CHAPTER 8

FIRE PROTECTION

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FIRE PROTECTION

General

The aircraft fire protection system consists of the following:

- engine nacelle fire detection system
- engine nacelle overheat fire detection system
- engine nacelle fire and overheat system fault warning
- engine nacelle fire extinguisher system
- non-engine detection/protection.

The fire detection system and an overheat detection system give visual and aural annunciations of a fire or overheat in the engine nacelle zones.

1. Engine Nacelle Fire Detection System

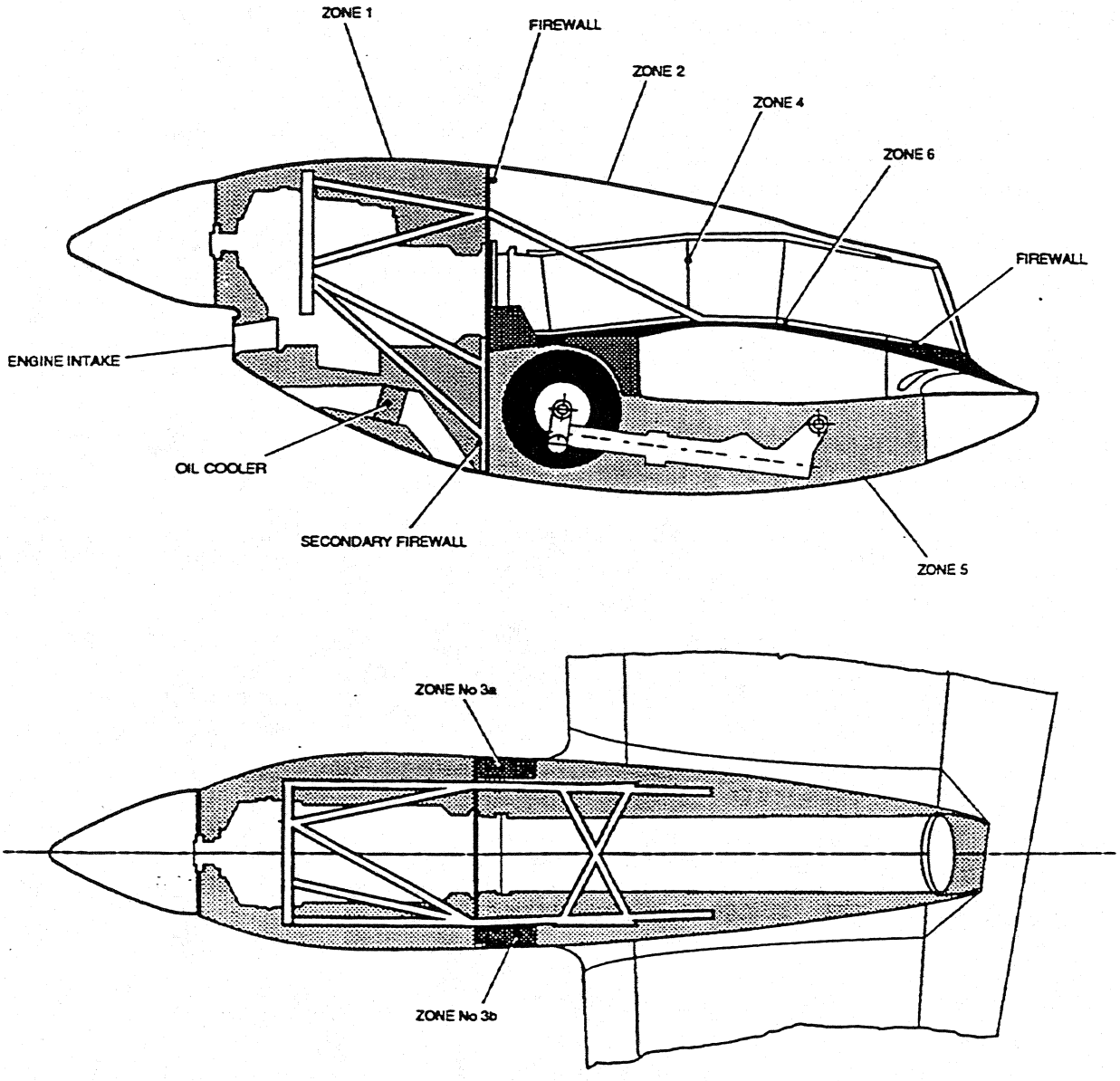
A. System Description

An independent fire detection system monitors each engine nacelle. The system gives protection in three nacelle areas:

- The engine nacelle forward of the firewall (zone 1)
- Two zones aft of the firewall, one each side of the engine (zones 3a and 3b).

A single-loop firewire system provides protection for the three zones. The single-loop is divided into three segments, one for each zone. The three segments are connected together at the firewall.

The firewire has two temperature sensing functions. An alarm is given if the entire zone is exposed to an average temperature or to a local area discrete temperature. The normal maximum ambient temperature for all engine zones is 150°C. Alarms will be given for zones 1, 3a and 3b at an overall average temperature of 250°C or local area discrete temperature of 460°C.



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Engine Nacelle Zones

B. System Indications

The fire detection loops are connected to separate monitoring control units remote from the firezones. The control units are electrically connected to the flight deck visual and aural warning indicators.

When an engine fire is detected the monitoring control unit annunciates:

- A CAP [L FIRE] (red) caption for the left engine or a CAP [R FIRE] (red) caption for the right engine
- A red fire light on the CONDITION lever
- An audible warning (bell)
- Red attention-getter warning light
- A red FIRE light adjacent to the relevant FIRE EXT selector switch.

When the red attention-getter light is pressed the warning light and bell are cancelled. The CAP [L FIRE] or [R FIRE] (red) caption, CONDITION lever light and FIRE light adjacent to the FIRE EXT selector switch stay on until the fire is extinguished.

The 28 V dc emergency busbar supplies power to the fire detection system. This supply gives continuous protection while the aircraft electrical power is selected ON.

2. Engine Nacelle Overheat Detection System

A. System Description

An independent overheat detection system is installed in each engine nacelle. The system monitors the exhaust area aft of the firewall (zone 2) and gives a warning indication of high engine temperature. The overheat detector is a single-loop of firewire installed in each zone 2 area. The firewire is the same design as the fire detection system firewire.

Alarms will be given for zone 2 at an overall average temperature of 270°C or local area discrete temperature of 460°C.

B. System Indications

The overheat detection loops are connected to separate monitoring control units remote from the firezones. The monitoring control units monitor the overheat detection system and provide visual and aural warnings when there is an overheat condition in the zone. The warnings are:

- A CAP [L OVHT] (amber) caption for the left engine or a CAP [R OVHT] (amber) caption for the right engine
- Amber attention-getter warning light
- Caution audio tone.

When the attention-getter amber light is pressed the warning light and caution audio tone are cancelled. The CAP [L OVHT] or [R OVHT] (amber) caption will stay on whilst the overheat condition exists.

The 28V dc left and right essential busbars supply power to the overheat detection system.

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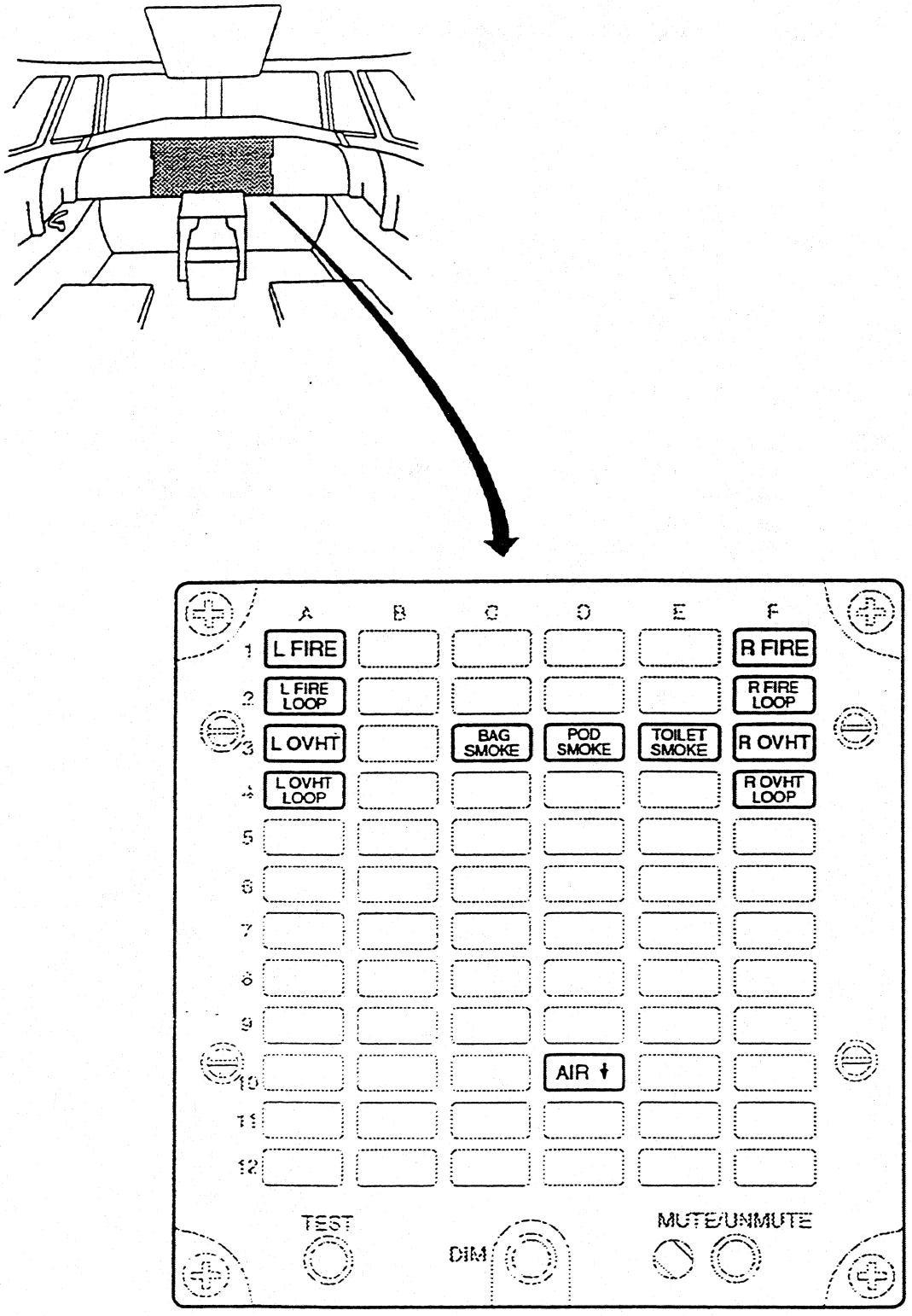
3. Engine Nacelle Fire and Overheat System Fault Warning

A. General

If the monitoring control units, in the fire detection system, detect a fault the CAP [L FIRE LOOP] (amber) caption for the left engine or the CAP [R FIRE LOOP] caption for the right engine will come on. If the monitoring control units, in the overheat detection system, detect a fault the CAP [L OVHT LOOP] or [R OVHT LOOP] (amber) caption for the left or right engines will come on. The amber attention-getter will also flash and the caution audio tone will sound.

B. Fire and Overheat System Test

A SYSTEM TEST panel is installed in the right-hand side console of the flight deck. Two centre-off switches labelled FIRE SYST/FAULT, one for each engine, control the test function. Both the fire and overheat detection systems are tested together. The SYST test position activates all the warnings related to the fire and overheat detection system. The FAULT test position gives all the warnings related to system failures.



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Fire Protection-CAP

4. Engine Nacelle Fire Extinguisher System

A. General

A fire extinguisher system is installed for each engine. The system will suppress any fire which may occur in zones 1, 3a and 3b. The extinguishant is supplied from two bottles installed in the hydraulic bay on the left side of the aircraft. The two bottles have a "dual-shot" capability and can be used to extinguish a fire in either engine nacelle.

B. System Operation and Indication

A three-position switch for each engine fire extinguisher system is located in the centre pedestal on the flight deck. Each switch is labelled FIRE EXT SHOT 1/SHOT 2. Adjacent to the switch is the red FIRE light. The three-position switch is gated and guarded.

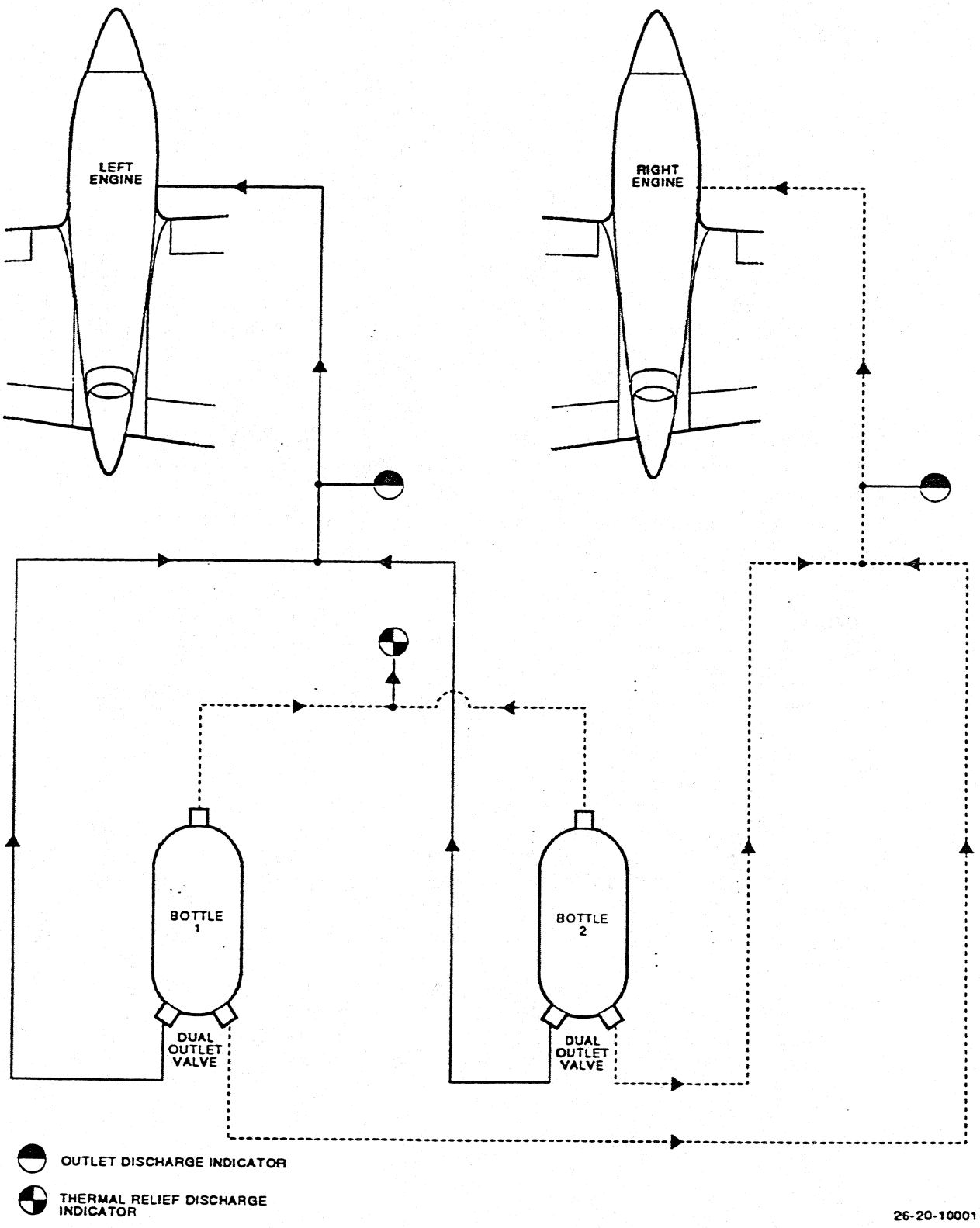
Selection of SHOT 1 will discharge all the contents of bottle 1 to the selected engine. Selection of SHOT 2 will discharge the contents of bottle 2 to the selected engine. For the complete fire drills refer to MOM Vol 1, Emergency Drills - Engine Fire.

The battery busbars supply power to operate the fire extinguisher system. The right battery busbar supplies the power to operate the SHOT 2 bottle outlets. The left battery busbar supplies the power to operate the SHOT 1 bottle outlets. This gives two independently operated systems. With the batteries installed and connected to the battery busbars the two systems can be operated in the air or on the ground.

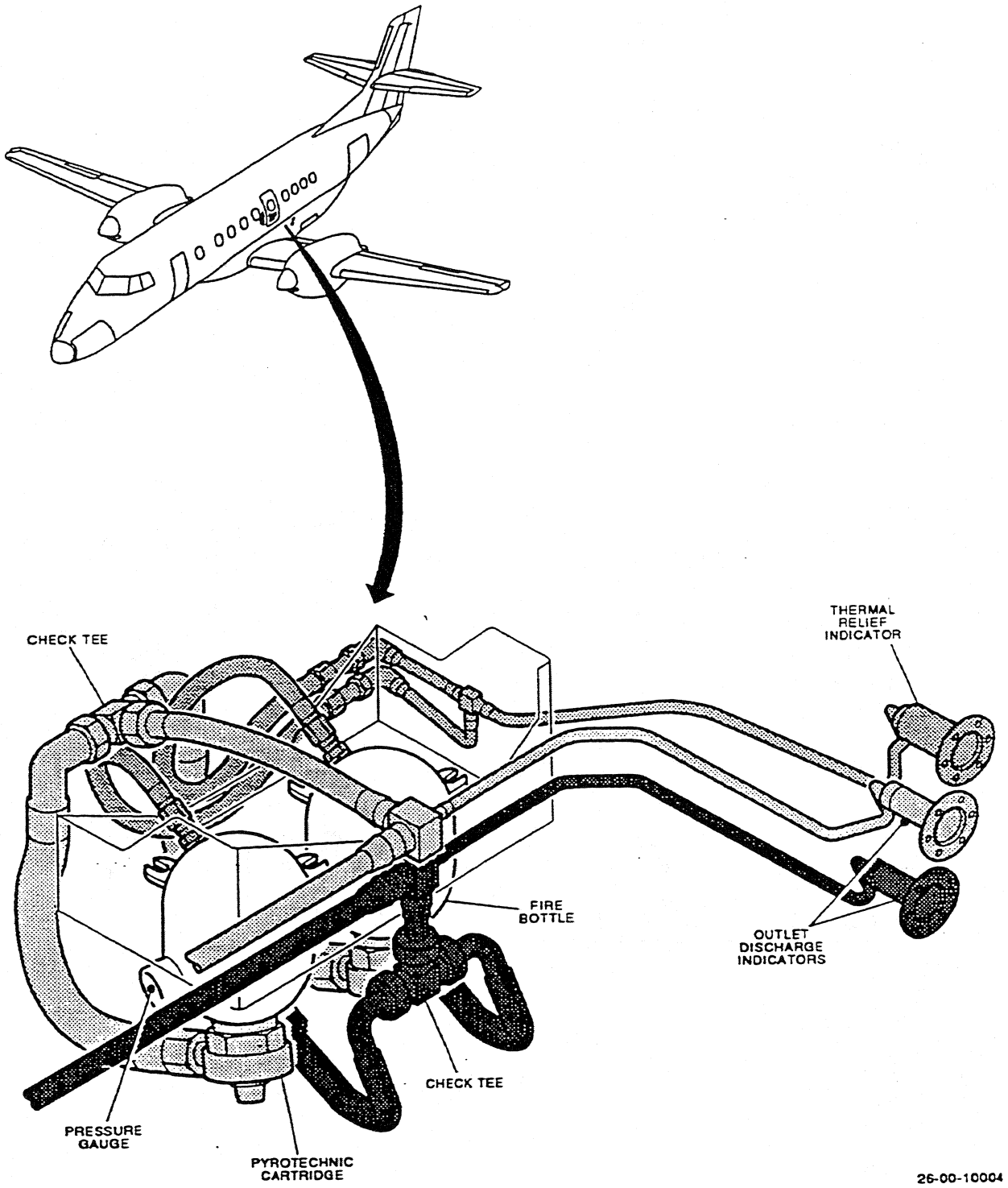
Each bottle is charged with Halon 1301 (CbrF3) and pressurised with nitrogen. A pressure gauge and pressure data plate are installed on each bottle.

An outlet discharge indicator shows when the bottle has been discharged. Mounted on the left side of the ventral fairing, a green disc indicates that the extinguisher system has not been operated. Should the system be discharged into the engine nacelle the green disc is displaced to show the red indicator housing. There is an outlet discharge indicator for each engine.

Also mounted on the left side of the ventral fairing is a thermal relief discharge indicator. This disc type indicator is also a green/red indicator. If an abnormal pressure rise occurs in the bottle due to excessive ambient temperature a diaphragm ruptures allowing the extinguishant to ventilate to atmosphere. This causes the green disc to be displaced to show the red indicator housing.



Fire Extinguisher System-Schematic



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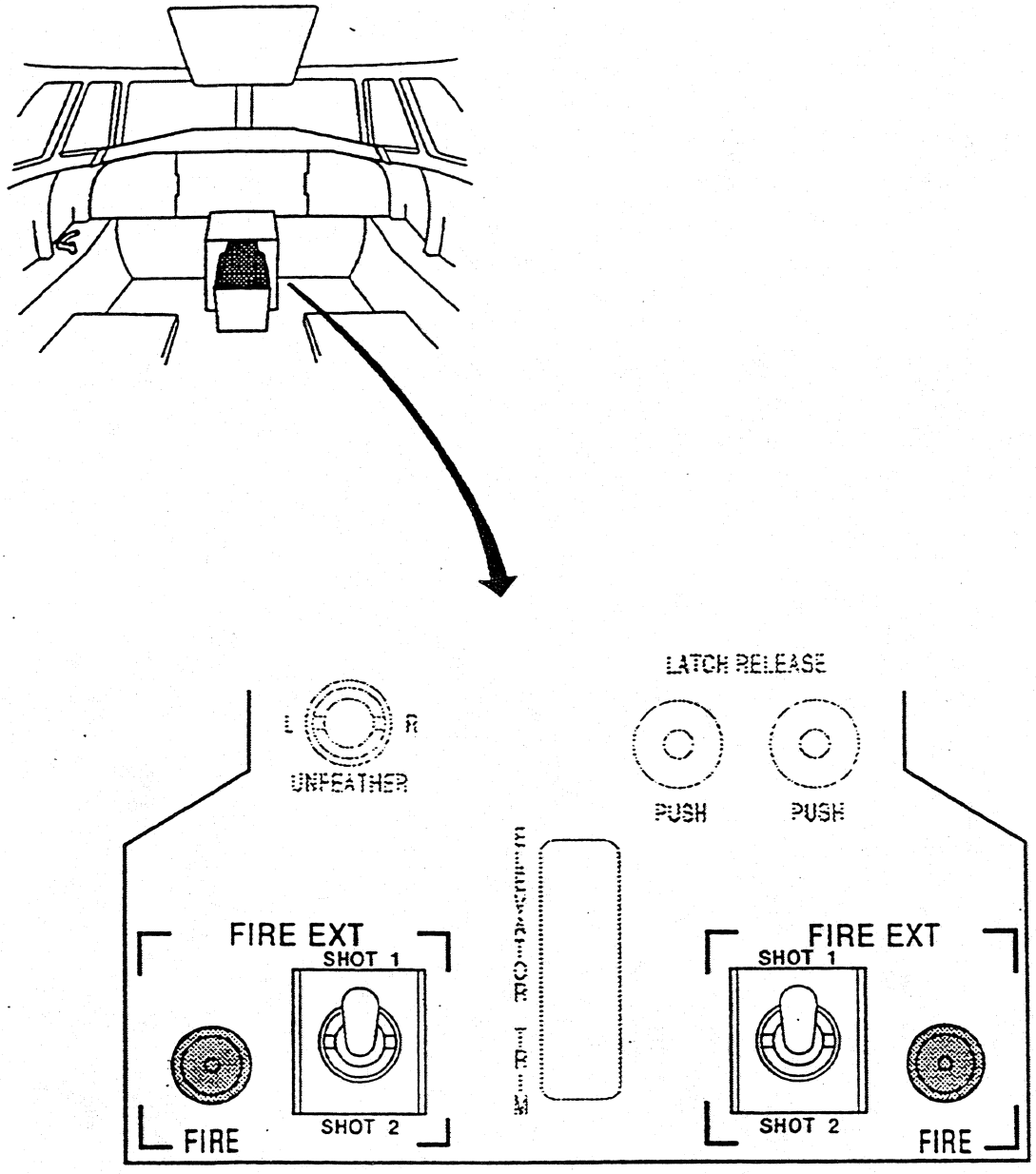
Fire Extinguisher System



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Fire Extinguisher System - Control switches

5. Non-engine Detection/Protection

A. Main Baggage Compartment

The main baggage compartment is fitted with a smoke detector located adjacent to the main baggage compartment door. When fire or smoke is detected in the rear baggage compartment a CAP [BAG SMOKE] (red) caption will come on.

Suppression of a main baggage compartment fire is by hand-held fire extinguishers. Access to the compartment is by a fire extinguisher port in the rear passenger cabin bulkhead.

B. Ventral Pod Baggage Compartment

A smoke detector is located at the rear of the ventral pod baggage compartment. When smoke is detected in the ventral baggage pod a CAP [POD SMOKE] (amber) caption will come on. There is no fire extinguishing system for the ventral pod baggage compartment.

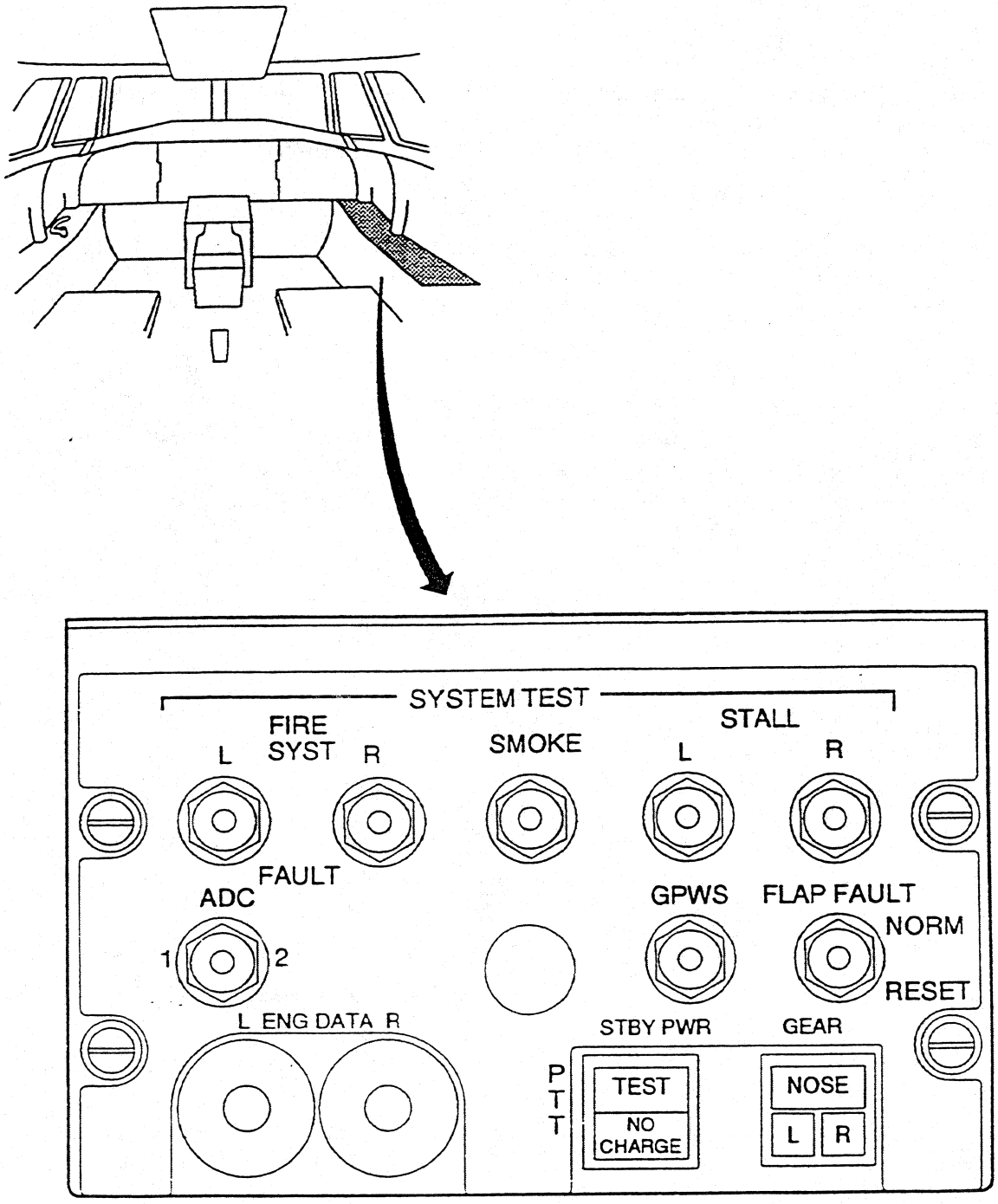
C. Toilet

The toilet is fitted with a smoke detector in the roof. When smoke is detected in the toilet compartment a CAP [TOILET SMOKE] (red) caption comes on.

Suppression of a fire in the toilet or cabin area is by hand held fire extinguishers.

D. Smoke Detector Test

A SMOKE switch on the SYSTEM TEST panel on the right hand side console will test the smoke detector circuits and, if they are serviceable, illuminate the SMOKE captions on the CAP.



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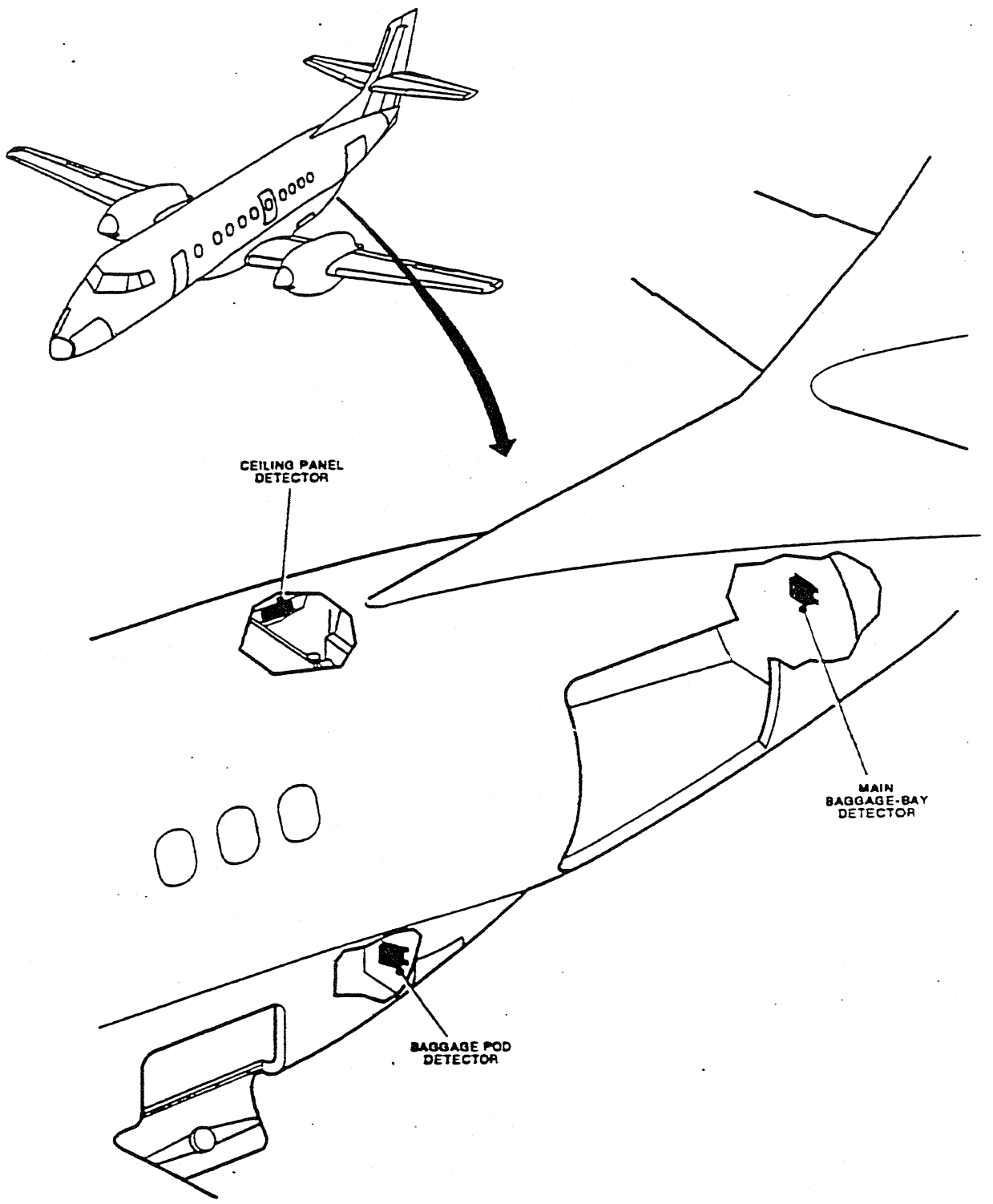
System Test Panel



Smoke Detectors