

Chapter 1

ACTUATOR, ROTAX, TYPE C7001

and

GEARBOX ZA3701

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LEADING PARTICULARS

Actuator, Type C7001	Stores Ref. 5W/359
Gearbox, ZA3701	Stores Ref. 5W/360
Current on full load	9.5 amp.
Normal load	33 lb. in.
Speed	1,500 r.p.m.
Rating	15 operations (12 sec. periods)
Brush grade	P.M.50 H.A.M.
Brush spring tension	5-7 oz.
Minimum brush length	0.425 in.

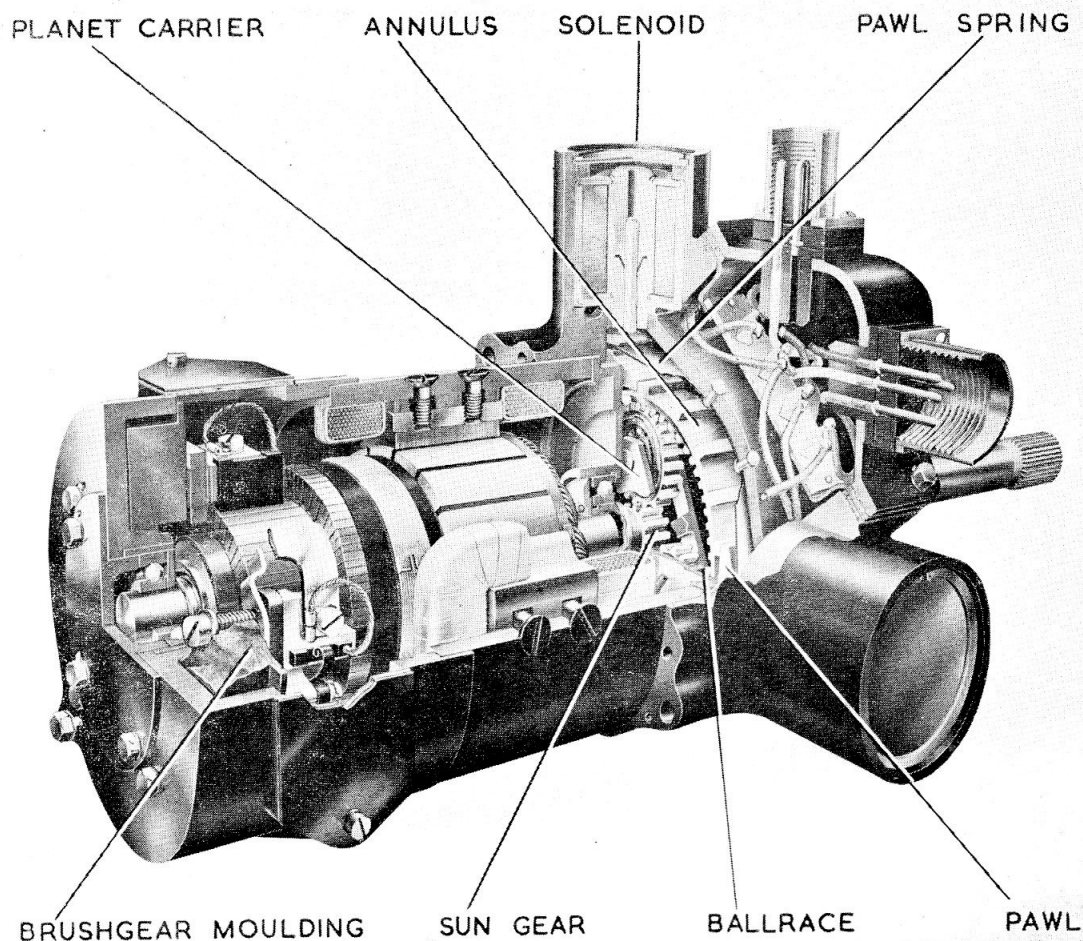


Fig. 1. Actuator, Rotax, Type C7001

Introduction

1. The C7001 actuator is designed for use, in conjunction with the gearbox ZA3701, for the operation of aircraft ancillary equipment, e.g. bomb doors. The two units bolt to opposite faces of a block (referred to as the trolley) which incorporates the necessary gears for engaging with the rack of the actuated equipment. The actuator motor operates on 112V d.c., whilst the solenoids of the actuator and the brake solenoid of the gearbox operate on 28V d.c.

DESCRIPTION

Actuator C7001

Motor

2. The motor (*fig. 1*) is a short shunt, compound wound machine, the direction of rotation being reversible. It develops a no-load speed of 13,200 r.p.m. The wave

wound armature runs in ball bearings, one housed in the commutator end frame and the other in the bearing plate of the gear assembly. The electrical connection to the motor is via a 5-pole plug (Stores Ref. 5X/6016).

Gear assembly

3. A single epicyclic train is contained in a housing bolted to the yoke and field assembly. It consists of a driven sun gear which engages the three planets driving against the annulus. The output shaft from the gear assembly extends beyond the motor end and has coarse longitudinal serrations at its extremity to provide engagement with the input shaft of the ZA3701 gearbox. The outer periphery of the annulus has square section teeth for engagement with two solenoid operated pawls.

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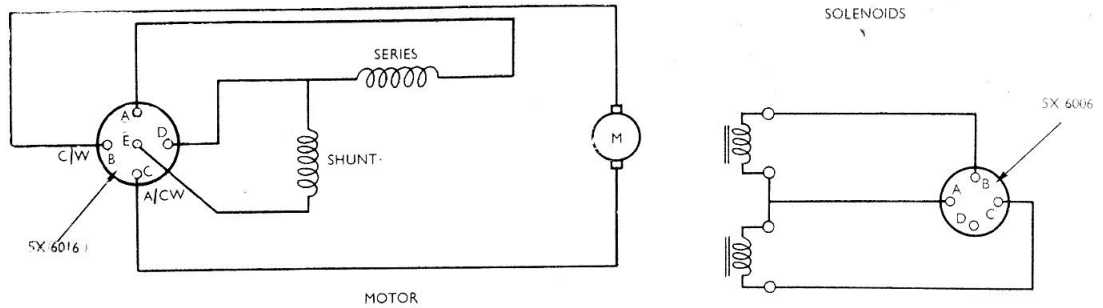


Fig. 2. Diagram of internal connections

Solenoids

4. Two solenoid operated pawls are disposed 90 deg. apart on the gear housing. The solenoids are set radially to the axis of the motor and are energized by operation of the aircraft engineer's control switch. Only one of the solenoids, depending upon the direction of rotation required, may be operated at one time. The pawls are spring loaded to bear on the annulus and are lifted by energizing the appropriate coil. For electrical connection, a 4-pole plug (Stores Ref. 5X/6006) is fitted.

ZA3701 gearbox

5. This unit (fig. 3) is designed specifically for use with the C7001 actuator. It comprises, in the main, a gear and clutch assembly and an electro-magnetic brake assembly.

6. Power from the actuator is transmitted through two epicyclic gear trains and a multiplate clutch to the gearbox output shaft. The electro-magnetic brake is applied when its solenoid is de-energized.

Gear assembly

7. The smaller cylindrical portion of the casing houses two epicyclic gear trains disposed axially round a central hollow shaft, and a third gear train which drives a brake drum. The latter, together with the solenoid of the brake, is housed in the larger diameter casing of the complete assembly.

8. The output end of the shaft, which extends to the exterior of the assembly, is splined to engage with the gears referred to in para. 12. The inner end of the hollow shaft is machined to receive the serrations on the actuator output shaft.

Brake assembly

9. This consists of a central core fitted with four spring loaded brake shoes which normally bear against the interior of the brake drum. A solenoid, wound on the central core attracts the shoes when energized and thereby permits rotation of the drum. Electrical connection to the solenoid is via three pins (A, B and C) of a four-pole plug (Stores Ref. 5X/6006) mounted on the exterior of the brake casing. A cover plate on the end of the brake casing gives access to the solenoid and its connections.

OPERATION

10. Operation of the master switch on the aircraft energizes a change-over contactor or reversing switch for the desired direction of rotation of the actuator. At the same time the appropriate solenoid of the actuator is energized to cause one of the pawls to be brought into engagement with the teeth in the outer periphery of the actuator annulus. By this means the latter is locked against the torque transmitted to the output shaft. Change-over of the master switch causes the motor to be excited in the opposite direction and selects the other solenoid.

11. Power is transmitted to the required equipment through the ZA3701 gearbox and trolley, limit switches being incorporated in the external circuit to satisfy individual requirements.

INSTALLATION

12. The actuator and the gearbox, when mounted in the aircraft are bolted to opposite faces of what is referred to as the trolley, so called because it carries the gears which ride in the rack of the sliding bomb door mechanism. The output shaft of the

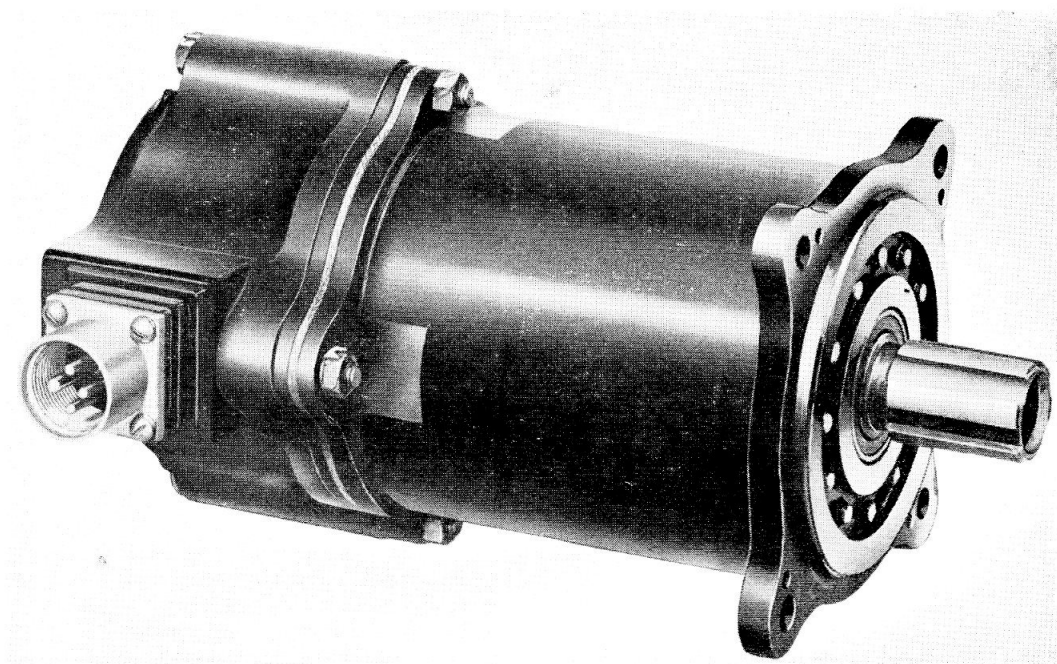


Fig. 3. Gearbox, Type ZA3701

ZA3701 gearbox engages with the gears of the trolley whilst the output shaft of the C7001 actuator passes through the complete arrangement to mate with the gear train at the inner end of the gearbox output shaft.

13. For details of installations on specific aircraft, reference should be made to the appropriate Aircraft Handbook.

SERVICING

14. Remove the four brush covers and gaskets of the actuator. Inspect the brushes to ensure freedom of movement in their respective boxes. Use a supply of clean, dry, compressed air to blow all trace of carbon dust clear of the assembly.

15. Inspect the brushes for wear. If the length of the brush is less than the minimum quoted in Leading Particulars, it will be necessary to remove the actuator from service in order to fit new brushes and to bed them in.

Note . . .

Inspection of brushes should be strictly in accordance with the Servicing Schedules for this machine.

16. Measure the brush spring tension and check with the quoted limits. Take care not to damage the spring during this operation.

17. Upon the completion of the foregoing inspection, replace the covers and gaskets and secure them.

18. Visually inspect the unit for signs of damage or distortion; ensure that all nuts, screws and covers are tight and secure and see that good electrical connection is made through mating plugs and sockets.

19. The actuator is sufficiently lubricated during manufacture and it is therefore unnecessary to add further lubricant until complete dismantling is carried out.