02-26 ATA 26 – FIRE PROTECTION

INTENTIONALLY LEFT BLANK

INTRODUCTION

The F900EX EASy airplane is equipped with a fire protection system and a warning system that warns the flight crew of fire, smoke or overheating within the described sections of the airplane.

Fire protection is provided by shutting-off fuel to the engine or APU when engine or APU fire has been detected and by discharging fire extinguishing agent into the concerned area (engine, APU, rear or baggage compartment).

Fire protection system controls and test button and circuit protection interfaces are located within the flight deck.

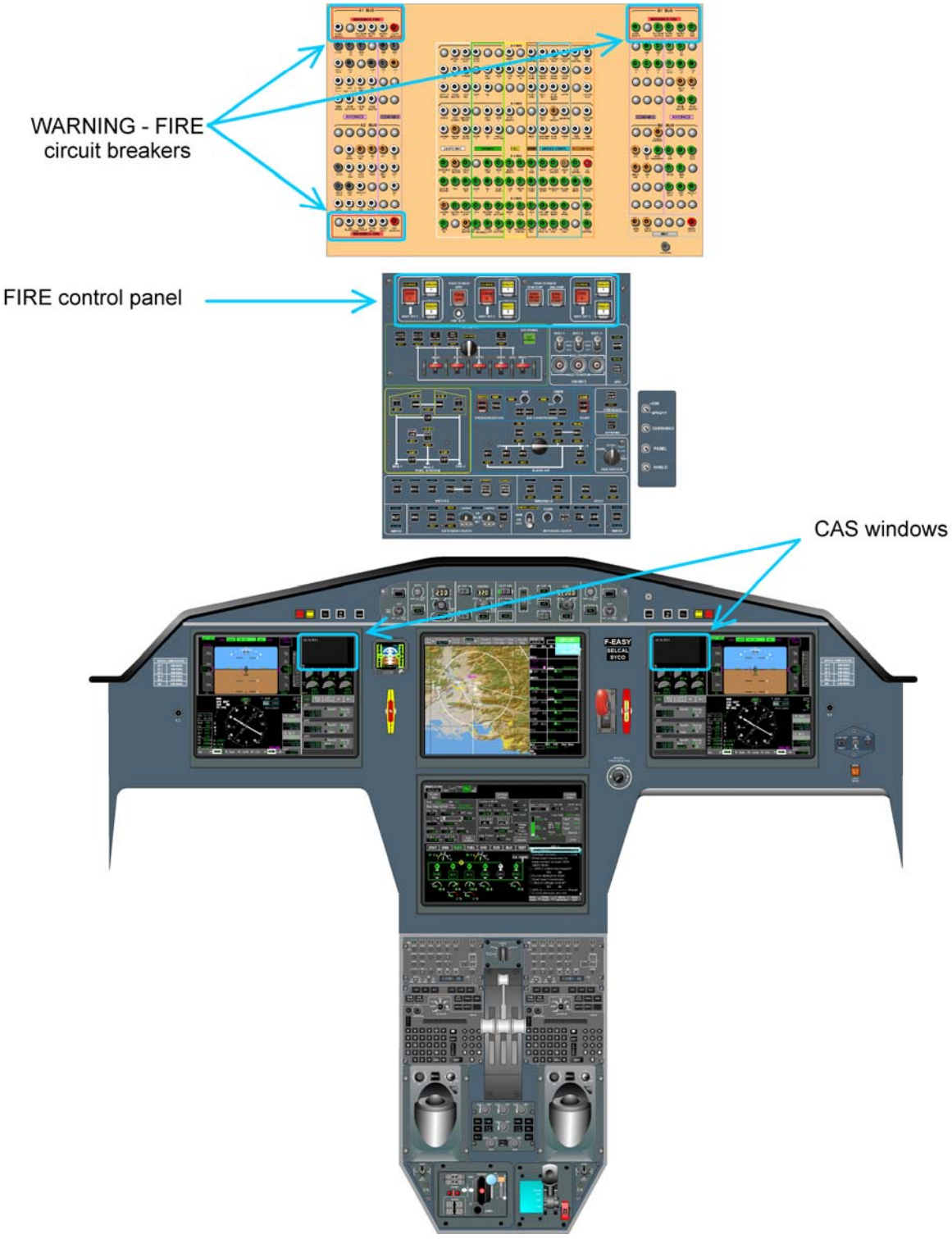

FIGURE 02-26-05-00 FLIGHT DECK OVERVIEW

SOURCES

Fire extinguishing is provided by a total of six fire cylinders. Five of them are located within the mechanic servicing compartment and one is located in the No 2 engine compartment. Three portable fire extinguishers (the number depends on airplane configuration) are at the crew disposal.

MECHANIC SERVICING COMPARTMENT	No 2 ENGINE COMPARTMENT	CABIN AREA
Four extinguisher cylinders are allocated for the three engines The APU and the baggage compartment shares one extinguisher cylinder	One extinguisher cylinder is allocated for the mechanic servicing compartment (rear compartment)	Three portable 2.5 lb. halon extinguishers are allocated for the flight deck, cabin and baggage compartment (The third one is optional)

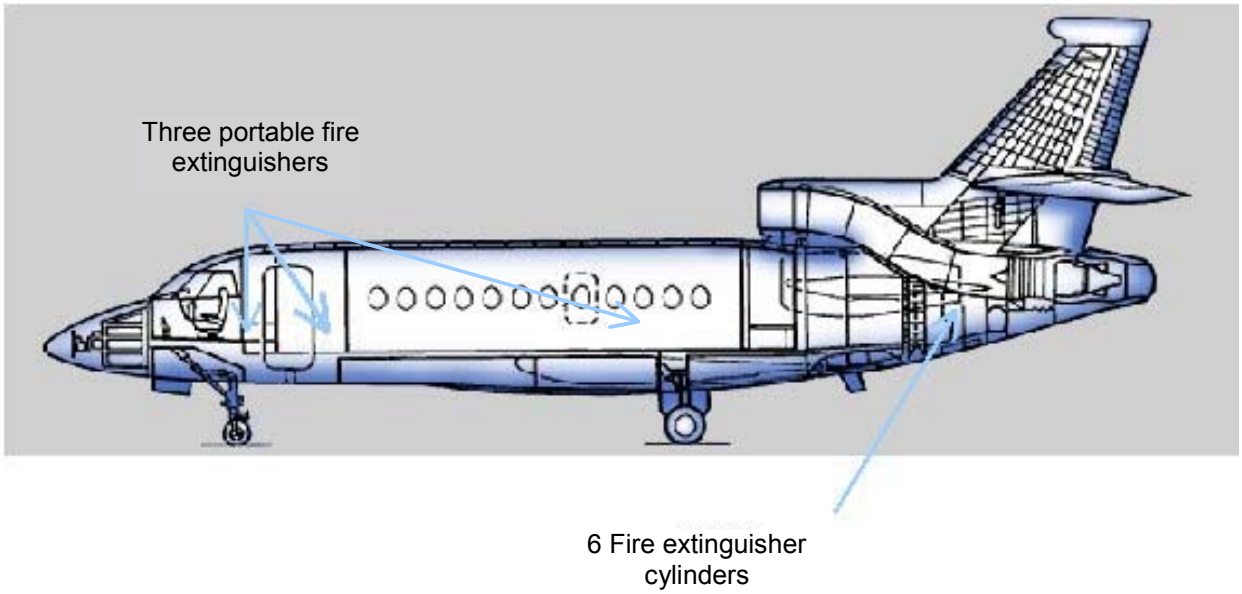

FIGURE 02-26-05-01 FIRE EXTINGUISHER CYLINDERS LOCATION

INTENTIONALLY LEFT BLANK

INTRODUCTION

The airplane is equipped with a fire protection system, which provides the flight crew with detection, warning, fuel shut-off and fire extinguishing capability.

Fire detection and extinguishing systems are provided for each engine, the APU, the baggage compartment and the rearcompartment.

The compartment of each main wheel well is equipped with a heat sensor providing overheat detection and warning.

The rear or forward (optional) toilet can also be equipped with an (optional) smoke detector that activates a message within the CAS window displays.

The overhead control panel and CAS windows provide the fire protection system interfaces and controls for the flight crew.

FIRE DETECTION

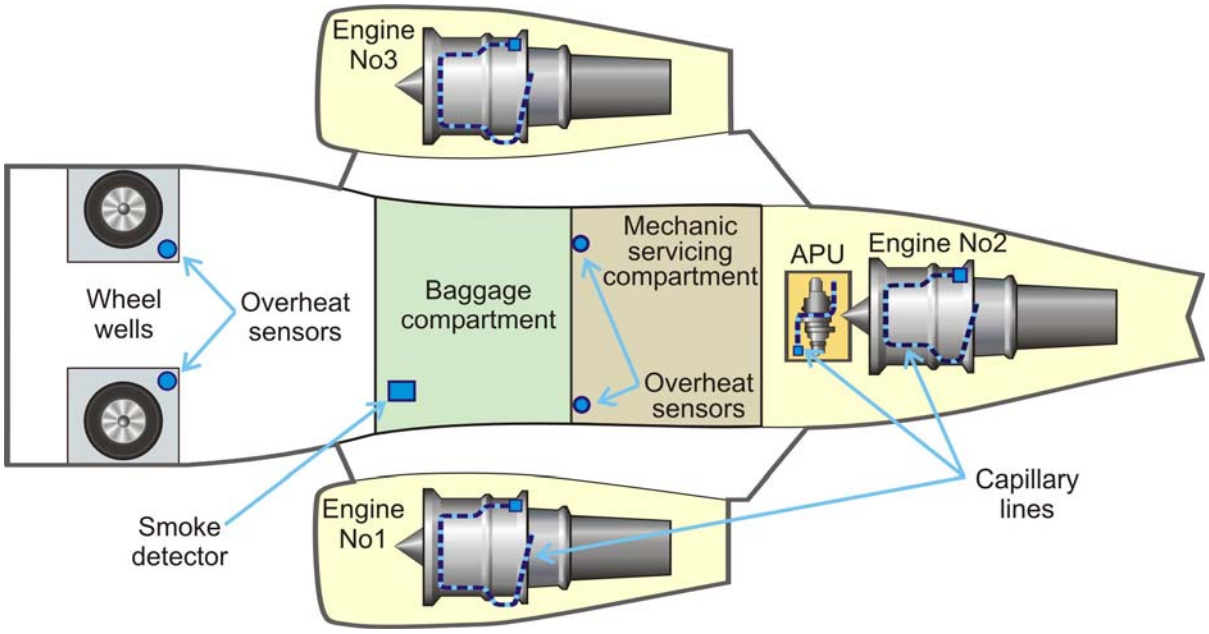

FIGURE 02-26-10-00 FIRE DETECTION SYSTEM

On each engine and in the APU compartment, a sealed box (detector) containing a warning and system integrity pressure switch, in conjunction with temperature sensitive capillary tubing, provides fire detection. The temperature sensitive capillary tubes contain a gas under pressure and a core that generates expanding gas when exposed to high temperature.

When the tube is submitted to a local high heat source or flame, the expanding gas, generated from the core, increases the pressure thus triggering the pressure switch which activates the appropriate fire warning.

If the tube is submitted to an overall relatively low temperature increase, the general gas expansion is enough to increase the pressure and trigger the switch.

This process is reversible so that when the fire is extinguished, the switches resume to normal position and warning stops.

In case of gas leak, the pressure in the tube decreases and the system integrity pressure switch, also located within the sealed box, triggers.

Then it activates a **ENG.. FIRE DETECT FAIL** message within the CAS windows.

NOTE

Emergency procedure must be applied even when a **ENG .. FIRE DETECT FAIL** message is displayed.

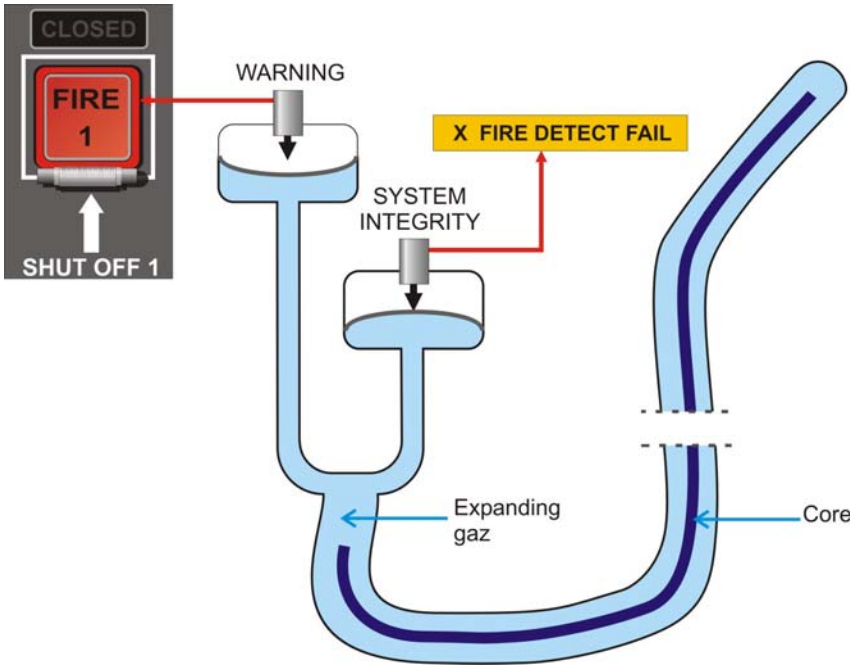

FIGURE 02-26-10-01 FIRE DETECTION CAPILLARY LINE DIAGRAM

Overheat detection within each wheel well is provided by a thermal switch. Within the mechanic servicing compartment, two overheat thermal switches are provided to monitor and detect overheat or a fire condition. Additionally, one smoke detector is located in the baggage compartment to detect smoke.

FIRE EXTINGUISHING

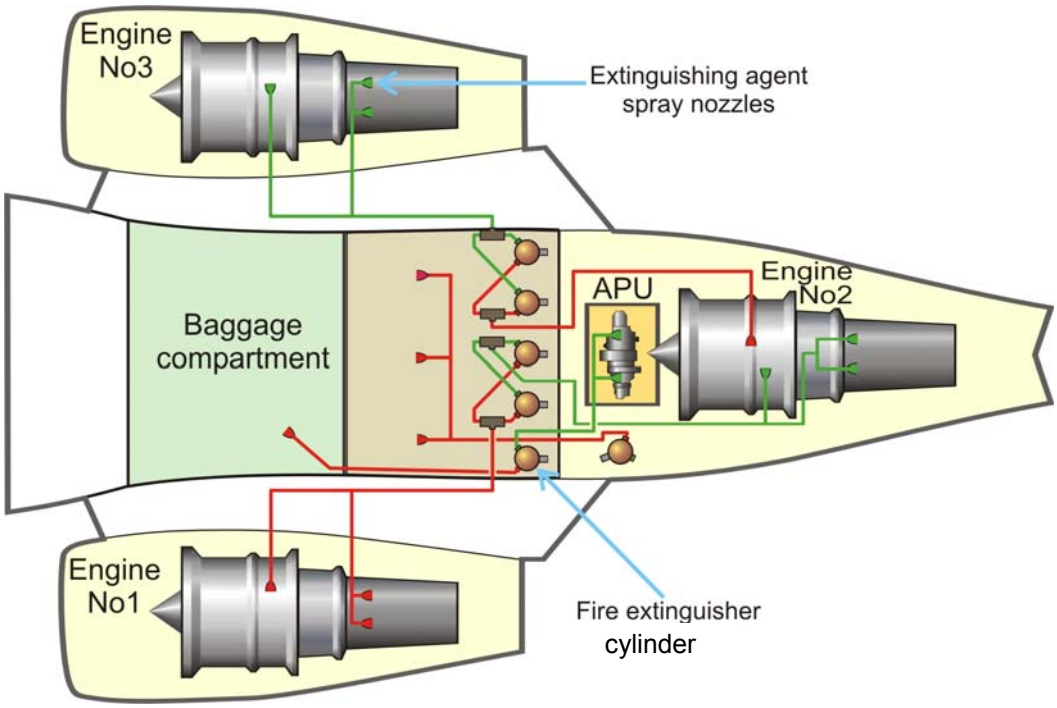

FIGURE 02-26-10-02 FIRE EXTINGUISHING SYSTEM DIAGRAM

Fire extinguishing is provided by a total of six fire extinguisher cylinders.

Five fire extinguisher cylinders are located in the mechanic servicing compartment, which provides fire protection for each engine, the APU and the baggage compartment. The sixth fire extinguisher cylinder, located within the No 2 engine compartment, provides dedicated fire protection to the mechanic servicing compartment (rear compartment).

The six cylinders are dedicated to:

- cylinder 1: Rear Compartment,
- cylinder 2: Baggage compartment or APU,
- cylinder 3: Discharge 1 Engine 1 or Discharge 2 Engine 2,
- cylinder 4: Discharge 1 Engine 2 or Discharge 2 Engine 1,
- cylinder 5: Discharge 1 Engine 2 or Discharge 2 Engine 3,
- cylinder 6: Discharge 1 Engine 3 or Discharge 2 Engine 2.

The engine fire extinction system is designed to enable up to two successive discharges: one cylinder discharge per percussion on No 1 and No 3 engines, and two cylinder discharge per percussion on No 2 engine because of its location within the aft fuselage section. The second discharge is available in case the engine fire persists after the first one.

The APU and the baggage compartment share one fire extinguisher cylinder. This provides a one-cylinder percussion, which can be selected for either the APU or the baggage compartment as required.

Each cylinder is equipped with a pressure gauge and a correction table to check the proper charging level according to the ambient temperature. Visual inspection of that pressure gauge is the only way to tell whether a fire extinguisher cylinder percussion has accidentally occurred during ground operation.

PORTABLE FIRE EXTINGUISHERS

Three portable halon extinguishers 2.5 lb (1.13 kg), located in the forward crew closet and cabin area (the number of extinguishers depends on airplane configuration), are available in the event the crew has to extinguish a fire in the cabin or baggage compartments.

➢ *For more information, refer to CODDE 1 / Chapter 02 / ATA 25.*

CONTROL

Interfaces and controls of the fire protection system are located in the upper portion of the overhead control panel.

They include controls of all engine fuel shut-off valves (FIRE 1, 2 and 3), the engines (DISCH 1, 2) and APU (FIRE APU) cylinder discharge pushbuttons, the rear (FIRE REAR COMP) and baggage (FIRE BAG COMP) compartment discharge pushbuttons, and a FIRE TEST button.

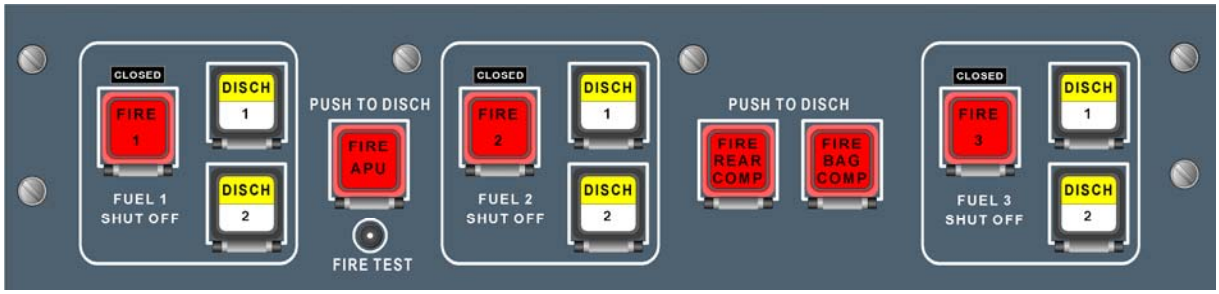

FIGURE 02-26-15-00 FIRE CONTROL OVERHEAD PANEL
APPLICABLE TO AIRPLANE S/N 120 TO 146

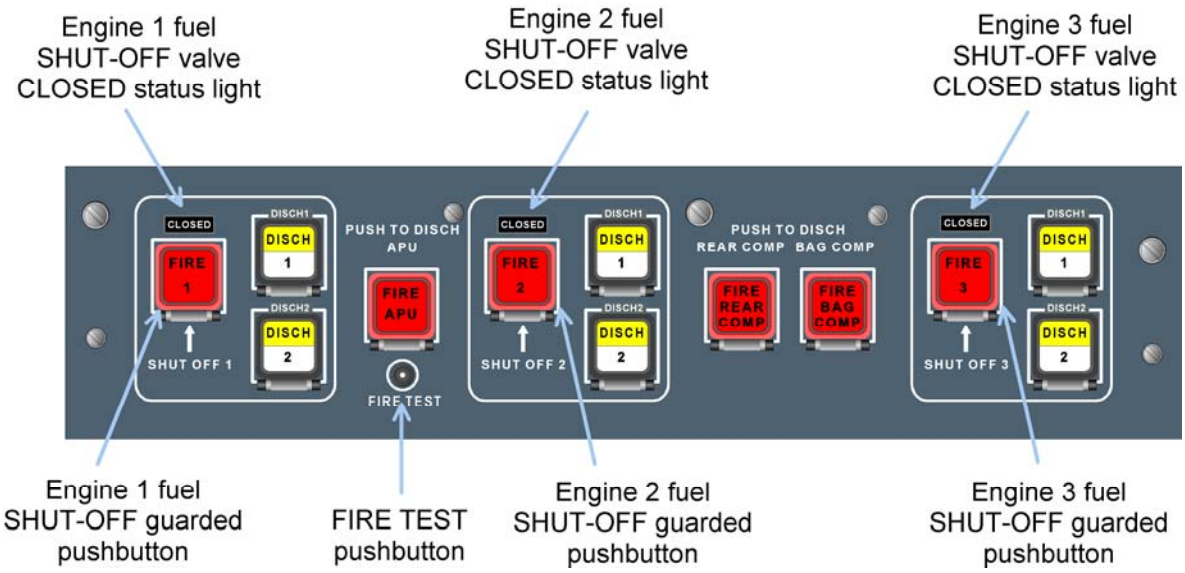

FIGURE 02-26-15-01 FIRE CONTROL OVERHEAD PANEL
APPLICABLE TO AIRPLANE S/N ≥ 147

SYNTHETIC TABLE

CONTROL	FUNCTION	TO ACTIVATE TO DEACTIVATE
	Activates closure of the corresponding engine fuel shut-off valve so that fuel feeding is cut off The **CLOSED** status light flashes during shut-off valve operation. Fuel shut-off valve is closed when **CLOSED** indication is illuminated fixed If a discrepancy between pushbutton control and fuel shut-off valve is detected, the **CLOSED** status light flashes **NOTE 1** FIRE 1 light goes out when fire is extinguished **NOTE 2** The pushbutton is also used to open the fuel shut-off valve again	Guarded  Guard raised to push and command fuel valve shut-off 
 	Discharges extinguishing agent from fire extinguisher cylinder(s) to the detected engine fire	Safety guarded, **FIRE** pushbutton not pushed yet  **FIRE** pushbutton pushed on. **1** illuminates steady white Raise the guard and push to discharge.  Cylinder percussion: **1** steady white **DISCH** steady amber 

CONTROL	FUNCTION	TO ACTIVATE TO deACTIVATE
	Discharges extinguishing agent from fire extinguisher cylinder to the detected APU fire **NOTE**  light goes out when fire is extinguished	Safety guarded  Raise the guard and push to discharge the cylinder 
	Discharges extinguishing agent from fire extinguisher cylinder to the rear compartment **NOTE**  light goes out when fire is extinguished	Safety guarded  Raise the guard and push to discharge the cylinder 
	Discharges extinguishing agent from fire extinguisher cylinder to the baggage compartment **NOTE**  light goes out when fire is extinguished and / or smoke is no longer detected	Safety guarded  Raise the guard and push to discharge the cylinder 

INDICATION

All fire detection warnings are provided through the illuminated pushbutton(s) on the fire control panel and through messages on the CAS window displays.

No fire detection indications are provided through any synoptic windows.

An audio warning system is activated when a fire is detected (engines, APU, BAG or REAR compartments) or fire test is performed.

INTRODUCTION

The fire control panel is physically and electrically segregated from the other systems located on the overhead control panel (except for the illuminated white markings on the front panel).

CIRCUIT BREAKERS

The Fire Protection System is protected by conventional trip-free circuit breakers located above the overhead panel.

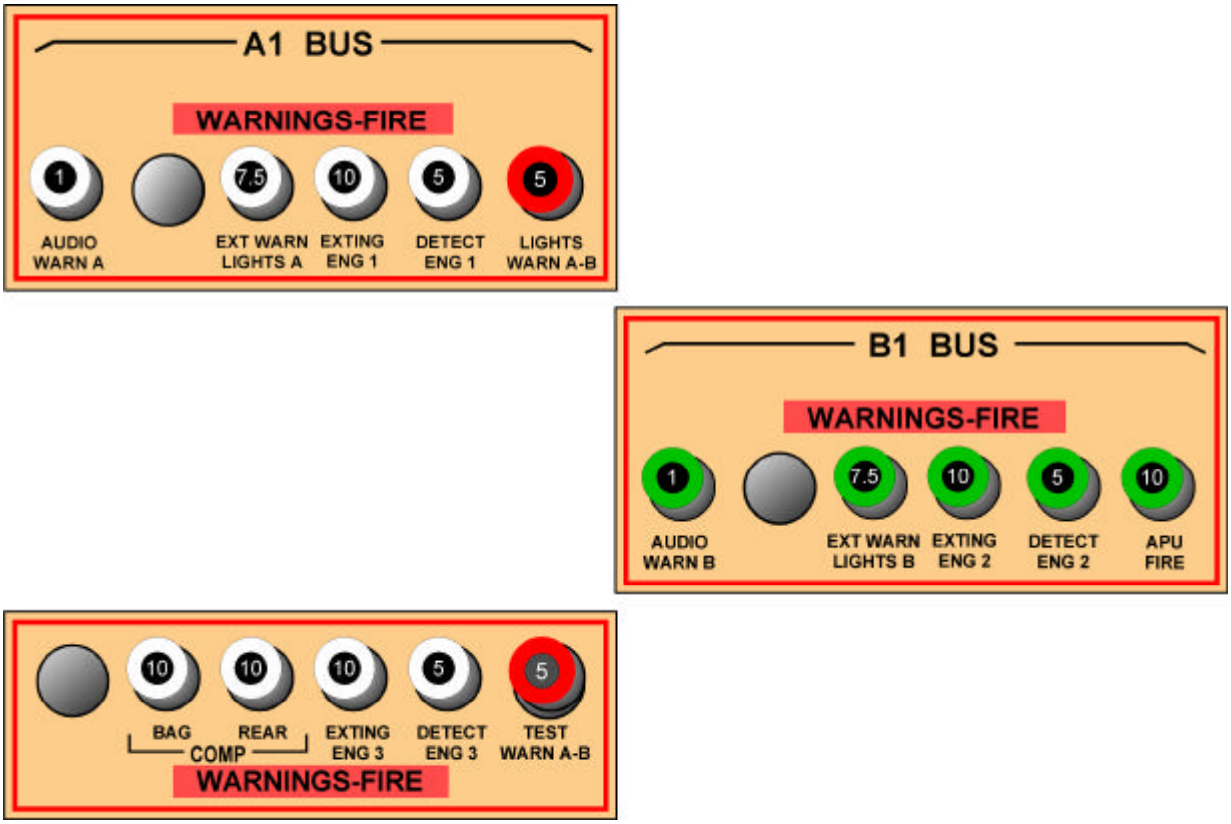

FIGURE 02-26-20-00 WARNINGS-FIRE CIRCUIT BREAKERS

Each cylinder is always dually electrically powered either by the LH bus or the RH bus for the first discharge and by the Secondary Flight Display standby battery for the second discharge.

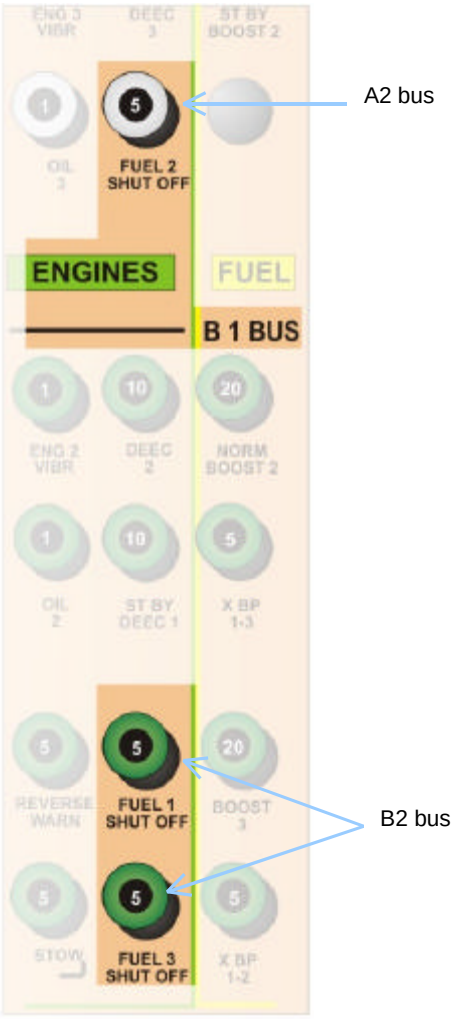

FIGURE 02-26-20-01 FUEL SHUT-OFF VALVES CIRCUIT BREAKERS

CYLINDER OVERPRESSURE PROTECTION

A pressure relief valve fitted on each cylinder provides protection against a rupture. In case of an overpressure, the relief valve frangible disk bursts and relieves pressure by discharging the extinguishing agent through the mechanic servicing compartment drainage system.

INTRODUCTION

In the following, ground and in-flight situations have been selected to help the crew to understand the symbols and the logic of the fire control panel and displays.

ENGINE AND APU FIRE EXTINGUISHING

ACTION	RESULT
Engine or APU on fire	FIRE X light on + audio warning + **FIRE ENG ..** or **FIRE APU** CAS message
Raise the guard and push FIRE X pushbutton	Fuel shut-off valve closes **CLOSED** status light flashes during shut-off valve operation Fuel shut-off valve is closed when **CLOSED** indication is illuminated fixed
Raise the guard and push DISCH 1 pushbutton	Corresponding fire extinguisher cylinders discharged 1 light steady white No 1 **DISCH** light becomes steady amber 2 light steady white If FIRE X light goes out, the fire is extinguished If FIRE X light remains illuminated, the fire persists: raise the guard and push DISCH 2 to activate the percussion of the second cylinder

Extinguishing a fire on No 2 engine activates the discharge of two cylinders per percussion. This means that the four extinguishers are discharged if DISCH 1 and DISCH 2 have been pressed.

Pressing the FIRE APU pushbutton automatically shuts off fuel to the APU and activates single fire cylinder percussion.

Failure of the fire detection system is indicated by **ENG .. FIRE DETECT FAIL** or the **APU FIRE DETECT FAIL** CAS messages.

WHEEL WELL / REAR COMP / BAG COMP / SMOKE IN TOILET

CONTEXT	RESULT
Overheat detected by one of the LH or RH sensors in wheel wells	**WHEEL XX OVHT** CAS message
Overheat detected by sensor in the rear compartment	FIRE REAR COMP light on + audio warning + **FIRE REAR COMP** CAS message Pressing the FIRE REAR COMP pushbutton discharges a single fire extinguisher cylinder into this compartment
Smoke detected in the baggage compartment	FIRE BAG COMP light on + audio warning + **FIRE BAG COMP** CAS message Pressing the FIRE BAG COMP pushbutton discharges a single fire extinguisher cylinder into this compartment
Smoke detected in the toilet compartment (option)	**SMOKE IN FWD TOILET** or/and **SMOKE IN AFT TOILET** CAS message(s)

FIRE TEST OPERATION

FIRE CONTROL PANEL

The following example gives the indications displayed during normal ground operation of the fire test.

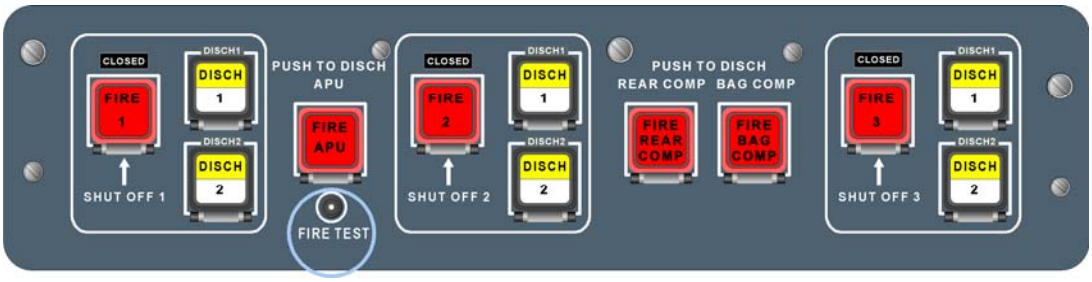

FIGURE 02-26-25-00 FIRE CONTROL PANEL WITH TEST PUSHBUTTON

Pressing the fire test pushbutton activates the warning horn and illuminates all the pushbuttons on the fire panel.

FIRE BAG COMP illuminates 5 seconds after the button has been pressed.

All the CAS messages associated to the FIRE X illumination are displayed in the CAS windows.

Test is OK when all the here above warnings are activated.

TEST SYNOPTIC

Engines, APU and wheel well fire detection systems test is available in the TEST synoptic by pressing the LIGHTS soft key.

If a failure is detected on the wheel well fire detection system, the **WHEEL XX OVHT** CAS message is displayed.

If a failure is detected on the engines or APU fire detection systems, the **ENG .. FIRE DETECT FAIL** or the **APU FIRE DETECT FAIL** CAS messages are displayed.

Test is OK when OK is displayed in the TEST synoptic.

FIRE ON ENGINE 2 AND DISCH 1 ALREADY ACTIVATED

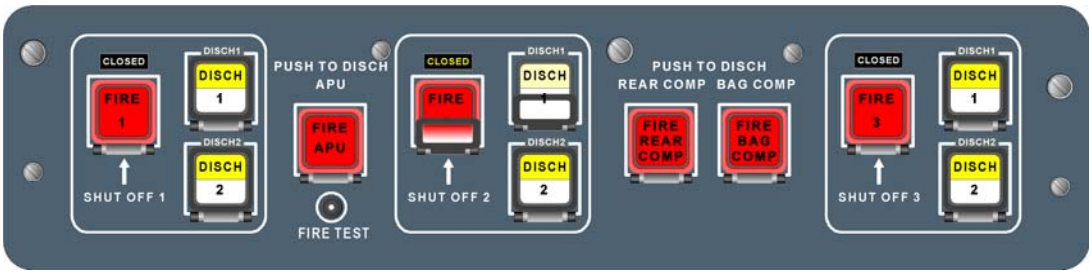

FIGURE 02-26-25-01 FIRE CONTROL PANEL WITH FIRE ON ENGINE 2 AND DISCH 1 ALREADY ACTIVATED

ACTION	RESULT
Raise the guard and push FIRE 2 pushbutton	No 2 engine fuel valve closed **CLOSED** illuminates **1** and **2** lights illuminate white
Raise the guard and push DISCH 1 pushbutton	Engine fire extinguisher cylinders No 4 and No 5 discharged **1** light steady white No 1 **DISCH** light becomes steady amber **2** light steady white Engine fire extinguisher cylinders No 3 and No 6 ready to be discharged
FIRE 2 pushbutton still illuminated	Fire on No 2 engine requires additional discharge
Raise the guard and push DISCH 2 pushbutton	Engine fire extinguisher cylinders No 3 and No 6 discharged **1** and **2** light steady white No 2 **DISCH** light becomes steady amber

CAS MESSAGES

CAS MESSAGE	DEFINITION
FIRE APU	Fire detected in APU compartment
FIRE BAG COMP	Fire detected in baggage compartment
FIRE ENG ..	Fire detected on engine (1/2/3)
FIRE REAR COMP	Fire detected in rear compartment
SMOKE IN XX TOILET	Smoke detected in the aft or/and forward toilet(s)
WHEEL XX OVHT	Excessive temperature in (LH/RH) wheel compartment
APU FIRE DETECT FAIL	APU fire detection system failure (on ground only)
ENG .. FIRE DETECT FAIL	Failure of engine (1/2/3) fire detection system
REAR COMP FIRE DETECT FAIL	Failure of rear compartment fire detection system

INTENTIONALLY LEFT BLANK