2A-26-10: General

The Gulfstream IV fire protection system provides a means to detect and indicate fire or overheat conditions, and to store and distribute fire extinguishing agent to all protected areas of the aircraft.

The fire detection system alerts the flight crew whenever a fire or overheat condition develops in the engine nacelles or APU enclosure. This is accomplished presenting both aural and visual warnings when temperatures reach an overheat condition. Area detectors are used in large zones; spot detectors are used in more focused areas. The engine portion of the system also provides an alert when the sensing elements (called firewires) develop a fault.

The fire extinguishing system suppresses left engine nacelle, right engine nacelle and APU compartment fires. Three extinguishing agent bottles are installed in the tail compartment; two for engine fire extinguishing and one for APU fire extinguishing. Provisions for testing the extinguishing system are also provided. In addition, two portable fire extinguishers are provided, both accessible in flight.

The Fire Protection System is divided into the following subsystems:

- 2A-26-20: Smoke Detection and Evacuation System
- 2A-26-30: Fire Detection and Warning System
- 2A-26-40: Fire Extinguishing System

2A-26-20: Smoke Detection and Evacuation System

1. General Description:

A. Smoke Detection System:

Aircraft SN 1034, SN 1156 and Subsequent

The smoke detection system provides a photo-cell smoke detector in the baggage compartment to detect and warn of smoke. It is operable and capable of being tested any time 28V Essential DC bus power is available.

Aircraft with ASC 268 incorporated have an additional smoke detector installed in the forward lavatory / radio rack area.

B. Smoke Evacuation System:

Smoke evacuation is accomplished by depressurizing the baggage compartment door seal, allowing smoke to escape overboard. Depending on aircraft effectivity, depressurizing the seal is accomplished using either the baggage door handle or the smoke evacuation valve.

2. Description of Subsystems, Units and Components:

A. Smoke Detection System:

Aircraft SN 1034, SN 1156 and Subsequent

(1) Smoke Detector:

Located in the baggage compartment, the smoke detector receives power from the Essential DC bus. It functions by passing a steady beam of light across a white surface. Smoke particles entering the detector interrupt the light beam, resulting in the following annunciations, depending on effectivity:

(a) SPZ-8000 equipped aircraft:

- Red SMOKE DETECT warning message on CAS
- Red SMOKE DETECT warning message on Standby Warning Lights Panel (SWLP)
- Red BAG COMPT SMOKE annunciator illuminating above copilot's NAV display (Figure 1)

(b) SPZ-8400 equipped aircraft:

- Red AFT BAG SMOKE warning message on CAS
- Red SMOKE DETECT warning message on SWLP (if installed)

(2) Other Smoke Detector Annunciations:

(a) On SPZ-8400 equipped aircraft, a red FWD LAV SMOKE DETECT warning message is displayed on CAS if the forward smoke detector detects smoke in the forward lavatory / radio rack area.

(b) On SPZ-8000 and SPZ-8400 equipped aircraft with ASC 415 incorporated, and airplanes SN 1390 and subsequent, a red RADIO RACK SMOKE warning message is displayed on CAS if the forward smoke detector detects smoke in the radio rack area. This CAS message is accompanied by a red SMOKE DETECT warning message on the SWLP (if installed).

(3) Smoke Detector Test Switch:

A test switch, labeled SMOKE DET TEST and shown in Figure 2, is provided to test the smoke detection system. The location and type of switch (pushbutton on center pedestal or toggle switch on copilot's console) depends on production serial number of the aircraft and operator preference during outfitting. Provided Essential DC bus power is available, selection of the TEST function results in the annunciations listed in (1).

B. Smoke Evacuation System:

Aircraft having ASC 18 (CAA Aircraft); SN 1000 through 1155 (excluding SN 1034) having ASC 157; SN 1034; SN 1156 and subsequent: Rotation of the emergency smoke evacuation valve handle (Figure 3) to the EVAC SMOKE position allows deflation of the baggage compartment door seal. With the door seal deflated, pressurized cabin air escapes around the door frame, drawing with it any smoke. Cabin altitude will climb accordingly. When smoke ceases, rotation of the valve handle to NORMAL OPS allows the door seal to reinflate.

Aircraft not having ASC 18; SN 1000 through 1155 (excluding SN 1034) not having ASC 157: Rotation of the baggage compartment door handle 45°, without opening the door, depressurizes the baggage compartment door seal.

3. Controls and Indications:

A. Circuit Breakers (CBs):

Circuit Breaker Name:	CB Panel:	Location:	Power Source:
SMOKE DET	CP	E-14	ESS DC Bus

B. Messages and Annunciations:

CAS Message:	SWLP Indication	Cause or Meaning:
AFT BAG SMOKE (1)	SMOKE DETECT	Smoke detected in aft baggage compartment.
FWD LAV SMOKE DETECT (1)	None	Smoke detected in forward lavatory area or radio rack area.
RADIO RACK SMOKE (2)	SMOKE DETECT	Smoke detected in radio rack area.
SMOKE DETECT	SMOKE DETECT	Smoke detected in area illuminated by annunciation.

NOTE(S):

(1) For SPZ-8400 equipped airplanes.

(2) For SPZ-8000 and SPZ-8400 equipped airplanes with ASC 415, and airplanes SN 1390 and subsequent.

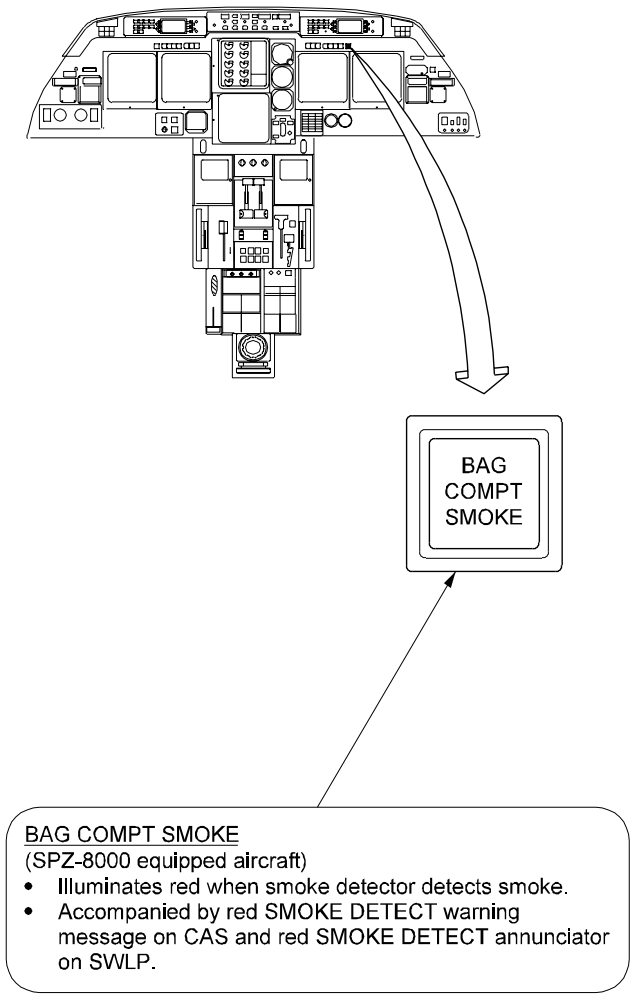
Annunciation:	Cause or Meaning:
Red BAG COMPT SMOKE light above copilot's NAV display. (1)	Smoke detected in aft baggage compartment.

NOTE(S):

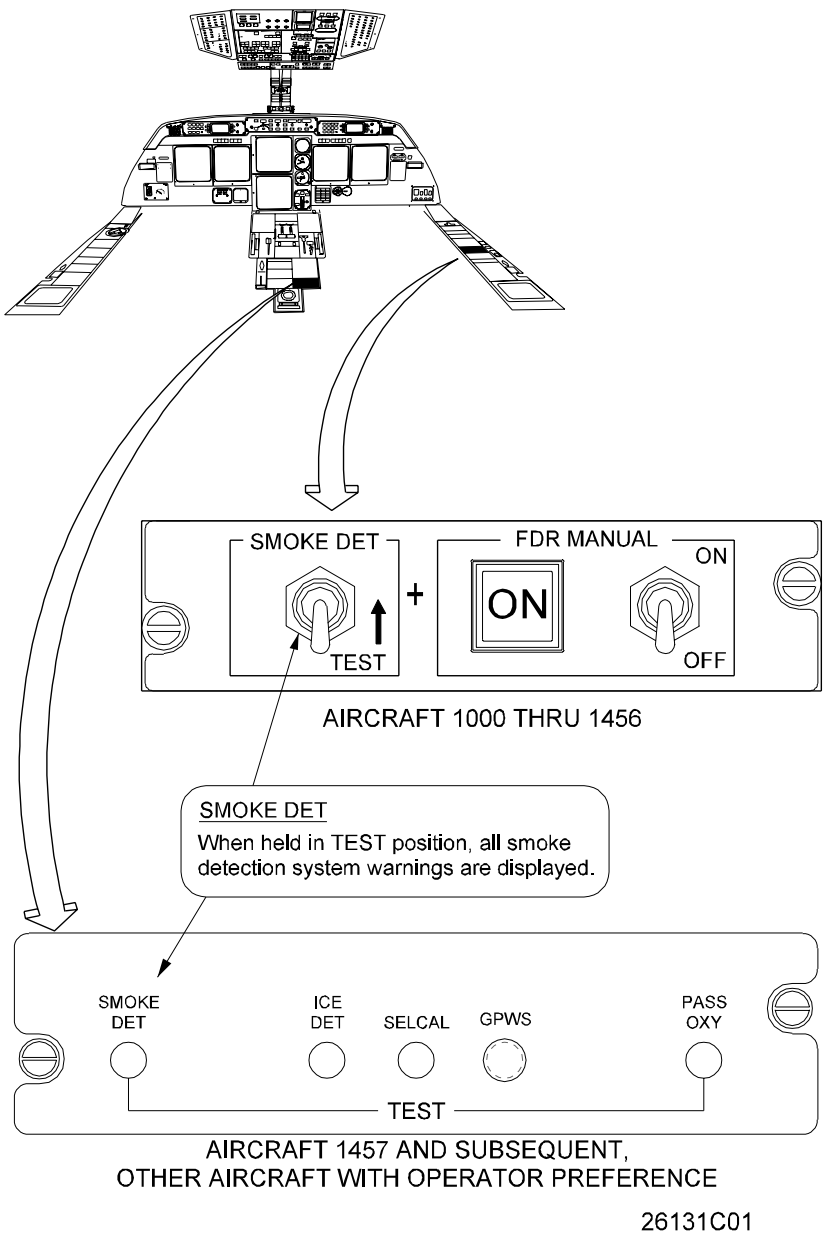
(1) For SPZ-8000 equipped aircraft.

4. Limitations:

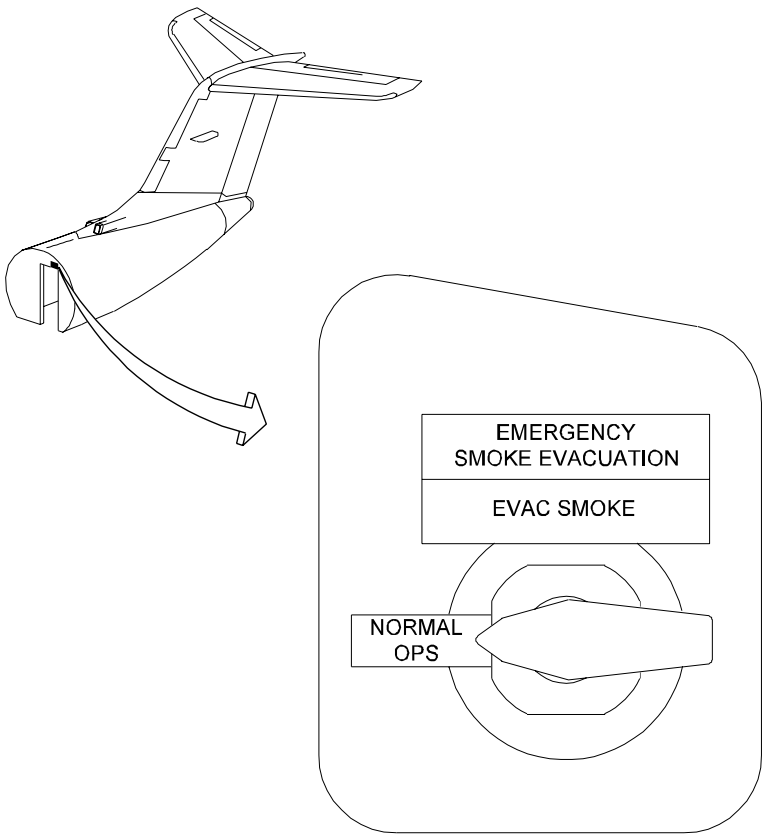
There are no limitations established for this system as of this revision.



Baggage Compartment Smoke Annunciator
Figure 1



Smoke Detector System TEST Switch
Figure 2



EMERGENCY SMOKE EVACUATION

(SN 1000-1155 (excluding SN 1034) having ASC 157; SN 1034; SN 1156 and subs)

- EVAC SMOKE: Allows deflation of baggage compartment door seal.
- NORMAL OPS: Allows baggage compartment door seal to reinflate.

26132C00

Emergency Smoke Evacuation Valve
Figure 3

2A-26-30: Fire Detection and Warning System

1. General Description:

The fire detection and warning system provides a means to detect and indicate the presence of an overheat or fire condition in the engine areas and APU enclosure. A dual channel system, it will remain functional should a single channel fail or one of its power sources be lost.

The system receives power upon selection of the battery switches to ON. It will remain operable at all times provided the Essential DC bus is powered and all associated circuit breakers are closed. Prior to APU start, the APU fire detection system is tested by the flight crew. Likewise, prior to engine start, the engine fire detection system is also tested. Any failures or faults during engine portion of the fire detection system testing are annunciated.

The fire detection and warning system remains active in sensing its respective areas during all phases of flight. The engine portion of the fire detection system continuously monitors self-health, annunciating any failures or faults.

During shutdown, the fire detection and warning system remains operable until selection of the battery switches to OFF.

2. Description of Subsystems, Units and Components:

A. Engine Fire Detection System:

A dedicated continuous-wire fire detection system monitors engine fire zone temperature with two parallel dual loops. The parallel dual loops, LOOP A and LOOP B, which are approximately one inch apart, provide independent, yet related, fire detection. Each loop consists of three series-wired sensing elements that are attached to the lower side of the engine combustion area, forward fixed cowl and aft fixed cowl. Each engine's two loops then connects to a digital engine fire detection control unit located in the tail compartment.

In response to an engine fire, the fire detection control unit triggers the appropriate visual and aural warnings. If the detection system malfunctions, the control unit triggers the appropriate CAS message and illuminates the overhead panel fault lights.

(1) Sensing Loop and Elements:

The engine's dual loops consist of two element assemblies parallel-mounted to rigid stainless steel rails. Each rail conforms to the shape of the area for which fire detection is provided. Each loop consists of three series-wired sensing elements, commonly called firewire segments.

A firewire consists of a thin stainless steel sheath containing a coaxial wire. The coaxial wire is insulated from the sheath by a semi-conductor material. Resistance of the semi-conductor varies proportionally with temperature, falling as sensor temperature increases. Simultaneously, capacitance of the sensor increases, providing a basis for logic discrimination between fire or fault. Both ends of each coaxial wire is connected to its respective portion of the fire detection control unit, while the sheath connects to the aircraft's electrical ground.

If either loop should fail or become shorted or fail for any reason, a fault alert illuminates. The flight crew may then select the faulty loop

off, leaving the remaining loop to function as a single loop system. Should a loop ever be severed, it will continue to operate normally, but will indicate as faulty during testing.

(2) Fire Detection Control Unit (FDCU):

The FDCU is a digital device that contains separate but identical circuit boards for the LOOP A and LOOP B fire detection loops. Each circuit board contains a voltage regulator, fire and fault warning logic circuits, fire and fault warning output circuits, a firewire driver and a fire warning comparator and reference selector.

Supplied with 28 VDC power from the Essential DC bus through the L/R FIRE DET circuit breakers, the FDCU generates a 400 Hz squarewave that is supplied to the fire detection loops. The FDCU uses this squarewave output and the resulting feedback signal to provide fire and fault detection.

(3) Test Control Panels:

Two system test control panels are provided for the flight crew to verify proper system operation. They are located on the cockpit overhead panel and are labeled FIRE TEST (Figure 4) and FIRE DETECTION (Figure 5). With the Essential DC bus powered, testing of the system is possible.

(4) Fire Annunciations:

When exposed to high temperatures, (e.g., engine fire), semi-conductor resistance drops and capacitance rises. If this occurs in both loops (except when a failed loop is isolated) and the changes are within the predetermined bounds as caused by heating of the firewire, the FDCU responds by triggering the fire warnings and providing a signal to the Data Acquisition Unit (DAU). Fire warnings include:

- Both upper and lower segments (LOOP A and LOOP B) of the affected engine FIRE TEST switchlight illuminate red
- The affected engine FIRE handle illuminates red. The handle's safety solenoid is activated, allowing the handle to be pulled. (Manual release of the handle is still available in the event of solenoid failure.)
- The affected engine HP fuel cock illuminates red
- Red ENG FIRE LOOP ALRT and warning message is displayed on CAS
- Red L FIRE DET LOOP capsule illuminates on the Standby Warning Lights Panel (SWLP), if the SWLP is in manual mode, or if in automatic mode coupled with CAS failure
- Both red MASTER WARN lights illuminate, with corresponding aural warning tone
- The ENGINE FIRE checklist is displayed on the lower center portion of the copilot's navigation display (DU 5) in MAP or COMP or PLAN mode (airplanes SN 1144 and subsequent and SN 1000 through 1143 with ASC 178 incorporated)

As the temperature drops, (e.g., after the fire is extinguished), semi-conductor resistance rises, capacitance drops and the FDCU

deactivates the fire warnings.

(5) Fault Annunciations:

If resistance and capacitance changes fall outside the predetermined bounds for a fire alarm, a fault alarm is generated. Additional protection against false alarms is achieved by requiring fire signals from both LOOP A and LOOP B before all cockpit fire alarm warnings are activated. A fire signal from either LOOP A or LOOP B only results in the following faulty loop annunciations, unless one of the loops has been selected off:

- Upper (FAULT) segment of the affected LOOP switchlight illuminates amber
- An amber ENG FLT LOOP ALRT caution message is displayed on CAS
- Both amber MASTER WARN lights illuminate, with corresponding aural caution tone

The flight crew would then isolate the faulty loop by selection of the illuminated switch to OFF. This restores the system to operation on the remaining good loop.

(6) Engine Fire Detection Test:

The flight crew normally performs the following engine fire detection test in the course of their normal procedures:

(a) Depress and hold the L ENG FIRE TEST switch. Verify the following:

- LOOP A and LOOP B segments of the L ENG FIRE TEST switchlight illuminate red
- Left (L) FIRE handle illuminates red
- Left engine HP fuel cock illuminates red
- Red ENG FIRE LOOP ALRT and L ENGINE HOT warning messages are displayed on CAS
- Red L ENGINE HOT and FIRE DET LOOP capsules illuminate on the Standby Warning Lights Panel (SWLP), if the SWLP is in manual mode
- Both red MASTER WARN lights illuminate, with corresponding aural warning tone
- The ENGINE FIRE checklist is displayed on the lower center portion of the copilot's navigation display (DU 5) in MAP or COMP or PLAN mode (airplanes SN 1144 and subsequent and SN 1000 through 1143 with ASC 178 incorporated)

(b) Release the L ENG FIRE TEST switch.

(c) Depress and hold the R ENG FIRE TEST switch. Verify the same annunciations are present, corresponding to the right engine.

(d) Release the R ENG FIRE TEST switch.

(7) Engine Fire Detection Fault Test:

The flight crew normally performs the following engine fire detection

fault test in the course of their normal procedures:

(a) Depress and hold the FIRE DETECTION FAULT TEST switch. Verify the following:

- Upper (FAULT) segment of the all four (4) LOOP switchlights illuminate amber
- An amber ENG FLT LOOP ALRT caution message is displayed on CAS
- Both amber MASTER WARN lights illuminate, with corresponding aural caution tone

(b) Release the FIRE DETECTION FAULT TEST switch.

B. APU Fire Detection System:

The APU is installed in a titanium and stainless steel enclosure in the tail compartment. The enclosure serves to isolate the APU from the aircraft structure and provide fire containment. Fire detection is provided by three thermal switches strategically located on the APU enclosure, with the sensing portion of the switches inside the enclosure. A fourth thermal sensing switch is placed in the air inlet duct. Placement and trip points of the sensors are:

- Top left side (APU accessory section) (450° F [232° C])
- Top center forward (load control valve) (600° F [316° C])
- Bottom aft right corner (450° F [232° C])
- APU air inlet duct (450° F [232° C])

The four thermal switches are parallel connected; therefore, any one of the four switches reaching its trip point will trigger the visual and aural APU fire annunciations. Accordingly, failure of one switch does not render the system inoperative. When a thermal switch closes, 28 VDC from the Essential DC bus (through the APU FIRE DET circuit breaker) closes a logic relay, causing the following visual and aural APU fire annunciations:

- Red APU FIRE warning capsule on APU control panel illuminates (Figure 6)
- Red APU FIRE warning message is displayed on CAS
- Red APU FIRE capsule illuminates on the SWLP, if the SWLP is in manual mode, or if in automatic mode coupled with CAS failure
- Both red MASTER WARN lights illuminate, with corresponding aural warning tone
- Nosewheel well warning bell (or tone speaker) sounds (if aircraft is on the ground)
- The APU FIRE checklist is displayed on the lower center portion of the copilot's navigation display (DU 5) in MAP or COMP or PLAN mode (airplanes SN 1144 and subsequent and SN 1000 through 1143 with ASC 178 incorporated)
- If the logic relay closes due to an actual fire warning (not a test), the APU will also be made to flame out

When the temperature drops below the thermal switch trigger point, the switch opens to de-energize the logic relay, deactivating the fire warnings.

Testing the APU fire detection system is accomplished using the APU FIRE

TEST switch, located on the cockpit overhead panel and shown in Figure 4. With Essential DC bus power available and the switch depressed and held, all of the previously-listed annunciations will occur, except the APU, if running, will not be made to flame out. Releasing the switch removes all annunciations.

C. Engine Overheat Detection:

Low pressure engine bleed air cools various parts of the engine. After cooling the engine, the air exhausts overboard through a duct on the bottom of the engine cowling. A thermal switch in this duct monitors cooling air temperature as it is exhausted overboard.

If engine cooling air temperature exceeds 860 ±25° F (460 ±15° C), the thermal switch closes to trigger the following annunciations:

- Red L-R ENGINE HOT warning message is displayed on CAS
- Red L (or R) ENGINE HOT capsule illuminates on the SWLP, if the SWLP is in manual mode, or if in automatic mode coupled with CAS failure
- Both red MASTER WARN lights illuminate, with corresponding aural warning tone

Like the fire detection systems, when the temperature drops below the thermal switch trigger point, the switch opens, deactivating the overheat warnings. Also like the fire detection systems, the overheat detection system receives power from the Essential DC bus.

D. Other Overheat Detectors:

Although not included in the engine or APU fire / overheat detection and warning system, the following overheat sensing components and their resultant annunciations bear discussion here. For more information on these overheat sensing components, see their respective system description.

(1) Aft Equipment Compartment:

A thermal switch is installed on each side of the aft equipment compartment (tail compartment), adjacent to the bleed air manifolds. The two switches, wired in parallel, close at 200 ±5° F (93 ±3° C) to trigger a red AFT EQUIP HOT warning message on CAS. A red AFT EQUIP HOT capsule will illuminate on the SWLP, if installed.

(2) Engine Pylons:

Three thermal switches installed in each engine pylon adjacent to the high stage bleed air pressure regulator and precooler. If any of the thermal switches reaches 300 ±5° F (149 ±5° C) the switch closes to trigger a red L-R PYLON HOT warning message on CAS. A red L (or R) PYLON HOT capsule will illuminate on the SWLP, if installed.

(3) Bleed Air Ducts:

A thermal switch is installed downstream of each bleed air precooler heat exchanger. The switch closes when air temperature downstream of the precooler reaches 200 ±5° F (93 ±3° C), triggering an amber L-R BLEED AIR HOT caution message on CAS.

(4) Nose Cowl Anti-Icing:

A thermal switch is installed downstream of each engine's anti-ice valve. The switch closes when air temperature downstream of the valve reaches 662 ±15° F (350 ±8° C), triggering an amber L-R COWL A/I OVHT caution message on CAS.

(5) Wing Anti-Icing:

Each wing leading edge plenum contains three thermal switches. The switches monitor wing leading edge temperature at the inboard, mid-wing and outboard areas to provide overheat warnings. Normally, wing leading edge temperature with anti-icing operating is approximately 130° F (54° C).

Each wing's three switches are wired in parallel and will close at 180 ±5° F (82 ±3° C), triggering an amber L-R WING HOT caution message on CAS.

(6) Radio Racks and Nose Avionics Bay:

Ten thermal switches, eight installed in the left and right avionics bays and two in the nose avionics bay, monitor temperatures in these areas. The switches, wired in parallel, close at 200 ±5° F (93 ±3° C), triggering an amber FWD RADIO RACK HOT caution message on CAS.

(7) Under Floor (Aircraft 1280 and Subsequent):

Eight thermal switches are mounted under the floor in the aft cabin. The switches, wired in parallel, close between 120-135° F (49-58° C) to trigger an amber UNDER FLOOR O'HEAT caution message on CAS.

(8) Pressure Bulkhead Inspection Window:

An inspection window is installed in the center of the aft pressure dome bulkhead to permit visual inspection of the tail compartment from within the baggage compartment.

3. Controls and Indications:

A. Circuit Breakers (CBs):

Circuit Breaker Name:	CB Panel:	Location:	Power Source:
APU FIRE WARN	P	A-4	ESS DC Bus
FIRE BELL	P	B-4	ESS DC Bus
L ENG O'HT	P	G-9	ESS DC Bus
R ENG O'HT	P	H-9	ESS DC Bus
L FIRE DET LOOP A	P	I-6	ESS DC Bus
L FIRE DET LOOP B	P	G-6	ESS DC Bus
R FIRE DET LOOP A	P	J-6	ESS DC Bus
R FIRE DET LOOP B	P	H-6	ESS DC Bus

B. Warning (Red) Messages and Annunciations:

CAS Message:	SWLP Indication	Cause or Meaning:
AFT EQUIP HOT	AFT EQUIP HOT	Aft equipment area temperature above 200° F (93° C). Possibility exists that high pressure duct has blown or that fire is in progress.

CAS Message:	SWLP Indication	Cause or Meaning:
APU FIRE	APU FIRE	APU fire detected.
ENG FIRE LOOP ALRT	FIRE DET LOOP	Engine fire loop senses fire.
L-R ENGINE HOT	L ENGINE HOT R ENGINE HOT	Engine cooling air temperature above 860° F (460° C).
L-R PYLON HOT	L PYLON HOT R PYLON HOT	Pylon temperature is above 325° F (163° C).

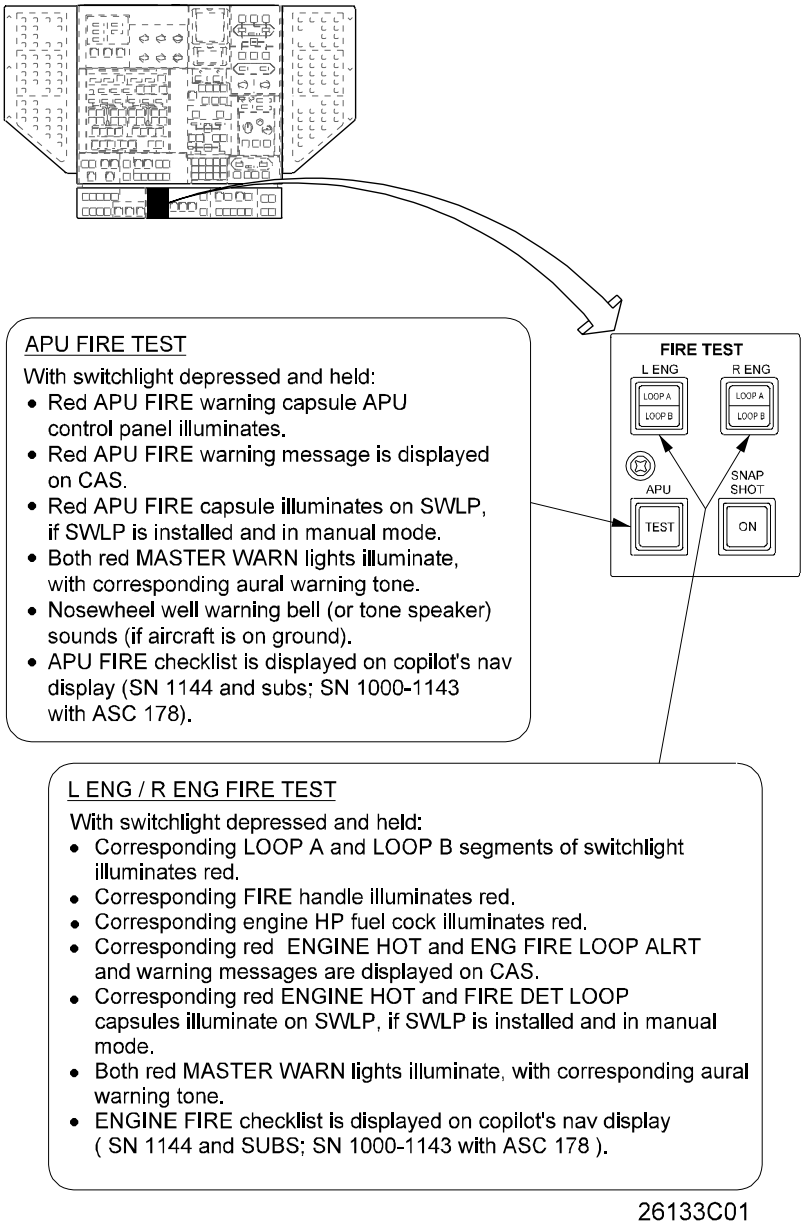
Annunciation:	Cause or Meaning:
Red LOOP A or LOOP B segments of L ENG or R ENG FIRE TEST switches illuminated. Red light in L / R Fire Handle. Red light in L / R HP FUEL COCK handle.	An engine fire loop senses fire.
Red APU FIRE light on the APU control panel.	APU fire sensors detect fire.
Nosewheel well APU fire bell or speaker tone sounds.	APU fire sensors detect fire.

C. Caution (Amber) Messages and Annunciations:

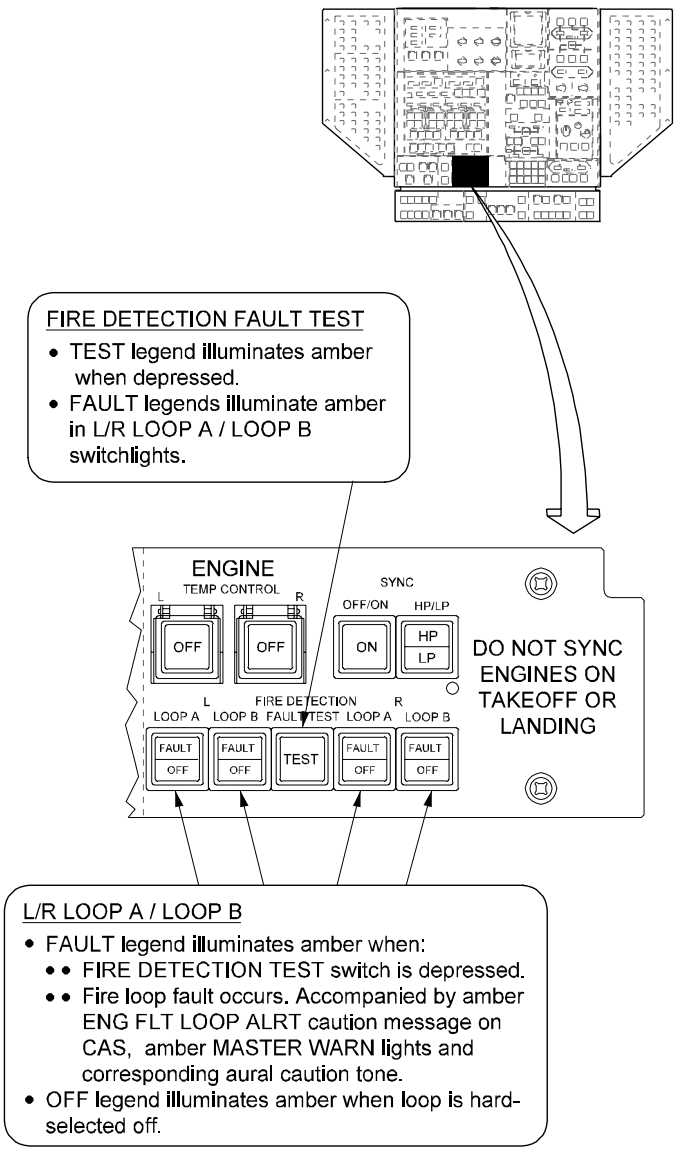
CAS Message:	Cause or Meaning:
L-R BLEED AIR HOT	Bleed air temperature is above 550° F (288° C).
L-R COWL A/I OVHT	Engine cowl temperature is above 662° F (350° C).
ENG FLT LOOP ALRT	Engine fire detection loop fault detector active.
FWD RADIO RACK HOT	Inside radome, left or right equipment bay temperature has exceeded 200° F (93° C).
L-R WING HOT	Wing anti-ice exhaust duct temperature is greater than 180° F (82° C).
UNDER FLOOR O'HEAT	Bleed air leak detected under cabin floor.

4. Limitations:

There are no limitations established for this system as of this revision.

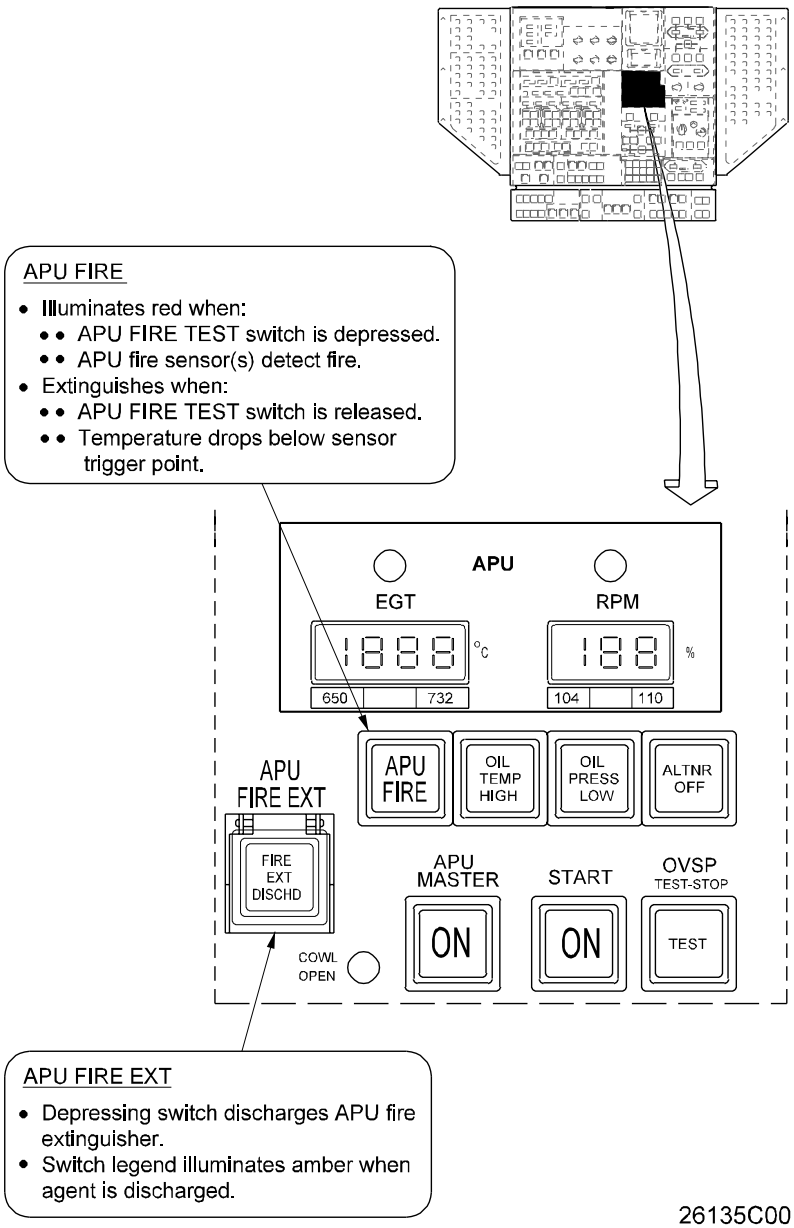


Engine / APU FIRE TEST Switches
Figure 4



26134C00

Engine FIRE DETECTION TEST Switches
Figure 5



APU Fire Annunciator / APU FIRE EXT Switch
Figure 6

2A-26-40: Fire Extinguishing System

1. General Description:

The fire extinguishing system provides the flight crew with fixed and portable methods to suppress fire in each engine nacelle, the APU compartment or pressure vessel area. The following subsystems, units and components together compose this system:

- Engine Fire Extinguishing System
- APU Fire Extinguishing System
- Portable Fire Extinguishing System

The engine and APU fire extinguishing systems use Halon™1301 (CF_3Br) pressurized with gaseous nitrogen. A relatively nontoxic and noncorrosive agent, Halon™ 1301 works by chemically interfering with the combustion process. Both the engine and APU fire extinguishing systems remain fully operative down to and including battery-only power configuration.

Two portable fire extinguishers are installed in production standard aircraft. The cockpit fire extinguisher contains either Halon™ 1211 or Carbon Dioxide (CO_2). The cabin fire extinguisher is filled with water.

2. Description of Subsystems, Units and Components:

A. Engine Fire Extinguishing System:

The engine fire extinguishing system, shown simplified in Figure 7, is classified as a “two shot” system. It consists of a left and right fire bottle and associated agent discharge handle (rotary switch) for the aircraft engines. Power for the system is supplied from the 28V Essential DC bus.

(1) Fire Extinguishing Bottles:

Two identical, single-shot fire extinguishing bottles are mounted on the left and right sides in the tail compartment. Each single-shot bottle is loaded with 5.6 pounds by weight of Halon™ 1301 and is charged with nitrogen to 600 +25 / -0 psi at 70° F. Each bottle has two firing heads, each containing an electrically-fired dual-squib cartridge. Either head being fired discharges the extinguishing agent into the distribution system. The bottles are fired by switches activated by rotation of the FIRE handle to the left or right.

Each bottle contains a thermal discharge device. If excessive temperature builds up within a fire bottle, a frangible disc ruptures and the entire contents of the bottle is discharged into the tail compartment. If excessive pressure builds within up the bottle, a blowout disc in the thermal discharge port ruptures at 1600 ±200 psi, releasing the contents into the tail compartment.

Each bottle has an incorporated pressure gauge which can be viewed from outside the aircraft through a small window built into the skin adjacent to the bottles. The windows, located on each side of the fuselage under the pylon, are used to check bottle pressure during preflight inspections.

(2) Extinguishing Agent Plumbing:

The extinguishing agent plumbing routes extinguishing agent from the fire bottle to the engine cowling interior areas. Crossover lines and double-check tees provide the capability to discharge either

bottle to either engine or both bottles to one engine.

On each side, the line from the common side of the double-check tee is routed through the pylon into the engine fire zone. The agent is then distributed by means of a distribution line which runs fore and aft with dual nozzles at each end.

(3) Fire Handles:

Located on the forward portion of the cockpit center pedestal and shown in Figure 8, the FIRE handles are labeled L (for left) and R (for right). They are normally locked in the IN position. When a valid fire signal is provided by the engine fire detection system, an internal lock-release solenoid is automatically energized, allowing the associated FIRE handle to be pulled to the OUT position. A manual override button is also provided underneath each handle to override the lock-release solenoid, allowing the FIRE handle to be pulled to the OUT position at all times.

Pulling the FIRE handle OUT approximately ½ to ¾ inches causes the following to occur:

- Engine fuel shutoff valves will close
- Hydraulic shutoff valves will close
- Alternator will be shut off
- Thrust reverser will be disabled

Once in the OUT position, each FIRE handle is capable of rotation to two positions, labeled DISCH 1 and DISCH 2. Rotation of the handle to the appropriate position supplies 28 VDC power to the associated cartridge on the bottle. Application of power detonates the squib, freeing the extinguishing agent to flow to the affected engine. Discharge logic is shown in the following table:

FIRE HANDLE PULLED	ROTATED TO	DISCHARGES	INTO
L	DISCH 1	LEFT Fire Bottle	Left Engine Nacelle
	DISCH 2	RIGHT Fire Bottle	
R	DISCH 1	RIGHT Fire Bottle	Right Engine Nacelle
	DISCH 2	LEFT Fire Bottle	

NOTE:

Once a fire bottle has been discharged, it must be removed for refilling.

B. APU Fire Extinguishing System:

The APU fire extinguishing system, shown simplified in Figure 7, incorporates a single-shot bottle located in the tail compartment. The APU fire bottle is loaded with 2.5 pounds by weight of Halon™ 1301 and is charged with nitrogen to 600 +25 / -0 psi at 70° F. The firing head being is identical to those used on the engine fire bottles, except only one is installed on the APU fire bottle.

The APU fire bottle is located on the aft side of the APU compartment, under the utility hydraulic pump. A pressure gauge is installed on the bottle,

allowing pressure to be checked on preflight inspections. The tail compartment must be entered, however to gain access to the gauge. Like the engine fire bottles, pressure and thermal relief are provided. Also like the engine fire bottles, once discharged, the APU fire bottle cannot be refilled on the aircraft.

Firing the bottle is accomplished by depressing the APU FIRE EXT switch, located on the APU control panel on the cockpit overhead panel. Depressing the switch allows 28 VDC power to detonate the squib, freeing the extinguishing agent to flow through a single dedicated line to the APU compartment. The amber FIRE EXT DISCHD legend in the switch will then illuminate.

C. Portable Fire Extinguishing System:

The aircraft is equipped with two portable fire extinguishers (Figure 9) to aid the flight crew in combating different types of fires which may occur. The cockpit fire extinguisher contains either Halon™ 1211 or Carbon Dioxide (CO_2). The cabin fire extinguisher contains water.

The cockpit fire extinguisher is mounted behind the copilot's seat and is used to combat Class A, B and C fires. It is typically loaded with Halon™ 1211 and pressurized with nitrogen. Halon™ 1211 is a relatively nontoxic agent that leaves no residue.

Cockpit fire extinguishers loaded with CO_2 contain a safety disc to permit release of the agent through the horn in the event of excessive pressure.

The cabin fire extinguisher is typically located on the aft end of the radio rack. It is loaded with water and uses an incorporated CO_2 cartridge to expel the water. It should be used to combat only Class A fires. Twisting the handle punctures the cartridge and pressurizes the container, making the extinguisher ready for use. If inadvertently pressurized, the extinguisher should not be left in the aircraft. Rather, it should be removed from the aircraft, discharged and serviced in accordance with the GIV Aircraft Maintenance Manual.

3. Controls and Indications:

A. Circuit Breakers (CBs):

Circuit Breaker Name:	CB Panel:	Location:	Power Source:
APU FIRE EXT	P	I-10	ESS DC Bus
FIRE EXT SHOT #1	P	G-8	ESS DC Bus
FIRE EXT SHOT #2	P	H-8	ESS DC Bus

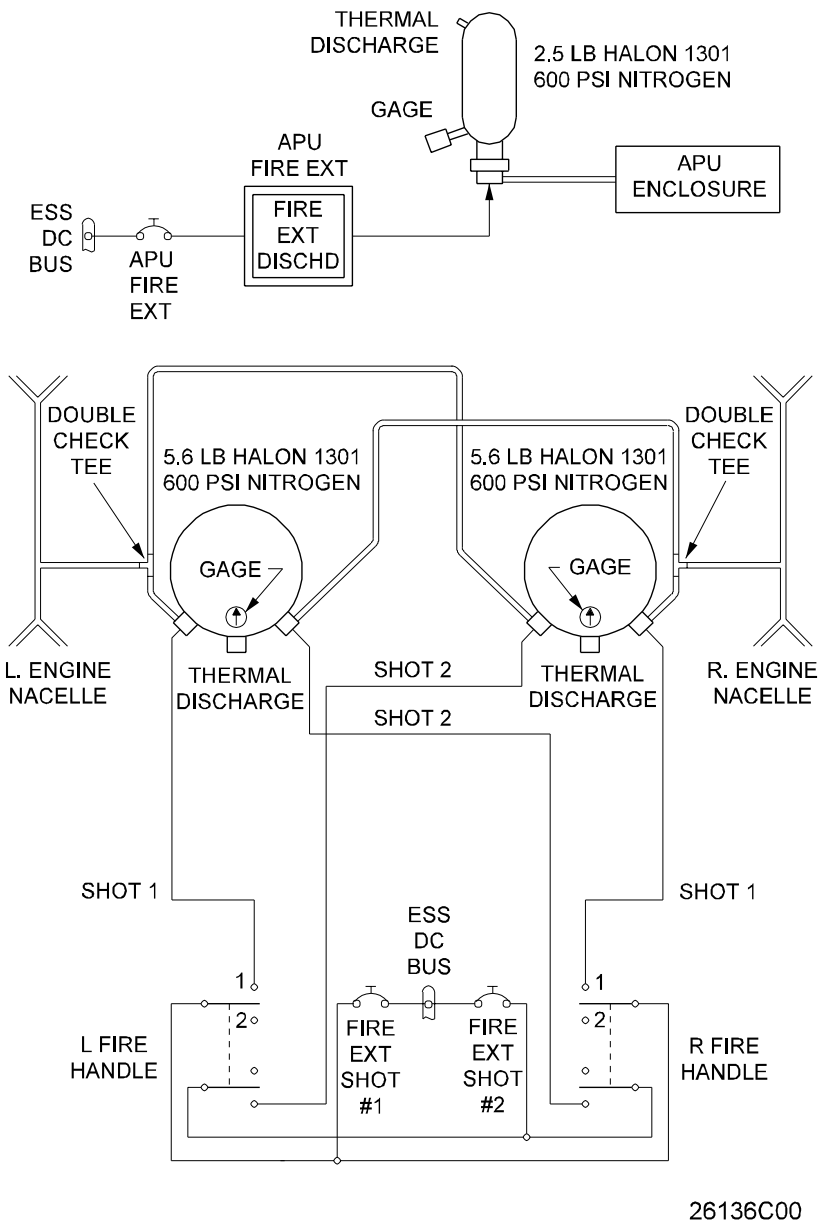
B. Messages and Annunciations:

Annunciation:	Cause or Meaning:
Amber FIRE EXT DISCHD legend illuminated on APU FIRE EXT switch on APU control panel.	APU fire extinguisher agent discharged.

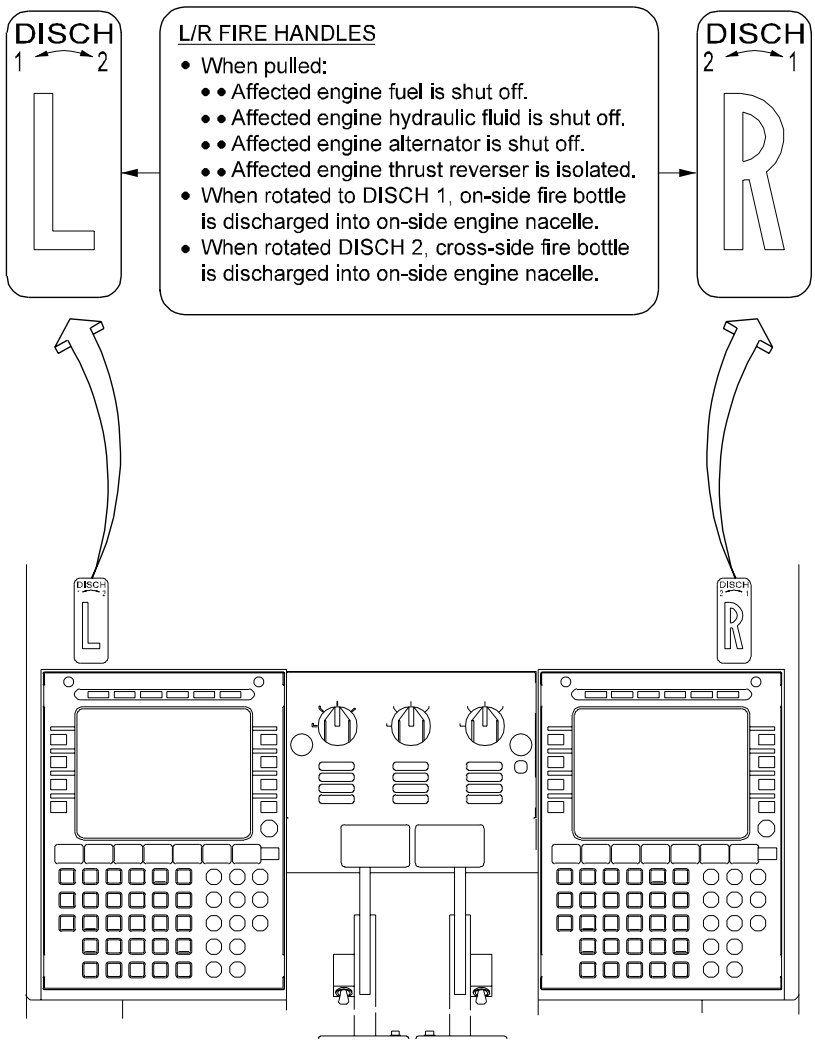
4. Limitations:

A. Flight Manual Limitations:

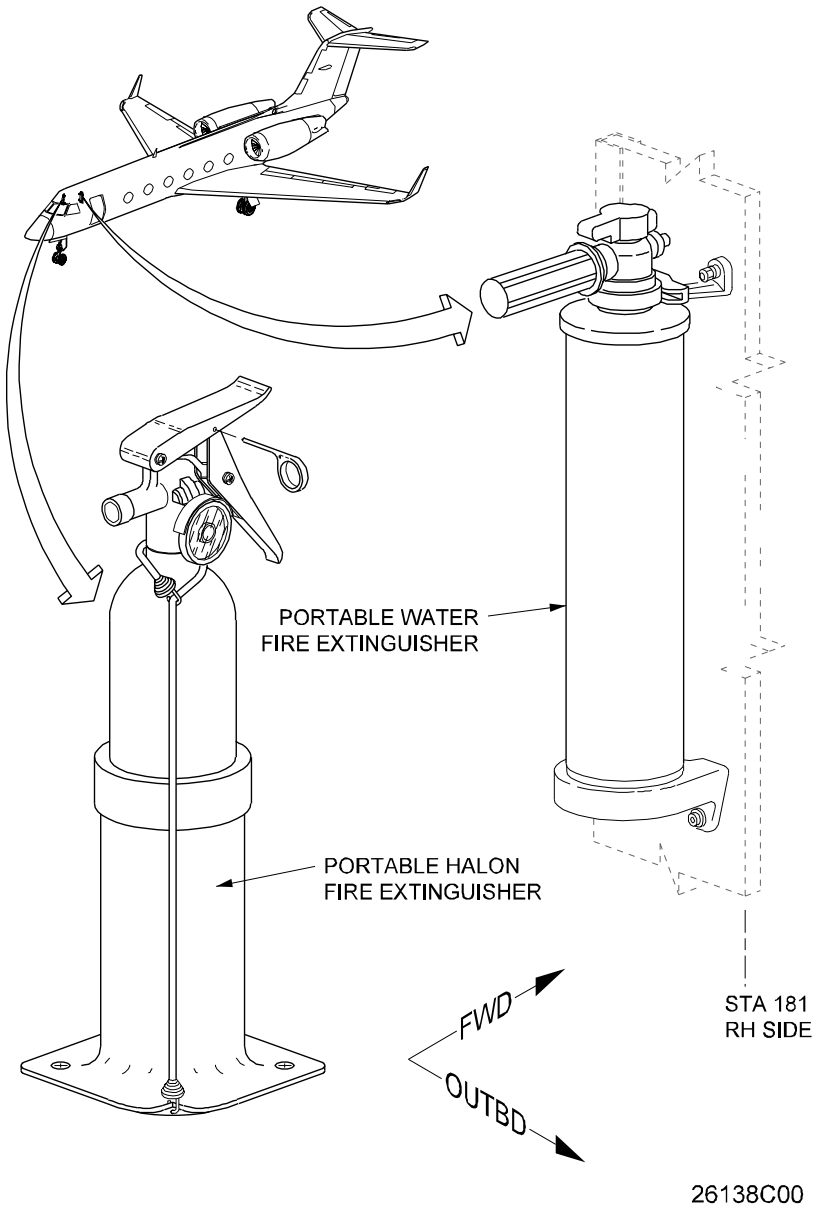
There are no limitations established at the time of this revision.



Engine / APU Fire Extinguishing System Simplified Block Diagram
Figure 7



Engine FIRE Handles
Figure 8



Portable Fire Extinguishers
Figure 9