

Reference to Figure 48 Fuel System General

ATA 28 FUEL

28–20 DISTRIBUTION

SYSTEM DESCRIPTION (A318/A319/A320)

Tank Usable Capacities

	Outer Cell	Inner Cell	Ctr. Tank	Total
A318				
A319	704 kg	5531 kg	6462 kg	18932 kg
A320	1552 lbs	12193 lbs	14246 lbs	41736 lbs

The Vent/Surge Tank is normally empty but can contain ~190 ltr.

1 Fuel Feed Pump (6EA)

All pumps are identical. The pump delivers fuel at 30 psi (4989kg/h). The pump, which is installed in a canister, can be removed without draining the fuel tank. As the pumps are cooled by fuel, pump operation should be avoided when the fuel tank is empty.

2 Sequence Valve

Sequence valves are pressure relief valves attached to the secondary outlets on the wing tank pumps only. These valves prevent the pump outlet pressure rising above 25 psi.

3 Pump Low Pressure Switch

The pressure switches monitor the output pressure of the fuel pumps. They are installed on the rear face of the wing and center tank rear spar.

If the main pump pressure decreases to less than 6 psi the pressure switch activates the fault light in the P/B and the ECAM Message.

4 Crossfeed Valve

In the usually closed position the crossfeed valve divides the main fuel pump system into two parts (one for each engine). When the valve is open, the two fuel suppliers are connected together. The crossfeed valve is controlled manually.

5 LP Fuel Valve

The LP valve actuator has two electrical motors which drive the same differential gear. When the ENG Master SW switch is set to OFF/ON the open or shut side of the actuator motor is energized. The actuator then turns the valve to the related position. Operation of the ENG Fire P/BSW always overrides an ON selection and closes the valve.

6 APU Fuel Pump

The pump element is a centrifugal type impeller which is driven by a 3 phase electrical motor, supplied with single phase 115V AC. Normally, the necessary fuel pressure is achieved by the main engine fuel pumps. The fuel pressure is monitored by the APU fuel pressure switch.

7 APU Fuel Pressure Switch

When the fuel pressure drops below 22 psi, the microswitch closes and gives a signal to start the APU fuel pump.

8 APU Low Pressure Valve

The valve will open when the APU MASTER SW is selected to ON. Closing of the valve is done by setting the switch to OFF position. In case of APU fire the LP valve will close automatically.

9 Intercell Transfer Valve

When a inner cell low level sensor detects less than 750 kg, the fuel transfer valves will be opened and fuel will be transferred by gravity into the inner cells. Fuel transfer from outer cell to inner cell will always be simultaneously on left and right wing when the first of four level sensors is exposed to air. One valve actuator is on the front face of the wing front spar. The other one is on the rear face of the wing rear spar, thus the actuators can be replaced without access to the related fuel tank.

10 Refuel Valves

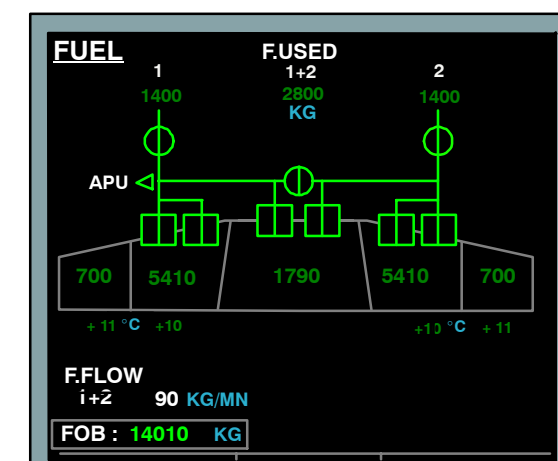
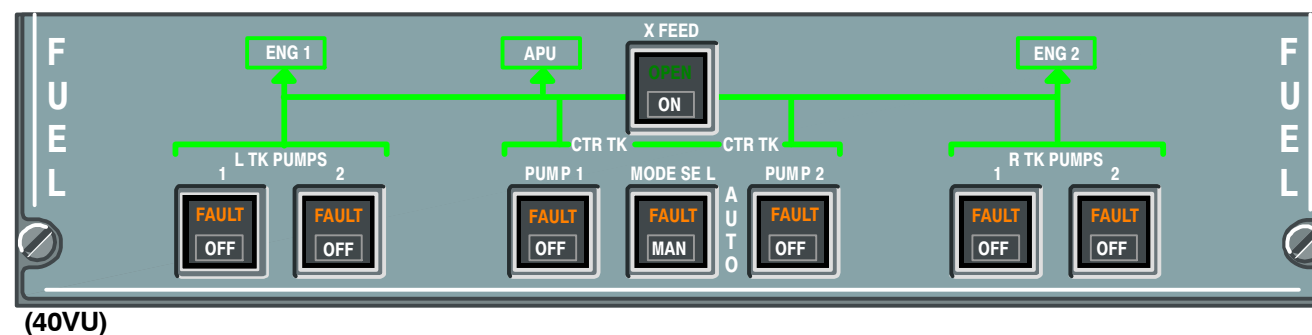
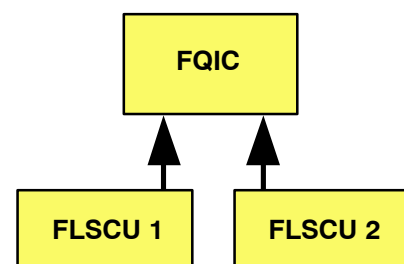
The valve is actuated by fuel pressure and a solenoid which is energized when the Mode SEL SW is set to REFUEL and the associated Refuel Valve SW is set to OPEN or NORM. The valve can be opened manually (if fuel pressure is available) by depressing a plunger and will be closed again by releasing the plunger.

11 Defuel/Transfer Valve

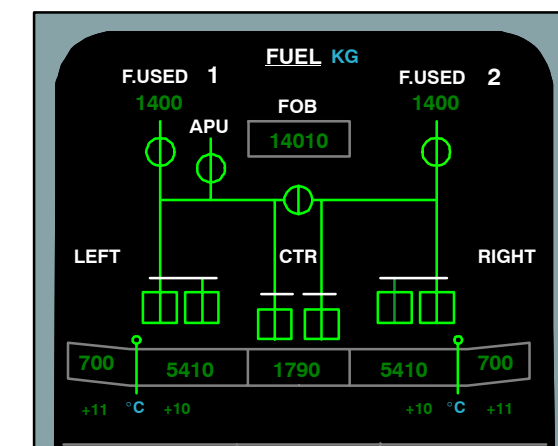
The Defuel/Transfer valve is in the center tank, on the rear spar. The valve connects the main fuel pump system to the refuel gallery. The MODE SEL SW, on the Refuel/Defuel control panel controls the position of the valve.

12 Spill Pipe

Allows overflow from outer to inner cell.



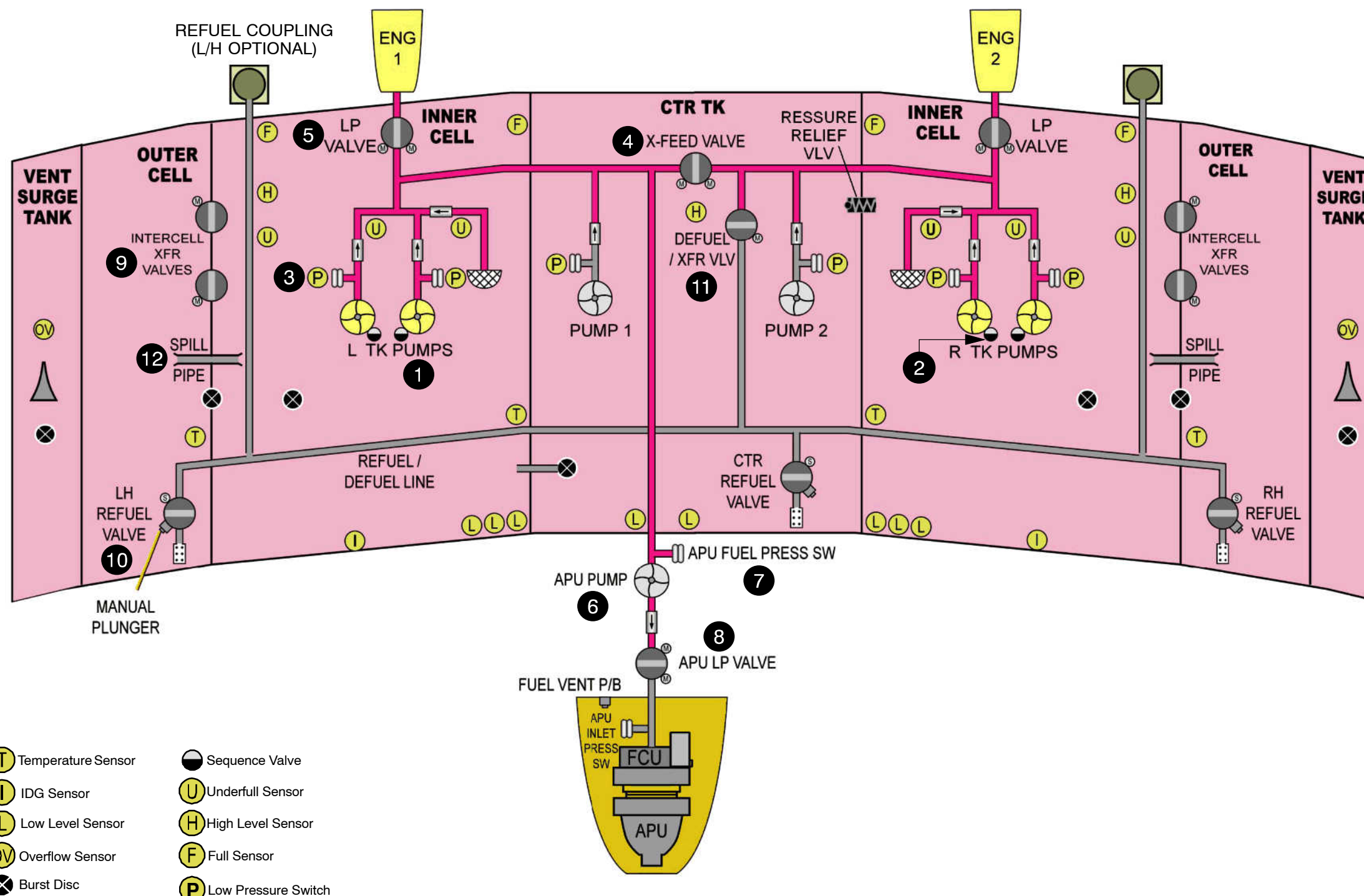
A318/319/320 FUEL PAGE (ENHANCED)



A318/319/320 FUEL PAGE



REFUEL/DEFUEL CONTROL PANEL (801VU)



- (T) Temperature Sensor
- (I) IDG Sensor
- (L) Low Level Sensor
- (OV) Overflow Sensor
- (X) Burst Disc
- (S) Sequence Valve
- (U) Underfull Sensor
- (H) High Level Sensor
- (F) Full Sensor
- (P) Low Pressure Switch

NOTE: Not all sensors are shown.
Component location deviates from position on A/C.

Reference to Figure 49 Fuel System Distribution

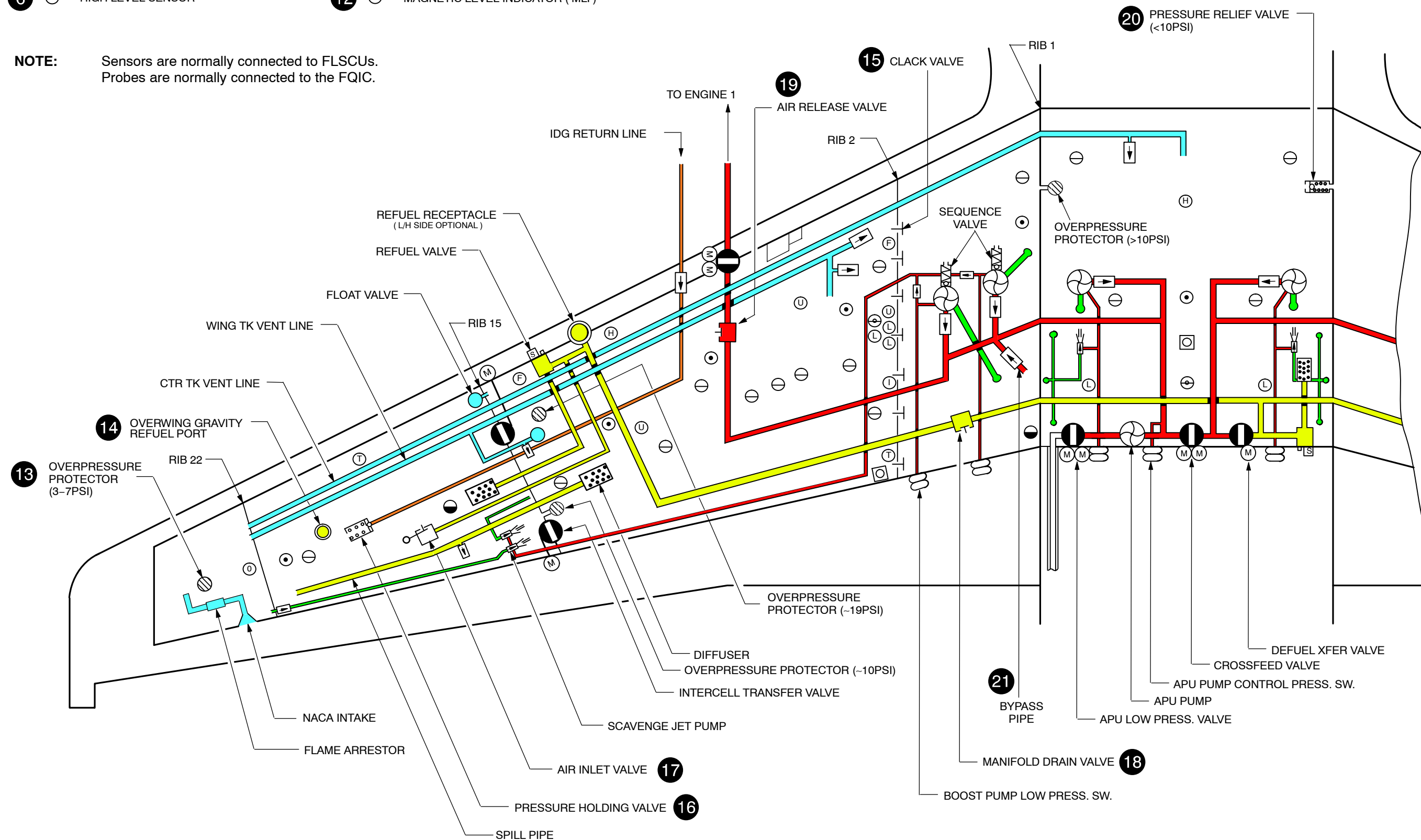
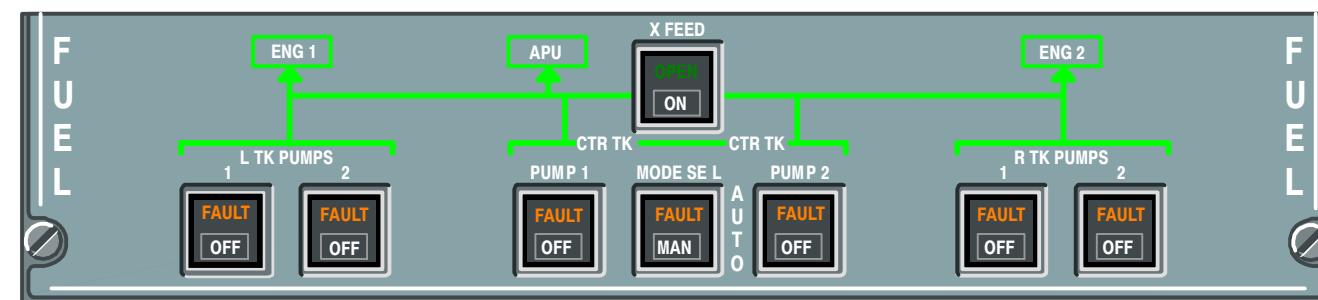
SYSTEM OPERATION (A318/A319/A320)

- 1 Fuel Quantity Indicating Probe**
Fuel level measurement by capacitance measurement.
- 2 Fuel Quantity Indicating Probe with Temperature Sensor**
Sensor is used for density calculation and ECAM.
- 3 Fuel Quantity Indicating Probe with CIC**
CIC (Capacity Index Compensator) is used for density calculation.
- 4 Cadensicon**
Contains a plate capacitor and a float for density calculation.
- 5 Low Level Sensors**
Two sensors each wing for INTERCELL XFER–VLV activation and ECAM.
One sensor each wing for ECAM.
(~750 kg XFER Valve open, if dry for more than 30 sec. ECAM is activated).
Two sensors in center tank(<130kg +5min) for center pump control logic.
- 6 High Level Sensor**
Used for high level shut–off during normal refuelling and transfer.
- 7 Overflow Sensor**
Used for fuel recirculation shut–off logic.
- 8 Underfull Sensor**
Senses underfull level for center pump control logic (~500 kg below full level).
- 9 Full Level Sensor**
Senses full level for center pump control logic.
- 10 Temperature Sensor**
Senses temperature for fuel recirculation shut off logic (outer tank >55°C, inner tank >52°C).
- 11 IDG Shut-Off Sensor**
Used for fuel recirculation shut–off logic (<280kg).
- 12 Magnetic Level Indicator**
Manual level measurement by an magnetic stick in a tube and a float. (four in each inner tank, one in each outer tank and one in CTR. Tank).
- 13 Overpressure Protector**
A disc bursts in case of over– or underpressure. Protectors to outside are visible through holes in tank access panels and marked with white crosses. Pressure burst values vary between 3 and 19 psi depending on position.
- 14 Overwing Gravity Refuel Port**
Used for gravity refuel. Since the location is not the highest point in the tank a total refuelling and overflow in inner tank is not possible. Therefore the intercell transfer valves have to be opened manually.
- 15 Clack Valve**
The clack valves have a check valve function.
- 16 Pressure Holding Valve**
Keeps the fuel return pressure in the pipe spring loaded at ~15 psi to prevent fuel boiling.
- 17 Air Inlet Valve**
A float makes sure that the refuel gallery drains when the fuel level in the outer cell falls.
- 18 Fuel Drain Valve**
Allows fuel to drain from the refuel gallery except the line is under pressure.
- 19 Air Release Valve**
A float allows air but not fuel to escape from the fuel line.
- 20 Pressure Relief Valve**
A poppet type check valve releases excessive pressure during refuelling.
- 21 Bypass Pipe**
Allows engine suction feed in case of pump malfunction.

LEGEND:

- | | | | | | |
|---|---|--|----|---|--------------------------------|
| 1 | ⊖ | FUEL QUANTITY INDICATING PROBE | 7 | ⊖ | OVERFLOW SENSOR |
| 2 | ⊖ | FUEL QUANTITY INDICATING PROBE (WITH TEMPERATURE SENSOR) | 8 | ⊖ | UNDERFULL SENSOR |
| 3 | ⊕ | FUEL QUANTITY INDICATING PROBE (WITH COMPENSATOR CIC) | 9 | ⊖ | FULL LEVEL SENSOR |
| 4 | ⊖ | CADENSICON (PLATE CAPACITOR + FLOAT) | 10 | ⊖ | TEMPERATURE SENSOR |
| 5 | ⊖ | LOW LEVEL SENSOR | 11 | ⊖ | IDG SHUT - OFF SENSOR |
| 6 | ⊖ | HIGH LEVEL SENSOR | 12 | ⊖ | MAGNETIC LEVEL INDICATOR (MLI) |

NOTE: Sensors are normally connected to FLSCUs.
Probes are normally connected to the FQIC.



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SYSTEM DESCRIPTION (A321)

Tank Usable Capacities

	Wing Tank	Ctr/Transfer Tank	Total
A321	6084 kg	6437 kg	18605 kg
	13413 lbs	14191 lbs	41017 lbs

The Vent/Surge Tank is normally empty but can contain ~190 ltr.

1 CTR Tank Transfer Valves and Jet Pumps

Two jet pumps and two transfer valves are installed instead of center tank boost pumps. The jet pump delivers the fuel from the center tank to the respective wing tank. Operating pressure for the jet pump is taken from the related wing tank pumps. The jet pumps are controlled by the center tank transfer valves.

NOTE: In case of jet pumps failure, fuel from the center tank spills by gravity through the jet pump and a check valve into the wing tank, when the fuel level in the wing tank reached a certain level. In this case 2000 kg remain in the center tank as unusable fuel.

IN CASE OF WING TANK OPENING THE CENTER TANK MUST BE EMPTIED.

2 Fuel Feed Pump (4EA)

All pumps are identical. The pump delivers fuel at 30 psi. The pump which is installed in a canister can be removed without draining the fuel tank. As the pumps are cooled by fuel, pump operation should be avoided when the fuel tank is empty.

3 Pump Low Pressure Switch

The pressure switches monitor the output pressure of the fuel pumps. They are installed on the rear face of the wing.

If the main pump pressure decreases to less than 6 psi the pressure switch activates the fault light in the P/B and the ECAM Message.

4 Crossfeed Valve

In the usually closed position the crossfeed valve divides the main fuel pump system into two parts (one for each engine). When the valve is open, the two fuel suppliers are connected together. The crossfeed valve is controlled manually.

5 LP Fuel Valve

The LP valve actuator has two electrical motors which drive the same differential gear. When the ENG Master SW switch is set to OFF/ON the open or shut side of the actuator motor is energized. The actuator then turns the valve to the related position. Operation of the ENG Fire P/BSW always overrides an ON selection and closes the valve.

6 APU Fuel Pump

The pump element is a centrifugal type impeller which is driven by a 3 phase electrical motor, supplied with single phase 115V AC. Normally, the necessary fuel pressure is achieved by the main engine fuel pumps. The fuel pressure is monitored by the APU fuel pressure switch.

7 APU Fuel Pressure Switch

When the fuel pressure drops below 22 psi, the microswitch closes and gives a signal to start the APU fuel pump.

8 APU Low Pressure Valve

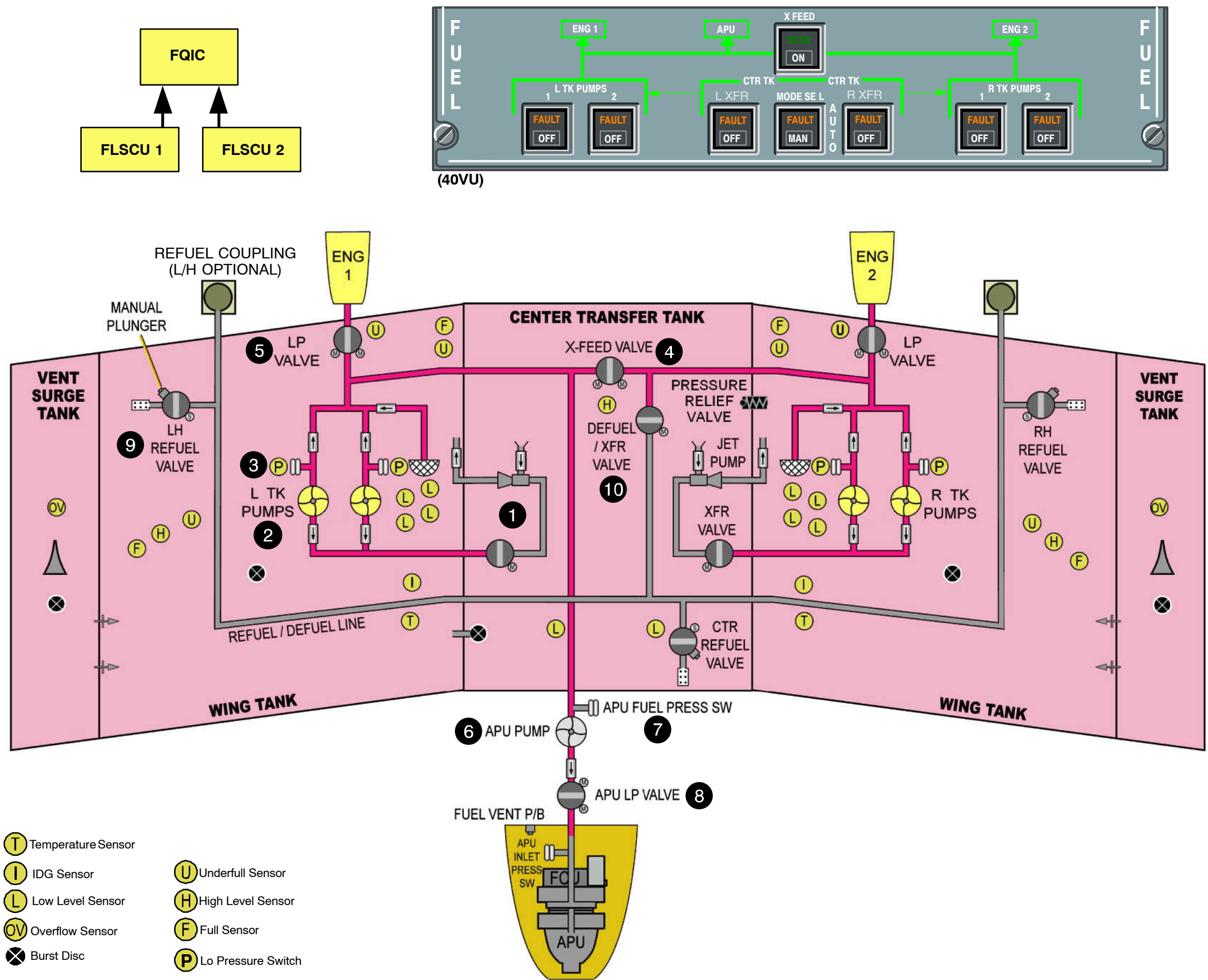
The valve will open when the APU MASTER SW is selected to ON. Closing of the valve is done by setting the switch to OFF position. In case of APU fire the LP valve will close automatically.

9 Refuel Valves

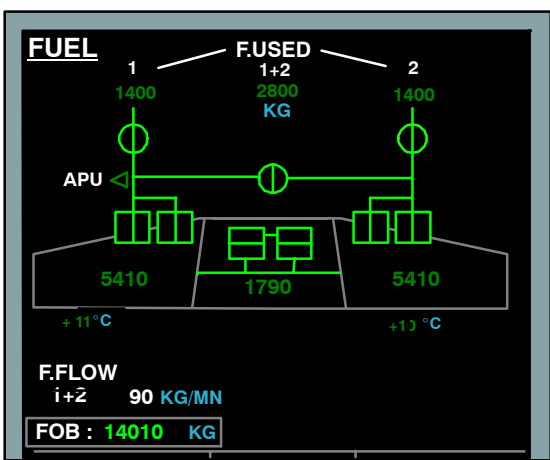
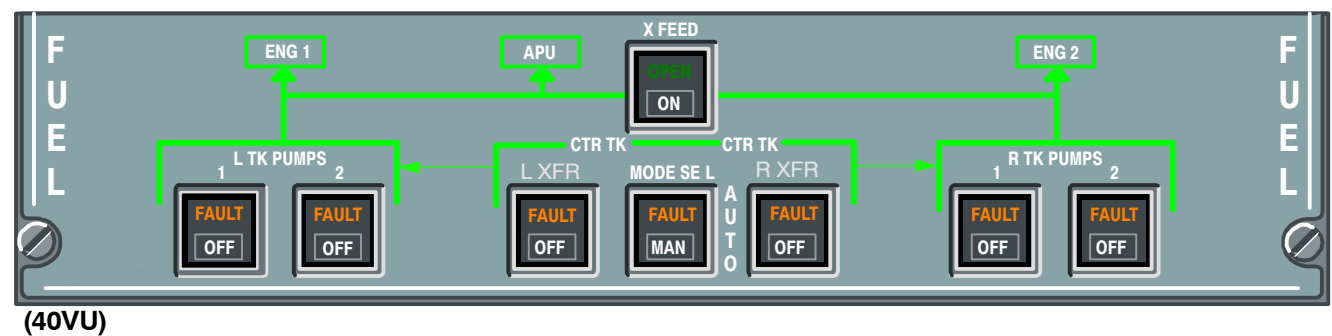
The valve is actuated by a solenoid which is energized when the Mode SEL SW is set to REFUEL and the associated Refuel Valve SW is set to OPEN or NORM. The valve can be opened manually (if fuel pressure is available) by depressing a plunger and will be closed again by releasing the plunger.

10 Defuel/Transfer Valve

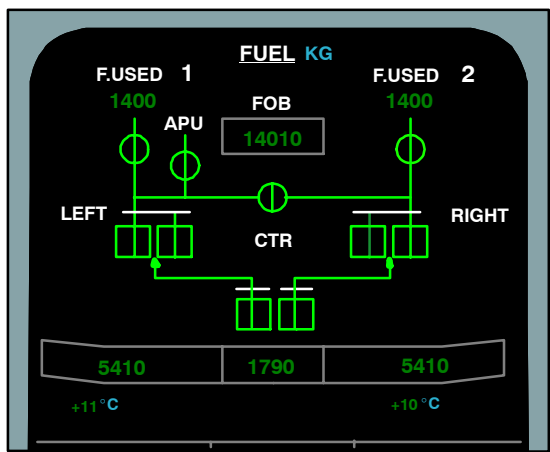
The Defuel/Transfer valve is in the center tank, on the rear spar. The valve connects the main fuel pump system to the refuel gallery. The MODE SEL SW, on the Refuel/Defuel control panel controls the position of the valve.



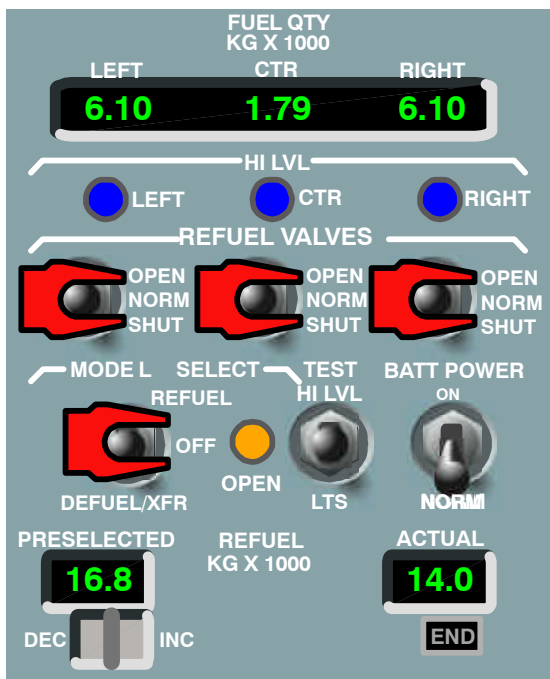
NOTE: Not all sensors are shown.
Component location deviates from position on A/C.



A321 FUEL PAGE (ENHANCED)



A321 FUEL PAGE



REFUEL/DEFUEL CONTROL PANEL (801VU)

Reference to Figure 51 Fuel System Distribution

SYSTEM OPERATION (A321)

- 1 Fuel Quantity Indicating Probe**
Fuel level measurement by capacitance measurement.
- 2 Fuel Quantity Indicating Probe with Temperature Sensor**
Sensor is used for density calculation and ECAM.
- 3 Ultracomperator**
Contains a plate capacitor plus a velocimeter(sound) and temperature sensor for density calculation.
- 4 Dualcomperator**
Contains two parallel plate capacitors for density calculation.
- 5 Low Level Sensors**
Three sensors each wing for ECAM (~750 +30sec.). One sensor each wing installed at an higher level for ECAM (FOB below 3 t). One sensor in Ctr. Tank for Ctr. Transfer Valve Control Logic (~130kg +5 min.).
- 6 High Level Sensor**
Used for High Level shut-off during normal refuelling and transfer.
- 7 Overflow Sensor**
Used for fuel recirculation shut-off logic and FAULT in Ctr. Tank Transfer P/B.
- 8 Underfull Sensor**
Senses underfull level for CTR Transfer Valve Control Logic (~200 kg below full level).
- 9 Full Level Sensor**
Senses full level for Ctr. Transfer Valve Control Logic.
- 10 Temperature Sensor**
Senses temperature for fuel recirculation shut off logic.
- 11 IDG Shut-Off Sensor**
Used for fuel recirculation shut-off logic (<280kg).
- 12 Magnetic Level Indicator**
Manual level measurement by an magnetic stick in a tube and a float. (seven in each wing tank, one in center tank).
- 13 Overpressure Protector**
A disc bursts in case of over- or underpressure. Protectors to outside are visible through holes in tank access panels and marked with white crosses. Pressure burst values vary between 3 and 19 psi depending on position.
- 14 Overwing Gravity Refuel Port**
Used for gravity refuel. Since the location is not the highest point in the tank a total refuelling is not possible.
- 15 Clack Valve**
The clack valves have a check valve function.
- 16 Pressure Holding Valve**
Keeps the fuel return pressure in the pipe spring loaded at ~15 psi to prevent fuel boiling.
- 17 Air Inlet Valve**
A float makes sure that the refuel gallery drains when the fuel level in the outer cell falls.
- 18 Fuel Drain Valve**
Allows fuel to drain from the refuel gallery except the line is under pressure.
- 19 Air Release Valve**
A float allows air but not fuel to escape from the fuel line.
- 20 Pressure Relief Valve**
A poppet type check valve releases excessive pressure during refuelling.
- 21 Bypass Pipe**
Allows engine suction feed in case of pump malfunction.

- LEGEND:**

1 ⊖ FUEL QUANTITY INDICATING PROBE

2 ● FUEL QUANTITY INDICATING PROBE (WITH TEMPERATURE SENSOR)

3 □ ULTRACOMPARATOR (PLATE CAPACITOR + VELOCIM. + TEMP.)

4 □□ DUALCOMPARATOR (2 X PLATE CAPACITOR)

5 ⊗ LOW LEVEL SENSOR

6 ⊕ HIGH LEVEL SENSOR

7 ⊖ OVERFLOW SENSOR

8 ⊕ UNDERFULL SENSOR

9 ⊕ FULL LEVEL SENSOR

10 ⊕ TEMPERATURE SENSOR

11 ⊖ IDG SHUT - OFF SENSOR

12 ⊙ MAGNETIC LEVEL INDICATOR (MLI)

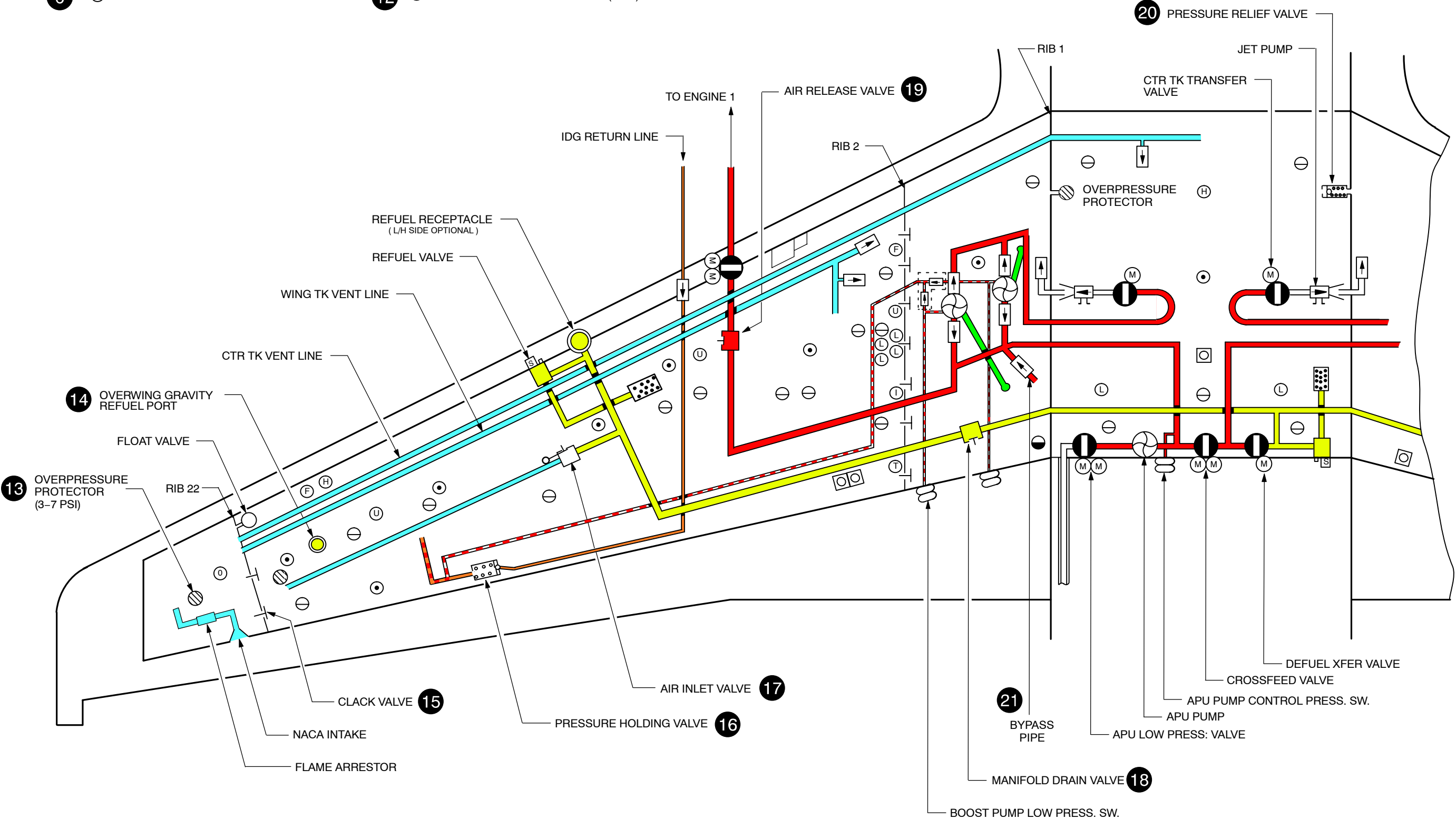
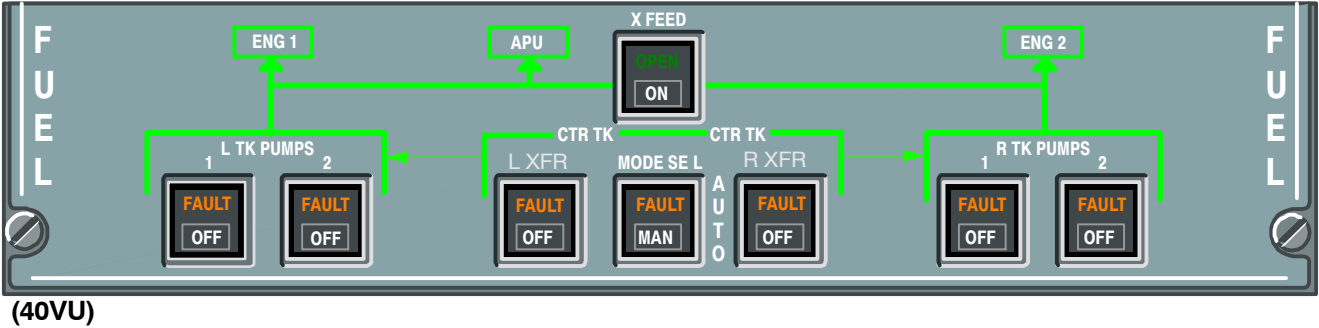


Figure 51 Fuel System Distribution
Page 102