

Appendix 6

PLESSEY, PANTHER SERIES

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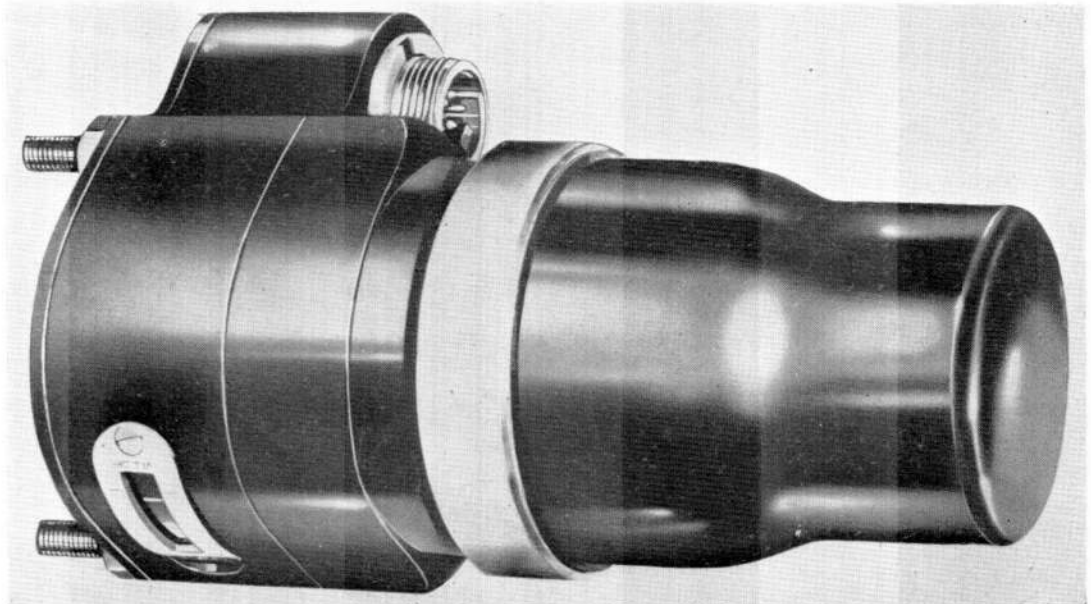


Fig. 1. General view of actuator, Type CZ54709/3

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(A.L.53, May, 54)

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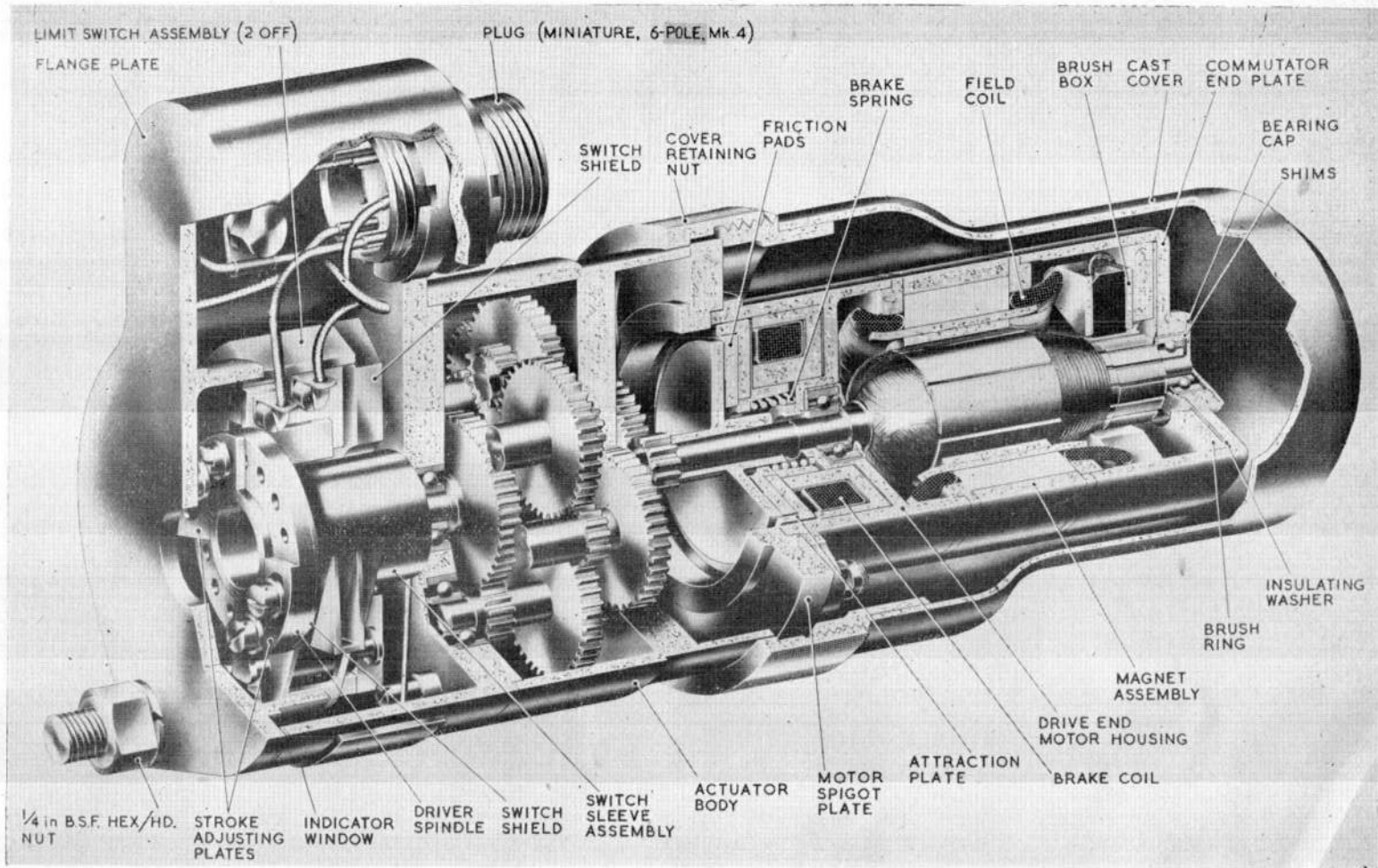


Fig. 2. Sectional view of actuator

Introduction

1. Plessey rotary actuators of the Panther series follow the general design described in this Appendix; the machine illustrated, the Type CZ54709/3, is typical of the series, and specific details of individual actuators will be found in A.P.4343D, Vol. 1, Sect. 16. They vary in such details as the working load, the distance and time of angular travel, and the method of mounting; a visual indicator may or may not be fitted.

2. Motive power in the actuator is provided by a small electric motor, the drive shaft pinion of which engages with a train of gears. Limit switches are fitted to switch off the motor supply automatically when the actuator reaches the end of its travel.

DESCRIPTION

Motor

3. The motor (*fig. 2*) is of the split-field, series wound, reversible type, incorporating an electro-magnetic brake, which rapidly stops the motor when the supply is switched off and effectively prevents overrun of the armature shaft. It is attached to a spigot plate interposed between the motor housing and gearbox by means of studs and 4 B.A. nuts and washers.

4. A terminal block located in the spigot plate accommodates the leads from the limit switches to the motor. In addition, it facilitates the removal of the motor from the main actuator assembly.

Gearbox

5. Positioned between the motor and the limit switch housing is the gearbox housing. The wall separating the motor and switch housings is bored to take the ball bearing supporting the main drive from the motor pinion to the gear train. The inside face of this wall and the corresponding face of the end plate to the switch housing are similarly bored and recessed to receive the ball bearings supporting and locating the ends of the shafts carrying the main gear train.

Final drive shaft

6. Torque is transmitted from the last gear in the train by a key which runs the whole length of the shaft. The circlip fitted at the end of the shaft merely prevents lateral play during assembly. End thrust at this point is taken up by a ball race which abuts a shoulder on the final drive shaft.

Switch housing assembly

7. The switch housing contains the two limit switches, the visual indicator, and switch adjustment mechanism. Half of the electrical plug, together with its associated wiring, also protrudes into the housing.

Limit switches

8. The purpose of the two limit switches is to break the motor supply circuit when the actuator reaches its extremes of travel in either direction. The actual tripping of the switches is performed by two shoulders on a cam of moulded composition material, which is moved radially by the final drive shaft.

9. The switches are of the single-pole, snap-action, change-over type, the switch bases being slotted to permit a fine adjustment in the travel of the output shaft. The circuit diagram (*fig. 3*) shows the switches connected to an external visual indicator. This is a typical aircraft installation arrangement.

Visual indicator

10. The indicator forms part of the switch assembly. A white line is painted on the end of the trip cam and may be viewed through a window in the switch housing (*fig. 2*). The words OPEN and SHUT are engraved on the frame of the window, at the appropriate ends. As the actuator operates, the white line is seen to move across the window, coming to rest against the word indicating the position of the load, i.e., OPEN or SHUT.

Electrical connections

11. A diagram of the electrical connections for this particular actuator appears in *fig. 3*. Connections from the actuator to the external circuit are made at a 6-pole plug and socket, the plug of which is mounted on the actuator. An insulated 4 B.A. terminal, fixed in the side of the switch housing, serves as an alternative point of connection for the negative lead. When this terminal is used, pin E in the plug and socket remains unconnected.

INSTALLATION

12. First, check that the actuator has the necessary fittings and is set to the appropriate angles of travel for the particular installation with which it is to be used. It is important to note that the attachments are able to move freely and to check that the actuator and its associated load are both at the correct end of their travel before coupling them together.

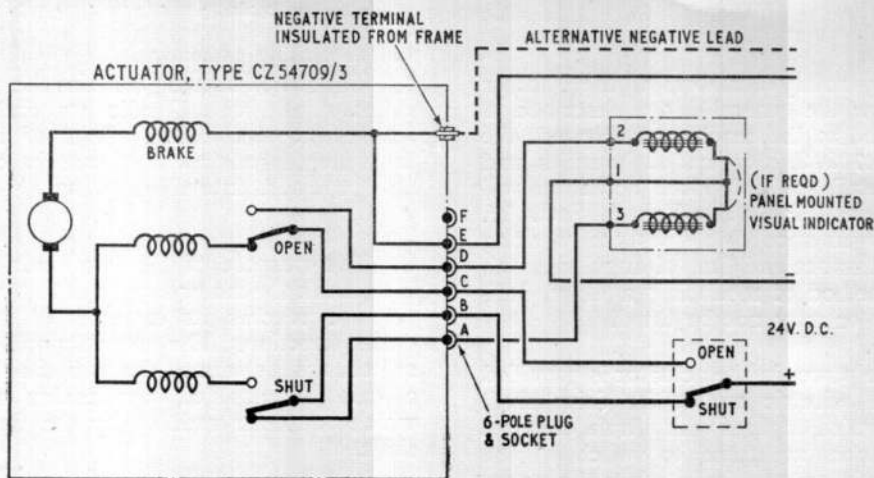


Fig. 3. Circuit diagram

13. Remove the protective cap from the electrical plug on the actuator and join the plug and socket. Check that the mounting studs on the actuator, or the mounting holes fitted on other types, are in alignment with the holes in the mounting plate on the driven component.

14. No lubrication of the actuator is necessary during installation, as thorough lubrication is effected during manufacture.

15. Finally, place the actuator in position and secure by means of washers and nuts.

16. As mentioned, the actuator is fitted with limit switches. If their operation is prevented by the restrictive action of some mechanical brake or stop on the mechanism which is being operated, the actuator will remain energized in a stalled condition. This will ultimately cause the fuse to blow, or, in the event of incorrect fusing, the motor windings to burn out.

17. After installation, the actuator should be given a test to ensure that it functions correctly.

SERVICING

Lubrication

18. As the actuators are lubricated during manufacture, they should not normally require attention during service.

Brush gear

19. The brush gear of the motor is accessible when the cast end cover of the motor housing is removed. The condition of the brushes may be tested with the use of a suitable resistance meter, when an abnormal reading will indicate the presence of brush dust.

Note . . .

During normal operational life of the actuator no adjustment to the brush spring pressure should be required, nor should it be necessary to renew the brushes. Should such action be necessary, it must be carried out only by qualified personnel acting on competent authority, and when adequate servicing gear is available.

Final check

20. Check all external screws and lock-nuts for tightness and security. Ensure that the electrical plug and socket connections are tight and free from corrosion.

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