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CESSNA MODEL 206
ON FLI-LITE 4000 WITH HYDRAULIC POWER PACK

SERVICE MANUAL

AND

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

ISSUED OCTOBER 20, 2004

**CONTACT WIPAIRE SERVICE DEPARTMENT
OR CHECK OUR WEBSITE AT WWW.WIPAIRE.COM
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INTRODUCTION

This manual describes the general servicing and maintenance for the Model 4000 FLI-LITE ski hydraulic power pack installation. For services and repairs not covered by this manual contact the factory.

The service products referred to throughout this manual are described by their trade name and may be purchased from the factory Parts Department.

To contact Wipaire for service assistance or parts sales, call or write:

Wipaire, Inc.
Telephone: (651) 451-1205
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5. RETRACT SYSTEM OPERATION AND MAINTENANCE

5.1 Description and Operation

Retraction and extension of the main and nose skis is affected by a hydraulic actuation system shown schematically in Figure 5-1. Figure 5-2 shows the electrical schematic.

The gear system is hydraulically actuated and driven by one reversible electric pump.

A pressure of between 500 psi and 700 psi in the down and 500 psi and 700 psi in the up position is maintained in the supply line. When the pressure falls below 500 psi in the down position and 500 psi in the up position, the pressure switch activates the pump solenoid, providing power to the pump. When the pressure reaches 700 psi in the down position and 700 psi in the up position, the pressure switch deactivates the solenoid and the pump motor stops. A check valve on the output side of the pump retains pressure in the system while the pump is off. The pump has an interval relief valve that directs oil back to the pump reservoir when the line pressure exceeds 800 +100/-0 psi. The system also has an internal relief valve to protect against thermal expansion when line pressure exceeds 1100 +100/-0 psi.

See Section 8 for disassembly, service and troubleshooting.

The system requires hydraulic oil (Mil-H-5606 Red). To check the fluid level, fill the reservoir with hydraulic oil and cycle the gear. If the reservoir empties (i.e., fluid disappears in sight glass), stop the cycle by pulling the circuit breaker on the control panel. Fill the reservoir again and complete the cycle. Continue this procedure until the fluid level in the reservoir stabilizes (it will vary in level between up and down positions). If the fluid level continues to decline during gear cycles, check for external leaks. If pump cycles on and off during gear cycle, it may be necessary to select hand pump to "UP." Cycle gear "UP" with electric pump, then select gear "DOWN" on hand pump and cycle gear "DOWN" with electric pump. Repeat if necessary. This manually bleeds system.

NOTE

Fluid level in reservoir in "UP" position is full; "DOWN" position reservoir is half full. Don't over fill in "DOWN" position.

A cockpit-mounted switch accomplishes the selection of gear up or gear down

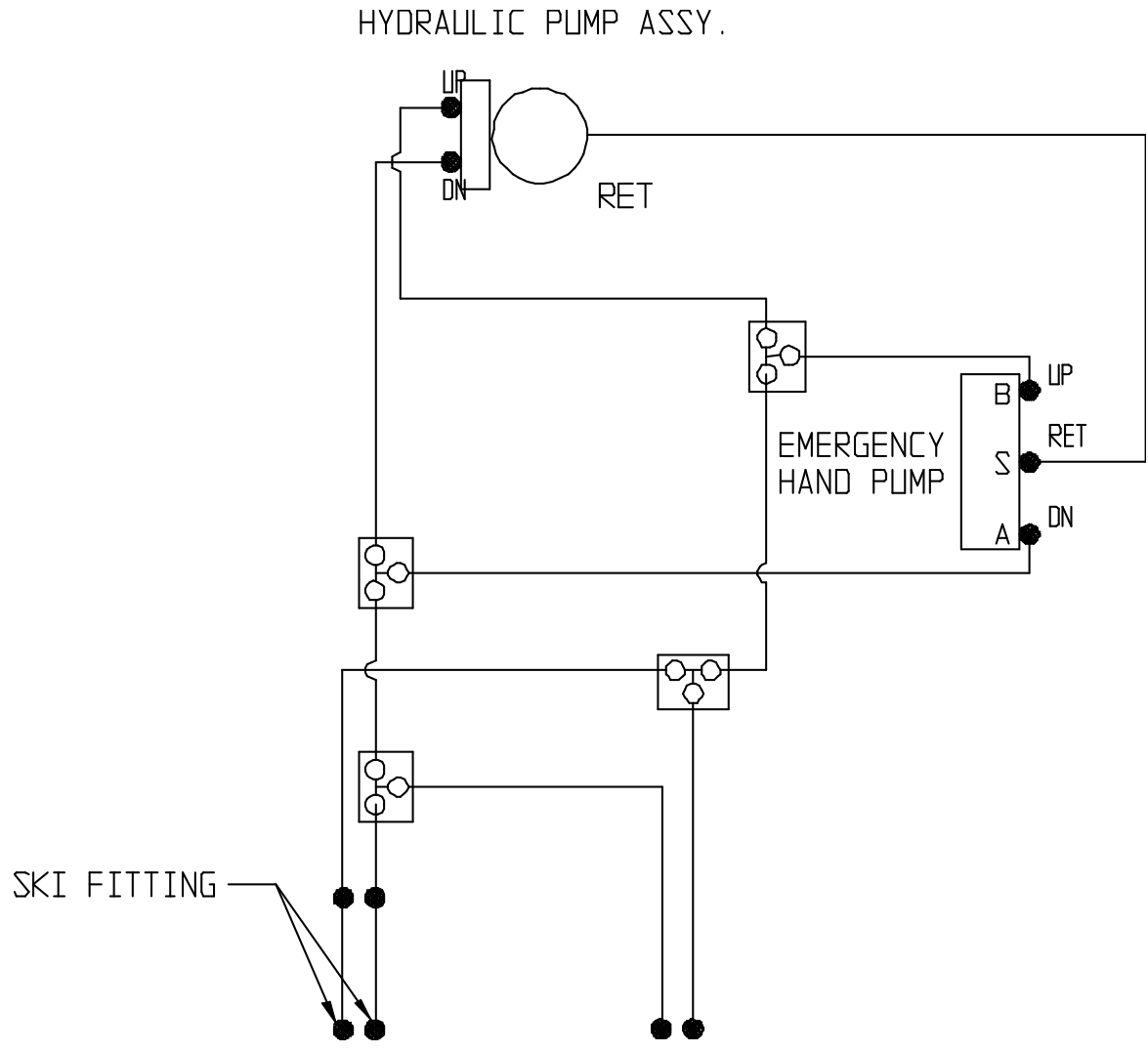


Figure 5-1. Schematic Hydraulic System
CESSNA 206

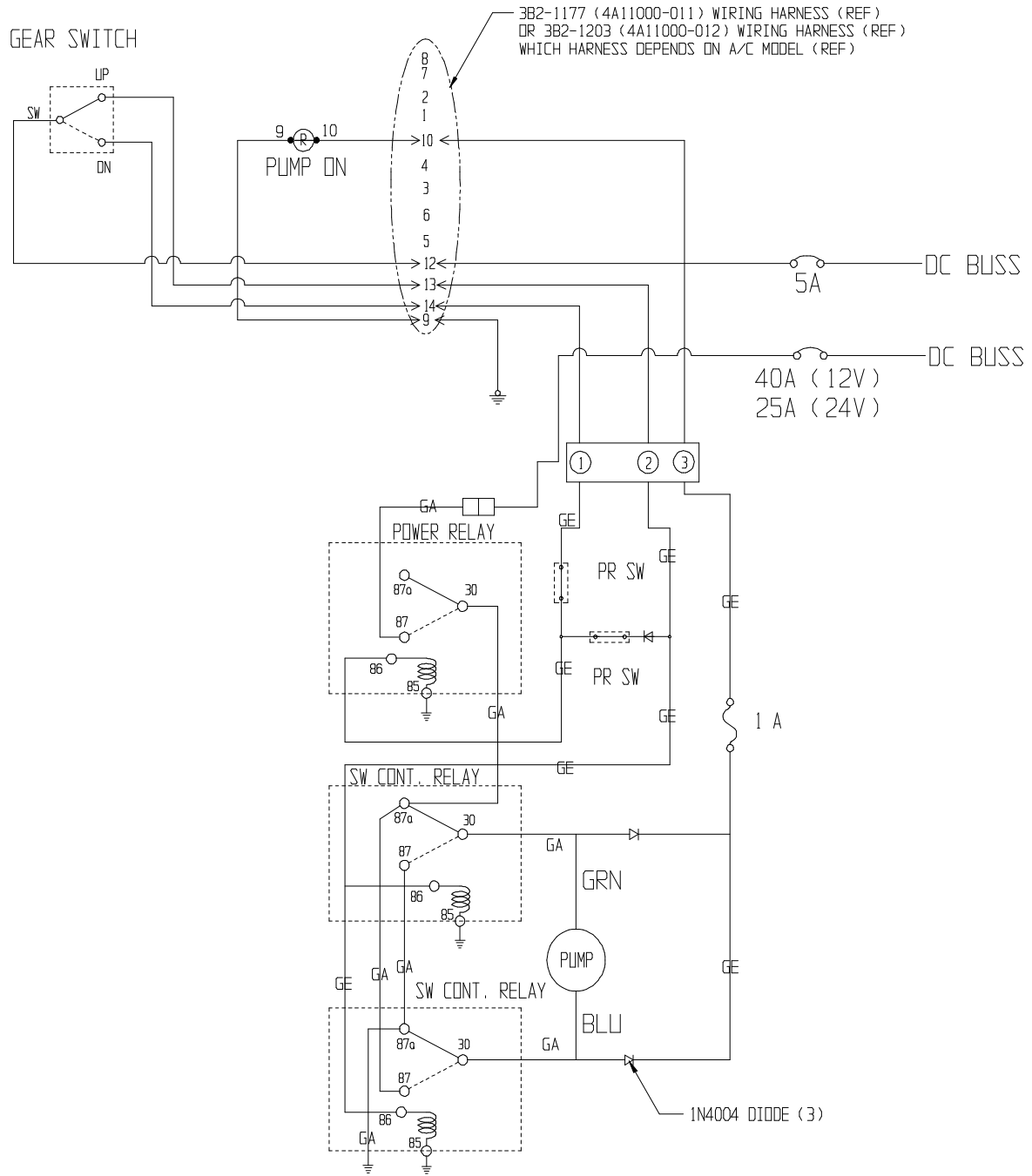


Figure 5-2. Schematic Electrical

CESSNA 206

6.3 Gear Selector Switch

The gear selector switch is located on the instrument panel in front of the pilot. The gear selector is an electrical switch that changes pump direction of the electro-power pack for gear up or down. The red light on panel indicates the pump has power supplied to it

8. HYDRAULIC PUMP DISASSEMBLY AND SERVICE

Pump may be returned to factory for service. Electric pump motor may be returned to factory for service.

The pump is located on the fuselage side just aft of access panel in the baggage compartment. The entire pump assembly maybe removed from the aircraft by removing the (2) top and (2) lower bolts securing the pump bracket to the fuselage bracket. Remove hydraulic lines and unplug wiring harness. Remove assembly from aircraft.

The screens maybe cleaned by the following, without removing pumps from the aircraft.

- 1) Remove return line on lower reservoir and drain oil.
- 2) Remove screw on bottom of reservoir for tank removal.
- 3) After tank removal, pick up filters to be pulled off (friction fit) and cleaned. (Refer to Figures 8-1 & 8-2.)
- 4) Replace tank, reinstall lower hose and fill with clean hydraulic oil (Mil-H-5606).
- 5) Fill by removing breather and filler stand pipe.

NOTE: ANY PARTS THAT MAYBE REQUIRED TO REPLACE REFER TO WIPAIRE 206 WIPLINE 3450 PARTS CATOLOG ON WEB SITE
WWW.WIPAIRE.COM

8.1 Setting Thermal and Pressure Relief Valves

- 1) These are preset at the factory. Thermal relief is set at 1100° +100/-0 PSI and pressure relief at 800° +100/-0 PSI.
- 2) If adjusting, refer to Figure 8-2 for location of relief valves.
- 3) Loosen jam nut on relief valve to be changed. Turn clockwise to increase and C' clockwise to lessen.
- 4) Do not exceed factory settings noted above.

8.2 Troubleshooting Hydraulic System

- 1) **PROBLEM** – Power pack does not run after gear selection.

RED pump light **OFF**

Probable cause:

- a. Circuit breaker has tripped.
- b. Pressure switch not pulling in at low cut in.
- c. Solenoid switch not pulling in.

- d. Motor not properly grounded.
- e. Pressure buildup on both sides of up and down lines.

PROBLEM – Power pack does not run after gear selection.

RED pump light **ON**

Probable cause:

- a. Faulty pump motor.

Verification and Remedy:

- a. Reset circuit breaker.
- b. Short across pressure switch leads and see if motor runs. If motor operates, replace pressure switch.
- c. Short across solenoid pressure switch leads and see if motor runs. If motor operates, replace solenoid pressure switch.
- d. If c. above does not produce results and it is verified that voltage was actually applied to motor, it can be assumed motor is bad or not properly grounded.
- e. Check motor ground.
- f. Select hand pump to up and down position to relieve pressure. Return to center and select gear.

2) PROBLEM – Power pack does not shut off after gear reaches position.

- a. Faulty pressure switch.
- b. Faulty or dirty pressure relief valve allowing insufficient pressure buildup.

Remedy:

- a. Replace pressure switch.
- b. Clean and check relief valve.

3) PROBLEM – Power pack shuts off before gear reaches position.

Probable Cause:

- a. Binding, jammed or frozen gear retractor, which causes pressure to build up (and stay up), and pressure switch shuts off power pack.

Remedy:

- a. Repair retractor.

4) PROBLEM – Power pack cycles on and off after gear is in position.

Probable Cause:

- a. Internal hydraulic leak.
- b. External hydraulic leak.

Remedy:

- a. Verify leak is not external by checking fluid level in reservoir and looking at couplings for oil leaks. If no external leaks are found, disconnect and cap off the hydraulic actuators one at a time and find the leaky one by process of elimination.
- b. If isolating entire system still indicates internal leak, power pack check valve (located in pressure port of pump) is bad and needs replacement or reseating.
- c. Visually inspect lines, cylinders, and hoses and replace as necessary.

5) PROBLEM – Power pack cycles on and off during gear cycle.Probable Cause:

- a. Binding in retraction unit.
- b. Pressure switch cut off limit too low.

Remedy:

- a. Investigate for free operation. Check gear that retracts last.
- b. Replace pressure switch.

6) PROBLEM – Slow gear operation cycle (considerably longer than 30 seconds).Probable Cause:

- a. Plugged oil screen.
- b. Poor electrical connection to motor. Check ground.
- c. Poor motor.
- d. Worn pump gears.

Remedy:

- a. Clean intake screen located inside reservoir tank.
- b. Connect motor direct to 12/24-volt source and note operation poor, motor needs overhaul.
- c. Covered in (b) above.
- d. Replace pump

7) PROBLEM – Circuit breaker pops during cycle.Probable Cause:

- a. Wire connections bad or corroded.
- b. Bad motor brushes.
- c. Bad circuit breaker.

Remedy:

- a. Clean and protect terminal with grease.
- b. Overhaul motor.
- c. Replace circuit breaker.

8) PROBLEM – Power pack does not cycle up or down.

Probable Cause:

- a. Pressure build-up in both sides of up and down lines.

Remedy:

- a. Select hand pump to up and down position to relieve pressure. Return to center and select gear.

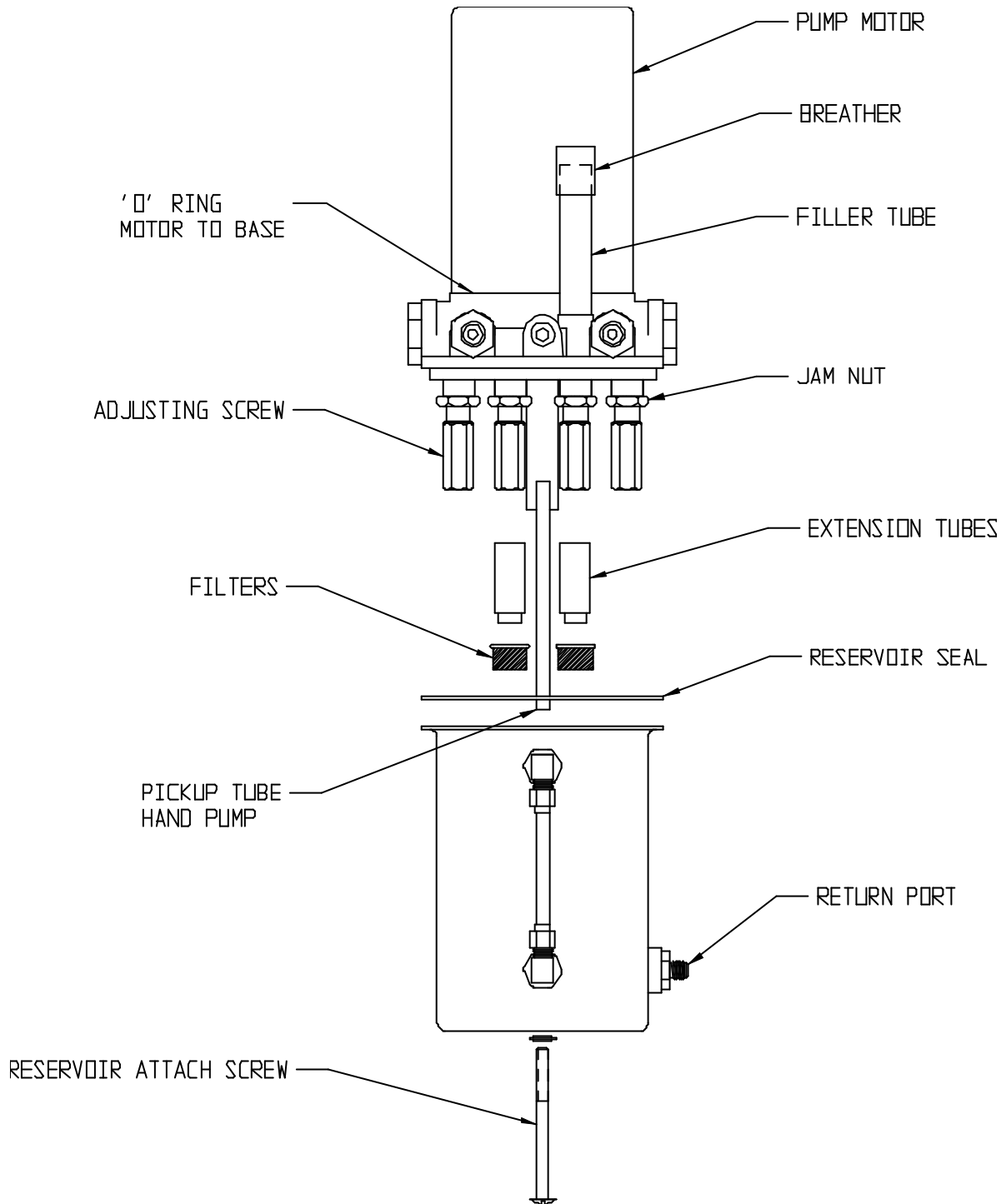


Figure 8-1. Hydraulic Pump

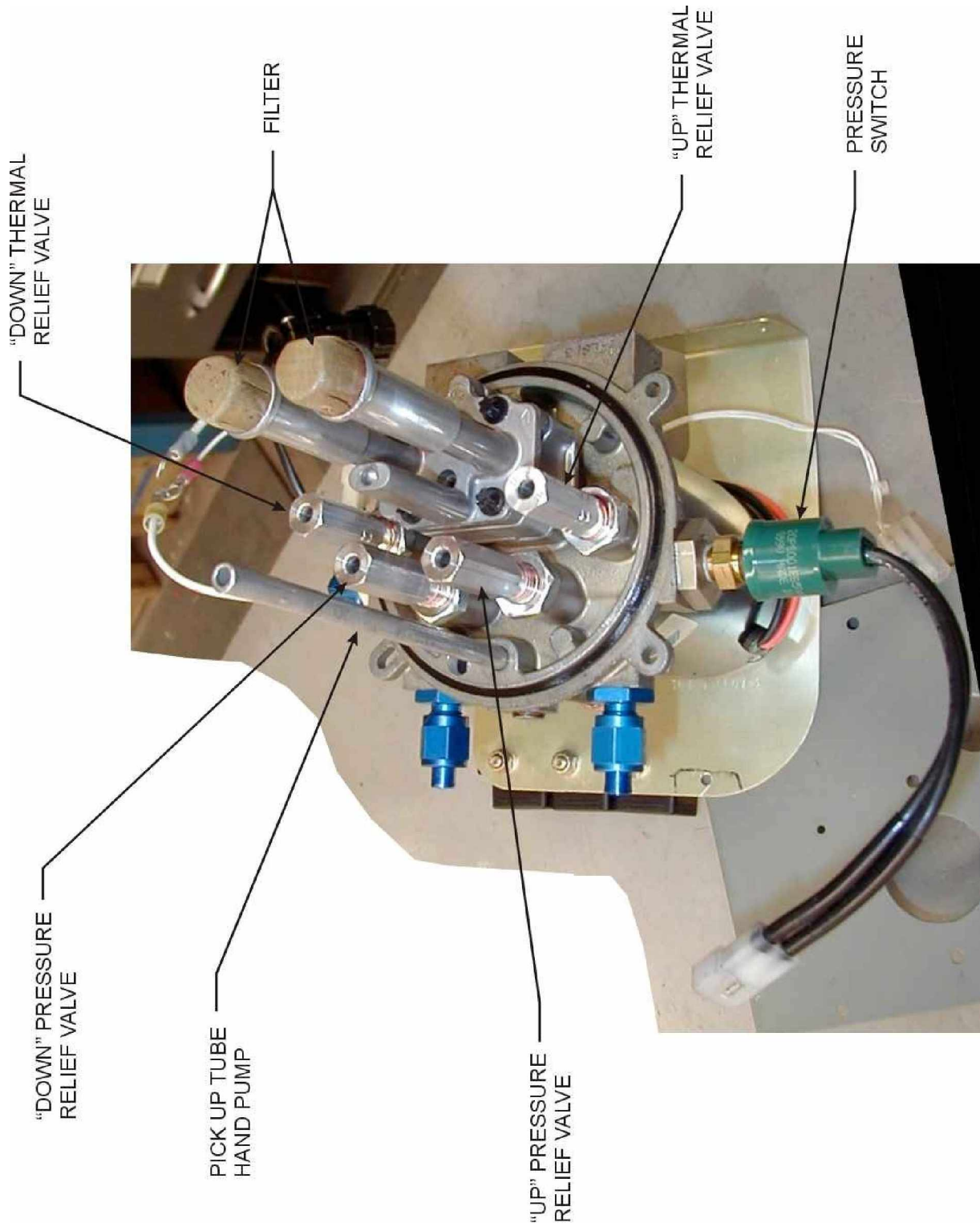


Figure 8-2. Internal View Hydraulic Pump

9. CONTINUED AIRWORTHINESS

As coded in the Inspection Time Intervals chart in this section, there are items to be checked each 25, 50, 100, and 200 hours. Also there are notes on special items which may require servicing at more frequent intervals.

- When conducting an inspection at 25 hours, all items marked for 25 hours would be accomplished.
- When conducting an inspection at 50 hours, the 25 and 50-hour items would be accomplished.
- When conducting an inspection at 100 hours, the 25, 50, and 100-hour items would be accomplished.
- When conducting an inspection at 200 hours, the 25, 50, 100, and 200-hour items would be accomplished.
- A complete inspection (Annual Inspection) would include all 25, 50, 100, and 200-hour items.

INSPECTION TIME INTERVALS			HOURS			
			25	50	100	200
Electrical System	Pump and Indicator Light Wiring – Inspect for chafing, broken or loose terminals and general condition.			X		
	Solenoids – Inspect wiring, mounting and general condition.			X		
	Pressure Switches – Inspect wiring, mounting and general condition.			X		
	Pump Motors – Inspect wiring, mounting and general condition.			X	X	
Landing Gear Systems	Gear Pivot – Inspect for condition, lubrication, corrosion and paint.	X				
	Nose and Main Wheel Bearing – Grease zerk fittings.		X			
	Hydraulic Fluid Level		X			
	Wheels and Tires – Inspect for wear, pressure, condition.		X			
	Brake Assemblies – Inspect for wear, corrosion, leakage.		X			

INSPECTION TIME INTERVALS		HOURS			
		25	50	100	200
	Hydraulic Fluid Screen – Clean and inspect. Note: If floats sit for extended periods of time (i.e., if removed during winter months), screen should be cleaned before putting floats back into service. Hydraulic fluid in reservoir should be checked for moisture or other contaminants and changed if necessary.			X	
	Main and Nose Gear Actuator, Assemblies – Inspect for condition, lubrication, leakage, corrosion and cleanliness.			X	
	Hydraulic lines – Inspect for leaks, condition and security.				X
	Perform Retraction Test	Main Gear – Inspect up and down for proper engagement.			X
		Perform emergency gear Extension (hand pump).			X
	Nose and Main Wheel Bearings – Disassemble and inspect.				X

As general inspection guidelines, each of the following areas should be inspected for their own unique attributes:

Movable Parts – For lubrication, servicing, security of attachment, binding, excessive wear, safetying, proper operation, proper adjustment, correct travel, cracked fittings, security of hinges, defective bearings, cleanliness, corrosion, deformation.

Fluid Lines and Hoses – For leaks, cracks, dents, kinks, chafing, security, corrosion, and deterioration.

Metal Parts – For security of attachment, cracks, metal distortion, broken welds, corrosion, condition of paint, and any other apparent damage.

Wiring – For security, chafing, burning, defective insulation, loose or broken terminals, corroded terminals.

Bolts in Critical Areas – For corrosion, correct torque when installed, or when visual inspection indicates a need for a torque check.

10. **AIRWORTHINESS LIMITATIONS**

No time limitations for this installation.

“The Airworthiness Limitations section is FAA approved and specifies maintenance required under 43.16 and 91.403 of the Federal Aviation Regulations unless an alternate program has been FAA approved”