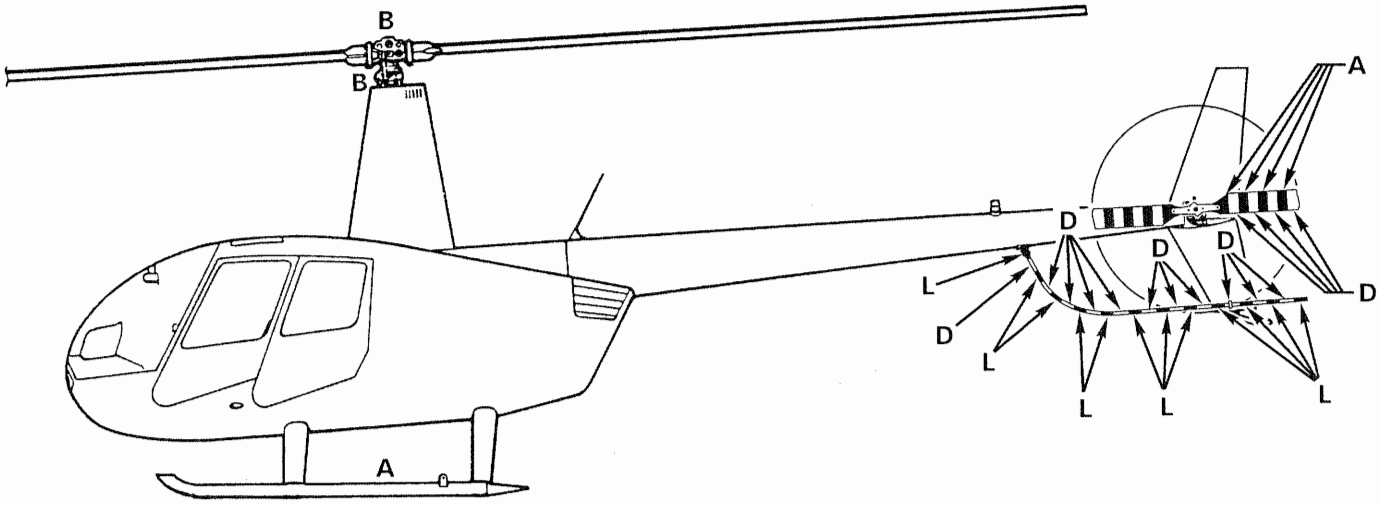
1.460 Paints

Paint code numbers for specific helicopter serial numbers are listed on the inside cover of factory supplied maintenance record (log book). Use fisheye eliminator, accelerator, or other additives per manufacturers recommendations.

	MATERIAL	MANUFACTURER
A	Flat Black Imron 373-P-29950 Polyurethane enamel with 193S or 8909S activator and 8685S reducer	Dupont Los Angeles, CA
	Semi-gloss Black 3900-05-1GK with 39-SG catalyst and water reducer (landing gear only)	Cardinal Industrial Finishes El Monte, CA
B	Dark gray Imron DS020HK Polyurethane enamel with 193S or 8909S activator and 8685S reducer	Dupont
C	Lycoming engine gray (high temperature) #76448* (engine case and cylinders)	Textron Lycoming Williamsport, PA
	Lycoming engine gray E-8948 (cooling panels and carburetor heat shroud)	Randolph Products Co. Carlstadt, NJ
	Lycoming engine gray enamel #A219 (aerosol can, for touch up)*	Tempo Products Cleveland, OH
D	White Imron K0774HK Polyurethane enamel with 193S or 8909S activator and 8685S reducer	Dupont
E	Yellow Imron K0680HK Polyurethane enamel with 193S or 8909S activator and 8685S reducer	" "
F	Imron 5000/6000 Polyurethane enamel tint(s) with 193S or 8909S activator and 8685S reducer	" "
G	Clear Imron 2400S with 193S or 8909S activator	" "
H	Clear Imron 2400S (1-part) and RK-P-19478 (11-parts) with 193S or 8909S activator (4-parts)	" "
J	White #2300 latex flat exterior acrylic (for landing gear floats)	Vista Paint Co. Long Beach, CA
K	White Cat-L-Ink #50-100R (shelf life 3 years) A20 Catalyst* (for silk screen letters)	Ethone, Inc. West Haven, CT
	Yellow Cat-L-Ink #50-202BR (shelf life 3 years) A20 Catalyst* (for silk screen letters)	" "
L	Red Imron K0759HK Polyurethane enamel with 193S or 8909S activator and 8685S reducer	Dupont
N	Krylon #1311* Matte clear (aerosol can; for silk screen letters)	Krylon Div. of Borden Columbus, OH
	For limited touch-up of interior and landing gear only:	
A	Krylon #1613 Flat Back (aerosol can)*	Krylon Div. of Borden
	NYBC #14 Flat Back (aerosol can)*	New York Bronze Powder Co. Scranton, PA

*Shelf life two years





EXTERNAL SURFACE PAINTING

See approved materials list for detail information on each letter finish code.

See Section 9.130 for specific blade paint pattern dimensions.

All exterior surfaces are code D & F unless otherwise specified.

FIGURE 1-11A PAINT FINISH CODE LOCATIONS

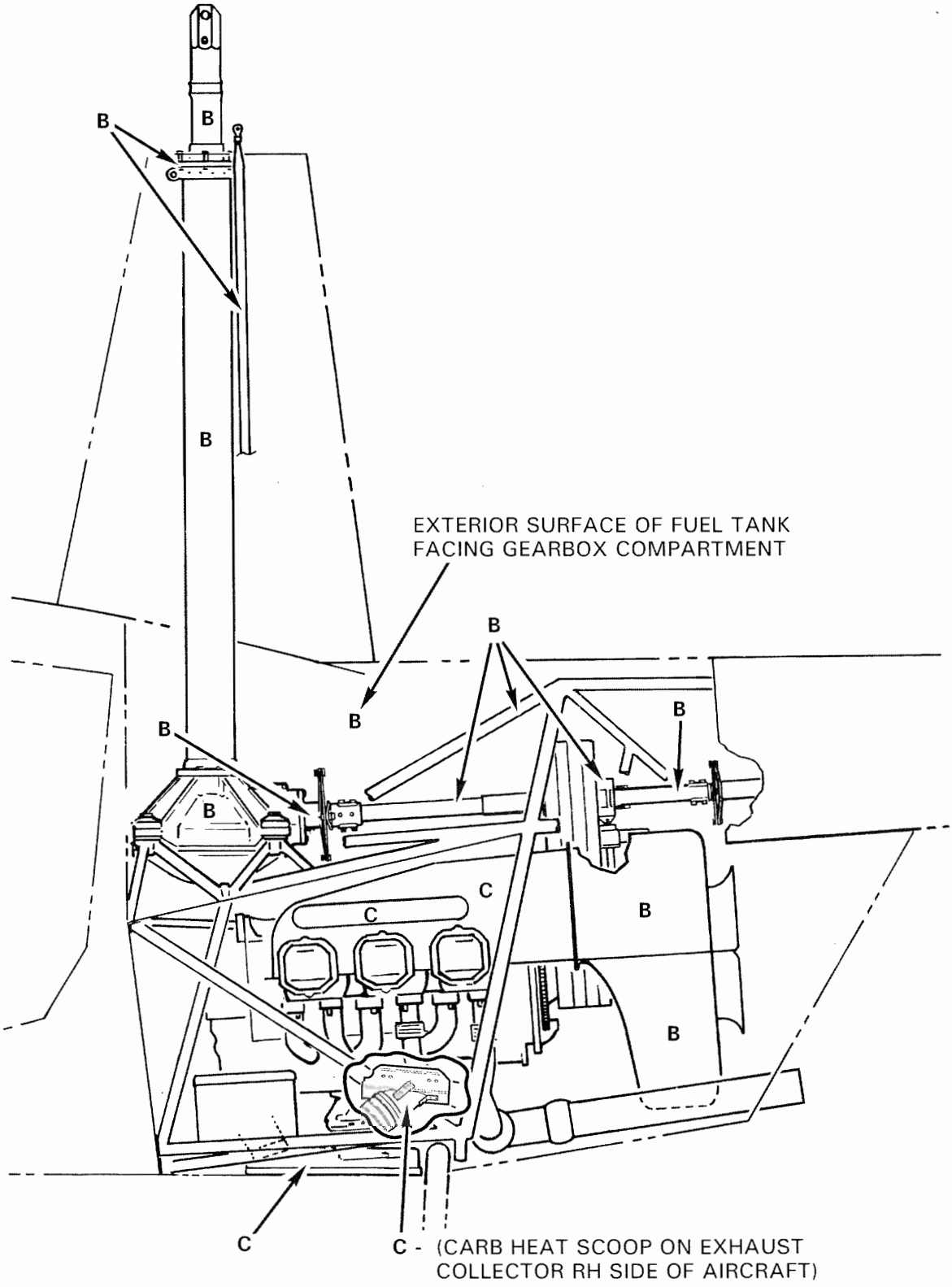


FIGURE 1-11B PAINT FINISH CODE LOCATIONS

1.470 Lubricants

RHC PART NO.	MFR. PART NO.	MANUFACTURER
A257-1	Moly Grease 101	Southwestern Petroleum Corp. Fort Worth, TX
A257-2	Gear Lube 201 gear oil	Southwestern Petroleum Corp.
A257-3	Aero Shell 14 MIL-G-25537	Shell Oil Company Houston, TX
A257-4	Dexron II or Dexron II/Mercon or Dexron III/Mercon automatic transmission fluid	Pennzoil-Quaker State Division of Shell Oil Co. Houston, TX
A257-5	Sta-Lube 3120 water-resistant grease	Sta-Lube, Inc. Compton, CA
A257-5	11402 water-resistant grease	Lubrimatic Buffalo Grove, IL
A257-6	Fuelube fuel-resistant grease	Fleet Supplies Inc. Cleveland, OH
A257-6	EZ Turn	United-Erie Div. of Interstate Chemical Co. Erie, PA
A257-7	Lubri-Kote Type A 1040 CR dry film lubricant	Mealey Lubricants Cleveland, OH
A257-8	P-80, rubber lubricant	International Products Trenton, NJ
A257-9	Anti-seize 767	Loctite Corp. Newington, CT
A257-10	2612, spark plug thread lubricant	Champion Spark Plug Toledo, OH
A257-10	T-556	Union Industries Jacksonville, FL
A257-12	Mobilgrease 28 grease	Exxon-Mobil Corp. Fairfax, VA

1.470 Lubricants (cont'd)

RHC PART NO.	MFR. PART NO.	MANUFACTURER
A257-15	Mil-H-5606 hydraulic fluid	Any
A257-16	Type M 20W-50, SAE J1966	Phillips 66 Co. Pasadena, TX
A257-16	Aviation Oil 20W-50, SAE J1966,	ExxonMobil Corp. Fairfax, VA
A257-18	55 O-ring lube	Dow Corning Corp. Midland, MI
A257-19	111 Valve lube & Sealant	Dow Corning Corp. Midland, MI
A257-20	SP-15 PAG Oil	Sanden Corp. Wylie,TX
A257-21	P-16 Petrolatum Lube	Panef Corp. Milwaukee, WI

1.480 Adhesives and Sealants

RHC PART NO.	DESCRIPTION	COLOR	MFR. PART NO.	MANUFACTURER
B270-1	Sealant-polysulfide, fuel resistant (2-part)	Gray	FS-8907 B-2	PPG Aerospace Glendale, CA
B270-1	Sealant-polysulfide, fuel resistant (2-part)	Gray	AC-350 B2	Advanced Chemistry & Technology Inc., Garden Grove, CA
B270-2	Sealant-metal (1-part)	Silver	2084	3M St. Paul, MN
B270-4	Sealant-silicon rubber (1-part)	Translucent	SCS 1201	General Electric Waterford, NY
B270-5	Sealant-synthetic rubber putty (1-part)	Black	Q4-2805 94-031	3M
B270-6	Sealant & lubricant-thread (1-part)	Cream	Titeseal 55	Radiator Spec. Co. Charlotte, NC
B270-7	Adhesive-foam & fabric (aerosol)	Amber	74	3M
B270-8	Adhesive-rubber, nitrile/solvent (1-part)	Brown	C 160	Stabond Corp. Gardena, CA
B270-9	Adhesive, epoxy, structural, flexible (2-part)	Gray	2216 B/A	3M
B270-10	Adhesive/sealant-thread-locking (tight-fits) (1-part)	Red	271	Loctite Corp. Newington, CT
B270-11	Adhesive/sealant thread-locking (loose- fits) (1-part)	Red	277	Loctite Corp.
B270-12	Sealant-electrical potting (2-part)	Tan	CS3100	Flamemaster Corp. Chem Seal Division Sun Valley, CA
B270-13	Sealant-silicone, electronic use (1-part)	Translucent	3145	Dow Corning Corp. Midland, MI
B270-14	Adhesive-foam, neoprene/water (1-part)	White Lavender	100 Neutral 100 Lavender	3M
B270-15	Adhesive-plastic, for vinyl (1-part)	Clear	2262	3M

1.480 Adhesives and Sealants (cont'd)

RHC PART NO.	DESCRIPTION	COLOR	MFR. PART NO.	MANUFACTURER
B270-17	Adhesive - cyanoacrylate, Instant (1-part)	Clear	Super Bonder 495	Loctite Corp. Newington, CT
B270-18	Adhesive - Weather-strip (1-part)	Black	051135-08008	3M
B270-19	Adhesive - Epoxy, Structural, rigid (2-part)	Green	1838 B/A	3M
B270-20	Adhesive - Thread locking, Non-permanent (1-part)	Purple	222 or 222MS	Loctite Corp.
B270-21	Protectant - Corrosion, Non-drying (1-part)	Lt. Amber	LPS3	LPS Laboratories, Inc. Tucker, GA
B270-22	Protectant - Corrosion, Drying (1-part)	Amber	LPS Hardcoat	LPS
B270-23	Sealant - Gasket (1-part)	Brown	GM3D	P.O.B., Inc., Cincinnati, OH
B270-23	Sealant - gasket, (1-part)	Brown	JV66B	Dana Corp. Churubusco, IN (Victor Reinz Brand)
B270-24	Activator/Primer - Anaerobic Adhesive (1-part)	Translucent Green	7649	Loctite
B270-25	Clear Coat - Automotive Touch-up, brush in bottle (1-part)	Clear	Clear Coat Touch up bottle	Automotive - Touch up

1.490 Storage Limits

1. P/N B283-x hoses have a shelf storage life of 5 years. Hose service life is "on condition", with a maximum of 12 years or 2200 hours, whichever occurs first.

2. Elastic cords have a shelf storage life of 5 years. Elastic cord service life is "on condition", with a maximum of 12 years. Use invoice or FAA Form 8130 date as start date.

3. Store drive and alternator V-belts at less than 85 degrees F (30 degrees C), with relative humidity below 70 percent. Avoid solvent and oil vapors, atmospheric contaminants, sunlight, and ozone sources (electric motors, arc welding, ionizing air purifiers, etc.). Belt shelf life is 4 years if preceding recommendations are followed. Use invoice date or FAA Form 8130 date as start date.

4. Oils and greases have a 5 year shelf life when stored and kept sealed in their original container. Use invoice date or FAA Form 8130 date as start date unless the manufacturer has marked container with manufacture date (in which case use manufacture date as start date).

5. Rubber O-rings, seals, and gaskets have a shelf storage life of 20 quarters (5 years). Service life is "on condition" with a maximum of 12 years. Use cure date on package as start date.

1.500 (RESERVED)

1.600 PART INTERCHANGEABILITY

The following parts are interchangeable. Unless noted otherwise, whenever one part is referred to in this manual, its substitute part is also permitted.

Part	Interchangeable with:
AN340 nut	MS35649 nut per NASM35649 except brass nut
AN345 nut	MS35650 nut per NASM35650
N364 nut	MS21083 nut per NASM21083
AN507 screw	MS24693 screw per NASM24693
AN509 screw	MS24694 screw per NASM24694
AN515 screw	MS35206 screw per NASM35206
AN515C screw	MS51957 screw
AN515UB screw	B567-__ screw
AN525 & AN526 screw	MS27039C screw per NASM27039
AN814 & MS24391 plug	AS5169 plug
AN815 & MS24392 union	AS5174 union
AN819 & MS20819 sleeve	AS5176 sleeve
AN822 & MS20822 elbow	AS5195 elbow
AN823 & MS20823 elbow	AS5196 elbow
AN825 & MS20825 tee	AS5197 tee
AN826 & MS20826 tee	AS5198 tee
AN894 & MS24398 bushing	AS5173 bushing
AN900 gasket	MS35769 gasket per AS35769
AN924 nut & MS24400 nut	AS5178 nut
AN931 grommet	MS35489 grommet
AN936 lockwasher	B332-__ lockwasher
AN960-8L washer	NAS1149FN816P washer
AN960-8 washer	NAS1149FN832P washer
AN960-10L washer	NAS1149F0332P washer
AN960-10 washer	NAS1149F0363P washer
AN960-416L washer	NAS1149F0432P washer
AN960-416 washer	NAS1149F0463P washer
AN960-516L washer	NAS1149F0532P washer
AN960-516 washer	NAS1149F0563P washer
AN960-616L washer	NAS1149F0632P washer
AN960-616 washer	NAS1149F0663P washer
AVDEL 1693 rivet	AVDEL 1691 rivet
MS20604ML4W1 rivet	MS20604M4W1 rivet per NASM20604
MS21919DG clamp	AS21919 clamp
NAS1291 nut	MS21042 nut per NASM21042
NAS1303 thru NAS1320 bolt	NAS6603 thru NAS6620 bolt*
NAS487 instrument nut	MS33737 Instrument nut per NASM33737
NAS679A_ nut	NAS1291-_ nut
NAS679C_ M nut	NAS1291C_ M nut
NAS696 nutplate	MS21071 nutplate per NASM21071
NAS698 nutplate	MS21073 nutplate per NASM21073
NAS698 nutplate	MS21073 nutplate per NASM21073

* The following bolts must be NAS1300 series only:
NAS1304-28, -35, -37, & -38, and NAS1305-35

1.700 SPECIAL INSTRUCTIONS FOR REASSEMBLING AND FLIGHT TESTING R44 SERIES HELICOPTERS AFTER CRATING FOR EXPORT

REASSEMBLY: **TO BE PERFORMED BY A CERTIFICATED MECHANIC**

1. Remove top of cabin assembly crate. Remove wall marked "A" by removing lag bolts painted black. Remove empennage assembly. Remove remaining walls. Remove all parts, except cabin assembly, from crate base. Open main rotor blade and tailcone crate.

2. Reinstall main rotor hub per Section 9.122.

3. Assemble landing gear per Section 5.320.

> NOTE
>
> Do not install strut fairings at this time.

4. Attach a hoist to main rotor hub per Section 1.220. Lift aft end of crate while at same time taking up slack in hoist. When helicopter belly is in a horizontal position, lift with hoist until cabin is supported by hoist alone. Remove lag screws and carriage bolts attaching helicopter cabin to crate. Remove crate.

> **CAUTION**
>
> Do not lift helicopter and attached crate using main rotor hub; damage to main rotor gearbox and frames could result.

5. Remove supports from landing gear attachment points and install assembled landing gear per Section 5.120 or Section 5 (float landing gear). Install front cross tube cover panel. If desired, install strut fairings per Section 5.420 (not applicable to utility float landing gear).

6. Remove tailcone cowling and install tailcone per Section 4.312. Install strobe light. Install communication, Loran, and GPS antennas (if equipped). Install tailcone cowling.

> **CAUTION**
>
> Make sure all foam packing material is removed from inside of tailcone before installation; damage to tail rotor drive shaft could result.

7. Install empennage assembly per Section 4.322. Install tail rotor guard per Section 4.330.

8. Fill tail rotor gearbox with A257-2 oil to full level.

9. Install tail rotor per Section 9.212. Match color coded markings on blades with pitch links.

10. Install fan and scroll per Section 6.220.

1.700 SPECIAL INSTRUCTIONS FOR REASSEMBLING AND FLIGHT TESTING R44 SERIES HELICOPTERS AFTER CRATING FOR EXPORT (cont'd)

11. Install engine exhaust per Section 6.520.

12. Install main rotor blades per Section 9.112. Match color-coded markings on blades with markings on hub and pitch links.

13. Perform tail rotor drive shaft runout per Section 7.340.

14. Fill main rotor gearbox with A257-2 oil to full level as required.

15. Fuel helicopter and drain a small amount of fuel through gascolator.

16. If ship is equipped with attitude horizon, directional gyro, turn coordinator, and/or vertical card magnetic compass, install as follows:

Attitude Horizon, Direction Gyro, and Turn Coordinator:

Remove warning lights from lower console. Pull out B197 instrument face by removing six (6) securing screws.

NOTE
Place a piece of foam under B197-1 face to prevent scratching lower face.

Install required instrument(s) by securing with hardware provided.

CAUTION
Directional gyro mount screws must not exceed 1 inch in length or unit will be damaged.

Connect existing straight connector(s) to directional gyro and/or turn coordinator. Connect angle connector to attitude horizon, ensuring strain relief points down. Ensure connectors lock in place. Ty-rap excess wiring. Reinstall B197-1 face to console. Reinstall amber FUEL FILTER (IO-540 only), AUX FUEL PUMP (IO-540 only), ALT, & GOV OFF lights and red ENG FIRE & OIL warning lights.

Vertical Card Magnetic Compass:

Remove vertical card compass from foam-protected box. Install a 2-inch length of B158-3 heat-shrink tubing over each compass wiring pin. Locate existing wires from windshield center bow. Connect pins from compass to existing sockets (polarity is not critical), cover connection with heat-shrink, then apply heat. Secure compass in mount with four screws and hide and secure wiring atop compass.

1.700 SPECIAL INSTRUCTIONS FOR REASSEMBLING AND FLIGHT TESTING R44 SERIES HELICOPTERS AFTER CRATING FOR EXPORT (cont'd)

17. Install battery (negative ground system).

18. Remove plastic dehydrator plugs from each cylinder's upper spark plug hole.

19. Lubricate provided upper spark plugs with A257-10 spark plug thread lubricant, install, and torque per Section 1.330.

20. Connect ignition leads to upper spark plugs and install spark plug access covers.

21. Disconnect ignition leads from lower spark plugs and remove lower spark plugs.

22. Place a small container under each cylinder's lower spark plug hole. With ignition switch in the OFF position, rotate engine by hand, several revolutions, to force excess preservation oil from cylinders.

23. Temporarily connect a grounding wire from each magneto's primary lead terminal to airframe ground.

24. Activate starter for no more than 12 seconds or until oil pressure is indicated on gage, whichever comes first. Allow starter to cool for 5 minutes after each activation.

25. After oil pressure is indicated remove temporary grounding wire from each magneto.

26. Lubricate lower spark plug threads with A257-10 spark plug thread lubricant, install, and torque per Section 1.330.

27. Connect ignition leads to lower spark plugs.

28. Install belly, left, right, and aft cowling assemblies.

29 Perform Section 2.205 ground check.

30. Perform Section 2.210 run-up.

1.700 SPECIAL INSTRUCTIONS FOR REASSEMBLING AND FLIGHT TESTING R44 SERIES HELICOPTERS AFTER CRATING FOR EXPORT (cont'd)

NOTE
IO-540 engines should idle at 58-62% rpm with engine warm, clutch engaged.

IO-540 IDLE ADJUSTMENT PROCEDURE

Idle rpm and mixture were set for sea-level standard conditions during factory flight test. If idle and off-idle throttle performance are not satisfactory upon reassembly, adjust as follows:

First set idle rpm to 58-62% rpm with engine warm & clutch engaged. Then, with engine off, disconnect fuel control outlet hose, connect test hose if desired, and measure fuel flow rate at fuel control outlet with mixture full rich, throttle at idle, and electric fuel pump on (ignition key to PRIME position). Adjust idle mixture as required to obtain 16-18 pounds/hour fuel flow (170-190 cc/minute). Clockwise rotation of idle mixture adjustment wheel (viewed from aircraft right side) enriches mixture. Re-check idle rpm after mixture adjustment and repeat as required until both rpm and mixture are within limits. With rpm and mixture set, verify smooth acceleration from idle to 102% rpm with no engine hesitation or smoke from tailpipe. Also verify smooth needle split from 102% to idle with no engine roughness or erratic rpm indications and acceptable idle quality. Note that 16-18 pounds/hour fuel flow should produce acceptable idle quality and off-idle throttle performance under sea-level standard conditions. Richer mixtures may be required for cold temperature operation and leaner mixtures may be required for hot/high altitude operation. Deviate from 16-18 lb/hr recommendation as required for acceptable idle quality and off-idle throttle performance (smooth accelerations and needle splits).

1.700 SPECIAL INSTRUCTIONS FOR REASSEMBLING AND FLIGHT TESTING R44 SERIES HELICOPTERS AFTER CRATING FOR EXPORT (cont'd)

FLIGHT TEST: **TO BE DONE BY A QUALIFIED PILOT AND A CERTIFICATED MECHANIC**

1. Perform preflight inspection per the Pilot's Operating Handbook.
2. Balance fanwheel per Section 6.240.
3. Balance tail rotor per Section 10.240.
4. Perform hover checks per Section 2.220 Step 1. DO NOT proceed into forward flight at this time.
5. Track and balance main rotor per Section 10.200.
6. After completing track and balance, adjust autorotation RPM per Section 10.250. Avoid rotor overspeeds by avoiding higher gross weights and higher altitudes during autorotation checks.
7. While climbing at Maximum Continuous Power (MCP), 60 KIAS, and governor on:
   a. Evaluate roughness and controllability.
   b. Perform 30 degree left yaw to check for adequate directional control.
8. Level flight at 2000 feet density altitude (deviate as required for weather and terrain), MCP, and governor on, evaluate the following:
   a. Longitudinal and lateral cyclic control forces.
   b. Collective control forces.
9. Evaluate roughness at MCP and 130 straight and level flight.
10. Check all instruments, gauges, and avionics for proper operation.
11. During autorotation at 50 KIAS and 90% RPM, perform a 30 degree right yaw to check for adequate directional control.

1.800 REPLACEMENT COMPONENT IDENTIFICATION (DATA) PLATES

In order to issue a replacement component identification plate for field installation, RHC must first receive the old identification plate in legible condition. If old identification plate is lost or destroyed, then RHC must have an original letter (photocopies or faxes are NOT acceptable) from customer's Civil Aviation Authority authorizing identification plate replacement AND stating component name, part number, and serial number for each requested identification plate. There is a charge for each plate issued.