Chapter 61

MANUALLY-OPERATED SWITCH, TYPE SW.4000/2

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LEADING PARTICULARS

*Switch, battery change-over, Type SW.*4000/2	*Ref. No.* 5*CW*/8040
Nominal voltage	112 *V. d.c.*
Nominal current	100 *amp.*
Overall dimensions	$5\frac{3}{4}$ *in. square*
Weight of unit	7 *lb.*

Introduction

1. The static condenser, type SW.4000/2 switch is specifically designed for use as a battery change-over switch. It is a two-position, rotary-action switch, comprising six copper knife contact assemblies, mounted on a common shaft.

DESCRIPTION

2. Four copper forked-contact assemblies are spaced at 90 degree intervals around each centre contact assembly and connections to these stationary contacts are made via flexible links which are soldered on to certain of the contacts, or, on $\frac{5}{16}$ in. B.S.F. terminal studs fitted with Nyloc nuts.

3. The contacts are housed in circular moulded sections which fit together and, with the addition of endplates, from the body of the switch. The stud and contact assemblies are free when the moulded plates are separated, but the link assembly contacts are secured to the plates with 6 B.A. screws. Four 0 B.A. bolts pass through the length of the body and are fitted with nuts and tab washers to secure and lock the sections together.

4. The squared drive shaft is located in the centre of the assembly and is housed in bronze bushes moulded into the endplates. The shaft protrudes through the square endplate at the top of the switch to permit engagement with the operating mechanism; this endplate is drilled at each corner to accommodate mounting bolts.

5. An aluminium index plate is attached to the round endplate at the base of the switch and indicates the position of the moving contacts: CHARGE or INTERNAL START. Each section carries an alphabetical reference letter and the terminal banks are numbered (fig. 1).

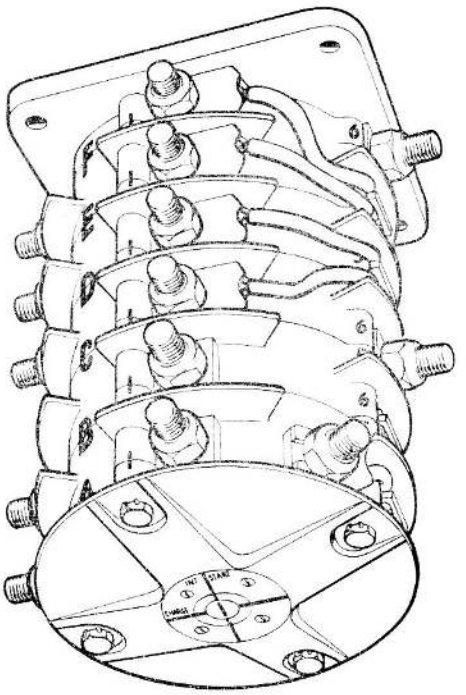

Fig. 1. **Schematic view of switch**

6. Interconnection is necessary to obtain the conditions required in the battery change-over circuit and this is achieved by means of the ten flexible link assemblies and one stiff link fitted to the terminal banks. Two additional terminal studs are linked to contacts 5-6 on section 'A' to accommodate the aircraft cables to those contacts. A schematic view of the switch is shown in fig. 1.

Operation

7. The two switch positions are 90 degrees apart and are obtained by rotation of the squared drive shaft in the required direction. The centre contact assemblies rotate with the shaft and engage in the appropriate forked contact assemblies. A stop plate is silver-soldered on the shaft and prevents override.

8. The bottom end of the shaft is grooved and, in conjunction with the index plate at the base of the switch, indicates the position of the contacts and permits correct engagement of the drive shaft in relation to the control lever position.

9. Switch section 'A' is used in the battery control circuit and the centre contact assembly is of different construction to those in other sections. Consequently during change-over, contacts 2-3 and 5-6 in section 'A' "break" before similar contacts in other sections are broken, and "make" after the other contacts are made. A contact arrangement of the switch is shown in fig. 2.

10. Control of the switch is affected by means of a cable and pulley assembly fitted to the drive shaft, and an operating lever located in the flight compartment.

INSTALLATION

11. The switch is held together by two endplate assemblies (fig. 1); the square endplate being utilized for mounting purposes on installation and is drilled with four 0·257 in. holes on 5·5 in. P.C.D.

SERVICING

12. Little servicing is possible "in situ" except for ensuring correct switch operation and an inspection for signs of corrosion, pitting of contacts and cracks; the latter defect may most likely occur at the corners of the mounting endplate. If defective a new endplate assembly should be fitted; this can be effcted without renewing the complete switch.

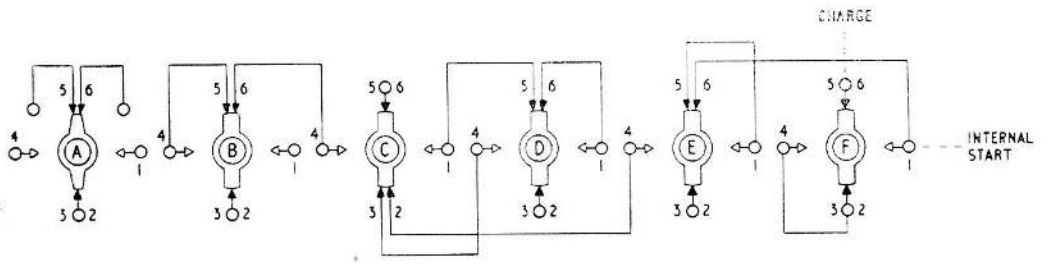

Fig. 2. **Contact arrangement**

TESTING

Continuity and non-contact test

13. With the links removed, and using a 500V. insulation resistance tester make the following tests:—

(1) Operate the switch from 'CHARGE' to 'INTERNAL START' and check that continuity between contacts 2-3 and 5-6 on section 'A' is broken, before continuity between similar contacts on each of the other sections is broken.

(2) Operate the switch from 'INTERNAL START' to 'CHARGE' and ensure that continuity between contacts 2-3 and 5-6 on section 'A' is made, after continuity between similar contacts on each of the other sections has been made.

Millivolt drop test

14. Using a suitable Avometer, set the switch to 'CHARGE' and check that:—

(1) The volt-drop measured between contacts 2-3 and 5-6 on section F does not exceed 10 millivolts at 100 amp. d.c.

(2) The volt-drop measured between contacts 5-6 and between contacts 5-6 and 2-3 on sections A, B, D and E does not exceed 50 millivolts at 100 amp. d.c.

(3) The volt-drop measured between contacts 2-3 and between contacts 2-3 and 5-6 on section C does not exceed 50 millivolts at 100 amp. d.c.

15. Set the switch to 'INTERNAL START' and check that:—

(1) The volt-drop measured between contacts 1-4 on sections B, C, D, E and F does not exceed 10 millivolts at 100 amp.

(2) The volt-drop measured between contacts 1-4 on section A does not exceed 50 millivolts at 100 amp. d.c.

Insulation resistance test

16. Using a 500 Volt insulation resistance tester, and with the switch in the 'INTERNAL START' position, measure the insulation resistance between the following points.

(1) Contacts 5-6 on sections A, B, D and E, and on contacts 5-6 between sections.

(2) Contacts 2-3 on section C, and on contacts 2-3 between sections.

(3) Each connector on terminal bank No. 1.

(4) Each connector on terminal bank No. 4.

(5) Each connector and the drive shaft.

17. All individual readings should not be less than 5 megohm (R.A.F.) and 0·5 megohm (R.N.).