CHAPTER 16

CAUTION/ WARNING SYSTEM

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ILLUSTRATIONS and TABLES

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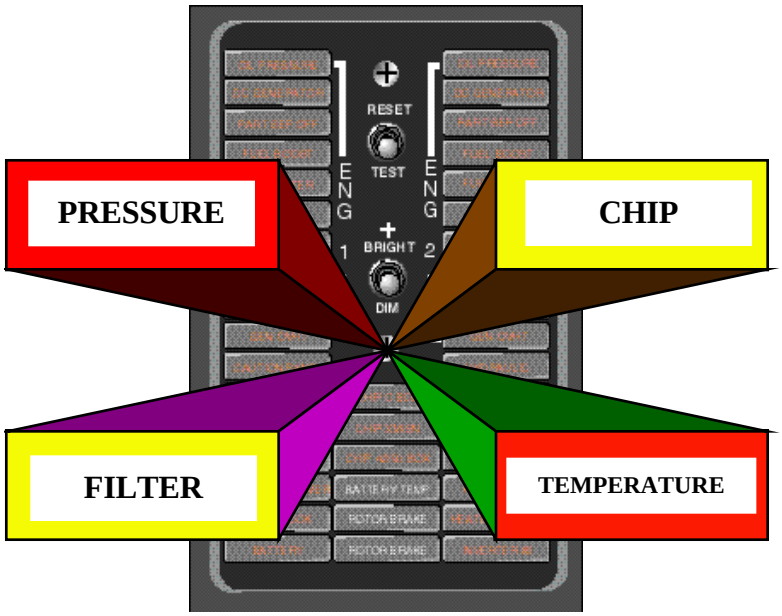
CHAPTER 16

CAUTION/WARNING SYSTEM



INTRODUCTION

The caution/warning system of the Bell 212 provides the pilot with immediate notification of all major systems' malfunctions. The majority of the caution/warning lights are located on the caution panel. Additional caution/warning lights are located on the instrument panels, readily visible to both pilots. Two MASTER CAUTION lights alert the pilot to a malfunction that has occurred.

General

The caution/warning system includes: the caution panel, other caution/warning lights for associated systems, the two MASTER CAUTION lights, caution panel system switches, and associated electrical supply systems. Warning lights pertaining to systems that require the pilot's immediate attention have black letters on a red background. Caution lights pertaining to systems that require other than immediate attention have black letters on an amber background.

Caution Panel

The caution panel is located on the lower left of the engine instrument panel or on the upper left side of the pedestal between the two pilot positions. The Bell 212 caution panel contains 40 individual monitoring and detecting systems and lights, all of which are functional.

Each monitoring/detecting circuit, when activated, causes its respective caution or warning light to illuminate. The circuits utilize DC electrical power to illuminate two parallel wired bulbs located behind a clearly marked caution or warning screen. Should

one bulb fail, the remaining bulb still functions; however, the screen appears only partially illuminated.

When a fault or malfunction is detected by one of the individual circuits, the associated caution or warning light illuminates and remains illuminated as long as the fault or malfunction persists. In addition, when a malfunction occurs, both pilots' MASTER CAUTION lights illuminate to draw attention to the caution panel.

Caution/Warning Electrical Supply System

DC electrical power is supplied from the No. 1 DC essential bus through a circuit breaker marked MASTER CAUTION to the caution panel and the monitoring circuits. When a fault or malfunction occurs, the individual monitoring circuit detects it and completes an electrical circuit to ground, and the respective caution or warning light illuminates. Several caution/warning lights have monitoring circuits that activate only when the circuit is open; these lights are discussed in the text for the associated system.

In normal operation when all caution/warning lights are extinguished, failure of electrical power to the caution panel might go unnoticed. Therefore, a special caution panel electrical power monitoring circuit has been added which illuminates a caution light marked CAUTION PANEL in the event of interruption of electrical power to the caution panel. The caution panel monitoring circuit and caution light are powered from the No. 2 DC essential bus through a circuit breaker marked CAUTION FAIL. A test switch allows the pilot to check proper operation of the caution panel electrical power monitoring system.

Other Caution Warning Lights

Other caution/warning lights for engine fire, engine out, baggage compartment fire, rotor rpm, and optional equipment are located on the pilot's, copilot's, and engine instrument panels. These caution/warning lights are discussed in text under the specific system to which the caution or warning light applies.

Master Caution Lights

The two MASTER CAUTION lights, located directly in front of each pilot at the top of the respective instrument panels, illuminate whenever a caution panel light illuminates. The MASTER CAUTION lights remain illuminated until the fault is either corrected or the MASTER CAUTION lights are reset. The MASTER CAUTION lights are reset by pressing the face of either light or by use of the RESET-TEST switch located on the caution panel.

Caution Panel Switches

General

The RESET-TEST, BRIGHT-DIM, and MASTER CAUTION switches provide the pilot a means to check proper operation of the caution panel. The caution panel switches are shown in Figure 16-1.

Test-Reset Switch

The TEST-RESET switch is spring-loaded to center OFF and located on the caution panel, has two functions. Moving the switch to the RESET position resets both MASTER CAUTION lights.

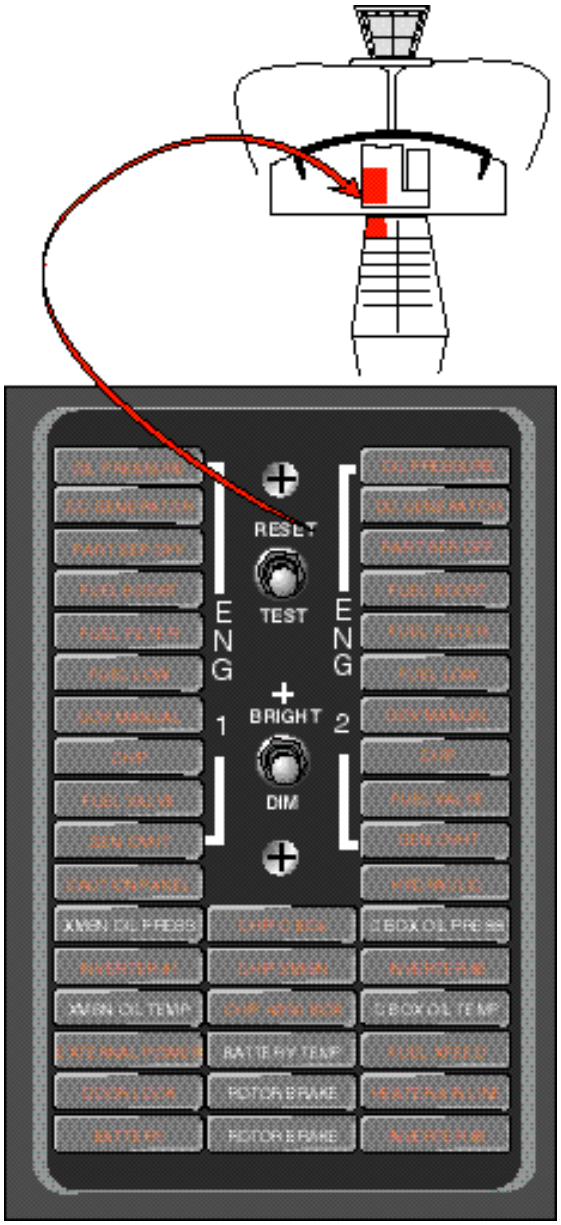


Figure 16-1 Caution Panel Switches

Placing the switch in the TEST position tests all the caution panel lights and the two MASTER CAUTION lights for illumination. When the switch is released from the TEST position, all caution panel lights with existing faults remain illuminated. All other caution panel lights and the MASTER CAUTION lights extinguish. Testing of caution and warning lights other than those on the caution panel is discussed in the text for the associated system.

Bright-Dim Switch

The BRIGHT-DIM switch, also spring-loaded to center OFF and located on the caution panel, allows the pilot to vary the brightness of the caution panel lights when desired. With electrical power applied, all caution panel lights illuminate at full brightness; however, for night flying or at other times, the pilot may wish to reduce the caution panel brightness. Provided the pilot's instrument light switch (rheostat) is in the ON position, moving the switch to the DIM position reduces the brightness of any illuminated caution panel lights by half. Moving the switch to BRIGHT after the caution panel lights are dimmed restores the lights to normal brilliance.

Master Caution Switch

The MASTER CAUTION switch (Figure 16-2) is located on the overhead console. Moving the switch from the spring-loaded NORMAL position to the TEST position interrupts electrical power to the caution panel. All illuminated caution panel and ENGINE OUT lights extinguish. The monitoring circuit detects the loss of electrical power and illuminates both MASTER CAUTION lights and the CAUTION PANEL light on the caution panel. During the test the MASTER CAUTION lights and the RPM light dim slightly.

There is also a Master Caution light on the door used for external loads next to the torque gage.

NOTE: The MASTER CAUTION switch may not function if one of the engine GOV switches is in the MANUAL position. This may be corrected with a wiring modification.

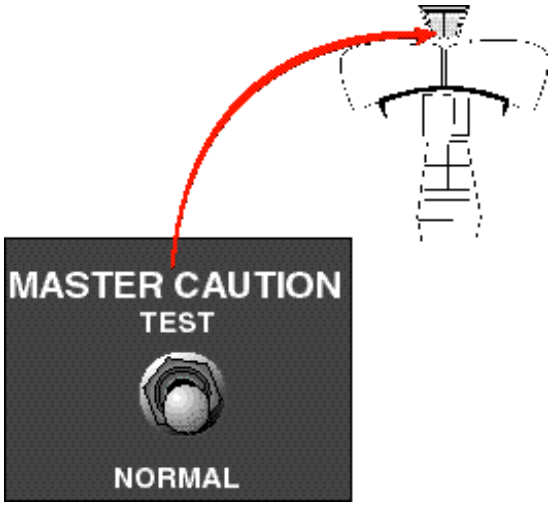


Figure 16-2 Master Caution Switch

Caution/Warning Light Listing

Table 16-1 contains the legends (in alphabetical order), colors, and causes for illumination of all caution/warning lights on the caution panel. If duplicate caution/warning lights exist, such as for the No. 1 and No. 2 engines or the No. 1 and No. 2 systems, only one light, marked "1/2," is described.

Table 16-2 contains the legends (in alphabetical order), colors, and causes for illumination of other caution/warning lights that are located on the pilot's, copilot's, and engine instrument panels.

Caution/warning lights applicable to kits and optional equipment are discussed in Chapter 25, "Kits and Accessories."

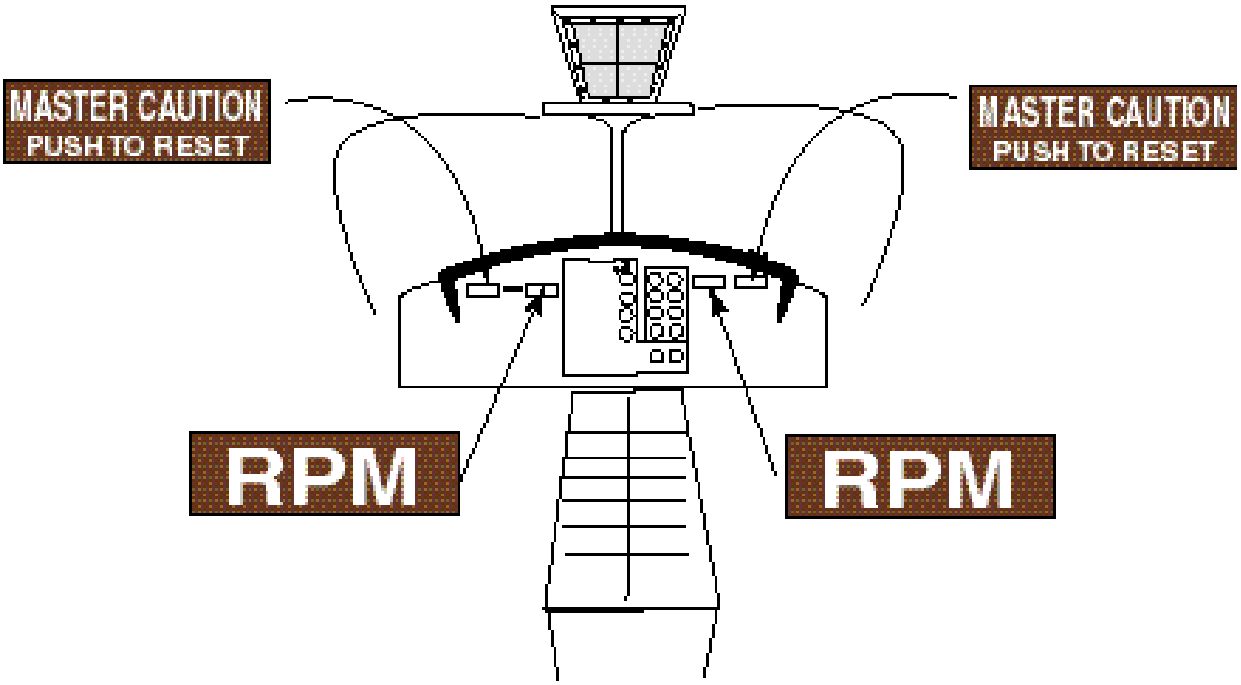


Figure 16-3 Master Caution & RPM lights

Table 16-1 CAUTION / WARNING LIGHTS

Light	Cause for Illumination
BATTERY	Both battery bus relays are in the same position, either open or closed.
BATTERY TEMP	Battery case temperature is 130° F.
CAUTION PANEL	Electrical power to the caution panel is interrupted.
C BOX OIL PRESS	Combining gearbox oil pressure is below limits.
C BOX OIL TEMP	Combining gearbox oil temperature is above limits.
CHIP 42/90 BOX	Metal chip(s) are detected in 42 or 90° gearbox (es).
CHIP C BOX	Metal chip(s) are detected in combining gearbox.
CHIP	Metal chip(s) are detected in indicated engine.
CHIP XMSN	Metal chip(s) are detected in main transmission. Remote indicator panel shows which detector.
DC GENERATOR	Indicated generator has failed, is turned off, or is disconnected from the electrical system.
DOOR LOCK	Passenger doors and/or baggage compartment doors are not properly secured.
EXTERNAL POWER	External power connector door is not closed.
FUEL BOOST	Indicated fuel boost pump, flow switch, or ejector pump has failed.
FUEL FILTER	Indicated fuel filter bypass is imminent.
FUEL LOW	Indicated fuel supply is low.
FUEL VALVE	Indicated fuel shutoff valve is in transit, its position does not agree with fuel switch position, or circuit breaker has popped.
FUEL XFEED	Fuel crossfeed valve is in transit, its position does not agree with fuel crossfeed switch position, or both circuit breakers have popped.
GEN OVHT	Indicated generator cooling air is overheated.
GOV MANUAL	Indicated engine fuel control switch has been placed in manual mode.

HEATER AIR LINE	Temp in Heater System plenum is above 220° F.
HYDRAULIC	Either hydraulic system's pressure is below limits, or temperature is above limits. Gages indicate which system.
INVERTER 1	Indicated inverter output power has failed or is shut off.
INVERTER 2	
INVERTER 3	
OIL PRESSURE	Indicated engine oil pressure is below limits.
PART SEP OFF	Indicated particle separator door is not full open, or circuit breaker has popped.
ROTOR BRAKE	Rotor brake puck is not fully retracted from the disk.
XMSN OIL PRESS	Transmission oil pressure is below limits.
XMSN OIL TEMP	Transmission oil temperature is above limits.

Table 16-2 ADDITIONAL CAUTION / WARNING LIGHTS

BAGGAGE FIRE	Smoke is detected in the baggage compartment.
ENG 1 OUT	Indicates engine N1 rpm is below 52.5%.
ENG 2 OUT	Indicates engine N1 rpm is below 52.5%.
FIRE 1 PULL	Fire is detected in the indicated engine.
FIRE 2 PULL	Fire is detected in the indicated engine
RPM	Main rotor rpm is either above 103% or below 93%. If rotor rpm is low, a warning signal is also heard in the pilot and copilot's headsets.

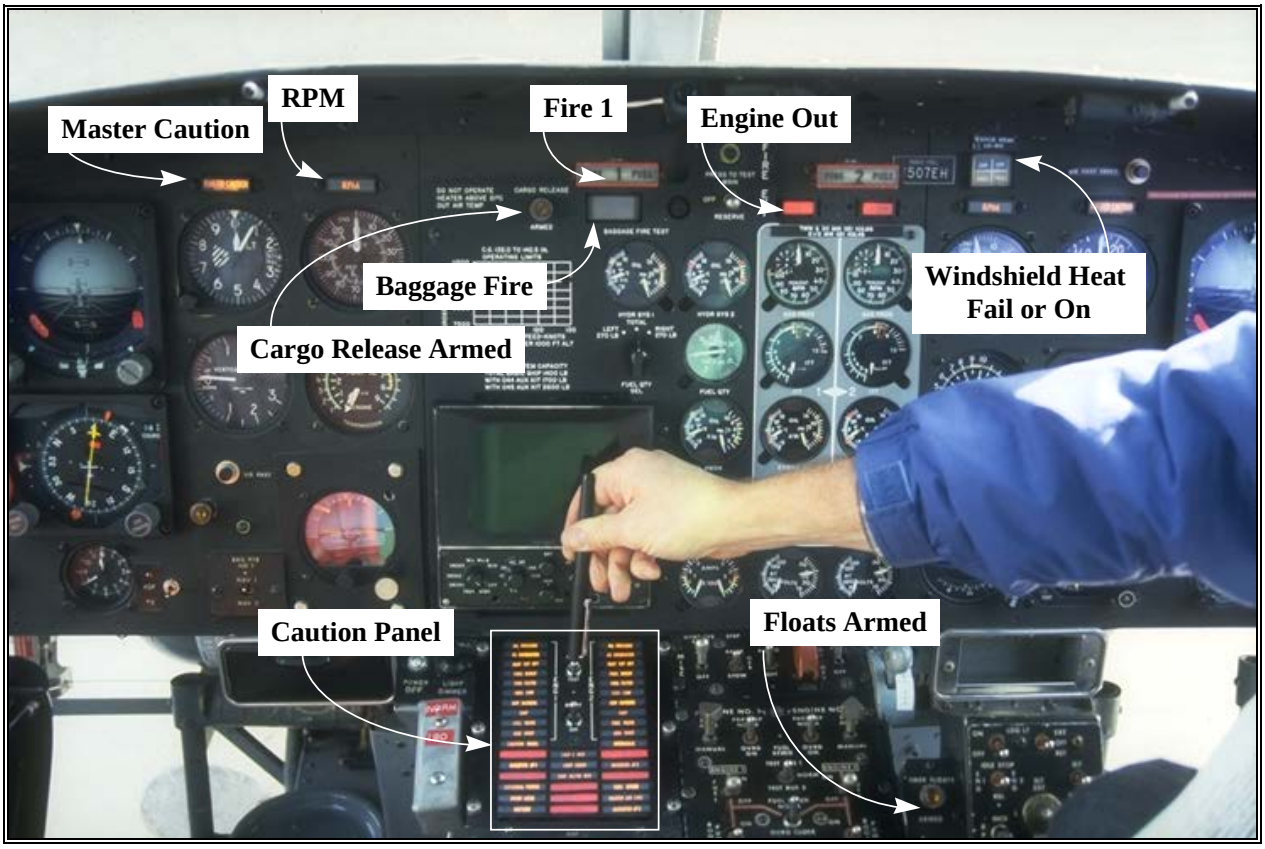


Figure 16-4 Caution Panel Test Switch

Figure 16-5 Engine Fire Detection Test Button

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