

Group X A.C. POWER SUPPLY

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INTRODUCTION

1. This group contains information relating to the a.c. power supplies; for details of individual items of equipment, refer to the appropriate specialist Air Publication listed below.

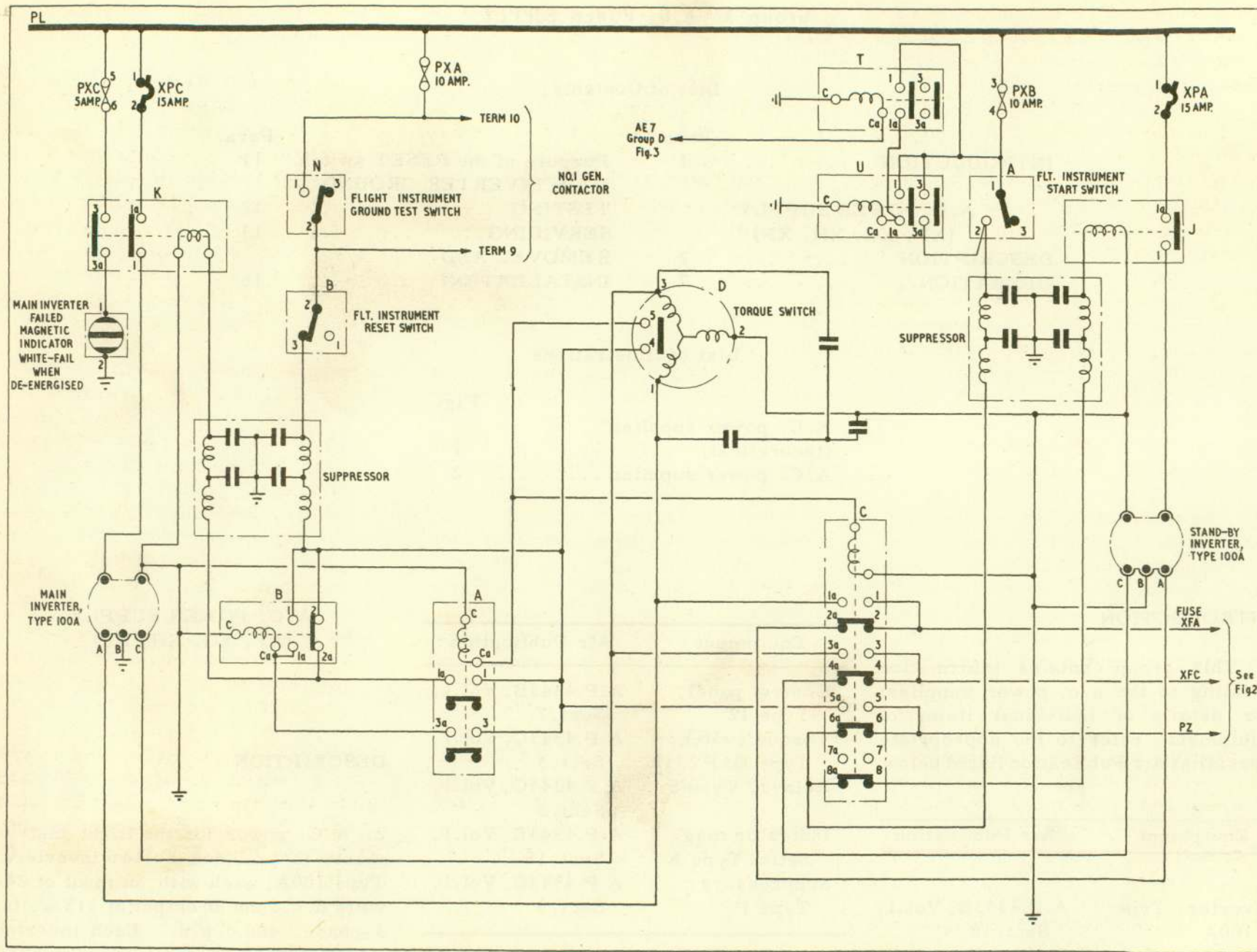
Equipment	Air Publication
Inverter, Type 100A	A.P.4343B, Vol.1, Sect.16

Equipment	Air Publication
Control panel, Type 12	A.P.4343B, Vol.1, Sect.7
Torque switch, Type EAP2312	A.P.4343C, Vol.1, Sect.3
Relays, Type S	A.P.4343C, Vol.1, Sect.3
Indicator magnetic, Type A	A.P.4343E, Vol.1, Sect.18
Suppressors, Type P	A.P.4343C, Vol.1, Sect.5

A.C. POWER SUPPLY  
(XF, XG, XH, XP)

DESCRIPTION

2. A.C. power for the flight instruments is provided by two inverters, Type 100A, each with an input of 24-volts d.c., and an output of 115-volts, 3-phase, 400 c.p.s. Each inverter



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Fig.1. A.C.power supplies - PX, XF, XG, XH, XP (theoretical)

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is controlled by its associated control panel, Type 12, which, in each instance is mounted immediately adjacent to its associated inverter.

3. The normal supply is provided from the main inverter (A) positioned in the cabin on the aft face of bulkhead 1. The input is controlled through a circuit breaker J on the starboard console panel A.

4. The second, or stand-by inverter (B) is mounted at the rear of the nose-wheel bay, and is controlled from a circuit breaker H on the starboard console panel A. There is no separate control switch for this inverter. Refer to para. 7 for an explanation of the automatic switching of the circuit.

5. The torque switch, connected in the main inverter output lines only, functions as a protection device. If the a.c. output from the main inverter fails, this switch will trip, and through change-over relays switch off the main inverter and switch in the standby inverter.

Note...

The time lag is small, and the stand-by inverter will run up to operational speed and output to sustain the gyro flight instruments at their correct speed.

The torque switch, change-over relays, and distribution fuses in the

115-volt supply lines are located in J. B. K.

6. To give warning of failure of the main inverter supply and the change-over to the stand-by system, a magnetic indicator is positioned on the instrument panel. The indicator shows white under these conditions (i.e. failure of MAIN inverter).

#### OPERATION

7. Under normal flight conditions the main inverter will be supplying the gyro flight instruments and the stand-by inverter will be inoperative. Under ground starting conditions the standby inverter (B) will be switched on first and will energize the a.c. supply circuits. When the engine is started a d.c. supply from the generator contactor (contact 3 of No. 1 generator contactor) will automatically energize the main inverter control relay, switching on the main inverter A and switching OFF the standby inverter B. Under flight conditions with the alighting gear retracted a separate relay control circuit by-passes the flight instrument switch. This ensures that automatic operation of the system cannot be interrupted by inadvertent switching off of the flight instrument switch which would in effect switch off the standby inverter.

8. Referring to fig. 1 and 2 in this

group, the operation sequence is as follows:-

(1) Ground starting (prior to engine starting). Closing the flight instrument switch A on the lower instrument panel places a supply through the closed contacts 8-8a of relay C to energize relay J. Contacts 1-1a in relay J close, placing a supply to energize the standby inverter. The a.c. supply from this inverter is fed out through closed contacts 2-2a, 4-4a of relay C.

(2) On starting the engine a supply from the generator output feeds a supply via the flight instrument reset switch B on panel A (contacts 2-3), through contacts 2-2a of relay B to energize relay K. Contacts 3-3a in this relay close to complete the supply from fuse PXC to energize the magnetic indicator which moves to a "black" indication.

Note...

The magnetic indicator shows a white-fail indication when it is de-energized.

Contacts 1-1a of relay K completes the supply from circuit breaker XPB to the main inverter which now runs up to speed. Then output from this inverter is applied to the coils of the torque switch D.

(3) The torque switch operates closing its contacts 4 and 5 ener-

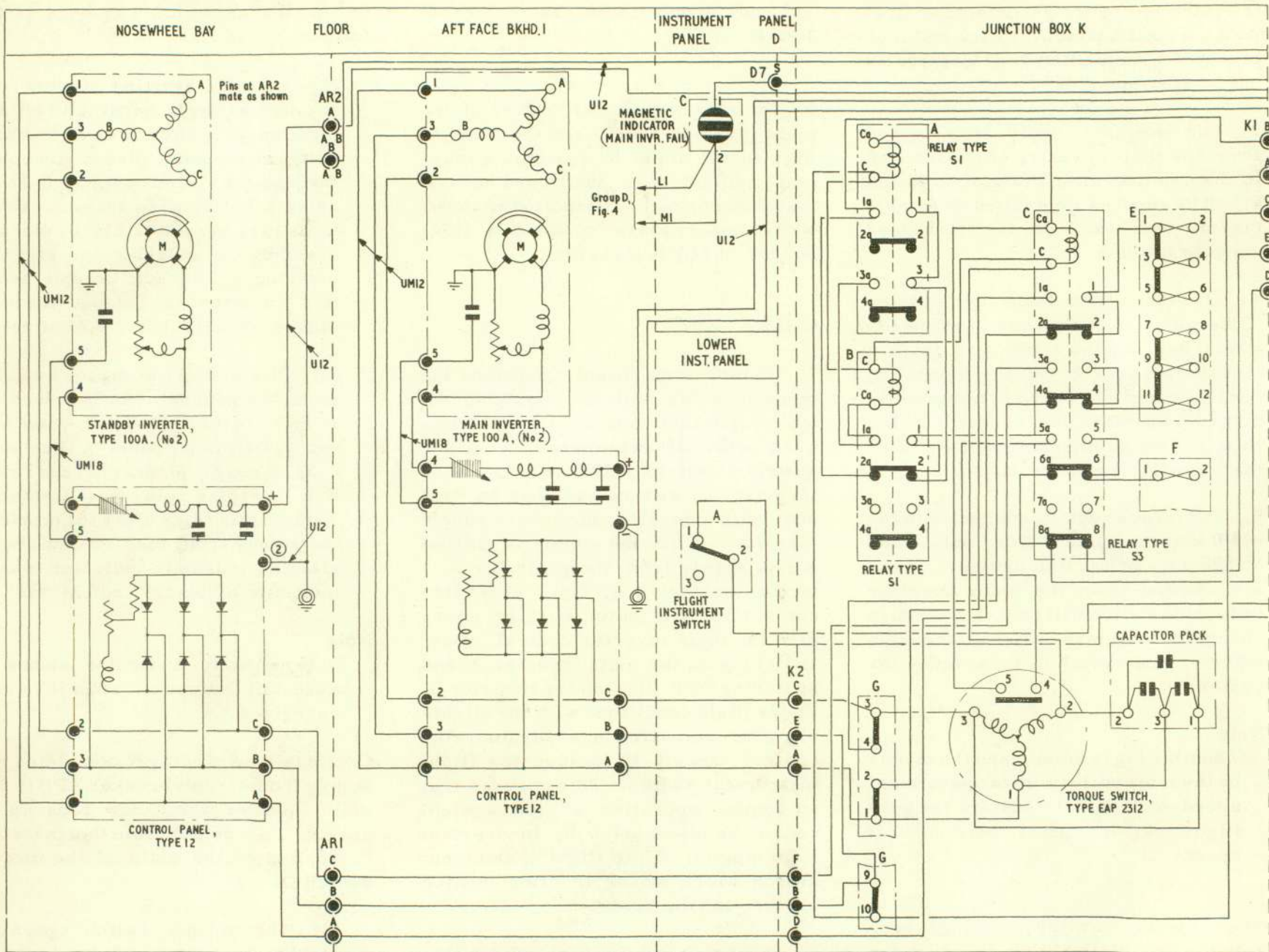
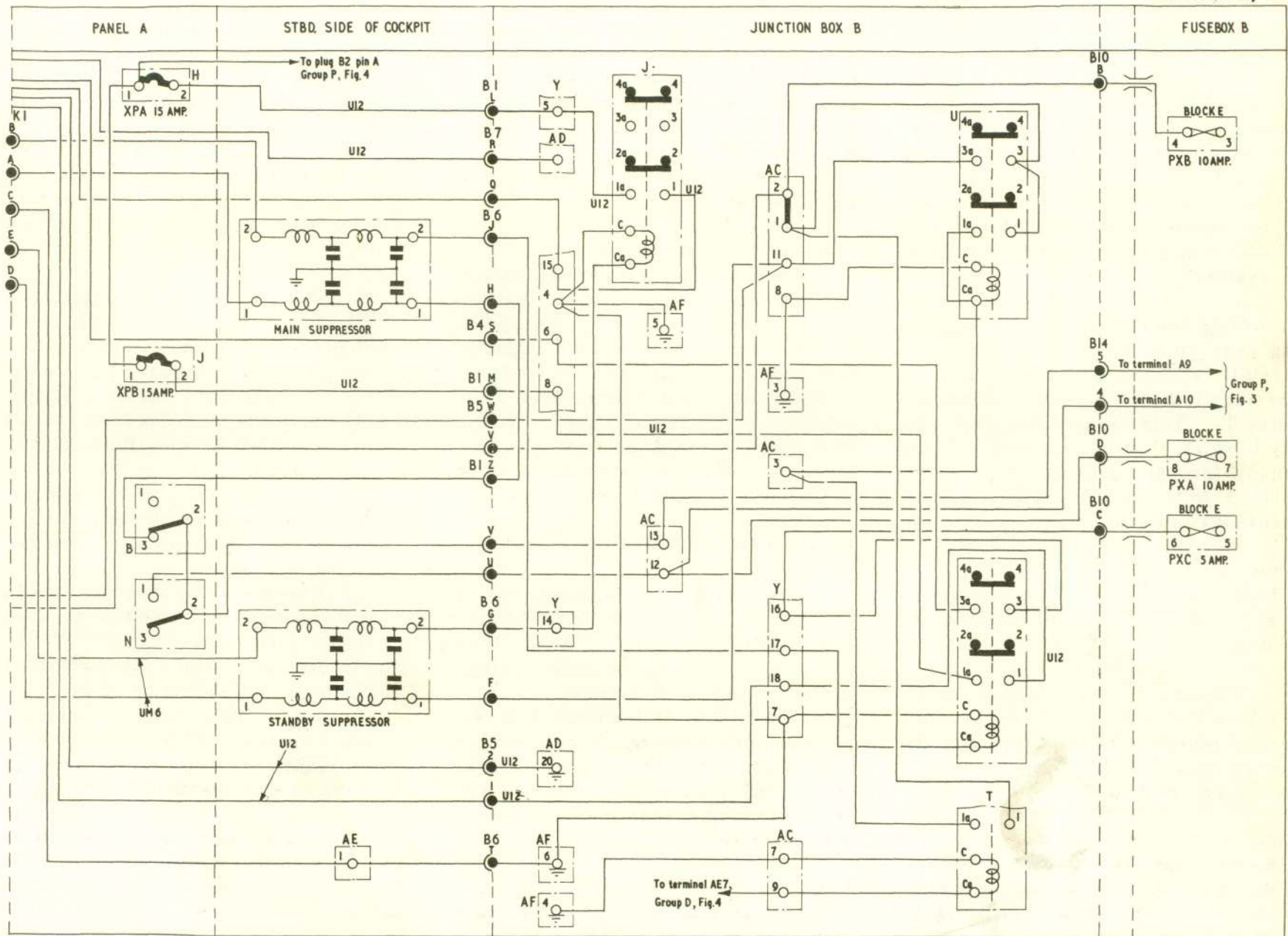


Fig.2(l) A.C.power supplies

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Fig.2 (2) AC power supplies

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energizing relays A and C.

(4) Contacts 3-3a of relay A close to energize relay B. Relay B then has its own hold-in supply.

(5) Contacts 1-1a, 3-3a, 5-5a of relay C close, completing the supplies to the gyro flight instruments. Contacts 8-8a open and break the supplies to relay J which controls the stand-by inverter. The stand-by inverter cuts out. This is now the normal running condition of the system.

9. In flight conditions with the alighting gear retracted and locked up, a circuit is made from the undercarriage leg lock circuit to energize relay T. This in turn energizes relay U which then has its own hold-in supply through contacts 1-1a. Contacts 3-3a by-pass the flight instrument start switch.

Note...

Relay U cannot be de-energized except by switching off the aircraft supply.

10. In the event of failure of the main inverter 115-volt a.c. supply, the torque switch will trip, opening its contacts 4 and 5, breaking the supplies to relays A and C.

Note...

Relay B has its own hold-in supply which can only be broken by operating the reset switch B on panel A. This relay prevents the main in-

verter from cutting in after a fault condition.

Contacts in relay C revert to their normal position and complete the circuits from the stand-by inverter to the gyro flight instruments. Contacts 8-8a of relay C complete the circuit to relay J which places a supply to the stand-by inverter.

Purpose of the RESET switch

11. When taxiing the aircraft at low r.p.m. there is a possibility that the main inverter will trip giving an erroneous indication, via the magnetic indicator, of main inverter failure. This indication will remain even when engine r.p.m. is increased. If the pilot operates the RESET switch under these conditions, the circuit will be restored to normal operation.

MAIN INVERTER GROUND TESTING

12. For ground testing only there is a separate switch labelled FLIGHT INSTRUMENTS - GROUND TEST on panel A. Operating this spring-loaded switch N will place a supply from fuse PXA via terminal 4 of No. 1 generator contactor, through switch B, and contacts 2-2a of relay B (de-energized) to energize relay K. Relay K closing places a supply to the main inverter.

Note...

The circuit is only operative while the test switch is held depressed.

## SERVICING

13. A functional test of the main inverter circuit can be carried out as detailed in para. 8 above. To fully test the system switch ON the system in the normal manner. The stand-by inverter will run and continue to do so until the GROUND TEST switch N is held to the ON position. With this switch held in this position, check that:-

- (1) The main inverter starts up.
- (2) The magnetic indicator changes from white to black indicating the main inverter has cut in.
- (3) The stand-by inverter stops.
- (4) Trip the main inverter circuit breaker XPB which will simulate a fault condition.
- (5) Check the main inverter stops.
- (6) Check that magnetic indicator moves to white-main inverter failed indication.
- (7) Check standby inverter cuts in and takes over supplies to gyro flight instruments.
- (8) Release the spring-loaded Ground Test switch to OFF.
- (9) Place the flight instrument start switch to OFF.
- (10) Replace the main inverter circuit breaker XPB to ON.

14. During alighting gear retraction checks a supply will be made to relay T whenever the undercarriage is in an unlocked condition. A check should be made to ensure that relay T is

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energized whenever any one of the undercarriage leglock micro switches are broken.

15. Servicing information on individual items of equipment is given in the appropriate Air Publication listed at the beginning of this group.

#### REMOVAL AND INSTALLATION

16. The main inverter and its associated control panel are located on the rear face of bulkhead 1 accessible from the cabin. It is necessary to remove the radar equipment from the starboard lower corner of the cabin to gain full access to this equipment. The stand-by inverter and control panel is located in a com-

partment at the rear of the nose-wheel bay. The unit can be removed from its mounting after disconnecting the plug and socket connections and releasing the attachment bolts.

17. The aircraft should be rendered electrically safe before removing either of the inverters.

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