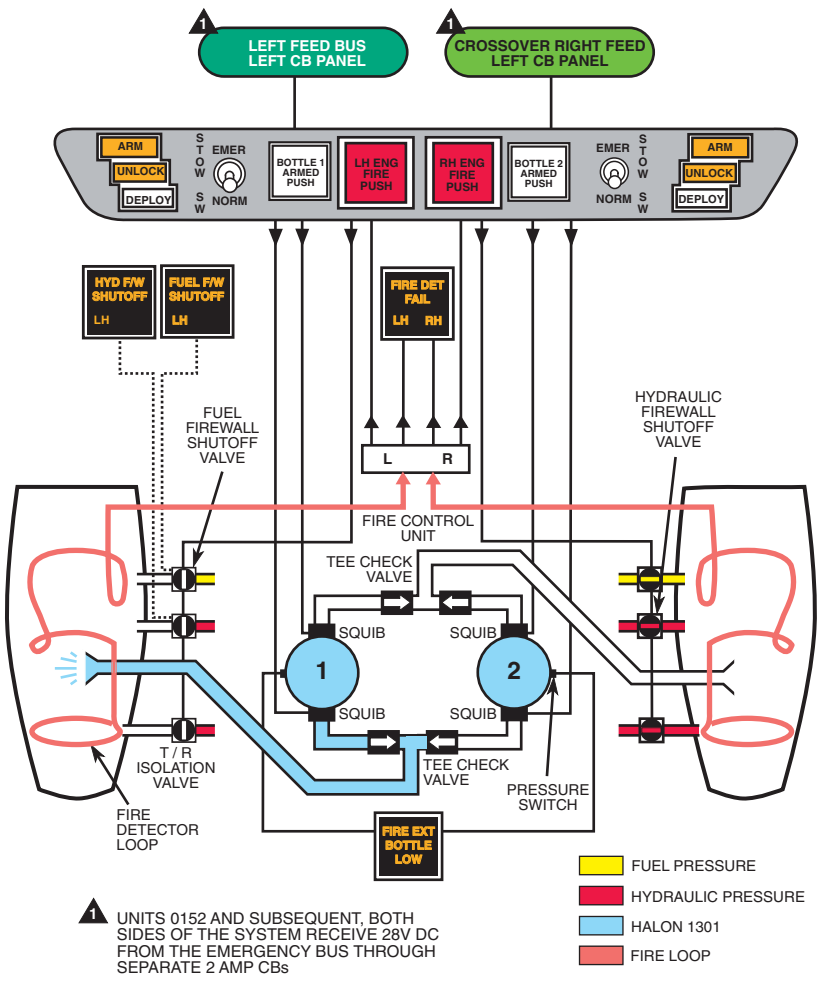
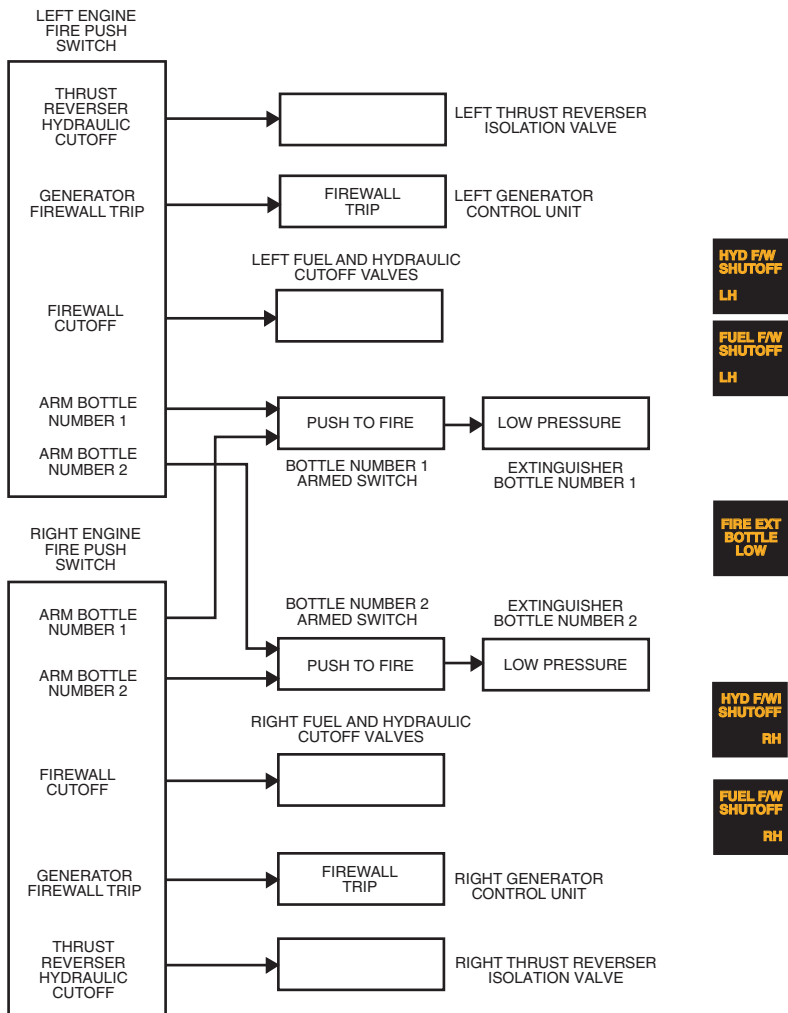


Engine Fire Protection System



Engine Fire Detection System



Fire Detection

Engine

The engine fire detection system consists of a stainless steel sensing tube that wraps around the engine combustion section and accessory section. A responder assembly connected to the sensing tube has two pressure switches: alarm responder and integrity responder.

When subjected to high temperatures, the inert gas in the sensing tube expands and exerts pressure against the alarm responder switch. When the switch closes, it completes a circuit within the fire detection control unit box to illuminate the respective LH/RH ENG FIRE PUSH switchlight and sound the fire bell. After three seconds, a time delay relay silences the fire bell.

If the sensing tube develops a leak and the inert gas escapes, the loss of pressure opens the normally closed integrity responder pressure switch to illuminate the respective amber LH/RH DET FAIL annunciator.

APU

On **aircraft with a Turbomach APU**, the fire detection system consists of a fire detection loop that surrounds the APU powerplant. On **flight operable APUs**, an additional fire detection loop mounts to the inside of the APU enclosure.

As a fire or bleed air leak heats the fire detection loop(s), resistance of the loop decreases until current flows from its core to its outer sheath to complete a circuit to the fire control unit. The fire control unit then illuminates the APU FIRE switchlight, triggers the flashing Master Warning lights, and sounds the fire bell.

On aircraft with the Duncan installed GTCP36-150W APU, the fire detection system consists of four spot detectors strategically located on the APU and APU enclosure. If a fire or bleed air leak occurs, the spot detectors trigger the flashing APU control panel APU FIRE PUSH switchlight and the Master Warning lights and sound the fire bell. Pressing the APU FIRE PUSH switchlight closes the APU fuel shutoff valve, arms the fire extinguishing system, and initiates an automatic APU shutdown.

Pressing the FIRE TEST button tests the APU fire detection circuits. If the APU FIRE PUSH switchlight and Master Warning lights flash and the fire bell sounds, the system is operating normally.

Smoke

A smoke detector under the aft cabin floor near the outflow provides cabin fire detection. If a cabin fire develops, smoke in the air exiting the outflow valve triggers the smoke detector. The detector operating on 28V DC from the Crossover Left Feed bus illuminates the SMOKE DETECT annunciator and triggers the Master Warning lights.

Testing

Placing the rotary TEST switch in SMOKE FIRE WARN tests the engine and cabin fire detection systems. Illumination of the ENG FIRE PUSH switchlights and SMOKE DETECT annunciator, sounding of the fire bell, and flashing Master Warning lights denotes proper system operation.

Fire Extinguishing

Engine

Two dual-head single-shot fire extinguisher bottles in the tail compartment contain Halon 1301 (bromotrifluoromethane) pressurized with nitrogen. Each bottle has a temperature compensating switch, a combination fill and safety valve outlet, and two discharge valves and outlets.

When the fire detection system senses an engine fire or overheat, it illuminates the associated ENG FIRE PUSH switchlight, triggers the flashing Master Warning lights, and sounds the fire bell for three seconds. Pressing the ENG FIRE PUSH switchlight arms the fire extinguishing system (BOTTLE 1/2 ARMED PUSH switchlights illuminated). This action also closes the fuel and hydraulic firewall valves, trips the affected engine's generator offline, and closes the thrust reverser isolation valve.

Pushing the BOTTLE 1 or 2 ARMED PUSH switchlight supplies 28V DC to fire the explosive cartridge and release bottle contents to the affected engine. Pressurized nitrogen carries the fire extinguishing agent from the bottle through distribution lines to the engine nacelle.

If the ENG FIRE PUSH light remains illuminated after 30 seconds, pressing the other BOTTLE ARMED PUSH switchlight discharges the other bottle into the same engine nacelle.

After bottle discharge, the FIRE EXT BOTTLE LOW annunciator illuminates.

If bottle pressure falls below 500 ± 25 PSIG, the bottle's temperature compensating switch illuminates the FIRE EXT BOTTLE LOW annunciator. If this occurs, the bottle must be removed and serviced by an appropriate agency. The bottle also has a fusible plug in the safety valve that reacts to bottle overheat by melting and releasing bottle contents through the fill port into the tail compartment.

APU

Depending on the APU installed and service bulletin compliance, varying APU fire extinguishing systems are installed. This includes:

- units 001 to 121 with Cessna installed Turbomach APU: single bottle discharges into APU enclosure (shroud)
- aircraft with SB650-28-16: one bottle discharges into APU enclosure and one bottle discharges into APU air inlet
- ground and flight certified APUs: larger single bottle discharges into APU enclosure
- PATS, Inc. installed Turbomach APU: single bottle discharges into APU enclosure
- Duncan STC SA2110CE Garrett GTCP36-150: single bottle discharges into APU enclosure.

The APU fire extinguishing bottle(s) is similar to the engine fire extinguisher bottle except that it has a single discharge outlet. A temperature compensating switch illuminates the APU FAIL light if bottle pressure drops to approximately 500 PSI. If the light illuminates, the bottle must be removed and serviced.

On **aircraft with SB650-28-16 and ground/flight APUs**, the extinguisher bottle(s) also has a pressure gage.

When exposed to high temperatures, the APU fire detection system control unit illuminates the APU FIRE switchlight, sounds the fire bell, and energizes the time delay relay. Pressing the illuminated APU FIRE or FIRE EXT (**Duncan**) switchlight supplies 28V DC to fire the bottle's explosive cartridge and supply extinguishing agent to the APU enclosure. If the crew fails to act within eight seconds, the time delay relay automatically fires the explosive cartridge (**except Duncan installation**).

On **aircraft with SB650-28-16**, the APU fire extinguishing system automatically arms when the single-point refueling door opens or unlatches, the APU READY-TO-LOAD light illuminates (APU operating), and the left main gear squat switch indicates aircraft on ground. If the APU fails or an APU fire occurs during refueling, the fire extinguishing system automatically discharges extinguishing agent into the APU air inlet.

Do not shut down the APU or close and latch the single-point refueling door before shutting down the APU. These precautions prevent inadvertent bottle discharge during refueling with the APU operating.

Portable Fire Extinguishers

Portable fire extinguishers in the cockpit and cabin (varies with government regulations) contain Halon 1211 (bromochlorodifluoromethane). Halon 1211 is a relatively non-toxic fire extinguishing agent that leaves no residue and is effective on most fires that occur in the aircraft.

Engine Fire Protection

Power Source	Left and Right Feed buses – 28V DC Emergency Crossover bus (unit 152 and subsequent)
Distribution	Each bottle to either engine
Control	Fire control unit LH/RH ENG FIRE PUSH switchlights BOTTLE 1/2 ARMED PUSH switchlights
Monitor	Annunciators LH/RH ENG FIRE PUSH LH/RH FIRE DETECT FAIL FIRE EXT BOTTLE LOW LH/RH FUEL F/W SHUTOFF LH/RH HYD F/W SHUTOFF Fire bell SMOKE/FIRE/WARN system test
Protection	Circuit breakers Bottle fusible plug

APU Fire Protection

Power Source	Left Feed bus – 28V DC APU fire extinguisher bottle(s)
Distribution	Fire detect sensor Distribution lines and nozzles APU enclosure (shroud) APU combustor shroud* APU air inlet*
Control	Fire control unit APU FIRE PUSH switchlight FIRE EXT switchlight (Duncan only) Time delay relay (except Duncan)
Monitor	APU FAIL light (low bottle pressure) APU FIRE PUSH switchlight Fire bell APU TEST PUSH switch
Protection	Circuit breakers Bottle fusible plugs

* Varies with APU installed.

