Group D.8

PARACHUTE BRAKE (CODE TC)

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LIST OF ILLUSTRATIONS

Introduction

1. This Group contains the description and operation of the parachute brake control 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

Parachute brake

General

2. The parachute brake is installed in a fairing above the tail cone of the rear fuselage with its cable attached to a shackle

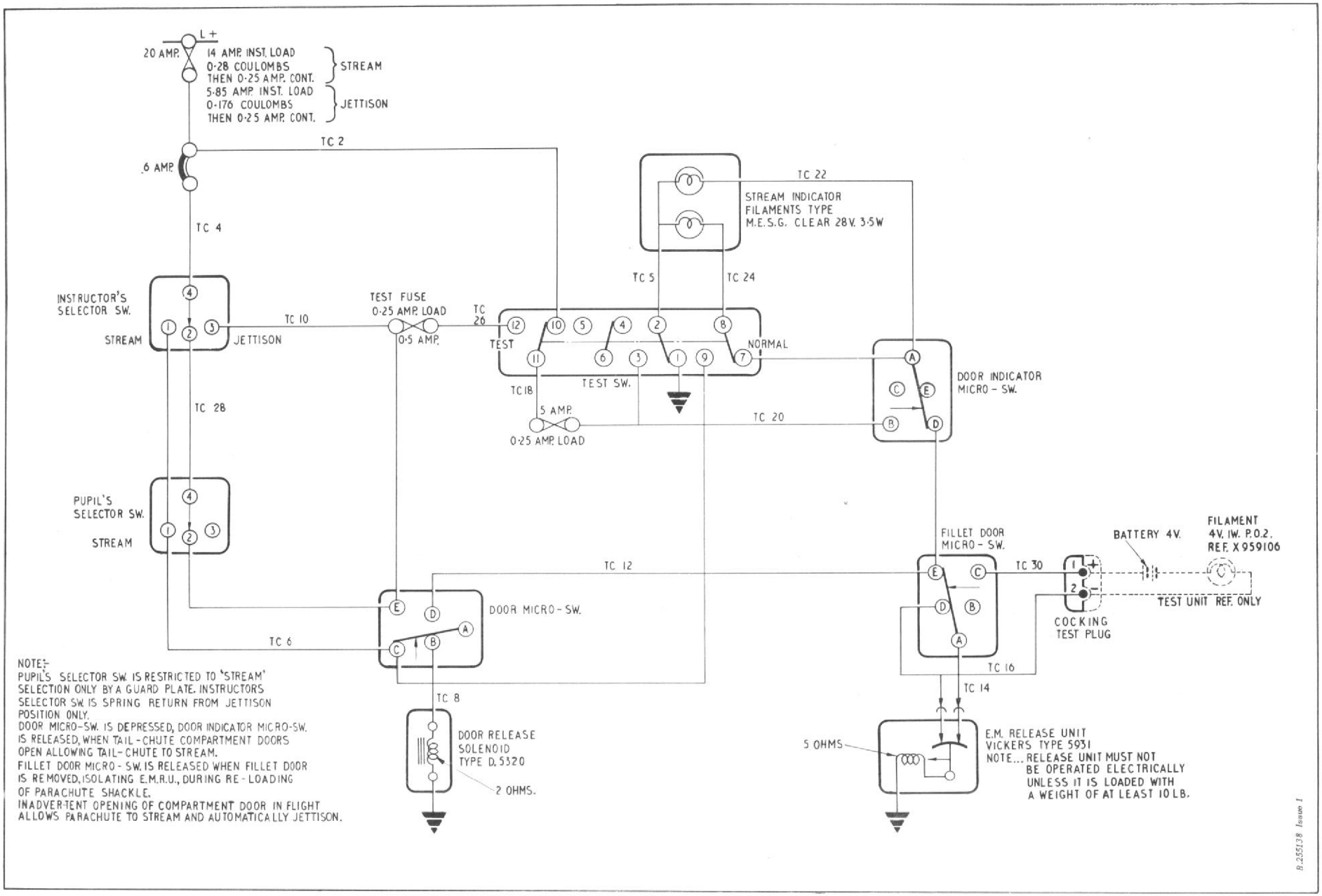

Fig. 1 Parachute brake (theoretical)
◀ (minor amendment) ▶

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held in the jaws of an electro-magnetic release unit bolted to the top of frame 57. The parachute is streamed and jettisoned by the operation of either the instructor's or pupil's control switch located in the cabin. A twin filament warning lamp, controlled by a microswitch operated by the parachute doors, is provided to indicate that the parachute has been streamed.

3. The electrical control circuit is so arranged that should the parachute doors open inadvertently in flight, or during take-off, and stream the parachute without the operation of either control switch, the parachute release unit will be automatically energized, via a further microswitch, and jettison the parachute, thus preventing an emergency arising due to the drag of the parachute. The continuity of the control circuit may be checked by the operation of a test switch situated in the cabin. When this switch is in the TEST position, the filaments in the warning lamp are connected in series with the parachute door release solenoid and the release unit's operating coil, via the microswitches, and the lamp filaments glow to indicate that the circuit is complete.

4. Access to the release unit for parachute attachment is made through an access door in the tail cone fillet. When opened, this door releases a microswitch which isolates the electrical supply to the release unit so preventing any possible damage to the unit due to an electrical overload, when inserting the parachute shackle. A small two-pole plug, located adjacent to the release unit, is provided for testing the release unit for correct cocking.

TABLE 1

Equipment type and Air Publication reference

Equipment Type	Air Publication
Instructor's and pupil's control switches, Rotax Type D.10007	A.P.113D-1113-1
Test switch, N.S.F. Type 7675/B.102	A.P.113D-1110-1
Microswitches, Type 4.A	A.P.113D-1200 series
Circuit breaker, B.T.H. Type LGA-6-B1/1	A.P.113D-0903-1
Door release solenoid, Rotax Type D.5320	A.P.113F-0101-16
Warning lamp, H.S.A. design	
Jettison release unit, A.5931 E.M. No.1, Mk.1	A.P.110G-0300 series
Modified to Vickers Drg. No. 92574/54 (Pre Mod.835)	
Modified to Vickers Drg. No. 92574/71 (Post Mod.835)	

Control switches and warning lamp

5. The instructor's and pupil's control switches are situated on the centre instrument panel and armament panel respectively. The instructor's switch is marked JETTISON and STREAM and is of the spring-return to centre from one side only type, in this case the return action being from the JETTISON position. The pupil's switch is marked JETT/OFF and STREAM and is of the same type as the instructor's, but the spring-return side is not used, as the switch is restricted to two positions only by a guard plate. The switches are so wired that the pupil has control only while the instructor's switch is in its centre position. The parachute warning lamp is mounted on the centre glare shield and consists of a Hawker designed lamp housing containing two failaments. The lamp is controlled by the door indicator microswitch, which is situated in the tail cone, and operated by the parachute door when open. Both filaments of the lamp glow to indicate that the parachute is streaming and will remain lit after the parachute has been jettisoned.

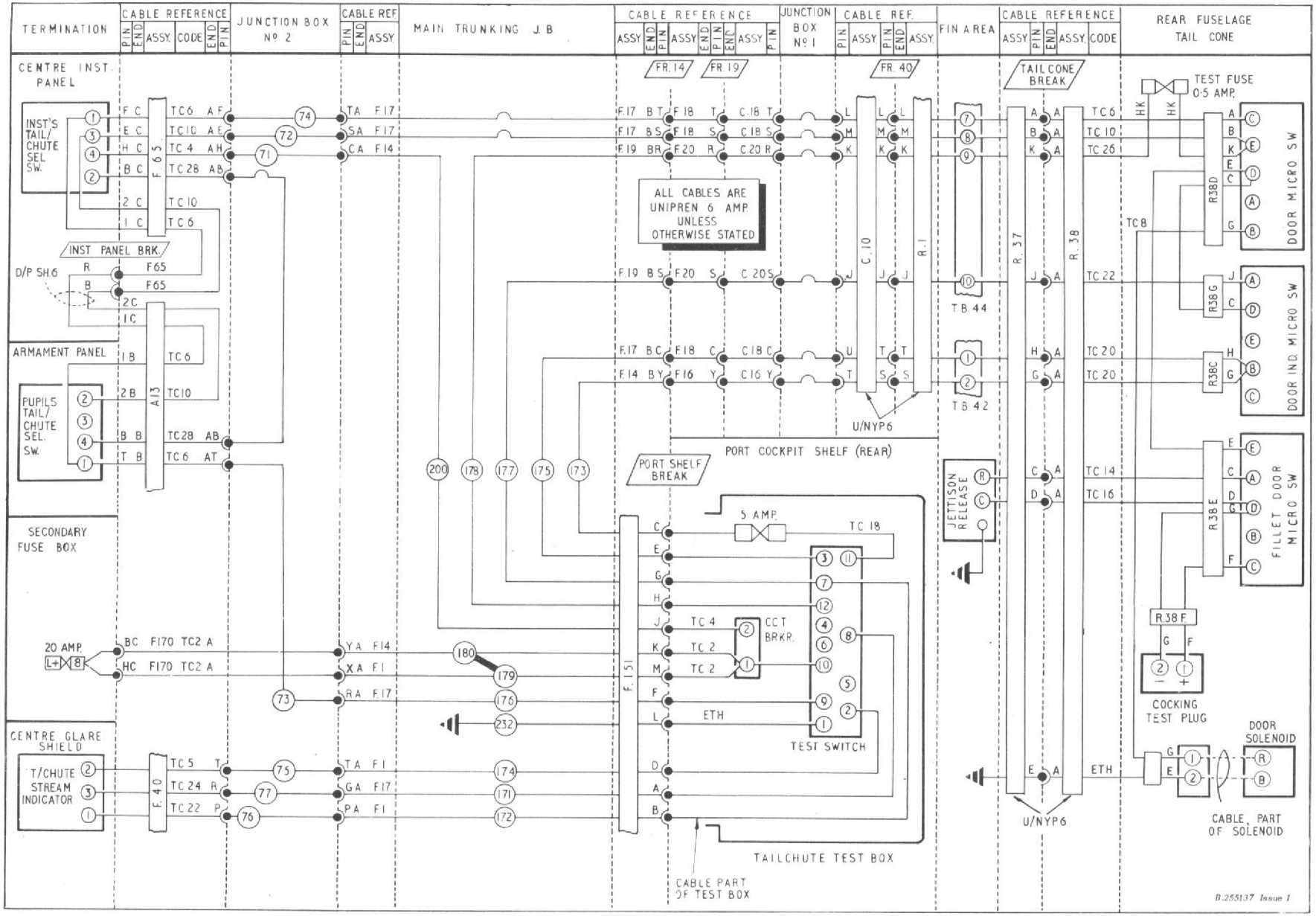

Fig. 2. Parachute brake (routeing)

Door solenoid and parachute release unit

6. The parachute doors are spring-loaded and are opened to stream the parachute by a solenoid-operated release mechanism located in the tail cone. The solenoid is controlled by the control switches via the door microswitch. The door microswitch is operated when the doors open to isolate the supply to the door release solenoid and then complete the circuit from the control switches to the parachute release unit, via the fillet door microswitch. It is, therefore, impossible to jettison the parachute until it has been streamed.

Test switch and cocking test plug

7. The test switch is mounted on the tailchute test box which is situated on the rear portion of the cabin port shelf. The switch is marked TAILCHUTE TEST and is used in conjunction with the parachute warning lamp, to check the continuity of the control circuit, the door release solenoid and the release unit. The test box also contains the parachute circuit breaker and a Belling Lee fuseholder containing a 5 amp fuse, which is part of the warning lamp and test circuit. A further Belling Lee fuseholder, containing a 0.5 amp fuse, is situated on the port side of the tail cone front former. Access to this fuse, which protects the test circuit, may be obtained when the parachute doors are open.

8. The cocking test plug is situated in the tail cone adjacent to the release unit, access being obtained through a door in the port side of the tail cone. The plug is used to connect a test set to the release unit circuit to check that the unit is serviceable and correctly cocked. The fillet access door must be open when using this plug to test the release unit.

Operation

Normal stream and jettison

9. The theoretical diagram of the circuit *(fig.1)* is drawn in the condition found when the parachute is stowed with its doors closed, the automatic parachute jettison circuit ready to operate and both control switches in circuit to control the installation *(i.e. normal flight conditions)*. If during landing, the instructor places his control switch in the STREAM position, a supply will be fed to contact C of the door microswitch, which is in the unoperated condition, because the doors are closed. In this condition, contacts C and B of the microswitch are made and complete the circuit to the door release solenoid.

10. When the door release solenoid is energized, it allows the door locks to release the doors, which open and stream the parachute. With the doors open, contacts D and E of the door microswitch are made to complete the circuit from the control switches to the parachute release unit via the fillet door microswitch. When the instructor's switch is placed in the JETTISON position, current is fed to contact E of the door microswitch and, as the doors are open, current passes to the parachute release unit via contacts A, D and E of the fillet door microswitch. When the release unit is energized its jaws open and so jettison the parachute. With the instructor's control switch in its centre position, the circuit via the pupil's switch is similar to that for the instructor's switch, as described above.

Indication

11. When the parachute doors open to stream the parachute, the door indicator microswitch is operated and makes contacts A, B and C. Contacts A and B of the microswitch complete a supply to both filaments of the warning lamp. This supply is obtained from the circuit fuse via contacts 10 and 11 of the test switch and also passes through a 5 amp circuit fuse before reaching contact B of the microswitch. One filament is supplied through contacts 7 and 8 of the test switch and the other is fed direct from contact A of the microswitch. The return from both filaments passes to earth through contacts 1 and 2 of the test switch. The warning lamp will, therefore, glow when the doors open to give indication that the parachute is streaming. The lamp remains lit after the parachute has been jettisoned, but is extinguished when the battery master switch is placed in the OFF position after flight.

Automatic jettison

12. On inadvertent release of the parachute, the operation of the automatic jettisoning circuit is such that when the

doors open and allow the parachute to stream, the door microswitch is operated and makes contacts D and E. With these contacts made, a supply is immediately available from the series connected central contacts of both control switches to the parachute release unit, via the fillet door microswitch. The release unit is, therefore, energized immediately and jettisons the parachute.

Release unit overload precaution

13. When the fillet door is opened to gain access to the release unit for parachute attachment, the fillet door microswitch is released and makes contacts A, B and C, thus isolating the supply to the release unit and completing the circuit of the cocking test plug. The isolation of the supply is necessary, because with the parachute doors open, a supply would be available at the release unit via the door microswitch. Under these conditions, the release unit would be energized immediately the shackle was inserted into the jaws and if the shackle was held in the jaws manually for any length of time, the release unit's solenoid coil and feed switches would be damaged by the electrical overload.

14. After insertion of the shackle, the release unit may be tested for correct cocking by use of the cocking test plug. *(para.16)*. When the parachute doors are closed after the parachute has been stowed, the door microswitch is released and makes contacts A, B and C to isolate the feed to the release unit. When the fillet door is closed the fillet door microswitch is operated and makes contacts A, D and E to complete the circuit to the release unit ready for further operation.

Control circuit test

15. The door release solenoid, parachute release unit and control circuit are tested for continuity when the test switch is placed in the TEST position. With the switch in this position, one filament of the warning lamp is connected in series with the parachute door release solenoid via the control switches and the door microswitch, and the other filament is connected in series with the release unit's operating coil via the control switches, the indicator microswitch and the fillet door microswitch. Both filaments will, therefore glow to indicate that the circuit is complete and undamaged.

Release unit test

16. The cocking test plug is used to connect a test set, consisting of a lamp and low voltage battery, to the release unit circuit to check that the unit is serviceable and correctly cocked. The fillet access door must be open when using this test plug to allow the fillet microswitch to complete the test circuit *(para.13)*. The test lamp will light, when the release unit is serviceable and correctly cocked, as a circuit is then completed through the release unit feed switches, the solenoid coil and the test set.

SERVICING

General

17. For general servicing of the aircraft electrical system, reference should be made to Group A.1. All the components must be kept clean and inspected periodically for signs of damage and to ensure that they are securely mounted. Apart from the standard routine bench testing of the components, as described in the appropriate Air Publications listed in Table 1, no further servicing should be required.

REMOVAL AND ASSEMBLY

General

18. Once access has been obtained, the removal and assembly of the components forming the parachute brake circuit should present no difficulties. The location and access to all the components is indicated in Group A.3.