7.7 - FUEL SYSTEM (Figure 7.7.1)

The fuel system comprises fuel tanks, fuel unit, selectors (manual and automatic), electric and mechanical boost pumps, engine fuel system, gaging installation, monitoring installation and drains.

FUEL TANKS

Fuel tanks are formed by sealed casings in each wing. Each fuel tank comprises a filling port located at the end of wing upper surface, two drain valves located at the lower surface (one near main landing gear, at trailing edge side, the second one near wing root side, at leading edge), a vent valve located on the lower surface, a suction strainer and three level gages.

FUEL UNIT

The fuel unit combines shut-off valve, tank selector and filter functions. It is connected to the manual selector through a mechanical control. The fuel filter is located in a bowl at the lower part of the unit. It is fitted with a by-pass valve, a clogging indicator and a drain valve.

TANK MANUAL SELECTOR (Figure 7.7.2)

The tank manual selector is located on the pedestal rear face. It allows selecting the tank ("R" or "L") to be used and setting unit to "OFF". To change from "L" position to "OFF" position, turn the selector clockwise ("L" → "R" → "OFF") ; change from "R" position to "OFF" position requires a voluntary action from the pilot (pull and turn). The "pull and turn" maneuver prevents involuntary operation. When the unit is set to "OFF", the "FUEL OFF" warning light on advisory panel remains illuminated.

1) Flow divider
2) Flowmeter
3) Collector tank
4) Fuel regulator
5) High pressure pump (HP)
6) Oil to fuel heater
7) Low pressure switch
8) Pressure transmitter
9) Fuel jet
10) Main mechanical boost pump
11) Electric boost pump
12) Fuel filter
13) Filter clogging by-pass valve
14) Filter clogging indicator
15) Fuel unit
16) Filter drain
17) Fuel return pipe
18) Filling port
19) NACA scoop
20) Tank vent valve
21) Fuel level gages
22) Tank drain valve
23) Check-valve
24) Low level detector
25) Suction strainer
26) Fuel pressure indicator
27) Fuel gage indicator
28) Sequencer
29) Advisory panel
30) ETM indicator/computer

Figure 7.7.1 (1/2) - FUEL SYSTEM

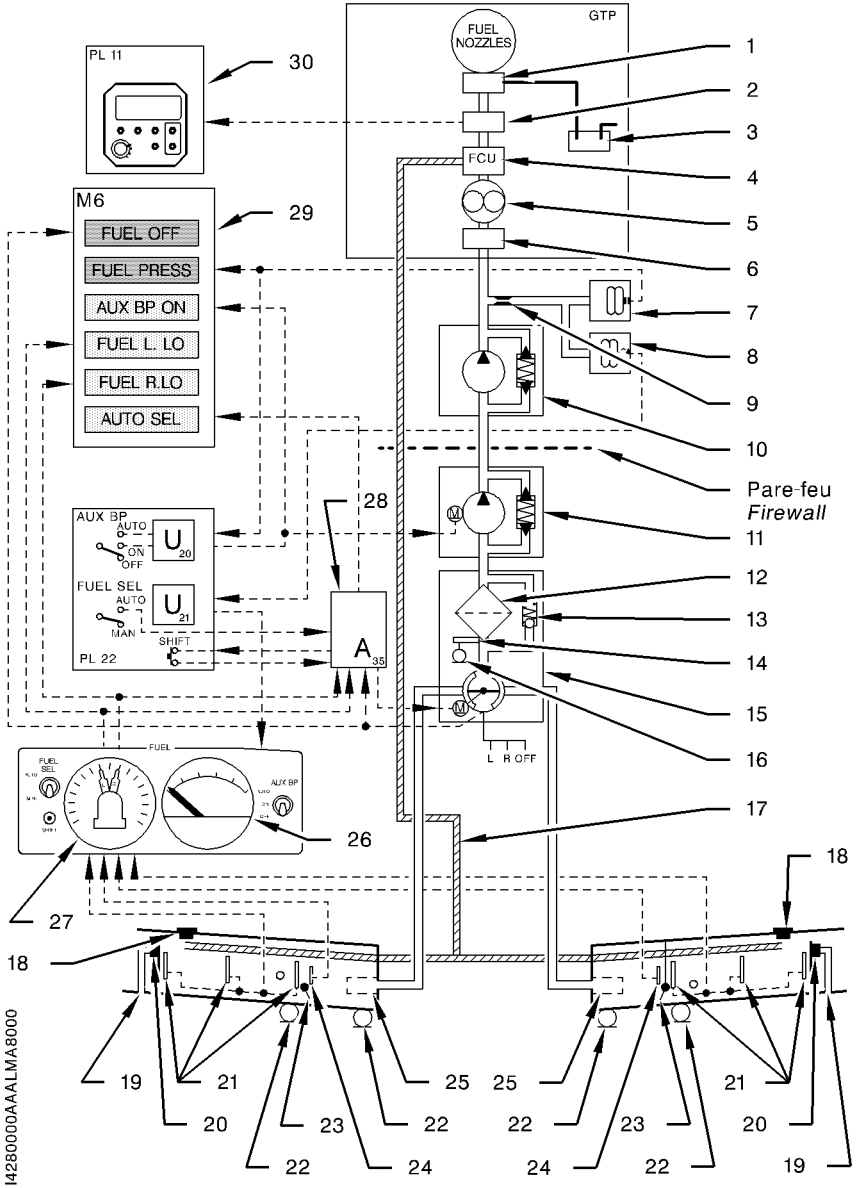


Figure 7.7.1 (2/2) - FUEL SYSTEM

TANK AUTOMATIC SELECTOR (Figures 7.7.3 and 7.7.4)

Tank automatic selection allows, without pilot's intervention, feeding the engine from one tank to the other in predetermined sequences. These sequences depend on airplane configuration (ground, in-flight, fuel low level warning lights illuminated).

Tank automatic selection system comprises an electronic box (sequencer), an actuator attached on fuel unit, "FUEL SEL" two-position selector ("AUTO", "MAN") and "SHIFT" knob located on "FUEL" panel as well as "AUTO SEL" warning light located on advisory panel.

To operate the automatic selector, set "FUEL SEL" switch to "AUTO" position and manual selector to "R" or "L".

Selector operation

When the system is operated, "AUTO SEL" warning light goes out ; the sequencer chooses a tank ("R" or "L") and through the actuator, positions the fuel unit selector on the selected tank. The sequencer controls the time during which the selected tank will operate. This time varies, depending on airplane conditions.

Airplane on ground : tank is changed every minute and 15 seconds.

Airplane in flight : tank is changed every ten minutes, as long as both "FUEL L. LO" and "FUEL R. LO" low level warning lights are not illuminated. When the first low level warning light illuminates, the sequencer immediately selects the other tank. The selected tank will operate until the second low level warning light illuminates. When both low level warning lights are illuminated, the sequencer changes tanks every minute and 15 seconds.

NOTE :
The manual selector is driven by the fuel unit and is positioned on "R " or "L" mark corresponding to the tank selected by the sequencer. Therefore, the pilot continuously knows the tank which is operating.

Test for system proper operation

"SHIFT" push-knob allows the pilot to test system proper operation anytime.

When the system operates, the fuel tank is changed when "SHIFT" push-knob is pressed once.

If airplane is on ground or in flight, low level warning lights not illuminated, the new selected tank remains operating and a new sequence is initiated.

NOTE :
This procedure allows the pilot to preferably choose the tank from which he wants to take fuel.

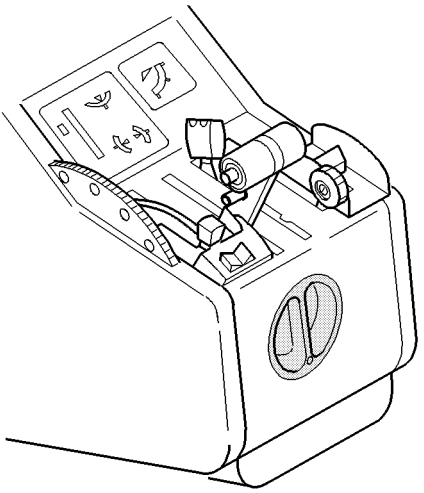
In all cases, proper system operation is indicated by rotation of the manual selector.

Setting "FUEL SEL" switch to "MAN" position or setting manual selector to "OFF" position leads to system de-activating and illumination of "AUTO SEL" warning light on advisory panel. "AUTO SEL" warning light also illuminates when order given by the sequencer has not been executed after 12 seconds.

ELECTRIC BOOST PUMP ("AUX BP")

Electric boost pump is an auxiliary pump located between fuel unit and main mechanical boost pump. It is controlled through "AUX BP" switch located on "FUEL" panel. This switch allows stopping or selecting the two pump operating modes :

- when set to "ON", electric boost pump operates permanently
- when set to "AUTO", electric boost pump is automatically operated in case of fuel pressure drop at the mechanical boost pump outlet.



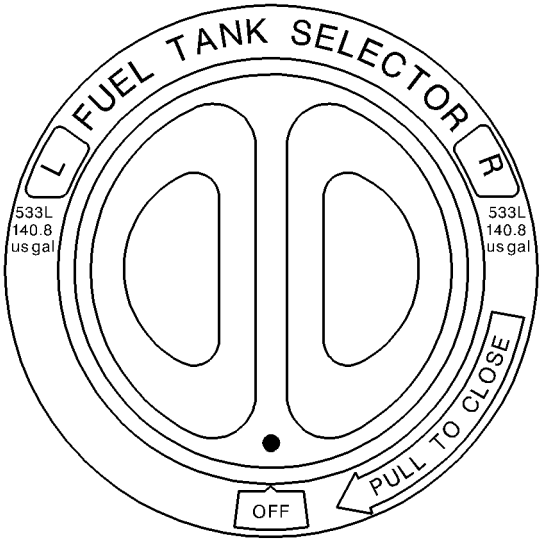


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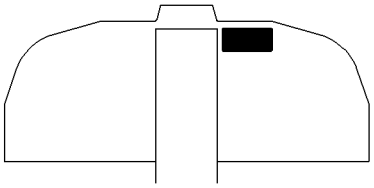
Figure 7.7.2 - MANUAL SELECTOR OF FUEL TANKS



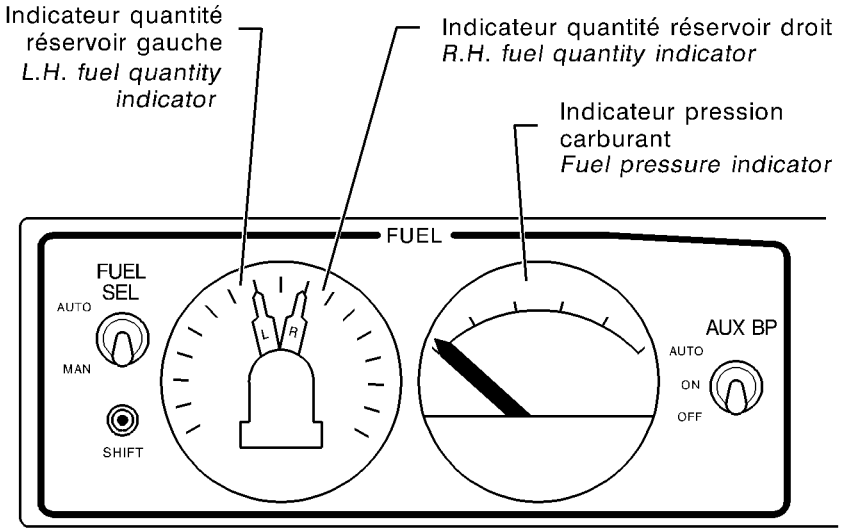


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Figure 7.7.3 - FUEL CONTROL PANEL

MAIN MECHANICAL BOOST PUMP

The mechanical boost pump is attached to accessory gearbox and supplies fuel necessary for engine operation.

ENGINE FUEL SYSTEM

The engine fuel system consists of a fuel regulator, pumps, filters, a fuel divider and fuel nozzles. The system provides the fuel flow necessary to satisfy the engine power and rating needs.

The fuel coming from airplane system goes through a heater which is automatically controlled by a thermostatic valve.

FUEL GAGING INSTALLATION

Fuel gaging installation is a capacitive type and consists of a dual indicator graduated in us gallons (Figure 7.7.3) and fuel level gages. Three fuel level gages are installed in each tank. The wing root side fuel level gage is equipped with a low level detector which leads to "FUEL L. LO" or "FUEL R. LO" warning light illumination when usable fuel quantity remaining in the concerned fuel tank is under about 9.1 us gal (34.6 Litres).

ETM INDICATOR/COMPUTER

Located at the lower part of L.H. instrument panel, the indicator/computer helps the pilot to control fuel during one or several flights. Indicator/computer operation is described in manufacturer technical data.

CAUTION

THE INDICATOR/COMPUTER NEITHER REPLACES FUEL GAGES NOR FUEL PRESSURE INDICATOR. THESE INSTRUMENTS SHALL BE CONSULTED FIRST FOR FLIGHT MANAGEMENT.

FUEL MONITORING INSTALLATION (Figure 7.7.3)

Monitoring installation comprises pressure indicator and warning lights grouped on advisory panel.

Pressure indicator is attached on "FUEL" panel ; it indicates fuel pressure at main booster pump outlet.

Indications provided by illumination of warning lights on advisory panel :

- "FUEL OFF" : Fuel tank selector set to "OFF"
- "FUEL PRESS" : Fuel pressure at mechanic pump outlet under 10 psi
- "AUX BP ON" : Electric boost pump operating
- "FUEL L. LO" : Fuel quantity in L.H. fuel tank under about 9.1 us gal (34.6 Litres) of usable fuel
- "FUEL R. LO" : Fuel quantity in R.H. fuel tank under about 9.1 us gal (34.6 Litres) of usable fuel
- "AUTO SEL" : Sequencer inactive or operating defect

FUEL SYSTEM DRAINING AND CLOGGING INDICATOR (Figure 7.7.4)

The fuel system comprises five drain points, a drain on the filter bowl, two drain valves on each tank, located on wing lower surface, one at wing root and the other past main landing gear well.

These drains allow draining water or sediments contained in fuel.

Fuel tank drain valves are provided with a slot which allows opening them with a screwdriver.

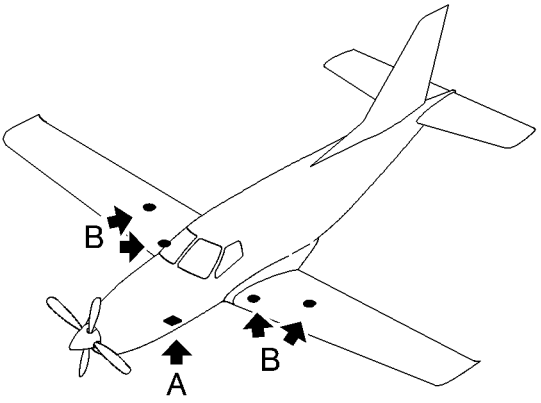
Fuel system draining shall be performed prior to the first flight of the day and after each tank refueling, using a sampler to pick off fuel at the two drain valves of each tank and at the filter vent valve.

A red filter bypass flag on the fuel unit and visible from outside, when an inspection door located on L.H. side under front baggage compartment is open, indicates filter clogging. A push-button, adjacent to the inspection door, controls the illumination of a light provided to improve visibility of the clogging indicator. This indicator shall be observed during preflight inspection.

NOTE :
When filter gets clogged in flight, the filter is by-passed in order not to deprive power plant from fuel. The power plant is then supplied with non-filtered fuel.

1) Lighting switch
2) Mirror door
3) Clogging indicator
4) Central access door
5) Filter drain
6) Tank drain
7) Drain bowl

Figure 7.7.4 (1/2) - FUEL SYSTEM DRAINING POINTS AND CLOGGING INDICATOR



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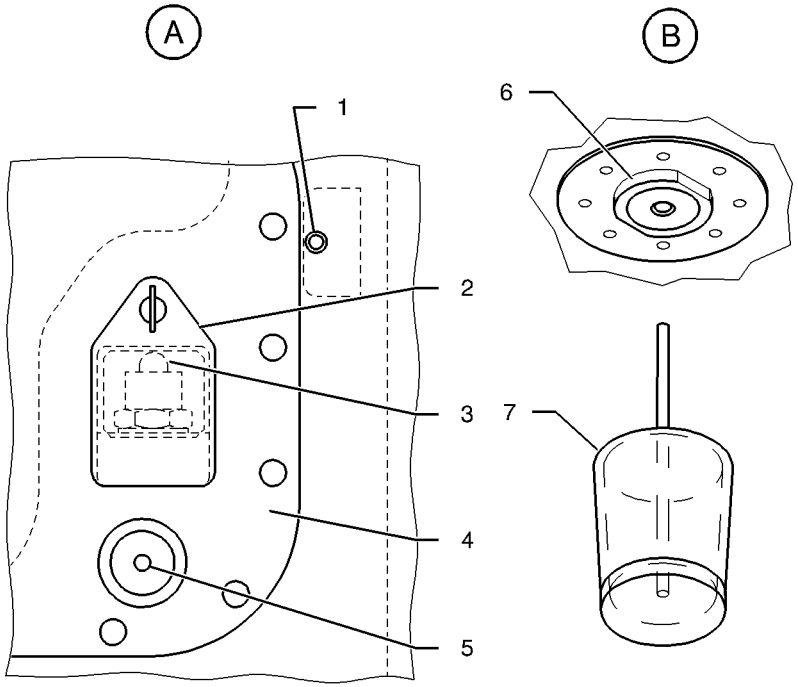

Figure 7.7.4 (2/2) - FUEL SYSTEM DRAINING POINTS AND CLOGGING INDICATOR

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