

DC-10
FLIGHT CREW OPERATING MANUAL

CHAPTER 4
AUXILIARY POWER

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FLIGHT CREW OPERATING MANUAL

AUXILIARY POWER

GENERAL

The APU is an onboard gas turbine source of pneumatic and electrical power for engine starting, operation of the air conditioning system on the ground, and electrical system on the ground and in flight. The APU compartment is located in an unpressurized area of the lower aft fuselage section. The APU can be started in flight for auxiliary electrical power. Electrical power demand has automatic priority over pneumatic power whenever the combined demand exceeds the total APU capability. Where takeoff performance is a critical factor, the APU may be used to power the air conditioning system, in lieu of using engine bleed air during the takeoff segment.

DESCRIPTION

The APU can be started on the ground or in-flight using electrical power from the battery or from the APU start transformer-rectifier. A battery powered pump provides starting fuel flow to the APU from main tank 2. This pump is normally used for an APU start when ac power is not available. As soon as ac power is available, APU fuel can be supplied by a pump in main tank 2. Fuel pressure from at least one tank pump must be available if the APU is to be operated. When using one of the tank 2 pumps, the left, aft pump is preferred.

The APU generator is identical to the three engine-driven generators. However, in place of a CSD, a fuel governor maintains constant-speed control of the APU high pressure rotor from which the generator is driven.

The APU is capable of operating all three air conditioning packs prior to or after engine start. Also, under most conditions, the APU has sufficient capability to fulfill normal air conditioning requirements while satisfying full electrical power demands.

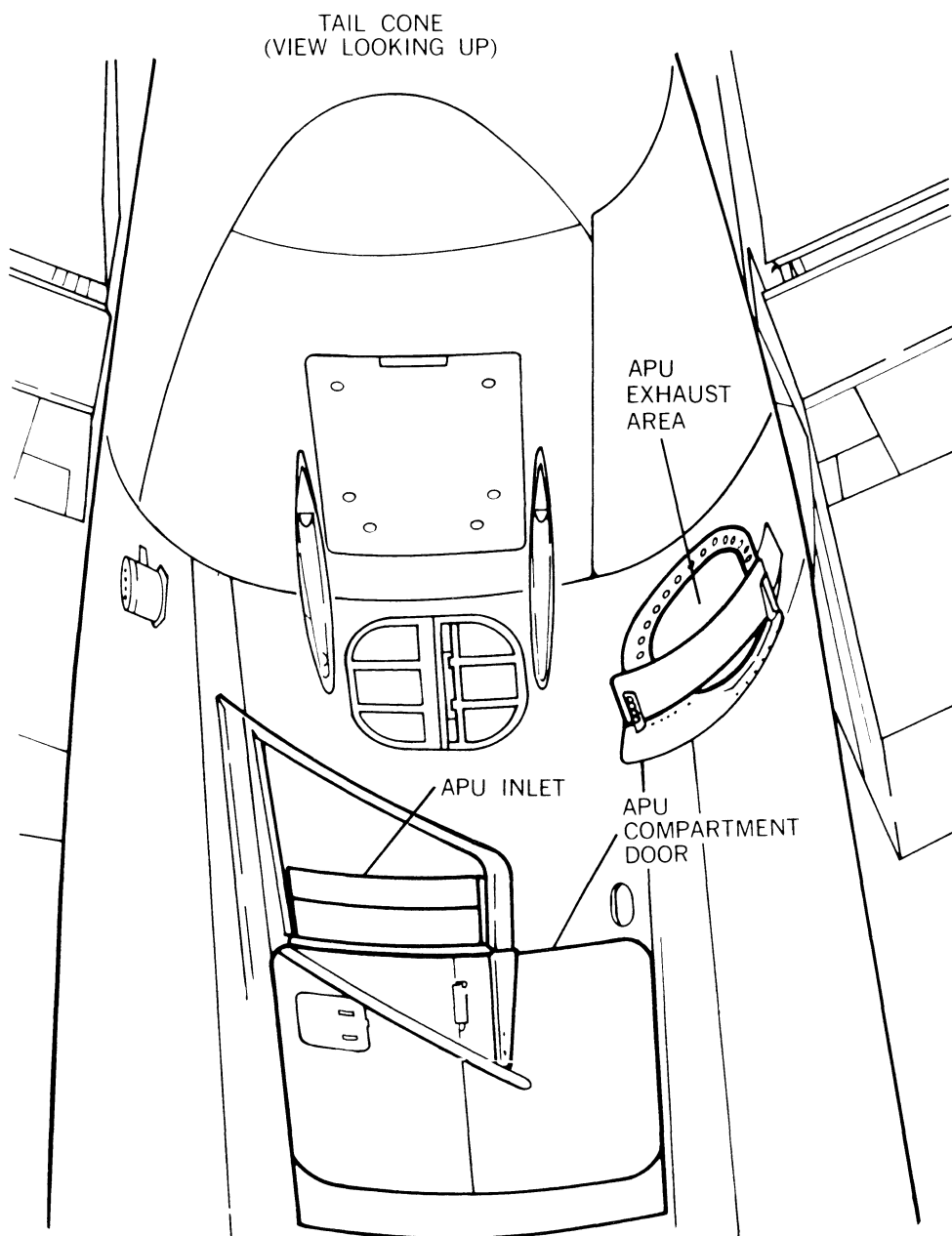
The APU control system has automatic shutdown protection for the following conditions: fire warning; overspeed; high EGT; low oil pressure; high oil temperature; starter motor energized over one minute; and loss of EGT, N₁ or N₂ signals.

CONTROLS AND INDICATORS

The controls, indicators, and annunciator lights are on the Flight Engineer's Upper Panel No. 1, Upper Panel No. 2, the Overhead Panel, and the Glareshield. Illustrations of these major panels are in Chapter 1. The individual controls and indicators are illustrated and described in another section of this chapter.

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APU EXHAUST AREA



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APU - Controls and Indicators

APU START SEL



APU START SEL

BAT — Selects the battery as the electrical power source to start the APU

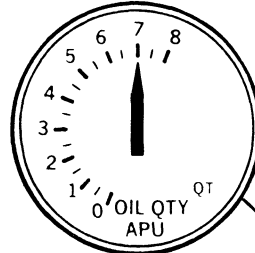
TR — Selects the APU start transformer-rectifier as the electrical power source to start the APU

NOTE

The DC current and the DC voltage of the starter may be monitored on the DC V/AMP meter when the APU is started by placing the VOLT/AMP/FREQ SEL switch at APU GEN & START position

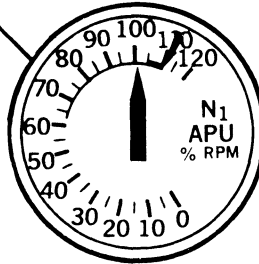
APU % RPM N₁ Gage

Indicates percent of rated rotor speed, normal operating range, caution range, and limit. Automatic shutdown will occur at 110% of rated speed. Indicator is powered from the battery bus during the start sequence and is self-powered after the APU is up to speed.



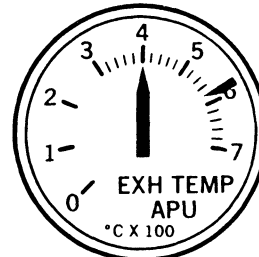
APU OIL QTY Gage

Indicates usable oil quantity remaining (in quarts). Indicator is powered from ac bus 2 and, accordingly, may not indicate during a ground start using battery power.



APU % RPM N₂ Gage

Indicates percent of rated rotor speed, normal operating range, caution range, and limit. Indicator is powered from the battery bus during the start sequence and is self-powered after the APU is up to speed.



APU EGT Gage

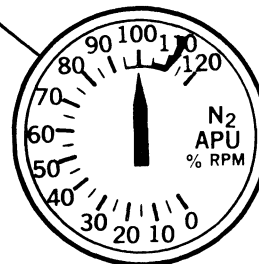
Indicates exhaust gas temperature and limit. Indicator is powered from the battery bus during the start sequence and is self-powered after the APU is up to speed.

APU OIL PRESS LO/TEMP HI Light

Comes on when either the oil pressure decreases below allowable limit or oil temperature exceeds allowable limit. Automatic shutdown will occur when light comes on except during start. The light is normally on during start and goes out at or below 50% N₂ rpm.

NOTE

If a modified electronic control box is installed, failure of the low oil pressure circuitry will prevent the APU from starting and the APU OIL PRESS LO/TEMP HI light will come on flashing during an APU start attempt.



APU USING BAT PWR Light

When on, indicates the APU is not supplying its own electrical power required for operation of the APU, and that electrical power is being supplied to the APU from the aircraft electrical system. If the battery is supplying electrical power (with this light on) and the battery switch is moved to OFF, the APU will shut down automatically. The light is normally on until the APU reaches the operating range.

NOTE

Continued operation of the APU with the APU USING BAT PWR light on, when the APU generator is inoperative and no other source of AC power is supplied to the aircraft will deplete the aircraft battery.

APU USING BAT PWR

APU OIL PRESS LO/TEMP HI

FLIGHT ENGINEER'S UPPER PANEL NO 1

Effective on some aircraft

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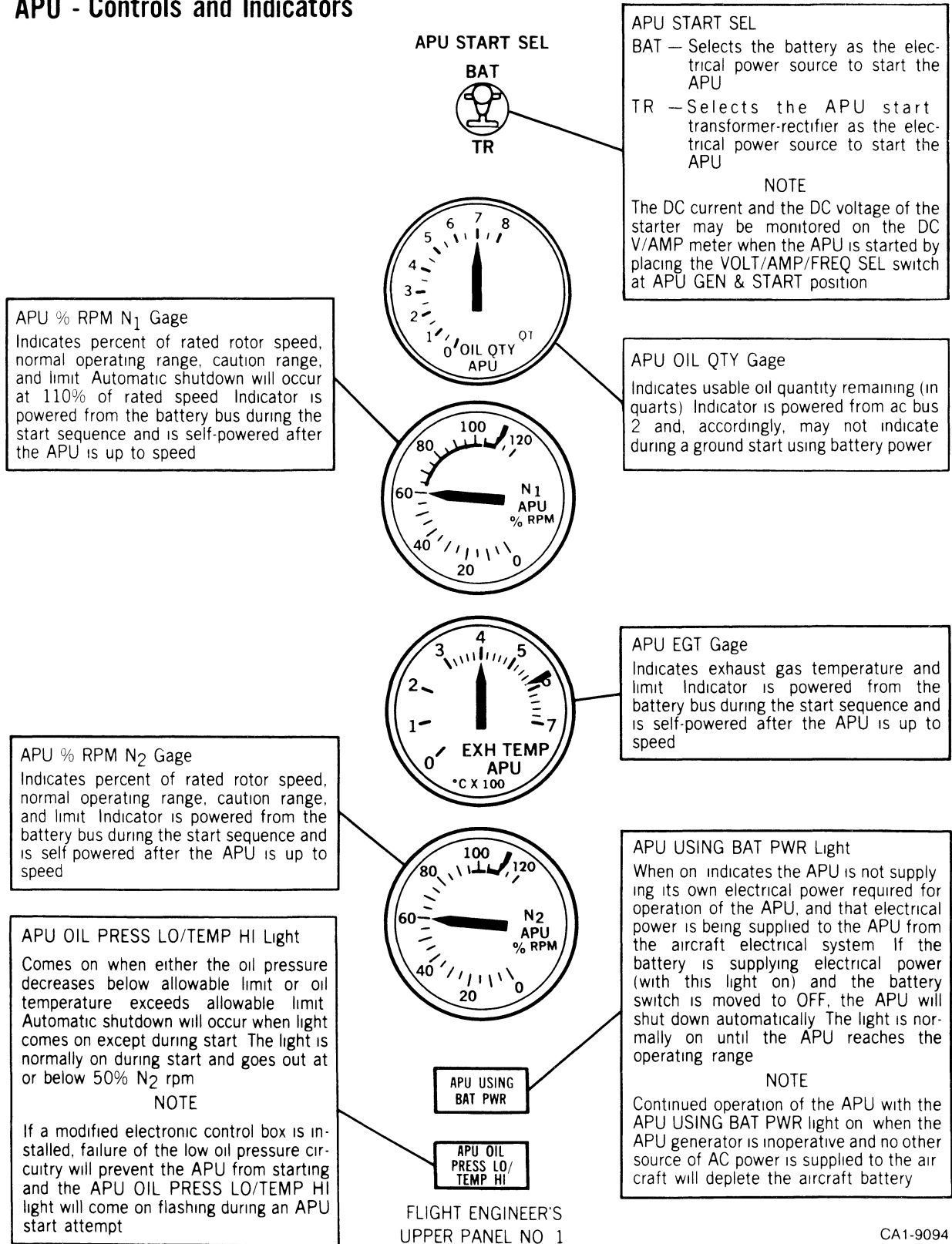
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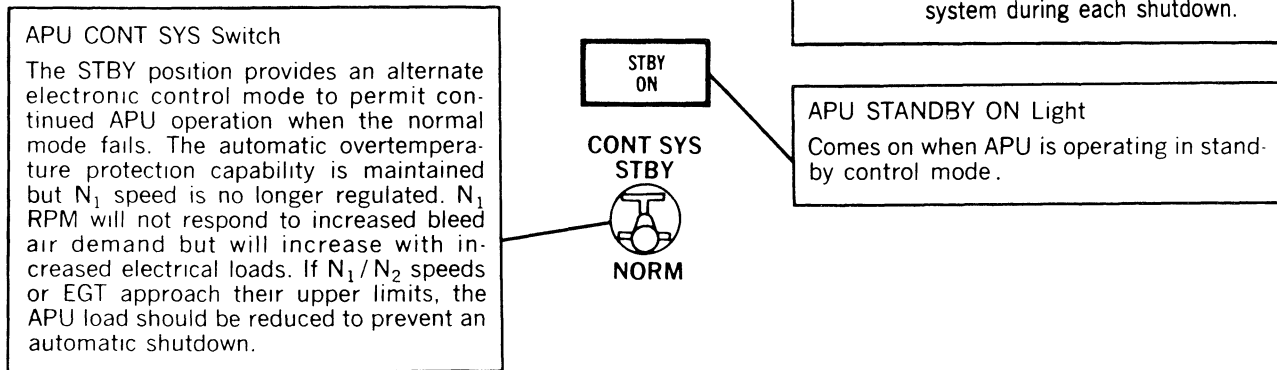
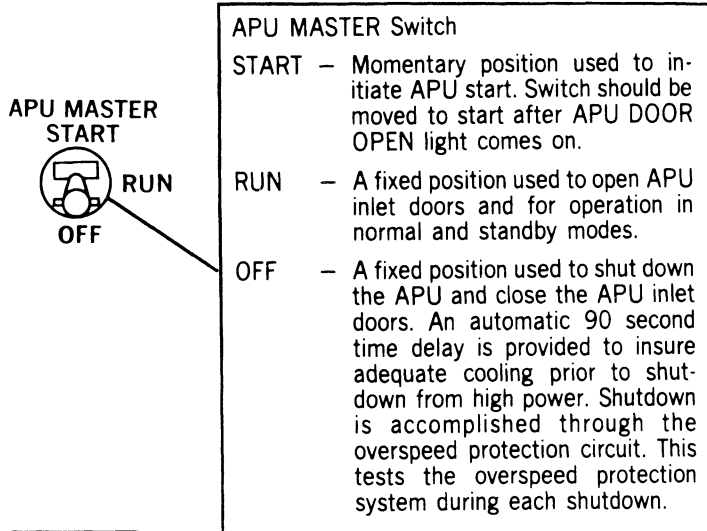
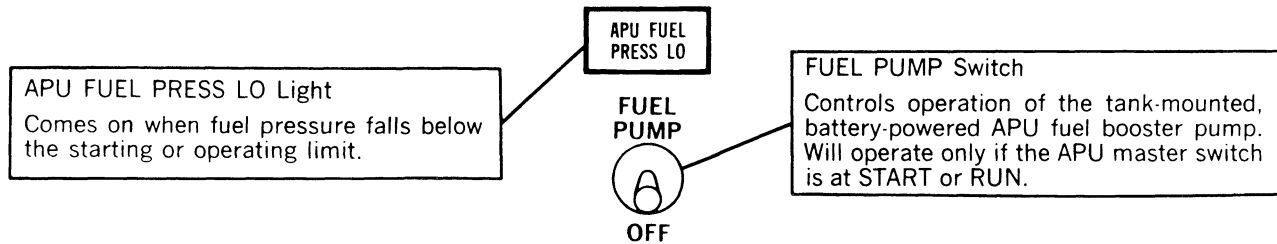
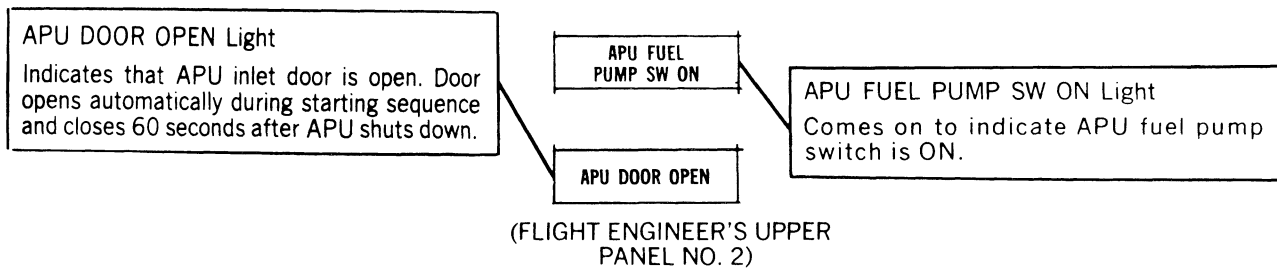
APU - Controls and Indicators



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FLIGHT CREW OPERATING MANUAL

APU - Controls and Indicators



FLIGHT ENGINEER'S UPPER PANEL NO. 1

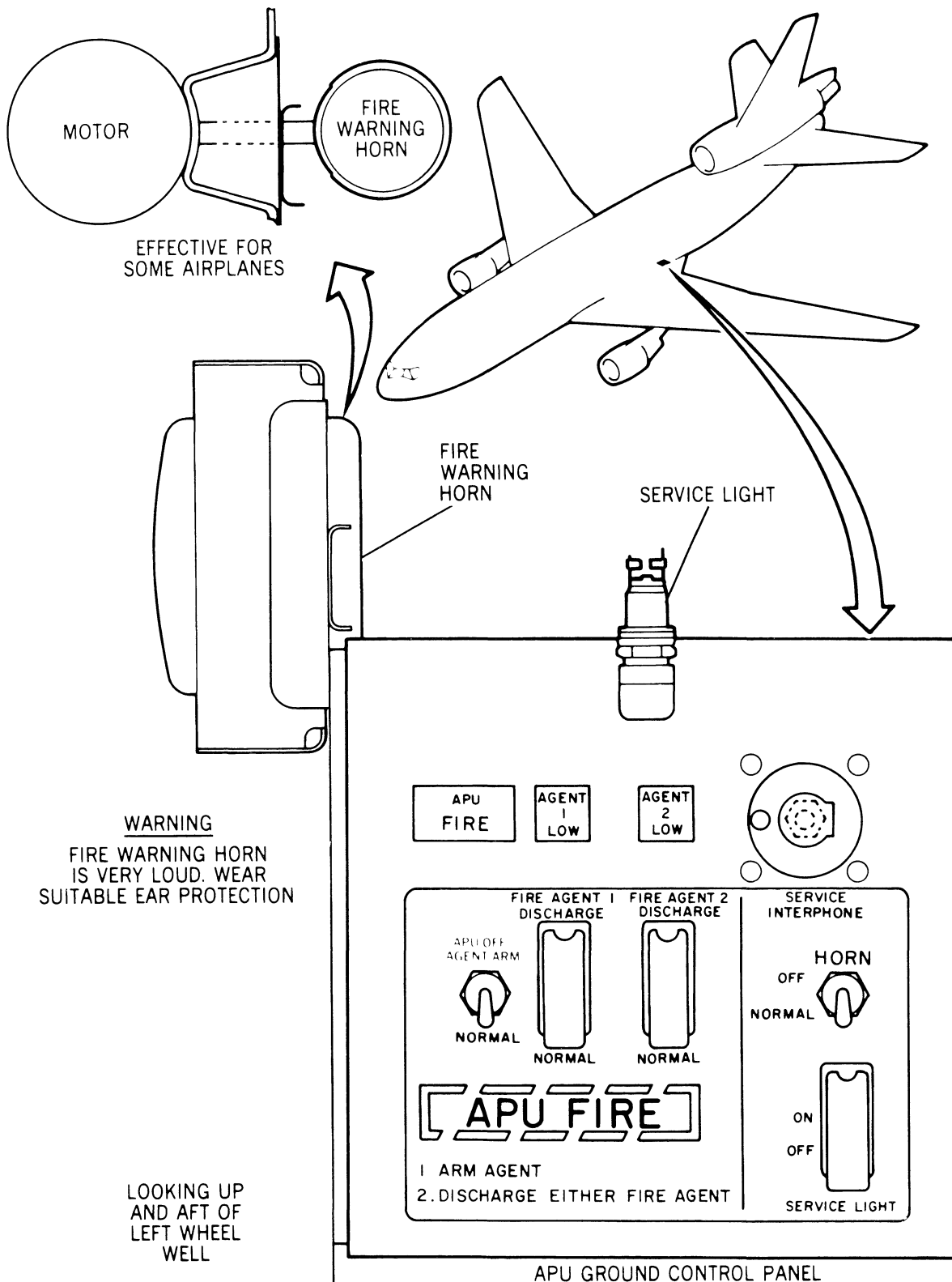
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EXTERNAL FIRE WARNING COMPONENTS



For description of above Controls and Indicators refer to Fire Protection Chapter

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APU - Controls and Indicators



APU GEN OFF LIGHT



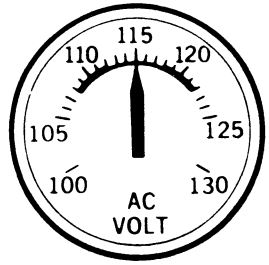
APU GEN FAIL LIGHT



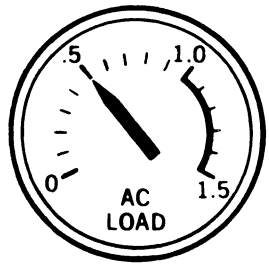
APU PWR AVAIL LIGHT (2)
(ONE ON CABIN GND SVC PANEL)



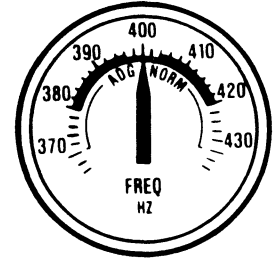
APU PWR IN USE LIGHT (4)
(ONE ON CABIN GND SVC PANEL)



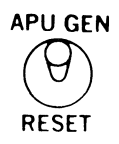
AC VOLT METER



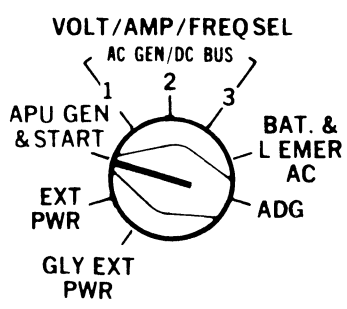
APU AC LOAD METER



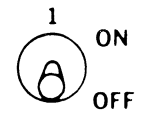
FREQ METER



APU GEN RESET SWITCH



VOLT/AMP/FREQ SEL SWITCH



APU GEN BUS SWITCH (1 2 3)

FLIGHT ENGINEER'S UPPER PANEL NO 1
(For Description of above Controls and Indicators refer to Electrical Chapter)

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APU - Controls and Indicators

APU
SCREEN
ANTI-ICE



OFF

APU SCREEN ANTI-ICE SWITCH

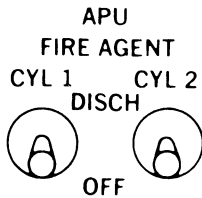
FLIGHT ENGINEER'S UPPER PANEL NO. 1

For Description of above Control refer to
Ice and Rain Protection Chapter



APU FIRE LIGHT (SUMMARY)

(OVERHEAD PANEL)



APU FIRE AGENT CYL SWITCH (1 2)



FIRE CONTROL

APU FIRE LIGHT

APU OFF
AGENT ARM

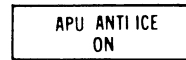


NORM

APU FIRE CONTROL SWITCH

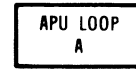
FLIGHT ENGINEER'S UPPER PANEL NO. 1

For Description of above Controls and
Indicators refer to Fire Protection Chapter

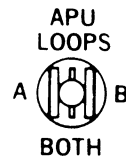


APU ANTI-ICE ON LIGHT
FLIGHT ENGINEER'S UPPER PANEL NO. 2

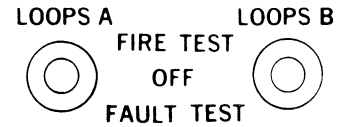
For description of above control refer to
Ice and Rain Protection Chapter



APU LOOP LIGHT (A B)



APU LOOPS SELECTOR SWITCH



LOOPS A/LOOPS B FIRE TEST/FAULT TEST SWITCHES

FLIGHT ENGINEER'S UPPER PANEL NO. 2

For Description of above Controls and
Indicators refer to Fire Protection Chapter

APU/ISOL
VALVE
OPEN



CLOSE

APU/ISOL VALVE SWITCH



APU/ISOL VALVE OPEN LIGHT

FLIGHT ENGINEER'S UPPER PANEL NO. 2

For Description of above Controls and
Indicators refer to Pneumatic Chapter

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