

GROUP A.1

SYSTEM DETAILS

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Typical routeing and theoretical diagram

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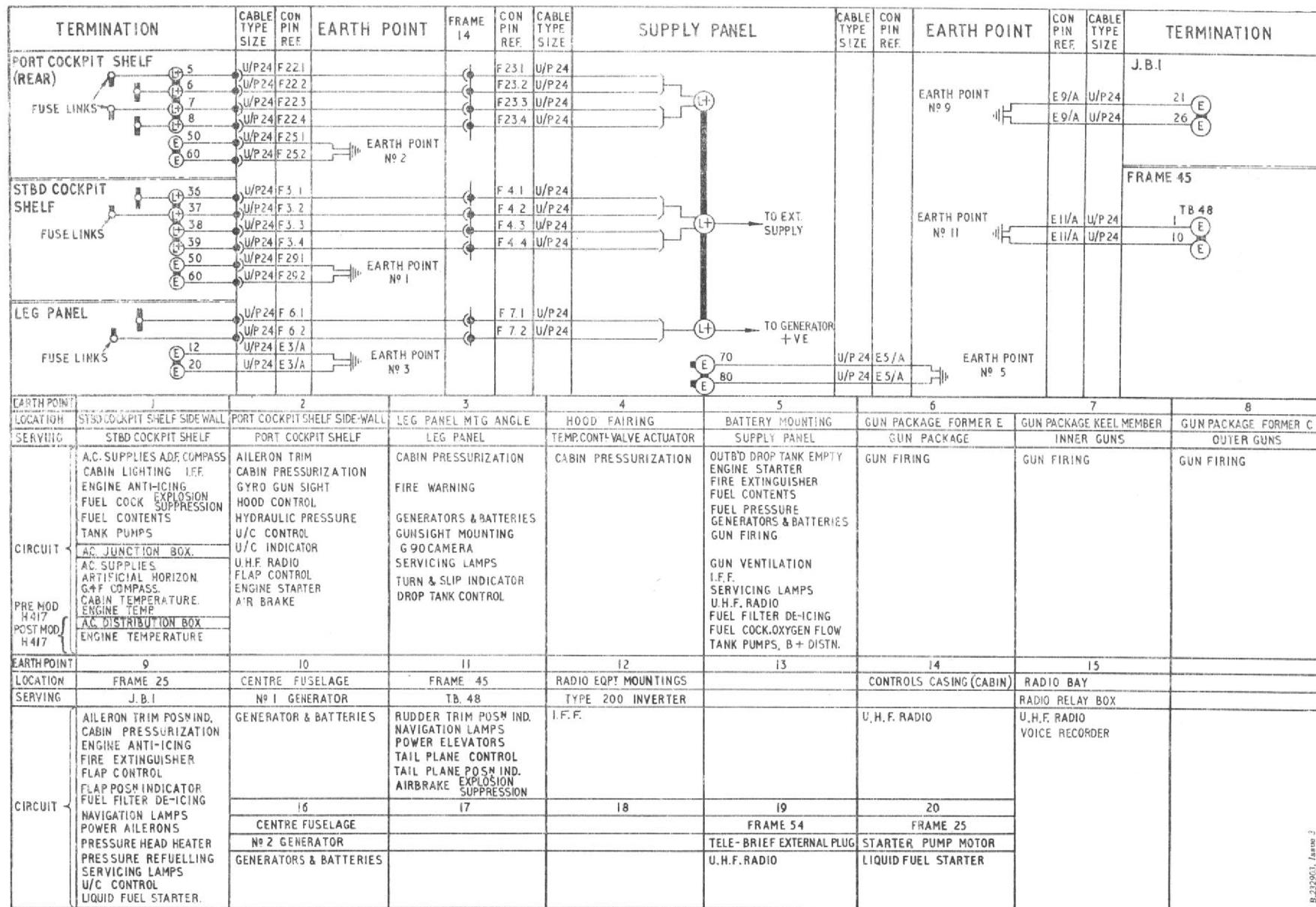


Fig. 1 Supply and earth routeing chart

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Introduction

1. This group contains a general description of the electrical system as a whole, together with wiring details and general servicing information. Tables listing the ratings and References of the fuses, circuit breakers and filament lamps are also given, together with circuit coding details and circuit index. For detailed information concerning the standard items of equipment, reference should be made to the appropriate Air Publications, which are quoted at the beginning of each group of this chapter.

2. This system is of the 28-volt, single pole, earth return, voltage regulated type. It is supplied by two Type 517 generators, connected in parallel and stabilized by two Type J, 24-volt, 25 amp. hour batteries, which are connected in parallel and float across the output of the generators. The batteries are coupled into circuit by Cannon type plugs and are provided with protective covers which are vented to atmosphere. A test socket is also provided for checking the state of charge of the batteries, by voltage, as no specific gravity check is possible. A 24 volt standby supply, obtained from two 12-volt 4 amp. hour batteries in series, is also provided for certain services should the normal supply fail.

3. The wiring cable assemblies are run between junction boxes and panels located at points convenient for distribution to the equipment and for breaking down the aircraft. The majority of the

cable assemblies are provided with fully weatherproof multi-pole plug and socket breakdown points. Whenever possible the cable connections to the plug and socket pins are crimped. To facilitate servicing and testing, the earth return connections are restricted in number and taken to stud type earth points, which are shown on the cable assembly layout, (Group A.3, fig.1) and listed on the supply and earth routeing chart, fig.1 of this group.

4. The generators are mounted on, and driven by the auxiliary gearbox situated in the engine bay, and their control equipment is mounted on a panel located on the starboard side of the radio bay. The batteries are mounted on a platform also located in the radio bay. The supply from the generators and batteries to the fuse bus-bars is shown, together with the earth return points, on fig.1 of this group.

REFERENCING AND GENERAL SERVICING OF COMPONENTS

Junction, control, and distribution boxes

5. These are of welded aluminium, waterproof construction with the insides suede finished to obviate chafing and condensation. They contain terminal blocks, and certain other equipment. Junction boxes are referenced numerically, with the exception of those which are labelled according to the circuits they feed, the numbers being preceded by the letters J.B. or in the case of the armament junction boxes, ARM.J.B. Each box contains a wiring diagram. The terminals in the

boxes are numbered and may be identified by reference to the wiring diagrams, spare terminals being starred on the diagrams to denote that they are spares. When a cable passes through a box without connecting to a terminal, the cable is wired pin to pin between its associated plugs, i.e. pin A to pin A or pin B to pin B, etc. The cable outlets on the junction boxes are either multi-pole plugs and sockets or rubber grommets.

6. Junction box 1 is the major box and is located at the bottom of the centre fuselage on the rear face of the main spar. Junction box 2 is located in the front fuselage above the rear portion of the cabin port shelf between frames 11 and 12 and is used mainly for distribution to the equipment on the port side of the cabin. Junction box 3 is mounted on the engine auxiliary gearbox access door and is used to interconnect the engine starting equipment. Junction box 4 is situated in the cabin on the starboard side of the floor behind the seat, and is employed in the a.c. supplies circuit.

7. The A.C. junction box is mounted aft of the cabin starboard shelf, and is used to supply the flight instruments. The G4F compass junction box is mounted in the fin between frames 51 and 52 just above the tailplane actuator. This junction box is also used to feed the autostabilizer circuit on Post Mod.417 aircraft. The power controls junction box is located in the front fuselage, on the starboard side under the cabin floor between frames 11

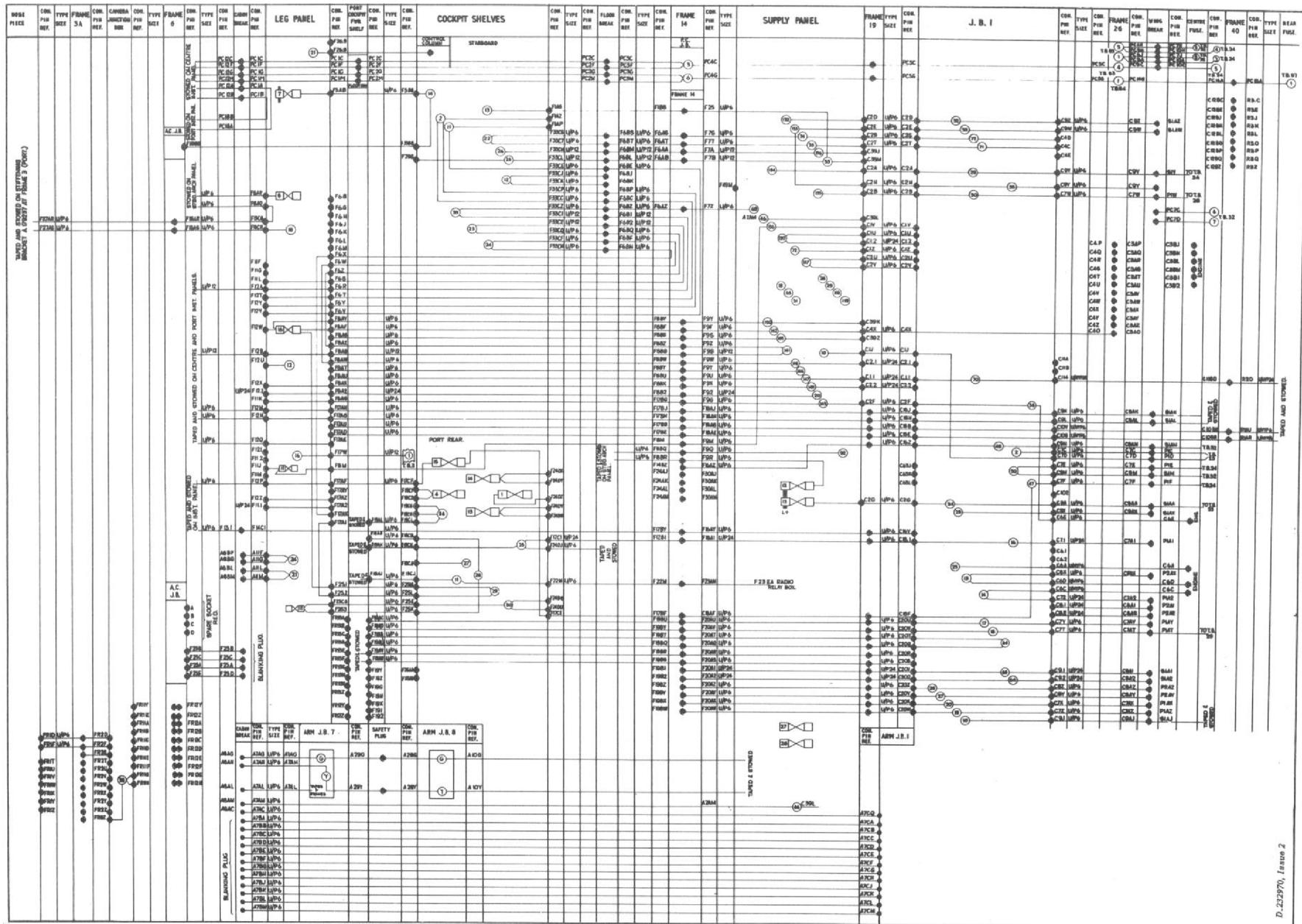


Fig.2 Available spare wiring

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and 12, being mounted on the aft end of the cabin well. It contains a terminal block and fuses, which are part of the elevator and aileron power control circuit.

8. The ARM.J.B.1 is located on the forward face of the starboard fuel tank access panel on frame 19, above the battery platform. ARM.J.B.3 and 4 are located in the port wing, being mounted on the top skin of the wheel bay and the diaphragm between interspar ribs Q and R, respectively. ARM.J.B.5 and 6 are located in similar positions in the starboard wing. All these junction boxes are used as breakdown and distribution points for the armament services.

9. The A.C. distribution box fitted on Post Mod.417 aircraft is located on the starboard side of the cabin aft of the pilot's seat and is mounted on the upper surface of the longeron tie member at frame 13. It contains terminal blocks and fuses and has a suppressor mounted on the lid. Its function is to distribute the a.c. supply to the engine temperature control circuit and on Post Mod.417 aircraft the autostabilizer circuits. The top temperature a.c. control box is mounted on the port side of the front fuselage at frame 17A in the radio bay above the radio sets. It contains a torque switch and relay, both of which are employed in the engine top temperature control circuit. The airbrake relay control box containing the relays employed in the airbrake control circuit, is situated in the cabin over the port shelf between frames 10 and 11.

Servicing of junction boxes.

10. A regular examination of these boxes should be carried out to ensure that they are correctly supported, clean and undamaged. All the components in the boxes should also be examined for security, and the wiring and terminals examined for damage and corrosion.

11. The boxes are provided with readily detachable lids and have been designed for ease of removal, being supported on quick-release mountings. When major servicing is necessary, it is recommended that the boxes are removed from the aircraft and replaced with fully serviced components, thus reducing the time in which the aircraft is unserviceable. The faulty boxes should then be made serviceable, in the servicing bay and held as spares. The method of removing the boxes is described in Group A.2.

Generator control and supply panels

12. These two panels are located together between frames 16 and 19 on the starboard side of the radio bay in the front fuselage. The supply panel is outboard of the generator control panel and is curved to conform with the inside contour of the fuselage skin, being attached by studs on frames 17 and 18, which engage with channel members on the panel. The panel carries a number of terminal blocks, fuse boxes and relays, together with plugs for the cable assemblies to and from the panel. The generator control panel contains all the control components, fuse boxes and

test equipment. It is hinged to the top longeron and fits over the supply panel to form a lid, being attached to the latter panel by four fasteners along the lower edge. When the generator control panel is raised for access to the supply panel, it may be retained in the up position by a hook attached to a length of chain secured to the radio mounting structure.

Leg panel

13. This panel is in the form of a box, bolted to the cabin floor, below the centre instrument panel and just forward of the control column. It is provided with a hinged door on the port side and a sloping plate carrying the plugs for the cable assemblies on its forward face. The rear face carries the oil pressure gauge, generator power failure warning lamps, ignition and starter switches, together with the gyro gun sight circuit breaker and a number of control switches. The box contains relays, terminal blocks and fuse blocks, these latter components being mounted on the inside face of the door for easy accessibility.

Cabin port shelves

14. The cabin port shelf, as a whole, extends between frames 8 and 12, and the two portions about to be described form removable parts of this structure. The forward portion is located just inboard of the throttle lever at the forward end of the structure, while the rear portion extends aft from just behind the throttle lever to the end of the structure. Each portion is attached to the fixed structure by a number

of screws and fasteners and is in the form of a panel with a side member. The rear portion is also provided with an end plate which carries the plugs for connection with the cable assemblies to and from this shelf. The panels carry control switches, warning lamps and indicators, while below a hinged door, in the top surface of the rear portion, are a number of terminals and fuse blocks supplying the equipment.

Cabin starboard shelf

15. This shelf, of which the removable portion is the major part extends between frames 8 and 12. The removable portion is attached to the fixed structure by a number of fasteners and is in the form of a panel with a side member and end plate. The end plate carries the plugs for the cable assemblies to and from the shelf and the panel incorporates a number of switches and circuit breakers, together with the radio controllers and fuel content gauges. Below a hinged door, at the rear end of the panels are a number of fuse and terminal blocks supplying the equipment.

Gun-firing panel

16. This panel is bolted on the aft port side of frame 16 and carries the gun-firing equipment, consisting of an inverter circuit breaker and a number of relays, together with terminal and fuse blocks supplying the equipment.

Radio relay box

17. This box is mounted on the underside

of the top radio mounting structure in the radio bay. It contains the radio supply fuses and control relays together with a number of plugs for the radio connectors to and from the box. For further details of this box, reference should be made to Sect.6, Chap.1.

Servicing of panels and shelves

18. The equipment panels and cabin shelves and their components should be regularly examined to ensure that they are secure and are clean and undamaged. Examine the wiring and terminals for signs of damage and corrosion. The fasteners securing these panels and shelves should also be examined to ensure that they are correctly engaged and not damaged or distorted, paying particular attention to the springs. Any fasteners found to be unlocked must be re-engaged and any found defective renewed as described in A.P.1464B, Vol.1, Part 2, Sect.6, Chap.3.

19. When major servicing, is necessary to these panels and shelves, it is recommended that they are removed from the aircraft and replaced with fully serviceable components, thus reducing the time in which the aircraft is unserviceable. The faulty panel or shelf should then be serviced, in the servicing bay and held as a spare. The method of removing these components is given in Group A.2.

Cable assemblies

20. These consist of a number of cables assembled together, most of which are

fitted at each end with multi-pole plugs or sockets. The assemblies are referenced numerically, the number being prefixed with a letter denoting their location in the aircraft or, with special circuits, the service which they supply. Front fuselage cable assemblies are prefixed by the letter F, centre fuselage assemblies by the letter C and rear fuselage assemblies with the letter R. Cable assemblies in the port wing are prefixed by the letter P, while those in the starboard wing carry the letter S. The artificial horizon, GM-4F compass and armament cable assemblies are prefixed with the letters AH, GC and A respectively. The cable assemblies in the engine bay hot zones consist of Nypren insulated cables.

21. A periodical examination of the cable assemblies should be made for signs of oil soakage and to ensure that they are properly supported and not chafing, cut or damaged. Damaged cables must be renewed or repaired as described in A.P.4343, Vol.1, Sect.12, Chap.5 and all slack support-clips re-tightened.

Cables

22. The ends of each cable are identified, in one of two ways, by means of rubber sleeves. At the equipment, the sleeve gives the item and terminal to which the cable core is connected, while at the terminal blocks the sleeve gives the equipment and terminal from where the cable core originated. For the type of cable employed in the various circuits, reference should be made

to the routeing diagrams and the table of cable abbreviations following para.53. The method of servicing and repairing the cables and P.V.C. conduit is contained in A.P.4343, Sect.12 and A.P.4343C, Vol.1, Book 3, Sect.5.

Multi-pole plugs and sockets

23. Plessey standard and pressure-proof plugs and sockets, together with the Mk.4 miniature types, are used on the cable assemblies, junction boxes and panels, etc. These are fully described in A.P.4343C, Vol.1, Book 3, Sect.5, Chap.1 and 8, and consist of internal mouldings, holding the plug pins and socket inserts, which float in fully weather-proof metal housings. The plug pins and socket inserts are each identified by a letter or number on the internal moulding and are arranged in a pattern so as to prevent incorrect assembly with their associated component, thus preventing cross-connection or short-circuiting.

24. Those plugs and sockets fitted to cable assemblies outside junction boxes and panels etc., are provided with rubber sleeves and bungs, which seal the cable entry to prevent the ingress of moisture. The sleeves and bungs are retained in position by inner and outer ferrules locked by a coupling nut. Each socket may be identified by the cable assemblies to which it is attached, the reference being printed on the rubber sleeve or P.V.C. conduit. Each plug is also identified by its associated cable assembly reference or colour which is painted on the junction box or panel to which the plug is attached. Where two or more identical plugs or

sockets are situated together, they are coloured for easy identification.

25. Before an attempt is made to remove a Plessey standard or pressure-proof socket from its associated plug, the coupling nut, retaining the sleeve and bung or ferrule and P.V.C. assembly to the socket, must be slackened. This is necessary as the coupling nut also serves to lock the socket when it is mating with its plug. It should also be noted that this nut should be slackened before fitting the socket and the socket screwed in by hand, being assisted home by pushing on the back. A spanner or undue force must *not* be used, or damage will result.

26. The plugs and sockets should be examined periodically for signs of corrosion which, if found, must be removed. When removing corrosion, care must be taken not to damage the plated surface of the plug pins or socket inserts or early re-corrosion will result. The importance of cleanliness and the need for regular lubrication of the plug and socket screw threads cannot be over-emphasized if seizing of these threads is to be avoided. Low temperature grease XG-275 (Ref.No.34B/9100512) is to be used and the excess ◀ wiped off. On no account should a lubricant with a graphite base be employed. ▶

27. When it is required to examine or service the cable connections to plugs and sockets incorporating rubber sleeves and bungs, access may be gained by releasing the sleeve at the coupling nut and rolling it back until clear of the connections.

Fuses

28. The circuit fuses are contained in quick-release fuse blocks in the A.C. junction box and attached to the various panels and cabin shelves carrying the electrical equipment. They are referenced numerically, each panel and shelf having its own series of numbers. In most instances, these numbers, together with the fuse rating and the code letters of the circuit it serves, appear on the associated wiring diagram in the box concerned. In certain instances this information is given on a photographic label attached to the appropriate fuse block. The majority of the fuses are of the type S series, but a few Type 33 fuses are used on the gun firing panel and reference should be made to Table 1 for the Ref.No., rating and fuse numbers. The fuse should be examined periodically to ensure that they are serviceable and of the correct value.

29. Dummy fuses are fitted in NOT IN USE circuits to prevent inadvertent operation of the circuit. These fuses, in red plastic, are identifiable by feel by their square section centre and corrugated sides. One side is embossed "NOT IN USE". Whenever a live fuse is removed while servicing it is to be temporarily replaced by a dummy fuse fitted with a 9 inch by 1 inch streamer. Dummy fuses are referenced:-

2 amp. size fuse dummy	5CZ/5865
2.5 amp. size fuse dummy	5CZ/5866
5 amp. size fuse dummy	"
10 amp. size fuse dummy	5CZ/5867
40 amp. size fuse dummy	5CZ/5868

TABLE 1 - FUSES

Location	Fuse	Size (Amp.)	Service	Location	Fuse	Size (Amp.)	Service
Supply panel	1	2.5	Hydraulic pressure warning	A.C. junction box	1	—	Spare
"	2	10	Ignition (starboard)	"	2	2.5	Compass d.c. bias
"	3	10	Ignition (port)	"	3	10	No.1 inverter supply
"	4	2.5	Engine top temperature control	"	4	10	No.2 inverter supply
"	5	2.5	Service lamps	"	5		Spare
"	6	—	Spare	"	6		Spare
"	7	2.5	Flap position indicator	"	7		Spare
"	8	5	Pressure refuelling	"	8	—	Spare
"	9	5	Fire warning	"	9	2.5	Oil pressure blue phase
"	10	10	Fuel filter de-icing	"	10	2.5	Engine top temperature control (blue phase) (Pre Mod.417)
"	11	5	Fuel filter de-icing	"	11	2.5	Artificial horizon blue phase
"	12	—	Spare	"	12	2.5	Compass blue phase
"	13	—	Spare	"	13	2.5	Oil pressure red phase
"	14	2.5	Tail plane position indicator	"	14	2.5	Engine top temperature control red phase (Pre Mod.417)
"	15	2.5	Aileron trim indicator	"	15	2.5	Artificial horizon red phase
"	16	2.5	Rudder trim indicator	"	16	2.5	Compass red phase
"	17	5	Drop tanks	Cabin port shelf	1	—	Spare
"	18	5	Drop tanks	"	2	2.5	Alighting gear control
"	19	10	Gun firing	"	3	5	Gyro gun sight
"	20	5	Fuel content gauges	"	4	—	Spare
"	21	5	Fuel content gauges	"	5	5	Tail plane control
"	23	2.5	Tank pumps	"	6	20	Tail plane control
"	24	2.5	Tank pumps	"	7	2.5	Tail plane control
"	25	20	Fire extinguisher	"	8	10	Tail parachute control
"	26	5	Fire extinguisher	"	9	5	Aileron power controls
"	27	—	Spare	"	10	5	Hood control
"	28	—	Spare	"	11	2.5	Aileron trim control
"	29	5	Aileron power controls	"	12	2.5	U.H.F. controller light
"	30	2.5	Oxygen regulator	"	13	—	Spare
"	31	2.5	Artificial horizon				
"	32	5	Elevator power controls				

TABLE 1 FUSES (Continued)

Location	Fuse	Size (Amp.)	Service	Location	Fuse	Size (Amp.)	Service	
Cabin port shelf	14	—	Spare	Generator control panel	1	5	Generator test socket No.2	
	15	—	Spare		2	5	Generator test socket No.2	
	16	—	Spare		3	5	Generator test socket No.1	
	17	5	Engine top temperature control		4	5	Generator test socket No.1	
	18	2.5	Alighting gear indicator		5	5	Power failure indicator No.2	
	19	5	Alighting gear control		6	5	Power failure indicator No.1	
	20	5	Flap control		7	10	A.C. supplies	
	21	5	Cabin pressurization control		8	—	Spare	
	22	5	Cabin pressurization control		Leg panel	1	2.5	Nose wheel bay service lamp
	23	5	Cabin pressurization control		2	10	Fire extinguisher	
	24	5	Airbrake control		3	2.5	Turn and slip indicator	
	1	5	Navigation lamps		4	2.5	Turn and slip indicator	
	2	5	Fuel low level indicator		5	10	Pressure head heater	
	3	2.5	Port outboard drop tanks		6	10	G.90 camera gun	
	4	2.5	Starboard outboard drop tanks		7	—	Spare	
Cabin starboard shelf	5	2.5	Cabin panel lamps		8	—	Spare	
	6	2.5	Cabin lamps (starboard)		9	—	Spare	
	7	2.5	Cabin lamps (port)		10	5	Drop tank	
	8	5	Engine anti-icing		11	—	Spare	
	9	2.5	Fuel pressure		12	—	Spare	
	10	10	A.C. supplies		13	5	Engine starter	
	11	5	I.F.F. radar		14	10	Engine starter (Post Mod.639)	
	12	5	Radio compass	A.C. distribution box (Post Mod.)	15	20	Spare (Pre Mod.639)	
	13	—	Spare		16	—	Engine starter	
	14	—	Spare		417)	1	Spare	
	15	2.5	Fuel contents		"	2	2	
	16	2.5	Fuel contents				Engine top temperature control	

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TABLE 1 FUSES (continued)

Location	Fuse	Size (Amp.)	Service	Location	Fuse	Size (Amp.)	Service
A.C. distribution box	3	2	Engine top temperature control	Radio relay box	10	5	Aerial change-over relay
"	4	1	Autostabilizer	"	11	5	Voice recorder
"	5	1	Autostabilizer	"	12	2.5	Set selection
Radio relay box	1	10	Standby battery	Gun firing panel	1	2	H.R.C. Starboard outer gun
"	2	5	Tele-briefing	"	2	2	H.R.C. Starboard inner gun
"	3	—	Spare	"	3	2	H.R.C. Port inner gun
"	4	—	Spare	"	4	2	H.R.C. Port outer gun
"	5	5	Test Set	"	5	5	Gun ventilation
"	6	—	Spare	"	6	—	Spare
"	7	—	Spare	"	7	—	Spare
"	8	—	Dummy	"	8	—	Spare
"	9	10	Transmitter-receiver (standby)	Power controls junction box	—	2.5	Elevator indicator
				"	—	2.5	Aileron indicator

Circuit breakers

30. All the circuit breakers, apart from those on and below the generator control panel and that on the gun-firing panel, which are located in the radio bay, are accessible from the cabin. They are not referenced, but may be identified by the name of the circuit which they protect, this being given adjacent to each breaker. The interior of the circuit breakers is inaccessible and servicing is therefore restricted to the functional and insulation tests given in A.P.4343B, Vol.1, Book 2, Sect.10, Chap.6. Table 2 lists the circuit breakers together with their ratings and References.

Note . . .

The starter and booster pump circuit breakers and those below the generator control panel are fitted with rubber packing at their mountings to prevent tripping due

to vibration (S.T.I./Hunter/290). When replacing these circuit breakers ensure that this packing is refitted.

Relays

31. The relays are located in the junction boxes and on the various panels and shelves carrying the electrical equipment. They are referenced alphabetically, the letters being given adjacent to each unit and on the wiring diagrams. The relays should be inspected at regular intervals to ensure that the contacts are kept clean and that the units are undamaged and secure. They should also be subjected periodically to the functional tests given in A.P.4343C, Vol.1, Book 2, Sect.3.

NOTE . . .

Relays that are operating correctly are best left alone and it is, therefore, recommended that the covers are not

removed or the contacts cleaned, unless absolutely necessary.

Switches

32. The switches employed in this aircraft are sealed units and cannot be readily dismantled for servicing, they should, however, be examined for cracks and signs of strain, paying particular attention to the switch dolly.

Terminal blocks

33. Apart from those inside junction boxes and on the panels carrying electrical equipment, terminal blocks are also used as distribution and breakdown points throughout the aircraft. These are of the quick-release 2,3,5,10 and 20-way types. The blocks are referenced numerically, the numbers being preceded by the letters T.B. Each terminal carries a coding plate on

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which is marked the terminal numbers quoted in the wiring diagrams. The terminal blocks may be located on the cable assembly layout and location diagrams contained in Group A.3.

Filament lamps

34. When renewing filament lamps, reference should be made to Table 3 to ensure that the correct type is used.

Earth points

35. Apart from the guns, engine starter, inverters, suppressors, the U.H.F. and I.F.F. radio sets, which are earthed internally or adjacent to their mountings, all the other earth leads are grouped, for ease of servicing and insulation resistance testing and connected to the aircraft structure at a number of stud-type main earth points. All the main earth points are numbered and may be located on the cable assembly layout in Group A.3 and on the supply and earth routeing chart (*fig.1*) of this group. When refitting earth leads, care must be taken to ensure that the surfaces in contact are perfectly clean and in particular, free from grease and paint. Completed assemblies should be protected against corrosion by applying one coat of blue oil-base paint to D.T.D. Spec.827.

Circuit coding and group references

36. Each circuit of this aircraft is coded by means of a letter or letters, which normally consist of the initials of the circuit title, e.g. the fire warning circuit is coded FW. It must be noted that these

TABLE 2
Circuit Breakers

Circuit	Rating (Amp.)	Ref.No.
Gun-firing	5	5CY/2559
Parachute brake	6	
Gun sight mounting	10	5CY/2560
No.1 generator, field	15	5CY/2561
No.2 generator, field	15	5CY/2561
Flight instrument control		
Normal	15	5CY/2561
Stand-by	15	5CY/2561
Hood control	15	5CY/2561
Tail plane control	24	5CY/5312
Tank pumps		
Port	25	5CY/2562
Starboard	25	5CY/2562
◀ U.H.F. main supply (ARC.52)	25	5CY/9992777 ▶
F.95 camera	35	5CY/2563
Engine starting	45	5CY/2564
I.F.F.	45	5CY/2564
◀ U.H.F. services	45	5CY/2564 ▶
No.1 generator, main	200	5CY/2853
No.2 generator, main	200	5CY/2853

code letters are for reference only and will not be found on the cables in the aircraft. They are, however, shown at every terminal connection in the aircraft by means of a label or wiring diagram. The code letters will also be found on the theoretical and routeing diagrams in the various groups of this chapter, because

each section of a particular circuit is also referenced by a number preceded by the circuit code letters, e.g. FW2, FW4, etc. A list of the various circuits employed in this aircraft, together with their code letters and the chapter and group references of this Section is given in Table 4 of this group.

GENERAL SERVICING OF SYSTEM

External supply socket

37. This is mounted on the battery support structure below the batteries; access is gained by opening the radio access panel. It is used to connect an external supply to the aircraft services by means of a standard plug and it is most important that, when servicing, the external supply is used to prevent the aircraft batteries from being discharged. When the external supply is in use, the generators are automatically isolated to prevent a reverse feed (*Group B.1*) and it is recommended that the battery master switch, located on the leg panel, is placed in the OFF position to prevent discharge of the aircraft batteries should the external supply voltage fall below that of the batteries.

Rendering aircraft electrically safe

38. When not required for flight, and during any servicing operations not requiring the electrical supply, the aircraft must be rendered electrically safe to eliminate the possibility of a short-circuit resulting in the accidental operation of the guns, hydraulic units, etc., with consequent damage to the aircraft or injury to personnel. To render safe, it is recommended that the

leads from the aircraft batteries be disconnected, as operation of the battery master switch will not render the system completely safe. Also ensure that the external supply is disconnected.

Use of spare cables for emergency servicing
39. Fig.2 shows the spare cables avail-

able in the cable assemblies. These are provided for future modifications and additions to the existing installations, but may also be used, in an emergency, to replace a defective cable. Under this condition, having found the defective portion of cable, refer to fig.2 to find a similar cable which can be used. At suit-

able points, modify the existing cable run to use the spare cable and isolate the defective cable. Amend the junction box, panel and shelf wiring diagrams to agree and note the fact of this change in the aircraft log book, with the instruction that the cable assembly containing the defective cable must be changed or repaired at the next available opportunity.

NOTE . . .

The above procedure is only to be adopted as a temporary measure to keep the aircraft operational and must not be allowed to carry on indefinitely.

Insulation resistance testing

40. As an interim measure, pending the introduction of a full insulation resistance test, the following procedure, which only covers the minimum requirements, should be carried out.

- (1) Remove all lamps.
- (2) Disconnect the inverters.
- (3) Disconnect earth points (1 to 20).
- (4) Remove the white compass plug from the A.C. junction box.
- (5) Remove the plugs from the fire extinguishers.
- (6) Remove the supply plug to both fuel contents gauge amplifiers.
- (7) Disconnect the gun sight suppressor F5.
- (8) Remove the voltmeter, if this has been fitted.
- (9) Remove the lamps from the Type A cut-outs.
- (10) Bridge all other suppressors.

TABLE 3

Filament Lamps

Lamp	Circuit	Qty.	Voltage	Wattage	Inter-Service Ref.No.
Power failure warning	Generators and batteries	2	28	3.5	5L/9951273
Fuel pressure warning	Fuel pressure	1	28	3.5	5L/9951273
Cabin pressure warning	Cabin pressurization and temperature control	1	28	3.5	5L/9951273
Alighting gear indicator	Alighting gear indicator	9	28	2.5	5L/9951286 ►
Alighting gear warning	Alighting gear indicator	1	28	3.5	5L/9951273
Ultra-violet lamps	Cabin lighting	2	12	7.5	5L/9952261
Red lamps	Cabin lighting	9	24	2.8	5L/9951263
Red stand-by lamps	Cabin lighting	2	24	2.8	5L/9951263
Wing-tip navigation	Navigation lamps	2	28	24	5L/9952431
Tail navigation	Navigation lamps	1	24	10	5L/9952276
Service lamps	Service lamps	2	28	7	5L/9953271
Gun sight	Gun sight	4	22	12	5L/9951260
Hydraulic pressure	Hydraulic pressure indicator	1	28	3.5	5L/9951273
U.H.F. control	U.H.F.	2	28	1.1	
Tele-briefing	U.H.F.	1	28	3.5	5L/9951273
Fire warning	Fire warning and extinguisher	1	28	3.5	5L/9951272
Refuelling indicator	Pressure refuelling	6	24	2.4	5L/9959211
Tank pump	Tank pumps	2	28	3.5	5L/9951273
E.2B compass	Cabin lighting	1	28	1.1	5L/9959121
Parachute indicator	Parachute brake	2	28	3.5	5L/9951273
Fuel low level	Fuel contents	2	28	3.5	5L/9951273

TABLE 4

Circuit codes and group references

Circuit	Code	Chapter	Group	Circuit	Code	Chapter	Group
A.C. supplies	CH	1	E.1	Flap control	F	1	D.4
Aileron trim controls	A	1	D.1	Flap position indicator	FD	2	3.B
Aileron trim indicators	AD	2	3.B	Fuel content gauges	FC	2	2.A
Aileron power controls	PA	1	D.2	Fuel filter de-icing	EFD	1	C.5
Alighting gear control	UC	1	D.7	Fuel transfer pressure			
Alighting gear indicator	U	2	5.A	warning	FP	2	2.A
Air brake control	AB	1	D.7	Fuel system low level warning	FL	2	2.A
Artificial horizon	AH	2	3.B	Generators and batteries	GA	1	B.1
Autostabilizer	AS	1	D.9	Gyro compass	GC	2	3.B
B+ distribution	B+	1	B.1	Gyro gun sight and camera			
Cabin lighting	M	1	F.1	recorder	GS	2	4.A
Cabin pressurization and temperature control	CP	1	D.6	Gun firing	GF	1	G.1
Camera gun	CG	1	G.1	Gun ventilation	GV	1	G.1
Cameras F.95	FR	1	D.10	Hood control	HC	1	D.5
Drop tank empty warning	FC	2	2.A	Hydraulic pressure warning	HP	2	5.A
Drop tank control	DT	1	G.1	I.F.F. radio	IF	1	H.1
Explosion suppression	EX	1	C.6	L+ distribution	L+	1	A.1
Engine anti-icing	EA	1	C.4	Liquid fuel starter	S	1	C.1
Engine starting	SA	1	C.1	Navigation lamps	N	1	F.2
Elevator power controls	PE	1	D.2	Oil pressure gauge	OP	2	2.C
Exhaust gas thermometer and top temperature control	ET	2	2.B	Oxygen flow indicator	OX	2	5.A
Fatigue meter	FM	2	5.A	Pressure head heater	P	2	3.A
Fire warning	FW	1	C.2	Pressure refuelling	PR	1	C.3
Fire extinguisher	FE	1	C.2				

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TABLE 4

Circuit codes and group references (Continued)

Circuit	Code	Chapter	Group	Circuit	Code	Chapter	Group
Parachute brake	TC	1	D.8	Tail plane position indicator	TD	2	3.B
Radio compass	RC	1	H.1	Tank pumps	BP	1	C.3
Rudder trim controls	R	1	D.1	Tank pump failure warning	PF	1	C.3
Rudder trim indicators	RD	2	3.B	Turn and slip indicator	TS	2	3.B
Service lamps	L	1	F.3	U.H.F. radio	RT	1	H.1
Spare wiring	*	1	A.1	Voice recorder	VR	1	H.1
Tachometer	RA	2	2.C				
Tail plane control	T	1	D.3				

- (11) Remove the engine igniter plugs.
- (12) Disconnect all radio equipment.
- (13) Place all switches to the ON position.
- (14) Connect a 250-volt insulation resistance tester to positive terminal and to an earth point of the aircraft.

NOTE . . .

It is not necessary to disconnect the suppressors if an insulation resistance tester, Type C (Ref.No. 5G/152) is used.

◀ Electrical cables on throttle lever

41. The engine throttle lever carries the gyro gun sight ranging twist grip control unit, which incorporates the radio press-to-transmit and air brake control switches. The cables from these switches

are clamped to the throttle lever and pass through a grommet in the cabin port shelf. To avoid accidental operation of the hood control switch due to fouling by these cables, it is important that all excessive slack be eliminated as follows:-

- (1) With the throttle lever fully forward, i.e. throttle open, draw the cables through the grommet on the cabin port shelf so that all slack between the throttle lever and grommet is taken up. Care must be taken during this operation to avoid kinking the cables at the clamp block on the throttle lever.
- (2) Reposition the cable strapping to

clear the guard on the hood control switch box.

INTERPRETATION OF DIAGRAMS**General**

42. The wiring of all the circuits in this aircraft is shown by means of routeing and theoretical diagrams. The routeing diagrams show the complete wiring for each individual circuit and the physical relationship between the electrical components. The diagrams are divided into a number of columns which bear the names of the junction box and equipment panels through which the wiring passes and also the circuit code, connector pin references, and cable type, together with all break

points and terminations. A plug and socket connection is shown by a small semi-circle embracing a black dot; the semi-circle denotes the socket insert and the black dot the plug pin. Terminals in the junction boxes and on equipment panels are represented by small circles with their reference numbers enclosed. Fuses are numbered and, in most instances, are shown in the equipment panel column. These numbers refer to the terminals and fuses in the box or on the panel concerned, each unit having its own series of numbers, as shown on the diagrams. The external connections to the equipment are shown in their correct relationship, but the internal wiring is not shown as this is given in the theoretical diagrams.

43. In the theoretical diagrams, the equipment is shown by symbols complete with internal wiring. Each symbol is annotated and designed to make the operation of the circuit readily understandable; brief explanatory notes are also given where necessary. As the diagrams are drawn for ease of reading, the symbols are not given in their correct physical relationship, but are positioned to give a straightforward presentation, the connections being arranged to assist in this direction. The fuse rating is given adjacent to each fuse and each section of the circuit is referenced at suitable points with the circuit code. It must be noted that these circuit codes are for reference only and will not be found on the cables in the aircraft, but are shown, by means of a label or wiring diagram at every terminal

connection through which the wire may pass. It will assist when reading theoretical and routeing diagrams to refer to the cable assembly layout in Group A.3 and to note that all positive cables are given an even reference number, while all negative cables bear an odd number.

44. Unless indicated otherwise, all the routeing and theoretical diagrams are drawn with the circuits in the condition found when the aircraft is at rest on the ground with its alighting gear down, the throttle closed, the engine stopped and electrical power off.

Method of reading a theoretical diagram

45. Reading theoretical diagrams is a straight-forward matter if a start is made at the fuse or circuit breaker, given at the top of each circuit, and the diagram followed through to the earth point at the bottom. As an example, consider the pressure head heater circuit given in fig.3. From the 10-amp. fuse, the positive supply, referenced P.2, is taken to the control switch, which is a single-pole switch marked OFF and ON. From the switch, the positive supply cable, referenced P.4, passes to the heater element in the pressure head. The negative return from the heater, which is referenced P.1. is connected to earth.

46. From the above example and a study of the diagram, it will be seen that, when the switch is closed, the heater element will be supplied with current and will thus heat the pressure head.

Method of reading a routeing chart

47. Routeing charts are divided into a number of columns, and all circuits commence from the fuse or circuit breaker shown in one of the shelf, panel, or termination columns. As an example of how to read a routeing chart, consider the pressure head heater circuit given in fig.3.

48. From fuse number 5, on the leg panel, the positive supply is conducted by a unipren 12 cable, referenced P.2, to terminal 2 of the pressure head switch, which is also mounted on this panel. From terminal 1 of the switch, a further unipren 12 cable, referenced P.4, connects with pin Q of plug F.17, which is mounted on the leg panel. Cable assembly F17 mates with this plug and a further unipren 12 cable, also referenced P.4 and connected to pin Q of the socket, continues the supply to pin R of a plug and socket break at frame 14.

49. After this break, the cable assembly number changes to F18 and the unipren 12 cable, still referenced P.4, is connected to pin R and continues to another plug and socket break at frame 19. At this point, the cable assembly number changes to C18 and the unipren 12 cable, still referenced P.4, continues to pin R of plug C18 attached to J.B.1. The cable passes through the junction box and leaves it, still referenced P.4, via pin H of plug C7, which is also attached to the box. Cable assembly C7 mates with this plug and runs to the portwing plug and socket break.

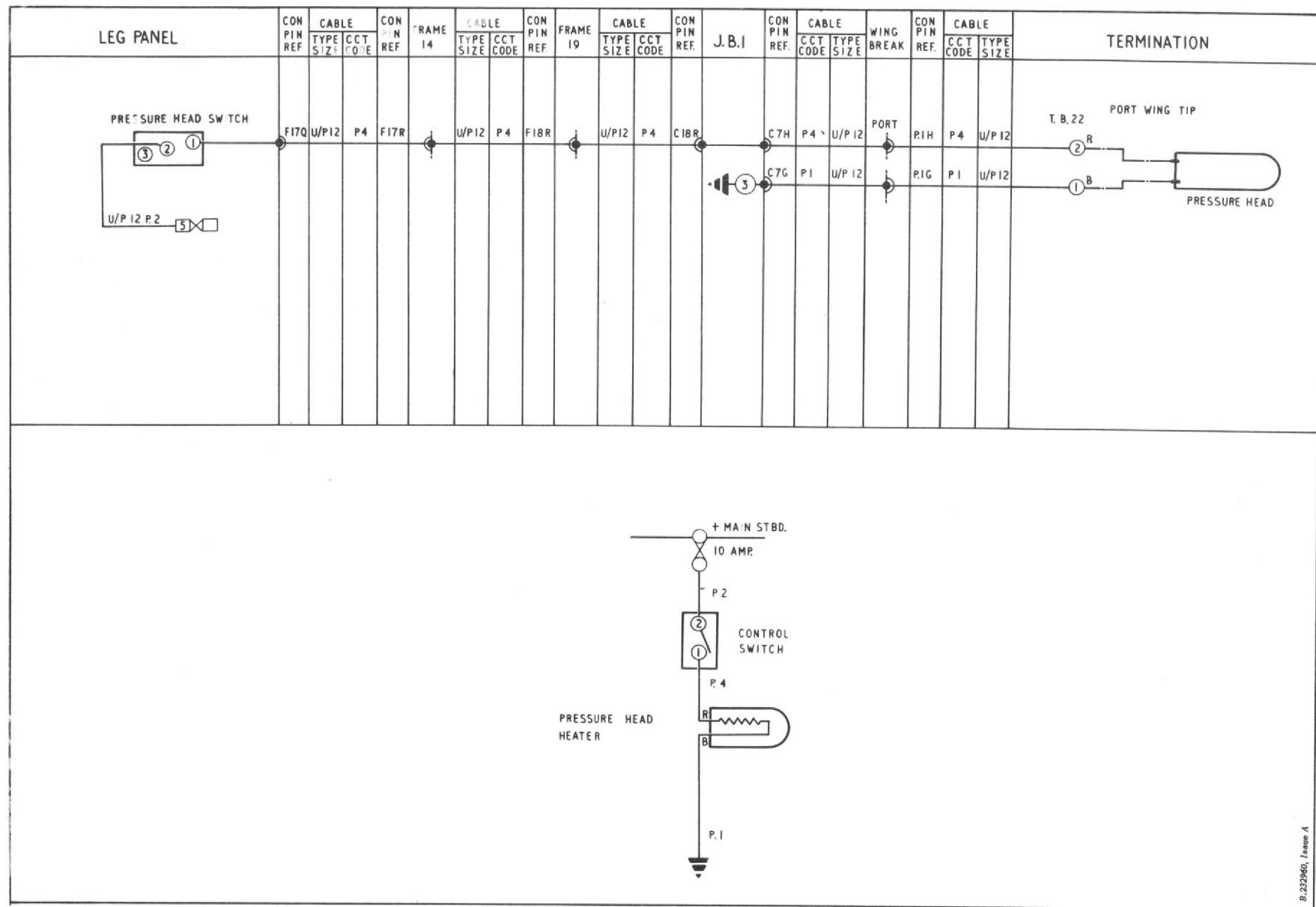


Fig.3 Typical routeing and theoretical diagram

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TABLE 5

Cable Abbreviations

Abbreviation	Definition	Abbreviation	Definition
U/P	Unipren	D/PM	Duprenmet
D/P	Dupren	T/PM	Triprenmet
T/P	Tripen	U/NYP	Uninypren
D/P SHEATH	Duprensheath	U/FIRE	Unifire
T/P SHEATH	Tripensheath	D/CS	Ducralsil
Q/P SHEATH	Quinprensheath	D/CV	Ducralvin
U/PM	Uniprenmet	MIN. 2C etc.	Miniature cables 2C (etc.)

50. After this break, the cable assembly number changes to P.1 and the unipren 12 cable, still referenced P.4, is connected to pin H of the socket on this cable assembly and continues to terminal 2 of T.B.22 in the port wing-tip. From this terminal the red core of the pressure head heater cable continues the supply to the heater element.

51. The negative return from the heater

is the blue core. It is connected to terminal 1 of T.B.22 and a unipren 12 cable, referenced P.1, from the terminal block enters cable assembly P.1 and is connected to pin G of the plug and socket break in the port wing. After this break, the cable assembly number changes to C7 and the cable, still referenced P.1, is connected to pin G of the plug on this cable assembly and runs to J.B.1, where it is connected

to pin G of plug C7 attached to the junction box. From the plug a further length of unipren 12 cable connects with earth terminal 3 in J.B.1.

Cable abbreviations

52. The following table should be used in conjunction with the cable type and size column on the routeing charts to define the type of cable employed in the various circuits of this aircraft.

Loading chart

53. Details of the aircraft's electrical loading, together with the generator and battery characteristic curves and graphs showing the power used during a typical flight are given in Group A.4.

Junction box, panel, and shelf wiring diagrams

54. To facilitate servicing, each junction box, equipment panel, and shelf of this aircraft contains a diagram of its electrical wiring. These diagrams give the cable size, terminal numbers and plug references, together with the fuse numbers, ratings and the services that they serve. A record of the modification state of the box or panel is also included on the diagram.



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