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AIRCRAFT LIGHTING

INTRODUCTION

The Challenger 300 lighting system provides interior and exterior illumination of the aircraft. In addition, lights provide information and guidance to passengers in normal and emergency situations.

The lighting systems includes:

- Flight compartment lighting
- Emergency lighting
- Passenger compartment lighting
- Service compartment lighting
- Entrance lighting
- External lighting

The flight compartment and external lighting is selected from the lighting control panels located on the center pedestal and along the flight crew side panels.

Passenger compartment lighting consist of indirect LED lighting and adjustable reading lights placed in the overhead passenger service unit (PSU).

Emergency lights are controlled from the flight deck. When armed, they illuminate automatically when R MAIN BUS power has been lost (total loss of generated electrical power). Emergency lighting is provided to the emergency power supply units and are designed to last a minimum of ten minutes at critical ambient conditions, such as low temperature.

EICAS messages display the status of the emergency lights and passenger signs.

FLIGHT COMPARTMENT LIGHTING

DESCRIPTION

The cockpit lighting provides illumination of all control panels and instruments installed in the flight compartment that are not otherwise illuminated by their own integral lighting system or display. They include the following:

- Cockpit Dome Light
- Cockpit Stowage Light
- Flight Crew Reading Lights
- Integral Lighting System

COMPONENTS AND OPERATION

COCKPIT LIGHTING

The cockpit dome light sub-system consists of one light unit. The cockpit dome light is mounted in the overhead fascia panel of the cockpit for general illumination of the cockpit and the cockpit entrance area.

One cockpit stowage light is used to illuminate the cockpit stowage box, and it is mounted on the aft end of the center pedestal. The switch for this light is activated by the stowage door, so that the light illuminates only when the door is open.

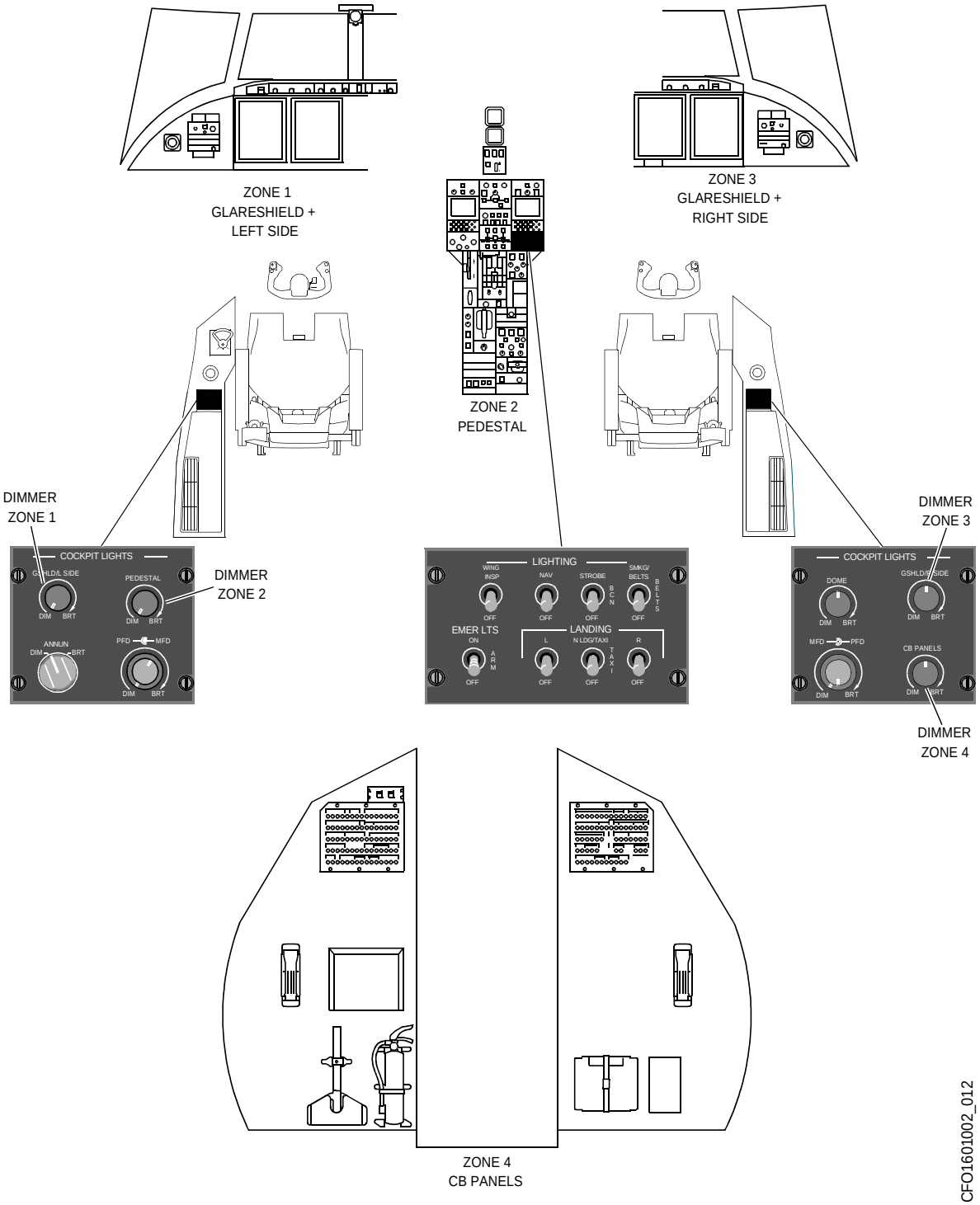
Two flight crew reading lights are provided to illuminate the pilot and copilot's lap area. They are recessed in the headliner on each side of the cockpit, to avoid head impact to the pilots.The light can be rotated up to $\pm$ 30°. It includes a built-in shutter with an ON/OFF position and continuous light intensity adjustment from bright to dim.

The integral lighting system is divided into four control zones as follows:

- Zone 1 - Pilot panel and part of glareshield
- Zone 2 - Center pedestal
- Zone 3 - Copilot panel and part of the glareshield
- Zone 4 - Circuit breaker panels

A brief explanation of the panels, locations, and the zones they control follows:

FLIGHT COMPARTMENT LIGHTING (Cont)



FLIGHT COMPARTMENT LIGHTING (Cont)

LEFT COCKPIT LIGHTS PANEL

The left COCKPIT LIGHTS panel is powered by 28 vdc.

A description of each of the potentiometer controls located on the left COCKPIT LIGHTS panel is as follows:

GSHLD/L SIDE 

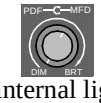
Dimming the fluorescent light beneath the left side of the glareshield is controlled via this potentiometer.

PEDESTAL 

This potentiometer controls the lighting intensity of equipment installed in the pedestal. The FMS display intensity is regulated by the dim button on the FMS control panel.

ANNUN 

This push button switch controls the brightness of the other switches from DIM to BRT as well as off.

PFD/MFD 

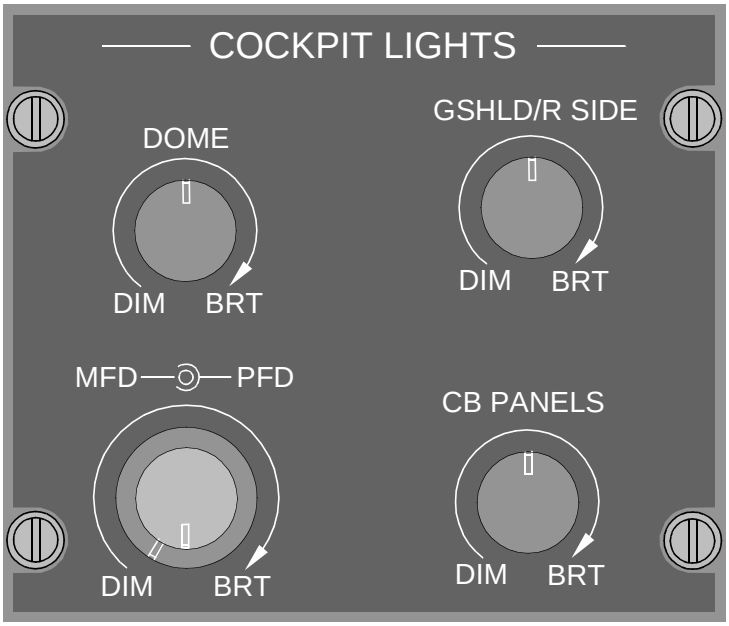
Display units have internal lighting, and the intensity is controlled through the PFD/MFD potentiometer.

FLIGHT COMPARTMENT LIGHTING (Cont)

RIGHT COCKPIT LIGHTS PANEL

The right COCKPIT LIGHTS panel is powered by 28 vdc.

Following is a description of each of the potentiometer controls located on the right COCKPIT LIGHTS panel.



DOME 

The center overhead dome light is controlled by the DOME potentiometer. The pilot dome light can also be turned on with the COCKPIT light switch on the main entryway control panel when the cabin door is open and the DOME control is off. When the cabin door is closed, cockpit overhead light control from the main entryway control panel is disabled. The dome light is powered by the right main bus and is protected by the DOME circuit breaker within the CABIN group on the copilot circuit breaker panel. When the pilot dome light is controlled via the main entryway switch, it receives power from the airplane hot bus system.

GSHLD/R SIDE 

Dimming the right hand side panel and the copilot DCP is controlled via this potentiometer.

MFD — PFD 

Display units have internal lighting, and the intensity is controlled by the MFD/PFD potentiometer.

CB PANELS 

This potentiometer controls the intensity of lighting to the pilot and copilot circuit breaker panels.

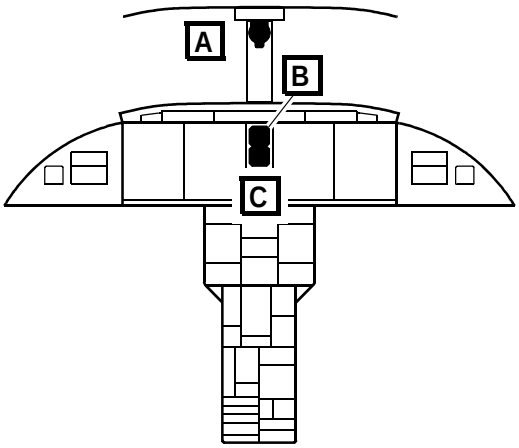
FLIGHT COMPARTMENT LIGHTING (Cont)

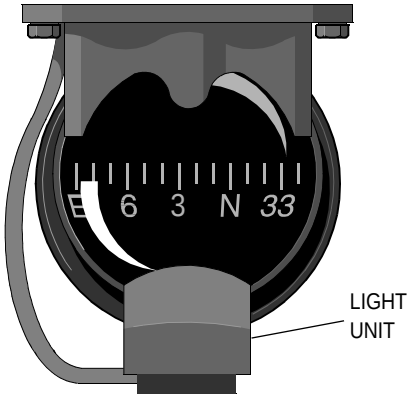
STANDBY INSTRUMENT LIGHTING

The standby instrument lights are designed to supply lighting to the three standby instruments. When left main bus power to the cockpit lights is lost, power to the standby lights is automatically switched to the right essential bus.

These standby instruments are as follows:

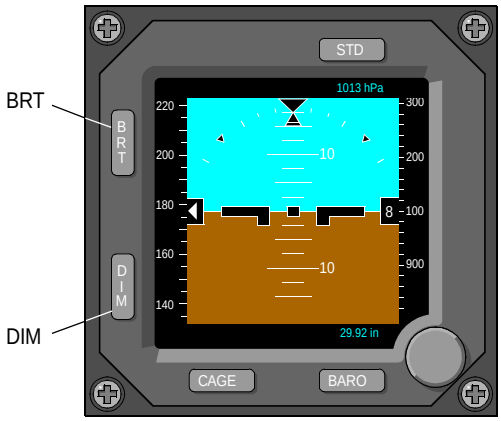
- Standby compass
- Standby instrument
- Clock





STANDBY COMPASS

A



STANDBY INSTRUMENT

B

CLOCK

C

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FLIGHT COMPARTMENT LIGHTING (Cont)

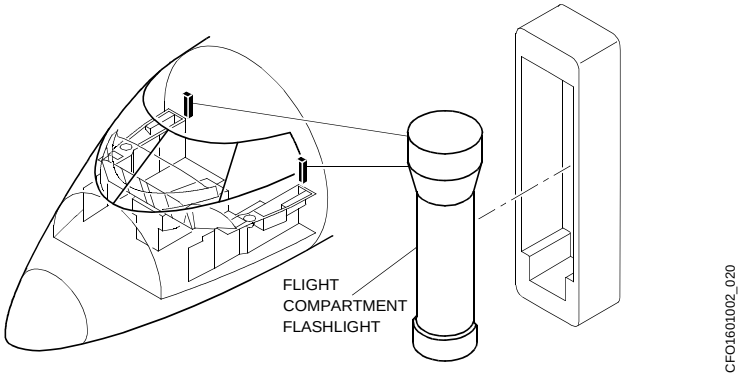
CHART HOLDER AND MAP/READING LIGHTS

Chart holders are mounted on the control yokes, and the lights are integral to the chart holders.There are overhead lights that shine downward onto the crew lap area for map/reading lighting.

Individually controlled reading lights are installed in the overhead panel. Light intensity is adjusted by a dimmer knob above each unit.

FLASHLIGHTS

Flashlights are installed in holders behind the pilot's and copilot's seats, below the circuit breaker panels. Flashlights are also located in the lavatory area of the cabin.



EMERGENCY LIGHTING

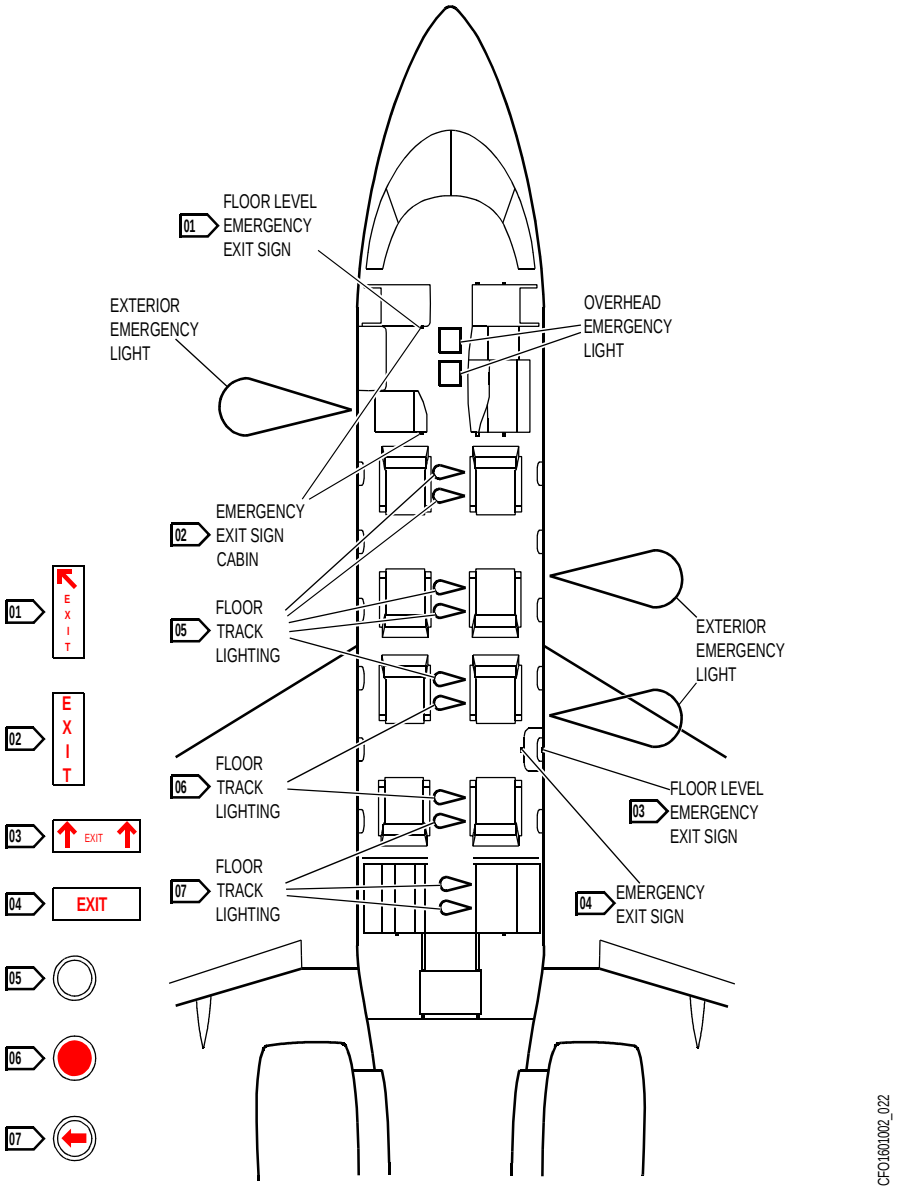
DESCRIPTION

Emergency lighting contributes to the safe exit of passengers during an emergency. The emergency lighting system consists of the following:

- Exit signs
- Ceiling emergency floodlights
- Floor emergency floodlights
- Exterior emergency lights

COMPONENTS AND OPERATION

Emergency lights are powered by two independent rechargeable battery packs that provide 15 minutes of power. The lights are controlled by a switch on the LIGHTING control panel. During an emergency, exterior emergency lights will provide illumination of the aircraft's immediate area. When the battery switch is ON and the EMER LTS switch is OFF, an EMER LIGHTS OFF (C) message is displayed. When the EMER LTS switch is selected to ON, the emergency lights illuminate and the amber EMER LIGHTS ON (C) message is displayed. When the switch is in the ARM position and the 28 VDC R MAIN BUS power is lost, all interior and exterior emergency lights illuminate automatically.



EXTERNAL LIGHTS

The following external lights make the aircraft visible to other aircraft and controllers:

- Anti-collision strobe lights
- Wing tip anti-collision strobe lights (optional)
- Logo lights (optional)
- Navigation lights
- Rotating beacons

COMPONENTS AND OPERATION

The wing inspection lights are mounted on the either side of the fuselage to visually inspect the wing for ice formation.

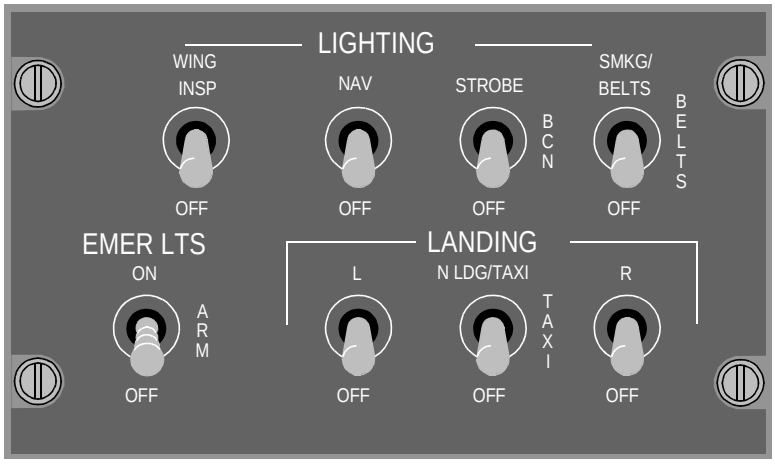
The navigation lights allow visual tracking as well as orientation or position of an airplane relative to an observer. The wing tip navigation lights utilize a dual light system for increased dispatch reliability. This consists of a primary, and secondary unit under the same lens in each wing tip. If the primary navigation light fails, the secondary light will illuminate when the NAV switch located on the right secondary power center (right avionics rack circuit breaker panel) is selected. The tail navigation light also utilizes a dual light system. These consists of two identical high intensity halogen lamp in each unit. The upper unit is used as the secondary and the lower unit is used as the primary tail navigation light.The NAV switch controls the navigation lights and is located on the LIGHTING panel. Optional logo lights are mounted on the top rear of the engine pylons and are powered from the RH Aux bus. The NAV light switch is replaced with a three position switch to include the logo light option.

The strobe/beacon lights are supplied with power from a dedicated power supply. The color of the strobe/beacon light system can be selected white or red. The red light system will generally be used for ground operations since it minimizes the unfavorable effects on vision of the crew or on personnel outside the aircraft during ground handling. The light emission of the red light is reduced and cannot be used as a backup anti-collision light. The shape of the strobe/beacon lights minimizes aerodynamic drag. The STROBE BCN switch controls the red beacon lights, white anti-collision strobe lights and the optional wing anti-collision strobe lights. The flight data recorder (FDR) is activated as soon as the STROBE BCN switch is selected to either position.

The nose gear landing light is designed to illuminate the ground reference during the final approach, during takeoff and also to illuminate any major obstructions in the approach area or on the runway.

The taxi light, also mounted on the nose gear, is designed to illuminate the ground reference during takeoff and taxi. The N LDG/TAXI switch is a three position switch, with the center position only powering the taxi light. In the N LDG/TAXI position, both lights on the nose gear will illuminate. They are also controlled by the proximity-sensor electronic unit (PSEU) and powered when the landing gear is in the down and locked position.

The two high intensity discharge (HID) landing lights are incorporated in the wing-to body fairing. This system is designed to provide sufficient illumination for night landing and recognition and also to ensure that no objectionable glare is visible to the pilots. The L and R LANDING switches, located on the LIGHTING control panel, activates the left and/or right HID landing lights respectfully.



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ENTRANCE AND CABIN LIGHTING

COMPONENTS AND OPERATION

The stair lighting system contains seven stair lights. The stair lights contain four light-emitting diodes (LEDs) each and they receive 28 vdc electrical power from the L BATT BUS. The lights are controlled ON and OFF by the STAIR LIGHTS switch located on the wardrobe bulkhead aft of the passenger door. The lights are also controlled by a microswitch in the door frame that turn off the lights when the passenger door is in the closed and locked position.

Cabin lighting (except entry/exit lighting) is powered by the LEFT and RIGHT MAIN busses. Primary cabin lighting control is through the main entryway control panel which is located on the left storage cabinet, aft of the cabin door. An optional CABIN LIGHTS control panel is located on the center pedestal in the flight compartment.

Cabin lighting consists of:

CARGO BAY LIGHT

Selection of the cargo bay light is by a switch mounted inside the cargo bay. The switch is automatically switched off when the cargo bay door is closed. The cargo bay light is powered from the hot bus system

ENTRY/EXIT LIGHTS

The cabin entry/exit door light illuminates the passenger door steps. This light is controlled by the ENTRY light switch and is powered by the hot bus, regardless of the BATT switch position.

GALLEY LIGHTS

Fluorescent lighting is provided for the passenger refreshment area.

LAVATORY LIGHTS

Lavatory lights consist of two overhead spotlights (one located above the left cabin stowage area, and one located above the toilet) and wraparound overhead fluorescent lights (covered with lenses). Control of the spotlights is by the lavatory control panel and the main entryway control panel. The fluorescent light is controlled by the LAV LIGHT switch on the main entryway control panel and the LAV LIGHT switch on the lavatory control panel.

OVERHEAD LIGHTS

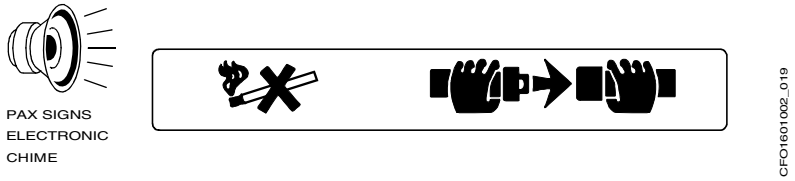
The overhead lights consist of indirect LED lighting located within the cabin passenger service unit. Covered by lenses, the overhead lights are controlled by the CABIN LIGHT switch on the main entry control panel.

PASSENGER READING TABLE LIGHTS

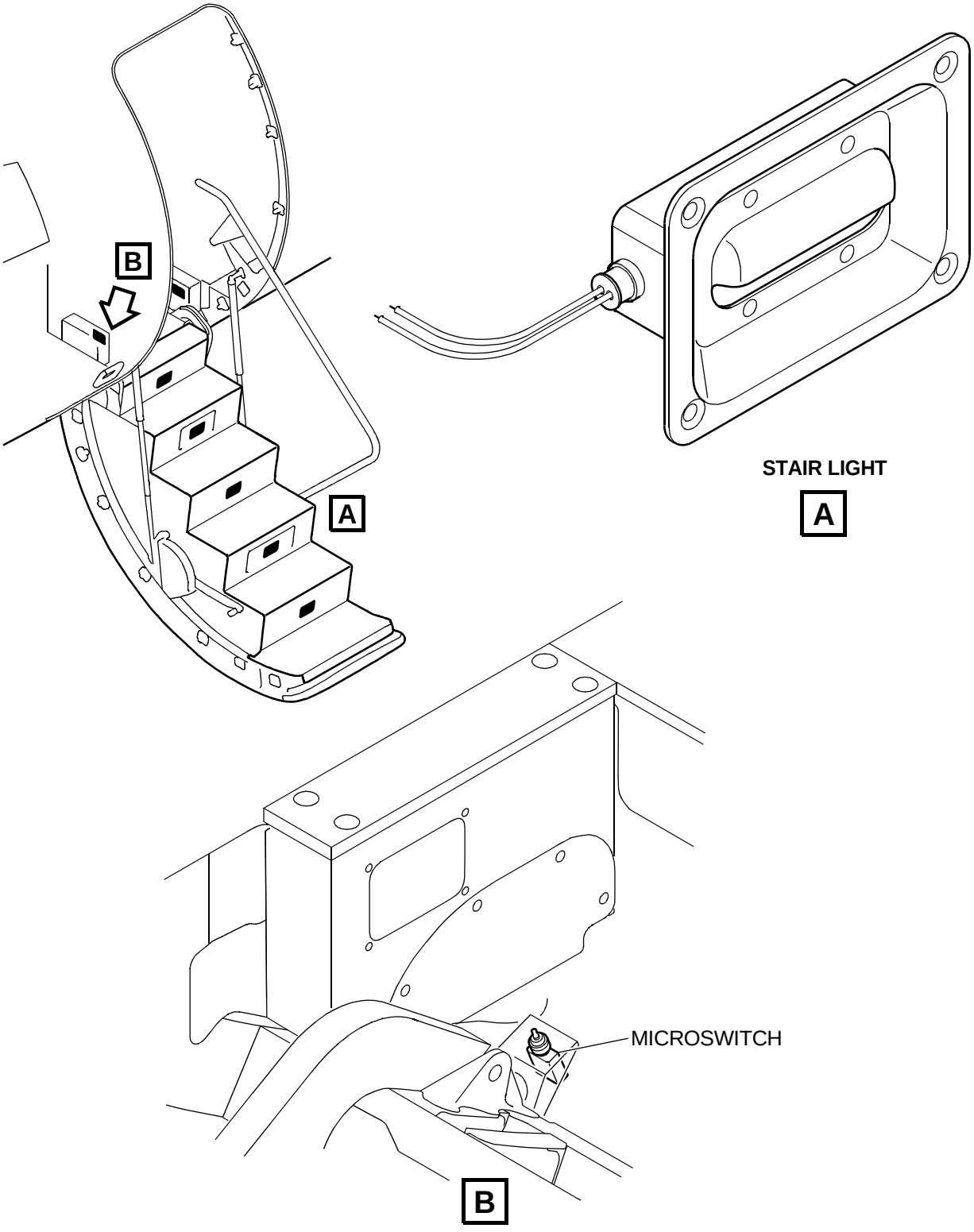
Reading and table lighting consists of lights installed in the passenger service unit above the seats on each side of the cabin. The seats have one light, while the table lights consist of a two-light assembly installed above each table. Control for the reading lights is by the seat-mounted control units.

SEAT BELTS/NO SMOKING LIGHTS

Control of the SMKG/BELTS is through a switch on the LIGHTING control panel, located on the center pedestal. The three-position switch is labeled OFF, BELTS, SMKG/BELTS.



AIRSTAIR LIGHTING



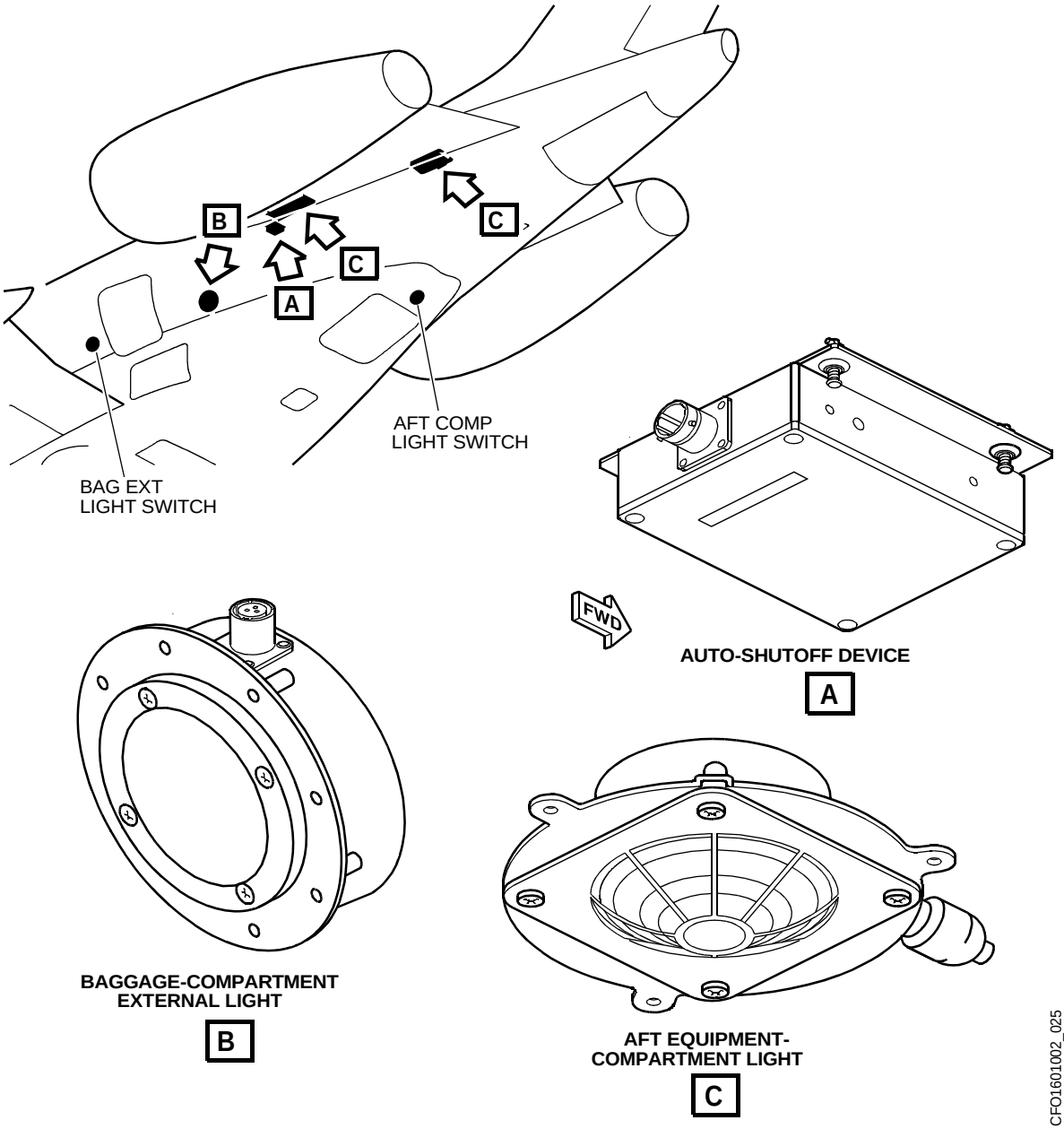
CARGO AND SERVICE COMPARTMENTS LIGHTING

COMPONENTS AND OPERATION

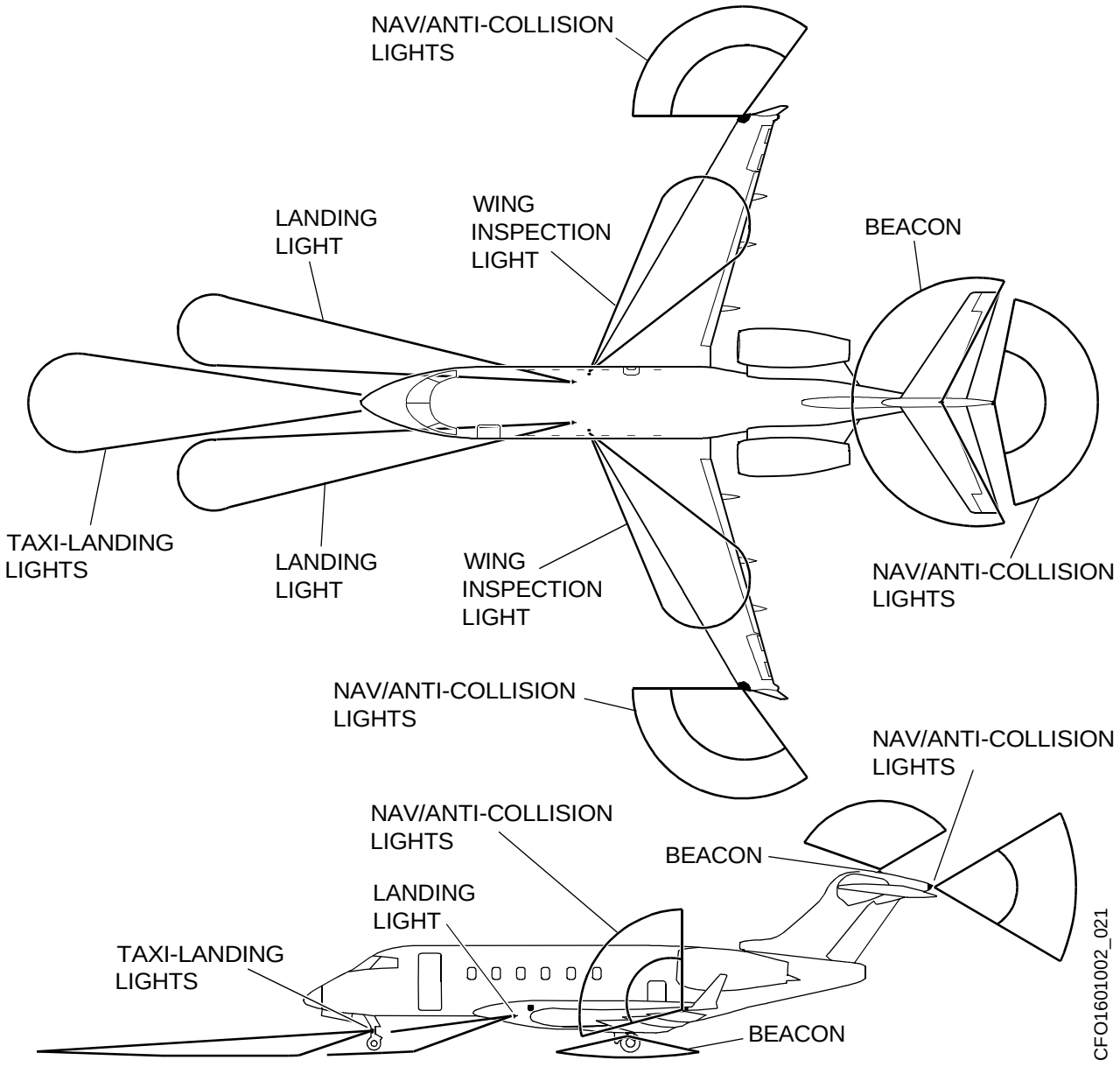
The cargo loading light is used for the area in front of the cargo door.

The service lights provide adequate lighting to the work area of the aircraft for general servicing, maintenance and inspection purposes. Two service lights are installed in the aft compartment to illuminate that area.

The auto shut-off box may be switched on by a single “click” on the push button. After 15 minutes in normal operation the output will automatically flash for a period of 10 seconds, then it will go back to normal operation for approximately 5 minutes. After 20 minutes of total time, the auto shut-off box automatically switches to standby mode. The timing interval can be reset/restarted by pressing the button again while the lights are on. The auto shut-off box may be switched from the normal operation to standby operation via two quick clicks.



EXTERNAL AIRCRAFT LIGHTING



EICAS MESSAGES

Emergency lights and passenger messages are shown on the EICAS primary and status pages. A brief explanation of each message is provided.

MESSAGE	INHIBITS	MEANING	AURAL WARNING
EMER LIGHTS OFF		The cabin emergency lights are off when they should be armed	
EMER LIGHTS ON		The cabin emergency lights are on	

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