Cancelled. now AP/13P-0502-1

Chapter 3

SEA VIXEN THROTTLE ACTUATOR AND CLUTCH ASSEMBLY

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF APPENDICES

LEADING PARTICULARS

Throttle actuator	*Ref. No. 6TE/4453*
Over dimensions	$4\frac{7}{8}$ *in.* × $3\frac{7}{8}$ *in.* × $1\frac{3}{4}$ *in.*
Weight	2 *lb.*
Clutch assembly	*Ref. 6TE/4456*
Overall dimensions	2·3 *in.* × 5 *in.*
Weight	1·5 *lb.*

Introduction

1. The throttle actuator (fig. 1) controls the engine throttle, to increase or decrease engine thrust as required in response to electrical signals from the throttle actuator amplifier. The output shaft of the actuator is clutch-coupled to the pilot's port throttle lever, the clutch being normally disengaged during flight but engaged during the final approach. The output shaft is driven, by an electric motor via a gear train and rack and pinion.

2. The air speed error and elevation correcting signals are applied to separate control windings on the first of three magnetic amplifiers contained in the auto-throttle amplifier. The output of the third amplifier controls the phase and amplitude of the supply to the control winding of a motor-tachogenerator contained within the throttle actuator and thereby controls the speed and direction of rotation. The motor drives an output shaft through a reduction gear train and rack and pinion, this output shaft being clutch-coupled to the pilot's port throttle lever during the final approach.

3. Position feedback is derived from an a.c. pick-off coupled to the output shaft, and rate feedback is derived from the tacho-generator. Both forms of feedback are demodulated and applied to a common control winding on the second magnetic amplifier of the auto-throttle amplifier.

THROTTLE ACTUATOR

General

4. The throttle actuator (fig. 2) consists of an a.c. motor-tachogenerator, a reduction gear train with a rack and pinion output stage and an a.c. pick-off. The rack is fixed to the output shaft which has a maximum movement of $1{\cdot}00 \pm 0{\cdot}01$ in. The a.c. pick-off is coupled to the output shaft by a lever.

5. The motor-tachogenerator consists of a 2-phase, 2-pole squirrel cage motor and a 4-pole induction tachogenerator on a common shaft. The tachogenerator output is a voltage at 400 c/s, proportional to the motor speed, which is applied to the second magnetic amplifier in the system as rate feedback to effectively stabilize the servo system.

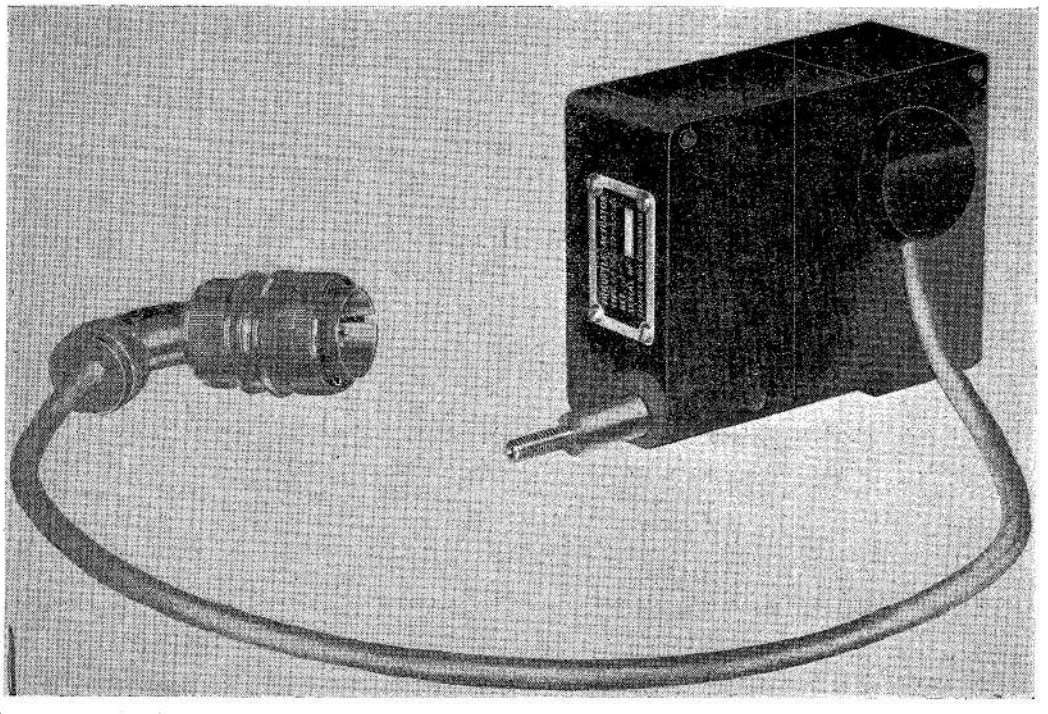

Fig. 1. Throttle actuator

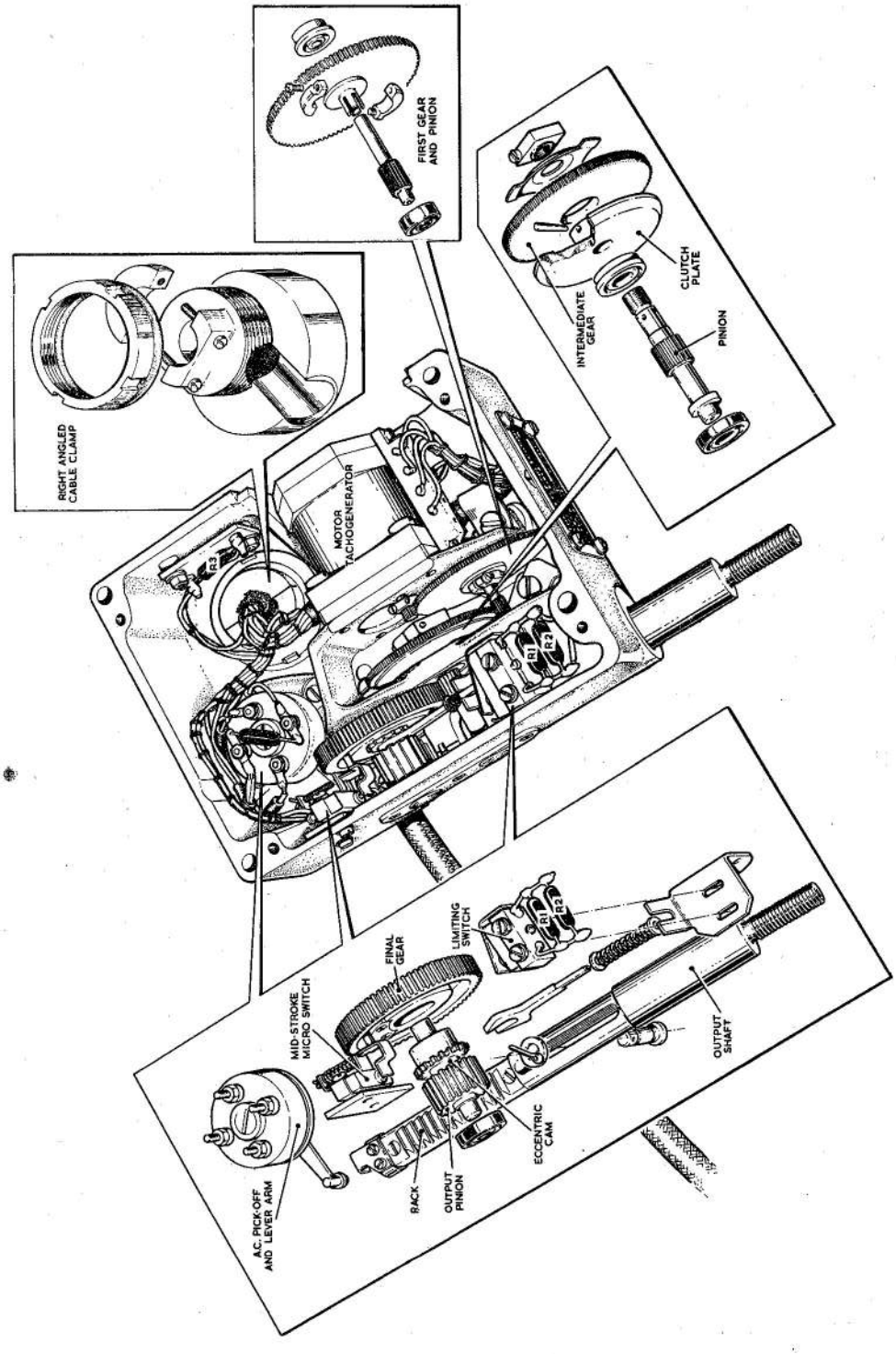

Fig. 2. Actuator—exploded view

6. The motor drive is transmitted through a 764 : 1 reduction gear train (fig. 2) to the actuator output shaft. A slipping clutch is included in the gear train to prevent motor inertia from damaging the gears in the event of an output overload. To save excessive wear on the overload clutch a protection circuit is included which stalls the motor when the actuator shaft reaches its full travel limit.

7. The components are housed in a cast light alloy case (fig. 2) which has an open top and a cut-out on one side. A light alloy dust cover which fits over the case top and cut-out is secured by six countersunk screws. The unit has three fixing holes which pass through the case and cover.

Motor-tachogenerator

8. The motor-tachogenerator is secured by four bolts to a gear housing which is bolted to the case. Removal of the motor-tachogenerator, complete with its associated tagboard and driving pinion, is facilitated by the cut-out in the side of the case. The stainless steel driving pinion (15 teeth) has a split collar which is secured to the motor-tachogenerator spindle by a split clamp.

First gear

9. The first gear (159 teeth) and pinion (15 teeth) are located between the walls of the gear housing. The pinion and spindle are machined integrally in stainless steel, and the gear, together with its associated boss is of light alloy. The gear is pressed onto the boss which is secured by a split clamp to the spindle.

Intermediate gear and overload clutch

10. The intermediate gear (159 teeth) and overload clutch are located in the gear housing and side case. The pinion and spindle are machined integrally in stainless steel.

11. The overload clutch protects the gear train in the event of an output overload and consists of a friction plate, spring and locking nut. The friction plate is taper-pinned to the clutch spindle, but the intermediate gear is freely mounted on the friction plate boss. The intermediate gear is damped against the friction plate by a spring and locking nut. The locking nut is adjusted so that the clutch transmits the rotation of the spindle to the gear on normal loads but slips on loads just below the overload rating for the motor.

Final gear and output pinion

12. The final gear (102 teeth) and pinion (15 teeth) are located between the gear housing and case side. The output pinion and shaft are machined integrally in stainless steel. The light alloy gear is pressed onto a boss machined on the pinion shaft. The section shaft between the boss and pinion is eccentrically turned with its centre offset 0·050 in. from the shaft centre, and forms an eccentric cam operating the protective circuit microswitch (para. 17). A machined groove in approximately the centre of the gear face, fitted with a cam, is provided to operate the mid-stroke microswitch (para. 19).

Rack and output shaft

13. The output pinion drives the stainless steel rack (13 teeth) which is secured by two bolts to the output shaft. The output shaft slides in a plain journal bearing and projects through the case. A stop pin located in the bottom of the case passes through a slot machined in the output shaft and restricts its movement. A sealing ring is fitted at the end of the shaft bearing. The end of the output shaft is threaded and connects to the auto-engage clutch in the aircraft throttle system.

Protective circuit mechanism

14. A mechanism, consisting of a cam and pushrod, is arranged to operate a protective circuit which reduced the power output of the driving motor just before the output shaft reaches the end of its travel. This arrangement prevents excessive wear on the overload clutch due to continual slipping in the hard-over condition.

15. The mechanism consists of an eccentric cam and a light alloy pushrod. One end of this pushrod is forked to engage with the cam and the distance between the jaws corresponds to the cam diameter. The other end of the pushrod is located in a bracket and bears against a leaf spring which operates a microswitch plunger. The profile of the cam causes the pushrod to actuate the microswitch before the output shaft reaches a hard-over position.

16. The bolts securing the microswitch pass through two elongated holes in the

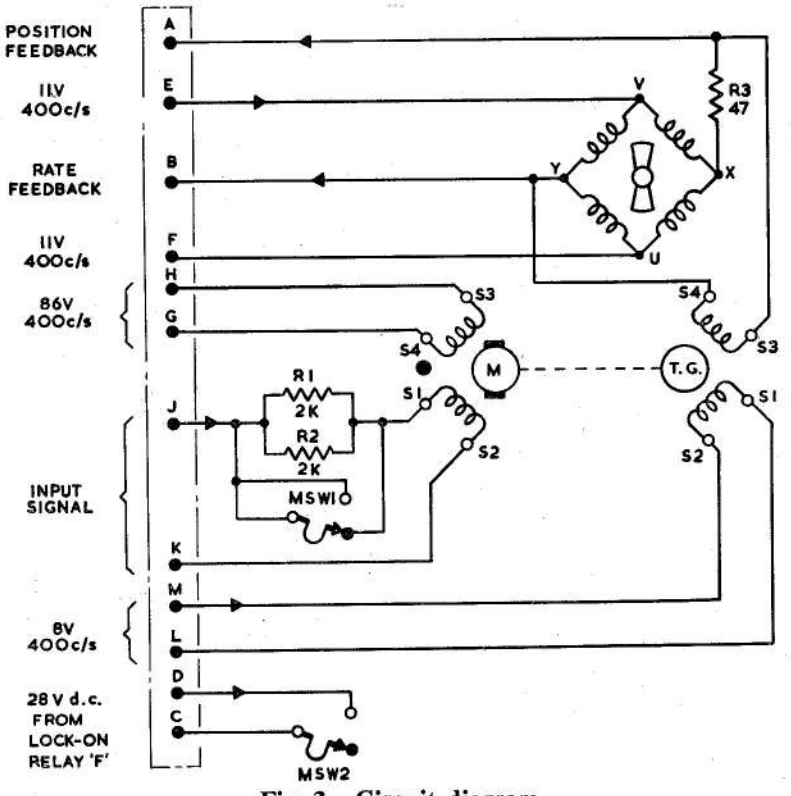

Fig. 3. Circuit diagram

microswitch bracket. This permits the position of the switch to be adjusted so that it is operated within 0·05 in. of the extreme shaft movement.

Protective circuit

17. The protective circuit consists of a microswitch and two 2 kilohm resistors (R1 and R2) in parallel. A cam driven pushrod operates the microswitch plunger just before a hard-over position is reached. When actuated, the microswitch connects the resistors in series with the motor control coil supply, thereby reducing the control coil current and hence the effective output power of the motor. This reduction in output power is not immediately evident, since kinetic energy due to motor inertia causes the overload clutch to slip initially as the hard-over position is reached. The stored energy is soon dissipated however, and the motor, no longer capable of slipping the clutch, subsequently stalls.

18. The motor remains stalled until the phase of the control coil supply is reversed by the output from magnetic amplifier MA3. The motor then reverses and, still at reduced power, drives the output shaft away from the hard-over position. When the cam has rotated sufficiently to release the microswitch plunger, the resistor is short-circuited and the motor runs at full power.

Mid-stroke microswitch MSW2

19. The mid-stroke microswitch is incorporated in the unit to permit the autothrottle to be engaged only when the output shaft of the actuator is extended to between 0·3 and 0·7 in. of its travel.

20. The microswitch assembly, complete with spring loaded cam follower mechanism, is mounted and secured by two 8BA screws to the side of the unit immediately above the end of the output shaft. A pin attached to the mechanism fits into a machined groove in the final gear, con-

sequently, as the gear rotates, the pin rides over a cam mounted on the gear, and is so arranged to actuate the microswitch only when the output shaft is centralized.

A.C. pick-off

21. An a.c. pick-off is secured by two clamps to a raised platform cast integral with the case. Movement of the actuator output shaft is transmitted to the pick-off rotor through a lever. One end of the lever is fixed to pick-off rotor by a split bush and split clamp. The other end of the lever carries a pin which is held in contact with the end of the output shaft by a spring. The pin is not rigidly connected to the output shaft because some lateral movement of the pin must occur since the shaft movement is linear and the pick-off lever follows an arc.

22. The pick-off consists of a laminated soft iron rotor and a four-pole stator. The four stator coils form an inductance bridge which is balanced when the rotor is stationary at a null point. When the rotor is moved, the inductance is increased in two arms of the bridge and the bridge is unbalanced. Dependent upon the direction of rotor displacement, the output signal is either in phase or antiphase with the supply voltage, this relationship determining the sense of the output signal. The amplitude of the signal is dependent upon the amount of rotor displacement.

23. When the actuator output shaft is in its central position the bridge is balanced. Movement of the output shaft results in a modulated signal output, this being demodulated and applied to the second magnetic amplifier in a sense as to oppose the demand signal.

24. The pick-off is fitted with an adjusting screw which is used to determine the amount of rotor end-float. This control is pre-set and should not be disturbed.

Connections

25. Electrical connection to the actuator is by a cable terminating in a 14 way U.K.A.N. plug. The cable enters the case via a right-angled cable clamp and is connected internally to the motor-tachogenerator tagboard and a.c. pick-off. The cable carries motor-tachogenerator and a.c. pick-off supplies and feedback signals from the pick-off and tachogenerator.

MAGNETIC CLUTCH ASSEMBLY

General

26. The magnetic clutch assembly (fig. 4) serves to couple the output of the autothrottle actuator to the aircraft's throttle control linkage. When the pilot engages the system, within the engagement band, the clutch locks the actuator to the control run and the actuator then operates to move the entire throttle linkage.

Construction (fig. 5).

27. The magnetic clutch assembly comprises an aluminium frame casting, pivoted top and bottom and used to provide a housing for the main clutch assembly.

28. The unit is a combined electromagnetic and friction clutch. The magnetic circuit is provided by two plates, one of which has an inset annular coil. When the coil is energized by means of a 28V d.c. supply, the plates are drawn together by the resultant magnetic force, and the torque is transmitted by means of an annulus of nylon teeth these being set in each magnetic plate. When the coil is de-energized, the plates are separated by a coil spring contained in the clutch body.

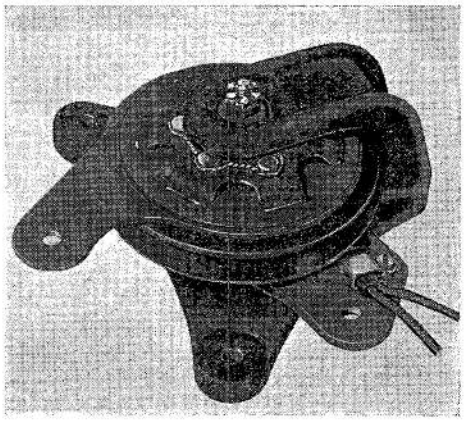

Fig. 4. Clutch assembly

29. Should either a malfunction of a switching circuit occur or the plates fail to separate, the magnetic clutch may be overridden by the friction clutch. The friction clutch consists of an actuator arm, which has bonded to its annular section, rings of high-temperature brake-lining material, (Minitox H2) which may slide in contact with a spring loaded metal plate. The slipping torque may be set to any desired

value by means of six screws acting on this spring loaded plate.

SERVICING

General

30. The test procedures normally carried out at specified periods, or at any time when the correct functioning of the throttle actuator is suspect, is described in Appendix A of this chapter.

Preliminary examination

31. Remove the cover by unscrewing the six 6BA $\frac{5}{16}$ in. countersunk screws. The components of the actuator are now accessible for servicing.

32. A brief visual examination of the unit should be made for :—

(a) Faulty insulation
(b) Broken wiring
(c) Wiring not placed in position
(d) Cleanliness

and signs of :—

(e) Overheating
(f) Corrosion
(g) Cracking

33. Subject the actuator to the standard serviceability tests described in Appendix A.

Renewal of components

Limit microswitch

34. Disconnect the two leads and resistors soldered to the microswitch tags and lift the wiring assembly clear. Manually move the actuator shaft to its mid-position.

35. Grip the coil spring on the pushrod and compress it slightly, so that the free end of the pushrod can be lifted clear of the slot in the microswitch bracket. Remove the pushrod, coil-spring and washers and stow in a safe place.

36. Remove one screw securing the microswitch and then slacken the other just sufficiently to allow the microswitch to be rotated through 90 degrees.

37. Locate the new microswitch alongside the old one, insert the securing bolt, pick up the threads on the locking plate and tighten.

38. Remove the securing bolt from the old microswitch, and remove the switch.

39. Slacken the bolt holding the new microswitch just sufficiently to allow the switch to be turned through 90 degrees.

40. Insert the second securing bolt, pick-up the threads in the locking plate and tighten.

41. Reconnect the electrical leads and the resistors.

42. Locate the fork end of the pushrod on the cam of the output pinion. Position the washer/coil-spring/washer assembly on the pushrod and compress the spring sufficiently to allow the free end of the pushrod to be located in the slot in the microswitch mounting plate.

Setting up limit microswitch

43. Slacken the two cheesehead screws securing the microswitch to its mounting plate approximately one turn and move the microswitch bodily in the required direction. Tighten the cheesehead screws.

44. If necessary carry out tests detailed in para. 12 and 13 in Appendix A of this chapter.

Replacement of mid-stroke microswitch

45. Disconnect the two electrical leads, remove the two securing screws and remove the defective microswitch.

46. Insert the new microswitch, and replace the two securing screws and reconnect the two electrical leads.

Adjustment of mid-stroke microswitch

47. Manually extend the actuator shaft to 0·3in. $\pm$ 0·02 in.

48. Locate the two microswitch securing screws on the outside of the actuator body. Slacken the two screws just sufficiently to allow movement of the microswitch.

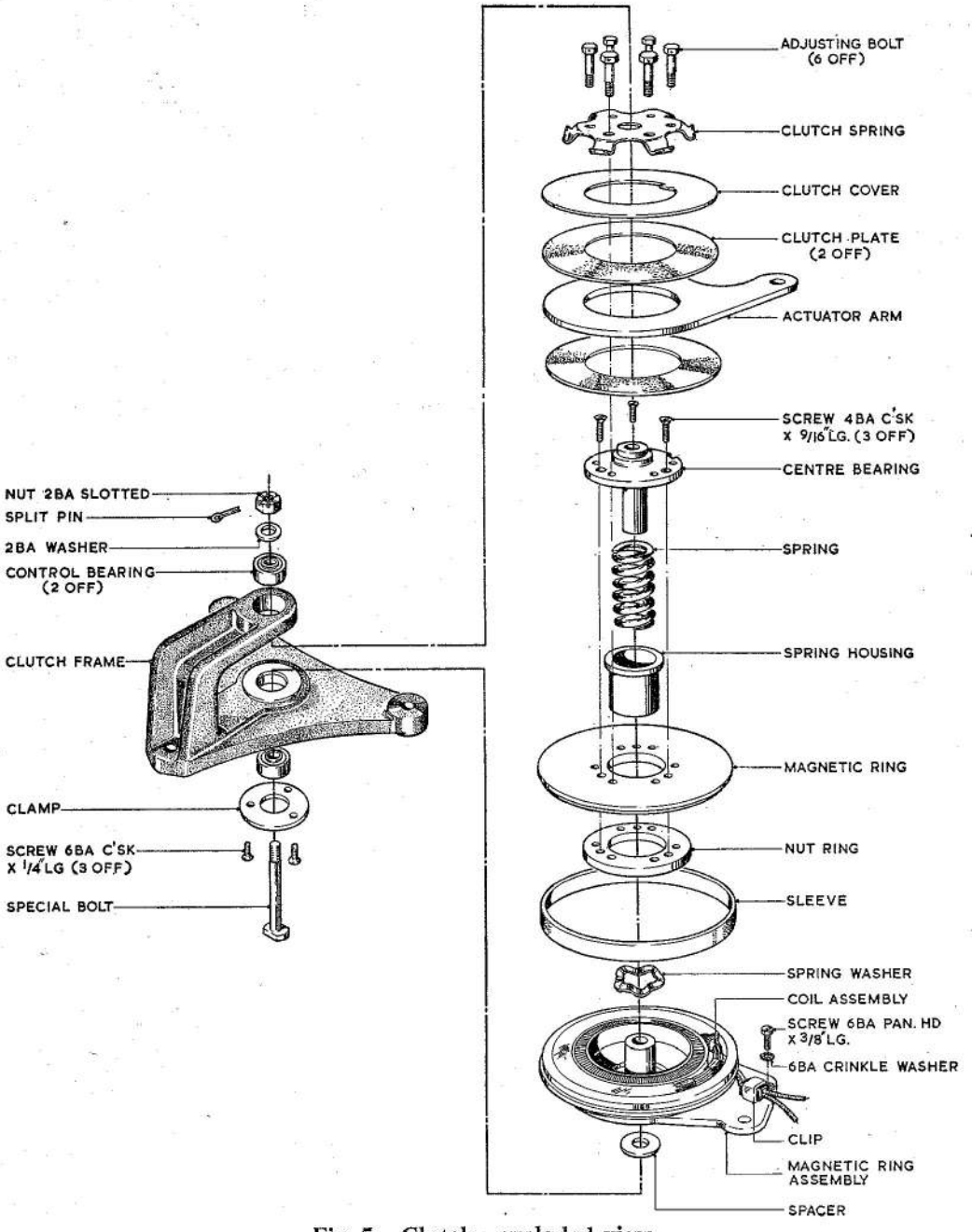

Fig. 5. Clutch—exploded view

49. Move the microswitch bodily until the microswitch just makes. Tighten the securing screws.

50. Manually extend the actuator shaft to 0·7 in ± 0·02 in. and check that the microswitch just breaks.

51. Repeat the above procedure, if necessary until microswitch is within the limits specified.

52. If necessary carry out the electrical tests detailed in para. 14 to 16 in Appendix A of this chapter.

Replacement of feedback pick-off

53. Disconnect the four electrical leads connected to pins U, V, X and Y and note the orientation of the pick-off in its mounting.

54. Slacken off the two screws securing the pick-off clamps, swing the clamps clear, and carefully remove the pick-off unit and lever.

55. Slacken the split clamp securing the pick-off lever to the pick-off unit shaft. Remove the pick-off lever noting its alignment relative to the slot in the pick-off unit shaft.

56. Fit the lever to the shaft of the new pick-off unit and aligning it as near as possible to the previous setting. Tighten the split clamp.

57. Carefully insert the pick-off and the pick-off lever assembly into the actuator body, ensuring that the follower pin locates against the end of the output shaft and under the coupling spring and that the pick-off unit is squarely seated in its housing and correctly orientated as noted in para. 53.

58. Position the pick-off clamps and tighten.

Adjustment of position pick-off

59. Connect the actuator and set the test set controls as shown in Para. 17 to 19 inclusive in Appendix A of this chapter.

60. Set the actuator to 0·500 ± 0·010 in. extension from the 'hard-in' position.

61. Set switches S18 and S9 to ON. Loosen the two screws securing the pick-off clamps and slowly rotate the body of the pick-off until the valve voltmeter reading is 0·0 ± 0·05V. Tighten the securing screws.

62. Set switches S9 and S18 to OFF and disconnect the valve voltmeter and the test set.

Replacement of motor-tachogenerator assembly

63. Remove the four bolts securing the motor-tachogenerator and tagboard assembly to the gear housing and carefully slide the assembly out.

64. Disconnect the cable-loom assembly from the motor-tachogenerator tagboard, ensuring that the cables are adequately coded.

65. Slacken the split clamp which secures the driving pinion to the motor-tachogenerator spindle and remove the pinion.

66. Fit the pinion to the spindle of the new motor-tachogenerator and tighten the split clamp.

67. Connect the cable loom assembly to the tagboard.

68. Slide the new motor-tachogenerator and tagboard assembly into the actuator body, engage the driving pinion with the first gear.

69. Align the bolt holes in the motor-tachogenerator with the holes in the gear housing and insert the securing bolts.

70. Before finally tightening the securing bolts, ensure that the driving pinion is fully engaged but not binding with the first gear. If necessary slacken off the split clamp and correctly position the driving pinion.

71. Carry out setting up and testing procedure as laid down in Appendix A of this chapter.

PACKAGING

72. The following description and instructions on the method employed to pack the

auto-throttle actuator and the clutch assembly are extracted from Issue 1 of the Services' Packaging Instruction Sheet to comply with Defence Specification DEF-1234 and to the latest issues of all other relevant specifications.

Throttle actuator package

73. The actuator package is a restricted standard container made up as follows :—

(1) Primary container which is a rigid, fibreboard box, Type C to Specification DEF-1319. The internal dimensions of the box are 8½ ins. × 6 in. × 3 in.

(2) Outer container which is a rigid, fibreboard box, Type C to Specification DEF-1319. The internal dimensions of the container are 13½ in × 11 in. × 8 in. and the inside faces are lined with rubberised hair blocks. The gross package weight is 7½ lb. Warning labels F.PKG. 59, F.PKG. 192 and F.PKG. 193 are attached giving details as follows :—

Label F.PKG. 59

DESICCATED PACK

NOT TO BE OPENED UNTIL REQUIRED FOR USE EXCEPT FOR THE RENEWAL OF DESICCANT

DESICCANT CHARGE

CLIMATIC PORTION	6 oz.
DUNNAGE PORTION	Nil
TOTAL QUANTITY OF CHARGE	6 oz.
DATE OF LAST CHARGE	

Label F.PKG. 192 :—

PRIMARY STANDARD PACKAGE

Label F.PKG. 193 :—

RESTRICTED STANDARD PACKAGE

74. Special packaging instructions are as follows:—

(1) Ensure that the actuator is clean, dry and free from dust and corrosion.

(2) Mask all electrical connections with tissue paper (DEF-1251) and secure with tape (DEF-1314).

(3) Mask all sharp edges liable to puncture barrier with tape (DEF-1314).

(4) Secure the desiccant to the actuator with tape (DEF-1314).

(5) Place the actuator in a polythene envelope (DEF-1317) 11 in × 9 in. × 0·020 in. thick. Extract all excess air and heat seal in accordance with DEF-1234, Part 2, Sect. 4, Appendix B.

(6) Place the actuator in the primary container and tightly pack with cellulose wadding (DEF-1248). Secure the lid of the container with gummed strip paper (DEF-1299).

(7) Float the primary container into the outer container, securing the lid using gummed strip paper (DEF-1299).

(8) Identify throughout in accordance with DEF-1234.

Clutch assembly package

75. The clutch package consists of a rigid, fibreboard box, Type C to Specification DEF-1319. The internal dimensions of the box are 5½ in. × 5½ in × 3 in. The gross package weight is 2 lb. Warning label F.PKG. 193 is attached giving details as follows :—

RESTRICTED STANDARD PACKAGE

76. Special packaging instructions are as follows :—

(1) Ensure that the clutch is clean, dry and free from dust and corrosion.

(2) Wrap the clutch in three thicknesses of tissue paper (DEF-1251).

(3) Place the clutch in a polythene bag (DEF-1317) 9 in × 8 in × 0·005 in thick. Extract excess air and heat seal in accordance with DEF-1234, Part 2, Sect. 4, Appendix B.

(4) Place the clutch in the container and cushion by filling all excess space with cellulose wadding (DEF-1248).

(5) Secure the lid of the container with tape (DEF-1299).

(6) Identify throughout in accordance with DEF-1234.

Appendix A

STANDARD SERVICEABILITY TEST FOR THROTTLE ACTUATOR

LIST OF CONTENTS

Introduction

1. The tests laid down in this Appendix may be carried out on the throttle actuator before it is fitted to an aircraft, or at any time when its serviceability is suspect.

TEST EQUIPMENT

2. The following test equipment is required:—

(1) 2nd line test set, Type 3D2262-A-1.

(2) Valve voltmeter C.T.471, J.S. Ref. No. 6625-99-972-0247.

(3) 500V Insulation tester, Type B Ref. No. 5G/1708.

(4) Avometer model 8. Ref. No. 10S/16411.

POWER SUPPLIES

3. The following power supplies are required:—

(1) 115V ± 0·5V a.c. single phase.

(2) 28V ± 0·5V d.c.

PRELIMINARY PROCEDURE

Preparation

4. Remove the cover and examine the interior of the unit for signs of moisture ingress, corrosion, damage to components and electrical connections. Replace cover.

5. Ensure that all test switches are set to the OFF position. Connect 115V 400 c/s and 28V d.c. to PL1 of test set.

6. Switch on external power supplies and check supplies on the test set as follows:—

(1) S16 to A.C.
S18 to ON.
The a.c. supply indicated on meter M1 shall be 115V $^{+2}_{-5}$ V a.c.

(2) S16 to D.C.
S17 to ON.
The d.c. supply indicated on meter M1 shall be 28V ± 0·5 d.c.

(3) Set S17 to S18 to OFF.

TEST PROCEDURE

Insulation resistance

7. Measure the insulation resistance between the following isolated circuits and between each circuit and chassis.
Pins A, D, G, J and M on connector.
In each case the insulation resistance shall be greater than 5 megohms at 500V d.c.

Output backlash and limit microswitch operation

8. Remove the actuator cover and fit the actuator to the actuator deflection jig No. 3D6347, (Ref. No. 6C3085). Set Dial indicator gauge to zero.

9. Slowly rotate the actuator motor pinion by hand until an output shaft movement is obtained, as indicated by a change in the dial indication gauge.

10. Rotate the motor pinion in the reverse direction until an output shaft movement is obtained in the opposite direction.

11. Not more than 3 revolutions of the motor pinion shall be required to reverse the direction of the output shaft movement as indicated by dial indication gauge.

12. Connect the Avometer (ohms range) across resistors R1 and R2 on the microswitch SW1. Slowly rotate the actuator motor spindle and note that the microswitch operates at not greater than 0·050 in. and not less than 0·015 in. of the extreme shaft movement in both directions. Note that when the microswitch operates the Avometer indicates a reading of approximately 1000 ohms.

13. Remove the Avometer after confirming that maximum shaft movement is 1·00 in ± 0·01 in.

Mid-stroke microswitch operation

14. Connect cable harness No. 3C2866 between the Actuator and test set socket SK3. Manually push the actuator shaft fully in. Set dial indicator gauge to zero.

15. Set switch S17 to ON and slowly extend the actuator shaft by hand.

16. At an extension of 0·3 in ± 0·02 in lamp LP8 shall light and remain ON while the extension of the shaft is continued until an extension of 0·7 in ± 0·02 in is reached. At this extension lamp LP8 shall go out and remain out for any further extensions of the shaft. Set switch S17 to OFF.

Centring of position pick-off

17. The actuator shall remain connected to the deflection jig 3D6347 and cable harness 3C2866 to the test set.

18. Set the test set controls as follows:—

S12 to position 4 (ACT F/B)
S8 to the mid-position
S9 to OFF
S10 to OFF

19. Connect an a.c. valve voltmeter with cable harness No. 3C3022 to socket SK4 on the test set.

20. Set the actuator shaft to 0·500 ± 0·010 in. extension from the 'hard-in position.'

21. Set switches S18 and S9 to ON. The valve voltmeter should indicate not greater than 0·06 volts r.m.s.

22. Set switch S18 and S9 to OFF and leave the valve voltmeter and actuator connected to the test set.

Input-output sense

23. Set the valve voltmeter range switch to 4V.
Set the test set controls as follows:—
Switch S8 to mid-position. Switch S9 to PO SUPPLY.
Switch S10 to F/B SIGNAL. Switch S12 to position 4 (ACT F/B). Switch S13 to position 2 (5V ACTUATOR). Switch S15 to position 5 (ACT O/P). Switch S18 to 115V ON.

24. Set S8 to OUT. The actuator shaft should extend. Meter 2 should deflect to the left and remain deflected to the left with the shaft fully extended.

25. Set S10 to OFF. The external valve voltmeter should read 2·7 ± 0·45Vrms with the actuator shaft fully extended.

26. Set S10 to F/B SIGNAL. Set S8 to IN. Meter 2 should deflect to the right whilst the actuator retracts and remains deflected to the right with the ram fully retracted.

27. Set S10 to OFF. The external valve voltmeter should read 2·7 ± 0·45Vrms with the actuator shaft fully retracted.

28. Set S10 to F/B SIGNAL. Set S9 to OFF. Remove valve voltmeter.

29. RATE FEEDBACK TEST. Set S8 to OUT. The actuator should extend and meter 2 reads actuator tachogenerator output, which should be greater than 0·5V to the left on the upper scale, whilst the actuator shaft is moving.

30. Set S8 to IN. The actuator should retract and meter 2 reads actuator tachogenerator output voltage, which should be greater than 0·5V to the right on the upper scale, whilst the actuator shaft is moving. Return S8 to mid position. Leave the actuator connected to the jig and test set.▶

Overload slipping clutch

31. Set switch S8 to OUT. The actuator shaft should drive fully out. When the shaft reaches the limit of its movement the overload clutch shall first slip and then the motor shall stall.

32. Set switch S8 to IN. The actuator shaft should drive fully in. When the shaft reaches the limit of its movement the overload clutch shall first slip and then the motor shall stall. Set switch S8 to the mid position.

33. Set switch S18 to OFF and remove the actuator from the deflection jig.

Output thrust

34. Connect the actuator to the thrust jig No. 3D1292, (Ref. No. 6C3188) screwing the output shaft to the jig coupling.

35. Set the scale on the jig in line with the indicating flange of the coupling.

36. Couple the actuator to the socket SK3 on the test set using cable harness No. 3C2866.

37. Set switch S18 to ON and switch S8 to OUT. The actuator shaft should drive the indicator flange at least three divisions before clutch slip or motor stall.

38. Set switch S8 to the mid position and allow enough time for the actuator to settle down.

39. Set switch S8 to IN. The actuator shaft should drive the indicator flange at least three divisions before clutch slip or motor stall.

40. Set switch S8 to the mid position and switch S18 to OFF. Remove the actuator from the jig. Replace cover. Seal with 'Wellseal' sealing component D.T.D./900/4139(34B/942976).

Final check

41. Repeat the insulation check detailed in para. 7.

Appendix B
FOR
CLUTCH ASSEMBLY

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

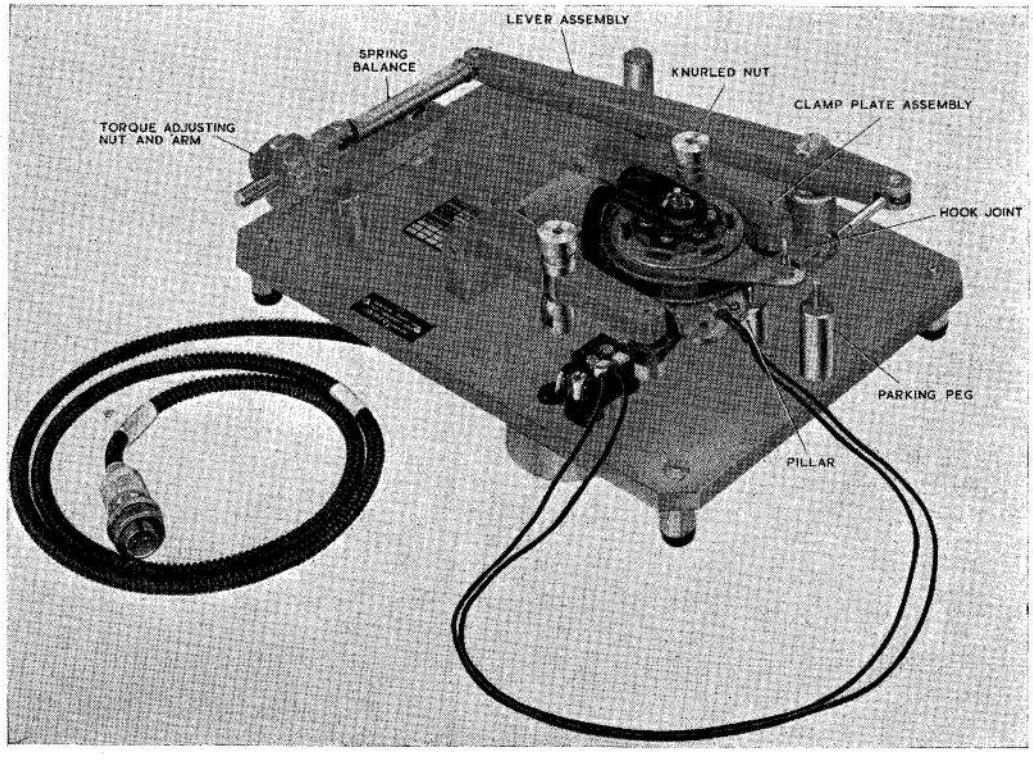

Fig. 1. Clutch torque jig

Introduction

1. The tests laid down in this appendix are to be carried out on the clutch assembly before it is fitted to an aircraft, or at any time when its serviceability is suspect.

TEST EQUIPMENT

2. The following test equipment is required :—

(1) 2nd Line test set, Type 3D2262-A-1.

(2) 500V Insulation Tester, Type B. Ref. No. 5G/1708.

POWER SUPPLIES

3. The following power supplies are required :—

(1) 28V ± 0·5V d.c.

PRELIMINARY PROCEDURE

Preparation

4. Examine the unit for signs of moisture ingress corrosion and damage.

5. Ensure that all test set switches are set to the off position. Connect 28V d.c. to PL1 of test set.

TEST PROCEDURE

Insulation resistance

6. Measure the insulation resistance between the coil and the casing which shall not be less than 5 megohms at 15 seconds after the application of 500 d.c.

Functional tests

7. Set switch S12 to position 5 (clutch), set switch S11 to OFF, S16 to D.C. and S17 to ON. The test set meter M1 shall indicate 28V ± 0·5V.

8. Mount the clutch on the clutch torque jig 3D2035 (fig. 1) and connect the two leads from the clutch to the terminals on the torque jig.

9. Connect the cable harness from the torque jig to the test set socket SK4.

10. Move the lower clutch arm into contact with the pillar (fig. 1) on the jig.

11. Set switch S11 to ENGAGE, lamp LP9 shall light and the magnetic clutch shall engage.

12. Secure the clutch in torque jig as shown in fig. 1.

13. Turn the torque adjusting nut (fig. 1) to the right to increase the load on the friction clutch, which shall slip between 7 and 10 lb. on the spring balance (70 to 100 lb/in on friction clutch).

14. Turn the torque adjusting nut to the left to release load off spring balance. Move the torque adjusting nut and arm to the left. Set switch S11 to OFF.

15. Release the two knurled nuts (fig. 1), securing the clamp plate assembly and lift the assembly from the clutch. Remove lock joint (fig. 1) from upper actuator arm bolt and place on parking peg (fig. 1).

16. Remove the magnetic clutch from the jig leaving its cable connected to the jig.

17. Set switch S11 to ON, the magnetic clutch shall engage. The clutch shall be free to rotate in its frame.

18. Set switch S11 to OFF. The clutch shall disengage and both arms shall be free to rotate independently in the frame. Disconnect the two leads from the torque jig.

Final check

19. Repeat the insulation check detailed in para. 6.

Printed for H.M. Stationery Office by G. F. Wilson, Southampton No. 571364 900 91385 12/65 GFW7588