Chapter 107

SWITCH, A.E.I. TYPE TD FORM 8

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LEADING PARTICULARS

Rotary pattern switch, Type TD Form 8	**Ref. No. 5CW/5020**
Voltage rating	28*V d.c.*
Current rating	10*A d.c.*
Voltage drop at rated current—	
Between all terminals	*Less than* 100*mV*
Weight	7 *oz.*
Terminals	4 *B.A. combined screws and washers*

Introduction

1. The TD Form 8 switch shown in fig. 1 is a single pole, four position switch designed for use in 28V d.c. aircraft electrical circuits. The switch is suitable for panel mounting and is manually controlled by a knob moulding protruding from the switch body.

DESCRIPTION

General

2. The TD Form 8 switch is a totally enclosed rotary pattern switch which controls a maximum current of 10A at 28V d.c. The switch comprises essentially a base moulding containing the fixed contacts and terminal screws, and a cast aluminium body which houses the rotary mechanism.

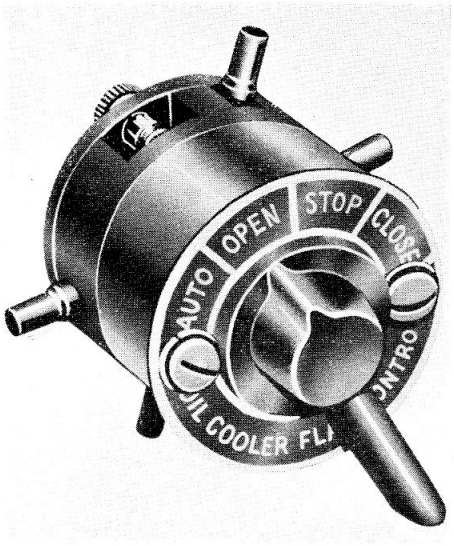

Fig. 1. Switch, A.E.I. type TD form 8

Body

3. The switch is assembled on two locating studs which are mounted in tapped inserts in the aluminium body. The knob moulding is retained in the bore of the body by a circlip and has a 'D' shaped insert extension which engages a brass contact plate. This plate makes connection between the appropriate contacts, moulded into the base moulding, when the knob is operated. The pressure spring provides adequate contact pressure between the contact plate and the moulded-in base contacts. The contact plate has semi-circular projections on one side which engage with corresponding indentation in a locating plate when the knob is turned to the selected position.

4. The locating plate is mounted in an insulation plate which locates on the two studs fitted in the switch body. Correct mating between the rotary mechanism and the base moulding is provided by a locating pin which engages an aperture in the insulation plate.

Base moulding

5. The base moulding contains four moulded-in contacts, four tapped inserts for terminal screws, four moulded-in slots for cable sleeves and two locating holes. A plain insert is provided for the locating pin which engages the slot in the insulation plate. The base is located to the body by the two locating studs, and is secured to the body by two 4 B.A. locknuts and washers. A terminal cover is secured to the base moulding by two 4 B.A. captive nuts.

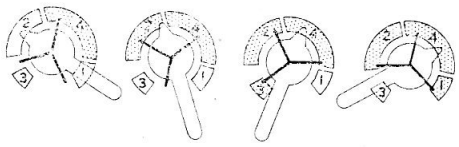

Fig. 2. Correlation of switch positions and terminal connections

OPERATION

General

6. The switch is manually operated by moving the knob moulding to the required position. The switch has a stay-put action in each of its four positions, thus the knob moulding will stay at the selected position. Due to the physical arrangement of the moulded-in contacts and the contact plate, the switch has a break-before-make switching action. The correlation between the switch positions and the terminal connections is shown in fig. 2. Table 1 details the continuity between the terminals for each of the four switch positions.

SERVICING

7. Examine the switch for obvious external damage and security of mounting. Remove the terminal cover and check that all electrical leads are in good condition and are securely connected. For further servicing the switch should be removed from the aircraft.

Dismantling

8. To dismantle the switch for further servicing the following procedure should be carried out, reference being made to fig. 3.

(1) Unscrew two 2 B.A. screws and remove the escucheon plate from the switch body.

(2) Unscrew two captive screws and remove the terminal cover from the base moulding.

(3) Remove two 4 B.A. locknuts and washers from the locating studs and separate the base moulding from the switch body.

(4) Remove the contact plate, locating plate, insulation plate and the pressure spring from the switch body.

(5) Remove the knob retaining circlip and the insulation washer. Withdraw the knob moulding through the switch body.

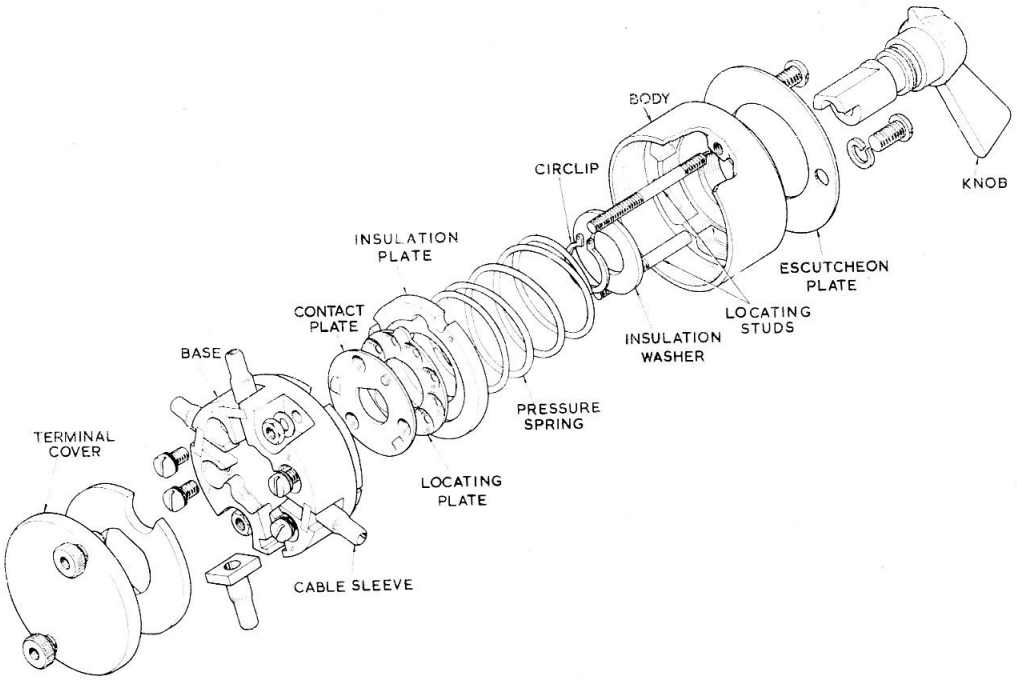

Fig. 3. Switch—exploded view

Bay servicing

9. Clean all components of the switch with an approved cleaning fluid and dry thoroughly in a jet of clean dry air.

Body and knob

10. Check that the tapped inserts in the body are in good condition and that the locating studs are securely fixed. Damaged studs should be replaced as necessary. Stripped threads in the fixing holes necessitates the fixing of a new body as detailed in Para. 15. Examine the knob moulding for signs of cracks or chipping. Check that the 'D' shaped insert is secure. Replace the knob as necessary.

Pressure spring

11. Examine the pressure spring for evidence of corrosion or distortion. Check that the spring pressure is 6 lb + 10% when the spring is compressed to a length 0·394 in.

Locating plate and insulation plate

12. Examine the locating plate for signs of excessive wear and deep score marks. Check that the insulation plate is not cracked or chipped. Replace each item as necessary.

Contact plate

13. Examine the contact plate for signs of damage or corrosion. Examine the three raised contact faces for excessive wear, pitting or burns. If necessary clean the contacts with an approved contact cleaner in accordance with the instructions given in A.P.4343, Vol. 1, Sect. 11, Chap. 2. After dressing at least 50 per cent of the contact surface must be clean and smooth, and the minimum contact depth should not be less than 0·040 in.

Base moulding

14. Ensure that the insert threads are not damaged and that the contact inserts are secure and are not pitted or scored. If necessary the contacts should be cleaned in accordance with the instructions given in A.P.4343, Vol. 1, Sect. 11, Chap. 2. At least 50 per cent of the contact surface must be smooth and clean after dressing. The minimum depth between the back face of the base moulding and the surface of the contact inserts should not be less than 0·580 in. If the insert threads are damaged or the contact faces do not clean up at the minimum permissable dimension, a new base moulding should be fitted as detailed in Para. 15.

Assembling

15. To assemble the switch the following sequence should be carried out, reference being made to fig. 3.

(1) If a new switch body is required or if the locating studs are being replaced, coat the short thread ends of the studs with locking varnish (Ref. No. 33H/176) before assembly.

(2) Lightly smear the bore of the body with an approved pressure grease and fit the knot moulding into the body.

(3) Position the insulation washer over the knob insert and refit the retaining circlip.

(4) Refit the spring to the insulation plate so that the spring locates on the plate spigot.

(5) Position the locating plate in the insulation plate recess so that both plate surfaces are flush.

(6) Smear the indentations in the locating plate with a liberal coating of approved pressure grease.

(7) Position the contact plate onto the locating plate and ensure that its semi-circular projections engage with the locating plate indentations.

(8) If a new base is fitted, insert a new locating pin in the plain recess moulded into the moulding.

Note . . .

Coat the locating pin with locking varnish (Ref. No. 33H/176).

(9) Position the spring, complete with the insulation plate, locating plate and contact plate over the knob insert. Depress the contact plate so that it locates on the 'D' shaped insert of the knob moulding. Ensure that the insulation plate engages the two locating studs.

(10) With the contact plate held depressed, refit the base moulding over the two locating studs and ensure that the base moulding locating pin engages with the slot near the insulation plate periphery.

(11) Refit the base moulding to the body and secure to the locating studs with two 4 B.A. nuts and washers.

Note . . .

Coat the locknut threads and washers with locking varnish (Ref. No. 33H/176).

(12) Tighten the locknuts rotating the knob moulding as necessary to ensure correct mating of the switch body and base.

(13) Refit the escucheon plate to the switch body and secure with two 2 B.A. screws.

Testing

16. Details of the tests which are applied to the switch to verify its serviceability are given in Appendix A to this chapter.

TABLE 1

Switch handle positions and terminal connections

Switch handle position	Continuity between terminals
OFF	All terminals open-circuit
SLOW	4 and 2
MED	4, 2 and 3
FAST	4, 2 and 1

Appendix A

STANDARD SERVICEABILITY TEST

for

ROTARY SWITCH, A.E.I. TYPE TD FORM 8

Introduction

1. The following tests should be applied when ever the serviceability of the switch is suspect or before it is put into service.

TEST EQUIPMENT

2. The following equipment is required:—

(1) Variable 28V, 10A d.c. supply
(2) Variable resistance 0–5 ohm rated at 10A
(3) Multimeter, Type 12889
(4) D.C. millivoltmeter, 0V to 1V
(5) Insulation resistance tester, 250V

TESTING

Continuity test

3. Select the 2 megohm range on the multimeter type 12889. With the following switch positions selected, check for continuity between the appropriate terminals.

Switch Position	Terminal Nos.
SLOW	4 and 2
MED	4, 2 and 3
FAST	4, 2 and 1
OFF	Open circuit between all terminals

Ensure that when changing from one switch position to another, there is a definite 'off' period before contact is made at the new position.

Millivolt drop test

4. Connect the variable 28V, 10A d.c. supply, the variable 10A rated resistor and the multimeter Type 12889 (set to the 10A d.c. range) in series. With the switch set to the SLOW position, pass a current of 10A d.c. through the switch contacts via terminals 2 and 4. Measure the voltage drop across the terminals with the d.c. millivoltmeter; the voltage drop should not exceed 100mV. Repeat the test across terminals 3 and 2, and 3 and 4 with the switch set at the MED position, and across terminals 1 and 2, and 1 and 4 with the switch set at the FAST position. The voltage drop in each case should not exceed 100mV.

Insulation resistance test

5. Using a 250V insulation resistance tester, measure the insulation resistance between all terminals and the aluminium switch body. Set the switch to each position in turn and check the insulation resistance between unconnected terminals. The resistance value in each test should not be less than 5 megohms (R.A.F.) and 0·5 megohms (R.N.).

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