Chapter 43

ACTUATORS, PLESSEY, JAGUAR (STANDARD) SERIES

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Introduction

1. The Jaguar series of actuators are designed to provide remotely-controlled linear motion against tensile or compressive loads.

2. Basically, the actuators in the standard range consist of a reversible motor which drives a leadscrew, threaded into a plunger, through a multi-stage reduction gear train and a slip clutch. The travel of the plunger is controlled by two adjustable limit switches which are operated by a plunger. Electrical connections to the actuator are made through a plug positioned on the front cover. An end fitting screwed on to the plunger provides one attachment point, the other being an end fitting secured to the rear of the actuator body.

3. Variants in this range differ in their plunger travel, electrical connections and end fittings. Details of these variants will be found in the appropriate appendix to this chapter.

Note . . .

The servicing notes are limited to the information available at the time of issue, and a more detailed and comprehensive servicing schedule will be issued later.

DESCRIPTION

General

4. A general view of a typical Jaguar actuator is shown in Fig. 1, and a unit in this standard range is shown sectioned in Fig. 2.

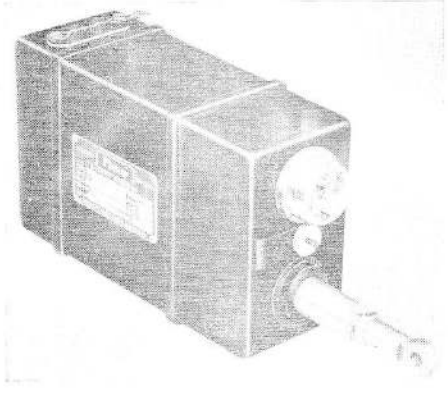


Fig. 1. General view of typical standard Jaguar actuator

Motor

5. The motor is series-wound and incorporates a split field winding to permit reversible operation, and an electro-magnetic brake. The armature is supported in two ball bearings, one located in the drive-end housing and the other in the commutator-end housing. The housings are secured to the yoke by through-studs, screwed into the brake coil casing in the drive-end housing, and the assembly is secured by two nuts at the commutator end. The brushgear is secured to the commutator-end housing and, for the purpose of adjustment, the brushgear can be moved radially within the limits of the two slots through which the studs pass.

6. The brake coil is enclosed within the drive-end housing and, when energized, attracts the lined brake disc away from the rear face of the brake plate. The motor pinion forms an integral part of the brake plate which is secured to the drive end of the armature. The brake disc is prevented from rotating by two lugs on its periphery and is located by the brake spring.

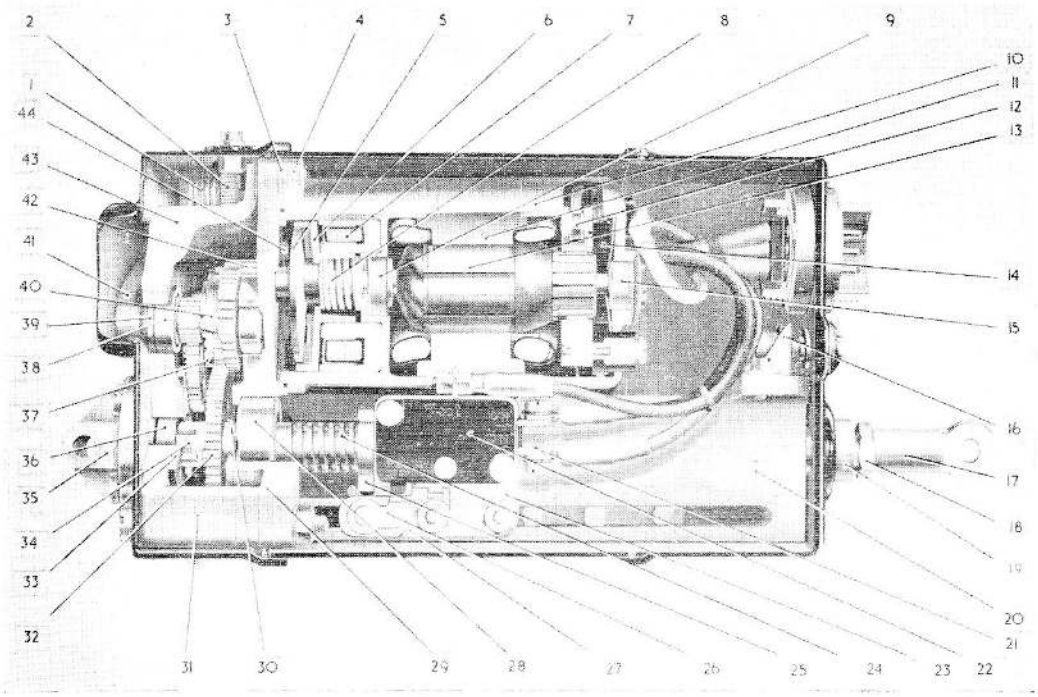
Reduction gear train and clutch

7. The drive from the motor pinion to the leadscrew is through a reduction gear train of two compound spur gear and a final gear.

8. A slip clutch is incorporated between the two gears of the first stage. The larger gear is recessed to accommodate a cone pinned to the smaller gear. The adjustable clutch pressure is applied by a spring-loaded lever which pivots about a spindle and bears on a thrust disc located against the outer race of the ball bearing supporting the smaller gear. In the majority of units, the clutch pressure is set to maximum thus making the clutch inoperative.

Leadscrew and plunger

9. The final gear is secured to the rear end of the leadscrew. An Acme thread machined on the outside of the leadscrew and in the bore of the plunger serves to convert the



1	SPRING	23	SWITCH MOUNTING PLATE
2	CLUTCH ADJUSTING NUT	24	LEADSCREW
3	SPACER	25	PLUNGER TORQUE-REACTION EAR
4	MOTOR DRIVE-END HOUSING	26	SWITCH OPERATING ARM
5	BRAKE PLATE	27	STOP
6	BRAKE DISC	28	LEADSCREW BALL BEARING
7	BRAKE COIL	29	GEARBOX FRONT CASING
8	BRAKE SPRING	30	LEADSCREW DRIVE PIN
9	DRIVE-END BEARING	31	GEARBOX REAR CASING
10	COMMUTATOR-END HOUSING	32	FINAL GEAR
11	YOKE	33	BEARING RETAINING PLATE
12	BRUSH SPRING	34	FINAL GEAR RING NUT
13	ARMATURE	35	REAR END FITTING
14	BRUSHGEAR MOULDING	36	LEADSCREW REAR BEARING
15	COMMUTATOR-END BEARING	37	REDUCTION GEAR TRAIN
16	FRONT COVER FIXING BRACKET	38	GEAR SHAFT BALL BEARING
17	FRONT END FITTING	39	CLUTCH THRUST DISC
18	LOCKNUT	40	SLIP CLUTCH
19	PLUNGER	41	CLUTCH LEVER
20	PLUNGER HOUSING	42	MOTOR PINION
21	SWITCH CONNECTION	43	CLUTCH-LEVER PIVOT SPRING
22	LIMIT SWITCH	44	GREASE GUARD

Fig. 2. Sectional view of typical standard Jaguar actuator

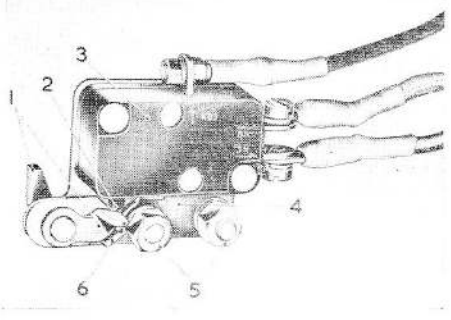
rotary action of the leadscrew into linear movement of the plunger causing the plunger to extend or retract. The plunger is prevented from rotating by integral torque-reaction ears which locate in slots in the plunger housing.

10. A large ball bearing supports the rear end of the leadscrew and plunger assembly while the front end of the assembly is supported in a plain bush. The outer end of the plunger is threaded to carry the front end fitting for attachment to the component being driven.

Limit switches and operating mechanism

11. Plunger travel is controlled by two limit switches, mounted one on each side of the plunger housing. The switches are operated by a mechanism (*fig.* 3) which is tripped by one of the torque-reaction ears on the plunger.

12. At the pre-set limit of plunger travel, the lower torque-reaction ear comes into contact with the operating arm of the switch mechanism. Movement of this arm is transmitted through a transverse spindle to an operating arm on the outside which moves upwards to depress the limit switch plunger and so cut off the power supply to the motor.



1 OPERATING ARMS
2 SWITCH PLUNGER
3 LIMIT SWITCH
4 MOUNTING PLATE
5 SECURING NUTS
6 SPECIAL WASHER AND STOP

Fig. 3. Limit switch assembly

13. Adjustment of plunger travel is made by altering the position of the limit switch assemblies along the slots in the sides of the plunger housing, so that the torque-reaction ear on the plunger contacts the operating arms earlier or later.

Electrical connections

14. The electrical connections to the actuator are made through a plug which is positioned on the top, front or sides of the front cover, according to the variant.

15. The internal connections and a typical external circuit are shown in Fig. 4.

End fittings

16. The rear end fitting is spigotted into the rear housing and is secured with screws. The front end fitting is screwed on to the front of the plunger and locked by a locknut. The type of end fitting used varies with the actuator type.

OPERATION

17. The motor rotates the leadscrew through the reduction gear train and the final gear. The plunger, being threaded on to the leadscrew, is caused to extend or retract according to the direction of rotation of the leadscrew and is itself prevented from rotating by two integral torque-reaction ears which locate in slots in the plunger housing.

18. At the extremes of plunger travel, the contacts in one of the limit switches are opened by the switch operating mechanism, thereby cutting off the power supply to the motor; the brake incorporated in the motor prevents excessive overrun of the plunger. The reverse rotation is achieved by selecting the alternative position on the external control switch.

INSTALLATION

19. For details of an actuator installation in a particular aircraft, reference should be made to the appropriate Aircraft Handbook.

20. When fitting a new or overhauled unit, first check that the actuator is of the correct type for the installation; no adjustment of

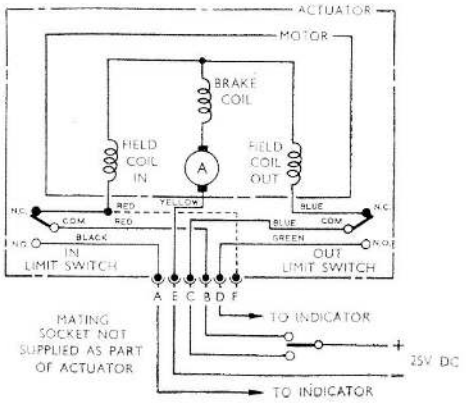


Fig. 4. Circuit diagram

the plunger travel is possible in service since a special test rig is used to obtain the required accuracy. Check that the actuator has not been damaged in transit, that all external screws, nuts and bolts are fully tightened, and that the necessary fittings are available for securing the actuator to its associated component. Ensure that the plunger of the actuator and the drive shaft of the associated component are correctly positioned before coupling them together.

21. After the actuator has been installed, check the security of the installation and operate the actuator to ensure that it functions correctly.

SERVICING

22. These actuators should be serviced in accordance with the general chapter in A.P. 4343, Vol. 1, Sect. 17, Chap. 2 and the instructions contained in the relevant Servicing Schedule.

Lubrication

23. As these actuators are lubricated during manufacture or overhaul, they should not require internal re-lubrication between overhauls. External fittings should be kept well lubricated with a low-temperature grease.

Testing

24. If the serviceability of an actuator is suspect apply the standard serviceability test detailed in the appropriate appendix to this chapter. If the actuator fails to meet the requirements of its standard serviceability test it should be disposed of in accordance with the current service instruction.

Appendix A

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE CZ53681/11/- VARIANTS

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required: —

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the appropriate Table following: —

TABLE 1

CZ53681/11/A

Applied voltage	Load	Time for 2·83 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·5	3·6	2·0	2·83 ± 0·03
29	100 lb. T.L.O.	3·8	5·1	3·0	2·83 ± 0·03
29	100 lb. C.L.O.	3·8	5·1	3·0	2·83 ± 0·03
29	100 lb. C.L.A.	2·5	3·6	2·0	2·83 ± 0·03

TABLE 2

CZ53681/11/B

Applied voltage	Load	Time for 2·3 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·1	2·9	2·0	2·3 ± 0·03
29	100 lb. T.L.O.	3·1	4·1	3·0	2·3 ± 0·03
29	100 lb. C.L.O.	3·1	4·1	3·0	2·3 ± 0·03
29	100 lb. C.L.A.	2·1	2·9	2·0	2·3 ± 0·03

TABLE 3

CZ53681/11/C and /Q

Applied voltage	Load	Time for 3·0 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·7	3·8	2·0	3·0 ± 0·03
29	100 lb. T.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.A.	2·7	3·8	2·0	3·0 ± 0·03

TABLE 4

CZ53681/11/Z

Applied voltage	Load	Time for 2·9 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·6	3·7	2·0	2·9 ± 0·03
29	100 lb. T.L.O.	3·9	5·2	3·0	2·9 ± 0·03
29	100 lb. C.L.O.	3·9	5·2	3·0	2·9 ± 0·03
29	100 lb. C.L.A.	2·6	3·7	2·0	2·9 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix B

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE CZ53681/12/- VARIANTS

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required: —

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the appropriate Table following: —

TABLE 1

CZ53681/12/A, /F, /Q and /R

Applied voltage	Load	Time for 3 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·7	3·8	2·0	3·0 ± 0·03
29	100 lb. T.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.A.	2·7	3·8	2·0	3·0 ± 0·03

TABLE 2

CZ53681/12/C and /E

Applied voltage	Load	Time for 2 in. stroke (sec.) Min.	Time for 2 in. stroke (sec.) Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·8	2·5	2·0	2·0 ± 0·03
29	100 lb. T.L.O.	2·7	3·6	3·0	2·0 ± 0·03
29	100 lb. C.L.O.	2·7	3·6	3·0	2·0 ± 0·03
29	100 lb. C.L.A.	1·8	2·5	2·0	2·0 ± 0·03

TABLE 3

CZ53681/12/D

Applied voltage	Load	Time for 2·94 in. stroke (sec.) Min.	Time for 2·94 in. stroke (sec.) Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·6	3·8	2·0	2·94 ± 0·03
29	100 lb. T.L.O.	3·9	5·3	3·0	2·94 ± 0·03
29	100 lb. C.L.O.	3·9	5·3	3·0	2·94 ± 0·03
29	100 lb. C.L.A.	2·6	3·8	2·0	2·94 ± 0·03

TABLE 4

CZ53681/12/Z

Applied voltage	Load	Time for 2·55 in. stroke (sec.) Min.	Time for 2·55 in. stroke (sec.) Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·3	3·2	2·0	2·55 ± 0·03
29	100 lb. T.L.O.	3·4	4·6	3·0	2·55 ± 0·03
29	100 lb. C.L.O.	3·4	4·6	3·0	2·55 ± 0·03
29	100 lb. C.L.A.	2·3	3·2	2·0	2·55 ± 0·03

TABLE 5

CZ53681/12/AF

Applied voltage	Load	Time for 1·5 in. stroke (sec.) Min.	Time for 1·5 in. stroke (sec.) Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·4	1·9	2·0	1·5 ± 0·03
29	100 lb. T.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.A.	1·4	1·9	2·0	1·5 ± 0·03

TABLE 6

CZ53681/12/AP

Applied voltage	Load	Time for 1·3 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·2	1·7	2·0	1·3 ± 0·03
29	100 lb. T.L.O.	1·7	2·4	3·0	1·3 ± 0·03
29	100 lb. C.L.O.	1·7	2·4	3·0	1·3 ± 0·03
29	100 lb. C.L.A.	1·2	1·7	2·0	1·3 ± 0·03

TABLE 7

CZ53681/12/AT

Applied voltage	Load	Time for 2·12 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·9	2·7	2·0	2·12 ± 0·03
29	100 lb. T.L.O.	2·8	3·9	3·0	2·12 ± 0·03
29	100 lb. C.L.O.	2·8	3·9	3·0	2·12 ± 0·03
29	100 lb. C.L.A.	1·9	2·7	2·0	2·12 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix C

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE 1CZ82600/12/- VARIANTS

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required: —

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the appropriate Table following: —

TABLE 1

1CZ82600/12/AF

Applied voltage	Load	Time for 1·5 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·4	1·9	2·0	1·5 ± 0·03
29	100 lb. T.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.A.	1·4	1·9	2·0	1·5 ± 0·03

TABLE 2

1CZ82600/12/AQ

Applied voltage	Load	Time for 3 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·7	3·8	2·0	3·0 ± 0·03
29	100 lb. T.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.A.	2·7	3·8	2·0	3·0 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix C

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE 1CZ82600/12/- VARIANTS

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required: —

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the appropriate Table following: —

TABLE 1

1CZ82600/12/AF

Applied voltage	Load	Time for 1·5 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·4	1·9	2·0	1·5 ± 0·03
29	100 lb. T.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.A.	1·4	1·9	2·0	1·5 ± 0·03

TABLE 2

1CZ82600/12/AQ

Applied voltage	Load	Time for 3 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·7	3·8	2·0	3·0 ± 0·03
29	100 lb. T.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.A.	2·7	3·8	2·0	3·0 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix D

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE CZ53681/13/H

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required: —

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the Table following: —

TABLE 1

Applied voltage	Load	Time for 1·5 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·4	1·9	2·0	1·5 ± 0·03
29	100 lb. T.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.O.	2·0	2·7	3·0	1·5 ± 0·03
29	100 lb. C.L.A.	1·4	1·9	2·0	1·5 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix E

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE CZ72257

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required: —

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the Table following: —

TABLE 1

Applied voltage	Load	Time for 1·35 in. stroke (sec.) Min.	Time for 1·35 in. stroke (sec.) Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·2	1·8	2·0	1·35 ± 0·03
29	100 lb. T.L.O.	1·8	2·5	3·0	1·35 ± 0·03
29	100 lb. C.L.O.	1·8	2·5	3·0	1·35 ± 0·03
29	100 lb. C.L.A.	1·2	1·8	2·0	1·35 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix F

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE CZ53681/1F/- VARIANTS

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required.—

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the appropriate Table following: —

TABLE 1

CZ53681/1F/A

Applied voltage	Load	Time for 2 in. stroke (sec.) Min.	Time for 2 in. stroke (sec.) Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	1·8	2·5	2·0	2·0 ± 0·03
29	100 lb. T.L.O.	2·7	3·6	3·0	2·0 ± 0·03
29	100 lb. C.L.O.	2·7	3·6	3·0	2·0 ± 0·03
29	100 lb. C.L.A.	1·8	2·5	2·0	2·0 ± 0·03

TABLE 2

CZ53681/1F/J

Applied voltage	Load	Time for 3 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·7	3·8	2·0	3·0 ± 0·03
29	100 lb. T.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.O.	4·0	5·4	3·0	3·0 ± 0·03
29	100 lb. C.L.A.	2·7	3·8	2·0	3·0 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix G

STANDARD SERVICEABILITY TEST FOR ACTUATOR, PLESSEY, TYPE CZ80730/3/A

Introduction

1. When considered necessary the tests detailed in this appendix may be applied to the above-mentioned actuator immediately prior to installation in an aircraft, or when its serviceability is suspect.

Test equipment

2. The following test equipment is required.—

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V Insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A 29V d.c. supply.

TEST PROCEDURE

Insulation resistance test

3. Using the insulation resistance tester, check the resistance between each pin of the plug and the body in turn. The reading in each instance must not be less than 50,000 ohms.

Function test

4. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. Set the actuator to be tested on the rig using the correct end fittings. Ensure that the results for the tests agree with the values given in the Table following:—

TABLE 1

Applied voltage	Load	Time for 2·7 in. stroke (sec.) Min.	Max.	Max. current (amp.)	Length of stroke (in.)
29	100 lb. T.L.A.	2·4	3·5	2·0	2·7 ± 0·03
29	100 lb. T.L.O.	3·5	4·9	3·0	2·7 ± 0·03
29	100 lb. C.L.O.	3·5	4·9	3·0	2·7 ± 0·03
29	100 lb. C.L.A.	2·4	3·5	2·0	2·7 ± 0·03

T.L.A. Tensile load assisting
T.L.O. Tensile load opposing
C.L.O. Compressive load opposing
C.L.A. Compressive load assisting

5. Connect indicating lamps or magnetic indicators to poles A and D of the actuator plug. Check that the lamp connected to pole A lights when the actuator is fully retracted and the lamp connected to pole D lights when the actuator is fully extended.

6. Perform several inching strokes in each direction to check for satisfactory brake operation.

Appendix H

STANDARD SERVICEABILITY TEST
ACTUATOR, JAGUAR, PLESSEY, TYPE 1CZ135400

Introduction

1. The tests detailed in this appendix may be applied to this actuator, immediately prior to installation in an aircraft, or whenever its serviceability is suspect.

Test equipment

2. The following test equipment is required:—

(1) Linear actuator test rig (Ref. No. 4G/5420)

(2) 250V d.c. insulation resistance tester, Type C (Ref. No. 5G/152)

(3) A d.c. supply, variable between 24 and 29 volts.

TEST PROCEDURE

Insulation resistance test

3. Using a 250V d.c. insulation resistance tester, measure the insulation resistance between each plug pin and the actuator frame. The values in each instance must not be less than 50,000 ohms.

Brushgear

4. At the periods prescribed in the relevant Servicing Schedule, the actuator should be dismantled sufficiently for examination of the brushgear. The brushes should be replaced by new, in accordance with the instructions contained in the relevant Servicing Schedule, or whenever this examination reveals that the brushes may reach their minimum length before the next routine servicing.

5. To gain access to the brushes, refer to fig. 1 then proceed as follows:—

(1) Slacken locking nut (18) and remove front end fitting (17).

(2) Loosen captive screw, located just above the plunger.

(3) Ease back the front cover to expose the terminal block and take out the three terminal screws.

(4) Withdraw front cover and spacer case.

6. Re-assembly in general is the reverse of the dismantling procedure. Assemble locknut and front end fitting to dimensions shown in the Installation drawing (fig. 4). The end fitting should be lined up so that the axis of the hole in the eye-end is parallel to the horizontal axis of the actuator, and the locknut tightened against it.

Functional test

7. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. With the variable d.c. supply set to 25 volts, mount the actuator to be tested on the test rig, using the correct end fittings, and after running the actuator on no-load, adjust the stroke to 2·00 inches. Then operate the actuator under the voltage and load condition shown in Table 1, and check that the stroke times and current values conform to the tabulated conditions.

TABLE 1

Applied Voltage	Load (lb.)	Conditions of load	Times in seconds for full stroke (3 in.) Min.	Max.	Maximum current (Amperes)	Stroke variation
29	160	C.L.O.	11·0	15·0	2·2	
29	160	C.L.A.	7·0	10·5	1·6	−0·05 in.
29	160	T.L.O.	11·0	15·0	2·2	
29	160	T.L.A.	7·0	10·5	1·6	+0·05 in.
29	0	Extend	5·5	7·5	1·2	
29	0	Retract	5·5	7·5	1·2	
24	0	Extend	7·0	10·0		
24	0	Retract	7·0	10·0		

C.L.O.—Compressive load opposing
C.L.A.—Compressive load assisting
T.L.O.—Tensile load opposing
T.L.A.—Tensile load assisting

8. If a test rig is not available, connect the actuator through an ammeter and a three-way switch, with a central 'OFF' position, to a d.c. supply, variable between 24 and 29 volts as shown in the circuit diagram (fig. 3) of Appendix 8. Perform the no-load tests as detailed in Table 1, timing the stroke with a stop watch and noting the ammeter readings.

9. Check that excessive vibration is not felt during the tests.

10. Make several inching strokes in each direction to check for satisfactory operation.

Appendix J

STANDARD SERVICEABILITY TEST ACTUATOR, JAGUAR, PLESSEY, TYPE 1CZ136520 —VARIANTS

Introduction

1. The tests detailed in this appendix may be applied to this actuator, immediately prior to installation in an aircraft, or whenever their serviceability is suspect.

Note . . .

Owing to the short stroke of this actuator, the recommended procedure is to set the actuator to a stroke of 1·5 in. and test at this setting. After testing; the centres, dimensions, and stroke should be set as detailed in Appendix 9, Para. 2, Table 1 for /A and /B variants.

Test equipment

2. The following test equipment is required:—

(1) Linear actuator test rig (Ref. No. 4G/5420).

(2) 250V d.c. insulation resistance tester, Type C (Ref. No. 5G/152).

(3) A d.c. supply, variable between 18 and 29 volts.

TEST PROCEDURE

Insulation resistance test

3. Using a 250V d.c. insulation resistance tester, measure the insulation resistance between each plug pin and the actuator frame. The values in each instance must not be less than 50,000 ohms.

Brushgear

4. At the periods prescribed in the relevant Servicing Schedule, the actuator should be dismantled sufficiently for examination of the brushgear. The brushes should be replaced by new, in accordance with the instructions contained in the relevant Servicing Schedule, or whenever this examination reveals that the brushes may reach their minimum length before the next routine servicing.

5. To gain access to the brushes, refer to Fig. 2 in the main chapter, then proceed as follows:—

(1) Slacken locking nut (18) and remove front end fitting (17), if fitted.

(2) Unscrew plug locking ring, then slacken off captive screw located just above the plunger.

(3) Withdraw the front cover and spacer case.

Reassembly in general is the reverse of the dismantling procedure. To re-assemble, line up the front end fitting, run the locknut on to the plunger as far as it will go and then slacken off one full turn. Screw the end fitting to meet it, then align the eye end hole with the horizontal axis of the actuator and lock the locknut against it.

Functional test

6. The linear actuator test rig is described and illustrated in A.P.4343S, Vol. 1, Book 2, Sect. 8. With a variable d.c. supply of 18 to 29 volts, mount the actuator to be tested on the test rig, using the correct end fittings, and adjust the stroke to 1·5 in. against a 20 lb. load. Operate the actuator and check that the stroke times and current values conform to the conditions detailed in Table 1.

TABLE 1

Applied Voltage	Load (lb.)	Condition of load	Time in seconds for full stroke (1·5 in.) Min.	Max.	Maximum current (Amperes)	Stroke variation
29	100	C.L.O.	2·0	2·7	3·0	
29	100	C.L.A.	1·4	1·9	2·0	−0·062 in.
29	100	T.L.O.	2·0	2·7	3·0	
29	100	T.L.A.	1·4	1·9	2·0	+0·062 in.
29	0	Extend	1·3	1·7	2·0	
29	0	Retract	1·3	1·7	2·0	
22	0	Extend	1·5	2·5	1·8	
22	0	Retract	1·5	2·5	1·8	
18	100	C.L.O.	4·5	7·3	2·9	
18	100	T.L.O.	4·5	7·3	2·9	
18	0	Extend	1·8	3·5	1·6	
18	0	Retract	1·8	3·5	1·6	

C.L.A.—Compressive load assisting
C.L.O.—Compressive load opposing
T.L.A.—Tensile load assisting
T.L.O.—Tensile load opposing

7. The centres dimensions and the stroke lengths for the /A and /B variants should be adjusted on no-load to conform to the relevant values quoted in Table 1 of Appendix 9.

Appendix 1

ACTUATOR, PLESSEY TYPE CZ53681/11/ - VARIANTS

LEADING PARTICULARS

The following particulars are common to the actuators type CZ53681/11 - variants

Voltage range	22—29*V d.c.*
Nominal load	100 *lb.*
Maximum working load	150 *lb.*
Stall load	340 *lb.*
Maximum static load	800 *lb.*
Current at nominal load	2·4 *amp.*
Stall current	4·6 *amp.*
Rating of motor	1·5 *min.*
Maximum operating frequency	10 *cycles/per hour*
Ambient temperature range	−60°*C. to* +90°*C*
Electrical connection (Plessey CZ48995)	*Ref. No.*
Motor (CZ54249)	*Ref. No. 5W/1068*

TABLE 1

Stroke setting and insulation details

Plessey Type	*Ref. No.*	*Extended Centres*	*Retracted Centres*	*Stroke*	*Eye End Front Part No.*	*End Fitting Rear Part No.*	*Position of Rear Fitting*
CZ53681/11/A	5W/306	10·33 in.	7·50 in.	2·83 in.	CZ55336	CZ54077	↕
CZ53681/11/B	5W/304	9·8 in.	6·50 in.	2·3 in.	CZ55336	CZ54077	↕
CZ53681/11/C	5W/2836	9·93 in.	6·93 in.	3· in.	Z64376	CZ54077	↔
CZ53681/11/Q	5W/311	10·50 in.	7·50 in.	3· in.	CZ55336	CZ54077	↔
CZ53681/11/Z	5W/363	10·50 in.	7·60 in.	2·9 in.	Z60332	CZ54077	↔

1. The Type CZ53681/11 - actuator is of the Standard, Jaguar Series and is similar to the one described and illustrated in the main chapter. It supersedes the earlier version in this range the type CZ53681/1 already described in this section.

2. Stroke settings and insulation details are given in Table 1.

143911/Wt.48380/D.3151 1,875 10/61 E.S.Ltd. Gp.375/7

Appendix 2

ACTUATOR, PLESSEY, TYPE CZ53681/12/- VARIANTS

LEADING PARTICULARS

The following particulars are common to the actuator type CZ53681/12/- variants.

Voltage range	22 *to* 29*V d.c.*
Nominal load	100 *lb.*
Maximum working load	150 *lb.*
Stall load	340 *lb.*
Maximum static load	800 *lb.*
Current at nominal load	2·4 *amp.*
Stall current	4·6 *amp.*
Maximum operating frequency	10 *cycles per hour*
Ambient temperature range	—60 *to* + 90 *deg. C*
Electrical connection	6 *pole plug*
Weight	2 *lb.* 3 *oz.*
Motor, Type C1606H/1 (CZ54249)	*Ref. No. 5W/1068*
Output	0·03 *h.p. at* 15,000 *r.p.m.*
Rating	1·5 *minutes*
Commutator dia., new	0·490 *to* 0·495 *in.*
worn (min.)*	0·450 *in.*
Undercut micas, depth	0·024 *to* 0·026 *in.*
width	0·020 *to* 0·025 *in.*
Bearings, Type, drive end	*CZ60748*
comm. end	*CZ60749*
Brushes	*Ref. No. 5W/1041*
Length, new	0·355 *to* 0·385 *in.*
worn	0·25 *in.*
Brush spring pressure	3·5 *to* 4·5 *oz.* (100 *to* 127 *gm.*)

**After skimming to* 0·470 *in.*

TABLE 1

Stroke setting and installation details

Type	Ref. No.	Extended centres (in.)	Retracted centres (in.)	Stroke (in.)	End fittings Front	End fittings Rear	Position of hole within rear fitting
CZ53681/12/A	5W/305	10·50	7·50	3	CZ55336	CZ54077	↔
CZ53681/12/C	5W/301	9·50	7·50	2	Z60332	CZ54077	↕
CZ53681/12/D	5W/303	11·94	9·0	2·94	CZ60333	CZ54077	↕
CZ53681/12/E	5W/302	9·50	7·50	2	Z51228	CZ54077	↔
CZ53681/12/F	5W/299	10·50	7·50	3	Z60332	CZ54077	↔
CZ53681/12/Q	5W/320	11·88	8·88	3	CZ60333	CZ54077	↔
CZ53681/12/R	5W/323	10·50	7·50	3	*CZ70439	CZ54077	↔
CZ53681/12/Z	5W/427	10·50	7·95	2·55	Z60332	CZ54077	↕
CZ53681/12/AF	5W/2396	9·0	7·50	1·5	A52663	Z58424	↔
CZ53681/12/AP	5W/3351	9·40	8·10	1·3	CZ55336	CZ54077	↔
CZ53681/12/AT	5W/4152	9·64	7·52	2·12	Z60332	CZ54077	↕

* Used for stroke setting only.

1. The basic construction of the actuator, Type CZ53681/12/-, is as described and illustrated in the main chapter. Electrical connections are made through a 6-pole plug positioned on the top of the front cover, not on the front as in the typical model.

2. The circuit diagram of this actuator is as the circuit diagram in the main chapter. The connection between the normally closed contact of the IN limit switch and pole F of the plug is not used on this model.

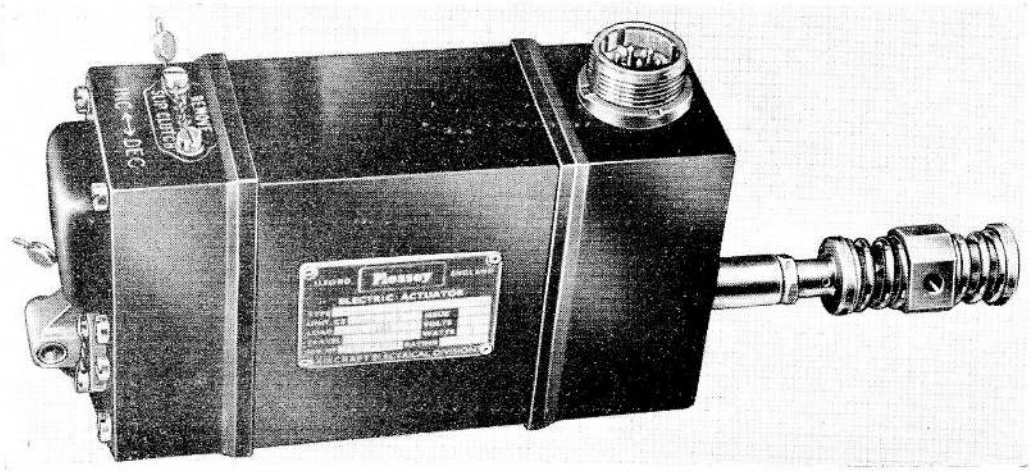


Fig. 1. General view of actuator, Type CZ53681/12

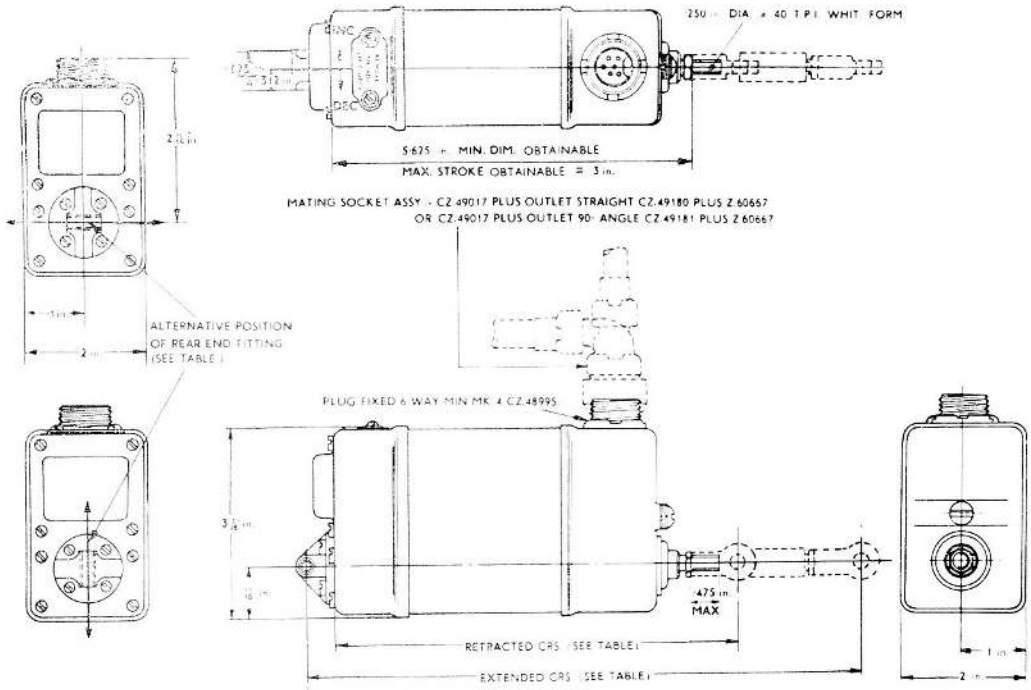


Fig. 2. Installation drawing

Appendix 3

ACTUATOR, PLESSEY, TYPE 1CZ82600/12/- VARIANTS

LEADING PARTICULARS

The following particulars are common to the actuator type 1CZ82600/12/- variants.

Voltage range	22 *to* 29*V d.c.*
Nominal load	100 *lb.*
Maximum working load	150 *lb.*
Stall load	340 *lb.*
Maximum static load	800 *lb.*
Current at nominal load	2·4 *amp.*
Stall current	4·6 *amp.*
Maximum operating frequency	10 *cycles per hour*
Ambient temperature range	—60 *to* + 90 *deg. C*
Electrical connection	6 *pole plug*
Weight	2 *lb.* 3 *oz.*
Motor, Type C1606H/1 (CZ54249)	*Ref. No. 5W/1068*
Output	0·03 *h.p. at* 15,000 *r.p.m.*
Rating	1·5 *minutes*
Commutator dia., new	0·490 *to* 0·495 *in.*
worn (min.)*	0·450 *in.*
Undercut micas, depth	0·024 *to* 0·026 *in.*
width	0·020 *to* 0·025 *in.*
Bearings, Type, drive end	*CZ60748*
comm. end	*CZ60749*
Brushes	*Ref. No. 5W/1041*
Length, new	0·355 *to* 0·385 *in.*
worn	0·25 *in.*
Brush spring pressure	3·5 *to* 4·5 *oz.* (100 *to* 127 *gm.*)

**After skimming to 0·470 in.*

TABLE 1

Stroke setting and installation details

Type	Ref. No.	Extended centres (in.)	Retracted centres (in.)	Stroke (in.)	End fittings Front	End fittings Rear	Position of hole within rear fitting
1CZ82600/12/AF	5W/	9·0	7·50	1·5	A52663	Z58424	↔
1CZ82600/12/AQ	5W/3698	11·0	8·0	3·0	CZ55524	Z58424	↔

1. The basic construction of the actuator, Type 1CZ82600/12/-, is as described and illustrated in the main chapter. Electrical connections are made through a 6-pole plug positioned on the top of the front cover, not on the front as in the typical model.

2. The circuit diagram of this actuator is as the circuit diagram in the main chapter. The connection between the normally closed contact of the IN limit switch and pole F of the plug is not used on this model.

3. Actuator 1CZ82600/12/- is identical to CZ53681/12/- except that the materials of certain components have been altered to render it resistant to ester-base lubricants.

Appendix 4

ACTUATOR, PLESSEY, TYPE CZ53681/13/H

LEADING PARTICULARS

Actuator, Type CZ53681/13/H	*Ref. No.* 5W/1014
Voltage range	22 *to* 29V *d.c.*
Nominal load	100 *lb.*
Maximum working load	150 *lb.*
Stall load	340 *lb.*
Maximum static load	800 *lb.*
Current at nominal load	2·4 *amp.*
Stall current	4·6 *amp.*
Maximum operating frequency	10 *cycles per hour*
Extended centres	9·03 *in.*
Retracted centres	7·53 *in.*
Front end fitting (not supplied with actuator, used to obtain extended and retracted centres)	Z64376
Rear end fitting	CZ55532
Position of hole within rear fitting	◀—▶
Ambient temperature range	− 60 *to* + 90 *deg. C.*
Electrical connection	6 *pole plug*
Weight	2 *lb.* 3 *oz.*
Motor, Type C1606H/1(CZ54249)	*Ref. No.* 5W/1068
Output	0·03 *h.p. at* 15,000 *r.p.m.*
Rating	1·5 *minutes*
Commutator dia., new	0·490 *to* 0·495 *in.*
worn (min.)*	0·450 *in.*
Undercut micas, depth	0·024 *to* 0·026 *in.*
width	0·020 *to* 0·025 *in.*
Bearings, Type, drive end	CZ60748
comm. end	CZ60749
Brushes	*Ref. No.* 5W/1041
Length, new	0·355 *to* 0·385 *in.*
worn	0·250 *in.*
Brush sping pressure	3·5 *to* 4·5 *oz.* (100 *to* 127 *g.m.*)

* After skimming to 0·470 in.

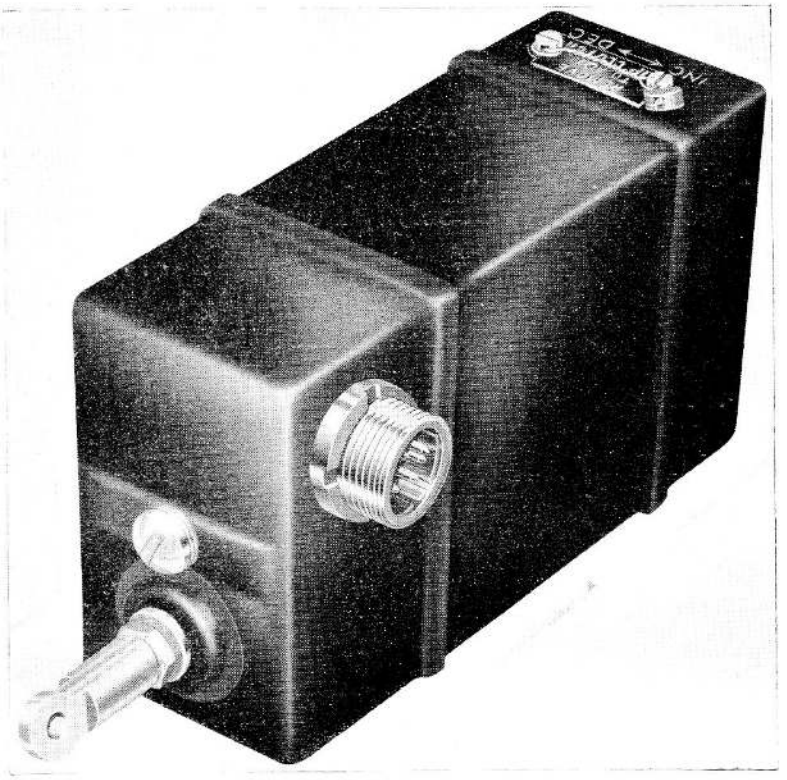


Fig. 1. General view of actuator, Type CZ53681/13/H

1. The basic construction of the actuator, Type CZ53681/13/H is as described and illustrated in the main chapter. Electrical connections are made through a 6-pole plug positioned on the side of the front cover, not on the front as in the typical model.

2. The circuit diagram of this actuator is as the circuit diagram in the main chapter. The connection between the normally closed contact of the IN limit switch and pole F of the plug is not used on this model.

Appendix 5

ACTUATOR, PLESSEY, TYPE CZ72257

LEADING PARTICULARS

Actuator, Type CZ72257	*Ref. No. 5W/329*
Voltage range	22 *to* 29*V d.c.*
Nominal load	100 *lb.*
Maximum working load	150 *lb.*
Stall load	340 *lb.*
Maximum static load	800 *lb.*
Current at nominal load	2·4 *amp.*
Stall current	4·6 *amp.*
Maximum operating frequency range	10 *cycles per hour*
Extended centres	8·35 *in.*
Retracted centres	7·00 *in.*
Front end fitting	*CZ51228*
Rear end fitting	*CZ54077*
Position of hole within rear fitting	◀—▶
Ambient temperature range	− 60 *to* + 90 *deg. C.*
Electrical connection	6 *pole plug*
Weight	2 *lb.* 3 *oz.*
Motor, Type C1606H/1(CZ54249)	*Ref. No. 5W/1068*
Output	0·03 *h.p. at* 15,000 *r.p.m.*
Rating	1·5 *minutes*
Commutator dia., new	0·490 *to* 0·495 *in.*
worn (min.)*	0·450 *in.*
Undercut micas, depth	0·024 *to* 0·026 *in.*
width	0·020 *to* 0·025 *in.*
Bearings, Type, drive end	*CZ60748*
comm. end	*CZ60749*
Brushes	*Ref. No. 5W/1041*
Length, new	0·355 *to* 0·385 *in.*
worn	0·250 *in.*
Brush spring pressure	3·5 *to* 4·5 *oz.* (100 *to* 127 *g.m.*)

* After skimming to 0·470 in.

1. The basic construction of the actuator, Type CZ72257 is as described and illustrated in the main chapter. Electrical connections are made through a 6-pole plug positioned on the side of the front cover, not on the front as in the typical model.

2. Actuator, CZ72257 is identical to CZ53681/13/H except for differences given in Leading Particulars and the additional connection between the normally closed contact of the IN limit switch and pole F of the plug. The circuit diagram given in the main chapter including the dotted connection is applicable to this model.

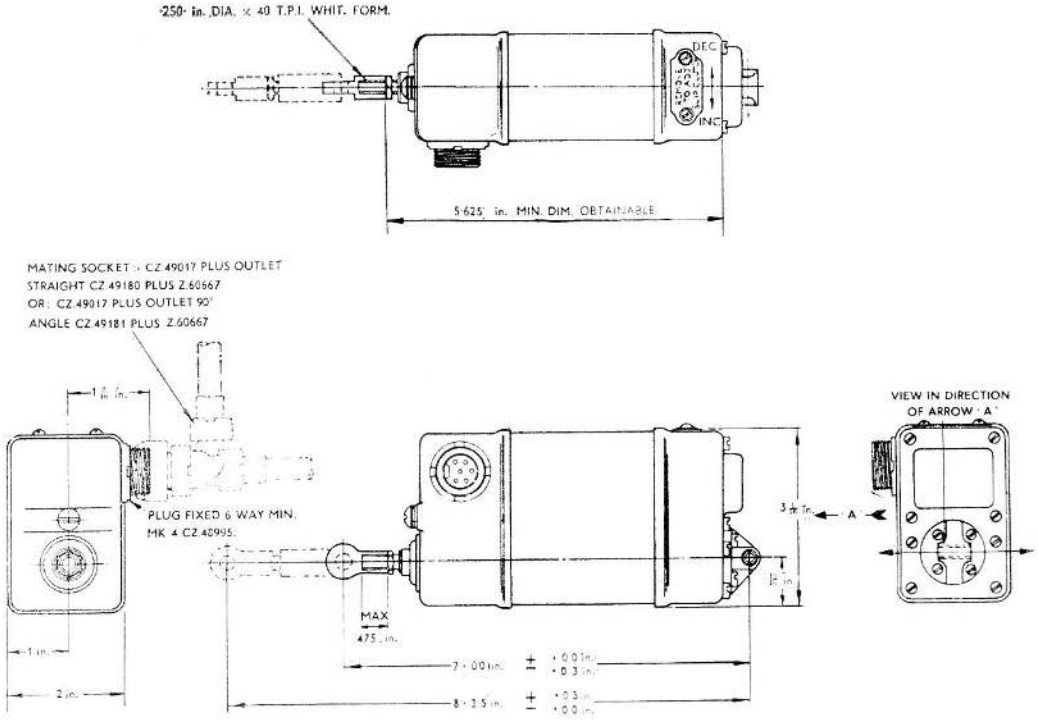


Fig. 1. Installation drawing

Appendix 6

ACTUATOR, PLESSEY, TYPE CZ53681/1F/- VARIANTS

LEADING PARTICULARS

The following particulars are common to the actuator type CZ53681/1F/- variants.

Voltage range	22 *to* 29*V d.c.*
Nominal load	100 *lb.*
Maximum working load	150 *lb.*
Stall load	340 *lb.*
Maximum static load	800 *lb.*
Current at nominal load	2·4 *amp.*
Stall current	4·6 *amp.*
Maximum operating frequency	10 *cycles per hour*
Ambient temperature range	− 60 *to* + 90 *deg. C*
Electrical connection	5-*pole fireproof plug*
Weight	2 *lb.* 11 *oz.*
Motor, Type C1606*H*/1(CZ54249)	*Ref. No.* 5*W*/1068
Output	0·03 *h.p. at* 15,000 *r.p.m.*
Rating	1·5 *minutes*
Commutator dia., new	0·490 *to* 0·495 *in.*
worn (min.)*	0·450 *in.*
Undercut, micas, depth	0·024 *to* 0·026 *in.*
width	0·020 *to* 0·025 *in.*
Bearings, Type, drive end	CZ60748
comm. end	CZ60749
Brushes	*Ref. No.* 5*W*/1041
Length, new	0·355 *to* 0·385 *in.*
worn	0·25 *in.*
Brush spring pressure	3·5 *to* 4·5 *oz.* (100 *to* 127 *g.m.*)

* After skimming to 0·047 in.

TABLE 1

Stroke setting and installation details

Type	Ref. No.	Extended centres (in.)	Retracted centres (in.)	Stroke (in.)	End fittings Front	End fittings Rear	Position of hole within rear fitting
CZ53681/1F/A	5W/300	9·50	7·50	2	Z60332	CZ54077	↕
CZ53681/1F/J	5W/2697	13·69	10·69	3	CZ55729	CZ59826	↔

1. The CZ53681/1F/- actuator is a fireproof type. The basic construction of this actuator is as described and illustrated in the main chapter. Electrical connections are made through a 5-pole fireproof plug positioned on the top of the front cover, not on the front as in the typical model; the plug is secured by four screws and nuts. This type has steel covers.

2. The leads from the actuator plug are connected to a terminal block as shown in fig. 1.

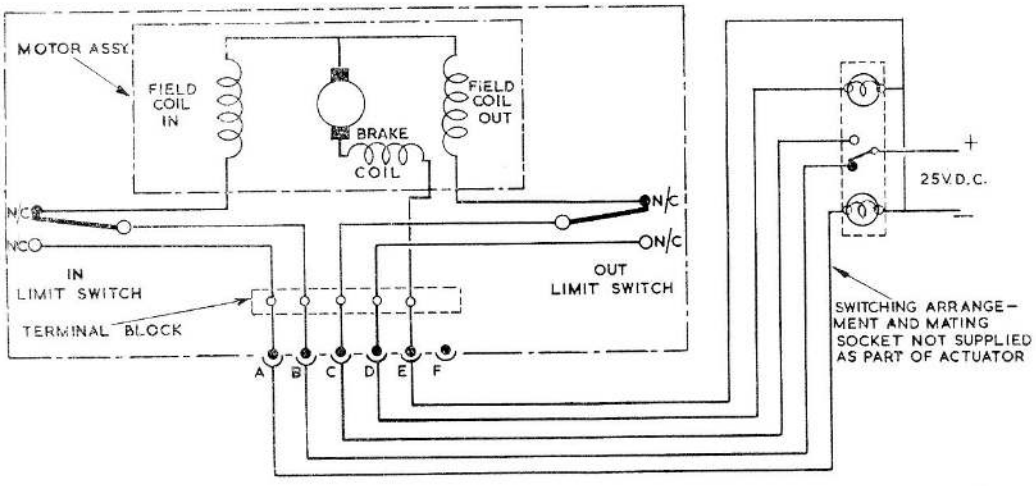


Fig. 1. Circuit diagram

Appendix 7

ACTUATOR, PLESSEY, TYPE CZ80730/3/A

LEADING PARTICULARS

Actuator, Type CZ80730/3/A	*Ref. No.* 5*W*/1349
Voltage range	22 *to* 29*V d.c.*
Nominal load	100 *lb.*
Maximum working load	150 *lb.*
Stall load	340 *lb.*
Maximum static load	800 *lb.*
Current at nominal load	2·4 *amp.*
Stall current	4·6 *amp.*
Maximum operating frequency	10 *cycles per hour*
Extended centres	9·52 *in.*
Retracted centres	6·82 *in.*
Rear end fitting	1CZ8041
Position of hole within rear fitting	
Ambient temperature range	− 60 *to* + 90 *deg. C*
Electrical connection	6-*pole plug*
Weight	2 *lb.* 3 *oz.*
*Motor, Type C*1606*H*/1(CZ54249)	*Ref. No.* 5*W*/1068
Output	0·03 *h.p. at* 15,000 *r.p.m.*
Rating	1·5 *minutes*
Commutator, dia., new	0·490 *to* 0·495 *in.*
worn (min.)*	0·450 *in.*
Undercut micas, depth	0·024 *to* 0·026 *in.*
width	0·020 *to* 0·025 *in.*
Bearings, Type, drive end	*CZ*60748
comm. end	*CZ*60749
Brushes	*Ref. No.* 5*W*/1041
Length, new	0·355 *to* 0·385 *in.*
worn	0·250 *in.*
Brush spring pressure	3·5 *to* 4·5 *oz.* (100 *to* 127 *gm.*)

* After skimming to 0·470 in.

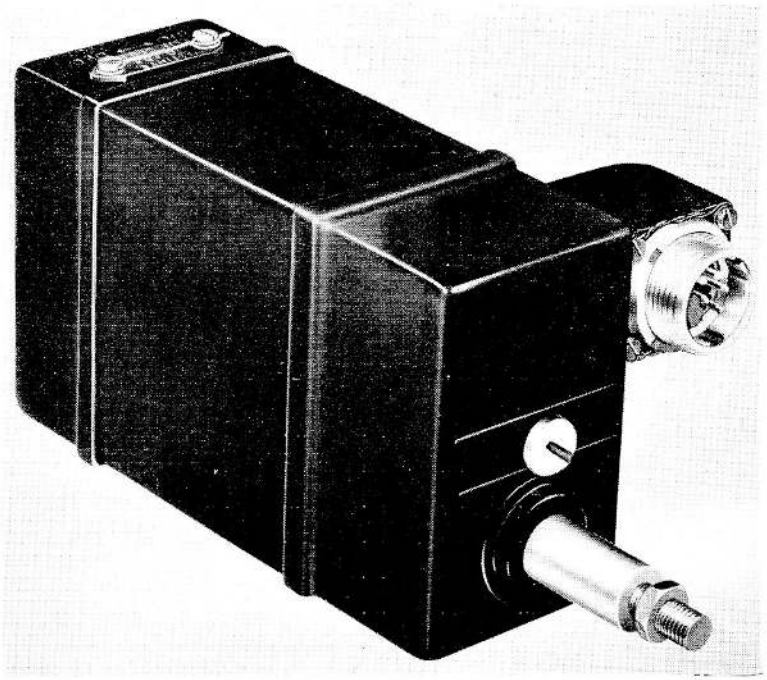


Fig. 1. General view of actuator, Type 1CZ80730/3/A

1. The basic construction of the actuator, Type CZ80730/3/A, is as described and illustrated in the main chapter. Electrical connections are made through a 6-pole plug positioned on the side of the front cover as shown in fig. 1.

2. The leads from the actuator plug are connected to a terminal block as shown in fig. 2.

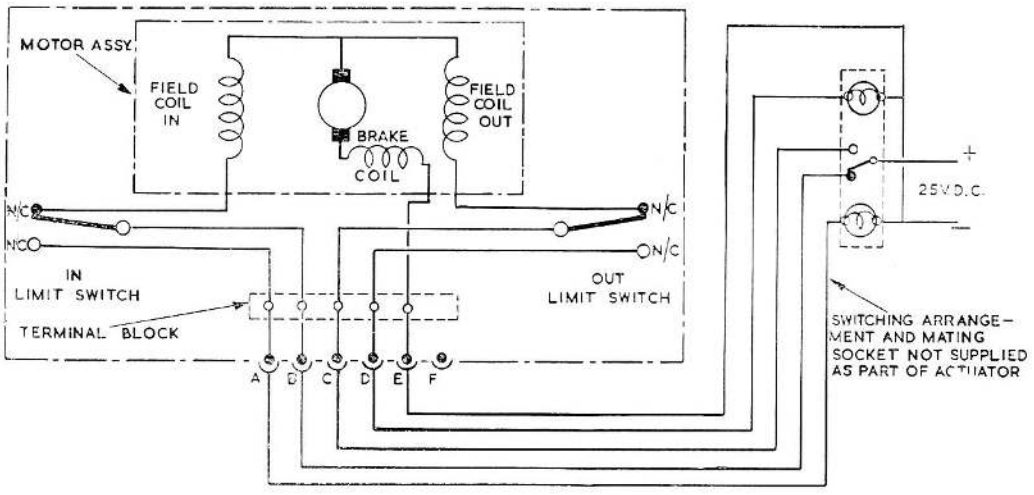


Fig. 2. Circuit diagram

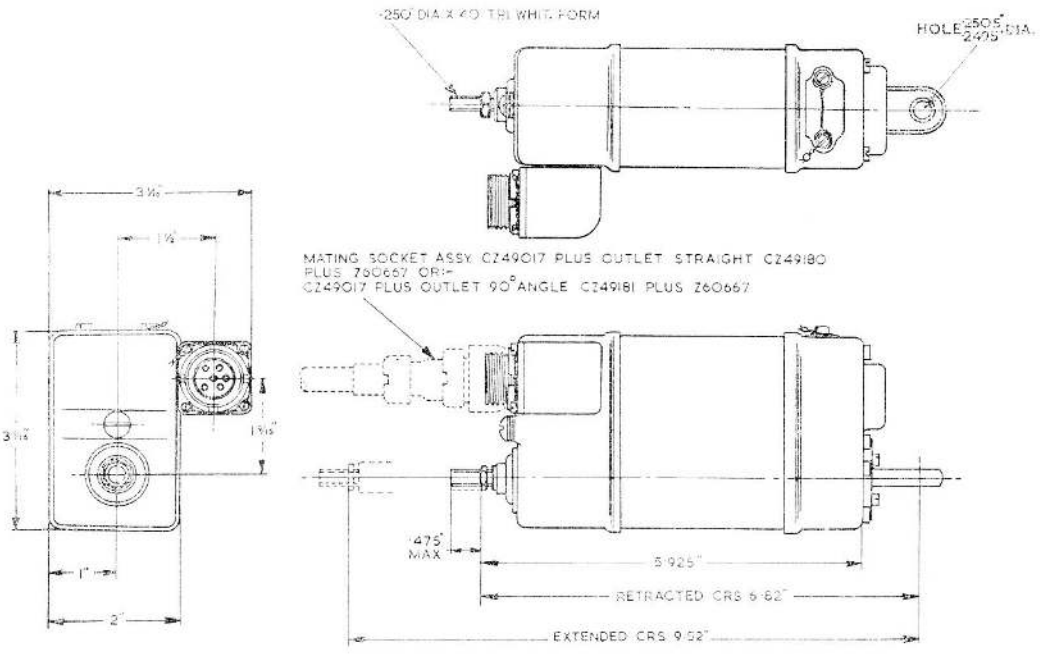


Fig. 3. Installation drawing

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Appendix 8

ACTUATORS, JAGUAR, PLESSEY, TYPE 1CZ135400

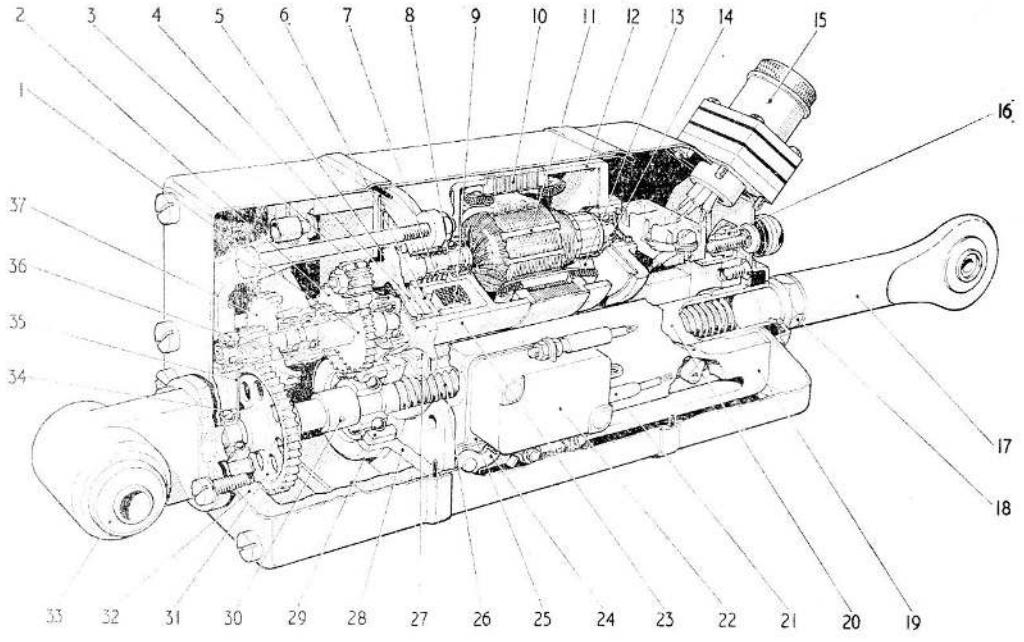
LEADING PARTICULARS

Actuator, Type 1CZ135400	*Ref. No. 5W/2565*
Operating voltage range	24 *to* 29*V d.c.*
Normal voltage	28*V d.c.*
Normal working load	160 *lb.*
Maximum working load	200 *lb.*
Maximum static load	500 *lb.*
Rating at normal load	$1\frac{1}{2}$ *min.*
Ambient temperature range	−60 *to* +90 *deg. C*
Weight	2 *lb.* 4 *oz.*
Motor, Type C1606B/1	*Part No. CZ55457, Ref. No. 5W/1065*
Output	0·015 *h.p. at* 15,5000 *rev/min*
Commutator dia., new	0·490 *to* 0·495 *in.*
worn (min.)	0·450 *in.*
after skimming (min.)	0·470 *in.*
Undercut mica, depth	0·020 *to* 0·025 *in.*
width	0·018 *to* 0·022 *in.*
Maximum eccentricity of commutator to shaft journal	0·0003 *in. T.I.R.*
Bearing, drive end	*Hoffman* 4666, *Ref. No. 2A/9501383*
commutator end	*Hoffman N463, Ref. No. 2A/9501186*
Brushes	*Type H.A.M. E.G.14, Ref. No. 5W/1041*
length, new	0·355 *to* 0·385 *in.*
worn (min.)	0·250 *in.*

1. This actuator, Plessey Part No. 1CZ135400, is a 3 in. stroke, linear actuator which may be categorised as a slow speed version of the Jaguar (Standard) series as described in the main chapter. This classification must not be confused with the slow speed Jaguar Series described elsewhere in this Section.

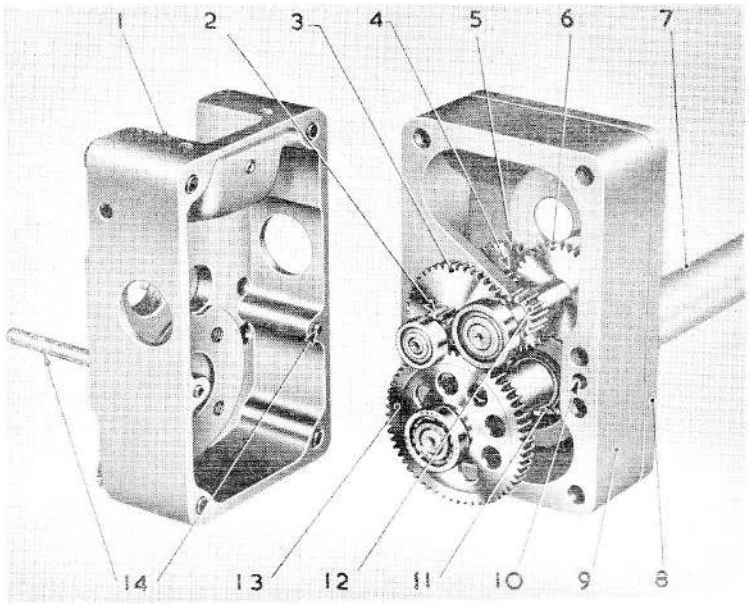
2. Although this actuator is not a Standard Jaguar, it is closely allied to the series, the essential difference being in the reduction gear ratio which is slightly higher for this type: e.g. 58:1 for 1CZ135400 as against 33:1 for the standard series. This increase in the reduction gear ratio has been effected by a design change which introduces an extra compound spur gear (making a total of three) into the drive gear train, the increased gearbox capacity being afforded by a spacer case interposed between the front and rear housings. This has resulted in the requirement for a leadscrew with a longer extension shaft on the front housing. The slip clutch and associated gear components have also been replaced by a single compound spur gear. A sectional view of the actuator is shown in fig. 1, and a view of the gearbox, with the rear housing detached is shown in fig. 2.

3. The electrical circuit for this type differs from the standard series, in that this actuator is not wired for connection to external indicators. A terminal block, located on top of the plunger housing, is introduced into



1 FOURTH GEAR
2 SECOND GEAR
3 MOTOR PINION
4 DISC
5 FRICTION LINING
6 BRAKE PLATE
7 BRAKE SPRING
8 MOTOR BEARING, DRIVE END
9 BRAKE COIL
10 MAGNET ASSEMBLY
11 ARMATURE
12 COMMUTATOR HOUSING
13 BRUSH GEAR
14 MOTOR BEARING, ARMATURE END
15 PLUG
16 SECURING BRACKET
17 FRONT END FITTING
18 NUT
19 PLUNGER HOUSING
20 PLUNGER
21 SWITCH TERMINAL
22 LIMIT SWITCH
23 BRAKE HOUSING
24 OPERATING LEVER
25 MOUNTING PLATE
26 LEADSCREW
27 FLANGE LUG
28 FRONT CASING
29 LEAD SCREW BEARING
30 DRIVE PIN
31 EIGHTH GEAR
32 REAR CASING
33 REAR END FITTING
34 LEAD SCREW SPIGOT BEARING
35 RETAINING PLATE
36 SEVENTH GEAR BEARING
37 SIXTH GEAR

Fig. 1. Sectional view of actuator



1 REAR CASING
2 SEVENTH GEAR
3 SIXTH GEAR
4 THIRD GEAR
5 SECOND GEAR
6 FOURTH GEAR
7 PLUNGER
8 FRONT CASING
9 CENTRE CASING
10 DOWEL PIN HOLE
11 LEAD SCREW BEARING
12 FIFTH GEAR
13 EIGHTH GEAR
14 DOWEL PINS

Fig. 2. Gearbox

the circuit between the actuator and the plug. The motor is constructionally and operationally similar to that described in the main chapter but is of a lower power to that of the standard series. Fig. 3 is the schematic circuit diagram for the actuator.

4. Fig. 4 is the installation diagram which includes details of end fittings, stroke setting, etc.

5. Apart from the differences noted in the foregoing paragraphs, the actuator is similar to the Standard Jaguar series described in the main chapter to which reference must be made for a general description of the construction and operation of the unit. The installation and servicing instructions also apply, in addition, a Standard Serviceability Test on this actuator is contained in Appendix H.

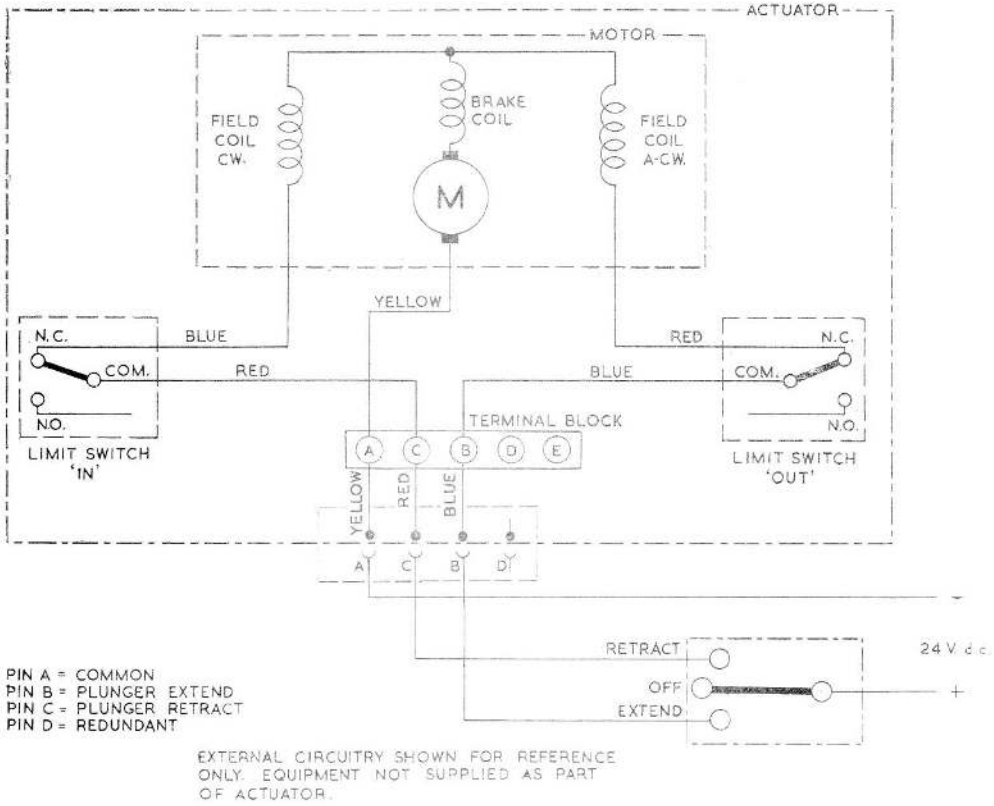


Fig. 3. Circuit diagram

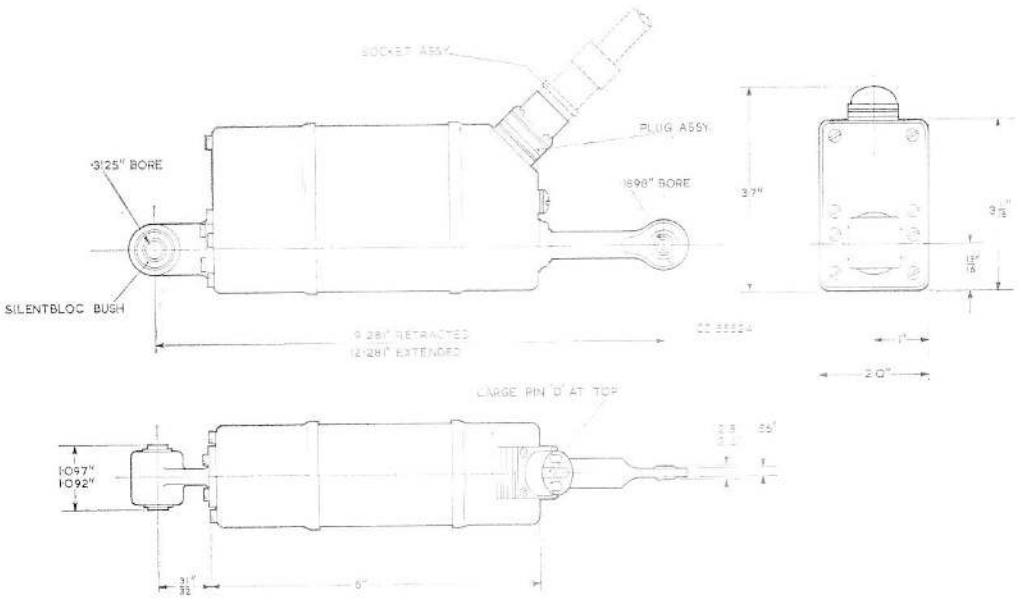


Fig. 4. Installation diagram

Appendix 9

ACTUATORS, JAGUAR, (STANDARD) PLESSEY, TYPE 1CZ136520—VARIANTS

LEADING PARTICULARS

Actuator, Type 1CZ136520	... *Ref. No. 5W/*
Voltage range	18 *to* 29*V d.c. up to* 100 *lb. load* 24 *to* 29*V d.c. up to* 150 *lb. load*
Normal voltage	28*V d.c.*
Normal working load	100 *lb.*
Maximum working load, normal voltage	150 *lb.*
18*V d.c.*	100 *lb.*
Maximum static load	800 *lb.*
Rating at normal load	1½ *min.*
Ambient temperature range, 24V d.c.	−60 *to* +90 *deg. C*
18*V d.c.*	−50 *to* +90 *deg. C*
Overall dimensions, height (to top of plug)	3·06 *in.*
width	2 *in.*
length (excluding end fittings)	5·67 *in.*
Motor, Type C1606H/1	*Part No. CZ54249, Ref. No. 5W/1068*
Output	0·03 *h.p. at* 15,000 *rev/min*
Commutator dia., new	0·490 *to* 0·495 *in.*
worn (min.)	0·450 *in.*
after skimming (min.)	0·470 *in.*
Undercut mica inter-segments, depth	0·020 *to* 0·025 *in.*
width	0·018 *to* 0·022 *in.*
Maximum eccentricity of commutator to shaft journal ...	0·0003 *in. T.I.R.*
Bearing drive end	*Hoffman* 4666, *Ref. No. 2A/9501383*
commutator end	*Hoffman N463, Ref. No. 2A/9501186*
Brushes	*Type H.A.M. E.G.14,, Ref. No. 5W/1041*
length, new	0·355 *to* 0·385 *in.*
worn (min.)	0·250 *in.*

1. These actuators, Plessey Part No. 1CZ136520, are variants in the Jaguar (Standard) Series described in the main chapter. This type has a 6-pole plug, located at the front face of the front cover, for connection to the external electrical circuit. The typical circuit diagram, Fig. 4, in the main chapter, is applicable to actuators covered in this appendix. All other information given in the main chapter is applicable to the types covered in this appendix, in addition a Standard Serviceability Test on these actuators is contained in Appendix J.

2. The differences between the 1CZ136520 variants relate to stroke, centres dimensions, end fittings and the position of the rear end fitting. These features are detailed, for each actuator, in Table 1, following.

TABLE 1

Stroke setting and installation details for 1CZ136520 actuator

Variant 1CZ136520	Ref. No.	Centres (in.) Retracted	Centres (in.) Extended	Stroke (in.)	End Fitting Front	End Fitting Rear	Position of Rear End Fitting (Refer to Fig. 1)
/A		10·16 +0·010 −0	9·38 +0 −0·010	0·78	1Z136221	1CZ80401	B
/B		10·10 +0·010 −0	9·25 +0 −0·010	0·85	1Z136221	1CZ80401	B

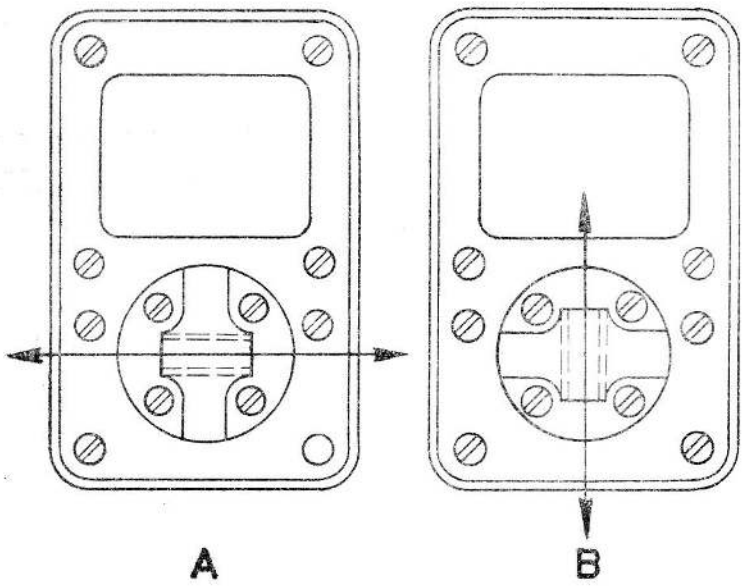


Fig. 1. Alternative positions of rear end fitting