

SECTION VIII.

HANDLING, SERVICING & MAINTENANCE

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INTRODUCTION

This section contains factory recommended procedures for proper ground handling, routine care and servicing of your Mooney.

As required by Federal Aviation Regulations, all civil aircraft of U. S. registry must undergo a complete inspection (ANNUAL) each twelve calendar months. In addition to the required ANNUAL inspection, aircraft operated commercially (for hire) must have a complete inspection every 100 hours of operation. All inspections must be performed by a designated representative of the FAA.

The FAA may require other inspections by the issuance of airworthiness directives applicable to the airplane, engine, propeller and other components. It is the responsibility of the owner/operator to ensure compliance with all applicable airworthiness directives and, when the inspections are repetitive, to take appropriate steps to prevent inadvertent noncompliance.

Scheduling of ALL maintenance is the responsibility of the aircraft operator. A general knowledge of the aircraft is necessary to perform day-to-day service procedures and to determine when unusual service or shop maintenance is needed.

Service information in this section of the manual is limited to service procedures which the operator will normally perform or supervise. Reference should be made to FAR Part 43 for information regarding preventive maintenance which may be performed by a licensed pilot.

It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered in your locality.

Keep in touch with your Mooney Service Center and take advantage of his knowledge and experience. He knows your airplane and how to maintain it.

Should an extraordinary or difficult problem arise concerning the repair or upkeep of your Mooney, consult the Customer Service Department, Mooney Aircraft Corporation, P.O. Box 72, Kerrville, TX 78028. Phone Area Code 512-896-6000.

All correspondence regarding your airplane should include the model and serial numbers. These numbers can be found on an identification plate located on the lower aft portion of the left side of the tailcone. The model and serial numbers must also be used when consulting either the Service & Maintenance Manual or Parts Manual.

Service & Maintenance and Parts Manuals may be obtained for your airplane from your Mooney Marketing or Service Center.

GROUND HANDLING

TOWING

For maneuvering the aircraft in close quarters, in the hangar, or on the ramp, use the tow bar furnished with the aircraft loose equipment. The towbar attaches to the nose gear crossbar. One man can move the aircraft providing the ground surface is relatively smooth and the tires are properly inflated.

When no towbar is available, or when assistance in moving the aircraft is required, push by hand:

- (1) on the wing leading edges, (2) on the wing tips, and
- (3) on the inboard portion of propeller blades adjacent to the propeller hub. Towing by tractor or other powered equipment is not recommended.

CAUTION

Exercise care not to turn the nose wheel past its normal swivel angle of 14° either side of center. Exceeding the turn limits shown on the turn indicator may cause structural damage.

TIEDOWN

As a precaution against wind damage, always tie down the aircraft when parked outside. Removable wing tiedown eye-bolts, supplied with the loose equipment, screw into wing receptacles marked HOIST POINT just outboard of each main gear. Replace these eyebolts with jack point fixtures when it is necessary to lift the aircraft with jacks. The tail tiedown point is part of the tail skid.

To tie down the aircraft:

- a. Park the airplane facing the wind.
- b. Fasten the co-pilot seat belt through the flight control wheel.
- c. Fasten strong ground-anchored chain or rope to the installed wing tiedown eyebolts, and place wheel chocks fore and aft of each wheel.
- d. Fasten a strong ground-anchored chain or rope through the tail skid.

JACKING

When it is necessary to raise the aircraft off the ground:

- a. Install jack points in tiedown mounting holes outboard of each main gear.
- b. Use standard aircraft jacks at both wing hoist points (wing tiedown eyebolt receptacles) outboard of the main gears. While holding jack point in place, raise jack to firmly contact jack point.
- c. Raise aircraft, keeping wings as nearly level as possible.
- d. Secure safety locks on each jack.
- e. Use a yoke-frame jack under propeller to lift the nose.

CAUTION

Do not raise the aircraft on jacks out of doors when wind velocity is over 8 KTS. When lowering aircraft on jacks, bleed off pressure on all jacks simultaneously and evenly to keep aircraft level as it is lowered

NOTE

Individual wheels may be raised without raising the entire aircraft. Wheels not being raised should be chocked fore and aft.

SERVICING

REFUELING

Integral sealed tanks in the forward inboard sections of the wings carry the fuel. With the aircraft standing on level ground, service each fuel tank after flight with 100 or 100 LL octane aviation-grade gasoline. Both tanks have fuel level indicators that are visible through the filler ports. These indicators show the 25-gallon fuel level in each tank. The visual quantity gauge located on top of each tank should be used for partial refueling only.

Before filling the fuel tanks when planning a maximum weight flight configuration, consult the Weight & Balance Record for loading data.

CAUTION

Never use aviation fuel of a lower grade than 100 or 100 LL octane. Aviation fuel grades can be distinguished by their color: 80 octane is red, 100 LL octane is blue, 100 octane is green.

Sample fuel from the sump drain in each tank before the first flight of the day and after each refueling to check for water or sediment contamination.

WARNING

Allow five minutes after refueling for water and sediment to settle in the tank and fuel selector valve drain before taking fuel samples or draining the gascolator.

Tank sump drains are near each wing root forward of the wheel wells. A small plastic cup is supplied in the loose equipment kit for obtaining fuel samples. To collect a fuel sample, insert the cup actuator prong in the sump drain receptacle and push upward to open the valve momentarily and drain fuel into the cup. If water is in the fuel, a distinct line separating the water from the gasoline will be seen through the transparent cup wall. Water, being heavier, will settle to the bottom of the cup, while the colored fuel will remain on top. Continue taking fuel samples until all water is purged from the tank.

The fuel tank gascolator control is on the cabin floor forward of the pilot's seat. To flush the gascolator sump and the lines leading from the wing tanks to the selector valve, turn the selector handle to the left, and pull the fuel drain control for about five seconds. Repeat the procedure for the right tank, being sure that the fuel drain control ring is returned to the closed position and that the drain valve is not leaking.

ENGINE LUBRICATION

The new Lycoming engine has been carefully run-in and tested at the factory. Operate the new engine at full power within the limitations given in Section II. Before every flight, check the engine oil level and replenish as necessary.

Check engine oil level after engine has been stopped long enough for oil to drain back into sump. The oil filler cap access door is located in the top cowling. Any lubricating oil, either straight mineral or compounded, must conform with Lycoming Specification No. 301F to be acceptable for use in Lycoming engines. New or newly overhauled engines should be operated on aviation grade straight mineral oil during the first 25 hours of operation or until oil consumption has stabilized. The aircraft is delivered from Mooney with straight mineral oil of the correct viscosity.

The engine is equipped with an external oil filter and the engine oil change intervals may be extended to 100-hour intervals providing the external filter element is changed AT 50-HOUR INTERVALS. If an engine has been operating on straight mineral oil for several hundred

hours, a change to additive oil should be undertaken with caution. If the engine is in an extremely dirty condition, the switch to additive oil should be deferred until after engine has been overhauled. When changing from straight mineral oil to additive or compounded oil, after several hundred hours of operation on straight mineral oil, take the following precautionary steps:

- a. Do not mix additive oil and straight mineral oil. Drain straight mineral oil from engine, change filter and fill with additive oil.
- b. Do not operate engine longer than five hours before again changing oil.
- c. Check oil filter for evidence of sludge or plugging. Change oil and replace oil filter element every 10 hours if sludge is evident. Resume normal oil drain periods after sludge conditions improve.

Your Mooney Service Center will change the engine oil in addition to performing all other service and inspection procedures needed when you bring your airplane in for its 50-hour, 100-hour, or annual inspections. Excessive oil sludge buildup indicates that the oil system needs servicing at less than 50-hour intervals.

When changing or adding oil Lycoming specifies the following grades of oil to use for various ambient air temperatures.

Average Ambient Air	*Recommended Grade Oil	
	Single Viscosity	Multi Viscosity
Above 60°F	SAE 50	40 or 50
30° to 90°F	SAE 40	40
0° to 70°F	SAE 30	40 or 20W-30
Below 10°F	SAE 20	20W-30

*Refer to the latest edition of Lycoming Service Instruction No. 1014.

Your Mooney Service Center has approved brands of lubricating oil and all consumable materials necessary to service your airplane.

INDUCTION AIR FILTER SERVICING

The importance of keeping the induction air filter clean cannot be over-emphasized. A clean filter promotes fuel economy and longer engine life. The dry-type filter can usually be washed six to eight times before replacement is necessary. Replace the induction air filter every 500 hours or at one-year intervals, whichever occurs first.

1. To clean the dry-type induction air filter:
 - a. Remove the top engine cowling.
 - b. Remove filter element.
 - c. Direct a jet of air against down or clean side of filter (opposite to normal airflow). Keep air nozzle at least two inches from filter element. Cover entire filter area with air jet.

CAUTION

Do not use a compressor unit with a nozzle pressure greater than 100 PSI.

- d. After cleaning, inspect filter and gasket for damage. Discard a ruptured filter or broken gasket.

NOTE

If filter shows an accumulation of carbon, soot, or oil, continue with cleaning steps e. through h.

- e. Soak filter in nonsudsing detergent for 15 minutes; then agitate filter back and forth for two to five minutes to free filter element of deposits.

NOTE

A Donaldson D-1400 Filter Cleaner is also recommended. Do not use solvents.

- f. Rinse filter element with a stream of clear water until rinse water is clear.
- g. Dry filter thoroughly. Do not use a light bulb or air heated above 180°F (82°C) for filter drying.
- h. Inspect for damage and ruptures by holding filter before a light bulb. If damage is evident, replace filter with a new one.

GEAR & TIRE SERVICE

The aircraft is equipped with 6-ply standard-brand tires and tubes. Keep the main gear tires inflated at 30 PSI and the nose tire at 49 PSI for maximum service life. Proper inflation will minimize tire wear and impact damage. Visually inspect the tires at preflight for cracks and ruptures, and avoid taxi speeds that require heavy braking or fast turns. Keep the gear and exposed gear retraction system components free of mud and ice to avert retraction interference and binding.

The gear warning horn may be checked in flight by retarding the throttle with the gear up. The gear horn should sound with an intermittent note at about 12 inches manifold pressure.

BATTERY SERVICE

The 12-volt 35-ampere-hour electrical storage battery is located in the tailcone, aft of baggage compartment bulkhead, accessible through tailcone access panel. Check battery fluid level every 25 flight hours or each 30 days, whichever comes first.

To service the battery, remove the battery box cover and check the terminals and connectors for corrosion. Add distilled water to each battery cell as necessary; keep the fluid at one-quarter inch over the separator tops. Check the fluid specific gravity for a reading of 1.265 to

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1. 275. A recharge is necessary when the specific gravity is 1.240 or lower. Start charging at four amperes and finish at two amperes; do not allow battery temperature to rise above 120°F (59°C) during recharging. Keep the battery at full charge to prevent freezing in cold weather and to prolong service life.

CAUTION

The alternator and voltage regulator operate only as a one-polarity system. Be sure the polarity is correct when connecting a charger or booster battery.

If corrosion is present, flush the battery box with a solution of baking soda and water. Do not allow soda to enter the battery cells. Keep cable connections clean and tightly fastened, and keep overflow lines free of obstruction.

HYDRAULIC BRAKE RESERVOIR SERVICE

The brake system hydraulic reservoir is located in the tailcone above the battery. To service, remove the tailcone access panel and check fluid level every 50 hours of operation. Fluid level should be no higher than two (2) inches below the filler cap. Use only hydraulic fluid (Red) conforming to specification MIL-H-5606. DO NOT FILL reservoir while parking brake is set.

MAINTENANCE

PROPELLER CARE

The high stresses to which propeller blades are subjected makes their careful inspection and maintenance vitally important. Check the blades for nicks, cracks, or indications of other damage before each flight. Nicks tend to cause high-stress concentrations in the blades which, if ignored, may result in cracks. It is very important that all nicks and scratches be polished out prior to next flight.

It is not unusual for the propeller blades to have some end play or fore and aft movement as a result of manufacturing

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tolerances in the parts. This has no adverse affect on propeller performance or operation and is no cause for concern if the total movement at the blade tip does not exceed .12 inches. With the first turn, centrifugal force firmly seats the blades, rigidly and positively against the retention bearing in the propeller hub.

Preflight inspection of the propeller blades should include in addition to the foregoing an occasional wiping with an oily cloth to clean off grass and bug stains. Never use an alkaline cleaner on the blades; remove grease and dirt with tetrachloride or Stoddard solvent. McCauley recommends the propeller be removed and overhauled every 1500 hours of operation. Hartzell recommends the optional propeller be removed and overhauled every 1500 hours of operation.

Your Mooney Service Center will answer any questions you may have concerning blade repair and inspection.

EXTERIOR CARE

As with any paint applied to a metal surface, an initial curing period is necessary for developing the desired qualities of durability and appearance. Therefore, do not apply wax to the new aircraft exterior until two or three months after delivery. Wax substances will seal paint from the air and prevent curing. Do wash the exterior to prevent dirt from working into the curing paint, but hold buffing to a minimum until curing is complete and there is no danger of disturbing the undercoat.

Before washing the exterior, be certain the brake discs are covered, a pitot cover is in place, and all static-air buttons are masked off. Remove grease or oil from the exterior by wiping with a cotton cloth saturated in kerosene. Flush away loose dirt and mud deposits before washing the exterior with an aircraft-type washing compound mixed in warm water. Use soft cleaning cloths or a chamois, and avoid harsh or abrasive detergents that might scratch or corrode the surface. It is essential that all cleaning compounds and application cloths be free of abrasives, grit, or other foreign matter. Use a prewax cleaner to remove a heavy oxidation film. For nonoxidized or precleaned surfaces, apply a good exterior finish wax recommended for protection of urethane enamel finishes. Carefully follow the manufacturer's instructions. A heavier coating of wax

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on the leading edge of the wings, empennage and nose section will help reduce drag and abrasion in these areas.

If fuel, hydraulic fluid, or any other dye-containing substance is found on the exterior paint, wash the area at once to prevent staining. Immediately flush away spilled battery acid, and treat the area with a baking soda-and-water solution, followed by a thorough washing with a mild aircraft detergent and warm water.

Before wiping the windows or windshield, flush the exterior with clear water to remove particles of dirt. Household window cleaning compounds should not be used as some contain abrasives or solvents which could harm plexiglas. An anti-static plexiglas cleaner is good for cleaning and polishing the windshield and windows.

INTERIOR CARE

Normal household cleaning practices are recommended for routine interior care. Frequently vacuum clean the seats, rugs, upholstery panels, and headliner to remove as much surface dust and dirt as possible. Occasionally wash the leather or vinyl upholstery and kick panels with a mild soap solution to prevent dirt from working into the surface. Wipe clean with a slightly damp cloth and dry with a soft cloth. Never apply furniture polishes. Foam-type shampoos and cleaners for vinyl, leather, textiles, and plastic materials are good for removing stains and reconditioning the entire interior. Spray dry cleaners are also recommended. Grease spots on fabric should be removed with a jelly-type spot lifter.

Never use denatured alcohol, benzene, carbon tetrachloride, acetone, or gasoline for cleaning plexiglas or interior plastics. Carefully follow the manufacturer's instructions when using commercial cleaning and finishing compounds.

Do not saturate fabrics with a solvent which could damage the backing and padding materials. To minimize carpet wetting, keep foam as dry as possible and gently rub in circles. Use a vacuum cleaner to remove foam and to dry the materials. Use a damp cloth or a mild soap solution to clean interior garnish plastic, vinyl trim, and metal surfaces.

AIRPLANE FILE

Certain miscellaneous data, information and licenses are a part of the airplane file. The following is a checklist of documents that must either be carried in the airplane or available on request of the proper authority.

1. To be displayed in the airplane at all times:
 - (a) Aircraft Airworthiness Certificate
(FAA Form 8100-2)
 - (b) Aircraft Registration Certificate
(FAA Form 8050-3)
 - (c) Aircraft Radio Station License, if transmitter installed (FCC Form 556).
2. To be carried in the airplane during all flight operations:
 - (a) Pilot's Operating Handbook (including FAA Approved Flight Manual)
 - (b) Weight and Balance, and associated papers (latest copy of the Repair and Alteration Form, FAA Form 337, if applicable).
 - (c) Equipment List.

NOTE

The original weight and balance data and Equipment List are contained in Section VI of this manual; the manual is supplied with each new airplane purchased from Mooney Aircraft Corporation. It is recommended that copies of Section VI be made and stored in a safe place.

3. To be made available upon request:
 - (a) Airplane Log Book
 - (b) Engine Log Book

Since the Regulations of other nations may require other documents and data, owners of airplanes not registered in the United States should check with their own aviation officials to determine their individual requirements.



PRATT & LAMBERT

Paints/Chemical Coatings/Adhesives
16116 E. 13TH ST./WICHITA, KA. 67230

CARE AND MAINTENANCE OF YOUR POLYURETHANE FINISH

Congratulations on your purchase of a new Mooney! Pratt and Lambert is proud to be the paint finisher on your new Mooney aircraft. Mooney asked Pratt and Lambert to develop a total finish that would give maximum protection and we feel that the introduction of the corrosion-protective intermediate primer, prior to the finish coat, offers the Mooney owner the latest state-of-the-arts in aircraft protection.

Because the care and maintenance of your paint finish is important to the continued beauty of your aircraft, Pratt and Lambert offers the following guidelines for care and maintenance of your polyurethane paint finish:

Because it takes 30 to 45 days for all the solvents to flash-off, the aircraft should be cleaned only with water and a mild detergent; using a clean, soft cloth, keeping the rag or cloth free of dirt and grime.

You should never use rubbing compound or abrasive polish on your polyurethane finish. Pratt and Lambert recommends that you use only a wax (liquid or paste) to maintain the luster of your paint. Waxing three or four times a year will help to maintain your finish for a longer, brighter life.

Care and maintenance of your paint finish should receive the same attention as the mechanical functions of your aircraft.

Pratt and Lambert wish you many happy hours of flying in your new Mooney.

