



PA-23
APACHE
Service Manual

CARD 1 OF 2

- **PA-23-150**

- **PA-23-160**

PIPER AIRCRAFT CORPORATION

SECTION IX

FUEL SYSTEM

9-1. GENERAL

9-2. The Apache fuel system installation (Figure 9-1) includes an auxiliary system. Because of this, an auxiliary fuel system illustration (Figure 9-2), and facts pertinent to the system, are presented in this section with the main system data. To secure a complete auxiliary fuel system for an aircraft where such a system does not exist, contact your distributor and request Kit No. 754 058. This item is complete in materials and instructions for obtaining a proper installation. Recent manufacture provides drilled attaching points whether the system is incorporated or not. In these instances, some of the installation procedures can obviously be ignored. Troubles peculiar to the Apache fuel system are listed in troubleshooting Table IX-I, along with probable causes and remedies.

9-3. REMOVAL AND INSTALLATION.

9-4. FUEL SYSTEMS.

9-5. MAIN FUEL SYSTEM. Refer to Figure 9-1 for the layout and relationship of the various fuel system components. Replace a fuel cell in accordance with the instructions of paragraphs 9-10 and 9-17.

9-6. AUXILIARY FUEL SYSTEM. The items comprising the auxiliary fuel system are shown in Figure 9-2. Refer to this illustration as a guide for removal and installation. In addition, refer to paragraph 9-7 for general practices regarding fuel cells.

9-7. FUEL CELLS.

9-8. GENERAL. The purpose of this procedure is to provide a method of handling the bladder type fuel cell, including removal, pre-installation inspection pre-installation of the cell compartment, installation and storage procedures.

9-9. GENERAL REMOVAL INSTRUCTIONS. If it is necessary, for any reason, to remove the cell from the cavity or to deform it inside the cavity, it is suggest-

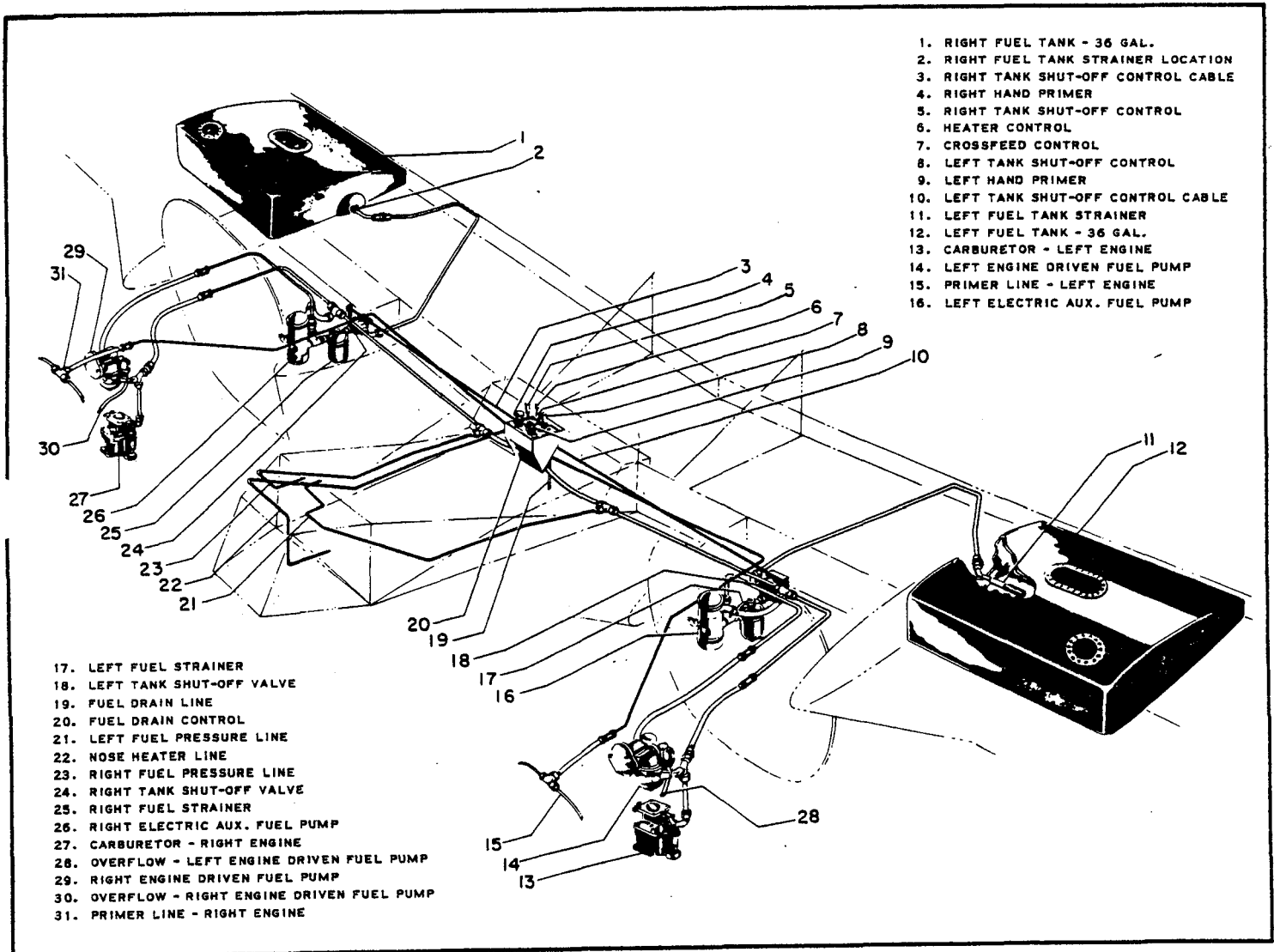


Figure 9-1. Main Fuel System

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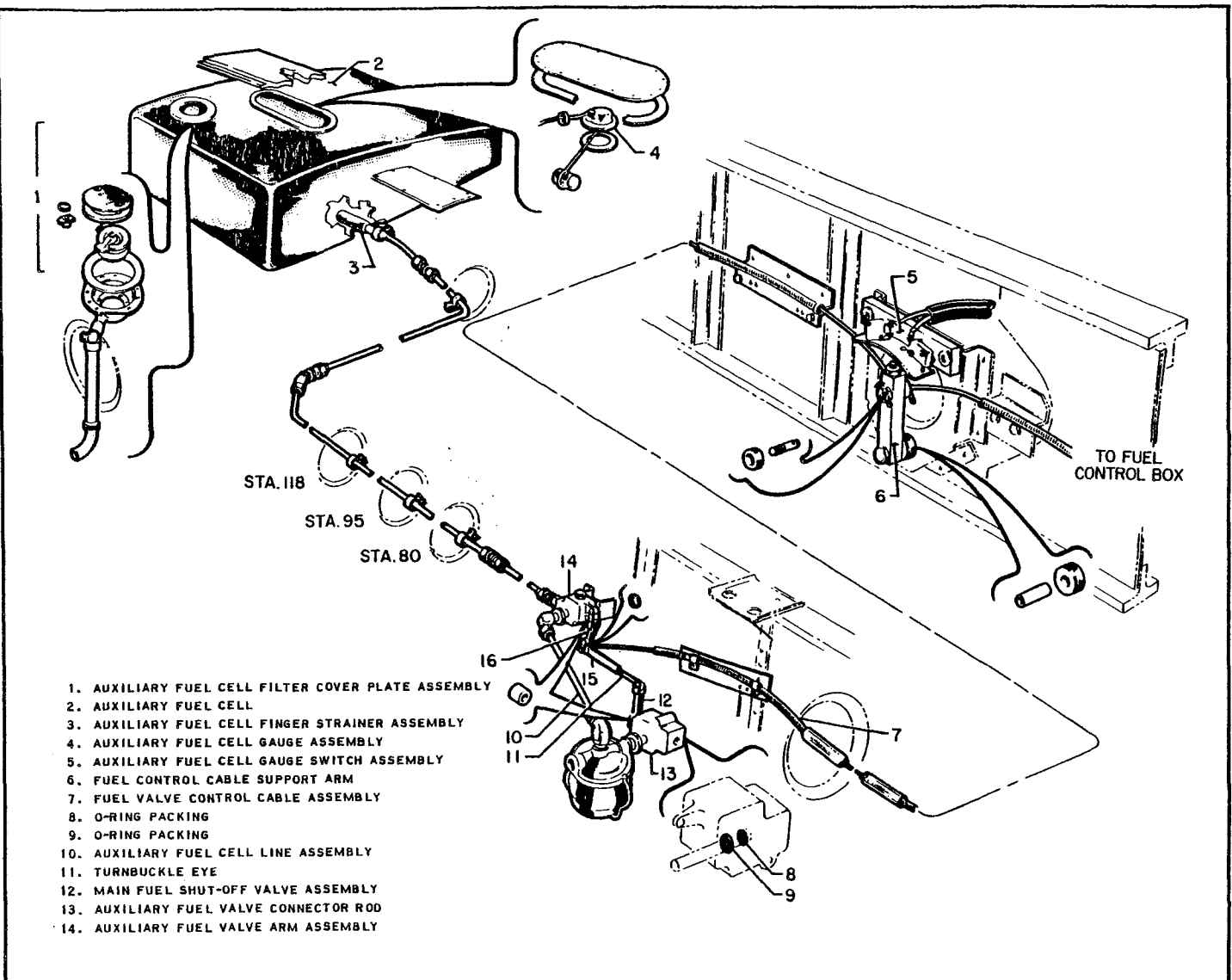


Figure 9-2. Auxiliary Fuel System

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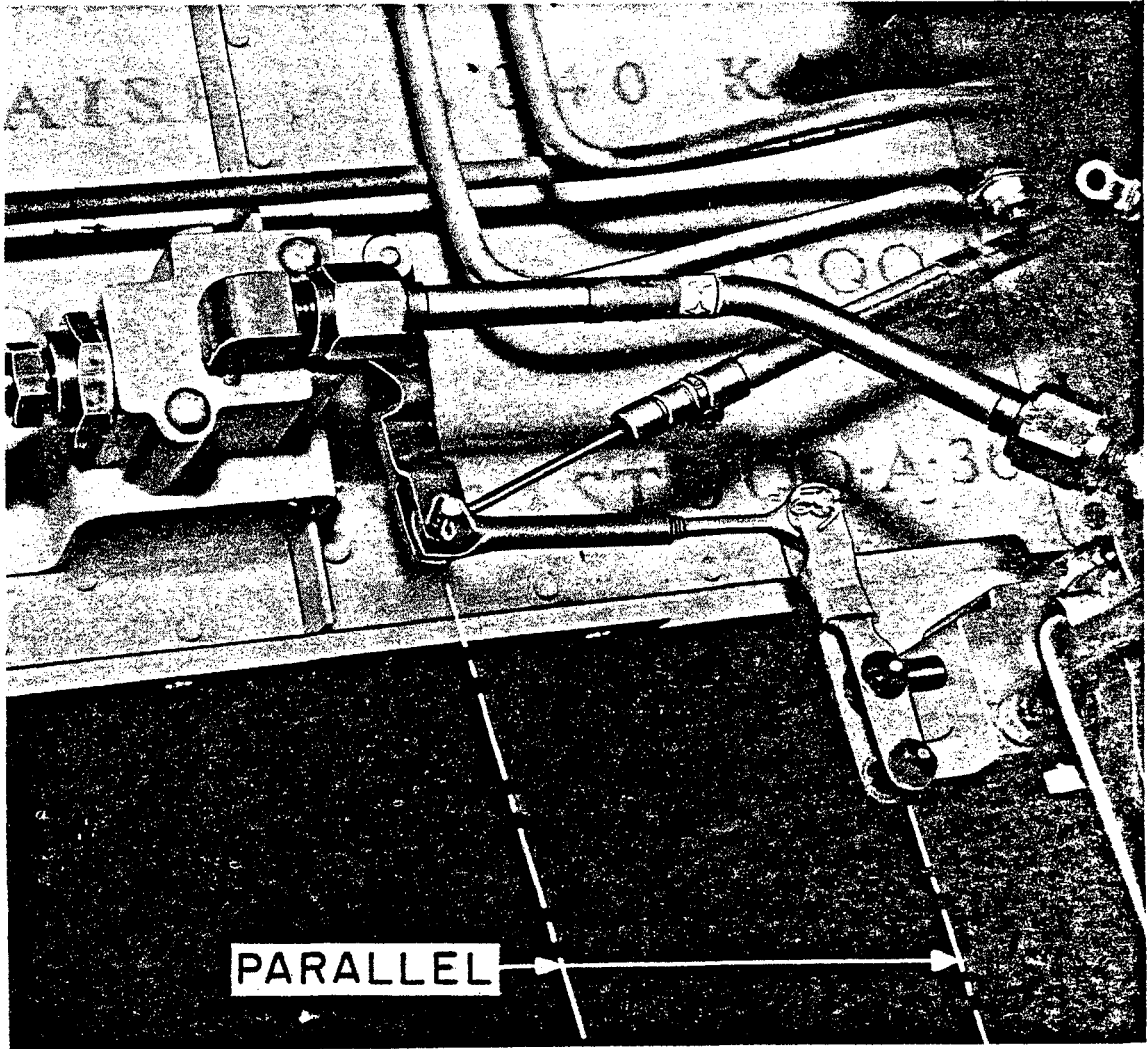


Figure 9-3. Parallel Relation of the Fuel Valve Control and Auxiliary Fuel Valve Arm Assemblies in the "OFF" Position

- e.. Replace the two round gaskets and filler neck plate on the round covering in the cell. Follow instructions in step "c", to replace the eight bolts.
- f. Tighten the clamp on the cell outlet neck and replace access plate with two screws.
- g. Connect the crossfeed fuel lines.
- h. Fill the cell to normal capacity of the proper octane fuel.

9-18. ADJUSTING THE FUEL SHUT-OFF VALVES.

9-10

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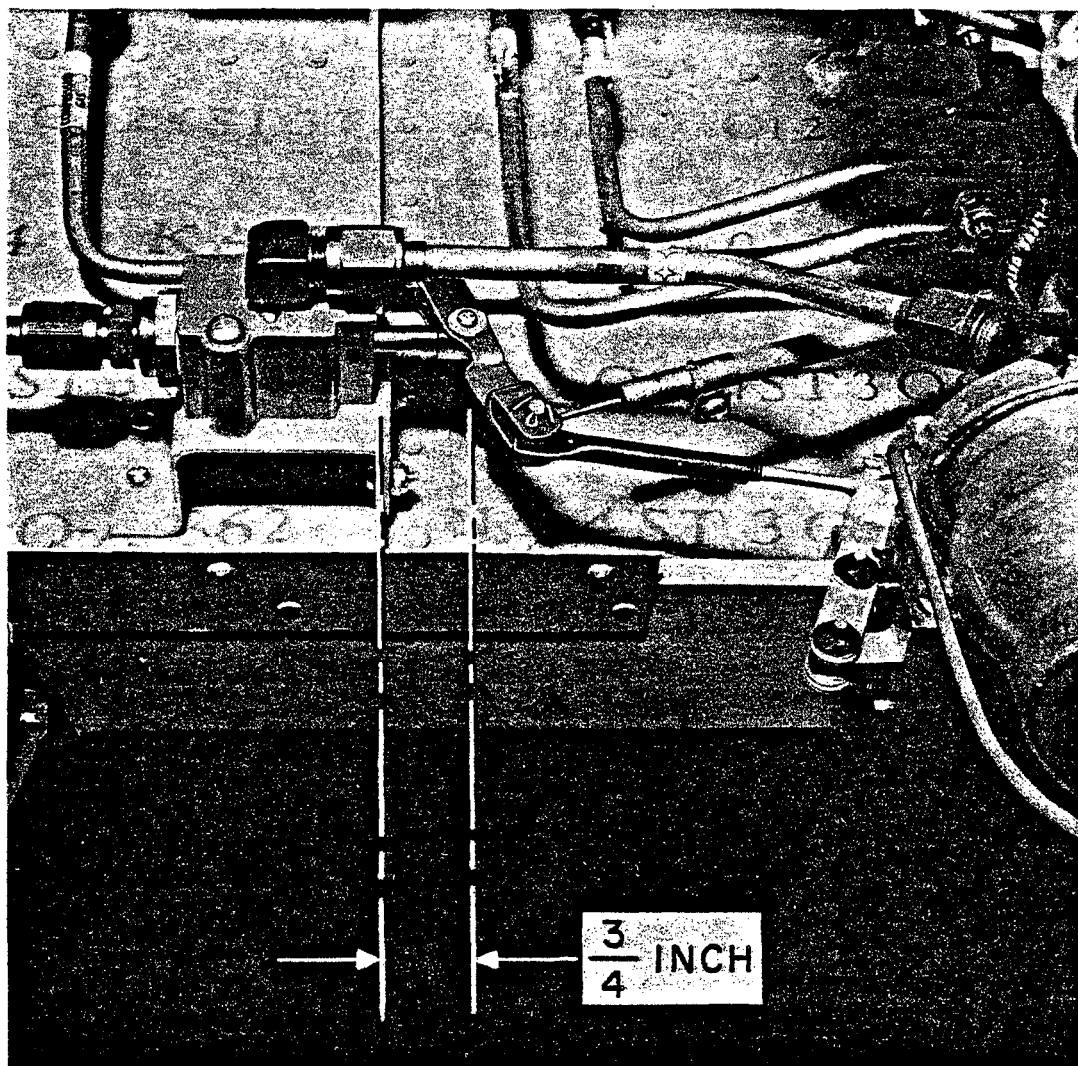


Figure 9-4. Checking Recommended Clearance Between Valve Arm and Valve in the "ON" Position

- a. Place the "LEFT TANK" and "RIGHT TANK" fuel control levers on the fuel control panel box located between the front seats in the "OFF" position.
- b. Observe the fuel valve control arm assembly (12, Figure 9-2) and the auxiliary fuel valve arm assembly (16), noting if they are parallel to each other. (Refer to Figure 9-3.)

TABLE IX-I. FUEL SYSTEM TROUBLESHOOTING

Trouble	Cause	Remedy
Fuel gauge fails to indicate on main or auxiliary.	Micro switches not operating.	Check and adjust adjusting screw. (See 5 Figure 9-2.)
	Broken wiring.	Check and repair.
	Gauge not operating.	Replace.
	Float partially or completely filled with fuel.	Remove fuel transmitter unit and replace float.
	Circuit breaker out.	Reset - check.
Fuel gauge indicates full on either auxiliary or main, or both.	Incomplete ground.	Check ground connections at fuel transmitters in wings and at micro switch.
	Defective gauge.	Replace.
No fuel pressure indication on either one or both gauges.	Fuel valves off.	Check valves, turn on.
	No fuel in tank.	Check fuel, fill.
	Defective pump.	Check pumps individually for pressure build up. Check diaphragm and relief valves in engine pump. Check strainer for obstruction in electric pump. Check by-pass valves. Air leak in Intake line.
	Defective gauge	Replace gauge.
	Obstruction in inlet side of pump.	Trace lines and remove obstructions.
Pressure surges or pressure low.		

TABLE IX-I. FUEL SYSTEM TROUBLESHOOTING (cont.)

Trouble	Cause	Remedy
Pressure surges or pressure low. (cont.)	Faulty by-pass valve.	Replace.
	Faulty diaphragm.	Replace or rebuild pump.
Unidentified leak.	Fuel lines damaged, or improperly installed.	Locate and repair or tighten.
Fuel system locked in either "on" position.	Actuating tab at fuel micro switches interfering with actuating arm.	Check spring tabs and remove side play in arm.
Fuel system open in "off" position.	Fuel valve linkages out of adjustment.	Adjust arms for proper movement. (Refer to paragraph 9-17.)
Fuel valve leaks.	Worn "O" rings.	Replace "O" rings or valve.

NOTE

In addition to being parallel to each other, the arms must also be parallel to the facing surfaces of the bodies of the fuel shut-off valve assemblies (13-14, Figure 9-2).

c. If the arms are not parallel, make the initial adjustment towards correcting this situation by establishing the parallelism of the auxiliary or outboard fuel valve arm assembly and the face of the fuel shut-off valve. To do this, loosen the nut holding the clamp to the support blocks and shift the cable until the arm position is satisfactory. Reclamp the cable.

d. Note the relation of the fuel valve control arm assembly with respect to the properly adjusted auxiliary fuel valve arm assembly. If it is not parallel to the latter, remove the cotter pin, pin, bushing and washer which secure the eye (11, Figure 9-2) to the arm. Turn the eye in whichever direction will make the auxiliary valve arm parallel to the main valve arm. Reconnect the eye to the main arm, placing the head of the pin forward and the washer between the bushing and the forward leg of the main valve arm yoke.

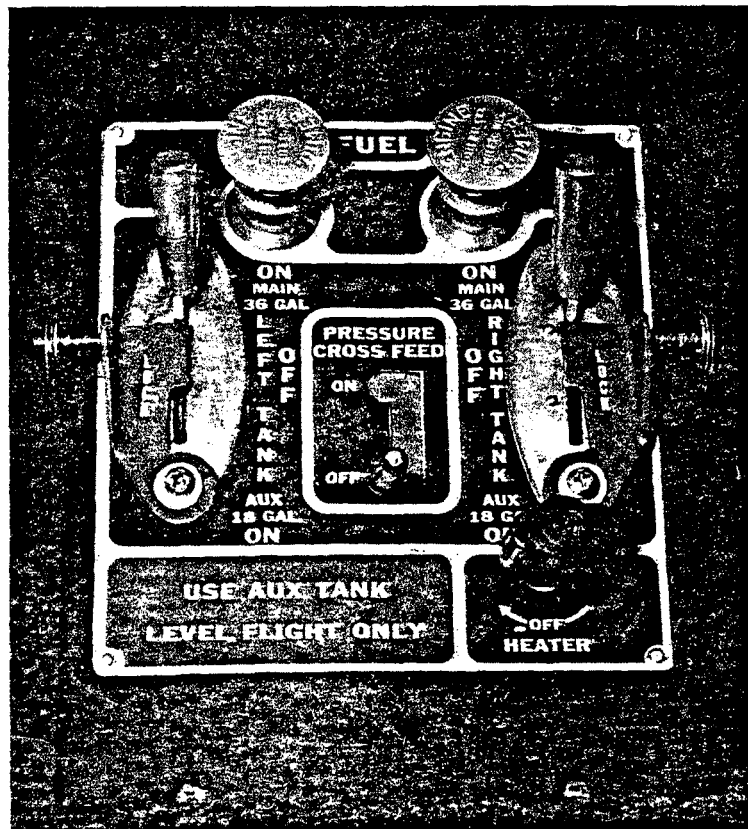


Figure 9-5. Fuel Selector Control Box

e. When either valve is open by virtue of the control being placed in the "ON" position, there must be no less than 3/4 inch between the valve-to-arm attaching rivet and the valve body to obtain complete freedom of travel. (Refer to Figure 9-4.)

9-19. CHECKING THE FUEL SHUT-OFF VALVES.

- a. Disconnect the crossfeed fuel line hoses at the engine-driven fuel pump.
- b. Fill either the main or auxiliary fuel cells with from 2 to 2-1/2 gallons of

fuel in accordance with the instructions in Section II.

c. Place the fuel control levers of the fuel control panel box in the "OFF" position.

d. Start the electric auxiliary fuel pumps (16 and 26, Figure 9-1) and observe the hoses for indications of fuel. If the valves are functioning properly, there will be no flow.

e. Now fill the other set of tanks and check them in a similar manner, using the electric auxiliary fuel pumps again.

f. When a leak is observed at the conclusion of the checking procedures, adjust the valves. (Refer to Paragraph 9-18.)

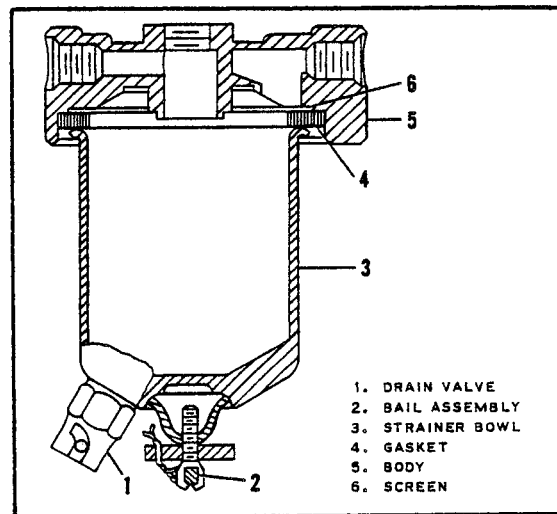


Figure 9-6. Fuel Strainer Bowl

9-20. CLEANING FUEL FILTER BOWL AND SCREEN. (Refer to Figure 9-6.)

The fuel filter bowl with screen, located inside the inboard lower aft section of the nacelle, may be removed and cleaned by the following procedure:

- Open the access door on the lower inboard side of the nacelle.
- Cut the safety wire on the fuel bowl, loosen the round nut, move the bail wire to the side and remove the bowl.
- Remove the gasket and screen from the filter housing.
- Clean the screen and bowl with acetone or a suitable dry type solvent. If damaged, replace screen.
- Replace the screen followed by a new gasket.
- Position the bowl and bail wire, and tighten the round nut.
- Safety the round nut to the bail wire assembly.

9-21. CLEANING ELECTRIC FUEL PUMP SCREEN. The electric fuel pump screen, located inside the inboard lower aft section of the nacelle just forward of the fuel filter bowl, may be removed and cleaned by the following procedure:

- Open the access door on the lower inboard side of the nacelle.
- Cut the safety wire on the bottom of the fuel pump.
- Remove the base of the fuel pump, removing the screen at the same time.
- Clean the screen and magnet with acetone or a dry type solvent.
- Position the screen, gasket and base cover to the pump and turn cover until it snaps into place.
- Safety the base of the pump to the inlet line.