

# DC-10 FLIGHT CREW OPERATING MANUAL

## CHAPTER 8 FIRE PROTECTION

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# DC-10

## FLIGHT CREW OPERATING MANUAL

### FIRE PROTECTION

#### GENERAL

The fire protection system provides the means to detect and extinguish a fire in the engine nacelles, the auxiliary power unit (APU) compartment, and the forward and center/aft cargo compartment. (The center and aft cargo compartments are considered a single compartment and fire protection is provided by the aft cargo system.) Aural and/or visual indications are provided to alert the flight crew that fire or overheat conditions exist.

The fire protection system consists of fire and smoke or overheat detection, fire warning, and fire extinguishing subsystems.

#### DESCRIPTION

##### FIRE DETECTION SYSTEMS

###### Engines and APU

Each detection system consists of two redundant sensing elements (fire detector loops) mounted parallel to each other. The sensing elements for each fire area are monitored by a control unit. False fire warnings are minimized because both loops must be subjected simultaneously to fire or overheat conditions before they will electrically trigger the control units and energize the alarm system. A fault discrimination circuit eliminates short circuits as being false fire warnings. If one sensing loop is detective, the airplane can still be dispatched, or continue in

flight, using the single operational detector by moving the applicable loops selector switch to the operating loop position. In normal operation, with the loops selector switch at BOTH, and if a single system is falsely energized, or if in abnormal operation, with the loops selector switch in a single system and that system sends a fault warning, the applicable engine nacelle temperature indicator will move into the red band on the vertical scale and the engine loop fault light will come on. If the single system fault signal is in the APU detection system the APU loop fault light will come on. Warning lights and bell or horn will not activate.

The pneumatic duct from engine 2 is routed through the APU compartment, therefore an APU fire indication could be the result of a ruptured duct rather than an APU fire.

###### Forward and Center/Aft Cargo Compartments

The forward cargo compartment fire detection system consists of four smoke detectors in the compartment ceiling (powered by separate amplifiers), and one heat detector in the ventilation exhaust duct.

The center/aft cargo compartment fire detection system consists of four smoke detectors in the compartment ceiling (powered by separate amplifiers), three in the center and one in the aft cargo compartment. In addition, two heat detectors are in the ventilation exhaust duct, one in each outlet.

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Any individual detector will actuate the fire warning system when smoke or heat is detected.

### FIRE WARNING SYSTEMS

#### Engines and APU

The fire warning for the engines consists of engine fire lights in the engine fire handles on the overhead panel, an engine fire light on the glareshield, fuel lever lights on the pedestal, a vertical scale engine fire detector and nacelle temperature indicator on the Flight Engineer's panel, and a bell sound from the aural warning system. The engine fire handle light and fuel lever light identify which engine has a fire or overheat condition when the bell rings and, simultaneously, the engine fire light comes on. A bell cutoff switch, generator field cutoff switch, and fuel and hydraulic shut-off features are actuated when the engine fire handle is pulled. The light in the engine fire handle remains on until the fire is extinguished. The light in the fuel shutoff lever remains on until the fire is extinguished and the lever is moved to OFF. One each, fire bell off/reset switch is in the engine fire light on the glareshield and on the Flight Engineer's panel.

The fire warning for the APU consists of three master warning lights (two on the glareshield and one on the Flight Engineer's panel), an APU fire light and the APU loop A and B lights on the Flight Engineer's panel, an APU fire summary light on the overhead panel, and a warning horn and APU fire light on the external APU ground control panel. APU will automatically shutdown when fire is detected.

#### Forward and Center/Aft Cargo Compartments

The fire warning system indication, from either cargo compartment, when one or more of the smoke (or heat) detectors actuate, consists of three master warning lights (two on the glareshield and one on the Flight Engineer's panel), a cargo fire summary light on the overhead panel, the forward or aft cargo fire lights and smoke/heat detector lights on the Flight Engineer's panel.

### FIRE EXTINGUISHING SYSTEMS

#### Engines and APU

The engine and APU fire extinguishing system consists of three dual-cylinder fixed systems. Each system contains two fire agent cylinders, distribution lines, control circuits, and fire agent low lights. The fire agent cylinder can be selected and discharged by using the engine fire handles or APU fire agent cylinder discharge switches. The two fire agent cylinders in system 2 are shared by the APU and engine 2.

#### Forward and Center/Aft Cargo Compartments

The forward and center/aft cargo compartments fire extinguishing system is a single manifold, dual-cylinder system. Extinguishing agent is discharged into either the forward cargo compartment or the center/aft cargo compartments from nozzles in the compartment ceiling from either of the two cylinders. Cylinder 1 contains the primary extinguishing agent charge and will discharge first. Cylinder 2 contains a lesser charge to be used for replenishing agent losses due to compartment

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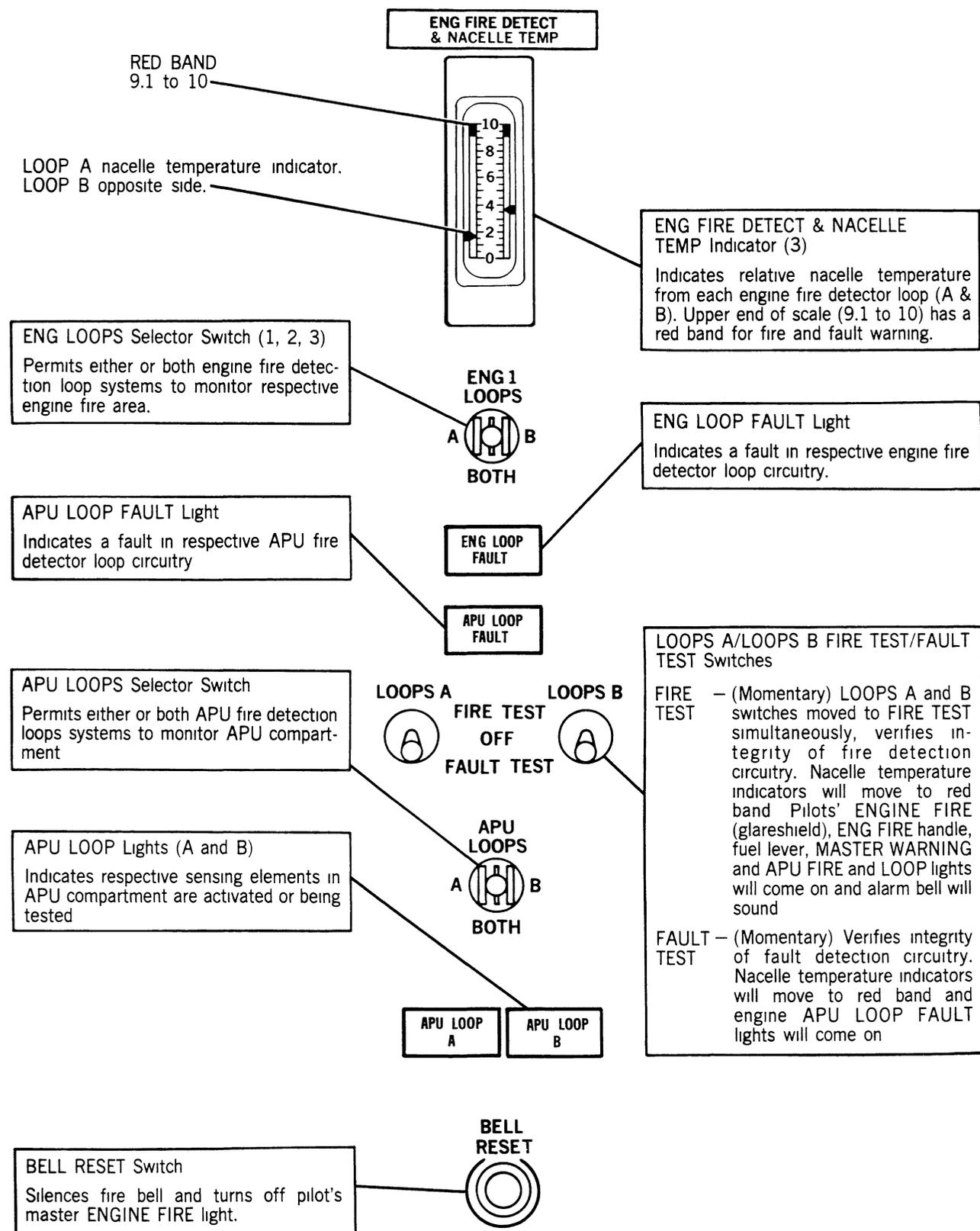
leakage, if required. Agent low lights on the Flight Engineer's panel come on to indicate that the cylinders were discharged. All controls for testing and arming the system and discharging the agent are on the Flight Engineer's panel.

### CONTROLS AND INDICATORS

Controls, indicators, and annunciator lights are on the Flight Engineer's Upper Panel No. 1 and Upper Panel No. 2, Pilots' Overhead Panel, Pedestal, and Glareshield. Illustrations of these major panels are in Chapter 1. Individual controls and indicators are illustrated and described in another section of this chapter.

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## FIRE PROTECTION - Controls and Indicators

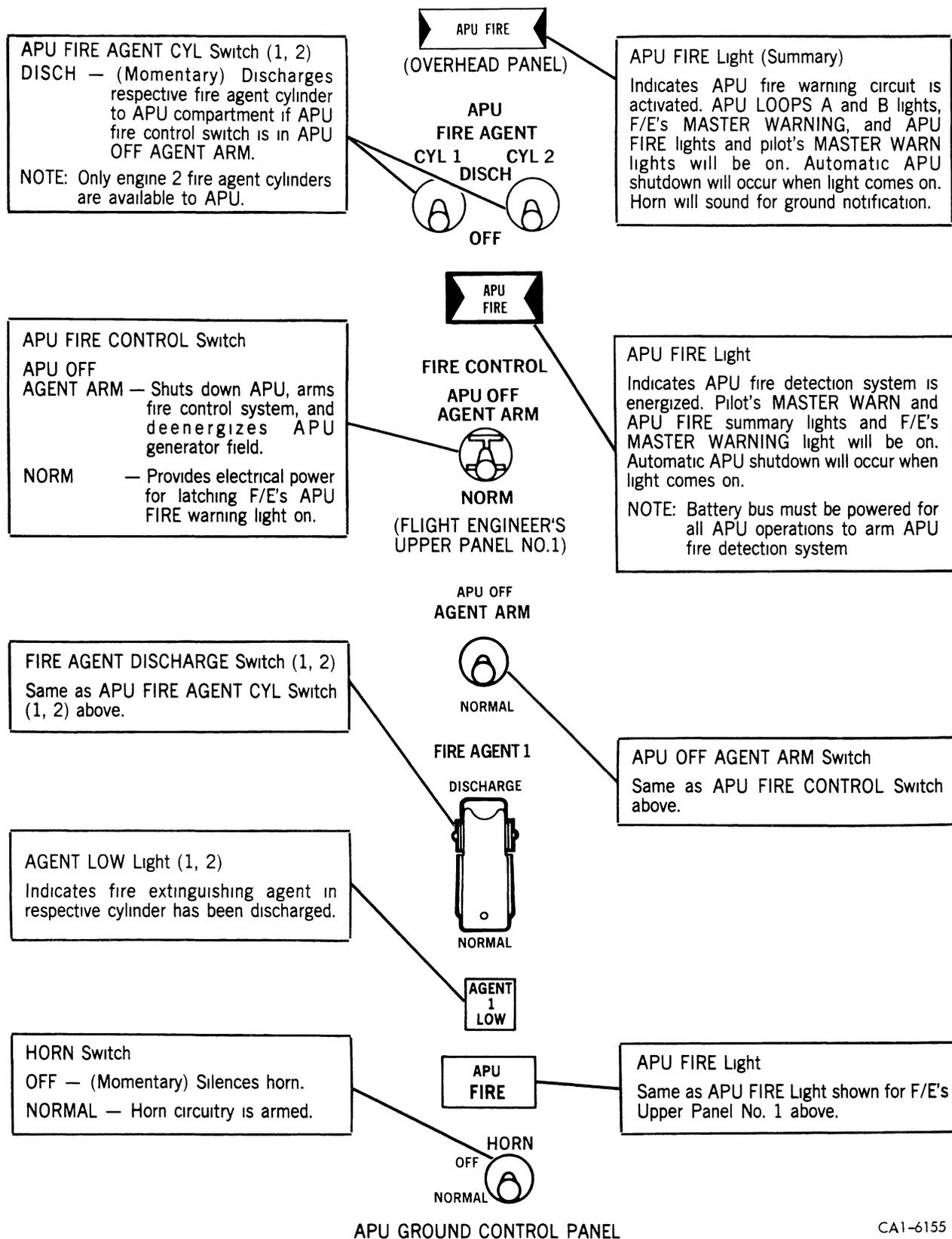


FLIGHT ENGINEER'S UPPER PANEL NO 2

CA1-4039 C

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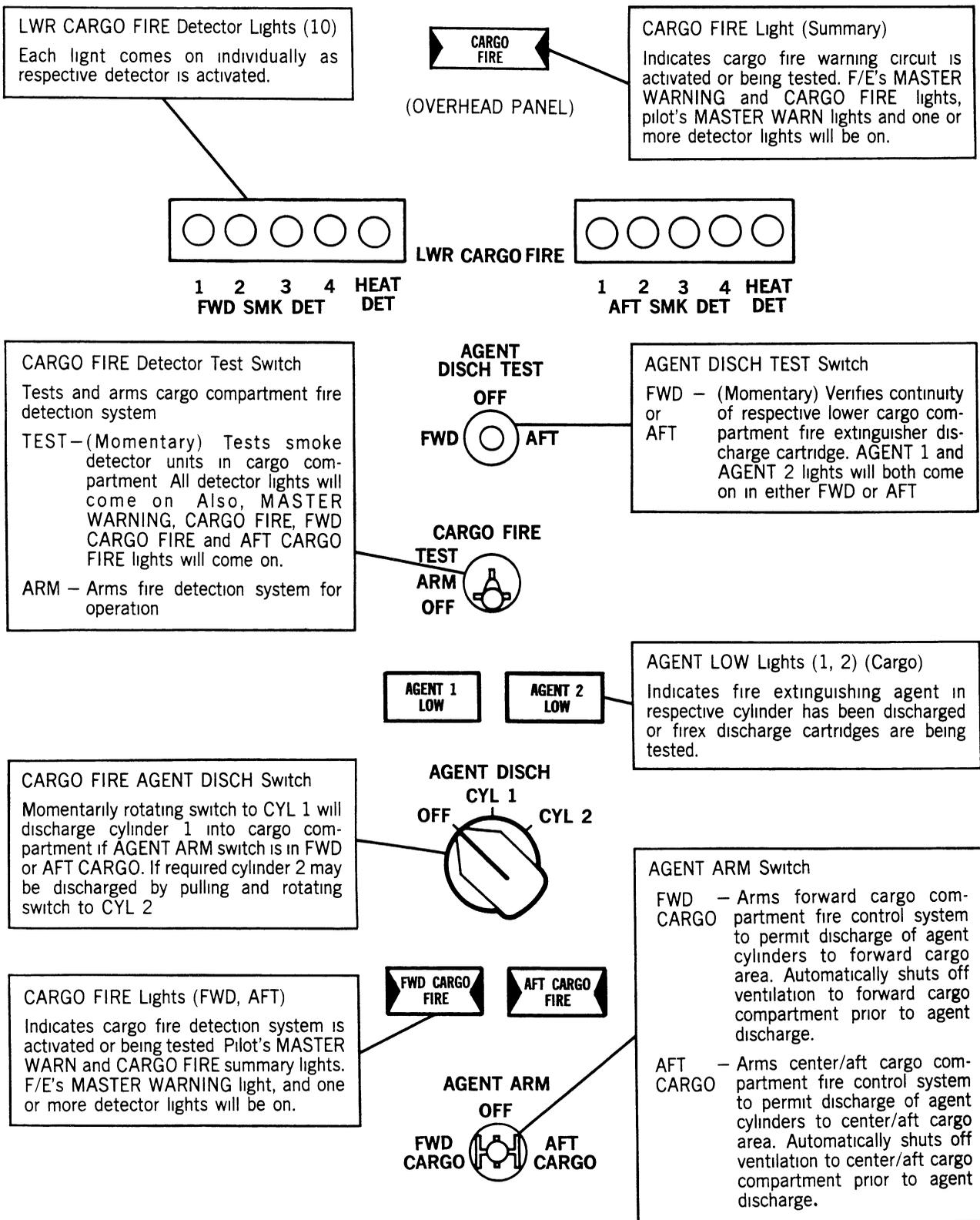
## FIRE PROTECTION - Controls and Indicators



CA1-6155 B

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## FIRE PROTECTION - Controls and Indicators



FLIGHT ENGINEER'S UPPER PANEL NO. 2

CA1-4040 A

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## FIRE PROTECTION - Controls and Indicators

### AGT LOW Light (1, 2)

Indicates that fire extinguishing agent in respective cylinder has been discharged. Engine 2 (and APU) AGENT LOW Light 1 and 2 are powered by battery bus.

### ENG FIRE Handle (1, 2, 3)

Shuts off electrical power, alarm bell, fuel and hydraulic supply and, when pulled full forward and rotated, will discharge agent into selected engine nacelle.

**GEN FIELD DISCONNECT** — Deenergizes respective generator field and silences alarm bell if not already silenced by respective ENGINE FIRE light.

**FUEL & HYD OFF** — Shuts off respective fuel and hydraulic supply, and positions engine fire handle to permit rotation for agent discharge into selected nacelle.

#### NOTE

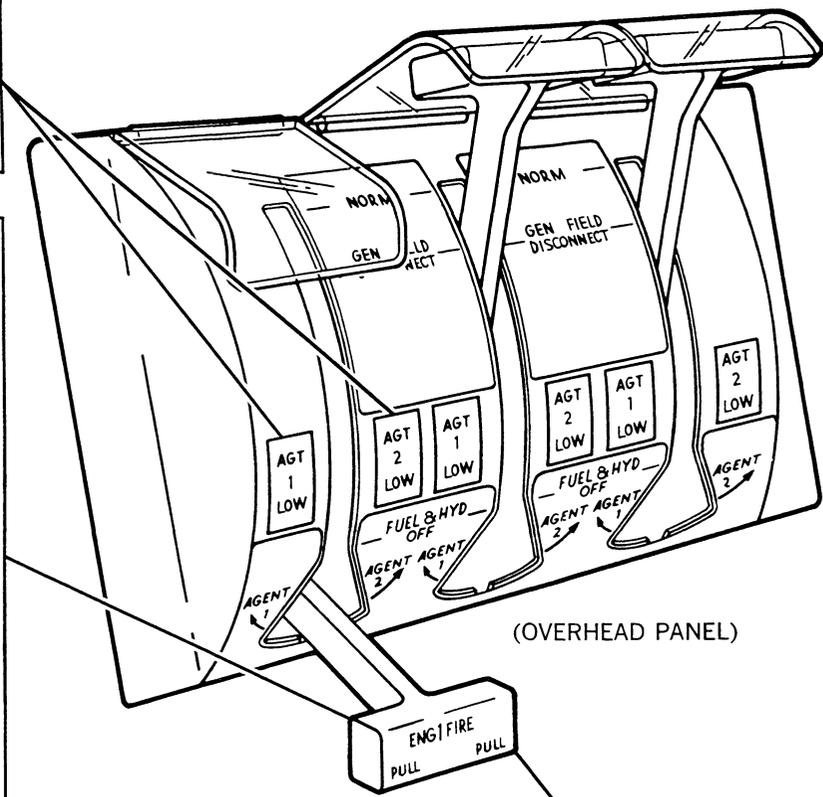
Twisting engine fire handle while pulling handle may result in premature firing of extinguishing agent.

### ENGINE FIRE Light

Comes on when engine fire warning system is activated. Pushing light will turn off light, silence alarm bell, and rear arm engine fire warning system. Pushing light will not turn off ENG FIRE warning light in engine fire handle.

### Fuel Lever Light (3)

The light in fuel lever comes on when respective engine fire warning light (in engine fire handle) is activated. Indicates which fuel lever to shut off. With engine fire handle pulled and fuel lever ON or OFF the light will remain on if fire warning still exists. With engine fire handle pulled and fire warning terminated, light will remain on until fuel lever is moved to OFF position.



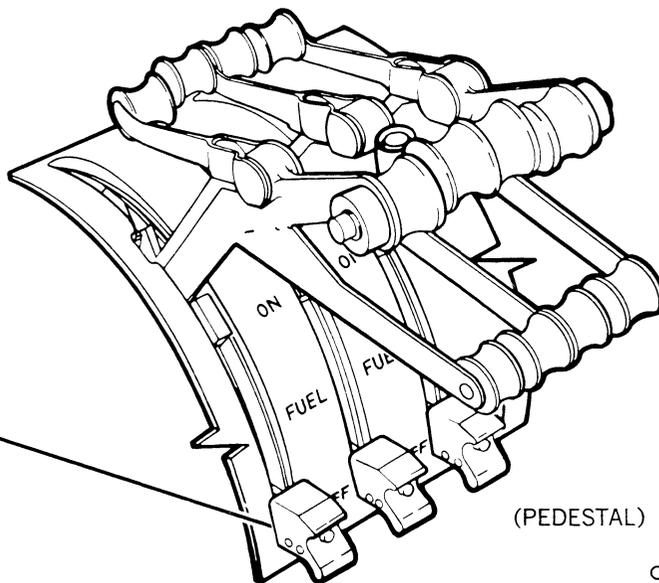
(OVERHEAD PANEL)



(GLARESHIELD)

### ENG FIRE Warning Light (1, 2, 3)

Comes on to indicate that overheat or fire has been detected in the associated engine nacelle.



(PEDESTAL)

CA1-2181 A