

## Chapter 58

### TRIM SWITCHES, DUNLOP SERIES

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#### LEADING PARTICULARS

<i>Two-way and four-way trim switches</i> ... ..	<i>Ref. No. see Appendix 1</i>
<i>Voltage range</i> ... ..	25 to 28.5V d.c.
<i>Current rating</i> ... ..	0.5 A
<i>Ambient temperature range</i> ... ..	-35 to +70 deg. C, with cowl fitted -65 to +70 deg. C, without cowl up
<i>Altitude</i> ... ..	to 60,000 ft.
<i>Performance</i> ... ..	100,000 operations on each position of the switch, (i.e. 400,000 operations for a four-way switch) with the contacts controlling an inductive load equivalent to 0.5A, 500 mH (two type "S" relays in parallel on 28V d.c.)
<i>Overall dimensions</i> ... ..	1 7/8 in. (excluding leads)
<i>Weight</i> ... ..	0.06 lb. (excluding leads)

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## Introduction

1. These trim switches are thimble operated, and are designed for incorporation in pilot control handles of aircraft, to provide a convenient and efficient means of trim actuation.

2. They are small single-pole switches having two or four positions with a rapid "pivot-to-make" and "release-to-break" action in two or four positions from a central "off" position.

3. The "on" positions, located by a gate, are spaced around the switch circumference at 180 degrees for the two-way and 90 degrees for the four-way switches.

4. Connecting cables are crimped to the switch during assembly and a suffix number after the switch type number, denotes the length of the cable in feet. Details of individual types are given in Appendix 1 to this chapter.

## DESCRIPTION

### General

5. The switch is housed in a circular metal case, the upper section of which is of reduced diameter and accepts an inner metal case. A dimple is pressed into the larger diameter of the outer case for location purposes.

6. The operating thimble fits through the top of the inner case, in which it can pivot, and a protective rubber cover fits into a groove around the thimble and over the outer case. Later models include rhodium plated pins, a new type of distance piece and an "all over cover".

7. The connecting cables are fitted with numbered cable markers to correspond with numbers on the moulded base and are crimped in position during assembly. Four tongues of the metal case are bent into grooves in the insulating base and serve to locate and hold the switch mechanism secure in the case.

### Switch mechanism

8. A sectional view of the four-way trim switch is shown in fig. 1. The operating thimble, complete to the spring, spring support and tip is assembled in the inner case, the rim of the thimble fitting under the turned down edge of the inner case.

9. A rubber stocking, a Tufnol washer and an insulating distance piece are then assembled in the base part of the outer case. The stocking is fitted to protect the switch contacts from ingress of any foreign matter which may find its way into the upper part of the switch.

10. The connecting cables are threaded through an insulator block and the ends are crimped to contact pins which are moulded into the base moulding. The moulding has eight such contact pins, into each of which is pressed a pin, which carries a roller contact. In the two-way switch, only four contact pins are used.

11. A tumbler assembly comprising a centre spindle, having a metal socket at its upper end, and a contact pad moulding with four equally spaced contacts is fitted to the centre of the base moulding. The tumbler and base are then pressed into the outer case, so that the dimple in the case aligns between contacts number 1 and 2, and the tip of the spring support bears in the socket of the tumbler assembly.

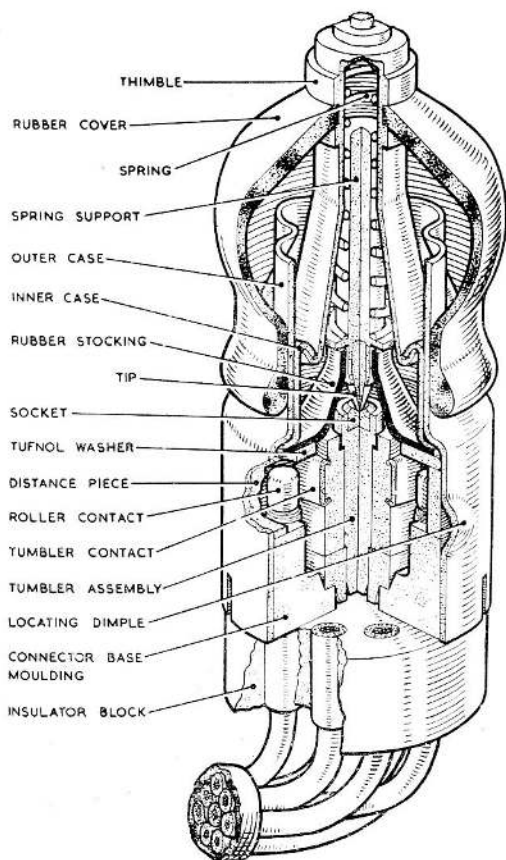


Fig. 1. Sectional view of four-way trim switch

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12. The tongues of the outer case will now align with grooves in the base moulding and, when bent into these grooves, will hold the mechanism in place. The insulator block on the cables is then pressed close against this base.

### Operation

13. When the thimble is operated to pivot in one direction, it hinges under the rim of the inner case and the tip of the spring support puts a side thrust on the socket of the tumbler assembly. As the pivoting of the thimble is increased, the line of thrust through the tip and socket will fall outside the base of the tumbler assembly. The tumbler will then snap over in the opposite direction to the movement of the thimble, and one contact on the tumbler will bridge a pair of roller contacts to complete a circuit.

14. When pivoting pressure is removed the loaded spring in the thimble will cause it to align itself centrally in the case. The tumbler assembly will move with a snap action to resume its central position in the connector base moulding, so parting the contacts and breaking the circuit. The thimble has a 25 degree movement to each side of the central "off" position for two-way trim switches and a 25 degree movement to each of the four operating positions for the four-way trim switches.

### INSTALLATION

15. A dimensional view of the four-way trim switch is shown in fig. 2. The switch is designed to be supported at the lower rim of the outer case and to fit into a circular mounting recess having a slot to align with the dimple on the switch case. The switch is held in its housing by a circlip. The mounting attitude of the switch is unrestricted.

### SERVICING

16. It is not intended that these types of switches should be stripped for servicing, since a new case would then have to be fitted. A visual examination, however, should be made for security of mounting and electrical connections, also for signs of corrosion or deterioration of cables. An unserviceable switch should be removed and replaced by a serviceable switch.

### TESTING

17. The switch should be tested in its relevant circuit.

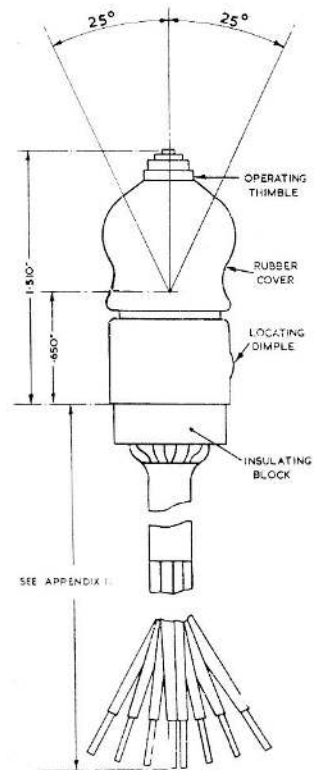


Fig. 2. Trim switch, four-way

### Millivolt drop test

18. The millivolt drop should be measured at the end of each pair of connecting cables with a current of 0.5 amperes flowing; also measure the millivolt drop over the same length of a similar pair of cables with the same current flowing. The difference between the two readings should not exceed 50 millivolts. ◀Operate the switch 20 times before this test is carried out.▶

### Insulation resistance test

19. Using a 250V d.c. insulation resistance tester Type C (Ref. No. 5G/152), or equivalent, measure the insulation resistance between:—

- (1) Open contacts.
- (2) Each contact and metal body, with contacts open.
- (3) Each contact and metal body, with contacts closed.

The measured reading should not be less than 5 megohm in each case.

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## Appendix 1

## LEADING PARTICULARS

Type AC	Ref. No. 5CW/	Type of knob	Type of cable	Remarks
<b>Two-way trim switches</b>				
13486		Special	7 ft. Uniflexpren 6	Thimble exposed
13488		Special	7 ft. Uniflexpren 6	Thimble exposed
13502	5899	Standard	18 in. Equip. wire, Type 2, 14/0-0076 white	Thimble exposed
13504		Standard	7 ft. Equip. wire, Type 2, 14/0-0076 white	Thimble exposed
13902	5998	Standard	7 ft. Uniflexpren 3	Thimble exposed
13904	6173	Standard	Uniflexpren 6	All over cover
14314		Standard	Uniflexpren 6	All over cover
14318		Special	Uniflexpren 6	All over cover
14706/5	8482	Special	5 ft. Uniflexpren 6	All over cover
14710		Standard	Equip. wire, Type 2, 14/0-0076 white	All over cover
14710/2	6732 27J/492	Standard	2 ft. Equip. wire, Type 2, 14/0-0076 white	All over cover
14714	6419	Standard	Vinsmall 5E/9100004	All over cover
14828		Special	Uniflexefglas 20	All over cover
14834/4	7176	Standard	4 ft. Uniflexpren 6	All over cover
14834/7	6686	Standard	7 ft. Uniflexpren 6	All over cover
14834/8	8496	Standard	8 ft. Uniflexpren 6	All over cover
14834/15	6620	Standard	15 ft. Uniflexpren 6	All over cover
14838/8	6730	Special	8 ft. Uniflexpren 6	All over cover
14838/15	6645	Special	15 ft. Uniflexpren 6	All over cover
14840		Special	Uniflexpren 6	All over cover
14864/6	6927	Special	6 ft. Uniflexpren 6	All over cover
<b>Four-way trim switches</b>				
13500	27J/418	Standard	Equip. wire, Type 2 14/0-0076 white	Thimble exposed
13506		Standard	Equip. wire, Type 2 14/0-0076 white	Thimble exposed
13904	6173	Standard	Uniflexpren 6	Thimble exposed
13906	6418	Standard	Uniflexpren 6	Thimble exposed
14306		Special	Uniflexpren 6	
14308		Special	Equip. wire, Type 2 14/0-0076 white	
14320		Special	Uniflexpren 6	
14704/8	8505	Concave	8 ft. Uniflexpren 6	All over cover
14708	27J/460	Standard	Equip. wire, Type 2 14/0-0076 white	All over cover
14708/2	27J/464	Standard	Equip. wire, Type 2 14/0-0076 white	All over cover

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**Appendix 1 (continued)**

Type AC	Ref. No. 5CW/	Type of knob	Type of cable	Remarks
<b>Four-way trim switches (continued)</b>				
14712	27J/495	Standard	Uniflexpren 6	All over cover
14712/8	6792	Standard	8 ft. Uniflexpren 6	All over cover
14716		Special	Uniflexpren 6	All over cover
14832		Mushroom	Uniflexpren 6	All over cover
14836		Special	Equip. wire, Type 2 14/0-0076 white	All over cover
60264/8	6896	Special	8 ft. Uniflexefglas 20 P.T.F.E. covered	All over cover
60292	8502	Standard	Uniflexefglas 20, P.T.F.E. covered	Landing lamp switch
60294	8504	Large (flat)	Uniflexefglas 20, P.T.F.E. covered	
60806		Standard	Uniflexpren 6	
60810/8	8489	Standard	8 ft. D.E.F.12	
60812/1	8486	Standard	1 ft. D.E.F.12	
61576		Standard	Uniflexefglas 20	

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A close-up photograph of a red aircraft fuselage. A grey fabric cover is draped over a section, with the text "LIGHTNING MK. 1", "COVER PITOT HEAD", and "EB2-88-511" printed on it. To the right, a rectangular metal plate is mounted on the red surface. The background shows the curved structure of the aircraft with several rivets.

LIGHTNING MK. 1  
COVER PITOT HEAD  
EB2-88-511