Chapter 1

ROTARY ACTUATORS

LIST OF CONTENTS

LIST OF APPENDICES

Note . . .

General information on various series of rotary actuators, e.g. Plessey, Panther series, will no longer be issued in Appendices to this chapter. Existing Appendices will gradually be deleted, as they are transferred to the appropriate Section in A.P.4343D, Vol. 1, Book 5, until only chapters of a purely general nature remain.

Introduction

1. Since rotary actuators produced by different manufacturers vary considerably in design, this chapter will not attempt to describe any one actuator in detail, but will confine itself to general principles. More detailed information on the different types of rotary actuators will be given in Chapters in the appropriate Sections of A.P.4343D, Vol. 1, Book 5; where there are several variants within a series, these will be covered in Appendices to the Chapter concerned.

DESCRIPTION

2. Rotary actuators are used in many aircraft installations where remote control of certain rotary movement is required, for example, for the operation of fuel cocks, valves, etc. The majority incorporate a small split-field, series wound motor, operating from the main aircraft supply, which transmits the drive through a gear train to the output shaft. Limit switches are fitted to control the angular travel of the shaft; when either switch interrupts the supply to the motor, a limiting position of the output shaft is reached. In many instances a visual indicator shows words such as OPEN and SHUT to indicate the condition of the controlled item of equipment. In some applications the limit switches also provide control of remote indication.

3. To minimize overrun the motor is fitted with an electro-magnetic brake, the "hold-off" coil of which is in series with the armature and one of the directional field coils. When the motor is energized, the brake is held off, at the same time compressing the brake spring. When a limit switch is operated one of the two field coils and the "hold-off" coil is interrupted, the loaded brake spring extends itself, the brake is applied instantly, thus preventing overtravel of the output shaft.

4. Electrical connection to the actuator is normally made at a multi-pole plug and socket

connection. Circuit diagrams for each actuator appear in the individual chapters in A.P.4343D, Vol. 1, Book 5.

INSTALLATION

5. The chapters in A.P.4343D, Vol. 1, Book 5, give general installation details only, with any precautions that may be necessary for a particular type. For details relating to a particular aircraft installation, reference should be made to the relevant Aircraft Handbook.

SERVICING

6. The following general examination will normally be required for all rotary actuators; details of further servicing procedure will be given in the relevant Chapters in A.P.4343D, Vol. 1, Book 5, and should be undertaken in accordance with the appropriate Servicing Schedule.

Brushgear

7. After removal of the brush cover plates, the brushes should be examined for cracks, security of flexible connections and wear. Brushes should be renewed at the periods prescribed in the relevant Servicing Schedule, and whenever examination reveals that they will not remain serviceable for the period that must elapse before the next servicing.

8. Brushes should be free, but not slack in their boxes. If they are tight as a result of carbon being deposited in the boxes, the deposits should be removed using a dry air blast.

9. Brush spring pressure should be measured using a tension gauge of the appropriate range; available gauges are as follows:—

Ref. No.	*Range*
1H/57	4– 24 gm.
1H/58	10– 80 gm.
1H/59	50–250 gm.
1H/86	100–500 gm.

Note . . .

1 *oz. is equivalent to* 28·352 *gm.*

10. The commutator should be examined for scores and burns. If its condition is such that communication is likely to be impaired, the actuator must be considered unserviceable and be returned for repair in accordance with current authorized procedure.

Insulation resistance test

11. The insulation resistance, when measured with the appropriate insulation resistance tester ⋈ between all live parts and the frame, should not be less than 0·05 megohm.

Note . . .

Should suppression capacitors whose working voltage is less than the applied voltage be fitted, these should be isolated from the frame before the insulation resistance test is commenced.

General

12. A general examination of the actuator should be made for freedom from mechanical damage and security of electrical connections. All covers and cover plates should be in place, and all external locking devices secure.