Chapter 37

ACTUATOR, WESTERN, TYPE EJ25, Mk. 4

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Voltage	24V d.c.
Nominal working load	25 lb.
Maximum working load	50 lb.
Maximum static load	100 lb.
Stroke	0·27 in. + 0·01 in.
Brush spring pressure	1½ to 2 oz.
Minimum length of brushes	0·06 in.
Resistance of field coils (together)	3 ohms
Rating of motor	0·011 h.p. at 4,300 r.p.m.
Weight	1 lb.

Introduction

1. The actuator, Western, Type EJ25, Mk. 4, is a linear, in-line actuator, and is sometimes known as the Miles, Type EJ25, Mk. 4. It is rated to operate for 1 minute at a nominal load of 25 lb. with a current consumption not exceeding 2·65 amp.

DESCRIPTION

2. A general description of the Western actuators is contained in A.P.4343, Vol. 1, Sect. 17, Chap. 2, and most of the information therein applies to the EJ25, Mk. 4. Additional information on the EJ25, Mk. 4, is contained in the following paragraphs.

Motor and reduction gearing

3. The motor is a split series type, the field coils of which also control the operation of the brake. The drive from the motor passes through a 3-stage epicyclic reduction gear train with a reduction ratio of 119 to 1.

Brake

4. The brake (*fig.* 1) consists of a spring loaded brake plate with a friction lining on one face. The lined face is adjacent to the face of the brake disc which is fixed to the motor armature shaft. The brake plate can move only in a longitudinal direction, and the brake disc rotates with the motor. Operation of the brake is controlled by the motor field coils so that when the coils are energized, the brake plate is held off the brake disc, and when the coils are de-energized the brake plate makes contact with the brake disc and prevents the motor over-running when the current is switched off.

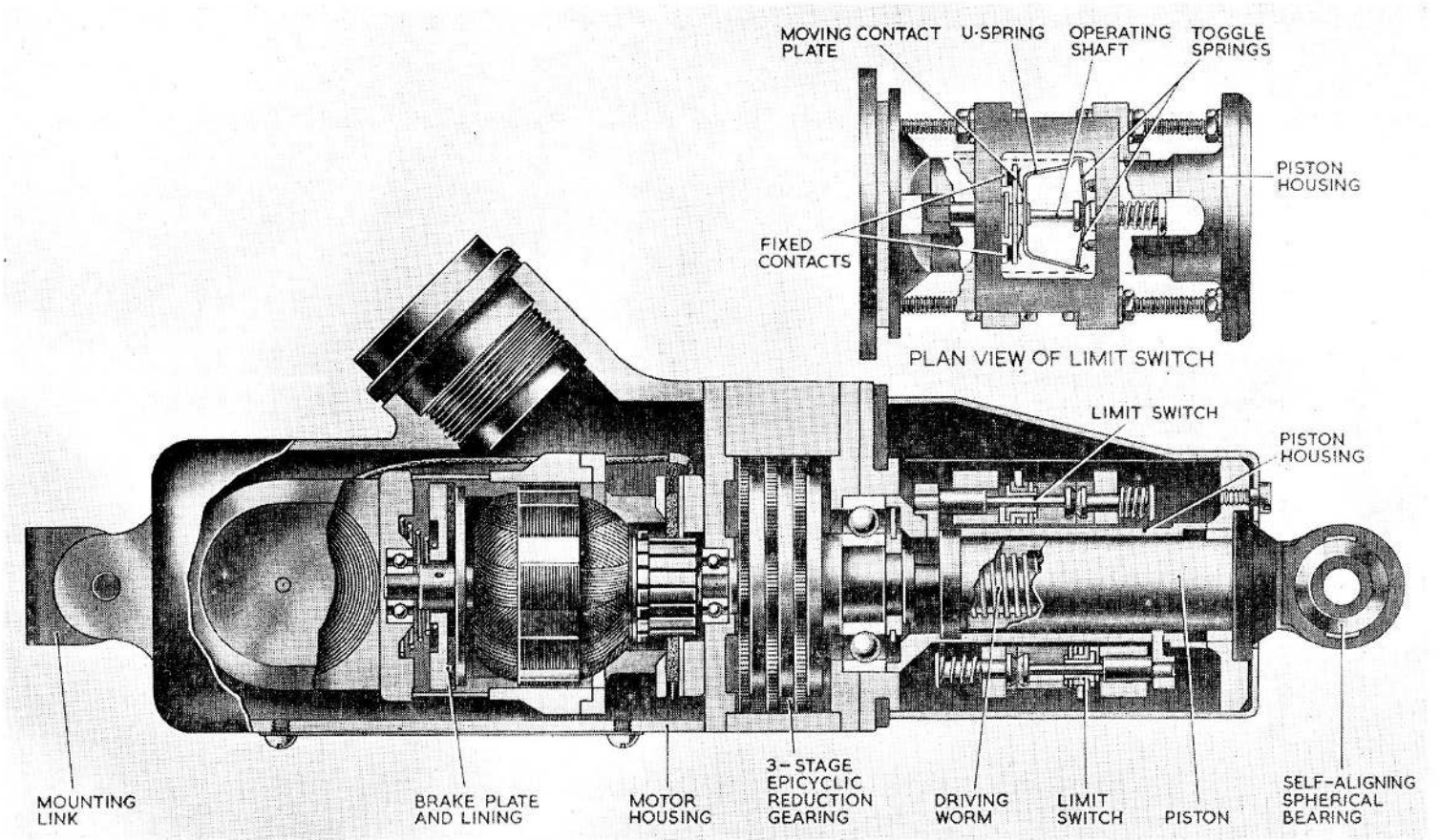

Fig. 1. Sectional view of actuator, Western, Type EJ25, Mk. 4

End fittings

5. An operating worm, driven by the motor, extends and retracts a piston at one end of the actuator. This piston has a self-aligning spherical bearing which forms an eye for connecting the actuator to the equipment it operates. The fitting at the motor end is a fixed mounting provided with a link which allows for mis-alignment up to 6 degrees.

Limit switches

6. Travel of the piston is controlled by two snap-action limit switches operated by lugs attached to the piston. Each switch is identical and consists of a U-spring contact plate, contacts and two toggle springs actuated by an operating shaft. When the piston approaches the limit of its travel, one of the lugs on the piston pushes the operating shaft, and the toggle springs move and allow the ends of the U-spring to close to just below their horizontal position. This allows the contact plate at the back of the U-spring to disengage from the two contacts and break the electrical circuit. When the piston has travelled a short distance in the opposite direction, the switch closes under the influence of a coil spring on the end of the operating shaft. Switching of the actuator takes place at the fully extended and fully retracted positions of the piston.

Electrical connections

7. The internal wiring (*fig.* 2) of the actuator is brought out to a 3-pole Breeze plug mounted on a boss on the motor housing.

SERVICING

8. The servicing of this actuator is the same as that for Western actuators described in A.P.4343, Vol. 1, Sect. 17, Chap. 2, with reference being made to the information contained in the Leading Particulars of the EJ25, Mk. 4.

9. A function test should be performed by connecting the actuator to a 24V d.c. supply and applying loads of 0, 25 lb. and 50 lb. The time the piston takes to complete its 0·27 in. travel, and the current consumption, should not exceed the values given in the following table :—

Load (lb.)	Max. current (amp.)	Max. time (sec.)
0	2·2	1
25	2·65	1
50	3·00	1·5

10. Check the insulation resistance with a 250V insulation resistance tester. This should be done by testing between each plug terminal, in turn, and the actuator body. If a reading of less than 0·2 megohm (cold) or 0·1 megohm (hot) is obtained, the actuator will be unfit for service.

11. Access to the brake, motor and brush-gear is obtained by removing the motor housing. This is done by removing the four nuts on the end of the gear casing, and drawing the housing from the actuator. On completion of the servicing of the motor, refit the housing, secure it with the nuts, and lock the nuts with 24 S.W.G., cadmium plated, soft iron wire.

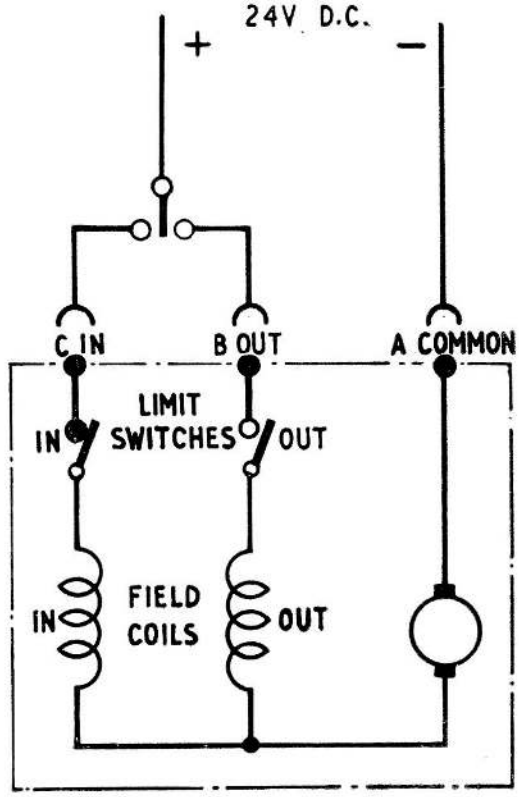

Fig. 2. Internal wiring diagram

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