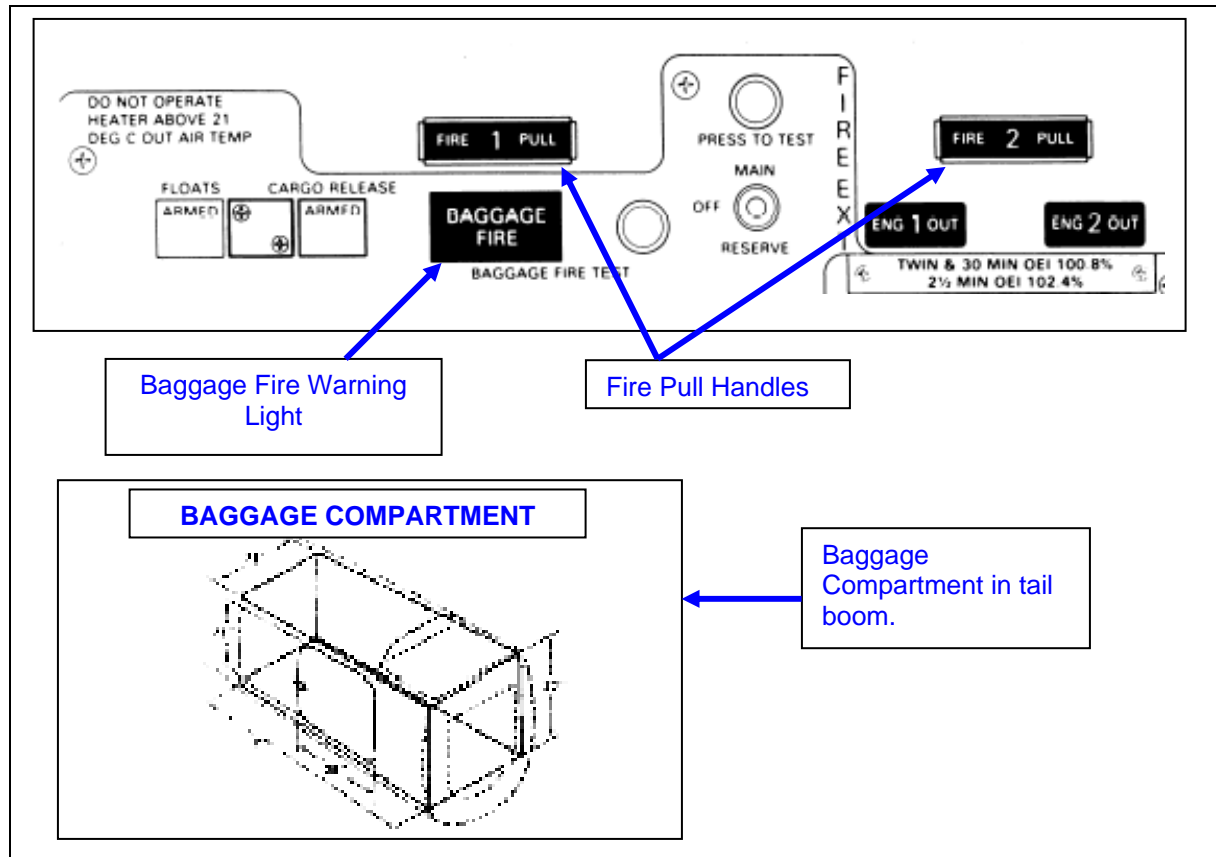


EMERGENCY SYSTEMS REVIEW

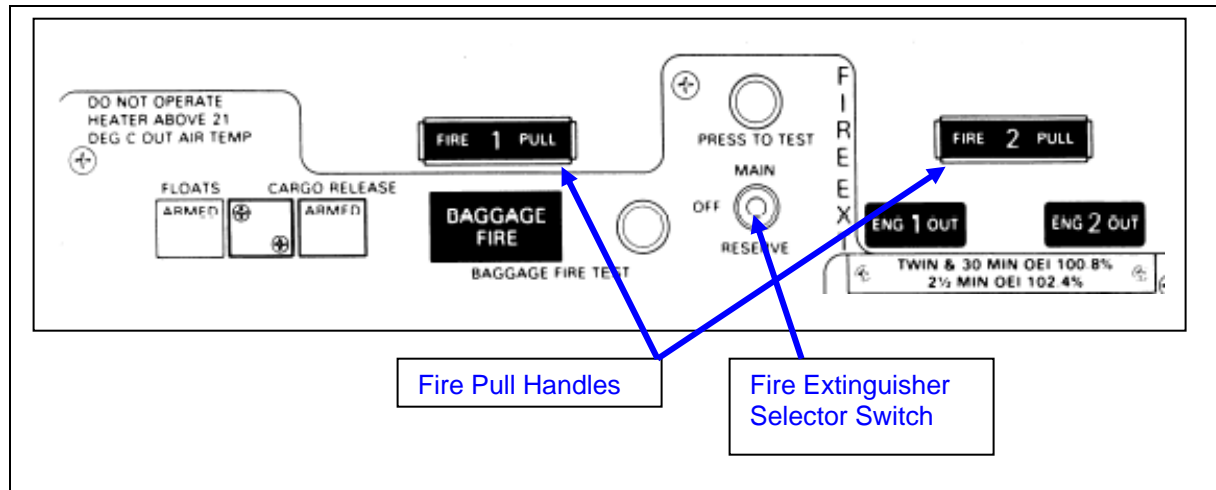
warning and caution panel review



Fire Detection

A set of heat sensing elements is mounted to the cowling and forward firewall for each power section. A fire or overheat condition will cause the **FIRE PULL HANDLE** for the affected power section to illuminate.

A smoke detector is mounted at the forward end of the baggage compartment ceiling. The **BAGGAGE COMPARTMENT** and **smoke detector** is in the tail boom. Smoke in the baggage compartment will cause the **BAGGAGE FIRE WARNING LIGHT** in the instrument panel to flash intermittently.

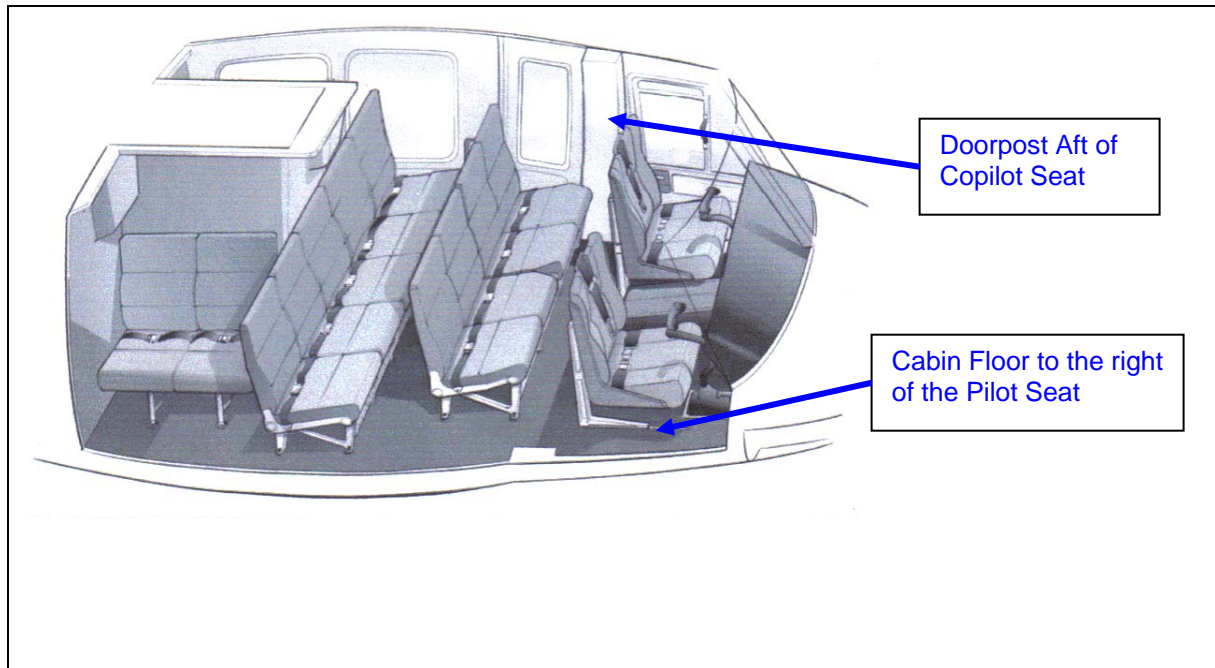


Fire Extinguisher System

A fire extinguishing bottle for each power section is mounted in the **AFT FUSELAGE**. These bottles are connected in such a way as to allow either or both bottles to be discharged onto either engine.

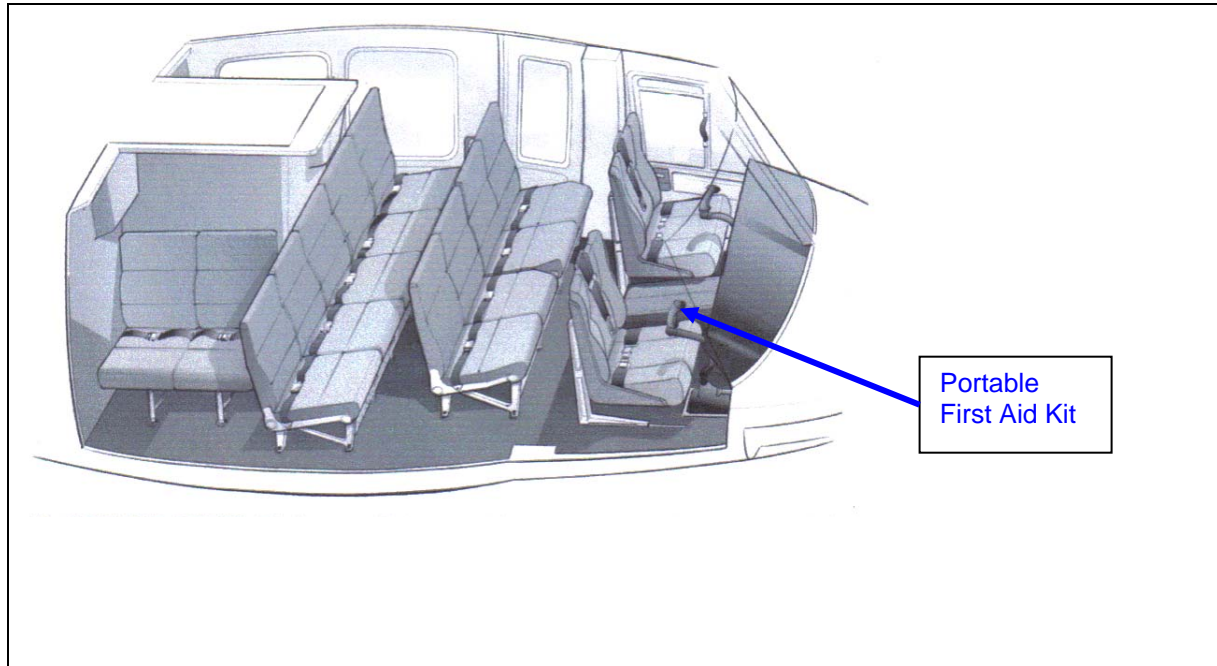
Pulling the **FIRE PULL HANDLE** of the affected power section **closes the bypass door in the air management system, closes the fuel shutoff valve, closes both heater bleed air valves, and arms both fire bottles.**

The **FIRE EXTINGUISHER SELECTOR SWITCH** may then be used to discharge the main and reserve fire extinguisher bottles individually.



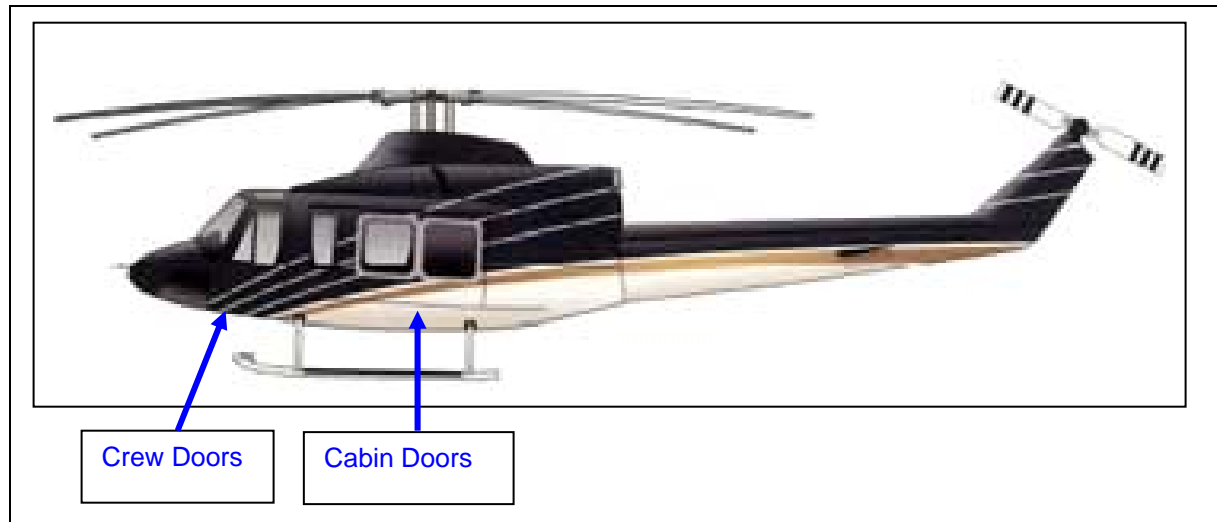
Portable Fire Extinguishers

Two portable fire extinguishers are mounted in the cabin, one on the cabin floor to the right of the pilot seat, and the other on the **DOORPOST AFT OF THE COPILOT SEAT**.



First Aid Kit

A **PORTABLE FIRST AID KIT** is attached to the left side of the pedestal by hook and pile fasteners.



Emergency Exits

There are two types of doors for exiting the helicopter:

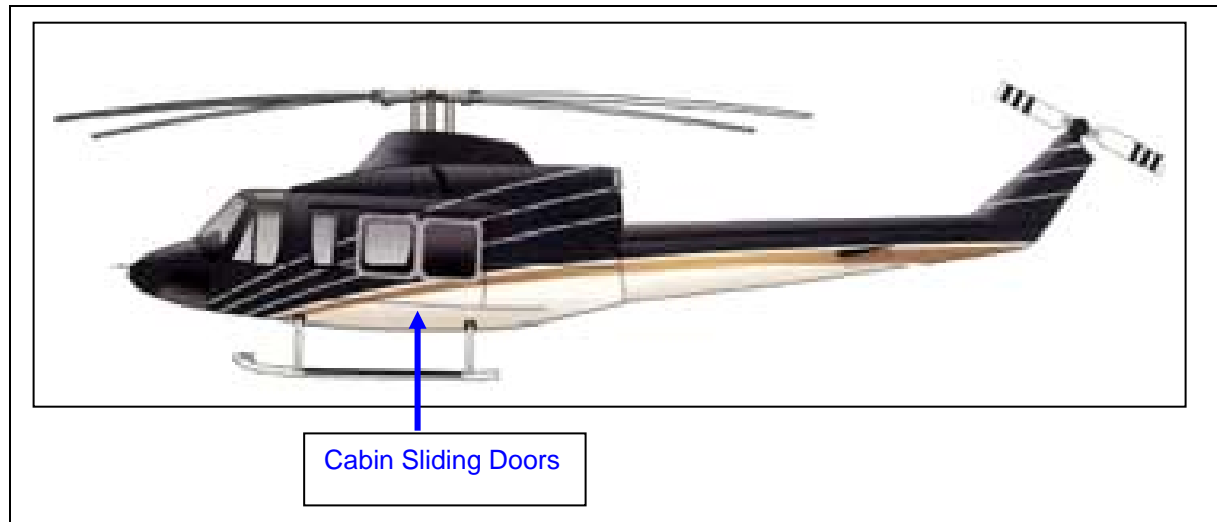
CREW DOORS: Crew doors are on each side for easy entry. Large glass windshields and clear acrylic windows in the crew doors, roof, and lower nose area allow good visibility from crew stations. The doors slide from front to rear, can be locked open, or removed.

CABIN DOORS: A large sliding door and a hinged panel on each side of the cabin provide easy access to the passenger/cargo compartment. Large acrylic windows in the doors provide good visibility. The doors slide from front to rear, can be locked open symmetrically or asymmetrically, or removed.



Crew Door Jettison

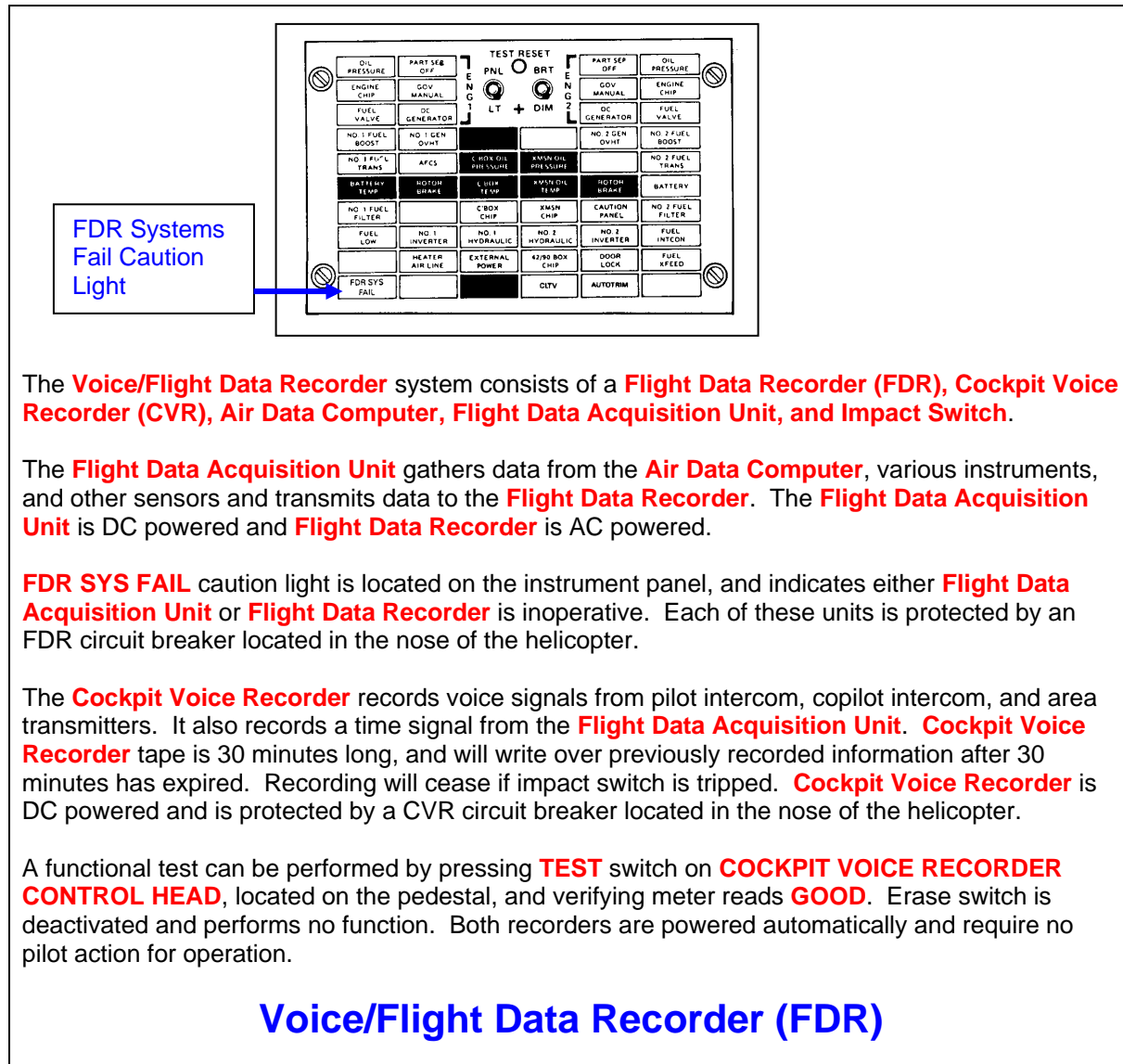
If **CREW DOORS** will not open, door jettison can be accomplished by pulling jettison handles located on doorpost forward of each crew door.



Cabin Door Window Jettison

If **CABIN SLIDING DOORS** or hinged panels cannot be opened, emergency escape is possible by pushing on the corners of windows in sliding doors to jettison windows.

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The **Voice/Flight Data Recorder** system consists of a **Flight Data Recorder (FDR)**, **Cockpit Voice Recorder (CVR)**, **Air Data Computer**, **Flight Data Acquisition Unit**, and **Impact Switch**.

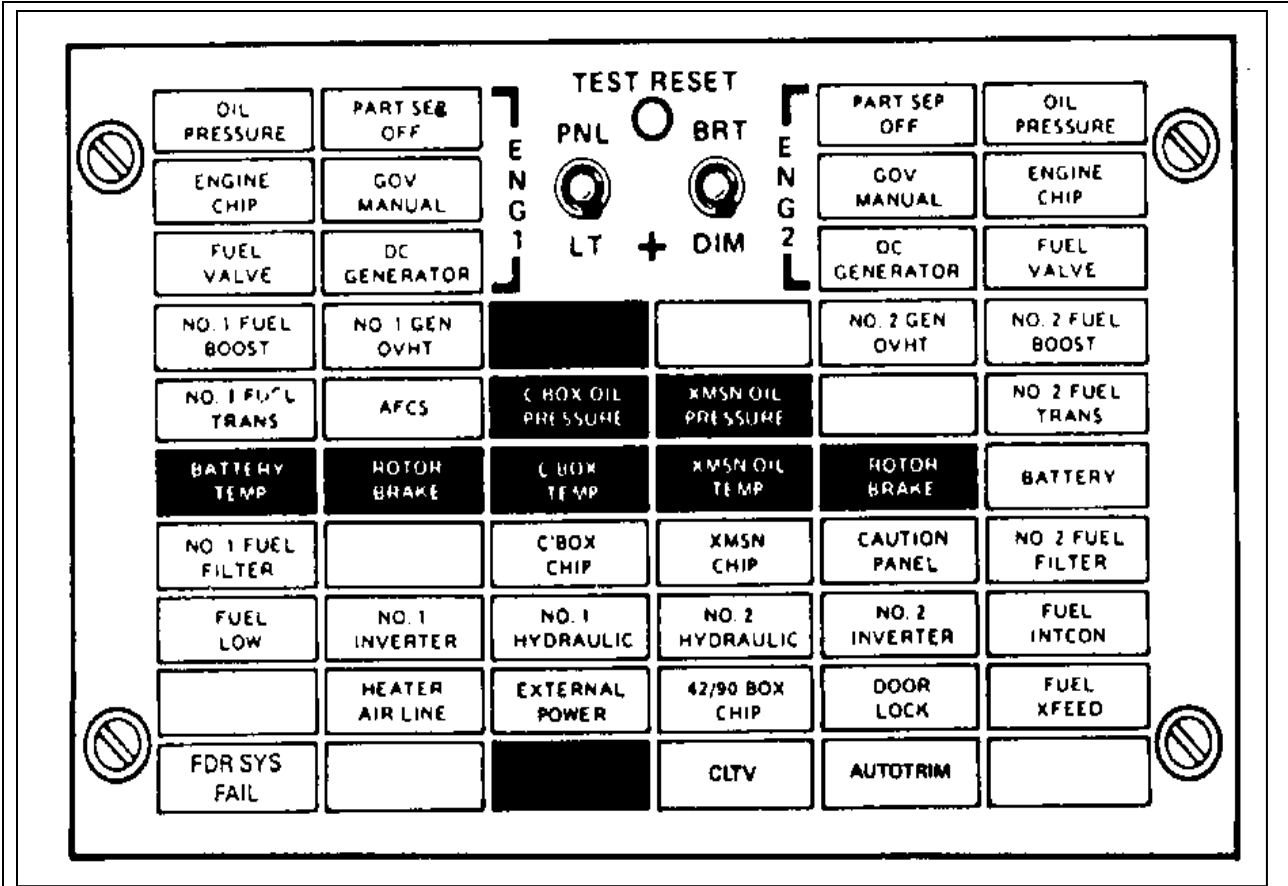
The **Flight Data Acquisition Unit** gathers data from the **Air Data Computer**, various instruments, and other sensors and transmits data to the **Flight Data Recorder**. The **Flight Data Acquisition Unit** is DC powered and **Flight Data Recorder** is AC powered.

FDR SYS FAIL caution light is located on the instrument panel, and indicates either **Flight Data Acquisition Unit** or **Flight Data Recorder** is inoperative. Each of these units is protected by an FDR circuit breaker located in the nose of the helicopter.

The **Cockpit Voice Recorder** records voice signals from pilot intercom, copilot intercom, and area transmitters. It also records a time signal from the **Flight Data Acquisition Unit**. **Cockpit Voice Recorder** tape is 30 minutes long, and will write over previously recorded information after 30 minutes has expired. Recording will cease if impact switch is tripped. **Cockpit Voice Recorder** is DC powered and is protected by a CVR circuit breaker located in the nose of the helicopter.

A functional test can be performed by pressing **TEST** switch on **COCKPIT VOICE RECORDER CONTROL HEAD**, located on the pedestal, and verifying meter reads **GOOD**. Erase switch is deactivated and performs no function. Both recorders are powered automatically and require no pilot action for operation.

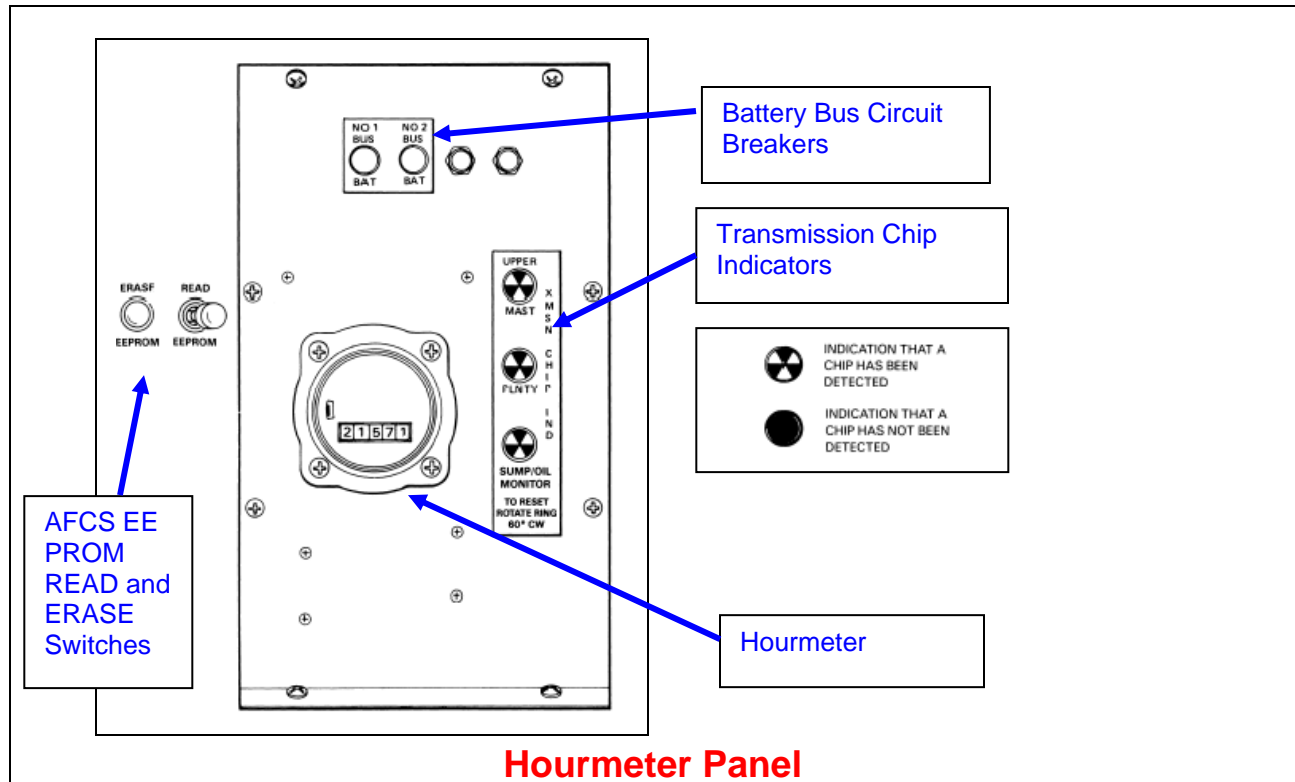
Voice/Flight Data Recorder (FDR)



Warning and Caution Panel

Warning and Caution Panel Overview

The Warning and Caution Panel contains **RED WARNING LIGHTS** that provide indications of unsafe flight conditions, and **AMBER CAUTION LIGHTS** that provide indications of cautionary flight conditions.

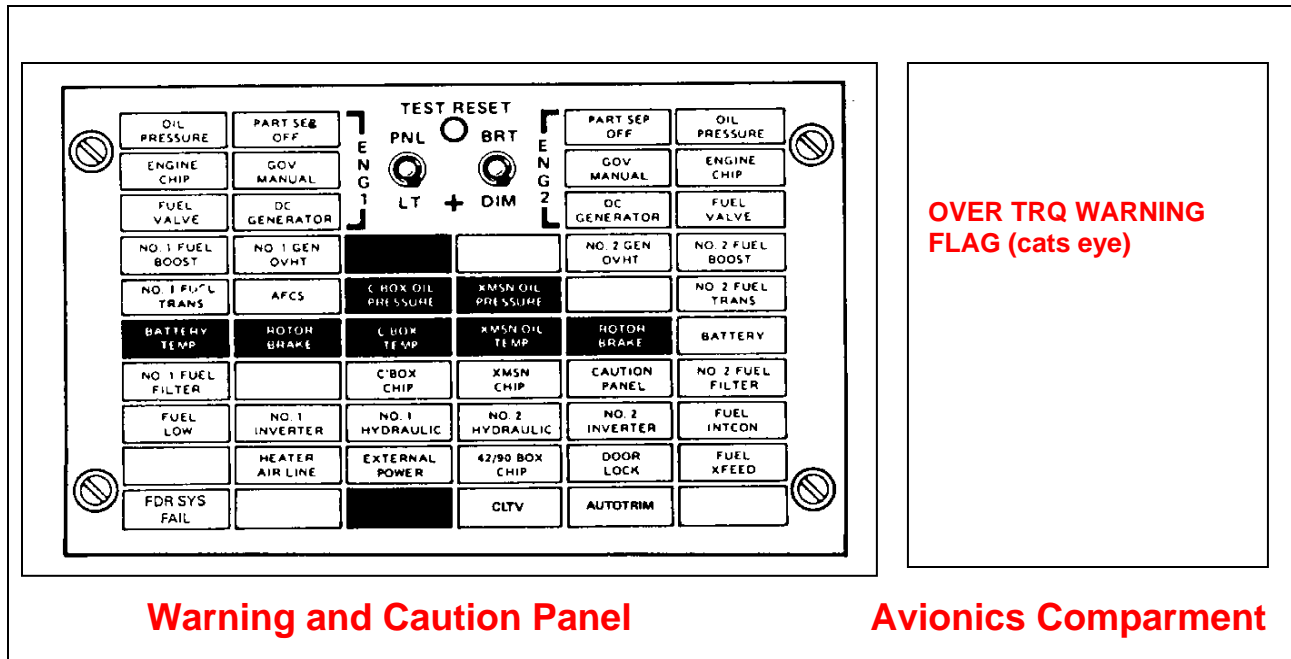


Hourmeter Panel

The hourmeter panel is located at the **base of the pedestal on the right side**. It supports the **HOURMETER, TRANSMISSION CHIP INDICATORS (XMSN CHIP IND)**, and the **BATTERY BUS CIRCUIT BREAKERS (NO. 1 BUS BAT and NO. 2 BUS BAT)**.

The hourmeter records aircraft operating time in hours and tenths. The transmission chip indicators provide an indication to maintenance personnel that the **transmission chip caution light (XMSN CHIP) had illuminated** and where the chip occurred. To reset the indicator, rotate the outer portion 60 degrees clockwise.

The Dual Digital **AFCS EEPROM READ and ERASE** switches are located on the console just aft of the hourmeter panel.

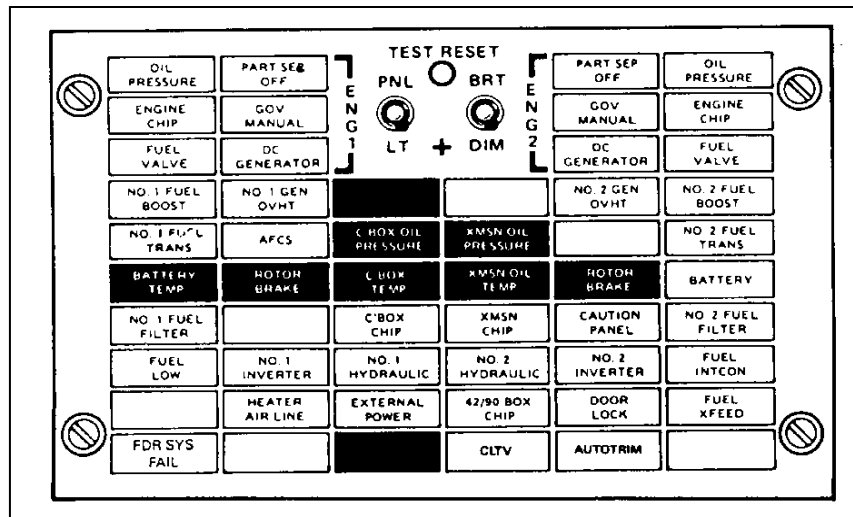


Overtorque Warning and Caution Lights

An **OVER TRQ WARNING FLAG (cat's eye)** is located in the lower left aft avionics compartment. If **mast torque exceeds 110%**, the warning flag will be tripped showing alternating black and white sections.

There is a **MAST TORQUE CAUTION LIGHT** on the Warning and Caution Panel.

The Fault Condition that activates each Warning and Caution Light will be covered later in the lesson.



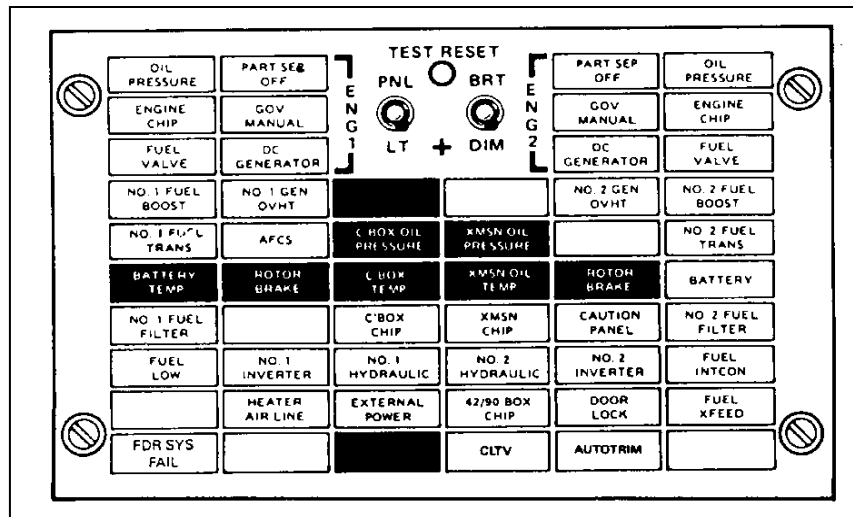
Warning and Caution Panel

Transmission Warning and Caution Lights

A gauge on the instrument panel allows the flight crew to monitor transmission oil temperature and pressure. **TRANSMISSION WARNING AND CAUTION LIGHTS** warn of high transmission oil temperature, low transmission oil pressure, and metal particles in transmission oil.

Three remote transmission chip indicators are located on the right side of the pedestal near the cabin floor. You learned about these indicators previously.

The Fault Condition that activates each Warning and Caution Light will be covered later in the lesson.



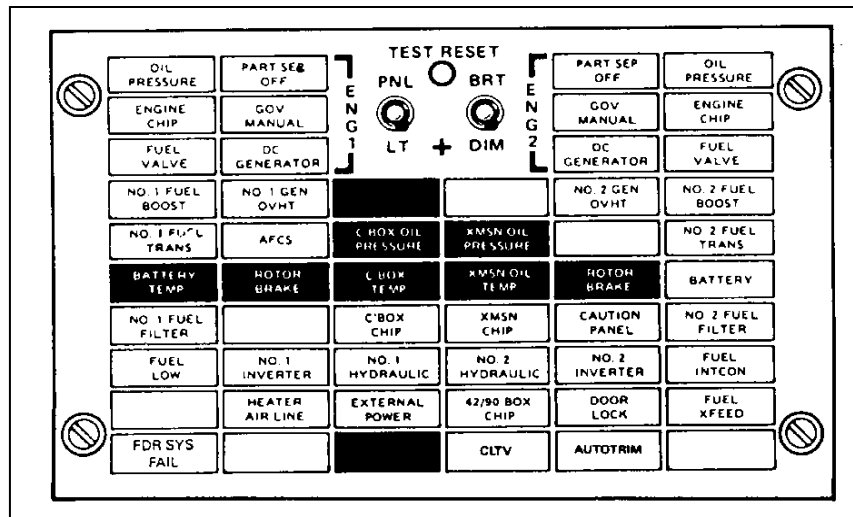
Warning and Caution Panel

Powerplant Warning and Caution Lights

Instruments on the instrument panel provide indications of gas producer (N_I) rpm, power turbine (N_{II}) RPM, torque, interturbine temperature, oil temperature, and oil pressure for each power section, and oil temperature and oil pressure for the combining gearbox.

POWERPLANT CAUTION AND WARNING LIGHTS alert the crew to the following conditions:

- Low engine N_I or power turbine N_{II} RPM
- Low engine oil pressure
- Metal particles in engine oil
- Low combining gearbox oil pressure
- High combining gearbox oil temperature
- Metal particles in combining gearbox oil



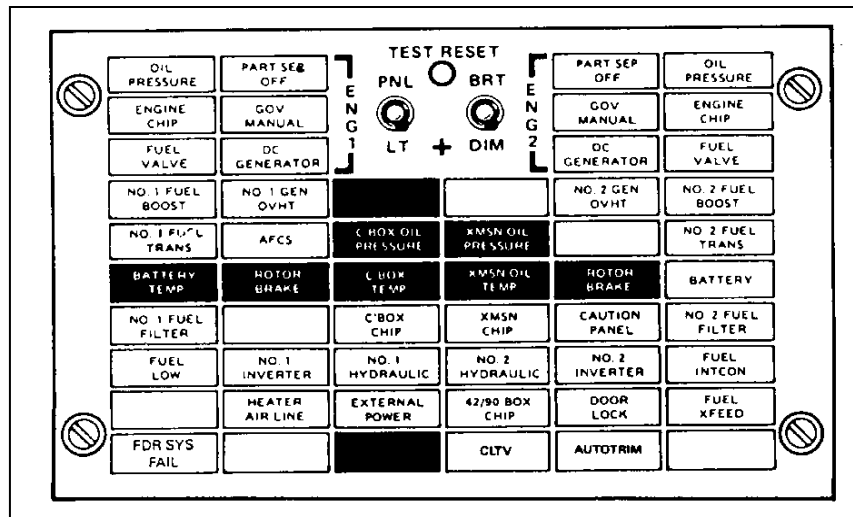
Warning and Caution Panel

Fuel System Warning and Caution Lights

The fuel system includes the following **FUEL SYSTEM CAUTION LIGHTS**:

FUEL TRANS, FUEL BOOST, FUEL LOW, FUEL FILTER, FUEL VALVE, FUEL XFEED.

The Fault Condition that activates each Warning and Caution Light will be covered later in the lesson.



Warning and Caution Panel

DC Electrical System Warning and Caution Lights

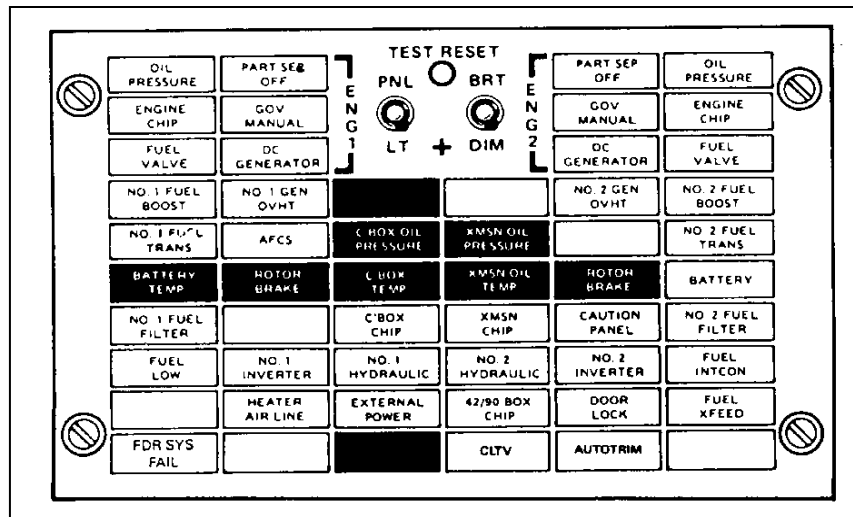
The DC Electrical System includes the following **DC ELECTRICAL SYSTEM WARNING (RED) LIGHTS**:

BATTERY TEMP

The DC Electrical System includes the following **DC ELECTRICAL SYSTEM CAUTION (AMBER) LIGHTS**:

DC GENERATORS (Engine 1 and 2), GEN OVHT (Engine 1 and 2), PART SEP OFF (Engine 1 and 2).

The Fault Condition that activates each Warning and Caution Light will be covered later in the lesson.



Warning and Caution Panel

AC/Other Electrical System Warning and Caution Lights

The AC Electrical System includes the following **AC ELECTRICAL SYSTEM WARNING (RED) LIGHTS**:

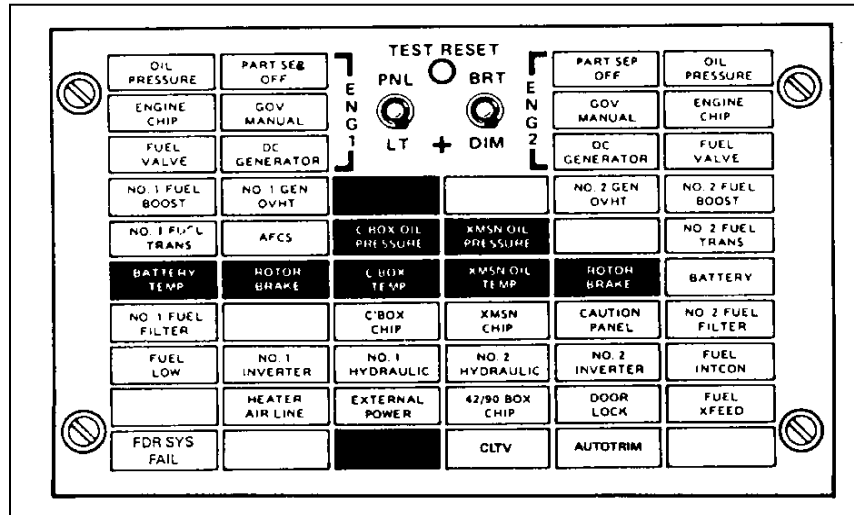
NO1. INVERTER, NO. 2 INVERTER.

OTHER ELECTRICAL SYSTEM CAUTION LIGHTS include:

EXTERNAL POWER, BATTERY, FDR SYSTEMS FAIL, FT OFF, AHRS FAN, GOV MANUAL, CAUTION PANEL, DOOR LOCK, AUTOTRIM.

The Fault Condition that activates each Warning and Caution Light will be covered later in the lesson.

Artist Media Production Notes:



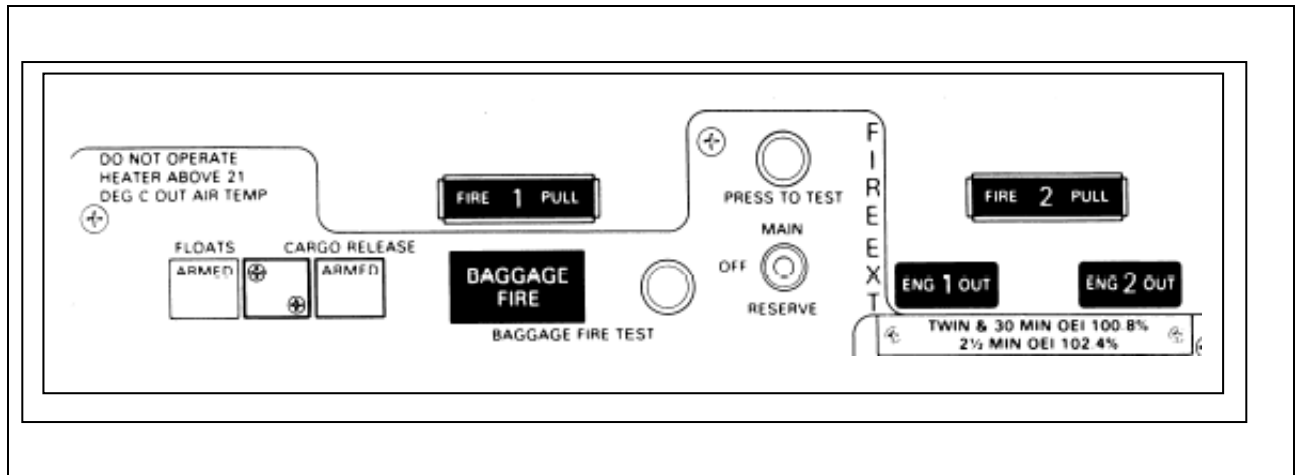
Warning and Caution Panel

Hydraulic System Warning and Caution Lights

The Hydraulic System includes the following **HYDRAULIC SYSTEM CAUTION LIGHTS:**

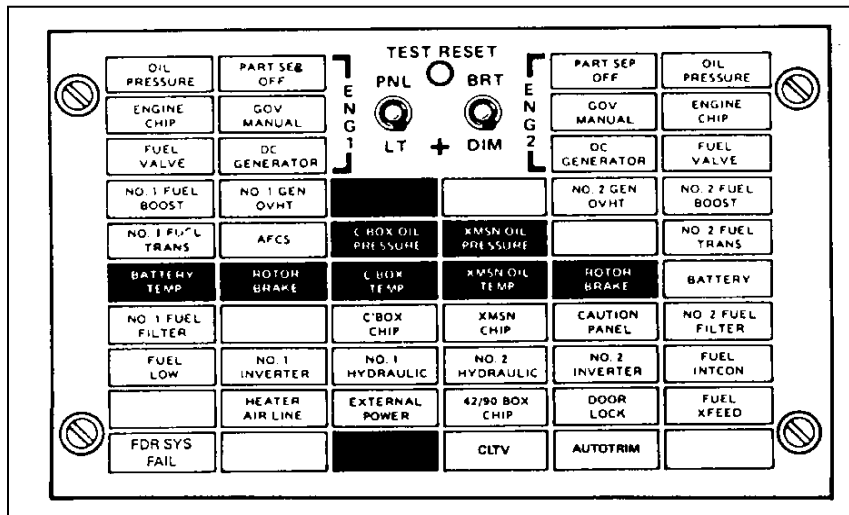
NO.1 HYDRAULIC or NO.2 HYDRAULIC

Each hydraulic system also has a gauge to allow the flight crew to monitor fluid pressure and temperature.



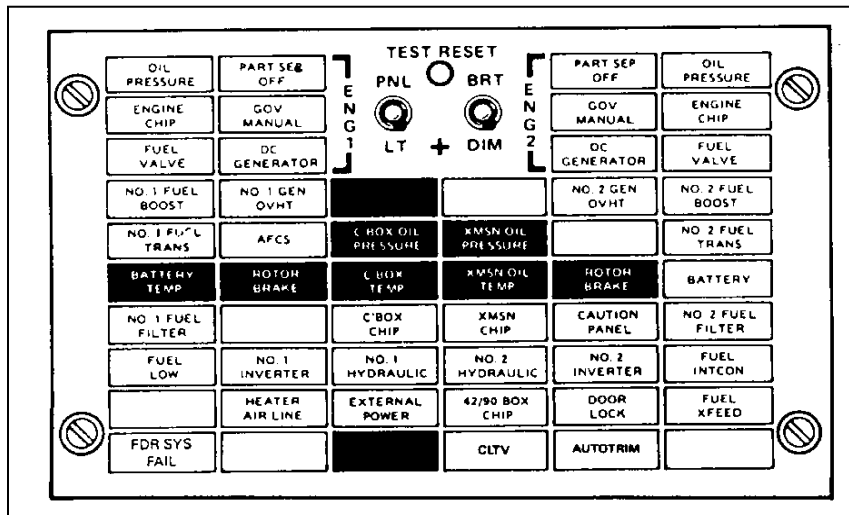
Warning (RED) Light Fault Condition Screen 1 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
FIRE PULL (Engine 1 or 2)	Fire indication in engine No. 1 or 2 engine compartment.
BAGGAGE FIRE	Smoke in baggage compartment.
ENG OUT (Engine 1 or 2)	GAS PROD abnormally low (below 53% plus or minus 2%) RPM (N ₁) on number 1 or number 2 engine.



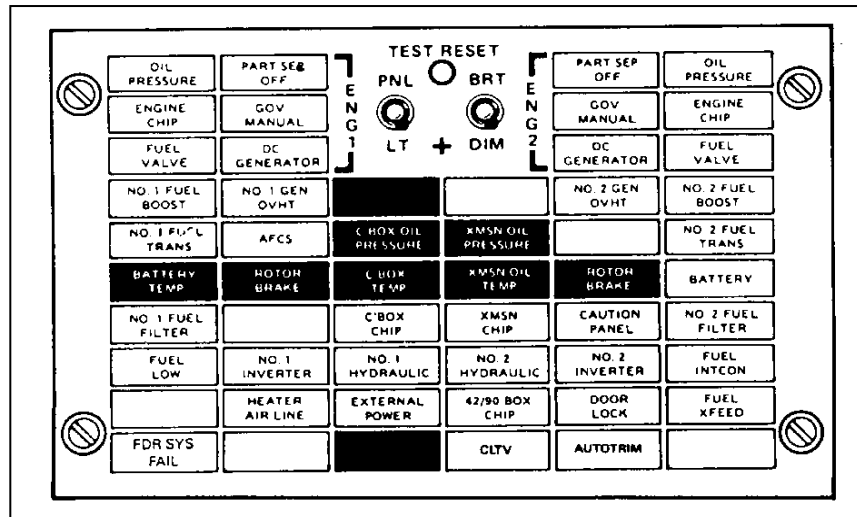
Warning (RED) Light Fault Condition Screen 2 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
XMSM OIL PRESSURE	Transmission oil pressure below limits.
XMSM OIL TEMP	Transmission oil teperature above limits.
C BOX OIL PRESSURE	Combining gearbox oil pressure below normal.
C BOX TEMP	Combining gearbox oil temperature above limit.
BATTERY TEMP	Battery case temperature above limit.
ROTOR BRAKE	Rotor brake linings not retracted.
RPM (with audio)	Rotor RPM at or below 95%.
RPM (without audio)	Rotor RPM at or above 105%.



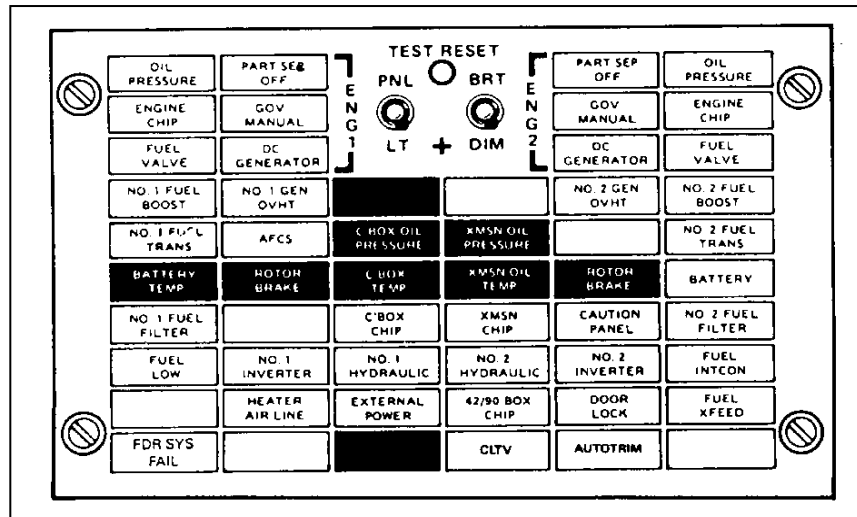
Caution (AMBER) Light Fault Condition Screen 1 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
OIL PRESSURE (No. 1 or 2)	Engine oil pressure below limits.
DC GENERATOR (No. 1 or 2)	Failure of DC generator.
PART SEP OFF (No. 1 or 2)	Particle separator bypass door closed or circuit breaker out. Ice and dust protection system inoperative.
FUEL BOOST (No. 1 or 2)	Fuel boost pump failure has occurred.
FUEL FILTER (No. 1 or 2)	Fuel filter is partially blocked.



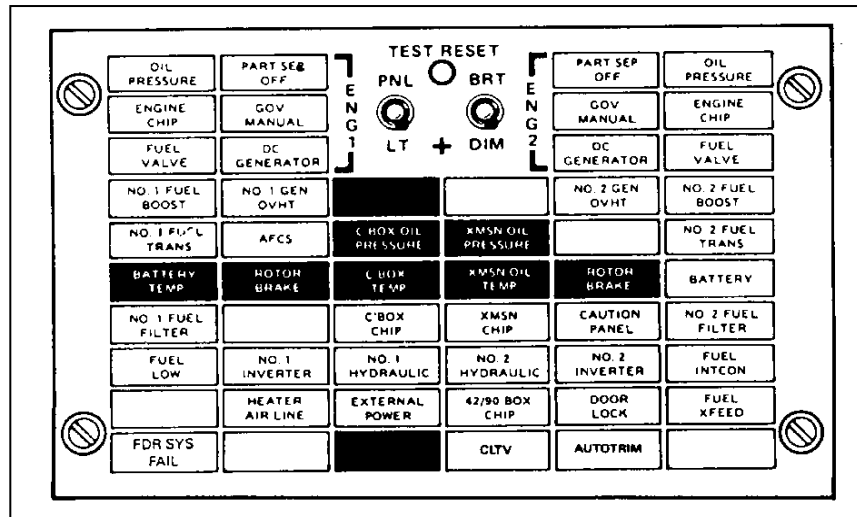
Caution (AMBER) Light Fault Condition Screen 2 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
FUEL LOW	More than 100 pounds difference between No. 1 and No. 2 fuel quantities. Indicates a possible fuel leak in cells with lower quantity. Fuel level in left or right cells is at or below 190 pounds.
GOV MANUAL (No. 1 or 2)	Engine governor is in manual mode.
ENGINE CHIP (No. 1 or 2)	Metal particles in engine oil.
FUEL VALVE (No. 1 or 2)	Fuel valve not properly seated, or circuit breaker out.
GEN OVHT (No. 1 or 2)	Generator overheating.



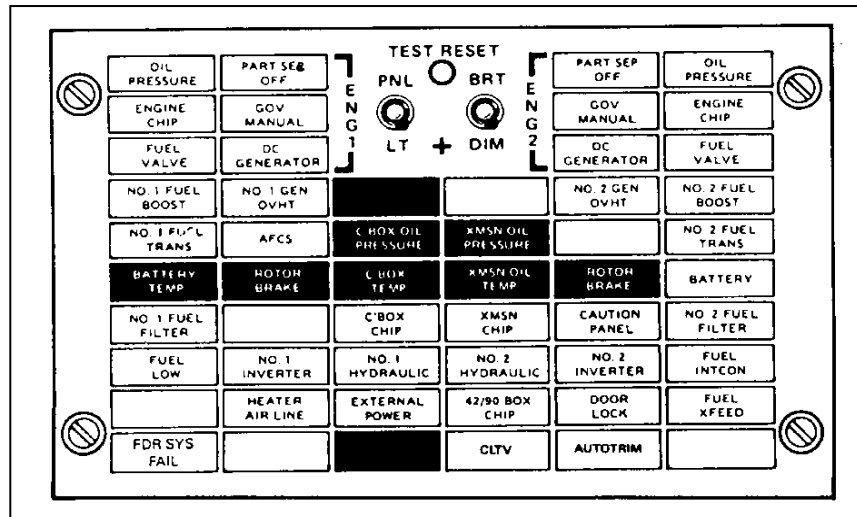
Caution (AMBER) Light Fault Condition Screen 3 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
CAUTION PANEL	Caution panel inoperative.
INVERTER (No. 1 or 2) Or No. 2 INVERTER	Failure of AC power inverter. Or Emergency Load Switch in EMERG LOAD position.
EXTERNAL POWER	External Power door open.
DOOR LOCK	Passenger door(s) or baggage compartment doors not locked.



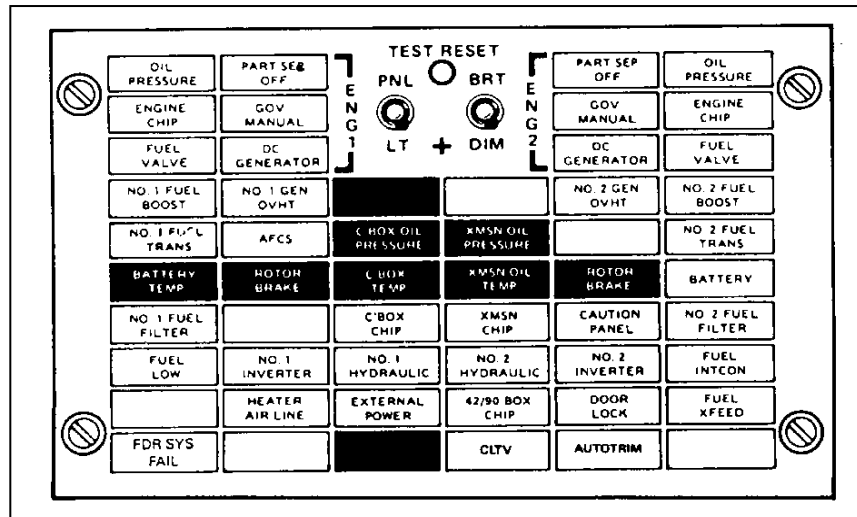
Caution (AMBER) Light Fault Condition Screen 4 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
BATTERY	Both battery switches/relays in the same position.
C BOX CHIP	Metal particle in combining gearbox oil.
XMSM CHIP	Metal particles in transmission oil (one or more remote XMSM CHIP indicators tripped).
42/90 BOX CHIP	Metal particles in 42 degree or 90 degree gearbox oil.
HYDRAULIC (No. 1 or 2)	Hydraulic pressure below limit or temperature above limit.



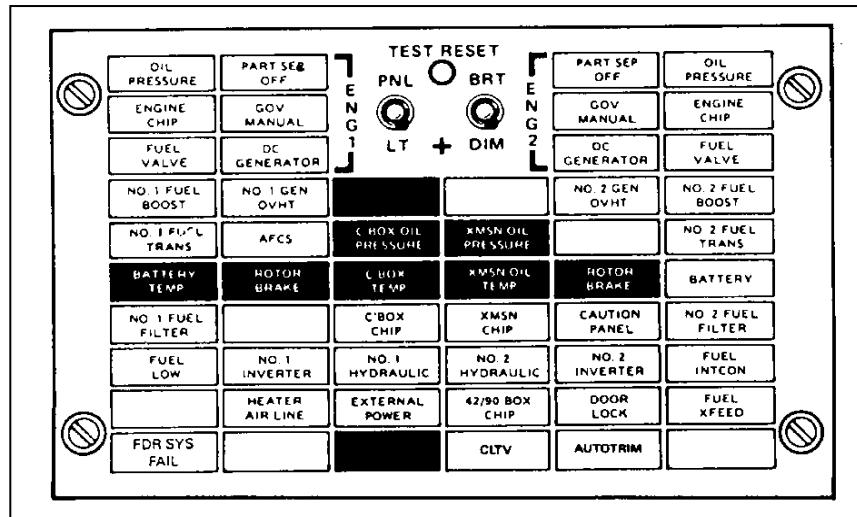
Caution (AMBER) Light Fault Condition Screen 5 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
FUEL TRANS (No.1 or 2)	Fuel transfer pump or ejector pump malfunction (no fuel transfer from lower forward or middle cells to lower aft cell). OR Check valve malfunction allowing fuel to leak from aft to mid cell after normal transfer is complete (total fuel 800 pounds or less).
FUEL INTCON (Switch NORM)	Fuel interconnect valve not fully closed. (Automatic valve opening is normal if FUEL LOW light is also illuminated).
FUEL INTCON (Switch OPEN)	FUEL interconnect valve not fully open OR FUEL INTCOM circuit breakers out.
FUEL XFEED	Fuel crossfeed valve not fully open or closed, OR FUEL XFEED circuit breakers out.
HEATER AIR LINE	Heater mixing valve malfunction.



Caution (AMBER) Light Fault Condition Screen 6 (Condition that causes light to illuminate)

PANEL WORDING	FAULT CONDITION
AUTOPILOT (No.1 or 2)	Autopilot 1 or 2 inoperative: <ul style="list-style-type: none"> Automatic flight control system hardover. Loss of AC power to AP 1 or 2. Loss of attitude gyro input to AP 1 or 2 (possible disengagement of either or both Autopilots). Auto trim malfunction. Displacement between AP 1 and AP 2 actuators at least 50% travel.
AUTOTRIM	Pitch, roll or yaw trim inoperative.
FDR SYS FAIL	Flight Data Recorder inoperative.
FT OFF	Force Trim inoperative
CYC CTR	Cyclic not centered.



Overview of Warning and Caution Light Panel