

## Appendix 4

## ROTAX, TYPE C5200 SERIES

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**Introduction**

1. The rotary actuators of the Type C5200 series have been designed to open and close the cabin hood in aircraft, but it is possible that they may be used for other purposes. In aircraft with a pressurized cabin, the actuator is controlled by a relay, Type 1301, which incorporates a time-delay switch to enable deflation of the hood seal to take place before the actuator motor is brought into operation. In aircraft with a non-pressurized cabin, the actuator is used with the relay, Type F1302, which has no time-delay mechanism. In external appearance, the relays are similar. Individual details for these relays are given in A.P.4343B, Vol. 1, Sect. 22. The circuit for the Type F1301 is included in the typical circuit diagram for the installation, shown in fig. 1.

**DESCRIPTION**

2. With the exception of Type C5203/1, which has a split series motor, all the Type C5200 group actuators incorporate a small reversible shunt-wound motor, which drives the splined drive shaft through a three-stage epicyclic gear train. Additional information relevant to a specific type will be found in A.P.4343D, Vol. 1, Sect. 16.

**Motor, clutch and brake**

3. The electric motor is of 4-pole construction, rated at 24 volts. It transmits its drive through a single plate spring-loaded clutch, which bears on the inner face of the rotating brake drum, integral with which is the first sun gear of the gear train. The clutch is so set that it will slip under excessive load, thus preventing damage to the mechanism.

4. The brush gear assembly incorporates four brushes connected as shown in fig. 1. Access to the brushes is gained by removing the brush inspection cover, and the connections from the aircraft electrical supply are made to the terminal block situated on the motor cover.

5. Between the motor and clutch is an electro-magnetic brake mechanism. This consists of an 8-pole brake spider, with eight pole shoes which bear radially under spring tension against the inner periphery of the brake drum. The brake coil is connected in series with the armature of the motor so that when the motor is switched on, the brake coil is energized. This attracts the brake shoes to the poles of the spider, and releases the brake, so that the rotation of the armature shaft is transmitted via the clutch to the brake drum and gear train.

### Gear train and release mechanism

6. The drive is taken from the armature shaft to the splined drive shaft by a three-stage epicyclic gear train, which produces the necessary reduction in speed from the motor to the drive shaft. When the release mechanism is operated by pulling on the Bowden plunger, the final annular gear is free to rotate, allowing the equipment which the actuator is operating to become free. When the plunger is allowed to run back into position, a cone-shaped pin is brought into engagement with a cam face on the rotating annular gear, thus keeping it rigid for transmitting drive to the splined shaft.

### Functioning

7. The actuator is controlled by a relay, the circuit for which is shown in fig. 1. This relay incorporates two relay coils, one for clockwise rotation and the other for anti-clockwise rotation of the actuator, which are energized by operation of the appropriate push-switch. The relay shown in this circuit is the Type F1301, which incorporates a time delay to allow deflation of the hood seal to take place before the cabin hood is opened. This time delay is adjustable to cater for cable voltage drop. A similar relay, the Type F1302, may be used as an alternative to the Type F1301; this does not, however, incorporate a time

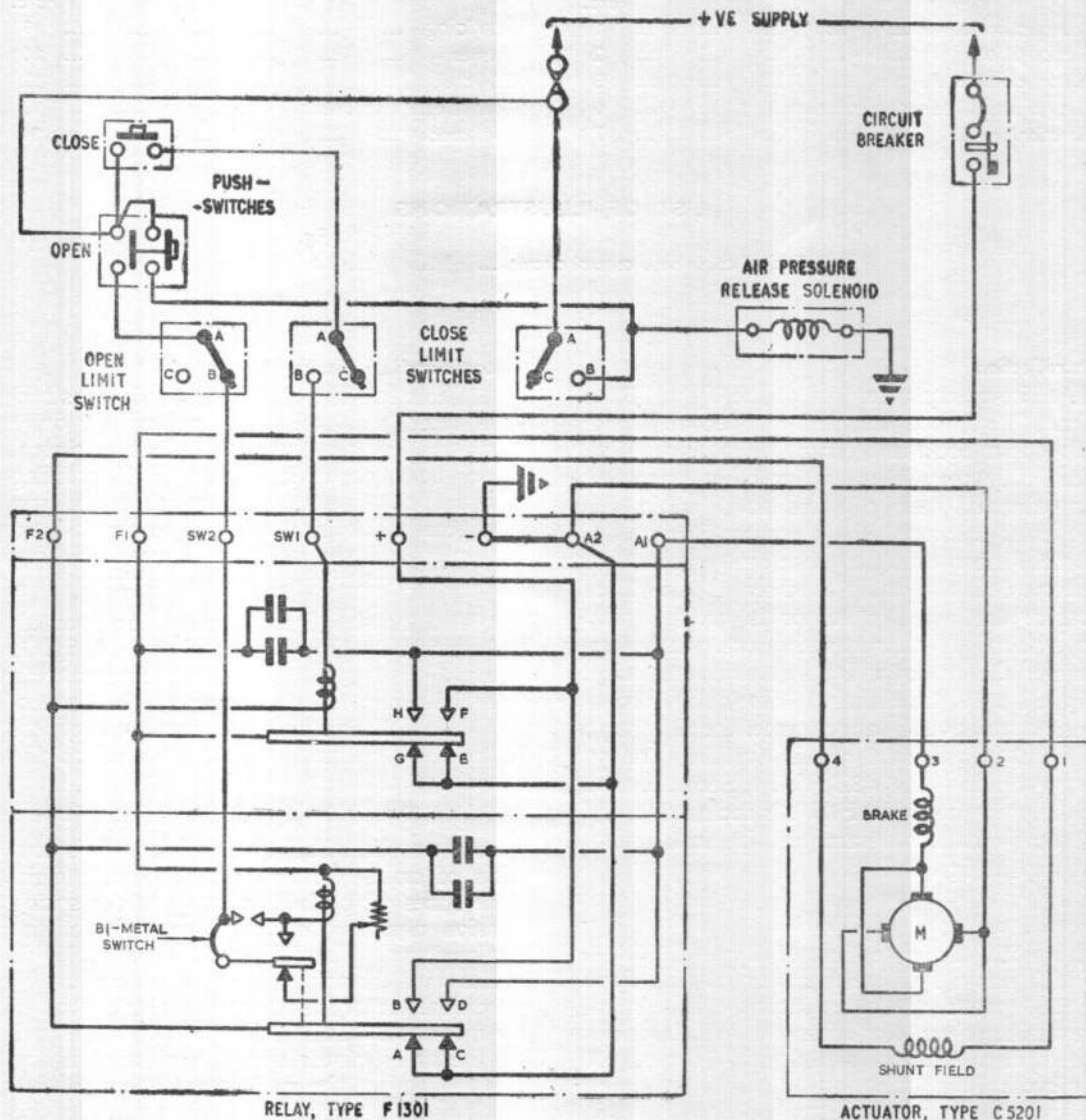


Fig. 1. Typical cabin hood control circuit

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delay and is intended for use with non-pressurized cabins.

8. When the appropriate control push-switch is depressed, the motor in the actuator is energized and rotates in the required direction. The brake coil is also energized, thus releasing the brake and allowing the drive to be transmitted through the gear train to the drive shaft. When the motor is de-energized at the end of its travel, the brake coil is de-energized simultaneously, thus stopping instantly the actuation of the mechanism.

#### SERVICING

9. Little servicing, other than that outlined in the following paragraphs, should be required between major servicing periods.

#### Brushes

10. When inspecting the brushes, the following should be the method of procedure:—

- (1) Remove the brush inspection cover.
- (2) Ensure that the brushes are a free fit in the brush boxes.
- (3) Check the brush spring pressure with a suitable spring balance.
- (4) Re-fit the brush inspection cover.

11. Always renew the brushes before they are worn down to the minimum permissible length. New brushes should be bedded down by running the machine on no load for 5 min. in each direction of rotation, or until the brushes are fully bedded, whichever is the longer time. The current should not exceed 6 amp. during this operation, and the machine should be kept cool by air blast.

#### Lubrication

12. Actuators are lubricated during manufacture and should require no further attention between the appropriate servicing periods.

#### Gear release mechanism

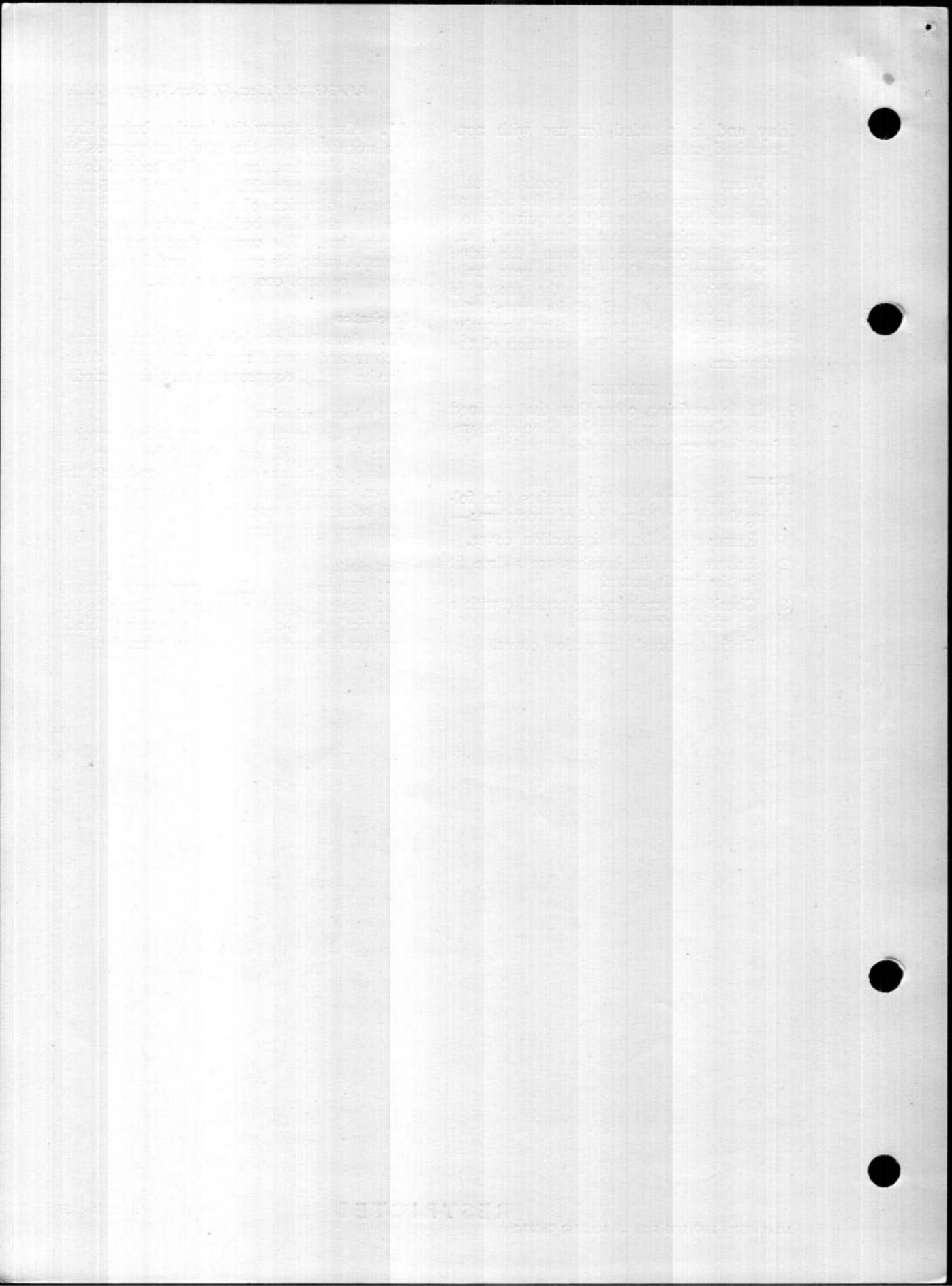
13. If the cover of the gear release mechanism is removed, care should be taken not to lose the release pin. When re-fitting the cover, ensure that the cone-shaped end of the release pin engages with the cam face of the rotating annulus.

#### Final check

14. Ensure that all external nuts, screws and locking devices are secure. Examine the electrical connections to the terminal block for security and freedom from corrosion.

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