

GROUP D.5

HOOD CONTROL (CODE HC)

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Equipment employed

1. The major components employed in the hood control circuit are listed below, together with the appropriate Air Publications to which reference should be made for a detailed description and the necessary servicing required to maintain them in an efficient condition.

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
Control switch, Type D.5501	A.P.4343C, Vol.1, Book 1, Sect. 1
Micro switches, Type 1A 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
External control switch, Type D.5503	A.P.4343C, Vol.1, Book 1, Sect. 1
Circuit breaker, Type A.4	A.P.4343B, Vol.1, Book 2, Sect.10

DESCRIPTION

Hood control
General

2. An electric rotary actuator incorpo-

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rating a clutch is located in the cabin on the port side of the forward face of frame 14 to drive the rack and pinion system, which opens and closes the sliding hood. The actuator is controlled, via a relay unit located below it, by a three position switch marked OPEN, OFF and SHUT, which is contained in a combined hood

and clutch control box mounted on the port side of the cabin above the throttle lever. The switch is provided with a guard to avoid accidental operation when the throttle

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lever is moved. The lever controlling the actuator clutch moves in a gate marked FREE and LOCKED. When in the FREE position, the clutch is disengaged by means of a Bowden cable interconnection and the hood control switch is moved to the OFF position by a mechanical linkage within the control box. This operation enables the hood to be manually operated.

▲ 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 these cables be eliminated as described in Group A.1



Fig.1. Hood control
RESTRICTED

Electrical interlocks

3. Two plunger-operated micro switches, located one in the cabin on the top port longeron at the forward end of the hood rail and the other on the port side of the radio bay just aft of frame 16, are provided as limit switches to stop the actuator motor when the hood is fully open or closed. In addition to stopping the actuator when the hood reaches the fully closed position, the forward limit switch also controls the solenoid-operated hood seal valve, located in the hood fairing, and the hood interlock relay, located on the rear portion of the port shelf. When de-energized, the hood seal valve, admits air, taken from the engine compressor, to inflate the hood seal. The interlock relay is linked with the cabin pressurization circuit, as described in Group D.6 of this chapter.

External control

4. A centre-off switch, located at the bottom of the forward face of frame 3, is provided to operate the hood externally when testing the cabin pressurization equipment. When not in use, this switch is normally OFF and disconnected from the hood control selector plug, located adjacent to the cabin control switch.

Operation

Hood open

5. With the hood fully open and the clutch disengaged, the control switch is in the OFF position, the contacts of the open limit switch are broken and the close

limit switch is making contacts A, B and C. Contact A of the close limit switch feeds the hood interlock relay (Group D.6) and energizes the hood seal solenoid valve, which closes the air supply and opens the seal to atmosphere thus maintaining the seal in the deflated condition, while contact C feeds the hood control switch in preparation for closing the hood. A supply is also made to the relay unit, via the circuit breaker, but this will not energize the actuator as the relays in the units are not energized, due to the position of the hood control switch and open limit switch. To close the hood it is first necessary to move the clutch lever to the LOCKED position before the control switch can be operated and this action also engages the clutch, thus enabling the actuator to move the hood.

Hood shutting

6. Placing the control switch in the SHUT position feeds current from the fuse, through the contacts of the close limit switch and control switch to terminal SW1 of the relay unit and through the "shut" relay coil to earth via the contacts of the "open" relay, which are in contact with the negative terminal of the unit. The "shut" relay is now energized and makes the supply from the circuit breaker, via the positive terminal of the relay unit, to terminal A1, which feeds the armature of the actuator from pin 2, while the negative return is taken to earth from pin 1, via terminal A2 of the relay unit, which is in connection with the negative terminal of the unit.

7. The supply for the field coil of the actuator is taken from the positive terminal, through the contacts of the "shut" relay to terminal F1 and on to pin B of the actuator. The negative return from pin A of the actuator is fed to terminal F2 and to earth in the same manner as the "shut" relay coil. The actuator will now rotate in the direction required to close the hood, until switched off either at the control switch or by operation of the close limit switch when the hood completes its full travel. Operation of the close limit switch will also de-energize the hood seal valve solenoid thus allowing the seal to inflate and as the hood moves forward the open limit switch will make its contacts to feed the control switch in preparation for opening the hood.

Hood opening

8. With the hood closed, the contacts of the open limit switch are made and the close limit switch is making contact E. When the control switch is placed in the OPEN position a supply is made from the fuse, via the open limit switch, control switch and contact E of the close limit switch, to energize the hood seal valve solenoid, thus deflating the seal in preparation for opening the hood. A supply is also taken from the control switch to terminal SW2 of the relay unit and this terminal feeds the coil of the "open" relay via a delay switch, which allows time for the hood seal to deflate. The negative return passes to earth through the contacts

of the "shut" relay which are in connection with the negative terminal of the unit.

9. The "open" relay is now energized and makes the supply from the positive terminal to feed the armature of the actuator in a manner similar to that during the hood closing operation. The supply to the field coil of the actuator is taken from the contacts of the "open" relay to terminal F2 and on to pin A of the actuator. The negative return from pin B is taken to terminal F1 of the relay unit and so to earth via the contacts of the "shut" relay and negative terminal.

10. The actuator will now rotate in the reverse direction and open the hood, until switched off either at the control switch or by operation of the open limit switch when the hood completes its full travel. As the hood moves aft, the close limit switch will make contacts A, B and C to maintain a supply to the hood seal solenoid valve and to supply the control switch in preparation for again closing the hood.

External control of hood

11. The operation of the external control switch is similar to that of the cabin switch and the necessary action required to connect it to the selector plug, together with the method of use is described in para.13 of this group. For manual operation of the hood, the clutch lever should be placed in the FREE position, as this action disengages the actuator clutch by means of a Bowden cable and also places the control switch in the OFF position by

a linkage within the control box, thus allowing the hood to be moved by hand.

Note . . .

The hood must not be opened or closed by pushing on the transparent plastic.

SERVICING

General

12. 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 and bench testing of the components, as described in the appropriate Air Publications, quoted in para.1, no further servicing should be necessary.

Hood external control switch

13. When the cabin pressurization equipment is being tested, the hood is operated externally by a three position centre-off switch, which is 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) 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.
- (2) Place the actuator clutch lever to the LOCKED position.

- (3) 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.

- (4) Gain access to the external control switch by removing the fuselage nose piece, as described in Section 3, Chapter 1 of this volume. The external control switch may now be used to open and close the hood.

WARNING

Ensure that the hood is clear before using the switch.

- (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

14. 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 the components is indicated in Group A.3 of this chapter.

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