



TABLE OF CONTENTS

FUEL - SYSTEM DESCRIPTION . . . . . 6-1

FUEL - CONTROLS AND INDICATORS

    Fuel System Control Panel. . . . . 6-3

    Fuel System Control Panel (N8177U). . . . . 6-6

    Pressure Fueling Adapter . . . . . 6-8

    Fuel Dump System Controls. . . . . 6-9

FUEL - SYSTEM SCHEMATIC

    Fuel System . . . . . 6-11



## FUEL - SYSTEM DESCRIPTION

The fuel system is designed to supply the engines, maintain structural integrity and keep the airplane center of gravity within limits as the fuel load varies with loading and usage. Fuel is carried in four main and four alternate wing tanks with total capacity of approximately 120,000 pounds. Normal usage is for each engine to burn fuel from its respective main tank and to replenish the main from its respective alternate. Drip sticks mounted in the bottom of each tank provide a mechanical means of measuring fuel quantity.

A crossfeed manifold permits fuel transfer from any tank to any other tank, or from any tank to any engine. All tanks have internal boost pumps to provide fuel pressure to the engines, or pressure to transfer fuel to other tanks. Main tanks also have a feed pump to draw fuel from the low points in the tank to fill a reservoir which contains the engine fuel pickup point and tank boost pump. Tank fuel system controls, indicators, switches and indicating lights are located on the Second Officer's panel. The crossfeed manifold, transfer lines and check valves are diagrammatically displayed on the fuel panel.

A fuel vent system provides positive venting of the fuel tanks to the atmosphere for all attitudes of the airplane.

An exterior, underwing fueling panel is installed between engine No.'s 1 and 2 (except N8177U) to facilitate refueling without having someone present at the cockpit fuel panel. Control of fill valves is transferred by a switch actuated by the fueling panel door.

Pressure fueling adapters under each wing are connected through the crossfeed manifold to all tanks. An electrically operated fill valve for each tank is used to stop filling at less than full quantities. Fuel flow to a tank is stopped automatically by a mechanical fuel level control valve when the fuel level in that tank approaches full volume. (On N8177U, the tank fuel level can also be controlled to an intermediate level by an adjustable bug on the face of the indicator. The tank fill valve closes automatically when the tank quantity pointer reaches the level selected by the bug.) Overwing fueling can be accomplished through individual tank fill ports.

Defueling can be accomplished by means of a toggle lever on the fueling adapter which allows fuel to flow from the crossfeed manifold into ground defueling equipment. The crossfeed manifold must be pressurized by the tank boost pumps to allow defueling.

All tanks are connected to a gravity fuel dump system capable of dumping fuel at the rate of approximately 5,000 pounds per minute. The dump system consists of a dump valve in each fuel tank, a standpipe in each main tank and two dump chutes. A warning flag adjacent to each dump chute indicates that the dump chute actuating cable has failed and the chute is being held in the retracted position by the uplatch. Dump system controls consist of a switch on the overhead panel and an indicator with a hand crank attachment at the aft end of the Second Officer's table.



## FUEL - CONTROLS AND INDICATORS

### FUEL SYSTEM CONTROL PANEL

#### FUEL PRESS Indicators

Indicate fuel pressure at associated engine fuel pump inlet. This pressure is tank boost pump pressure or engine boost pump pressure or both.

#### MAIN Tank BOOST & FEED Pump Switches

**BOOST & FEED** - Turn on tank boost pump and tank feed pump. Pressurize respective tank outlet. Arms FEED PUMP PRESS lights.

**FEED ONLY** - Turn on only associated tank feed pump. Tank outlet is unpressurized. Arms FEED PUMP PRESS lights.

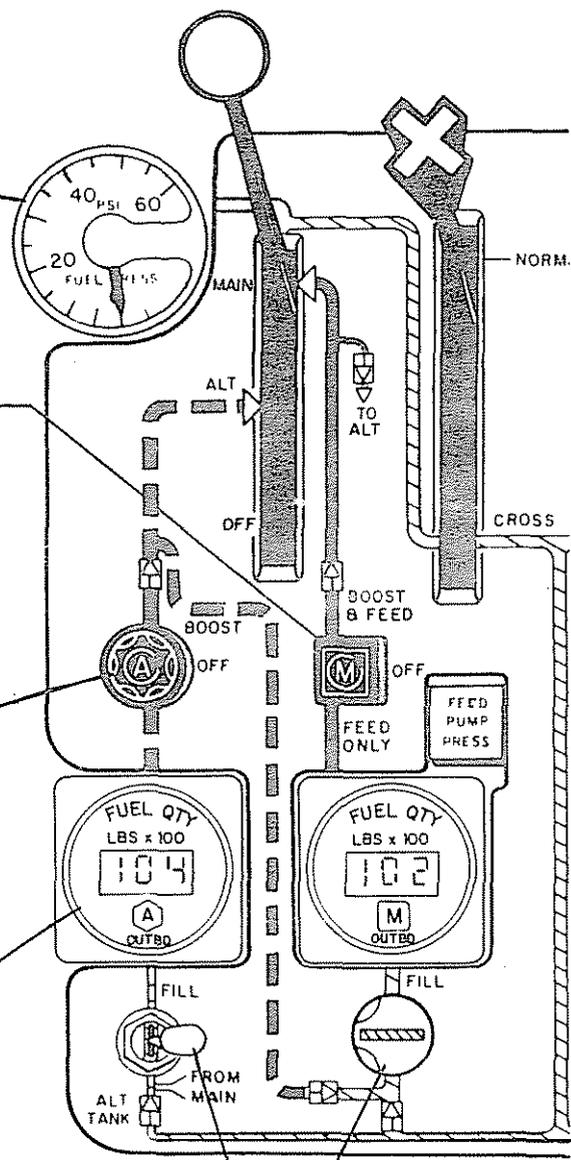
#### ALT Tank BOOST Pump Switches

Pressurize alternate tank outlets. Additionally, pressure from No. 1 and No. 4 alternate boost pumps activates an intermediate level control set to maintain their associated main tanks between 6100 and 7500 pounds of fuel (rather than full tanks) to maintain structural design limits.

#### FUEL QTY Indicators

Indicate associated main, alternate and auxiliary fuel tank quantity in hundreds of pounds. Accuracy of fuel tank indicators when near empty is:

No. 1 and No. 4 main:	± 500 pounds
No. 2 and No. 3 main:	± 450 pounds
Alternate tanks:	± 300 pounds



#### FILL Switches

Open associated tank's fill valve when rotated (main tanks) or when toggled (alternate tanks) to FILL. Outboard alternate switches are spring-loaded to the off position.

FUEL SYSTEM CONTROL PANEL

TANK SELECTOR LEVERS

**MAIN** - Connect associated main tank to engine, and close associated alternate tank to engine supply line.

**ALT** - Connect associated alternate tank to engine, and close associated main tank to engine supply line.

**OFF** - Close associated main and alternate supply valves, cutting off respective tank to engine flow. Transfer from alternate to main tank is still available and in addition No. 1 and No. 4 main tanks may still reverse transfer to their associated alternate tanks.

CROSSFEED LEVERS

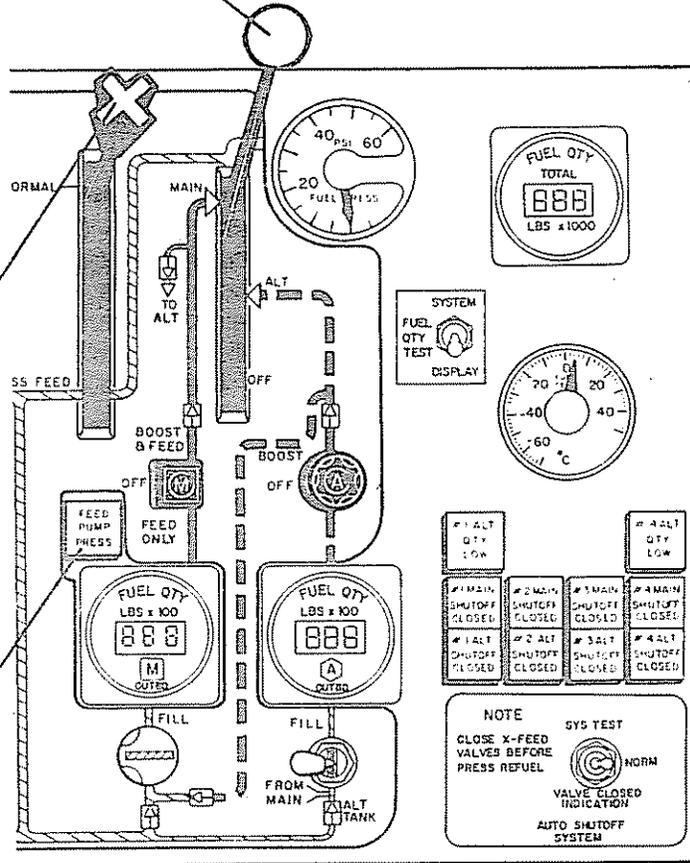
**NORMAL** - Close associated crossfeed valve isolating corresponding engine and its tank from the crossfeed manifold.

**CROSSFEED** - Open associated crossfeed valve.

FEED PUMP PRESS LIGHTS

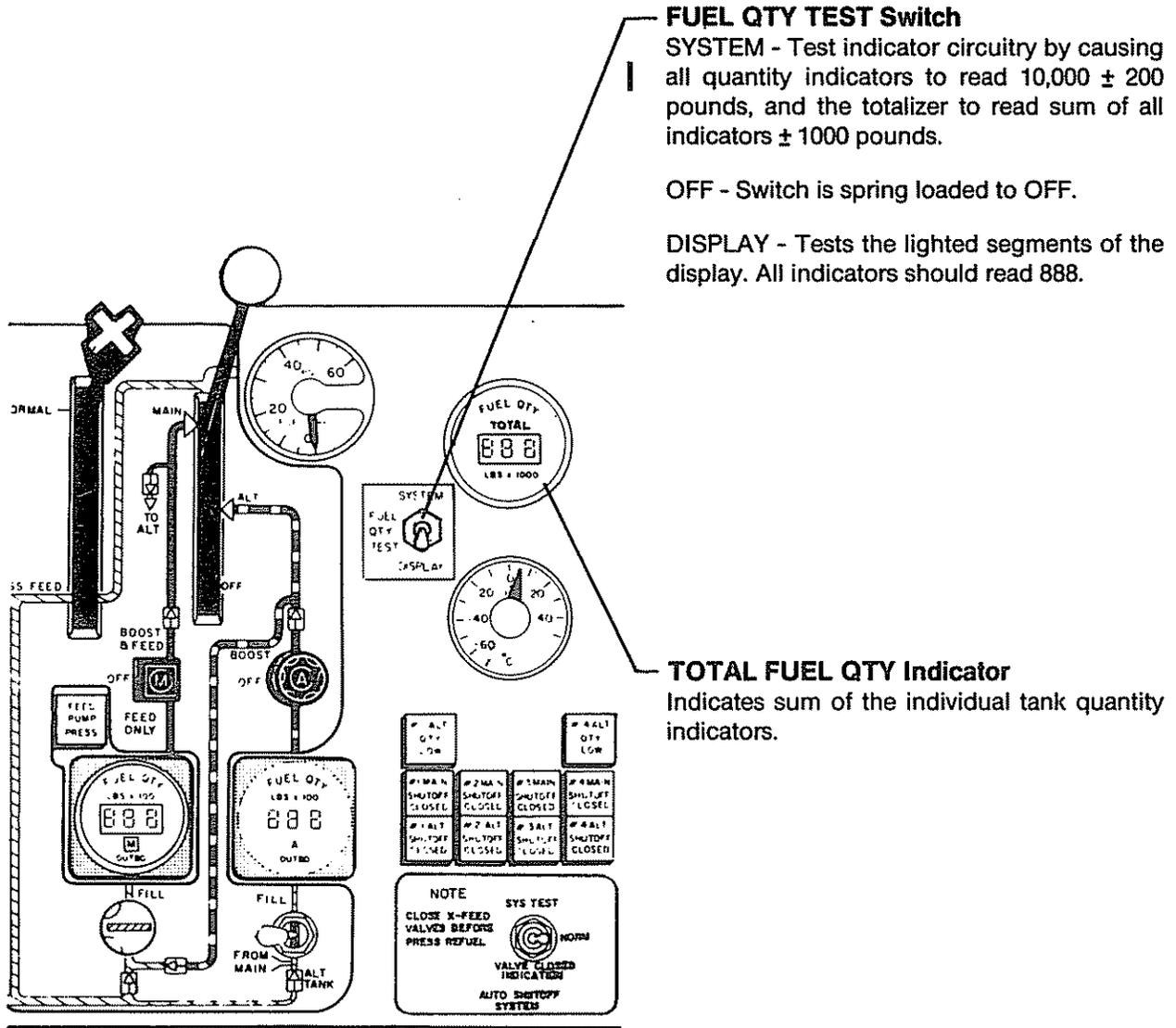
Indicate associated feed pump is powered but its output is low.

Light pushes to test only when feed pump is powered.



Location: Lower S/O Panel

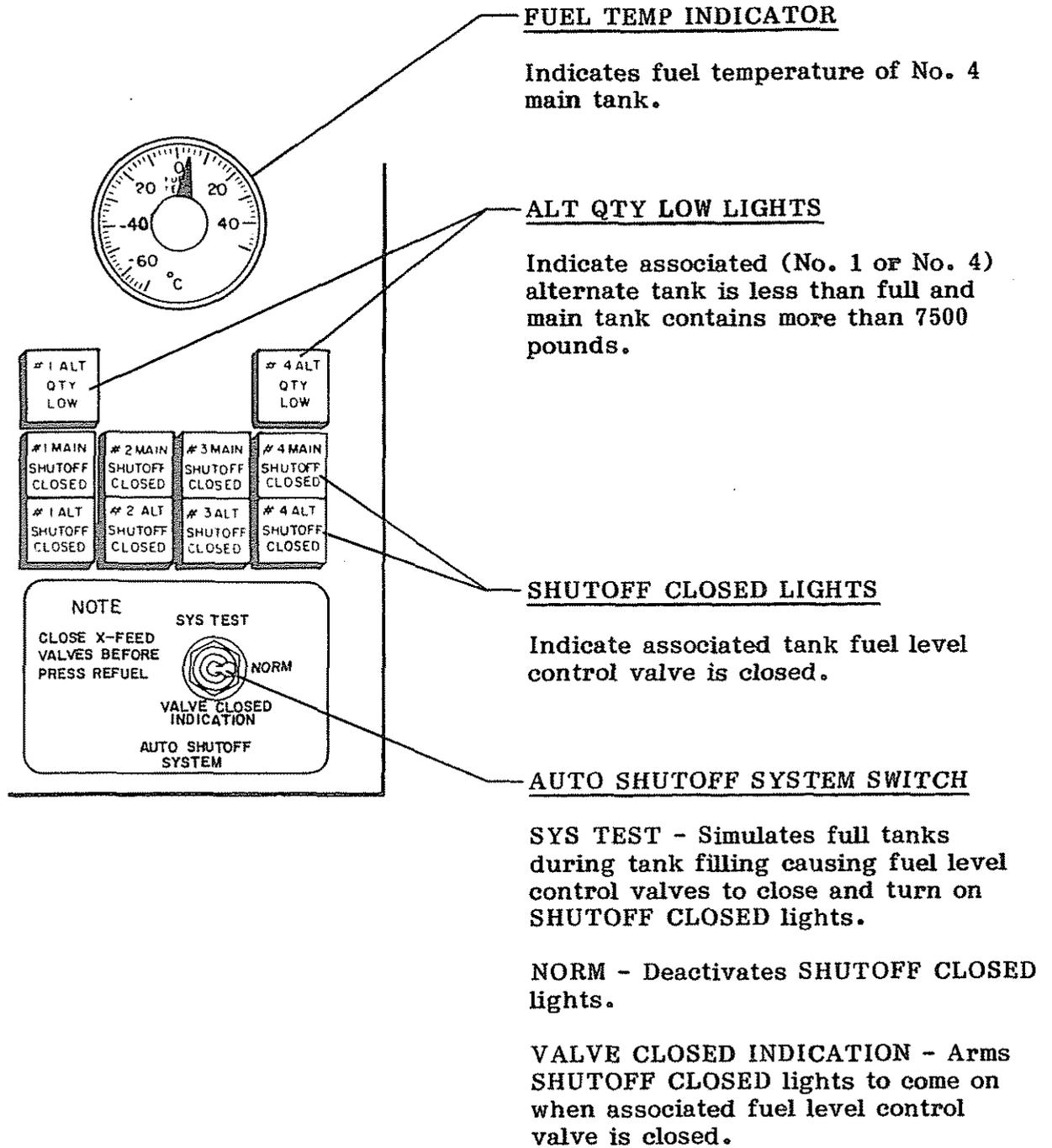
**FUEL SYSTEM CONTROL PANEL**



Location: Lower S/O Panel



FUEL SYSTEM CONTROL PANEL

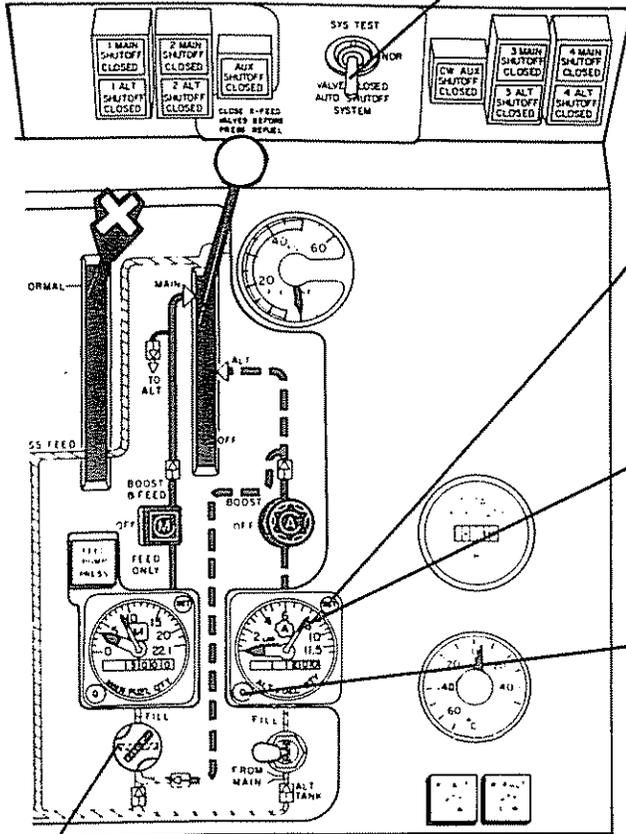


Location: Lower S/O Panel

FUEL SYSTEM CONTROL PANEL (N8177U)

**AUTO SHUTOFF SYSTEM Switch**

Different location only. Located above fuel panel.



**SET Knobs**

Position associated bug to desired fueling or transfer level for automatic fill valve closing.

**Fuel Quantity Bugs**

Control fuel quantity allowed into associated tank by closing tank fill valve when quantity reaches or exceeds bug setting.

**Q Buttons**

Simulate empty tank and cause quantity indication to decrease.

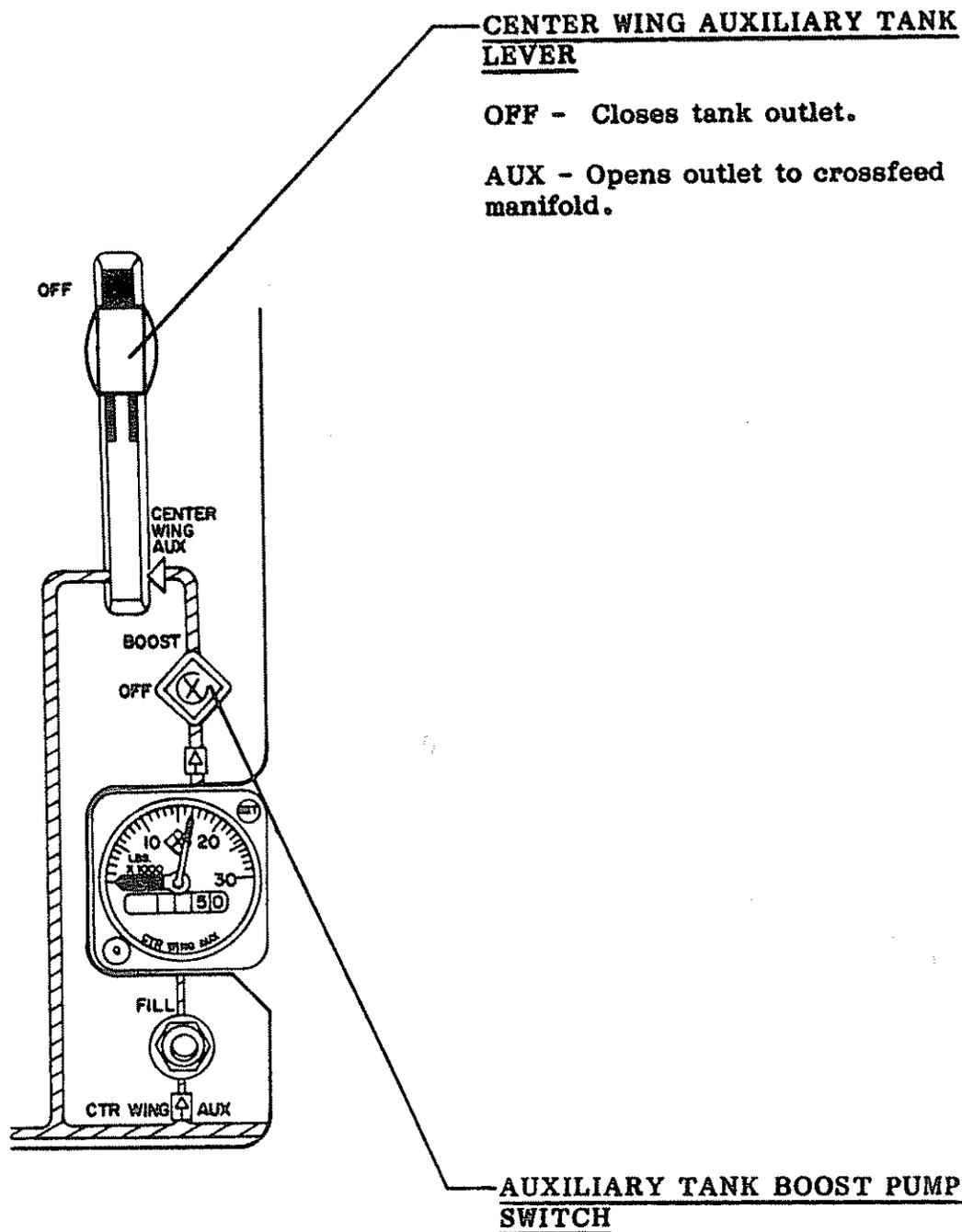
**FILL Valve Switches (1 and 4 Main Tanks)**

**INTERMEDIATE LEVEL** - Transfers fuel level control to a float switch in the associated main tank set to maintain the tank fuel level between 6100 and 7500 pounds.

**BLANK STRIPE** - Allows transfer into the associated main tank to the level selected by the bug or until the tank is full.

**Location:** Lower S/O Panel

FUEL SYSTEM CONTROL PANEL (N8177U)



CENTER WING AUXILIARY TANK LEVER

OFF - Closes tank outlet.

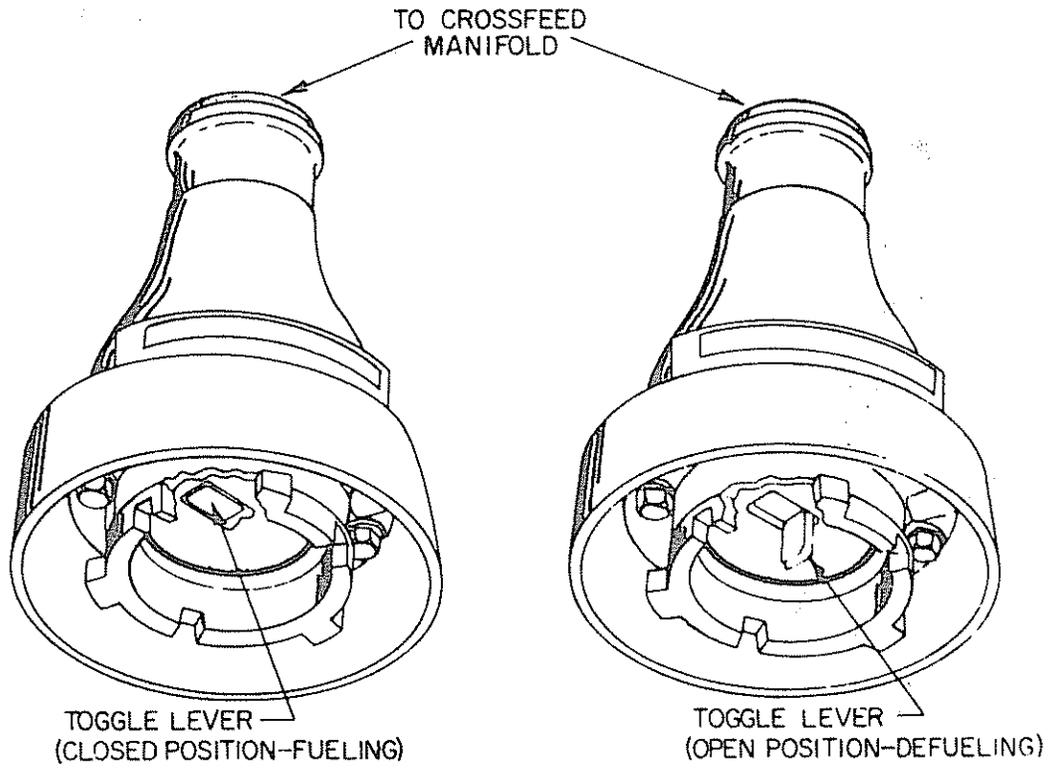
AUX - Opens outlet to crossfeed manifold.

AUXILIARY TANK BOOST PUMP SWITCH

Turns on auxiliary tank boost pumps which pressurize center wing auxiliary tank outlet making fuel available to crossfeed manifold.

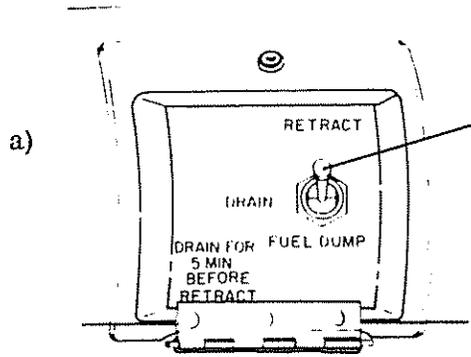
Location: Lower S/O Panel

PRESSURE FUELING ADAPTERS



Location: Left and Right Underwing

FUEL DUMP SYSTEM CONTROLS



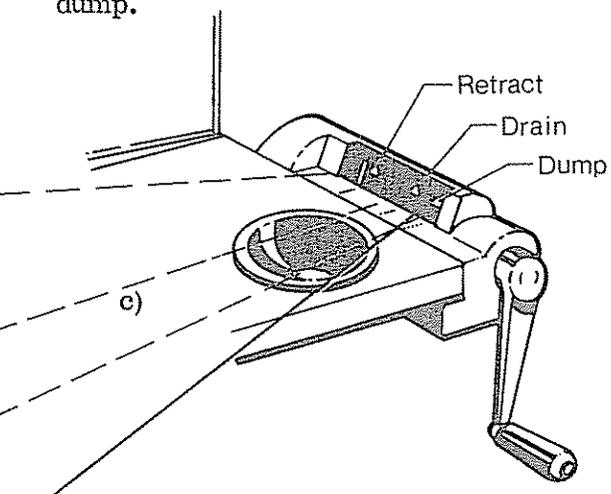
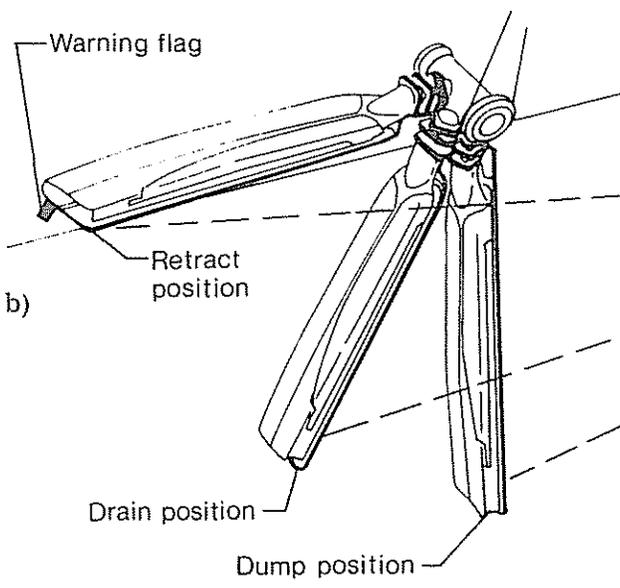
FUEL DUMP SWITCH

RETRACT - Retracts dump chutes into wing.

DRAIN - Retracts dump chutes to a mid position. Drains fuel dump lines after dumping.

FUEL DUMP - Extends dump chutes fully and opens all fuel tank dump valves.

If switch is moved directly from FUEL DUMP to RETRACT position, chutes will remain extended and fuel will continue to dump.



FUEL DUMP CHUTE INDICATOR

Indicates position and movement of underwing fuel dump chutes. The crank is normally removed and stowed near the indicator and is used for manually extending the chutes.

CAUTION

DUMP SYSTEM MUST NOT BE OPERATED ELECTRICALLY WITH HAND CRANK INSTALLED.

- Location: a) Overhead Panel  
 b) Left and Right Underwing  
 c) Lower S/O Panel

