CL-350

CL-350 TRAINING MANUAL

LIGHTING SYSTEM 13

AIRCRAFT SYSTEMS
TRAINING MANUAL

LOFT.AERO

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LIGHTING SYSTEM

The Challenger 350 lighting system provides comprehensive illumination for all phases of flight operations, from preflight inspection through landing and passenger evacuation. The system integrates flight compartment lighting for crew operations, external lighting for aircraft visibility and ground operations, cabin lighting for passenger comfort, and emergency lighting for evacuation scenarios. Most lighting systems are controlled through dedicated panels in the cockpit, with automatic features for emergency situations and power loss conditions.

I. INTRODUCTION

A. SYSTEM OVERVIEW

Primary Functions:

- Interior and exterior aircraft illumination
- Emergency evacuation guidance
- Aircraft visibility to other traffic
- Ground operations support
- Passenger comfort and safety

Major Subsystems:

- Flight compartment lighting system
- Emergency lighting system
- External aircraft lighting
- Entrance and cabin lighting
- Cargo and service compartment lighting

B. SYSTEM SPECIFICATIONS

Control Locations:

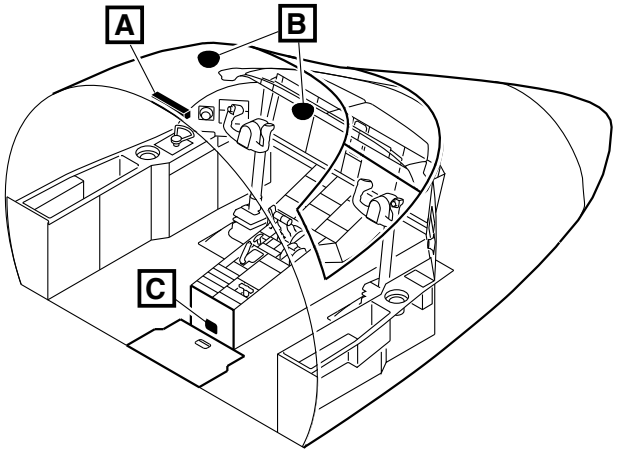
- **Center Pedestal:** Primary lighting control panel
- **Side Panels:** Flight crew lighting controls
- **Overhead Panel:** Dome light and reading lights
- **Wardrobe Bulkhead:** Stair lights switch

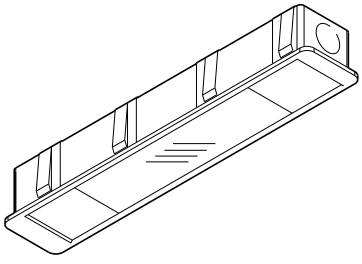
II. FLIGHT COMPARTMENT LIGHTING

A. COCKPIT DOME LIGHT

Components:

- LED array for soft illumination
- Low power consumption design
- Overhead panel mounting
- Potentiometer control





DOME LIGHT (DS1)

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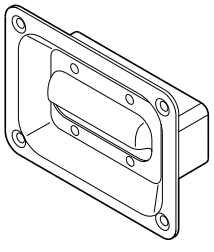

STOWAGE LIGHT (DS4)

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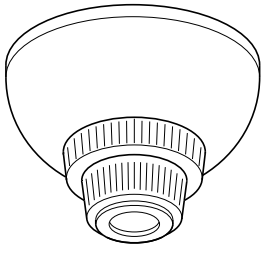


FLIGHT–CREW READING LIGHT (PILOT, DS7) (CO–PILOT, DS8)

B

Control Features:

- DOME rotary switch on Co-Pilot's COCKPIT LIGHTS panel
- DIM to BRT continuous adjustment
- Powered by 28 VDC Right Essential Bus
- Protected by DOME circuit breaker (CB2 E14)

B. INTEGRAL LIGHTING SYSTEM

Zone 1 - Pilot Area:

- Pilot panel illumination
- Left glareshield section
- GSHLD/L SIDE control knob
- DIM to BRT adjustment

Zone 2 - Center Pedestal:

- Pedestal panel lighting
- PEDESTAL control knob
- Throttle quadrant illumination
- Center console coverage

Zone 3 - Copilot Area:

- Copilot panel illumination
- Right glareshield section
- GSHLD/R SIDE control knob
- DIM to BRT adjustment

Zone 4 - Circuit Breakers:

- Pilot and copilot CB panels
- CB PANELS control knob
- DIM to BRT adjustment
- Even illumination distribution

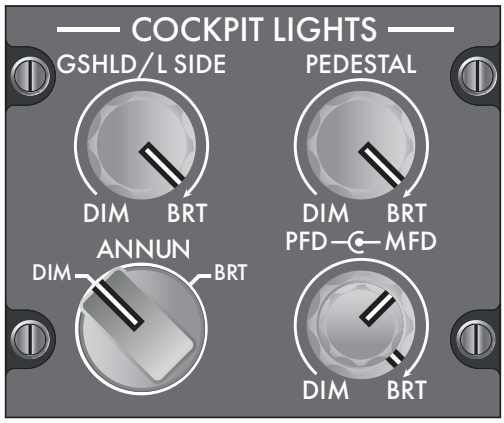
C. CONTROL PANEL FEATURES

Pilot's Individual Light Controls:

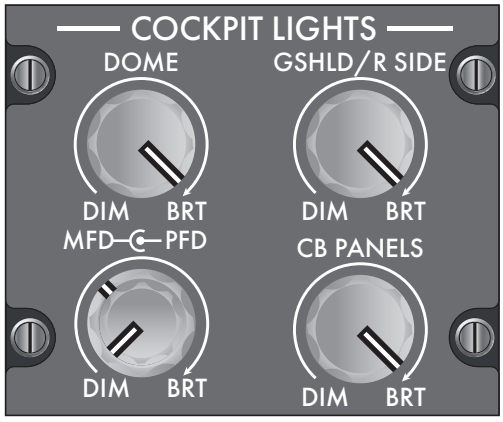
- GSHLD/L SIDE dimming
- PEDESTAL
- ANNUN DIM/BRT switch
- MFD – PFD control knob

Co-Pilot's Individual Light Controls:

- DOME light switch
- GSHLD/R SIDE dimming
- MFD – PFD control knob
- CB PANELS illumination



Left Cockpit Lights Panel

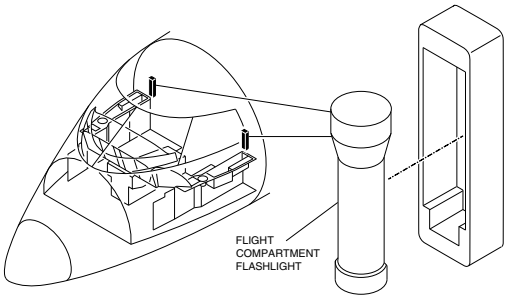


Right Cockpit Lights Panel

D. SPECIALIZED COCKPIT LIGHTING

Crew Reading Lights:

- Recessed in headliner
- ±30 degrees rotation
- Built-in shutter ON/OFF
- Continuous intensity adjustment
- Individual pilot/copilot units



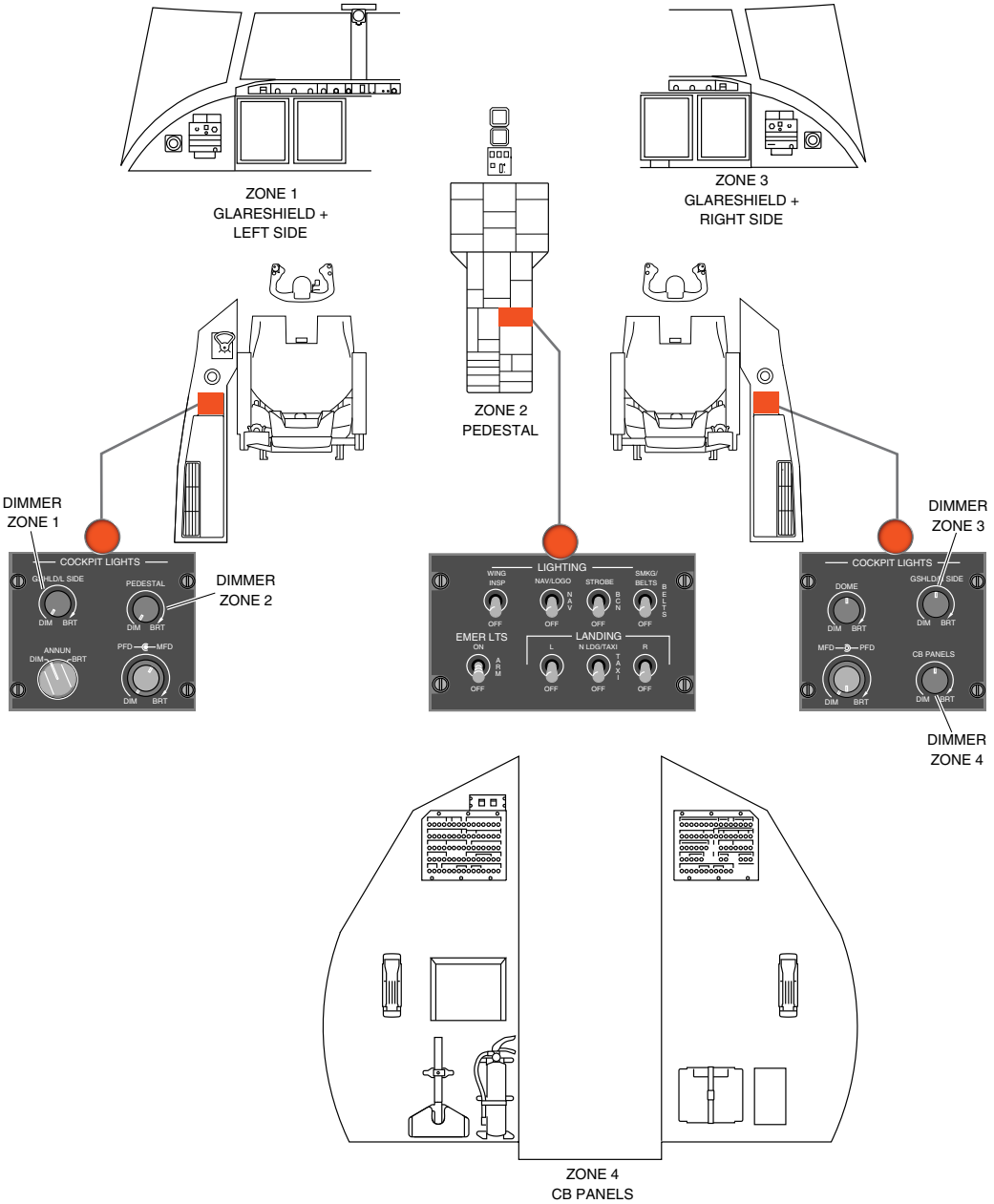


Chart Holder Lights:

- Integral to control yokes
- Direct chart illumination
- Independent left/right operation

Cockpit Stowage Light:

- Center pedestal aft end
- Door-activated switch
- Automatic ON when door open

Flashlights:

- 2 – Installed in holders behind the pilot's and copilot's seats below CB panels

III. EMERGENCY LIGHTING

A. SYSTEM DESCRIPTION

Power Sources:

- Two independent battery packs
- Rechargeable
- 15-minute maximum duration (10 minutes required for dispatch)

Components:

- Exit sign illumination
- Ceiling emergency floodlights
- Floor emergency floodlights
- Exterior emergency lights
- Floor track lighting

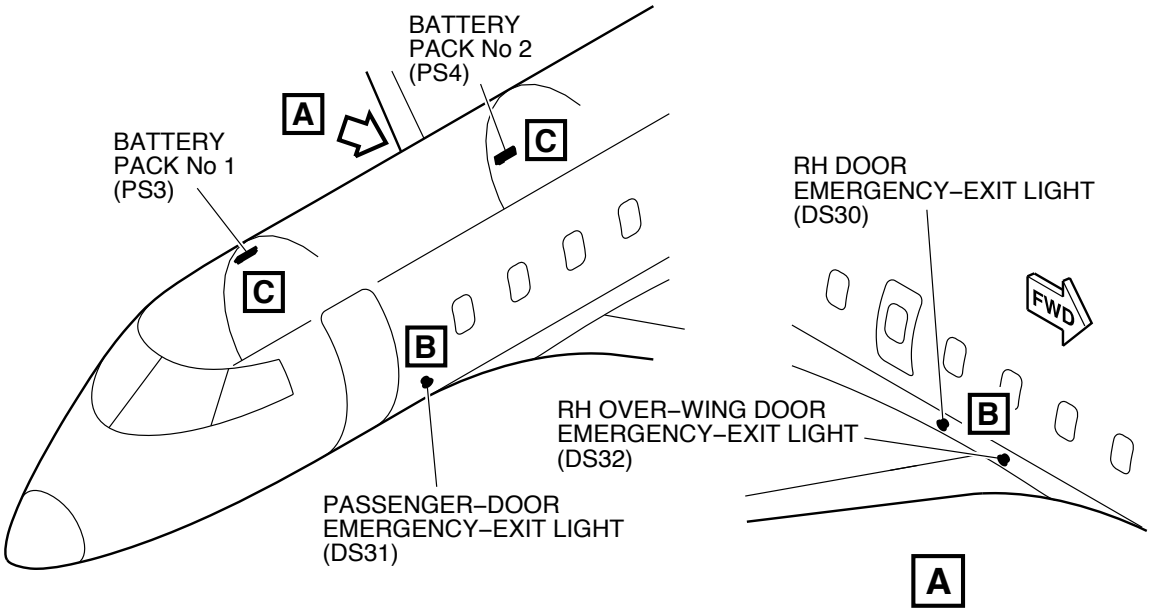
B. CONTROL AND OPERATION

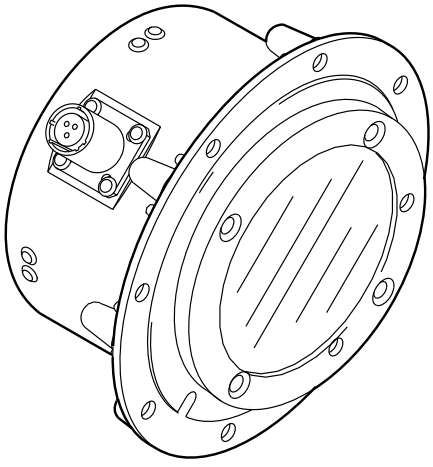
EMER LTS Switch Positions:

- **OFF**: System disabled, EMER LIGHTS OFF (C) displayed
- **ARM**: Automatic activation on R MAIN BUS loss
- **ON**: Manual activation, EMER LIGHTS ON (C) displayed

Automatic Activation:

- Occurs when ARM selected and R MAIN BUS power lost
- All interior lights illuminate
- All exterior lights illuminate
- No crew action required





EXTERNAL EMERGENCY LIGHT

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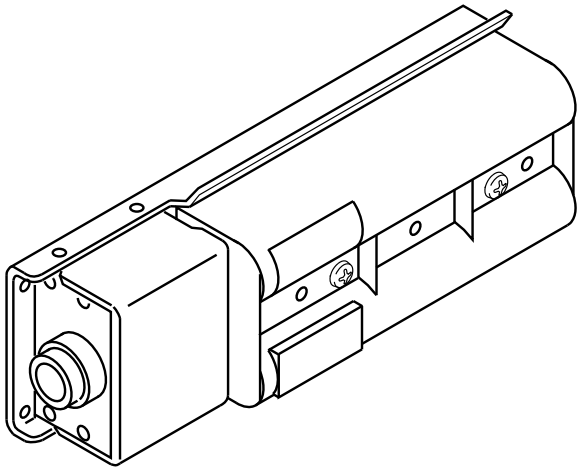


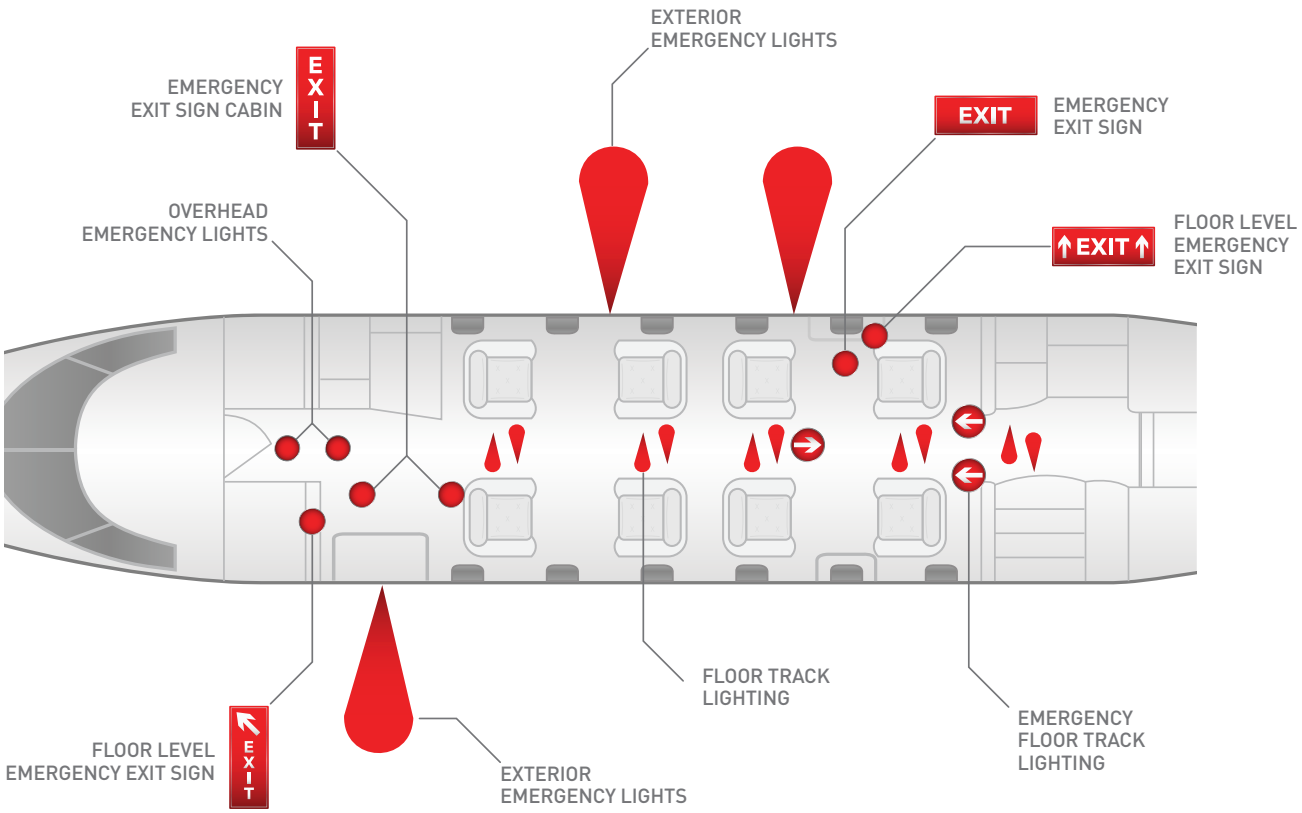
EMERGENCY–LIGHTING POWER SUPPLY

C

C. EMERGENCY LIGHT LOCATIONS

Interior Emergency Lighting:

- 2 ceiling emergency floodlights
- 2 floor level emergency exit signs
- 3 emergency exit signs (two main cabin door, 1 emergency exit door)
- Floor track lighting (multiple segments)



Exterior Emergency Lighting:

- 3 exterior emergency lights
- Wing and fuselage area illumination
- Ground evacuation support

IV. EXTERNAL LIGHTING

The navigation lights on the Challenger 350 utilize a dual light system, a design choice made to ensure increased dispatch reliability. This dual system is incorporated in both the wing tip navigation lights and the tail navigation light. For the wing tips, the system consists of a primary and a secondary unit housed under the same lens.

The tail navigation light also contains two identical high-intensity halogen lamps, where the lower unit serves as the primary light and the upper unit serves as the secondary light. If the primary navigation light fails, the secondary light will illuminate when the pilot selects the NAV SEC switch position (located on the right secondary power center).

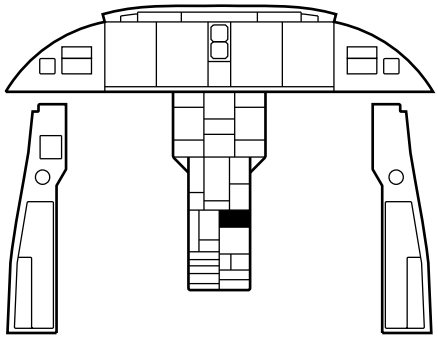
A. NAVIGATION LIGHTS

Standard Navigation Lights:

- Left wing tip - Red
- Right wing tip - Green
- Tail position - White
- Controlled by NAV switch
- Optional NAV/LOGO combined switch (post-SB)

Anti-Collision Strobes:

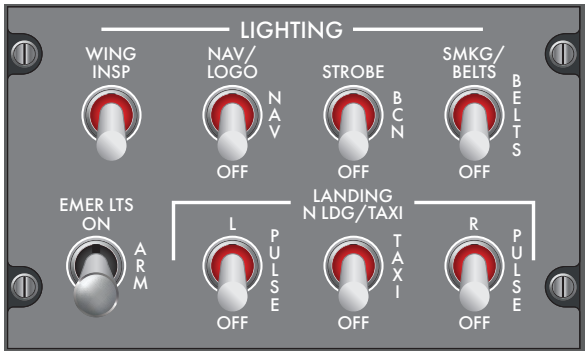
- 4 strobe light units (2 are optional)
- Wing tips and tail locations
- STROBE switch control (FDR activates w/switch)
- High-intensity white flashing



B. LANDING AND TAXI LIGHTS

Landing Lights:

- 2 High Intensity Discharge (HID) units
- Wing-to-body fairing installation
- L and R LANDING switches
- Individual left/right control
- Sufficient illumination for night landing



Taxi Lights:

- Combined landing/taxi configuration
- N (Nose) position for taxi operations
- LDG/TAXI switch positions
- Enhanced ground maneuvering visibility

Note: Nose gear lights are only powered with the gear Down.

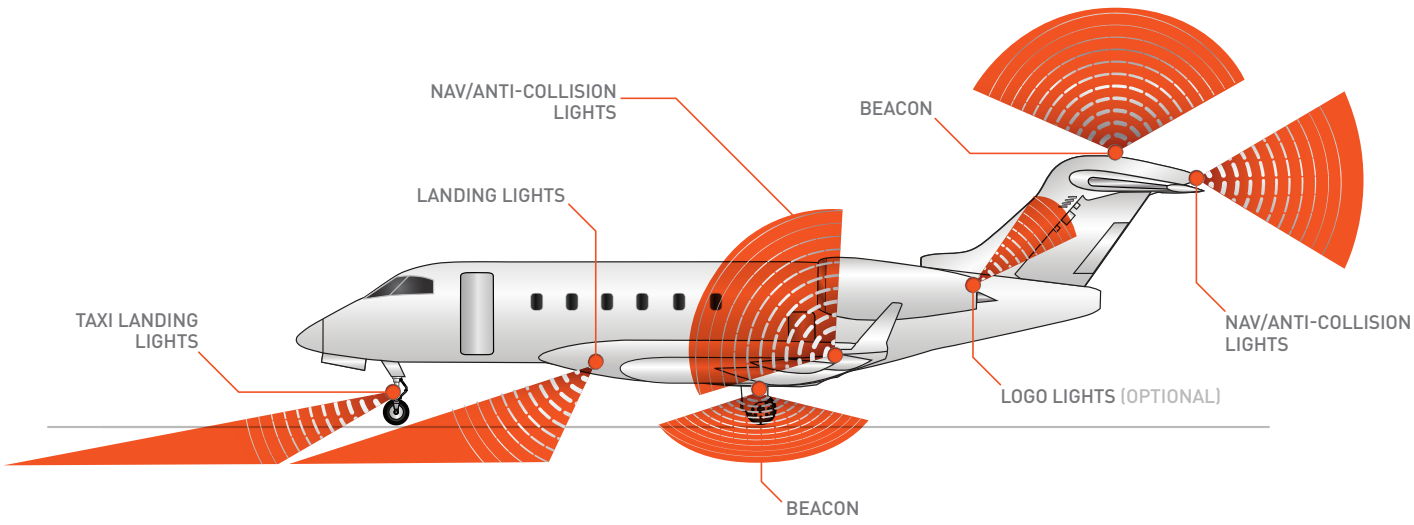
C. ADDITIONAL EXTERNAL LIGHTS

Wing Inspection Lights:

- 2 units (left and right wings)
- WING INSP switch control
- Leading edge illumination
- Ice accumulation detection

Beacon Lights:

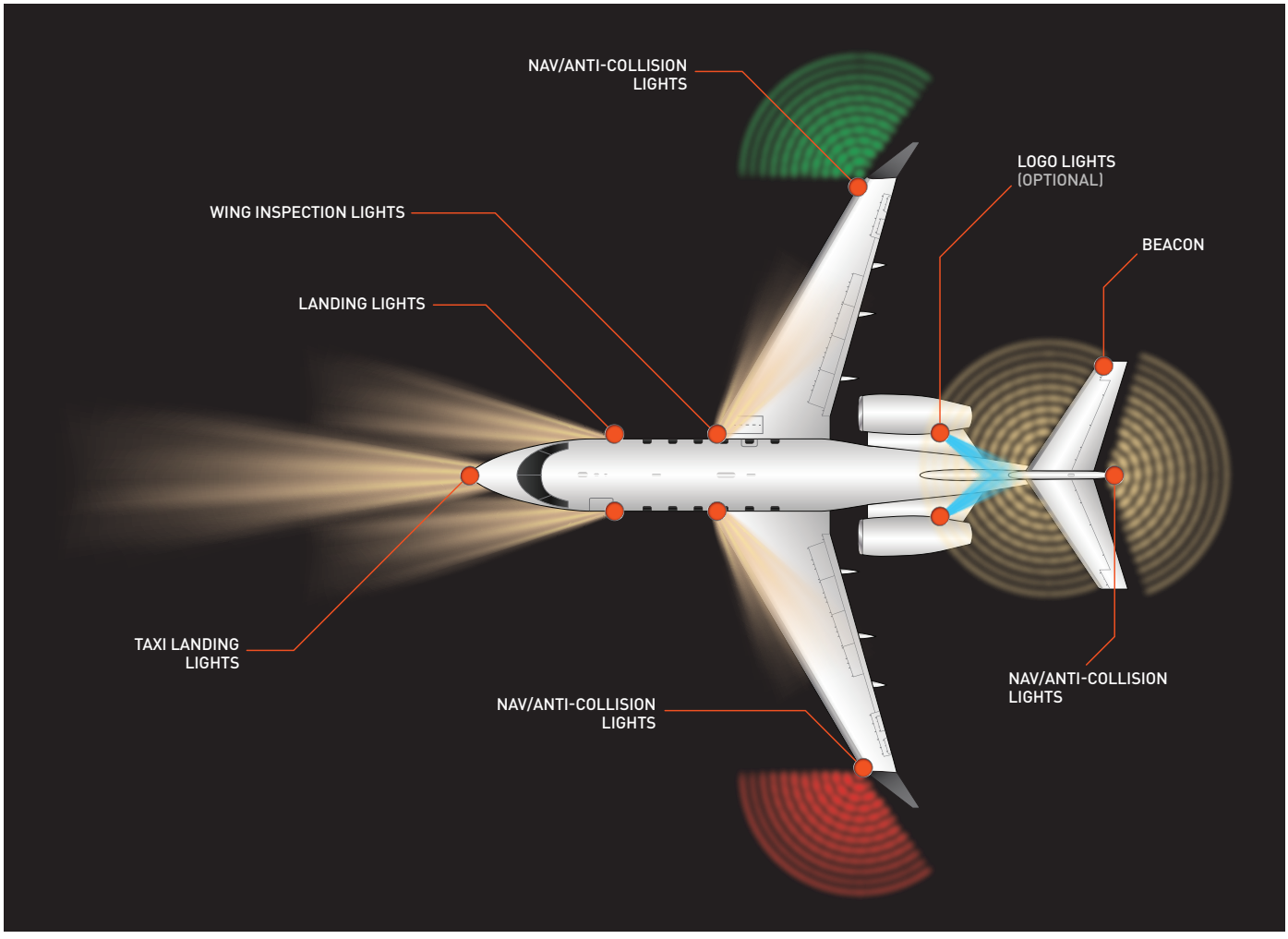
- 2 rotating beacon units
- BCN switch control
- Red flashing lights
- Ground operations warning



Logo Lights (Optional):

- Tail logo illumination
- NAV/LOGO combined switch
- Enhanced aircraft identification

EXTERNAL AIRCRAFT LIGHTING SCHEMATIC



V. ENTRANCE AND CABIN LIGHTING

A. STAIR LIGHTING

System Components:

- 7 stair light units
- 4 LEDs per light
- 28 VDC from L BATT BUS

Control Features:

- STAIR LIGHTS switch on wardrobe bulkhead
- Microswitch door interlock
- Automatic OFF when door closed/locked
- CB3-E9 circuit protection

Operation Note:

- Switch off when not in use
- Prevents battery discharge
- Manual control override available

B. CABIN LIGHTING

Passenger Compartment:

- Indirect LED lighting system
- Overhead passenger service units (PSUs)
- Adjustable reading lights
- Individual passenger control

Galley Lights:

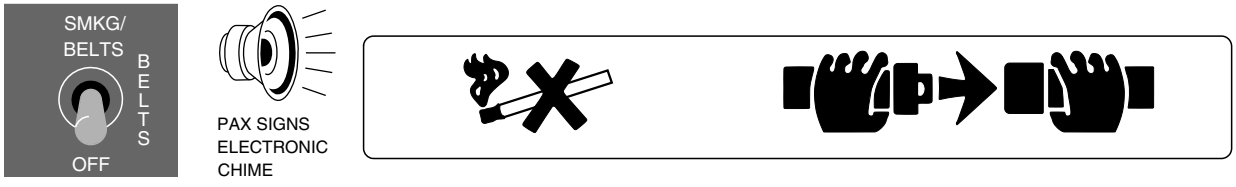
- Fluorescent lighting

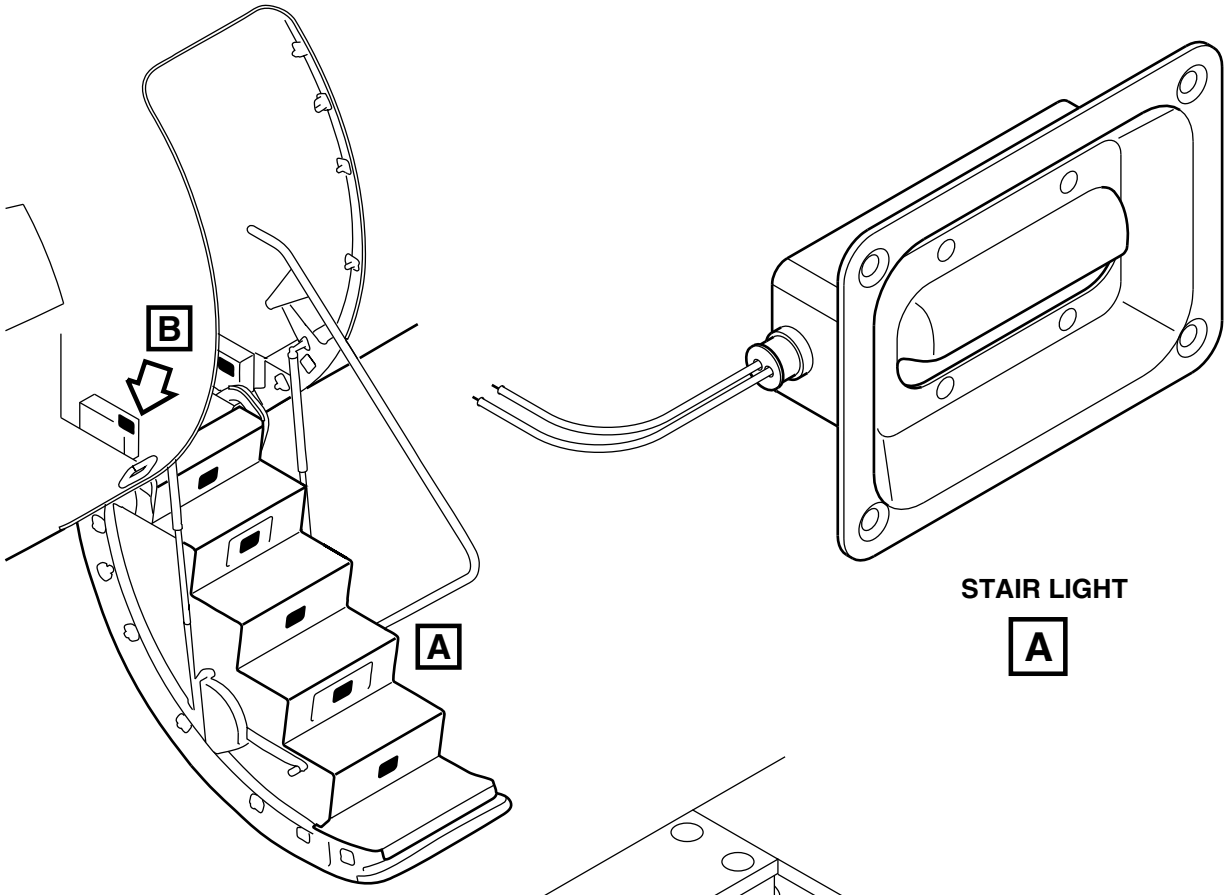
Lavatory Lights:

- Indirect LED lighting
- Located in Cabin PSU
- Controlled by CABIN LIGHT switch on lavatory control panel

Seat Belts / No Smoking Lights:

- Controlled via switch on Lighting Panel
- Three Position: OFF, BELTS, SMKG/BELTS
- Includes electronic chime





STAIR LIGHT

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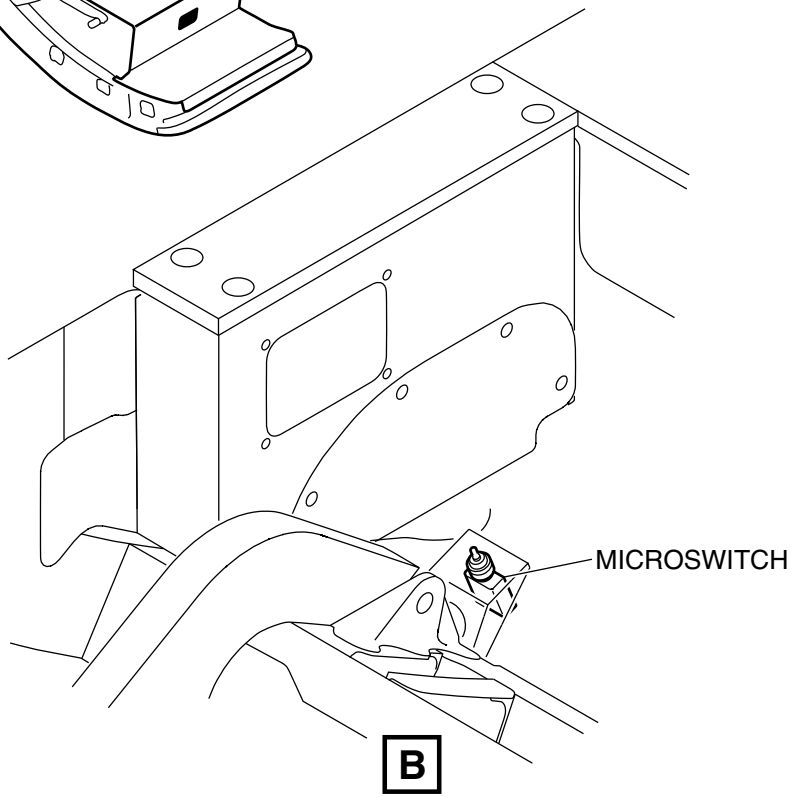


VI. STANDBY INSTRUMENT LIGHTING

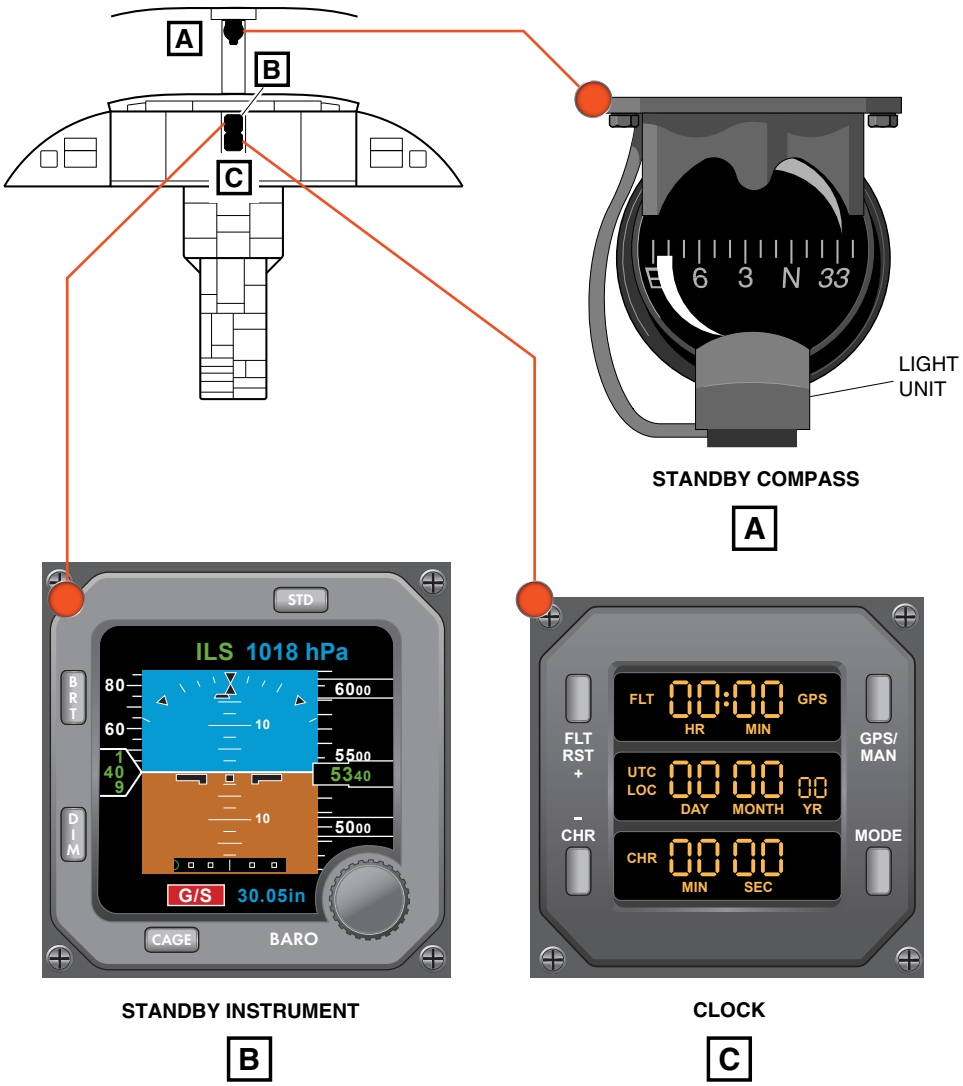
A. COMPONENTS

Illuminated Instruments:

- Standby compass
- Standby flight instrument
- Clock

Power Transfer:

- Automatic switch to right essential bus
- Occurs on left main bus power loss
- Ensures continued instrument visibility



VII. CARGO AND SERVICE COMPARTMENTS LIGHTING

A. CARGO COMPARTMENT LIGHTING

Cargo Loading Light:

- Located in front of cargo door area
- Provides illumination for baggage loading operations
- Powered by left hot battery bus
- Connected directly to left battery
- Protected by circuit breaker CB5-A5 (LDCPC)

Cargo Bay Light Controls:

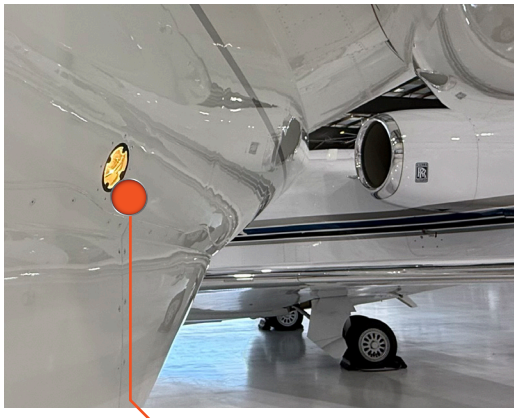
- Switch located in passenger cabin
- Automatic shutoff after 20 minutes when on battery power only
- Powered from left battery hot bus
- Manual ON/OFF operation

Operation Notes:

- Switch off when not in use
- Prevents unwanted battery discharge
- Available regardless of aircraft electrical configuration

External Baggage Light:

- Light located below left engine pylon
- Light switch located on the forward edge of cargo compartment
- Switched marked PYLON LIGHT



EXTERNAL BAGGAGE LIGHT

EXTERNAL BAGGAGE LIGHT SWITCH

B. SERVICE COMPARTMENT LIGHTING

Aft Equipment Compartment Lights:

- Two service lights
- Illuminate aft compartment work areas
- Support general servicing activities
- Support maintenance operations
- Support inspection procedures

Power Supply:

- Powered by left battery hot bus
- Connected directly to left battery
- Protected by circuit breaker CB5-A5 (LDCPC)

C. AUTO SHUT-OFF SYSTEM

Timer Operation:

- Single click activates normal operation
- 15 minutes normal illumination
- 10 seconds flashing warning period
- 5 minutes additional normal operation
- 20 minutes total before automatic shutoff

Control Functions:

- Reset/restart by pressing button while lights on
- Two quick clicks switches to standby mode
- Prevents battery depletion
- Visual warning before shutoff

Timing Sequence:

- 0-15 minutes: Normal continuous operation
- 15 minutes: 10-second flash warning
- 15-20 minutes: Normal operation resumes
- 20 minutes: Automatic switch to standby mode

D. OPERATIONAL PROCEDURES

Battery Conservation:

- Always switch off when not in use
- Use two quick clicks for immediate standby
- Monitor 20-minute automatic timeout
- Reset timer as needed during extended operations

Switch Locations:

- Cargo Bay Light: Passenger cabin panel
- Service Lights: Push button with auto shut-off device
- Baggage External Light: BAG EXT light switch
- Aft Compartment Light: AFT COMP light switch

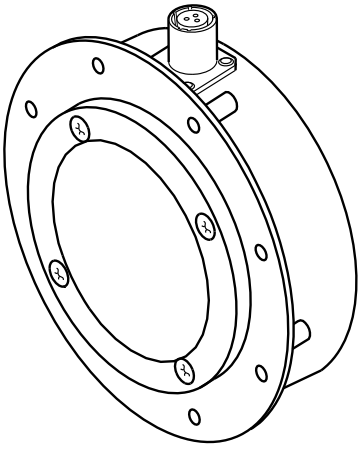
E. SYSTEM INTEGRATION

Battery Bus Connection:

- Independent of main electrical system
- Available during ground operations
- Aircraft does not need to be powered up
- Direct battery connection ensures availability

Maintenance Support:

- Adequate illumination for inspection
- Work area lighting for servicing
- No external power requirement
- Timer prevents inadvertent discharge



BAGGAGE–COMPARTMENT EXTERNAL LIGHT

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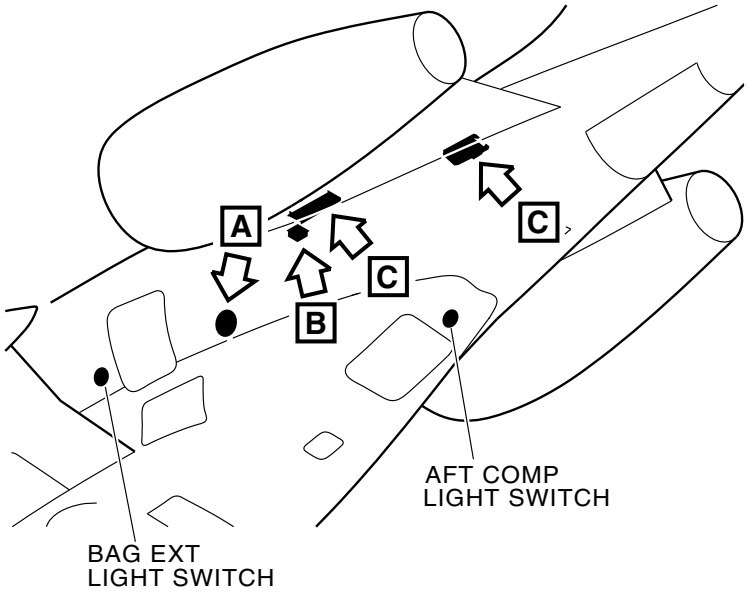

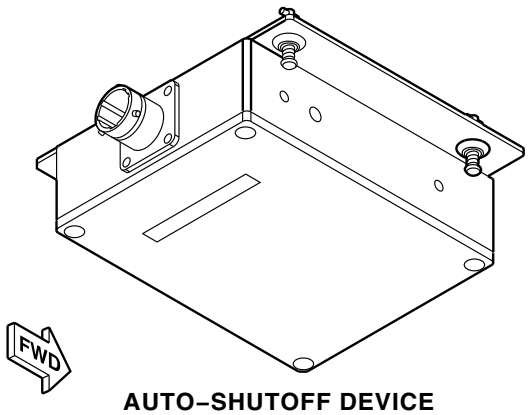

AUTO–SHUTOFF DEVICE

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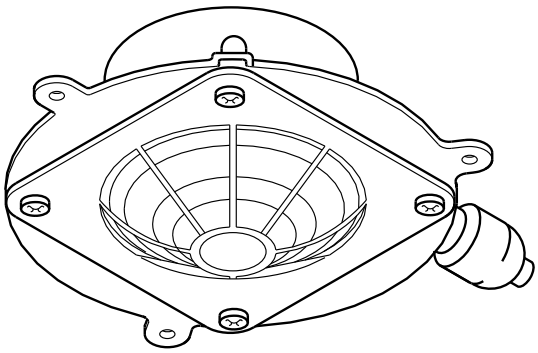

AFT EQUIPMENT–COMPARTMENT LIGHT

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VIII. SYSTEM LIMITATIONS

A. OPERATIONAL LIMITATIONS

Lighting Limitations

Category	Limitation
Emergency Lighting Duration	Minimum 10-minute duration required for dispatch
Emergency Lighting Armed	Must be armed for takeoff and landing
Strobe Lights Ground Operations	OFF during ground operations near personnel

IX. CIRCUIT BREAKERS

Lighting System Circuit Breakers

CB Name	Bus	Location
BCN/STROBE LIGHT	LEFT MAIN	CB3-E8
CABIN LIGHTS	RIGHT MAIN	CB4-E4
CABIN SIGNS	LEFT MAIN	CB3-E5
COMPASS LIGHTING	RIGHT ESS	CB4-F8
DOMES LT	RIGHT ESS	CB2-E14
EMER LTS	RIGHT MAIN	CB2-E15
ENTRY LTS	LEFT BATT	CB3-E9
EXT BAG/AFT BAY LIGHT	LEFT BATT	CB5-A5
LH LDG LIGHT	LEFT MAIN	CB5-A6
LIGHTS L CKPT/PED	LEFT MAIN	CB3-E4
LIGHTS R CKPT/CBP	RIGHT MAIN	CB4-E2
MAP STOW LIGHT	LEFT MAIN	CB3-E7
NAV LTS	RIGHT MAIN	CB4-E8
NOSE LDG LIGHT	RIGHT MAIN	CB4-E6
NOSE TAXI LIGHT	RIGHT MAIN	CB4-E5
OVHD LIGHTS	RIGHT ESS	CB2-E14
RH LDG LIGHT	RIGHT MAIN	CB6-A6
WING INSP LIGHT	LEFT MAIN	CB3-E6

X. EICAS MESSAGES

A. CAUTION MESSAGES

CAUTION MESSAGES

Timely crew awareness/action needed

Message	Meaning	Inhibits
EMER LIGHTS OFF	The cabin emergency lights are off when they should be armed	TO/LAND
EMER LIGHTS ON	The cabin emergency lights are on	TO

NOTES

- All caution messages are accompanied by a single chime
- "TO/LAND" indicates the message is inhibited during takeoff and landing phases
- "TO" indicates the message is inhibited during takeoff only
- Emergency lights automatically illuminate when armed and R MAIN BUS power is lost
- Emergency light battery packs provide 15 minutes of power when activated

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XI. LIGHTING SYSTEM QUIZ

1. How many minutes of emergency lighting are provided by the battery packs?

    A) 10 minutes
    B) 15 minutes
    C) 20 minutes
    D) 30 minutes

2. What type of lights are used for the landing light system?

    A) Halogen
    B) LED
    C) Incandescent
    D) High Intensity Discharge (HID)

3. Which bus powers the cockpit dome light?

    A) Left Essential Bus
    B) Right Essential Bus
    C) Left Main Bus
    D) Battery Bus

4. What happens to emergency lights when ARM is selected, and R MAIN BUS power is lost?

    A) They remain off
    B) They illuminate automatically
    C) They flash intermittently
    D) Crew must select ON

5. What controls the intensity of the circuit breaker panel lighting?

    A) MFD-PFD knob
    B) PEDESTAL knob
    C) CB PANELS knob
    D) DOME knob

6. The crew reading lights can rotate through what angle?

    A) ±15 degrees
    B) ±20 degrees
    C) ±25 degrees
    D) ±30 degrees

7. Which switch position combines navigation and logo lights (if installed)?

    A) NAV
    B) NAV/LOGO
    C) LOGO
    D) BCN

8. How many beacon light units are installed?

A) One
B) Two
C) Three
D) Four

9. What automatically turns off the stair lights?

A) Timer circuit
B) Door microswitch
C) Weight on wheels
D) Battery voltage

10. How many emergency exit signs are installed?

A) Five
B) Six
C) Seven
D) Eight

11. What powers the stair lighting system?

A) R BATT BUS
B) L BATT BUS
C) R ESS BUS
D) L MAIN BUS

12. The wing inspection lights are used primarily to check for?

A) Fuel leaks
B) Hydraulic leaks
C) Ice accumulation
D) Tire condition

13. What type of anti-collision lights are installed?

A) Rotating beacons
B) Strobe lights
C) LED flashers
D) Halogen pulsing

14. What is displayed when the EMER LTS switch is in the OFF position with battery switch ON?

A) **EMER LIGHTS ARM** (A)
B) **EMER LIGHTS TEST** (S)
C) **EMER LIGHTS OFF** (C)
D) No message

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