

GROUP C.2

FIRE WARNING AND EXTINGUISHER (CODE FW & FE)

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Equipment employed

1. The major components employed in the fire warning and extinguisher circuit are quoted below, together with the appropriate Air Publications to

which reference should be made for a detailed description and the necessary servicing required to maintain the equipment in an efficient condition:-

Fire warning lamp and extinguisher switch	A.P.4343C, Vol.1, Sect. 1, Chap. -.
Flame switches, Mk.4, No.HS/RS.300	A.P.4343E, Vol.1, Sect.14, Chap. 2.
Fire extinguishers, Mk.12A and Mk.13A	A.P.957C, Vol.1, Sect. 3, Chap. 1
Inertia switches, Mk.1, Type S.3	A.P.4343E, Vol.1, Sect.16, Chap. 4.
Fire extinguisher relay, Type S, No.3	A.P.4343B, Vol.1, Sect.22, Chap.13.
Test switch, Rotax D.5507	A.P.4343C, Vol.1, Sect. 1, Chap. -.

DESCRIPTION

Fire warning and extinguisher

2. A warning lamp, giving warning of fire in the engine bay, is contained in a combined fire warning lamp and extinguisher switch, situated on the starboard arch 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. The warning lamp may be tested by pulling out the extinguisher switch button and the continuity of the flame switch wiring checked by means of a test switch on the cabin starboard shelf. The two fire extinguishers are carried in cradles mounted in the centre fuselage, one on the aft face of the main spar frame and the other on the forward face of frame 26. The extinguishers are connected, by a system of pipe-lines, to two spray rings which encircle the engine bay at frames 34 and 38. The extinguishers are discharged manually, by depression of the button of the combined fire warning and extinguisher switch, or automatically, in the event of a crash landing, etc., by operation of relay X, situated on the supply panel. This relay is energized by two inertia switches mounted one underneath the battery platform in the radio bay and the other on frame 12 in the gun bay. At the same time, this relay isolates the batteries from all but the essential load line and also open-circuits the generator fields (Group B.1). For a full description of the fire protection system as a whole, reference should be made to Section 4, Chapter 5 of this volume.

OPERATION

3. The flame switches are all connected in parallel; thus, 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 and the test switch, when in the NORMAL position, thereby lighting the lamp. The flame switch contacts close at 300 deg. + 30 deg.C. The lamp may light intermittently on - 0 deg.C.

the ground, or in the air, due to heat surges in the engine bay. It must be noted that the flame switches do not discharge the fire extinguishers, which, if the lamp remains alight steadily for a period of 5 to 10 seconds, must be manually discharged by depression of the extinguisher push-switch. When depressed, the push-switch completes the circuit to the fuze in each extinguisher discharge head and both extinguishers are simultaneously discharged. To test the warning lamp filament for correct functioning, the fire extinguisher push-switch is pulled, thus making a contact within the switch unit, which supplies the lamp directly from the fuse, thereby lighting the lamp without operation of the flame switches. To test the continuity of the fire warning circuit wiring, the test switch is moved to the CCT TEST position, thus placing the circuit wiring in series with the lamp. The lamp should light to indicate that the wiring is complete.

4. In the event of a crash landing, etc., the inertia switches, which are connected in series, will operate and complete the circuit from the essential load line to energize relay X. When relay X is energized, contacts within this relay complete the circuit from the essential load line to the fuse in each extinguisher discharge head and feed the generator crash relays. The extinguishers are thus discharged and the generator crash relays energized to open-circuit the generator fields (Group B.1). A pair of contacts, in relay X, which feed the battery master switch and battery relay, are broken when relay X is energized; the battery relay is thus de-energized and isolates the batteries from all but the essential load line.

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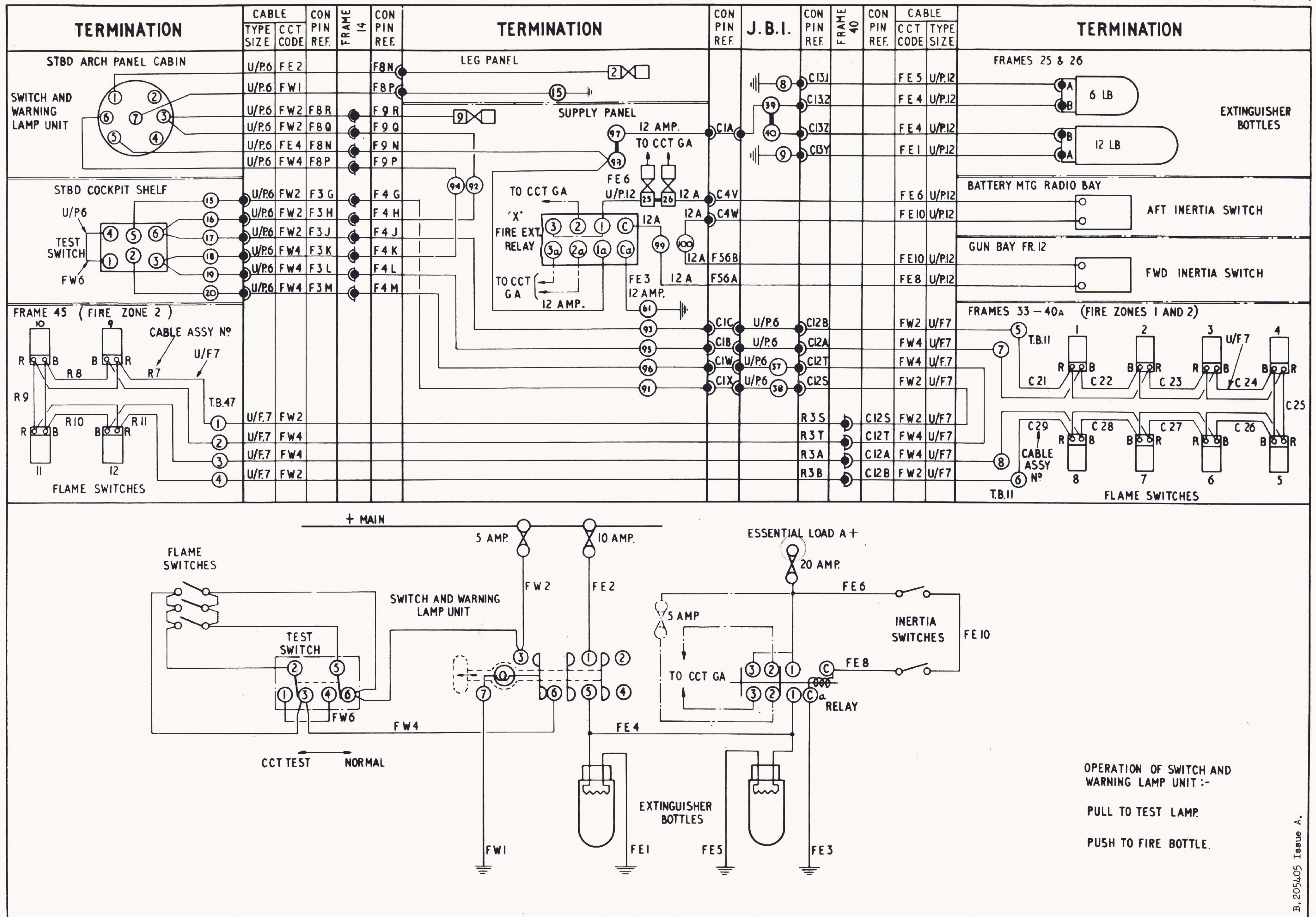


FIG. I. FIRE WARNING AND EXTINGUISHER

SERVICING

General

5. For general servicing of the electrical system as a whole, reference should be made to Group A of this chapter. 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 quoted in para.1, no further servicing should be necessary.

WARNING

As operation of the battery master switch will not isolate the fire extinguisher circuit, 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

6. The fire warning lamp, contained in the combined fire warning and extinguisher switch unit, should be tested for correct operation, before each flight, by pulling out the fire extinguisher switch button. When the switch is pulled, the lamp should light to indicate that the bulb is serviceable.

Testing fire extinguishers

7. To test the continuity of the fuzes in the fire extinguisher discharge heads, disconnect the electrical sockets from the plug on each discharge head and remove the discharge heads from the extinguishers. Connect a suitable safety ohmmeter to each discharge head plug in turn and if the reading obtained does not lie between 7 and 11 ohm, replace the unit with a fully serviceable component. It must be noted that

the actuating fuses are very sensitive and the electrical checks must be made with care. The safe test current is 8 to 12 mA. As an additional safeguard, it is recommended that the discharge heads are mounted on a suitable fixture with the charge end shielded, but unrestricted in case of accidental firing. To measure the insulation resistance, take a reading between each plug pin and the discharge head body. The reading obtained should be at least 20 megohms. *using a Type C insulation tester.*

Testing flame switches

8. 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, Type 1, tong tester. 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 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.

Testing flame switch wiring

9. The flame switch wiring should be tested for continuity before each flight, by placing the fire warning test switch, located on the cabin starboard shelf, in the OCT TEST position. With the switch in this position the lamp in the combined fire warning and extinguisher switch unit should light to indicate that the wiring is complete.

Re-setting inertia switches

10. To re-set each inertia switch, proceed as follows:-
(1) *Disconnect the battery*
~~Ensure that the battery master switch~~

~~is~~ off.

- (2) Gain access to the switch (Group A.3) and remove the terminal cover.
- (3) Re-set the switch, by depressing the re-setting plunger situated between the terminals of the switch.
- (4) Replace the terminal cover and any doors 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 unusual difficulties. The location of, and access to, all the components is indicated in Group A.3 of this chapter, while the removal of the fire extinguishers is fully described in Section 4, Chapter 5 of this volume.

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