Chapter 47

MAGNETIC SWITCH, TYPE 31A

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Magnetic switch, Type 31A	*Stores Ref. 5CW/*
Operating voltage	*28 volts d.c.*
Minimum pull-in voltage	*18 volts d.c.*
Drop-out voltage	*4 to 10 volts d.c.*
Current rating—	
Main contacts	*50 amp. at 115 volts a.c.*
Auxiliary contacts	*5 amp. at 28 volts d.c.*
Initial operating current	*2·5 amp.*
Hold-in current	*0·25 amp.*
Coil resistance at 20 deg. C.—	
Operating coil	*5 ohms ± 5 per cent*
Hold-in coil	*40 ohms ± 8 per cent.*
Ambient temperature range	*—70 deg. C. to + 85 deg. C.*
Overall length	*4·25 in.*
Diameter of body	*2·75 in.*
Mounting flange	*3 in. square*
Weight	*2·75 lb. (approx.)*

Introduction

1. The magnetic switch, Type 31A (*fig.* 1) is a sealed, double-pole change-over unit originally designed for use on aircraft in conjunction with fuel pumps.

2. The main change-over contacts can carry up to 50 amp. at 115 volts a.c. continuously. Two pairs of auxiliary change-over contacts are fitted, rated at 5 amp. at 28 volts d.c., which can be used for subsidiary indicator or control switching.

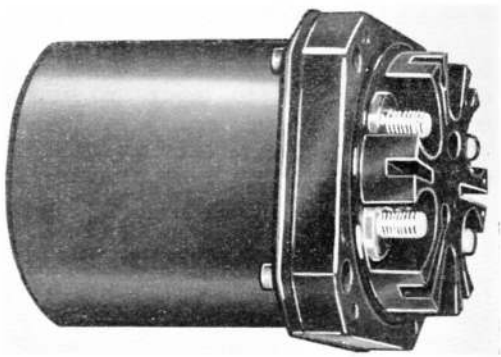

Fig. 1. Magnetic switch, Type 31A

(A.L.97, Feb. 57)

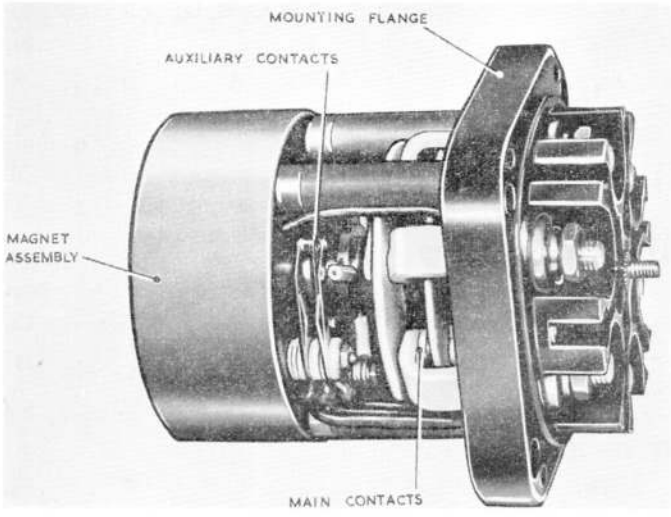

Fig. 2. Switch with cover removed

DESCRIPTION

3. A view of the switch with the cover removed is given in fig. 2. The mechanism incorporates three main sub-assemblies, the terminal block and fixed contact assembly, the moving contact assembly, and the magnet assembly. Since the mounting flange is an integral part of the terminal block, all the other assemblies are mounted on it.

4. The magnet assembly is of the solenoid type, with a conical faced plunger, and is mounted on the terminal block with four pillars. The fixed and moving contact assemblies occupy the intervening space.

5. The main moving contacts, which are of the double break type, are mounted on two strips disposed on either side of fixed contacts, so that movement of the armature causes the shorting of the make or the break contacts.

6. In the operated position, an auxiliary pair of contacts opens to insert an economy winding into the coil circuit, thus reducing the holding current consumption. The economy contacts and the auxiliary change-over contacts are mounted on the magnet assembly.

7. The case is an aluminium spinning, with a square flange at the open end for fixing on to the terminal block. Sealing between these two parts is achieved by a silicone rubber gasket.

8. Electrical connection is made to six main terminals arranged around the outside of the circular terminal plate. These are $\frac{1}{4}$ in. U.N.F. studs suitable for one Prenal 50 lug and one Pren 24 lug.

9. Six auxiliary terminals are arranged in a circle inside the main terminals, with the shrouded lead-outs running between the latter. These are combined 4 B.A. screw and washer terminations, for connection to the auxiliary contacts. The two coil terminals are located with the main terminals A, F, C, and D, and are fitted with special 8 B.A. combined screw and washer terminations.

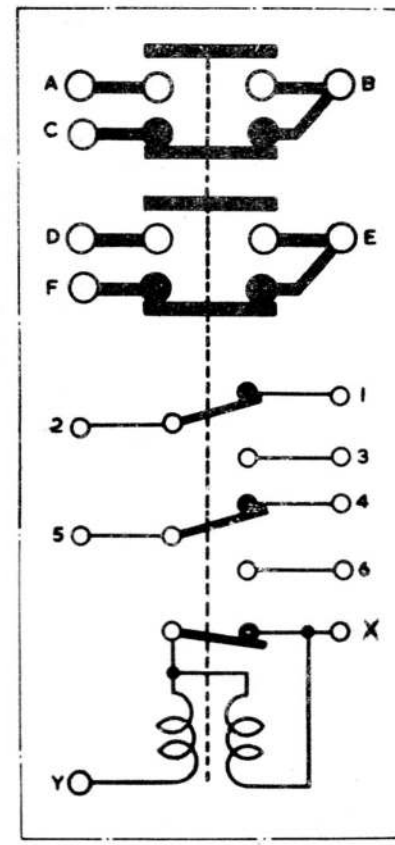

Fig. 3. Circuit diagram

10. A circuit diagram of the connections is given in fig. 3, and the terminal arrangement is shown in fig. 4. All terminals are shrouded, and the terminal cover carries a diagram of the terminal connections. Correct orientation of the cover is indicated by two white dots on the cover, which must be aligned with corresponding dots on the terminal block.

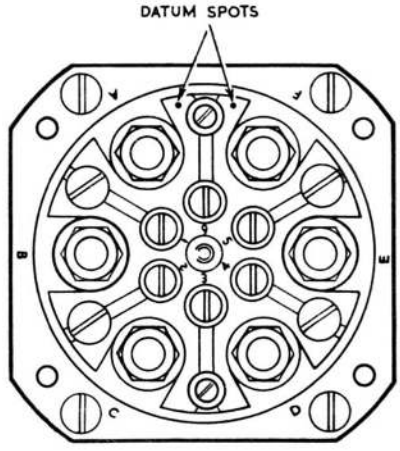

Fig. 4. Terminal arrangement

INSTALLATION

11. The switch may be mounted in any plane in central aircraft regions. It is fixed by means of the mounting flange by four 4 B.A. screws.

SERVICING

12. Since this switch is a sealed unit, the cover should not be removed. The only permissible servicing, is a general inspection for freedom from damage and security of connections.

Testing

13. The switch may be tested for correct functioning in accordance with the operating figures given under Leading Particulars.

14. The insulation resistance between all metallic parts not electrically connected should be tested with a standard 250-volt insulation resistance tester. The reading should not be less than 20 megohms.