

## HANDLING AND SERVICING

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## **HANDLING AND SERVICING**

This section contains information on preventive maintenance. Refer to the PA-28-151 Service Manual for further maintenance procedures. Any complex repair or modification should be accomplished by a Piper Certified Service Center.

### **GROUND HANDLING**

#### **TOWING**

The airplane may be moved by using the nose wheel tow bar available with the airplane, or by power equipment that will not damage or cause excess strain to the nose gear assembly. The tow bar is stowed in the baggage compartment.

#### **CAUTION**

When towing with power equipment, do not turn the nose gear beyond its turning radius in either direction as this will result in damage to the nose gear and steering mechanism.

#### **CAUTION**

Do not tow the airplane when the controls are secured.

#### **TAXIING**

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Engine starting and shut-down procedures and taxiing techniques should be covered. When it is ascertained that the propeller back blast and taxi areas are clear, power should be applied to start the taxi roll, and the following checks should be performed:

- a. Taxi forward a few feet and apply the brakes to determine their effectiveness.
- b. While taxiing, make slight turns to ascertain the effectiveness of the steering.
- c. Observe wing clearances when taxiing near buildings or other stationary objects. If possible, station an observer outside to guide the airplane.
- d. When taxiing on uneven ground, avoid holes and ruts.
- e. Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel, or any loose material that might cause damage to the propeller blades.

### PARKING

When parking the airplane, be sure that it is sufficiently protected from adverse weather conditions and that it presents no danger to other aircraft. When parking the airplane for any length of time or overnight, it is suggested that it be moored securely.

- a. To park the airplane, head it into the wind if possible.
- b. Set the parking brake by pulling back on the brake lever and depressing the knob on the handle. To release the parking brake, pull back on the handle until the catch disengages; then allow the handle to swing forward.

### CAUTION

Care should be exercised when setting brakes that are overheated or during cold weather when accumulated moisture may freeze a brake.

- c. Aileron and stabilator controls may be secured with the front seat belt. Wheel chocks may be used if they are available.

### MOORING

The airplane should be moored for immovability, security, and protection. The following procedures should be used for the proper mooring of the airplane:

- a. Head the airplane into the wind, if possible.
- b. Retract the flaps.
- c. Immobilize the ailerons and stabilator by looping the seat belt through the control wheel and pulling it snug.
- d. Block the wheels.
- e. Secure tie-down ropes to the wing tie-down rings and to the tail skid at approximately 45 degree angles to the ground. When using rope of non-synthetic material, leave sufficient slack to avoid damage to the airplane should the ropes contract.

### CAUTION

Use bowline knots, square knots, or locked slip knots. Do not use plain slip knots.

### NOTE

Additional preparations for high winds include using tie-down ropes from the landing gear forks and securing the rudder.

- f. Install a pitot head cover if one is available. Be sure to remove the pitot head cover before flight.
- g. Cabin and baggage doors should be locked when the airplane is unattended.

## CLEANING

### CLEANING ENGINE COMPARTMENT

Before cleaning the engine compartment, place a strip of tape over the magneto vents to prevent any solvent from entering these units.

- a. Place a large pan under the engine to catch waste.
- b. With the engine cowling removed, spray or brush the engine with solvent or a mixture of solvent and degreaser. In order to remove especially heavy dirt and grease deposits, it may be necessary to brush areas that were sprayed.

#### CAUTION

Do not spray solvent into the alternator, vacuum pump, starter, or air intakes.

- c. Allow the solvent to remain on the engine from five to ten minutes. Then rinse the engine clean with additional solvent and allow it to dry.

#### CAUTION

Do not operate the engine until excess solvent has evaporated or otherwise been removed.

- d. Remove the protective tape from the magnetos.
- e. Lubricate the controls, bearing surfaces, etc., in accordance with the Lubrication Chart.

### CLEANING LANDING GEAR

Before cleaning the landing gear, place a cover of plastic or a similar waterproof material over the wheel and brake assembly.

- a. Place a pan under the gear to catch waste.
- b. Spray or brush the gear area with solvent or a mixture of solvent and degreaser. In order to remove especially heavy dirt and grease deposits, it may be necessary to brush areas that were sprayed.
- c. Allow the solvent to remain on the gear from five to ten minutes. Then rinse the gear with additional solvent and allow it to dry.
- d. Remove the cover from the wheel and remove the catch pan.
- e. Lubricate the gear in accordance with the Lubrication Chart.

### CLEANING EXTERIOR SURFACES

The airplane should be washed with a mild soap and water. Harsh abrasives or alkaline soaps or detergents could make scratches on painted or plastic surfaces or could cause corrosion of metal. Cover areas where cleaning solution could cause damage. To wash the airplane, use the following procedure:

- a. Flush away loose dirt with water.
- b. Apply cleaning solution with a sponge, a soft cloth, or a soft bristle brush.
- c. To remove exhaust stains, allow the solution to remain on the surface longer.
- d. To remove stubborn oil and grease stains use a cloth dampened with naphtha.
- e. Rinse all surfaces thoroughly.
- f. Any good automotive wax may be used to protect and preserve painted surfaces. Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning or polishing. A heavier coating of wax on the leading surfaces will reduce the abrasion problems in these areas.

### CLEANING WINDSHIELD AND WINDOWS

A certain amount of care is needed to keep the windows clean and unmarred. The following procedure is recommended:

- a. Remove dirt, mud, and other loose particles from exterior surfaces with clean water.
- b. Wash with mild soap and clean water or with aircraft plastic cleaner. Use a soft cloth or sponge in a straight back and forth motion. Do not rub harshly.
- c. Remove oil or grease with a cloth moistened with kerosene.

#### CAUTION

Do not use gasoline, alcohol, benzene, carbon tetrachloride, thinner, acetone, or window cleaning sprays.

- d. After cleaning plastic surfaces, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion.
- e. A severe scratch or mar in plastic can be removed by rubbing out the scratch with jeweler's rouge. Smooth both sides and apply wax.

### CLEANING HEADLINER, SIDE PANELS AND SEATS

- a. Clean headliner, side panels and seats with a whisk broom, dusting cloth, or a vacuum cleaner.
- b. Soiled upholstery may be cleaned with a good upholstery cleaner suitable for the material. Carefully follow the manufacturer's instructions. Avoid soaking or harsh rubbing.

#### CAUTION

Solvent cleaners require adequate ventilation.

### **CLEANING CARPETS**

To clean carpets, first remove loose dirt with a vacuum or a whisk broom. For soiled spots and stubborn stains use a noninflammable dry cleaning fluid. Floor carpets may be removed and cleaned like any household carpet.

### **POWER PLANT INDUCTION AIR FILTER**

The wet-type polyurethane foam air filter must be inspected at least once every fifty hours. Under extremely adverse operating conditions, it may be necessary to inspect the filter more frequently. The filter is disposable and inexpensive and a spare should be kept on hand for a rapid replacement.

### **REMOVAL OF INDUCTION AIR FILTER**

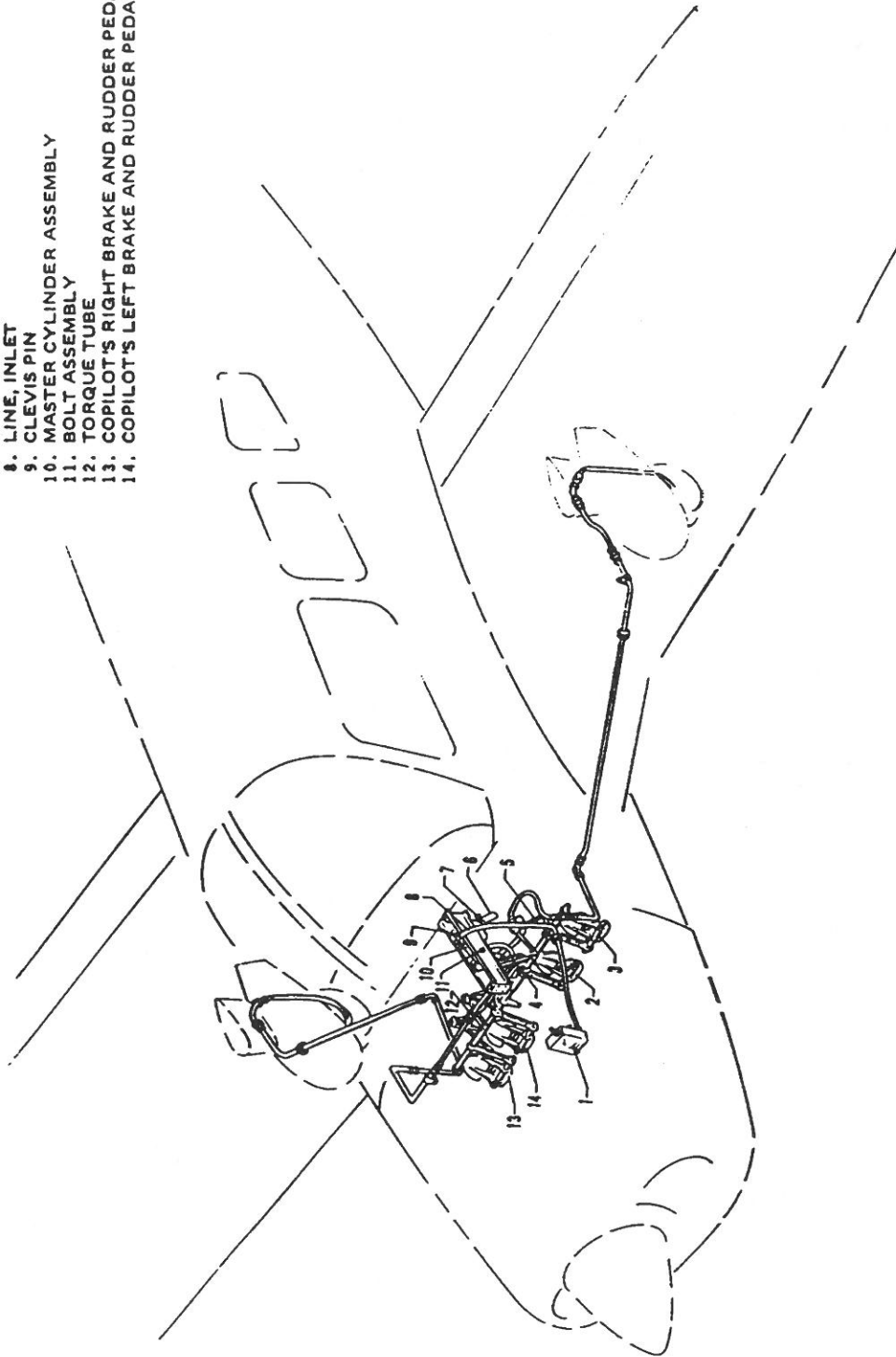
The filter is located in the lower right front of the engine compartment and may be removed by the following procedure:

- a. Open the right side of the engine cowl.
- b. Loosen each of the four quarter-turn fasteners securing the air filter cover.
- c. Separate the cover and remove the filter.
- d. Inspect the filter. If it is excessively dirty or shows any damage, replace it immediately.

### **INSTALLATION OF INDUCTION FILTER**

When replacing the filter, install the filter in the reverse order of removal.

1. BRAKE RESERVOIR
2. RIGHT BRAKE AND RUDDER PEDAL
3. LEFT BRAKE AND RUDDER PEDAL
4. RIGHT BRAKE CYLINDER
5. LEFT BRAKE CYLINDER
6. BRAKE HANDLE
7. HANDLE RELEASE BUTTON
8. LINE, INLET
9. CLEVIS PIN
10. MASTER CYLINDER ASSEMBLY
11. BOLT ASSEMBLY
12. TORQUE TUBE
13. COPILOT'S RIGHT BRAKE AND RUDDER PEDAL
14. COPILOT'S LEFT BRAKE AND RUDDER PEDAL



Brake System

## **BRAKE SERVICE**

The brake system is filled with MIL-H-5606 (petroleum base) hydraulic brake fluid. The fluid level should be checked periodically or at each 50 hour inspection and replenished when necessary. The brake reservoir is located on the upper left side of the fire wall in the engine compartment. If the entire system must be refilled, fill with fluid under pressure from the brake end of the system. This will eliminate air from the system.

No adjustment of brake clearances is necessary. If after extended service brake blocks become excessively worn, they should be replaced with new segments.

## **LANDING GEAR SERVICE**

The main landing gears use Cleveland 6.00 x 6 wheels, and the nose gear carries a Cleveland 5.00 x 5 wheel. All three tires are 4 ply rating, Type III tires with tubes; the main gear tires are 6.00 x 6 and the nose gear tire is 5.00 x 5. (See Tire Inflation, this Section.)

Main wheels are removed by taking off the hub cap, pin, axle nut, and the two bolts holding the brake segment in place, after which the wheel slips easily from the axle.

The nose wheel is removed by taking off the axle nut and washer from one side, sliding out the axle rod and plugs, lightly tapping out the axle tube, and then removing the wheel and spacer tubes from between the fork. Wheels are replaced by reversing the procedure.

Tires are removed from the wheels by deflating the tire, removing the through bolts, and separating the wheel halves.

Landing gear oleo struts should be checked for proper strut exposure and visible leaks. The required extensions for the struts under normal static load (empty weight of airplane plus full fuel and oil) are 3.25 inches for the nose gear and 4.50 inches for the main gear. If the strut exposure is below that required, it should be determined whether air or oil is needed by first raising the airplane on jacks. Depress the valve core to allow air to escape from the strut housing chamber. Remove the filler plug and slowly raise the strut to full compression. If the fluid is then visible up to the bottom of the filler plug hole, only proper extension with air is required.

If fluid is below the bottom of the filler plug hole, oil should be added. Replace the plug with the valve core removed. Then attach a clear plastic hose to the valve stem of the filler plug and submerge the other end in a container of hydraulic fluid (MIL-H-5606). Fully compress and extend the strut several times, thus drawing fluid from the container and expelling air. The torque link assembly must be disconnected to let the strut be extended a minimum of 10 inches. (The nose gear torque links need not be disconnected.) DO NOT allow the strut to extend beyond 12 inches. When air bubbles cease to flow through the hose, fully compress the strut, remove the filler plug, and again check the fluid level. When the fluid level is correct, disconnect the hose, reinstall the valve core, the filler plug, and the main gear torque links.

With the fluid in the strut housing at the proper level, attach a strut pump to the air valve. With the airplane on the ground under normal static load, inflate the oleo strut to the proper strut exposure.



## CHEROKEE WARRIOR

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In jacking the airplane for landing gear or other service, two hydraulic jacks and a tail stand should be used. At least 250 pounds of ballast should be placed on the tail stand before jacking the airplane. The hydraulic jacks are placed under the jack points on the underside of the wings, and the airplane is jacked up until the tail stand can be attached to the tail skid. After attaching the tail stand and adding the ballast, the jacking can be continued until the airplane is at the desired height.

The steering arms from the rudder pedals to the nose gear are adjusted at the rudder pedals or at the nose wheel by turning in or out the threaded rod end bearings. Adjustments are normally made at the forward end of the rods and should be done in such a way that the nose wheel is in line with the fore and aft axis of the airplane when the rudder pedals and rudder are centered. Alignment of the nose wheel can be checked by pushing the airplane back and forth with the rudder centered to determine that the plane follows a perfectly straight line.

The turning arc of the nose wheel is 30 degrees either side of center and is factory adjusted at stops on the bottom of the forging. The turning radius of the nose wheel is 13 feet.

The rudder bar stops should be carefully adjusted so that the rudder bar reaches its full travel just after the rudder hits its stops. This guarantees that the rudder will be allowed to move through its full travel.

### PROPELLER SERVICE

The spinner and backing plate should be cleaned and inspected for cracks frequently. Before each flight the propeller should be inspected for nicks, scratches, or corrosion. If found, they should be repaired as soon as possible by a rated mechanic, since a nick or scratch causes an area of increased stress which can lead to serious cracks or the loss of a propeller tip. The back face of the blades should be painted when necessary with flat black paint to retard glare. To prevent corrosion, all surfaces should be cleaned and waxed periodically.

### OIL REQUIREMENTS

The oil capacity of the Lycoming O-320-E3D series engines is 8 quarts and the minimum safe quantity is 2 quarts. On engines equipped with a pressure screen system, it is recommended that the oil be changed and screen cleaned every 25 hours. On engines equipped with a fuel-flow pressure system, it is recommended that the oil be changed and filter replaced every 50 hours. On engines using either filtration system, it is recommended that the oil be changed and screen cleaned or filter replaced more frequently under unfavorable operating conditions. Time periods between oil changes should not exceed four months.

The following grades are recommended for the specified temperatures:

Temperatures	Single Viscosity Grade	Multi-Viscosity Grade
Above 60°F	SAE 50	SAE 40 or SAE 50
Between 30° and 90°F	SAE 40	SAE 40
Between 0° and 70°F	SAE 30	SAE 40 or 20W-30
Below 10°F	SAE 20	SAE 20W-30

## FUEL SYSTEM

### SERVICING FUEL SYSTEM

At every 50 hour inspection, the fuel screen in the strainer will require cleaning. The strainer, located ahead of the fire wall, is accessible for cleaning through the left cowl door. After cleaning, a small amount of grease applied to the gasket will facilitate reassembly.

### FUEL REQUIREMENTS

The minimum aviation grade fuel for the PA-28-151 is 80/87. Since the use of lower grades can cause serious engine damage in a short period of time, the engine warranty is invalidated by the use of lower octanes.

Whenever 80/87 is not available, the lowest lead 100 grade should be used (See Fuel Grade Comparison Chart, below).

The continuous use, more than 25% of the operating time, of the higher leaded fuels can result in increased engine deposits, both in the combustion chamber and in the engine oil. It may require increased spark plug maintenance and more frequent oil changes. The frequency of spark plug maintenance and oil drain periods will be governed by the amount of lead per gallon and the type of operation. Operation at full rich mixture requires more frequent maintenance periods; therefore it is important to use proper approved mixture leaning procedures.

Reference Avco Lycoming Service Letter No. L185A attached to the Engine Operators Manual for care, operation and maintenance of the airplane when using the higher leaded fuel.

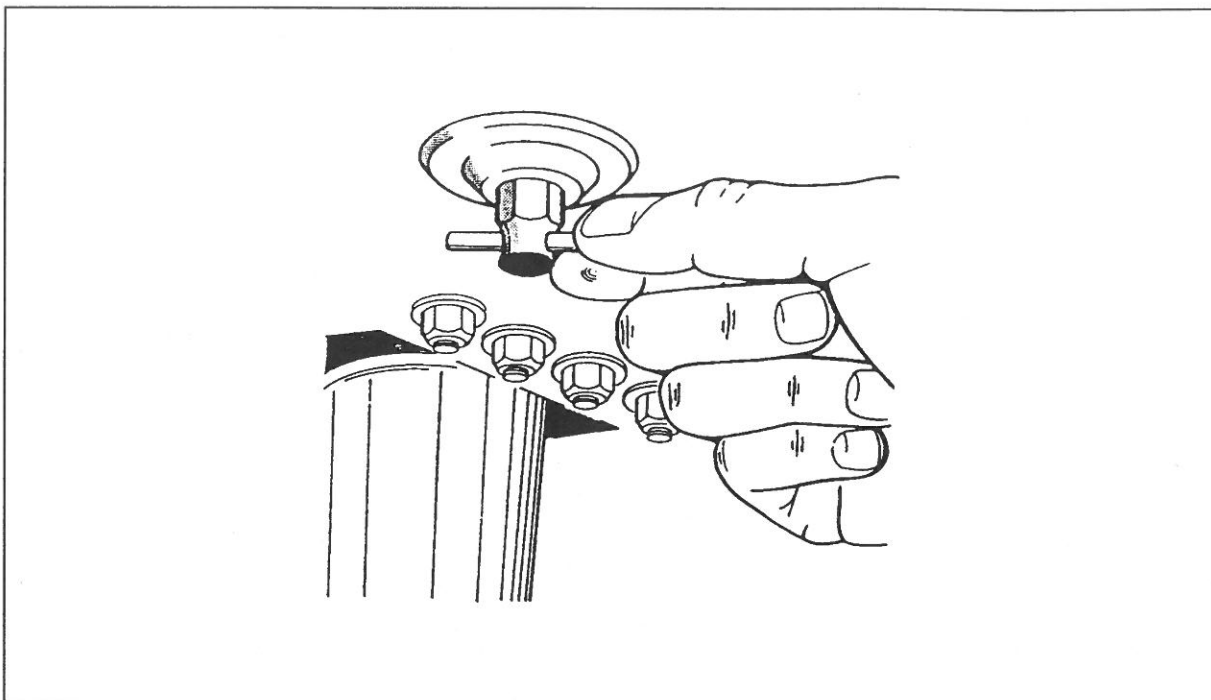
A summary of the current grades as well as the previous fuel designations are shown in the following chart:

**FUEL GRADE COMPARISON CHART**

Previous Commercial Fuel Grades (ASTM-D910)			Current Commercial Fuel Grades (ASTM-D910-75)			Current Military Fuel Grades (MIL-G-5572E) Amendment No. 3		
Grade	Color	Max. TEL ml/U.S. gal.	Grade	Color	Max. TEL ml/US. gal.	Grade	Color	Max. TEL ml/U.S. gal.
80/87	red	0.5	80	red	0.5	80/87	red	0.5
91/98	blue	2.0	*100LL	blue	2.0	none	none	none
100/130	green	3.0	100	green	**3.0	100/130	green	**3.0
115/145	purple	4.6	none	none	none	115/145	purple	4.6

\*- Grade 100LL fuel in some over seas countries is currently colored green and designated as "100L."

\*\* - Commercial fuel grade 100 and grade 100/130 (both of which are colored green) having TEL content of up to 4 ml/U.S. gallon are approved for use in all engines certificated for use with grade 100/130 fuel.



Fuel Drain

#### FILLING FUEL TANKS

Observe all safety precautions required when handling gasoline. Fuel is stored in two 25 U.S. gallon tanks (24 U.S. gallons usable). To obtain the standard quantity of 50 U.S. gallons (approximately 48 U.S. gallons usable), fill each tank to the top of the filler neck.

#### DRAINING FUEL VALVES AND LINES

The fuel system should be drained daily prior to first flight and after refueling to avoid the accumulation of water and sediment. Each fuel tank has an individual quick drain at the bottom inboard rear corner, and on early models each fuel collector manifold has a drain under the wing and near the fuselage. Each of these drains should be opened until sufficient fuel has flowed to ensure the removal of any contaminants.

The gascolator, located on the lower left front of the fire wall, is also equipped with a drain. It too should be checked for water or sediment accumulation. The gascolator drain is accessible from outside the nose section of the airplane.

A special bottle is provided for these fuel draining and checking operations.

#### CAUTION

When draining fuel, be sure that no fire hazard exists before starting the engine.

## DRAINING FUEL SYSTEM

The bulk of the fuel may be drained by opening the individual drain on each tank. The remaining fuel in the lines may be drained through the fuel collector manifold drains (on early models only) and the gascolator drain. Any individual tank may be drained through its individual drain.

### CAUTION

Whenever the fuel system is completely drained and fuel is replenished it will be necessary to run the engine for a minimum of 3 minutes at 1000 RPM on each tank to insure no air exists in the fuel supply lines.

## TIRE INFLATION

For maximum service from the tires, keep them inflated to the proper pressures. The main gear tires should be inflated to 24 psi and the nose gear should be inflated to 30 psi.

Interchange the tires on the main wheels if necessary to produce even wear. All wheels and tires are balanced before original installation, and the relationship of the tire, tube, and wheel should be maintained if at all possible. Unbalanced wheels can cause extreme vibration on takeoff. In the installation of new components, it may be necessary to rebalance the wheel with the tire mounted.

When checking the pressure, examine the tires for wear, cuts, bruises, and slippage.

## BATTERY SERVICE

Access to the 12-volt battery is obtained by raising the rear seat and removing the cover of the battery box. The plastic battery box has a drain tube which is normally closed off with a cap and which should be opened occasionally to drain off any accumulation of liquid.

The battery should be checked for proper fluid level. DO NOT fill the battery above the baffle plates. DO NOT fill the battery with acid - use only water. A hydrometer check will determine the percent of charge in the battery.

If the battery is not up to charge, recharge starting at a 4 amp rate and finishing with a 2 amp rate. Quick charges are not recommended.

## WINTERIZATION

For winter operation a winterization plate is installed on the inlet opening of the oil cooler. This plate should be installed whenever the ambient temperature reaches 50°F or less. The plate should be removed and stored in the cockpit when the ambient temperature exceeds 50°F.

### FACTS YOU SHOULD KNOW

The Federal Aviation Administration (FAA) occasionally publishes **Airworthiness Directives (ADs)** that apply to specific groups of aircraft. They are mandatory changes and are to be complied with within a time limit set by the FAA. When an AD is issued, it is sent by the FAA to the latest registered owner of the affected aircraft and to subscribers of the service. Owners should periodically check with their Piper Service Center or Piper's Customer Services Department to see whether they have the latest AD against their airplane. The owner is solely responsible for keeping up with ADs.

Piper Aircraft Corporation takes a **continuing interest** in having owners get the most efficient use from their airplane and keeping it in the best mechanical condition. Consequently, Piper Aircraft, from time to time, issues Service Bulletins, Service Letters, and Service Spares Letters relating to the airplane.

**Service Bulletins** are of special importance and Piper considers compliance mandatory. These are sent to the latest FAA-registered owners in the United States (U.S.) and Piper Service Centers worldwide. Depending on the nature of the release, material and labor allowances may apply. This information is provided to all authorized Piper Service Centers.

**Service Letters** deal with product improvements and service hints pertaining to the airplane. They are sent to Piper Service Centers and, if necessary, the latest FAA-registered owners in the U.S. Owners should give careful attention to Service Letter information.

**Service Spares Letters** offer improved parts, kits, and optional equipment which were not available originally, and which may be of interest to the owner.

Piper Aircraft Corporation offers a **subscription service** for Service Bulletins, Service Letters, and Service Spares Letters. This service is available to interested persons, such as owners, pilots, and mechanics at a nominal fee, and may be obtained through a Piper Service Center or Piper's Customer Services Department.

A maintenance manual, parts catalog, and revisions to both, are available from Piper Service Centers or Piper's Customer Services Department. Any correspondence regarding the airplane should include the airplane model and serial number to ensure proper response.

**Pilot's Operating Manual** supplements are distributed by the manufacturer as necessary. These revisions and additions should be studied and put into the operating manual to keep it up to date. This manual contains important information about the operation of the aircraft and should be kept with the airplane at all times, even after resale. Every owner, to avail themselves of the latest information concerning their airplane, should stay in contact with their Piper Service Center or Piper's Customer Services Department.

The owner or pilot is required to ascertain that the following Aircraft Papers are in order and in the aircraft.

- a. To be displayed in the aircraft at all times:
  - 1. Aircraft Airworthiness Certificate Form FAA-1362B.
  - 2. Aircraft Registration Certificate Form FAA-500A.
  - 3. Aircraft Radio Station License Form FCC-404A, if transmitters are installed.
- b. To be carried in the aircraft at all times:
  - 1. Aircraft Flight Manual.
  - 2. Weight and Balance data plus a copy of the latest Repair and Alteration Form FAA-337, if applicable.
  - 3. Aircraft equipment list.

Although the aircraft and engine log books are not required to be in the aircraft, they should be made available upon request. Log books should be complete and up to date. Good records will reduce maintenance cost by giving the mechanic information about what has or has not been accomplished.

### PREVENTIVE MAINTENANCE

The holder of a Pilot Certificate issued under FAR Part 61 may perform certain preventive maintenance described in FAR Part 43. This maintenance may be performed only on an aircraft which the pilot owns or operates and which is not used in air carrier service. The following is a list of the maintenance which the pilot may perform:

1. Repair or change tires and tubes.
2. Service landing gear wheel bearings, such as cleaning, greasing or replacing.
3. Service landing gear shock struts by adding air, oil or both.
4. Replace defective safety wire and cotter keys.
5. Lubrication not requiring disassembly other than removal of non-structural items such as cover plates, cowling or fairings.
6. Replenish hydraulic fluid in the hydraulic reservoirs.
7. Refinish the exterior or interior of the aircraft (excluding balanced control surfaces) when removal or disassembly of any primary structure or operating system is not required.
8. Replace side windows and safety belts.
9. Replace seats or seat parts with replacement parts approved for the aircraft.
10. Replace bulbs, reflectors and lenses of position and landing lights.
11. Replace cowling not requiring removal of the propeller.
12. Replace, clean or set spark plug clearance.
13. Replace any hose connection, except hydraulic connections, with replacement hoses.
14. Replace pre-fabricated fuel lines.
15. Replace the battery and check fluid level and specific gravity.

Although the above work is allowed by law, each individual should make a self analysis as to whether he has the ability to perform the work.

If the above work is accomplished, an entry must be made in the appropriate log book. The entry should contain:

1. The date the work was accomplished.
2. Description of the work.
3. Number of hours on the aircraft.
4. The certificate number of pilot performing the work.
5. Signature of the individual doing the work.



## REQUIRED SERVICE AND INSPECTION PERIODS

Piper Aircraft Corporation provides for the initial and first 50-hour inspection, at no charge to the owner. **The Owner Service Agreement** which the owner receives upon delivery of the aircraft should be kept in the aircraft at all times. This identifies him to authorized Piper dealers and entitles the owner to receive service in accordance with the regular service agreement terms. This agreement also entitles the transient owner full warranty by any Piper dealer in the world.

**One hundred hour** inspections are required by law if the aircraft is used commercially. Otherwise this inspection is left to the discretion of the owner. This inspection is a complete check of the aircraft and its systems, and should be accomplished by a Piper Authorized Service Center or by a qualified aircraft and power plant mechanic who owns or works for a reputable repair shop. The inspection is listed, in detail, in the inspection report of the appropriate Service Manual.

An **annual inspection** is required once a year to keep the Airworthiness Certificate in effect. It is the same as a 100-hour inspection except that it must be signed by an Inspection Authorized (IA) mechanic or a General Aviation District Office (GADO) representative. This inspection is required whether the aircraft is operated commercially or for pleasure.

A **Progressive Maintenance** program is approved by the FAA and is available to the owner. It involves routine and detailed inspections at 50-hour intervals. The purpose of the program is to allow maximum utilization of the aircraft, to reduce maintenance inspection cost and to maintain a maximum standard of continuous airworthiness. Complete details are available from Piper dealers.

A **spectrographic analysis** of the oil is available from several sources. This system, if used intelligently, provides a good check of the internal condition of the engine. For this system to be accurate, oil samples must be sent in at regular intervals, and induction air filters must be cleaned or changed regularly.



TYPE OF LUBRICANT			PREFERRED PRODUCT AND VENDOR
IDENTIFICATION LETTER	LUBRICANT	SPECIFICATION	
A	LUBRICATING OIL GENERAL PURPOSE, LOW TEMP.	MIL-L-7870	
B	LUBRICATING OIL, AIRCRAFT RECIPROCATING ENGINE (PISTON) GRADE AS SPECIFIED SAE 50 ABOVE 60°F AIR TEMP. SAE 40 30°F TO 90°F AIR TEMP. SAE 30 0° TO 70°F AIR TEMP. SAE 20 BELOW 10°F AIR TEMP.	MIL-L-6082	
C	HYDRAULIC FLUID PETROLEUM BASE	MIL-H-5606	
D	GREASE, AIRCRAFT AND INSTRUMENT, GEAR AND ACTUATOR SCREW	MIL-G-23827	
E	GREASE, AIRCRAFT, HIGH TEMP.		TEXACO MARFAK ALL PURPOSE GREASE, MOBIL GREASE 77 (OR MOBILUX EP2), SHELL ALVANIA EP GREASE 2
F	PARKER "O" RING LUBRICANT		
G	AERO LUBRIPLATE		FISKE BROS. REFINING CO.
H	FLUOROCARBON RELEASE AGENT DRY LUBRICANT	*MS-122	
I	GREASE - LUBRICATION GEN PURPOSE AIRCRAFT	MIL-G-7711	

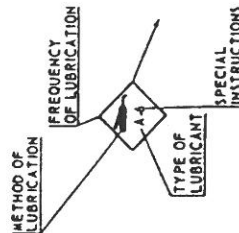
NOTES

1. PILOT AND PASSENGER SEATS - LUBRICATE TRACK ROLLERS AND STOP PINS AS REQUIRED. (TYPE OF LUBRICANT: "A")
2. WHEEL BEARINGS REQUIRE CLEANING AND REPACKING AFTER EXPOSURE TO AN ABNORMAL QUANTITY OF WATER.
3. FUEL SELECTOR VALVE - LUBRICATE FUEL SELECTOR VALVE AS REQUIRED, REFER TO PAPER SERVICE LETTER NO. 351
4. SEE LYCOMING SERVICE INSTRUCTIONS NO. 1014 FOR USE OF DETERGENT OIL.

CAUTIONS

1. DO NOT USE HYDRAULIC FLUID WITH A CASTOR OIL OR ESTER BASE.
2. DO NOT OVER-LUBRICATE COCKPIT CONTROLS.
3. DO NOT APPLY LUBRICANT TO RUBBER PARTS.

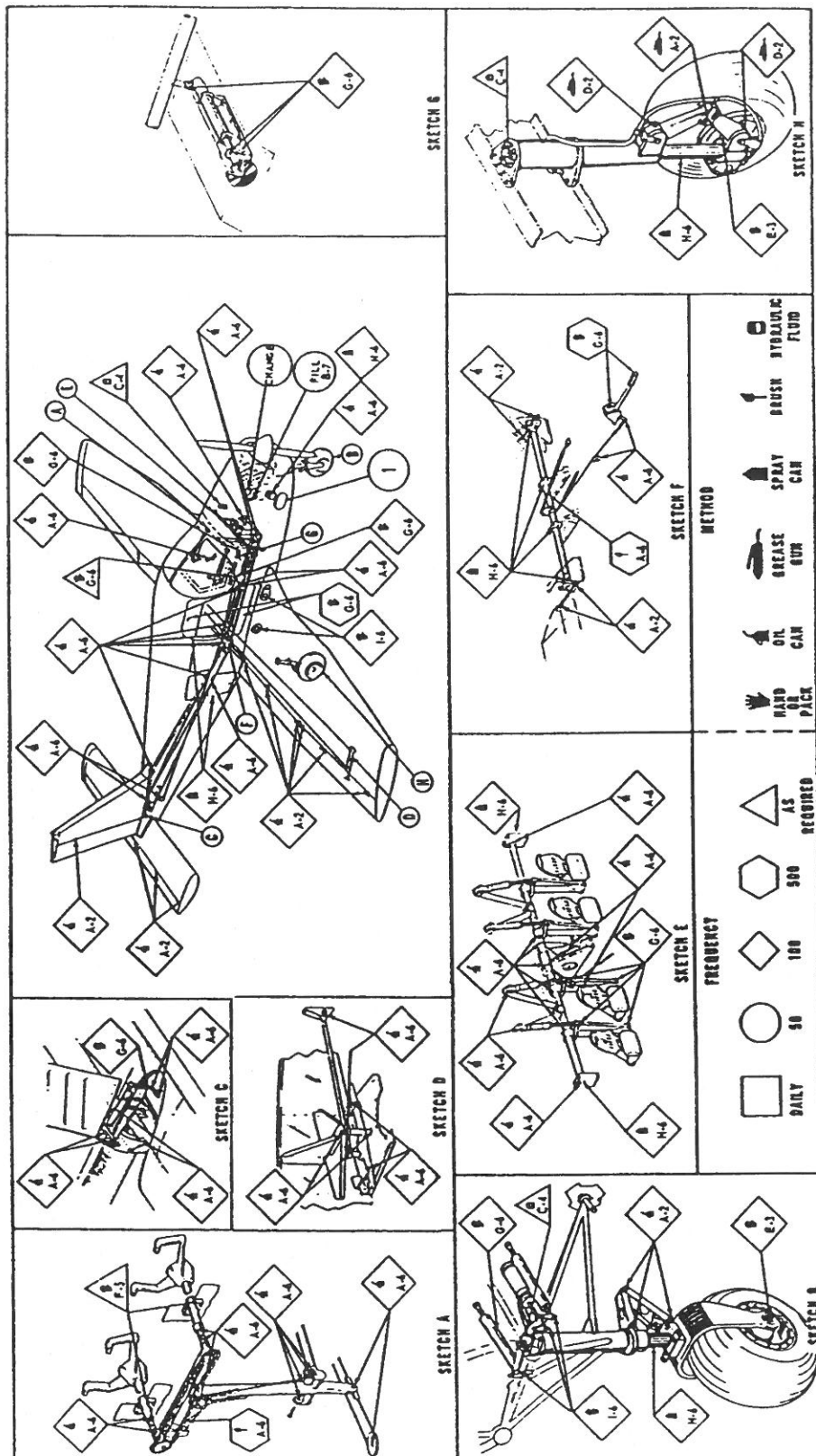
EXAMPLE



SPECIAL INSTRUCTIONS

1. AIR FILTER - TO CLEAN FILTER, TAP GENTLY TO REMOVE DIRT PARTICLES. DO NOT BLOW OUT WITH COMPRESSED AIR OR USE OIL. REPLACE FILTER IF PUNCTURED OR DAMAGED.
2. BEARINGS AND BUSHINGS - CLEAN EXTERIOR WITH A DRY TYPE SOLVENT BEFORE LUBRICATING.
3. WHEEL BEARINGS - DISASSEMBLE AND CLEAN WITH A DRY TYPE SOLVENT. ASCERTAIN THAT GREASE IS PACKED BETWEEN THE BEARING ROLLER AND CONE. DO NOT PACK GREASE IN WHEEL HOUSING.
4. OLEO STRUTS AND BRAKE RESERVOIR - FILL PER INSTRUCTIONS ON UNIT OR CONTAINER, OR REFER TO SERVICE MANUAL, SECTION II
5. "O" RING, CONTROL SHAFT BUSHING (WITH 1.125 INCH SHAFT ONLY) - DISASSEMBLE "O" RING RETAINER PLATES FROM INSTRUMENT PANEL, LUBRICATE "O" RING AND REASSEMBLE
6. LUBRICATION POINTS - WIPE ALL LUBRICATION POINTS CLEAN OF OLD GREASE, OIL, DIRT, ETC. BEFORE LUBRICATING.
7. INTERVALS BETWEEN OIL CHANGES CAN BE INCREASED AS MUCH AS 100% ON ENGINES EQUIPPED WITH FULL FLOW (CARTRIDGE TYPE) OIL FILTERS, PROVIDED THE ELEMENT IS REPLACED EACH 50 HOURS OF OPERATION AND THE SPECIFIED OCTANE FUEL IS USED. SHOULD FUEL OTHER THAN THE SPECIFIED OCTANE RATING FOR THE POWER PLANT BE USED, REFER TO LYCOMING SERVICE LETTER NO. L185A FOR ADDITIONAL INFORMATION AND RECOMMENDED SERVICE PROCEDURES.

Lubrication Nomenclature



Lubrication Chart