Chapter 28

TUMBLER SWITCHES, ROTAX, D5400 and D5500 SERIES

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF APPENDICES

Introduction

1. Each switch in the Rotax Type D5400 series (*fig.* 1) is a single-pole type contained in a moulded case. In the Type D5500 series (*fig.* 2) each switch comprises two Type D5400 switches in one moulded case, with the switch levers strapped together. The Type D5500 series thus becomes double pole. The action of the switches in both series is generally the same, but in some cases a spring return is incorporated. A list of variations is given in Appendix 1, Table 2.

DESCRIPTION

2. The bottom of the switch lever carries two spring-loaded balls, one of which rests in the centre of a pivoted cam. This cam is attached to the moving contacts. Movement of the switch lever forces the spring-loaded ball over the centre of the cam face, causing the moving contacts to bear down on the fixed contacts.

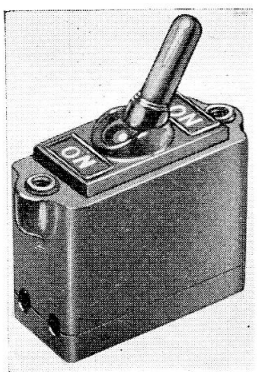

Fig. 1. General view of Rotax D5400 switch

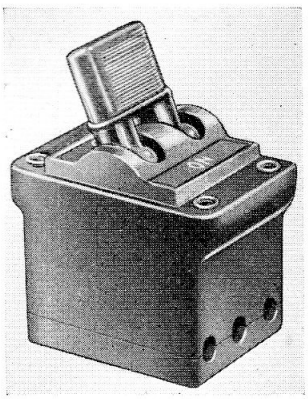

Fig. 2. General view of Rotax D5500 switch

3. As stated in para. 1, in some cases the switch is of the spring return type. This means that the cam is of a somewhat different shape, and directly the switch lever is released it returns to its initial centre position. Thus a very sharp break is achieved between fixed and moving contacts.

◄ **4.** When a switch has a restricted position, it is necessary to lift the switch lever outwards from the centre position before the restricted position can be selected. The switch lever is suitably modified to facilitate this operation. ►

5. Electrical connection to all except D5513 is made by means of 4 B.A. terminals. Type D5513 is identical in switch action with D5503, but instead of 4 B.A. terminals has a 5-pole plug (*Ref. No.* 5*X*/6016) fitted, giving an overall height of 4·78 in.

6. The terminal arrangement for all except D5513 is shown in Appendix 1 with further details of switch operation in Table 3, Appendix 1.

INSTALLATION

7. The Type D5400 series has two 4 B.A. holes tapped into it whilst the Type D5500 series has four 4 B.A. holes. The switches are intended for mounting in banks, but a minimum clearance of 0·031 in. must be allowed between each switch.

Protective shrouds

8. Protective rubber shrouds and fixing plates (*Table* 1, *Appendix* 2) are provided to prevent the ingress of moisture and dust. Care should be taken when fitting the shrouds (*figs.* 1 *and* 2, *Appendix* 2) to ensure that the shroud occupies the position shown; this will avoid stretching the shroud during normal operation of the switch. Where shrouds cover switch engravings, appropriate transfers (*Appendix* 2) can be fitted to the fixing plates or panel.

SERVICING

9. These switches are sealed in the course of manufacture, and cannot be fully dismantled.

10. They should be examined for cracks and signs of strain. The terminal cover should be removed, and the leads checked for loose connections and corrosion.

Testing

◄ **11.** If the serviceability of the switch is suspect, it may be tested as laid down in Appendix A. ►

Appendix A

STANDARD SERVICEABILITY TEST FOR TUMBLER SWITCHES, ROTAX, D5400 and D5500 SERIES

Introduction

1. The following tests may be applied to the switch before it is put into Service, or at any time when its serviceability is suspect.

Test equipment

2. The following test equipment is required:—

(1) Suitable 0–30A d.c. ammeter.

(2) Multimeter, Type 12889 (Ref. No. 5QP/17447) or equivalent.

(3) Insulation resistance tester, Type C (Ref. No. 5G/152) (for R.A.F.) or Type 0557/A.P.5047 (for R.N.).

Testing

Millivolt drop test

3. With the rated current of 20 amp. at 28 volts flowing through the contacts, the potential drop across pairs of contacts in the made position should not exceed 40 mV.

Insulation resistance test

4. The insulation resistance, measured with a 250-volt insulation resistance tester between all terminals not normally connected together, with the operating lever in all positions, should not be less than 0·5 megohm (for R.N.), or 5 megohms (for R.A.F.).

Appendix 1

LEADING PARTICULARS

Table 1

	D5400 series	D5500 series
Voltage	... 28 *d.c.*	28 *d.c.*
Maximum current rating ...	... 20 *amp.*	20 *amp.*
Number of poles	... 1	2
Fixing centres	... 1·58 *in.*	1·58 *in. by* 0·86 *in.*
Weight	... 2 *oz.*	3·75 *oz.* (4 *oz. for* D5511)
Overall dimensions		
Length	... 2·3 *in.*	1·964 *in.*
Width	... 0·76 *in.*	1·33 *in.*
Height	... 2·5 *in.*	2·468 *in.*

Table 2
Range of tumbler switches

Type	Ref. No.	Switch action
Basic types		
D5401	5CW/5826	S.P. changeover, centre "off"
D5402	5CW/5829	S.P. changeover, centre "off" (spring return, one position)
D5403	5CW/5822	S.P. changeover, centre "off" (spring return, both positions)
D5404	5CW/5825	S.P. "on–off"
D5405	5CW/5830	S.P. "on–off" (spring return to centre "off")
D5406	5CW/5823	S.P. changeover
D5407	5CW/5835	S.P. Changeover (spring return to centre "on")
D5501	5CW/5828	D.P. changeover, centre "off"
D5502	5CW/5831	D.P. changeover, centre "off" (spring return, one position)
D5503	5CW/5832	D.P. changeover, centre "off" (spring return, both positions)
D5504	5CW/5827	D.P. "on", centre "off"
D5505	5CW/5833	D.P. "on–off" (spring return to "off")
D5506	5CW/5824	D.P. changeover (without centre "off")
D5507	5CW/5834	D.P. changeover (spring return, to centre "on")
Variants		
D5431/1	5CW/5515	As D5401 but with pyramid knob
D5435	5CW/6765	As D5405 but with special knob for arrester hook
D5436	5CW/7209	As D5406 but with special knob for arrester hook
D5509	5CW/7019	D.P. three positions
D5511	5CW/	As D5501 but position A restricted
D5513	5CW/4838	As D5403 but with 5-pole plug
D5521	5CW/6348	As D5501 but with luminous tipped dolly

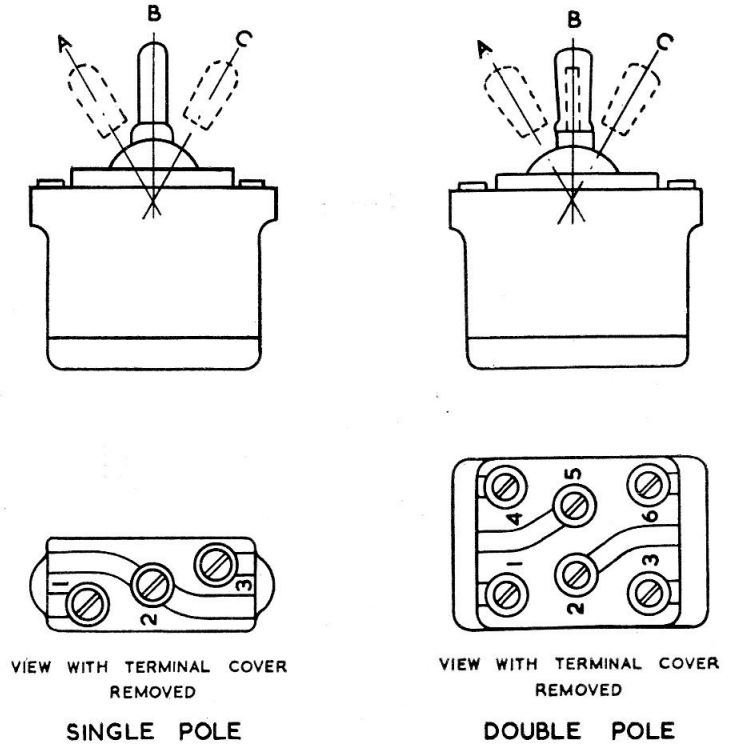

Fig. 1. View showing operating positions and terminal arrangement

Table 3
Details of switch operation

Type	Switch operation Pos. A	Pos. B	Pos. C
D5401, D5431	2–3	OFF	1–2
D5402	2–3	OFF	*1–2
D5403	*2–3	OFF	*1–2
D5404		OFF	1–2
D5405, D5435		OFF	*1–2
D5406, D5436	2–3		1–2
D5407		2–3	*1–2
D5501, D5521	2–3, 5–6	OFF	1–2, 4–5
D5502	2–3, 5–6	OFF	*1–2, 4–5
D5503	*2–3, 5–6	OFF	*1–2, 4–5
D5504		OFF	1–2, 4–5
D5505		OFF	*1–2, 4–5
D5506	2–3, 5–6		1–2, 4–5
D5507		2–3, 5–6	*1–2, 4–5
D5509	2–3, 5–6	4–5	1–2, 4–5
D5511	2–3, 5–6 (restricted)	OFF	1–2, 4–5
D5513	*B–C, E–D	OFF	*A–B, E–D

* Denotes spring return to position B (shown on fig. 1).

Appendix 2

SWITCH ACCESSORIES

The following accessories are available for use with the single- and double-pole switches list in Appendix 1.

	Ref. No.
Locking guards—	
3-position, single-pole ...	5CW/4222
Centre position only, single-pole	5CW/4320
One side only, single-pole ...	5CW/4860
3-position, double-pole ...	5CW/5765
Luminous tabs—	
Single-pole switches ...	5CW/4325
Double-pole switches ...	5CW/4326
Coupling bars—	
Two single-pole switches ...	5CW/4324
Three single-pole switches	5CW/4363
Four single-pole switches	5CW/4364
Marking transfers—	

Marking	*Ref. No.*
On	5CW/4327
Off	5CW/4328
High...	5CW/4329
Low	5CW/4330
Open	5CW/4331
Shut	5CW/4332
Test	5CW/4333
Manl	5CW/4334
Auto	5CW/4335
Trip	5CW/4336
Close	5CW/4337
Stop	5CW/4338
Run	5CW/4339
Up	5CW/4340
Down	5CW/4341
Hot	5CW/4342
Cold	5CW/4343
Dim	5CW/4344
Bright	5CW/4345
In	5CW/4346
Out	5CW/4347

Marking	*Ref. No.*
L.V.	5CW/4348
M.V.	5CW/4349
A	5CW/4350
B	5CW/4351
C	5CW/4352
D	5CW/4353
E	5CW/4354
F	5CW/4355
G	5CW/4356
H	5CW/4357
J	5CW/4358
K	5CW/4359
Port	5CW/4481
Stbd.	5CW/4482
Flt	5CW/4483
Grd	5CW/4484
Normal	5CW/4485
C/O	5CW/4486
Eng	5CW/4487
Neut...	5CW/4488
Half	5CW/4489
Full	5CW/4490
Oxy	5CW/5000
Steady	5CW/6727
Flash	5CW/6728
No. 1	5CW/6989
No. 2	5CW/6990
No. 3	5CW/6991
No. 4	5CW/6992
Reset	5CW/6993
P and S	5CW/6994
Increase	5CW/6995
Light	5CW/6996
Heavy	5CW/6997
Kill	5CW/6998
Rich	5CW/6999
Weak	5CW/7000
A.D.F.	5CW/7001
V.O.R.	5CW/7002
Decrease	5CW/7272

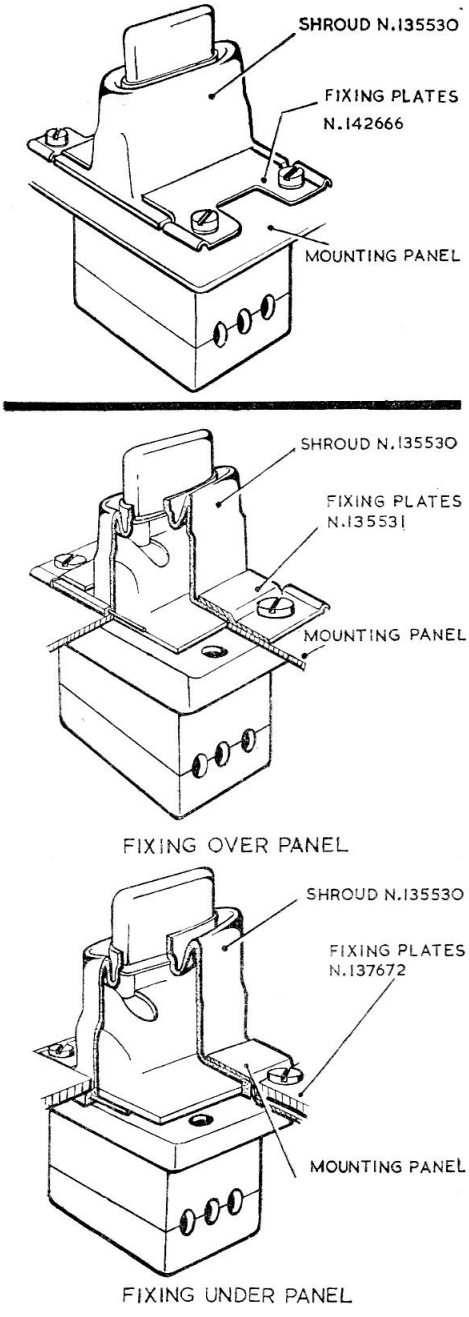

Fig. 1. D5500 shroud fixing detail

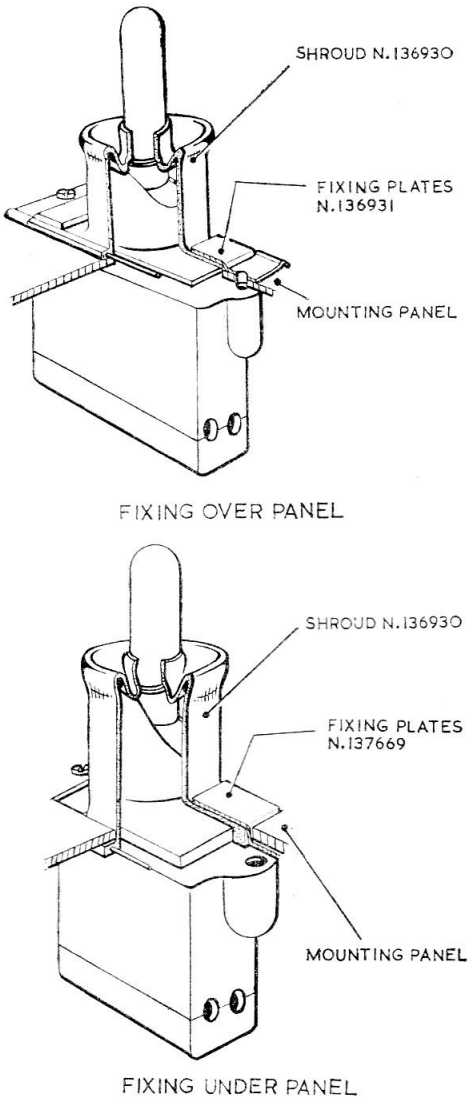

Fig. 2. D5400 shroud fixing detail

Table 1

Protective rubber shrouds and fixing plates

Description	Part No.	Ref. No.	Quantity per unit
Shroud, D5400 series	N136930	—	1
Shroud, D5500 series	N135530	5CW/6589	1
Fixing plate, D5400 series, fixing over panel	N136931	—	2
Fixing plate, D5400 series, fixing under panel	N137669	—	2
Fixing plate, D5500 series, fixing over panel	N135531/1	5CW/6590	2
Fixing plate, D5500 series, fixing under panel	N137672	—	2

Note . . .

A larger rectangular cut-out is required in the mounting panel in order to fix the shroud under the panel:—

*D*5400 *Fixing over panel: cut out* 1·260 *in.* × 0·670 *in.*
Fixing under panel: cut out 1·320 *in.* × 0·720 *in.*

*D*5500 *Fixing over panel: cut out* 1·260 *in.* × 1·190 *in.*
Fixing under panel: cut out 1·320 *in.* × 1·260 *in.*