GROUP F — MISCELLANEOUS CIRCUITS

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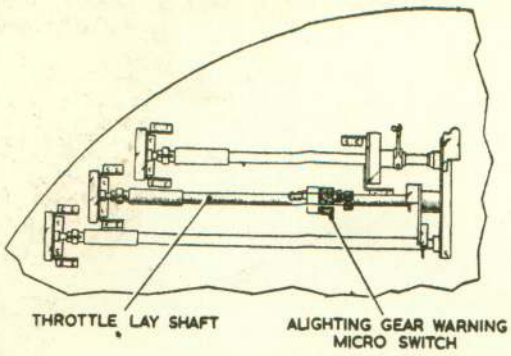
LIST OF ILLUSTRATIONS

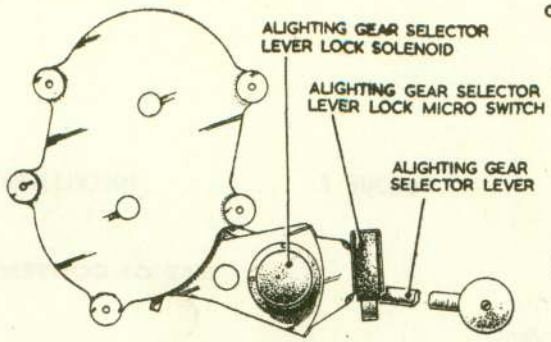
Introduction

1. This group deals with circuits which cannot be arranged conveniently elsewhere. The components used are described in the specialist Air Publications listed below:—

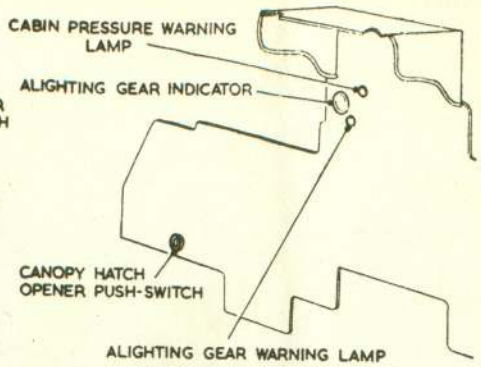
Equipment	Air Publication
Pressure regulating valve, Mk.11	1275A, Vol.1, Sect.20, Chap.4
Micro switch, Type 1, 1A and 2A	4343C, Vol. 1, Sect. 1, Chap. 4
Solenoid, Type MS 7609 (A/G lever lock)	4343C, Vol. 1, Sect. 3 at a later date
Electro-pneumatic valve, Type FKF/A/5	4343E, Vol. 1, Sect. 1 at a later date
Push-switch, Type B, No. 3	4343C, Vol. 1, Sect. 1, Chap. 3 at a later date



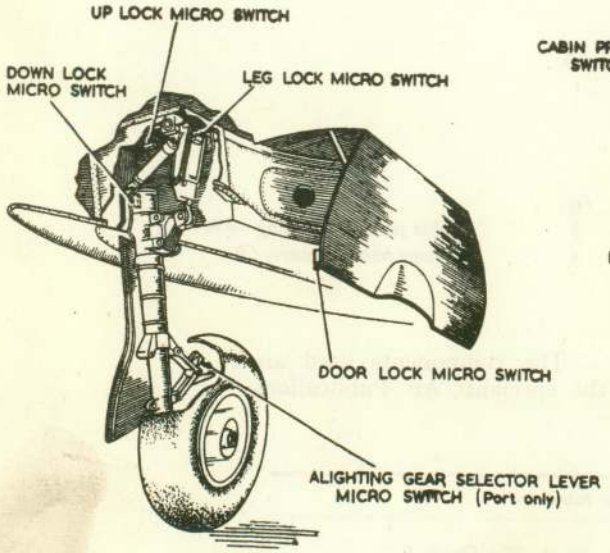
VIEW ON AFT FACE BULKHEAD 4



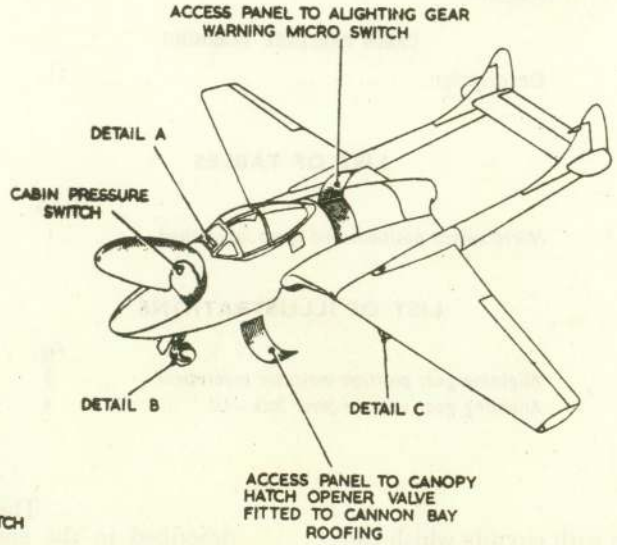
OUTBOARD VIEW ON PUPIL PILOT'S THROTTLE QUADRANT

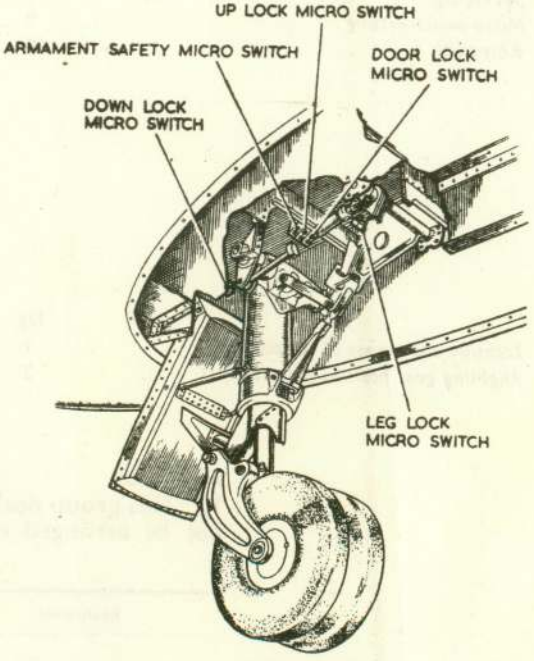


DETAIL A
INSTRUMENT PANEL



DETAIL C
PORT UNDERCARRIAGE (STBD SIMILAR)





DETAIL B
NOSE UNDERCARRIAGE

Fig. 1. Location and access of components

ALIGHTING GEAR POSITION INDICATOR

Description

2. An indicator, described in Chap. 2, App. 1, Group B of this Section and fitted to the instrument panel, indicates, by the use of coloured lamps, the attitude of the aircraft's alighting gear. When the alighting gear is down and locked, the green lamp circuit is completed through the leg lock and down lock micro switches, as shown in fig. 3.

3. Immediately the mechanical leg lock is broken, the contacts of the leg lock and down lock switches change over (A to B), the green lamp circuit is disconnected, and the red lamp circuit is completed through the leg lock and door lock switches.

4. When the alighting gear is locked up, the leg lock micro switch returns to its original position (A to C), the door lock switch changes (A to C) to disconnect the red lamp circuit and the up lock switch closes (A to C) connecting a supply to the throttle warning lamp circuit via the leg lock, down lock and up lock switches.

5. This circuit is completed when the alighting gear is locked up and the throttle setting is reduced to approximately one quarter open, this setting actuating a micro switch fitted to the rear face of bulkhead 4, thus lighting a warning lamp fitted to the instrument panel.

Servicing

6. The equipment in this circuit is described in the specialist Air Publications listed in para. 1.

7. All the micro switches in the wheel wells should be kept clean and free from moisture, particular attention being given to weather-proofing (General Information, para. 23) and to the tightness of the lamps in the indicator.

8. During alighting gear retraction tests, the sequence of the lamps should be checked; check also the serviceability of the spare lamps and the operation of the throttle warning lamp. The spare lamps (green only) may be switched into circuit by pulling out the centre button of the indicator.

Micro switch setting

Note . . .

Any adjustment of micro switches in the alighting gear indicator circuit must be followed by an alighting gear retraction test.

9. The settings of the various micro switches for the alighting gear are important, and should be carried out in conjunction with an airframe tradesman (Sect. 3, Chap. 5). They are as follows:—

Note . . .

The aircraft should be on jacks, with all wheels clear of the ground.

(1) *Main undercarriage (port and starboard)*

(a) Leg lock micro switch
With the leg locked down, the micro switch must operate when the radius rod roller is moved 0·75 in. from its locked position. The adjustment is achieved by altering the setting of the striker bolt and locking it in its set position by its locking nuts. The GREEN lamp in the position indicator should light when the switch is depressed.

(b) Down lock micro switch
With the leg locked down, the micro switch plunger must be depressed between 0·05 in. and 0·08 in. This adjustment is achieved by positioning the switch on its bracket, mounting slots being provided for this purpose. The GREEN lamp in the indicator should light with the switch plunger depressed.

(c) Up lock micro switch
With the leg locked up, the micro switch plunger should be depressed just sufficiently to operate the alighting gear warning lamp. For this circuit to be completed the throttle must be closed Screw out the striker, fitted to the micro switch hinged bracket, three complete turns and lock. The warning lamp should remain alight while the switch plunger is depressed. The micro switch and striker are accessible via a detachable panel in the wing top skinning.

(d) Door lock micro switch
Both the wheel and leg fairing must be removed and the leg locked up. Adjust the micro switch so that the switch plunger is depressed 0·22 in. by the door lock bolt. The switch mounting bracket has slots for this purpose. With this switch depressed, all lamps in the position indicator should be extinguished.

(2) *Nose undercarriage*

(a) Leg lock micro switch
With the leg locked down, the micro switch must operate when the radius rod roller is moved 0·75 in. from its locked position. The adjustment is achieved by altering the setting of the striker bolt and locking it in its set position. The green lamp should light when the switch is depressed.

(b) Down lock micro switch
With the leg locked down, check that the switch is depressed. The switch mounting bracket has one slot for adjustment purposes. The green lamp in the position indicator should light.

(c) Up lock and door lock micro switches
Of the three micro switches fitted to the lower forward face of bulkhead 1, the central and starboard switches are the up lock and door lock, respectively. These switches must be depressed when the leg is locked up; the switches are mounted beneath a cover plate in the nose com-

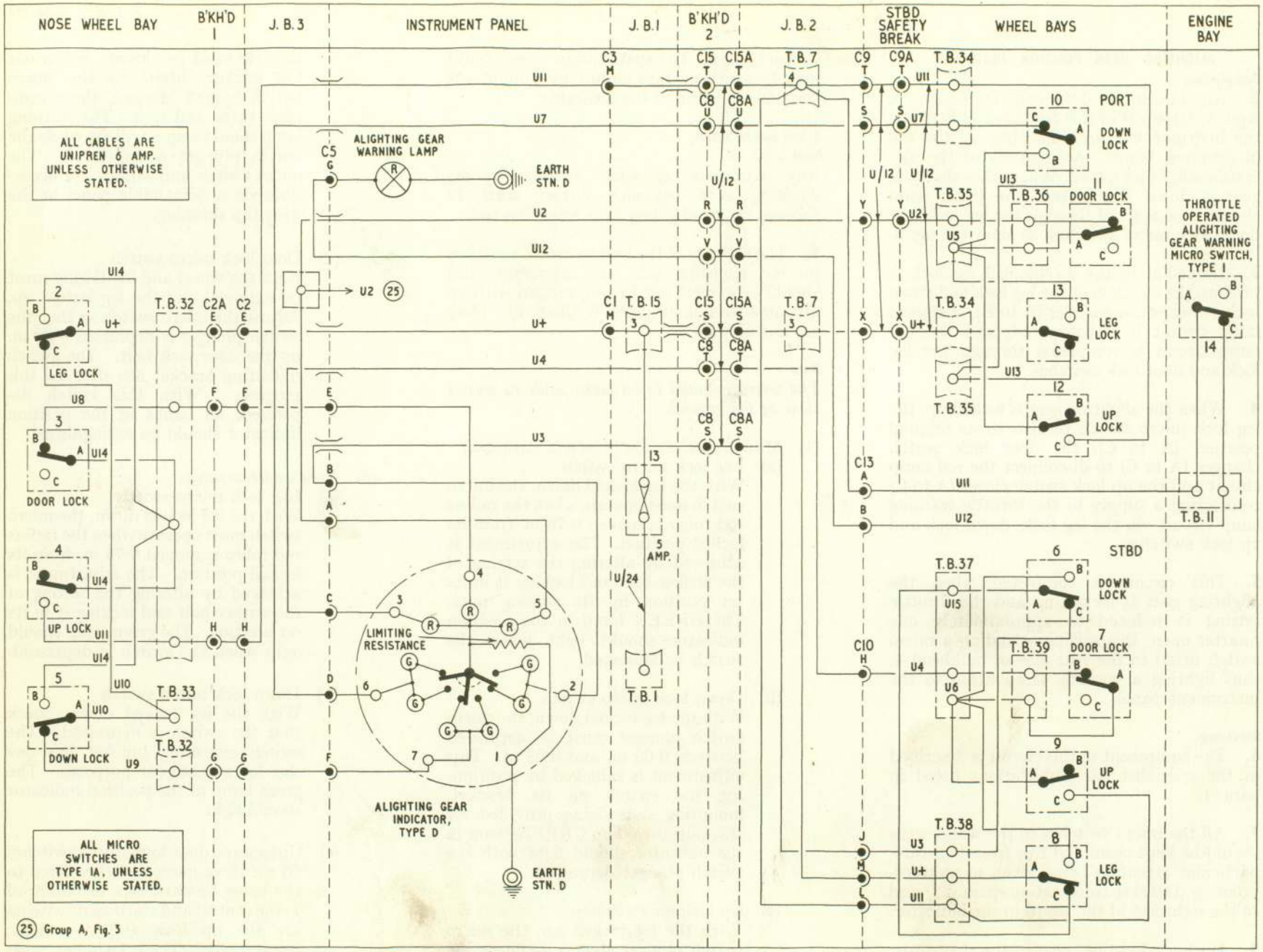


Fig. 2. Alighting gear position indicator–U

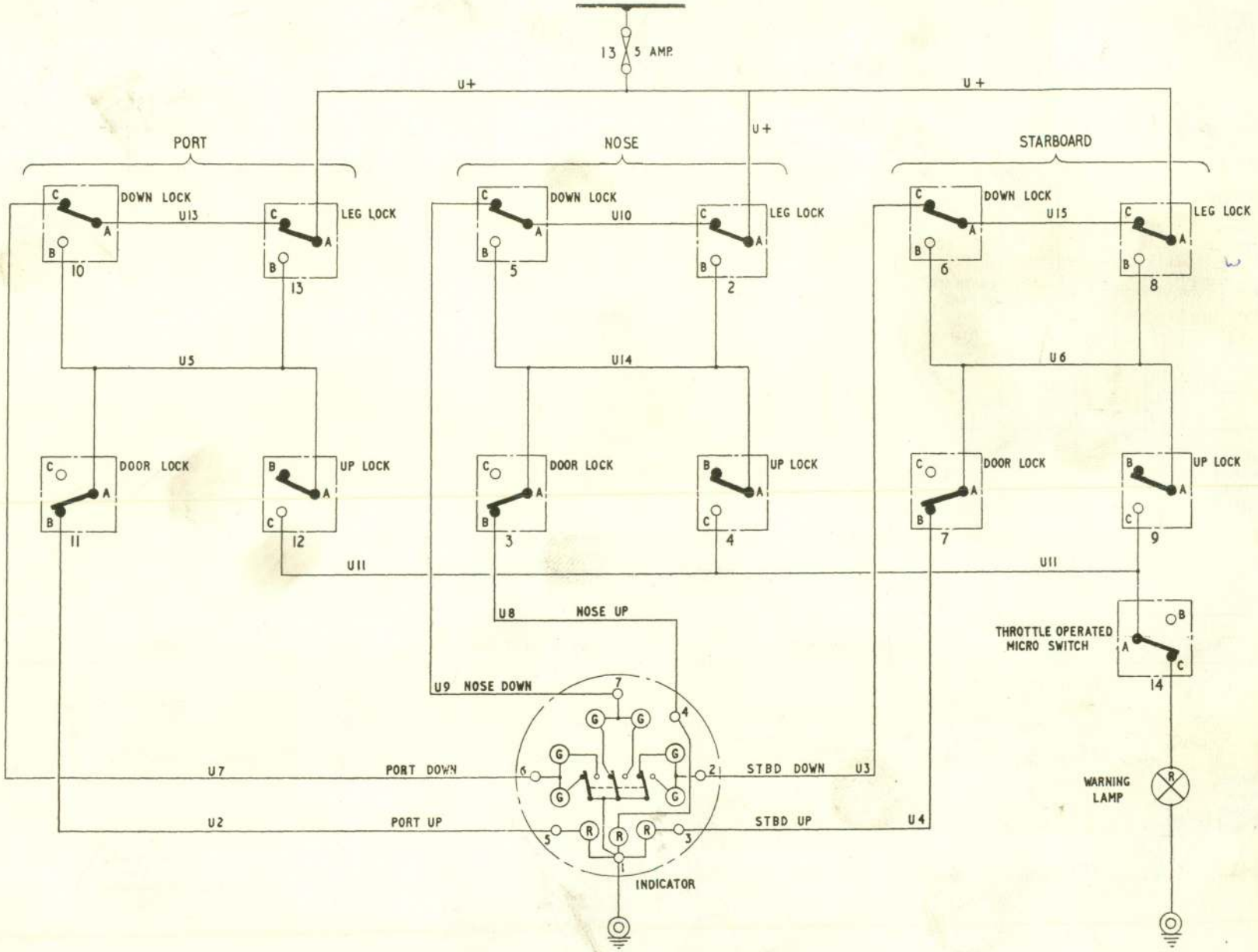


Fig. 3. Alighting gear position indicator theoretical

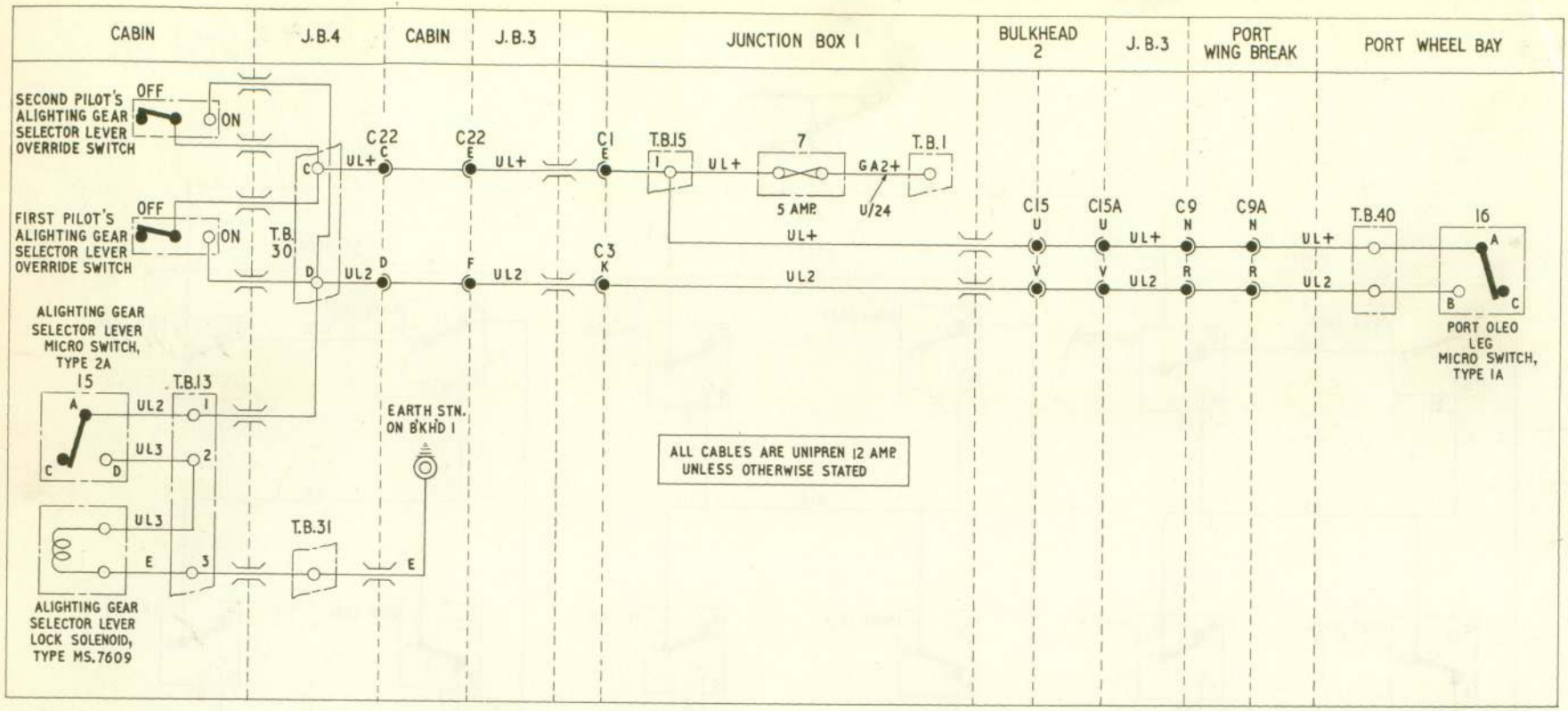


Fig. 4. Alighting gear selector lever lock—UL

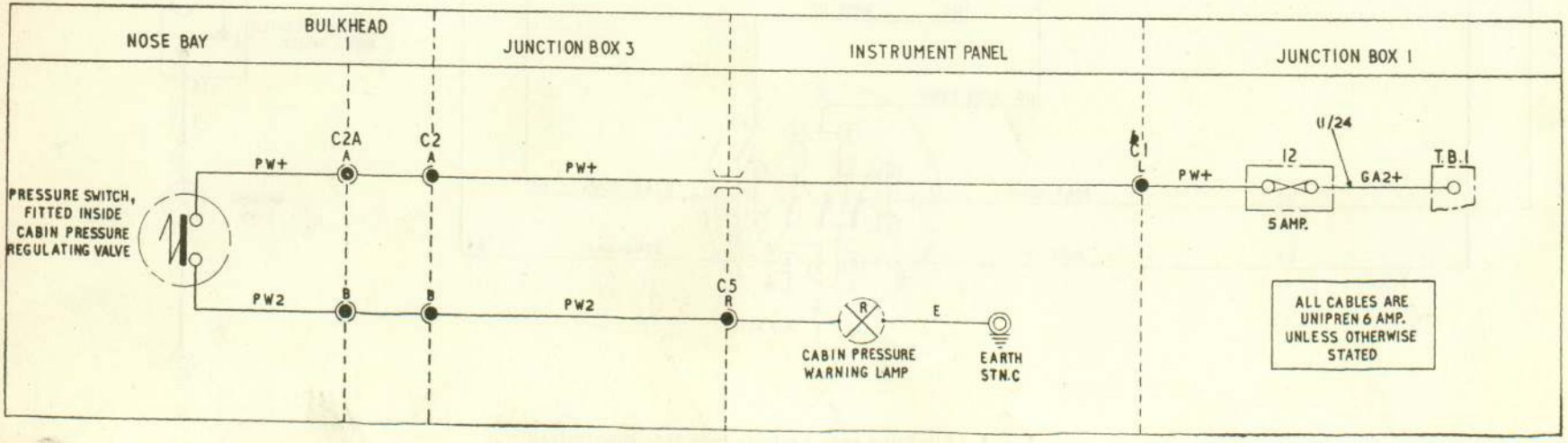


Fig. 5. Cabin pressure warning—PW

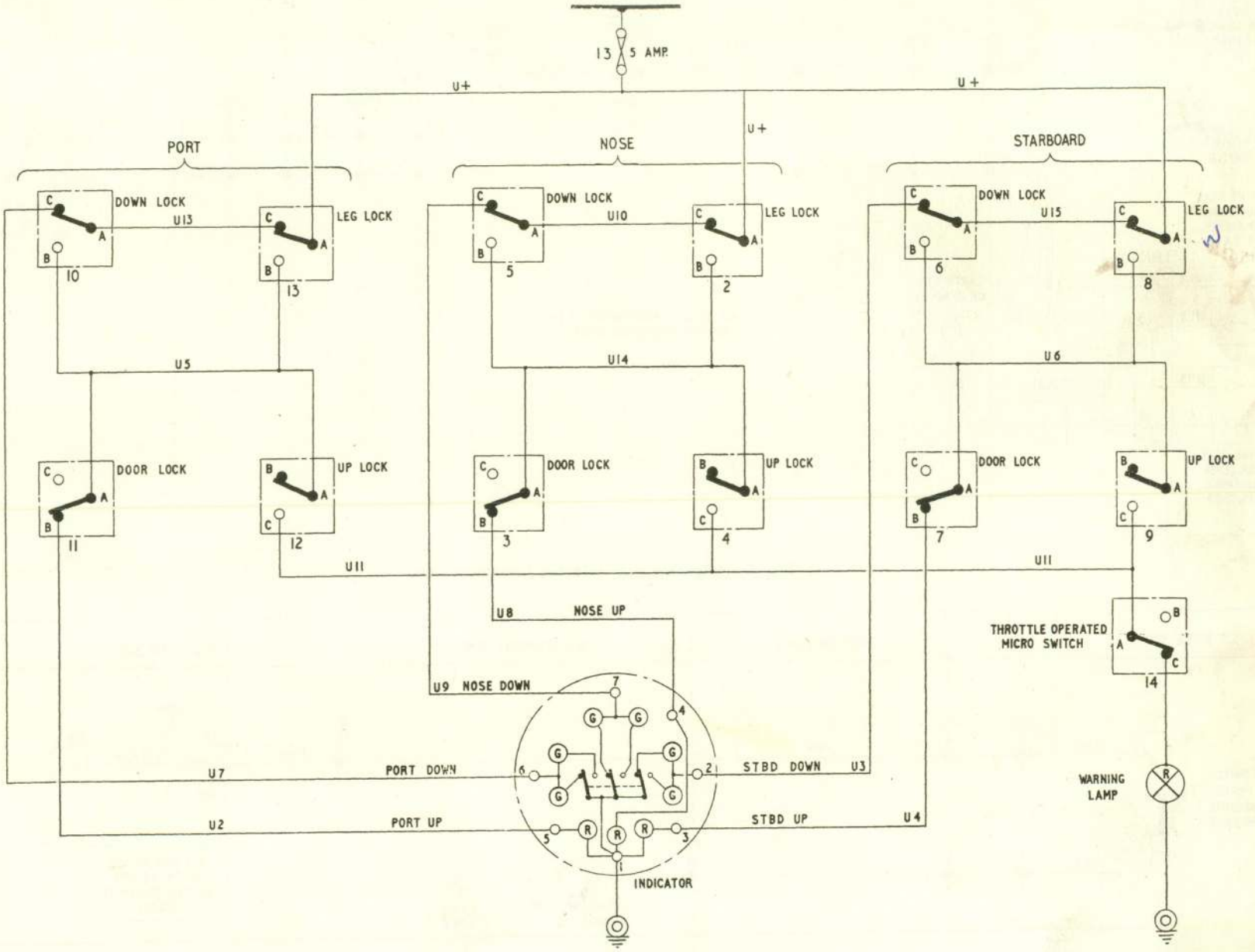


Fig. 3. Alighting gear position indicator theoretical

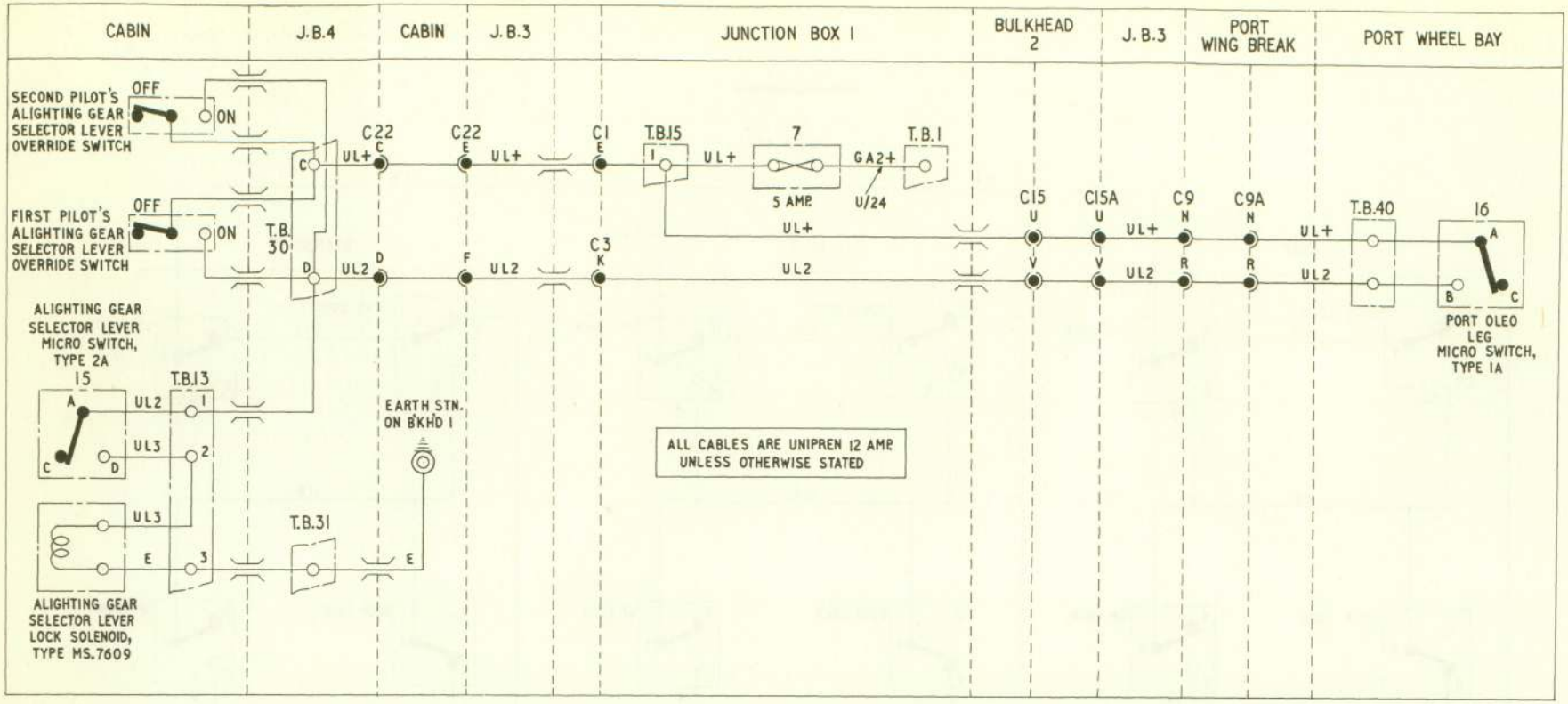


Fig. 4. Alighting gear selector lever lock—UL

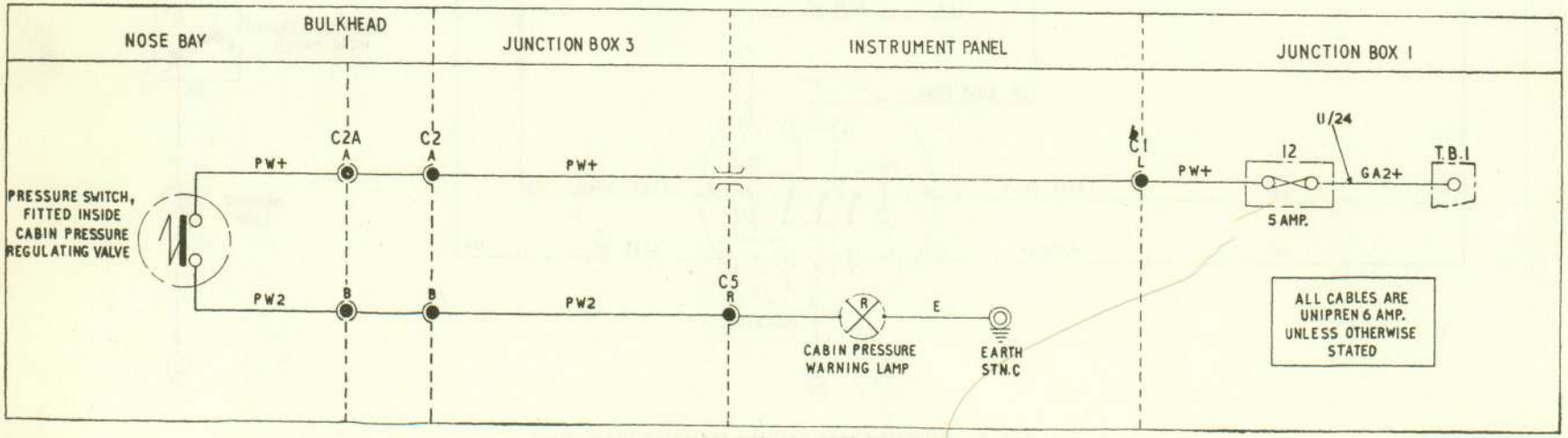


Fig. 5. Cabin pressure warning—PW

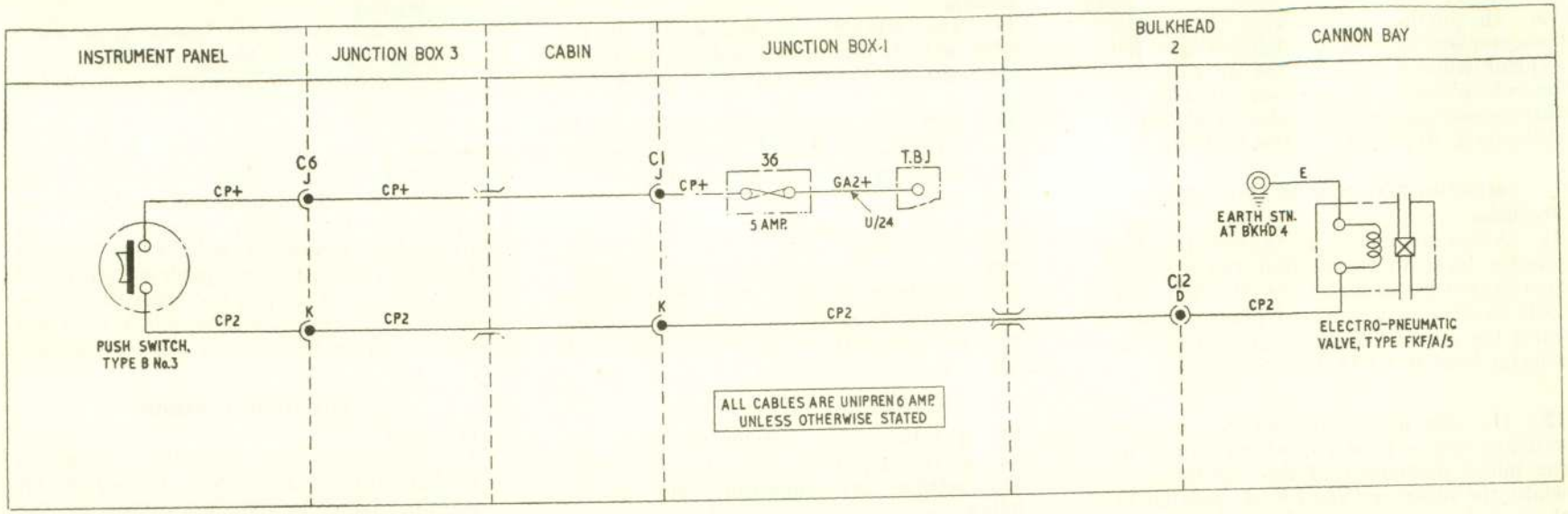


Fig. 6. Canopy hatch opener—CP

partment. As the switches are fitted to a common bracket, their adjustment is simultaneous. Loosen the adjusting screw lock-nut, and then the screw, till the red lamp is alight and the alighting gear warning lamp extinguished (the throttle must be closed). Screw in the adjusting screw until the red lamp extinguishes and the warning lamp lights. Lock the adjusting screw, using its lock-nut.

(3) *Alighting gear warning micro switch*
The alighting gear must be locked up. Move the throttle lever to a quarter open. At the aft face of bulkhead 4, port side, check that the inboard of the two micro switches is just depressed. Adjustment is afforded by loosening the cam fitted to the throttle control shaft. The warning lamp should light while the switch is depressed, that is, between throttle closed and throttle a quarter open.

TABLE I

Micro switch positions and lamp indications

Alighting gear position	Micro switch position	Circuit effected
Up and locked	Door-lock (A to C) Down-lock (A to B) Up-lock (A to C) Leg-lock (A to C)	Red and green lamps out. Throttle warning supply connected.
Intermediate	Door-lock (A to B) Down-lock (A to B) Up-lock (A to B) Leg-lock (A to B)	Red lamps on, green lamps out. Throttle warning supply broken.
Down and locked	Door-lock (A to B) Down-lock (A to C) Up-lock (A to B) Leg-lock (A to C)	Red lamps out, green lamps on. Throttle warning supply broken.

Removal

10. The method of removing the position indicator and all micro switches will be self-evident when viewed on the aircraft. To provide access to the position indicator, the instrument panel will first have to be lowered (Chapter 2, Appendix 1 of this Section).

ALIGHTING GEAR SELECTOR LEVER LOCK

Description

11. A lock is embodied for the alighting gear selector lever to ensure that the alighting gear cannot be inadvertently retracted. The lock consists of a solenoid plunger which, when the solenoid is de-energised, locks the selector lever in its DOWN position.

12. The solenoid is controlled by two micro switches, one, a Type 2A, being operated by the initial movement of the selector lever whilst the other, a Type 1A, is operated by the port oleo leg only when the leg is extended.

13. As the weight of the aircraft is removed from the alighting gear, the main undercarriage oleo legs extend, and the port leg torque link depresses the micro switch plunger, connecting contacts A–B of the switch.

14. The initial movement of the selector lever operates the selector lever micro switch, thus completing the circuit to energise the solenoid and withdrawing the lock. The selector lever can then be moved to its fully UP position.

15. When up, the selector lever allows its micro switch contacts to open, thereby de-energising the solenoid as a precaution against it burning out.

16. Two single pole toggle switches, retained in their OFF position by spring loaded guards, are fitted, one for each pilot, at the bottom of the instrument panel for emergency use. With either of these switches ON the selector lever may be moved to the UP position with the weight of the aircraft still on the alighting gear

Servicing

17. The servicing of equipment in the selector lever lock circuit is described in the specialist Air Publications listed in para. 1.

18. Particular attention should be paid to the serviceability and weatherproofing (General Information, para. 23) of the micro switches.

Micro switch setting

Note . . .

Any adjustment of one or more micro switches in the alighting gear selector lever lock circuit must be followed by an alighting gear retraction test.

19. The two micro switches should be set during the alighting gear retraction test. The settings are important and are as follows:—

Note . . .

The aircraft should be on jacks, with all wheels clear of the ground.

(1) Selector lever micro switch
This switch is fitted to a bracket at the aft face of the pupil pilot's throttle quadrant. The switch should be adjusted by movement of the spring, such that the switch plunger is depressed before the alighting gear selector meets the lock. The switch must return to its inoperative state BEFORE the selector lever reaches its fully up position. The circuit should then be tested both for up selection and down selection of the selector lever.

(2) Port oleo leg micro switch
With the leg locked down and fully extended, adjust the striker pin to compress the switch plunger 0·125 in. after the switch has closed. This condition can be checked by listening for the lock solenoid to operate with the selector lever micro switch manually depressed.

Warning . . .

Do not operate the selector lever micro switch for the above test by moving the selector lever, or the alighting gear will be retracted.

Removal

20. Both micro switches are removed quite easily, the method being self-evident when viewed on the aircraft. The selector lever lock solenoid, however, is built into the port throttle quadrant. This quadrant must first be removed, in conjunction with the engine tradesman, before the three 2 B.A. nuts and bolts securing the solenoid can be removed.

CABIN PRESSURE WARNING

Description

21. The cabin of the aircraft is pressurised for high altitude flying (*Sect.* 3, *Chap.* 8). A warning lamp is therefore fitted to the instrument panel to indicate to the pilot a cabin pressure drop of more than 0·5 lb. per sq. in. below the normal for any altitude.

22. The lamp is controlled by a switch built integrally into the pressure-regulating valve which is fitted to the forward face of bulkhead 1.

Servicing

23. The switch, being an integral part of the pressure-regulating valve, is described in the specialist Air Publication listed in para. 1.

24. The warning lamp circuit should be periodically tested by removing the cap-nut adjacent to the terminal block fitted to the valve, taking care not to loosen the lock-nut, and inserting a $\frac{3}{32}$ in. diameter insulated rod into the hole in the adjusting screw.

25. Pressure on the rod should now close the switch, and the lamp should light. Remove the rod and replace the union cap-nut securely.

Removal

26. As the switch is an integral part of the pressure-regulating valve, the valve unit will

have to be renewed if the switch becomes unserviceable. Removal of the valve is the airframe tradesman's responsibility.

CANOPY HATCH OPENER

Description

27. The hatch in the cabin canopy is opened pneumatically by depressing an electrical push-switch on the instrument panel; the push-switch actuates an electro-pneumatic valve fitted in the cannon bay.

Servicing

28. The components in this circuit are described in the specialist Air Publications listed in para. 1.

29. The circuit may be functionally tested by closing the hatch from inside the cabin. To effect this, support the weight of the hatch, pull the handle at the top hatch lifting strut to disengage the locking plunger and lock the hatch by using the internal locking handle (Sect. 3, Chap. 1).

30. To open the hatch, it must first be unlocked mechanically by operation of the internal locking handle. The hatch will lift a few inches. Now depress the push-switch to actuate the electro-pneumatic valve which allows air, under pressure, to enter the piston chamber to extend the hatch lifting strut. The push-switch must be kept depressed until the hatch is locked open.

Removal

31. The method of removing the push-switch and valve will be obvious when the equipment is viewed on the aircraft. The valve must only be removed with the assistance of an airframe tradesman, ensuring that the pneumatic system of the aircraft is first exhausted.