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SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

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AIRPLANE HANDLING, SERVICING AND MAINTENANCE

8.1 GENERAL

This section provides general guidelines relating to the handling, servicing and maintenance of the Chieftain.

Every owner should stay in close contact with his Piper dealer or distributor and Authorized Piper Service Center to obtain the latest information pertaining to his aircraft and to avail himself of the Piper Aircraft Service Back-up.

Piper Aircraft Corporation takes a continuing interest in having the owner get the most efficient use from his aircraft 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 aircraft.

Service Bulletins are of special importance and should be complied with promptly. These are sent to the latest registered owners, distributors and dealers. Depending on the nature of the bulletin, material and labor allowances may apply, and will be addressed in the body of the Bulletin.

Service Letters deal with product improvements and service hints pertaining to the aircraft. They are sent to dealers, distributors and occasionally (at the factory's discretion) to latest registered owners, so they can properly service the aircraft and keep it up to date with the latest changes. Owners should give careful attention to the 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.

If an owner is not having his aircraft serviced by an Authorized Piper Service Center, he should periodically check with a Piper dealer or distributor to find out the latest information to keep his aircraft up to date.

Piper Aircraft Corporation has a Subscription Service for the Service Bulletins, Service Letters and Service Spares Letters. This service is offered to interested persons such as owners, pilots, and mechanics at a nominal fee, and may be obtained through Piper dealers and distributors.

A service manual, parts catalog, and revisions to both, are available from Piper dealers or distributors. Any correspondence regarding the airplane should include the airplane model and serial number to insure proper response.

8.3 AIRPLANE INSPECTION PERIODS

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 also to subscribers of their service. The owner should periodically check with his Piper dealer or A & P mechanic to see whether he has the latest issued AD against his aircraft.

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 the 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 Programmed Inspection 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 spectographic 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.

8.5 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 to carry persons or property for hire, except as provided in applicable FAR's. Although such maintenance is allowed by law, each individual should make a self-analysis as to whether he has the ability to perform the work.

All other maintenance required on the airplane should be accomplished by appropriately licensed personnel.

If maintenance is accomplished, an entry must be made in the appropriate logbook. The entry should contain:

(a) The date the work was accomplished.

(b) Description of the work.

(c) Number of hours on the aircraft.
(d) The certificate number of pilot performing the work.
(e) Signature of the individual doing the work.

8.7 AIRPLANE ALTERATIONS

If the owner desires to have his aircraft modified, he must obtain FAA approval for the alteration. Major alterations accomplished in accordance with Advisory Circular 43.13-2, wnen performed by an A&P mechanic, may be approved by the local FAA office. Major alterations to the basic airframe or systems not covered by AC 43.13-2 require a Supplemental Type Certificate.

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) Pilot's Operating Handbook.
    (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 logbooks are not required to be in the aircraft, they should be made available upon request. Logbooks 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.

8.9 GROUND HANDLING

(a) Towing

The airplane may be towed by use of the nose wheel tow bar stowed in the baggage area or with power equipment that will not damage or excessively strain the nose gear steering assembly.

CAUTION

When towing with power equipment, do not turn the nose gear beyond its turning radius in either direction, as this may result in damage to the nose gear and steering mechanism. Turn limits are marked on a placard on the nose gear strut assembly.

CAUTION

Do not tow the airplane when the controls are secured. Do not push or pull on the propeller or the control surfaces when handling the airplane on the ground.

(b) 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 procedures should be followed:

(1) Taxi with the propeller in the low pitch, high RPM setting.
(2) When taxiing on uneven ground, avoid holes and ruts.
(3) Observe wing clearances when taxiing near buildings or other stationery objects. If possible, station an observer outside to guide the airplane.
(4) Do not operate the engines 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.

(5) Be sure that alternate air is not being used.
(6) After taxiing forward a few feet, apply the brakes to determine their effectiveness.
(7) While taxiing, make slight turns to ascertain the effectiveness of the steering.
(8) When the aircraft is stopped on the taxiway or runway and brake freeze-up occurs, actuate the brakes several times using maximum pressure. To reduce the possibility of brake freeze-up during taxi operation in severe weather conditions, one or two taxi slow-downs (from 25 to 5 knots) may be made using light brake pressure, which will assist moisture evaporation within the brake.

(c) Parking

When parking the airplane, be sure that it is sufficiently protected against 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.

(1) When parking the airplane, head it into the wind if possible.
(2) The parking brake handle is located on the lower left face of the instrument panel. To set the parking brake, first depress and hold the toe brake pedals and then pull out the parking brake handle. To release the parking brake, first depress and hold the toe brake pedals and then push in on the parking brake handle.

WARNING

Braking may not occur if parking brake handle is pulled and held prior to brake pedal application.

CAUTION

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

When excessive moisture/freezing temperature conditions exist, parked aircraft should have their brakes in the OFF condition and wheel chocks should be properly positioned. If brake freeze-up is suspected, actuate the brakes several times using maximum pressure.

(3) Aileron and elevator controls may be secured with the front seat belts. Wheels should be blocked if chocks are available.

(d) Mooring

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

(1) Head the airplane into the wind if possible.
(2) Retract the flaps.
(3) Immobilize the ailerons and elevator by looping the seat belts through the control wheel and pulling it snug.
(4) Block the wheels.
(5) Secure tie-down ropes to the wing tie-down rings and 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.

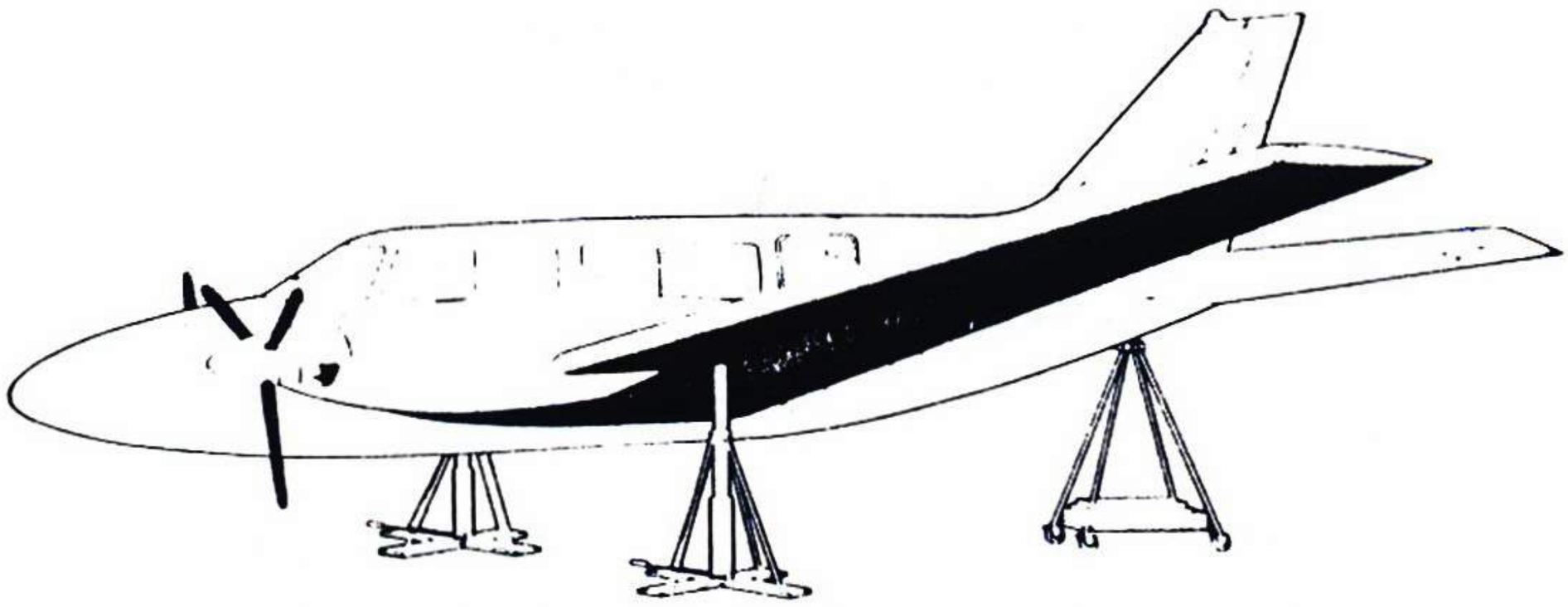
CAUTION

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.

(6) Install the pitot head cover(s) if available. Be sure to remove the pitot head cover(s) before flight.
(7) Cabin and baggage doors should be locked when the airplane is unattended.



JACKING ARRANGEMENT

Figure 8-1

(e) Jacking

When it is necessary to place the airplane on jacks for landing gear servicing or other servicing operations, be sure that the jack pads (located on the underside of the front wing spars outboard of the engine nacelles) are used (Figure 8-1). A tail support will be necessary and should be attached to the tail skid and weighted with approximately 500 pounds of ballast. For complete jacking instructions refer to the Service Manual.

CAUTION

Be sure to apply sufficient tail support ballast or the airplane will tip forward. Should it be necessary to raise the nose gear while the main gear remain on the ground, use the seat belts to hold the control wheel aft, raising the elevators to neutral or higher. If the elevators are down, the tabs will contact the ground before the skid and could be damaged.

8.11 SERVICING AIR FILTERS

Induction air filters should be cleaned and examined at least once every fifty hours. Filters should be replaced if the paper filter material is torn or ruptured, if the housing is damaged, or if the filter is excessively dirty. The usable life of an air filter should be restricted to one year or 500 hours, whichever comes first. Depending on the conditions in which the airplane is operated, filters may have to be cleaned or replaced at shorter intervals.

(a) Remove the screws from the securing brackets on both sides of the filter box and remove the filter.
(b) Check the filter. If its damaged or excessively dirty, replace it immediately.
(c) Clean the filter by one of the two following methods:
    (1) Keeping the air nozzles at least one inch from the filter, direct a jet of air not exceeding 100 psi up and down the pleats on the clean air side of the filter. This method will remove grit, dust, and sand from the filter.
    (2) If carbon, soot, or oil remain on the filter after completing the above procedure, soak the filter for 15 minutes in a good non-sudsing detergent; then swish it gently in the solution for about two minutes. Rinse the filter with a stream of water not exceeding 40 psi until the rinse water is clear. Dry the filter thoroughly before reinstalling, but do not use light bulbs or extreme heat for drying.
(d) Recheck the filter for damage, and if it is found to be clean and sound, reinstall the filter.
(e) Before reinstalling the filter, examine the filter gasket. It should have no tears and should be securely in place.

8.13 BRAKE SERVICE

The brake system is filled with MIL-H-5606 (petroleum base, red) hydraulic fluid. This should be checked at every 50 hour inspection and replenished when necessary.

Do not use vegetable base brake fluids (blue) when refilling the system. The brake fluid reservoir is filled by opening the access door, which is located above the forward access panel on the right side of the fuselage, and removing the filler cap. Then add fluid to the reservoir to the required level.

If it is necessary to bleed the brake system to get air out of the lines, fluid should be added under pressure at the bleeder attachment on the brake unit.

No adjustment of brake clearances is necessary. If, after extended service, braking action requires too much movement of the toe pedal or the brakes are spongy, check the Service Manual for corrective action.

Main wheels are easily removed by removing the dust cover, hub cap, cotter pin, and axle nut. The wheel will slip off the axle.

8.15 HYDRAULIC SYSTEM SERVICE

The fluid level of the hydraulic reservoir should be checked every 50 hours by placing the airplane in a level position and viewing the fluid level through the sight gauge on the reservoir dome. Access to the reservoir is through the forward baggage compartment door. The reservoir is mounted directly aft of the radio shelf.

If fluid is required, filtered hydraulic fluid MIL-H-5606 should be added. Fluid may be added by utilizing the filler line located at the upper forward corner of the access panel on the right side of the nose section. See Service Manual for filling instructions.

8.17 LANDING GEAR SERVICE

The operation of the landing gear oleos is standard for the air-oil type. Hydraulic fluid passing through an orifice serves as the major shock absorber, while air compressed statically acts as a taxiing spring. The piston tube has a total travel of 8 inches on the nose and 9 inches on the main. About 3.25 inches of tube should be exposed under normal static loads.

All of the oleos are inflated through readily accessible valves on the top of the unit. All major attachments and actuating bearings are equipped with grease fittings for lubrication of the bearing surfaces, and should be lubricated periodically. (Refer to the Lubrication Chart in the Service Manual.)

In the event the oleo strut slowly loses pressure and extension, the most probable source of trouble is the air valve attachment to the leg or the core of the air valve. These parts should be checked first to determine whether or not air leaks are occurring. If a hydraulic fluid leak is evident on the exposed chrome plated oleo strut, the O-rings on the piston tube bearing units may need to be replaced. If the landing gear is washed with a degreaser (refer to Paragraph 8.43), the strut must be lubricated or the O-ring will fail.

NOTE

The exposed portion of the strut piston should be wiped down regularly with hydraulic fluid. This can contribute to the service life of the strut seals.

To add air to the oleo struts, a strut pump is attached at the air valve and the oleo pumped up until 3.25 inches of piston tube is exposed with normal static weight on the gears. To add hydraulic fluid, first place the airplane on jacks; then release all the air through the valves, allowing the oleo to extend fully. Next, remove the air valve and fill the unit through this opening. Compress the oleo again to within ¼ inch of full compression, allowing excess hydraulic fluid to overflow and working out trapped air. Then reinsert the valve core and pump up the strut.

The turning arc of the nose wheel is 20 degrees in either direction and is factory adjusted at stops on the bottom of the forging. The turning radius of the nose wheel is approximately 25 feet.

8.19 TIRE SERVICE

For maximum service from the tires, keep them inflated to the proper pressure of 42 psi for the nose wheel and 66 psi for the main wheels. When inflating the tires, visually inspect them for cracks and breaks. If necessary, reverse the tires on the wheels or interchange them for even wear. All tires and wheels are balanced before original installation, and the relationship of tire, wheel, and tube should be maintained upon reinstallation. If new components are installed, it may be necessary to rebalance the wheels with the tires mounted. Out-of-balance wheels can cause extreme vibration during takeoff and landing.

8.21 PROPELLER SERVICE

Since propellers will pick up loose pieces of rock or debris from the ramp and runway, the blades should be checked periodically for damage. Minor nicks in the leading edge of blades should be filed out and all edges rounded, since cracks sometimes start from such defects. Use fine emery cloth for finishing the depressions. Repairs should be accomplished by authorized personnel. Refer to FAA Advisory Circular 43.13-1 for blade

repair recommendations and repair limitations. The daily inspection should include examination of blades and spinner for visible damage or cracks and inspection for grease or oil leakage.

Remove spinner cap and check air pressure or, if necessary, charge the cylinder with dry air or nitrogen gas to the prescribed pressure. Refer to the placard in the spinner cap or following Table for an exact pressure for the existing temperature. It is most important that an accurate air charge be maintained.

NOTE

Do not check pressure or charge with propeller in feathered position.

CHAMBER PRESSURE REQUIREMENTS
WITH TEMPERATURE

Temperature °F	Chamber Pressure (PSI)
70 to 100	41 ± 1 lb.
40 to 70	38 ± 1 lb.
0 to 40	36 ± 1 lb.
-30 to 0	33 ± 1 lb.

8.23 OIL REQUIREMENTS

The oil capacity of the Lycoming TIO-540-J2BD and LTIO-540-J2BD engines is 12 quarts. The minimum safe quantity of oil in the sump is 2¾ quarts. It is recommended that the engine oil and oil filter element be changed every 50 hours of flying time. Under unfavorable dusty conditions, the oil and oil filter should be changed more frequently.

It is recommended that single or multi-viscosity aviation grade oils in accordance with latest issue of Avco-Lycoming Service Instruction 1014 be used. The following seasonal aviation oil grades and seasonal ambient temperature ranges are recommended.

LUBRICATING OIL RECOMMENDATIONS
USE AVIATION ENGINE OIL FOR PISTON ENGINES

Outside Air Temperature	MIL-L-6082B Straight Mineral SAE Weight	(Reference Aviation Grades)	MIL-L-22851 Ashless Dispersant SAE Grades
Above 60°F	50	100	20W-40 or 50
30°F to 90°F	40	80	20W-40
0°F to 70°F	30	65	20W-40 or 20W-30
Below 10°F	20	—	20W-30

(Refer to the Lycoming S.I. 1014 latest revision when changing from straight mineral to ashless dispersant oil.)

NOTE

When checking oil level, read right engine side of dipstick for right engine, and left engine side of dipstick for left engine.

8.25 FUEL SYSTEM

(a) Fuel Requirements (AVGAS ONLY)

Aviation grade 100/130 (minimum) octane should be used in the Chieftain. The use of lower grades of fuel can cause serious damage in a very short period of time, and is considered of such importance that the engine warranty is invalidated by such use. Refer to Paragraph 1.7, Fuel.

The operation of the aircraft is approved with or without an anti-icing additive in the fuel. When an anti-icing additive is used it must meet the specification MIL-I-27686, must be uniformly blended with the fuel while refueling, must not exceed 0.15% by volume of the refueled quantity, and to ensure its effectiveness should be blended at not less than 0.10% by volume. One and one half liquid ozs. per ten gallon of fuel would fall within this range. A blender supplied by the additive manufacturers should be used. Except for the information contained in this section, the manufacturer's mixing or blending instructions should be carefully followed.

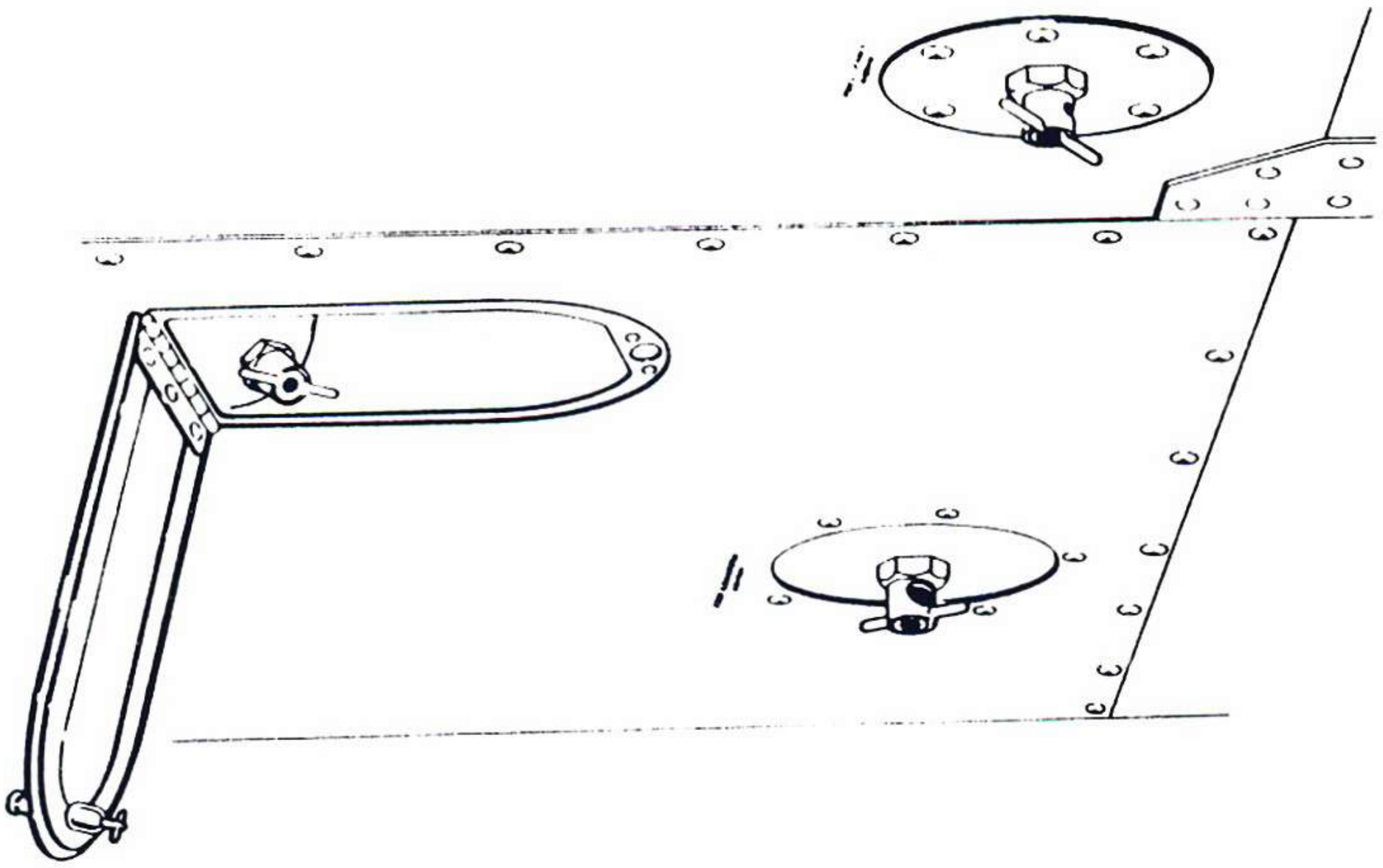
CAUTIONS

Assure that the additive is directed into the flowing fuel system. The additive flow should start after and stop before the fuel flow. Do not permit the concentrated additive to come in contact with the aircraft painted surfaces or the interior surfaces of the fuel tanks.

This additive should not be used as a replacement for preflight draining of the fuel system drains.

(b) Inspection

At every 50 hour inspection or every 90 days, screens and bowls in the fuel filter units should be cleaned.



FUEL DRAINS
Figure 8-3

(c) Filling Fuel Cells

The fuel supply is carried in two 56 gallon main cells and two 40 gallon auxiliary cells. A filler neck is provided in the upper center section of each wing for servicing the main cells, while another filler neck in the upper outboard section of each wing is provided for servicing the auxiliary cells. Observe all safety precautions required when handling gasoline.

When refueling the Chieftain, ground the refueling hose before beginning the transfer of fuel. Secure the filler cap immediately after servicing each cell. The optional lockable filler cap need not be locked to be secure.

NOTE

Never leave the fuel cells completely dry, or the cell inner liners may dry out and crack, permitting fuel to diffuse through the walls of the cell after refueling. If the cell is to be left empty for a week or more, spray the inner liner with a light coat of engine oil.

(d) Fuel Draining

Condensed water vapor can be drained from the main or auxiliary cells by the quick-drain fittings on the wing panel lower surface (Figure 8-3).

The fuel filter drain and inboard fuel cell fuel line drain valves are located inboard of the main wheel wells, and the outboard fuel cell drain valves are outboard of the main wheel wells. They are fitted with quick drains and should be drained regularly. In order to check the fuel system for possible moisture content, the inboard fuel cell line quick drain valve should be opened and drained and the quick drain valve on the fuel filter should be opened and drained. This procedure should be repeated at the quick drain valves located outboard of the main wheel well. Fuel screens are provided at the cell outlets, in the injectors, and in the fuel filter bowls.

A crossfeed line drain valve is located to the rear of the left fuel filter drain valve. This valve should be opened occasionally, with the crossfeed on, the left emergency fuel pump on, and then the right emergency fuel pump on to allow any water that might accumulate at that point to be drained out.

CAUTION

When draining fuel, care should be taken to insure that no fire hazard exists before starting the engines.

8.27 BATTERY SERVICE

Access to the battery is through the forward baggage compartment opening. The stainless steel battery box has a plastic drain tube, located on the bottom right rear corner, to drain off any electrolyte that may have overflowed into the box.

Corrosion on the battery terminals and connections may be neutralized by applying a solution of baking soda and water mixed to the consistency of thin cream. Do not allow any of this soda solution to enter the battery. Repeat this application until all bubbling action has ceased before washing battery and box with clean water. Dry battery and box and close drain tube clamp.

Whenever checking the battery, ascertain that all connections are clean and tight and the fluid level is above the baffle plates. If it is necessary to add fluid, use distilled water.

A hydrometer check should be performed to determine the percentage of charge present in the battery.

Hydrometer Readings	Percent of Charge
1280	100
1250	75
1220	50
1190	25
1160	Very little useful capacity
1130 or below	Discharged

The battery should be removed for recharging. Starting recharge current should be 2 amperes. Finishing current should be 1 ampere.

8.29 PRESSURE GYRO SYSTEM

The pressure gyro system operates at a pressure of 4.3 to 6.1 inches of mercury. The system obtains the regulated pressure from the engine driven pressure pumps. The filters on the pumps should be inspected regularly and changed every 100 hours. The setting of the pressure regulators should be performed by an experienced mechanic.

8.31 HEATING SYSTEM

A preflight check should be made of the air inlet scoop, combustion air inlet scoop, exhaust outlet, and fuel drain for possible obstructions. Make sure that all of the openings are clear of any restrictions and that no damage has occurred to the exhaust outlet or combustion air inlet.

An operational check can be performed by moving the airplane master switch to the ON position and the heater control toggle switch to the HEAT position. The ventilating air blower and combustion air blower should operate.

To proceed with the operational check, move the right tank fuel control and the right emergency fuel pump switch to ON. This will start the fuel and ignite the burner simultaneously; heat should be felt within a few minutes.

8.33 PROPELLER DEICING*

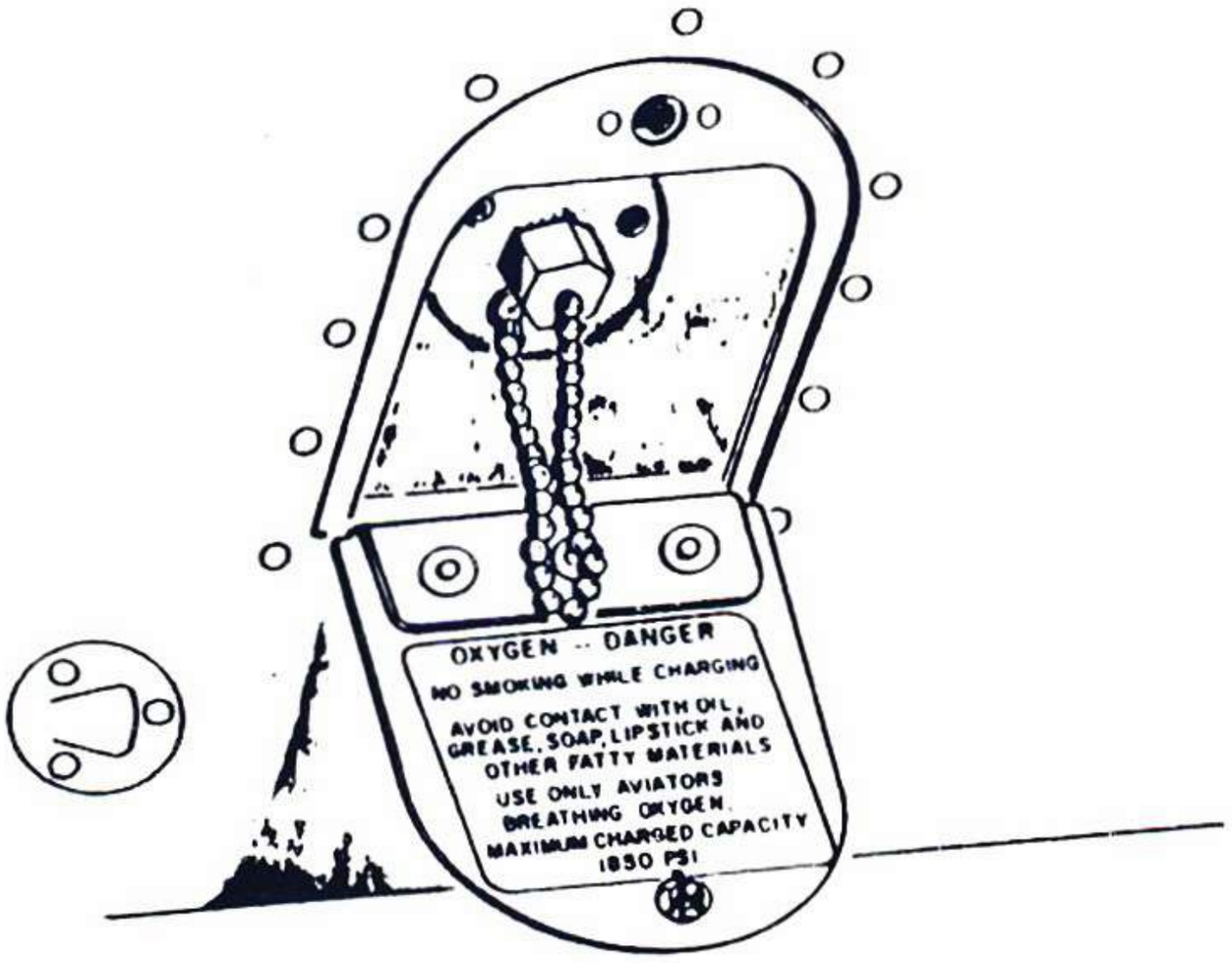
Lock brakes and operate engines at near takeoff power. Turn deicer system switch ON and observe deicer ammeter for at least 2 minutes. Ammeter needle must stay within the shaded band except for a "flicker," approximately each 30 seconds, as the step switch of the timer operates.

With engines stopped, turn the deicer switch ON and feel deicers on propellers for proper sequence of heater operation. The starting point is not important but sequence is vital and must be: RIGHT OUTBOARD, RIGHT INBOARD, LEFT OUTBOARD and LEFT INBOARD heaters, in that order. Temperature rise should be noticeable and each heater should warm for about 30 seconds. Local hot spots indicate surface damage of deicer heaters.

CAUTION

When conducting above static test, do not operate system longer than two complete cycles.

*Optional equipment



OXYGEN FILLER
Figure 8-5

8.35 OXYGEN SYSTEM SERVICE*

Depending upon whether the oxygen cylinder is mounted forward or aft, the filler valve for the oxygen cylinder is serviced by opening the access panel on the lower left nose section just aft of the forward baggage compartment door or on the right side of the fuselage tail section aft of the rear baggage compartment (Figure 8-5). To charge the oxygen system, remove the protective cap from the filler valve and attach the fitting from an oxygen cart.

WARNING

Inspect the filler connection for cleanliness before attaching it to the filler valve. Be sure your hands, tools and clothing are very clean and free from grease and oil since these contaminants will ignite when in contact with pure oxygen under pressure.

*Optional equipment

Open the cylinder supply valve on the airplane and fill the system slowly by adjusting the recharge rate with the pressure regulating valve on the cart. When the pressure gauge on the cylinder reads 1800 to 1850 psi, close the pressure regulating valve and replace the protective cap on the filler valve.

8.37 AIR CONDITIONER*

The compressor drive belt should be checked for a broken or loose belt during preflight. If the system becomes inoperative, consult the aircraft service manual.

8.39 NUMBER PLATES

The manufacturer's name plate is located on the fuselage underside even with the forward edge of the cabin door. A second plate containing only the serial number is located to the left of the tail skid. The serial number should always be used in referring to the airplane in service or warranty matters.

8.41 LUBRICATION

For lubricating instructions, a chart showing lubrication points and types of lubricants to be used, and lubrication methods, refer to the PA-31-350 Service Manual.

8.43 CLEANING

(a) Cleaning Engine Compartment

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

(1) Place a large pan under the engine to catch waste.
(2) 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.

*Optional Equipment

CAUTION

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

(3) 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 the solvent has evaporated or otherwise been removed.

(4) Remove the protective covers from the magnetos.
(5) Lubricate the controls, bearing surfaces, etc., in accordance with the Lubrication Chart in the Service Manual.

(b) Cleaning Landing Gear

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

(1) Place a pan under the gear to catch waste.
(2) Spray or brush the gear with solvent or a mixture of solvent and degreaser. To remove especially heavy dirt and grease deposits, it may be necessary to brush areas that were sprayed.
(3) 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.
(4) Remove the protective cover and the catch pan.
(5) Lubricate the gear in accordance with the Lubrication Chart in the Service Manual.

CAUTION

Do not brush the micro switches.

(c) Cleaning Exterior Surfaces

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

(1) Flush away loose dirt with water.
(2) Apply cleaning solution with a soft cloth, a sponge, or a soft bristle brush.
(3) To remove exhaust stains, allow the solution to remain on the surface longer.
(4) To remove stubborn oil and grease stains, use a soft cloth dampened with naphtha.
(5) Rinse all surfaces thoroughly.
(6) 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 coat of wax on leading surfaces will reduce the abrasion problems in these areas. Refer to item (h) when surface deicers are installed.

(d) Cleaning Windshield and Windows

(1) Remove dirt, mud, and other loose particles from exterior surfaces with clean water.
(2) Wash interior and exterior window surfaces with mild soap and warm water or with aircraft plastic cleaner. Use a soft cloth or sponge in a straight back and forth motion. Do not rub harshly.
(3) Remove oil and grease with a cloth dampened with kerosene.

CAUTION

Do not use gasoline, alcohol, benzene, carbon tetrachloride, thinner, acetone, other strong solvents, or window cleaning sprays. Do not use plastic cleaner on heated glass windshields.

(4) A severe scratch or mar in plastic can be removed by rubbing out the scratch with jeweler's rouge.

(5) When windows are clean, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion. Do not apply wax on the optional heated windshield.

(e) Cleaning Interior

(1) Headliners and other vinyl interior surfaces may be cleaned with a damp cloth and mild soap and water solution.

(2) Window curtains may be dry cleaned but it is not recommended that they be laundered.

(3) Leather may be cleaned with a mild hand soap and water solution or with saddle soap. Follow the precautions which apply to the cleaning of any fine leather product. Avoid saturation and never use detergents or harsh cleaning solutions on leather.

(4) Wood surfaces may be cleaned with any good household liquid or spray cleaner/polish manufactured for this purpose.

(5) All upholstery fabrics are "Scotchgard" treated and may be cleaned as follows:

Spilled oily and watery liquids will generally bead up on the fabric and can be blotted away leaving little or no stain. Blot spills up as quickly as possible with an absorbent cloth, tissue or sponge. If the material is a solid or semi-solid, such as butter, remove the excess by gentle scraping with a table knife. Often, blotting will remove all traces of stain but if the staining agent is not completely removed by blotting, the following techniques are suggested:

a. Water-based stains such as ketchup, milk, ice cream, coffee:

Wipe the stain with a cloth wet with water containing a detergent or ammonia (1/2 cup ammonia to a gallon of water). Repeat if necessary.

b. Oil based stains such as salad dressing, butter, mayonnaise removed by either of the following procedures:

Apply "Texize K-2R Spot Remover" by spraying or rubbing into the fabric, and let dry. Vacuum off the residual powder. Repeat if necessary.

or

Wet a cloth with a solvent type spot cleaner such as "Energine" or "Renuzit" and wipe or gently rub the stained area. Turn cloth and rewet with solvent often. Repeat until stain disappears.

Fabrics treated with "Scotchgard" Fabric Protector with Extra Soil Defense offer remarkable oil resistance. This means that dirt will sit on the fabric surface and can be readily vacuumed off. Frequent vacuuming of loose dirt will prevent its being worked into the fabric.

Fabrics which have accumulated significant overall soil must be vacuumed thoroughly. A foam cleaner recommended by the manufacturer should then be applied. The following cleaners have been found to be suitable: "Fiber Fresh Concentrate." "Bissell Foam Upholstery Cleaner," "Glamorene," and "Ivory Flakes" or any other similar product. Carefully follow the manufacturer's instructions.

NOTE

It is best to test the cleaner on an inconspicuous portion of the fabric to test for discoloration. Also, avoid soaking or harsh rubbing.

To remove residual detergent left on the fabric, wipe the entire fabric surface with a cloth dampened with water. The cloth should be rinsed in clean water several times. This procedure will ensure that the treatment will continue to function.

CAUTION

Solvent cleaners require adequate ventilation.

(f) Cleaning Carpets

Use a small whisk broom or vacuum cleaner to remove dirt. For soiled spots, use a nonflammable dry cleaning fluid. Floor carpets may be removed and cleaned like any household carpet.

(g) Cleaning Toilet*

(1) To dispose of the sanitary bag, pull the top of the bag from the pail and close with a wire tie. Remove it from the airplane in the covered pail and dispose of according to field facilities. Do not attempt to flush the bag in a toilet.
(2) To clean and deodorize the airplane's toilet, mix a solution of disinfectant type cleaner. Using a soft bristled brush, rag and solution, wash the toilet pail and seat. The toilet may be removed for cleaning by disconnecting the two fasteners at the inside forward end of the unit. Slide it back and lift from the floor.
(3) When offensive odor remains, use a stronger solution and reclean.
(4) Rinse with fresh water and dry.
(5) To install a new sanitary bag, place it over the top edge of the pail and push it into the bottom of the pail.

*Optional equipment

(h) Cleaning Surface Deicing Equipment*

The deicers should be cleaned when the aircraft is washed using a mild soap and water solution.

In cold weather, wash the boots with the airplane inside a warm hangar if possible. If the cleaning is to be done outdoors, heat the soap and water solution before taking it out to the airplane. If difficulty is encountered with the water freezing on boots, direct a blast of warm air along the region being cleaned, using a portable type ground heater.

As an alternate cleaning solvent, use benzol or nonleaded gasoline. Moisten the cleaning cloth in the solvent, scrub lightly, and then, with a clean, dry cloth, wipe dry so that the cleaner does not have time to soak into the rubber. Petroleum products such as these are injurious to rubber, and therefore should be used sparingly if at all.

When the deicers are clean, a coating of B.F. Goodrich Icex should be applied. Icex is compounded to lower the strength of adhesion between ice and the rubber surface of the deicer boots. The manufacturers instructions (B.F. Goodrich) must be followed explicitly.

*Optional equipment