CHAPTER 1

ELECTRICAL SERVICING

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

Introduction

1. This section contains diagrams giving the location of the various electrical components and wiring of the various services; notes on the servicing of equipment, and access to components. For detailed information on standard items of equipment, reference should be made to the list of specialist publications at the beginning of this book.

Power supply

2. Power is supplied by a generator, type HX, 24-volt, 1500-watt, mounted on the starboard side behind the firewall, which charges two 12-volt, 40-amp. hr. accumulators connected in series. To prevent interference

with the radio equipment a suppressor is included in the circuit. A voltage regulator, type A, maintains a constant voltage irrespective of engine speed or load current. A cut-out, type D2, prevents reverse feed from the accumulator when the generator voltage falls below the accumulator voltage. A warning lamp mounted on the top instrument panel indicates when the generator is not charging the accumulators, either because the generator has failed or the main fuse has broken.

INSTALLATION DETAILS

Fuses

3. The general service fuses are located on J.B.1 and J.B.2. Their numbers, service and rating are shown on the fusebox covers.

Table of fuses

4.

Circuit	*Circuit code size*	*Fuse (amps)*	*Fuse No.*
Generator	GA	5	32
		5	33
		10	34
		60	35
Starter and booster coils	SA	5	31
		10	1
Identification lamps	J	10	5
Landing lamp	LL	5	17
		20	28
Heated pressure head....	P	10	3
I.F.F. supply and demolition	QS-Q	20	18, 25
Camera gun....	CG	10	10
Gun firing valves	GF	10	14
		25	26
			27
T.R.1464 supply	QG	40	29
Interior lamps	T	5	6
			7
Cabin pressure warning	PW	15	15
R.I. compass supply	RI	5	2
Navigation lamps	N	5	4
Fire extinguisher	FA	5	8
			16
Undercarriage indicator	U	5	22
Undercarriage lever lock	UL	5	23
Fuel contents gauges	S	5	20
Fuel pressure warning lamp	PA	5	9
Flap indicator	F	5	21
Gyro gun-sight	GS	10	24
Oil thermometer	OA	5	11
Metering oil pressure....	TA	5	19
Wing tank jettison	TJ	5	12
Booster pump	BP	10	13

Junction boxes

5. The junction boxes are prefixed by the letters JB., and are referenced numerically, i.e., JB.1, etc. They are referenced on the routing charts and their positions in the aircraft shown on the location diagram. Multi-pole plugs on the junction boxes are each denoted by a label showing its number preceded by a letter, i.e., C1 on JB.1 and C10 on JB.2. The internal wiring of all junction boxes and conduits between junction boxes is carried out in V.I.R. cable.

Terminal blocks

6. Terminal blocks are provided at convenient points throughout the installation. They are not numbered themselves, and the numbers shown on the routing charts are arbitrary, and used purely to correlate them with the location and other diagrams.

Bulkhead plugs

7. The plugs are double-ended and are used to take wiring through metal panels as at firewalls and bulkheads.

INTERPRETATION OF DIAGRAMS

Location

8. This diagram shows the position of the electrical components, the lay-out of the instrument panel and the junction boxes. The location diagram will be found of assistance if referred to when reading a routing chart.

Schematic

9. The purpose of this diagram is to give the theoretical representation of a circuit.

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Routing chart

10. The various electrical circuits are drawn in the form of routing charts, which have vertical columns, each representing either a junction box, a pin reference, or an equipment panel, as indicated at the head of each column. The extreme left-hand column gives the circuit name and code letter. Where one routing chart bears more than one circuit, each circuit is separated by a heavy horizontal line.

Method of reading

11. As an example of the manner in which the routing chart is used, reference should be made to the flap indicator circuit, *fig.* 8. Commencing at fuse No. 21, in junction box JB.1, a quintocel 4 cable, coded F+, is connected to the transmitter. The cable is then taken from the transmitter through cable coded F1, F2, F3, and enters JB.2 by the conduit C10 at X, Y and Z, leaving by the conduit at C5A at T, U and V and passing through bulkhead 2 by conduit C5 at T, U and V to JB.1. The cable continues from JB.1 through conduit C2 at T, U and V to the indicator in the instrument panel. The negative wire is connected from the transmitter to JB.1 through conduit C10 at T.

SERVICING NOTES

General

12. The information given in the following paragraphs covers the procedure for certain inspections, tests and adjustments with respect to the electrical equipment in the aircraft, but does not cover all the operations that may be necessary during the servicing of the various circuits. The servicing of other items of equipment fitted in the aircraft is covered in specialist publications, a list of which is given in the front of this publication.

Table of lamps

13. *Lamp*	*Stores Ref.*	*Voltage*	*Wattage*
Navigation :			
Port	5C/887	24	20
Starboard	5C/889	24	20
Tail	5C/498	24	10
Identification (downward)	5C/557	24	80
Landing	5C/1515	24	240
Floodlamps :			
Right-hand	5C/2278	24	2·8
Left-hand	5C/2278	24	2·8
Compartment	5C/2278	24	2·8
Ultra-violet	5C/1952	2·5	0·75
Fire warning	5C/1069	24	3
Undercarriage warning	5C/1069	24	3
Fuel pressure warning	5C/1553	6	0·24
Generator power failure warning	5C/1553	6	0·24

Ground/flight switch

14. This switch is situated on the port side aft of the throttle box and enables the services to be tested with external accumulators. The switch must be placed in the FLIGHT position before take-off. The prime function of the Ground/Flight switch is for ground testing and starting from an external supply.

Starter and booster coils (SA)

15. It is important to maintain the solenoid switch-covers in good condition and the terminal lugs spaced adequately to avoid the possibility of a short circuit between the terminals, as this may cause unexpected operation of the starter motor.

Note . . . The aircraft accumulators must not be used for ground tests or ground starting.

Fire extinguishers (FA)

16. A flame switch is mounted on each engine bearer behind the firewall and one on each diaphragm at the trailing edge of rib one. The container should be disconnected during any tests to this circuit. To disconnect the container from the circuit, the 2-pole plug should be pulled from the socket at the bottom of the container.

Fuel pressure warning lamp (PA)

17. The warning lamp is mounted on the top instrument panel, and gives a red light when the engine fuel pressure drops below 1½ lb. per sq. in. The switch unit can be adjusted on a test rig by removing the C-spring and lifting the cover off by the eye, when a small 4 B.A. nut will be revealed. Use a box spanner to slacken the nut and a fine screwdriver to turn the adjusting screw; turning the screw in a CLOCKWISE direction will REDUCE the operating pressure.

Undercarriage position indicator (U)

18. In the event of trouble in this circuit, check the micro switch connections; renew a micro switch if the plungers or contacts have become corroded. The only servicing required for the indicator will be the replacement of the filament lamps. This can be effected by removing the two screws on the bezel of the instrument, and unscrewing the bezel from the body to gain access to the lamps.

Navigation lamps (N)

19. The lamps are mounted on the port and starboard wing tips and are easily accessible through the access panel on the undersurface of the main plane. The tail lamp is withdrawn by releasing the screws securing the lamp to the port tail boom so that the screws securing the lamp housing to the mounting are revealed. Release these screws and withdraw lamp and holder from the mounting.

Identification lamps (J)

20. These are positioned on underside of the rear cone engine fairing. To remove the filament lamps remove the nuts securing the glass holder.

Landing lamp (LL)

21. Adjustments can be carried out by slackening the screws holding the lamp panel to the main plane. For further information on adjustments reference should be made to A.P.1095A, Vol. 1.

Fuel contents gauges (S)

22. When a fuel tank has been changed ensure that the wire secured to the float arm has been removed.

Cabin pressure warning (PW)

23. This warning lamp system is fitted to give visual indication when the cabin pressure is less than $1\frac{1}{2}$ lb. per sq. in. above atmospheric pressure. The Westland valve is mounted in the nose, and the lamp on the right-hand dashboard. This circuit only applies to later aircraft.

Bonding

24. *Fig.* 12 shows the aircraft bonding. Pipes, metal-braided cables, fuel and oil tanks are bonded together and to the main structure. When refitting bonding clips, ensure that the surfaces to be bonded are free from oil, rust or grease. Tests from ailerons, elevators, flaps, rudders and control systems to the main airframe need not be made as the hinged joints are considered to be effective links and do not require additional bonding.

Access to components

25. The position of the main components can be ascertained from the location diagram, *fig.* 1. The table given below gives components to which access is not obvious.

Components	*Access*
GENERATOR CONTROLS	
Accumulators	From under fuselage through gun access door.
Generator	Port side of engine.
Suppressor	Rear spar of starboard main plane. Put flaps to DOWN position.
External supply socket (test)	On port side of fuselage, under main plane.
ENGINE STARTING	
Boost coils	On port and starboard side of engine at top of firewall.
External supply socket (start)	On starboard side of fuselage, under main plane.
UNDERCARRIAGE INDICATOR AND FLAP INDICATOR	
Flap transmitter	On rear starboard underside of main plane. Put flaps to DOWN position.
Throttle switch	In cockpit—switch is located at throttle lever in the engine control box.
UP limit switches	Two in the port and starboard wheelwell.
	Two on the underside of the mudguard in the nose.
Leg lock switches	One each on port and starboard leg knuckle.
	One on the nose wheel hinge casting.
Warning lamp	On left-hand instrument panel in cockpit.

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FIRE EXTINGUISHER

Extinguisher container	Rear spar of port main plane. Put flaps to DOWN position.
Flame switches	One on each engine bearer, and one on each diaphragm at the trailing edge of rib one.

FUEL PRESSURE WARNING LAMP

Resistance unit	In the cockpit, on JB.1

LANDING LAMP

Lamp	Lower surface of port wing, outboard of tail boom : access by removal of lamp panel.
Selector switch	In the cockpit, on JB.1

IDENTIFICATION LAMPS

Lamps, downward	Rear cone engine fairing access to lamps by removal of screws on lamp panel.

NAVIGATION LAMPS

Port and starboard lamps	From port and starboard outer plane wing tips through panel under main plane.
Tail lamp	Remove the fairing from port tail boom.

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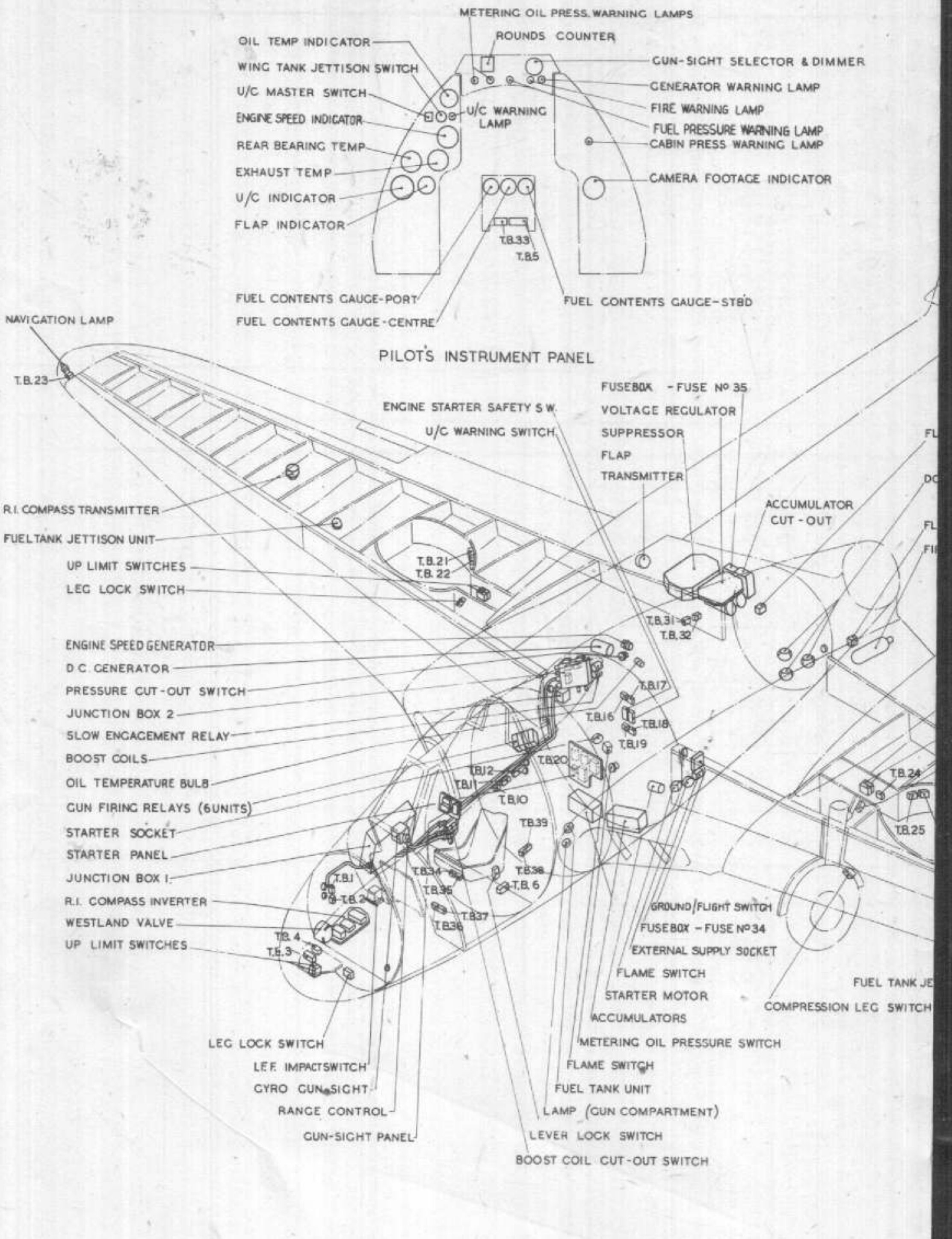
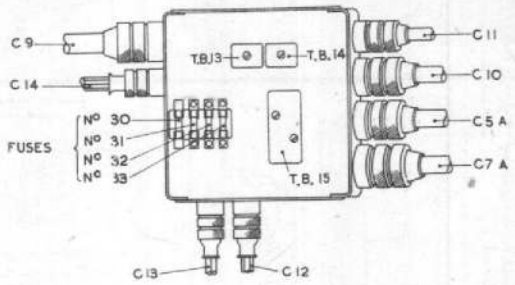


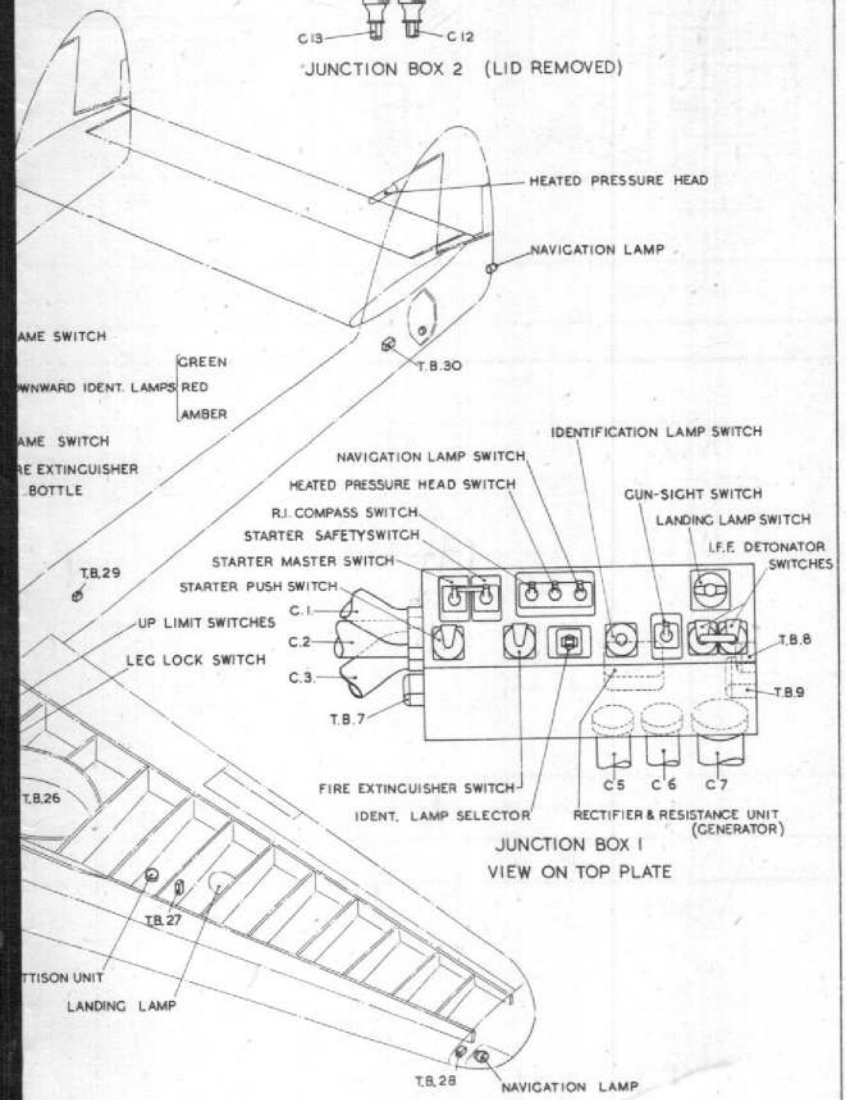
FIG. 1

LOCATION DIAGRAM

G1642 M45983 2/48 760 C.B.&S.Ltd. Gp.55.



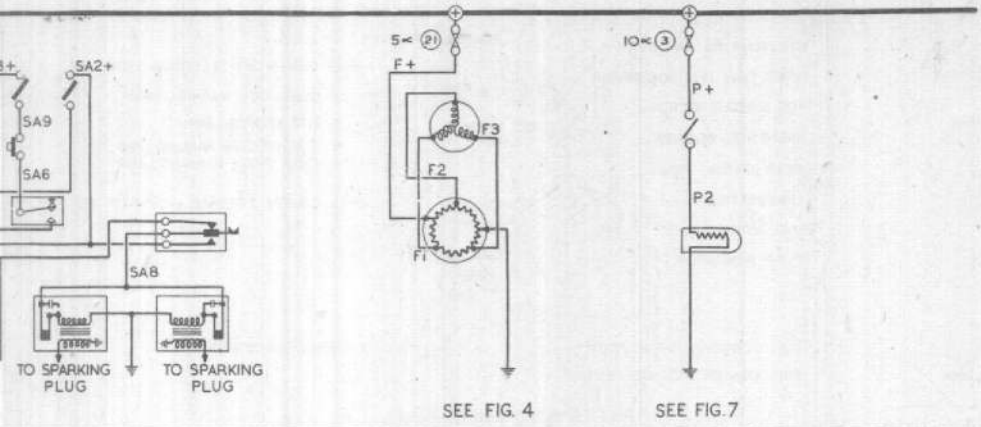
JUNCTION BOX 2 (LID REMOVED)



JUNCTION BOX 1
VIEW ON TOP PLATE

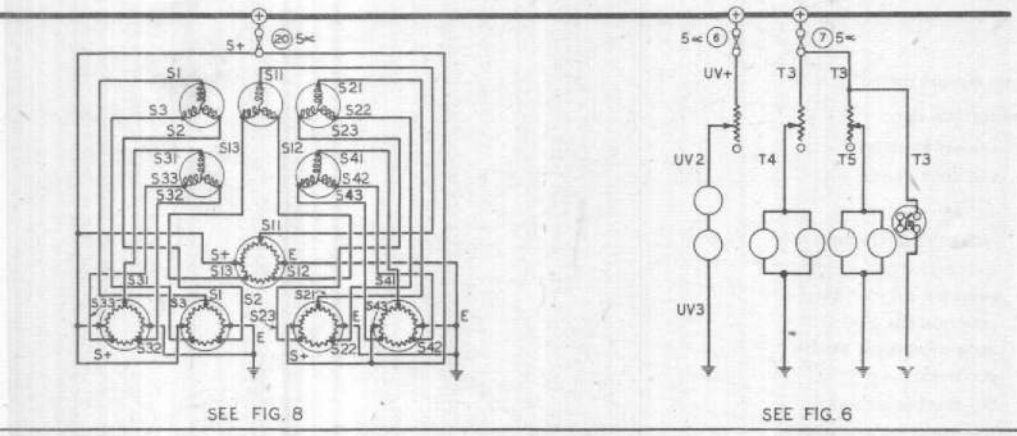
FIG. 1

FIG. 2



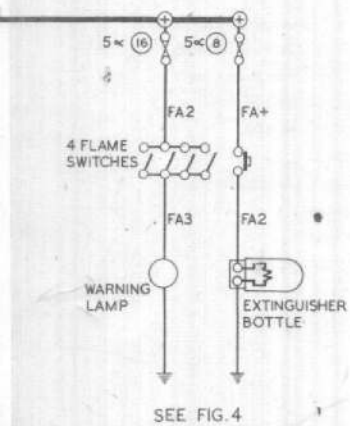
F FLAP INDICATOR

P HEATED PRESSURE HEAD



S FUEL CONTENTS GAUGES

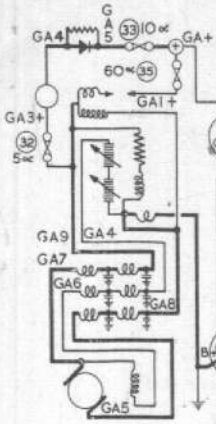
T INTERIOR LAMPS



FA FIRE EXTINGUISHER

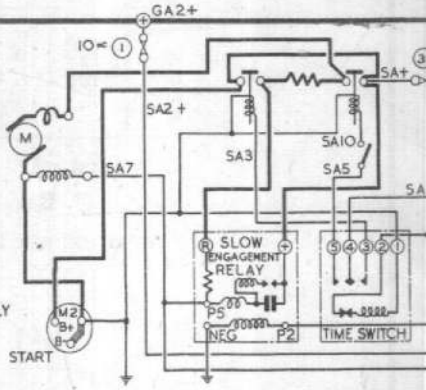
GRAM OF ELECTRICAL SERVICES

FIG. 2



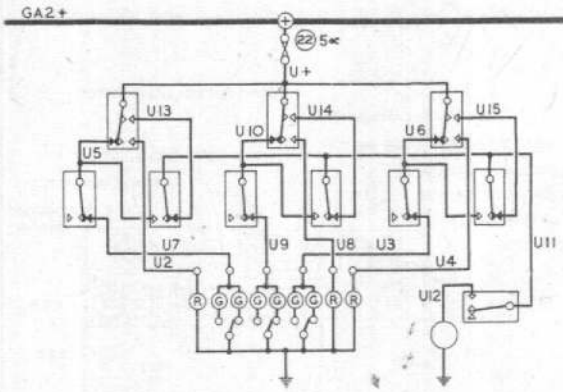
SEE FIG. 3

GA GENERATOR



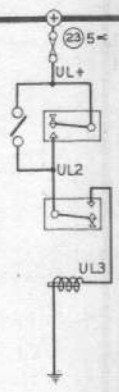
SEE FIG. 3

SA STARTER & BOOSTER COIL



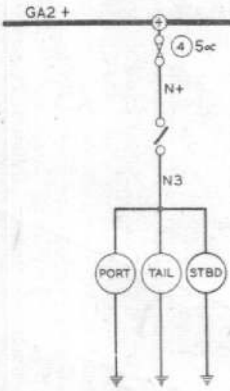
SEE FIG. 5

U U/C INDICATOR



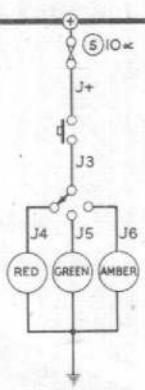
SEE FIG. 5

UL U/C LEVER LOCK



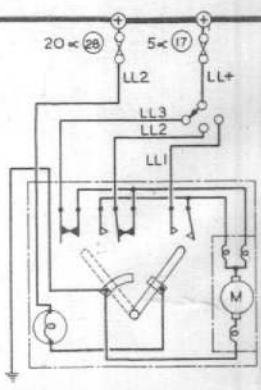
SEE FIG. 5

N NAVIGATION LAMPS



SEE FIG. 7

J IDENTIFICATION LAMPS



SEE FIG. 7

LL LANDING LAMP

FIG. 2

SCHEMATIC D

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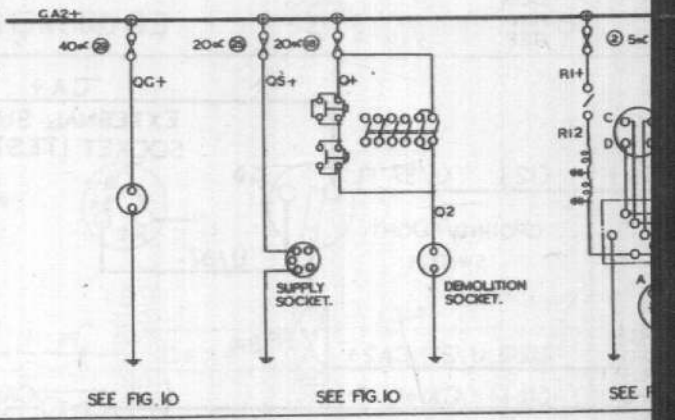
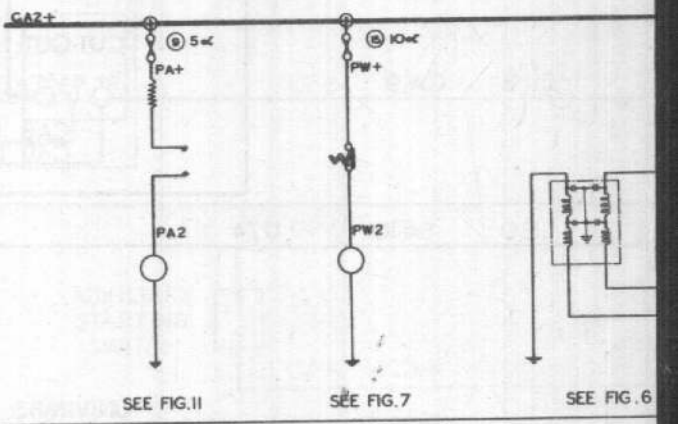


QG T.R.1464 SUPPLY

QS Q L.F.F. SUPPLY & DEMOLITION

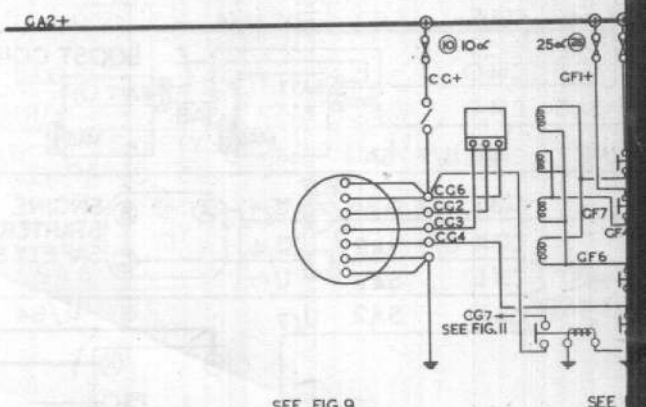
R1 COM



PA FUEL PRESSURE WARNING LAMP

PW CABIN PRESS. WARNING

BP BOOSTER PU



CG CAMERA GUN

GF GUN

FIG 2A

SCHEMATIC

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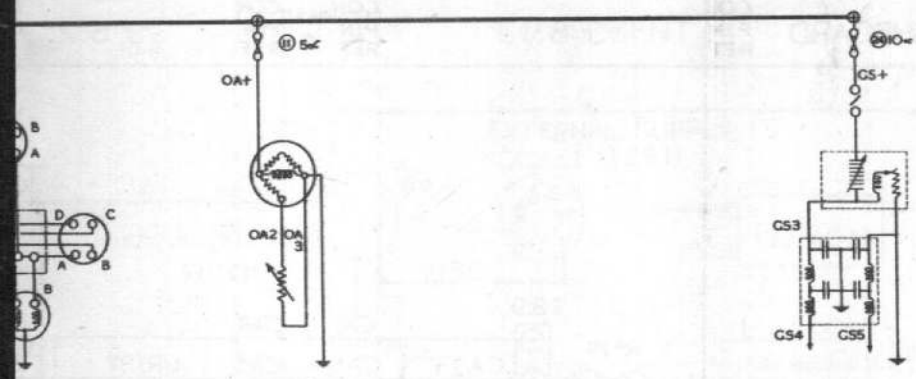
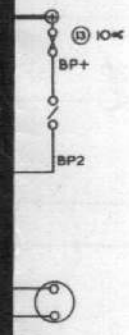
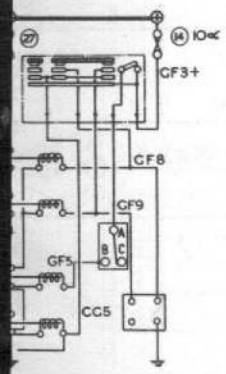


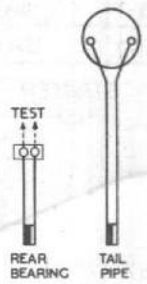
IG.10 — SEE FIG. 4 — SEE FIG.11

PASS SUPPLY — OA OIL THERMOMETER — GS GYRO GUNSIGHT



MP





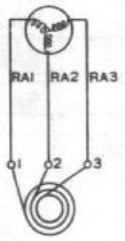


FIG.9 — SEE FIG.11 — SEE FIG.10

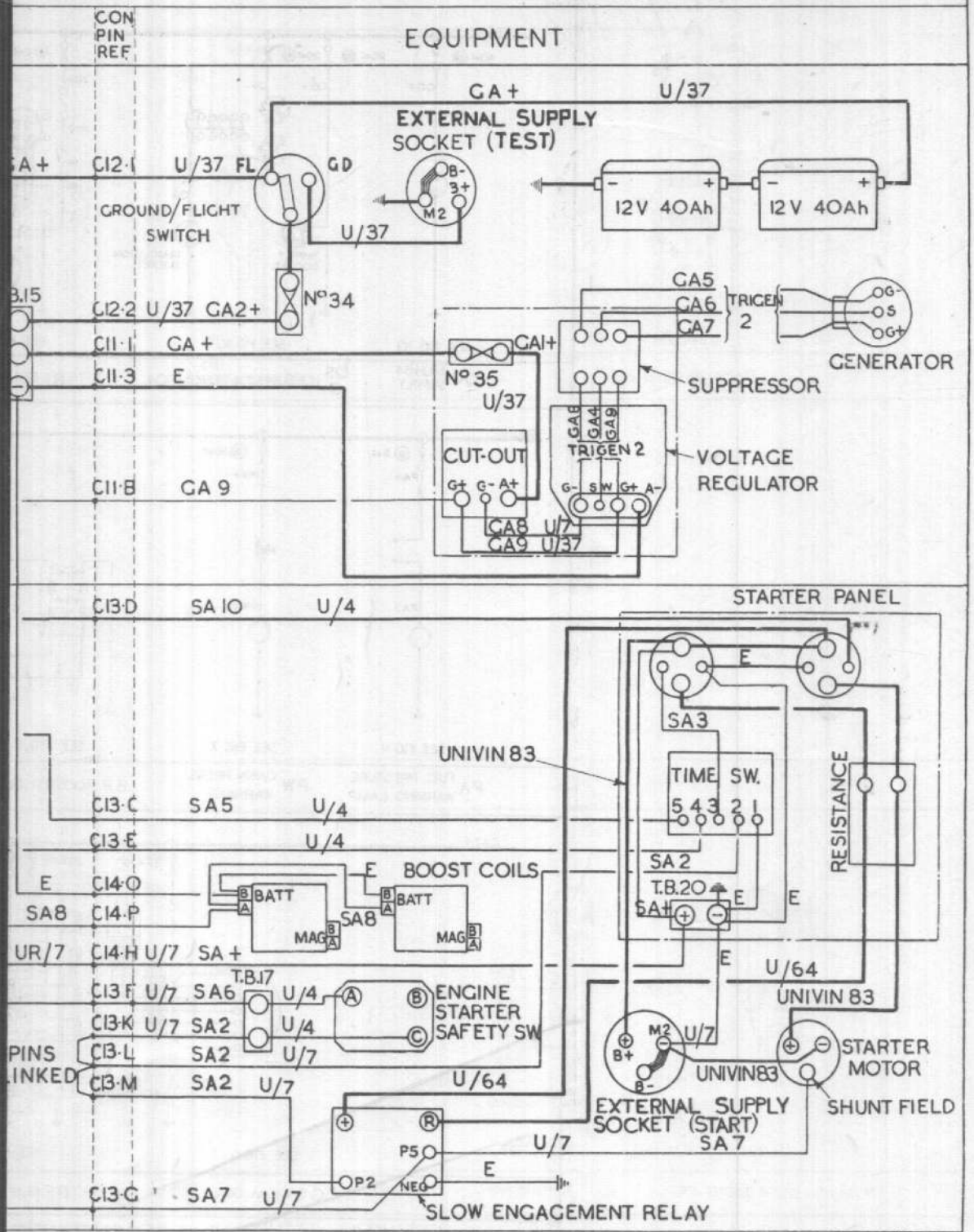
FIRING VALVES — PYROMETER — RA ENGINE SPEED INDICATOR

DIAGRAM OF ELECTRICAL SERVICES.

FIG. 2A

RESTRICTED

PANELS



CIRCUITS: GA-SA

FIG. 3

D

JUNCTION BOXES &

C'CT REF.	EQUIPMENT	DASHBOARD	CON PIN REF.	J.B.1	CON PIN REF.	BLK 2	CON PIN REF.	J.B.2

GA GENERATOR

T.B.9 (−) (+)
Nº 29
GA 2+ C7·5 C7A·5 UR/37
C7·T C7A·T GA 5+ GA+
Nº 33
TO CIRCUIT QG SEE FIG. 10
RECTIFIER
WARNING LAMP
U/4 C1·E GA 4+
U/4 C1·D GA 3+
C7·S C7A·S Nº 32

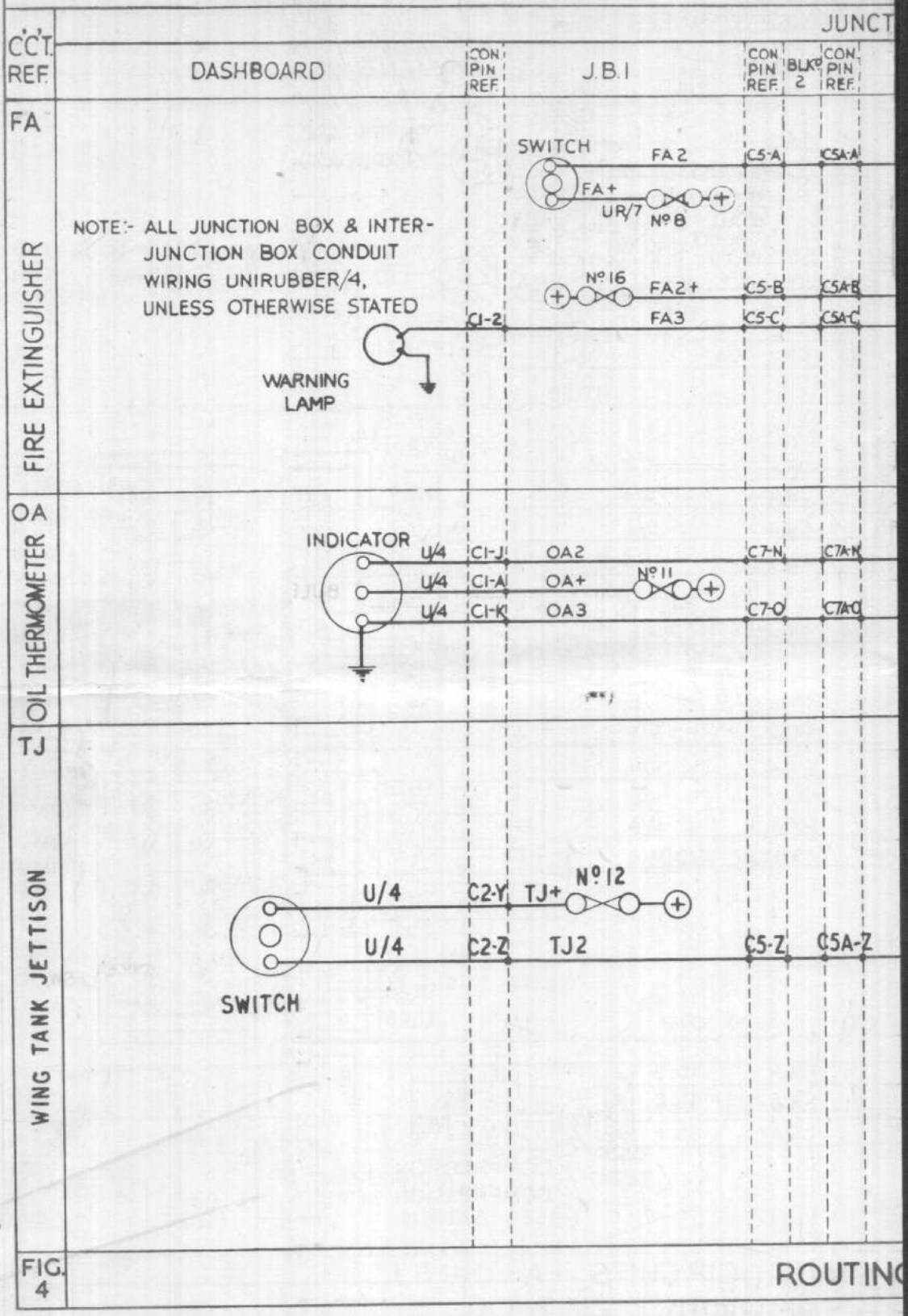
SA STARTER & BOOSTER COILS.

NOTE:- ALL JUNCTION BOX & INTER-JUNCTION BOX CONDUIT WIRING UNIRUBBER/4, UNLESS OTHERWISE STATED

C7·L C7A·L
AUXILIARY STARTING SWITCH
C7·K C7A·K
Nº 1
SAFETY SW.
UR/7
C7·E C7A·E SA 4
SA2+ U/7 C1·Y SA2+
SA8 U/7 C1·X UR/7
C7·M C7A·M
SA7 U/7
STARTER PUSH
SA3
SAFETY SW.
C7·H C7A·H SA3+ Nº 31
C7·F C7A·F
UR/7
SA 6
BOOST COIL CUT-OUT SWITCH
C1·W UR/7 C7·G C7A·G

FIG. 3

ROUTING CHART. C



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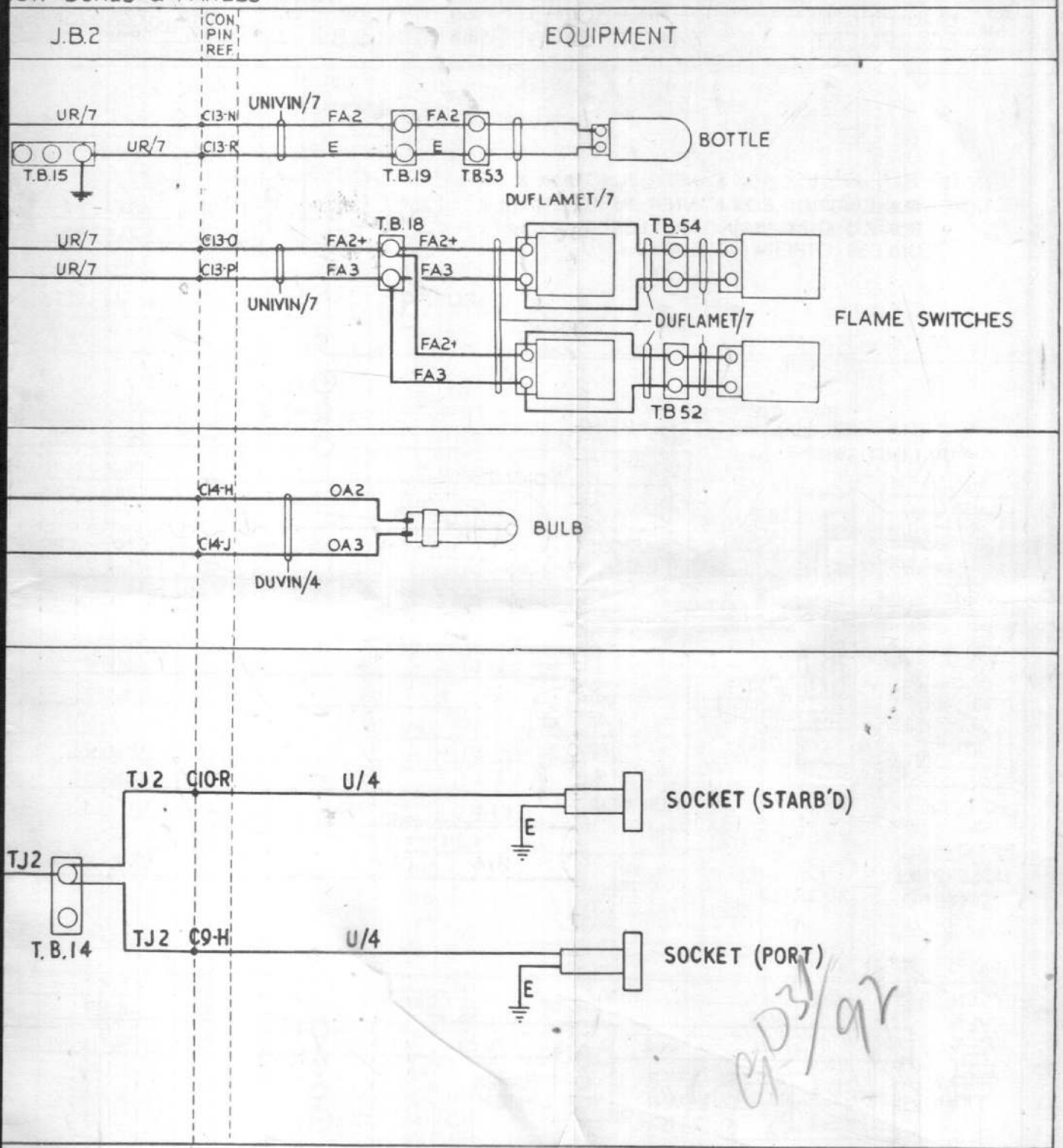
ION BOXES & PANELS



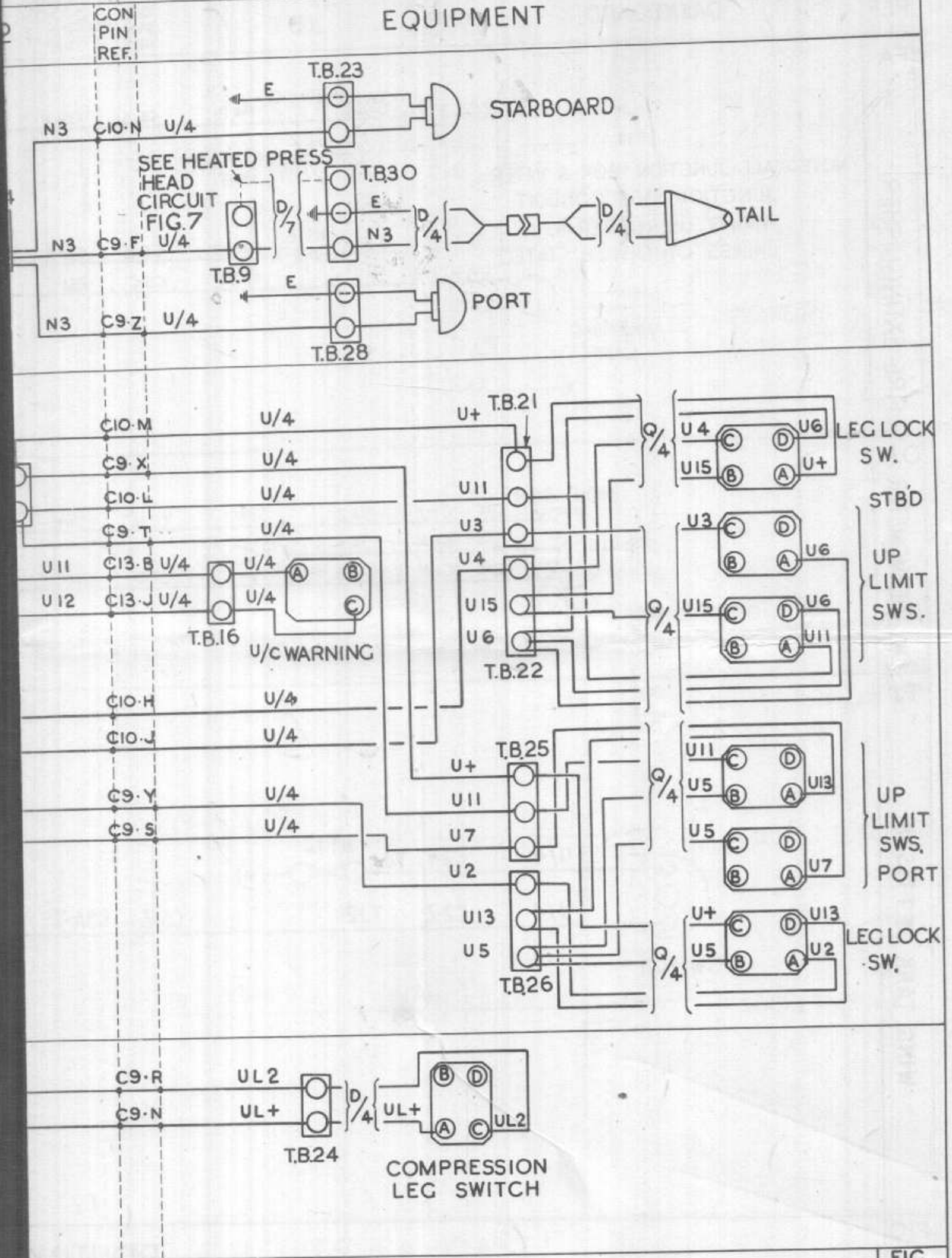
G CHART, CIRCUITS: FA - OA - TJ

FIG. 4

RESTRICTED

S

EQUIPMENT



TS: N-U-UL

FIG. 5

JUNCTION BOXES & PANEL

C'CT REF	EQUIPMENT	DASHBOARD	CON PIN REF.	J.B.1	CON PIN REF.	BLKD 2	CON PIN REF.	J.B.2
N	NAVIGATION LAMPS							
C	U/C POSITION INDICATOR							
UL	U/C LEVER LOCK							

NOTE:- ALL JUNCTION BOX & INTER-JUNCTION BOX CONDUIT WIRING UNIRUBBER/4 UNLESS OTHERWISE STATED.

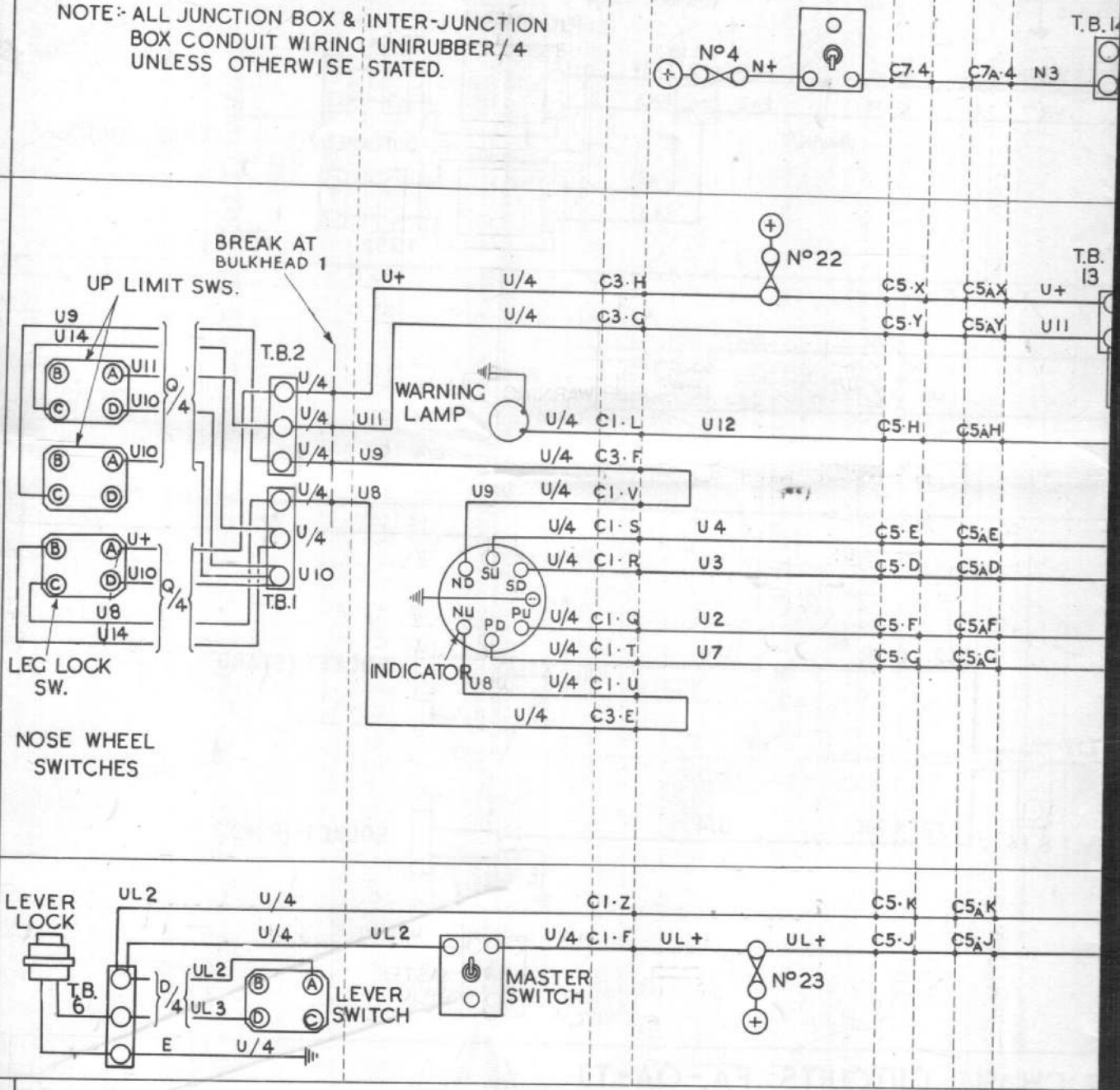


FIG. 5

ROUTING CHART. CIRCUI

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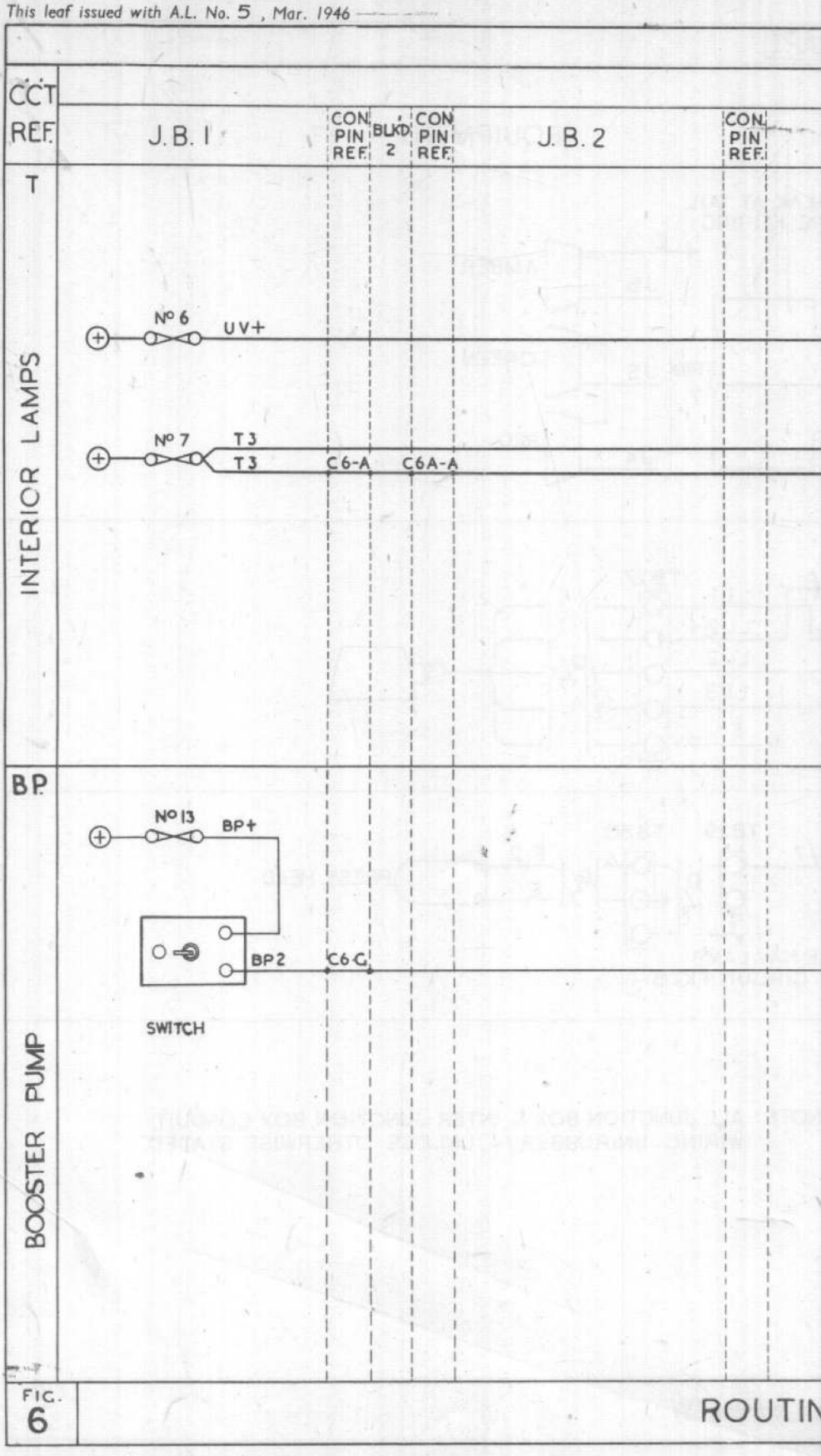
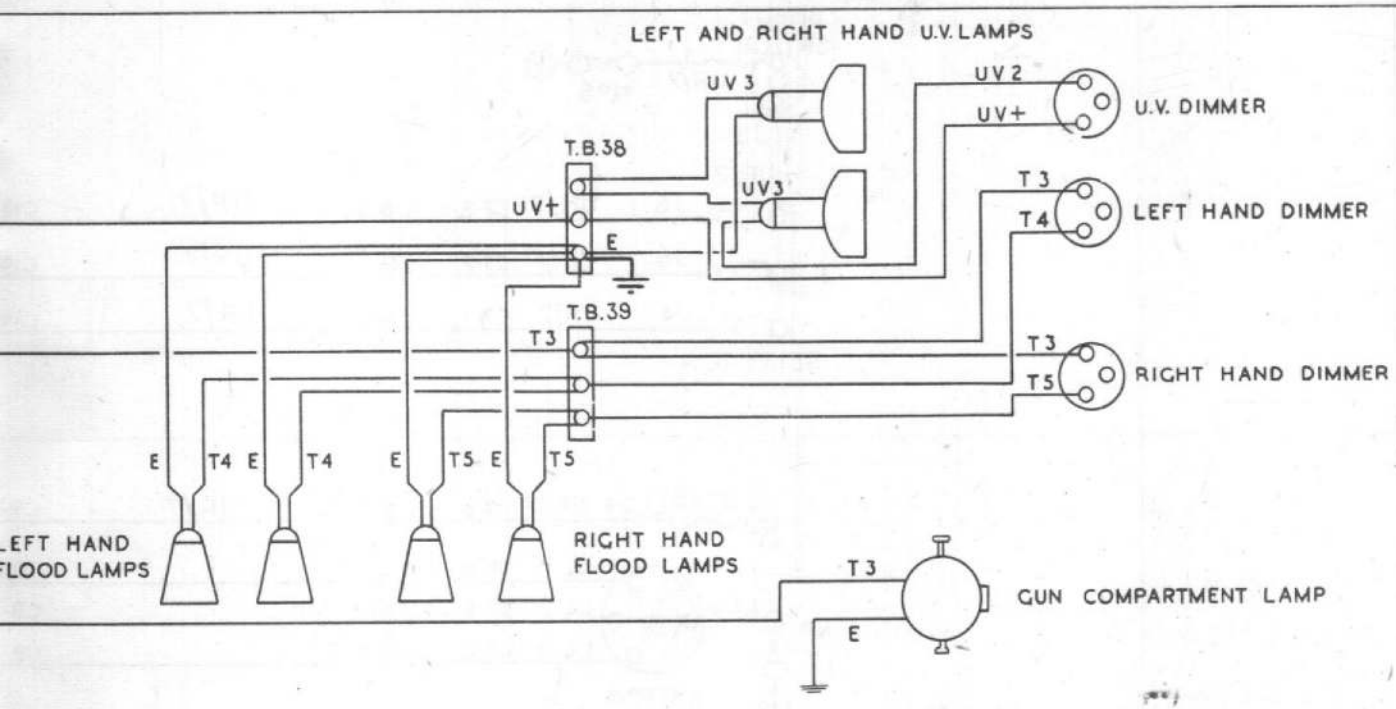


FIG. 6

ROUTIN

G346 M10744 325 6/46 C.B.& S. LTD. GP55.

EQUIPMENT



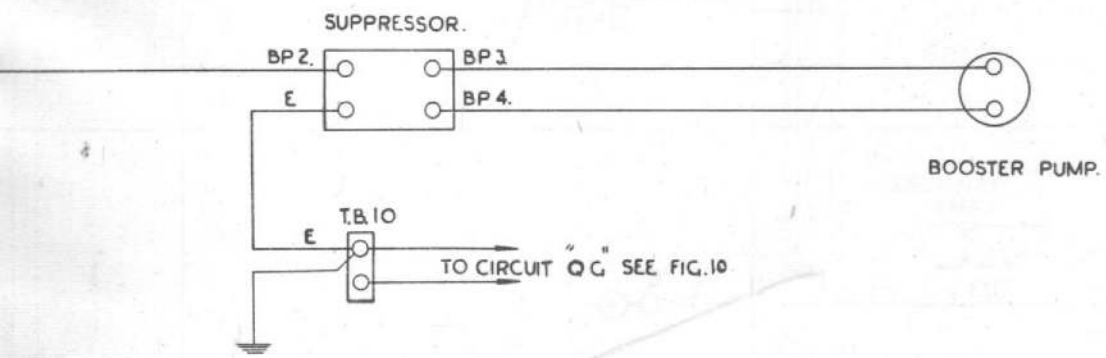
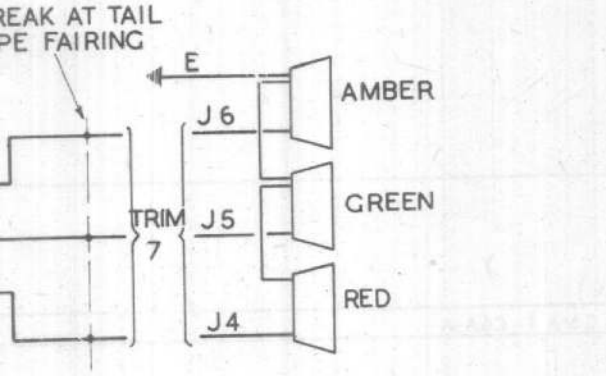


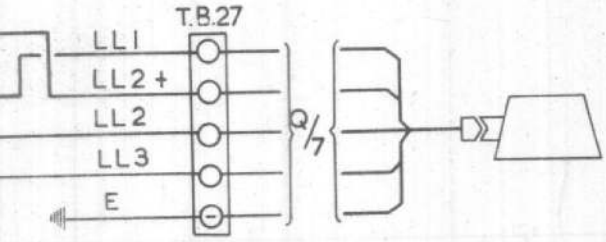
CHART. CIRCUITS: T—BP

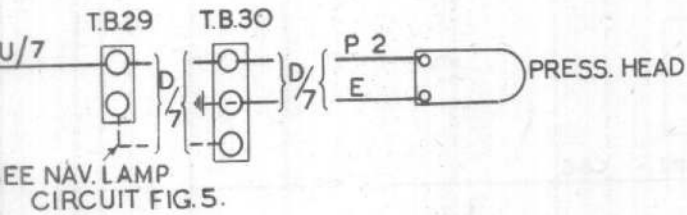
FIG. 6

AP.1

EQUIPMENT







NOTE :- ALL JUNCTION BOX & INTER-JUNCTION BOX CONDUIT WIRING UNIRUBBER/4, UNLESS OTHERWISE STATED.

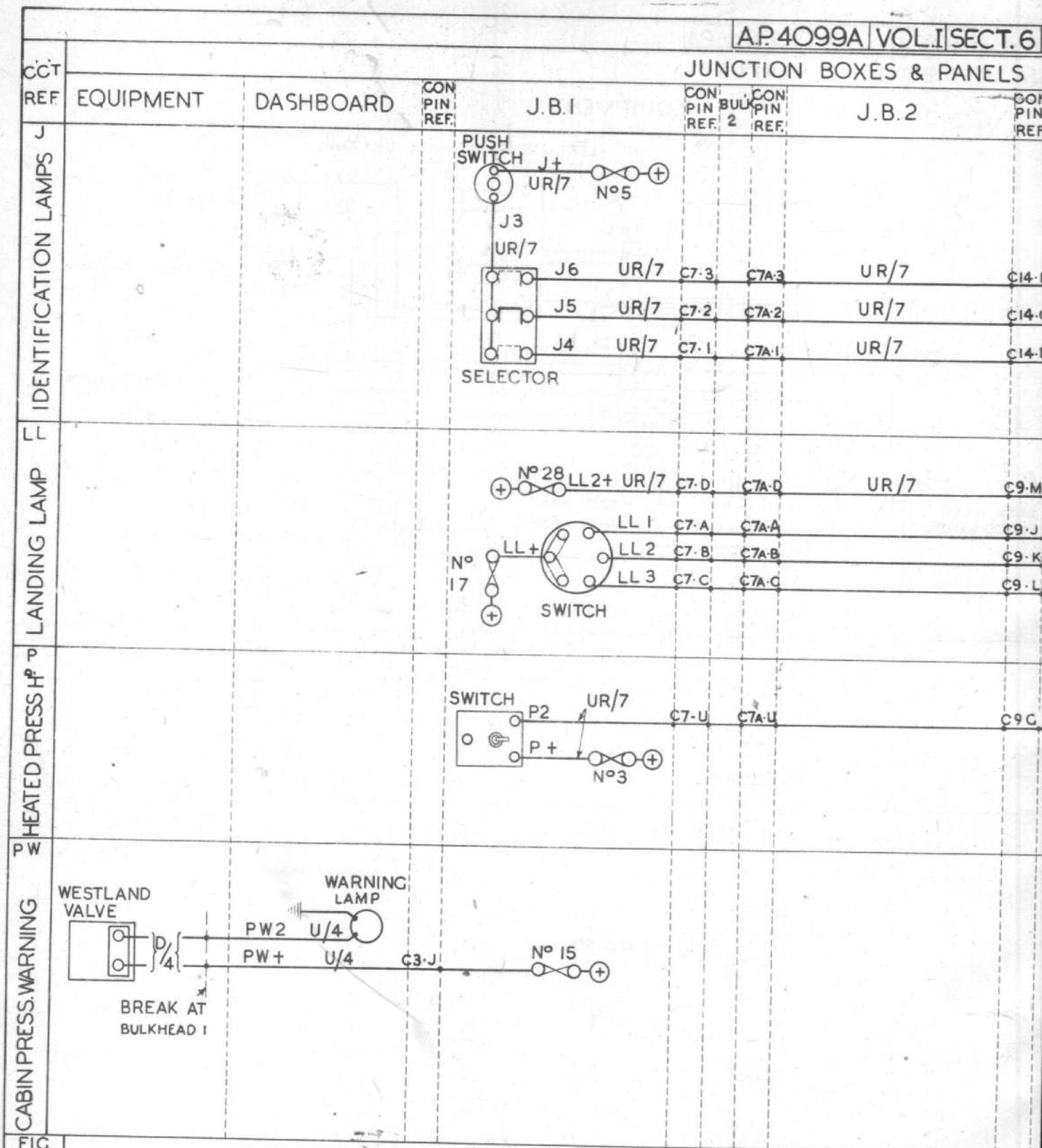


FIG. 7

ROUTING CHART. CIRCUITS: J

JUNCTION B

CCT REF.	EQUIPMENT	DASHBOARD	CON PIN REF.	J.B.I.	CON PIN REF.	BULKD 2	CON PIN REF.
S	FUEL CONTENTS GAUGES	INDICATOR (STARBOARD)	U/4 C2·J	S21	C5·P		C5A·P
			U/4 C2·K	S22	C5·Q		C5A·Q
			U/4 C2·L	S23	C5·R		C5A·R
					C5·S		C5A·S
				S+ Nº 20			
		CENTRE INDICATORS	U/4 C2·F	S11	C6·M		
			U/4 C2·G	S12	C6·J		
			U/4 C2·H	S13	C6·K		
					C6·L		
		PORT INDICATORS	U/4 C2·C	S1	C5·L		C5A·L
			U/4 C2·D	S2	C5·M		C5A·M
			U/4 C2·E	S3	C5·N		C5A·N
F	FLAP POSITION INDICATOR	INDICATOR	U/4 C2·T	F1	C5·T		C5A·T
			U/4 C2·U	F2	C5·U		C5A·U
			U/4 C2·V	F3	C5·V		C5A·V
				F+ Nº 21	C5·W		C5A·W

NOTE:- ALL JUNCTION BOX & INTER-JUNCTION BOX CONDUIT WIRING UNIRUBBER/4 UNLESS OTHERWISE STATED.

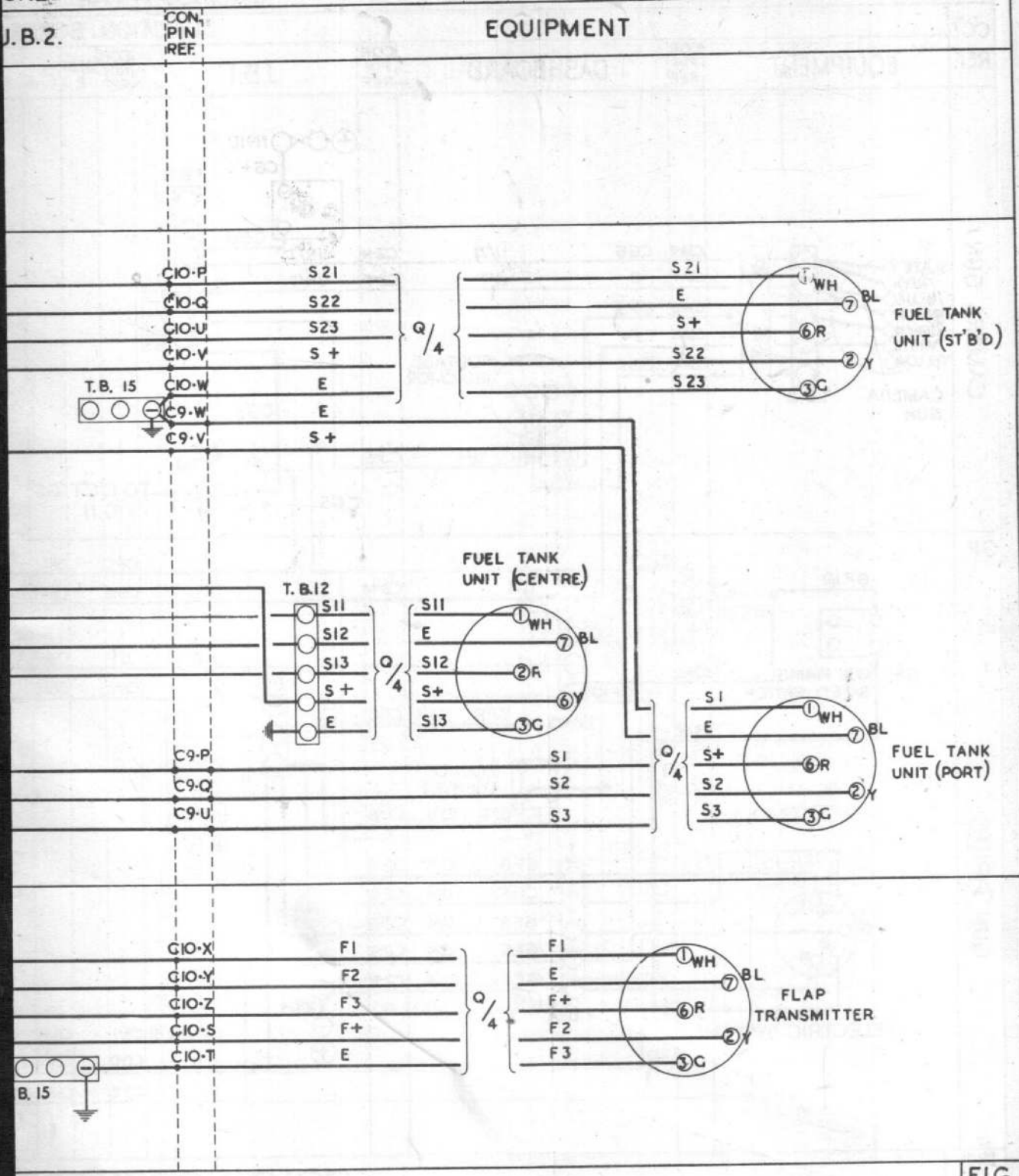
FIG. 8

ROUTING CHA

G1951 M19409 9/50 950 C.B.& S.LTD. GRSS.

OXES & PANELS

J.B.2.

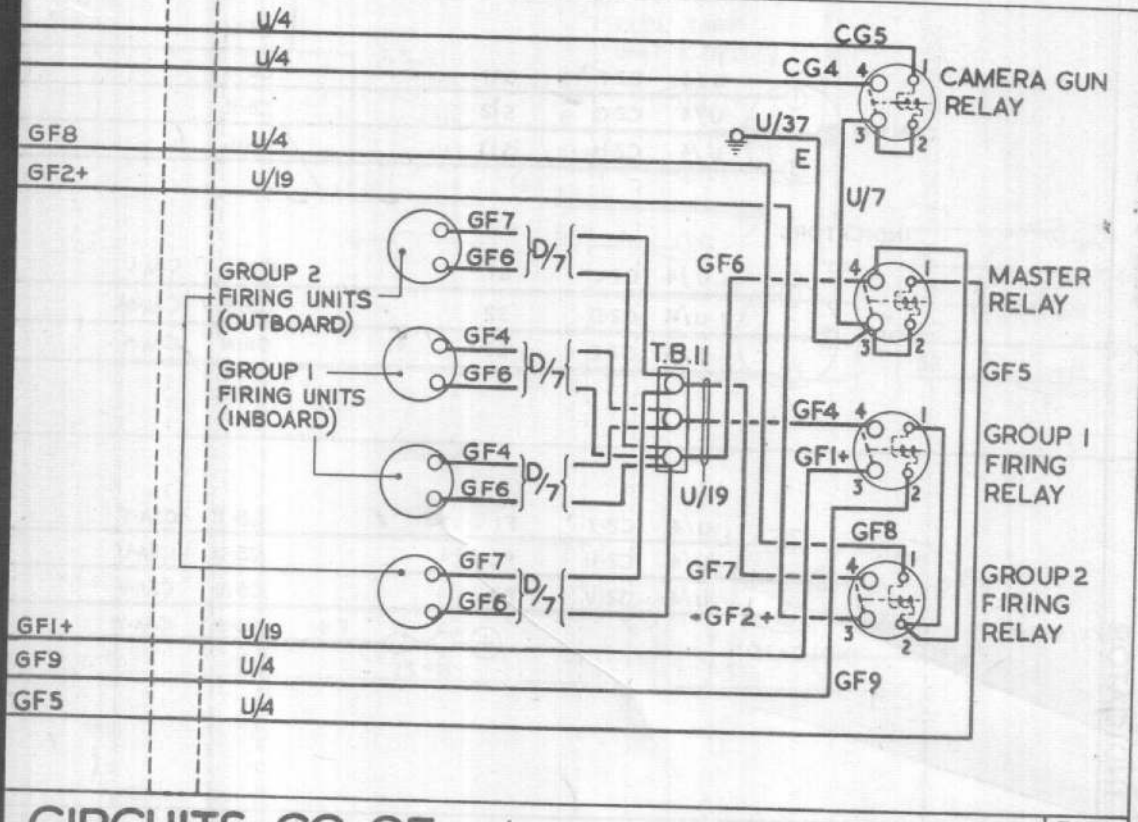


RT. CIRCUITS: S-F

FIG. 8

RESTRICTED

J.B.2	CON PIN REF.	EQUIPMENT



CIRCUITS: CG-GF

FIG. 9

JUNCTION BOXES

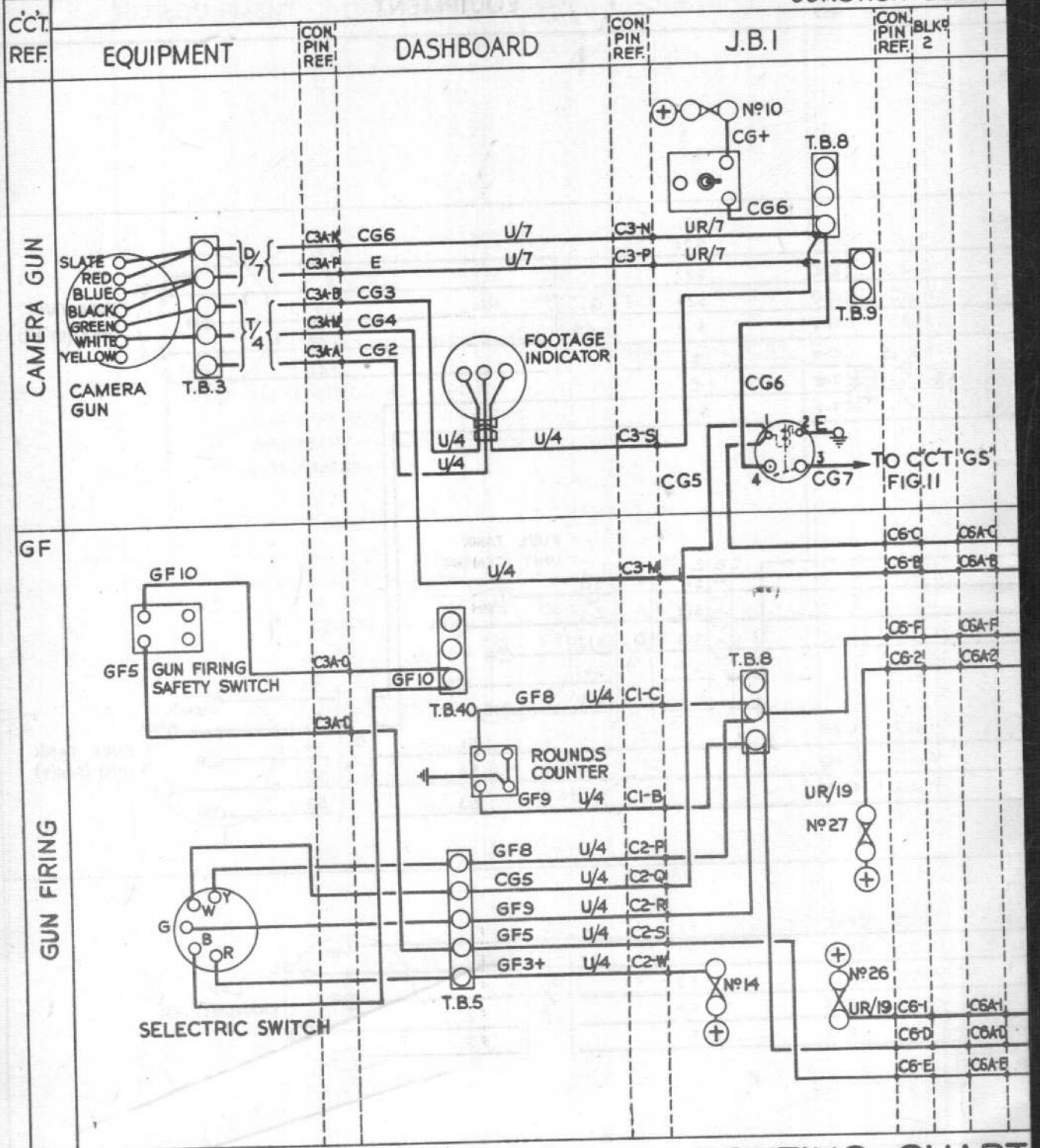


FIG. 9

ROUTING CHART

REST

This leaf issued with A.L. 32, August, 1950

JUNCTION

CCT REF.	EQUIPMENT	DASHBOARD	CON PIN REF.	J. B. 1	CON PIN REF.
QS	I.F.F. SUPPLY AND DEMOLITION	IMPACT SW. 1 2 3 4 5 6 Q+ Q2			
		BREAK AT BULKHEAD 1			
		T/7			
		T.B.4			
		TO I.F.F.			
		Q+ U/7	C3·K	UR/7	
		Q2 U/7	C3·L	UR/7	
		E U/7	C3·P	UR/7	
		PLUG FOR CONTROL UNIT			
		QS+ U/7			
		E			
		F U/7			
				Nº 18 Q+ UR/7	
				PUSH SWITCHES	
				Q+	
				Q2	
				Nº 25	
				T.B.9	
RI	R.I. COMPASS SUPPLY	SUPPRESSOR			
		RI2 U/4	C3·T		
				SWITCH	
				RI +	
				Nº 2	
QG	T.R.1464 SUPPLY				
				Nº 29 UR/19	C6·3
RA	ENGINE SPEED INDICATOR	INDICATOR			
		RA.3 B G 2 1 R RA.1 RA.2			
		U/4	C1·P	A3	C7·R
		U/4	C1·N	RA 2	C7·Q
		U/4	C1·M	RA 1	C7·P

FIG. 10

ROUTING CHART.

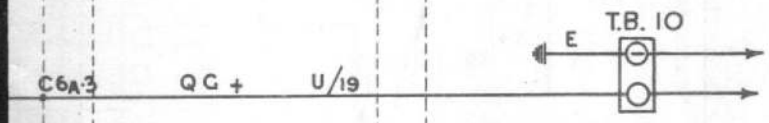
G1951 M13403 9/50 950 C.B.& S.LTD. GP58.

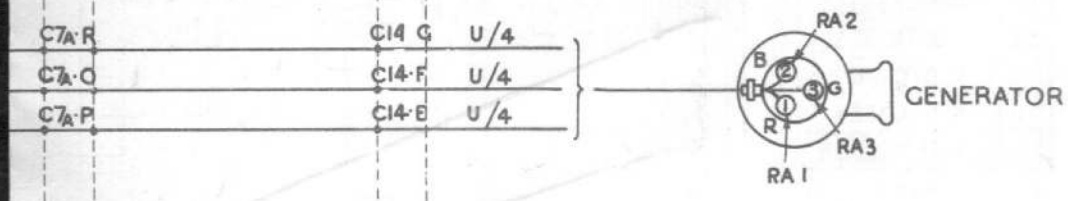
RES

BOXES & PANELS

BLKD 2	CON PIN REF.	J.B.2	CON PIN REF.	EQUIPMENT

NOTE:- ALL JUNCTION BOX & INTER-JUNCTION BOX CONDUIT WIRING UNIRUBBER/4, UNLESS OTHERWISE STATED.

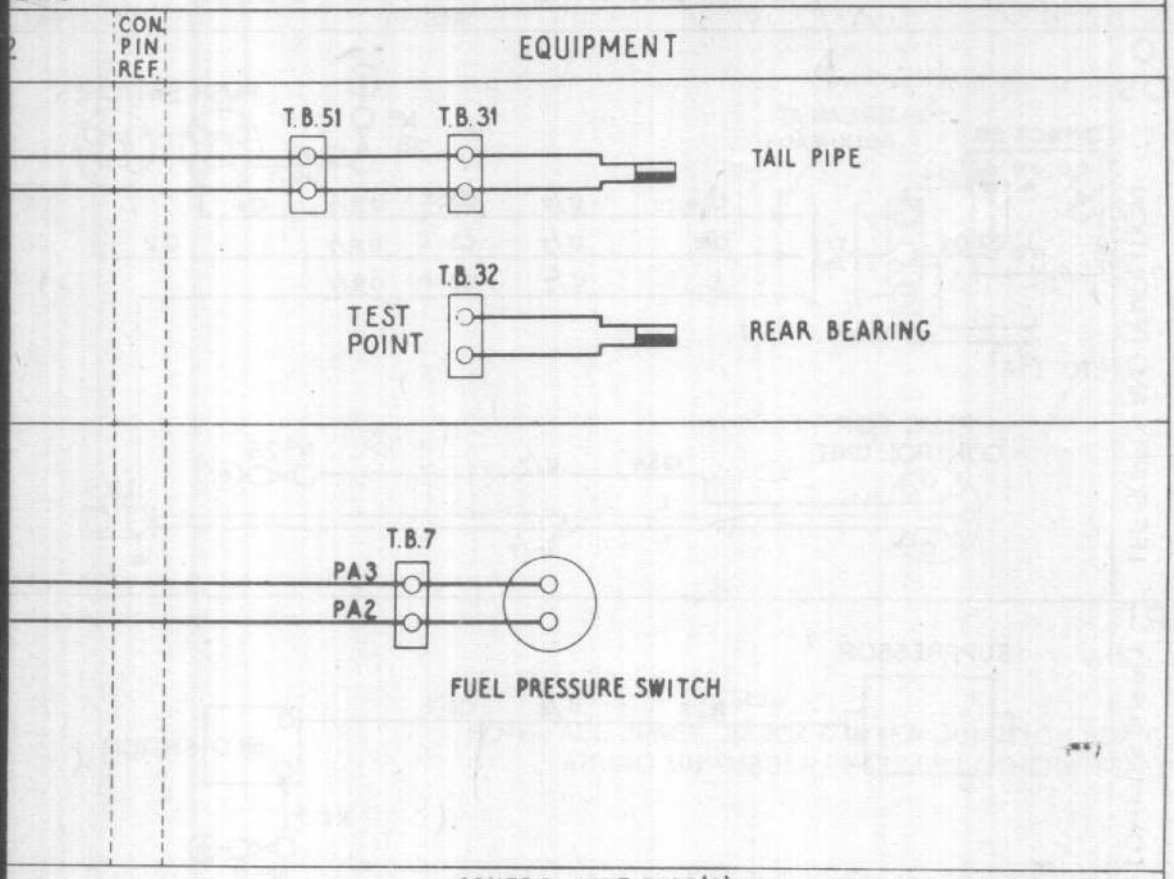


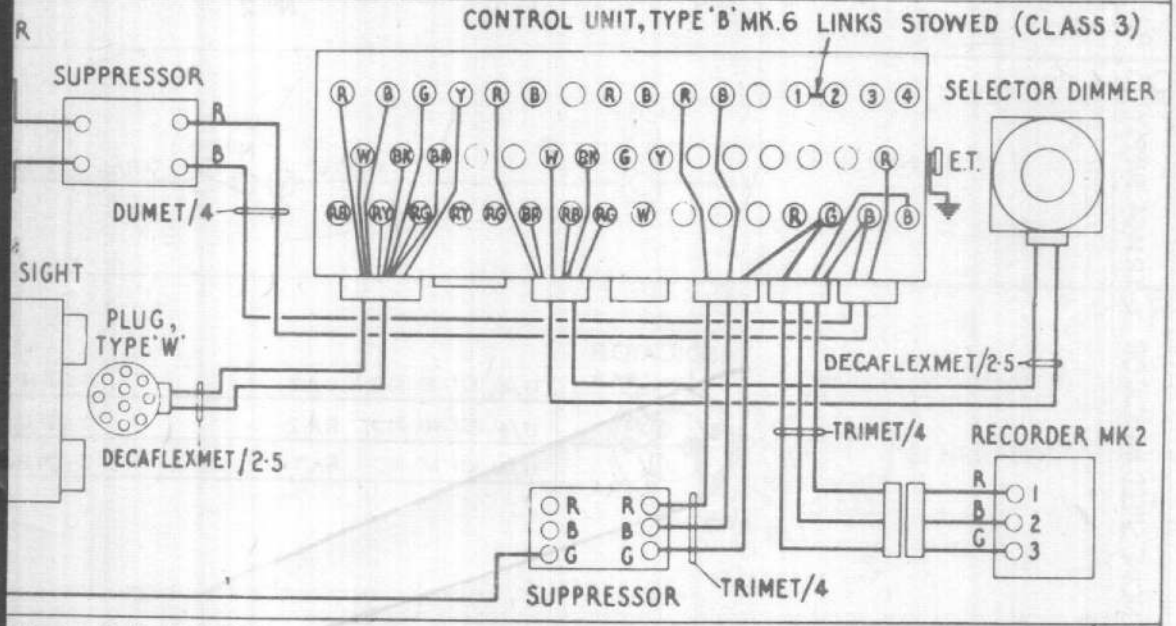


CIRCUITS: Q-QS-RI-QG-RA

FIG. 10

ELS





UITS: PYROMETER - PA - GS

FIG. 11

TED

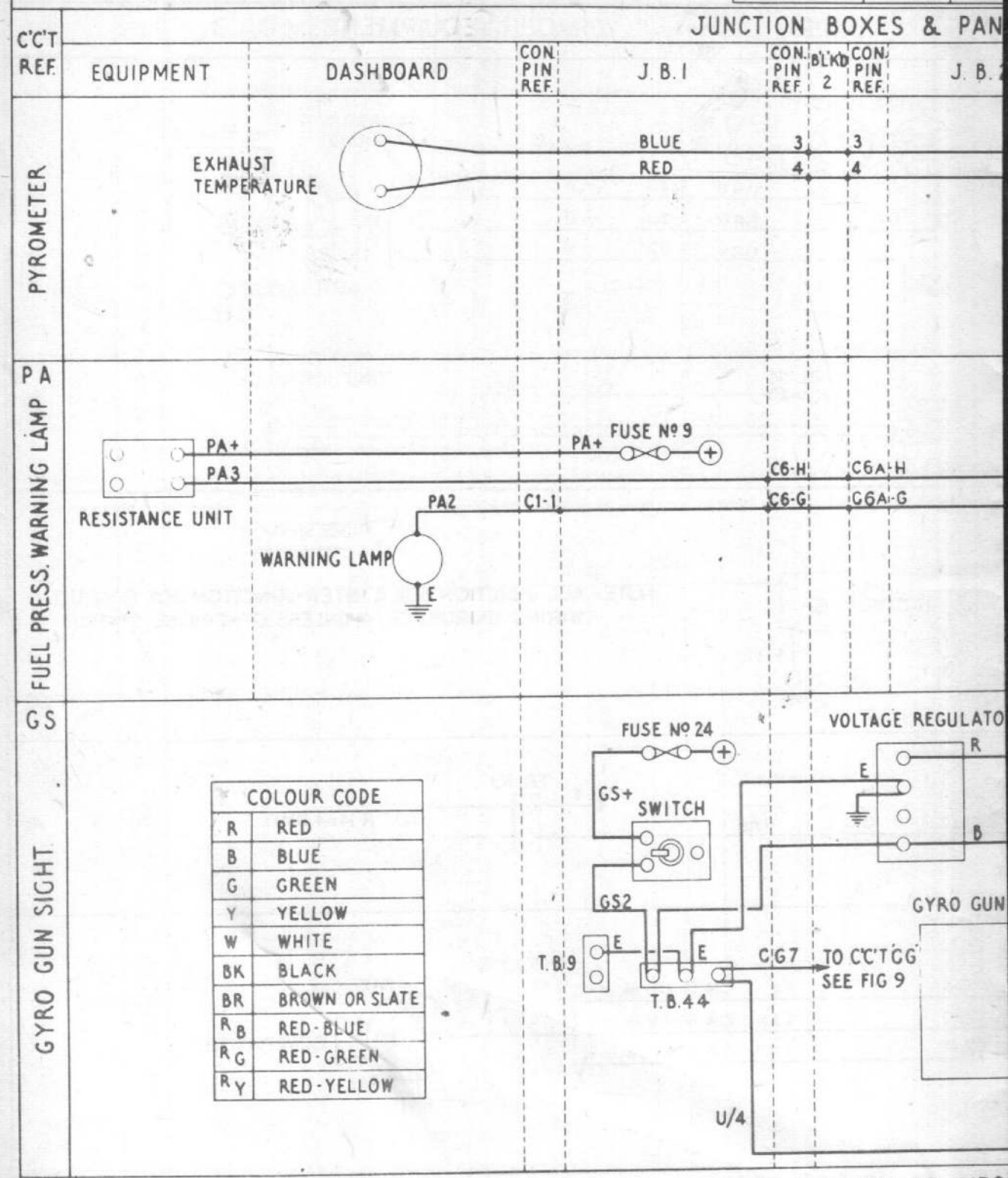
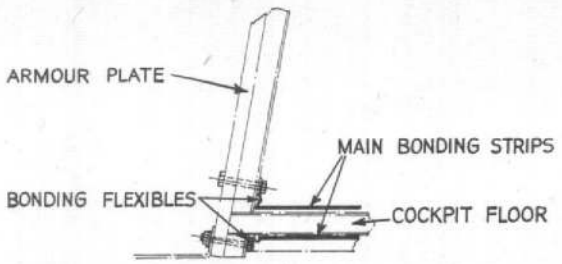


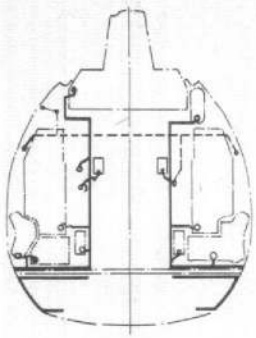
FIG. 11

ROUTING CHART, CIRC

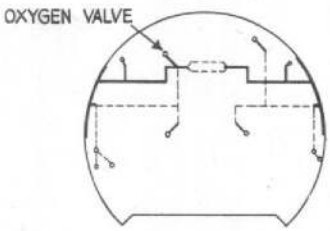
RESTRIC



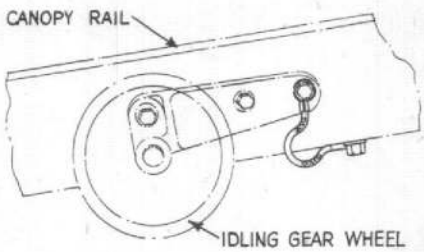
DETAIL OF FIXING AT BULKHEAD Nº1



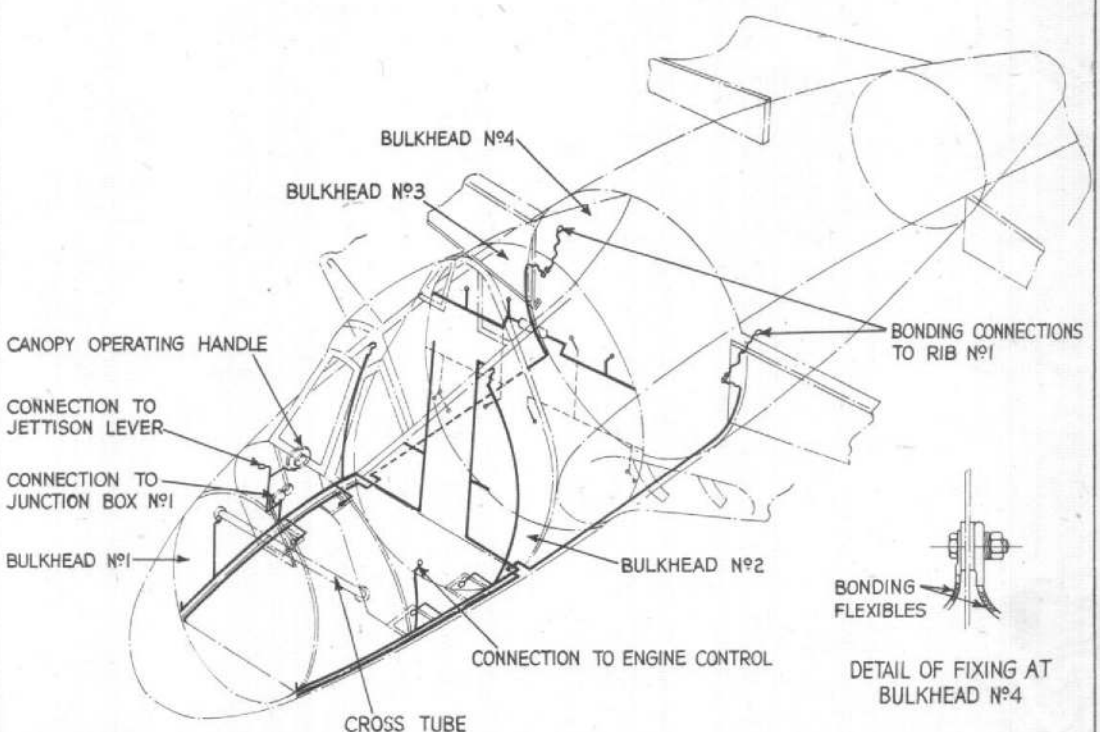
VIEW ON BULKHEAD Nº2 LOOKING AFT.



REAR FACE BULKHEAD Nº3



BONDING OF CANOPY OPERATING GEAR



DETAIL OF FIXING AT BULKHEAD Nº4

FIG. 12 — BONDING DIAGRAM — FIG. 12

G346 M10744 325 5/46 C.B. & S. LTD. GP.55.