

2.14. FUEL SYSTEM

The fuel system total capacity is 1597 LTS (421.9 U.S. Gallons) and the total usable fuel capacity is 1583 LTS (418.2 U.S. Gallons).

Each engine is fed by its own fuel system consisting of four interconnected tanks: an integral fuselage tank just above the wing, a wet wing tank extending from the wing center rib, and two fuselage collector tanks just under the wing. A crossfeed line allows feeding one side engine with the fuel from the opposite side tank. The crossfeed line connects the left and right side fuel system low pressure lines to the engine.

The left and right fuel systems are independent except during the pressure refueling operations. A valve-controlled interconnecting duct connects the left and right collector tanks allowing single point refueling. The REFUEL-OPEN-CLOSED switch as well as the TK INTCON INT and TK INTCON amber lights, that provide the control and the operation monitoring, are located on the Ground Test/Refuel panel on the right side of the fuselage under the wing. A single filler opening is provided on the right side fuselage top for gravity refueling.

A single point pressure refueling adapter is provided on the right side of the fuselage just under the wing. A float valve in the fuselage tank provides automatic stop of pressure refueling when the tank system is completely filled. Correct operation of the "full-tanks" float valve can be checked during pressure refueling through the Ground Test system.

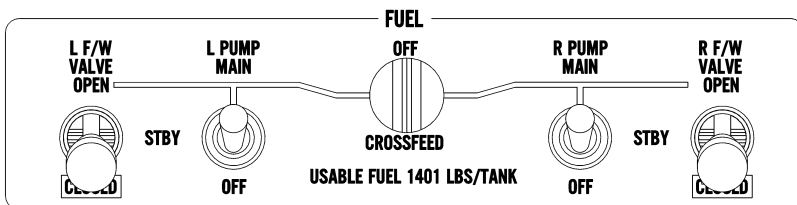


Figure 2.14-1. Fuel System Control Panel

DESCRIPTION AND OPERATION

FUEL SYSTEM

All fuel is supplied to the engine from the fuselage collector tank. Two electrically driven submerged boost pumps, located at the bottom of the collector tank, are connected on the fuel low pressure line to the engine. One only (referred as MAIN) is normally supplying fuel to the engine driven fuel pump. The second one (referred as STANDBY) is a backup of the main. The standby boost pump automatically switches on in the event of the main boost pump failure.

A check valve on each pump pressure port prevents fuel from flowing back into the collector tank through the inoperative pump.

The main and the standby pump of each side fuel system are pilot controlled through a single 3-position switch. The left and right fuel system switches, labeled L and R PUMP-MAIN-STBY-OFF respectively, are located in the FUEL panel on the control pedestal.

Switching on of the main boost pump requires the control switch to be moved from the OFF to the MAIN through the intermediate STBY position. This permits a positive functional check of the standby pump during each preflight check out. Setting of the control switch to the MAIN position actuates the main boost pump and arms the automatic switching function of the standby boost pump. The standby pump switches on when the main pump delivery pressure drops below 5.7 psi.

The L and R FUEL PUMP amber caution lights on the annunciator panel come on in the event the corresponding left or right fuel system main pump is inoperative (control switch in STBY position) or failed.

NOTE

During operations on the standby boost pump, after the main boost pump failure, it is advisable to move the corresponding control switch to the STBY position.

The L and R FUEL PRESS amber caution lights on the annunciator panel come on in the event of both the main and the standby boost pumps of the corresponding side fuel system are inoperative or failed.

During operations on the main boost pump the FUEL PRESS light can illuminate alerting the pilot of either a malfunction or an impending failure of the pump before the automatic switching on the standby pump occurs: in this event it is advisable to switch on manually the standby pump moving to the STBY position the control switch.

Momentaneous illumination of the FUEL PRESS light can occur during automatic or manual switching from the main to the standby pump and viceversa.

Electrical power for operation of each fuel system main boost pump is supplied from the corresponding side generator single feed bus through the L (left) or R (right) MAIN PUMP 10-ampere circuit breaker, on the corresponding side of the cockpit circuit breaker panel. The standby boost pumps are powered from the battery bus through individual circuit breaker located on the main junction box circuit breaker panel in the baggage compartment.

Low pressure fuel from the boost pump is delivered to the engine through an electrically operated firewall shutoff valve and a fuel filter. Each shutoff valve is controlled through a two-position toggle switch labeled L (left) or R (right) F/W VALVE-OPEN-CLOSED in the FUEL control panel on the control pedestal. Moving a F/W VALVE switch from the OPEN to the CLOSED position or viceversa the corresponding L or R F/W V INTRAN amber caution light, on the annunciator panel, momentarily comes on during the valve gate motion, then goes off when the valve positively reaches the selected closed or open position. The L or R F/W V CLSD amber caution light comes on and remains when the corresponding side fuel firewall shutoff valve is in the closed position. Electrical power for operation of each shutoff valve is supplied from the corresponding side generator dual feed bus through the 3-ampere circuit breakers labeled L and R FW SHUTOFF on the cockpit circuit breaker panels. In the event of electrical system failure the shutoff valves are powered from the hot battery bus through individual 3-ampere circuit breakers located in the main junction box.

The fuel filter is provided with an impending by pass switch which causes the L (left) or R (right) FUEL FILTER amber caution light to come on at a preset pressure. Each side fuel system is vented through a line which connects the fuselage tank expansion space to a NACA type opening on the fuselage belly. The vent line incorporates a flame arrester with two check valves. The relief valves are set at 1.5 psi so to prevent over/under pressure inside the tank in the event of a flame arrester obstruction. A vent line interconnects the wing tank tip to the fuselage tank expansion space.

Three fuel drains for each side fuel system are provided, one under the collector tank is accessible through a fuselage belly opening, the second one on the vent line from the fuselage tank to the wing tank tip can be operated through a "push-to-drain" button accessible through a hole on the fuselage side below the wing, the last one on the fuel filter is of the "push-to-drain" type and is accessible through a hole on the bottom of the engine nacelle.

DESCRIPTION AND OPERATION

FUEL SYSTEM

The fuel crossfeed is controlled through the CROSSFEED-OFF rotary knob at the center of the FUEL control panel on the control pedestal. Rotating the control knob either to the left or to the right from the central OFF position the electrically driven crossfeed valve opens. The XFEED INTRAN amber caution light, on the center display panel, momentarily comes on during the valve motion, then goes off when the valve positively reaches the open position. The FUEL XFEED amber caution light comes on and remains when the crossfeed valve is in open position. The crossfeed valve should always be maintained in OFF position except during the single engine operations and/or for fuel balancing. Crossfeed operation requires that the boost pump (either MAIN or STBY) of the "not-feeding" side fuel system is set to off just after the crossfeed has been actuated. (Refer to Section 3, Emergency Procedures, of the Airplane Flight Manual for proper operation of the crossfeed system).

NOTE

Crossfeed is not approved for takeoff or landing.

Electrical power for operation of the crossfeed valve is supplied from the essential bus through the CROSSFEED 3-ampere circuit breaker on the pilot circuit breaker panel.

Two fuel flow indications, one for each engine, are included in the Engine Indicating System display on the MFD. Fuel flow indication is a digital readout in pounds per hour.

Electrical power for operation of the fuel flow indicating systems is supplied from the left generator dual feed bus and from the right generator dual feed bus through the L and R FUEL FLOW 3-ampere circuit breakers respectively on the pilot and copilot circuit breaker panels.

Two fuel quantity indications, one for each side fuel system, are included in the Engine Indicating System display on the MFD. Fuel quantity is measured by a capacitance probe system and is displayed as a digital readout in pounds. In addition an electrically generated "low level" signal provides the LOW FUEL amber caution light on the annunciator panel to come on when the fuel quantity reaches the range of about 120 pounds either in the left or in the right side fuel system.

The fuel quantity system can be checked for proper operation rotating to the FUEL QTY position the SYS TEST knob on the instrument panel. Refer to the Normal Procedures Section of the Airplane Flight Manual for further information about test procedure.

Electrical power for operation of the quantity indicating systems is supplied from the left generator dual feed bus and from the right generator dual feed bus through the L and R FUEL QTY 3-ampere circuit breakers respectively on the pilot and copilot circuit breaker panels.

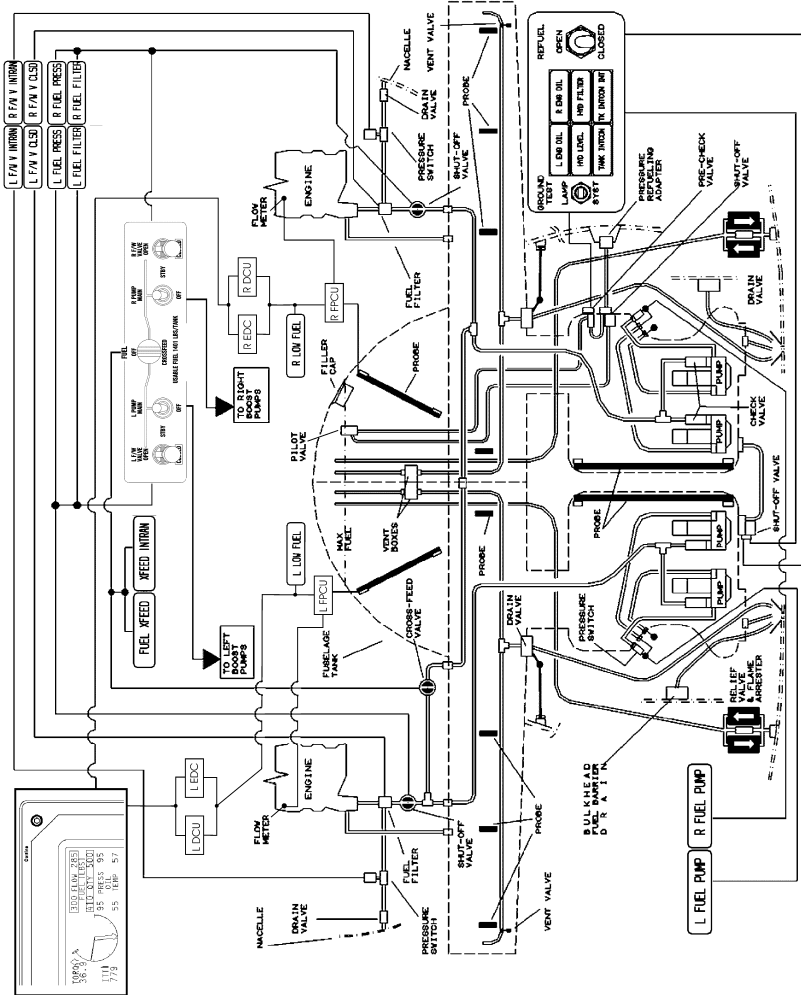


Figure 2.14-2. Fuel System