FUEL SYSTEM

The fuel system consists of fuel cells, engine-driven and emergency fuel pumps, fuel boost pumps*, control valves, fuel filters, fuel pressure and fuel flow gauges, fuel drains and non-icing NACA fuel tank vents.

Fuel is stored in four flexible **fuel cells**, two in each wing panel. The outboard cells hold 40 U.S. gallons each and the inboard cells hold 56 U.S. gallons each, giving a total of 192 gallons, of which 182 gallons are usable. Fuel is routed from the fuel cells to the selector valve, the fuel filter, the fuel boost pump*, the emergency fuel pump, the fire wall shutoff, the engine-driven fuel pump, to the injector, then to the cylinders. Fuel is routed from the fuel filter directly to the emergency fuel pump on airplanes not equipped with fuel boost pumps. The fuel selector, filter, fuel boost pump*, emergency fuel pump and fire wall shutoff are located on the butt-rib of each wing panel.

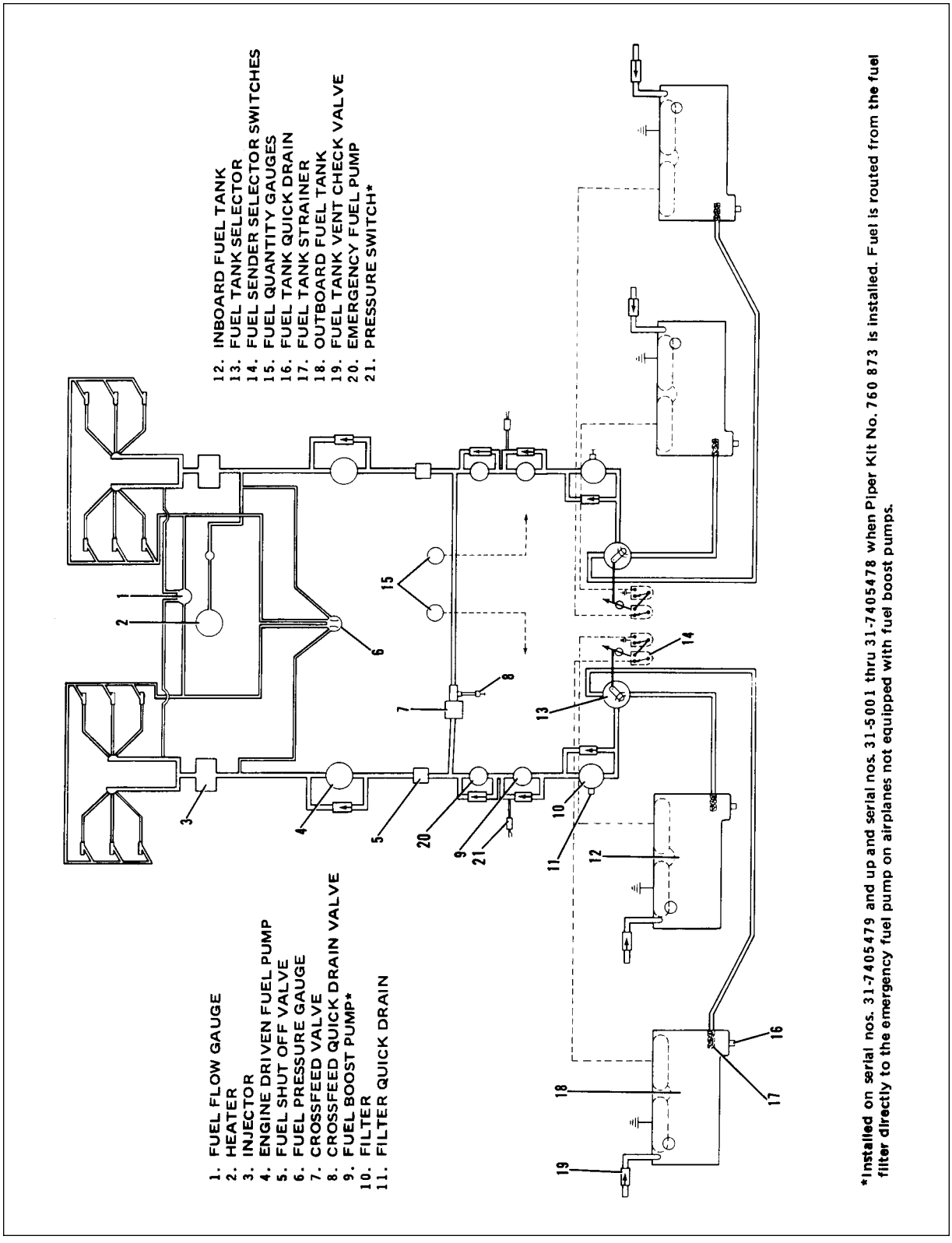
The emergency fuel pumps are installed for emergency use in case of an engine driven fuel pump failure, or whenever the fuel pressure falls below 34 PSI. They are also used during takeoff and landing, and for priming the engines. Control switches for the emergency fuel pumps are located in the overhead switch panel to the right of the fuel gauges.

The **fuel boost pumps*** are operated continuously and are provided to maintain fuel under pressure to the other fuel pumps, improving the altitude performance of the fuel system. There are no fuel boost pump control switches or pressure gauges provided. Each fuel boost pump is controlled by a separate circuit breaker located in the circuit breaker control panel. The fuel boost pumps are activated when the master switch is turned on and continue to operate until the master switch is turned off or the fuel boost pump circuit breakers are pulled (off). Fuel boost pump warning lights, mounted at the bottom of the windshield divider post, illuminate when the fuel boost pressure is less than 3 PSI.

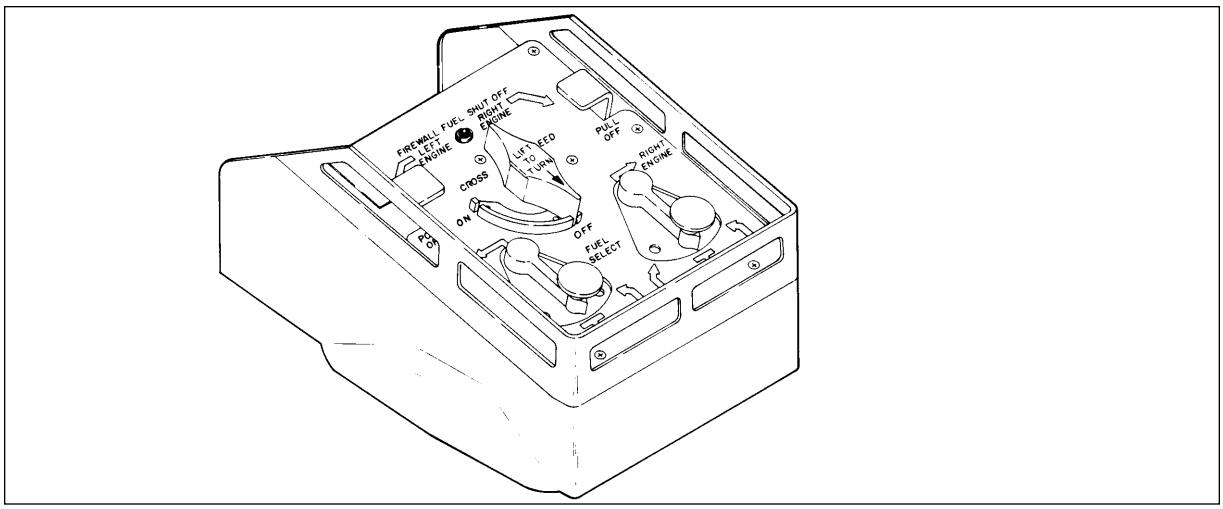
In a full power continuous climb from takeoff to high altitude under conditions of high ambient temperature, high climb rate, and extremely volatile fuel, the engine-driven fuel pump and the boost pump may not maintain a sufficient pressure head to the engine-driven fuel pump. This condition would be indicated by engine fuel pressure fluctuations beyond 2 to 5 PSI and/or illumination of the boost pump warning light. The pilot may continue the climb by using the emergency fuel pump to provide steady fuel pressure for the high power operation; the emergency pump can be turned OFF after level-out if reduction to cruise power extinguishes the boost pump warning light. Cruise can be continued with the emergency fuel pump OFF if fuel pressure remains steady and above 34 PSI, as indicated on the engine fuel pressure gauge.

The **fuel management controls** are located in the fuel control panel at the base of the pedestal. Located here are the fuel tank selectors, fuel shutoffs and crossfeed controls. During normal operation each engine is supplied with fuel from its own respective fuel system. The fuel controls on the right control the fuel from the right cells to the right engine and the controls on the left control the fuel from the left fuel cells to the left engine. For emergencies, fuel from

*Installed on serial nos. 31-7405479 and up and serial nos. 31-5001 thru 31-7405478 when Piper Kit No. 760 873 is installed.



Fuel System Schematic



Fuel Management Controls

one system can supply the opposite engine through a crossfeed system. The crossfeed valve is located in the left wing butt area and is intended only for emergencies. The crossfeed control is located in the center of the fuel control panel. A warning light, located on the fuel control panel in airplane serial numbers 31-7305118 and up, is incorporated in the fire wall fuel shut-off system to indicate that one or both of the shut-off valves are not fully open.

NOTE

The crossfeed system is not to be used for normal operation. When the crossfeed valve is on, be certain fuel selector valve on tank not in use is off. Do not use crossfeed to compensate for an inoperative emergency fuel pump.

Fuel drains are provided for checking fuel contamination. They are located at the rear inboard corner of the fuel cells, on the fuel filters and the lowest point of the crossfeed system. The quick drain for the crossfeed is located on the left wing fillet just forward of the main spar. The drains on the filters are at the base of the filter and are accessible through access doors in the lower wing fillets aft of the wing leading edge.

WARNING

If either the right or left fuel flow warning light illuminates and the fuel gauge indicates fuel remaining in the corresponding inboard tank, this will indicate a malfunction of the flapper door in the inboard tank. Immediately select the outboard tank or select crossfeed to avoid fuel flow interruption.

Right and left fuel flow warnings lights,* mounted at the base of the windshield divider post, illuminate to warn the pilot of an impending fuel flow interruption. The lights are activated by a sensing probe mounted near each inboard fuel tank outlet. In the event the fuel level near the tank outlet drops to a point where a fuel flow interruption and power loss could occur, the sensing probe will illuminate its corresponding warning light. The warning light will be on for a minimum of 10 seconds and will remain on if the cause is not corrected. The lights

*Serial nos. 31-7552017 and up.

are provided with a "press-to-test" feature. To test, depress the button mounted in the center of the light cluster for 3 seconds; the lights should illuminate and remain on for 10 seconds. During this test, the fuel boost pump inoperative lights mounted below the fuel flow warning lights should illuminate when the button is depressed (no hold required on this circuit), and go out when the button is released.

ELECTRICAL SYSTEM

The electrical system is a 24-volt system. Control switches are located in the overhead switch panels and in the circuit breaker panel. The circuit breaker panel, located on the side wall to the left of the pilot, has provisions to handle a complete complement of equipment. Switches and circuit breakers are clearly marked as to their function. Switches are of the toggle and rocker type and the circuit breakers are the push to reset type. If a breaker pops it is recommended to allow the breaker to cool for a couple of minutes before resetting. When a white band can be seen around the shank of the circuit breaker button, the breaker is open. The breakers can be manually topped by pulling on the reset button.

The standard electrical equipment includes alternators, starters, ammeter, battery, voltage regulators and external power source receptacle.

The starters are energized by a rocker style switch located in the overhead switch panel between the magneto switches. To operate, push on the side of the switch that corresponds to the engine to be started and hold until the selected engine has started. Release the switch and it will return to neutral.

NOTE

Starters should not be energized for more than 30 seconds of continuous cranking. Allow to cool between starting attempts.

The **primary electrical** source is two 24-volt 70-ampere alternators. The **alternators** are controlled independently by two voltage regulators which are interconnected electrically to provide parallel outputs at normal engine operating speeds. **Alternator inoperative lights** are located in the circuit breaker panel next to the alternator circuit breakers. A light illuminates when the respective alternator fails to provide voltage. The lights can be checked by turning on the master switch with the engines shut down. If a light fails to illuminate, it should be replaced. Whenever the engines are operating at a high differential RPM, the alternator inoperative light for the slower engine may come on.

The master switch is a split rocker type and gives the pilot control over the field of the respective alternator.

NOTE

For alternator failure emergency procedure, see the Flight Manual section.

Secondary electrical power is provided by a 24-volt 17-ampere hour battery as standard equipment. A 24-volt 25-ampere hour battery is offered as optional equipment.