Chapter 14

ELECTRO-MAGNETIC RELAY, TYPE F1301

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Type F1301	Stores Ref. 5UC/4936
Length	4·5 in.
Width	4·125 in.
Height	3·5 in.
Weight	1 lb. 12 oz.
Voltage	24
Current	20 amp.
Rating	15 min.
Coil resistance	40 ohms
Pull-in voltage for each coil	9 to 14 volts
Drop-out voltage	Not greater than 5 volts
Time delay at 28 volts	approximately 5·5 sec.
Normally-open contacts	Gap to be not less than 0·068 in.

Introduction

1. This type of electro-magnetic reversing relay provides remote control for certain actuators, e.g. actuators in the cabin hood circuit of certain aircraft. A circuit diagram for a typical installation is given in fig. 3. For details of individual installations in particular aircraft, reference should be made to the appropriate aircraft handbook.

DESCRIPTION

2. The electro-magnetic relay, Type F1301, incorporates a time delay switch, and is intended for use on aircraft with pressurized cabins. It is designed for operation from a 24-volt d.c. supply, where the current does not exceed 20 amp.

3. The relay unit (*fig.* 1) incorporates two electro-magnetic relays mounted on a Bakelite base plate, each relay having a Bakelite cover secured in position with a U-shaped spring. The internal connections are brought out to an eight-way terminal block at one end. One relay coil is energized by a positive feed through terminal SW2 when the OPEN push-switch is operated, and the other relay

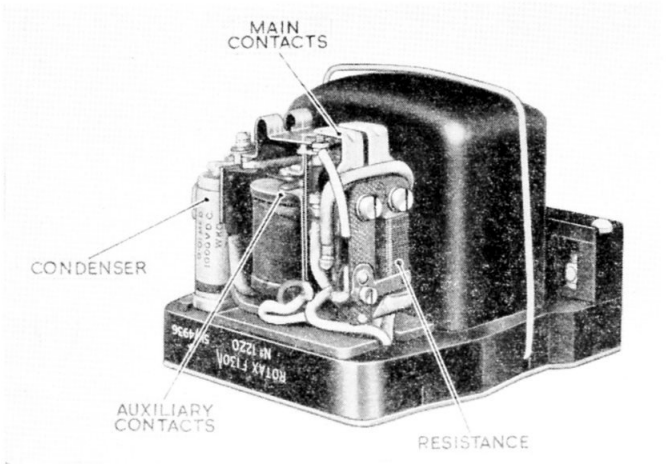

Fig. 1. Relay showing auxiliary contacts

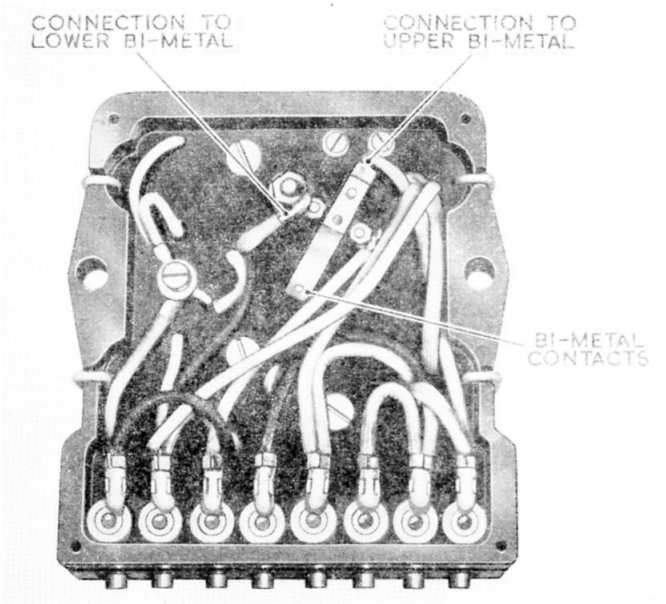

Fig. 2. View of underside of relay

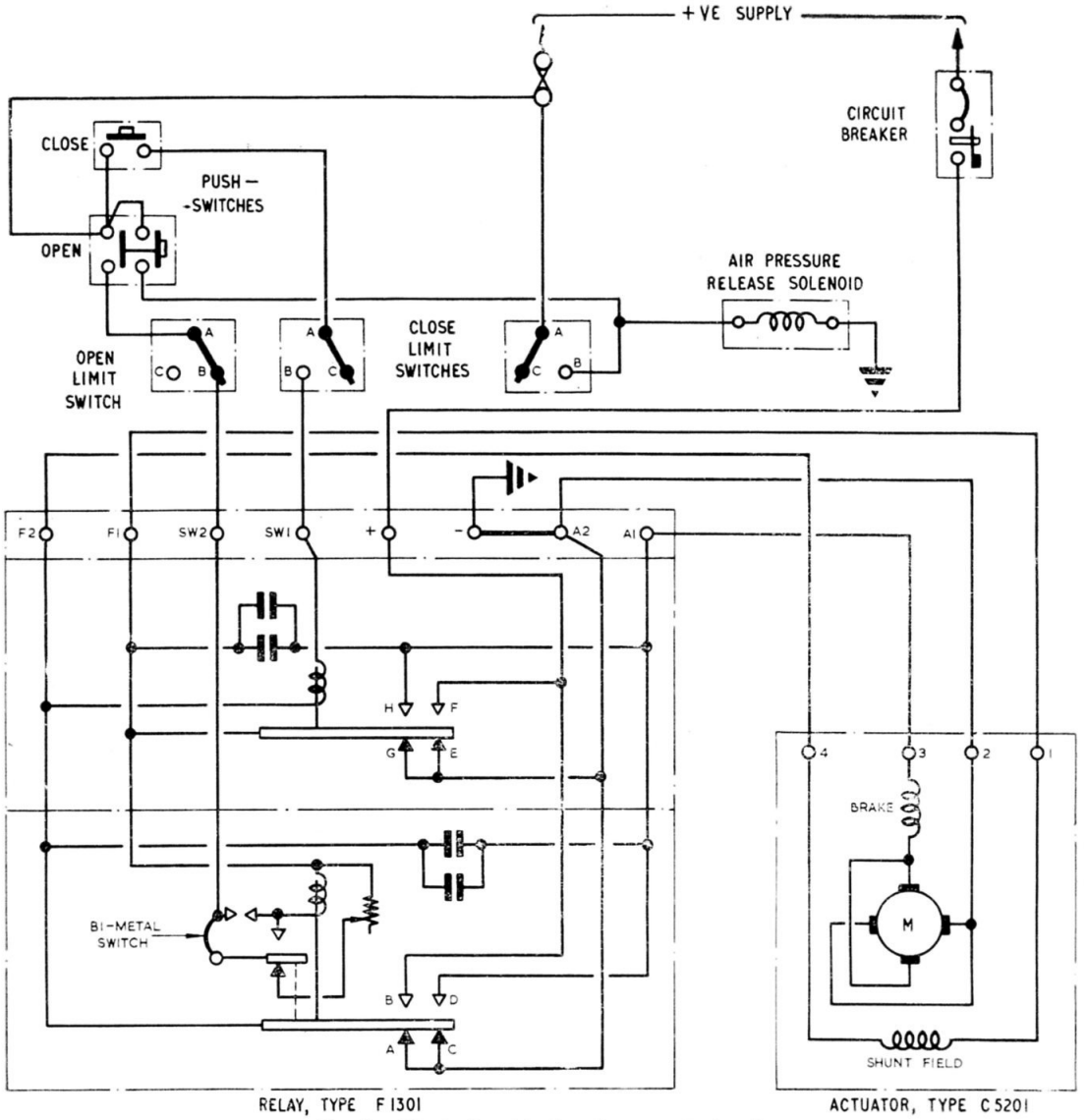

Fig. 3. Typical cabin hood control circuit

coil through terminal SW1 when the CLOSE push-switch is operated; this passes a current through the actuator field in the reverse direction. A circuit diagram is given in fig. 3.

4. Each relay has two pairs of change-over contacts. The moving contact, which in the normal or unoperated position makes with the upper fixed contact, is coupled with the armature, so that when the relay coil is energized, the armature moves downwards, and the moving contact makes with the lower fixed contact. When the relay coil is de-energized, the armature is returned to the unoperated position by spring tension. Two condensers are connected in parallel in each relay assembly.

5. The relay assembly remote from the terminal block also incorporates a resistance element and auxiliary contacts which can be seen in fig. 1, and is connected through a pair of bi-metal contacts fitted under the base (*fig.* 2) which gives the requisite time delay before the main contacts close. A circuit diagram is given in fig. 3, which shows the relay unit in conjunction with cabin hood actuator, Type C5201, as used in certain aircraft with pressurized cabins.

(A.L.74, July, 56)

6. When a positive feed is applied through terminal SW2, current flows through the bi-metal element, the normally-closed auxiliary contact, the resistance, and the normally-closed contacts of the other relay. After the time delay determined by the variable resistance, the bi-metal contacts close, which passes current through the relay coil. The movement of the armature operates the main contacts to energize the actuator, and also operates the auxiliary contacts, which breaks the circuit to the resistance, but keeps the bi-metal in circuit.

INSTALLATION

7. After the relay has been fitted into the aircraft, and using a 24-v. supply, the time delay should be checked by means of a stop watch. Should the time delay be in excess of 9·5 seconds, the following procedure should be adopted.

(1) Slacken the resistance adjusting arm locking screw, and move the arm away from the base of the relay by approximately $\frac{1}{16}$ in. of its contact point on the resistance. Tighten the screw and check the delay period. This should be between 8·5 and 9·5 seconds.

(2) Should further adjustment be found necessary, a cooling period of at least 15 minutes should be allowed before this is undertaken.

Note . . .

Movement of the arm towards the relay base will increase the time delay.

SERVICING

8. Little or no servicing should be necessary with this type of relay, beyond periodic inspection of the contacts and a functional check. Various data, including coil resistance values, are given under Leading Particulars.

Checking the time delay

9. When the relay is tested on a supply of 24 volts obtained from a ground supply or the aircraft battery, the time delay should be approximately 9·2 seconds. Adjust as necessary as described in para. 7. A further check should then be made in the aircraft under take-off conditions, using the aircraft regulated supply of 28 volts, when a reading of approximately 5·5 seconds should be obtained.

10. Fig. 4 shows the time delay/supply volts curve for a typical F.1301 relay. Whilst this might not necessarily be accurate for another F.1301 unit, it should serve as a guide when checking a particular unit.

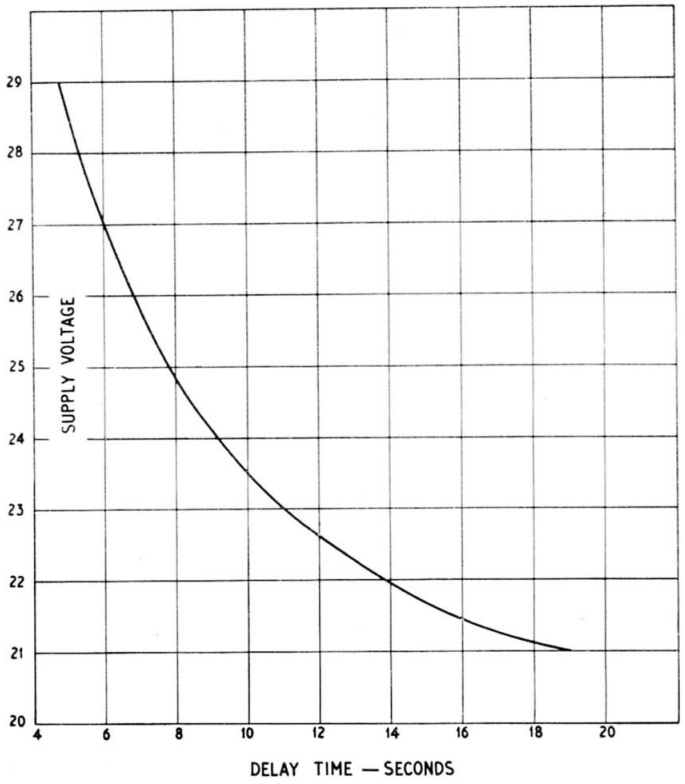

Fig. 4. Typical time delay/supply voltage curve