Group 2 EXTERIOR LIGHTING

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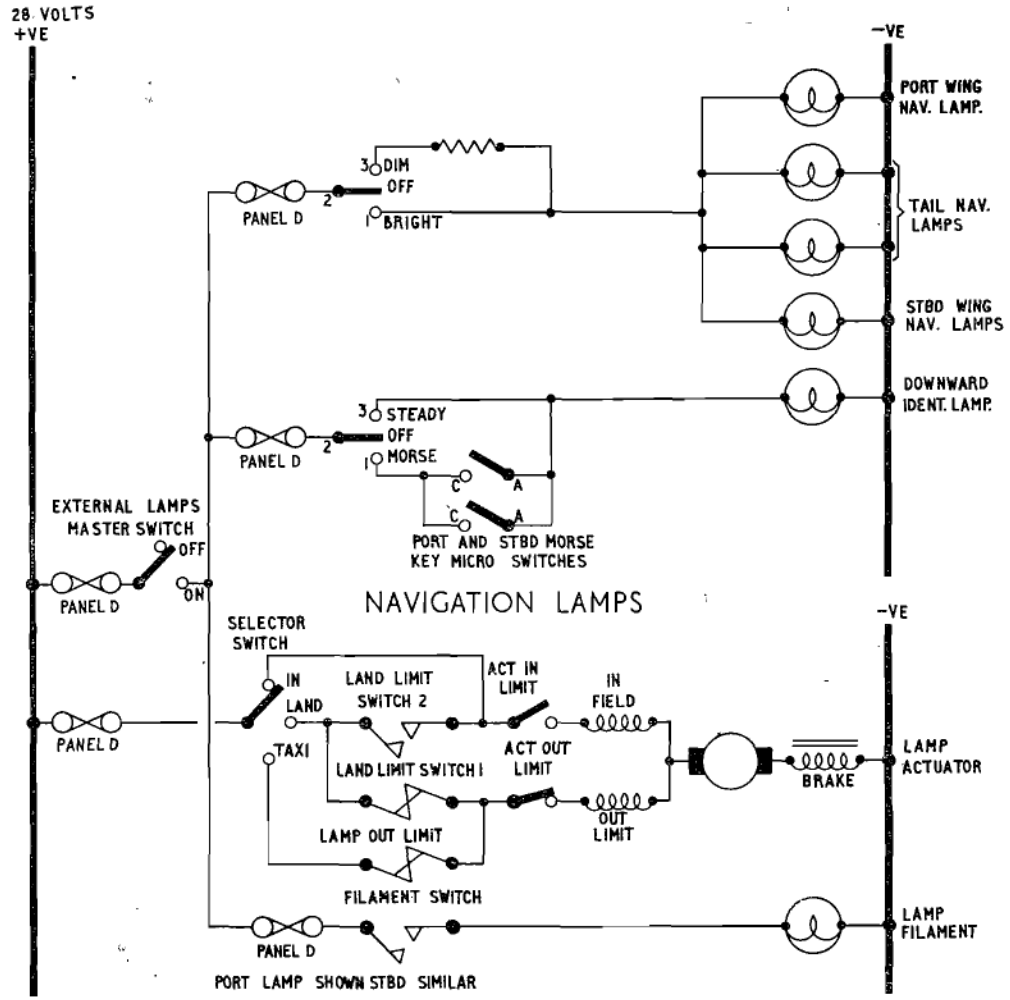
Warning . . .

Voltages in excess of 100 *volts a.c. or d.c. can be dangerous under certain circumstances. Personnel should, therefore, ensure that the electrical system is electrically safe before any servicing is attempted. Where it is essential that tests or adjustments are to be made with the electrical power switched on, the greatest care must be exercised.*



LANDING AND TAXI LAMP CONTROL

Fig. 1 External lamps (pre-Mod. 392 and 2232)

DESCRIPTION AND OPERATION

Introduction

1. Information on the lay-out and interpretation of the schematic wiring diagrams can be obtained from the General Information Group contained immediately after Section 5 marker card. Also to be found in the General Information Group are all the general modifications applicable to all aircraft.

General note

2. The supplies for the landing, taxi, navigation and identification lamp filaments, are obtained from fuses on the starboard fuse panel D. The supply at 28 volts to these fuses is controlled by the exterior lights master switch on the starboard coaming panel. The supply to the landing and taxi lamp actuators, however, also taken from fuse panel D, is NOT controlled by this switch and the lamps can be extended or retracted irrespective of the position of this switch.

Navigation and identification lamps (*fig.* 1) (*pre-Mod.* 2232)

Note . . .

For B|K Mk. 1 *and B|K|PR Mk.* 1 *aircraft the circuit differs; reference should be made to Chap.* 9, *Group* 3.

3. Four navigation lamps are installed, comprising two tail lamps, Type A, with 10-w filaments, one on each side of the rear fuselage, and one navigation lamp, Type A, with 20-w filaments, in each wing tip. They are connected in parallel and supplied from a single fuse on the starboard fuse panel D via a switch on the starboard coaming panel. The switch has three positions, BRIGHT, DIM and OFF; the BRIGHT position allows the lamps to operate on full voltage and the DIM position reduces the operating voltage by inserting a resistance, mounted in the starboard console, in series between the lamps and the supply.

4. One amber downward identification lamp, fitted with a 80-w filament, is installed to the port side of the bomb aimer's fairing, and is supplied from a fuse on the starboard fuse panel D via a three-position switch labelled MORSE, STEADY, OFF, on the starboard coaming panel. In the STEADY position the supply is taken directly to the lamp whereas, in the MORSE position, the supply is switched through two micro switches, labelled MORSE KEY, one on each console and connected in parallel. These enable the pilot or co-pilot to send visual signals by flashing the identification lamp.

Navigation lamps (post Mod. 2232) (*fig.* 2)

5. Four navigation lamps are installed, comprising two Type A tail lamps, fitted with 10-w filaments, one on each side of the fuselage,

and one Type A navigation lamp, fitted with a 24-w filament in each wing tip. They are connected in parallel and supplied from a single fuse on the starboard fuse panel D. Incorporated in the circuit is a flasher unit, mounted beneath the centre radio crate, comprising a motor driven cam switch which operates to flash the lamps alternately on and off. Connected in series with the motor armature is a governor which regulates the speed of the motor. Also in the flasher unit is a centrifugal switch connected in series with the lamps. On selection of the external lamps master switch to ON a supply is connected, via a fuse in panel D, to the governor and then through the motor to earth. The motor rotates and operates the cam switch. The lamps are controlled by a switch on the starboard coaming panel having three positions, BRIGHT, DIM and OFF. When BRIGHT is selected, a supply is connected, via a fuse in panel D, to the centrifugal switch in the flasher unit. Whilst the motor rotates the centrifugal switch flash contact is made and the supply is connected to the lamps via the cam switch. The lamps can be dimmed by selecting the switch to DIM thereby inserting a resistance in series with the lamps. Should the flasher motor supply fail the centrifugal switch operates breaking the flash contact and making the steady contact (A–A). Under this condition the lamps will be steady.

Note . . .

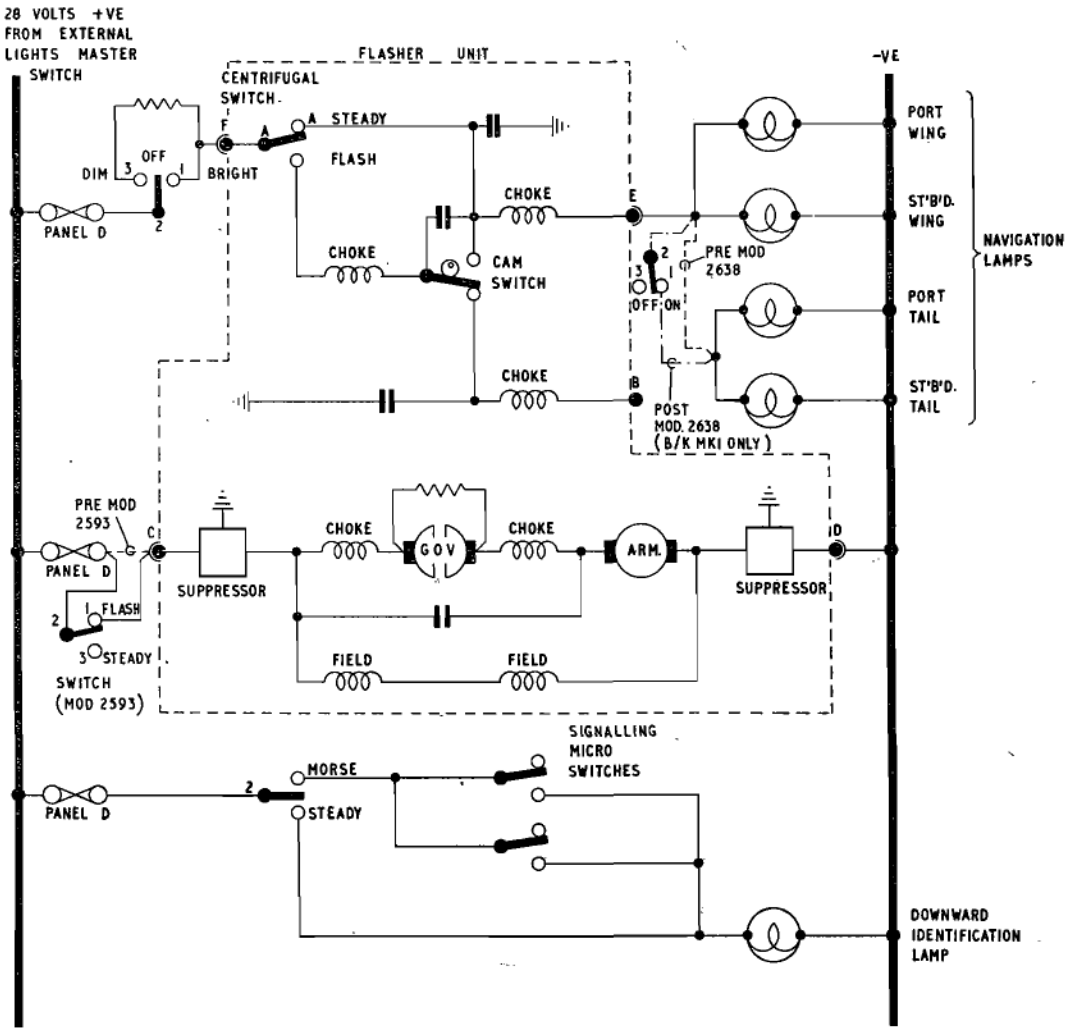
The resistance reading of the unit to earth must not exceed 0·025 *ohms.*

Navigation lamps (post Mod. 2593)

5A. A switch has been added in the supply circuit to the flasher unit motor and is mounted on the starboard coaming panel. This switch enables the lamps to be selected STEADY or FLASH as required. When STEADY is selected, the supply to the motor is broken and the centrifugal switch will make its 'steady' contact A–A.

◀ Navigation lamps (post Mod. 2871) (*fig* 2*A*)

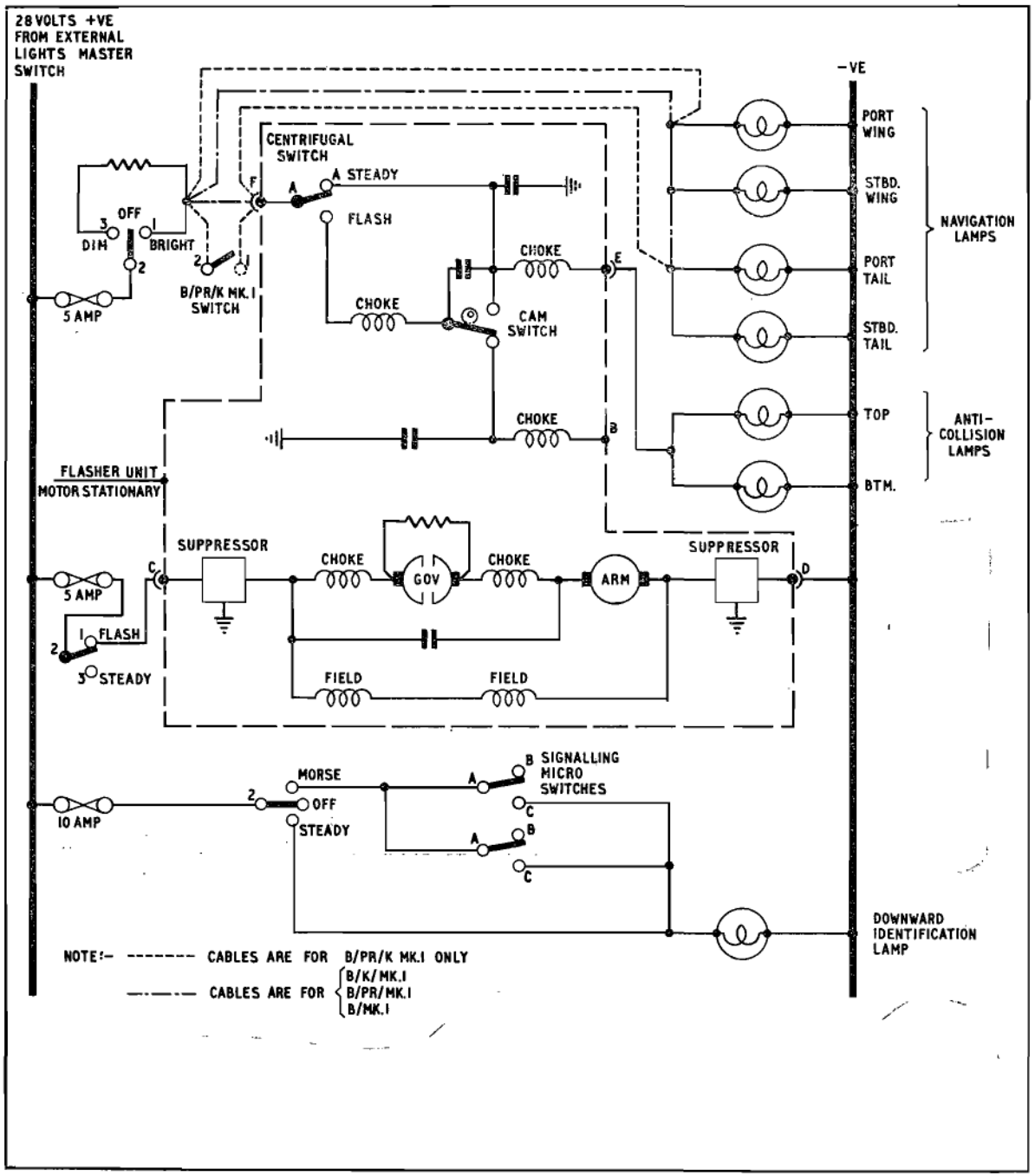
5B. Mod. 2871 introduces anti-collision lamps mounted on the upper and lower fuselage surfaces at stations 843 and 1019, and removes the flashing facility from the conventional navigation lamps. The flasher unit, together with the FLASH/STEADY switch (Mod. 2593), is retained and circuit wiring re-arranged to provide this facility for the anti-collision lamps. The TAIL LAMPS switch introduced for B/PR/K Mk. 1 aircraft by Mod. 2638, is re-wired to additionally control the anti-collision lamps. ▶



◀ Fig. 2 Navigation and identification lamps (post Mod. 2232 and pre-Mod. 2871) ▶

Landing and taxi lamps (pre-Mod. 392) (*fig.* 1)

6. A combined landing and taxi lamp is fitted to each outer wing. The lamp is fitted with a single filament of 500 watts, 26 volts,



◀ **Fig. 2A Navigation and identification lamps (post Mod. 2232 and 2871)** ▶

for both landing and taxi duties. The lamp and its housing are extended and retracted by a built-in electric actuator, having built-in in and out limit switches. Out limit, landing limit and filament switches are built into the lamp housing. The lamps are controlled by a 3-position rotary toggle switch, labelled IN, LAND and TAXI.

7. Assuming the lamp to be retracted, and with the switch placed to the LAND position, a supply from fuse panel D is connected through the landing limit switch 1, to the actuator out limit switch which is closed, and out field. The actuator brake is released and the actuator will start to extend the lamp. The actuator in limit switch closes as the actuator starts. As soon as the lamp leaves its housing the filament switch is closed, connecting a separate supply, from panel D, to the filament. The lamp will continue to be extended until it reaches a pre-determined angle when it operates the landing limit switch 1.

8. The landing limit switch 1, thus opened, disconnects the supply to, and stops the actuator and hence the lamp. Beyond this position the lamp is considered to be a taxi lamp, and therefore the TAXI position has to be selected, when the supply will be connected again to the actuator out field, but now via the lamp out limit switch and the actuator out limit switch. The lamp will now be further extended to its fully down or taxi position. As the lamp leaves the land position it closes the landing limit switch 2. When the lamp reaches the fully down position the lamp and actuator out limit switches will be operated to disconnect and stop the actuator.

9. Assuming the lamp to be still retracted, the TAXI position may be selected directly, when the lamp will be extended and the circuit will operate as described above except that it will not stop automatically when the landing limit is reached.

10. The lamp may be retracted from either the land or taxi positions by placing the selector switch to IN, when the supply will be connected to the actuator in field through the actuator in limit switch. The lamp will be

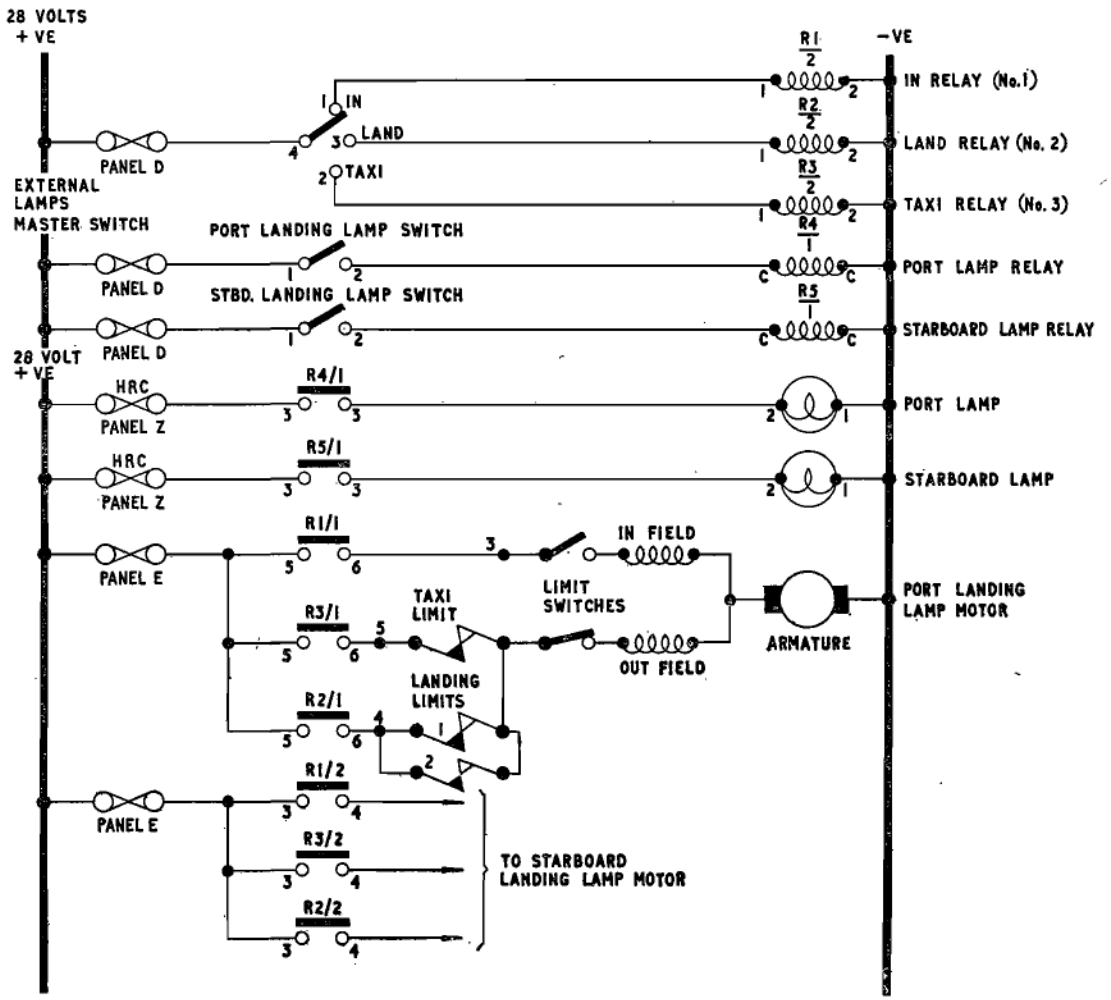


Fig. 3 Landing and taxi lamps (post Mod. 392)

steadily retracted, landing limit switch 2 opening slightly before switch 1 as the land position is passed. When the lamp is fully retracted the filament switch is opened, thus switching off the filament, and the actuator in limit switch is opened, thus disconnecting and stopping the actuator. The actuator out limit switch closes as soon as the actuator moves from the out position.

11. If the lamp is in the taxi position and it is desired to retract it as far as the land position, LAND should be selected on the switch. The supply will then be connected through the landing limit switch 1, to the actuator in field, the lamp will commence retraction. When it reaches the land position the landing limit switch 2 will be opened thus stopping the actuator and the lamp.

Landing and taxi lamps (post Mod. 392) (*fig.* 3)

12. A combined landing and taxi lamp, Type L, is fitted to each wing. The lamp is fitted with a single filament of 500 watts, 26 volts, for both landing and taxi duties. The lamp and its housing are extended and retracted by a built-in split field electric motor-driven actuator having built-in in and out limit switches. Landing limit and taxi limit switches are built into the lamp housing. The lamps are controlled by a 4-position rotary toggle switch, on the pilot's instrument top panel, its positions being labelled IN, LAND and TAXI, its remaining position being OFF.

13. The lamp filaments are switched on by placing the lamp switches, on the pilots' instrument top panel, to the ON position. These connect supplies from panel D to the coils R4 and R5 of the relative lamp relays on panel Z. These relays operate to connect (R4/1 and R5/1) supplies, from HRC fuses on panel Z, to the relative landing lamp filaments.

14. Assuming the lamp to be retracted, then, with the switch placed to the LAND position, a supply from fuse panel D, is connected to the coil R2 of land relay (No. 2), Type Q1, mounted in the port console. This relay operates (R2/1–2) to connect separate supplies, from panel E, through contact 1 of each landing limit switch normally closed, and each closed actuator out limit switch to each actuator motor out field and armature, and thence to the negative lines earthed back in the wing structure.

15. The actuator now operates to lower the landing lamps until the landing position is reached when the landing limit switch contacts 1 will be opened to disconnect the supplies to the actuators which then stop. Beyond this position the lamps are considered to be taxi lamps and therefore the TAXI position has to be selected to lower the lamps

still further, landing limit switch contacts 2 will be closed as the lamps are lowered a little further from the land position.

16. When TAXI is selected, the supply to the switch is connected to the coil R3 of the taxi relay (No. 3), Type Q1, mounted in the port console. This relay operates (R3/1–2) to connect the actuator supplies through the taxi limit switches to the actuator out limits switches, still closed, and thence through the out fields and armatures to earth. The actuator now continues to lower the lamp until the taxi limit switch operates to disconnect the supplies to the actuators which then stop.

17. The lamps can be retracted from any position by placing the control switch to the IN position when the switch supply is connected to the coil R1 of the in relay (No. 1), Type Q1, mounted in the port console. This relay operates to connect the actuator supplies to the actuator in limit switches, closed as soon as the actuators left the IN position, and thence through the in fields and armatures to the negative line. The actuators now operate to retract the lamps until the fully retracted position is reached when the actuator in limit switches will operate to disconnect the actuator supplies.

18. The LAND position may be selected when the lamps are at the taxi position. The land relay R2 is then energized to connect the actuator supplies through contacts 2 of the landing limit switches to the in limit switches of the actuators and thence to the in fields. The actuators will then retract the lamps until the land position is reached when contacts 2 will open thus disconnecting the actuator supplies.

19. The lamps may be lowered directly to the taxi position and also may be stopped at any position by returning the control switch to OFF as required. The lamps may also be 'inched' by the control switch.

SERVICING

Introduction

20. The General Information Group, contained in Book 2 immediately after Section 5 marker card, gives a detailed description of the general tests to be applied to all aircraft circuits and the procedure to be adopted when servicing special circuits.

Landing lamps

21. (1) Check the circuit fuses, and fuse No. 1 on panel D and connect up the 28-volt external supply.

(2) Connect an external 28-volt supply to the aircraft.

(3) Select the EXTERNAL LAMPS MASTER switch to ON.

Pre-Mod. 392

22. If Mod. 392 is NOT fitted, proceed as follows:—

(1) Select the starboard lamp switch to LAND.

(2) Check that the filament comes on as the lamp leaves the retracted position and check that the lamp stops at the LAND angle.

(3) Select the starboard lamp switch to TAXI and check that the lamp stops at the TAXI position.

(4) Check the general condition of the lamp and filament; if the filament looks suspect, select the EXTERNAL LAMPS MASTER switch to OFF and change the filament. Re-select the master switch to ON.

(5) Select the starboard lamp switch to LAND and check that the lamp stops at the LAND angle.

(6) Select the starboard lamp switch to IN and check that the lamp seats properly in its housing.

(7) Repeat the above operations for the port landing lamp.

(8) Switch off the EXTERNAL LAMPS MASTER switch.

Post Mod. 392

23. If Mod. 392 is incorporated, proceed as follows:—

(1) Select the lamp switch to LAND and check that both lamps lower to the LAND angle.

(2) Select the lamp switch to TAXI and check that both lamps lower to the TAXI angle.

(3) With both lamps fully extended, check the general condition of each lamp and filament; if the filament looks suspect, fit a new one.

(4) Select both filament switches to ON and check that both lamps come on. Retract the lamps and see that the filaments remain alight in all intermediate positions of the lamp.

(5) Re-select the lamp switch to TAXI and check that the filaments are alight in all intermediate positions of the lamps travel.

(6) Switch off the filaments and retract the units into the wing.

Navigation lamps (pre-Mod. 2232)

24. (1) Check the circuit fuses and fuse No. 1 on panel D and connect up the 28-volt external supply.

(2) With the navigation lamps switch at BRIGHT check that the wing tip lamps and the two tail lamps are alight.

(3) With the navigation lamps, switch at DIM check that the wing tip and tail lamps are alight but dim. If any filaments do not come on, switch the navigation lamps switch to OFF, change the filament and re-check.

(4) Switch the navigation lamps switch to OFF.

Navigation lamps (post Mod. 2232)

Note . . .

For Mod. 2638 *fitted to B/K Mk.* 1 *and B/K/PR Mk.* 1 *aircraft refer to Book* 3, *Sect.* 5, *Chap.* 9.

25. (1) Check the circuit fuses and connect on external 28-volt supply.

(2) Switch on the external lamps master switch.

(3) Select the flash/steady switch (Mod. 2593) to FLASH then select the navigation lamps switch to BRIGHT and check that the wing tip and the tail lamps are bright and flashing.

(4) Select the navigation lamps switch to DIM and check that the lamps are flashing but dim.

(5) Remove the flasher motor fuse (pre-mod. 2593) and select the flash/steady switch to STEADY (post Mod. 2593) and check that the lamps hold steady in both DIM and BRIGHT positions.

(6) Replace the flasher motor fuse and place all switches to OFF.

Navigation lamps (post Mod. 2871)

25A. (1) Check the circuit fuses and connect an external 28-volt d.c. supply to the aircraft.

(2) Select the 24-volt battery switch and the external lamps master switch to ON.

(3) With the FLASH/STEADY switch selected to FLASH, select the NAVIGATION LAMPS switch to BRIGHT and check that the upper and lower anti-collision lamps are alight and flashing and that the wing tip and tail lamps are alight and steady.

(4) Select the NAVIGATION LAMPS switch to DIM and check that the anti-collision lamps are flashing dimly and that the tail and wing tip lamps are dimly alight and steady.

(5) Remove the flasher motor fuse and check that the anti-collision lamps are alight and steady.

(6) Replace the fuse, select the FLASH/STEADY switch to STEADY and again check that the anti-collision lamps are alight and steady.

(7) Select all switches to OFF.

Identification lamp

26. (1) Switch the identification lamp switch to STEADY. Check that the identification lamp under the bomb aimers' compartment comes on. If not, switch off, change the filament and re-check.

(2) Switch the identification lamp switch to MORSE and operate the two morse key micro switches in turn checking that the lamp flashes accordingly.

(3) Switch to OFF both the identification lamp and external lamp master switches.

◀**Landing lamps**

Note . . .

Type L landing lamps are limited to 24 *cycles of operation per hour* (*A.P.*4343*E, Vol.* 1, *Book* 1, *Sect.* 7).▶

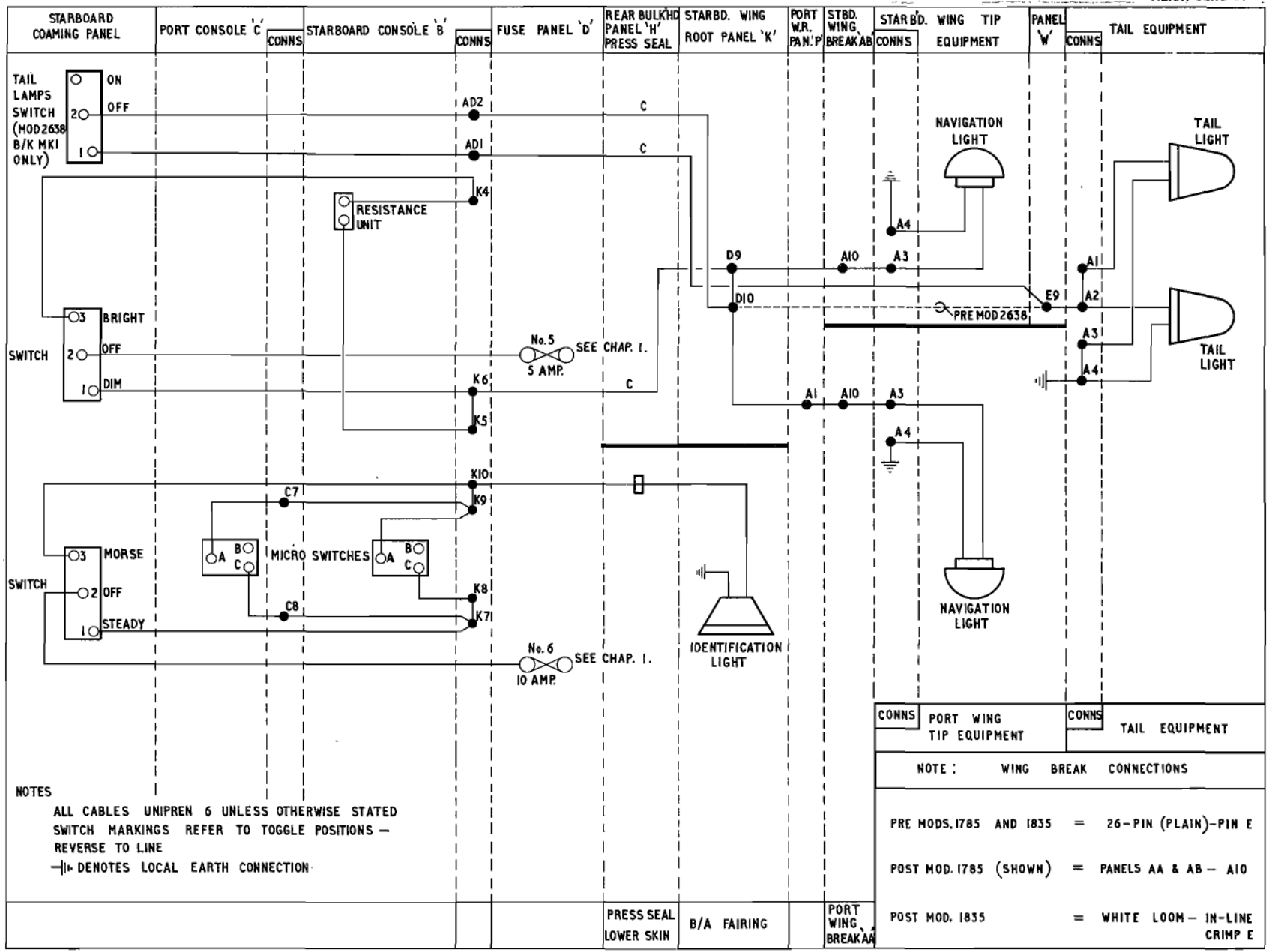


Fig. 4. Navigation and identification lamps (post Mod 1785 and pre Mod 2232)

67436 SHT. 108 75836 SHT. 108-B
70636 SHT. 108 73336 SHT. 108A-A

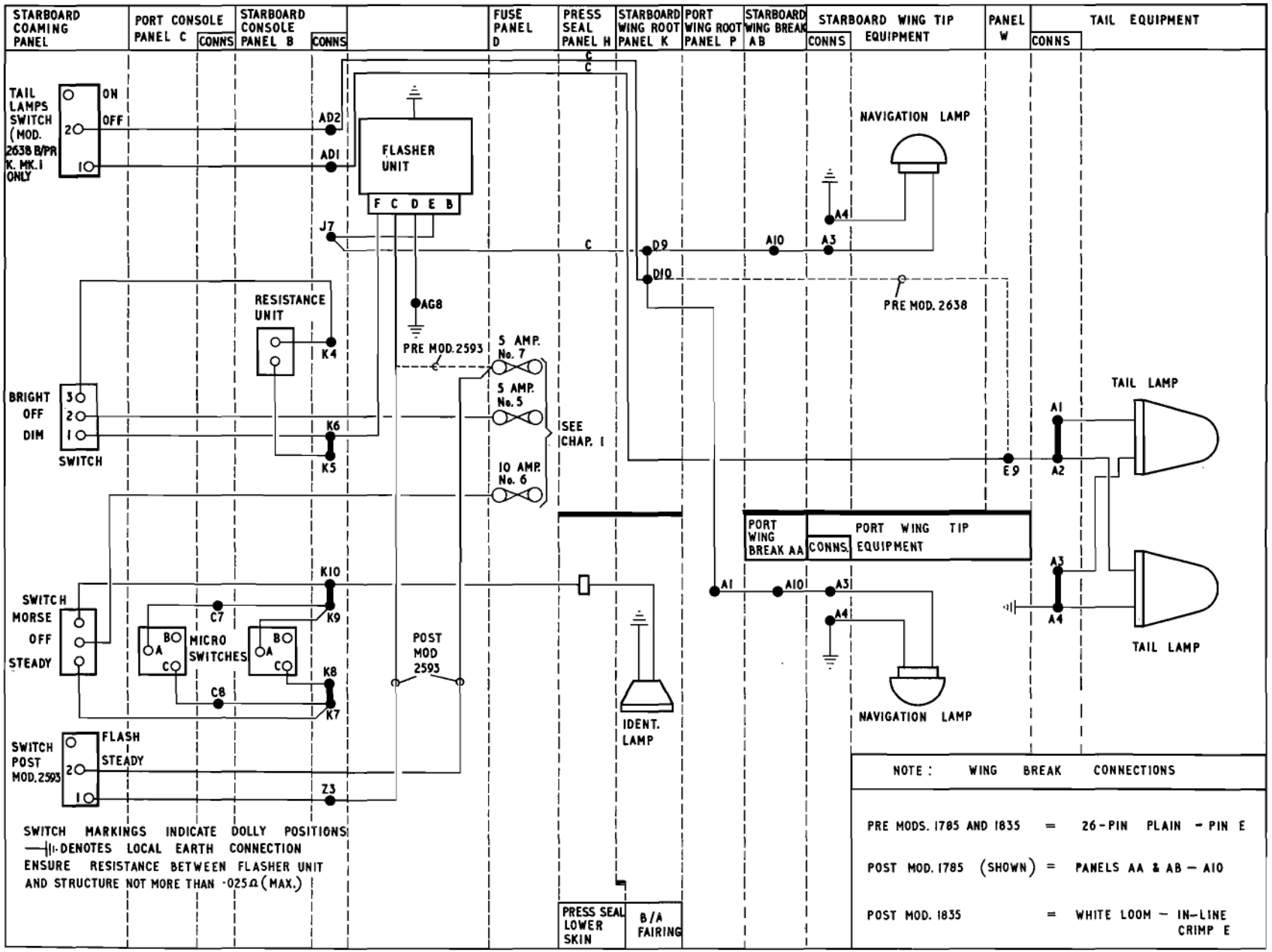


Fig. 5. Navigation and identification lamps (post Mod. 2232 & Pre. Mod. 2871)

RESTRICTED

70636 SHT. 108-D 73336 SHT. 108-C
67436 SHT. 108-Q 75836 SHT. 108-G

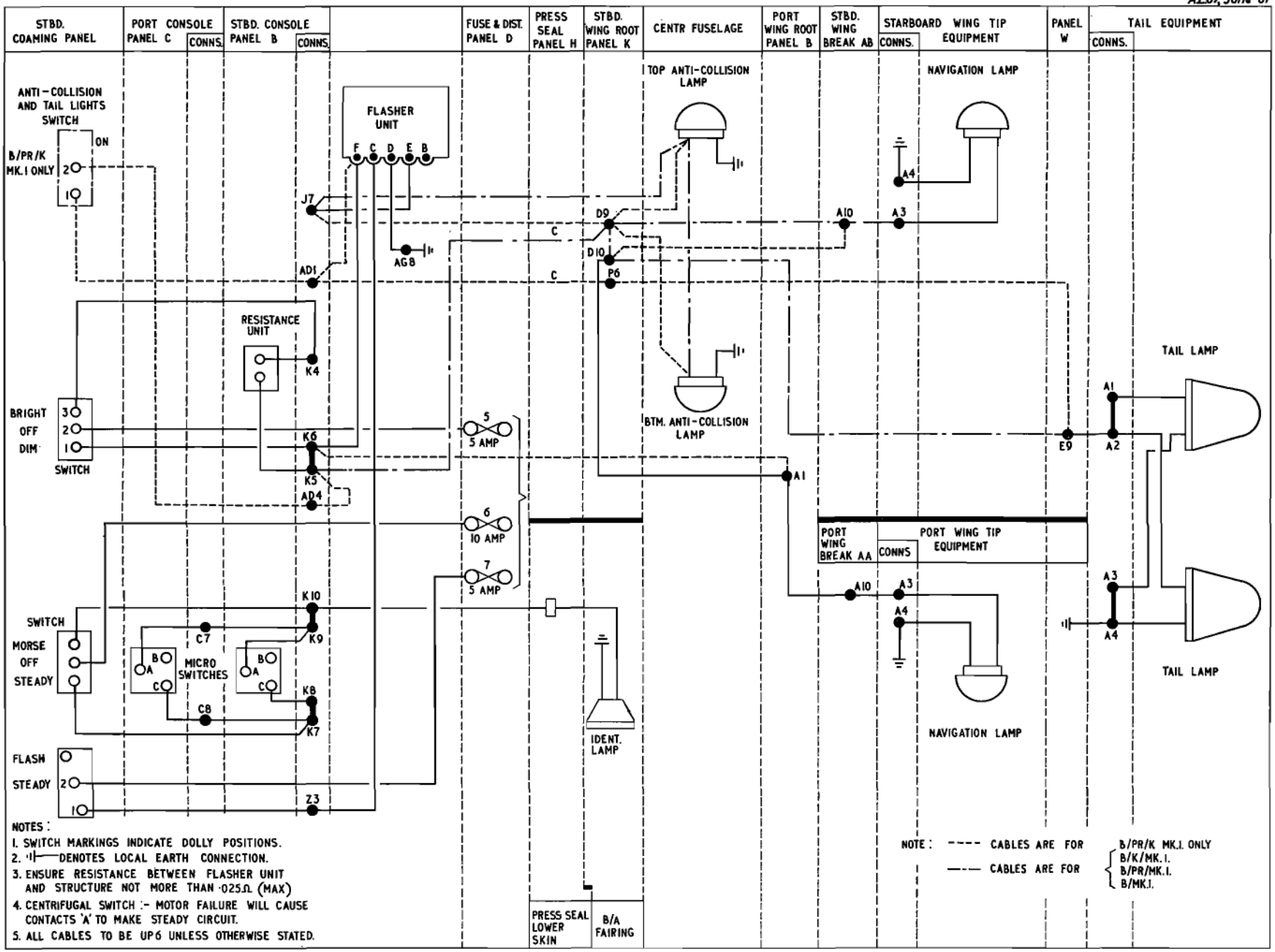


Fig. 5A Navigation and identification lamps (post Mod. 2232 & 2871)

73336 SHT. 108-F
75836 SHT. 108-J

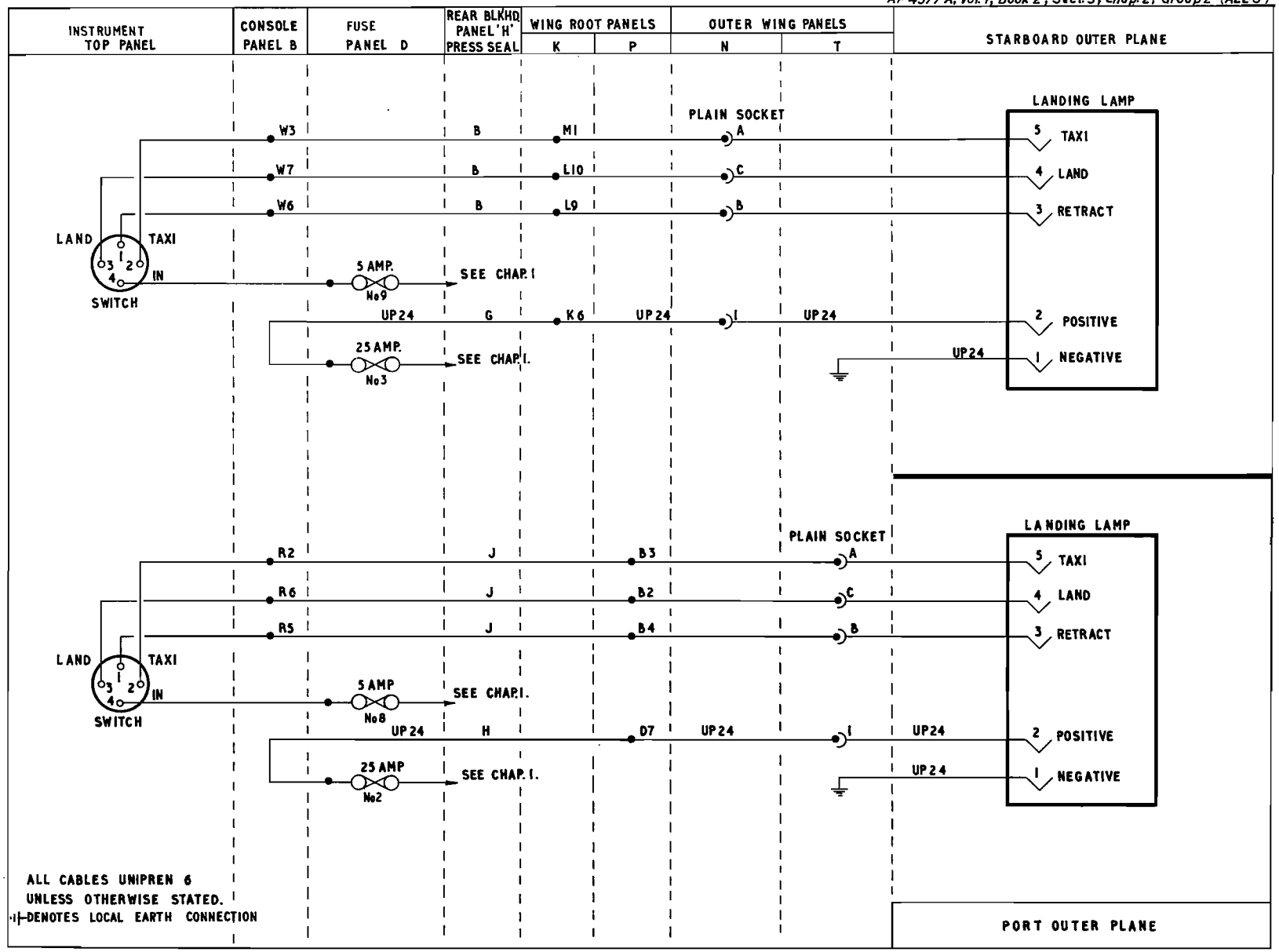


Fig. 6.. Landing & taxi lamps (pre-Mod. 392)

RESTRICTED

8186 347882 12/58 625 C.B.A.S. LTD. GP924

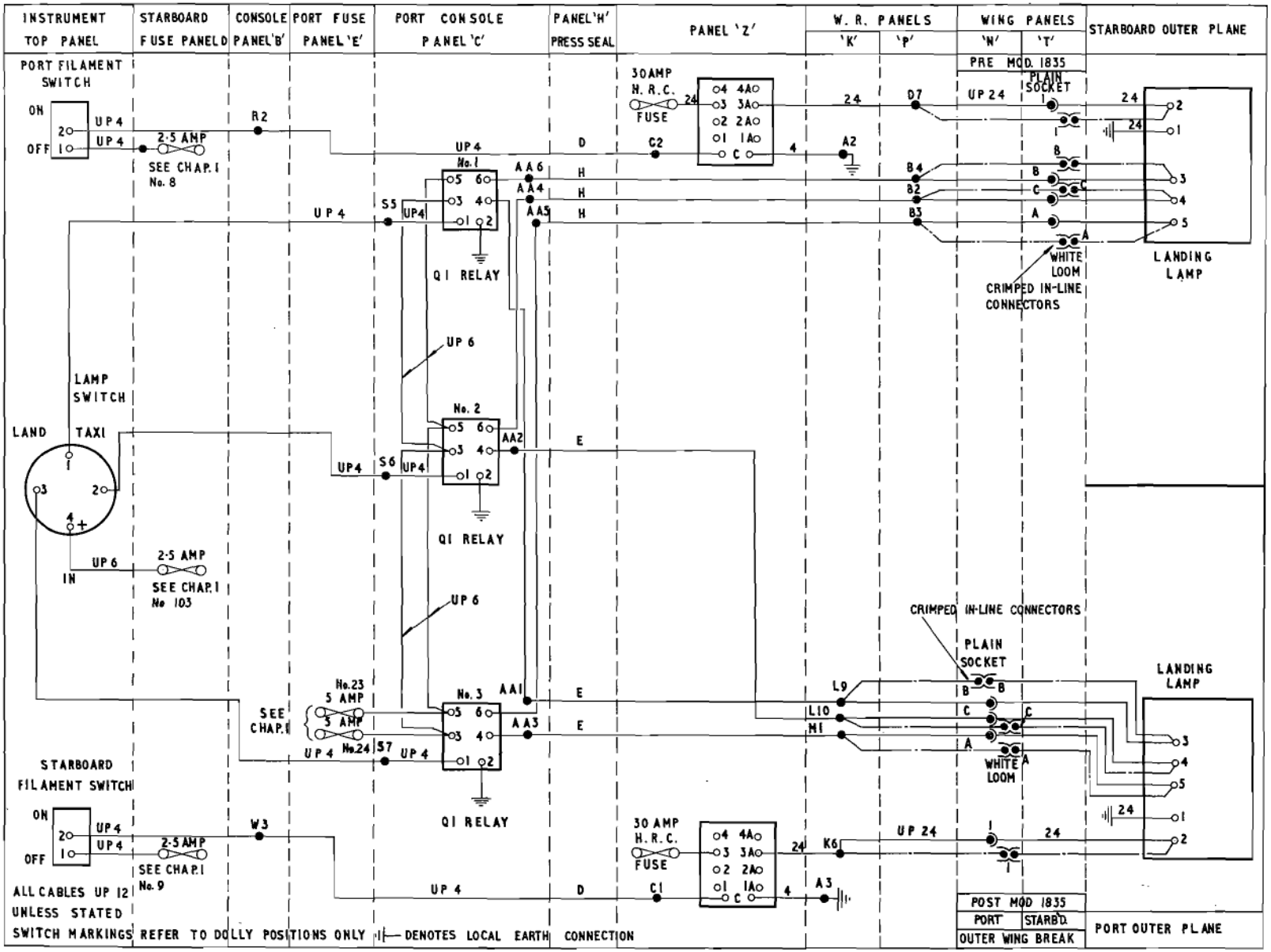


Fig. 7. Landing & taxi lamps (post Mod. 392 and pre.Mod 1785)

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75836 SHT. 107 - C
67436 SHT. 107—P

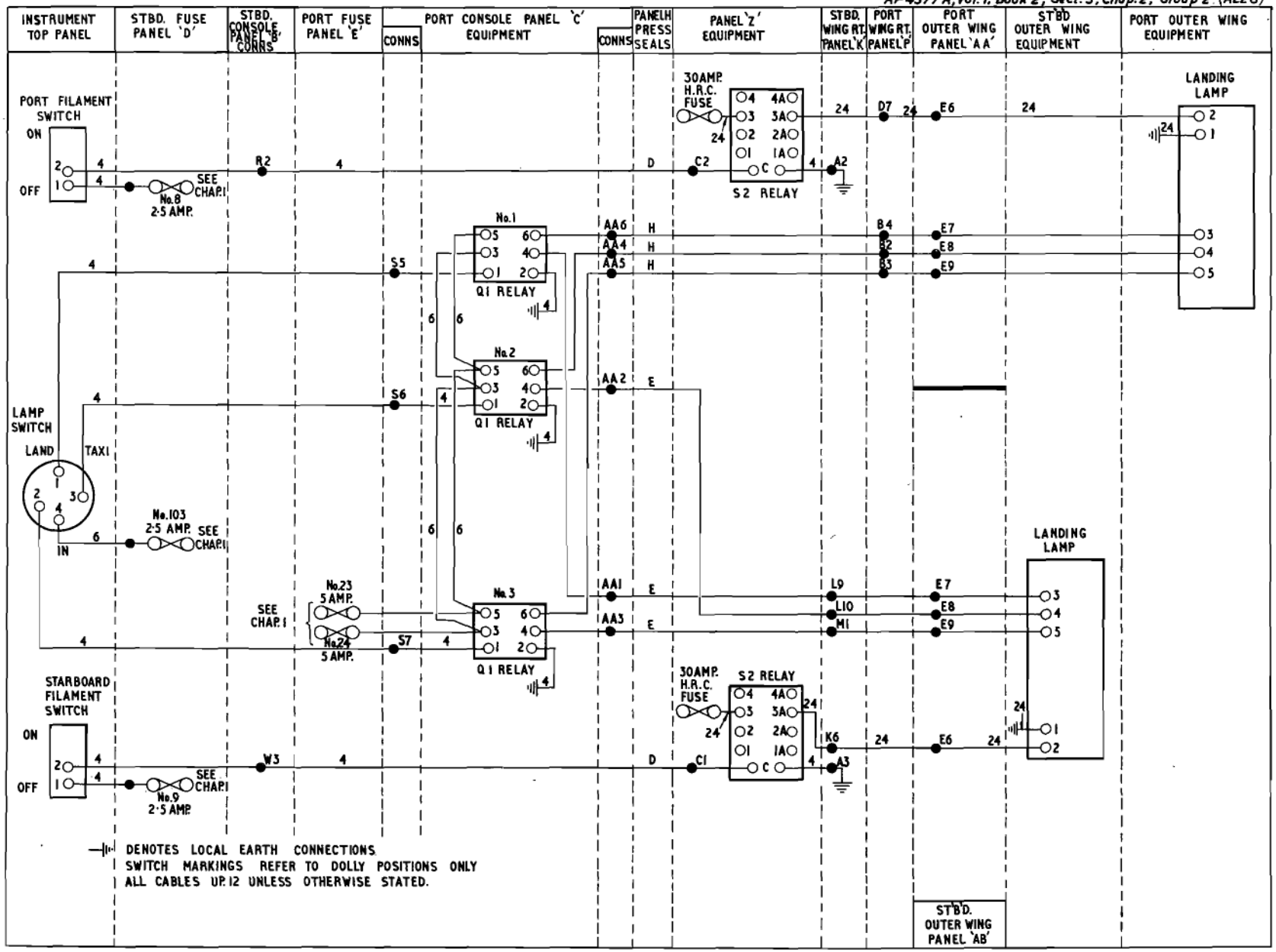

Fig. 8. Landing & taxi lamps (post Mod. 1785)

8166 347662 12/58 625 C.B.A.S. LTD. GP924