Chapter 2

ACTUATOR, ROTAX, TYPE A0107

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

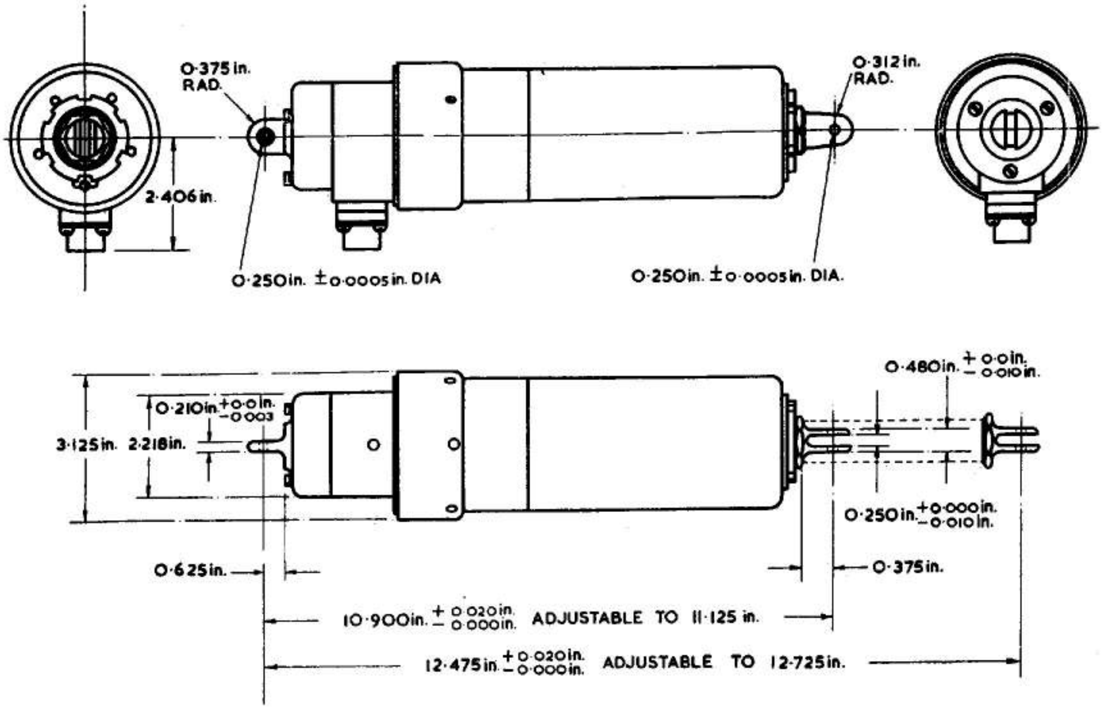

Fig. 1. Diagram showing dimensions of actuator

Introduction

1. The actuator, Type A0107, is powered by a four-pole, split-series field motor, rated at 24 volts. It is of in-line construction, the motor and ram being on the same axis. Types A0107/1 and /2 are essentially similar to the A0107, but differ slightly in the design details of the switch cam and spindle assembly, the brake, field coil and armature assemblies, the screwshaft assembly, and the front cover and ram housing assemblies; the A0107/2 has a window strap assembly instead of a motor housing and window cover. Leading particulars of the various types are given in A.P.4343D, Vol. 1.

2. The instructions given in this chapter apply to all variants, except where indicated otherwise. They must be read in conjunction with the instructions in A.P.4343, Vol. 6, Sect. 17, Chap. 2, App. 1, which cover the procedure which is common to all actuators of the A0100 group; the present chapter is concerned only with deviations from that procedure. It is important to ensure that the correct spare parts are ordered in each instance.

Tools

3. The following special tools are provisioned for the actuator, Type A0107.

NT2283	Assembly punch and base for motor housing bearing
NT2284	Assembly punch and base for screwshaft bearing
NT2285	Extractor for screwshaft bearing
NT2287	Assembly tool for brake housing bearing
NT2288	Extractor for brake housing bearing
NT2480	Ram checking gauge

DISMANTLING

4. Dismantling follows the procedure given in A.P.4343, Vol. 6 for A0100 actuators, with the exception that with Type A0107/2, the window strap assembly is to be removed instead of the motor housing and window cover, which was secured by three ch/hd. screws on the Type A0107.

ASSEMBLY

5. Assembly is as given for A0100 actuators, the only difference being in the fitting of the window strap assembly.

TESTING

6. The checks given for A0100 actuators should be made, and in addition the following tests should be carried out.

Resistance of windings

7. The resistance values of the windings should be as follows, a tolerance of ± 10 per cent. being allowed in each instance:—

Armature	2·0 ohms
Field windings (each pair)	1·5 ohms
Brake winding	0·74 ohms

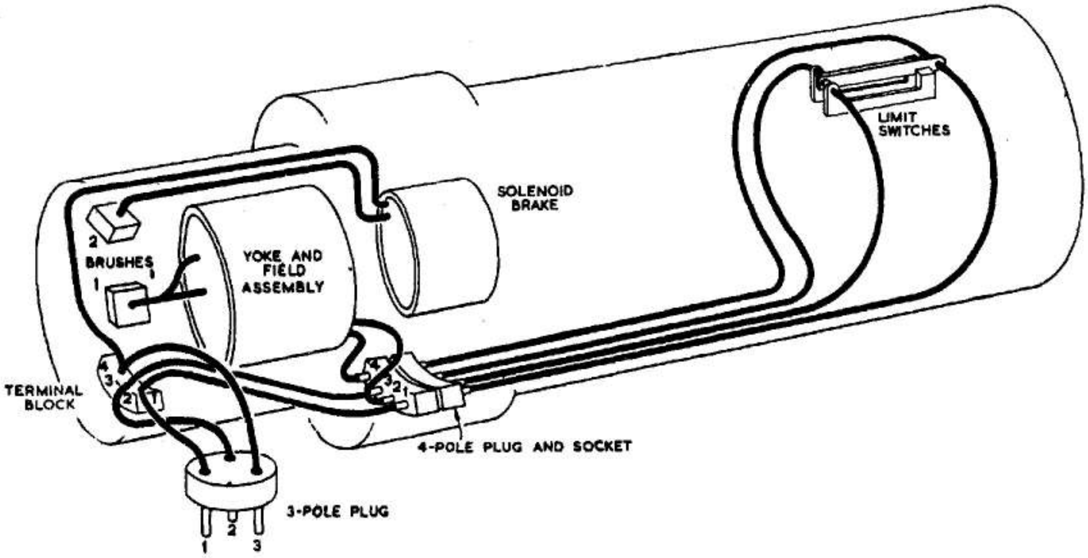

Fig. 2. Internal wiring arrangement

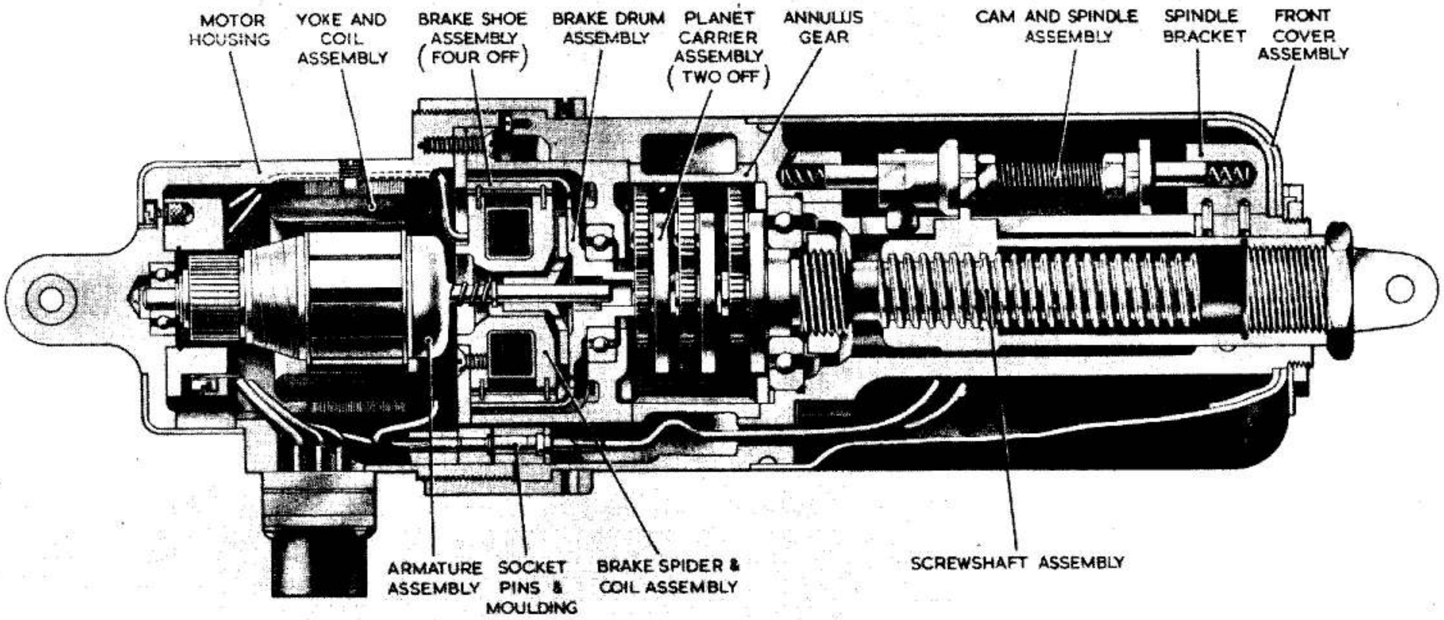

Fig. 3. Sectional view of actuator, Type A0107

Motor

8. The actuator should be run on no load in each direction of rotation with a supply of 28 volts. The current should not exceed 1·0 amp., and the speed should be not less than 15,000 r.p.m.

9. When tested on a load of 7 oz. in. at 28 volts, the motor should run at speeds between 5,200 and 6,500 r.p.m., and the current should not exceed 3·0 amp. The motor must be tested in both directions of rotation.

10. After these tests the insulation resistance should be checked with a 250-volt insulation resistance tester, and should be not less than 0·1 megohms, while still hot.

Motor and brake

11. When the brake has been assembled to the motor, the brake coil should be connected through a control resistance and switch to a low voltage supply. The resistance should be adjusted so that the current does not exceed 1·0 amp. Close the switch and increase the current until all four brake shoes are clear of the brake drum and the armature can be freely rotated; this must occur at a current not exceeding 2·5 amp. If these tests are to be repeated, the circuit must first be broken and the current reduced to its original level.

Clutch setting

12. Suitably supporting the motor assembly and holding the pinion securely, set the clutch to slip at a current of not less than 3·4 amp. in both directions of rotation. When setting the clutch, it should be slipped five times, each slip being of five seconds' duration and with a 15-second pause between each operation.

13. After these tests have been completed, the actuator may be tested as a complete unit. As a safety measure, however, the limit switches should be set to allow at least $\frac{1}{8}$ in. safety margin at each end of the ram travel.

Load tests

14. The actuator must be given a number of operations under load, in each direction of rotation. The current consumption should be not more than 2·9 amp. at 24 volts when operating under a load of 600 lb.

15. With the actuator operating on no load at 24 volts, the ram movement must be completed in 9·2 sec. and the current must not be more than 1·3 amp. in both directions of movement. Under a load of 600 lb. at the same voltage, the time for the set movement of the ram must not exceed 25 sec.; the current should not exceed 2·9 amp. Once again this test must be made in both directions of rotation.

16. The load should be increased to 750 lb., and the set movement should now be completed in 65 sec. at a current rating not exceeding 3·2 amp.

Clutch test

17. After allowing the actuator to cool to room temperature, and with 24 volts

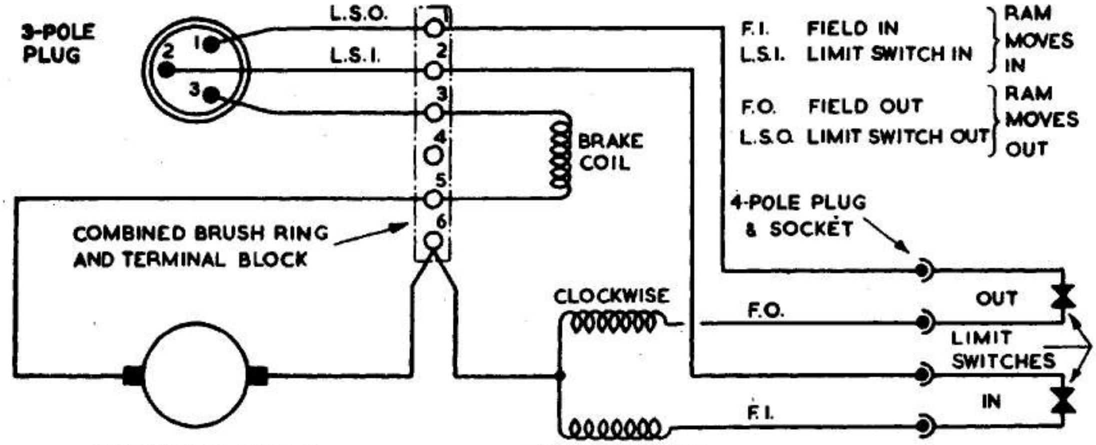

Fig. 4. Theoretical circuit diagram

applied, increase the overload of the actuator until the full slip of the actuator is obtained in each direction. The clutch should then be allowed to slip for 20 sec. in each direction of load, and the motor must not stall during this test. The actuator should be allowed to cool once more, after which the overload test should be repeated.

Over-run tests

18. Run the ram on no load, at 24 volts, to its fully-extended length ; this should lie between 12·475 in. and 12·495 in., the measurements being taken between the fixing centres. Return the actuator to the fully retracted position, after which the length between centres must be between 10·9 in. and 10·92 in. Any adjustment should be made by the limit switching device, which must be sealed on completion of adjustment. The actuator should then be run to the fully extended position and retracted again at the minimum possible speed ; when fully extended, it should not be less than the original position reached by more than 0·015 in., and must not exceed the original position by more than 0·015 in. when retracted.

19. At the conclusion of these tests it should be possible to adjust the length between fixing centres by mechanical alteration to the ram fixing point.

20. The complete machine should then be subjected to an insulation resistance test ; the reading when cold must be not less than 0·2 megohms.


CPL V WOOTON
23