

Chapter 43

ACTUATORS, PLESSEY, JAGUAR (STANDARD) SERIES

LIST OF CONTENTS

	Para.		Para.
<i>Introduction</i>	1	<i>Electrical connections</i>	14
Description		<i>End fittings</i>	16
<i>General</i>	4	Operation	17
<i>Motor</i>	5	Installation	19
<i>Reduction gear train and clutch</i> ...	7	Servicing	22
<i>Leadscrew and plunger</i>	9	<i>Lubrication</i>	23
<i>Limit switches and operating mechanism</i>	11	<i>Testing</i>	24

LIST OF ILLUSTRATIONS

	Fig.		Fig.
<i>General view of typical standard Jaguar actuator</i>	1	<i>Limit switch assembly</i>	3
<i>Sectional view of typical standard Jaguar actuator</i>	2	<i>Circuit diagram</i>	4

LIST OF APPENDICES

	App.		App.
<i>Standard serviceability test for actuator, Plessey, Type CZ53681/11/- variants</i> A		<i>Actuator, Plessey, Type CZ53681/11/- variants</i>	1
<i>CZ53681/12/- variants</i> B		<i>CZ53681/12/-</i> ..	2
<i>1CZ82600/12/- variants</i> C		<i>1CZ82600/12/-</i> ..	3
<i>CZ53681/13/H</i> ... D		<i>CZ53681/13/H</i> ...	4
<i>CZ72257</i> E		<i>CZ72257</i>	5
<i>CZ53681/1F/- variants</i> F		<i>CZ53681/1F/- variants</i>	6
<i>CZ80730/3/A</i> ... G		<i>CZ80730/3/A</i> ...	7
<i>1CZ135400</i> H		<i>1CZ135400</i>	8
<i>1CZ136520 variants</i> ... J		<i>1CZ136520 variants</i>	9

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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

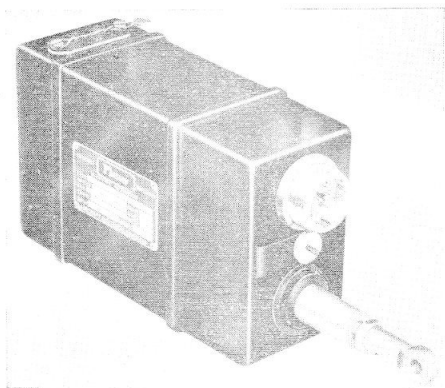


Fig. 1. General view of typical standard Jaguar actuator

actuator is shown in Fig. 1, and a unit in this standard range is shown sectioned in Fig. 2.

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

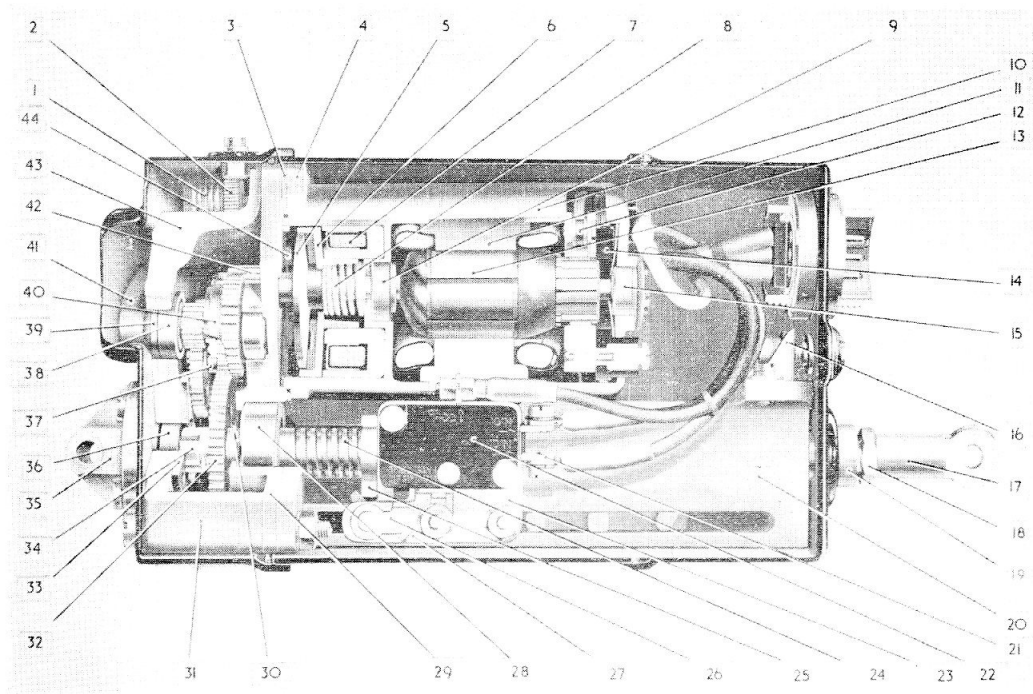
7. The drive from the motor pinion to the leadscrew is through a reduction gear train of two compound spur gear and a final gear.

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

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- | | | | |
|----|----------------------------|----|-----------------------------|
| 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

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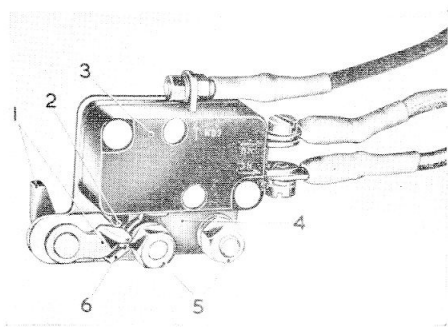
rotary action of the leadscrew into linear movement of the plunger causing the plunger to extend or retract. The plunger is prevented from rotating by integral torque-reaction ears which locate in slots in the plunger housing.

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 lock-nut. 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

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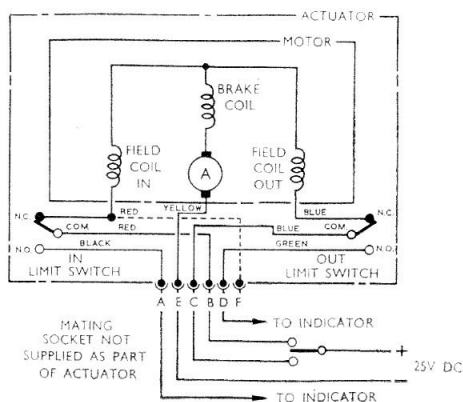


Fig. 4. Circuit diagram

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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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

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TABLE 2
CZ53681/11/B

Applied voltage	Load	Time for 2·3 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.

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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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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

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TABLE 2
CZ53681/12/C and /E

Applied voltage	Load	Time for 2 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
29	100 lb. T.L.A.	1.8	2.5	2.0	2.0 \pm 0.03
29	100 lb. T.L.O.	2.7	3.6	3.0	2.0 \pm 0.03
29	100 lb. C.L.O.	2.7	3.6	3.0	2.0 \pm 0.03
29	100 lb. C.L.A.	1.8	2.5	2.0	2.0 \pm 0.03

TABLE 3
CZ53681/12/D

Applied voltage	Load	Time for 2.94 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
29	100 lb. T.L.A.	2.6	3.8	2.0	2.94 \pm 0.03
29	100 lb. T.L.O.	3.9	5.3	3.0	2.94 \pm 0.03
29	100 lb. C.L.O.	3.9	5.3	3.0	2.94 \pm 0.03
29	100 lb. C.L.A.	2.6	3.8	2.0	2.94 \pm 0.03

TABLE 4
CZ53681/12/Z

Applied voltage	Load	Time for 2.55 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
29	100 lb. T.L.A.	2.3	3.2	2.0	2.55 \pm 0.03
29	100 lb. T.L.O.	3.4	4.6	3.0	2.55 \pm 0.03
29	100 lb. C.L.O.	3.4	4.6	3.0	2.55 \pm 0.03
29	100 lb. C.L.A.	2.3	3.2	2.0	2.55 \pm 0.03

TABLE 5
CZ53681/12/AF

Applied voltage	Load	Time for 1.5 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
29	100 lb. T.L.A.	1.4	1.9	2.0	1.5 \pm 0.03
29	100 lb. T.L.O.	2.0	2.7	3.0	1.5 \pm 0.03
29	100 lb. C.L.O.	2.0	2.7	3.0	1.5 \pm 0.03
29	100 lb. C.L.A.	1.4	1.9	2.0	1.5 \pm 0.03

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TABLE 6
CZ53681/12/AP

Applied voltage	Load	Time for 1·3 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.

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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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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

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TABLE 2
1CZ82600/12/AQ

Applied voltage	Load	Time for 3 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.

RESTRICTED

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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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

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TABLE 2
1CZ82600/12/AQ

Applied voltage	Load	Time for 3 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.

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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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.

RESTRICTED

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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
29	100 lb. T.L.A.	1.2	1.8	2.0	1.35 \pm 0.03
29	100 lb. T.L.O.	1.8	2.5	3.0	1.35 \pm 0.03
29	100 lb. C.L.O.	1.8	2.5	3.0	1.35 \pm 0.03
29	100 lb. C.L.A.	1.2	1.8	2.0	1.35 \pm 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.

RESTRICTED

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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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

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TABLE 2
CZ53681/1F/J

Applied voltage	Load	Time for 3 in. stroke (sec.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.

RESTRICTED

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.)		Max. current (amp.)	Length of stroke (in.)
		Min.	Max.		
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.

RESTRICTED

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.

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TABLE 1

Applied Voltage	Load (lb.)	Conditions of load	Times in seconds for full stroke (3 in.)		Maximum current (Amperes)	Stroke variation
			Min.	Max.		
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.

RESTRICTED

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.

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TABLE 1

Applied Voltage	Load (lb.)	Condition of load	Time in seconds for full stroke (1·5 in.)		Maximum current (Amperes)	Stroke variation
			Min.	Max.		
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.

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Appendix 1

ACTUATOR, PLESSEY TYPE CZ53681/11/ - VARIANTS

LEADING PARTICULARS

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

<i>Voltage range</i>	22—29V d.c.
<i>Nominal load</i>	100 lb.
<i>Maximum working load</i>	150 lb.
<i>Stall load</i>	340 lb.
<i>Maximum static load</i>	800 lb.
<i>Current at nominal load</i>	2.4 amp.
<i>Stall current</i>	4.6 amp.
<i>Rating of motor</i>	1.5 min.
<i>Maximum operating frequency</i>	10 cycles/per hour
<i>Ambient temperature range</i>	—60°C. to +90°C
<i>Electrical connection (Plessey CZ48995)</i>	Ref. No.
<i>Motor (CZ54249)</i>	Ref. No. 5W/1068

TABLE 1

Stroke setting and insulation details

<i>Plessey Type</i>	<i>Ref. No.</i>	<i>Extended Centres</i>	<i>Retracted Centres</i>	<i>Stroke</i>	<i>Eye End Front Part No.</i>	<i>End Fitting Rear Part No.</i>	<i>Position of Rear Fitting</i>
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.

RESTRICTED

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 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
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 micras, 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.

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TABLE 1
Stroke setting and installation details

Type	Ref. No.	Extended centres (in.)	Retracted centres (in.)	Stroke (in.)	End fittings		Position of hole within rear fitting
					Front	Rear	
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.

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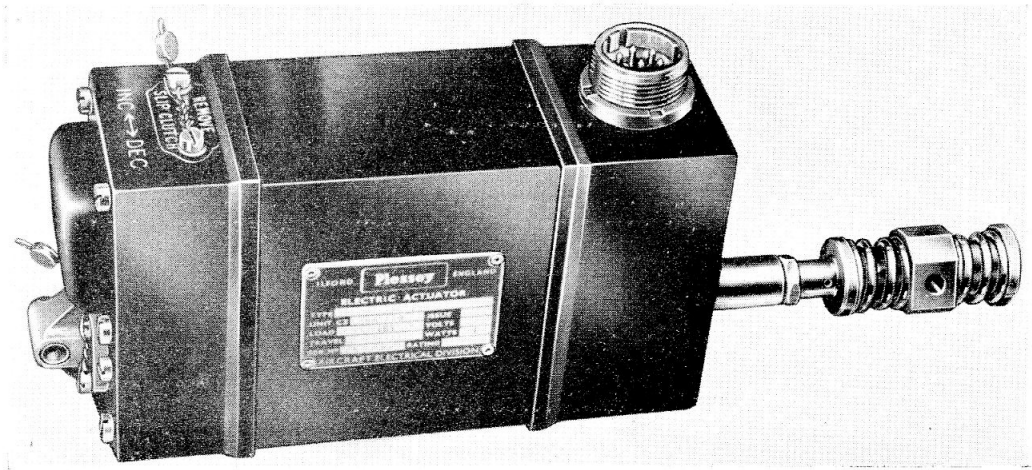


Fig. 1. General view of actuator, Type CZ53681/12

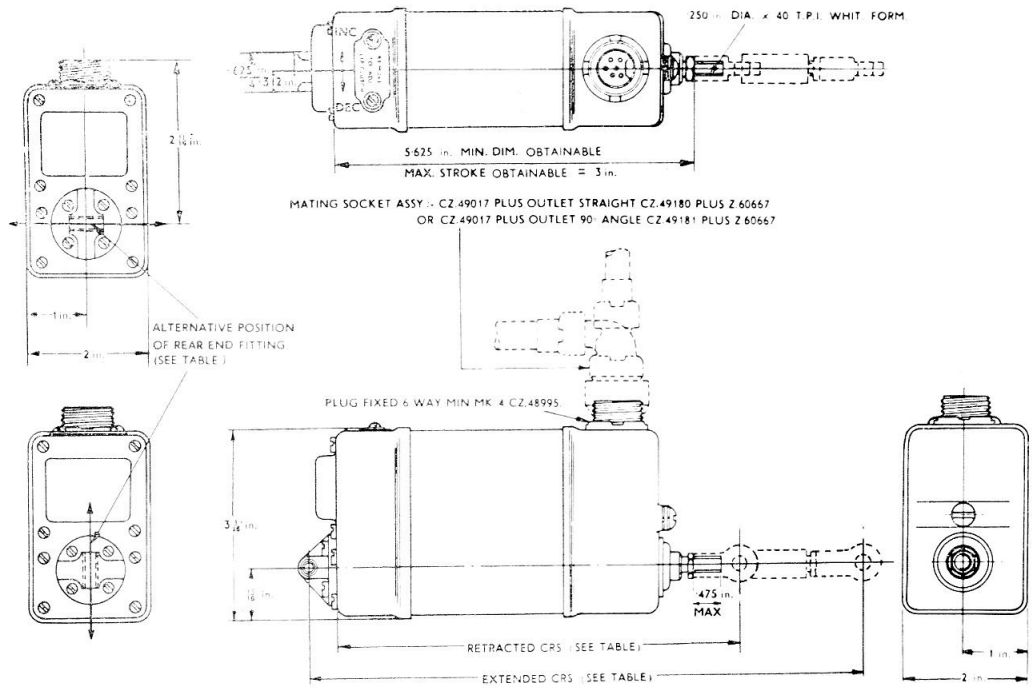


Fig. 2. Installation drawing

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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 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
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		Position of hole within rear fitting
					Front	Rear	
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.

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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.

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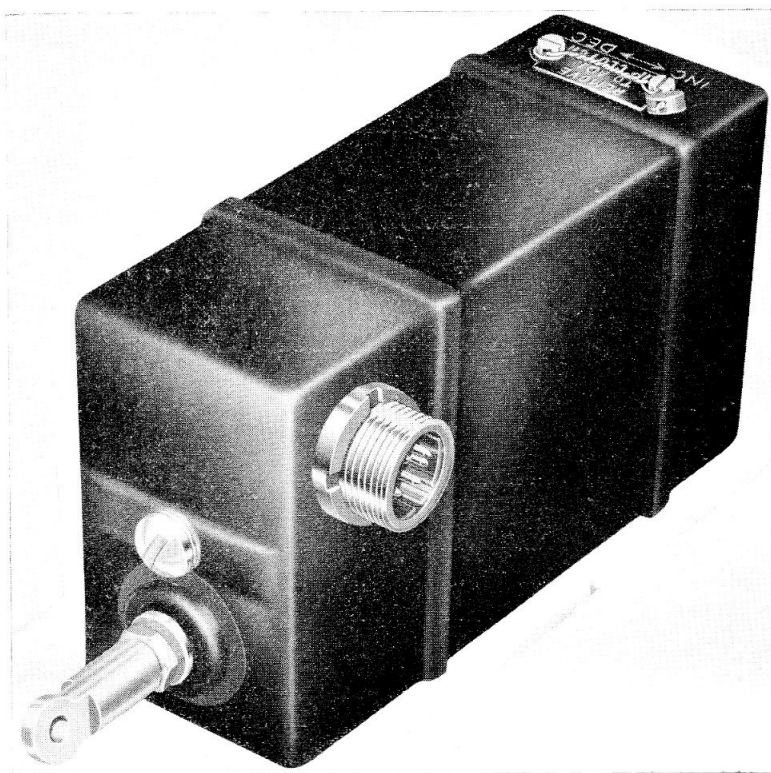


Fig. 1. General view of actuator, Type CZ53681/13/H

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.

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Appendix 5

ACTUATOR, PLESSEY, TYPE CZ72257

LEADING PARTICULARS

Actuator, Type CZ72257	Ref. No. 5W/329
<i>Voltage range</i>	....	....	....	....	....	....	22 to 29V d.c.
<i>Nominal load</i>	....	....	....	....	....	....	100 lb.
<i>Maximum working load</i>	....	....	....	....	....	....	150 lb.
<i>Stall load</i>	....	....	....	....	....	....	340 lb.
<i>Maximum static load</i>	....	....	....	....	....	....	800 lb.
<i>Current at nominal load</i>	....	....	....	....	....	....	2.4 amp.
<i>Stall current</i>	....	....	....	....	....	....	4.6 amp.
<i>Maximum operating frequency range</i>	....	....	....	....	....	....	10 cycles per hour
<i>Extended centres</i>	....	....	....	....	....	....	8.35 in.
<i>Retracted centres</i>	....	....	....	....	....	....	7.00 in.
<i>Front end fitting</i>	....	....	....	....	....	....	CZ51228
<i>Rear end fitting</i>	....	....	....	....	....	....	CZ54077
<i>Position of hole within rear fitting</i>	....	....	....	....	....	....	◄—►
<i>Ambient temperature range</i>	....	....	....	....	....	....	— 60 to + 90 deg. C.
<i>Electrical connection</i>	....	....	....	....	....	....	6 pole plug
<i>Weight</i>	....	....	....	....	....	....	2 lb. 3 oz.
<i>Motor, Type C1606H/1(CZ54249)</i>	....	....	....	....	....	....	Ref. No. 5W/1068
<i>Output</i>	....	....	....	....	....	....	0.03 h.p. at 15,000 r.p.m.
<i>Rating</i>	....	....	....	....	....	....	1.5 minutes
<i>Commutator dia., new</i>	....	....	....	....	....	....	0.490 to 0.495 in.
<i>worn* (min.)</i>	....	....	....	....	....	....	0.450 in.
<i>Undercut micas, depth</i>	....	....	....	....	....	....	0.024 to 0.026 in.
<i>width</i>	....	....	....	....	....	....	0.020 to 0.025 in.
<i>Bearings, Type, drive end</i>	....	....	....	....	....	....	CZ60748
<i>comm. end</i>	....	....	....	....	....	....	CZ60749
<i>Brushes</i>	....	....	....	....	....	....	Ref. No. 5W/1041
<i>Length, new</i>	....	....	....	....	....	....	0.355 to 0.385 in.
<i>worn</i>	0.250 in.
<i>Brush spring pressure</i> 3.5 to 4.5 oz. (100 to 127 g.m.)

* After skimming to 0.470 in.

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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.

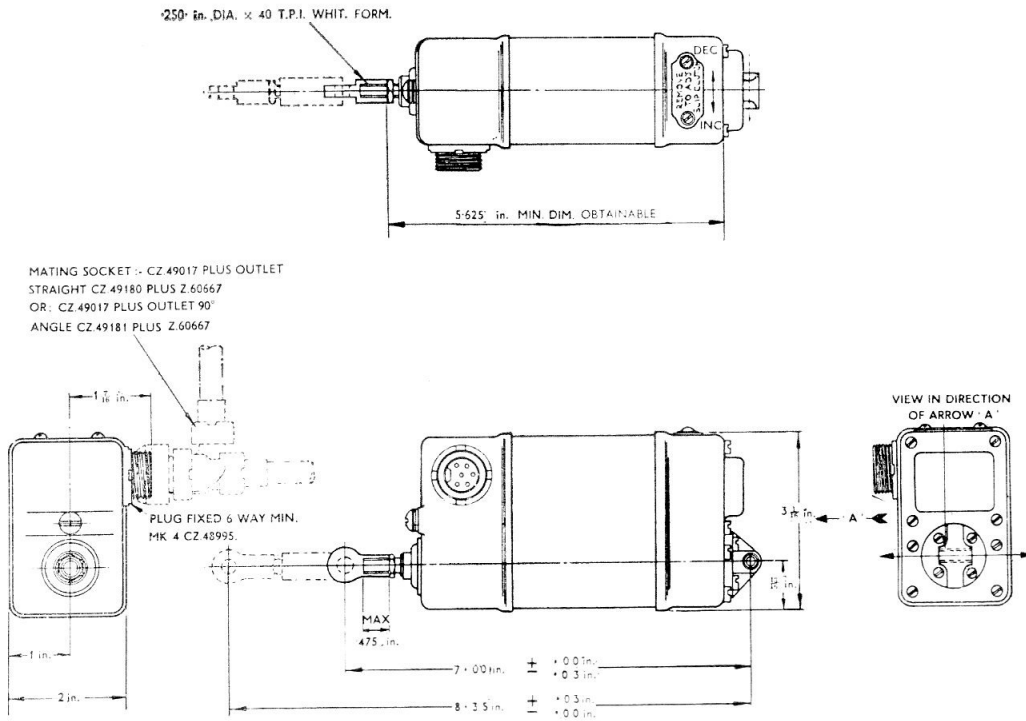


Fig. 1. Installation drawing

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Appendix 6

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

LEADING PARTICULARS

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

<i>Voltage range</i>	....	....	....	....	....	....	....	22 to 29V d.c.
<i>Nominal load</i>	....	....	....	....	....	....	....	100 lb.
<i>Maximum working load</i>	....	....	....	....	....	....	....	150 lb.
<i>Stall load</i>	....	....	....	....	....	....	....	340 lb.
<i>Maximum static load</i>	....	....	....	....	....	....	....	800 lb.
<i>Current at nominal load</i>	....	....	....	....	....	....	....	2.4 amp.
<i>Stall current</i>	....	....	....	....	....	....	....	4.6 amp.
<i>Maximum operating frequency</i>	....	....	....	....	....	....	....	10 cycles per hour
<i>Ambient temperature range</i>	....	....	....	....	....	....	....	- 60 to + 90 deg. C
<i>Electrical connection</i>	....	....	....	....	....	....	....	5-pole fireproof plug
<i>Weight</i>	....	....	....	....	....	....	....	2 lb. 11 oz.
<i>Motor, Type C1606H/1(CZ54249)</i>	....	....	....	....	....	....	....	Ref. No. 5W/1068
<i>Output</i>	....	....	....	....	....	....	....	0.03 h.p. at 15,000 r.p.m.
<i>Rating</i>	....	....	....	....	....	....	....	1.5 minutes
<i>Commutator dia., new</i>	....	....	....	....	....	....	....	0.490 to 0.495 in.
<i>worn* (min.)</i>	....	....	....	....	....	....	....	0.450 in.
<i>Undercut, micas, depth</i>	....	....	....	....	....	....	....	0.024 to 0.026 in.
<i>width</i>	....	....	....	....	....	....	....	0.020 to 0.025 in.
<i>Bearings, Type, drive end</i>	....	....	....	....	....	....	....	CZ60748
<i>comm. end</i>	....	....	....	....	....	....	....	CZ60749
<i>Brushes</i>	....	....	....	....	....	....	....	Ref. No. 5W/1041
<i>Length, new</i>	....	....	....	....	....	....	....	0.355 to 0.385 in.
<i>worn</i>	....	....	....	....	....	....	....	0.25 in.
<i>Brush spring pressure</i>	....	....	....	....	....	....	....	3.5 to 4.5 oz. (100 to 127 g.m.)

* After skimming to 0.047 in.

TABLE 1

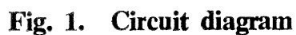
Stroke setting and installation details

Type	Ref. No.	Extended centres (in.)	Retracted centres (in.)	Stroke (in.)	End fittings		Position of hole within rear fitting
					Front	Rear	
CZ53681/1F/A	5W/300	9.50	7.50	2	Z60332	CZ54077	↑↓
CZ53681/1F/J	5W/2697	13.69	10.69	3	CZ55729	CZ59826	↔↔

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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.




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Appendix 7

ACTUATOR, PLESSEY, TYPE CZ80730/3/A

LEADING PARTICULARS

Actuator, Type CZ80730/3/A	Ref. No. 5W/1349
<i>Voltage range</i>	....	....	....	....	....	22 to 29V d.c.
<i>Nominal load</i>	....	....	....	....	....	100 lb.
<i>Maximum working load</i>	....	....	....	....	....	150 lb.
<i>Stall load</i>	....	....	....	....	....	340 lb.
<i>Maximum static load</i>	....	....	....	....	....	800 lb.
<i>Current at nominal load</i>	....	....	....	....	....	2.4 amp.
<i>Stall current</i>	....	....	....	....	....	4.6 amp.
<i>Maximum operating frequency</i>	....	....	....	....	....	10 cycles per hour
<i>Extended centres</i>	....	....	....	....	....	9.52 in.
<i>Retracted centres</i>	....	....	....	....	....	6.82 in.
<i>Rear end fitting</i>	....	....	....	....	....	1CZ8041
<i>Position of hole within rear fitting</i>	....	....	....	....	....
<i>Ambient temperature range</i>	....	....	....	....	....	- 60 to + 90 deg. C
<i>Electrical connection</i>	....	....	....	....	....	6-pole plug
<i>Weight</i>	....	....	....	....	....	2 lb. 3 oz.
Motor, Type C1606H/1(CZ54249)	....	....	....	....	....	Ref. No. 5W/1068
<i>Output</i>	....	....	....	....	....	0.03 h.p. at 15,000 r.p.m.
<i>Rating</i>	....	....	....	....	....	1.5 minutes
<i>Commutator, dia., new</i>	....	....	....	....	....	0.490 to 0.495 in.
<i>worn* (min.)</i>	....	....	....	....	....	0.450 in.
<i>Undercut micas, depth</i>	....	....	....	....	....	0.024 to 0.026 in.
<i>width</i>	....	....	....	....	....	0.020 to 0.025 in.
<i>Bearings, Type, drive end</i>	....	....	....	....	....	CZ60748
<i>comm. end</i>	....	....	....	....	....	CZ60749
Brushes	....	....	....	....	....	Ref. No. 5W/1041
<i>Length, new</i>	....	....	....	....	....	0.355 to 0.385 in.
<i>worn</i>	0.250 in.
<i>Brush spring pressure</i>	3.5 to 4.5 oz. (100 to 127 gm.)

* After skimming to 0.470 in.

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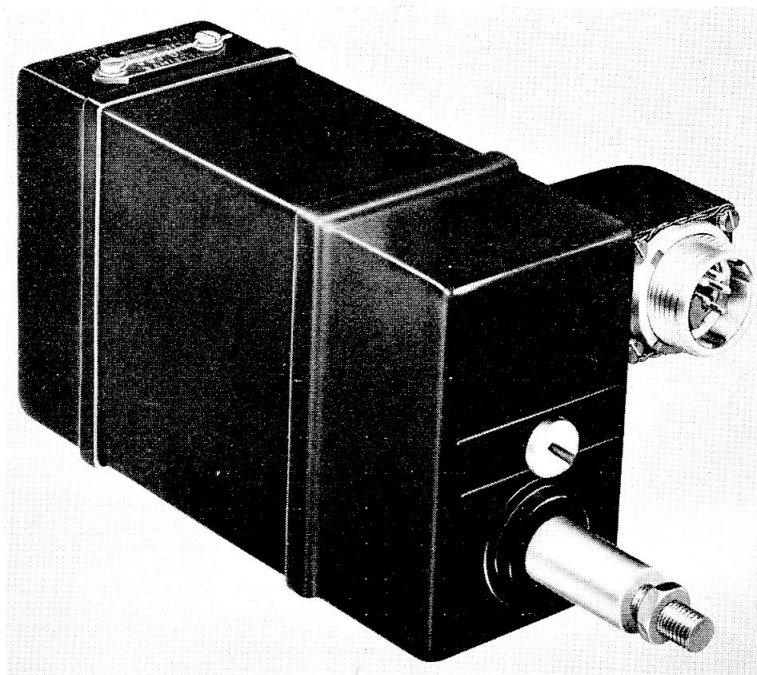


Fig. 1. General view of actuator, Type 1CZ80730/3/A

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.

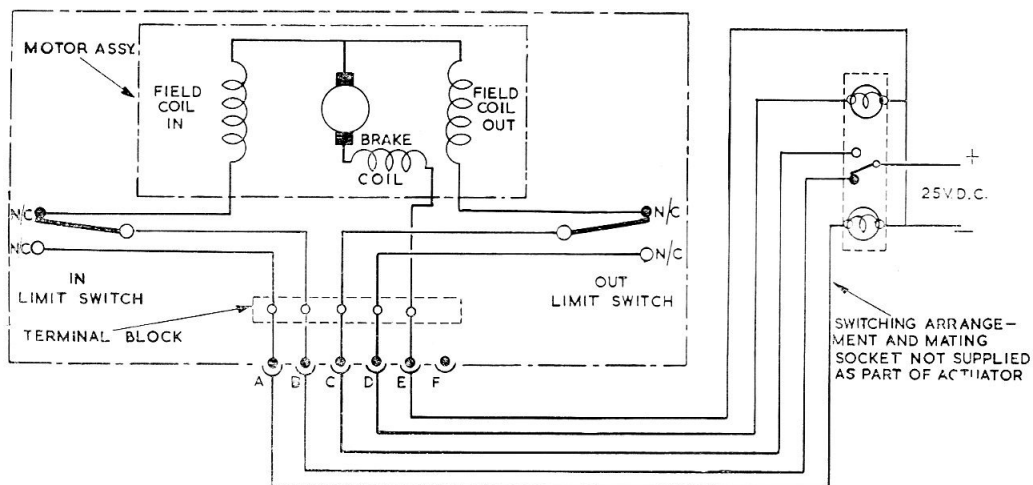


Fig. 2. Circuit diagram

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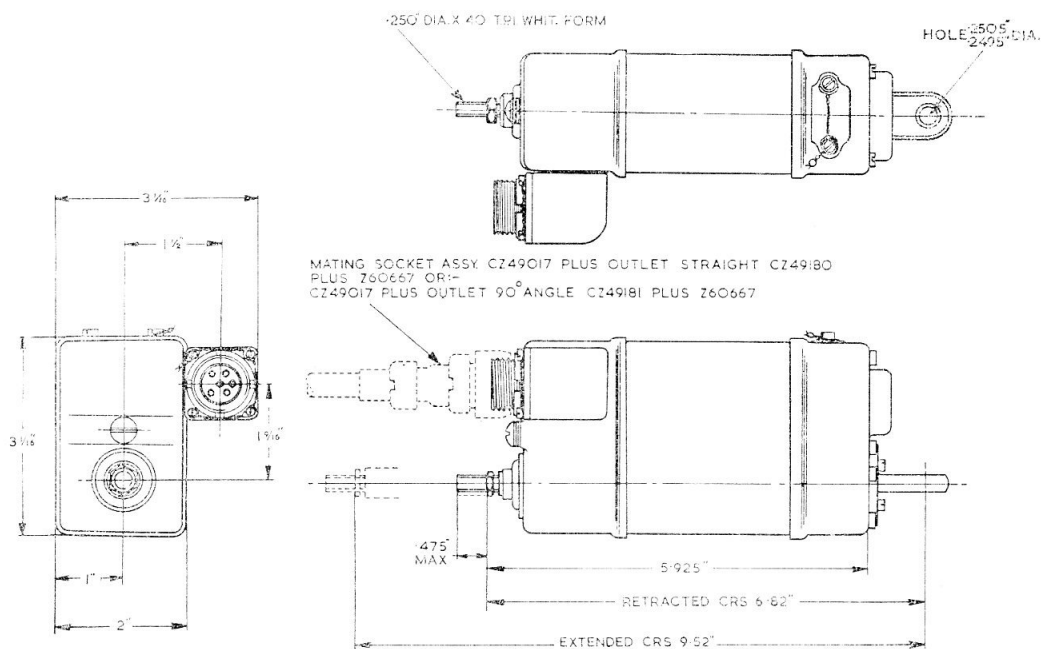


Fig. 3. Installation drawing

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Appendix 8

ACTUATORS, JAGUAR, PLESSEY, TYPE 1CZ135400

LEADING PARTICULARS

Actuator, Type 1CZ135400 ...	...	...	...	...	...	Ref. No. 5W/2565
<i>Operating voltage range</i> ...	...	...	...	...	...	24 to 29V d.c.
<i>Normal voltage</i> ...	...	...	...	...	...	28V d.c.
<i>Normal working load</i> ...	...	...	...	...	...	160 lb.
<i>Maximum working load</i> ...	...	...	...	...	...	200 lb.
<i>Maximum static load</i> ...	...	...	...	...	...	500 lb.
<i>Rating at normal load</i> ...	...	...	...	...	...	1½ min.
<i>Ambient temperature range</i> ...	...	...	...	...	...	−60 to +90 deg. C
<i>Weight</i> ...	...	...	...	...	...	2 lb. 4 oz.
Motor, Type C1606B/1 ...	...	...	...	...	Part No. CZ55457, Ref. No. 5W/1065	
<i>Output</i> ...	...	...	...	...	...	0.015 h.p. at 15,500 rev/min
<i>Commutator dia., new</i> ...	...	...	...	...	...	0.490 to 0.495 in.
<i>worn (min.)</i> ...	...	...	...	...	...	0.450 in.
<i>after skimming (min.)</i> ...	...	...	...	...	...	0.470 in.
<i>Undercut mica, depth</i> ...	...	...	...	...	...	0.020 to 0.025 in.
<i>width</i> ...	...	...	...	...	...	0.018 to 0.022 in.
<i>Maximum eccentricity of commutator to shaft journal</i> ...	...	...	...	...	...	0.0003 in. T.I.R.
<i>Bearing, drive end</i> ...	...	...	...	...	Hoffman 4666, Ref. No. 2A/9501383	
<i>commutator end</i> ...	...	...	...	...	Hoffman N463, Ref. No. 2A/9501186	
<i>Brushes</i>	Type H.A.M. E.G.14, Ref. No. 5W/1041	
<i>length, new</i>	0.355 to 0.385 in.
<i>worn (min.)</i>	0.250 in.

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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

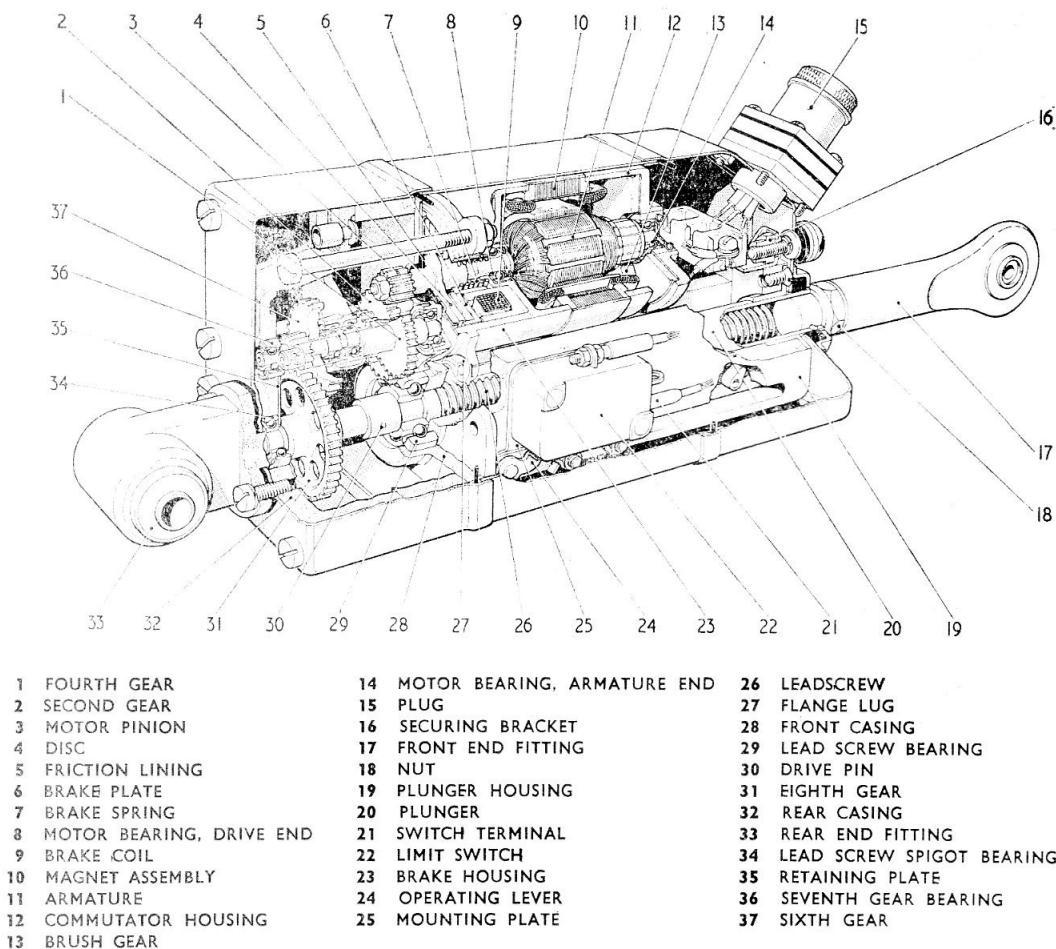
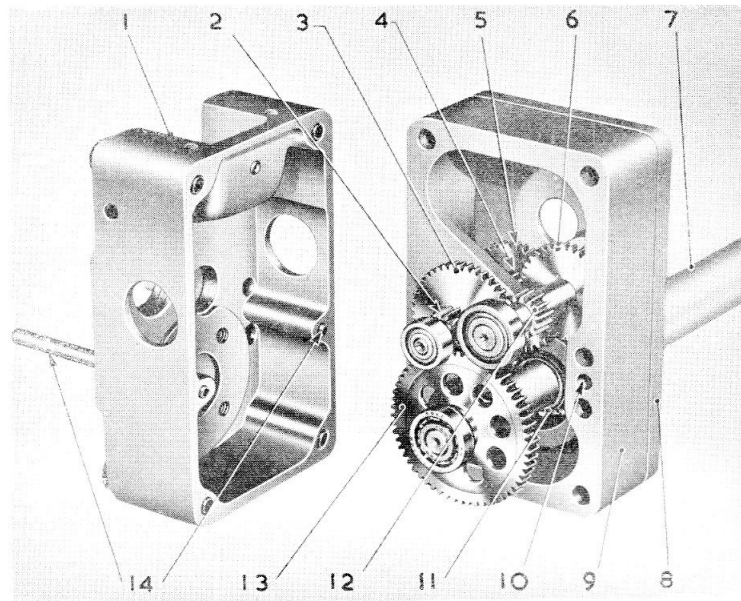


Fig. 1. Sectional view of actuator

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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.

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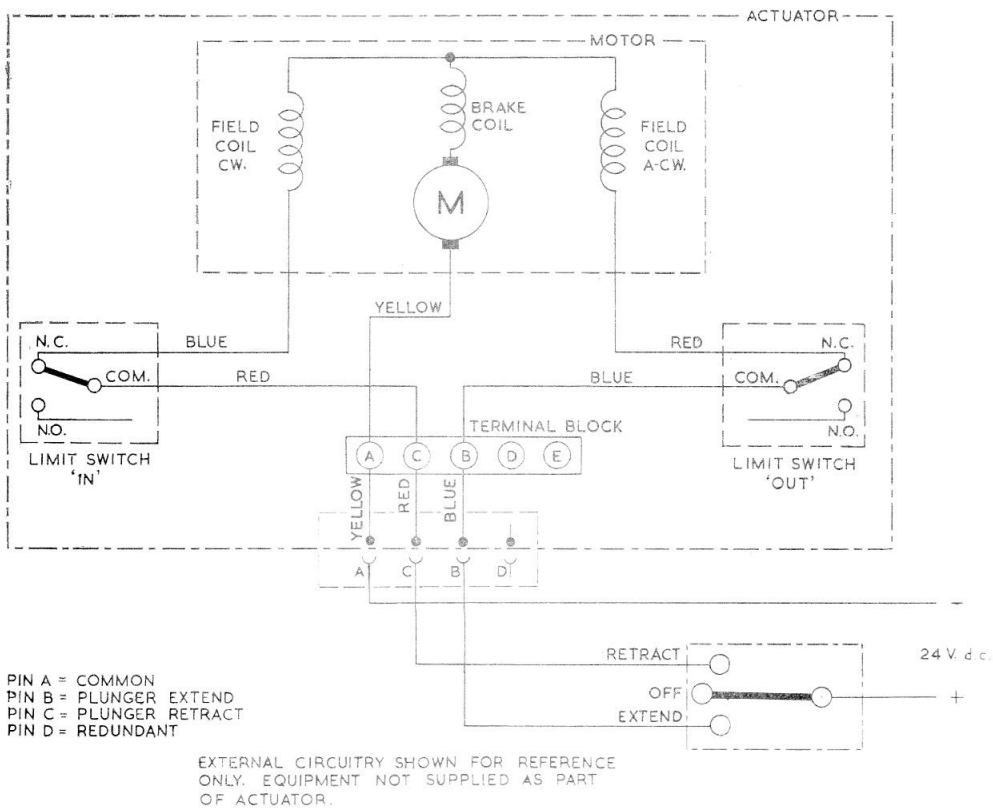


Fig. 3. Circuit diagram

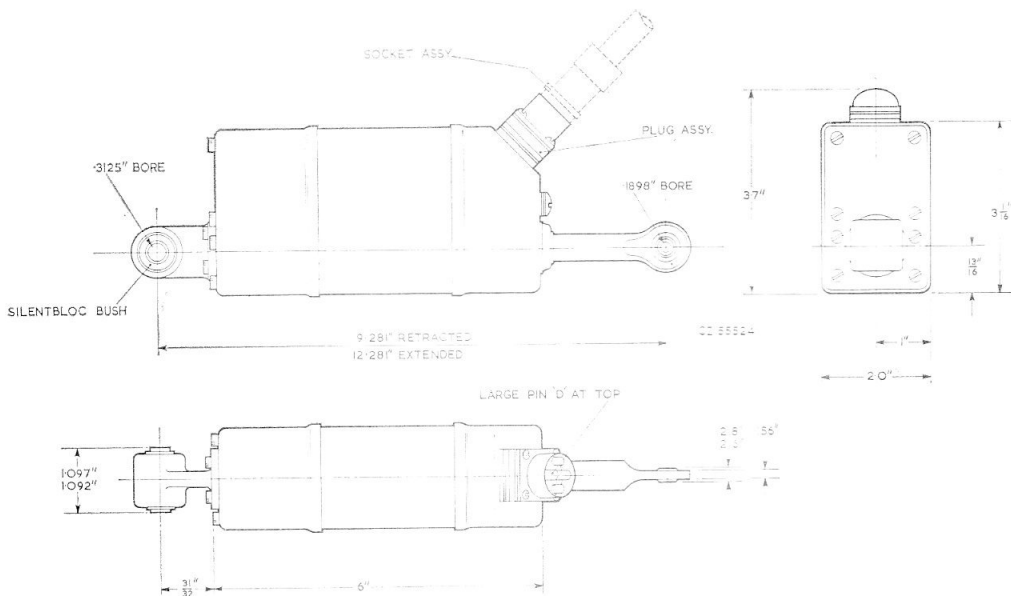


Fig. 4. Installation diagram

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Appendix 9

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

LEADING PARTICULARS

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

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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.)		Stroke (in.)	End Fitting		Position of Rear End Fitting (Refer to Fig. 1)
		Retracted	Extended		Front	Rear	
/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

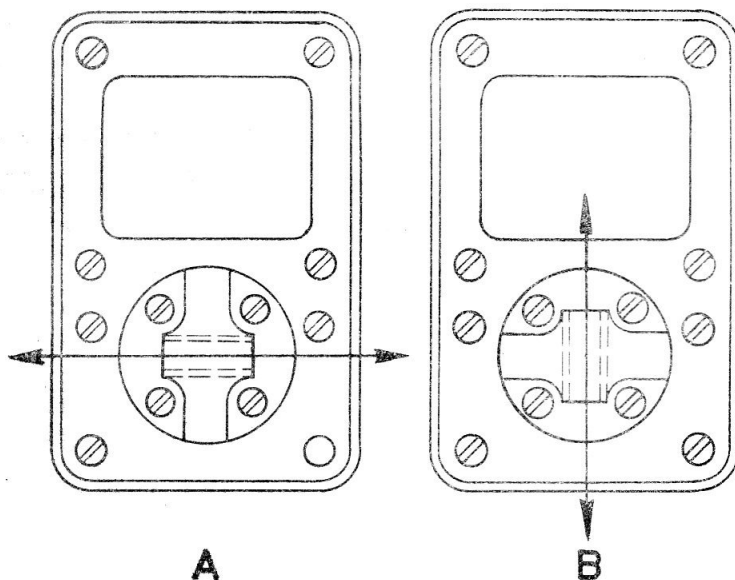


Fig. 1. Alternative positions of rear end fitting

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