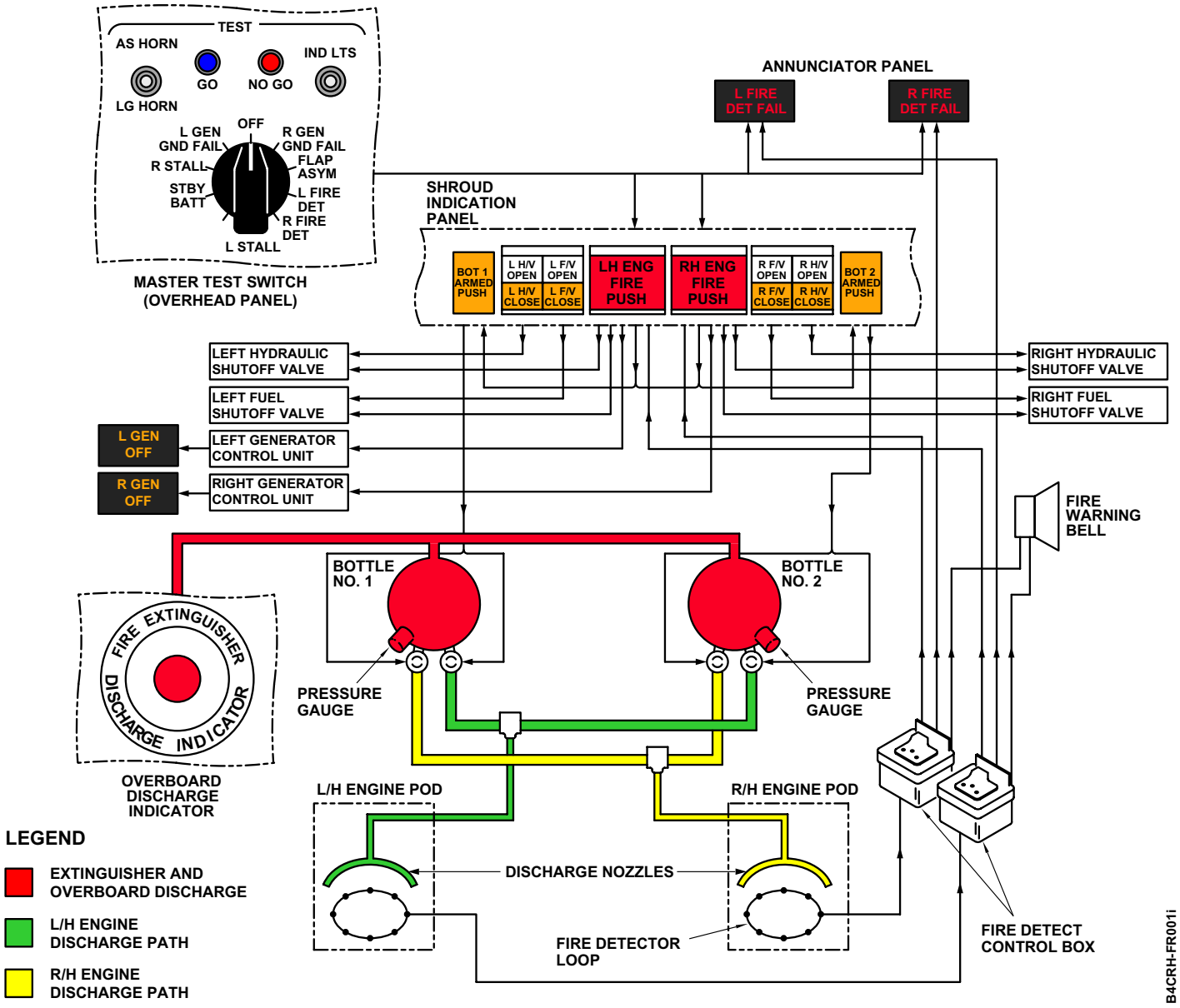
Engine Fire Protection System



Fire Protection System

A fire protection system is built into the engine nacelles. It includes detection circuits that display information in the cockpit, a warning bell, and extinguishers that are controlled from the cockpit.

There are two portable fire extinguishers, one in the cockpit and one in the cabin. The aft fuselage baggage compartment does not require detection or extinguishing systems.

Engine Fire Detection

The engine fire detection system provides the means to detect a fire in either engine nacelle. The detection system incorporates a semiconductor, coaxial cable, and sensor element. It forms a closed loop around all the vital engine components that are susceptible to fire. The loop has a variable resistance that changes with temperature. It is sensitive along its entire length and transmits a signal to the cockpit.

Two red fire warning lights, one for each engine, are located on the fire extinguisher control panel, which is mounted on the center of the instrument panel glareshield. The applicable light will illuminate when the temperature in that engine nacelle reaches a predetermined value. Pressing either fire warning light will arm the No. 1 and No. 2 fire bottles and will illuminate the BOT 1 ARMED PUSH and BOT 2 ARMED PUSH lights on the fire extinguisher control panel. At the same time, the generator field will be tripped and the L or R F/V CLOSE and L or R H/V CLOSE switch lights for the associated engine will illuminate, indicating that the fuel shutoff valve and the hydraulic shutoff valve have closed. These switchlights are located next to each fire warning light and can be used to open or close the fuel and hydraulic shutoff valves to the respective engine. Closure of the valve is indicated by illumination of the switch light.

These switchlights are the sequence type, so the light illumination will indicate the last position of the valve.

NOTE: After an engine fire, the fire-warning bell will continue to ring. Pushing the fire bell silence button located on the glareshield will silence the bell.

The rotary test switch on the overhead switch panel has L FIRE DET and R FIRE DET positions. These positions are used to perform integrity checks of the detection circuits, to test the fire bell and to illuminate the GO/NO GO lights, according to the condition of the system.

Selection of one of these positions completes a circuit through the sensing element and detector control unit, simulating a fire condition. If a fault exists in the detector control or the sensor element is shorted or open-circuited, the fire warning light will not illuminate. In this case, the respective red FIRE DET FAIL light on the annunciator panel will illuminate. The respective FIRE DET FAIL light will also illuminate any time a sensor element is shorted or open, as the sensor is continuously monitored.

Engine Fire Extinguishing

The engine fire extinguishing system consists of two fire extinguisher agent containers, deployment tubes, fire extinguisher discharge controls, and associated electrical circuits. The two containers each have a fill and pressure-relief valve, pressure gage, and two discharge assemblies. They are located in the aft fuselage just above the aft fuselage access door. Each container stores the agent under pressure until needed, and each contains one extinguishing shot. The discharge assemblies are explosive cartridges that are electrically fired to release the agent into the tubing. When fired, the pressure ruptures a fracture disc in the container outlet port.

The deployment tubes disperse the released agent from the containers to the selected engine. An individual deployment tube serves each engine compartment from each container. The deployment system is a rigid tube to the engine nacelle with discharge nozzles at the nacelle end.

Fire extinguisher discharge controls provide the means for a crewmember to select either extinguisher to either engine nacelle. When a red ENG FIRE PUSH light is illuminated, the clear plastic guard must be raised and the switch-light pushed in. This action closes the respective shutoff valves, trips the generator field, and illuminates and provides electrical power to the BOT 1 and BOT 2 ARMED PUSH (discharge) switches. Pressing either discharge switch powers the respective bottle cartridge, releasing the extinguishing agent into the engine nacelle represented by the respective illuminated ENG FIRE PUSH switch light.

The light in the depressed BOT ARMED PUSH switchlight goes out, indicating that the bottle has been fired. If the fire warning light remains on after discharging one bottle, it indicates that the fire is still present. In such a situation, the other bottle may be released by pressing the other DISCHARGE switch. If indications of fire persist after the second bottle discharges, execute an emergency descent and land as soon as possible.

Thermal Discharge Indicator

A thermal discharge indicator disc is located on the left aft side of the fuselage, just below the trailing edge of the engine pylon. Overheating of the extinguisher bottles causes the bottle fuse plugs to rupture. This, in turn, causes the indicator disc to rupture. If the red plastic disc in the center of the indicator is missing, it indicates a thermal discharge of one or both bottles.

Portable Fire Extinguishers

There are two portable fire extinguishers located in the airplane. In the cockpit there is a type B-C extinguisher for use against several classes of fire. There is also a type B-C extinguisher located in the cabin compartment.

Aft Fuselage Baggage Compartment

A baggage compartment is installed in the tail cone of the airplane. The compartment is made of lightweight composite material and is certified as a class D baggage compartment; therefore, it requires no detection or extinguishing capabilities.