

Chapter 3

UNDERCARRIAGE POSITION INDICATORS

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Introduction

1. Undercarriage indicators are intended to provide visual indication of the position of the undercarriage and the condition of the undercarriage locking mechanism. These indicators are usually fitted with coloured windows and filament lamps, "red," indicating that the undercarriage is unlocked and "green," indicating that the undercarriage is in the locked-down position. When the undercarriage is in the locked-up position the indicating lights are automatically switched off.

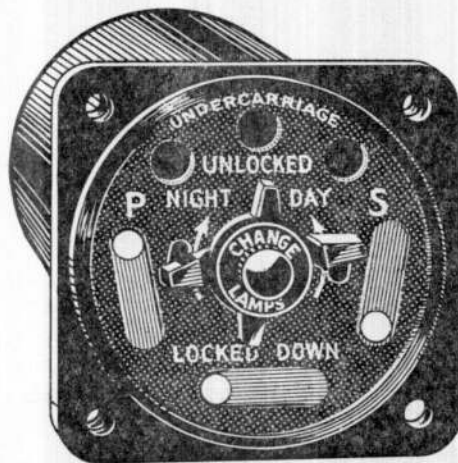


Fig. 1. General view of indicator

DESCRIPTION

2. A typical undercarriage indicator which is shown in fig. 1 is housed in a miniature S.A.E. case and consists of a case assembly and a lamp assembly as shown in fig. 2. The casing assembly has a square flange with holes for panel mounting screws and accommodates nine spring-loaded lamp contacts. The terminals are of the usual shrouded pattern (fig. 3) located in a recess at the rear end of the casing. Protection and sealing of the terminals is afforded by a removable cover which is secured to the rear of the casing.

3. The cover is fitted with a special rubber cable grommet, provided with a number of nipples which are "blind" until the ends are nipped off and the cables fed through. The grommet is flexible, and slight tension has the affect of inverting it, thereby facilitating removal of the cover without removing it from the cable. Some types of indicators are fitted with plug and socket connections instead of terminals.

4. The body of the lamp assembly (fig. 2) is of a moulding insulating material and has accommodation for a number of indicator lamps. These lamps are contained in cylindrical cells, the fronts of which coincide with the light windows in the instrument dial. These apertures are fitted with coloured

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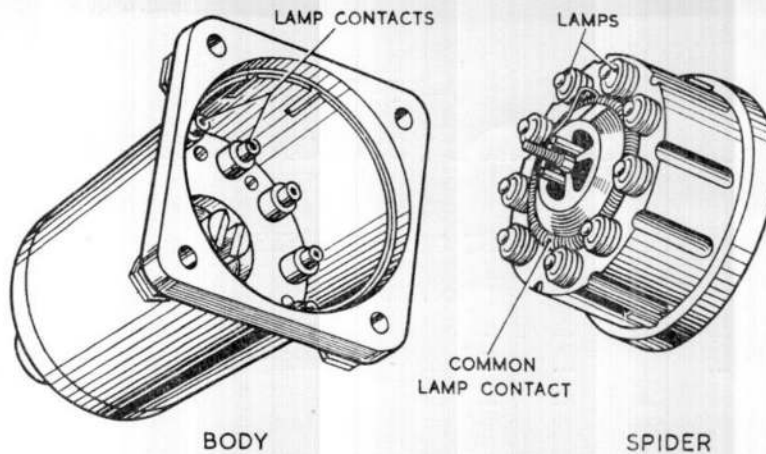


Fig. 2. Internal view of indicator

windows. A conductor in the form of a helix provides a common contact for all lamps and also serves to hold the lamps within the cells; this arrangement allows the lamps to be readily withdrawn for inspection or renewal.

windows for the locked-down position is such that two lamps are accommodated behind each of the slots. One lamp of each pair is spare and is only brought into operation by manipulation of the switch located at the centre of the dial.

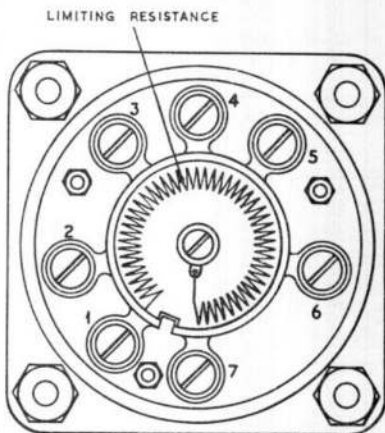


Fig. 3. Terminal end of unit

5. With some undercarriage indicators a limiting resistance is fitted in series with the indicating lamps to prevent overheating, when the indicator is fitted with 3.5 watt lamps. The limiting resistance is replaced by a link when the indicator is fitted with 2.5 watt lamps.

6. Detailed descriptions of individual types are given in A.P.4343E, Vol. 1, Book 4, Sect. 18, Chap. 4.

7. With the older type of indicator the arrangement of the three slots over the

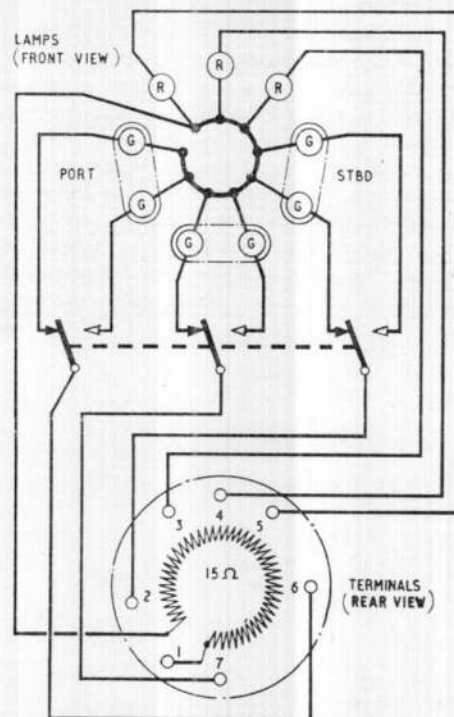


Fig. 4. Circuit diagram; with terminals and resistance

8. The indicator is shown ready for operation by day (fig. 1) but at night the dimming

screen obscuring the remainder of the locked-down windows may be operated to cover them completely by a second switch located at the centre of the dial. The switch which affects the change-over to the spare lamps is the one which has its lugs in the vertical position (*fig. 1*). The second or dimming switch, which is for the day or night screens, has its lugs in the horizontal position. The small knurled knob in the centre of the dial is used to turn the screw by which the lamp assembly is secured to the casing.

9. An improved type of u/c position indicator has been introduced to replace the older unit. The improvements are:—

- (1) Twelve lamps are used.
- (2) An improved presentation using two lamps for the illumination display of each window is provided in a more compact case.
- (3) Only one operating control—the night screen switch.

10. For reliability, each window of the locked (green) and unlocked (red) indication, is illuminated by two lamps connected in parallel; they are visible instantaneously. In event of one of the two lamp filaments failing, the serviceable lamp is sufficient to illuminate the display.

11. The windows are optically shaped to give a wider viewing angle and to bring the images of both lamp filaments close together; this allows filament failure to show up without any serious deterioration in the display.

12. For night use the display can be dimmed by the introduction of a neutral screen between the indicator windows and the filament lamps; this screen is controlled by a winged knob, which projects from the centre of the indicator face. The improved type of u/c position indicator is described in A.P. 4343E, Vol. 1, Book 4, Sect. 18, Chap. 51.

Operation

13. The lamps, indicating that the undercarriage is locked down are brought into operation by microswitches incorporated in the undercarriage mechanism, details of these microswitches are contained in the appropriate Aircraft Handbook.

14. In the event of one of the locked-down lamps failing, some doubt might exist as to whether the relevant undercarriage was functioning. Operation of the lamp change-over switch at the centre of the dial will bring the spare lamps into operation and check the condition.

15. With the improved type of indicator the operation of the filament lamps through limit switches is the same, except that each window is illuminated by parallel-connected lamps. Simultaneously, the optical design of the windows making the images of both lamp filaments appear close together.

INSTALLATION

16. The indicator mounting flange is fitted with four tapped bushes for securing to the pilot's instrument panel and will normally be mounted on the rear side of the panel with the dial bezel fitting snugly in an aperture in the panel. It may be necessary to mount the indicator from the front of the panel; this is achieved by gently pressing out the tapped bushes in the flange, thereby providing clearance holes for the securing screws.

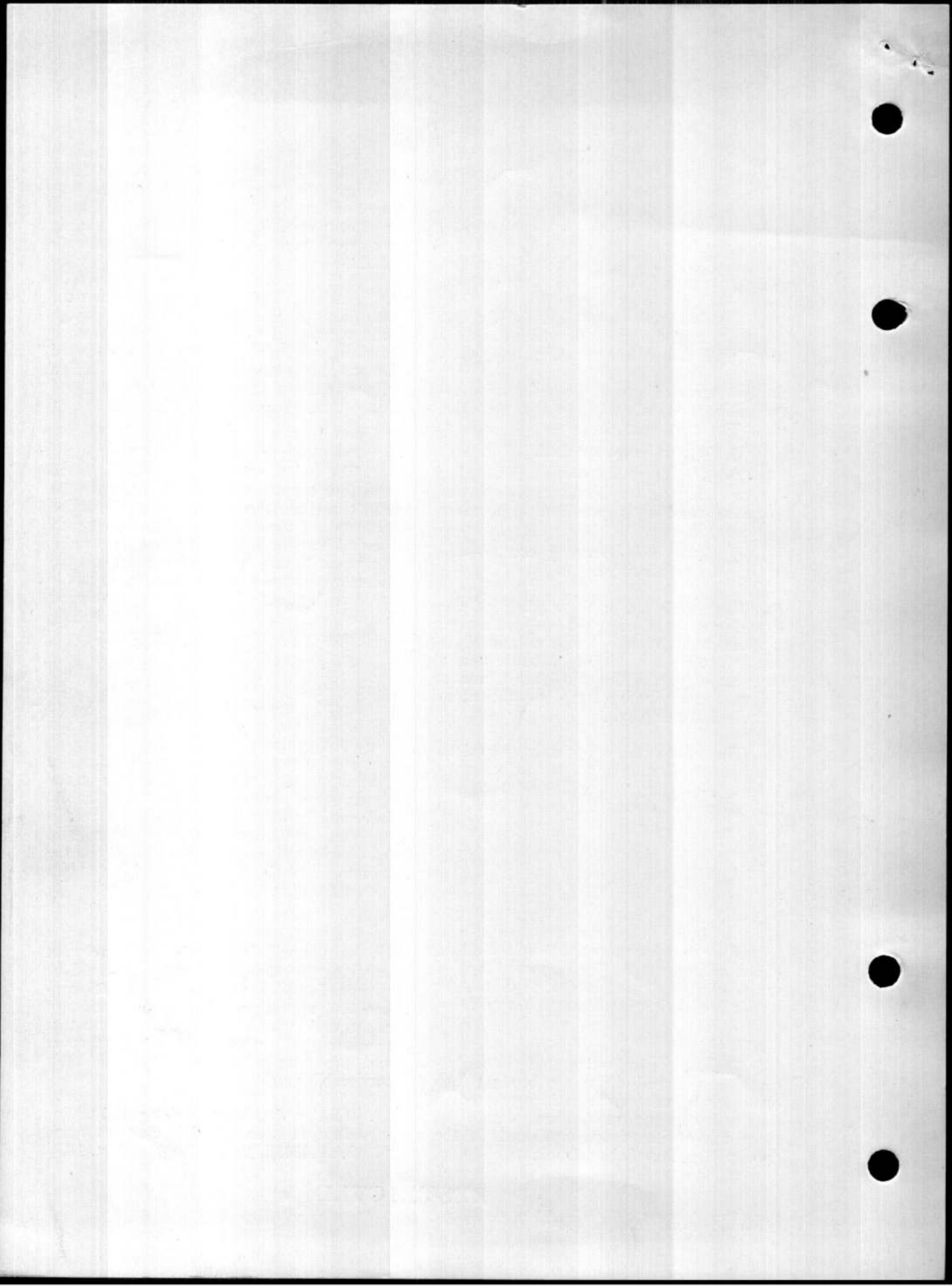
17. With indicators fitted with terminal connections, to connect the cables to the terminals, remove the terminal cover from the rear of the casing. After removing the appropriate number of tips from the cable grommet, pass the previously prepared cables through the grommet. Slight pressure on the grommet will invert it and permit the cables to be connected to the terminals. When this has been done, the cover may be secured, and by a slight pull on the cable, will reverse the grommet, thereby taking up the slack leads within the terminal recess.

SERVICING

18. At the periods prescribed in the relevant Servicing Schedule, the indicator should be examined for security of electrical connections, mounting fixings, deterioration of cables and signs of corrosion. Ensure that the waterproof seals under the terminal cover and the plug protection cover are in a serviceable condition.

19. Further details of servicing and testing of indicators is contained in chapters 4 and 51 of A.P.4343E, Vol. 1, Book 4, Sect. 18.

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