GROUP D.5

HOOD CONTROL (CODE HC)

LIST OF CONTENTS

Introduction

1. This group contains the description and operation, of the hood control circuit, together with information on the servicing required to maintain the equipment in an efficient condition. Routeing and theoretical circuit diagrams are included. For a description of the aircraft electrical system reference should be made to Groups A.1, A.2 and A.3 of this chapter. Additional information is given on the electrical interlocks between the hood control circuit and the cabin pressurization and temperature control circuit which is described in Group D.6 of this chapter. Detailed information on the standard items of equipment used in the circuit will be found in the Air Publications listed in Table 1.

DESCRIPTION

Equipment details

2. The hood may be opened or shut by an electro-mechanical system for which two control switches are provided. One of these is a three-position switch marked OPEN, OFF and SHUT and is mounted on the hood clutch control box on the port wall of the cabin above the throttle lever. This switch is provided with a guard to prevent accidental operation when the throttle lever is used. The other control is similar and is located at the bottom of the forward face of frame 3. Access to this switch for external operation of the hood control is obtained by removing the fuselage nose piece as described in Section 3, Chapter 1.

3. The hood control system also includes a rack and pinion driven by a rotary actuator via a clutch. This clutch is controlled from the clutch control box by a lever which may be moved in a gate to positions marked FREE and LOCKED to operate a Bowden cable link. Movement of the lever to the FREE position disengages the clutch and, by a mechanical link, sets the hood control switch in the cabin to the OFF position. Returning the clutch control lever to LOCKED does not move the control switch which is then free to be set to OPEN or SHUT as required.

4. With the clutch control lever in the FREE position, the hood may be opened or shut by hand.

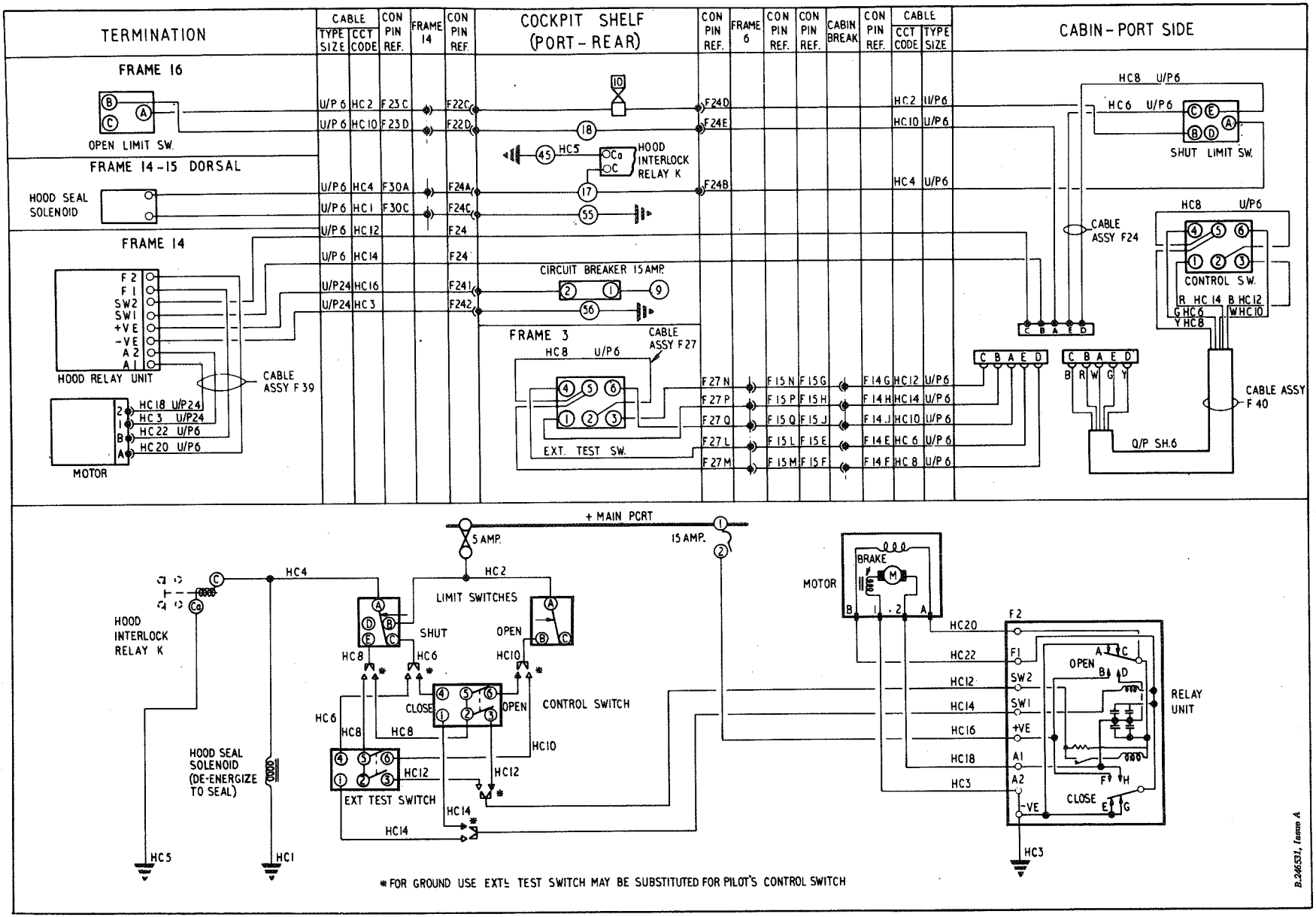

Fig. 1. Hood control

RESTRICTED

Note . . .

The hood must not be opened or shut by pushing on the transparent plastic. In the shut position, a small gap between the hood frame and windscreen arch allows a finger-hold for opening the hood. In shutting the hood by hand, push on the metal framework of the hood only.

5. The leads from the hood control switch in the cabin terminate in a socket which normally connects the switch to the hood control circuit via a plug on the cabin port shelf. The leads from the external control switch on frame 3 also terminate in a socket in the cabin. This socket is normally carried in a stowage above the port shelf. For external operation of the hood control system, the cabin hood clutch control lever must be set to the LOCKED position and the control switch lead sockets interchanged so that the external control switch is connected to the hood control circuit via the plug on the port shelf.

Note . . .

The cabin control switch socket must be returned to the control circuit socket at the end of any period of use of the external control switch.

Limit switches

6. Two plunger-operated microswitches are provided as limit switches to switch off the actuator when the hood is fully opened or shut. The hood-shut limit switch is mounted on the port top longeron at the forward end of the hood rail. The hood-open limit switch is mounted on the port side of the radio bay just aft of frame 16.

TABLE 1

Equipment type and Air Publication reference

Equipment	Air Publication
Rotary actuator, Type C.5209	A.P.4343D, Vol.1, Book 3, Sect.16
Relay unit, Type F.1306	A.P.4343C, Vol.1, Book 2, Sect. 3
Tumbler switch, D.P/C.O. Type XD.752 No.2 (Control internal)	A.P.4343C, Vol.1, Book 1, Sect. 1
Tumbler switch, D.P/C.O Type XD.752 No.2 (Control external)	A.P.4343C, Vol.1, Book 1, Sect. 1
Microswitches, Type 1A (or 430S) and 4A	A.P.4343C, Vol.1, Book 1, Sect. 2
Hood seal solenoid, Type ES/A/430	... ... A.P.4343E, Vol.1, Sect. 1
Circuit breaker, Type A.3	A.P.4343B, Vol.1, Book 2, Sect.10

7. The hood-shut limit switch also controls a solenoid-operated hood seal valve and a hood interlock relay. The hood seal valve is located in the hood fairing and is energized when the effective control switch is set to OPEN. When the hood is shut, with SHUT or OFF selected, the hood seal solenoid is de-energized and the valve opens to inflate the hood seal with air tapped from the cabin pressurization pre-cooler.

8. The hood interlock relay, located on the rear of the port shelf, is associated with the cabin pressurization system described in Group D.6 of this chapter. The relay is energized at the same time as the hood seal valve solenoid.

Delay switch

9. A delay switch in the hood-relay unit imposes a few seconds delay after OPEN has been selected before allowing the open relay to switch on the actuator. During this delay period the hood seal valve solenoid and the hood interlock relay are both energized. The delay allows the hood seal to deflate and the cabin pressure to be reduced before the hood starts to open.

Note . . .

Although the hood control switch box is provided with a guard to prevent accidental operation of the switch due to fouling by the electrical cables on the throttle lever, it is essential that all excessive

slack in the cables is eliminated as described in Group A.1. of this chapter.

Operation

Hood open

10. The circuit diagram *(fig.1)* shows the circuit arrangement when the hood is fully open with the control switch set to OPEN and the clutch control lever set to either FREE or LOCKED. The contacts of the hood-open limit switch are open and the hood-shut limit switch connects the hood seal valve solenoid and the hood interlock relay to the supply from the fused circuit via contacts A and B. The shut limit switch also connects the supply to one side of the control switch via contacts B and C. At this time, the relay unit receives a supply from the circuit breaker, but neither relay is energized. A supply from the control switch keeps the time-delay switch in the operated condition to allow the hood shutting sequence to start without delay when hood SHUT is selected.

Hood shutting

11. Before either control switch can be used to SHUT the hood, the clutch control lever must be in the locked position. Setting the control switch to SHUT connects the supply from the "shut" microswitch to energize the "shut" relay via SW1 of the relay unit. The "shut" relay coil circuit is completed to earth via the contacts of the de-energized "open" relay. The "shut" relay connects the supply from the circuit breaker to pin 2 of the actuator via A.1 of the relay unit. This actuator circuit is completed to earth from pin 1 of the actuator via A.2 of the relay unit.

12. The supply for the field coil of the actuator is taken to pin B from the moving contact of the "shut" relay via F.1 of the relay unit. The circuit is completed from pin A via F2 of the relay unit and the contacts of the de-energized "open" relay.

13. The actuator will rotate in the direction required to shut the hood until switched off by operation of the "shut" limit switch, or intermediately, by the control switch. Operation of the "shut" limit switch will also de-energize the hood seal valve allowing the hood seal to inflate as explained in para.7. The hood interlock is also de-energized to set the cabin pressurization system ready for operation. The "open" limit switch will connect the supply from the fused circuit to the OPEN contacts of the control switch as soon as the hood moves to shut.

Hood opening

14. When the effective control switch is set to OPEN the fused supply is connected to energize the hood seal valve solenoid and the hood interlock relay via the "open" limit switch, the control switch and the "shut" limit switch contacts E and A. The control switch also provides a fused supply to energize the "open" relay via SW2 of the relay unit and the delay switch. The onset of the actuator hood opening operation is delayed for a few seconds and, meantime, the hood seal is deflated by the operation of the hood seal valve solenoid and the cabin pressurization is reduced by the operation of the hood interlock relay.

15. When the delay switch connects the energizing coil of the "open" relay, the actuator rotates in the direction required to open the hood. The "open" relay now connects the supply from the circuit breaker to pin 2 of the actuator via A1 of the relay unit. This actuator circuit is completed to earth from pin 1 of the actuator via A2 of the relay unit.

16. The supply for the field coil of the actuator is now taken to pin A from the moving contact of the "open" relay and the circuit is completed to earth from pin A via F2 of the relay unit and the contacts of the de-energized "shut" relay. This represents a reversal of the field current compared with the "shutting" arrangement.

17. The actuator will rotate, opening the hood, until switched off by the operation of the "open" limit switch, or intermediately, by the control switch.

SERVICING

General

18. For general servicing of the electric system as a whole, reference should be made to Group A.1 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 standard routine serviceability checks and bench testing

of the components, as described in the appropriate Air Publications, listed in Table 1, no further servicing should be necessary.

CAUTION

Ensure that the hood is clear before using the external control switch.

Hood external control

19. When the cabin pressurization equipment is being tested, the hood is operated externally by the three position centre-off switch located at the bottom of the forward face of frame 3. This switch is normally OFF and disconnected from the hood control selector plug when not in use, thus, before use it must be connected as follows:-

(1) Gain access to the external control switch by removing the fuselage nose piece, as described in Section 3, Chapter 1 of this volume. Check that the switch is set to OFF.

(2) Disconnect the hood control switch plug and socket break on the cabin port shelf and leave the socket from the switch hanging as a reminder that this disconnection has been made.

(3) Place the actuator clutch lever to the LOCKED position.

(4) Remove the external control switch socket from its stowage above the port shelf and connect it to the plug originally connected to the cabin switch socket, thus completing the circuit to the external control switch. The external control switch may now be used to open and close the hood.

(5) After use, disconnect the external control switch socket from the plug on the cabin port shelf and replace the socket in its stowage.

(6) Re-connect the socket from the cabin control switch to the plug on the port shelf.

(7) Replace the fuselage nose piece.

REMOVAL AND ASSEMBLY

General

20. Once access has been obtained, the removal and assembly of the electrical components forming the hood control circuit should present no unusual difficulties. The location and means of access to all components is indicated in Group A.3.

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