Chapter 71

MANUALLY OPERATED SWITCHES, ROTAX, D7300 SERIES

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Introduction

1. Type D7300 series push-pull switches are designed primarily for the control of propeller feathering circuits. They are arranged to give two operating positions, with neutral in central. Hold-in is magnetic, and may be provided for either or both "push" or "pull" positions. A red warning lamp is located in the button; this lamp will light irrespective of the position of the switch, provided that a supply is connected across the lamp terminals.

DESCRIPTION

2. A typical switch is illustrated in fig. 1. The moulded

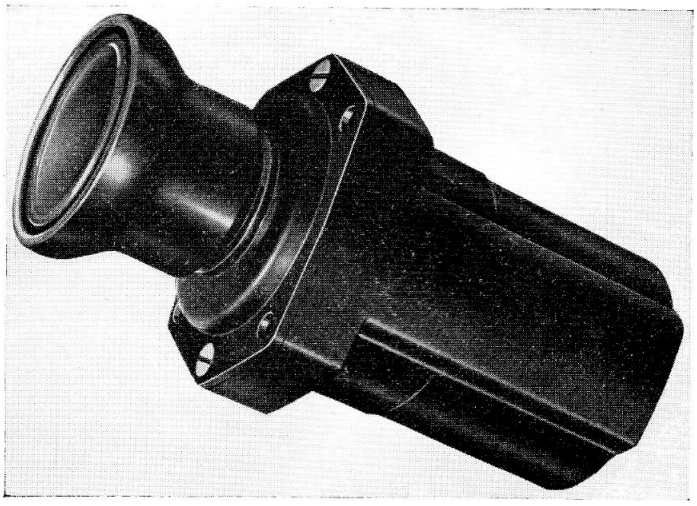

Fig. 1. A typical switch of the D7300 series

body holds a solenoid assembly in one end and a number of spring-mounted contacts on a carrier set round the inside of an inner spacer sleeve at the other. On the contact end of the spacer sleeve is mounted a terminal moulding carrying eight terminals, which are connected to the contacts.

3. Through the solenoid and the contact carrier there runs the lamp assembly, with the lamp projecting outside the body into the knob. Round the lamp assembly is the plunger assembly, carrying the armature, on the outer end of which is mounted the push-button and shroud.

4. The button is provided with a red translucent window to show the light from the lamp. The general arrangement is completed with a cover assembly at the button end which includes a bearing to carry the plunger, and a cover and connector assembly at the other end which covers the terminal moulding and provides a housing for the cable connector.

Operation

5. In general, these switches are arranged to give contact with one set of terminals when the button is pushed, and another when the shroud is pulled. Hold-on is magnetic; in some instances it operates on both positions, in others, only when the button is pushed. In the latter type, the switch should not hold-on with the coil energized when the shroud is pulled out and released. In both types the switch must return to centre position, when the coil is de-energized. Hold-on must be arranged to keep the switch in the operated position, when the coil voltage reduces to at least 12 volts. Drop-out must occur at 2 volts minimum.

INSTALLATION

6. The switches are intended for panel mounting, and a flange with four bolt holes is provided on the push-button end of the body. Electrical connections are made through the connector on the cover plate at the other end of the switch.

SERVICING

7. Little servicing is necessary other than periodic inspection for signs of damage, and to ensure that all contact faces are free from burns and pitting. Lamps (28V, 3·5W) will require replacement from time to time, and the window should be kept clean. Switch action should be free without being loose.

◀ Testing

8. If the serviceability of the switch is suspect, it may be tested as laid down in Appendix A. ▶

Appendix A

STANDARD SERVICEABILITY TEST FOR SWITCHES, MANUALLY OPERATED, ROTAX, D7300 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) Bridge megger tester, Type B (Ref. No. 5G/1708).

(2) Testmeter, Type F (Ref. No. 5QP/1) or equivalent.

(3) Insulation resistance tester, Type C (Ref. No. 5G/152).

Testing

Coil resistance test

3. The coil resistance, measured at 20 deg. C, should lie between 24·3 ohms and 29·7 ohms.

Note . . .

It is important that the coil should not be left in circuit for longer than 90 seconds.

Operation

4. Check the switch for correct operation as follows. With the switch in the position indicated below, and the coil energized, the switch must remain in its operated position when the coil voltage is reduced to at least 12 volts. Drop-out must occur at 2 volts minimum.

Type	*Switch position for hold-in*
D7308/1	Button depressed
D7309	Button shroud extended

The switch must not hold in when operated to the other position.

5. With a 28-volt d.c. supply on terminals L1 and L2, the lamp should light in all positions of the switch.

Insulation resistance test

6. The insulation resistance, measured with a 250-volt insulation resistance tester between the following points, should not be less than 5 megohms.

(1) *Type D*7308/1.—(a) Terminal L1 and frame
Terminal R and frame
Terminal B and frame
Terminal L2 and frame
Terminal + and frame

(b) With the switch in the normal position—
Terminal + and terminal R
Terminal + and terminal S
Terminal + and terminal C+
Terminal R and terminal S
Terminal R and terminal C+
Terminal R and terminal B
Terminal B and terminal C+
Terminal B and terminal +
Terminal B and terminal S
Terminal S and terminal C+

(c) With the centre button depressed—

Terminal + and terminal B
Terminal B and terminal S
Terminal B and terminal C+

(d) With the button shroud extended—

Terminal + and terminal S
Terminal S and terminal C+
Terminal S and terminal B
Terminal S and terminal R

(2) *Type D*7309.—(a) Terminal R and frame

Terminal S and frame
Terminal B and frame
Terminal + and frame
Terminal L1 and frame

(b) With the switch in the normal position—

Terminal + and terminal R
Terminal + and terminal S
Terminal + and terminal C+
Terminal R and terminal S
Terminal R and terminal C+
Terminal C+ and terminal S
Terminal + and terminal B
Terminal B and terminal S
Terminal B and terminal C+
Terminal R and terminal B

(c) With the centre button depressed—

Terminal + and terminal B

(d) With the button shroud extended—

Terminal + and terminal R
Terminal + and terminal S
Terminal C+ and terminal S

Appendix 1

SWITCH, MANUALLY OPERATED, ROTAX, TYPE D7308/1

LEADING PARTICULARS

Switch, manually operated, Type D7308/1	**Ref. No. 5CW/5121**
Voltage	29 *volts d.c.*
Minimum hold-in volts	12 *volts d.c.*
Coil resistance (at 20 deg. C)	26 *ohms*
Current consumption	1·1 *amp.*
Contact rating	5 *amp.*
Overall length	3 *in.* (*approx.*)
Button travel	0·218 *in.* (*max.*)
Shroud extension	0·437 *in.* (*max.*)
Weight	1 *lb.* 3 *oz.*

1. The manually operated switch, Type D7308/1, is generally similar to that described and illustrated in the main chapter. It is provided with magnetic hold-in to operate in the IN position only. A circuit diagram is given in fig. 1; the contacts and plunger assembly are arranged so that the following connections are made:—

(1) With button pressed in, circuit is made between

+ and R
+ and S
R and S
R and C+
S and C+
+ and C+
B and C+
+ and B
+ and C+
R and +
R and B
R and C+

(2) With button shroud extended, circuit is made between

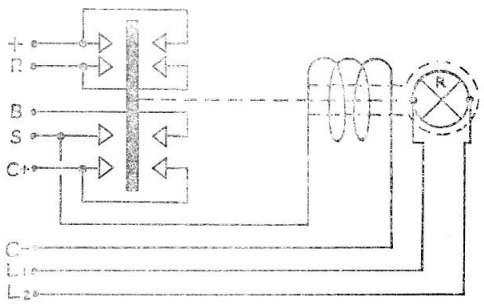

Fig. 1. Diagram of internal connections

Appendix 2

SWITCH, MANUALLY OPERATED, ROTAX, TYPE D7309

LEADING PARTICULARS

Switch, manually operated, Type D7309	**Ref. No. 5CW/6499**
Voltage	29 *volts d.c.*
Minimum hold-in volts	12 *volts d.c.*
Coil resistance (at 20 deg. C)	... 26 *ohms*
Current consumption	... 1·1 *amp.*
Contact rating	... 5 *amp.*
Overall length	3 *in.* (*approx.*)
Button travel	0·218 *in.* (*max.*)
Weight	... 1 *lb.* 3 *oz.*
Shroud extension	0·437 *in.* (*max.*)

1. The manually operated switch, Type D7309, is generally similar to that described and illustrated in the main chapter. It is provided with magnetic hold-in to operate in the OUT position only. A circuit diagram is given in fig. 1; the contacts and plunger assembly are arranged so that the following connections are made:—

(1) With button pressed in, circuit is made between terminals

\+ and R
\+ and S
R and S
R and C+
S and C+
\+ and C+

(2) With button shroud extended, circuit is made between terminals

B and C+
\+ and B
\+ and C+

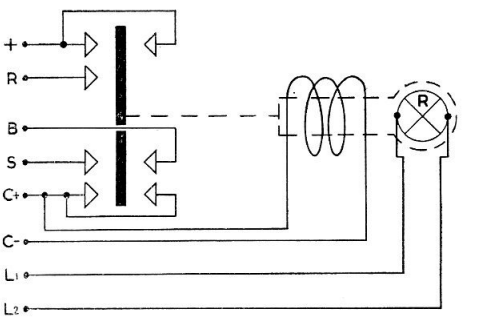

Fig. 1. Diagram of internal connections