



## **FIRE/OVERHEAT DETECTION SYSTEM**

### **Overview**

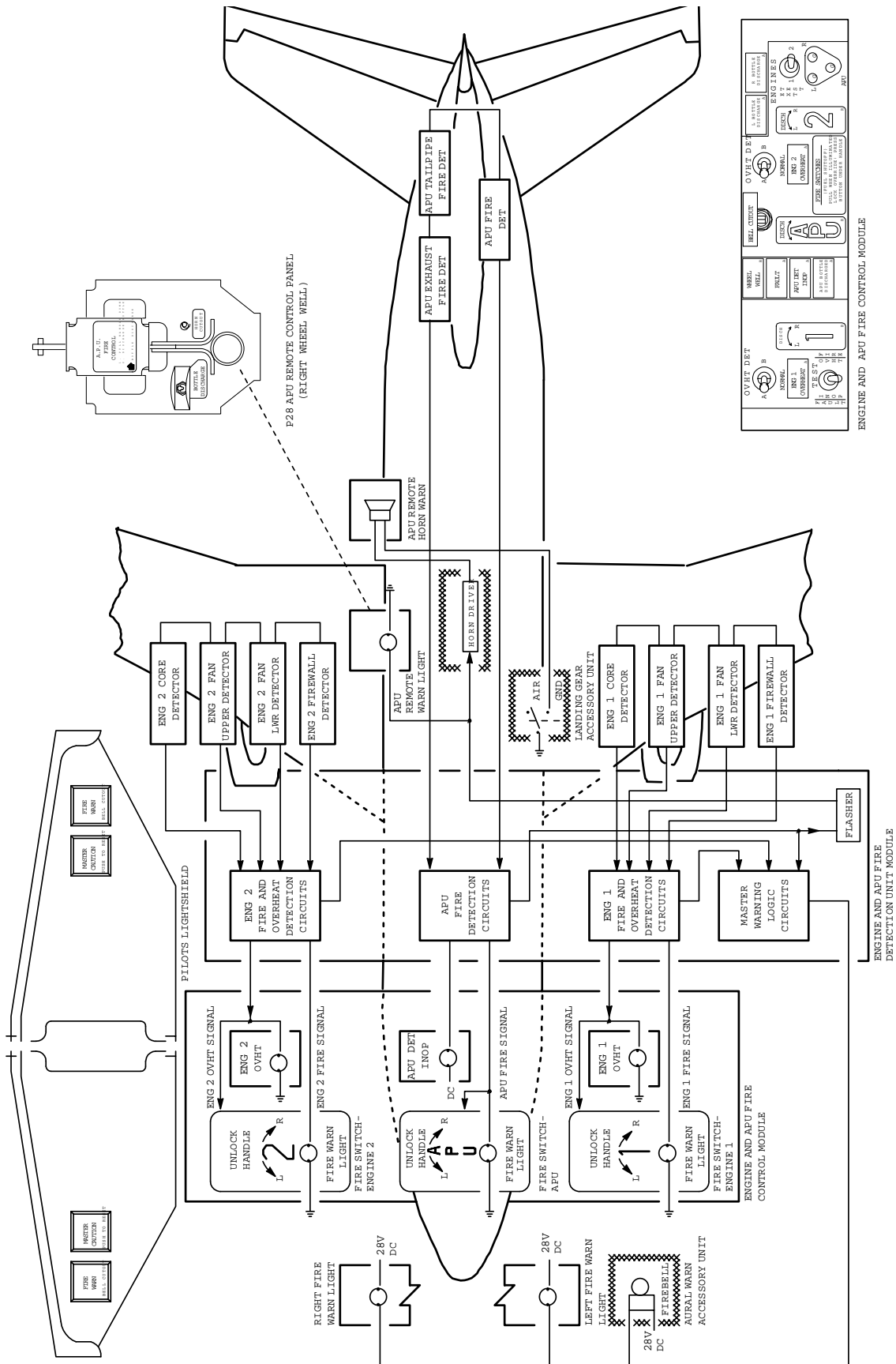
Fire and overheat detection systems provide aural and visual alerts when overheat or fire are detected.

### **Engine Fire Detection**

Dual-loop fire and overheat detection systems are in each engine area. Both loops of a system must sense fire in order for a fire alarm to be given. If one loop is inoperative, then the system may be set to operate on the operative loop.

### **APU Fire Detection**

A single-loop fire detection system is in the APU compartment.



Engine and APU Fire/Overheat Detection System Simplified Schematic

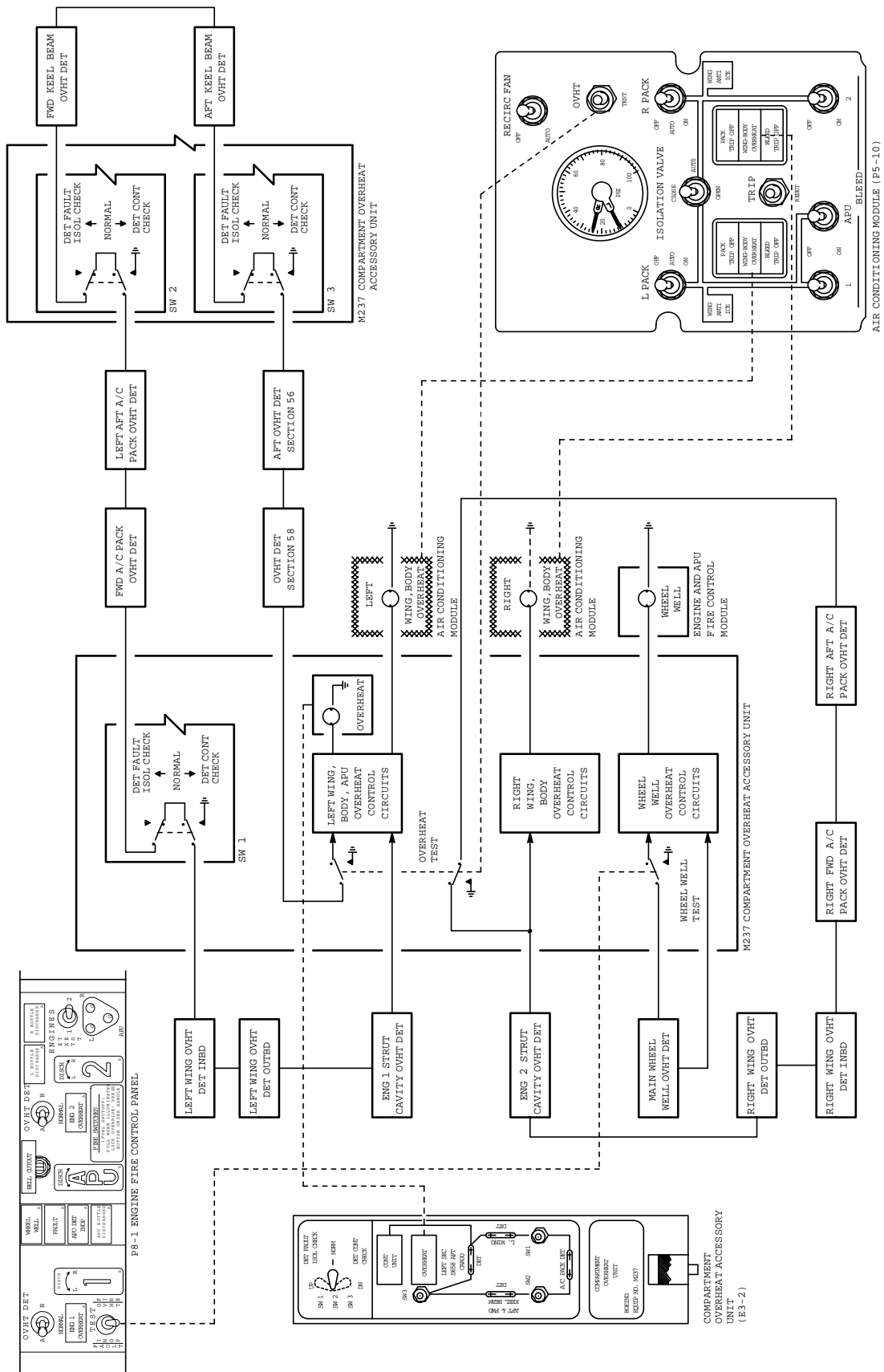


### **Wheel Well Fire Detection**

A single-loop fire detection system is in the main landing gear wheel well.

### **Wing and Lower Aft Body Overheat Detection**

Two single-loop overheat detection systems are located in the wings, the air conditioning bays, the aft cargo compartment, the keel beam, and the APU area.



M237 COMPARTMENT OVERHEAT ACCESSORY UNIT (E3-2)



## ENGINE FIRE DETECTION SYSTEM

### Engine Fire/Overheat Detectors

The engine fire detection system monitors engine and nacelle temperature for fire and overheat conditions. Dual-loop fire/overheat detectors are located in each engine area.

The system uses power from the 28-volt DC battery bus. The circuit breakers are on panel P6.

Engine fire detection system components are fire detectors, engine and APU fire detection accessory unit, and engine and APU fire control panel.

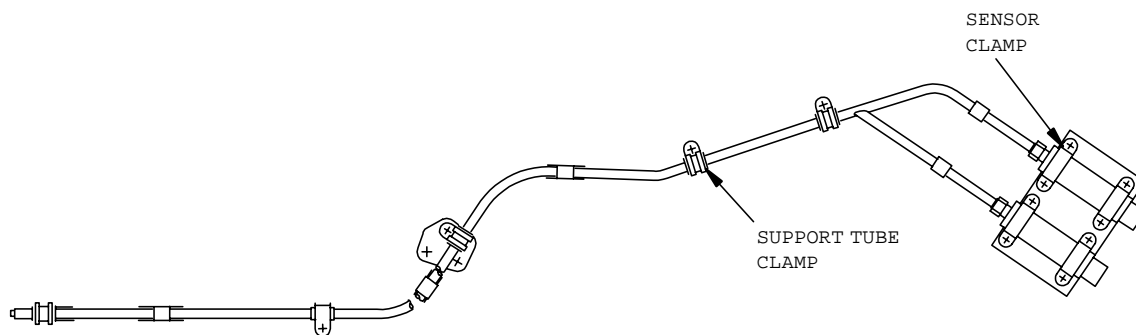
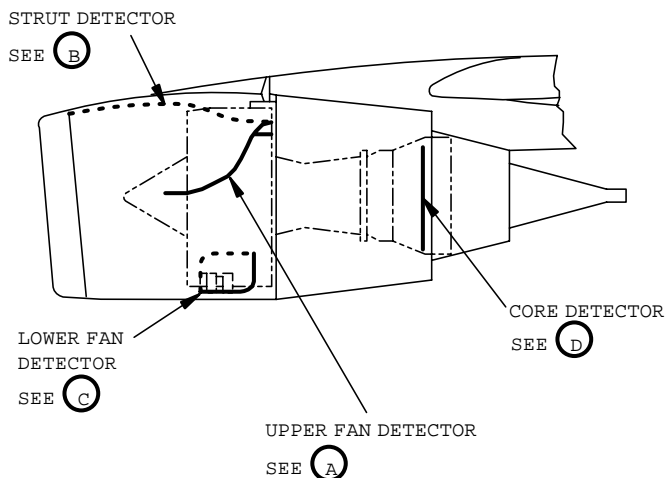
A detector consists of two identical sensing elements attached to a support tube by quick-release mounting clamps.

Each sensing element contains an inert gas and gas-emitting core, and has a responder on one end. The responder contains three pressure switches for sensing fire, overheat, and integrity (fault).

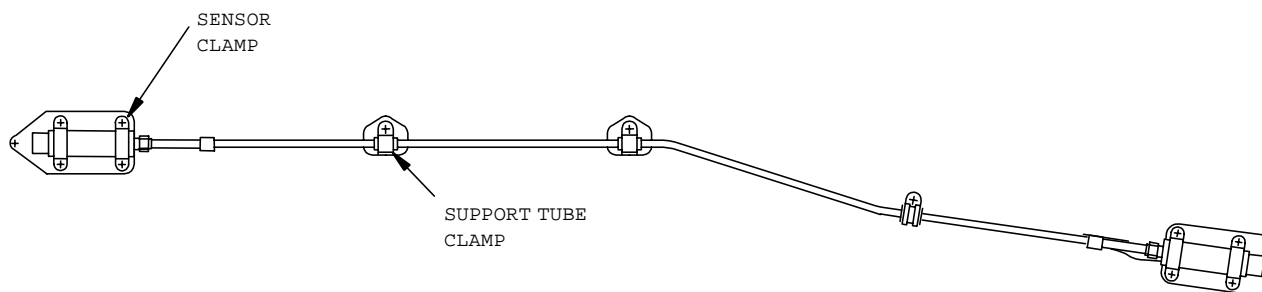
The inert gas in a sensing element expands as a function of average gas temperature. The gas-emitting core expels gas due to high localized temperatures. Both actions cause an increase in pressure in the element, which causes an alarm pressure switch in the responder to close, activating an alarm signal. Both actions are completely reversible - as the temperature decreases, the pressure decreases, and the alarm switch deactivates. When a sensing element is damaged allowing the inert gas to leak, the integrity pressure switch opens, activating a fault signal. The pressure switches provide alarm and integrity signals to the appropriate detector control card.

The detectors are identical except for length, temperature trip and reset settings of the pressure switches.

Each engine has four Engine Fire Detector Elements; one detector is located on the right side of the strut above the fan case, one detector is located on the upper left side of the fan case, one detector is located on the underside of the fan case, and one detector is located around the engine core. You can access the three detectors in the fan area by opening the fan cowl panel. You can access the core detector by opening the fan duct cowl and thrust reverser halves.



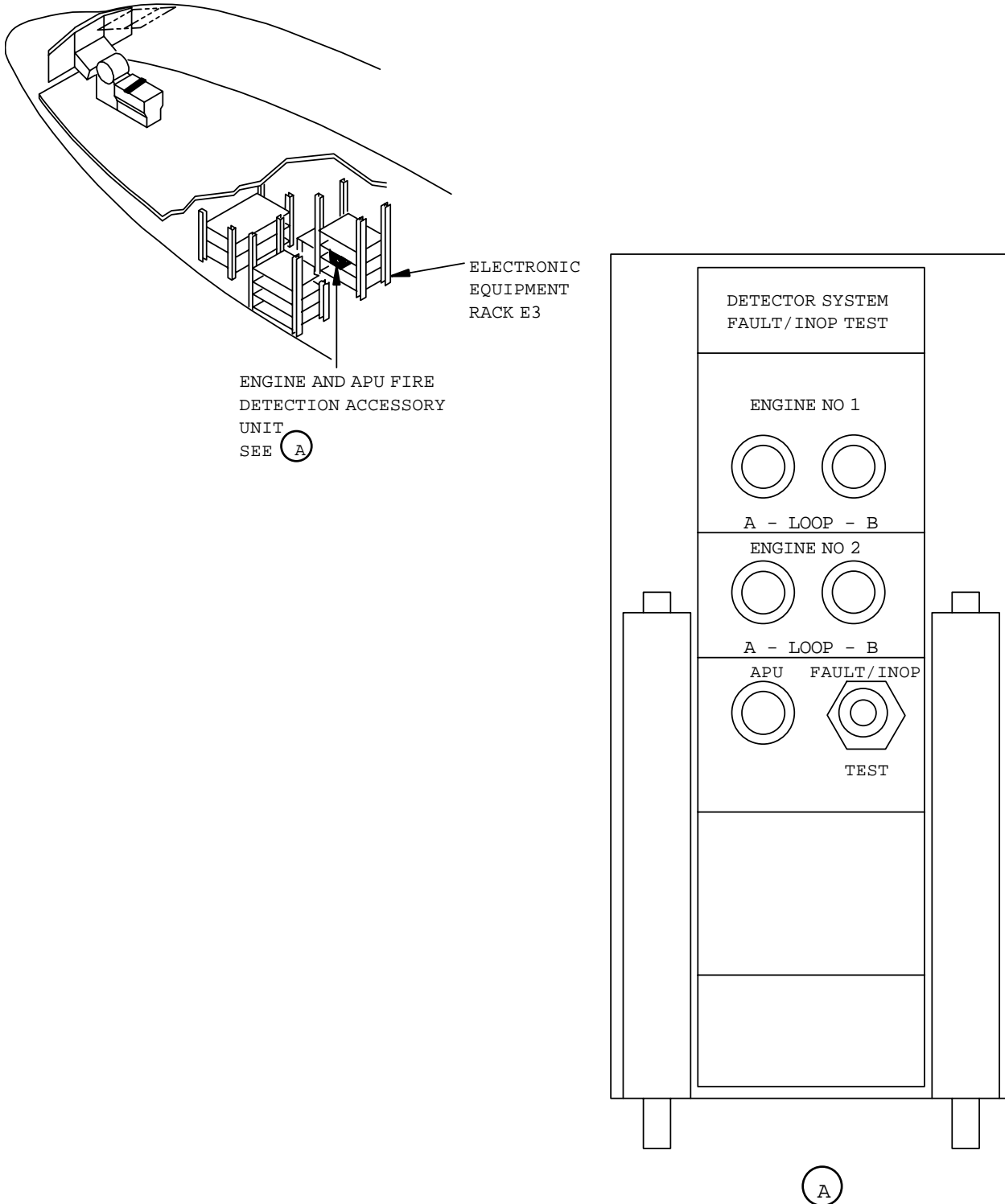
UPPER FAN DETECTOR  
(A)



STRUT DETECTOR  
(B)

### Engine and APU Fire Detection Accessory Unit

Engine fire detection system components of the engine and APU fire detection accessory unit are engine 1 and 2 control cards and accessory control card. The unit is on shelf E3-3 of the electronics rack.





## Engine and APU Fire Control Panel

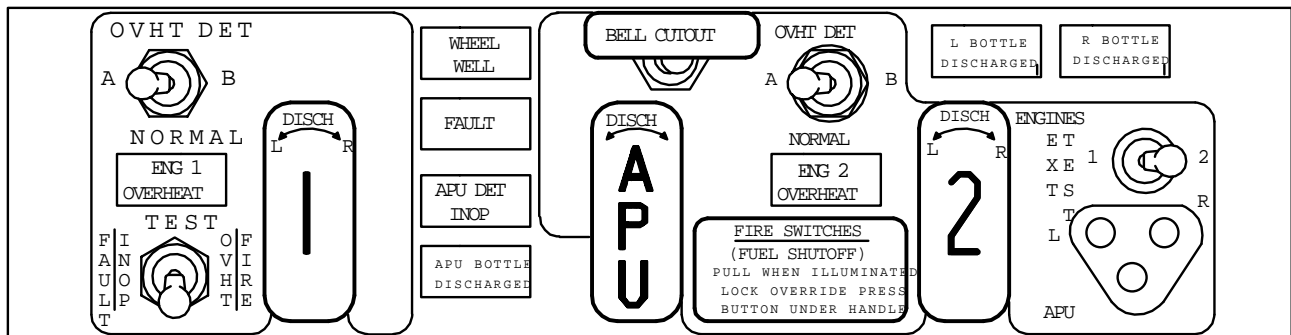
Engine fire detection system components of the engine and APU fire control panel are two fire/overheat detector selector switches, test switch, engine 1 and 2 overheat lights, engine fault light, and engine 1 and 2 fire switch handles. The panel is on the aft electronics panel of the control stand.

There is one fire/overheat detector selector switch for each engine. Setting the switch to NORMAL enables both loops to operate in AND - logic. Setting the switch to A or B enables the indicated loop and disables the other.

Setting the TEST switch to OVHT/FIRE checks the integrity of the sensing and warning circuits. The engine fire switch handle lights, OVERHEAT lights, master FIRE WARN lights, and bell activate.

Setting the TEST switch to FAULT/INOP checks the fault discrimination circuit. The FAULT and MASTER CAUTION lights illuminate.

The fire, overheat and fault lights illuminate when the appropriate signals from the accessory unit are sent.





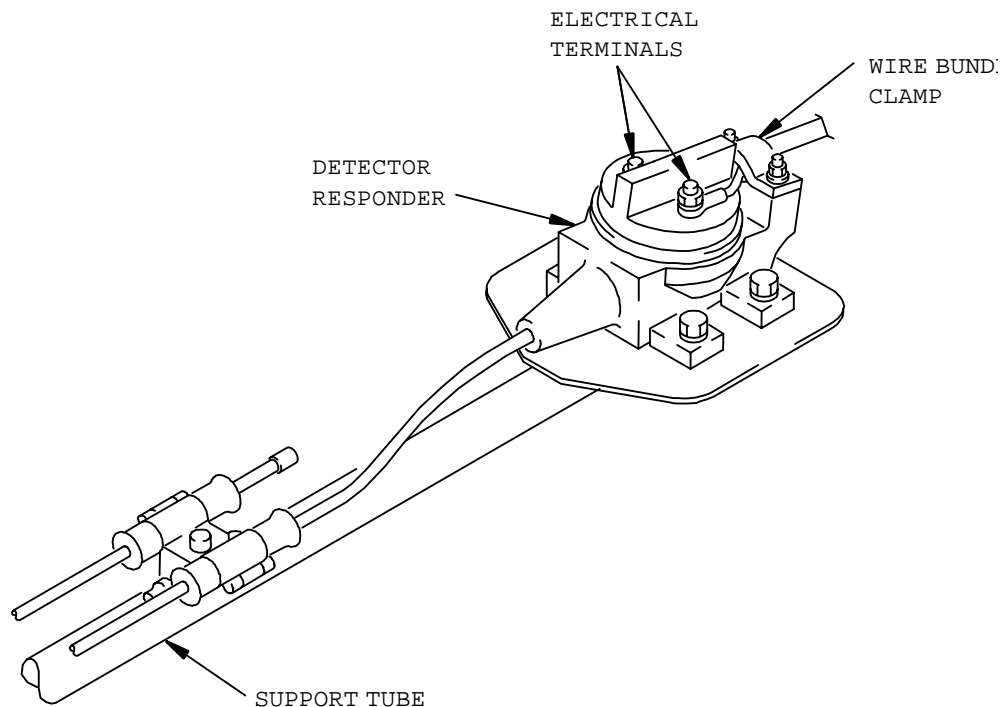
## APU FIRE DETECTION SYSTEM

### APU Fire Detector Elements

Detector elements are located in the engine and exhaust areas of the APU. Detector elements are located in the engine compartment, exhaust heat shield, and muffler assembly.

The sensing elements are attached to a support tube by quick-release mounting clamps. Each sensing element contains an inert gas, a gas-emitting core material, and has a responder on one end. The responder contains two pressure switches, alarm and integrity, and provides the electrical interface with the airplane wiring.

The inert gas in a sensing element expands as temperature increases. The gas-emitting core material expels gas due to high localized temperature. Both actions cause a pressure increase in the element, which causes the alarm pressure switch to close, activating an alarm signal. When the temperature decreases, the pressure decreases, and the alarm switch opens. If a sensing element is damaged and the inert gas leaks, the integrity pressure switch opens, activating a fault signal. The pressure switches provide alarm and integrity signals to the APU fire detection card.



DETECTOR WITH TERMINAL LUG TYPE RESPONDERS