# Chapter 3

# LANDING LAMP, TYPE J

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## LIST OF ILLUSTRATIONS



## LEADING PARTICULARS

| | |
|---|---|
| ***Landing lamp, Type, J*** | *Stores Ref. 5CX/1515* |
| *Lamp, filament, 240 watts (medium prefocus cap)* | *Stores Ref. 5L/X954717* |
| *Operating unit* | *Stores Ref. 5UD/1517* |
| *Mounting rig* | *Stores Ref. 5CX/1518* |
| *Front glass* | *Stores Ref. 5CX/1517* |
| *Weight* | *5 lb.* |
| *Overall depth, outer housing* | *5 in.* |

### Introduction

**1.** The type J landing lamp is widely used in military aircraft. It incorporates an electrically driven operating mechanism and can be remotely controlled. The beam selection, for landing or taxying, is arranged by the use of alternative " out " limits of the retractable filament housing. It is designed for operation at air speeds up to 175 knots and comprises three main assemblies, viz., the outer housing, the operating mechanism and the filament housing.

## DESCRIPTION

### Outer housing (*fig. 1*)

**2.** This is a fabricated coned unit having a flanged rim. The rim is held clamped between the plates of a mounting rig and carries the weight of the landing lamp in the aircraft. The operating mechanism is secured to the side of the outer housing by eight screws.

### Mounting rig

**3.** This consists of two metal plates, secured together by screws, between which is clamped the flanged rim of the outer housing. The larger metal plate fits over the outer housing locating behind the rim and is secured to the airframe structure. The smaller, front plate of the mounting rig has a circular hole through which the retractable filament housing operates. A scale is engraved round a short length of the periphery of this hole. The mounting rig is a separate assembly and is not normally supplied with the landing lamp.

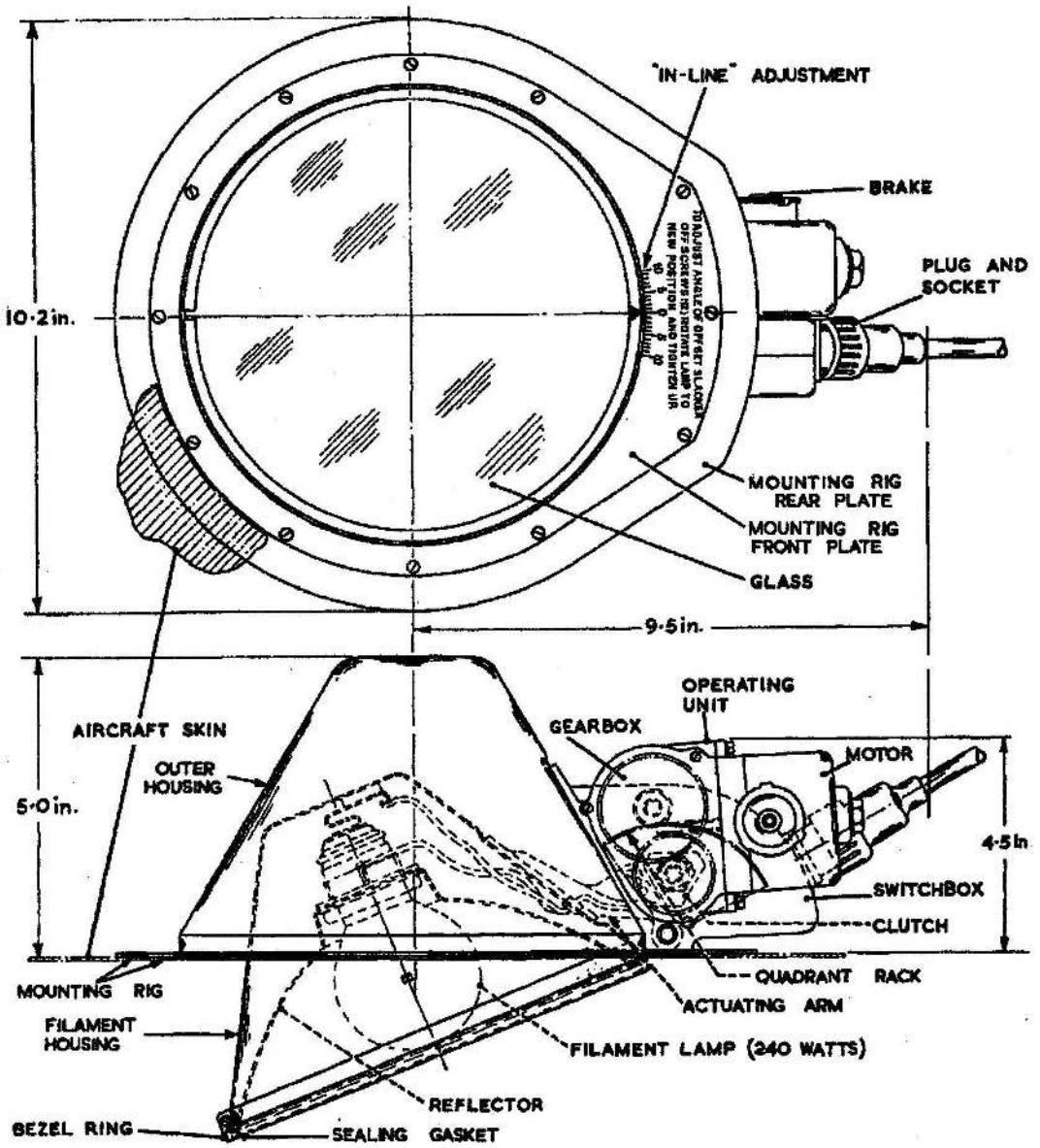


**Fig. 1. Type J landing lamp**

**Beam " in-line " adjustment**

**4.** An index mark on the bezel ring of the front glass (*fig.* 1) registers against the scale on the mounting rig front plate. When the twelve clamping screws are slackened the whole lamp may be rotated in its mounting rig. This permits adjustment of the beam within ± 10 deg. either side of the fore-and-aft line of the aircraft.

**Operating mechanism**

**5.** The operating unit of the Type J landing lamp is more fully described at Chap. 21 of A.P.4343D, Vol. 1, Sect. 16. The driving motor is an alternative field, reversible, series motor. It has a spring-loaded clutch which is set to slip when the air pressure at the centre of the lamp glass reaches 38 lb. (about 175 knots airspeed). Deadbeat action of the motor is obtained by the incorporation of an electro-magnetic brake.

**6.** The motor, driving through reduction gearing, operates a pinion meshing with a quadrant rack. To this quadrant is riveted the actuating arm casting which carries the

retractable filament housing, and through which flexible cables pass from the switchbox to the bulb holder.

**Switchbox**

**7.** The gearing quadrant spindle extends into the switchbox where it carries a moving switch arm. The switch arm contact wipes over a fixed contact forming a series switch in the filament circuit. The moving switch-arm, acting as a cam, mechanically operates limit switches, one at the fully retracted position and two at the extended, "high" and "low" positions. The settings of the limit switches are adjustable.

**Adjusting "high" beam**

**8.** Remove the cover of the switchbox and slacken the screws marked "A" in fig. 2. Slide the insulated base of the "out" limit switches to the new position and re-tighten the securing screws. The index mark against

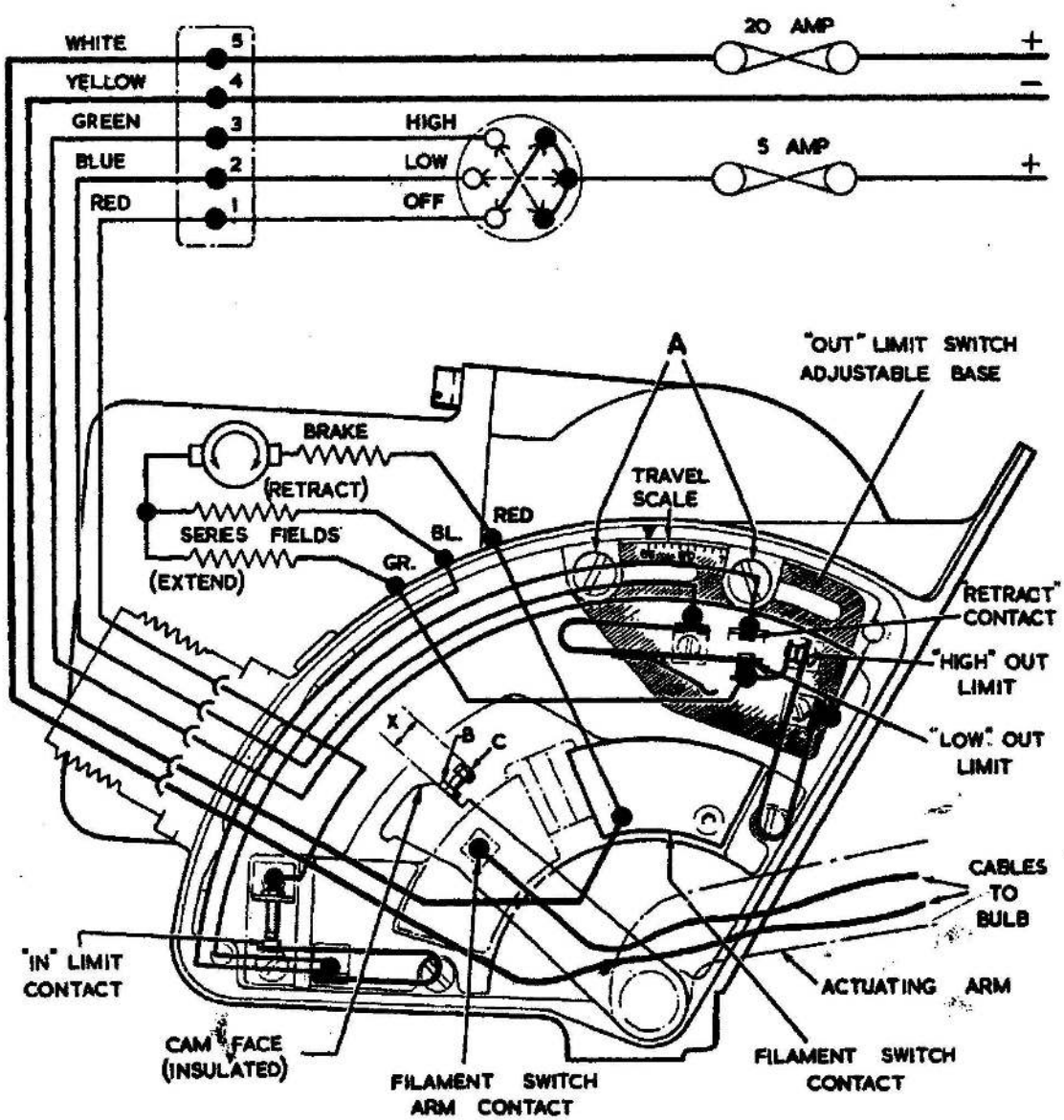


**Fig. 2. Switchbox adjustments and circuit diagram**

the scale on the switch base indicates the TOTAL travel of the filament housing, in degrees, from the retracted position, when the dimension "X" of the striker pin is 0·25 in.

#### Adjusting "low" beam

**9.** The length of striker pin "C," i.e., dimension "X," is initially set at 0·25 in. which corresponds to a difference of 7 deg. between the "high" and "low" positions of the beam. A change of $\frac{1}{32}$ in. of the dimension "X" corresponds to 1 deg. change of beam. Adjustment is made by slackening the locknut "B" of the striker pin "C" and moving the striker as necessary.

**10.** It must be noted that alteration of angular difference between "high" and "low" beam will cause a similar alteration to the total travel of the lamp housing. If the "low" beam position has been altered some adjustment of the "high" setting will be necessary (*para.* 8) if the "high" beam position is to remain unaltered.

**11.** In some modern aircraft the angular movement of the beam between landing and taxying positions is small, possibly less than 5 deg. Since the striker pin adjustment range is from 5 deg. to 9 deg. it may be necessary to remove the striker pin and replace it by a round head screw, 8 B.A., 0·75 in. long, to obtain the smaller angular movement.

#### Filament housing

**12.** The filament housing is a fabricated cone having a flanged rim into which the front glass and the rim of the reflector are fitted. At the apex of the cone is fixed a spring contact which bears on the centre contact of the filament bulb. The front glass, with its sealing ring, is secured by a bezel ring and located by a small bracket. The complete housing is held by six screws and nuts to the actuating arm.

#### Reflector and bulb holder

**13.** The reflector is located in the rim of the filament housing and secured by two screws and nuts. At its centre is the bulb holder which has a clamp fitting forming the electrical connection to the body of the lamp cap. The front of the bulb holder is slotted to correspond with the flange of the filament bulb cap and so assures correct positioning of the bulb.

#### Filament lamp

**14.** The light source in this landing lamp is a single, coiled coil, gas-filled, 240-watt filament bulb. The location of the filament relative to the bulb cap is made within fine limits to ensure correct focusing when bulbs are renewed. The bulb has a medium pre-focus cap, the flange of which ensures that it can be inserted in the holder in the correct position only.

#### Electrical connections (*fig. 2*)

**15.** The control and filament circuits are supplied from the 28V source and connected through a Type M, six-pole, 7 amp. socket (Ref. 5X/766) at the lamp switchbox. The control circuit, fed from a 5 amp. fuse, is taken through a three-position switch. The OFF position is used for housing or retracting the lamp; the LOW and HIGH positions select extended positions for either landing or taxying. The filament circuit has a separate 20 amp. fused supply and is not completed until the lamp housing has travelled to approximately the half extended position.

#### Operation

**16.** Selection of LOW at the control switch completes a circuit through the "low" limit switch, the "extend" field of the motor and the brake. The lamp housing will move until the switch-arm causes the "low" limit switch contact to open and, at the same time, closes a contact in the "retract" field circuit. If further out movement of the lamp is required, i.e., if HIGH is selected, the "extend" field is completed through the "high" limit switch.

**17.** If the LOW position is now selected the "retract" field circuit is completed through the "retract" contacts of the "low" limit switch. The motor will now reverse direction of drive and the lamp housing will retract until the low limit "retract" contacts open. If full retraction is required, i.e., OFF is selected, the motor "retract" field is completed through the "in" limit switch. This switch is mechanically operated by the switch-arm, to open when the lamp housing is fully retracted.

### SERVICING

#### Renewing the filament bulb

**18.** Examine the bulb for signs of blackening or white streaks on the glass. If a new bulb is required, actuate the lamp housing to the fully extended position. Unclamp the front

glass bezel ring by removing the clamping screw which locates through a bracket on the lamp housing. Lift out the front glass and its sealing gasket. Remove the old and fit the new bulb (Ref. 5L/X954717). Clean the reflector and front glass with a clean, soft cloth. If necessary use soapy water to remove dirt. Avoid finger printing the bulb and reflector and do not use any polish for cleaning.

#### Renewing the front glass

**19.** Proceed as for renewing a bulb. Remove all broken glass and fit the new front-glass (Ref. 5CX/1515) with the gasket sealing ring (Ref. 5CX/2901), renewing this gasket if necessary. Replace the bezel ring securing it by the clamp screw to the bracket provided.

#### General

**20.** If the landing lamp is removed from the aircraft, the switchbox cover may be removed and the switches examined for cleanliness. If necessary, clean the limit switch contacts but do not alter the adjustments. The contact over which the moving arm wipes should be cleaned with a cloth moistened with white spirit.

**21.** The operating unit gearing should not normally require lubrication nor the clutch require adjustment, except after stripping at fourth line servicing.

**22.** After servicing in the aircraft, check all screws for security. Actuate the lamp to its alternative positions and see the filament switched on. Do not leave the filament burning for long periods in still air because the heat generated will adversely affect the length of life of the bulb. The general chapter on landing lamps is in A.P.4343, Vol. 1, Sect. 21.