Chapter 8 LIGHTING

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UK RESTRICTED

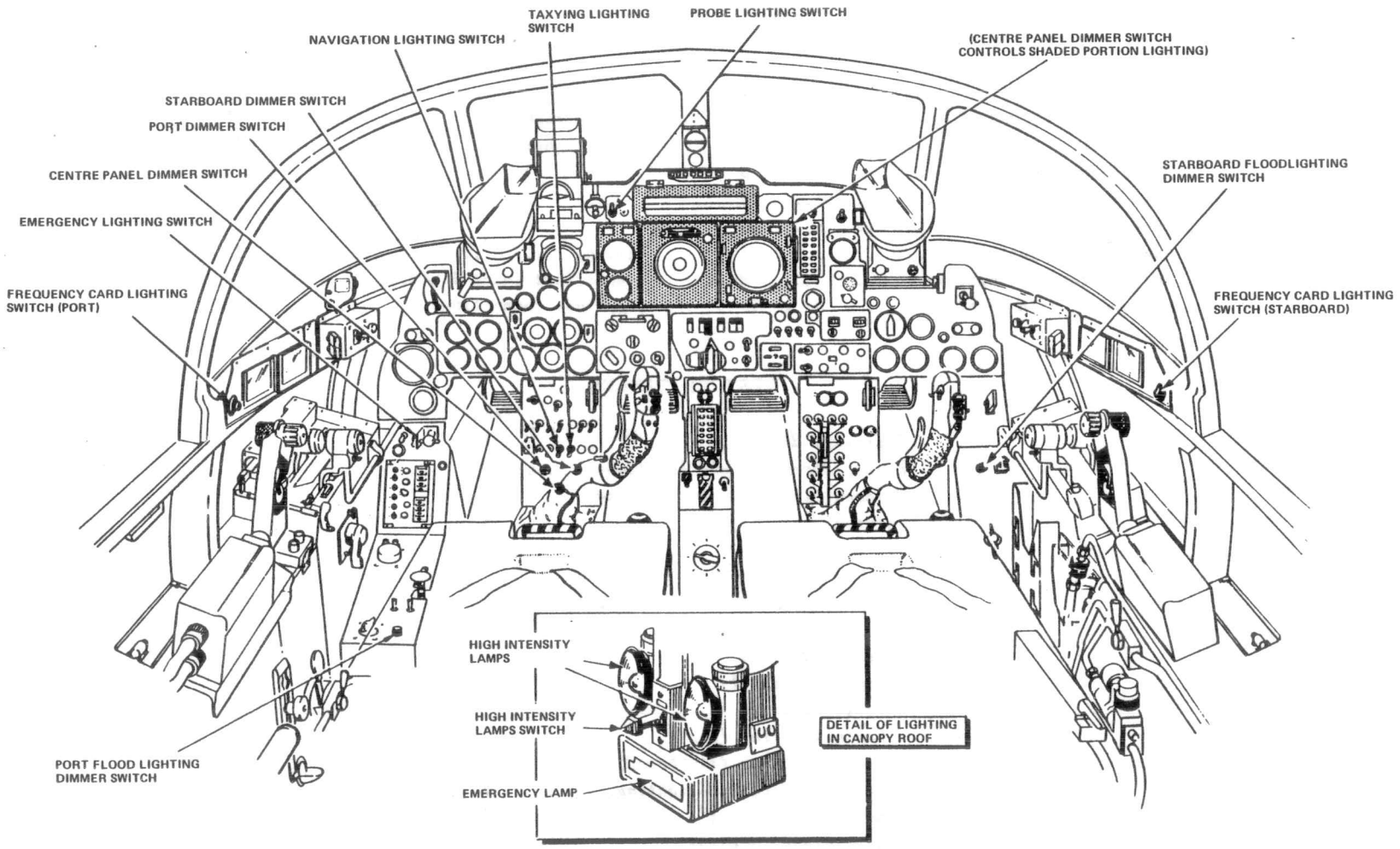

FIG. 1. LIGHTING DETAILS

◀ SEM/LTG/036 INCORPORATED ▶

DESCRIPTION

General

1. The lighting system for the aircraft is divided into two parts, (a) internal lighting, (b) external lighting. The former covers all cabin lighting services which comprise general floodlighting, instrument panel lighting, emergency, and high intensity lighting circuits. The latter part consists of navigation, anti-collision, refuelling probe, and taxying lamp circuits. All lighting is supplied from the aircraft's d.c. system, except for the 4-volt instrument lighting circuit which is fed via a transformer unit from the a.c. supply.

INTERNAL LIGHTING

Controls

2. All instrument panel lighting is controlled by a group of dimmer switches mounted on panel A3. The port sill and starboard sill floodlighting is controlled by two dimmer switches located on panel A2 extension and panel A6 respectively. Frequency card lighting control is by push-button type switches mounted adjacent to the card holders; the 4-volt instrument lighting circuit is operated from a controller which is one of the group of dimmers on panel A3. An emergency lighting unit in the canopy roof also contains the high intensity lamps and their control.

Panels and consoles

3. Apart from general cabin floodlighting, each one of the instrument panels, consoles or shroud panels is lit by groups of pillar lamps, mounted either as single units or as bridged pairs according to the requirements of the associated panel. The circuits are so arranged that each bank of lamps on a panel receives its supply from a different fuse group. This ensures that in the event of a fuse failure on one circuit, the lighting will be maintained from the other.

4. The circuits are divided into port and starboard groups, controlled by two dimmer switches on panel A3. These are labelled DIM PORT and DIM STBD respectively. Reference to the circuit diagrams will show the banks of lamps associated with each group.

5. It will be noticed that each dimmer also controls a switch and a fixed resistance. These latter items operate in the warning system *(Chap.12)* and are associated with the cancel and attention lamps. As the cabin lighting is switched on and brought up to brightness, these two circuits will be dimmed and vice-versa.

Plasteck panel lighting

6. A number of the instrument panels utilize the Plasteck system of lighting. This method employs a plastic laminated panel face plate with engraved captions according to the panel requirements. The centre lamination is of clear plastic and illuminated from within, the light being transmitted throughout the material and emitted via the engravings and circular discs around each lamp on the face of the panel or unit. By day or when not lit the captions show a translucent white.

4-volt instrument lighting

7. Lighting of the indicator units of the flight display system (i.e. navigation display, attitude indicator, altitude and rate of climb, Tacan offset computer, and the speed display unit) is achieved by lamps mounted inside each instrument. These lamps 4-volt, 1 watt are fed initially from busbars XA, XB, XC of the a.c. system, to a lighting control unit on the aft pressure bulkhead. In this unit the 200-volt, 3-phase, 400-cycle supply is transformed and passed through magnetic amplifiers to give twin outputs of 3.5-volt. Both these outputs are capable of being varied by a rotary dimmer control labelled DIM CENTRE, one of the group on panel A3.

Emergency lighting

8. In the event of a failure of the normal cabin lighting, the instrument panels and controls may be lit by a single floodlamp, housed on the emergency lighting unit in the canopy roof. Control of the floodlamp is by a switch on panel A2 labelled EMERG LTG ON – OFF which switches the emergency battery *(Chap.9)* into service. With the switch set to the ON position supply is from busbar PK. One pole of the emergency lighting switch feeds the lamps in the stand-by D.I. and the E2B compass, via one leg of the port dimmer switch.

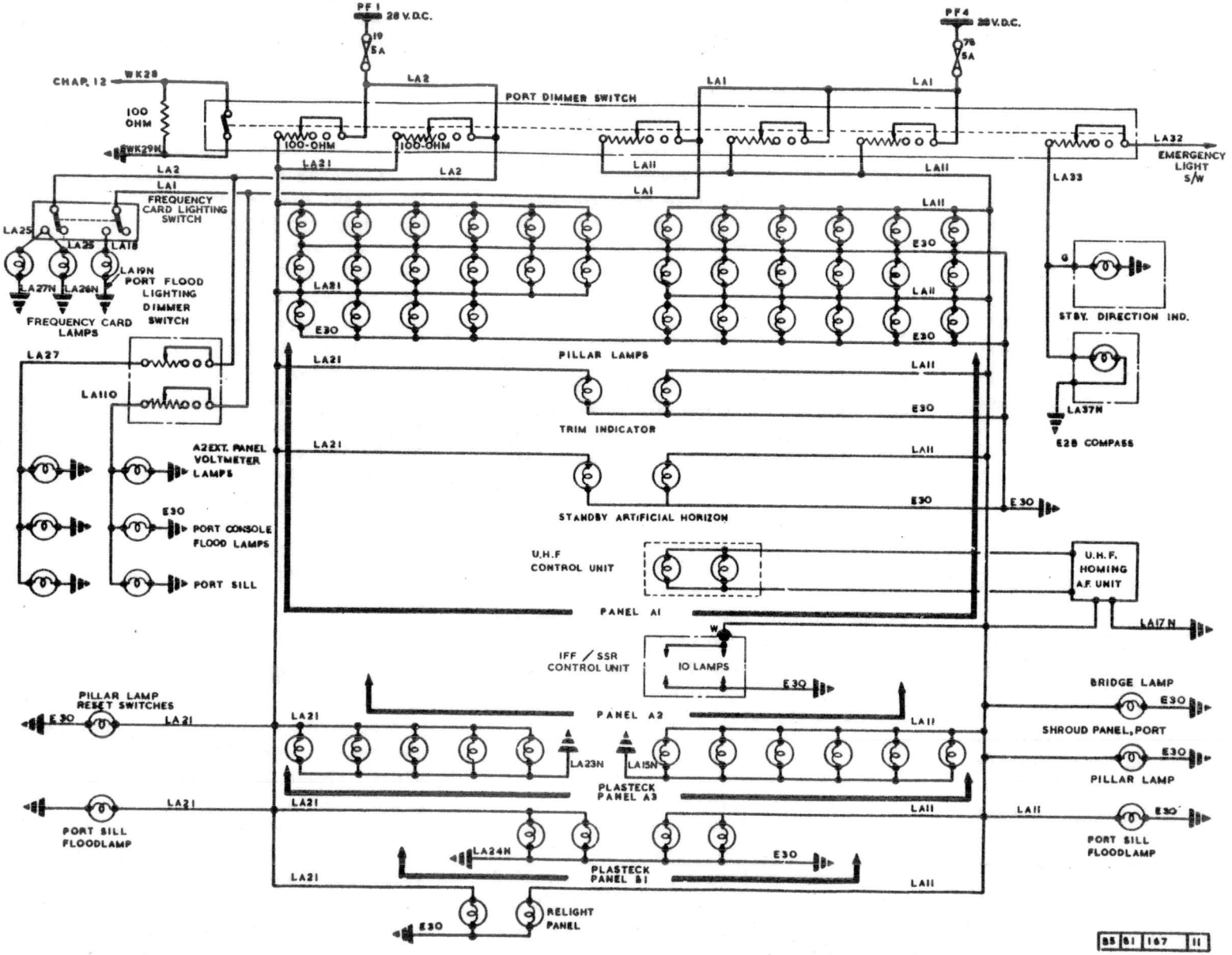

FIG. 2. CABIN LIGHTING (PORT)

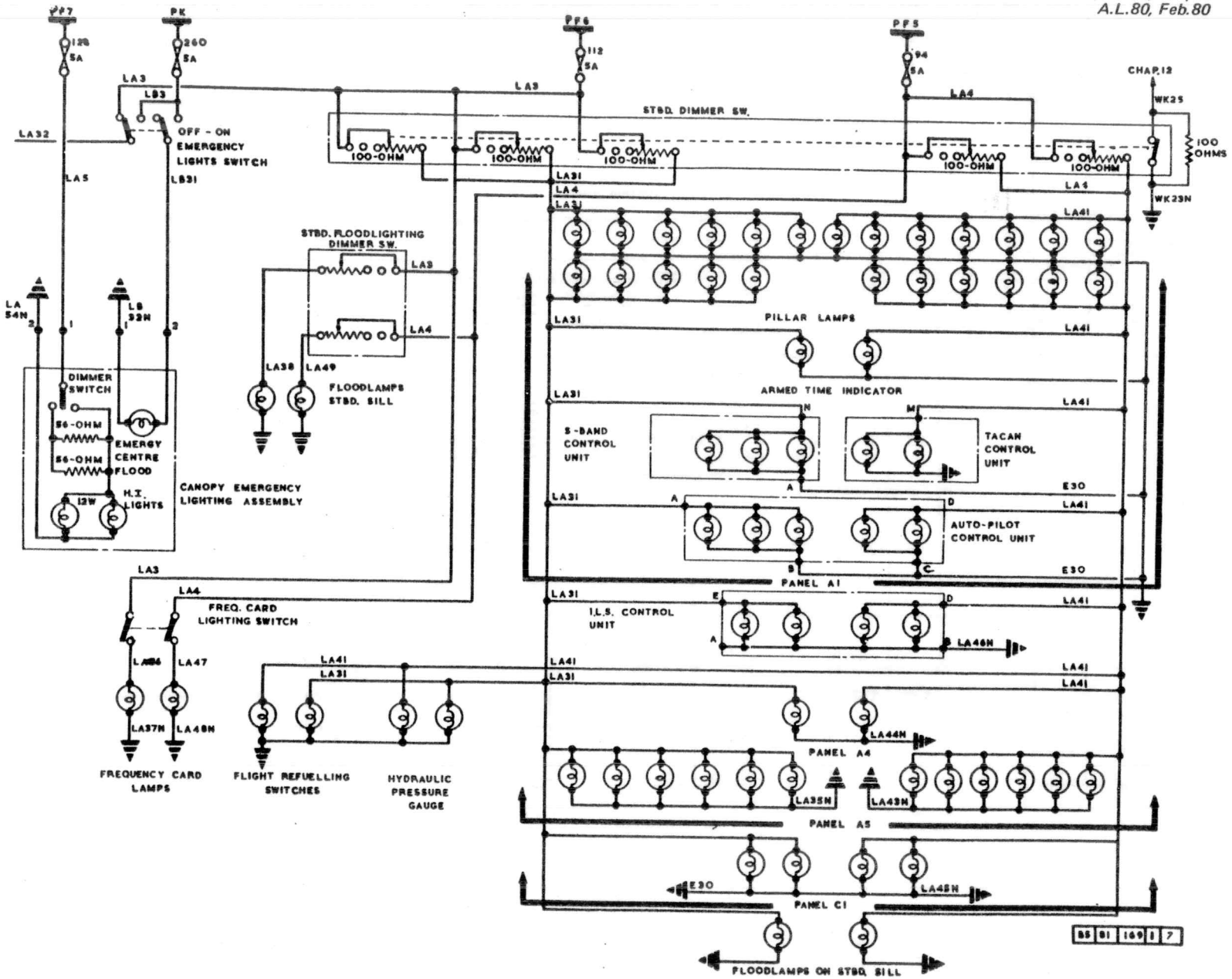

FIG.3. CABIN LIGHTING (STARBOARD)

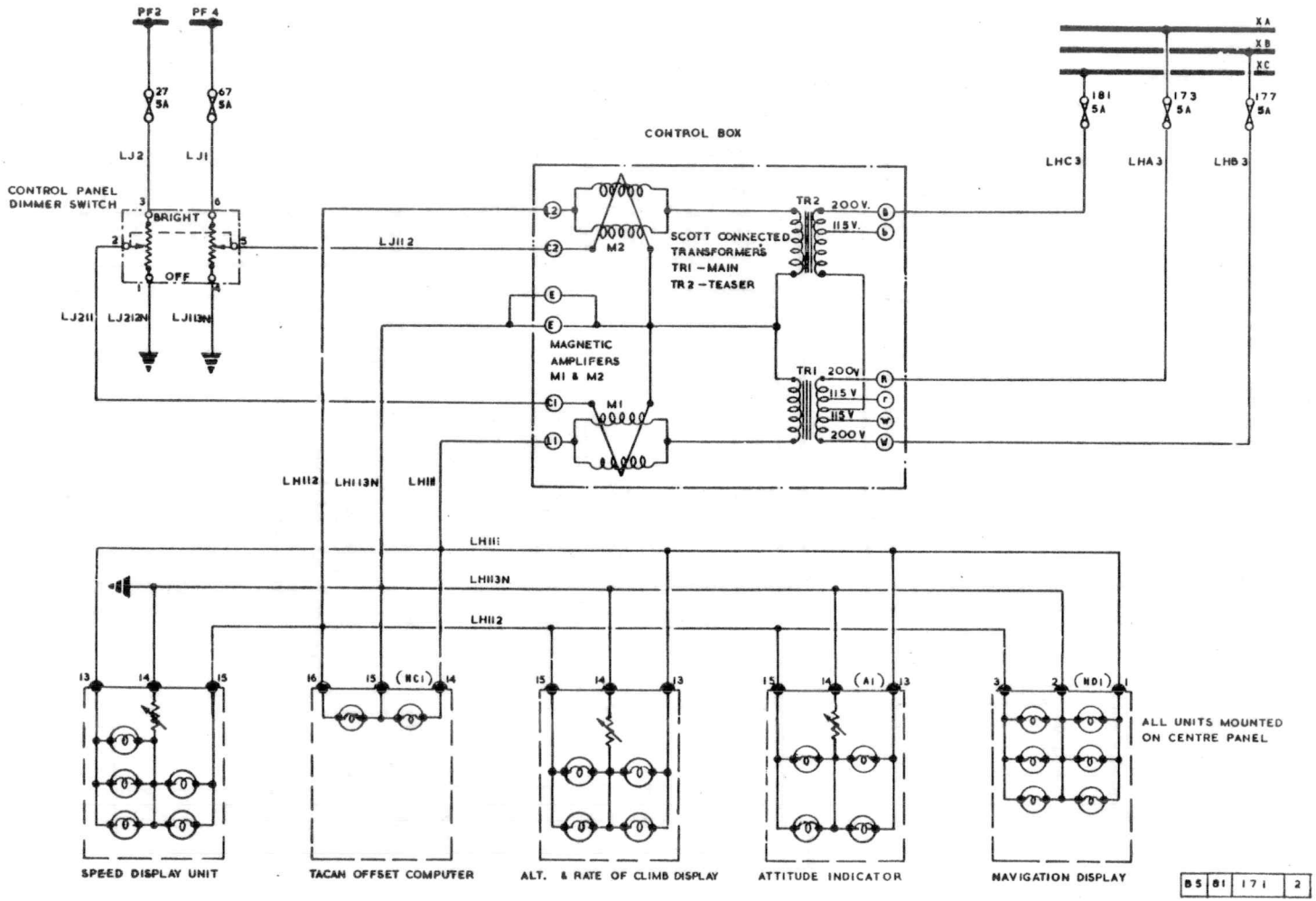

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FIG.4. 4-VOLT INSTRUMENT LIGHTING

High intensity lighting

9. The canopy emergency lighting unit also carries two high intensity lamps arranged to beam their light on to the essential flight display instruments. They are controlled by a 3-position switch labelled DIM - BRIGHT (centre position is OFF) located between the two lamp units. The switch operates in conjunction with two 56-ohm resistors, and if the pilot's vision should be temporarily impaired by the flash of an explosion, the lamps may be used to intensify the illumination of the essential instruments.

Frequency card lighting

10. Both the pupil's and the instructor's frequency cards located on the port and starboard sills, are lit by normal pillar type lamps. Each station is controlled by a toggle switch adjacent to the card holder. There is no dimming facility on these lamps.

EXTERNAL LIGHTING

Navigation and anti-collision lighting

11. These two circuits are controlled by a double-pole, 3-position switch, labelled NAV.LIGHT H.I. FLASH-STEADY located on panel A3. The navigation lamps are positioned in the leading edge of each wing tip, and also on each side of the fuselage tail section. The anti-collision lamps are located adjacent to the wing tip navigation lamps, and also in the spine portion of the upper engine hatch. A Type A flasher unit of the aft pressure bulkhead, operates in the anti-collision lamp circuit.

Taxying lighting

12. Two Type A taxying lamps are installed, one in each alighting gear fixed fairing. They are controlled by a switch labelled TAXI LIGHT - ON located on panel A3.

Probe lighting

13. Provision is made to illuminate the flight refuelling probe in the port wing. The circuit is installed as far as a two-way terminal block on the leading edge spar one, adjacent to the probe position. When the probe is fitted, two lamps are installed at its base to shine along its length. A switch on panel A1 controls the circuit.

SERVICING

WARNING

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cockpit or performing any operations upon the aircraft.

General

14. Servicing of the lighting equipment is mainly concerned with the cleaning of fittings and the renewal of unserviceable lamp filaments or components. The lamp filament ratings and references are given in Table 3. Information relating to the various internal and external lamp units is given in the associated Air Publications as detailed in Table 2.

4-volt instrument lighting

15. No attempt must be made to renew any unserviceable lamp filament in the flight display units. The units concerned should be removed from the aircraft and replaced with serviceable items.

Taper pin connections

16. A number of taper pin crimped tags are used in the lighting installation, mainly for instrument panel wiring. These tags are connected through special multi-way moulded connectors held by clips to the rear faces of the associated panels. The method of insertion and extraction of the taper pins, to and from these moulded connectors, using a special tool, will be found detailed on fig.6.

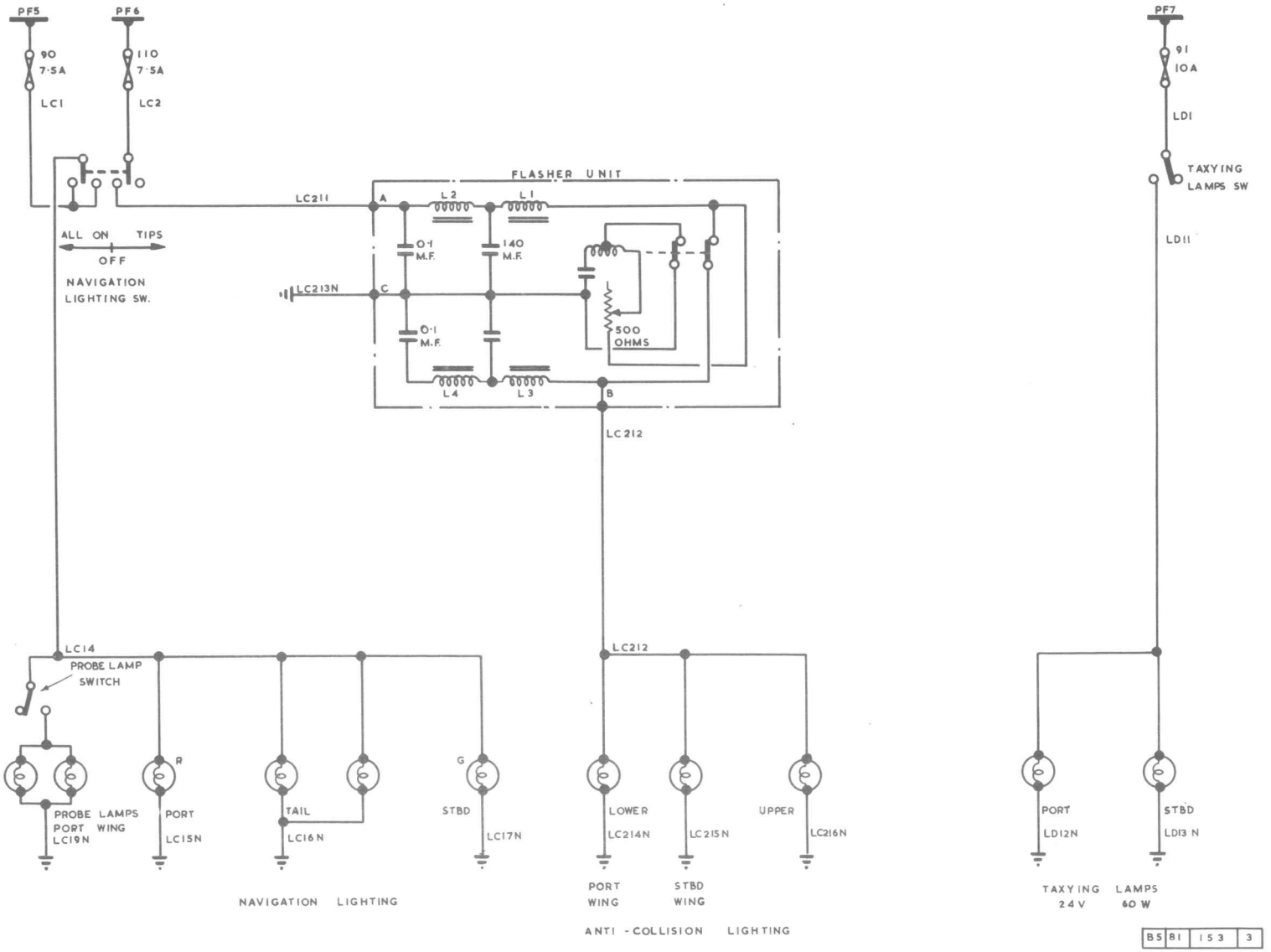
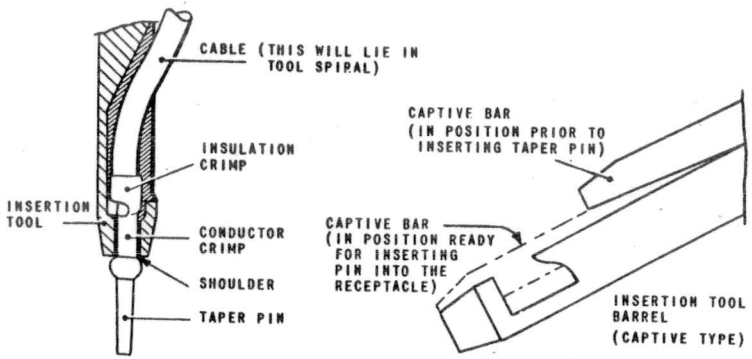
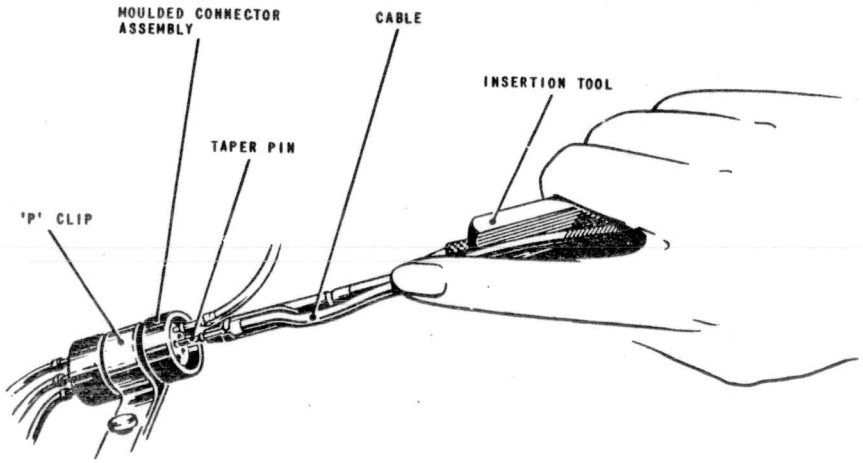


FIG.5. EXTERNAL LIGHTING





NOTE...
TWO TYPES OF A-MP INSERTION TOOL MAY BE USED FOR TAPER PIN CONNECTIONS. THEY ARE:-
(a) 380310/SERIES, HAVING A 'PULL-TO-TEST' FEATURE.
(b) 380518/SERIES, A CAPTIVE TYPE TOOL, WHICH RETAINS THE TAPER PIN UNTIL AN OBLIGATORY "PULL-TO-TEST" RELEASES IT.

PROCEDURE

(1) PLACE THE TAPER PIN IN THE INSERTION TOOL, WITH THE SHOULDER OF THE PIN JUST BELOW THE TIP OF THE TOOL. THE CABLE WILL THEN LIE IN THE SPIRAL GROOVE.

(2) IF A CAPTIVE TYPE TOOL IS BEING USED, THE TOOL HEAD SHOULD BE PUSHED BACK INTO THE TOOL BODY, WITH THE TAPER PIN IN POSITION. THIS WILL KEEP THE PIN IN THE TOOL THROUGHOUT INSERTION, UNTIL AN OBLIGATORY 'PULL-TO-TEST' RELEASES IT.

(3) INSERT THE PIN INTO THE DESIRED CONNECTOR ASSEMBLY SOCKET, MAKING SURE THAT THE APPROACH IS SQUARE AND IN LINE. PUSH STRAIGHT DOWN ON THE TOOL HANDLE WITH A STEADY MOTION, UNTIL A CLICK IS HEARD. USE ONLY A ONE DRIVE STROKE OR DAMAGE MAY BE DONE TO THE CONNECTOR ASSEMBLY.

(4) PULL-TO-TEST, TYPE(A)
WITH THIS TOOL, THE CONNECTION IS TESTED BY SLOWLY PULLING STRAIGHT BACK ON THE SLEEVE OF THE TOOL UNTIL THE SLEEVE BARELY MOVES. PULL SHOULD THEN BE RELEASED, IF THE PIN IS STILL IN POSITION A GOOD CONNECTION IS ASSURED.

(5) PULL-TO-TEST, TYPE(B)
USING THE CAPTIVE TYPE TOOL, THE CONNECTION CAN BE TESTED, AFTER INSERTION, BY A SLOW UPWARD PULL ON THE TOOL. THIS WILL RELEASE THE CAPTIVE BAR, AT A TENSION WHICH IS SET, ALLOWING THE TAPER PIN TO BE REMOVED FROM THE TOOL. IF THE PIN IS STILL IN POSITION IN THE CONNECTOR ASSEMBLY A GOOD CONNECTION IS ASSURED.

(6) EXTRACTION
SHOULD IT BECOME NECESSARY TO BREAK THE CONNECTION, EITHER FOR TESTING OR RENEWAL PURPOSES, THE TAPER PIN MAY BE EXTRACTED FROM ITS HOUSING BY SETTING THE PIN AND ITS ASSOCIATED CABLE INTO THE TOOL, AND GENTLY PULLING UNTIL THE JOINT IS BROKEN.

FIG.6. METHOD OF INSERTING TAPER PINS

5-91021

TABLE 1

Equipment details

Equipment	Location	Access	Air Publication
Cabin lighting dimmer switch, port, Type 80/10/2689	Panel A3	Cabin	4343C, Vol.1, Book 1
Cabin lighting dimmer switch, starboard, Type 80/10/2389	Panel A3	Cabin	
Flood lighting dimmer switch, port, Type 80/10/0936	Panel A2 ext.	Cabin	
Cabin lighting dimmer switch, starboard, Type 80/10/0947	Panel A6	Cabin	
Emergency lighting switch, Type 8824/B113	Panel A2	Cabin	113D-1110-1
Emergency lighting unit, incorporating H.I. lamps	Fitted in the roof of the canopy	Cabin	B5-81-10041
Taxying lighting switch, Type 8810/B104	Panel A3	Cabin	113D-1110-1
Taxying lamp, Type A	Alighting gear fixed fairing	P & S leg	113F-0209-1
Navigation lighting switch, Type 8820/B103	Panel A3	Cabin	113D-1110-1
Navigation and anti-collision lighting units, Ref.No.5CX/2783	Wing tips, port and starboard	Perspex panel over lamps	113F-0203-1
Upper anti-collision lamp, Ref.No.5CX/2783	Upper engine hatch, spine portion	Domed cover on hatch	
Tail navigation lamps, Ref.No.5CX/2583	Tail cone	106 P & S	113F-0227-1
Flasher unit, Type A, Ref.No.5CZ/5448	On sloping bulkhead	Cabin	113F-0618-1
4-volt instrument lighting control unit, Type TDD/143/6, Ref.No.5CZ/6962	On sloping bulkhead	Cabin	4343E, Vol.1, Book 1, Sect.8
4-volt instrument lighting, pilot's controller, Type AWE/149/4, Ref.No.5CZ/7285	Panel	Cabin	4343E, Vol.1, Book 1, Sect.7
Frequency card lighting tumbler switch, Type NSF 8824/B104, Ref.No.5CW/6533	Adjacent to unit P & S	Cabin	
Resistor in cancel lamp circuit and attention lamp circuit, 1000 ohm	Part of port dimmer switch Part of starboard dimmer switch	Cabin	
I.F.F. system failure check lamp switch, Ref.No.5CW/5743	Panel A2	Cabin	4343C, Vol.1, Book 1

TABLE 2

Fuses, circuits, and locations

Fuse No.	Rating	Code	Circuit	Location
19	5A	LA2	Cabin lighting (port)	A.C./D.C. fuse and relay box
27	5A	LJ2	4-volt instrument lighting	
67	5A	LJ1	4-volt instrument lighting	
78	5A	LA1	Cabin lighting (port)	
90	7.5A	LC1	Navigation and probe lighting	
91	10A	LD1	Taxying lighting	
94	5A	LA4	Cabin lighting (starboard)	
110	7.5A	LC2	Anti-collision lighting	
112	5A	LA3	Cabin lighting (starboard)	
128	5A	LA5	High intensity lighting	
173	5A	LHA3	4-volt instrument lighting	
177	5A	LHB3	4-volt instrument lighting	
181	5A	LHC3	4-volt instrument lighting	
260	5A	LB3	Emergency lighting	Rear of sloping bulkhead

TABLE 3

Filament location, rating, and reference

Location	No. off	Rating	Reference
Instrument panel A1	58	28-volt, 0.04A	5L/9959118
Instrument panel A2	3		
Instrument panel A3	11		
Instrument panel A4	2		
Instrument panel A5	12		
Panel B1	4		
Panel B2	2		
Panel C1	4		
Port sill floodlamps	4		
Starboard sill floodlamps	2		
Port console floodlamps	2		
Armed time indicator	2		
Tacan control panel	2		
'S'-band controller	3		
Autopilot control unit	5		
I.L.S. control unit	4		
Trim indicator	2		
Stand-by artificial horizon	2		
U.H.F. control unit	2		
I.F.F./S.R.R. control unit	10	2	28-volt, 0.04A	5L/9959118
		8	28-volt, 0.04A	Special made lamps supplied with unit
Voltmeter (pupil)	2	28-volt, 0.04A	5L/9959118
Frequency card (pupil)	3		
Stand-by D.I.	1		
Frequency card (instructor)	2		
Flight refuel test and probe lighting switches	2		
Hydraulic pressure gauge	2		

continued...

TABLE 3 Filament location, rating, and reference - *continued*

Location	No. off	Rating	Reference
E2B compass	1	28-volt, 0.04A	5L/995917 (non-magnetic)
Emergency floodlamp	1	28-volt, 3.5W	5L/9951271
High intensity lighting	2	28-volt, 12W	5L/9951282
Navigation lighting	4	28-volt, 20W	5L/9952431
Probe lighting	2 (not yet fitted)		
Anti-collision lighting	3	28-volt, 40W	5LX/2641
Taxying lighting	2	28-volt, 60W	5L/3869

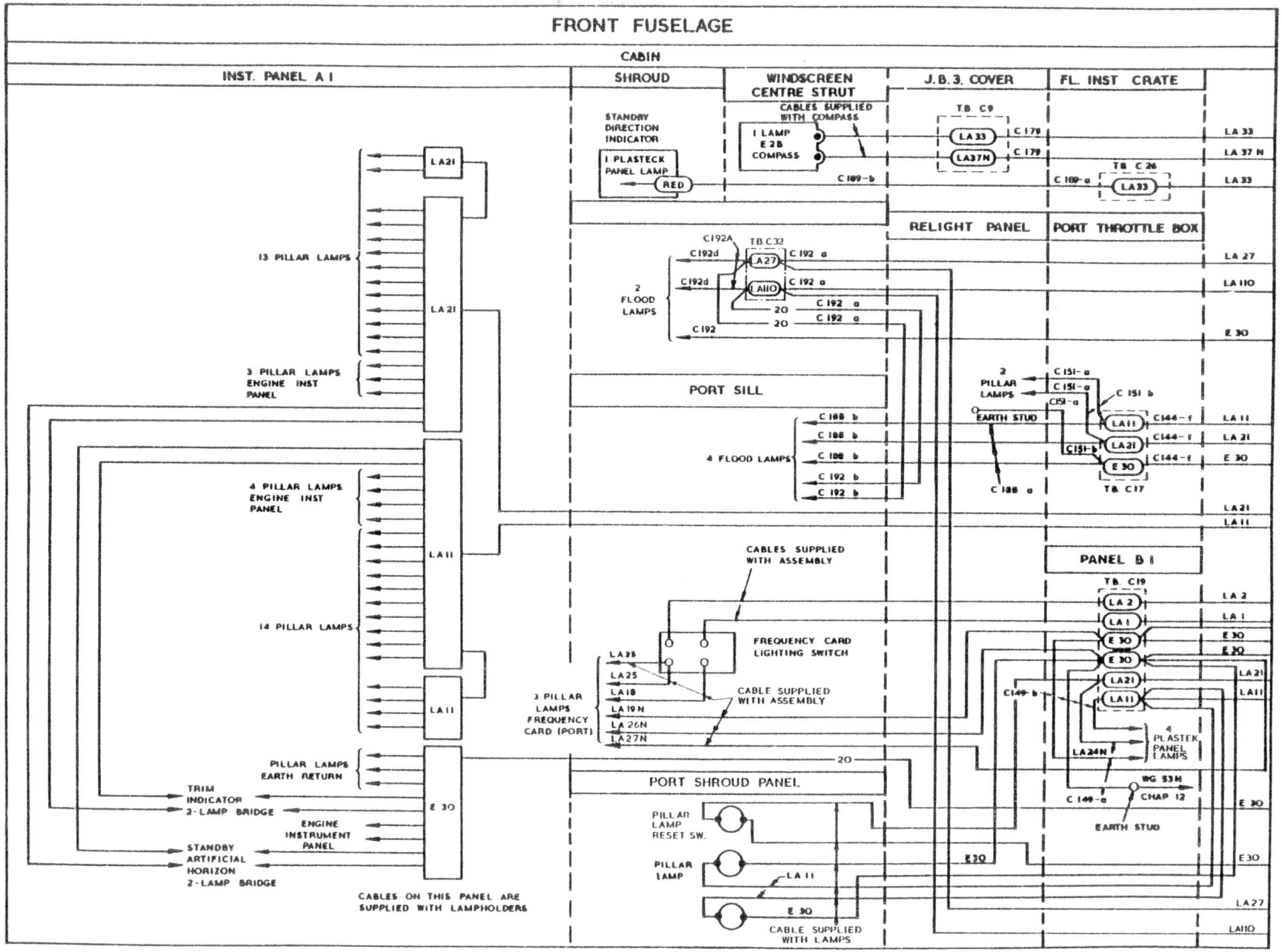


FIG. 7. CABIN LIGHTING (PORT)

◀ CIRCUIT CODES AND WIRING AMENDED ▶

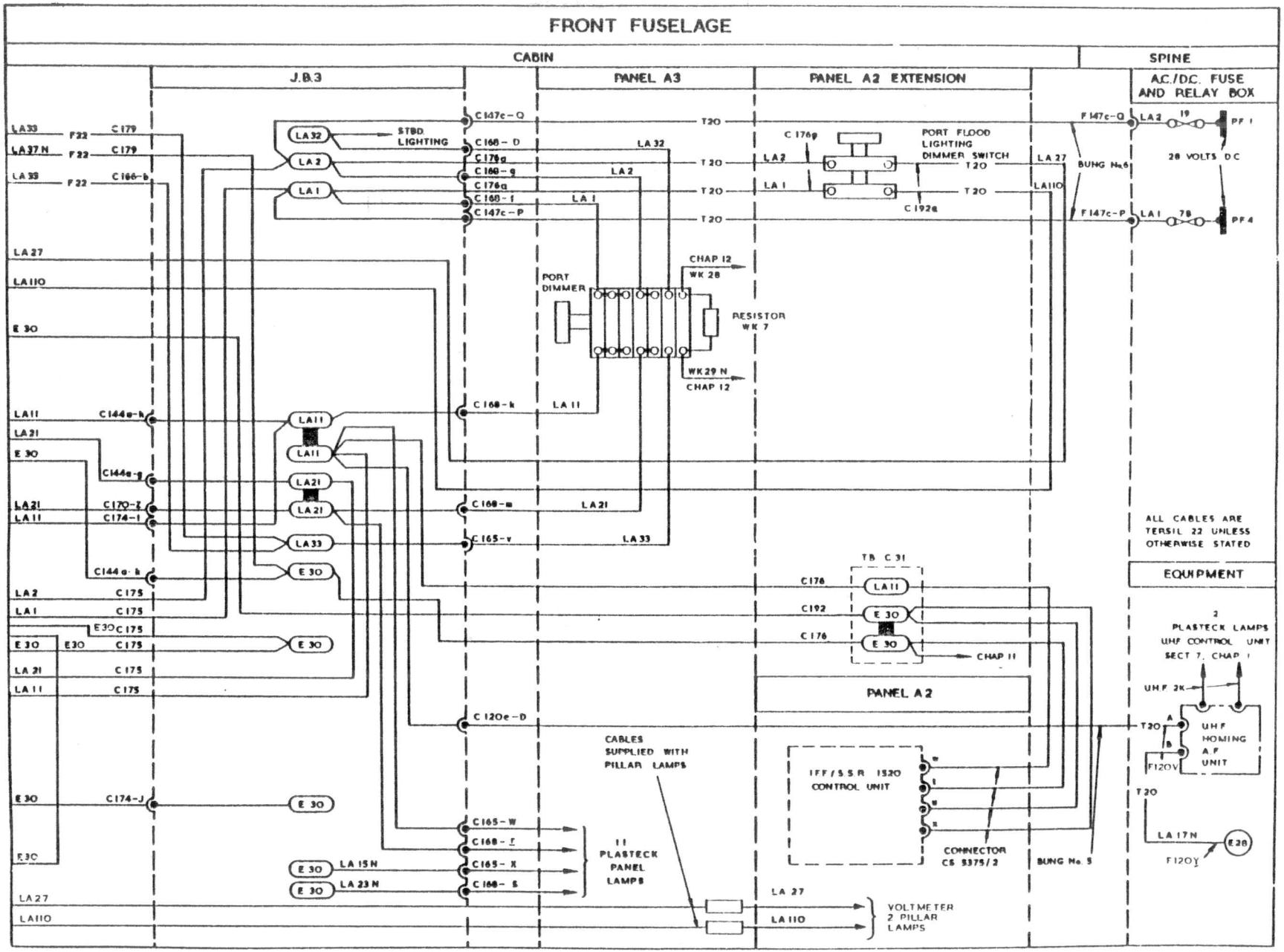


FIG. 7A. CABIN LIGHTING (PORT)

◀ WIRING CODES AND WIRING AMENDED ▶

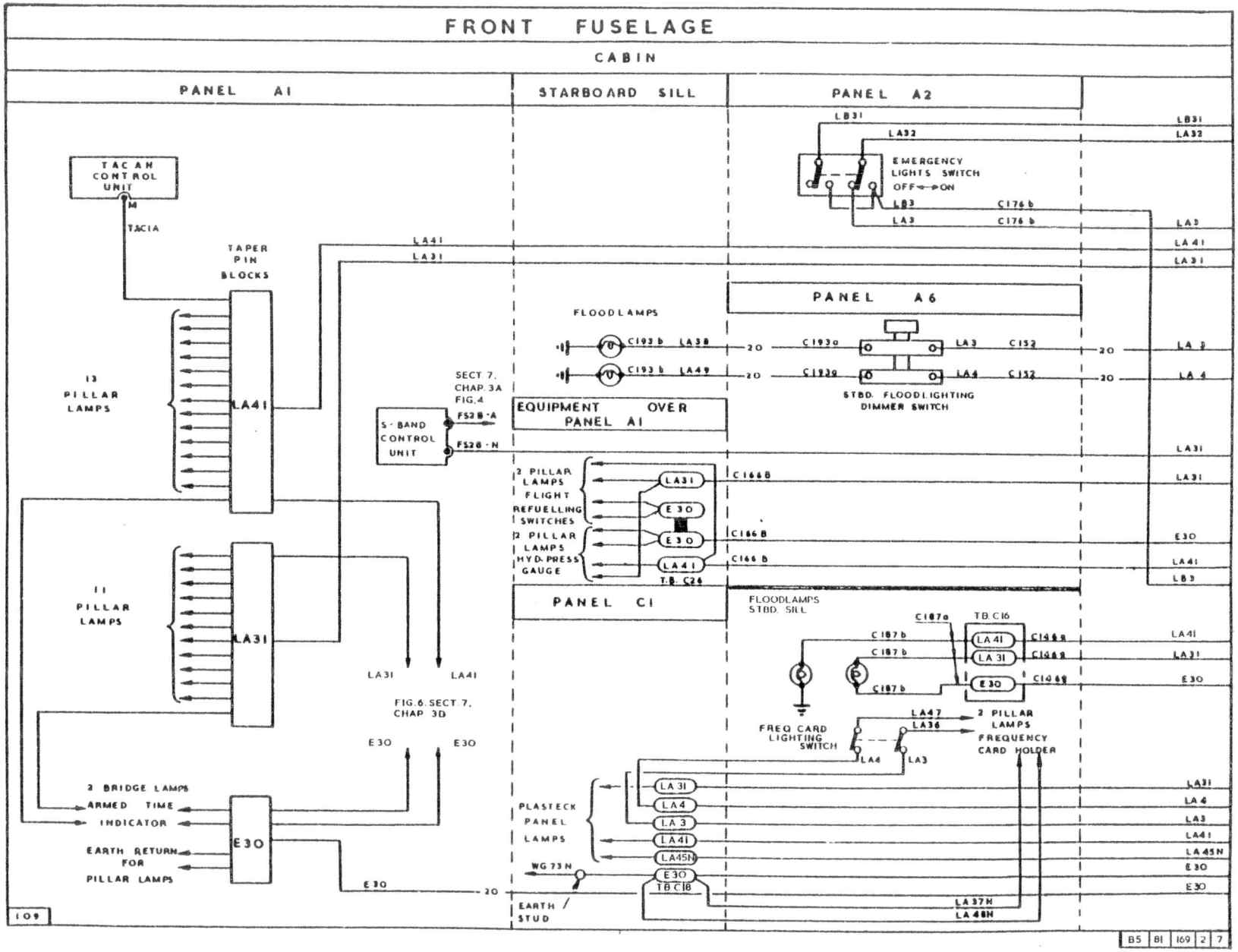


FIG. 8. CABIN LIGHTING (STARBOARD)

◀ CROSS REFERENCE AMENDED ▶

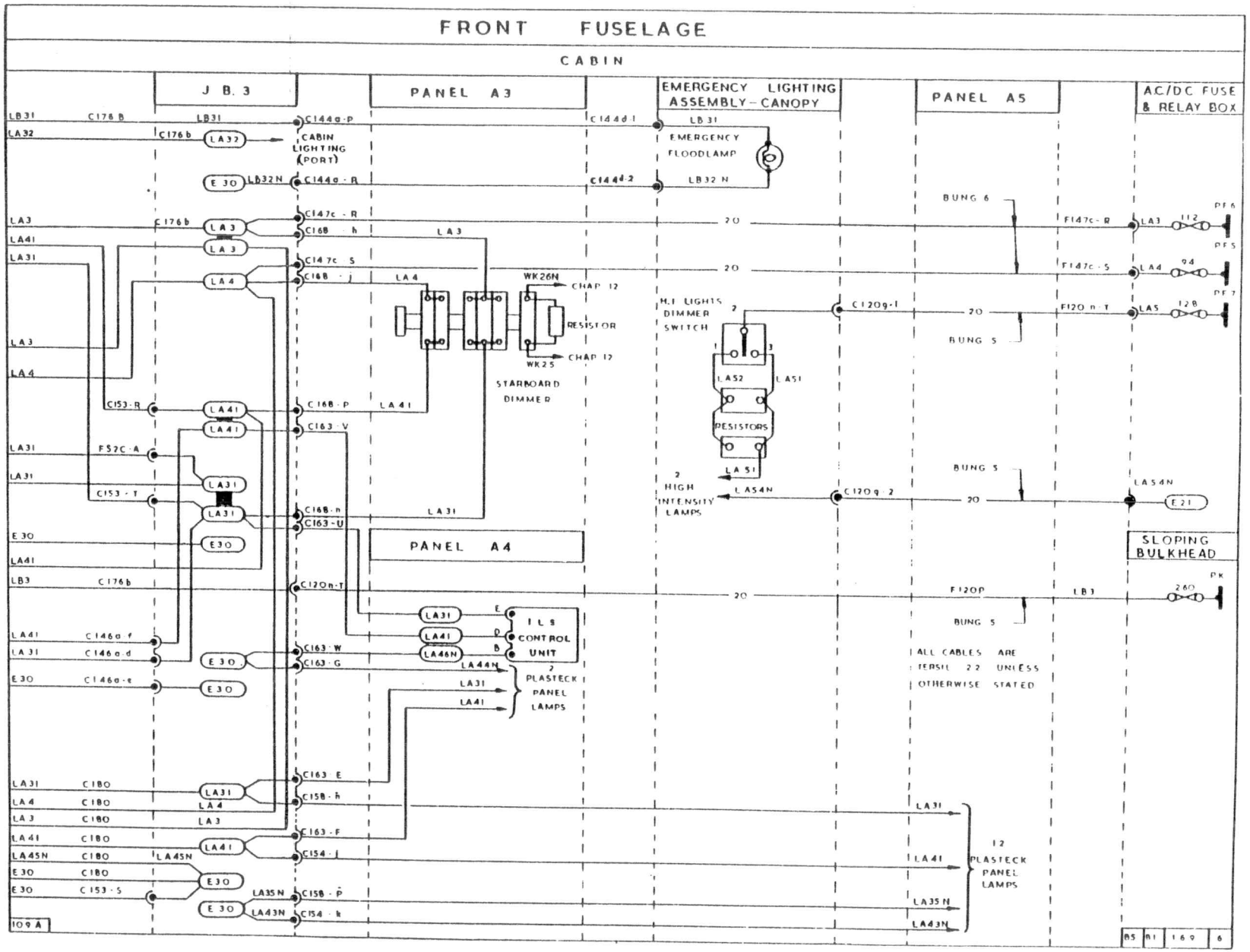


FIG. 8A. CABIN LIGHT (STARBOARD)

◀ CIRCUIT AND WIRING CODES AMENDED ▶

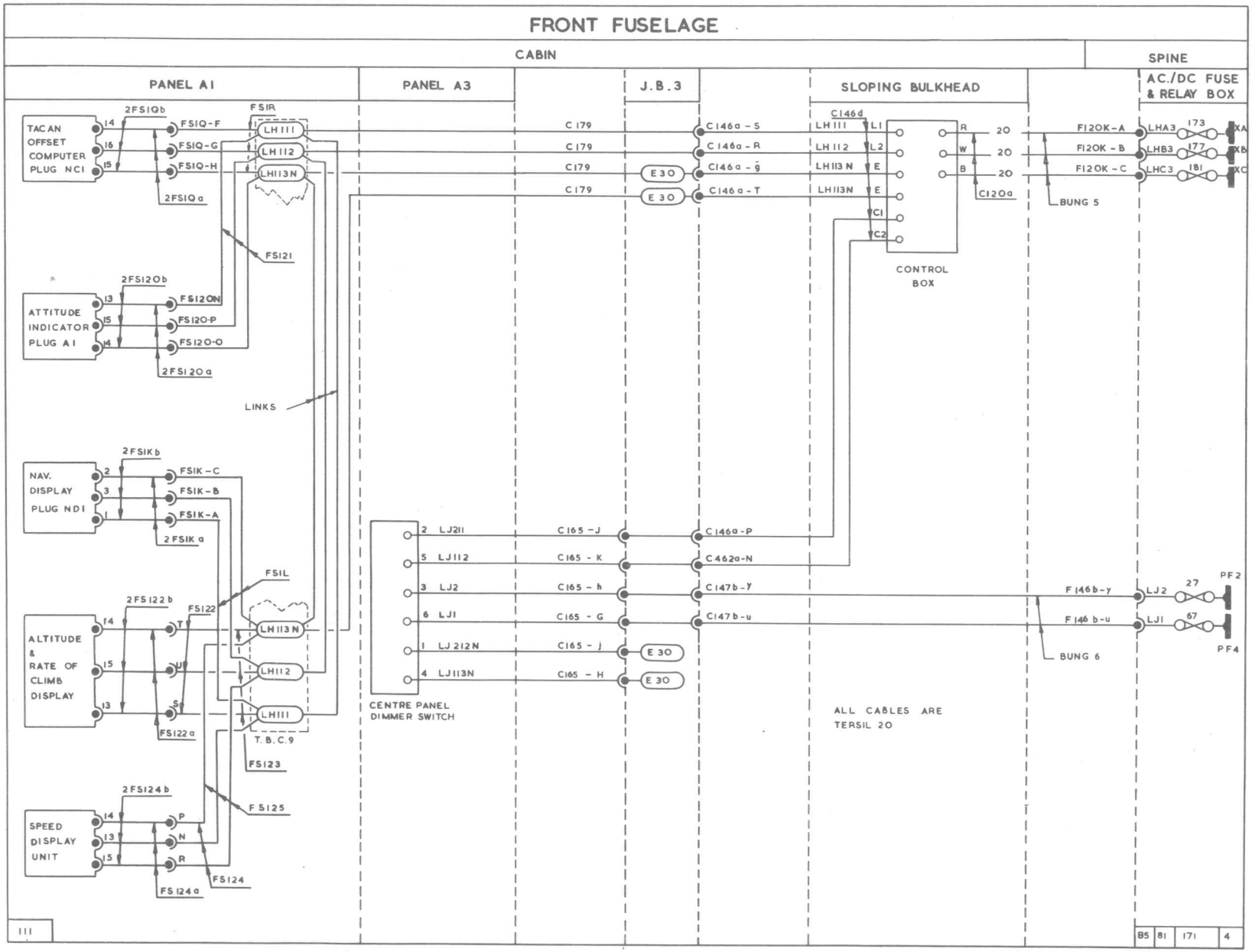


FIG.9. 4-VOLT INSTRUMENT LIGHTING

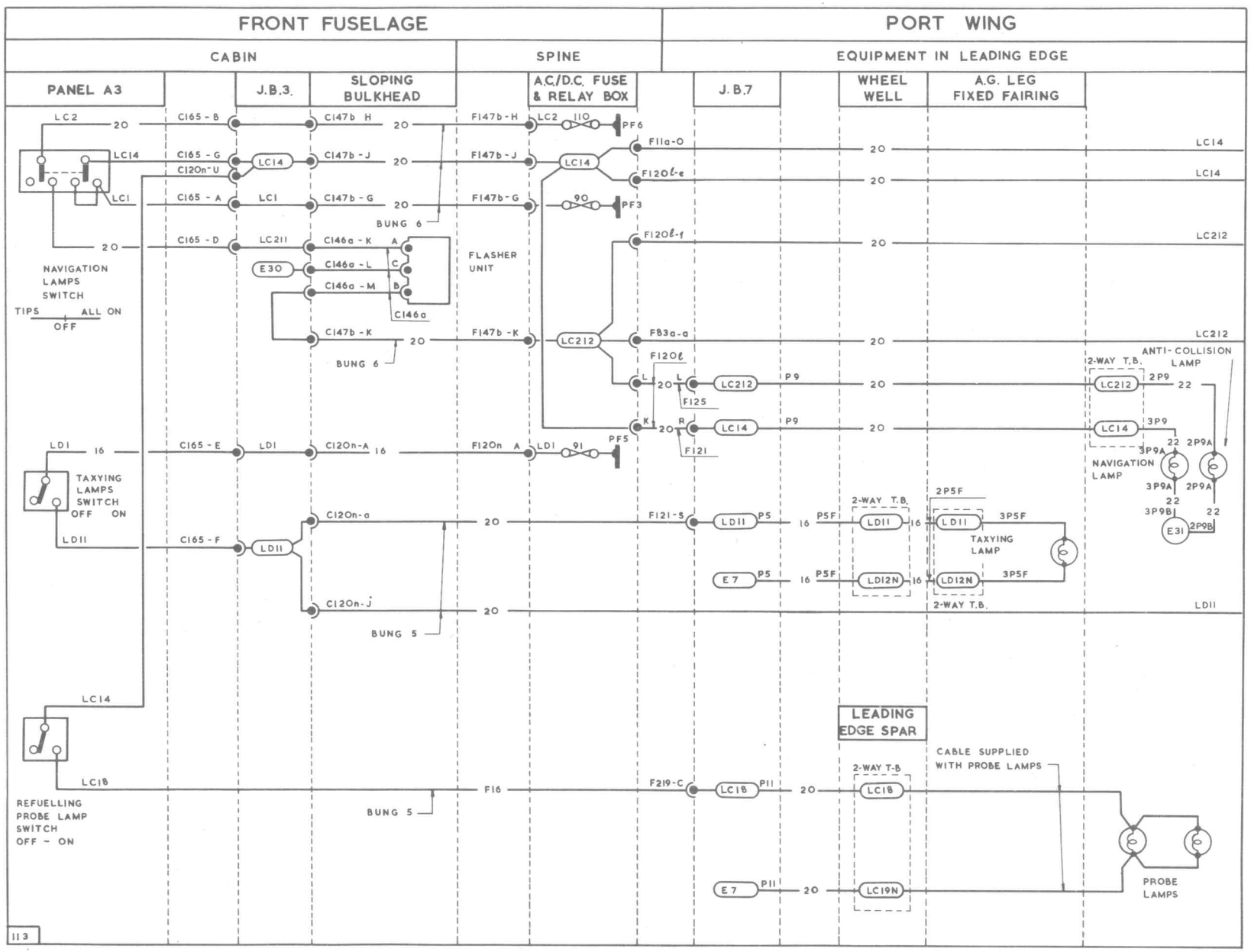


FIG.10. EXTERNAL LIGHTING

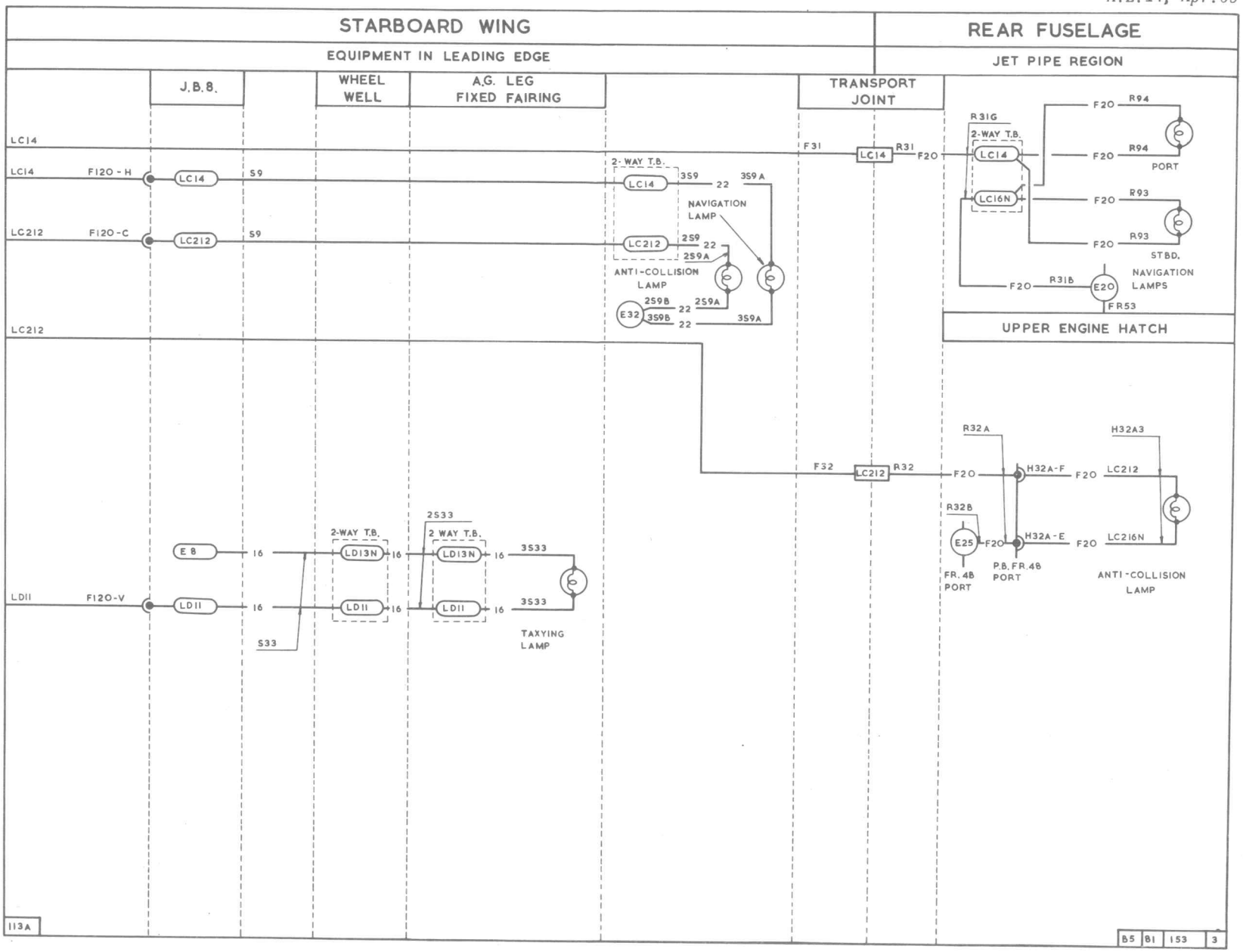


FIG.10A. EXTERNAL LIGHTING