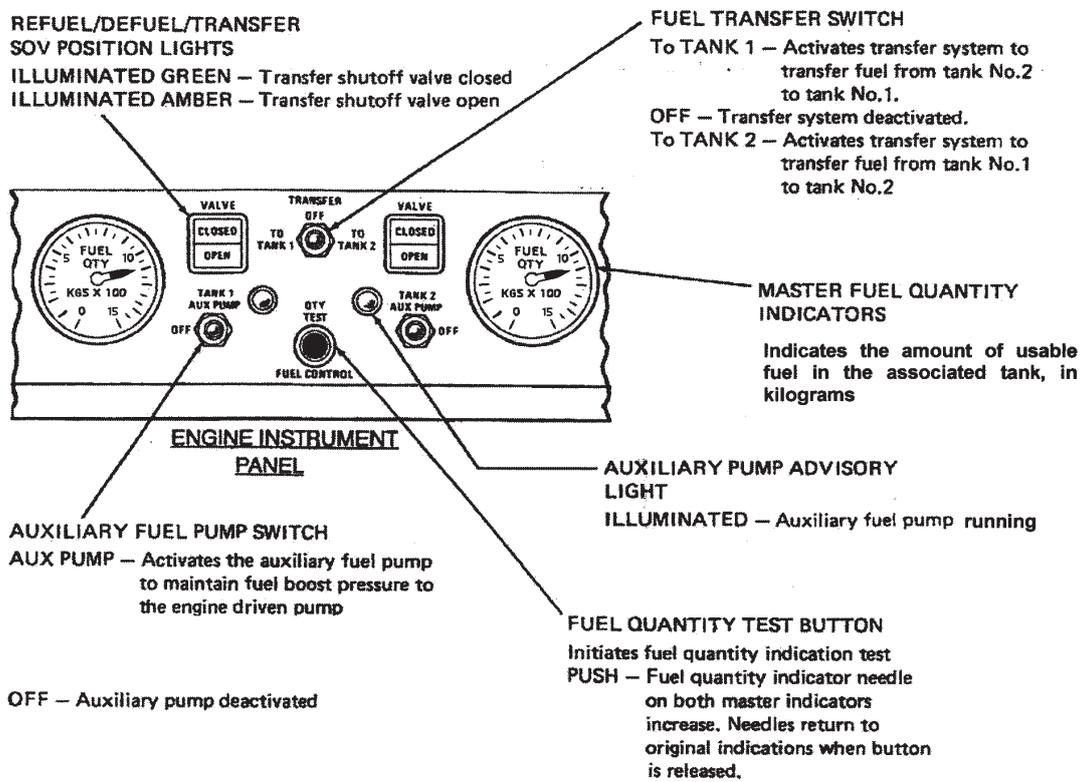
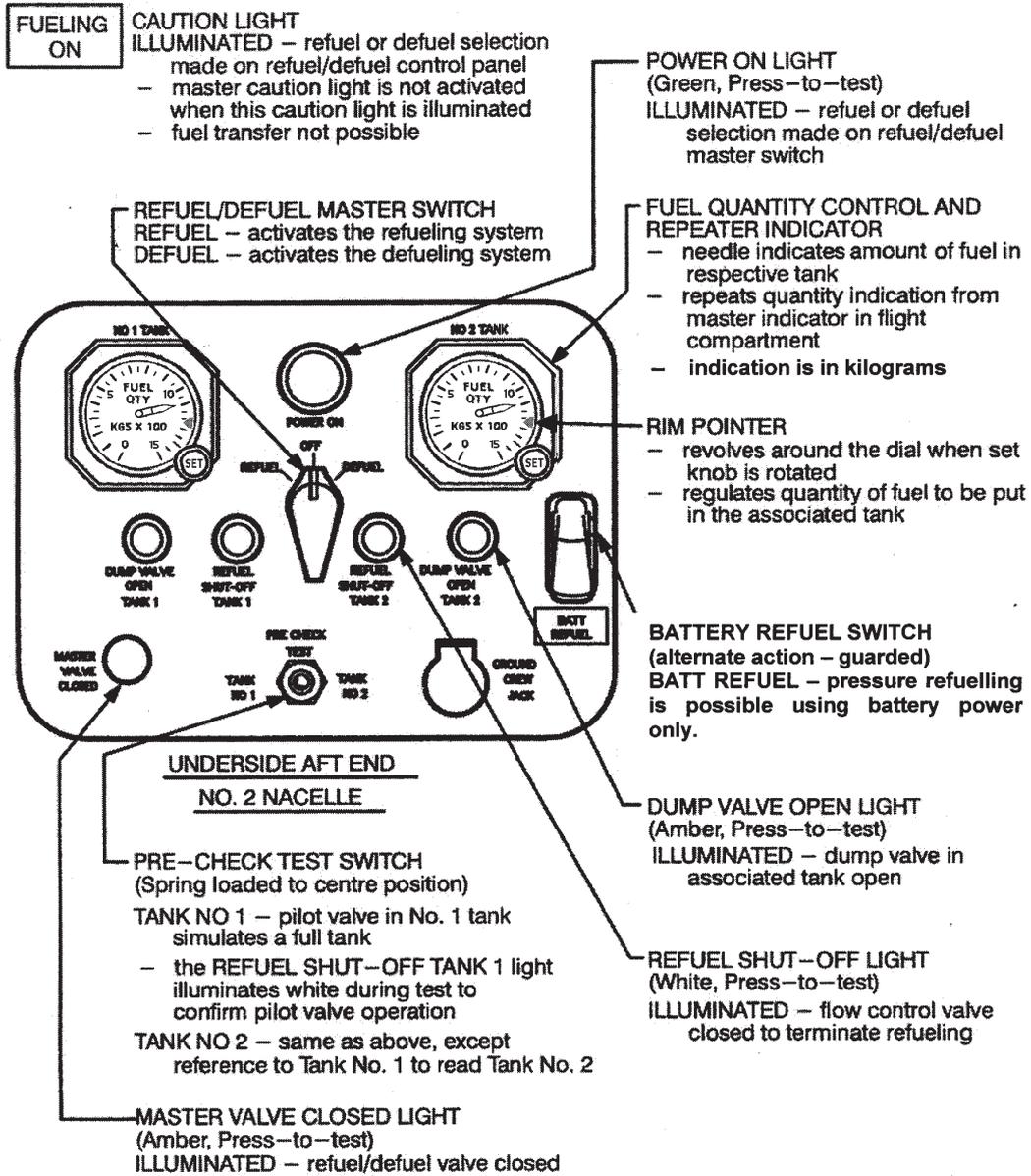


FUEL

CONTROL AND INDICATORS



Fuel control panel and caution lights



Refuel / defuel panel

SYSTEM DESCRIPTION

Fuel is contained in two integral main wing tanks, designated number 1 (left) and number 2 (right). Each wing tank includes a collector tank, which houses its associated AC auxiliary pump. Fuel from each collector tank supplies its respective engine. No cross feed capability is provided.

Positive main tank venting is into a surge tank provided at each wing tip. Any fuel accumulated into the surge tank drains back to the main tanks.

Fuel quantity

Six fuel probes in each tank measure fuel quantity indication. Usable fuel quantity in each main tank is displayed in kilos on two fuel quantity indicators in the flight compartment and repeated on the refuel/defuel panel in number 2 nacelle. When the fuel in either collector tank drops below 60 kilo's, the associated TANK FUEL LOW caution light illuminates and the master caution light flashes.

Fuel temperature

The fuel temperature in the left collector tank is displayed on the fuel temperature indicator whenever the left secondary bus is energized.

The fuel supply to each engine is heated prior to entering the engine driven fuel pump. The temperature is displayed on the respective temperature indicators on the engine instrument panel.

Engine fuel feed

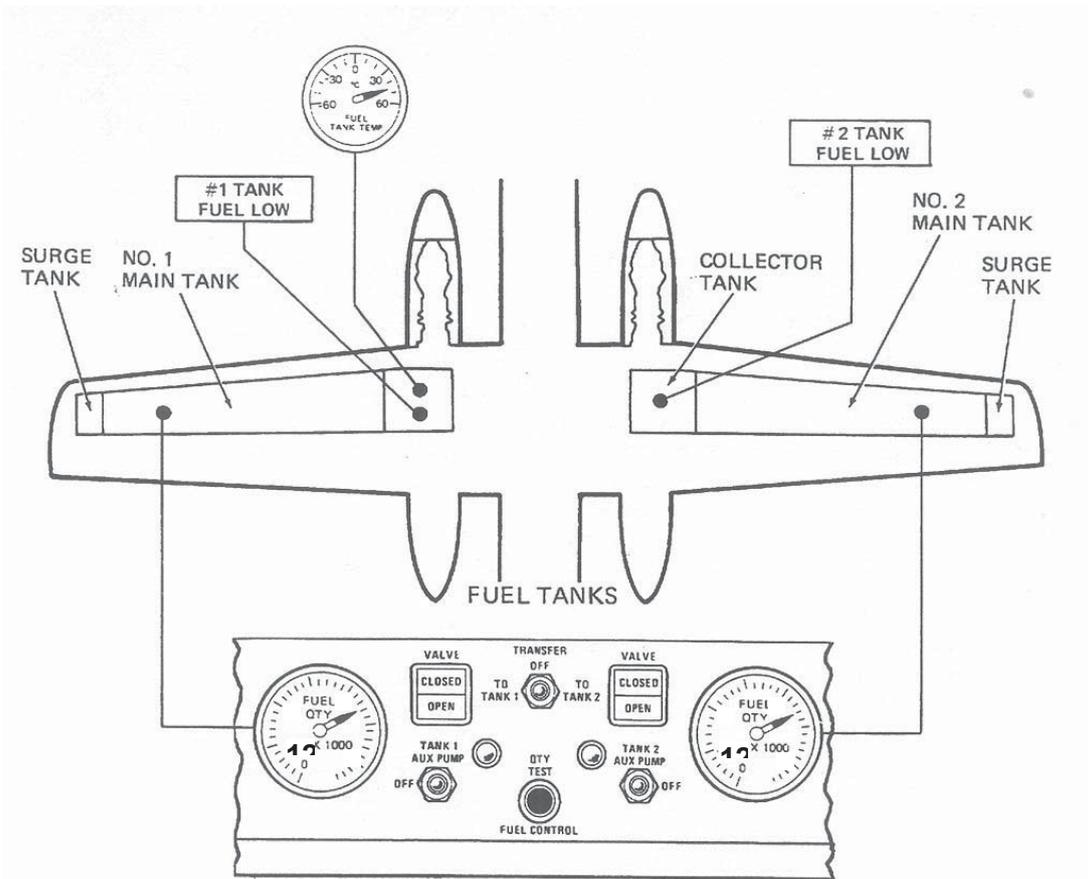
Fuel to each engine is fed from the collector tank and delivered to the hydro-mechanical control unit (HMU). Two pumps perform this function, a main engine driven pump and a boost ejector pump. The ejector pump draws fuel from the collector tank and delivers it to the main pump inlet continuously throughout the normal engine operating range. The main pump then delivers the fuel directly to the HMU.

If the main pump inlet boost pressure drops below 5.5 Psi, the respective ENG FUEL PRESS caution light illuminates.

An AC (variable frequency) auxiliary pump serves as a back up source of fuel boost pressure to the main pump if the ejector pump fails to provide the minimum boost pressure. A green advisory light adjacent to the AUX PUMP switch illuminates when the auxiliary pump is selected ON and providing fuel boost pressure.

The engine feed system from each tank incorporates an emergency shut off valve which closes when the associated PULL FUEL OFF handle on the fire protection panel is pulled. Adjacent fuel valve position indicator lights display when either valve is open or closed.

The fuel supply to each engine is heated and filtered before entering the engine driven fuel pump. If the fuel filter becomes clogged, fuel bypasses the filter to supply the engine and illuminates the respective FUEL FLTR BYPASS caution light and master caution light.



TANK CAPACITY – USABLE FUEL				
STANDARD TANKS	US GALS	LBS	LITRES	KG
LEFT	417.5	2839	1580.5	1287
RIGHT	417.5	2839	1580.5	1287
TOTAL	835	5678	3161	2574

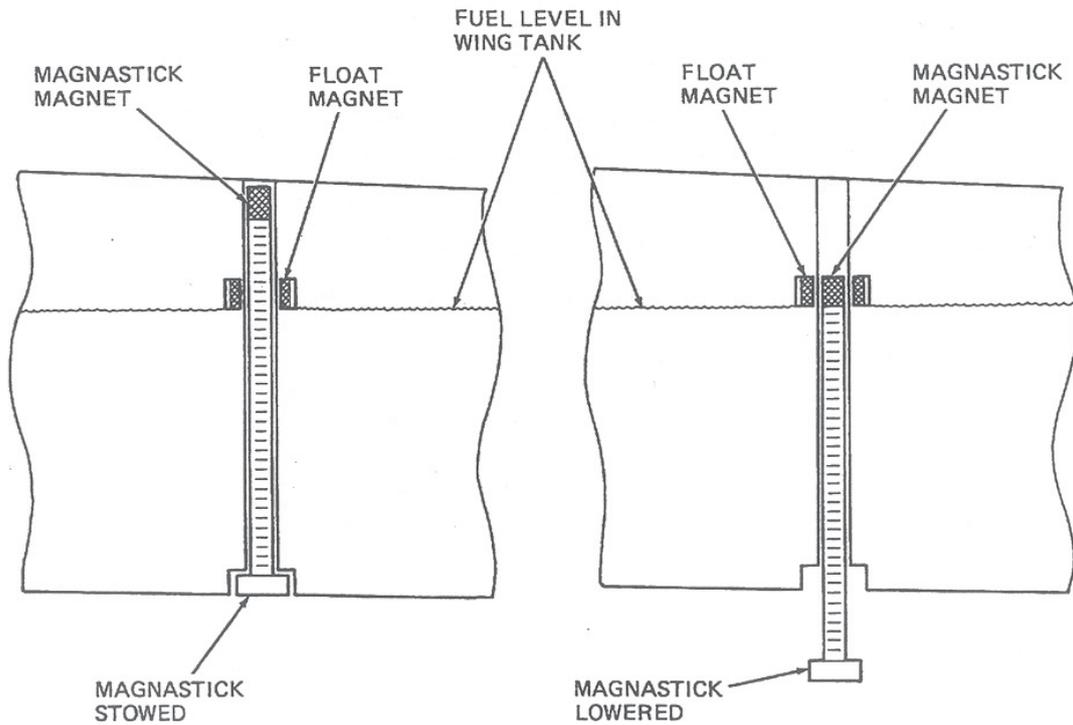
FUEL DENSITY USED – 6.8 lbs/US GAL
 QUANTITIES BASED ON JET A1 – SPECIFIC GRAVITY 0.816

Fuel quantity

Magnasticks

Two magnetic dipsticks (magna sticks) in each tank provide an alternate means of measuring fuel quantity when on the ground. Each consists of a calibrated rod, which slides within a tube extending vertically from the bottom of the fuel tank. When the rod is released, allow it to fall slowly until resistance is felt as the rod magnet becomes attracted to the float magnet. Read the tank contents from the bottom of the rod in U.S. gallons or in litres.

Due to wing dihedral, two dipsticks are required for each tank. If the inner dipstick does not drop when it is released, the fuel level is at the top of the tank (at that location). Total fuel quantity must then be read from the outer dipstick.



External fuel quantity indicators (magnasticks)

FUEL GRADE: Fuels conforming to any of the following specifications are approved for use. Mixing of fuels is permitted.

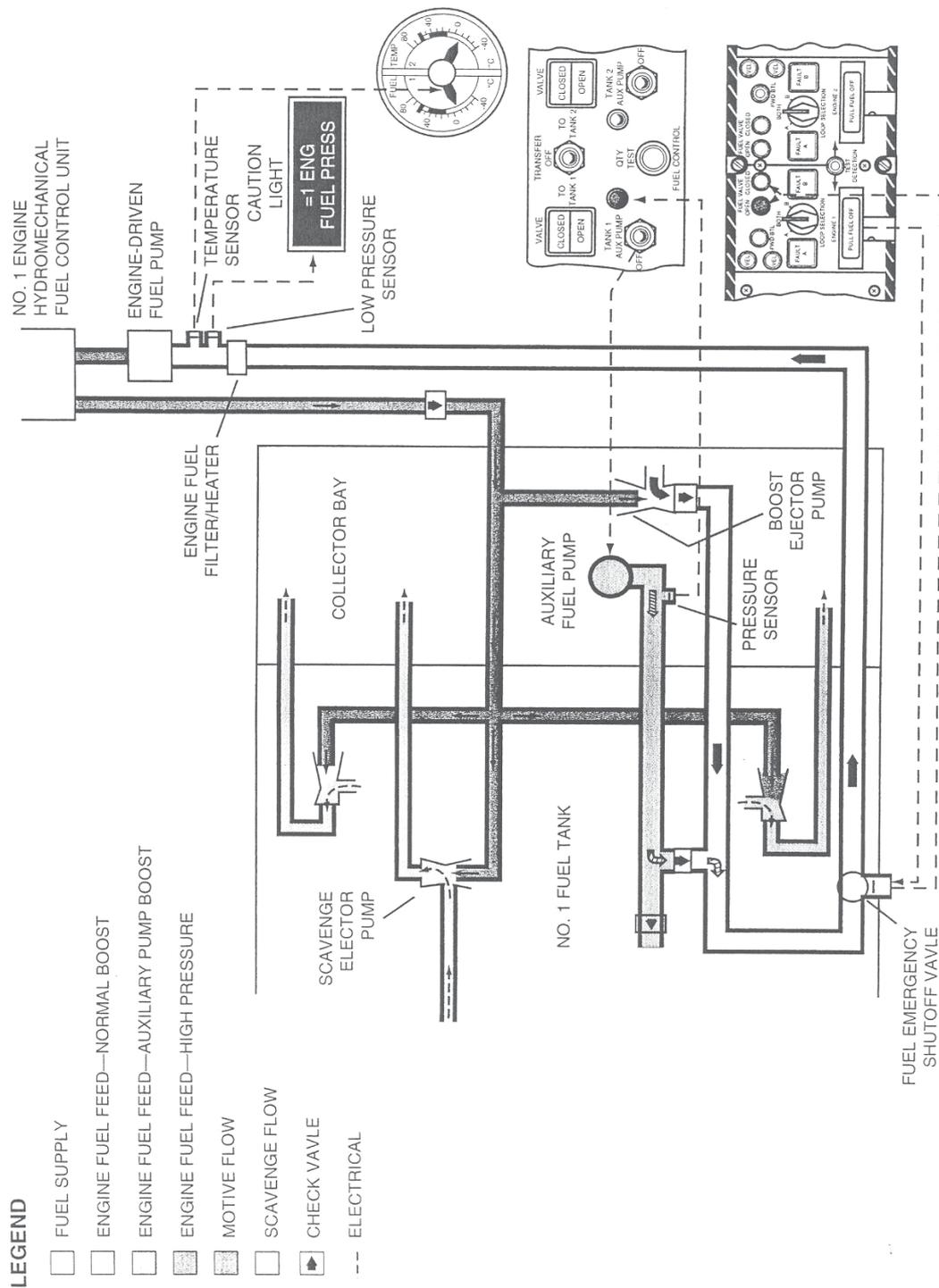
CANADIAN	U.S.
KEROSENE TYPE	
CAN 2 - 3.23 - M81 CAN 2 - 3.23 - M81	ASTM D1655 JET A ASTM D1655 JET A1 MIL-T-5624 JP-5 MIL-T-5624 JP-8
WIDE CUT TYPE	
CAN 2 - 3.22 - M80	ASTM-D1655-JET B MIL-T-5624 JP-4

USABLE FUEL: Fuel remaining in fuel tanks when quantity indicators show zero fuel is not usable in flight. Usable fuel tank capacities are 1287 kg per tank.

Tank 1 and tank 2 auxiliary pumps must be on for take-off and landing.

Take-off with fuel heater outlet temperature indication below 11°C is prohibited.

Operation with fuel heater outlet temperature indication above 57°C is prohibited.



Number 1 fuel feed schematic (number 2 similar)

Fuel transfer system

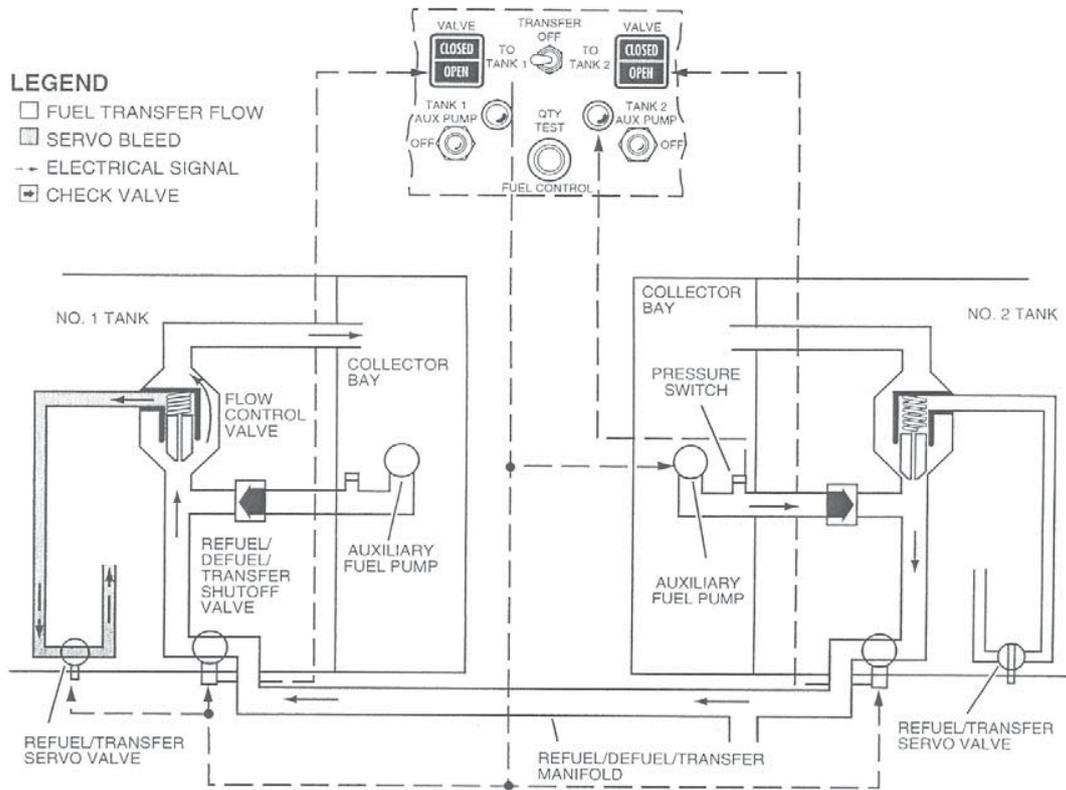
The fuel transfer system transfers fuel from tank to tank to correct any lateral imbalance. A single transfer switch on the fuel control panel controls the system. Transferring is not possible if refuelling is in progress.

During transfer, the auxiliary pump of the donor tank is activated to pump fuel through the transfer manifold to the receiving tank. A flow control valve in the receiving tank opens to admit fuel while the corresponding valve of the donor tank remains closed.

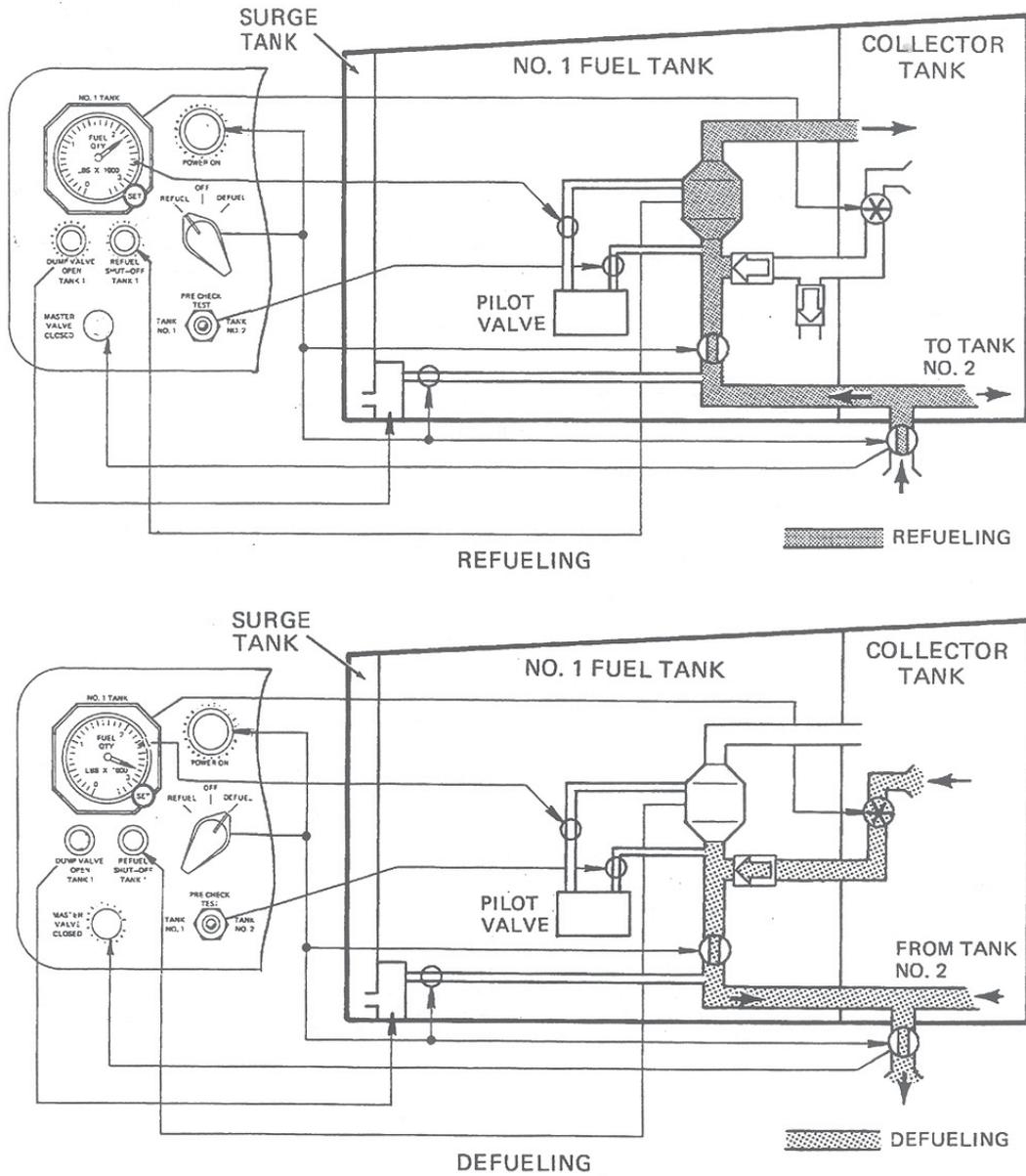
Electrically operated shutoff valves open when the transfer system is active and close when system is shut off. OPEN and CLOSED advisory lights show the position of each valve.

The refuel/transfer servo valve is controlled by the fuel transfer switch and opens in the receiving tank during fuel transfer and pressure refuelling. When the transfer system is deactivated, the servo valve closes causing the flow control valve terminating the fuel transfer.

A pressure refuelling pilot valve protects both tanks from overfilling during pressure refuelling or the receiving fuel tank during fuel transfer by shutting the fuel off when the desired level in the tank is reached.



Fuel transfer schematic



Refuel/defuel schematic

Fueling

Normal pressure fuelling is accomplished through a single pressure-refuelling adapter under the aft end of the number 2 nacelle. Both tanks are filled simultaneously when filled from the refuelling adapter. Automatic pressure refuelling is controlled from the refuel control panel adjacent to the refuelling adapter. Manual refuelling is accomplished through over the wing filler ports. Access to the refuel control panel and refuelling adapter is through an access door, which illuminates the panel on opening.

When the refuel/defuel master switch is selected to REFUEL, this activates all appropriate fuelling valves, which control the fuel flow from the pressurized manifold to the tanks. The control circuit's compare the quantity selected by the bug with the existing tank level, and opens the associated refuelling valves until the actual quantity in each tank corresponds to the bug setting. When the desired quantity (as selected on the quantity indicators) is reached, or, whenever the tanks are full, the control valves automatically shutoff the fuel flow to the tanks. Advisory lights on the refuel/defuel control panel indicate the position of the fuel control valves when fuelling is in progress.

A dump valve in each tank protects the tanks from damage due to overfilling should the normal and backup fuel shutoff functions fail. Any excess fuel entering the main tanks is pumped via the dump valve into the surge tank and then dumped overboard through the surge tank vents. Should the surge tank vents become blocked, increased pressure on the tanks dumps fuel overboard via a pressure relief valve through vents below each wing.

A pre-check test system simulates filled tanks thereby ensuring the serviceability and operation of the automatic shutoff system. During test, when the left or right tank is selected, refuelling through the manifold stops. Refuelling to the tank resumes when the switch is released.

NOTE: The refuelling control circuits are armed through switches activated by the dump valves. This ensures that dump valves are fully open before refuelling can take place.

Defueling

During defueling, the flow through the refuel/defuel manifold is reversed so that fuel flows from the tanks back into a receiving fuel truck.

When the refuel/defuel master switch is selected to DEFUEL, the shutoff valves operate automatically to limit refuelling to a preset quantity. If variable frequency AC power is used, the auxiliary pumps activate automatically to aid the defueling process. In the absence of a suction defueling facility but with an AC power source available, pressure defueling may be accomplished using the auxiliary fuel pumps.

NOTE: The refuel/defuel panel access door can be closed with the master refuel/defuel switch at REFUEL or DEFUEL. With the panel closed, the only indication that REFUEL or DEFUEL is still selected, is illumination of the FUELING ON caution light in the flight compartment. Fuel cannot be transferred when the FUELING ON caution light is illuminated.

Battery fueling

The aircraft may be refuelled on battery power only, without powering up the aircraft. This is accomplished by selecting the capped BATT REFUEL switch on the refuelling panel ON, which powers the fuel system controls and indicators. Refueling can now take place.

NOTE: During battery refuelling the quantity indicators and fuel valve lights in the flight compartment will also be powered. There is no indication other than the fuel valve lights that the BATT REFUEL switch is in the ON position. Therefore, care should be taken to ensure the switch is OFF and capped before commencing flight.

NON-NORMAL INDICATIONS AND OPERATION

Caution lights

#1 ENG FUEL PRESS	#2 ENG FUEL PRESS	Fuel boost pressure to engine inlet inadequate. May be an indication that ejector pump failed.
Applicable ECL:		#1 ENG FUEL PRESSURE LOW or #2 ENG FUEL PRESSURE LOW.
Remarks:		Outlet pressure below 5.5 Psi Caution light should go out as fuel boost pressure increases to 7.5 Psi
#1 FUEL FLTR BYPASS	#2 FUEL FLTR BYPASS	Engine fuel filter blocked.
Applicable ECL:		#1 FUEL FLTR BYPASS or #2 FUEL FLTR BYPASS.
Remarks:		Fuel bypasses filter to supply engine. Report condition on landing.
#1 TANK FUEL LOW	#2 TANK FUEL LOW	Fuel tank capacity less than 60 kg.
Applicable ECL:		#1 TANK FUEL LOW or #2 TANK FUEL LOW.
Remarks:		None
FUELING ON	Refuel or defuel selection made on refuel/defuel control panel.	
Applicable ECL:		FUELING ON CAUTION LIGHT.
Remarks:		Master caution light will not illuminate when this caution light illuminates. Fuel transfer is not possible