EXTERIOR LIGHTING

1. DESCRIPTION

A High Intensity Discharge (HID) landing light is installed in the lower engine cowl. The light is spring-mounted to the cowl and is ground adjustable by mounting screws. The landing light is controlled through the LAND light switch on the instrument panel bolster. The switch energizes a control relay in the MCU that completes a 28 VDC circuit from the airplane main distribution bus to the landing light ballast. The ballast, located on either the firewall (Serials 0002 thru 0820, 2438 & subs) or on the MCU cover (Serials 0821 thru 2437), provides boosted voltage to illuminate the HID lamp. A 15-amp breaker on the MCU main distribution bus protects the circuit.

The airplane is equipped with an anti-collision strobe light assembly mounted to the outboard surface of each wing tip. The light assembly includes a red (LH wing) or green (RH wing) navigation light in the forward position, an anti-collision strobe light in the middle position, and a white position light in the rear position. The navigation and position lights are controlled through the NAV light switch on the instrument panel bolster. 28 VDC for navigation light operation is supplied through the 5-amp NAV LIGHTS circuit breaker on non-essential bus.

Each anti-collision strobe light is flashed by a separate power supply. The strobe power supplies are controlled through the STROBE light switch on the instrument panel bolster. 28 VDC for strobe light and control circuits is supplied through the 5-amp STROBE LIGHTS circuit breaker on non-essential bus.

Serials 2438 & subs: A white recognition light assembly is installed on the leading edge of each wing tip. Each recognition light assembly consists of three LEDs and a power supply. The LEDs illuminate in a constant ON configuration and are controlled through the LAND light switch on the instrument panel bolster. 28 VDC for recognition light operation is supplied through the 5-amp REC/INST LTS circuit breaker on main bus 1.
2. MAINTENANCE PRACTICES

A. Landing Light - Serials 0002 thru 0118 before SB 22-01-00 (See Figure 33-401)

(1) Removal - Landing Light
   (a) Set landing light switch to OFF position.
   (b) Set BAT 1, BAT 2, and AVIONICS master switches to OFF positions.
   (c) Remove engine cowling. (Refer to 71-10)
   (d) Disconnect battery 1. (Refer to 24-30)
   (e) Identify and note routing of landing light wires.

   Note: Record the number of turns required to remove the adjustment/mounting screws. Tighten screws the same amount during installation.

   (f) Remove screws, washers, spacers, and springs securing lamp, mounting rings to housing.
   (g) Disconnect wires from landing light.
   (h) Remove lamp and mounting rings from housing.

(2) Installation - Landing Light
   (a) Position lamp and mounting rings to housing.
   (b) Connect wires to landing light.
   (c) Install screws, washers, spacers, and springs securing lamp and mounting rings to housing. Tighten screws the same number of turns as noted during removal.
   (d) Connect battery 1. (Refer to 24-30)
   (e) Install engine cowling. (Refer to 71-10)

(3) Adjustment - Landing Light

   Note: The airplane must be on a level and flat surface prior to adjusting landing light aim. There must be a vertical wall or door in front of the landing light lens.

   (a) Check and adjust tire pressure and fuel level if necessary. (Refer to 12-10)

   Note: To aid in obtaining an accurate adjustment, each fuel tank must have the same amount of fuel in it. Measurement will be taken from the center of landing light lens to the center of the illuminated pattern on the wall.

   (b) Position airplane 114 inches away from a vertical wall or door.
   (c) Place wheel chocks in position.
   (d) Place a small piece of tape on the vertical wall or door 32 inches high and directly in line of the landing light lens.
   (e) Turn on landing light. Verify tape is centrally located in beam. The landing light beam should be centrally illuminating the tape placed on the wall or door.

   Note: Up to two additional washers may be placed between lamp and vibration mount to adjust landing light position.

   (f) If necessary, adjust landing light position with top adjuster screw and by adding washers between lamp and vibration mount.
B. Landing Light - Serials 0119 thru 0319, 0320 thru 0820, 0002 thru 0118 after SB 22-01-00 (See Figure 33-401)

(1) Removal - Landing Light
(a) Set landing light switch to OFF position.
(b) Set BAT 1, BAT 2, and AVIONICS master switches to OFF positions.
(c) Remove engine cowling. (Refer to 71-10)
(d) Disconnect battery 1. (Refer to 24-30)
(e) Identify and note routing of landing light wires.
(f) Remove screw from clamp ring assembly.
(g) Unplug connector securing wires to landing light.

**Note:** Record the number of turns required to remove the adjustment/mounting screws. Tighten screws the same amount during installation.

(h) Remove upper adjustment/mounting screw, washers, and spring.
(i) Remove lamp and gasket from clamp ring assembly.

(2) Installation - Landing Light
(a) Install lamp and gasket into clamp ring assembly.
(b) Install screw into clamp ring assembly.

**Note:** Tighten screw to the number of turns noted during removal.

(c) Install upper adjustment/mounting screw, washers, and spring.
(d) Plug in connector securing wires to landing light.
(e) Clean bulb surface with isopropyl alcohol and allow to air dry.
(f) Connect battery 1. (Refer to 24-30)
(g) Install engine cowling. (Refer to 71-10)

(3) Adjustment - Landing Light

**Note:** The airplane must be on a level and flat surface prior to adjusting landing light aim. There must be a vertical wall or door in front of the landing light lens.

(a) Check and adjust tire pressure and fuel level if necessary. (Refer to 12-10)

**Note:** To aid in obtaining an accurate adjustment, each fuel tank must have the same amount of fuel in it. Measurement will be taken from the center of landing light lens to the center of the illuminated pattern on the wall.

(b) Position airplane 114 inches away from a vertical wall or door.
(c) Place wheel chocks in position.
(d) Place a small piece of tape on the vertical wall or door 32 inches high and directly in line of the landing light lens.
(e) Turn on landing light. Verify tape is centrally located in beam. The landing light beam should be centrally illuminating the tape placed on the wall or door.

**Note:** Up to two additional washers may be placed between lamp and vibration mount to adjust landing light position.

(f) If necessary, adjust landing light position with top adjuster screw and by adding washers between lamp and vibration mount.
C. Landing Light - **Serials 0821 & subs** *(See Figure 33-401)*

(1) Removal - Landing Light

(a) Set landing light switch to OFF position.
(b) Set BAT 1, BAT 2, and AVIONICS master switches to OFF positions.
(c) Remove engine cowling. *(Refer to 71-10)*
(d) Disconnect battery 1. *(Refer to 24-30)*
(e) Identify and note routing of landing light wires.
(f) Disconnect wire harness from landing light to ballast.
(g) Remove screws and washers securing landing light lens to lower cowl.

**Note:** Record the number of turns required to remove the adjustment/mounting screws. Tighten screws the same amount during installation.

(h) Remove screws and rubber mounts securing lamp lens and lamp to lower cowl.
(i) Remove lamp lens and lamp from lower cowl.

(2) Installation - Landing Light

(a) Acquire necessary tools, equipment, and supplies.

(b) Position lamp and lamp lens into lower cowl.

**Note:** Tighten screws to the number of turns noted during removal.

(c) Install rubber mounts and screws securing lamp lens and lamp to lower cowl.
(d) Connect wire harness from ballast to landing light.
(e) Clean lamp surface with isopropyl alcohol and allow to air dry.
(f) Connect battery 1. *(Refer to 24-30)*
(g) Install engine cowling. *(Refer to 71-10)*

(3) Adjustment/Test - Landing Light

**Note:** The airplane must be on a level and flat surface prior to adjusting landing light aim. There must be a vertical wall or door in front of the landing light lens.

(a) Check and adjust tire pressure if necessary. *(Refer to 12-10)*

**Note:** Measurement will be taken from the center of landing light lens to center of the illuminated pattern on the wall.

(b) Position airplane 114 inches away from a vertical wall or door.
(c) Place wheel chocks in position.
(d) Place a small piece of tape on the vertical wall or door 32 inches high and directly in line of the landing light lens.
(e) Turn on landing light. Verify tape is centrally located in beam. The landing light beam should be centrally illuminating the tape placed on the wall or door.
(f) If necessary, adjust the screws securing the lamp lens and lamp to the lower cowl to adjust landing light position.
(g) Install washers and screws securing landing light lens to lower cowl.

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<table>
<thead>
<tr>
<th>Description</th>
<th>P/N or Spec.</th>
<th>Supplier</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropyl Alcohol</td>
<td>TT-I-735 Grade A or B</td>
<td>Any Source</td>
<td>Clean lamp surface.</td>
</tr>
</tbody>
</table>

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P/N or Spec.: TT-I-735 Grade A or B
Supplier: Any Source
Purpose: Clean lamp surface.

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**EFFECTIVITY:**
Serials 0821 & subs

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D. Landing Light Ballast (See Figure 33-401)

(1) Removal - Landing Light Ballast
   (a) Set landing light switch to OFF position.
   (b) Set BAT 1, BAT 2, and AVIONICS master switches to OFF positions.
   (c) Remove engine cowling. (Refer to 71-10)
   (d) Disconnect battery 1. (Refer to 24-30)
   (e) Disconnect ballast wire harness from landing light.
   (f) Remove screws, washers, adel clamps, mounting tabs, and nuts securing ballast wire harness to firewall.
   (g) **Serials 0002 thru 0820:** Remove screws and washers securing ballast to firewall. Remove ballast from airplane.
   (h) **Serials 0821 & subs:** Remove nuts and washers securing ballast to MCU. Remove ballast from airplane.

(2) Installation - Landing Light Ballast
   (a) **Serials 0002 thru 0820:** Position ballast to firewall and secure with screws and washers.
   (b) **Serials 0821 & subs:** Position ballast to MCU and secure with washers and nuts.
   (c) Position ballast wire harness to firewall and secure with screws, washers, adel clamps, mounting tabs, and nuts.
   (d) Connect ballast wire harness to landing light.
   (e) Connect battery 1. (Refer to 24-30)
   (f) Install engine cowling. (Refer to 71-10)
LEGEND
1. Screw
2. Washer
3. Ring, Landing Light
4. Heat Shield
5. Lamp
6. Spring
7. Housing, Landing Light
8. Spacer
9. Screw, Countersunk
10. Lens, Landing Light
11. Vibration Mount
12. Gasket
13. Clamp
14. Nut
15. H.I.D. Ballast
16. Adel Clamp
17. Mounting Tab

NOTE
⚠️ Up to two additional washers may be placed in this location to adjust landing light position.
⚠️ Washer in this location may be omitted to adjust landing light position.

Figure 33-401
Landing Light Assembly - Serials 0002 thru 0319 (Sheet 1 of 3)

EFFECTIVITY:
Serials 0002 thru 0319
Up to two additional washers may be placed in this location to adjust landing light position.

NOTE

**DETAIL B**

*Figure 33-401*

_Landing Light Assembly - Serials 0320 thru 0820 (Sheet 2 of 3)_

EFFECTIVITY:
Serials 0320 thru 0820

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NOTE
Adjust vibration mount compression to set landing light position.

LEGEND
1. Screw
2. Washer
5. Lamp
10. Lens, Landing Light
11. Vibration Mount
14. Nut
15. H.I.D. Ballast
16. Adel Clamp
17. Mounting Tab
18. Lens, Lamp
19. Lens Retainer, Landing Light

Figure 33-401
Landing Light Assembly - Serials 0821 & subs (Sheet 3 of 3)
E. Anti-Collision Strobe Light Assembly (See Figure 33-402)

(1) Removal - Anti-Collision Strobe Light Assembly

(a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
(b) Pull NAV LIGHTS, STROBE LIGHTS, and REC/INST LTS circuit breakers.

Note: Place a pad between wing tip and top of wing to avoid damaging paint.

(c) Remove screws securing wing tip to wing and slide wing tip outboard to remove. Carefully flip wing tip upside down and rest wing tip on top of wing.
(d) Remove cable tie(s) securing light assembly wire harness to wing tip.
(e) Remove braided ground strap.
   1. Remove clamp securing braided ground straps to wire harness conduit in wing.
   2. Remove clamp securing braided ground strap to light assembly.
   3. Remove cable ties securing braided ground strap around light assembly wire harness.
(f) Disconnect light assembly connector.
(g) Disconnect output connector from strobe light power supply.
(h) Serials 0002 thru 1703: Remove strobe light power supply mounting screw securing light assembly terminal ring.
(i) Serials 1704 & subs: Disconnect light assembly terminal ring connector.
(j) Remove screws securing lens retainer to light assembly base plate.
(k) Remove screws securing light assembly base plate and terminal rings to wing. Remove light assembly from airplane.

(2) Installation - Anti-Collision Strobe Light Assembly

WARNING: Install anti-collision strobe light assembly with green lens in RH wing tip and anti-collision strobe light assembly with red lens in LH wing tip.

(a) Route light assembly wire harness through holes in wing tip.
(b) Position light assembly base plate and terminal rings to wing tip and secure with screws.
(c) Position lens retainer to light assembly base plate and secure with screws.
(d) Serials 0002 thru 1703: Position light assembly terminal ring between strobe light power supply and shear web and secure with screw.
(e) Serials 1704 & subs: Connect light assembly terminal ring connector.
(f) Connect output connector to strobe light power supply.
(g) Connect light assembly connector.
(h) Install braided ground strap.
   1. Position braided ground strap to light assembly and secure with clamp.
   2. Wrap braided ground cable around light assembly wire harness and secure with cable ties.
   3. Burnish wing conduit to ensure proper contact between braided ground strap and conduit.

Note: Fold over ends of braided ground straps to prevent fraying.

4. Position braided ground straps to wing conduit and secure with clamp.
5. Verify resistance from light assembly to airplane ground is less than 4 ohms. If resistance is greater than 4 ohms, remove braided ground strap and repeat conduit burnishing.
(i) Position light assembly wire harness to wing tip and secure with cable tie(s).
(j) **Serials 0002 thru 2437:** Position wing tip to wing and ensure wing tip shear pin fully engages receiving hole on wing.

(k) **Serials 2438 & subs:** Position wing tip to wing and ensure wing tip fully engages mounting clips on wing.

(l) Install screws securing wing tip to wing.

(m) Reset NAV LIGHTS, STROBE LIGHTS, and REC/INST LTS circuit breakers.

(n) Verify proper operation of anti-collision strobe light assembly.
F. Strobe Light Power Supply (See Figure 33-402)

(1) Removal - Strobe Light Power Supply
   (a) Set strobe light and NAV light switches to OFF positions.
   (b) Pull NAV LIGHTS and STROBE LIGHTS circuit breakers.

   **Note:** Place a pad between wing tip and top of wing to avoid damaging paint.

   (c) Remove screws securing wing tip to wing and slide wing tip outboard to remove. Carefully flip wing tip upside down and rest wing tip on top of wing.
   (d) Disconnect output connector from power supply.
   (e) Disconnect power connector from power supply.
   (f) **Serials 2438 & subs:** Remove screw securing terminal rings to power supply.
   (g) **Serials 0002 thru 2437:** Remove bolts, washers, and spacers (if installed) securing power supply, terminal rings, and braided ground strap to wing tip. Remove power supply from airplane.
   (h) **Serials 2438 & subs:** Remove bolts, washers, and spacers (if installed) securing power supply and braided ground strap to wing tip. Remove power supply from airplane.

(2) Installation - Strobe Light Power Supply

   **Note:** Spacers are optional. Install spacers if power supply contacts shear web radii.

   (a) **Serials 0002 thru 2437:** Position power supply, terminal rings, and braided ground strap to wing tip and secure with bolts, washers, and spacers (if installed).
   (b) **Serials 2438 & subs:** Position power supply and braided ground strap to wing tip and secure with bolts, washers, and spacers (if installed).
   (c) **Serials 2438 & subs:** Position terminal rings to power supply and secure with screw.
   (d) Connect power connector to power supply.
   (e) Connect output connector to power supply.
   (f) **Serials 0002 thru 2437:** Position wing tip to wing and ensure wing tip shear pin fully engages receiving hole on wing.
   (g) **Serials 2438 & subs:** Position wing tip to wing and ensure wing tip fully engages mounting clips on wing.
   (h) Install screws securing wing tip to wing.
   (i) Reset NAV LIGHTS and STROBE LIGHTS circuit breakers.
   (j) Verify proper operation of anti-collision light assembly.
G. Recognition Light Assembly - Serials 2438 & subs (See Figure 33-402)

(1) Removal - Recognition Light Assembly
   (a) Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.
   (b) Pull REC/INST LTS circuit breaker.

   **Note:** Place a pad between wing tip and top of wing to avoid damaging paint.

   (c) Remove screws securing wing tip to wing and slide wing tip outboard to remove. Carefully flip wing tip upside down and rest wing tip on top of wing.
   (d) Disconnect recognition light connector.
   (e) Remove screws securing recognition light to lens assembly. Remove recognition light from airplane.

(2) Installation - Recognition Light Assembly
   (a) Position recognition light to lens assembly and secure with screws.
   (b) Connect recognition light connector.
   (c) Position wing tip to wing and ensure wing tip fully engages mounting clips on wing.
   (d) Install screws securing wing tip to wing.
   (e) Reset REC/INST LTS circuit breaker.
   (f) Verify proper operation of recognition light assembly.
H. Bulb Replacement (See Figure 33-402)

CAUTION: Always wear clean cotton gloves when working with bulbs. Never allow glass portion of bulb to come into contact with exposed skin. Oils from exposed skin will cause premature bulb failure.

(1) Removal - Navigation Light Bulb
(a) Set strobe light and NAV light switches to OFF positions.
(b) Pull NAV LIGHTS and STROBE LIGHTS circuit breakers.
(c) Remove screws securing lens retainer to base plate.
(d) Push navigation light bulb in and rotate counterclockwise to remove.

(2) Installation - Navigation Light Bulb
(a) Position bulb to socket with flat portion of bulb facing lens retainer mounting bracket.
(b) Push bulb into socket and rotate clockwise to install.
(c) Position lens retainer to base plate and secure with screws.
(d) Reset NAV LIGHTS and STROBE LIGHTS circuit breakers.
(e) Verify proper anti-collision strobe light operation.

(3) Removal - Position Light Bulb
(a) Set strobe light and NAV light switches to OFF positions.
(b) Pull NAV LIGHTS and STROBE LIGHTS circuit breakers.
(c) Remove screws securing lens retainer to base plate.
(d) Pull position light bulb straight out from socket and remove.

(4) Installation - Position Light Bulb
(a) Push position light bulb straight into socket to install.
(b) Position lens retainer to base plate and secure with screws.
(c) Reset NAV LIGHTS and STROBE LIGHTS circuit breakers.
(d) Verify proper anti-collision strobe light operation.

(5) Removal - Strobe Light Bulb
(a) Set strobe light and NAV light switches to OFF positions.
(b) Pull NAV LIGHTS and STROBE LIGHTS circuit breakers.
(c) Remove screws securing wing tip to wing and slide wing tip outboard to remove. Carefully flip wing tip upside down and rest wing tip on top of wing.
(d) Remove cable tie securing anti-collision strobe light assembly wire harness to wing tip.
(e) Remove cable ties securing braided ground strap around strobe light wire harness.
(f) At connector, depin wires from strobe light bulb.
(g) Disconnect output connector from strobe light power supply.
(h) Remove strobe light power supply mounting screw securing strobe light connector terminal ring.
(i) Remove screws securing lens retainer to base plate.
(j) Remove strobe light bulb and wire harness from airplane.

Note: Place a pad between wing tip and top of wing to avoid damaging paint.

(6) Installation - Strobe Light Bulb
(a) Route strobe light wire harness through base plate.
(b) Repin strobe light bulb wires to connector.
(c) Position strobe light connector terminal ring between strobe light power supply and shear web and secure with screw.
(d) Connect output connector to strobe light power supply.
(e) Wrap braided ground strap around strobe light wire harness and secure with cable ties.
(f) Install cable tie securing strobe light wire harness to wing tip.
(g) Position lens retainer to base plate and secure with screws.
(h) Position wing tip to wing and ensure wing tip shear pin fully engages receiving hole on wing.
(i) Install screws securing wing tip to wing.
(j) Reset NAV LIGHTS and STROBE LIGHTS circuit breakers.
(k) Verify proper anti-collision strobe light operation.
NOTE

⚠️ Spacers are optional. Install spacers if strobe light module contacts shear web radii.

LEGEND
1. Anti-Collision Strobe Light Assembly
2. Bolt
3. Washer
4. Spacer
5. Strobe Light Power Supply
6. Lens
7. Bulb
8. Gasket
9. Flash Tube Assembly
10. Lens Retainer
11. Screw
12. Base Plate
13. Braided Ground Strap
14. Cable Tie
15. Light Assembly Connector
16. Strobe Light Output Connector
17. Terminal Ring Connector

Figure 33-402
Anti-Collision and Recognition Light Installation - Serials 0002 thru 2437 (Sheet 1 of 2)

EFFECTIVITY:
Serials 0002 thru 2437

SERIALS
Serials 0002 thru 2333, 2335 thru 2419, 2421 thru 2437.

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Figure 33-402
Anti-Collision and Recognition Light Installation - Serials 2438 & subs (Sheet 2 of 2)

Legend:
1. Anti-Collision Strobe Light Assembly
3. Washer
5. Strobe Light Power Supply
6. Lens
7. Bulb
8. Gasket
9. Flash Tube Assembly
10. Lens Retainer
11. Screw
12. Base Plate
13. Braided Ground Strap
14. Cable Tie
15. Light Assembly Connector
16. Strobe Light Output Connector
17. Terminal Ring Connector
18. Recognition Light

Serials 2334, 2420, 2438 & subs.