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A.P.101B-1306-1B, Sect.5, Chap.1, Group C.2
A.L.39, Dec.68**Group C.2****FIRE WARNING AND EXTINGUISHER (CODE FW & FE)****LIST OF CONTENTS**

	Para.		Para.		Para.
<i>Introduction</i>	1	Servicing		<i>Testing flame switches</i>	9
Description		<i>General</i>	6	<i>Re-setting inertia switches</i>	10
<i>Fire warning and extinguisher</i>	2	<i>Testing fire warning lamp</i>	7	Removal and Assembly	
<i>Operation</i>	4	<i>Testing fire extinguisher</i>	8	<i>General</i>	11

LIST OF ILLUSTRATIONS

<i>Fig.</i>		<i>Fig.</i>	
<i>Fire warning and extinguisher</i> (theoretical)	1	<i>Fire warning and extinguisher</i> (routeing)	2

TABLE

<i>Table</i>
<i>Equipment type and Air</i> <i>Publication reference</i>

Introduction

1. This Group contains the description and operation of the aircraft fire warning and extinguisher circuit, together with information on the servicing required to maintain the equipment in an efficient condition. Routeing and theoretical circuit diagrams are also included. For a general description of the aircraft electrical system, reference should be made to Groups A.1, A.2 and A.3. Detailed information on the standard items of equipment used in the circuit will be found in the Air Publications listed in Table 1.

DESCRIPTION**Fire warning and extinguisher**

2. A lamp, to give warning of fire in the engine bay, is contained in a combined fire warning lamp and extinguisher switch unit, situated on the centre instrument panel in the cabin. The lamp is controlled by a number of automatic re-setting flame switches, which are situated around the engine bay between the rear spar frame and rear transport joint and at frame 45 in the rear fuselage. The warning lamp may be tested by pressing a fire warning lamp

test push-switch, which is located adjacent to the combined warning lamp and extinguisher switch unit.

3. The extinguisher is carried in a cradle mounted in the centre fuselage on the aft face of the main spar frame and is connected by a system of pipe-lines to the engine spray units, via an inlet connection on the engine. The extinguisher is discharged electrically, either by manual pressing of the button of the combined fire warning and extinguisher switch unit, or automatically, in the event of a crash

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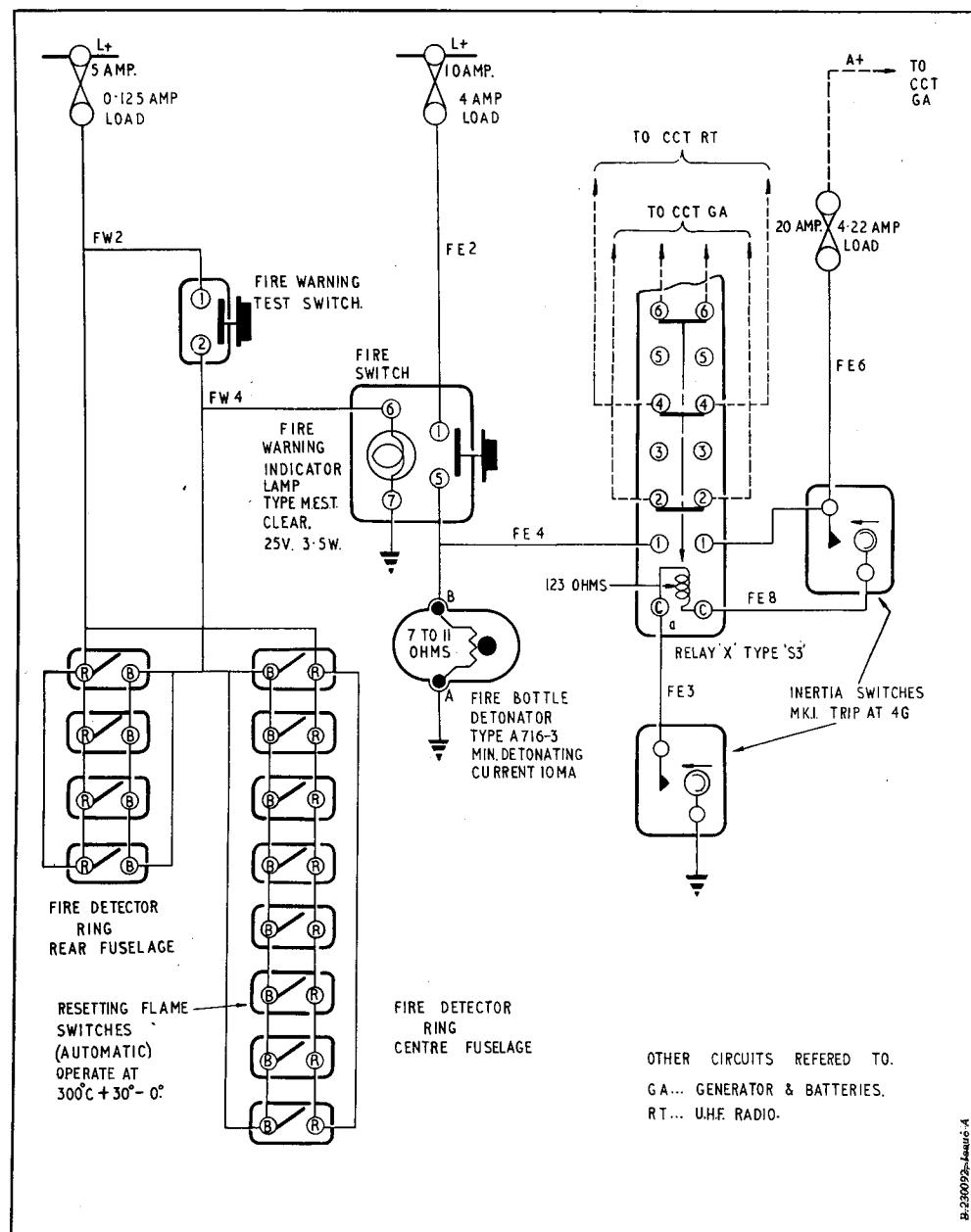


Fig. 1. Fire warning and extinguisher (theoretical)

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landing etc. by operation of relay X, situated on the supply panel. This relay is energized, by the operation of two inertia switches mounted in the radio bay, one on the port forward face of frame 17B and the other on the starboard forward face of frame 19. When energized this relay also isolates the batteries from all but the essential load line. The generators are also off-loaded in the event of a crash, by the operation of a further pair of inertia switches as described in Group B.1. For a full description of the fire protection system, reference should be made to Book 1, Sect.4, Chap.5.

Operation

4. The flame switches are all connected in parallel, on a ring main system, so that operation of any one switch will complete the circuit from the fuse to the warning lamp, via the contacts of the combined fire warning lamp and extinguisher switch unit. The flame switch contacts close at 300 + 30 deg.C. and the lamp may light - 0 intermittently on the ground or in the air, due to heat surges in the engine bay. It must be noted that operation of the flame switches will not discharge the fire extinguisher, which, if the lamp remains alight steadily for a period of 5 to 10 seconds, must be discharged by pressing the fire extinguisher push-button. When pressed, this push-switch completes the circuit to blow the fuze in the extinguisher discharge head and the extinguisher is then discharged. To test the warning lamp filament for correct functioning, the

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A.P.101B-1306-1B, Sect.5, Chap.1, Group C.2
A.L.46, Feb.74

fire warning lamp test push-switch is pressed, thus supplying the lamp directly from the fuse without the operation of the flame switches.

5. In the event of a crash landing etc., the inertia switches, which are connected in series with the coil of relay X, will operate and complete the circuit from the essential load line to energize the relay. When the relay X is energized one pair of contacts within the relay will close to complete the circuit from the essential load line to the fuze in the extinguisher discharge head and the extinguisher will be discharged. Another pair of contacts in relay X, which feed the battery relay via the battery master switch while relay X is de-energized, are opened when this relay is energized, so de-energizing the battery relay to isolate the batteries from all but the essential load line. The essential load line also feeds the tele-

briefing control relays via a pair of contacts in relay X and this feed is broken, when the relay is energized, to prevent a possible fire hazard.

SERVICING

General

6. For general servicing of the electrical system, reference should be made to the information given in Group A.1. All the components should be kept clean and inspected periodically for signs of damage and to ensure that they are securely mounted. Apart from the servicing described in the following paragraphs, together with the standard bench testing of the components, as described in the appropriate Air Publications listed in Table 1, no further servicing should be necessary.

CAUTION

As operation of the battery master switch will not isolate the fire extinguisher circuit completely, the system must be rendered safe, by removing the circuit fuses, before commencing any servicing operations found necessary after carrying out the following tests.

Testing fire warning lamp

7. The fire warning lamp, contained in the combined fire warning and extinguisher switch unit, must be tested for correct operation, before each flight, by pressing the fire warning lamp test push-switch. When the switch is operated, the lamp should light to indicate that the bulb is serviceable.

Testing fire extinguisher

8. To test the continuity of the fuze in the fire extinguisher discharge head, disconnect the electrical socket from the plug on the discharge head and remove the head from the extinguisher. Connect a suitable safety ohmmeter to the discharge head plug and, if the reading obtained does not lie between 5 and 6 ohms (*Type A716 head*) or 7 to 11 ohms (*Type A216 head*) replace the unit with a fully serviceable component. It must be noted that the actuating fuze is very sensitive and the electrical checks must be made with care. The safe test current is 10 mA. As an additional safeguard, it is recommended that discharge head is mounted on a suitable fixture with the charge end shielded, but unrestricted in case of accidental firing. To measure the insulation resistance,

TABLE 1

Equipment type and Air Publication reference

Equipment Type	Air Publication
Fire warning lamp and extinguisher switch (Ref.5CW/6311)	A.P.4343C, Vol.1, Book 1, Sect.1
Fire warning lamp test push switch, Dowty, Type C.5162Y, Mk.2	A.P.113D-1108-1
Flame switches, Mk.4, No.HS/RS.300 or 150.D/01/300 ...	A.P.4343E, Vol.1, Book 3, Sect.14
Fire extinguisher, Mk.13A or Type 5AX	A.P.107E-0400-1A
Inertia switches, Mk.1, Type 8C	A.P.113D-1206-1
Fire extinguisher relay, Type S, No.3	A.P.113D-1309-1

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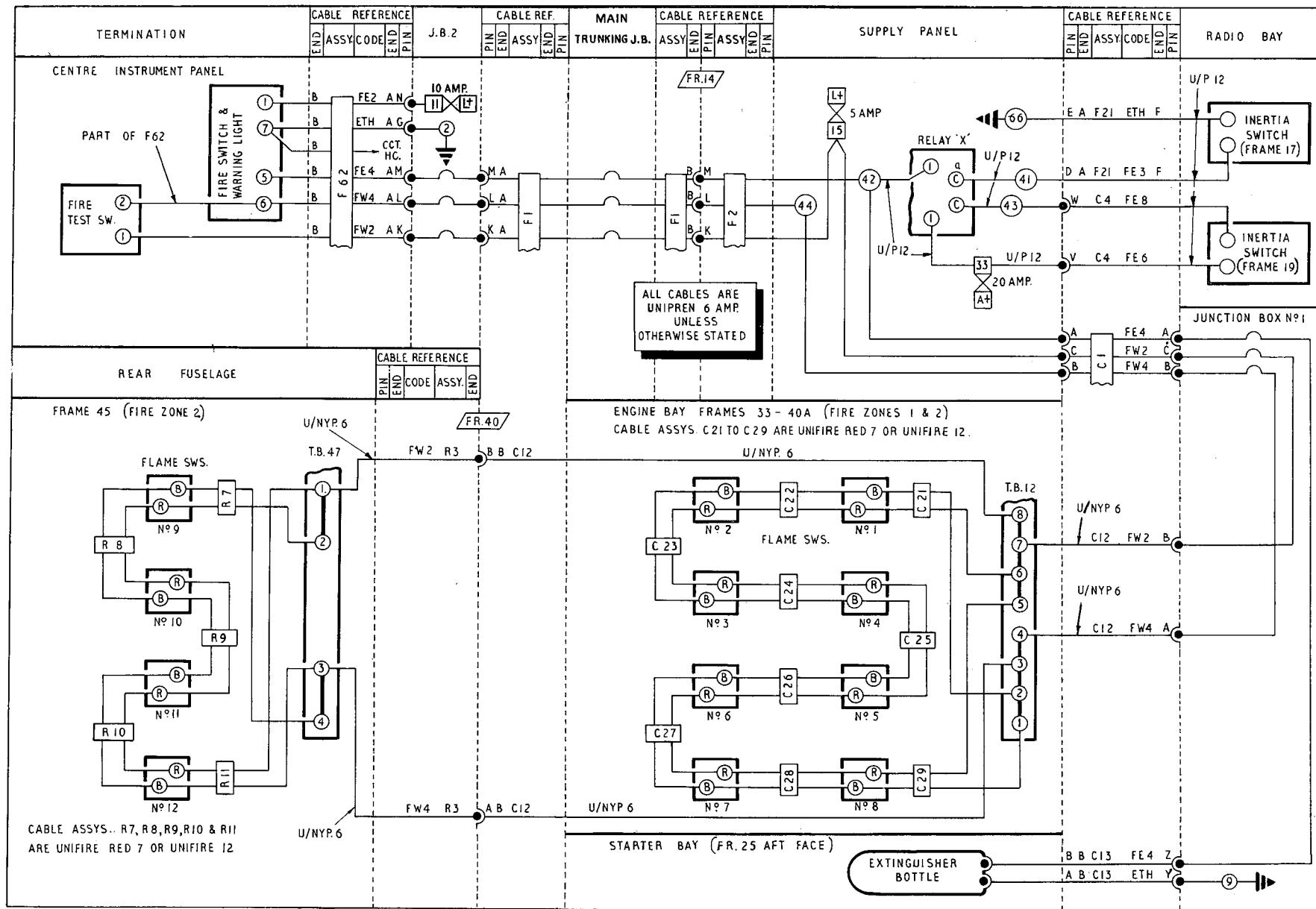


Fig. 2 Fire warning and extinguisher (routeing)

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T.P. (E) 10329

take a reading between each plug pin and the discharge head body. The reading obtained should be at least 20 megohms.

After replacing the discharge head and reconnecting the electrical connection, ensure that the extinguisher circuit wiring is undamaged by checking the resistance between terminal 42 on the supply panel and earth, using the safety ohmmeter with a 5 ohms resistor in parallel. The reading obtained should be between 2.75 and 3.75 ohms.

Testing flame switches

9. The re-setting flame switches, which operate the fire warning lamp, may be tested in situ, by using a 24 volt, 6 amp. battery-operated tong tester (Ref.5G/566). After allowing 6 minutes for the tester to warm up, it should be fitted over the

barrel of each switch in turn, when the warning lamp should light to indicate satisfactory operation. The temperature setting adjuster of the flame switch is locked and sealed during manufacture and in no circumstances must any attempt be made to interfere with its setting. An inspection should, however, be made to ensure that the expansion barrel of each flame switch is not damaged.

Re-setting inertia switches

10. To re-set each inertia switch, proceed as follows:-

- (1) Disconnect the battery.
- (2) Gain access to the switch (Group A.3) and remove the terminal cover.

- (3) Re-set the switch, by pressing the re-setting plunger situated between the terminals of the switch.
- (4) Replace the terminal cover.
- (5) Reconnect the battery and replace any panels removed to gain access.

REMOVAL AND ASSEMBLY

General

11. Once access has been obtained, the removal and assembly of the electrical equipment forming the fire warning and extinguisher circuit should present no difficulties. The location of, and access to all the components is indicated in Group A.3, while the removal of the fire extinguisher is fully described in Book 1, Sect.4, Chap.5.

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