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STUDENT GUIDE

FOR

UH-60 FUEL SYSTEM

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SEPTEMBER 2004

FUEL SYSTEM

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SECTION I. - INTRODUCTION

TERMINAL LEARNING OBJECTIVE:

At the completion of this lesson you will:

ACTION: Identify the characteristics of the UH-60 fuel system.

CONDITIONS: As a UH-60 maintenance text pilot.

STANDARD: In accordance with (IAW) TM 1-1520-237-23-5

SAFETY REQUIREMENTS: Remove all watches, rings and other jewelry before operating, or maintaining electronic equipment.

RISK ASSESSMENT LEVEL: Low

ENVIRONMENTAL CONSIDERATIONS: There are no environmental concerns for this lesson.

EVALUATION: Evaluation will be accomplished with performance exam at the end of this module of instruction.

SECTION II. - PRESENTATION

A. ENABLING LEARNING OBJECTIVE No. 1

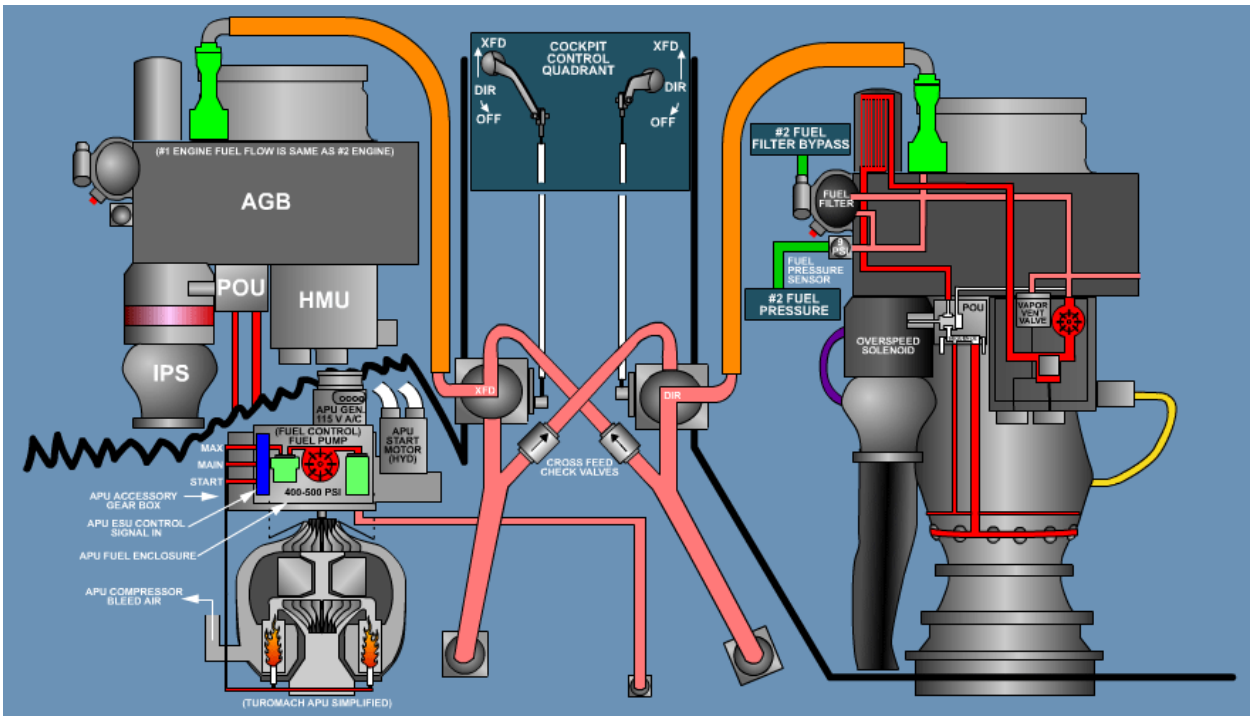
ACTION: Identify the function of the fuel system.

CONDITIONS: Using TM 1-1520-237-23-5.

STANDARD: IAW UH-60 TM 1-1520-237-23-5.

a. Fuel System Function

Frame #0025 (Fuel System Function)



(1) The function of the UH-60 fuel system is to store and distribute fuel for operation of the main engines and the Auxiliary Power Unit (APU).

B. ENABLING LEARNING OBJECTIVE No. 2

ACTION: Identify the major components of the fuel system.

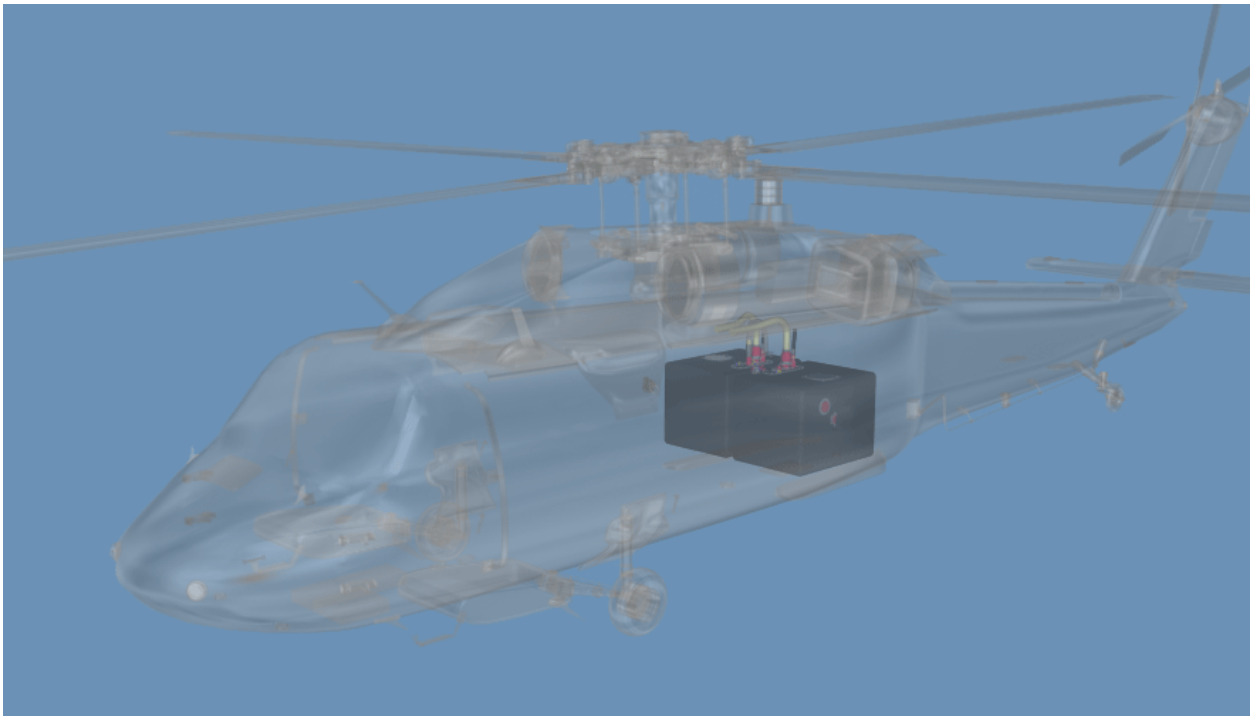
CONDITIONS: Using TM 1-1520-237-23-5.

STANDARD: IAW UH-60 TM 1-1520-237-23-5.

a. Major Components

(1) Fuel Cells

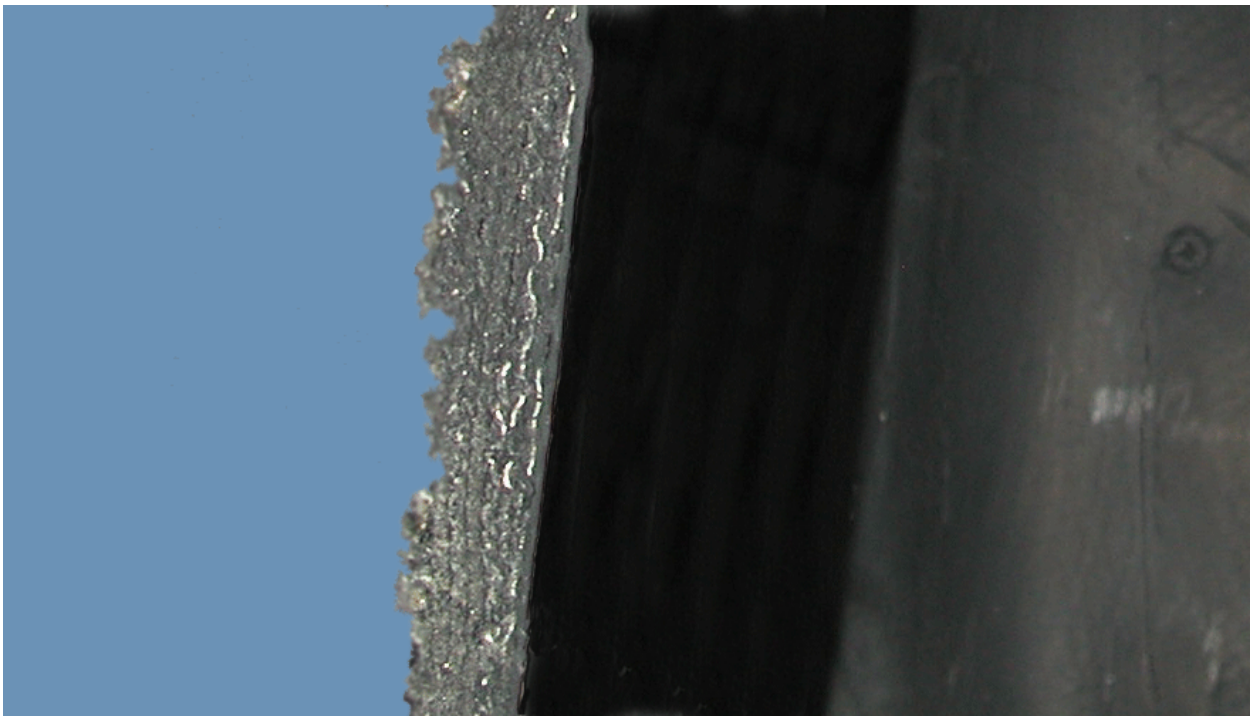
Frame #0035 (Fuel Cell Location)



(a) The two main fuel cells are in the transition section.

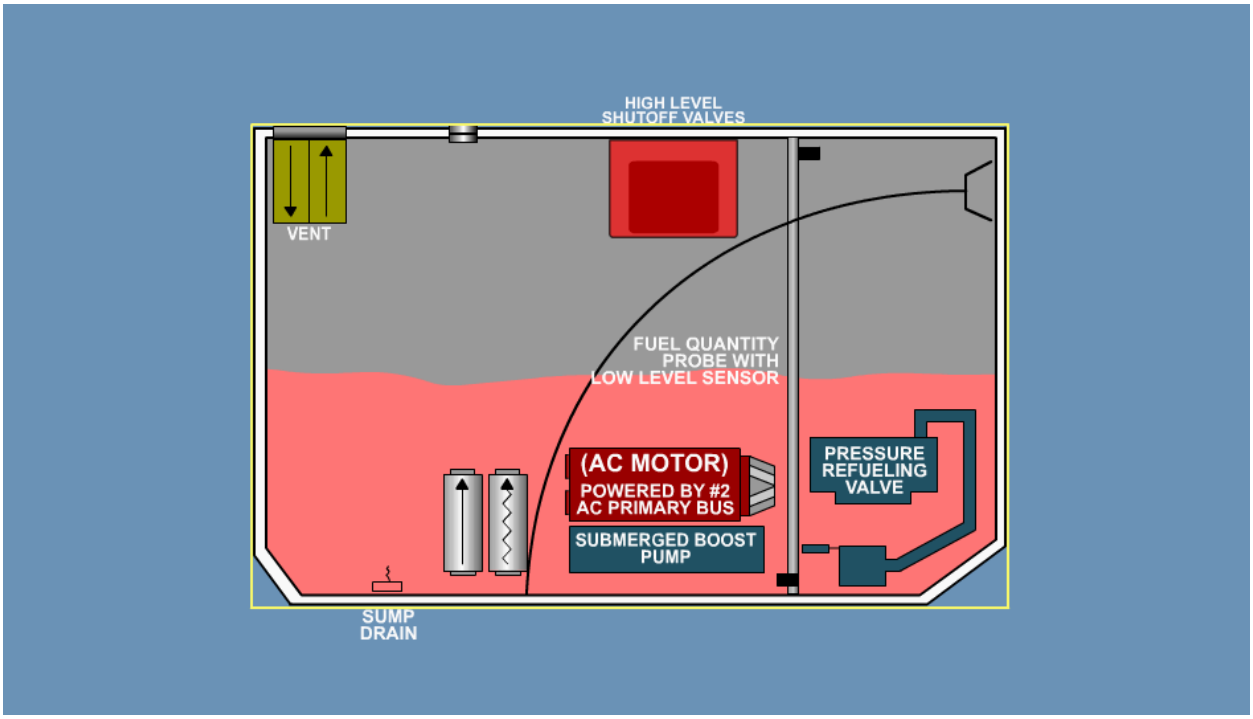
(b) The fuel cells are interchangeable, crashworthy, and self-sealing.

Frame #0035 (Fuel Cell Construction)



(c) The fuel cells are constructed in layers of a rubber compound with a nylon filament added for strength, and an outer coat of Vithane to give the cell a scuff resistant exterior.

Frame #0036 (FUEL CELLS FLASH)



(d) Bunna is the powder that mixes with the fuel to seal the fuel cell.

(e) Once the bunna and fuel mix, a yellow gel forms to seal the hole in the fuel cell.

(2) Fuel Supply Lines

Frame #0040 (Fuel Supply Lines)

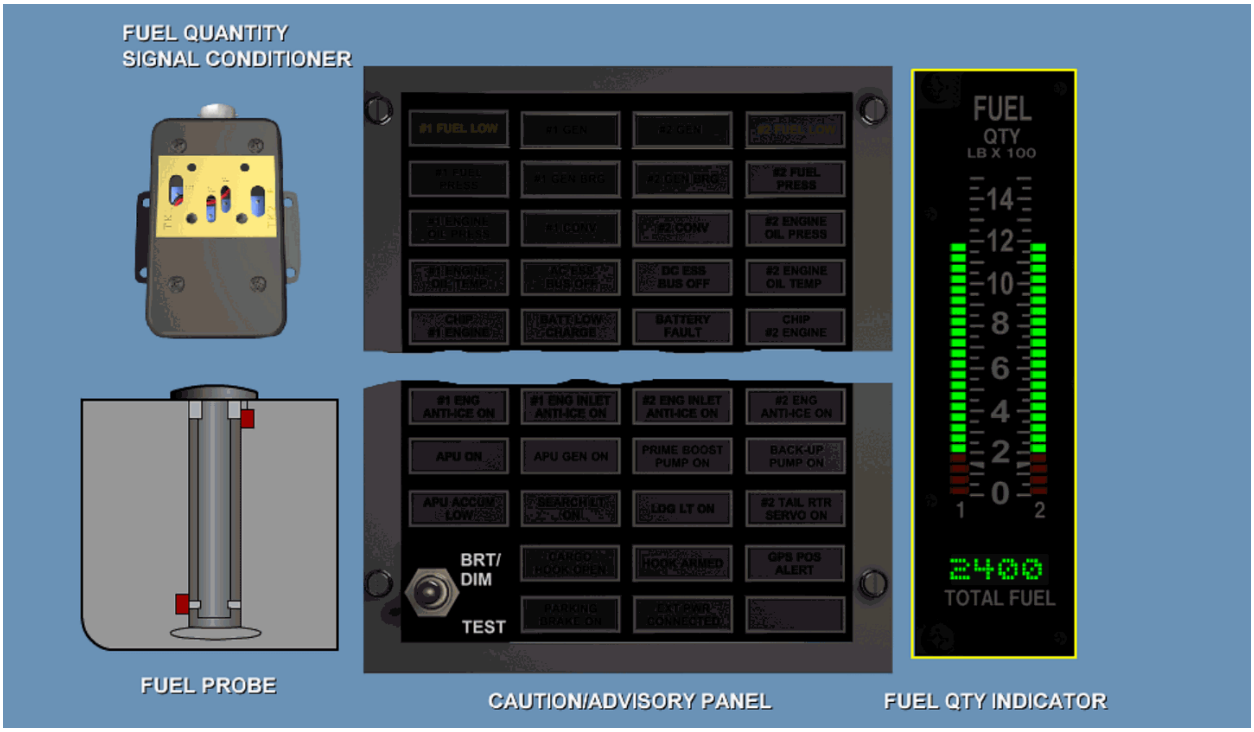
(a) The fuel supply lines are self-sealing, and have self-sealing, breakaway type valves.

(b) These valves and fuel lines prevent the loss of fuel in the event a line is severed, or a valve breaks away from the fuel lines.

(c) A typical breakaway valve is shown in the above graphic.

(3) Indicating System

Frame #0045 (Indicating System FLASH)



(a) The fuel quantity indicating system visually indicates the amount of fuel, in pounds, in each cell.

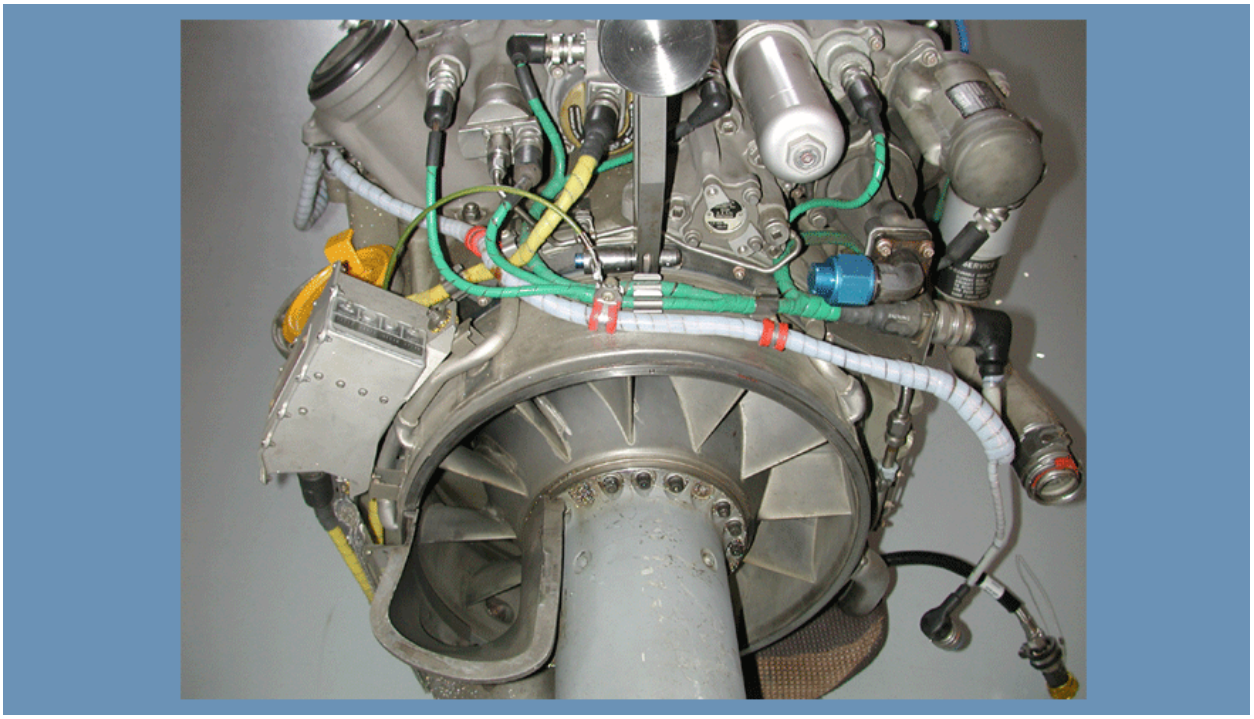
(b) The fuel quantity indicator scales are amber for 0 to 200 pounds of fuel, and green for 200 to 1500 pounds of fuel.

(c) A digital readout of the total fuel remaining in both cells is shown at the bottom of the vertical indicators.

(d) The #1 FUEL LOW and the #2 FUEL LOW warning lights on the caution/advisory panel will flash when the fuel level in each cell reaches approximately 172 pounds of fuel.

(4) Pumps

Frame #0050 (Pumps)

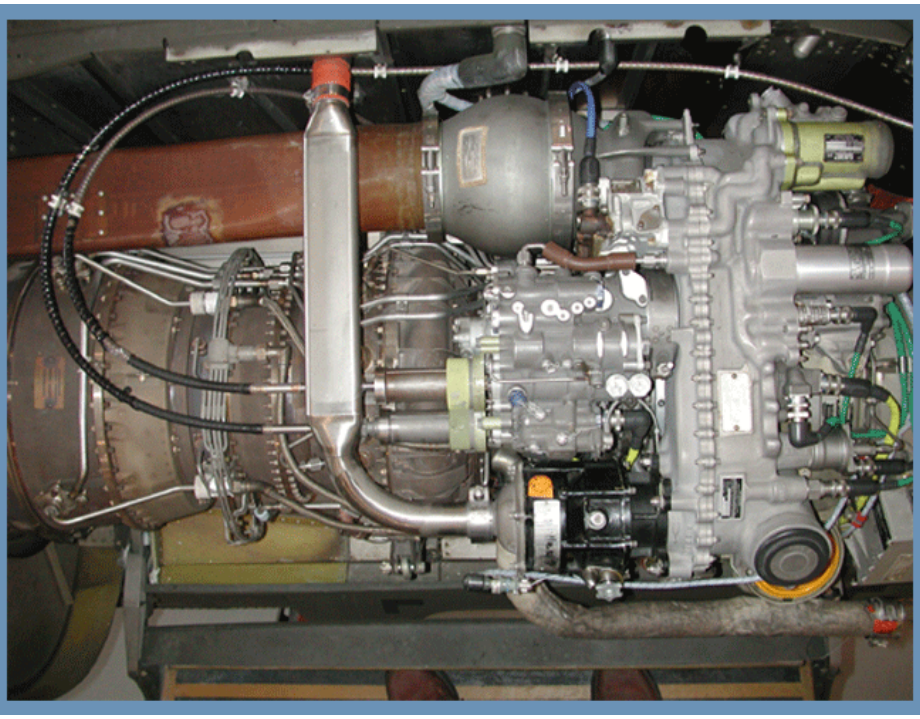


(a) There is an external engine driven fuel boost pump mounted on the accessory section of each engine.

(b) For aircraft modified with the in-tank submerged fuel boost pump, and the fuel boost pump switch in the OFF position, fuel is drawn to the Hydromechanical Unit (HMU) of each engine by suction created by the engine driven boost pump.

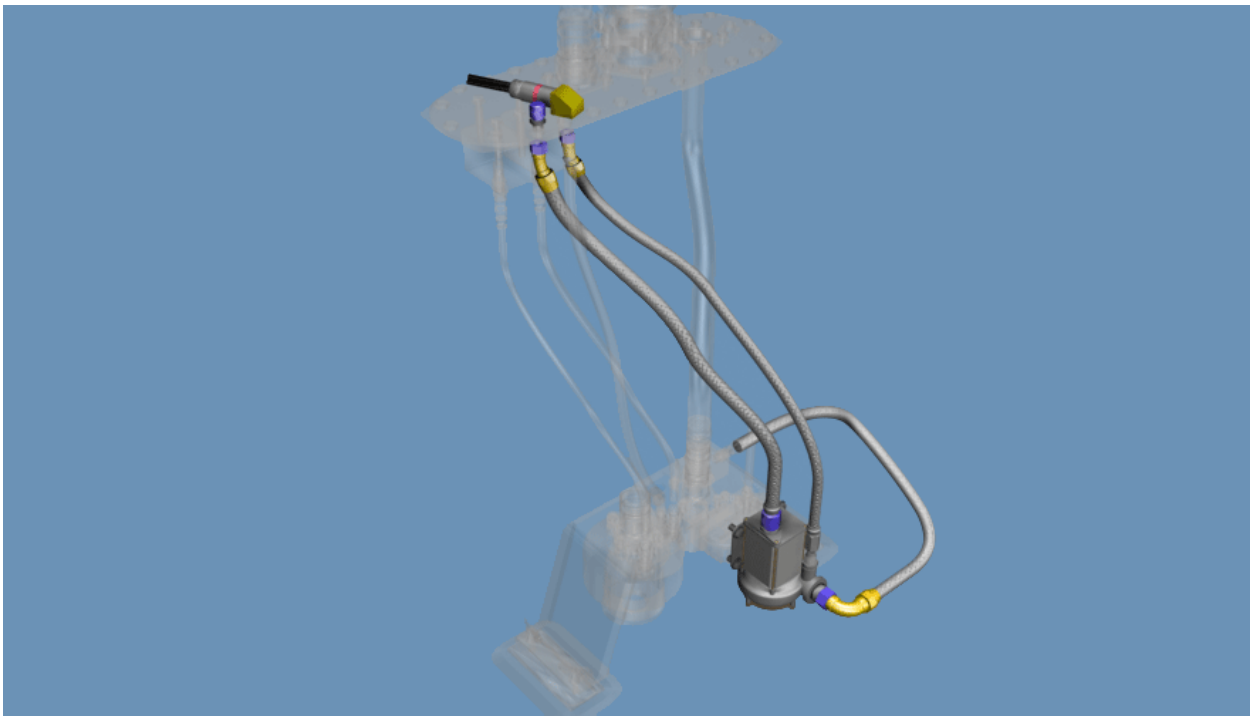
(c) For aircraft not modified with the in-tank submerged fuel boost pump, the fuel boost pump switch must be in the ON position.

Frame #0050 (HMU)



(d) The HMU contains a high-pressure pump that delivers fuel to the Pressurizing and Overspeed Unit (POU) (T700) or Overspeed and Drain Valve (ODV) (T701C).

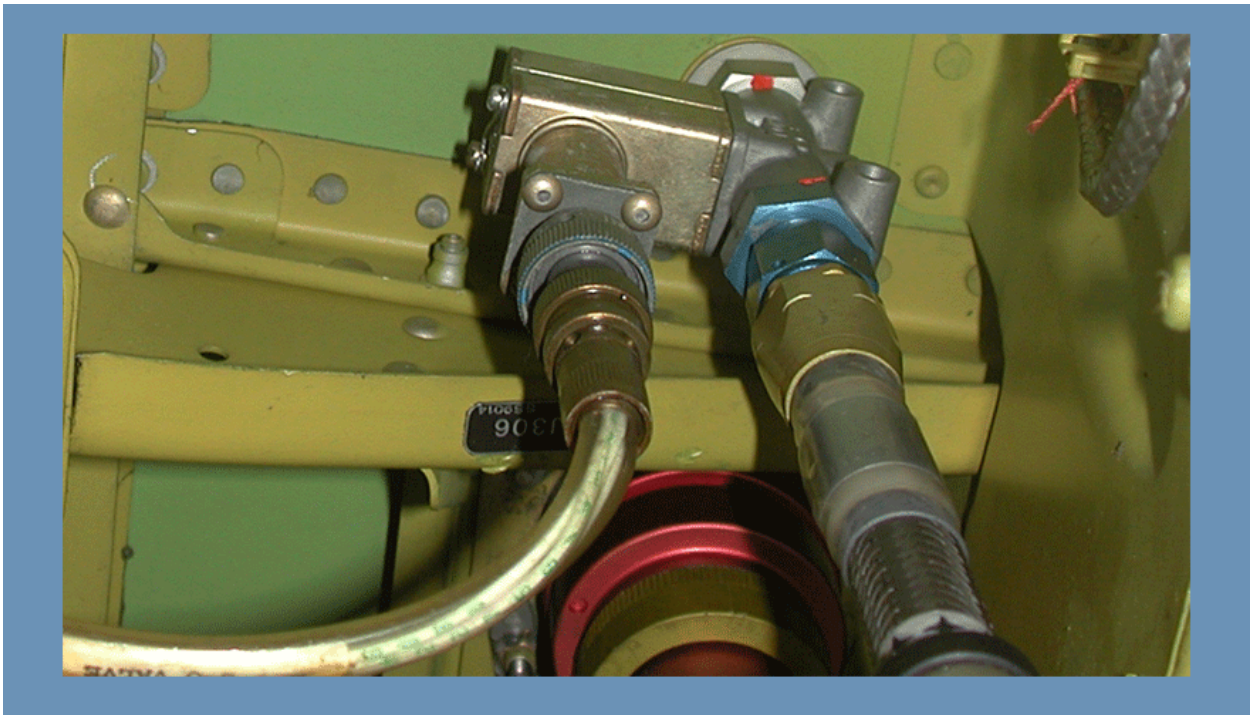
Frame #0050 (Submerged Fuel Boost Pump)



(e) There are two submerged (electrical) fuel boost pumps, one in each fuel cell of the aircraft modified with the in-tank fuel boost pumps.

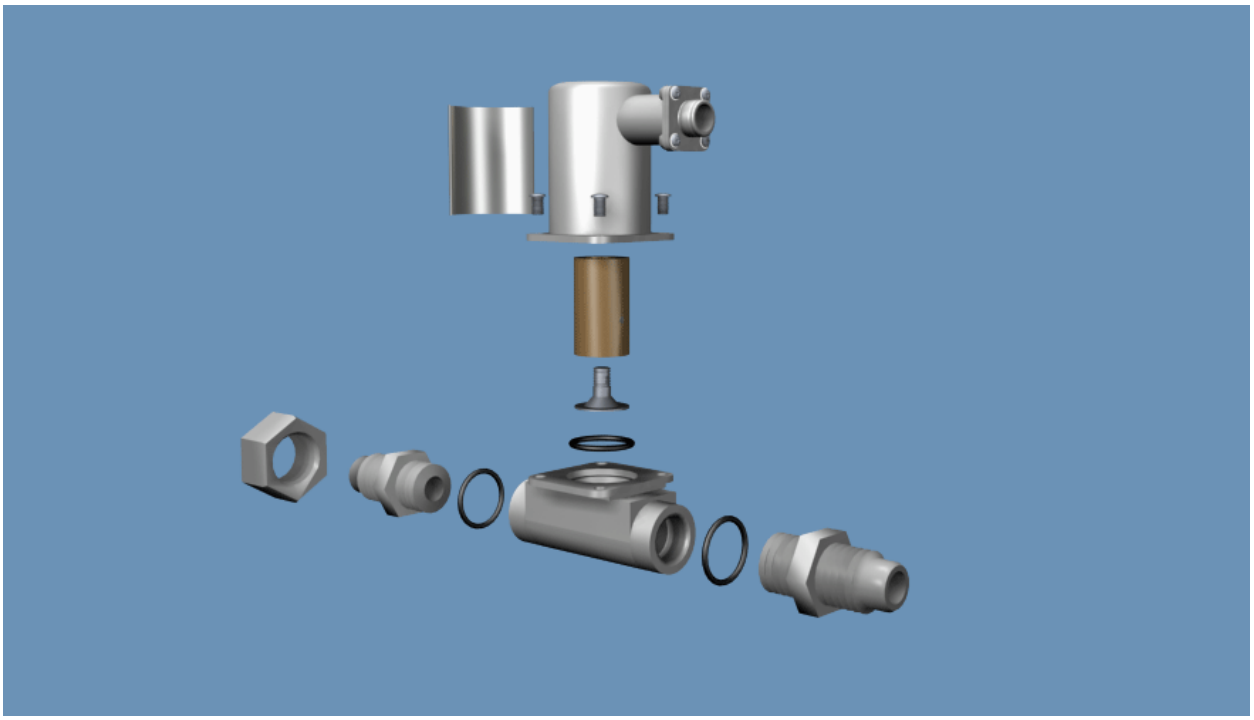
(5) APU Shutoff Valve

Frame #0055 (APU Fuel Shutoff Valve)



(a) The APU fuel shutoff valve is located above the No. 1 fuel cell on the APU supply line.

Frame #0055 (APU Shutoff Valve Exploded View)



(b) The APU fuel shutoff valve provides fuel supply to the APU and shuts off fuel to the APU.

CHECK ON LEARNING

1. The fuel quantity indicator scales are_____?

2. How many submerged electrical boost pumps are in each fuel cell?

3. How is fuel drawn to each engine's Hydromechanical Unit (HMU)?

SECTION III. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the UH-60 Fuel System major components topic.
The key points to remember are:

- The major components of the fuel system are: fuel cells, fuel supply lines, indicating system, pumps, APU shutoff valve.
- The fuel cells are interchangeable, crashworthy, and self-sealing.
- The fuel cells are constructed in layers of a rubber compound mixed with nylon filament and an outer coat of Vithane.
- The fuel lines are self-sealing, and have self-sealing breakaway type valves.
- The fuel quantity indicating system visually indicates the amount of fuel, in pounds, in each cell.
- There are four types of pumps in the fuel system: an external engine driven boost pump, a high pressure pump in the HMU, prime boost pump located on top o, and a submerged electrical boost pump in each fuel cell.
- The APU fuel shutoff valve provides fuel supply to the APU and shuts off fuel to the APU.

C. ENABLING LEARNING OBJECTIVE No. 3

ACTION: Identify the characteristics of the fuel system internal and external components.

CONDITIONS: Using TM 1-1520-237-23-5.

STANDARD: IAW UH-60 TM 1-1520-237-23-5.

a. Engine Prime Shutoff Valve

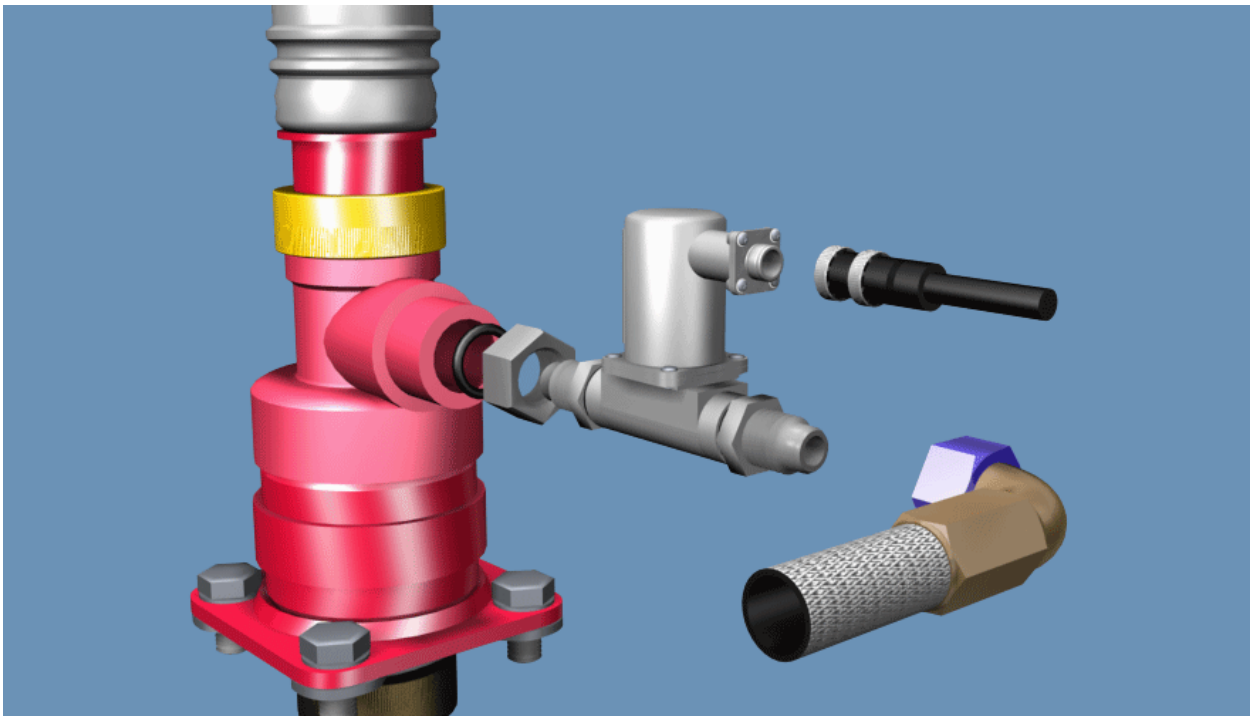
Frame #0085 (Engine Prime Shutoff Valves)

(1) There are two engine prime shutoff valves, one for each engine.

(2) The valves are located on the top of each cell, attached to the main fuel breakaway valve.

(3) The No. 1 or No. 2 engine starter system will electrically open or close the prime shutoff valves and supply electrical power to the prime boost pump.

Frame #0085 (Engine Prime Shutoff Valve Exploded View)



(4) When the starter speed switch drops out, the prime shutoff valve closes and turns off the prime boost pump.

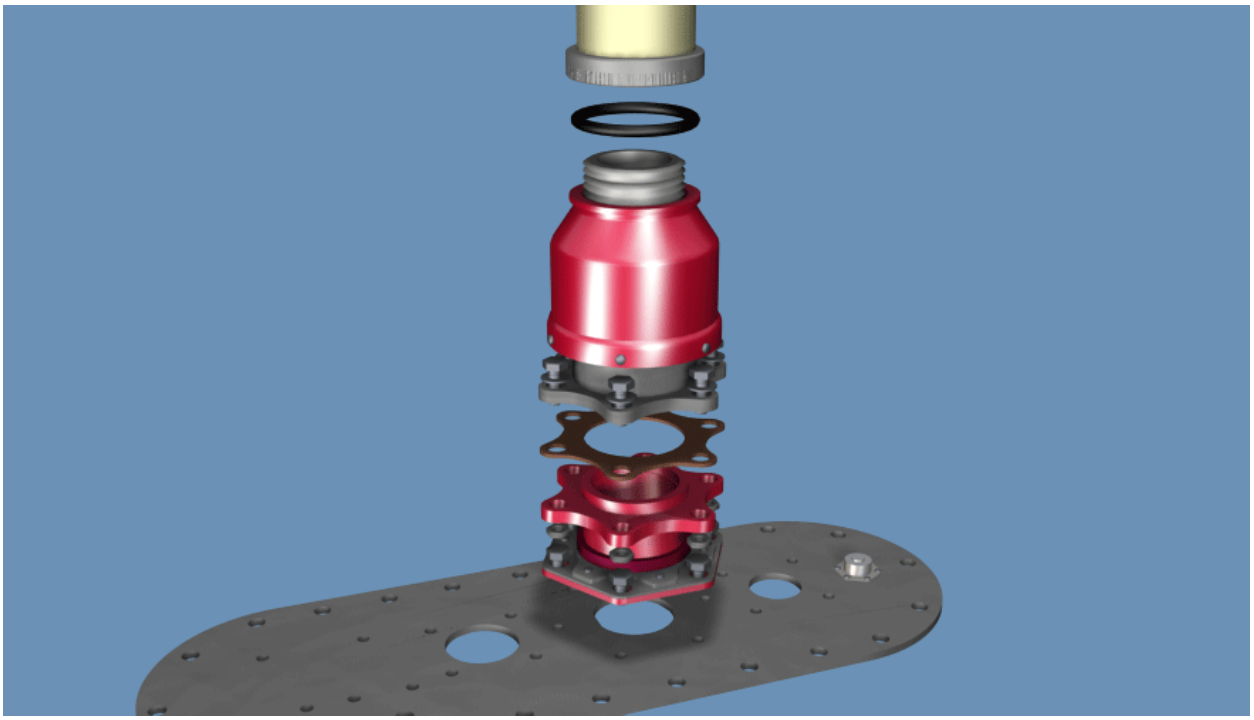
(5) When the valve closes, the engine driven boost pump takes over.

b. Vent Valves

Frame #0090 (Vent Valves)

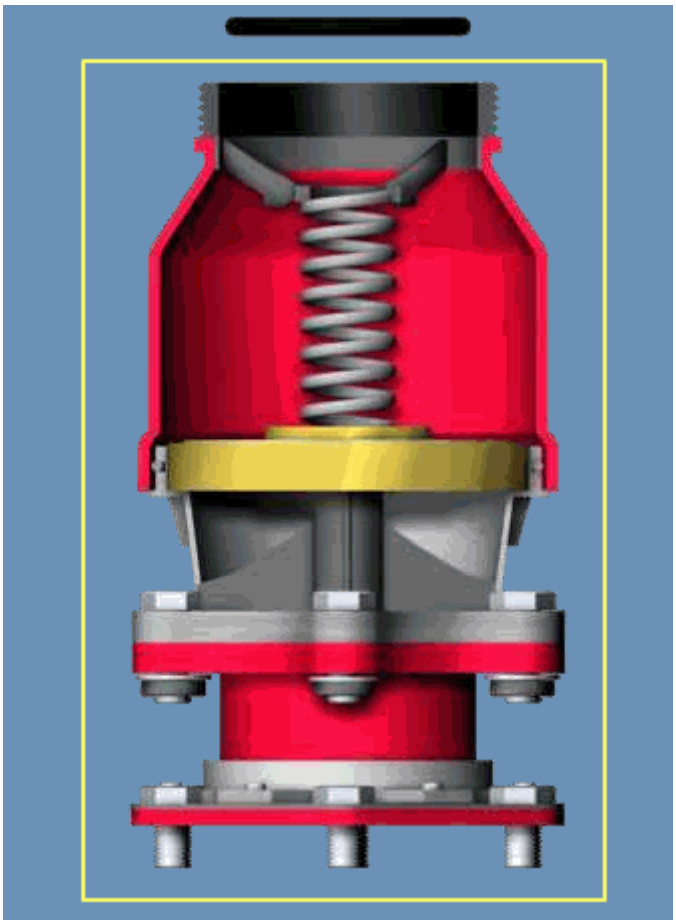
(1) The vent system allows air to enter and exit the main fuel cells through the vent valves.

Frame #0090 (Vent Valves Exploded View)



(2) The vent system also prevents fuel spillage if the aircraft banks or rolls excessively.

Frame #0091 (Vent Valve Inside View)



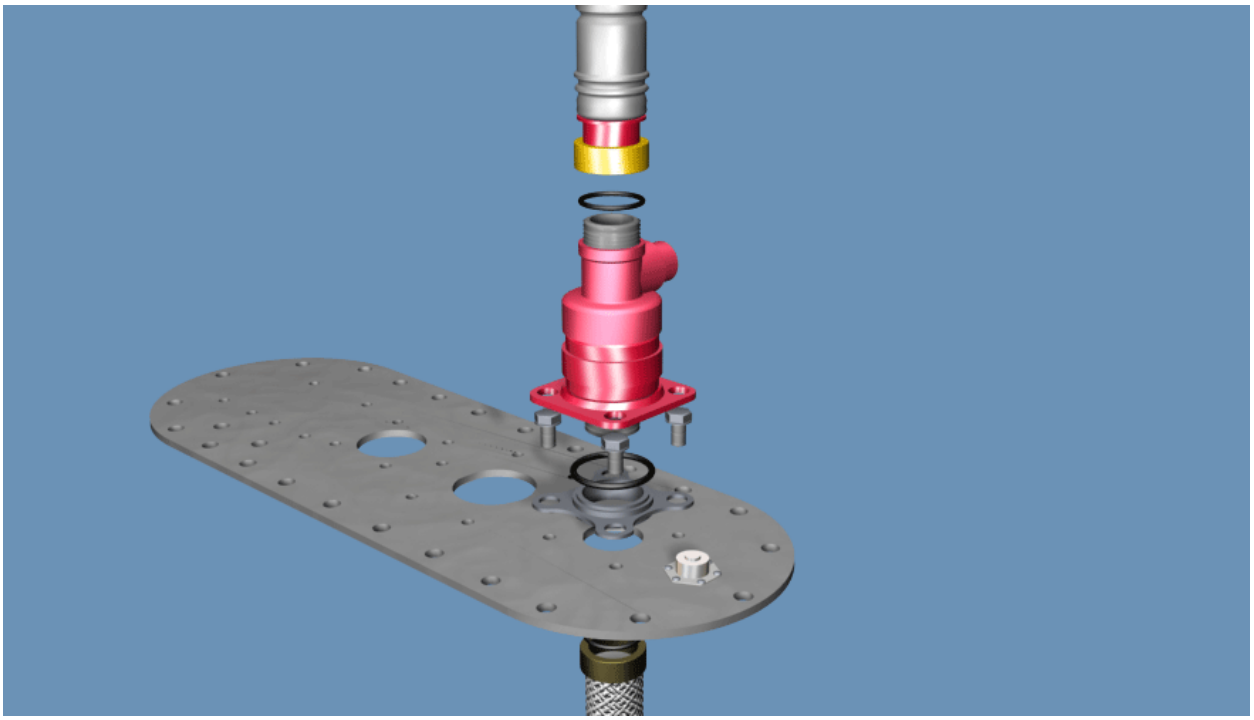
(3) The vent valves have double-acting check valves which open when there is a pressure differential between the fuel cells and the atmosphere.

c. Main Fuel Breakaway Valve

Frame #0095 (Main Fuel Breakaway Valve)

(1) The main fuel breakaway valves are located on top of the fuel cells, one for each cell.

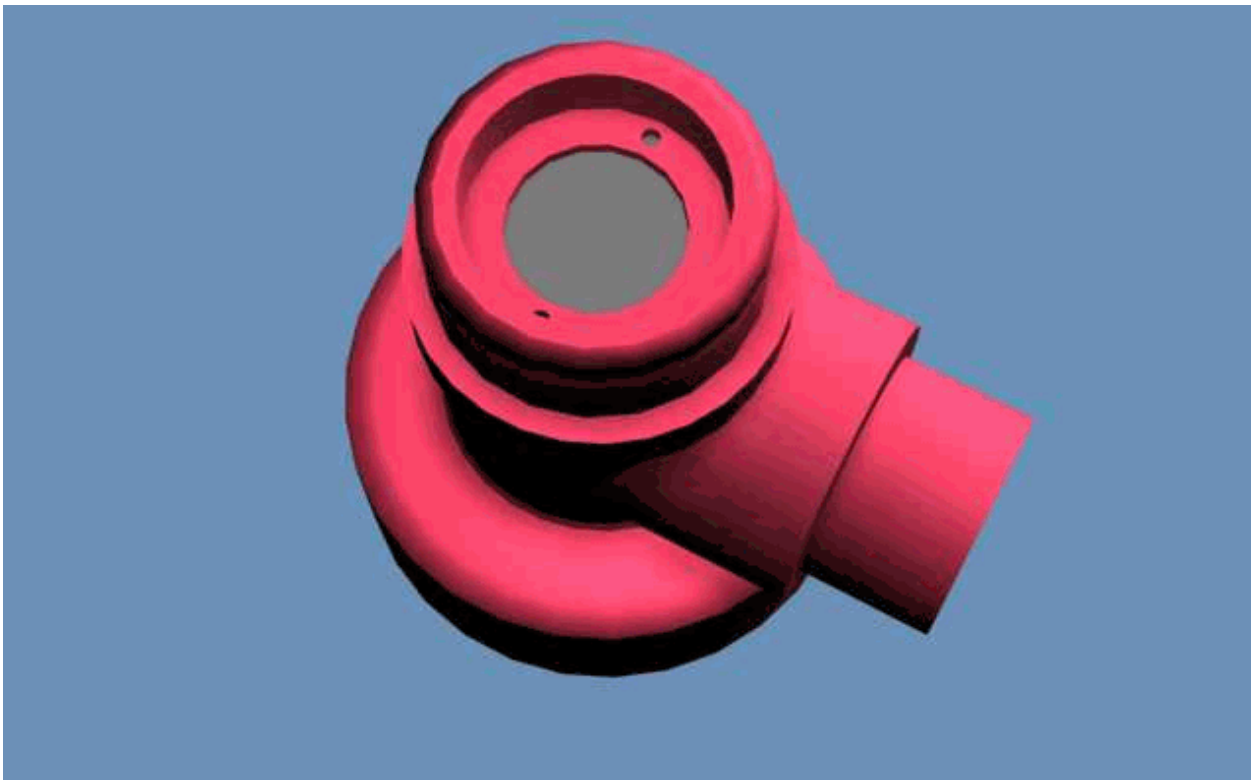
Frame #0095 (Main Fuel Breakaway Valve Exploded View)



(2) These valves prevent loss of fuel if the valves break away from the fuel lines.

(3) The breakaway valve is a one-way check valve.

Frame #0096 (Main Fuel Breakaway Valve)



d. Prime Boost Pump and Outlet Valve

Frame #0100 (Prime Boost Pump and Outlet Valve)

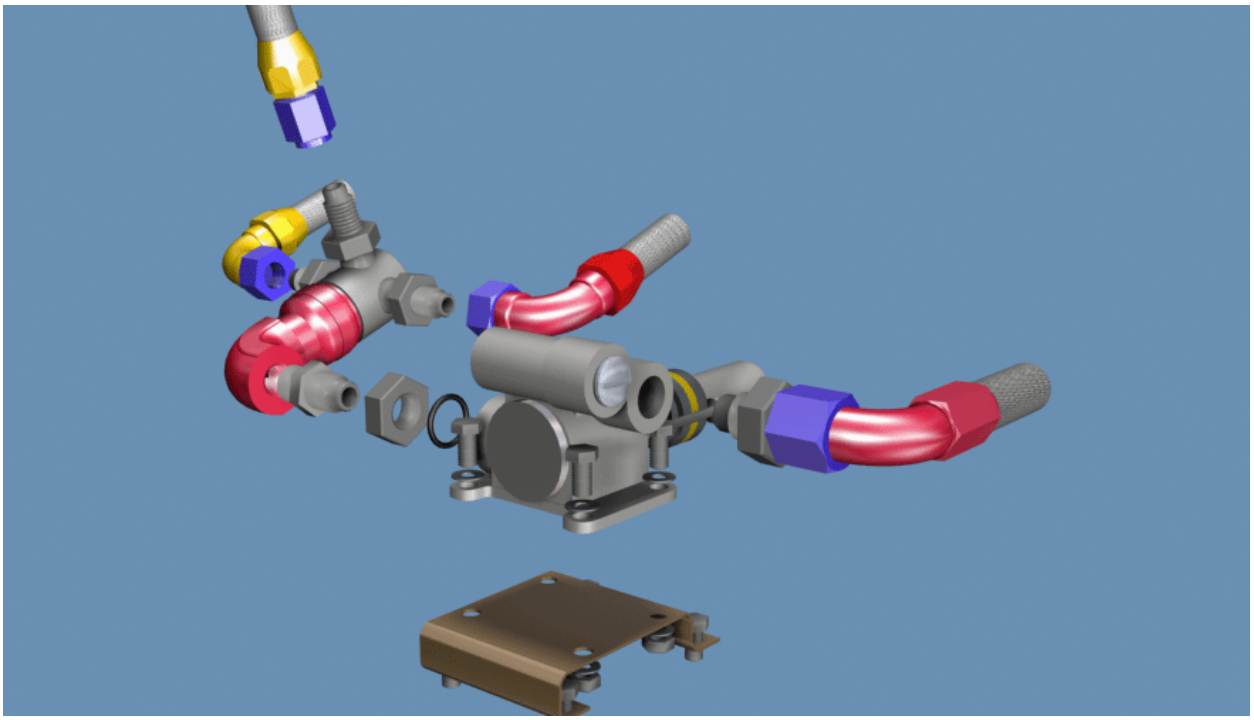
(1) The prime boost pump and outlet valve is automatically activated by the engine start system, and primes each engine fuel lines and the APU.

(2) The prime boost pump can also be activated by placing the FUEL PUMP switch to the APU BOOST position.

(3) The PRIME BOOST PUMP ON advisory light indicates 28 V dc is applied to the pump motor, it does not indicate pressure.

(4) Fuel to the valve comes from No. 1 fuel cell.

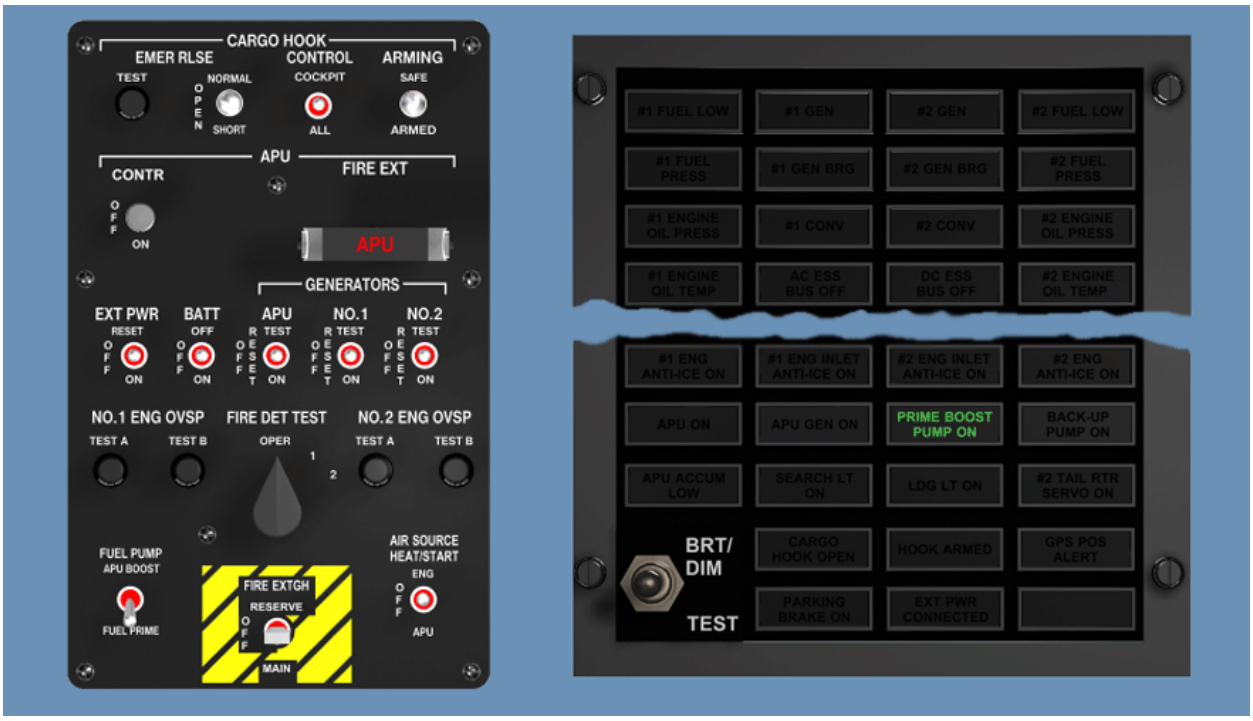
Frame #0100 (Prime Boost Pump and Outlet Valve Exploded View)



(5) If the main fuel lines or HMU lose their prime, the prime boost pump can prime the lines.

e. Fuel Pump Switch

Frame #0102 (Fuel Pump Switch FLASH)

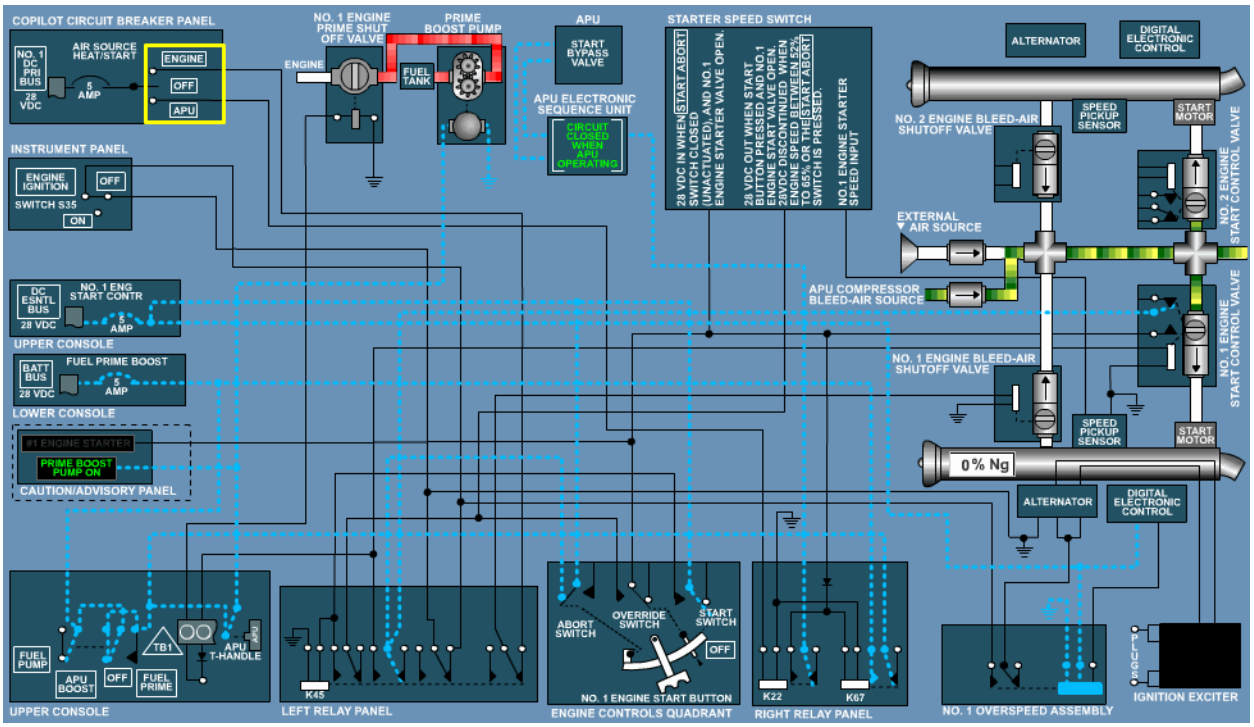


(1) The prime boost pump is controlled by the FUEL PUMP switch on the upper console.

(2) When the pump is running, the PRIME BOOST PUMP ON capsule on the CAUTION/ADVISORY panel will be illuminated and indicates that 28 V dc has been applied to the pump motor.

f. New Fuel Schematic

Frame #0103 (PRIME BOOST PUMP OPERATION Schematic)



(1) Following the pilot checklist, the APU is online; the FUEL PRIME switch is in the APU BOOST position.

(2) Placing the AIR SOURCE HEAT/START switch to the APU position, sends 28 V dc to energize relay K22.

(3) The contacts of relay K22 close and route 28 V dc from the APU ESU to energize relay K67.

(4) The closed contacts of relay K67 now supply 28 V dc to the PRIME BOOST PUMP, regardless of the position of the FUEL PRIME switch.

(5) Positioning the ENGINE IGNITION switch to the ON position, removes one of the two shorting points from the alternator output.

(6) The other shorting point is removed as relay K45 is energized, after the start switch has been pressed.

(7) Pressing the ENGINE START button routes 28 V dc to the left relay panel, energizing relay K45.

(8) Simultaneously, 28 V dc is routed from the starter speed switch to relay K45, creating a holding circuit, and allowing the ENGINE START button to be released.

(9) Power (28 V dc) is then routed to the No. 1 Engine Prime Shutoff Valve, opening the valve and allowing fuel flow to the engine.

(10) Power (28 V dc) is also routed to the No. 1 Engine Start Control Valve, energizing the relay and opening the valve allowing bleed-air from the APU to flow to the engine starter.

(11) The closed contacts of the No. 1 Engine Start Control Valve routes 28 V dc to the starter speed switch, and to the relay K67 holding circuit, and illuminates the #1 ENGINE STARTER capsule on the CAUTION/ADVISORY panel.

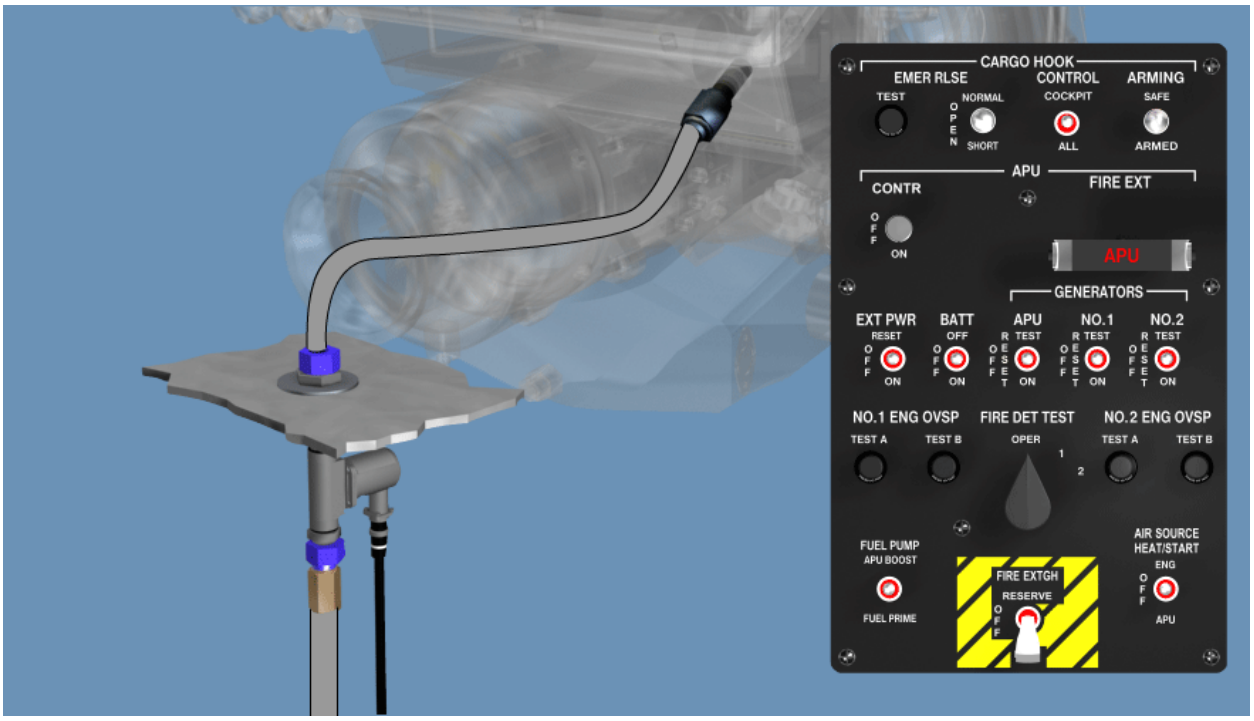
(12) The engine speed pickup sensor sends a signal to the starter speed switch, and as the engine spools up the alternator, produces an output to the ignition exciter, which fires the igniter plugs.

(13) When the engine Ng reaches 52-65%, the starter speed switch removes power to holding circuit for relay K45, effectively closing the No. 1 Engine Start Control Valve.

(14) It also shorts out the alternator output, removing the ignition source, and closes the No. 1 Prime Shutoff Valve, and the #1 ENGINE STARTER capsule goes out.

g. APU Fuel Shutoff Valve

Frame #0105 (APU Shutoff Valve FLASH)



(1) The APU fuel shutoff valve is located in the fuel cell compartment, on the underside of the APU work deck.

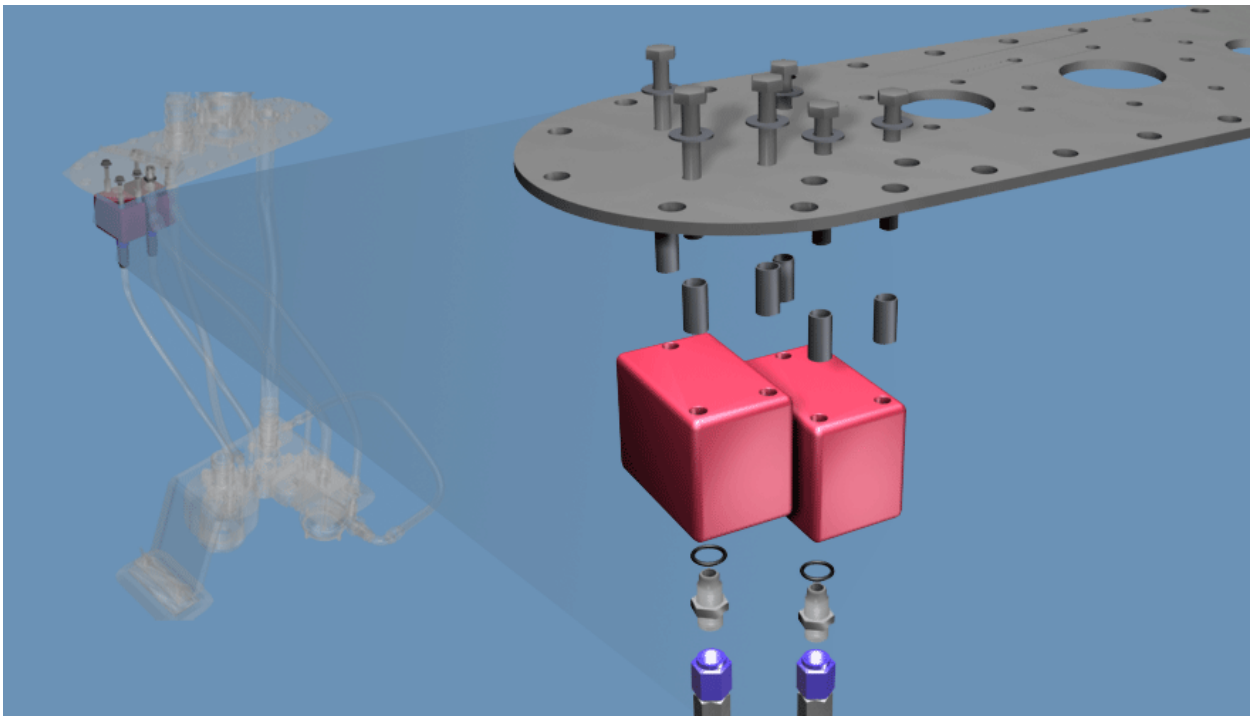
(2) The shutoff valve is a one way check valve that keeps the APU fuel line primed.

(3) The shutoff valve also shuts off fuel to the APU in case of fire.

(4) When the APU “T” handle is pulled, the APU fuel shutoff valve is electrically closed.

h. High Level Shutoff Valves

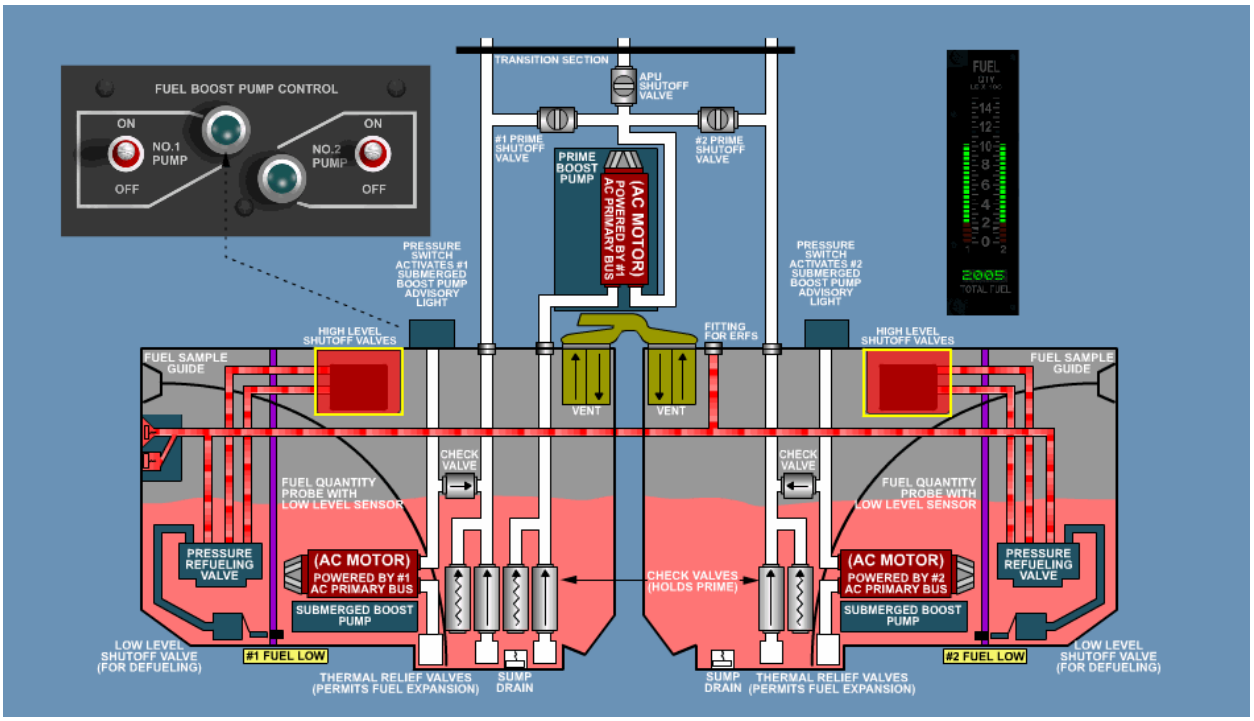
Frame #0115 (High Level Shutoff Valves)



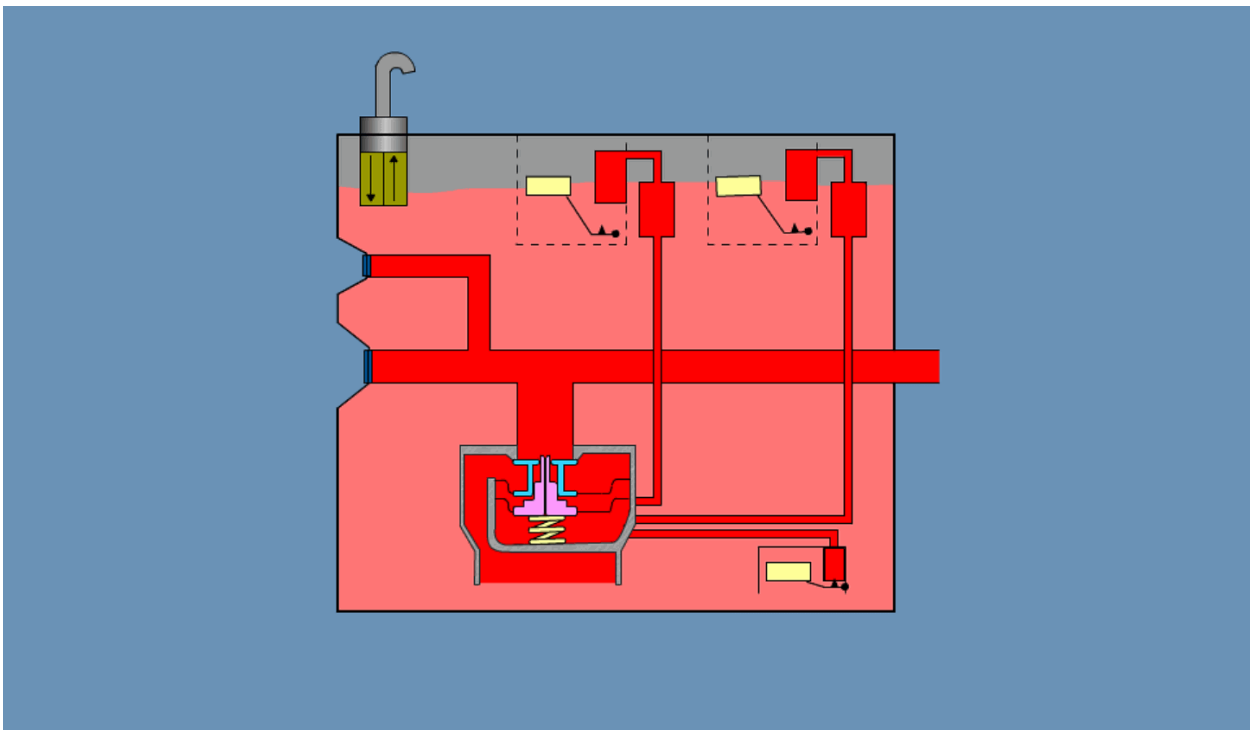
(1) There are two high-level shutoff valves in each fuel cell.

(2) Each shutoff valve acts as a backup for the other one.

Frame #0117 (High Level Shutoff Valves FLASH)



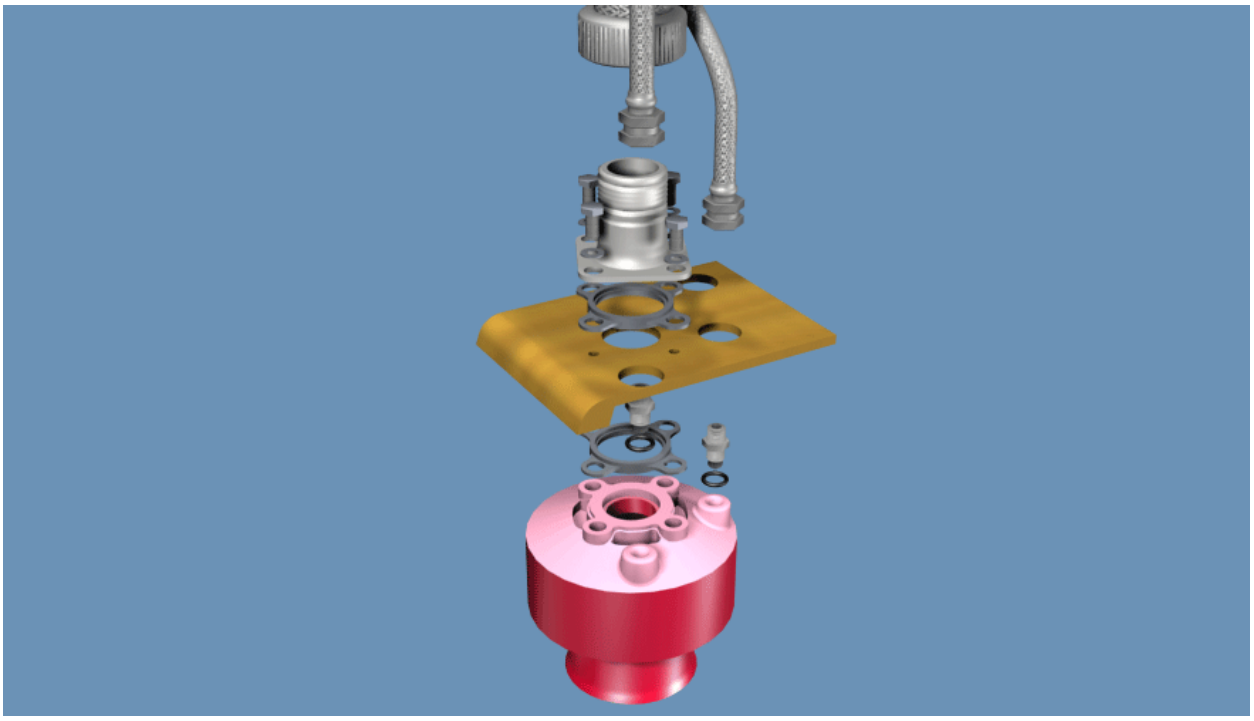
Frame #0117 (High Level Shutoff Valves FLASH)



(3) The high level shutoff valves in each cell closes the pressure refuel/defuel valve in the cell when the cell is full.

i. Pressure Refuel/Defuel Valves

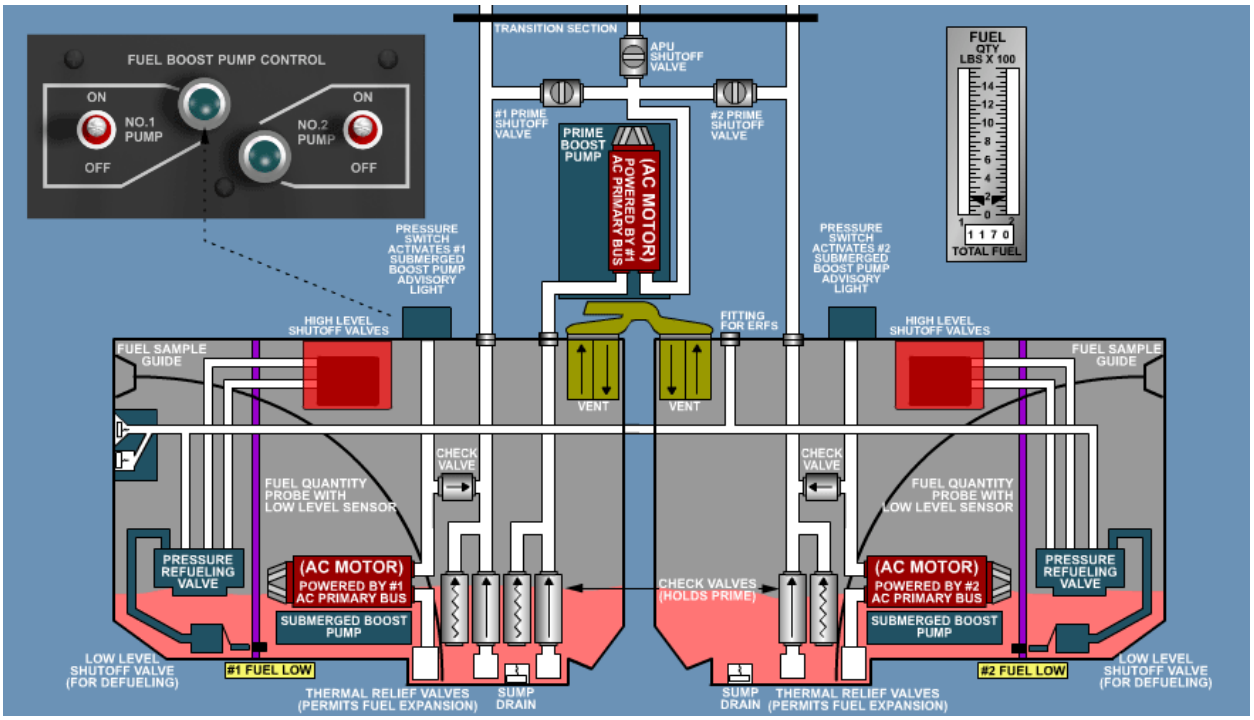
Frame #0120 (Pressure Refuel/Defuel Valves)



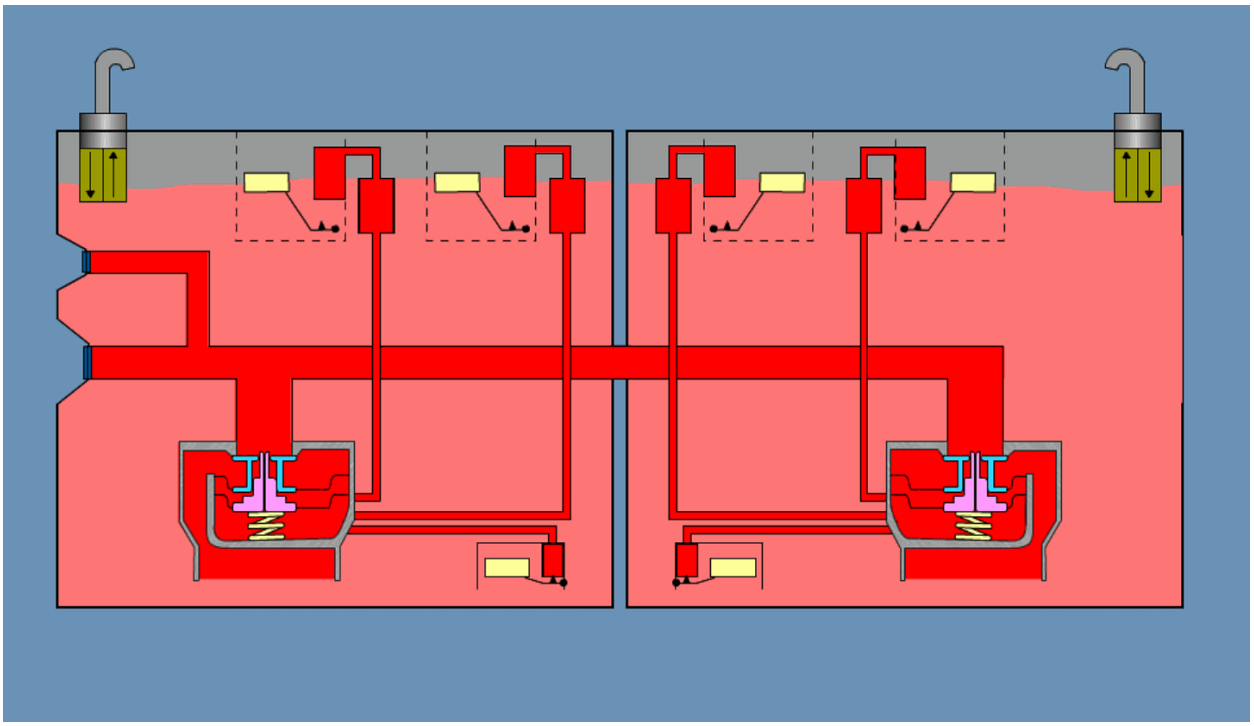
(1) There is one pressure refuel/defuel valve in each fuel cell.

(2) When a high level shutoff valve or a low level shutoff valve closes, a back pressure is created, causing the refuel/defuel valves to close.

Frame #0122 (Pressure Refuel/Defuel Valves FLASH)



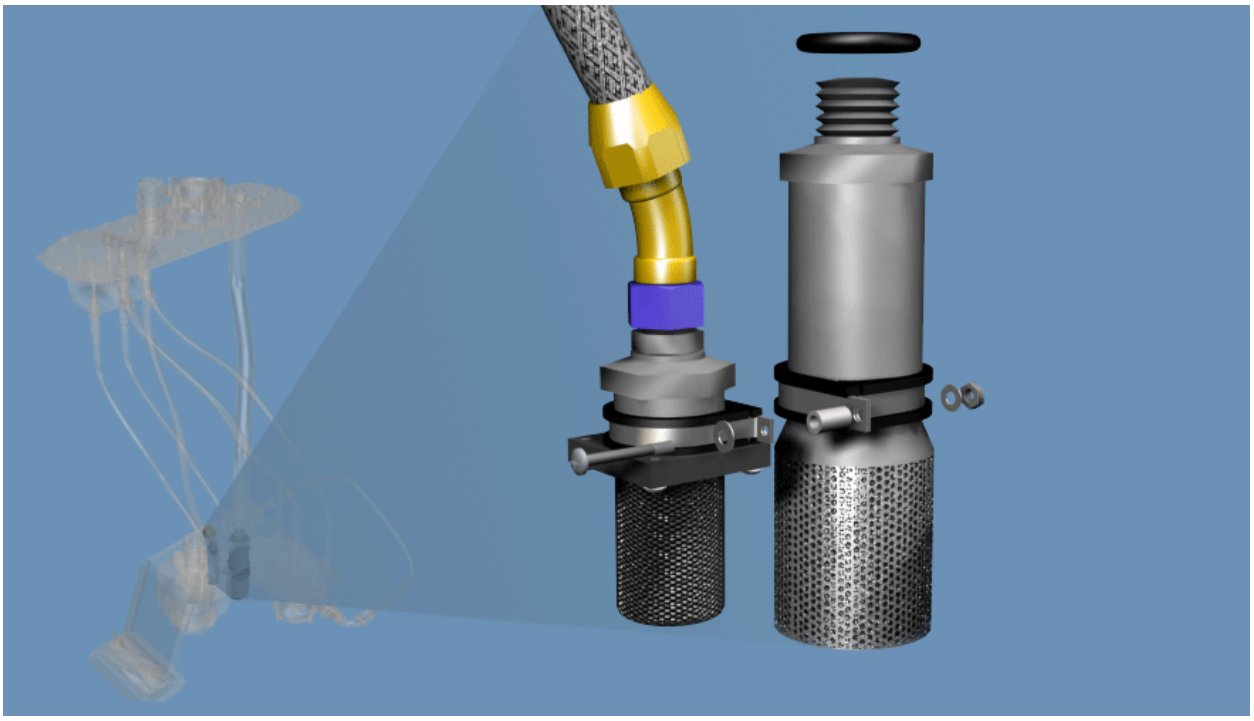
Frame #0122 (Pressure Refuel/Defuel Valves FLASH)



(3) When the refuel/defuel valves close, fuel flow is stopped at the fuel nozzle.

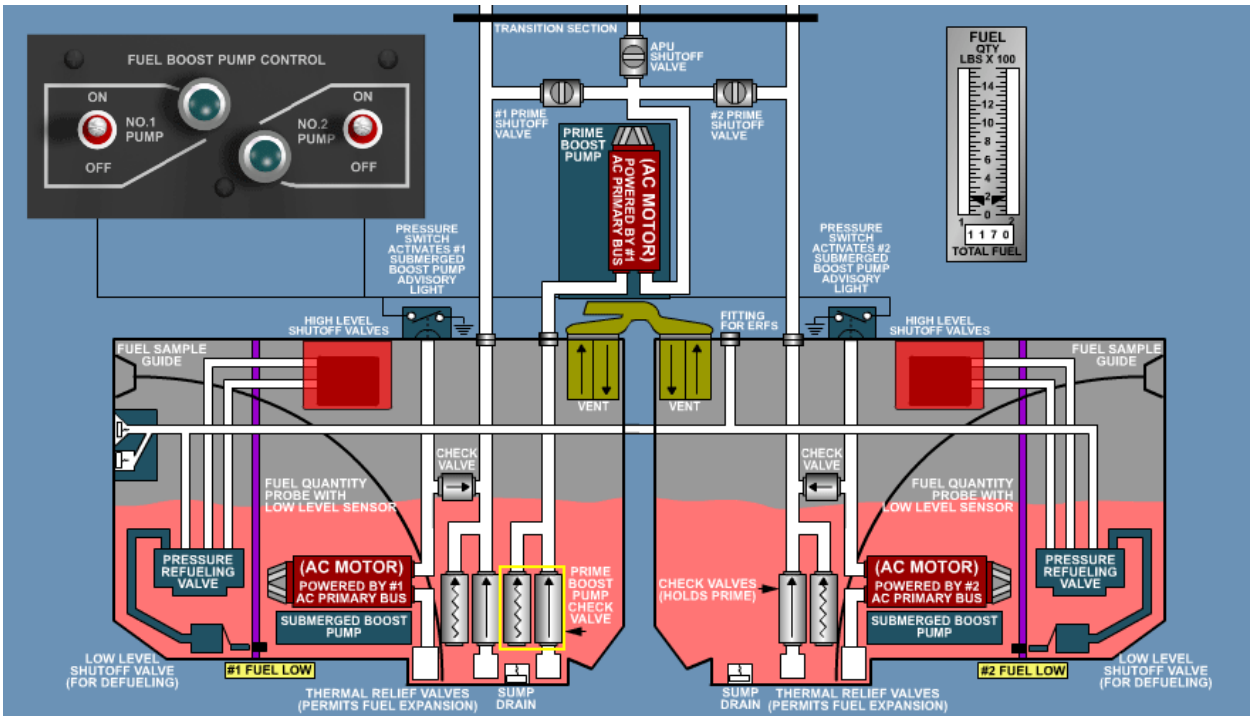
j. Prime Boost Pump and Main Fuel Line Check Valves

Frame #0125 (Prime Boost Pump and Main Fuel Line Check Valves)



(1) The prime boost pump check valve and the main fuel line check valves are one-way check valves.

Frame #0127 (Prime Boost Pump Check Valves FLASH)



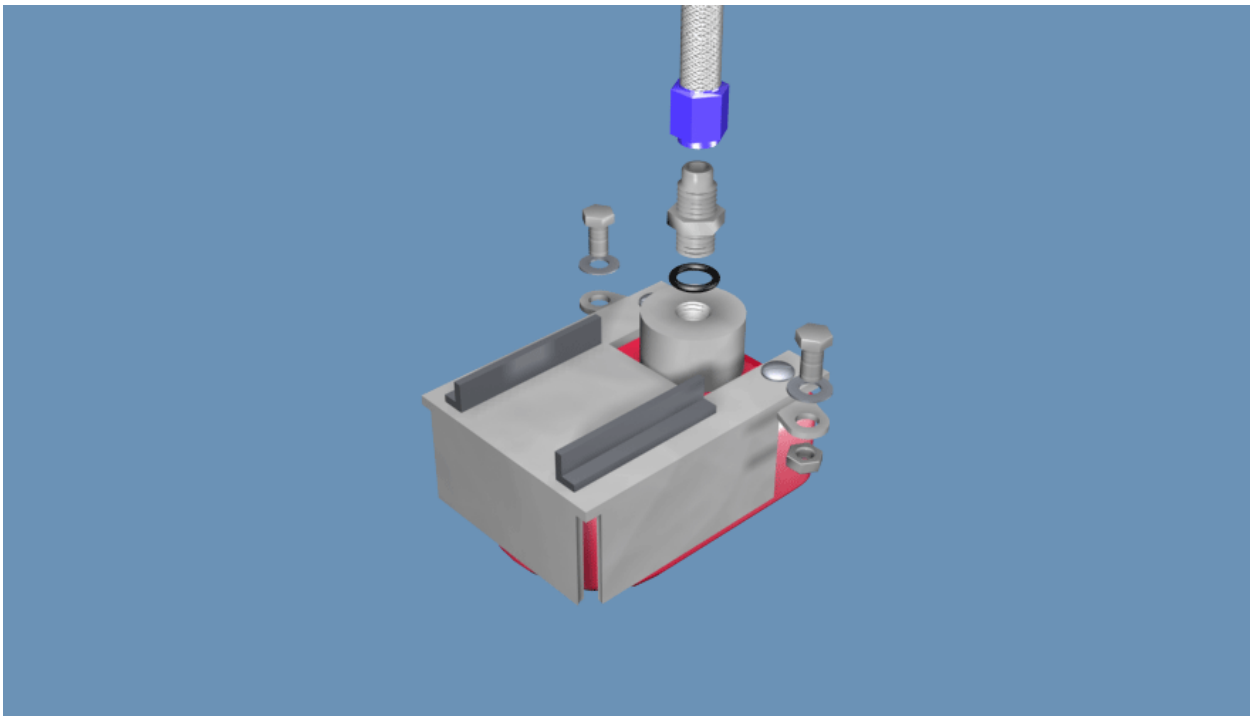
(2) The prime boost pump and main fuel line check valves do not allow air to enter the fuel lines.

(3) They also prevent loss of engine fuel prime, and prevent recirculation during fuel boost operation.

(4) The prime boost pump check valve is installed in the No. 1 fuel cell only.

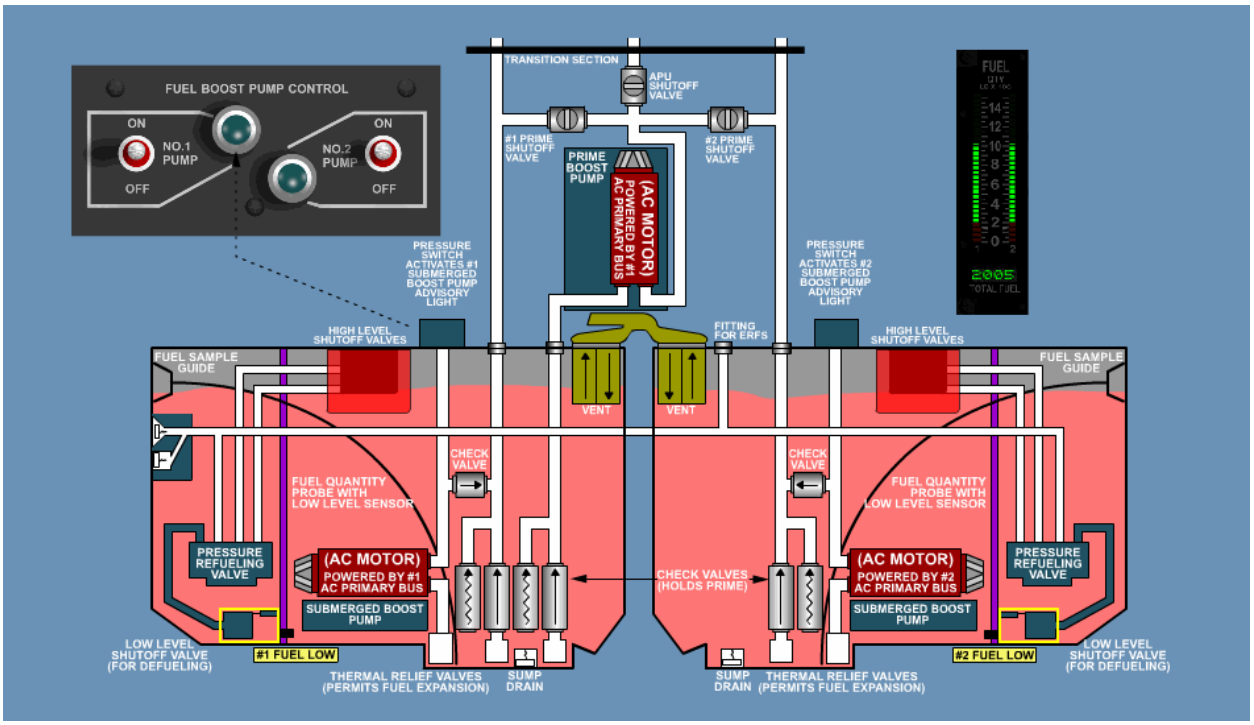
k. Low Level Shutoff Valves

Frame #0130 (Low Level Shutoff Valves)

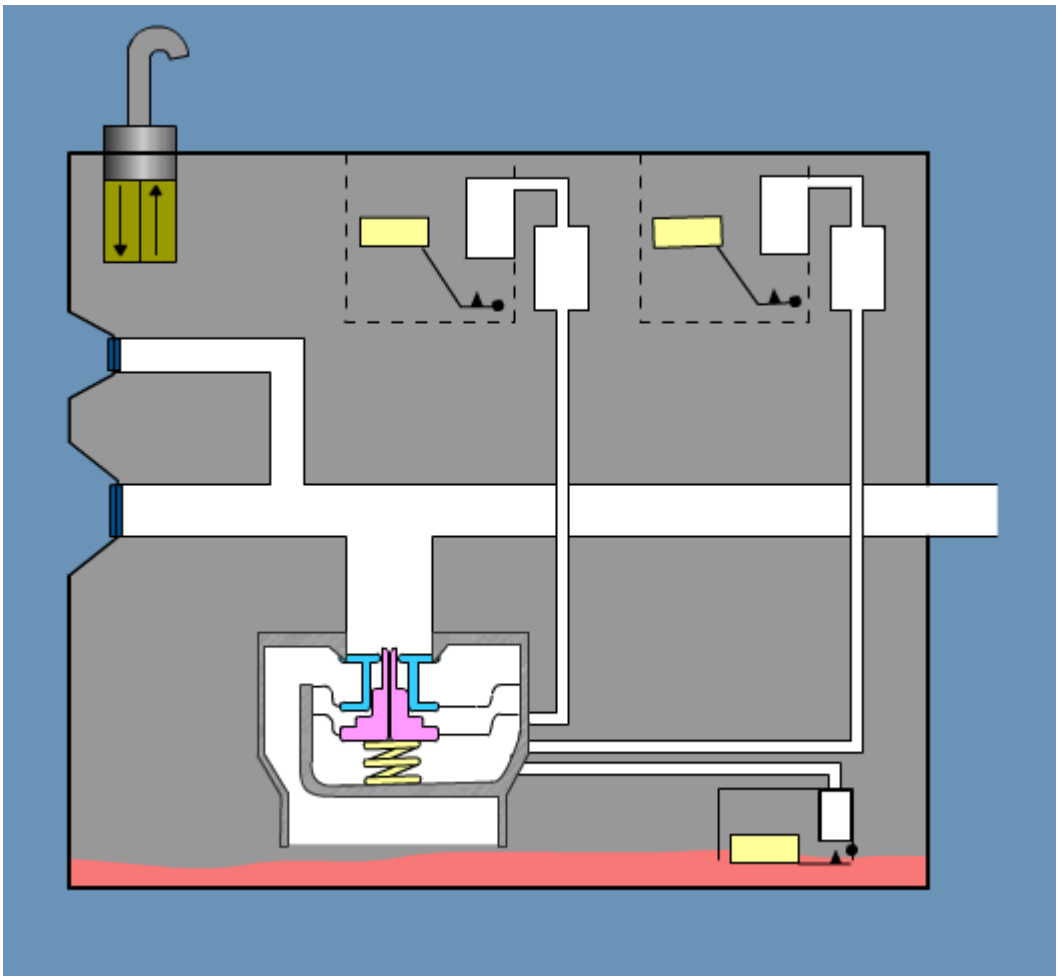


(1) There is a low level shutoff valve in each fuel cell.

Frame #0132 (Low Level Shutoff Valves FLASH)



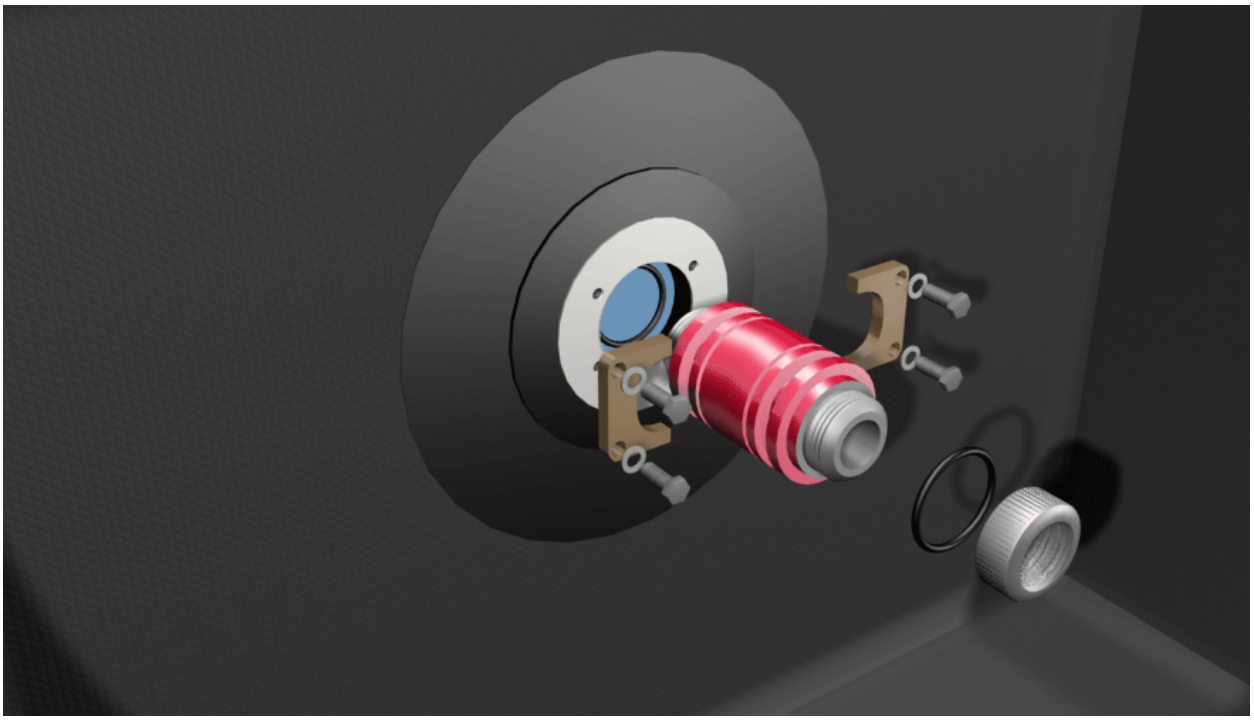
Frame #0132 (Low Level Shutoff Valve)



(2) During pressure defueling, the low-level shutoff valves close the pressure refuel/defuel valves, by creating back pressure, when the cell is empty.

l. Interconnect Tube and Breakaway Valve

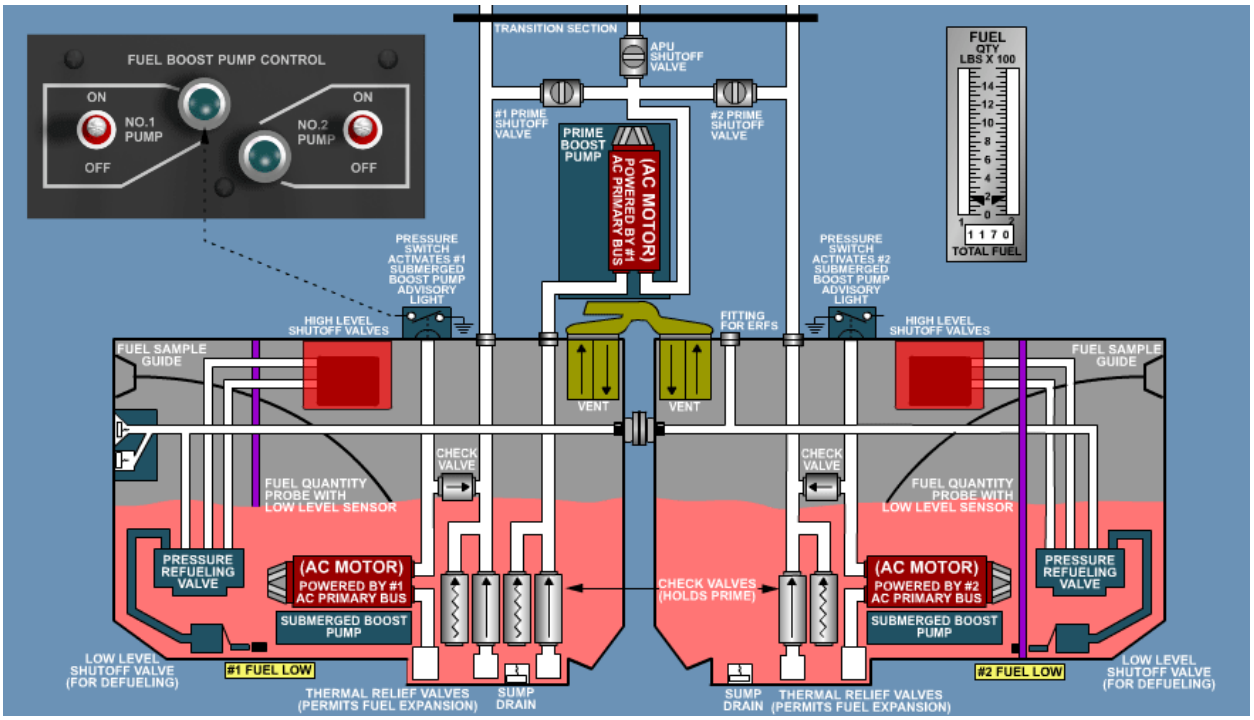
Frame #0135 (Interconnect Breakaway Tube and Breakaway Valve)



(1) The fuel cell interconnect breakaway valve is located between the fuel cells and connects the two fuel cells.

(2) The valve allows fuel to be transferred between the two cells.

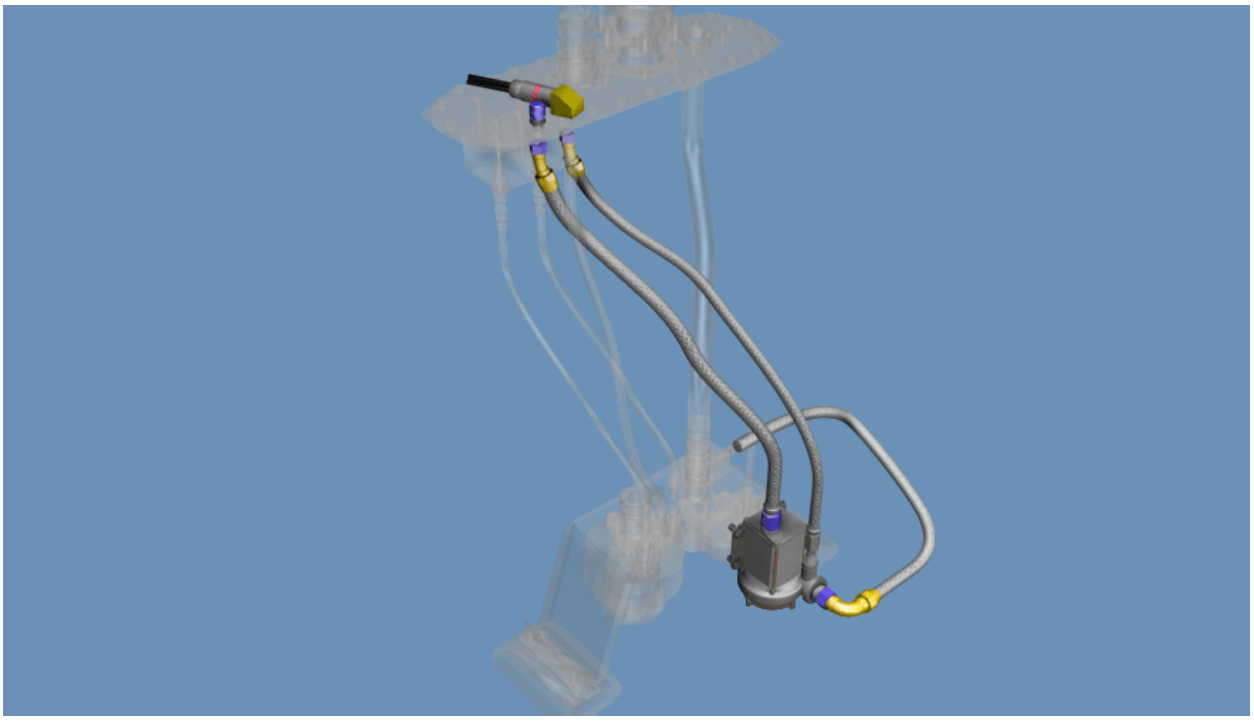
Frame #0137 (Fuel Cell Interconnect Breakaway Valves FLASH)



(3) The breakaway valve will close if either cell shifts or in the event of a crash.

m. Fuel Boost Pumps

Frame #0140 (Fuel Boost Pumps)



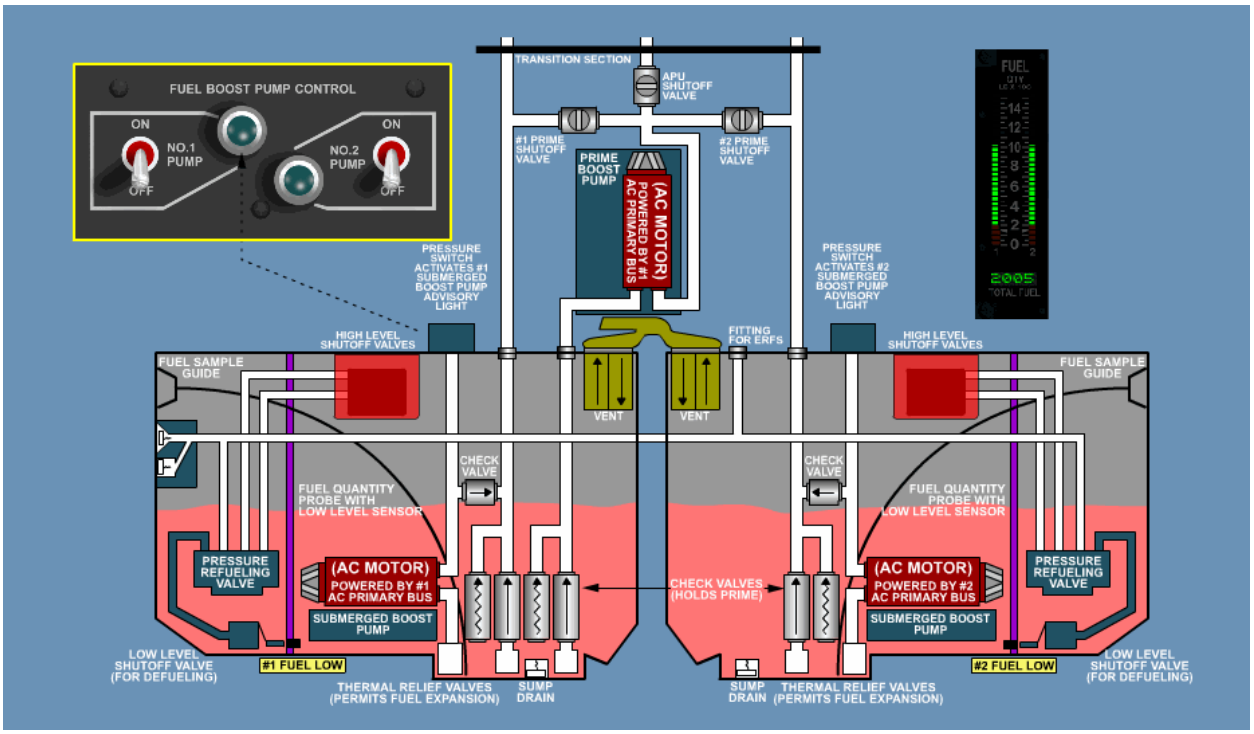
(1) Each fuel cell contains an electrically operated submerged fuel boost pump.

(2) The fuel boost pump provides pressurized fuel to the engine fuel inlet port.

(3) Each boost pump operates on 3 phase, AC, 115 volts at 25 psi outlet pressure.

(4) The No. 1 pump receives power from the NO. 1 AC PRI BUS, the No. 2 pump receives power from the NO. 2 AC PRI BUS.

Frame #0142 (Fuel Boost Pumps FLASH)

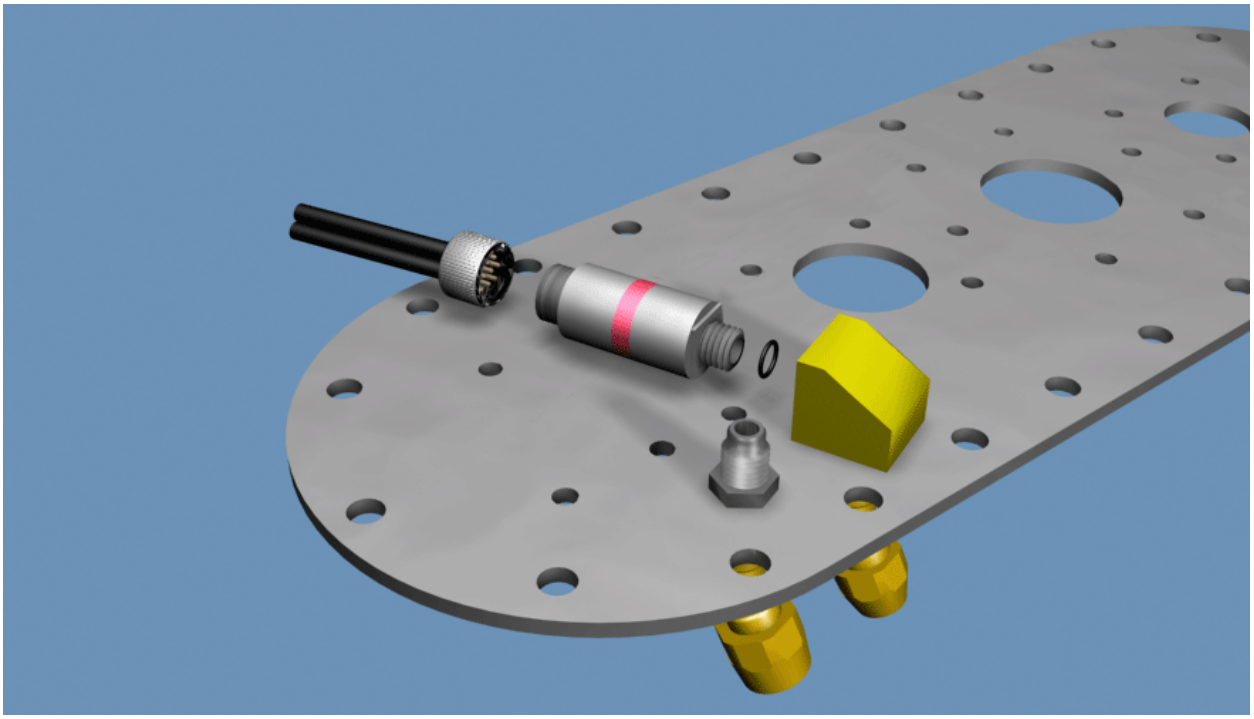


(5) Each boost pump is controlled by a two-position switch on the FUEL BOOST PUMP CONTROL panel; the switches are marked ON and OFF.

(6) An advisory light near each control switch on the panel indicates pump pressure and operation.

n. Fuel Boost Pump Pressure Switch

Frame #0145 (Fuel Boost Pump Pressure Switch)



(1) There is one pressure switch for each fuel boost pump located on top of the fuel tank.

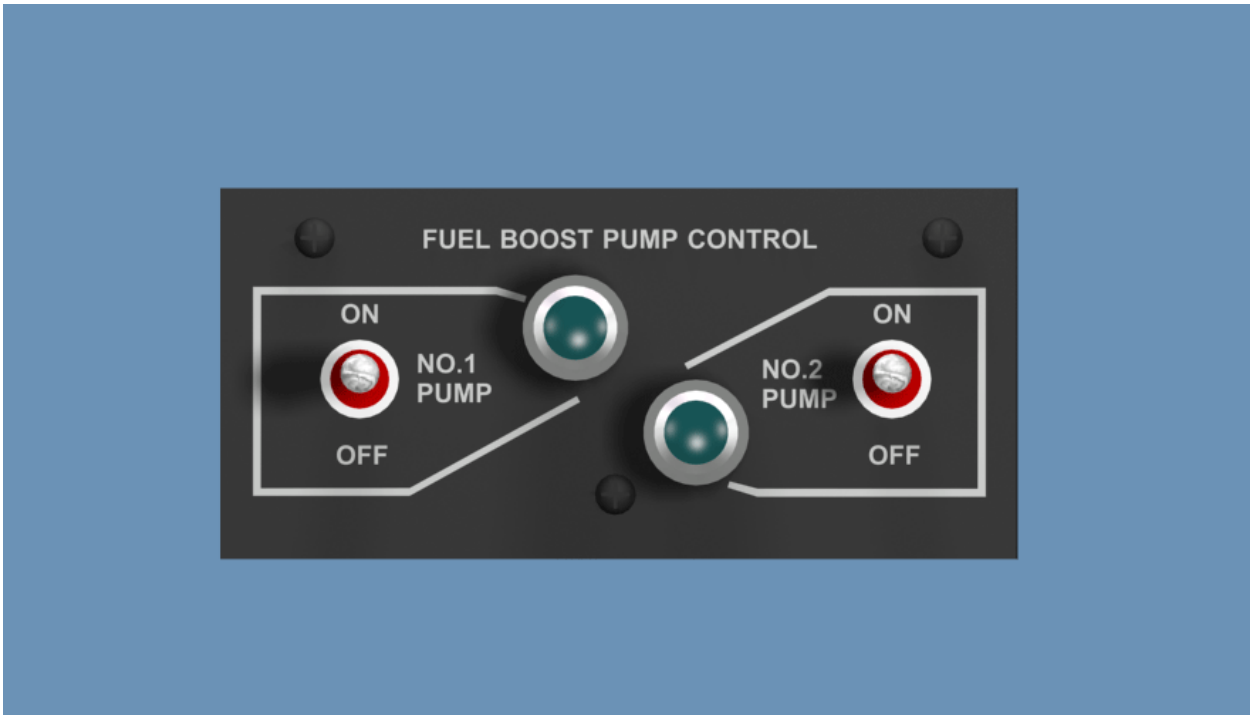
(2) The pressure switch operates at 16 psi.

(3) The boost pump light activation on the FUEL BOOST PUMP CONTROL panel, is controlled by fuel boost pump pressure.

(4) Lights on the FUEL BOOST PUMP CONTROL panel indicates the pump is running.

o. Fuel Boost Pump Control Panel

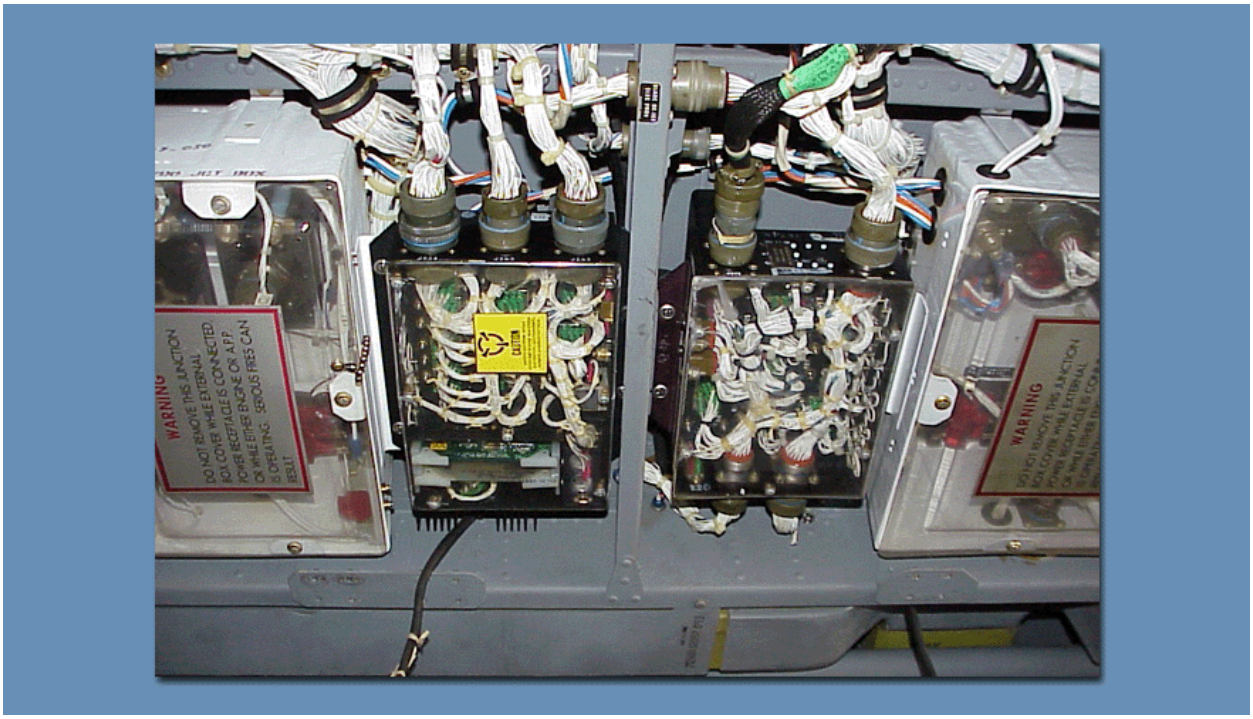
Frame #0150 (Fuel Boost Pump Control Panel)



(1) The NO. 1 PUMP and NO. 2 PUMP toggle switches control the fuel boost pumps.

(2) The corresponding indicators illuminate, when the pumps are turned on, to indicate adequate pressure at the respective pump outlet.

Frame #0150 (Left Hand Relay Panel)



(3) The control panel receives power through the K40 relay, in the left hand relay panel.

(4) K40 turns on lights on the caution panel.

(5) Power to turn on boost pump #1 and #2 are from the #1 AC Primary Bus and #2 Primary Bus.

p. Fuel Quantity Probe

Frame #0155 (Fuel Quantity Probe)

(1) The fuel quantity probe is part of the fuel quantity indicating system.

(2) The fuel quantity indicating system visually indicates the amount of fuel, in pounds, in each cell, and the total fuel remaining in both cells.

(3) There is one fuel quantity probe in each cell and each is interchangeable.

(4) The probes are mounted on the bottom of the modular panels, but do not touch the bottom of the fuel cell.

(5) The fuel quantity probe sends a signal to the fuel quantity signal conditioner, where it is converted to a "pound" reading.

(6) The bottom of the probe has thermistor beads that are used for the low fuel level warning system.

Frame #0155 (Fuel Quantity Probe 2)

(7) The fuel quantity probe construction is a tube within a tube.

(8) The inside tube is insulated at the top and bottom.

(9) The inner tube is tapered from the top to the bottom.

(10) The top (blue) wire is connected to the inside tube, and the bottom (red) is connected to the outside tube.

(11) The fuel quantity probe measures capacitance.

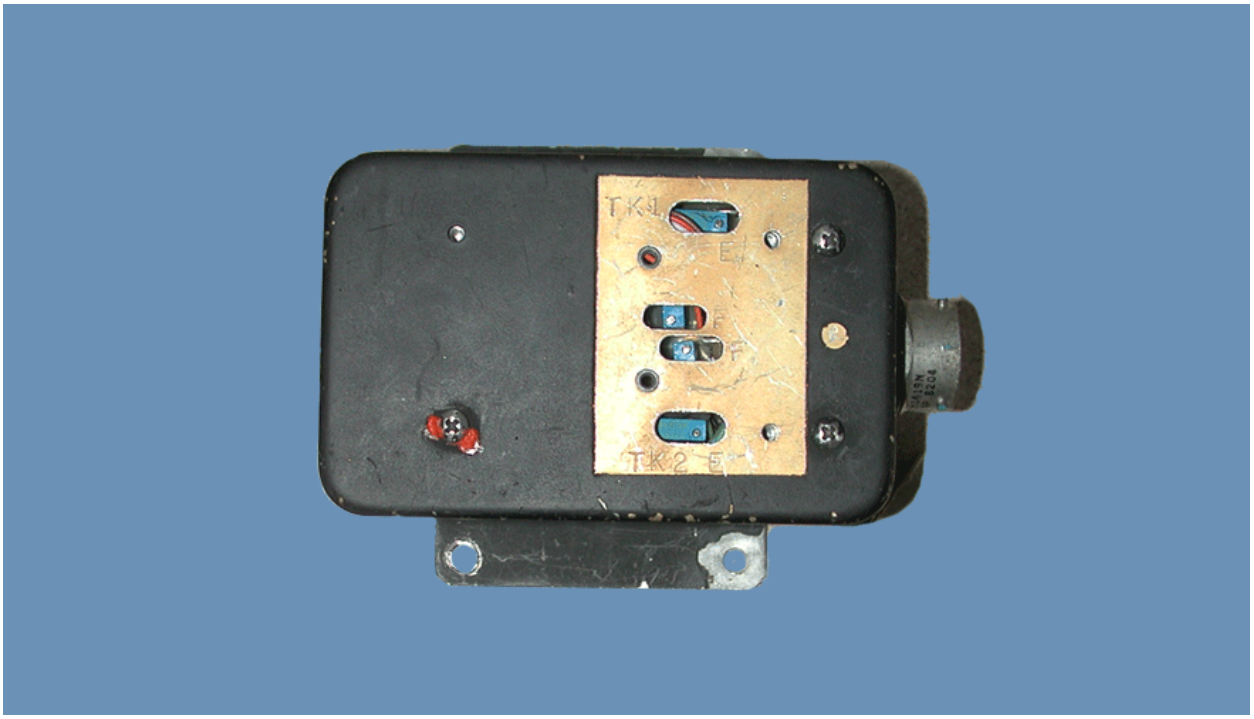
q. Fuel Quantity Signal Conditioner

Frame #0160 (Fuel Quantity Signal Conditioner)

(1) The fuel quantity signal conditioner is located on the right side, above the crew chief/gunner seat.

(2) The fuel probe sends a signal to the signal conditioner that is then processed and sent to the CDU.

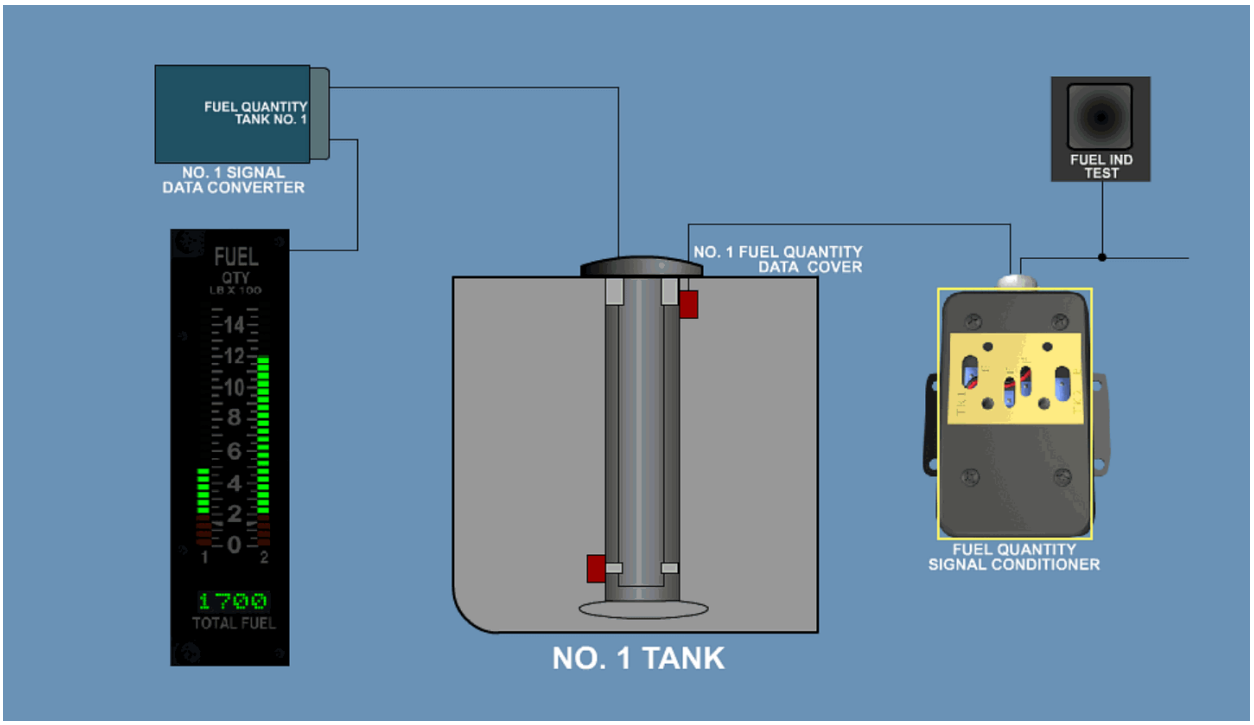
Frame #0160 (Fuel Quantity Signal Conditioner Uninstalled)



(3) The signal conditioner has four adjustment screws, two for each cell (full and empty).

(4) They are marked: TK1 "E" & "F" (tank #1 empty or full), and TK2 "E" & "F" (tank #2 empty or full).

Frame #0161 (Fuel Quantity Signal Conditioner adjustment)



(5) When adjustments are made to the signal conditioner, the fuel cells must be either empty or full.

(6) When performing adjustments on an empty cell, it should read 0-50 on the vertical indicator.

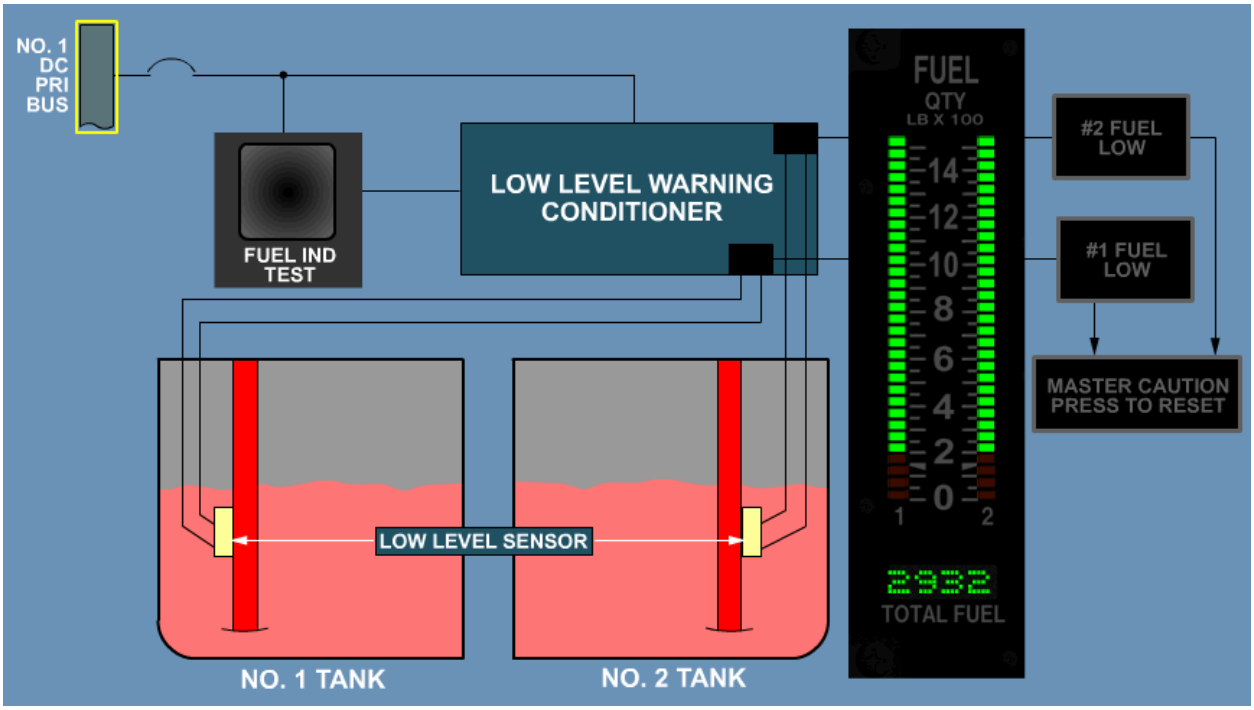
(7) When performing adjustments on a full cell, it should read 1150-1200 on the vertical indicator.

(8) The two methods of adjusting the fuel quantity system are wet and dry, with dry as the preferred method.

(9) The adjustment is done with No. 1 cell empty, then full. Then No. 2 cell empty, then full.

r. Low Level Sensor

Frame #0165 (Low Level Sensor FLASH)



(1) Power for the fuel low level warning system is supplied by the No. 1 dc primary bus.

(2) The fuel low level indicator test circuit sends a signal through the low level warning conditioner, to the #1 and #2 FUEL LOW caution lights, and the MASTER CAUTION light, causing the lights to illuminate.

(3) The fuel quantity system can be checked by pressing the FUEL IND TEST push-button on the miscellaneous switch panel, which will cause both vertical scales of the FUEL QTY indicator and the digital readouts to change, and the #1 and #2 FUEL LOW caution lights to flash.

(4) There is a low level sensor on each fuel quantity probe called a Thermistor.

(5) When the thermistor beads are wet, the sensor signal voltage to the low level warning conditioner is high.

(6) A high signal causes the low level warning conditioner to open the voltage supply path to the #1 FUEL LOW and the #2 FUEL LOW caution lights.

(7) When the thermistor beads are dry, the sensor signal to the low level warning conditioner is low.

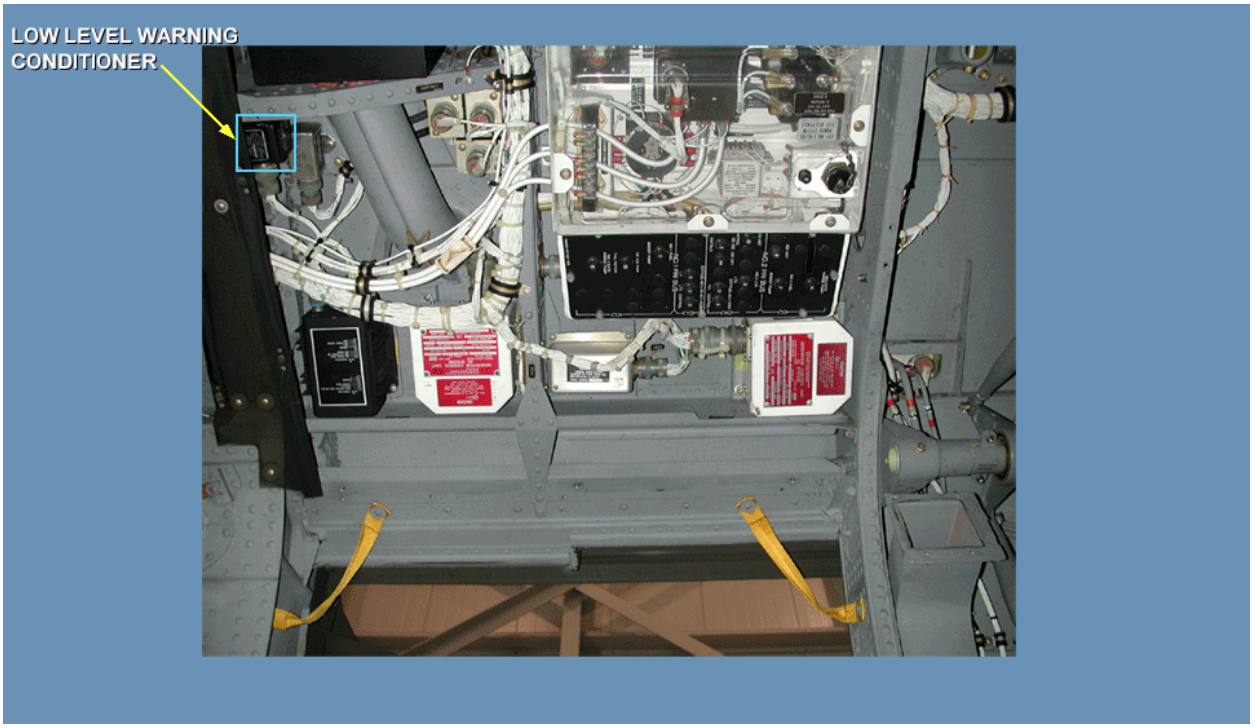
(8) A low sensor level causes the low level warning conditioner to close the voltage supply path.

(9) The FUEL LOW WARN circuit breaker is then supplied through the low level warning conditioner, causing the #1 FUEL LOW or #2 FUEL LOW caution light to illuminate.

(10) Each light will flash when about 172 pounds of fuel remain in the cells.

s. Low Level Warning Conditioner

Frame #0170 (Low Level Warning Conditioner)

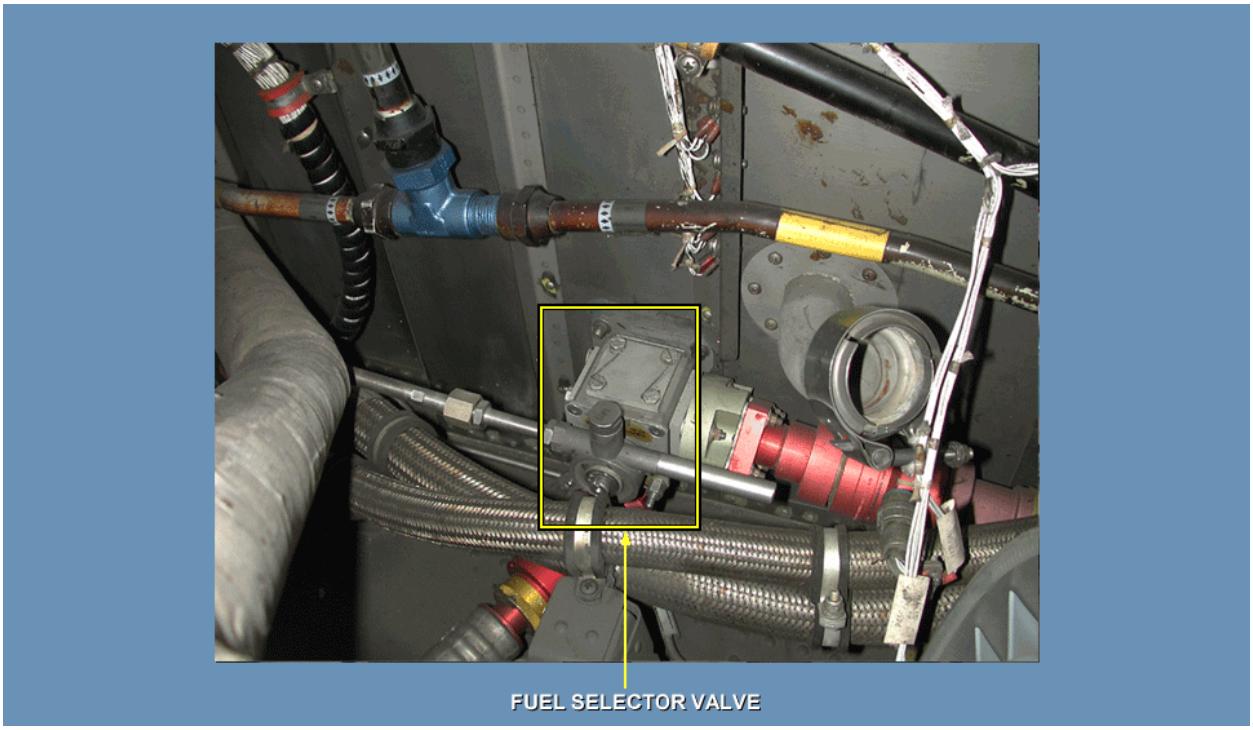


(1) The low level warning conditioner is located on the left side above the crew chief and is not adjustable.

(2) The warning conditioner processes a signal on to the caution/advisory panel.

t. Fuel Selector Valves

Frame #0175 (Fuel Selector Valves)

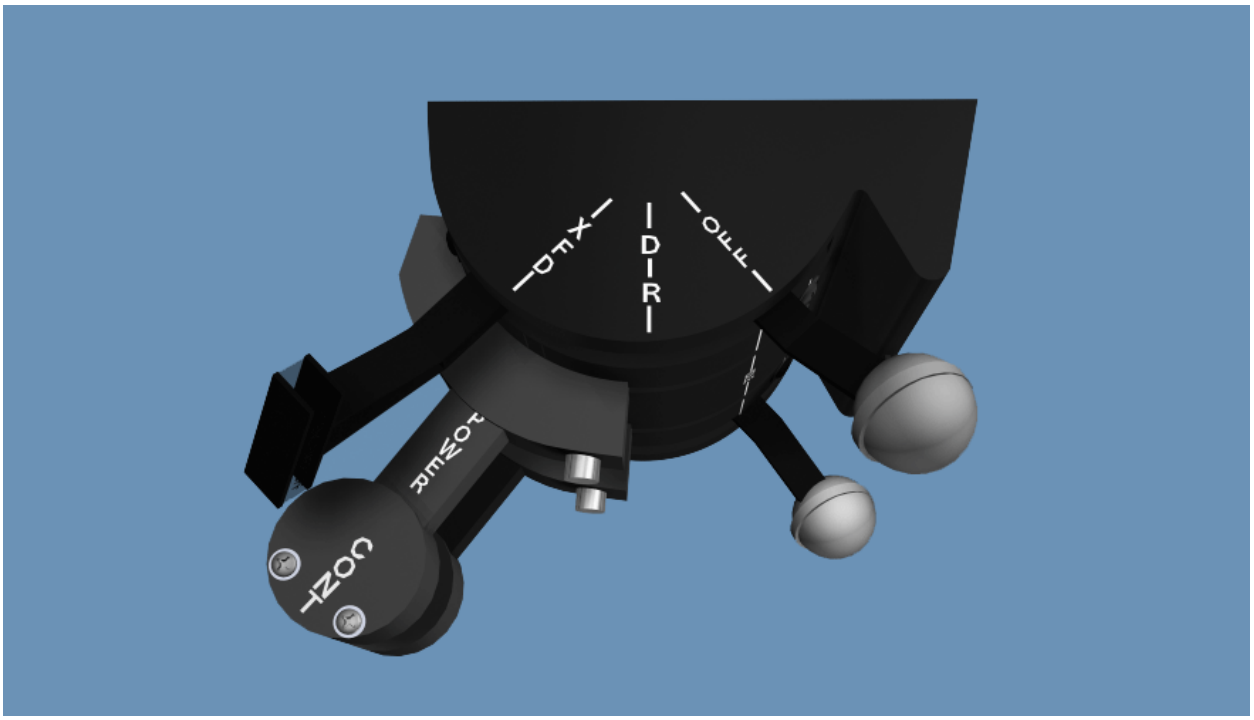


(1) There is a fuel selector valve for each engine.

(2) The fuel selector valve is connected to the fuel selector lever on the engine control quadrant by push/pull cables.

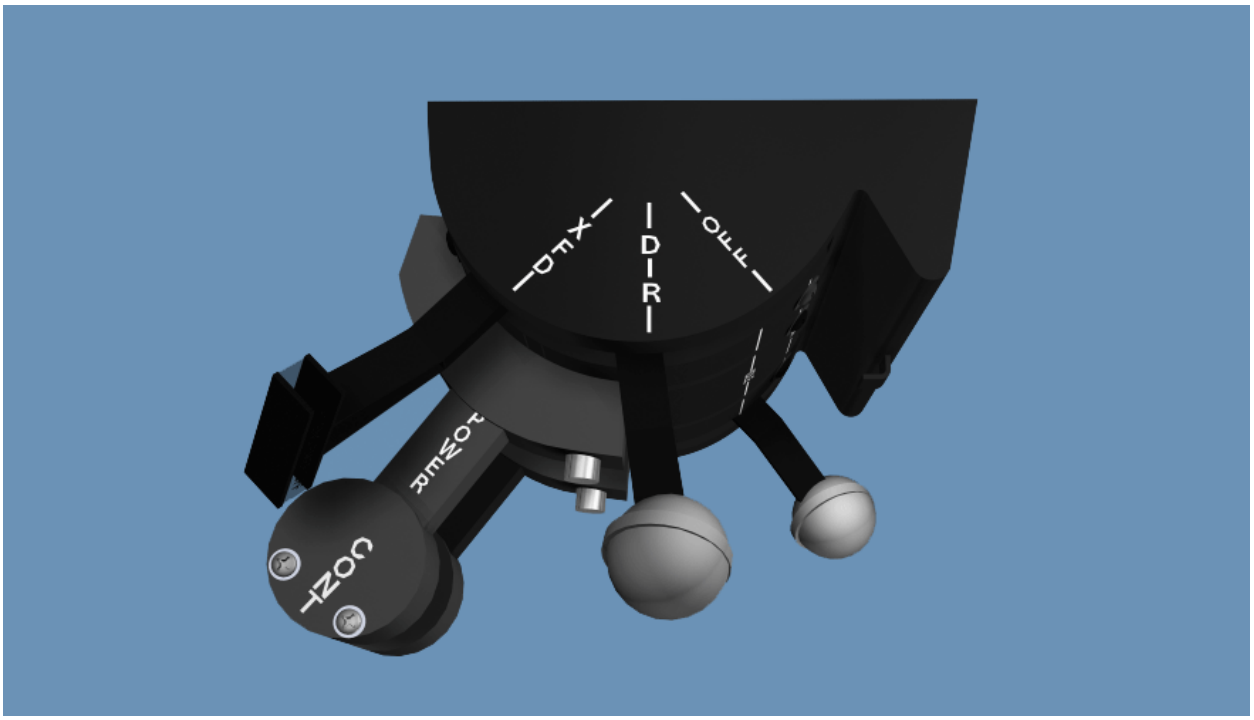
(3) The fuel detent felt in the fuel selector lever is physically located in the Fuel Selector Control Box and is connected to selector push pull cable.

Frame #0176 (Fuel Selector Lever OFF)

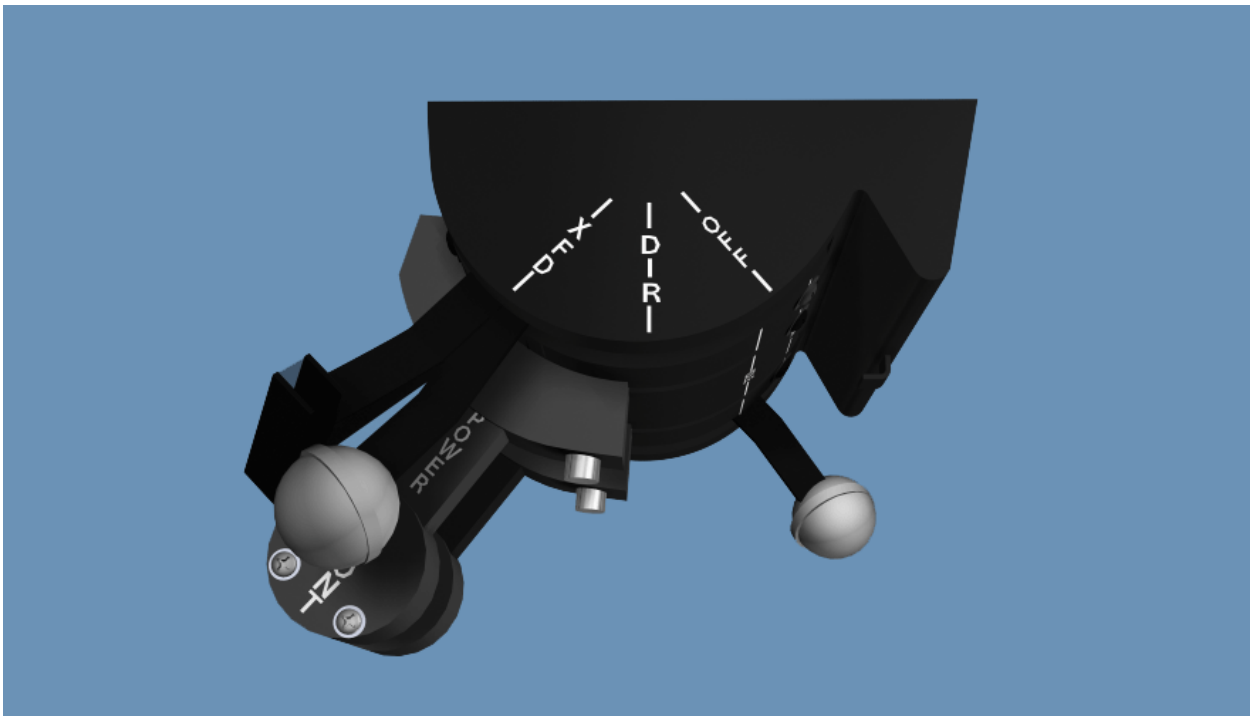


(4) There are three fuel selector lever positions on the quadrant: OFF, DIRECT, and XFD (cross feed).

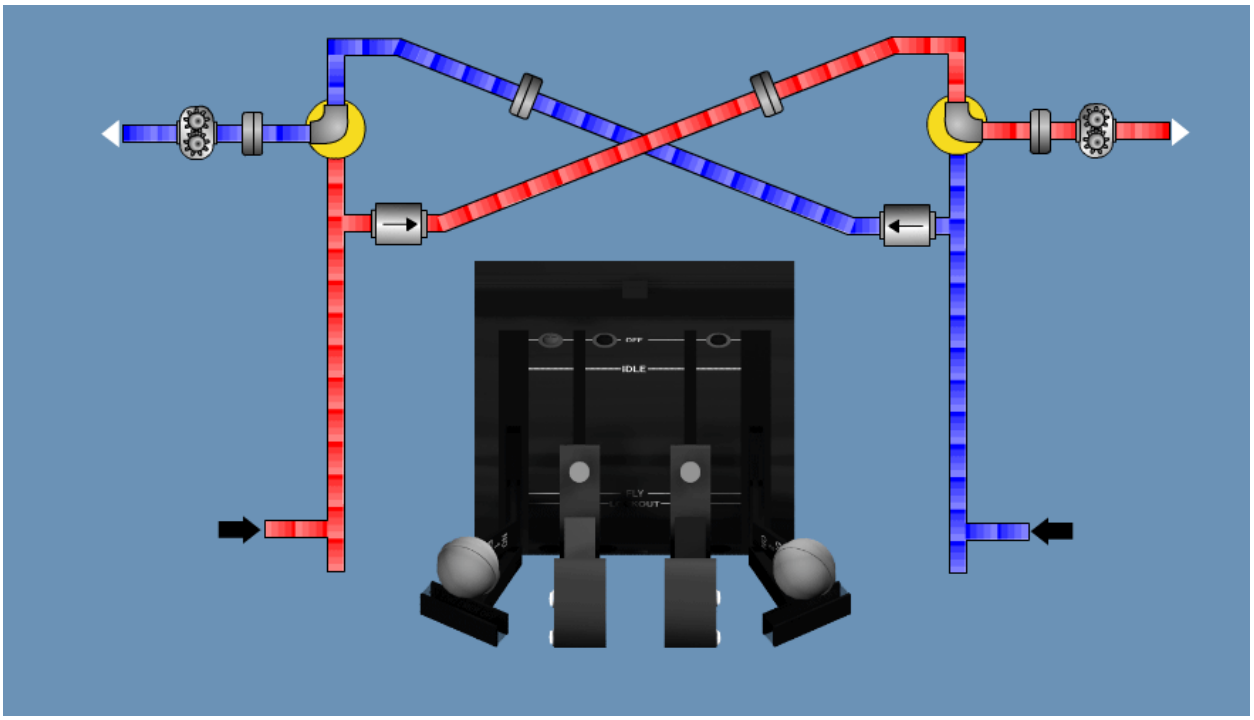
Frame #0177 (Fuel Selector Lever Direct)



Frame #0177 (Fuel Selector Lever XFD)



Frame #0178 (Fuel Selector Valves Flow)



(5) When the selector lever is OFF, the selector valves are closed.

(6) When the selector lever is in DIRECT, fuel from the No. 1 cell supplies the No. 1 engine and fuel from the No. 2 cell supplies the No. 2 engine.

(7) When the selector lever is in XFD, fuel from either cell can supply both engines, or fuel from either cell can supply the opposite engine.

CHECK ON LEARNING

1. The vent valves prevents fuel spillage from the main fuel cells if the helicopter?

2. The #1 FUEL LOW and #2 FUEL LOW caution lights will flash when there is approximately how much fuel left in each cell?

3. Power is supplied to the low level warning system by the_____.

SECTION IV. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the UH-60 Fuel System internal and external components topic. The main internal/external components of the Fuel System are:

- There are two engine prime shutoff valves, one for each engine. When the starter speed switch drops out, the prime shutoff valve closes and turns off the prime boost pump.
- The vent system allows air to enter and exit the main fuel cells through the vent valves. The vent system also prevents fuel spillage if the aircraft banks or rolls excessively.
- There are two main fuel breakaway valves, one for each cell. These valves prevent loss of fuel if the valves break away from the fuel lines.
- The prime boost pump and outlet valve is automatically activated by the engine start system, and primes each engine fuel lines and the APU. Fuel to the valve comes from the No. 1 fuel cell.
- The APU fuel shutoff valve is a one way check valve that keeps the APU fuel line primed. The valve also shuts off fuel to the APU in case of fire.
- There are two high-level shutoff valves in each cell. Each shutoff valve acts as a backup for the other one. The high-level shutoff valves in each cell closes the pressure refuel/defuel valve in the cell when the cell is full.
- There is one pressure refuel/defuel valve in each cell. When the high-level shutoff valves close, a back pressure is created, causing the refuel/defuel valves to close.
- The prime boost pump and main fuel line check valves are one-way check valves. The valves do not allow air to enter the fuel lines. The valves prevent loss of engine fuel prime, and recirculation during fuel boost operation. The prime boost pump check valve is installed in the No. 1 fuel cell only.
- During pressure defueling, the low level shutoff valves close the pressure refuel/defuel valves, by creating a back pressure, when the cell is empty.
- The fuel cell interconnect tube and breakaway valve is located between the fuel cells and connects the two fuel cells. The valve allows fuel to be transferred between the two cells. The breakaway valve will close if either cell shifts or in the event of a crash.
- Each cell contains an electrically-operated submerged fuel boost pump. The fuel boost pumps provide pressurized fuel to the engine(s) fuel inlet port.
- There is one fuel boost pump pressure switch for each boost pump. Lights on the FUEL BOOST PUMP CONTROL panel indicates the pump is running.
- The NO. 1 PUMP and NO. 2 PUMP toggle switches control the fuel boost pumps. The corresponding indicators illuminate, when the pumps are turned on, to indicate adequate pressure at the respective pump outlet.
- The fuel quantity probe is part of the fuel quantity indicating system. The fuel quantity indicating system visually indicates the amount of fuel, in pounds, in each cell, and the total remaining in both cells. There is one fuel quantity probe in each cell and each is interchangeable.
- The fuel probe sends a signal to the fuel quantity signal conditioner, that is then processed and sent to the CDU. The signal conditioner has four adjustment screws, two for each cell (full or empty).
- Power for the fuel low level warning system is supplied by the No. 1 primary dc bus.
- The fuel low level indicator test circuit sends a signal through the low level warning conditioner, to the #1 and #2 FUEL LOW caution lights, and the MASTER CAUTION light, causing the lights to illuminate.

- There is a fuel selector valve for each engine. The fuel selector valve is connected to the fuel selector lever on the engine control quadrant by push/pull cables. There are three fuel selector lever positions on the quadrant: OFF, DIRECT, and XFD (cross feed).

D. ENABLING LEARNING OBJECTIVE No. 4

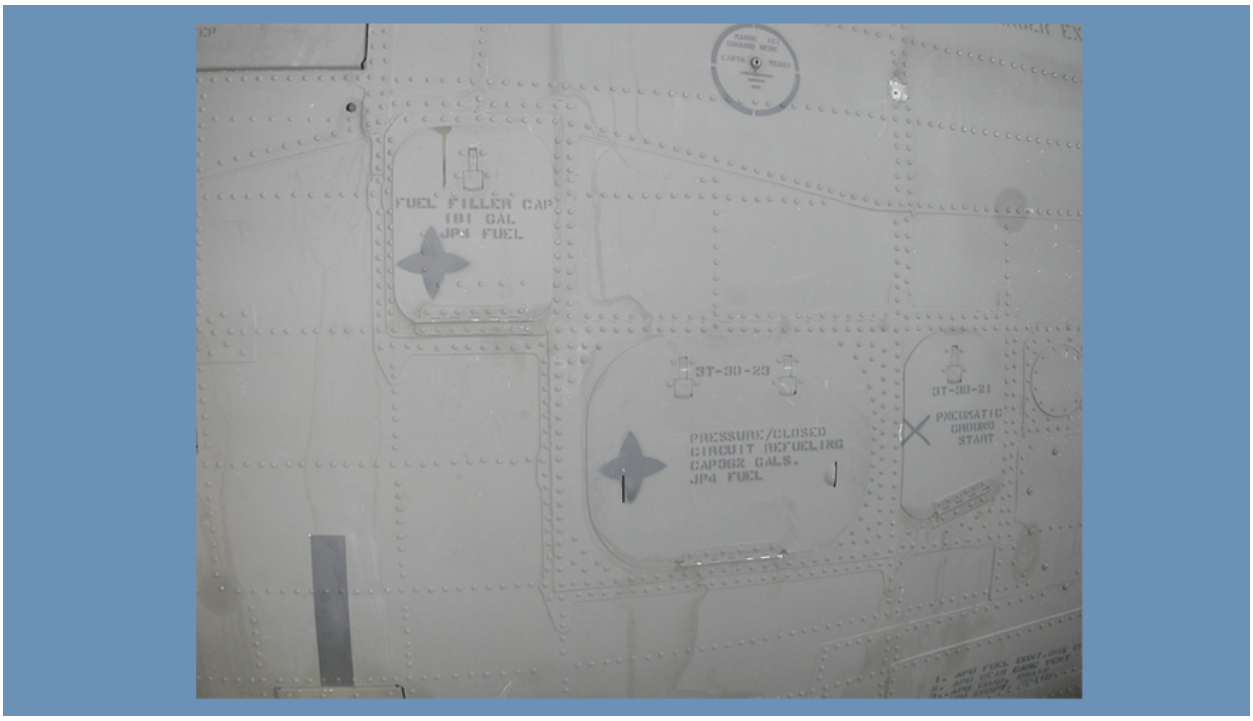
ACTION: Identify the methods of refueling and defueling the UH-60.

CONDITIONS: Using TM 1-1520-240-23-5

STANDARD: IAW UH-60 TM 1-1520-237-23-5

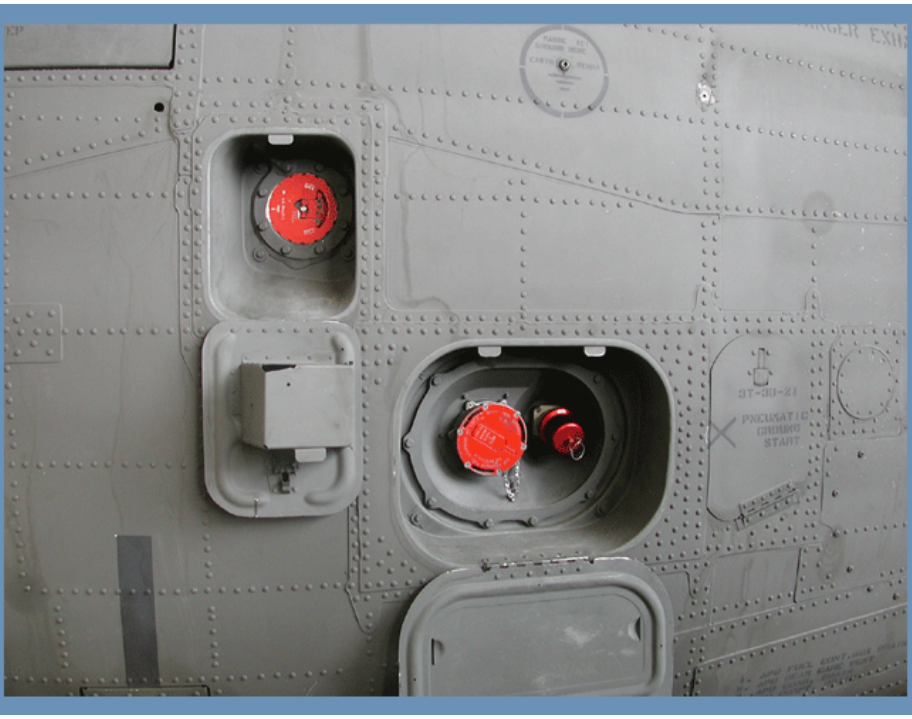
a. Pressure Refuel

Frame #0200 (Pressure Refuel Location)



(1) Pressure refueling of the helicopter is accomplished through a single point on the No. 1 side of the aircraft.

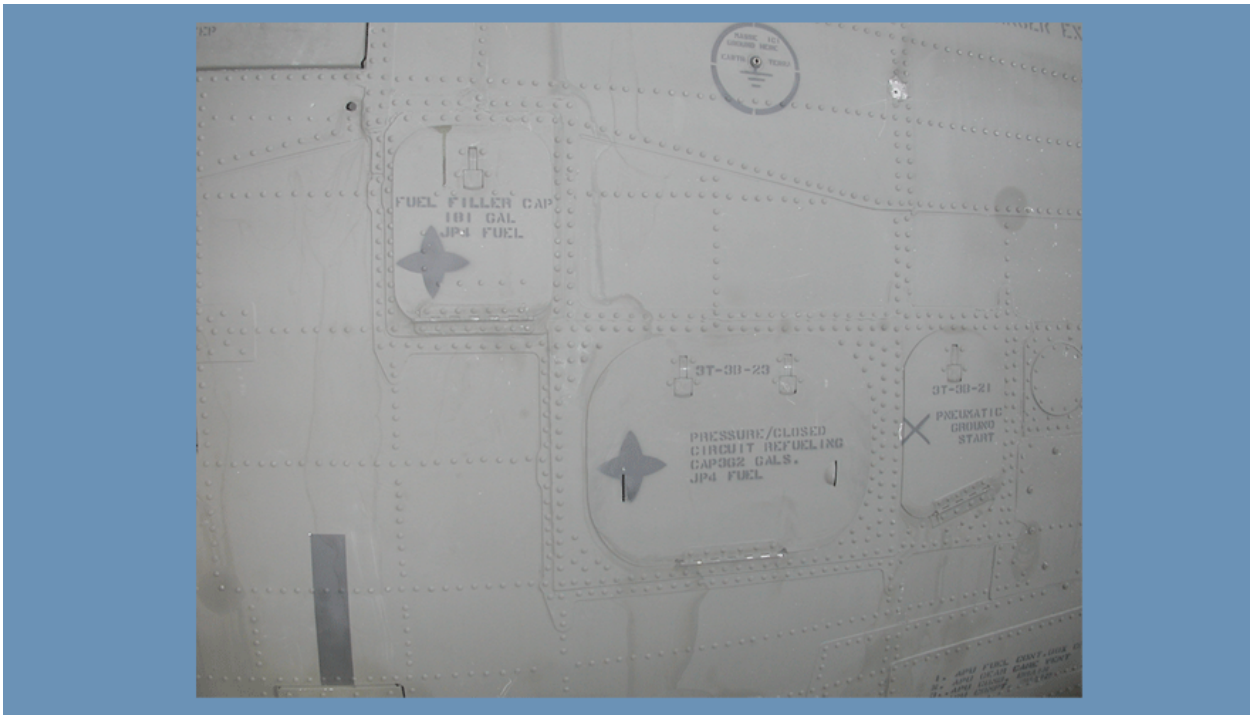
Frame #0200 (Pressure Refuel)



(2) When using the single-point pressure refueling method, the fuel cell's usable capacity is 180.5 gallons. Maximum fuel pressure from the service vehicle is 55 psi, at 300 gallons per minute.

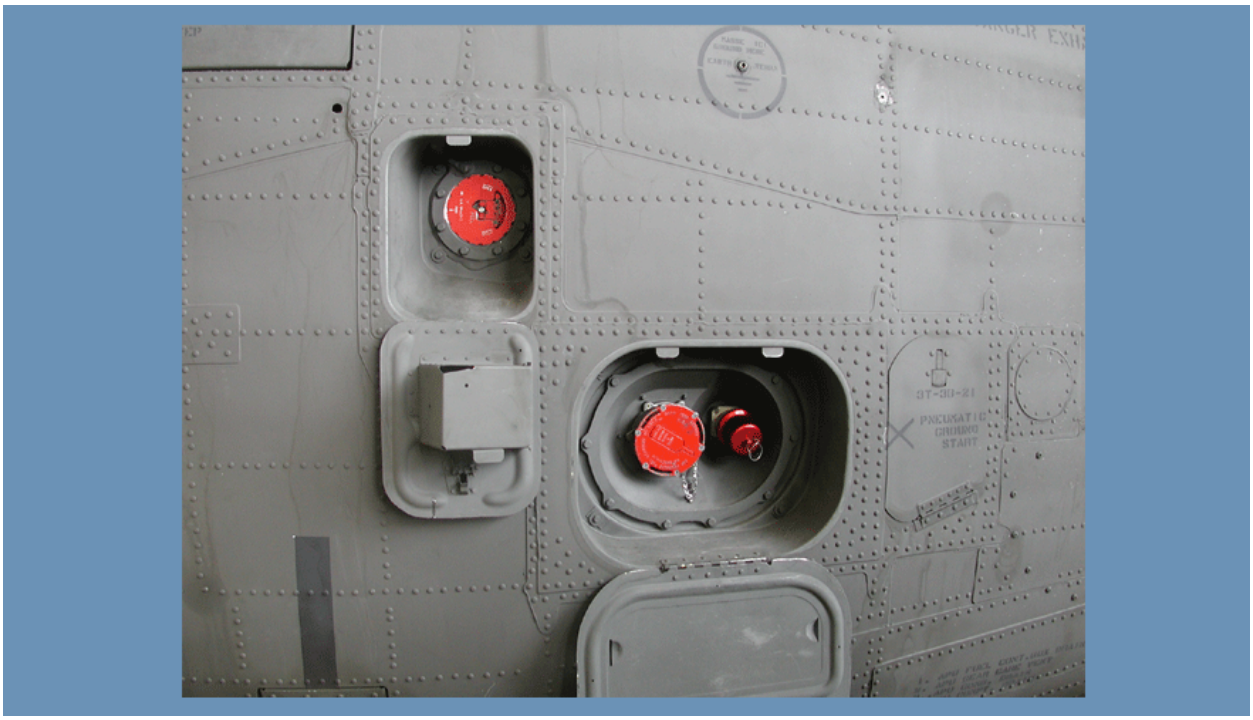
b. Gravity Refueling

Frame #0205 (Gravity Refueling Location)



(1) Gravity refueling is accomplished using separate ports on each side of the aircraft.

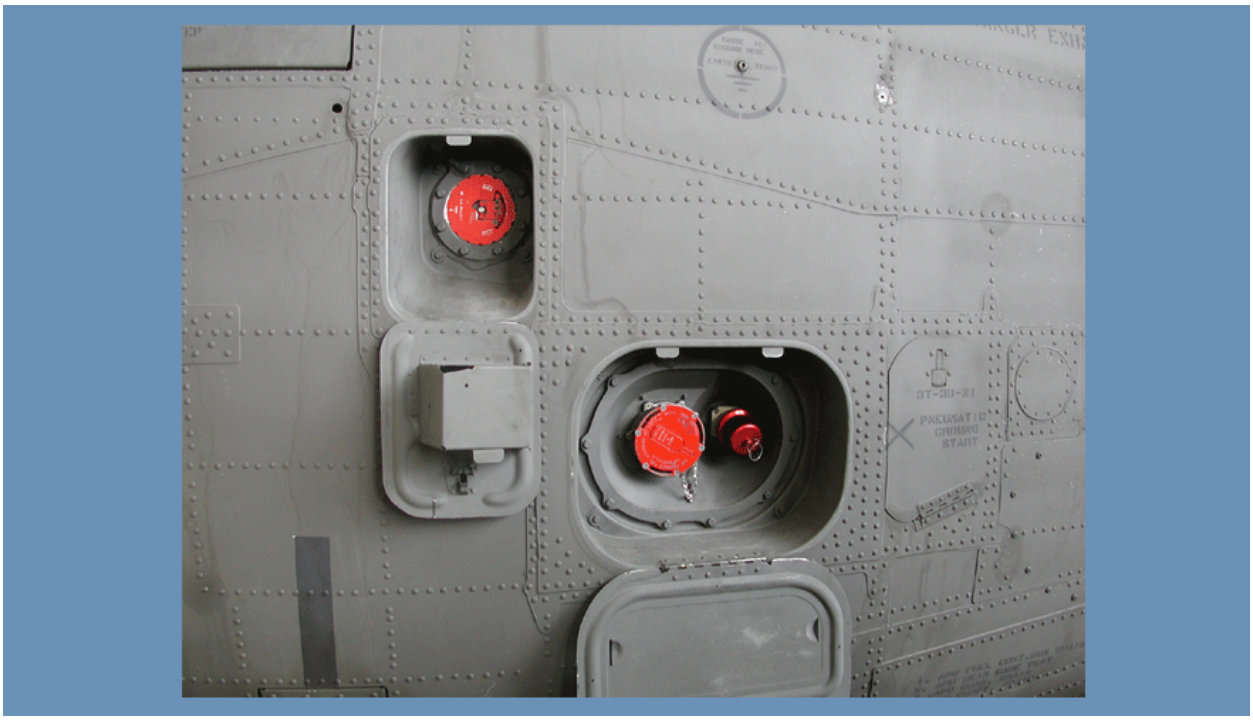
Frame #0205 (Gravity Refuel)



(2) Each fuel cell's usable capacity is 181 gallons using the gravity refuel method.

c. Closed Circuit Refueling Port

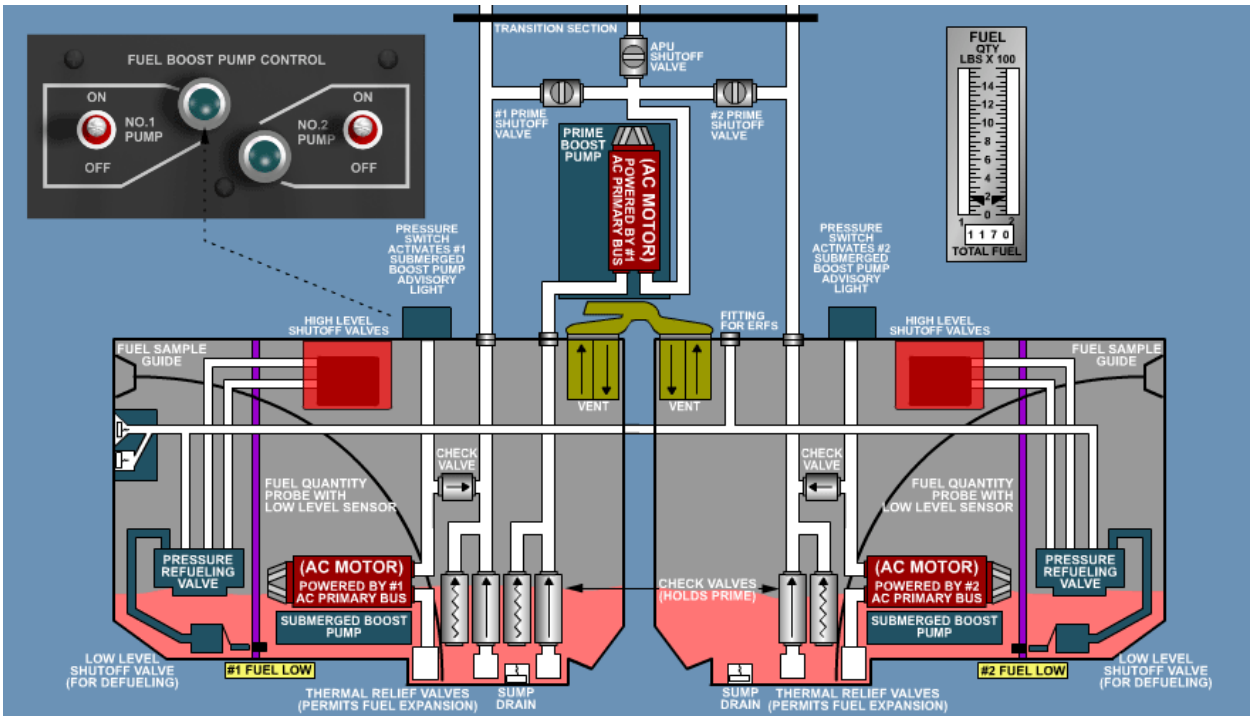
Frame #0207 (Closed Circuit Refueling Port)



(1) The closed circuit refueling port is located behind the same panel as the pressure refueling port on the No. 1 side of the aircraft.

(2) The closed circuit refueling port is the smaller one on the right.

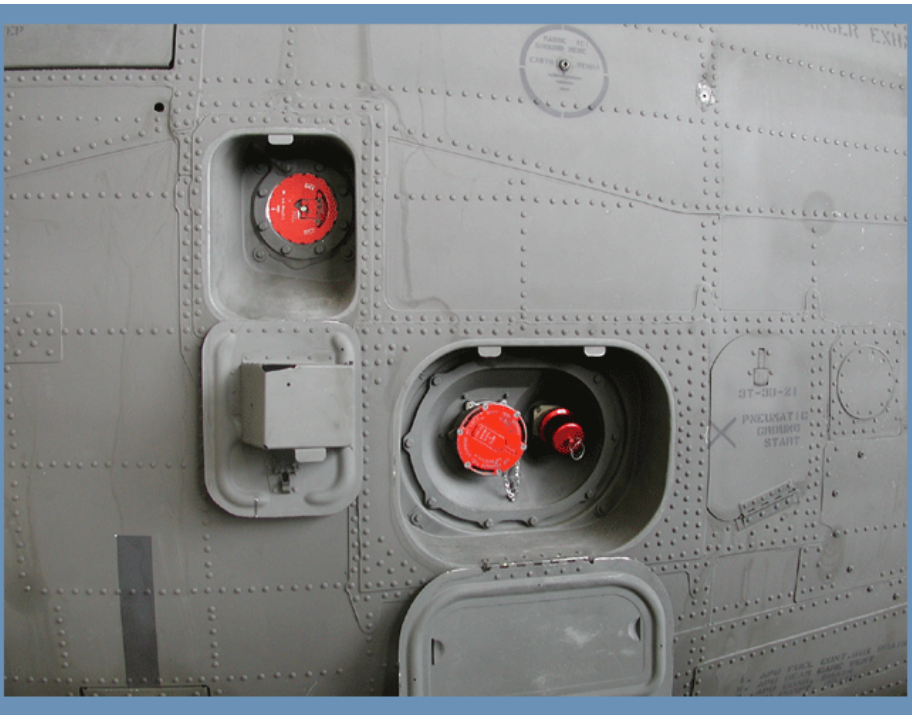
Frame #0208 (Closed Circuit Refueling FLASH)



(3) When using the closed circuit refueling method, the fuel cell's capacity is 179 gallons at a maximum pressure of 15 psi, 110 gallons per minute.

d. Pressure Defueling

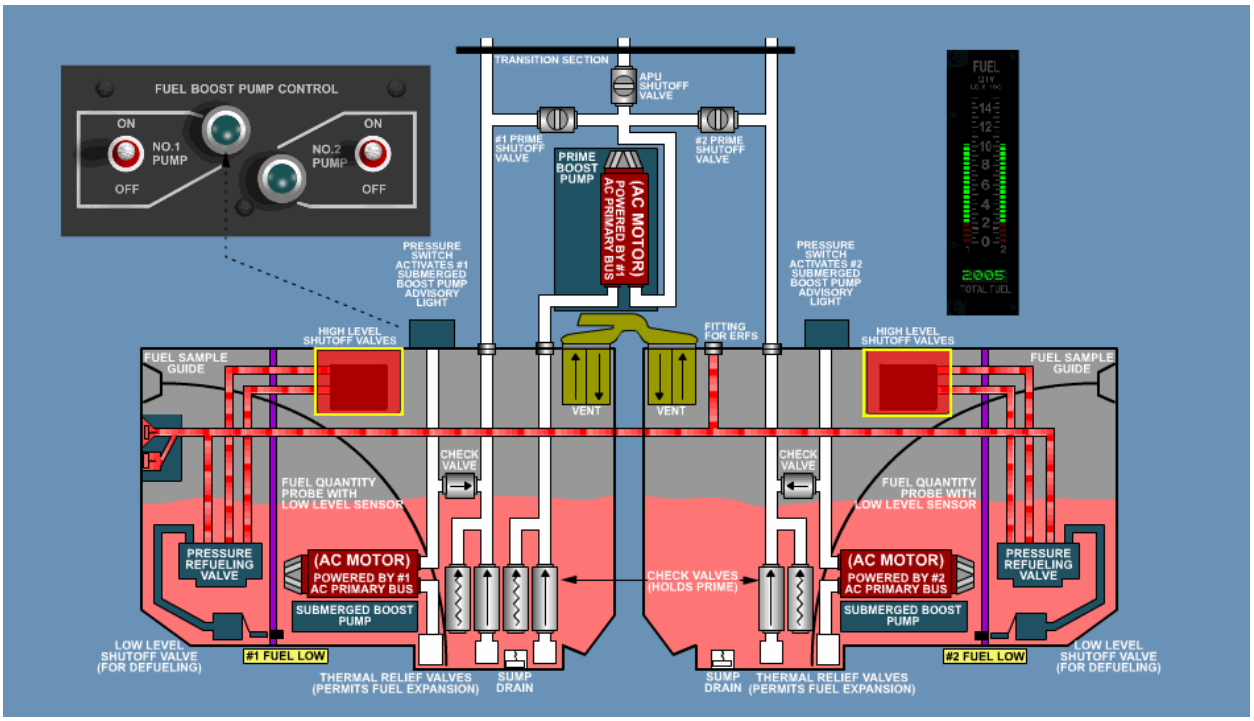
Frame #0210 (Pressure Defueling)



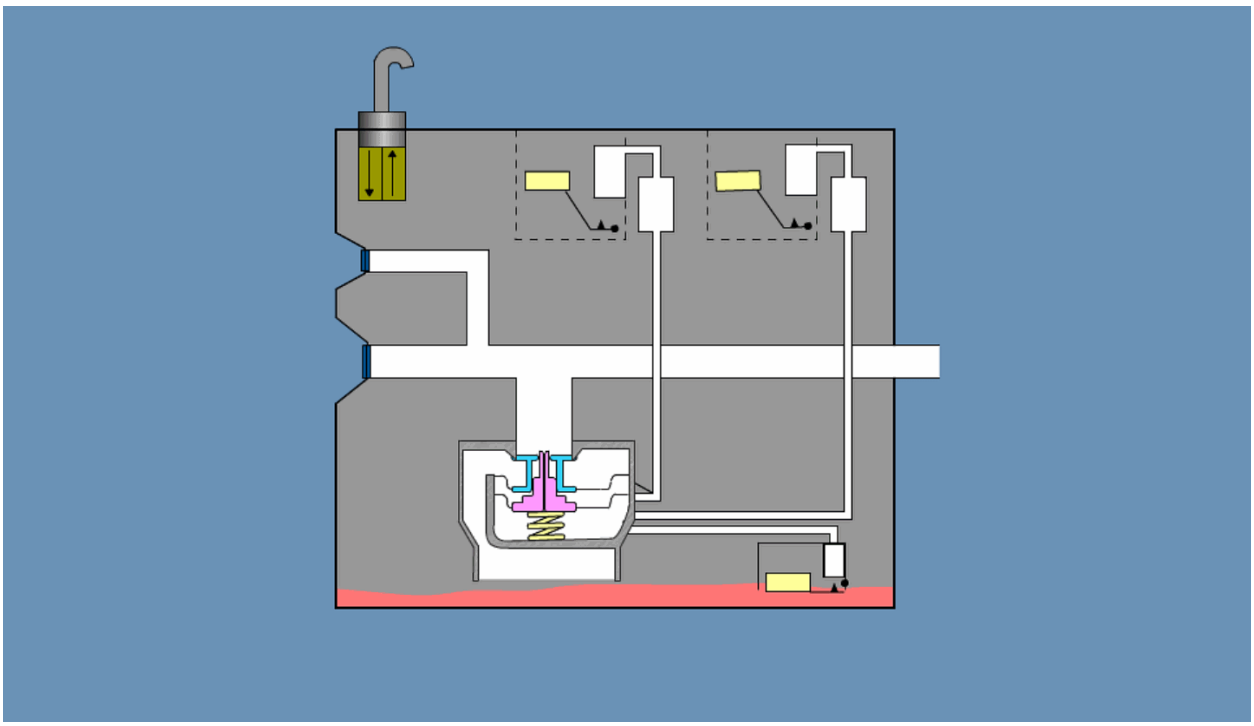
(1) The aircraft can be defueled using the pressure defuel method. Pressure defueling is the preferred method.

(2) Pressure defueling cannot exceed 3 psi of suction.

Frame #0212 (Pressure Defueling FLASH)



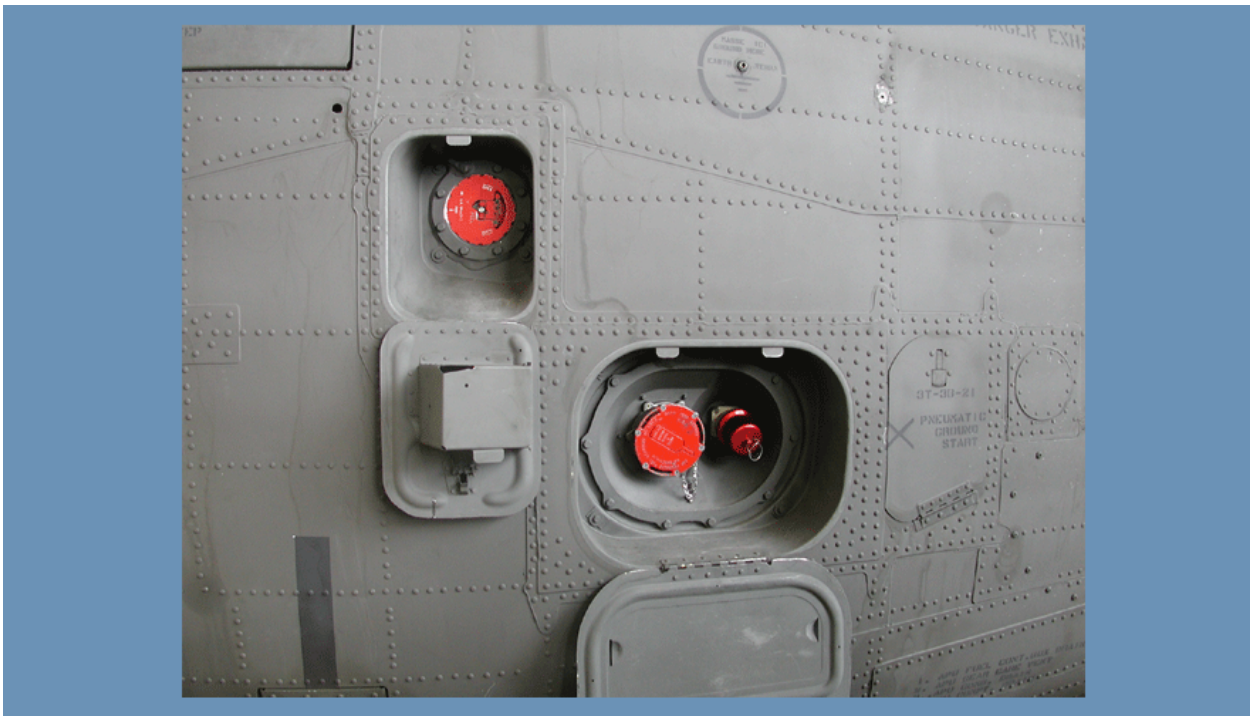
Frame #0212 (Pressure Defueling FLASH)



(3) During pressure defueling of the aircraft, the low level shutoff valve closes the pressure refuel/defuel valve, which then shuts off the fuel nozzle.

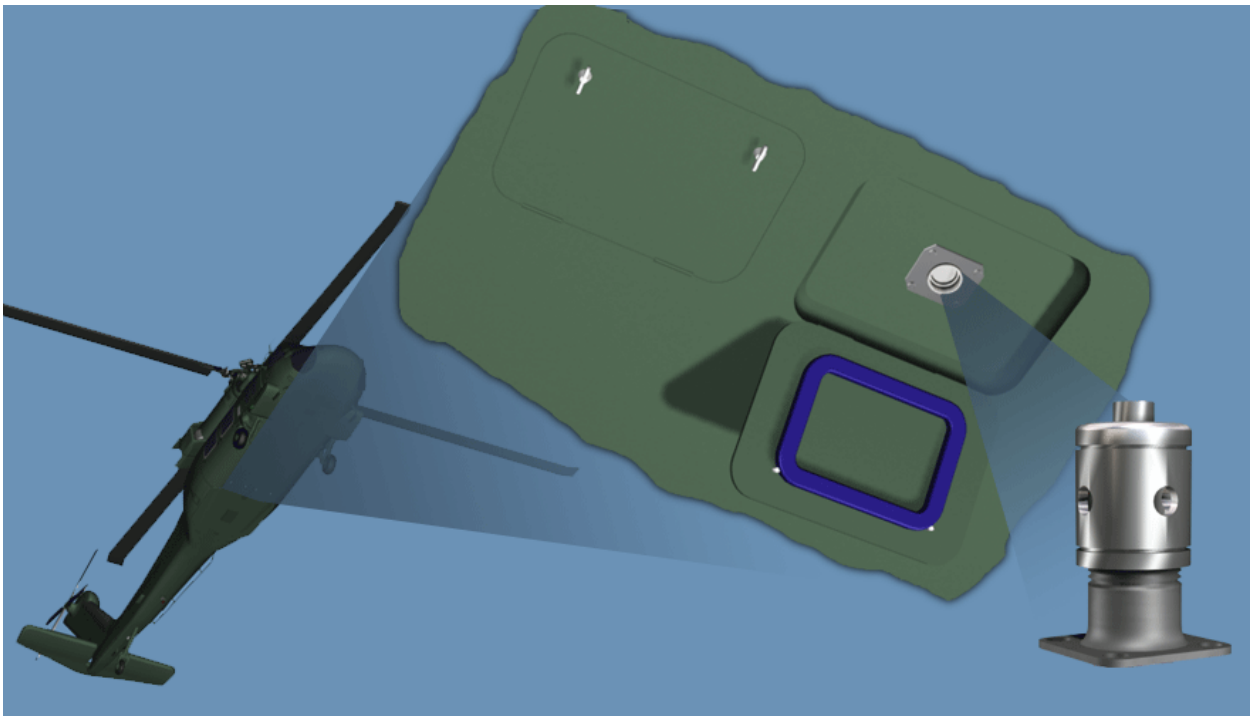
e. Gravity Defuel

Frame #0215 (Gravity Defuel)



(1) The helicopter can be gravity defueled from each side of the aircraft through the gravity refuel port by inserting a hose into the port and suctioning the fuel out.

Frame #0215 (Gravity Defuel Drain Valve)



(2) Fuel that cannot be suctioned out of the aircraft, can be drained out through the drain valve.

CHECK ON LEARNING

1. During pressure refueling of the UH-60 fuel system, the maximum fuel pressure from the service vehicle is _____.

2. During pressure defueling of the UH-60 fuel system, which valves close the pressure refuel/defuel valves?

3. When using the pressure refueling method, what is the usable capacity of each fuel cell?

SECTION V. - SUMMARY

1. REVIEW/SUMMARIZE:

You have completed the methods of refueling and defueling the UH-60.
The key points to remember are:
Pressure refueling:

- Single point, fills from the #1 side of the helicopter.
- 180.5 gallons of fuel.
- Maximum pressure 55 psi, 300 gallons per minute.

Gravity refueling:

- Fueled through separate ports on each side of the helicopter.
- 181 gallons of fuel.

Closed circuit refueling:

- Fueled from the #1 side of the helicopter.
- 179 gallons of fuel.

Defueling:

- The two methods are pressure and gravity.
- Pressure is the preferred method.
- Pressure defueling cannot exceed 3 psi of suction.
- During pressure defueling, the low level shutoff valves close the pressure refuel/defuel valves, which shuts off the nozzle.

APPENDIX A

ILLUSTRATION LISTING

FRAME #	FRAME TITLE
0015	Fuel System MENU
0025	Fuel System Function
0035	Fuel Cell Location
0035	Fuel Cells Construction
0040	Fuel Supply Lines
0045	Indicating System FLASH
0050	Engine Driven Fuel Boost Pump
0050	HMU
0050	Submerged Fuel Boost Pump
0055	APU Fuel Shutoff Valve
0055	APU Fuel Shutoff Valve Exploded View
0085	Engine Prime Shutoff Valves
0085	Engine Prime Shutoff Valve Exploded View
0090	Vent Valves
0090	Vent Valves Exploded View
0091	Vent Valve Inside View
0095	Main Fuel Breakaway Valve
0095	Main Fuel Breakaway Valve Exploded View
0096	Main Fuel Breakaway Valve2
0100	Prime Boost Pump and Outlet Valve
0100	Prime Boost Pump and Outlet Valve Exploded View
0102	Fuel Pump Switch FLASH
0103	New Fuel Schematic
0105	APU Fuel Shutoff Valve FLASH
0115	High Level Shutoff Valves
0117	High Level Shutoff Valves FLASH
0117	Refuel/Defuel Valve
0120	Pressure Refuel/Defuel Valves
0122	Pressure Refuel/Defuel Valves FLASH
0125	Prime Boost Pump and Main Fuel Line Check Valves
0127	Prime Boost Pump Valves FLASH
0130	Low Level Shutoff Valves
0132	Low Level Shutoff Valves FLASH
0132	Low Level Fuel Shutoff Valve 1
0135	Interconnect Breakaway Tube and Breakaway Valve
0137	Fuel Cell Interconnect Breakaway Valves FLASH
0140	Fuel Boost Pump
0142	Fuel Boost Pumps FLASH
0145	Fuel Boost Pump Pressure Switch
0150	Fuel Boost Pump Control Panel
0150	Left Hand Relay Panel
0156	Fuel Quantity Probe
0155	Fuel Quantity Probe 2
0160	Fuel Quantity Signal Conditioner
0160	Fuel Quantity Signal Conditioner Uninstalled
0165	Low Level Sensor FLASH

0170	Low Level Warning Conditioner
0175	Fuel Selector Valves
0175	Fuel Selector Lever
0176	Fuel Selector Valve Flow
0176	Fuel Selector Lever OFF
0177	Fuel Selector Lever Direct
0177	Fuel Selector Lever XFD
0200	Pressure Refuel Location
0200	Pressure Refuel
0205	Gravity Refuel Location
0205	Gravity Refuel
0207	Closed Circuit Refueling Port
0208	Closed Circuit Refueling FLASH
0210	Pressure Defueling
0212	Pressure Defueling FLASH
0215	Gravity Defuel
0215	Gravity Defuel Drain Valve

APPENDIX B

TEST AND TEST SOLUTIONS

1. This appendix is only used when the test and solutions are internal to the POI file.

2. When the test and solutions are internal to the POI file, then the POI file becomes a FOR OFFICIAL USE ONLY document.