Chapter 60

GRIMES ANTI-COLLISION LAMPS, ROTATING LAMPS TYPE

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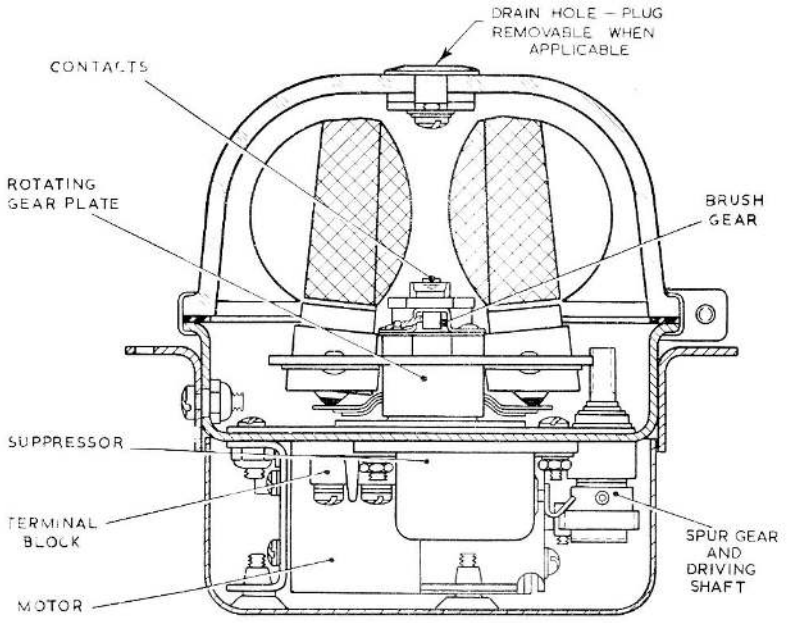


Fig. 1. Sectional view of typical lamp

Introduction

1. The Grimes rotating lamps, Type G8400-3-24 and Type G7740 series are used as anti-collision lamps and warning beacons. The lamps may be fitted on the upper and/or lower aircraft surface and present a flashing beam of light visible over a large area. The lamps give approximately 90 flashes per minute emitted by two partially mirrored filament lamps which are mounted facing in opposite directions and rotate at 45 r.p.m. The lamps differ in minor constructional details only, and this chapter deals with the typical lamp. Information of individual lamps will be found in the appendices to this chapter. The Type G8400-3-24, is the lamp described and illustrated in this chapter.

DESCRIPTION

General

2. The lamp (shown in fig. 1) consists of the motor and driving shaft, and the gear plate, which are mounted on the mechanism mounting plate. The driving motor is mounted on the underside of the mounting plate and is enclosed by the bottom cover. The gear plate which accommodates the filament lamps, rotates on a spindle on the top of the mounting plate, and is enclosed by the glass lens.

Motor and driving shaft

3. The motor is secured to the underside of the mechanism mounting plate by two mounting brackets as shown in fig. 2. The motor shaft carries a steel worm gear which engages with a nylon spur gear on the

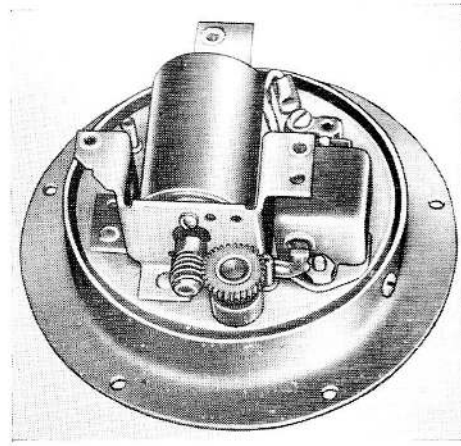


Fig. 2. Underside view with base cover removed

driving shaft. The driving shaft passes through the mounting plate carried in a bearing and is secured in position by a circlip and washer, the end of the shaft is in the form of a 12 tooth gear which engages with the gear teeth of the lamp gear plate. The mechanism cover is secured to feet on the motor mounting brackets, and provision for the cable entry is made by a side mounted plate and rubber grommet. Moisture drainage is accomplished by two $\frac{1}{4}$ in. drain holes in the base of the cover, and two drain tubes in the mechanism mounting plate.

Lamp gear plate

4. The lamp gear plate, which is shown in fig. 3, is positioned in the well formed by the mechanism mounting plate. The gear plate incorporates a bearing on which it rotates about the centre spindle and is secured to the centre spindle by a nut, the waist of which acts as the "earth" slip ring. The nut is locked on the centre spindle by a set screw, and a thrust washer is positioned below the gear plate on the spindle. Bearing on the slip ring is the "earth" brush which is housed in a brush holder rivetted to the gear plate, the pigtail of the brush is soldered to the brush holder. Directly opposite the brush holder is the rotating contact, this contact revolves with the gear plate and bears on a stationary contact-stud in the top of the centre spindle. The rotating contact is secured by two screws insulated from the gear plate to the "U" shaped leaf spring contact on the underside of the gear plate, the arms of the leaf spring contact bear on the base contact of the filament lamps.

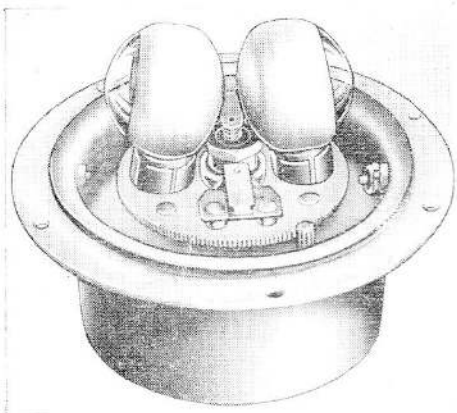


Fig. 3. View with lens removed

Filament lamps

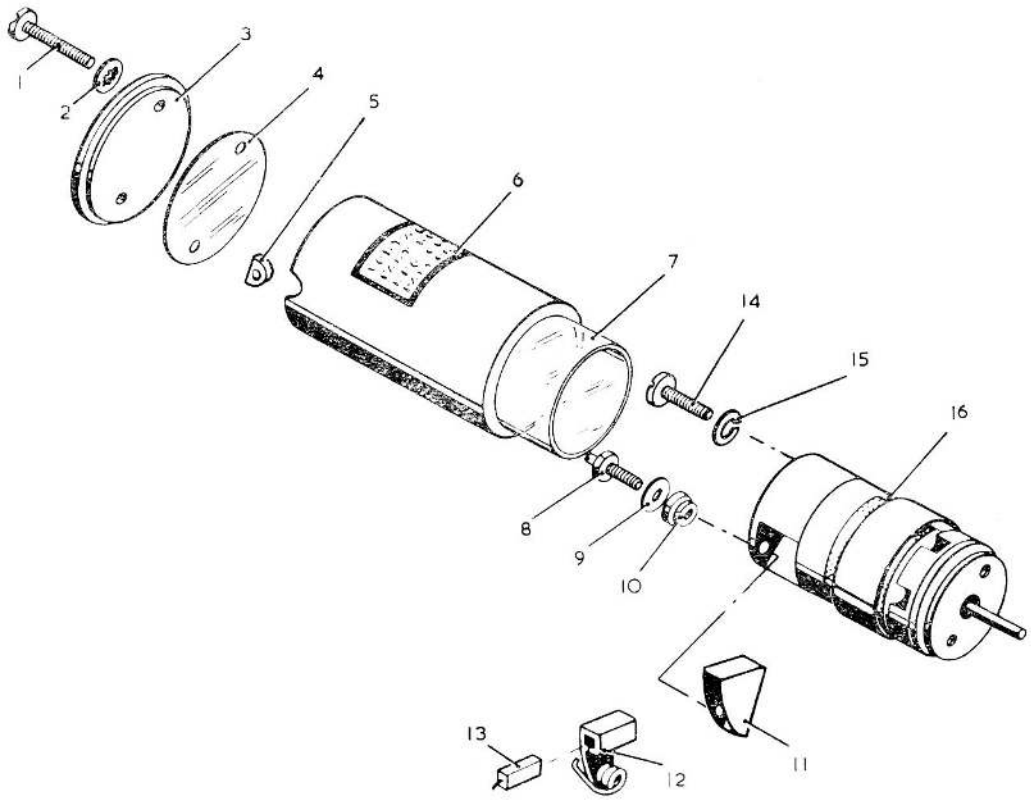
5. The filament lamps are 28 volt 40 watt, single-contact, bayonet cap filament lamps the glass envelope of which is mirror finished over approximately 60% of its surface area. This causes the lamp to give a beam of light, with the mirror-finished envelope acting as a reflector. The locating pins of the bayonet cap are positioned at different levels and the lamps will only fit the special lamp holders in one position, the lamp holders are so located that the two filament lamps face 180 deg. apart, as shown in fig. 3.

Lens

6. The lens which is of toughened red glass fits on to the rim of the mechanism mounting ring and is sealed by a rubber gasket and secured by a bezzle ring as shown in fig. 1. Provision for moisture drainage when the lamp is mounted in the inverted position is made by a drain plug in the centre of the lens, which should be removed when the lamp is fitted.

Electrical connection

7. Connection to the lamp is made by a 2-way terminal block mounted on the underside of the mechanism mounting plate, adjacent to the motor suppressor. The positive connection to the filament lamps is taken through the centre of the mechanism mounting plate spindle to a contact fitted to the top of the spindle, and via the rotating contact assembly to the base contact of each lamp. The return is made through the lamp holder and gear plate to the "earth" brush, and via the brush to the slip ring and thence to the frame of the lamp. The motor is conected to the positive terminal of the terminal block via the motor suppressor and earthed to the frame of the lamp. A circuit diagram for each lamp is given in the appendices to this chapter.



1	SCREW	**9**	WASHER
2	LOCK WASHER	**10**	INSULATING BUSH
3	COMMUTATOR END-CAP	**11**	BRUSH BOX INSULATOR
4	END-CAP INSULATOR	**12**	BRUSH BOW AND SPRING
5	CABLE ENTRY GROMMET	**13**	BRUSH
6	MOTOR COVER	**14**	TERMINAL SCREW
7	COVER INSULATOR	**15**	SPRING WASHER
8	TERMINAL, AND BRUSH BOX SECURING STUD	**16**	MOTOR

Fig. 4. Motor, exploded view

INSTALLATION

8. The lamp is mounted to the aircraft structure by three screws which pass through holes in the side of the mechanism mounting plate and may be mounted directly to a suitable airframe member or by means of a flange mounting ring as on the lamp which is illustrated in the chapter.

SERVICING

General

9. Servicing of the lamp on the aircraft should be confined to inspection for freedom from damage and corrosion, and renewal of the lens and filament lamps. To renew the lens or to gain access to the filament lamps, unscrew the bezzle ring securing screw and remove the lens and bezzle ring. At all times when the lens is removed the sealing gasket should be inspected for deterioration and renewed as required. The lens and filament lamps may be washed in warm soapy water using a soft cloth or chamois leather if they are exceptionally dirty. No abrasive of any sort should be used.

10. Servicing of the lamp on the bench should include a close inspection of the teeth

of all the gears paying particular attention to the teeth of the gear plate and pinion for signs of damage or cracks. The rotating contact should be inspected for signs of pitting and burning and the tension of the contact checked which should be between $1\frac{1}{2}-4$ ozs. If it is required to inspect the motor, or motor brushes, the motor should be removed following the procedure given in paragraph 11, and then dismantled using the sequence given in the key to fig. 4 as a guide.

Lubrication

11. Lubrication of the mechanism assembly may be made as follows:— To the gear plate and pinion a light smear of grease XG276 (Ref. No. 34B/9425189), and to the driving shaft and gear plate bearings one or two drops of oil OX14 (Ref. No. 34B/9100590 NATO Code 0-147). The motor bearings are lubricated for the life of the motor and no further lubrication should be attempted.

Motor renewal

12. To remove the motor from the lamp remove the screw securing the commutator end bracket to the underside of the mechanism mounting plate and the two screws securing the motor to the drive end bracket. Withdraw the motor complete with worm gear from the drive end bracket and remove the commutator end bracket, motor end-cap and the end-cap insulator from the motor by unscrewing the two securing screws. This gives access to the motor connections which should then be disconnected withdrawing the cable through the cable entry grommet. The motor may now be removed to the bench and the worm gear removed from the shaft by unscrewing the retaining Allen screw. Should it be required to dismantle the motor the sequence given by the key to fig. 4 should be used as a guide. To renew the motor prepare the new motor for fitting to the lamp by fitting the worm gear, and removing the end-cap and the end-cap insulator. Place the new motor in the lamp and fit in the reverse order to that given above for its removal.

Note . . .

The terminal screw in the new motor is a $\frac{7}{16}$ in. Phillips screw and must be replaced by the terminal screw which was removed from the old motor, this screw which is a $\frac{9}{16}$ in. round headed screw is required to accommodate the cable end connector of the earth connection.

Testing

Functional test

13. After all servicing the lamp should be connected to a variable 28V d.c. supply and functionally tested. At 28V the lamp should rotate at 45 r.p.m. $\pm$ 5 r.p.m. giving 90 flashes per minute and the lamps should remain bright without any flickering or dimming. The supply voltage should then be lowered to 22V and the lamp should commence to rotate when the supply is switched on with no tendency to sluggishness, the speed of rotation should be between 30-38 r.p.m. and the lamps should remain bright without any appreciable flickering or dimming.

Appendix 1

ANTI-COLLISION LAMP, GRIMES, TYPE G8400-3-24

LEADING PARTICULARS

Anti-collision lamp, Grimes, Type G8400-3-24	*Ref. No. 5CX/5433*
Lens, red glass	*Ref. No. 5CX/5541*
Filament lamp, Type 7079A-24, 28 volt 40 watt	*Ref. No. 5L/2641*
Motor, Globe Ind. Type C-25A-515	*Ref. No.*
Minimum permissible brush length	$\frac{1}{8}$ *in.*
Input voltage	28 *volt*
Speed of rotation (gear plate)	45 *r.p.m.*
Weight	2 *lb. (max.)*

1. This lamp is identical to that described and illustrated in the main chapter. A circuit diagram is given in fig. 1.

2. Servicing of the lamp should follow the instructions given in the main chapter.

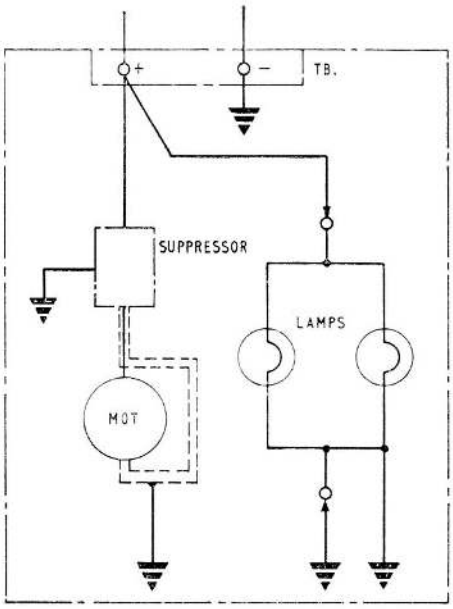


Fig. 1. Circuit diagram

Appendix 2

ANTI-COLLISION LAMP, GRIMES, TYPE G7740-3-24

LEADING PARTICULARS

Anti-collision lamp, Grimes, Type G7740-3-24	*Ref. No. 5CX/5398*
Lens, red glass	*Ref. No. 5CX/5541*
Filament lamp, Type 7079A-24, 28 volt 40 watt	*Ref. No. 5L/2641*
Motor, Globe Ind. Type C-25A-515	*Ref. No.*
Minimum permissible brush length	$\frac{1}{8}$ *in.*
Input voltage	28 *volt*
Speed of rotation (gear plate)	45 *r.p.m.*
Weight	1·5 *lb.*

1. The anti-collision lamp, Type G7740-3-24 is similar to that described and illustrated in the main chapter, but has some minor constructional differences. A circuit diagram is given in fig. 1.

2. Servicing of the lamp should follow the instructions given in the main chapter.

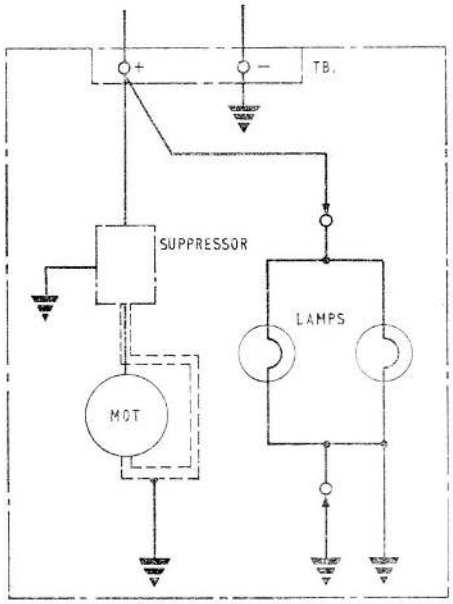


Fig. 1. Circuit diagram

Appendix 3

ANTI-COLLISION LAMP, GRIMES, TYPE G7740-8-24

LEADING PARTICULARS

Anti-collision lamp, Grimes, Type G7740-8-24	*Ref. No. 5CX/5552*
Lens, red glass	*Ref. No. 5CX/5541*
Filament lamp, Type 7079A-24, 28 volt 40 watt	*Ref. No. 5L/2641*
Motor, Globe Ind Type C-25A-515	*Ref. No.*
Minimum permissible brush length	$\frac{1}{8}$ *in.*
Input voltage	28 *volt*
Speed of rotation (gear plate)	45 *r.p.m.*
Weight	1·5 *lb.*–2 *lb.*

1. The anti-collision lamp, Type G7740-8-24 is similar to that described and illustrated in the main chapter but has minor constructional differences and incorporates a connector plug AN3102A-10SL-3P for electrical connection instead of the two-way terminal block. The connector is mounted on the base of the mechanism cover. A circuit diagram is given in fig. 1.

2. Servicing of the lamp should follow the instructions given in the main chapter but it should be noted that before the base cover can be removed the four connector securing screws must be removed. When inspecting the lamp the connections to the pins of the connector should be checked for security of attachment and the pins inspected for signs of corrosion or burning. If corrosion or burning is evident the plug should be renewed.

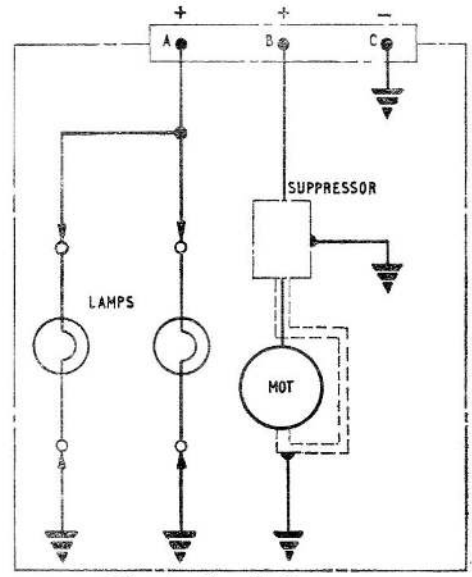


Fig. 1. Circuit diagram

Appendix 4

ANTI-COLLISION LAMP, GRIMES, TYPE G7740-24

LEADING PARTICULARS

Anti-collision lamp, Grimes, Type G7740-24	*Ref. No. 5CX/5763*
Lens, red glass	*Ref. No. 5CX/5541*
Filament lamp, Type G7079A-24, 28 volt 40 watt	*Ref. No. 5L/2641*
Motor, Globe Ind Type C-25A-515	*Ref. No.*
Minimum permissible brush length	$\frac{1}{8}$ *in.*
Input voltage	28 *volt*
Speed of rotation (gear plate)	45 *r.p.m.*
Weight	1·5 *lb.* – 2 *lb.*

1. The anti-collision lamp, Type G7740-24, is similar to that described in the main chapter but has no mounting flange fitted. The lamp is normally installed in a cylindrical mounting tube, which is incorporated in the airframe structure. The lamp is secured within the tube by three screws and stiff-nuts; access to the nuts, for removal of the lamp, is gained by first removing the lamp lens. Connection to the lamp is made by means of a three pole plug A.N.3102A-10SL-3P mounted on the base of the mechanism cover. A circuit diagram is given in fig. 1.

2. Servicing of the lamp should follow the instructions given in the main chapter, but it should be noted that before the base cover can be removed the four connector securing screws must be removed. When inspecting the lamp, the connections to the pins of the connector should be checked for security of attachment and inspected for corrosion, and signs of sparking or burning. Where damage to the plug is found the plug should be renewed.

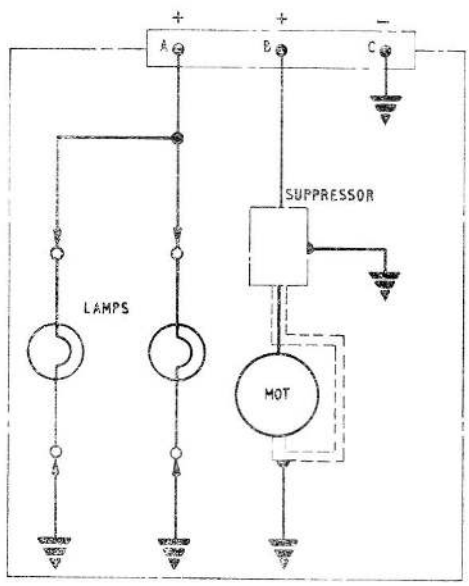


Fig. 1. Circuit diagram

Appendix 5

ANTI-COLLISION LAMP, GRIMES, TYPE G8400A-8-24

LEADING PARTICULARS

Anti-collision lamp, Grimes, Type G8400A-8-24	*Ref. No. 5CX/5851*
Lens, red glass	*Ref. No. 5CX/5541*
Filament lamp, Type 7079A-24, 28 volt 40 watt	*Ref. No. 5L/2641*
Motor, Globe Ind Type C-25A-515	*Ref. No. 5CX/5906*
Minimum permissible brush length	$\frac{1}{8}$ *in.*
Input voltage	28 *volt*
Speed of rotation (gear plate)	45 *r.p.m.*
Weight	2 *lb.*

1. The anti-collision lamp, Type G8400A-8-24 is similar to that described and illustrated in the main chapter but has minor constructional differences and incorporates a connector plug AN3102A-10SL-3P for electrical connection instead of the two-way terminal block. The connector is mounted on the base of the mechanism cover. A circuit diagram is given in fig. 1.

2. Servicing of the lamp should follow the instructions given in the main chapter but it should be noted that before the base cover can be removed the four connector securing screws must be removed. When inspecting the lamp the connections to the pins of the connector should be checked for security of attachment and the pins inspected for signs of corrosion or burning. If corrosion or burning is evident the plug should be renewed.

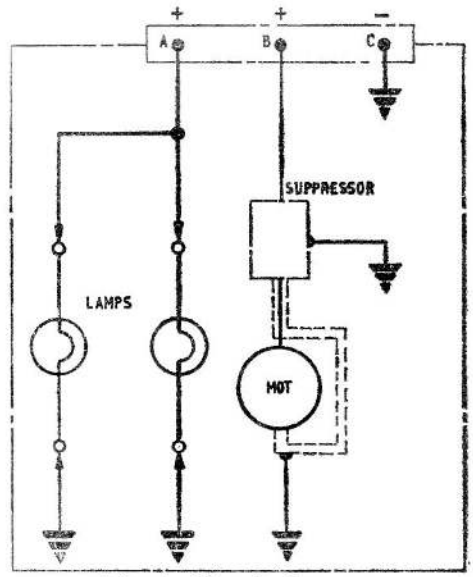


Fig. 1. Circuit diagram

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