WING FLAP CONTROL SYSTEM

7.1 WING FLAP CONTROL SYSTEM

Refer to Figure 7-1.

The wing flap control system comprises a selector handle mounted on the cabin roof at the left of the pilot, a common shaft assembly and pushrods connected to the flap control surface horns.

**WARNING**

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure. See Figure 6-1.

7.2 OPERATIONAL CHECK

Operate flaps through their full range of travel, observing for uneven or jumpy motion or binding in the system. Ensure flaps are moving together through their full range of travel.

7.3 FLAP HANDLE ASSEMBLY

See Figure 7-1.

7.4 FLAP COMMON SHAFT ASSEMBLY

See Figure 7-4.

7.4.1 Removal and Installation

The Flap Controls are Primary Controls and may not be removed or repaired without reference to JABIRU AIRCRAFT Pty Ltd.
### 7.4.2 Flap Control Rod

To remove, unbolt at both ends and remove. Reverse for installation.

### 7.5 FLAP

Flaps comprise a moulded and bonded monocoque structure embodying a composite control arm at the inboard end.

#### 7.5.1 Removal and Installation

1. Unbolt rod end from flap control arm.
2. Remove each flap hinge bolt and spacer.
3. Remove Flap.

Reverse the preceding steps for installation. Replace all three nyloc nuts and torque in accordance with Figure 1-2.

#### 7.5.2 Inspection and Repair

Inspect flaps for any signs of delamination or cracking. Pay particular attention to the Control Horn and hinges and their surrounding areas.

Repairs must be referred to JABIRU AIRCRAFT Pty Ltd.

### 7.6 RIGGING (as per template)

With the flap selector lever in the neutral position, use a straight edge not less than 1 metre long. Hold the straight edge flush on the underside of the wing aerofoil and adjust flap so that the trailing edge of the flap sits on the straight edge and there is 4mm clearance between straight edge and trailing edge of the wing.

Adjust with the rod ends. Ensure that the lock nut is tight on the control ends and that the thread is visible through the hole in the rod.

Check for FULL DOWN travel using the Flap Rigging Template (see Appendix 3 and Figure 7-6).
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**Figure: 7-4**
8.1 ELEVATOR CONTROL SYSTEM

See Figure 8-1.

The elevator control system is comprised of a control column and one enclosed push-pull cable fitted with rod ends at both ends.

WARNING

All spherical bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure. See Figure 6-5 view AA.

8.2 CONTROL COLUMN DESCRIPTION

Refer to Figure 6-2.

8.2.1 Removal and Installation

Refer to Paragraph 6.2.1.

8.3 ELEVATOR

The elevator comprises a Rigid Cellular Polystyrene core moulded and bonded to a composite skin and embodying a composite control horn at the centre. An elevator trim system is attached – Refer Paragraph 8.6.
8.3.1 Removal and Installation

1. Unbolt cable from control horn.
2. Unbolt trim linkage from control horn.
3. Loosen screws in hinge pin retainers and lift hinge pin retainers from hinge pins. It is not necessary to remove these parts.
4. Remove hinge pins.
5. Remove Elevator.

Reverse the preceding steps for installation.

8.3.2 Inspection and Repair

Inspect elevator for any signs of delamination or cracking. Pay particular attention to the Control Horn and hinges and their surrounding areas.

Repairs must be referred to JABIRU AIRCRAFT Pty Ltd.

8.4 CONTROL CABLE AND ATTACHMENTS

8.4.1 Removal and Installation

The Control Cable is a Primary Control and may not be repaired or removed without reference to JABIRU AIRCRAFT Pty Ltd.

8.5 RIGGING

1. Using the factory anchor points, make sure each end of the cable is secure.
2. Set the full up travel first using the factory templates. Making sure the control column is hard back. Adjust the female ball ends in or out if adjustment is needed.
3. To establish the neutral position, align balance horn with horizontal stabiliser.
4. Adjust cable rod ends to achieve UP and DOWN travel using the Elevator Rigging Template (see Appendix 3 and Figure 8-5).
   DO NOT move the Cable Anchors – These are factory set.
5. Ensure lock nut is tight on rod ends and that cable is visible through hole in spherical bearing.

8.6 ELEVATOR TRIM CONTROL SYSTEM

See Figure 8-6.

The elevator trim control system comprises a Trim Cable connected to a lubron block, so that the cable is able to move the block fore and aft approximately 35mm. An aluminium rod is free to slide through this lubron block and is centred by 2 compression springs. The output end of the rod is connected to the Elevator Horn.

8.6.1 Operational Check

Movement of the Trim Lever FORE and AFT should result in movement of the Main Control FORE and AFT and movement of the Elevator UP and DOWN. See Figure 8-6.
8.6.2 Trim Handle Assembly

See Figure 8-6.

8.6.3 Control Cable and Attachments

The control cable is of the enclosed push-pull type with the cable bolted directly to the Trim Horn Extension at the rear end and to the trim control lever at the lever end. TO operate, outer covers of the cable must be clamped firmly at both ends.

8.6.4 Removal and Installation

The Trim Control Cable is a Primary Control and may not be repaired or removed without reference to JABIRU AIRCRAFT Pty Ltd.

8.6.5 Inspection and Repair

Inspect Trim system generally for security and any signs of wear. Pay particular attention to the bearing blocks, friction plates, bearing, springs, cable and attachments.
Figure: 8-5

USE TEMPLATE TO
MEASURE ELEVATOR
TRAVEL UP & DOWN

Drawing 9016093/1 ELEVATOR RIGGING
RUDDER CONTROL SYSTEM

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9.1 RUDDER CONTROL SYSTEM

Refer to Figure 9-1.

Rudder control is maintained through the use of rudder pedals which also control nose wheel steering. The system is comprised of rudder pedals, two push rods, a centring mechanism and an enclosed push-pull cable.

9.2 RUDDER PEDAL ASSEMBLY

See Figure 9-2.

9.2.1 Removal and Installation

1. Unbolt push-pull cable.
2. Unbolt both steering push rods.
3. Unbolt rudder pedal bearings – both ends of rudder pedals.
4. Remove cover plates and nylon bearings.
5. Removal both pedal bars through RH side of main beam.

Reverse the preceding steps for installation.

9.2.2 Inspection and Repair

1. Inspect nylon bearings for wear. Replace if worn.
2. Inspect pedal bars for wear around bearing area and for distortion.
3. Inspect pedals for distortion or loose rivets in end stops.
4. Inspect bolt holes for wear and elongation.
5. Inspect bolts and nuts for distortion and wear.

Replace any distorted or worn parts.
9.3 RUDDER

See Figure 9-3.

9.3.1 Removal & Installation

1. Unbolt push-pull cable from rudder horn.
2. Loose screws in hinge pin retainers & lift retainer from hinge pin. It is not necessary to remove these parts.
3. Remove hinge pins.
4. Remove rudder.

9.3.2 Inspection & Repair

Inspect rudder for any signs of delamination or cracking. Pay particular attention to the Control Horn and hinges and their surrounding areas.

Repairs must be referred to JABIRU AIRCRAFT Pty Ltd.

9.4 CONTROL CABLE & ATTACHMENTS

The control cable is of the push-pull type fitted with spherical bearings at both ends.

To operate, the outer cover of the cable must be clamped firmly at each end.

9.4.1 Removal & Installation

The Control Cable is a Primary Control and may not be repaired or removed without reference to JABIRU AIRCRAFT Pty Ltd.

9.5 RIGGING

1. To establish the neutral position, raise the nose wheel off the ground by leaning down on the horizontal stabiliser.
2. Allow the nose wheel (and therefore the rudder pedals) to centralise.
3. Align the rudder 5mm to the right at the top of the rudder when referenced to the lower lip of the fin.
4. Adjust the rod ends on the cable so that the hole in the rear rod end aligns with the hole in the control horn.
5. Fit bolt, nut and washers.
6. Scribe a line from the centre of the Rudder trailing edge onto the Fuselage. Displace the Right Rudder Pedal to the Rudder Pedal Stop. Measure the Rudder displacement at the Rudder trailing edge with reference to the previously scribed line. It should be 70mm +/- 2mm.
7. Repeat Step 6 for Left Pedal and adjust Rudder Pedal Stops as required.

IMPORTANT
The Rudder Pedal Stops should engage – NOT the Control Surface Stops.
DO NOT move the Cable Anchor Points or adjust control surface stops – These are factory set..
Figure: 9-1
10.1 ENGINE COWLINGS

The engine cowls comprise both an Upper and Lower composite structure.

The Upper Cowl is fitted with three locating pins at the rear and two overcentre clips at the front. The rear pins locate in shock mounts in the fuselage at the rear of the cowl.

The Lower Cowl is attached to the Fuselage with 8 machine screws mounting in anchor nuts.
10.1.1 Removal and Installation

Upper Cowl
1. Remove the two locking pins in the front overcentre clips.
2. Unclip the overcentre clips.
3. Grasping the cowl around the front nose, pull carefully upwards and forwards until the lower edge of the cowl clears the upper edge of the Spinner, then pull forward.
4. Remove the cowl.
5. Replace the pins in the clips so as to ensure they are not misplaced.

NOTE: Always ensure that the cowl is placed in a position where it cannot be damaged by persons walking around the aircraft or by wind.

Reverse the preceding steps for installation.

WARNING
Ensure the overcentre clips are properly engaged and that they are double locked with pins before starting engine.

Lower Cowl
1. Remove the top cowl – Refer above.
2. Remove lower cowl screws at rear of cowl.

Reverse the preceding steps for installation.

10.1.2 Cleaning and Inspection

Wipe the inner surfaces of the cowlings with a cloth saturated with Mineral Turpentine. Wash with a solution of mild soap and water and rinse thoroughly. After cleaning, inspect for dents, cracks and any signs of delamination.

Inspect cowling clips (both top & bottom sections) for rigidity & bonding & for wear. Inspect locking pins for damage. Inspect rear pins for wear or damage & ensure nuts are tight. Inspect rubber grommets in firewall for wear or damage.

Replace any damaged or worn parts with new parts.

10.1.3 Repair

Repair is limited to replacement of cowl clips, pins and rubber grommets. Rivets fixing cowl overcentre clips should be backed with washers.

10.2 ENGINE

The engine is a JABIRU, 4-cylinder, 4-stroke, air-cooled, driving a fixed-pitch wooden propeller. The front Starboard cylinder is numbered 1, the front Port is numbered 2, the rear Starboard is numbered 3 and the rear Port cylinder is numbered 4.
Refer to Engine Instruction & Maintenance (Appendix 1) for detailed engine data.

For repair & overhaul of the engine, refer to the applicable publication issued by Jabiru Aircraft Pty Ltd.

10.2.1 Engine Data

Refer Engine Instruction & Maintenance Manual

10.2.2 Trouble Shooting

Refer Engine Instruction & Maintenance Manual

10.2.3 Cleaning

Refer Paragraph 2.3.5

10.2.4 Accessories Removal

Removal of engine accessories for inspection involves stripping the engine of parts, accessories & components as appropriate. During removal of all parts, carefully examine & tag defective parts for repair or replacement with a new part.

NOTE: All openings exposed by the removal of an item should be closed by installing a suitable cover or cap over the opening. This will prevent the entry of foreign particles. If suitable covers are not available, tape should be used to cover the opening.

10.2.5 Inspection

For specific items to be inspected and for periodic inspection details, refer to Engine Instruction & Maintenance Manual.

1. Visually inspect the engine for loose bolts, nuts, cracks, leaks & cooling fin damage.
2. Inspect baffles, baffle seals & brackets for cracks, deterioration or damage.
3. Inspect hoses for internal swelling, chafing, cuts, breaks, stiffness or loose connections. Excessive heat on hoses will cause them to become brittle & easily broken. Hoses are most likely to crack or break near the ends & at support points. Check fire sleeves on fuel lines within the engine compartment.

NOTE: Avoid excessive flexing & sharp bends when examining hoses for stiffness.

4. All flexible hoses in the engine compartment should be replaced at engine overhaul or every 2 years whichever comes first.
5. For major engine repairs, refer to JABIRU AIRCRAFT Pty Ltd or an Approved Jabiru Service Centre.

10.2.6 Flexible Hoses

Leak Test

After each 50 hours of operation, flexible hoses should be checked for leaks.

1. Examine the exterior of hoses for evidence of leakage or wetness.
2. Replace any doubtful hoses.

Replacement

1. Hoses should not be twisted on installation.
2. Provide as large a bend radius as possible.
3. Hoses should have a minimum of 12mm clearance from other hoses or surrounding objects or be tie-clamped to them.

NOTE: Rubber hoses will take a permanent set during extended use in service. Straightening a hose with a bend having a permanent set will result in hose cracking. Care should be taken during removal so that hose is not bent excessively, and during reinstallation to assure hose is returned to its original position.

10.3 Baffles

The baffles installed around the engine direct the cooling air flow to the radiator and to other engine components to provide optimum engine cooling. The baffles, air inlets and outlets and air scoops are accurately positioned to maintain engine cooling efficiency and their removal will cause improper air circulation and engine overheating.

10.3.1 Cleaning and Inspection

Engine baffles should be cleaned with a suitable solvent (Mineral Turpentine) to remove dirt and oil. Inspect baffles for cracks, splits or damage. Replace defective parts.

10.3.2 Removal and Installation

Baffles are removed by unbolting from the engine and removing tension springs and their attaching wires.

Reverse the preceding steps for installation.

10.3.3 Repair

Repair of baffles is limited to the replacement of rubber seals. These may be replaced by drilling out existing rivets and replacing the new rivets.
10.4 ENGINE MOUNT

The engine mount is a welded assembly. Its purpose is to support the engine and attach the engine to the airframe. The engine is attached to the mount with rubber cushions which absorb engine vibrations.

Spaces are used to correctly align the engine. Ensure that they are correctly marked on removal and correctly replaced on reassembly.

**IMPORTANT**

The engine mounts should not be repaired. If damaged, replace with a new part.

The bolts on the engine mount must only be fitted with high temperature nuts. DO NOT USE NYLOC NUTS as the nylon insert may melt causing failure.

10.5 ENGINE FUEL SYSTEM

The engine is equipped with a carburettor mounted below the engine and a fuel pump at the Starboard rear of the engine.

An auxiliary electronic fuel pump is mounted on the fuel tank support on the Starboard side below the fuel tank.

A fuel valve is located on the Port side of the Main Beam in the cabin and a fuel filter is located in the cabin below the firewall.

**IMPORTANT**

Both fuel lines within the engine compartment are fitted with fireproof sleeves. These sleeves must not be removed.

For carburettor jet removal, idle adjustment and carburettor bowl cleaning procedures, refer to Appendix I, Page 56 Chapter 7.4.7.

10.6 SPARK PLUGS

Refer to Engine Instruction & Maintenance Manual
Check for security prior to each flight.
10.7 ENGINE CONTROLS

10.7.1 Rigging
When adjusting any engine control, it is important to check that the control slides smoothly throughout its full range of travel & that the lever or knob moves through its full range of travel.

10.7.2 Throttle
The throttle controls are shown at Figure 10-7-2.

10.7.3 Choke
The Choke Control is located on the firewall & is connected to the carburettor by a control cable.

10.7.4 Air Intake System & Carburettor Heat
The engine air intake system comprises a cold air inlet in the lower cowl, a hot air muff attached to the exhaust system, a mixer assembly attached to the carburettor, incorporating the air filter, and associated hoses.

Carburettor Heat is activated by pulling the Carburettor Heat Control on the panel OUT. This opens the hot air valve in the mixer assembly and permits hot air to flow from the muff into the carburettor.

The air filter should be cleaned every 50 hours or more regularly if the engine is operated in dusty conditions. Refer Paragraph 10.9.

Refer to Figure 10-7-4

10.8 EXHAUST SYSTEM
The exhaust system consists of front and rear exhaust manifolds attached to the engine block and a muffler assembly and springs which attach the muffler to the manifolds.

10.8.1 Removal and Installation
1. Remove both top and bottom engine cowls.
2. Remove springs.

CAUTION
Never remove coupling spring with a sharp object or one which can mark the spring material. A rounded screwdriver shank or a hook fashioned from ¼” bar stock is ideal.

3. Remove muffler assembly.
4. If necessary, remove exhaust manifolds from engine.

Reverse the preceding steps for installation.
**10.8.2 Inspection**

All exhaust systems are subject to burning, cracking and general deterioration from alternate thermal stress and vibration, inspection is very important and should be carried out every 50 hours of operation.

In addition, an inspection of the exhaust system must be undertaken anytime exhaust fumes are noticed in the cabin.

1. Remove engine cowlings.
2. Inspect complete system, starting at the manifold gaskets and securing bolts and moving outwards. Especially check areas adjacent to welds. Look for exhaust gas deposits in surrounding areas, indicating that exhaust gas is escaping through a hole or crack.
3. For a more thorough inspection, the following procedure is recommended.
   - Remove manifolds and/or muffler.
   - Use rubber expansion plugs to seal openings.
   - Using a manometer or gauge, apply approximately 1-1/2 psi (3 inches of mercury) air pressure while the manifold and/or muffler are submerged in water. All leaks will appear as bubbles and can be readily detected.
4. It is recommended that any exhaust system component found to be defective is replaced with a new part before the next flight.

**10.9 EXTREME CLIMATIC CONDITIONS**

**10.9.1 Dust**

Dust induced into the carburettor air intake system is probably the greatest single cause of early engine wear. When operating under high dust conditions, the carburettor air filters should be serviced daily as outlined in Paragraph 10.7.4.

**10.9.2 Seacoast and Humid Area**

In salt water areas, special care should be taken to keep the engine and accessories clean to prevent oxidisation.

In humid areas, fuel should be checked frequently and drained of condensed moisture.
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**Figure: 10-7-4**

**Drawing: 476032/2 AIR INLET HOUSING ASSEMBLY**

**Issue: 3**

**Date: 04/04/01**
SECTION 11
FUEL SYSTEM

11.1 DESCRIPTION

Fuel is pump-fed from the composite fuel tank behind the seats, through a shut-off valve and through a filter to the carburettor. The primary fuel pump is attached to the engine. A secondary, electronic pump is mounted on the Starboard lower fuel tank support bracket, below the fuel tank in the cabin. Positive ventilation is provided by a vent line from the fuel tank extending overboard through the Starboard Wing Root.

11.1.1 Precautions

There are certain general precautions and rules concerning the fuel system which must be observed when performing the operations and procedures in this Section.
1. During all fuelling, defuelling, tank purging and tank disassembly, ground the aircraft to a suitable ground stake.
2. Residual fuel draining from hose constitutes a fire hazard. Use caution to prevent the accumulation of fuel when hoses are disconnected.
3. Cap open hoses and cover connections to prevent the entrance of foreign matter.
11.2 FUEL TANK

11.2.1 Description

The composite fuel tank is located behind the seats. A sump drain plug is provided for draining trapped water and sediment.

11.2.2 Removal and Installation

1. Drain tank of fuel by removing Fuel Drain Valve on sump
2. Disconnect and plug or cap fuel filler line and fuel tank vent line from tank.
3. Disconnect ground strap from fuel filler cap.
4. Disconnect fuel tank restraining straps.
5. Disconnect fuel line at bottom of tank.
6. Remove tank.

Reverse the preceding steps for installation, ensuring that lockwire is replaced on Fuel Drain Valve.

11.3 FUEL VENT

11.3.1 Description

A vent line is installed in the Starboard side of the fuel tank and extends overboard through lower fuselage.
11.3.2 Checking

Vent lines can become blocked, resulting in fuel starvation of the engine. Also, the vent line, if plugged, can result in pressure from expanding fuel pressurising the tank. The following procedure may be used to check the tank and tube.
1. Attach a rubber or plastic tube to the vent tube on the lower fuselage.
2. Blow into tube to slightly pressurise tank. If air can be blown into the tank, the line is open.
3. Correct any blockage.

11.4 FUEL SHUT-OFF VALVE

See Figure 11-4.

11.4.1 Description

The fuel shut-off valve is a two-positions ON – OFF valve located on the Port side of the main longitudinal beam.

11.4.2 Removal and Installation

1. Remove fuel shut-off valve cover.
2. Remove shut-off valve handle.
3. Remove cover plate and insertion rubber.
4. Disconnect and cap fuel lines at shut-off valve.
5. Remove shut-off valve.

Reverse the preceding steps for installation.

11.5 FUEL FILTER

11.5.1 Description

The fuel filter is of the in-line type and is located above the main longitudinal beam, near the Firewall.

11.5.2 Removal and Installation

1. Turn fuel Valve to OFF.
2. Place a cloth beneath the filter to collect any fuel which may be split during removal of the filter.
3. Disconnect the fuel lines at both ends of the filter.
4. Remove filter.

Reverse the preceding steps for installation. Ensure waste cloth is removed.

**WARNING**

The fuel filter must only be installed in one direction. An arrow on the side of the filter marks the fuel flow direction. Ensure this arrow is pointed towards the Firewall and Engine.
11.6 FUEL PUMPS

11.6.1 Primary Pump

The Primary Fuel Pump is located on the Starboard rear of the Engine. Refer to Appendix 1 for details.

11.6.2 Secondary Pump

The Secondary Fuel Pump is an electronic pump, mounted on the lower Starboard fuel tank mount bracket, below the fuel tank in the cabin. It is wired to an ON – OFF switch on the control panel. It may be used for priming and as a back-up to the Primary Pump. It is recommended that the Secondary Pump be engaged during take-off and landing.
**SECTION 12**

**INSTRUMENTS AND INSTRUMENT SYSTEMS**

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12.1 GENERAL

This Section describes the typical instrument installation and its operating system. Emphasis is placed on trouble shooting and corrective measures only. It does NOT deal with specific instrument repairs as this usually requires special equipment and data and should be handled by instrument specialists. Malfunctioning instruments should be either returned to JABIRU AIRCRAFT Pty Ltd or sent to an approved instrument overhaul and repair station for servicing. Our concern here is with preventive maintenance on the various instrument systems and correction of system faults which will result in instrument malfunctions. The descriptive material, maintenance and trouble shooting information in this Section is intended to help the owner or mechanic determine malfunctions and correct them, up to the defective instrument itself, at which point an instrument technician should be called in. Some instruments, such as Oil Temperature and Pressure Gauges, are simple and relatively inexpensive and repairs will usually cost more than a new instrument. Flight instruments, on the other hand, are usually well worth repairing. The words “replace instrument” in the text, therefore, should be taken only in the sense of physical replacement in the aircraft. Whether replacement is to be with a new instrument, an exchange one, or an original instrument is to be repaired must be decided on the basis of the individual circumstances.

12.2 INSTRUMENT PANEL

The instrument panel assembly consists of a stationary and a shock-mounted panel. The stationary lower panel contains switches and fuses which are not sensitive to vibration. The shock-mounted panel contains flight instruments which ARE affected by vibration. The instruments are screw-mounted to the panel.

12.2.1 Removal and Installation

The stationary panel is secured to the Firewall and ordinarily is not considered removable. The stock-mounted panel is secured to Firewall attachments with rubber shock-mounts. To remove shock-mounted panel proceed as follows:

1. Unbolt and remove the securing bolt at each side and at the bottom of the main instrument panel.
2. Lift the main instrument panel up and then away from the Firewall. Ensure that the Windscreen is not contacted by the panel as it is removed or damage to the perspex will result.
3. Cushion the front of the panel to support it from the Main Beam. Take care not to strain connections on wires or tubes.

12.2.2 Shock Mounts

Service life of instruments is directly related to adequate shock-mounting of the panel. If removal of the panel is necessary, check mounts for deterioration.

12.3 INSTRUMENTS

Refer to Figure 12-3.
12.3.1 Removal

Most instruments are secured to the panel with screws inserted through the panel face. To remove an instrument, disconnect wiring or plumbing to the instrument, remove mounting screws and take instrument out from behind, or in some cases, from the front of the panel.

In all cases when an instrument is removed, disconnected lines or wires should be protected. Cap open lines and cover pressure connections on instrument to prevent thread damage and entrance of foreign matter. Wire terminals should be insulated or tied up so that accidental ground or short-circuiting will not occur.

12.3.2 Installation

Generally, the installation procedure is the reverse of the removal procedure. Ensure mounting screws and nuts are tightened firmly, but do not over-tighten, particularly on instruments having plastic cases. The same rule applies to connecting plumbing and wiring.

12.4 PITOT AND STATIC SYSTEMS

Refer to Figure 12-4.

The pitot system conveys ram air pressure to the airspeed indicator. The static system vents vertical speed indicator (if fitted), altimeter and airspeed indicator to atmospheric pressure through plastic tubing connected to a static port.

12.4.1 Maintenance

Proper maintenance of pitot and static system is essential for proper operation of the altimeter, airspeed indicator and vertical speed indicator (if fitted). Leaks, moisture and obstructions in the pitot system will result in false airspeed indications, while static system malfunctions will affect readings of all three instruments. Cleanliness and security are the principal rules for system maintenance. The pitot tube and static ports MUST be kept clean and unobstructed.

12.4.2 Static Pressure System Inspection and Leakage Test

The following procedure outlines inspection and testing of the static pressure system, assuming that the altimeter has been tested and inspected in accordance with the current Regulations.

1. Ensure the static system is free from entrapped moisture and restrictions.
2. Ensure no alternations of airframe surface have been made which would effect the relationship between air pressure in the static pressure system and truce ambient static air pressure for any flight configuration.
3. Attach a source of suction to static pressure source opening. Figure 12-4 shows one method of obtaining suction.
4. Slowly apply suction until the altimeter indicates a 1000-foot increase in altitude.
CAUTION

When applying or releasing suction, do not exceed the range of either vertical speed indicator or airspeed indicator.

5. Cut off suction source to maintain a “closed” system for one minute. Leakage shall not exceed 100 feet altitude loss as indicated on the altimeter.
6. If leakage rate is within tolerance, slowly release suction source.

NOTE: If leakage rate exceeds maximum allowable, first tighten all connections, then repeat leakage test. If leakage rate still exceeds maximum allowable use the following procedure:

7. Disconnect static pressure lines from airspeed indicator and vertical speed indicator. Use suitable fittings to connect lines together so that the altimeter is the only instrument still connected into the static pressure system.
8. Repeat leakage test to check whether static pressure system or the bypassed instruments are the cause of the leakage. If instruments are at fault, they must be repaired by an “appropriately authorised repair station”, or replaced. If static pressure system is at fault, use the following procedure to locate the leakage.
9. Attach a source of positive pressure to the static source opening. Figure 12-4-2 shows one method of obtaining positive pressure.

CAUTION

Do not apply positive pressure with airspeed indicator or vertical speed indicator connected to the static pressure system.

10. Slowly apply positive pressure until altimeter indicates a 500-foot decrease in altitude and maintain this altimeter indication while checking for leaks. Coat line connectors and static course flange with solution of mild soap and water, watching for bubbles to locate leaks.
11. Tighten leaking connections. Repair or replace parts found to be defective.
12. Reconnect airspeed and vertical speed indicators into static pressure systems and repeat leakage test steps 3 through 6.

12.4.3 Pitot System Inspection and Leakage Test

To check pitot system for leaks, place a piece of rubber or plastic tubing over pitot tube, close opposite end of tubing and slowly roll up tube until airspeed indicator registers in the cruise range. Secure tube and after a few minutes recheck airspeed indicator. Any leakage will have reduced the pressure in the system, resulting in a lower airspeed indication. Slowly unroll tubing before removing it, so pressure may be released gradually. Otherwise instrument may be damaged. If the test reveals a leak in the system, check all connections for tightness.
12.4.4 Blowing Out Lines

Condensation may collect at points in the pitot system and produce a partial obstruction. To clear line, disconnect airspeed indicator. Using low pressure air, blow from indicator end of line toward pitot tube.

**CAUTION**

Never blow through pitot or static lines towards the instruments.

Like pitot lines, static lines may be kept clear and connections tight. When necessary, disconnect static line at first instrument to which it is connected, then blow line clear with low pressure air. Check all static pressure lines for tightness. If hose or hose connections are used, check for general condition and clamps for security. Replace hose which has cracked, hardened or shows signs of deterioration.

12.4.5 Removal and Installation of Components

To remove pitot mast, remove the two screws fastening it to the wing strut and pull it out from the strut far enough to disconnect the pitot line.

The static mast is fixed and cannot be removed. To gain access to disconnect the static tube from the static mast remove the VHF antenna cover at the tope of the fin. Pitot and static tubing is removed in the usual manner.

Installation of tubing will be simplified if a guide wire is drawn in as the tubing is removed. When replacing tubing and fittings, tighten connections firmly, but avoid overtightening and distortion of fittings or tubing.

12.4.6 Trouble Shooting – Pitot Static System

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low or sluggish airspeed indication (normal airspeed and vertical speed)</td>
<td>Pitot tube obstructed, leak or obstruction in pitot line</td>
<td>Test pitot tube and line for leaks or obstructions. Blow out tube and line, repair or replace damaged line.</td>
</tr>
<tr>
<td>Incorrect or sluggish response (all 3 instruments)</td>
<td>Leaks or obstruction in static line</td>
<td>Test line for leaks and obstructions. Repair or replace line, blow out obstructed line.</td>
</tr>
</tbody>
</table>
### 12.4.7 Trouble Shooting – Airspeed Indicator

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand fails to response</td>
<td>Pitot pressure connection not properly connected to pressure line from pitot tube</td>
<td>Test line and connections for leaks. Repair or replace damaged line, tighten connections</td>
</tr>
<tr>
<td></td>
<td>Pitot or static lines clogged</td>
<td>Check line for obstructions. Blow out lines.</td>
</tr>
<tr>
<td>Incorrect indication or hand oscillates</td>
<td>Leak in pitot or static lines</td>
<td>Test lines and connections for leaks. Repair or replace damaged lines, tighten connections</td>
</tr>
<tr>
<td></td>
<td>Defective mechanism or leaking diaphragm</td>
<td>Substitute known-good indicator and check reading. Replace instrument.</td>
</tr>
<tr>
<td>Hand vibrations</td>
<td>Excessive vibration</td>
<td>Check panel shock mounts. Replace defective shock mounts</td>
</tr>
<tr>
<td></td>
<td>Excessive tubing vibration</td>
<td>Check clamps and line connections for security. Tighten clamps and connections, replace tubing with flexible hose.</td>
</tr>
</tbody>
</table>

### 12.4.8 Trouble Shooting – Altimeter

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument fails to operate</td>
<td>Static line plugged</td>
<td>Check line for obstructions. Blow out lines</td>
</tr>
<tr>
<td></td>
<td>Defective mechanism</td>
<td>Substitute known-good altimeter and check reading. Replace instrument.</td>
</tr>
<tr>
<td>Incorrect indication</td>
<td>Hands not carefully set</td>
<td>Reset hands with knob</td>
</tr>
<tr>
<td></td>
<td>Leaking diaphragm</td>
<td>Substitute known-good altimeter and check reading. Replace instrument.</td>
</tr>
<tr>
<td></td>
<td>Pointers out calibration</td>
<td>Compare reading with known-good altimeter. Replace instrument.</td>
</tr>
<tr>
<td>Hand oscillates</td>
<td>Static pressure irregular</td>
<td>Check lines for obstruction or leaks. Blow out lines, tighten connections.</td>
</tr>
<tr>
<td></td>
<td>Leak in airspeed or vertical speed indicator</td>
<td>Check other instruments and system plumbing for leaks. Blow out lines, tighten connections</td>
</tr>
<tr>
<td></td>
<td>installations</td>
<td></td>
</tr>
</tbody>
</table>
12.4.9 Trouble Shooting – Vertical Speed Indicator (Option)

<table>
<thead>
<tr>
<th>Instrument fails to operate</th>
<th>Static line plugged</th>
<th>Check line for obstructions. Blow out lines.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static line broken</td>
<td>Check line for damage, connections for security. Repair or replace damaged line, tighten connections.</td>
<td></td>
</tr>
<tr>
<td>Incorrect indication</td>
<td>Partially plugged static line</td>
<td>Check line for obstructions. Blow out lines</td>
</tr>
<tr>
<td>Ruptured diaphragm</td>
<td>Substitute known-good indicator and check reading. Replace instrument</td>
<td></td>
</tr>
<tr>
<td>Pointer off zero</td>
<td>Reset pointer to zero</td>
<td></td>
</tr>
<tr>
<td>Pointer oscillates</td>
<td>Partially plugged static line</td>
<td>Check line for obstructions. Blow out lines</td>
</tr>
<tr>
<td></td>
<td>Leak in static line</td>
<td>Test lines and connections for leaks. Repair or replace damaged lines, tighten connections.</td>
</tr>
<tr>
<td></td>
<td>Leak in instrument case</td>
<td>Substitute known-good indicator and check reading. Replace instrument</td>
</tr>
<tr>
<td>Hand vibrates</td>
<td>Excessive vibration</td>
<td>Check shock mounts. Replace defective shock mounts.</td>
</tr>
<tr>
<td>Defective diaphragm</td>
<td>Substitute known-good indicator and check for vibration. Replace instrument</td>
<td></td>
</tr>
</tbody>
</table>

12.4.10 Pitot Tube Alignment

Refer to Figure 12-4-10

For correct airspeed indication, pitot tube must be properly aligned. Open end of tube must be perpendicular to longitudinal axis of the aircraft. Refer to Figure 12-4-10 for alignment details.

12.5 TACHOMETER

The tachometer is electronic and driven from the AC coils of the Alternator.

Should the tachometer fail to operate:
1. Check 10amp instrument fuse and replace if necessary.
2. Check 30amp main fuse and replace if necessary.
3. Remove Instrument Panel (see Paragraph 12.2.1) and check cable terminals for security.
4. Check wiring (see Wiring Diagram Figure 13-8).

Should the instrument give incorrect readings:
1. Check 10amp instrument fuse and replace if necessary.
2. Check 30amp main fuse and replace if necessary.
3. Refer to an Authorised Service Centre to have Alternator and Regulator checked.
4. Refer instrument to VDO Service Centre or JABIRU AIRCRAFT Pty Ltd for inspection and possible repair.

12.6 OIL PRESSURE GAUGE

The Oil Pressure Gauge is an electronic instrument.

Should the instrument fail to operate:
1. Check 10amp instrument fuse and replace if necessary.
2. Check 30amp main fuse and replace if necessary.
3. Remove Instrument Panel (see Paragraph 12.2.1) and check cable terminals for security.
4. Check wiring at Sender for security.
5. Replace Sender.
6. Replace Gauge.

12.7 OIL TEMPERATURE GAUGE

The Oil Temperature Gauge is an electronic instrument.

Should the instrument fail to operate:
1. Check 10amp instrument fuse and replace if necessary.
2. Check 30amp main fuse and replace if necessary.
3. Remove Instrument Panel (see Paragraph 12.2.1) and check cable terminals for security.
4. Check wiring at Sender for security.
5. Replace Sender.
6. Replace Gauge.

12.8 CYLINDER HEAD TEMPERATURE GAUGE

The Cylinder Head Temperature Gauge is a Thermo-couple instrument and is not connected to the aircraft electrical system.

See Wiring Diagram Figure 13-8.

Should the instrument fail to operate:
1. Check for loose terminal connections and damage to wiring.
2. Replace thermo-couple.
3. Replace Gauge.
12.9  EXHAUST GAS TEMPERATURE GAUGE (OPTION)

The Exhaust Gas Temperature Gauge is a Thermo-couple instrument and is not connected to the aircraft electrical system.

See Wiring Diagram Figure 13-8.

Should the instrument fail to operate:
1. Check for loose terminal connections and damage to wiring.
2. Replace thermo-couple.
3. Replace Gauge.

12.10  HOURMETER

The Hourmeter is an electronic instrument. An optional Airspeed Switch may be fitted.

Should the instrument fail to operate:
1. Check 10amp instrument fuse and replace if necessary.
2. Check 30amp main fuse and replace if necessary.
3. Remove Instrument Panel (see Paragraph 12.2.1) and check cable terminals for security.
4. Replace Gauge.

12.11  MAGNETIC COMPASS

The Magnetic Compass is liquid-filled, with expansion provisions to compensate for temperature changes. It is equipped with compensating magnets adjustable from the front of the case.
No maintenance is required on the compass except an occasional check on a compass rose for adjustment and compensation.

12.12  GYRO INSTRUMENT PACKAGE (OPTION)

A vacuum pump driven Artificial Horizon and Directional Gyro, together with an electric Turn Coordinator, is available as an option.

Where this option is provided, a larger instrument panel is fitted (see Figure 12-3A).

Repair should only be performed by an approved instrument workshop.
Drawing 9029043/5 INTRUMENT PANEL STANDARD
12.3
TO APPLY SUCTION:—

1: Squeeze air bulb to expel as much air as possible
2: Hold suction hose firmly against static pressure tube opening
3: Slowly release air bulb to obtain desired suction, then
   pinch hose tightly to maintain suction in the system
4: After leak test, slowly release suction by allowing a small
   amount of air into static system, wait for vertical speed
   indicator to return to zero, and repeat as required.

TO APPLY PRESSURE:—

CAUTION: DO NOT APPLY PRESSURE WITH AIRSPEED INDICATOR OR
        VERTICAL SPEED INDICATOR CONNECTED TO STATIC SYSTEM

1: Hold pressure hose firmly against static pressure tube opening
2: Slowly squeeze air bulb to apply desired pressure to static system
3: Release pressure slowly by opening bleed valve

Drawing 9017093/1 STATIC TEST EQUIPMENT

Figure: 12-4-2
<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART No.</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>50449N</td>
<td>TUBE BENT PITOT</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>HOSE CLAMP #MS8242</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>504439N</td>
<td>HOSE COUPLING</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>PV0029N</td>
<td>PVC TUBE 1/4&quot; ID</td>
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</tr>
<tr>
<td>5</td>
<td>PI0139N</td>
<td>WIRE TIE</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>PH0029N</td>
<td>RIVET</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>504429N</td>
<td>MOUNT PLATE PITOT TUBE</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>504419N</td>
<td>TUBE STRAIGHT PITOT</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2000093</td>
<td>WING STRUT ASSY</td>
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</tr>
</tbody>
</table>

Drawing 9024094/2 PITOT ASSEMBLY

Figure: 12-4-10
## SECTION 13

### ELECTRICAL SYSTEMS

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<tr>
<td>VHF Antenna Installation</td>
<td>13.10</td>
</tr>
</tbody>
</table>
13.1 ELECTRICAL POWER SUPPLY SYSTEM

Electrical energy for the aircraft is supplied by a 14 volt, direct-current, single-wire, negative ground electrical system. A 12-volt battery supplies power for starting and furnishes a reserve source of power in the event of electrical power system failure. An engine-driven Alternator is the normal source of power during flight and maintains a battery charge controlled by a voltage regulator.

The following paragraphs provide brief descriptions of the elements of the electrical system. They should be read in conjunction with the Wiring Diagram at Figure 13-8.

13.1.1 Bus Bars

Electrical power for electrical equipment and installations is supplied through Bus Bars. The bus bars are mounted at the rear of the lower instrument panel. Access is gained by removing the main instrument panel (see Paragraph 12.2.1).

13.1.2 Master Switch

The Master Switch activates a relay which in turn powers the bus bars.

Refer to Wiring Diagram at Figure 13-8.

13.2 BATTERY POWER SYSTEM

Refer also to Wiring Diagram at Figure 13-8.

13.2.1 Battery

The battery is 12-volts and approximately 20 ampere-hour capacity. The battery is mounted in the engine compartment and is vented overboard.

13.2.2 Trouble Shooting

Trouble Shooting is limited to inspection of wiring and terminals, battery charge condition and battery solonoid.

13.2.3 Removal and Installation

1. Disconnect the battery security strap.
2. Disconnect battery drain.
3. Disconnect the ground cable from the negative battery terminal (black insulation).

CAUTION

When installing or removing battery, always observe the proper polarity with the aircraft electrical system (negative to ground). Reversing the polarity, even momentarily, may result in failure of semi-conductor devices (alternator diodes, radio protection diodes and radio transistors).
4. Disconnect the cable from the positive battery terminal.
5. Lift the battery out of the battery box.
6. To replace the battery, reverse this procedure.

13.2.4 Cleaning the Battery

For maximum efficiency the battery and connections should be kept clean at all times.

1. Remove the battery and connections in accordance with the preceding paragraph.
2. Tighten the battery cell filler caps to prevent the cleaning solution from entering the cells.
3. Wipe the battery cable ends, battery terminals and the entire surface of the battery with a clean cloth moistened with a solution of bicarbonate of soda (baking soda) and water.
4. Rinse with clear water, wipe off excess water and allow battery to dry.
5. Brighten up cable ends and battery terminals with emery cloth or a wire brush.
6. Install the battery in accordance with the preceding paragraphs.
7. Coat the battery terminals with petroleum jelly or an ignition spray product to reduce corrosion.

13.3 Battery Box

The battery box is located on the firewall in the engine compartment.

13.4 Starter Solenoid

The starter solenoid is a sealed unit.
Service is limited to inspection of terminals for security and replacement of the unit.

13.5 Voltage Regulator

The voltage regulator is a sealed unit.
Service is limited to inspection of terminals for security and replacement of the unit.

13.6 Strobe System (Option)

A white strobe light may be installed in the rear lower fuselage or in the cabin roof.
The power source for the strobe light is located behind the fuel tank.

**WARNING**
The strobe system is a high-voltage device. Do Not remove or touch tube assembly while in operation. Wait at least 5 minutes after turning off power before commencing any activity near the strobe light.
13.7 ELECTRICAL LOAD ANALYSIS

As this aircraft is only certified for VFR Daylight only operations, an Electrical Load Analysis is not required as failure of the electrical generation system would have a limited effect on the length of time of radio transmissions and no effect on aircraft performance as the engine electrical system is totally isolated from the power supply and is self-sustaining. The battery is only used to crank the engine for starting.

13.8 WIRING DIAGRAM

The Wiring Diagram is shown at Figure 13-8.

13.9 RADIO WIRING DIAGRAM (OPTION)

The optional aircraft radio system diagram is shown at Figure 13-9.

13.10 VHF ANTENNA INSTALLATION
Drawing 404409R/2 RADIO CIRCUIT KY97A INTERCONNECT

Diagram:

- **Headphone Out** (pin H7)
- **Common Mic Audio** (pin J9)
- **Mic** (pin 9)
- **Key** (pin 8)
- **13.75V AC Power** (pin R14)
- **Switched AC Power** (pin P13)
- **13.75V Power** (pin M11)
- **Power Ground** (pin 6)
- **RG58 to Ant.** (pin 15)
- **Intercom Operator** (pin 7)
- **Noise Filter Choke**

**NOTES:**
1. Intercom operator requires a mic which provides audio out with the mic key deenergized.
2. All wires #24 AWG unless noted otherwise.
3. Terminate audio shields at one end only.
4. All grounds are airframe grounds unless noted otherwise.
5. Aircraft power wiring should be two #18 AWG to the circuit breaker and power ground two #18 AWG to ground.
6. Switched A/C power pins p & 13 and 13,75 power pins M & 11 must be jumped together with #20 AWG min.
SECTION 14

PAINTING AND FINISHING

14.1 Interior

The interior is painted with BERGER Matt Vinyl – Standard colour is Fumosus A154 – Grey.

14.2 Exterior

The exterior has a base gelcoat applied during the moulding process. This is supplemented with DUROKEM Acrylic Lacquer Primer.

Finishing is with REGAL Starfire Automotive Enamel – White.

Stripes and decals are 3M SCOTCHCAL Film Series 7725 and are applied by a 3M franchise with franchisees in each State. Contact Jabiru for details.

CAUTION

The Jabiru aircraft is only approved to be painted in basic White colour, so as to minimise the effects of heat and ultraviolet light to the aircraft structure.

In addition, colour must not be applied to horizontal, upper surfaces.
SECTION 15

PALCARDS

15.1 Refer to Figure 15.1
Appendix 1 of this Manual is the Instruction and Maintenance Manual for the Jabiru 2200 engine.
JABIRU AIRCRAFT PTY LTD
SERVICE MANUAL
APPENDIX 11

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JABIRU PROPELLER INSTRUCTION MANUAL
AIRWORTHINESS LIMITATIONS

MANDATORY REPLACEMENT TIMES

STRUCTURAL INSPECTION INTERVALS &

STRUCTURAL INSPECTION PROCEDURES
APPENDIX 3
AIRWORTHINESS LIMITATIONS

1. GENERAL

This Section sets forth each mandatory replacement time, structural inspection interval and related structural inspection procedure.

2. MANDATORY REPLACEMENT TIME

The following components MUST be replaced at the intervals described hereunder.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
<th>Interval (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rudder Cable</td>
<td>PC00394</td>
<td>2500</td>
</tr>
<tr>
<td>Elevator Cable</td>
<td>PC00194</td>
<td>2500</td>
</tr>
<tr>
<td>Aileron Cable (2)</td>
<td>PC00294</td>
<td>2500</td>
</tr>
</tbody>
</table>

3. STRUCTURAL INSPECTION INTERVALS

A visual inspection should be conducted each 100 hours in accordance with the Inspection Schedules detailed at Paragraph 2.3 of the Service Manual.

This inspection should identify the commencement of any structural deterioration which will be evidenced by cracking of the paintwork, whiting of unpainted areas, movement of wing attachments and threaded bushes, movement of undercarriage attachments, loosening of firewall/engine attachments.

Wing struts should be inspected for loose rivets, excessive clearance in wing strut attachments or corrosion.

Cable clamps should be inspected for evidence of movement and security.

4. INSPECTION PROCEDURES

All inspection is by visual means.

Refer Paragraph 3 above and Paragraph 2.3 of the Service Manual.