

SECTION VII

FUEL SYSTEM

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7. FUEL SYSTEM

A. GENERAL

Fuel is stored in each wing inside of the tubular spar. From the pickup point on the inboard end, the fuel line slopes continuously up through the fuel selector valve, to the electric fuel pump mounted on the forward side of the firewall.

B. FUEL TANK

The tubular wing spar, which also serves as the fuel tank, is sealed on each end by a machined casting. This casting has an o-ring and sealant around its entire periphery for sealing purposes. These are three baffles inside of the tank which serve to retard fuel slosh in uncoordinated maneuvers.

To disassemble the fuel tank components:

1. Remove the wing tip as described in Section 3-F.
2. Remove the sealant from around the outboard end plate and end plate mounting bolts.
3. Remove the end plate mounting bolts.
4. Slowly withdraw the end plate housing and tank baffle components by pulling straight out from the tank. Care should be taken not to scar the inside surface of the fuel tank.

NOTE

To remove the inboard end plate, the following additional steps are required.

5. Remove the wing as described in Section 3A.
6. Remove the sealant from around the inboard end plate and mounting bolt.

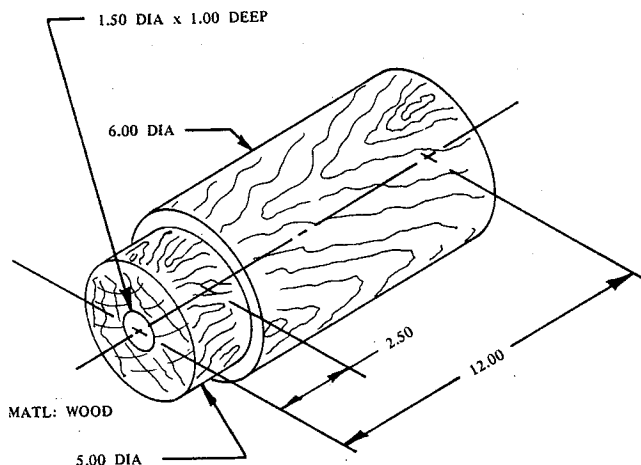


FIGURE 7-1 RAM-END PLATE REMOVAL

NOTE

Remove sealant by scraping with a knife or scraper. Care should be taken not to scar the walls of the fuel tank.

7. Remove the end plate mounting bolt. Later aircraft use 2 bolts in this installation.
8. With a wooden ram similar to that shown in Figure 7-1, and using light hammer taps, drive the end plate from the outboard end. Care should be taken not to scar the walls of the fuel tank or break an end plate.

To reassemble the fuel tank components:

1. Prior to installation, inspect the o-rings for distortion, cuts or gouges and replace if necessary. Be sure the proper o-ring seals are used as shown below:

Serial No. AA1-0001 through AA1-0004

"O"-ring seal #2-163

Serial No. AA1-0005 through AA1-0017

"O"-ring seal #MS29513-259

Serial No. AA1-0018 and up

"O"-ring seal #MS29513-361

2. To install the inboard end plate, locate the end plate as far into the spar by hand as possible. With a board and hammer, lightly tap around the edge, slowly working the end plate into position.
3. Install the inboard end plate mounting bolt or bolts, using new stat-o-seals.
4. Apply sealant* around the entire periphery of the end plate and over the complete head of the mounting bolt.

NOTE

Prior to the application of sealant, thoroughly clean the area to be sealed with MEK (Methyl Ethyl Ketone) or any equivalent commercial solvent.

5. To reinstall the outboard end plate and baffle assembly, slide the entire assembly into the spar taking care not to scar the inside surface.
6. Install the outboard end plate mounting bolts.
7. Apply sealant* around the entire periphery of the end plate and over the mounting bolts and nuts.

NOTE

Prior to the application of sealant, thoroughly clean the area to be sealed with MEK (Methyl Ethyl Ketone) or any equivalent commercial solvent.

*Approved sealants:

EP711 and EP890 by Coast Pro-Seal
 EC1239 and EC1675 by 3M Company
 3201 by Chemical Seal Corporation of America
 567 by Coast Pro-Seal

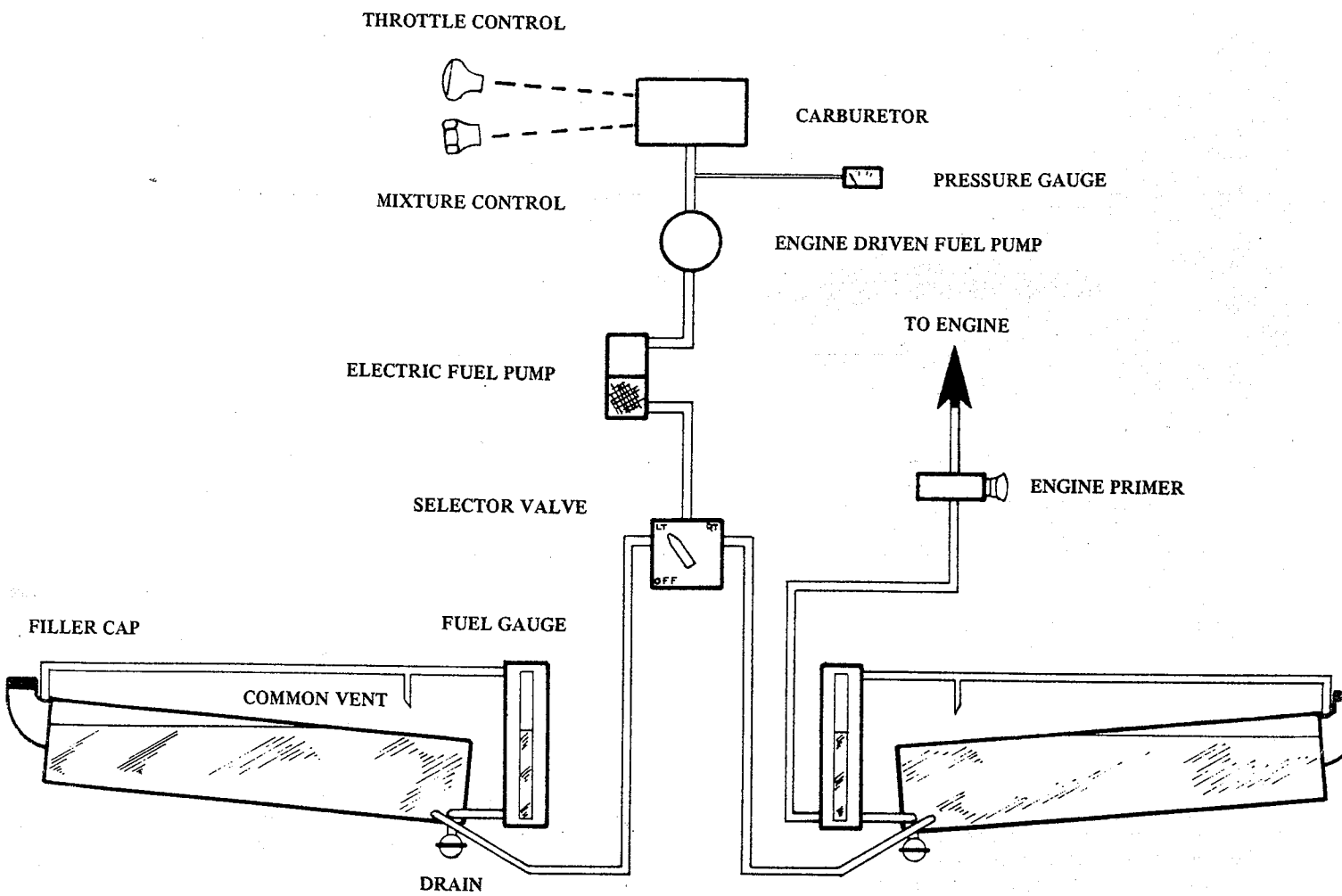


FIGURE 7-2 SCHEMATIC - FUEL SYSTEM



C. FUEL TANK DRAIN

The fuel tank drain is located towards the rear and on the bottom of the wing, just outboard of the wing root (Figure 7-3). It is spring loaded in the closed position to provide easy pre-flight draining. This quick-drain is connected with a line and a short length of hose to the lowest point in the fuel tank. A periodic inspection should be made of this line and hose connection for deterioration and leakage.

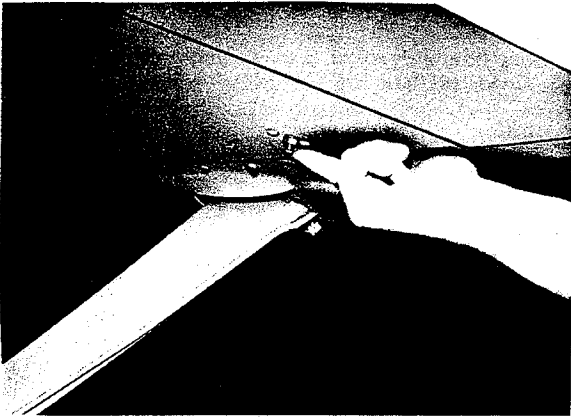


FIGURE 7-3 FUEL TANK QUICK DRAIN

NOTE

The center spar is drilled and equipped with a drain to allow any fuel to escape if the fuel tank end seals should start leaking.

If fuel leakage is noted at the center spar drain, it can be determined which tank is leaking by removing the wing root access covers and inspecting the wing spar and center spar joining surfaces. Normally a red dye will be evident on the side that is leaking. In the event the wing spar fits tightly enough in the center spar to prevent seepage at that point, inspect the landing gear to spar mounting bolts for similar indications.

D. FUEL CAP

The fuel caps are required to provide a fuel and air tight seal with the fuel filler neck. Absence of an air tight seal may produce erroneous readings in the fuel measurement system.

The fuel cap should be periodically inspected to assure that the gasket inside of the fuel cap has not deformed or deteriorated. Refer to the Parts Manual for replacement gaskets.

E. FUEL SELECTOR VALVE

The fuel selector valve, located in the forward portion of the console, provides for fuel tank selection and serves as the fuel supply shut-off valve.

To remove the fuel selector valve:

1. Remove the woodgrain cover and screw from the handle face and withdraw the handle from the selector valve shaft.
2. Remove the console.
3. Disconnect the fuel lines. Be sure to seal the line openings to prevent the entrance of foreign particles.
4. Remove the two mounting bolts which attach the fuel selector valve to the mounting brackets.
5. Reassemble in the reverse order.

F. FUEL PRESSURE GAUGE

The fuel pressure gauge, connected into the main fuel supply line at the carburetor inlet, is a direct indication of carburetor fuel pressure. The line which leads from the pick-up point to the gauge, begins with an .040-inch orifice to prevent damaging surges and excess spillage in the event of a line or gauge failure.

Normal fuel pressure readings should be approximately 3 psi with a maximum limit of 8 psi and a minimum limit of 1/2 psi.

G. ELECTRIC FUEL PUMP

The electric fuel pump is used as an emergency pump and, as an aid in starting a cold engine. It incorporates a 40 micron filter through which all fuel flow to the engine must pass. This filter must be serviced periodically (100 hours).

To service the fuel pump filter:

1. Remove the bottom cover from the fuel pump by cutting the safety wire and turning the cover with a 5/8-inch wrench (Figure 7-4).



FIGURE 7-4 ELECTRIC FUEL PUMP DISASSEMBLY

2. Remove the cover gasket, magnet and filter.
3. Clean the filter by rinsing in gasoline or kerosene and blowing out cleansing agent with air pressure. If filter is distorted or



damaged, it should be replaced. Refer to the Parts Manual for replacement.

4. Clean the cover and gasket in the same manner as the filter.
5. Reassemble in the reverse order. Be sure to safety wire the cover to prevent its loosening during operation.

To remove the fuel pump:

1. Disconnect the lines from the pump inlet and outlet. Be sure to cover the openings in these lines to prevent the entrance of foreign particles.
2. Disconnect the fuel pump electrical lead.
3. Remove the two mounting bolts which attach the fuel pump to the firewall.
4. Reassemble in the reverse order. (Splice electrical lead with a butt connector or quick disconnect terminal.)

H. FUEL MEASUREMENT SYSTEM.

The fuel measurement gauges (manometers) are interconnected with the fuel tank on both a fuel supply line and a vent line. The fluid tending to seek its own level will directly indicate the height of fuel in the tank. Damaging surges or loss of fuel by siphoning is prevented by orifices located at both ends of the gauges.

Periodic servicing of the fuel measurement system is not required except for the occasional replacement of a deteriorated vent hose. (Figure 7-5).

To disassemble the fuel measurement gauges:

1. Remove all side panel covers.

2. Disconnect the vent line from the top of the gauge.
3. From inside the wing root, disconnect the measurement gauge fuel supply line.

NOTE

Be sure the tank has been drained prior to disconnecting the fuel supply line.

4. Remove the two screws in each of the two clamps which mount the measurement gauge to the side panel.
5. The measurement gauge may now be disassembled on a bench and each component individually inspected. Be sure to inspect the U-cup packings for distortion, cuts or gouges, and replace if necessary.
6. Reassemble in the reverse order.

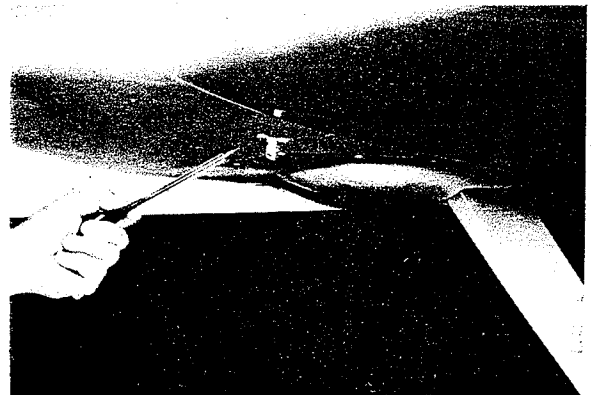


FIGURE 7-5 FUEL VENT

TROUBLE	PROBABLE CAUSE	REMEDY
FUEL SYSTEM TROUBLE SHOOTING		
No fuel pressure (electric fuel pump turned off)	Fuel selector valve in Off position	Switch to fullest tank
	Fuel tanks empty	Service with proper grade of fuel.
	Defective engine pump	Remove outlet line, crank engine several times, check for fuel flow from pump. Replace if faulty.
	Clogged filter in electric fuel pump	Check filter for blockage.
	Obstruction in fuel supply line	Starting at carburetor, remove, inspect and clean each line.



TROUBLE	PROBABLE CAUSE	REMEDY
FUEL SYSTEM TROUBLE SHOOTING (cont)		
No fuel pressure (cont)	Dirty tank strainer	Remove and clean strainer. Flush tank clean prior to reassembly.
	Defective gauge	Replace gauge
	Obstruction in pressure gauge line	Remove all fittings and lines starting at carburetor inlet and inspect and clean as necessary.
No or low fuel pressure (electric fuel pump turned on)	Partial or no fuel flow from the preceding causes	Use the preceding remedies
	Blown fuse	Replace with fuse of appropriate rating.
	Faulty switch	Replace switch
	Defective pump	Remove outlet line from pump. No or little fuel flow indicates bad pump. Repair or replace pump.
Low pressure or surging pressure	Obstruction in fuel lines	Starting at carburetor, remove, inspect, and clean all fuel lines.
	Fuel valve improperly positioned	Check position
	Clogged filter in electric fuel pump	Clean filter
	Defective engine pump	Repair or replace
	Fuel line or connection leaking	Inspect all lines and tighten connections. Use thread sealant as required.
	Leaking o-ring in electric fuel pump	Disassemble, inspect and replace o-ring or pump.
No fuel quantity indication	Empty fuel tank	Service with proper grade
	Obstruction in fuel gauge supply line	Remove, inspect and clean line.
	Obstruction at the fuel gauge inlet (bottom)	Disassemble and clean gauge
	Obstruction in fuel gauge vent line	Remove, inspect and clean line
	Obstruction in fuel gauge outlet (top)	Disassemble and clean gauge
Fuel quantity indicating too high	Aircraft not level	Disregard - fuel will indicate correctly when aircraft is level.
Fuel gauge indicates too low	Aircraft not level	Disregard - fuel will indicate correctly when aircraft is level.
	Obstruction in fuel tank vent line	Remove, inspect, and clean vent line.