

SECTION 3 - AIRPLANE HANDLING, SERVICE AND MAINTENANCE

3.0. GENERAL

This section provides information on cleaning, inspection, servicing and maintenance of the airplane.

If your airplane is to retain the new plane performance and dependability, certain inspection and maintenance requirements must be followed. 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 authorized PIAGGIO AVANTI Service Center to take advantage of their knowledge and experience. They know your airplane and how to maintain it. They will remind you when lubrications and oil changes are necessary, and about other seasonal and periodic services.

All correspondence concerning your airplane should include the airplane model and serial number. This information may be obtained from the identification plate located on the forward wall of the baggage compartment. Refer to the Airplane Maintenance Manual for an illustration of the identification plate.

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3.1. INSPECTION REQUIREMENTS

As detailed in Part. 91.217, Subpart D of the Federal Aviation Regulations, airplanes must be inspected in accordance with an authorized inspection program. The inspection requirements defined in Chapter 5 of P180 Maintenance Manual are the manufacturer's recommended procedures and are tailored to satisfy the requirements of FAR 91.217. A written notice must be sent to the local government aviation agency having jurisdiction over the area in which the airplane is based, providing the following information:

- a. Make, Model and Serial Number.
- b. Registration Number.
- c. Inspection Program Selected.
- d. Name and Address of the person responsible for scheduling the inspections required.

Additional inspections may be required by the government aviation agency. These inspections are issued in the form of Airworthiness Directives and can apply to the airframe, engines and/or components of the airplane. It is the owner's responsibility to insure compliance with these directives. In some cases, the Airworthiness Directives require repetitive compliance; therefore, the owner should insure inadvertent noncompliance does not occur at future inspection intervals.

NOTE

Refer to FAR Parts 43 and 91 for properly certificated agency or personnel to accomplish the inspections.

3.1.1 SERVICING REQUIREMENTS

For quick and ready reference, quantities, materials, and specifications for frequently used service items (such as fuel, oil, etc.) are shown in this section.

In addition to the Preflight Inspection covered in Section 4 of the Airplane Flight Manual, complete servicing, inspection, and test requirements for your airplane are detailed in the Airplane Maintenance Manual. The Maintenance Manual outlines all items which require attention at 150, 600, 1500 and 3000-hour as well as 12-months intervals plus those items which require servicing, inspection, and/or testing at special intervals.

HANDLING SERVICE AND MAINTENANCE
INSPECTION REQUIREMENTS

Since your authorized PIAGGIO AVANTI Service Center conducts all service, inspection, and test procedures in accordance with applicable Maintenance Manuals, it is recommended that you contact your authorized PIAGGIO AVANTI Service Center concerning these requirements and begin scheduling your airplane for service at the recommended intervals.

Depending on various flight operations, your local government aviation agency may require additional service, inspections, or tests. For these regulatory requirements, owners should check with local aviation officials where the airplane is being operated.

3.1.2 PREVENTIVE MAINTENANCE

Part 43 of the FAR's allows the holder of a pilot certificate, issued under Part 61, to perform preventive maintenance on any airplane owned or operated by him that is not used in air carrier service. Refer to FAR Part 43 for a list of preventive maintenance items the pilot is authorized to accomplish.

NOTE

Prior to performance of preventive maintenance, review the applicable procedures in the Airplane Maintenance Manual to insure the procedure is properly completed.

All maintenance other than preventive maintenance must be accomplished by appropriately licensed personnel. Contact your authorized PIAGGIO AVANTI Service Center for additional information.

Pilots operating airplanes should refer to the regulations of the country of certification for information on preventive maintenance that may be performed by pilots.

3.2. ALTERATIONS OR REPAIRS TO THE AIRPLANE

Alterations or repairs to the airplane must be accomplished by appropriately licensed personnel. If alterations are considered, the government aviation agency should be consulted to insure that the airworthiness of the airplane is not violated.

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3.3. GROUND HANDLING

3.3.1 TOWING

The airplane should be moved on the ground with the aid of the nosewheel towing bar provided with the airplane. The tow bar is designed to attach to the nose wheel axle.

Figure 3.3-1 shows minimum turning radius on towing.

CAUTION

Disengage steering link connecting pin. Do not push or pull on propellers or control surfaces when moving the airplane on the ground.

Do not tow the airplane when the parking brake is engaged.

At end of towing operations reconnect steering link.

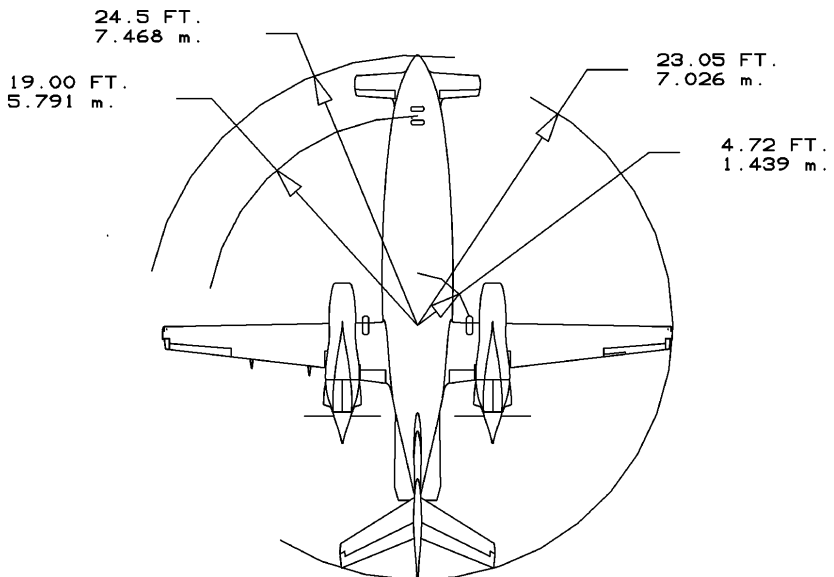


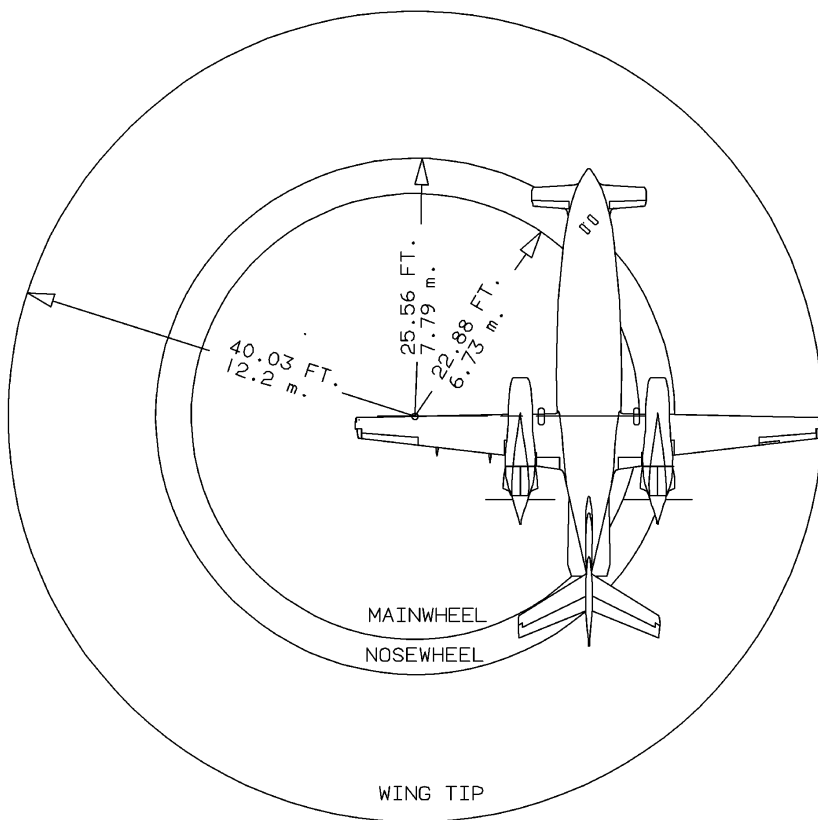
Figure 3.3-1. Minimum Turning Radius on Towing

3.3.2 TAXIING

Figure 3.3-2 shows minimum nose wheel steering turning radius.

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 explained. When it is ascertained that the propeller back blast and the taxi areas are clear, powers should be applied to start the taxi roll, and the following procedures should be followed:

1. Insure cabin and baggage doors are closed.
2. Set the parking brake.
3. Set hydraulic pump switch to HYD.
4. Start engines.
5. Set steering selector to TAXI.
6. Remove wheel chocks.
7. Disengage parking brake.
8. Set condition levers to GROUND IDLE.
9. Propeller thrust may be modulated using the power levers.
10. When taxiing avoid holes and ruts.
11. Observe wing clearances when taxiing near buildings or other stationary objects. If possible, station an observer outside to guide the airplane.
12. 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.
13. After taxiing forward a few feet, apply the brakes to determine their effectiveness.
14. While taxiing, make slight turns to ascertain the effectiveness of the steering.
15. When the airplane 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 may be made using light brake pressure, which will assist moisture evaporation within the brake.



NOTE

The figure shows the minimum turning radii based upon a maximum steering deflection of 50°.

Figure 3.3-2. Turning Radius on Taxiing

3.3.3 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. Align the nosewheel.
3. Set the parking brake by pulling the parking brake handle and then rotating the handle 90° clockwise to lock the handle.

NOTE

The parking brake can be actuated: if the hydraulic power pack is operating by pulling the parking brake handle; if the hydraulic power pack is inoperative by pulling the parking brake handle and then pressing (more than one time) on rudder pedals toe.

NOTE

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

When excessive moisture/freezing temperature conditions exist, parked aircraft should have their brakes released and wheel chocks properly positioned.

4. Aileron and elevator and rudder controls should be secured properly and flaps retracted.
5. Before leaving the airplane locking of the emergency window release handle is recommended.
For this purpose, a red flagged safety pin is provided to be engaged in a suitable locking hole close to the internal emergency window release handle.

3.3.4 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, the elevator and the rudder by installing the controls gust lock.
4. Place chocks both fore and aft of the main wheels.
5. Secure tie-down ropes to the attachment points located under the wings and close to the nose wheel strut (same points used for jacking). When using rope of non-synthetic material, leave sufficient slack to avoid damage to the airplane should the ropes contract.

CAUTION

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

6. Overnight or in blowing snow or dust, install dust covers on engine nacelles. Attach propeller restrainers to prevent windmilling.

NOTE

The propeller may windmill even in light winds. A windmilling propeller is a safety hazard. Prolonged windmilling at zero oil pressure can result in bearing damage.

The propeller should be secured with one blade down when mooring for safety and drainage purposes.

7. Install pitot covers and static discharge wicks red warning tags. Be sure to remove all covers and tags before flight.
8. Cabin and baggage doors should be locked when the airplane is unattended.

HANDLING SERVICE AND MAINTENANCE
GROUND HANDLING**3.3.5 JACKING**

The airplane is equipped with a jacking provision on each main spar outboard of the engine nacelle and one on fuselage located at right side of nose gear strut.

To jack the airplane, proceed as follows:

1. Install jack pads.
2. Place jacks under the wing and nose jack pads.
3. Raise the three jacks simultaneously until all wheels clear the surface, maintaining a level airplane.

3.3.6 LEVELING

Three leveling marks are provided to level the airplane: one is located on the forward mast of cabin door, the other two are located each side to the fuselage, close to the rearmost baggage compartment frame.

The airplane may be leveled either on jacks or on wheels using the communicating vessel system and deflating the tires or the shock absorbers.

Normally the airplane is leveled first laterally then longitudinally.

3.3.7 GROUND POWER UNIT

The ground power unit circuitry of the airplane is capable of accepting 400 amperes continuously and current surges up to 1200 amperes for short durations (few sec), that may occur during engine starts.

GROUND POWER UNIT CONNECTION

To connect a ground power unit proceed as follows:

1. Verify all switches are OFF.
2. Set BAT switch to BAT position.
3. Select the SYS Page on the MFD, and check the bus voltage.

CAUTION

If bus voltage is less than 21.5 VDC, the battery must be serviced or replaced before flight.
If bus voltage is between 21.5 and 23.0 VDC, allow 15 minutes of ground power unit battery recharging.

4. Set BAT switch to OFF.
5. Set ground power unit voltage to 28.25 ± 0.25 volts.
6. Set ground power unit switch to OFF position.
7. Open the ground power unit receptacle door.
8. Connect ground power unit to airplane.
9. Set ground power unit switch to ON position.
10. Set BAT switch to BAT position.
11. On the MFD SYS Page the EXT POWER message shows in green and the bus voltage value is greater than that read at step 3.

NOTE

Since the airplane is equipped with an overvoltage protection on the external power supply line the D.C. system automatically disconnects from the ground power unit should an overvoltage condition occur. The ground power unit operation is automatically recovered as soon as the voltage goes down to approximately 30 volts D.C.

GROUND POWER UNIT DISCONNECTING

1. Set G.P.U. switch to OFF position.
2. Disconnect the ground power unit.
3. Close the ground power unit receptacle door and secure.
4. Set generators L and R switches to ON position.

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3.4. GROUND SERVICING

3.4.1 HYDRAULIC SYSTEM SERVICE

Hydraulic system service consists primarily of fluid level and filter impending check.

To perform the above listed checks proceed as follows:

1. Open the ground test/refueling panel access door.
2. Note HYD LEVEL and HYD FILTER annunciators status.
3. Set GROUND TEST switch to LAMP position and hold.
4. HYD LEVEL and HYD FILTER annunciators are ON.
5. Release GROUND TEST switch.
6. Note HYD LEVEL and HYD FILTER annunciators status.
7. Set GROUND TEST switch to SYST position and hold.
8. After few seconds HYD LEVEL and HYD FILTER annunciators are ON.
9. Release GROUND TEST switch.
10. Observe HYD LEVEL annunciator.

NOTE

If HYD LEVEL annunciator is ON fluid top up is required. If HYD FILTER annunciator is noted ON at steps 2 and 6 hydraulic filter element replacement is required.

HYDRAULIC POWER PACK FLUID FILLING

If fluid top up is required, hydraulic fluid MIL-H-5606 should be added by utilizing the filler cap located on the baggage compartment left side, just forward the baggage door mast and the overfill drain valve, located on the left main gear well. To top up proceed as follows: open overfill drain valve, remove filler plug and using an appropriate oil servicing unit fill till to have a tap from overfill drain valve, close overfill drain valve and install filler plug.

HYDRAULIC FILTER REPLACEMENT

To replace the hydraulic filter element refer to the airplane maintenance manual.

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3.4.2 LANDING GEAR SERVICE

The operation of the landing gear shock absorbers 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.

All of the shock absorbers are inflated through readily accessible valves. 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 Maintenance Manual).

In the event the shock absorber slowly loses pressure and extension, the most probable source of trouble is the air valve attachment or the core of the air valve. These parts should be checked first to determine whether or not air leaks are occurring. If hydraulic fluid is evident on the exposed oleo strut plate the unit may need to be replaced.

To reinflate a shock absorber installed on airplane proceed as follows: lift the airplane till to have the wheels clear of ground. Connect the nitrogen supply to the charging valve and pressurize slowly to fully extend the unit. Increase the nitrogen pressure till 985 PSI for main gear and 120 PSI for nose gear.

NOTE

To avoid airplane unbalancing it is advisable to service both main gear shock absorbers.

HANDLING SERVICE AND MAINTENANCE
GROUND SERVICING**3.4.3 BRAKE SERVICE**

The brake service consists primarily of brake wear check. To carry out this check pressurize the brake system and check the wear indicator pin. A fully worn brake condition is indicated by a flush condition of wear indicator pin respect to the bushing.

If it necessary to bleed the brake system, consequently to an anomalous brake operation, excessive movement of rudder toe pedal or spongy brakes, refer to the Maintenance Manual.

NOTE

See Maintenance Manual for rigging and adjustment of landing gear.

3.4.4 TIRE SERVICE

For maximum service from the tires keep them inflated to the proper pressures of 64 PSI for the nose wheel and 115 PSI for the main wheels.

NOTE

For airplane resting on wheels increase the inflating pressure of 4%.

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.

3.4.2 LANDING GEAR SERVICE

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To reinflate a shock absorber installed on airplane proceed as follows: lift the airplane till to have the wheels clear of ground. Connect the nitrogen supply to the charging valve and pressurize slowly to fully extend the unit. Increase the nitrogen pressure till 1075 (\pm 20) PSI for main gear and 120 PSI for nose gear.

NOTE

To avoid airplane unbalancing it is advisable to service both main gear shock absorbers.

HANDLING SERVICE AND MAINTENANCE
GROUND SERVICING**3.4.3 BRAKE SERVICE**

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If it necessary to bleed the brake system, consequently to an anomalous brake operation, excessive movement of rudder toe pedal or spongy brakes, refer to the Maintenance Manual.

NOTE

See Maintenance Manual for rigging and adjustment of landing gear.

3.4.4 TIRE SERVICE

For maximum service from the tires keep them inflated to the proper pressures of 64 PSI for the nose wheel and 118 (± 2) PSI for the main wheels.

NOTE

For airplane resting on wheels increase the inflating pressure of 4%.

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.

3.4.5 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 dressed 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 43.13-1A 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. To prevent corrosion, the propeller surfaces should be cleaned and waxed periodically with hard automotive paste wax.

3.4.6 OIL SYSTEM SERVICE

The oil tank capacity (each engine) is 3.35 U.S. gallons (12.7 LTS) and usable oil is 1.25 U.S. gallons (4.7 LTS). Oil system servicing consists of: oil level check, oil top up, chip detector continuity check, oil filter cleaning and oil filter changing. For oil filter cleaning or changing refer to Pratt and Whitney Maintenance Manual P/N 3036122.

When adding oil, service the engine with the type and brand which is currently being used in the engine. Refer to the engine log book.

NOTE

Do not mix different brands viscosities or types of oil when performing oil top up. Should different brands of oil become mixed, drain and flush oil system and refill with fresh oil (refer to Pratt and Whitney Maintenance Manual P/N 3036122).

HANDLING SERVICE AND MAINTENANCE
GROUND SERVICING**OIL LEVEL CHECK**

To check oil level proceed as follows:

NOTE

Perform the oil level check within 10 minutes after engine shutdown.

1. Open ground test/refueling panel access door.
2. Set the GROUND TEST switch to LAMP position.
L ENG OIL and R ENG OIL annunciators are ON.
3. Set the GROUND TEST switch to SYST position and hold.
L ENG OIL and R ENG OIL annunciators are ON.
4. Release the GROUND TEST switch.
L ENG OIL and R ENG OIL annunciators are OFF.

NOTE

Engine low level condition is indicated by the relative annunciator lamp ON.

CAUTION

A real chip detection condition occurs, in the related engine oil, if the L ENG OIL or R ENG OIL annunciator light is flashing (3 Hz rate, 40% on and 60% off) while the GROUND TEST switch is held in the SYST position. Have an immediate maintenance check as per the applicable Engine Manual.

OIL TOP UP

To top up oil of the affected engine proceed as follows:

1. Open engine nacelle access door.
2. Unlock and remove filler cap and indicator assembly from filler neck.
3. Check oil tank contents against markings on dipstick (markings correspond to U.S. quart/liters) and service as required.
4. Fill the oil tank to normal level using an appropriate oil servicing unit and record quantity of oil added to system.
5. Install filler cap and indicator assembly ensuring cap is locked securely.
6. Close all access openings.

3.4.7 FUEL SYSTEM SERVICE

Service fuel system after each flight.
Keep full to retard condensation in the tanks.
The total system capacity is 421.9 U.S. Gall. (1597 LTS).

FUEL REQUIREMENTS

JP-4, JP-8, commercial kerosene, Jet A, A-1 and B fuels conforming to the latest revision of Pratt & Whitney Service Bulletin No. 14004.
It is not necessary to purge the unused fuel from the system when switching fuel types.

The use of aviation gasoline is not permitted.

The operation of the aircraft requires the use of anti-icing additive in the fuel. The anti-icing additive must meet the latest revision of Pratt & Whitney Canada Service Bulletin No. 14004 (including Phillips PFA 55 MB, MIL-I-27686D and MIL-I-27686E) and must be blended with the fuel while refueling in the event the used fuel has no anti-icing additive blended at the refinery.

A minimum anti-icing additive concentration of 0.06% by volume and a maximum concentration of 0.15% by volume must be used. When using the recommended anti-icing blending procedure (gravity refueling only) the additive concentration in the fuel shall be approximately 0.09% by volume. A blender supplied by the additive manufacturer should be used.

The additive manufacturer blending procedure has to be followed, providing to use not less than 0.8 fluid ounces of additive per 10 US Gallons of fuel nor more than 1.9 fluid ounces of additive per 10 US Gallons of fuel.

The refueling rate shall be in accordance with the additive manufacturer procedure providing the above mentioned concentration are guaranteed. To guarantee the mentioned concentrations, the additive temperature should be higher than 5° C (40°F).

HANDLING SERVICE AND MAINTENANCE
GROUND SERVICING**FILLING THE SYSTEM**

The airplane may be filled through a single-point gravity filler, located in the top of fuselage right side at wing-to-fuselage attachment, or through a single-point pressure filler located close to the ground test refueling panel recess (fuselage right side).

To fill the airplane observe all required safety precautions for handling aviation fuels, ground, proper fuels, etc.

WARNING

Fuel additive may be harmful if inhaled or swallowed. Use adequate ventilation. Avoid contact with skin and eyes. If sprayed into eyes, flush with large amount of water and contact a physician immediately.

SINGLE-POINT GRAVITY FILLING***CAUTION***

Assure that the additive is directed into the flowing fuel stream. 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.

Some fuels have anti-icing additives preblended in the fuel at the refinery, so no further blending should be performed.

1. Open the ground test/refueling panel.
2. Set REFUEL switch to OPEN position.
3. TK INTCON INT annunciator momentary comes on then goes off.
4. Verify TANK INTCON annunciator is on.
5. Remove filler cap and fill the airplane through the filler neck.
6. Reinstall filler cap and set the REFUEL switch to CLOSED position.
7. Insure TK INTCON INT and TANK INTCON annunciators are OFF.

SINGLE-POINT PRESSURE FILLING:

CAUTION

Single point pressure refueling must be performed only with fuel having anti-icing blended at the refinery or using a truck having the possibility to blend the anti-icing additive with the fuel during the refueling operation.

NOTE

A minimum truck delivery pressure of 20 PSIG at the nozzle is required for satisfactory system performance.
Do not exceed maximum truck delivery pressure of 60 PSIG.

1. Open the ground test/refueling panel and the single-point filler access doors.
2. Set the GROUND TEST switch to LAMP position.
3. Verify TANK INTCON and TK INTCON INT annunciators are ON. Release GROUND TEST switch.
4. Set the REFUEL switch to OPEN position.
5. Verify TK INTCON INT annunciator momentary comes on then goes off and TANK INTCON is on.
6. Remove refuel adapter cap and connect refueling nozzle to refuel adapter.
7. Apply refueling pressure, on ground test refueling panel, set the GROUND TEST switch to SYST position and verify a fuel flow stop.

NOTE

If the fuel flow doesn't stop and it is intended to fill completely the tanks, complete the refueling procedure checking visually the fuel level from the gravity filler cap.

8. Release GROUND TEST switch: normal refuel flow is restored and continue to flow till to have system full.
9. When fuel flow stops disconnect refueling nozzle from refuel adapter and install refuel adapter cap.
10. Set the REFUEL switch to CLOSED position. Insure TK INTCON INT and TANK INTCON annunciators are off.
11. Close ground test refueling panel access door.

HANDLING SERVICE AND MAINTENANCE
GROUND SERVICING**CHECKING FUEL ADDITIVE**

Prolonged storage of the aircraft will result in water buildup in the fuel which "leaches out" the additive. This is indicated when an excessive amount of water accumulates in the fuel sump. Check the additive concentration using a Differential Refractometer. Follow the Technical Manual instructions of the differential Refractometer when checking the additive concentration.

Minimum additive concentration shall be 0.035% by volume and the maximum concentration shall be 0.15% by volume.

A suggested refractometer is the B/2 HAND REFRACTOMETER manufactured by Cambridge Instrument Inc., BUFFALO N.Y.

Contact PIAGGIO PRODUCT SUPPORT for more information and availability of the above refractometer or equivalent.

DRAINING CONTAMINANTS FROM FUEL SYSTEM

To facilitate draining the fuel system filter bowls, vent lines and fuel tank sumps of moisture and foreign matter drains are incorporated.

1. To drain the fuel filters OPEN the fuel firewall shutoff valves, switch ON the fuel pump (either MAIN or STBY) and operate the drain valve located on the underside of the nacelles using the draining tool P/N 80-909172-801 or equivalent. When drainage has finished, switch OFF the fuel pump.
2. To drain the fuel vent system operate the drain valves located on the left and right sides of fuselage beneath wing-to-fuselage attachment, using the draining tool P/N 80-909172-801 or equivalent.
3. To drain fuel tank sumps operate the drain valve located on left and right main gear wells respectively.

NOTE

It is recommended, as a general rule, that at each fuel drain fuel be collected and examined in a clear container, so that it can be visually checked for water and sediments.

WARNING

When draining any amount of fuel, be sure that no fire hazard exists before starting engines. Do not allow fuel to come in contact with the tires.

3.4.8 BATTERY SERVICE

The battery used in P.180 AVANTI is a rechargeable, vented, sintered plate, nickel-cadmium battery. There are 20 nylon encased cells housed in a stainless steel battery box. The electrolyte is composed of a 30 percent solution of potassium hydroxide in distilled water. During operation, no appreciable chemical change occurs in the electrolyte; therefore, testing the specific gravity of the electrolyte can not determine the state of charge. For servicing and cleaning instructions, refer to airplane Maintenance Manual.

WARNING

Servicing the battery requires special training, tools, and equipment. Improper handling can result in serious bodily injury or damage to the airplane. The electrolyte used is potassium hydroxide (KOH), which is a caustic chemical agent and serious burns will result if it comes in contact with the skin. If spilled on skin or clothing, neutralize with vinegar or a mild boric acid solution, or, if these are not available, wash thoroughly with water. Should the electrolyte come in contact with the eyes, flush thoroughly with running water and secure immediate medical attention. Shorted batteries can deliver high currents and a spark can cause a cell to explode. Metal articles, such as jewelry, can fuse to intercell straps causing serious injury. Bodily injury and equipment damage may result if acid or tools contaminated with acid are used. Water or electrolyte spilled into the battery container may cause corrosion and battery failure. Personnel qualified to service the battery should refer to the airplane Maintenance Manual.

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3.4.9 OXYGEN SYSTEM SERVICE

NOTE

MIL-O-27210 Aviators Breathing Oxygen must be used for filling the system.

The filler valve for the oxygen cylinder is located on a recess part of the aft section of the cabin door coaming.

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 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.

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 on the cylinder reads 1850 psi at 21°C (70°F), close the pressure regulating valve and replace the protective cap on the filler valve.

Crew oxygen masks are of the permanent type and can be cleaned by the following procedure:

1. Remove the microphone from the mask.
2. Remove the sponge rubber discs from the mask. Do not use soap to clean sponge rubber parts, as this may deteriorate the rubber and give off unpleasant odors. Clean sponge rubber parts in clear water and squeeze dry.
3. Wash the rest of the mask in a very mild soap and water solution.
4. Rinse mask thoroughly to remove all traces of soap.
5. Allow components to dry thoroughly before reassembling. Do not allow sides of the breathing bag to stick together while drying.
6. The mask can be sterilized with a 70 percent ethyl alcohol solution.

OXYGEN SERVICING CHART

Ambient Temperature		After Cooling Pressure Static	(*) Filling Pressure For 1850 PSI at 21°C (70°F)
°C	°F		
-18	0	1550	1650
-12	10	1600	1700
-7	20	1640	1725
-1	30	1690	1775
5	40	1710	1825
10	50	1760	1875
16	60	1800	1925
21	70	1850	1975
27	80	1900	2000
32	90	1950	2050
38	100	2000	2100
43	110	2035	2150
49	120	2080	2200
55	130	2130	2250

(*) This column assumes about a 25 degree rise in temperature due to the heat of compression, and it assumes that the cylinders are being filled at their maximum rate.

3.4.10 ENVIRONMENTAL CONTROL SYSTEM

COOLING AIR CONDITIONING SYSTEM

CAUTION

During ground operation with a Ground Power Unit (GPU) only (both generators OFF) keep AVIONICS master switch OFF during the Cooling Airconditioning System start phase.

NOTE

During ground operation with GPU only (both generators OFF) the Cooling Airconditioning System use in conjunction with the hydraulic system, the windshield defog/deice system, the forward wing anti-ice system (all systems operating simultaneously) may overload the right channel of the DC distribution system and cause the R OVLD circuit breaker (pilot circuit breaker panel) to trip.

3.4.11 PRESSURIZATION SYSTEM

The system embodies a self-test facility to perform periodically a system functional check.

To perform this check proceed as follows:

1. Insure airplane is resting on wheels.
2. Start both engines and set power levers to IDLE position and condition levers to G.I.
3. Insure DUMP switch guard is in place.
4. Set rate selection knob (R) to "PIP" mark.
5. Insure cabin altitude selection (A) is not selected off the usable scale.
6. Insure barometric correction (B) is not selected off the usable scale.
7. Set AUTO-MAN switch first to MAN position then to AUTO position.
8. Observe cabin pressure selector fault indication lamp. The lamp will illuminate momentarily (3 sec. or less) and then extinguish.
If the fault indicator light remains illuminated for longer than 3 seconds a malfunction has been detected by the system.

Should the operational check show any malfunction of the pressurization system, the Maintenance Manual must be consulted for service instructions and any maintenance or adjustments required to make the system operational.

3.4.12 LUBRICATION

Refer to the airplane Maintenance Manual for lubricating instructions, chart showing lubrication points, types of lubricants to be used, and lubrication methods.

3.4.13 CLEANING

CLEANING ENGINE COMPARTMENT

Operating conditions and environment dictate the frequency and methods to be observed in cleaning the airplane engines. Salt and airborne pollution, for example, leave corrosive deposits which must be washed from the engine before they are allowed to accumulate.

For engine cleaning procedures, refer to and comply with the Pratt and Whitney PT6A-66 Maintenance Manual.

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 for 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 of the Maintenance Manual.

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 brush.
3. To remove stubborn oil and grease stains, use a soft cloth dampened with naphtha.
4. Rinse all surfaces thoroughly.
5. 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.

CLEANING WINDSHIELD AND WINDOWS

1. Remove dirt, mud, and other loose particles from exterior surfaces with clean water or with a 50% isopropyl alcohol. If adhered particles are present they should be removed with the bare hands before any cloth is rubbed over the surface.
2. Wash interior and exterior windows surfaces with mild soap and warm water. Use a soft cloth or sponge in a straight rubbing motion. Do not use any abrasive materials or any strong acids or bases.
3. Rinse thoroughly with clean water and dry. Application of a rain repellent such as REPCON every 25 flight hours or 10 days is recommended to enhance water shedding.
4. Rinse windows thoroughly and dry with soft lint-free cloth.

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.

5. A superficial scratch or mar in plastic can be removed by polishing out the scratch with jeweler's rouge.
6. When windows are clean, apply a thin coat of hand polishing wax. Rub lightly with a soft cloth.

CLEANING SURFACE DEICING EQUIPMENT

Nacelle air intake lip deice boots 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 taking it out to the airplane. If difficulty is encountered with the water freezing on boots, direct a flow 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 has not time to soak into the rubber.

CAUTION

Petroleum products such as these are injurious to rubber, and therefore should be used sparingly if at all.

When deice boots are clean, a coating of B.F. Goodrich Icx should be applied. Icx is compounded to lower the strength of adhesion between ice and rubber surface of the deice boots.

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3.5. OPTIONAL INSTALLATIONS

3.5.1 PORTABLE SUPPLEMENTARY OXYGEN SERVICE

Remove the oxygen bottle from the airplane and send to a suitable service center for refilling.

Aviators Breathing Oxygen per MIL-0-27210 pressurized to 1800 psig. at 70 °F must be used for refilling.

WARNING

Do not attempt to refill the oxygen bottle on board.

OXYGEN SERVICING CHART

Ambient Temperature Degrees Fahrenheit	After Cooling Pressure Static	* Filling Pressure For 1800 PSI At 70°F
0	1500	1600
10	1550	1650
20	1590	1675
30	1640	1725
40	1660	1775
50	1710	1825
60	1750	1875
70	1800	1925
80	1850	1950
90	1900	2000
100	1950	2050
110	1985	2100
120	2030	2150
130	2080	2200

* This column assumes about a 25 degree rise in temperature due to the heat of compression, and it assumes that the cylinders are being filled at their maximum rate.

HANDLING SERVICE AND MAINTENANCE

OPTIONAL INSTALLATIONS

3.5.2 PROTECTIVE BREATHING EQUIPMENT INSPECTION

The EROS P/N 15-40F Emergency Escape Hood does not require any maintenance since it is static, vacuum-packed and is provided with a "good condition indicator".

Inspection is limited to preflight check of the good condition indicator located on the upper side of cover. If the indicator has turned from green to red, signal is given that a leakage of the cylinder may have occurred and that therefore the 15 minutes hood autonomy might not be reached. Hood should then be removed from aircraft and returned to the factory for inspection. Service life of the hood is 10 years.

3.5.3 BALLAST KIT INSTALLATION/REMOVAL

Access to the ballast mounting plate can be gained by removing the tail panels 320AL and 320AR, the cone fairing 310A and the intermediate fairing (refer to Chapter 6 of the Airplane Maintenance Manual for panel identification).

Refer to the Table at Section 6 of this Supplement for authorized ballast units configurations.

Each ballast unit can be fastened by means of four screws and washers to the anchor nuts provided on the mounting plate at each mounting position.

After tightening the screws check the ballast units are positively fastened.

Install the "BALLAST IN THE TAIL" placard on the left of the pilot instrument panel utilizing one of the panel fastening screws.

After ballast units removal reinstall and tighten the fastening screws and washers on the mounting plate.

Remove the placard from the instrument panel.

Enter weight, arm and moment of the removed ballast and the new airplane basic weight and moment in the "Weight and Balance Record" form of the basic Weight and Balance Manual.

After ballast removal/installation reinstall the previously removed panels and fairings.

3.5.4 GRAVEL PROTECTION FOR UNPAVED RUNWAYS OPERATIONS

GRAVEL PROTECTION INSTALLATION

The gravel protection kit, consisting of a rubber shield fastend to a suitable support frame, a modified torque link lower pin and a pair of locking bolts washers and nuts, prevents damages to the airplane lower surfaces and equipments.

The gravel protection kit can be installed as follows:

1. Raise the airplane at nose gear and remove the nose gear wheels.
2. Remove the torque link lower pin (Dowty P/N 201031605).

NOTE

This pin must be stored for reinstallation when the gravel protection is removed.

3. Install the gravel protection:
 - engage the forward forks of the protection on the wheel hubs
 - install the modified torque link lower pin (Piaggio P/N 80K174111-001) engaging the protection sustaining holes
 - install the two locking bolts on the forward forks of the protection
4. Reinstall the nose gear wheels.

ADDITIONAL INSPECTIONS

When operating on runways not free of ruts, troughs or holes, stones and large tufts, external equipments (antennas and lights, aerodynamic surfaces like wings and flaps, flap mechanism, landing gears and tires) may be damaged.

After each landing on unpaved runways (and each landing following a takeoff from an unpaved runway) additional checks are required.

A complete walk-around check should be performed following the set pattern as per Fig. 4-1 at Section 4 of the basic Airplane Flight Manual.

The propeller blades, forward wing, main wing, empennage, control surfaces, antennas, external lights, landing gears, tires and gravel protection kit must be checked for absence of damages.