Chapter 3

MAGNETIC RELAY SWITCH, TYPE P1

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Switch, magnetic relay, Type P.1	Stores Ref. 5CW/1722
Voltage	
Contacts	28-V. d.c.
Coil	28-V. d.c.
Current rating of contacts	20 amperes
Coil resistance at 20 deg. C.	245 ohm. ±10 per cent
Minimum operating voltage	14 to 16-V. d.c.
Maximum drop-out voltage	10-V. d.c.
Length	4·062 in.
Width	1·450 in.
Height	1·906 in.
Weight	7·5 oz. approx.

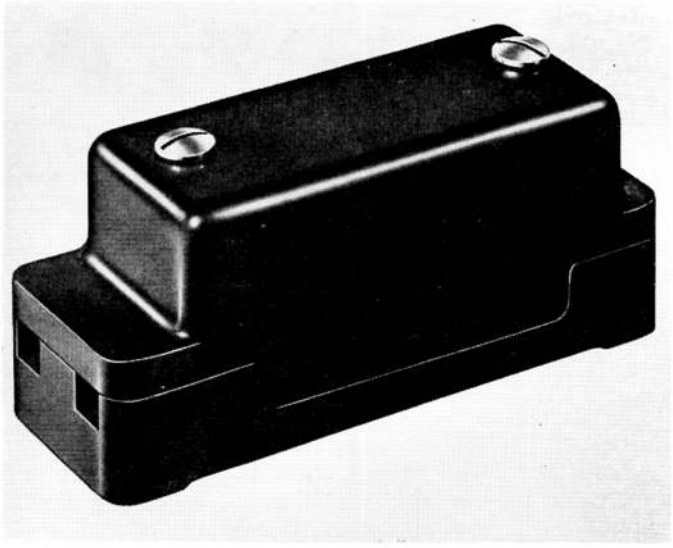

Fig. 1. Type P1 (Rotax F1504) relay switch

Introduction

1. Type P1 magnetic switch has one pair of normally open contacts which close when the operating coil is energized. The contacts are continuously rated for currents up to 20 amperes in 28-V. circuits. These relays (Rotax F1504/1 is a typical example) are produced by more than one manufacturer. As a result, individual switches, although interchangeable may be slightly different in internal design.

DESCRIPTION

2. A solenoid coil, having a soft iron bobbin core, is secured to a solid moulded base by means of a stud which projects from the bottom of the core. A

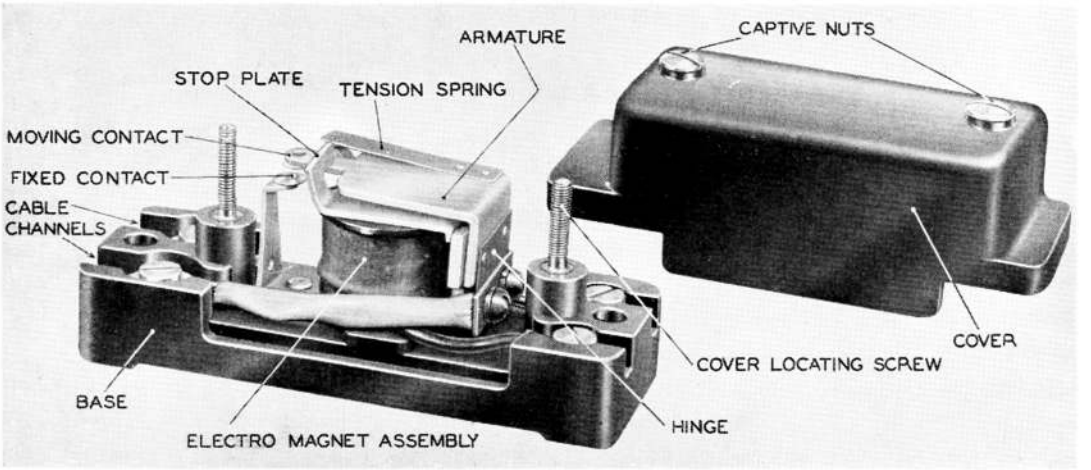

Fig. 2. View of relay, with cover removed

right-angled magnet frame is fitted between the coil and the base and stands at one side of the coil. An armature, carrying a single contact, is situated above the coil and has a portion set at right-angles, overlapping the magnet frame to which it is attached by a flexible hinge plate. A leaf spring is attached to the armature and bears on a stop plate fitted to the top of the bobbin core; it returns the armature to its normal (contacts open) position when the coil is de-energized. A fixed contact, which mates with the armature contact, is carried by a bracket riveted to the base. The circuit terminals (3, 4) are at one end of the base and the coil terminals (1, 2) at the other. The internal connections of the contacts circuit are made directly through the armature and fixed contact bracket. The relay (including the terminals) is enclosed by a moulded cover secured by two captive screws.

Operation

3. When the coil is energized, the armature is pulled down towards the solenoid and the contact on the armature makes with the contact on the bracket, so that the circuit between terminals 3 and 4 is completed. When the coil is de-energized the leaf spring returns the armature to its normal position and the circuit is broken.

INSTALLATION

4. A 0·156 in. diameter through mounting hole is situated between the two cable entries at each end of the relay base. Each hole is counter bored 0·260 in. diameter to a depth of 0·125 in. at the top and 0·300 in. diameter on the underside. The two holes are spaced 3·562 in. at centres. It is necessary to remove the cover to mount the unit.

5. The terminals are 4 B.A. combined screw and washer terminations. Each cable has a separate entry.

SERVICING

6. Examine the unit to ensure that it is in good condition and has not suffered damage. Remove the cover and examine the contacts for burns or signs of welding.

7. Measure the gap between the fully opened contacts. This should be 0·600 in. $\pm$ 0·002 in. Also measure the gap between core and armature with the contacts closed. This should be 0·005 and 0·010 in.

8. Measure the resistance of the operating coil, between terminals 1 and 2. The reading obtained should be 255 ohms $\pm$ 10 per cent.

Millivolt drop test

9. With the coil energized, pass a current of 20 amperes through the switch contacts and measure the potential drop across the terminals (3 and 4). A reading not exceeding 100 millivolt should be obtained.

Insulation resistance tests

10. Measure the insulation resistance between the following points, using a 250-V. insulation resistance tester. A reading of at least 50,000 ohm. should be obtained in each test.

(1) Coil de-energized:—
  (*a*) Terminal 1 and terminal 3
  (*b*) Terminal 1 and terminal 4
  (*c*) Terminal 1 and frame
  (*d*) Terminal 3 and terminal 4

(2) Coil energized:—
  (*a*) Terminal 3 and frame.

Note . . .

The value of insulation resistance given in para. 10 applies to units being tested under normal workshop conditions. Due allowances should be made for the climatic conditions of the locality and those of the aircraft servicing area or servicing point where the tests are being applied. In particularly damp or humid climates the readings obtained may be low enough to give apparently sufficient reason for rejection, and in these instances, discretion should be exercised.

Weatherproofing

11. If necessary, the relay switch may be weatherproofed as follows. The cover should be sealed to the base of the switch with insulating varnish (Stores Ref. 33B/484), and the captive nuts securing the cover should be treated at the same time. P.I.C., No. 2 (Stores Ref. 33C/887) should then be built up round the cable entries at both ends of the switch.

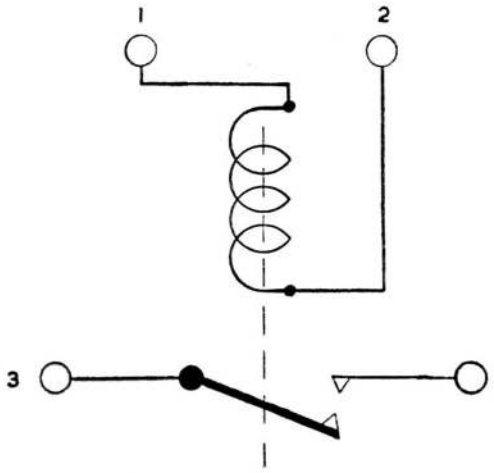

Fig. 3. Diagram of internal connections