

Chapter 17

FIRE DETECTION RELAY BOX, TYPE D1250

LIST OF CONTENTS

| | Para. | | Para. |
|---------------------------------------|-------|------------------------------------|-------|
| <i>Introduction</i> | 1 | <i>Test relay energized</i> | 8 |
| Description | | Servicing | |
| <i>General</i> | 2 | <i>General</i> | 9 |
| Operation | | <i>Testing</i> | 10 |
| <i>Test relay un-energized</i> | 5 | | |

LIST OF ILLUSTRATIONS

| | Fig. |
|-------------------------------------|------|
| <i>Relay box, Type D1250</i> | 1 |
| <i>Contents of relay box</i> | 2 |
| <i>Circuit diagram...</i> | 3 |

LIST OF APPENDICES

| | App. |
|---|------|
| ◀ <i>Standard serviceability test for fire detection relay box, Type D1250 (R.N.)</i> ... | A ▶ |

LEADING PARTICULARS

| | |
|--|-------------------|
| Relay box, Type D1250 | Ref. No. 5CZ/5279 |
| <i>Length</i> | 7.38in. |
| <i>Height</i> | 4.85in. |
| <i>Width</i> | 4.8in. |
| <i>Weight</i> | 2lb 12oz. |
| <i>Relay operating current (Type GD relays)</i> | 9-16mA |
| <i>Relay release current (Type GD relays)</i> | 2-6mA |
| <i>Relay operating current (Type JD relays)</i> | 13-17mA |
| <i>Relay release current (Type JD relays)</i> | 6-10mA |

Introduction

1. The relay box, Type D1250, is a 2-unit relay box for use in the Graviner continuous wire type of fire detection system. The relay box is fitted with a change-over relay to permit the test of both circuits with a remote test switch. Only the relay box is dealt with in this chapter and for general information on

the system reference should be made to A.P. 4343, Vol. 1, Section 22, Chapter 2, and for details on the sensing element and accessories in chapter 2 of this section. For information on the installation as a whole, reference may be made to A.P.957C, Vol. 1, Part 1, Section 3, Chapter 1.

RESTRICTED

DESCRIPTION

General

2. The relay box, shown in fig. 1, is hermetically sealed and comprises two light-alloy pressings. These pressings are similar in size and shape, the top half serving as a lid and the bottom half being the portion secured to the aircraft. The mounting brackets are fitted to the bottom half of the box and are drilled to take $\frac{1}{4}$ in. diameter fixing bolts. The two halves of the box are secured together by thirty-two 4 B.A. screws and nuts which ensure that an even pressure exists around the entire length of the sealing flanges.

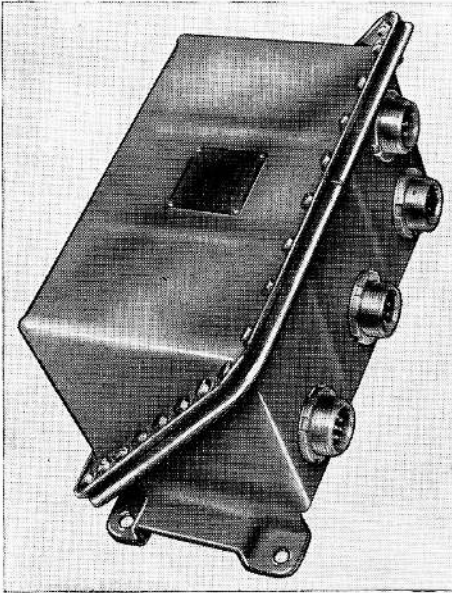


Fig. 1. Relay box, Type D1250

3. The components of the relay box, which are shown in fig. 2 are mounted on a light-alloy chassis which is screwed to the lower half of the box. These components form virtually two complete and separate single way units, there being two transformers, two full-wave rectifiers, two warning relays, and in early boxes two 330 ohm resistors. One double-pole change-over relay serves as a test relay for both units, no provision being made to test each circuit individually. The transformer is a step-down transformer with a tapped primary winding for use on 115V, or 26V, 400 c/s a.c. supply. The relays used in the boxes are of the GD or JD type, which are identical in operation but differ slightly in manufacturing details, and coil and contact rating. The Type GD relays are fitted to control units of the following serial numbers:—

100 to 103

The 330 ohm resistor, which was intended to compensate for the reduced circuit impedance on operation of the test switch, is deleted on relay box Serial No. 254 and all subsequent units.

4. One 3-pole and three 6-pole plugs are mounted on the rear face of the box. Viewing from the back they are arranged as follows:—

(1) Lower left-hand corner. A 6-pole plug which takes the 400 c/s, a.c. supply of 115 volts or the alternative level of 26 volts. Pins A and B being used for the higher voltage and pins B and C for the lower voltage. The remaining pins are spare.

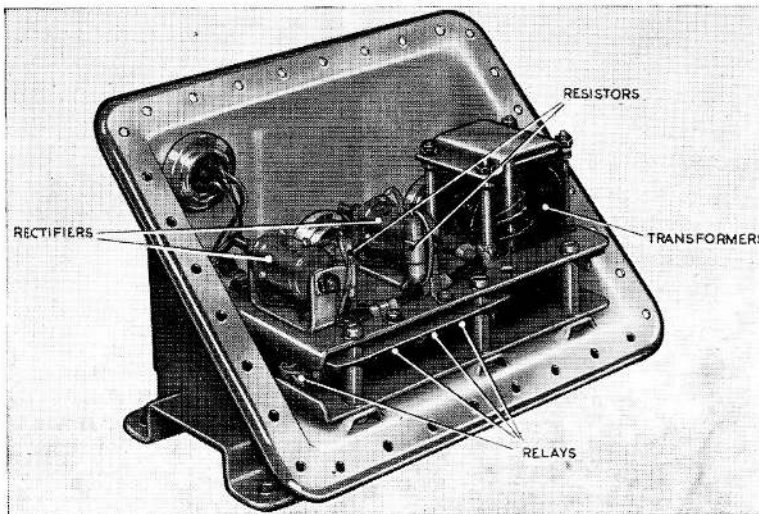


Fig. 2. Contents of relay box

RESTRICTED

(2) Lower centre. A 6-pole plug used for the warning-lamp circuits. 24-volts d.c. positive is supplied via pin E and is passed on to the warning lamps via pins A and B, when their respective relays close. The remaining pins are spare.

(3) Lower right-hand corner. A 3-pole plug pins A and B of which take the 24-volt d.c. supply, which is supplied to the test relay when the remote test switch is depressed. Pin C is spare.

(4) Top right-hand corner. A 6-pole plug which takes the connections from the sensing elements. Pins A and D are connected to the outer tubes of the elements and pins C, B, F and E are connected to the central electrodes. The 6-pole plug inserts are orientated so that the supply sockets are not interchangeable.

OPERATION

Test relay un-energized

5. From the circuit diagram shown in fig. 3 it will be seen that the two transformer primaries are connected in parallel to the a.c.

supply plug. These primaries are tapped to allow for the alternative voltage level of 26 volts. When the test switch is in its normal position, i.e., the test relay is un-energized, the transformer secondary circuits are completed through the filling material of the sensing elements.

6. A rise in temperature in the potential fire zones causes the resistance of the filling material in the elements to decrease, allowing increasing currents to flow through the secondary circuits. An increase in the rectified currents through the warning relay coils will result, and when these currents are within the range of 13–17mA (9–16mA for Type GD relays) the relays will operate and complete the circuits to the warning lamps. As can be seen from the circuit diagram the warning circuits can operate individually in which case only one relay will operate and one warning lamp light up.

7. Should the fire-zone temperature subsequently fall, the resistance of the filling material will rise and reduce the current flowing through the warning relay coils. When this current falls to within the range 6–10mA (2–6mA for Type GD relays) the relays will open and break the warning-lamp circuits.

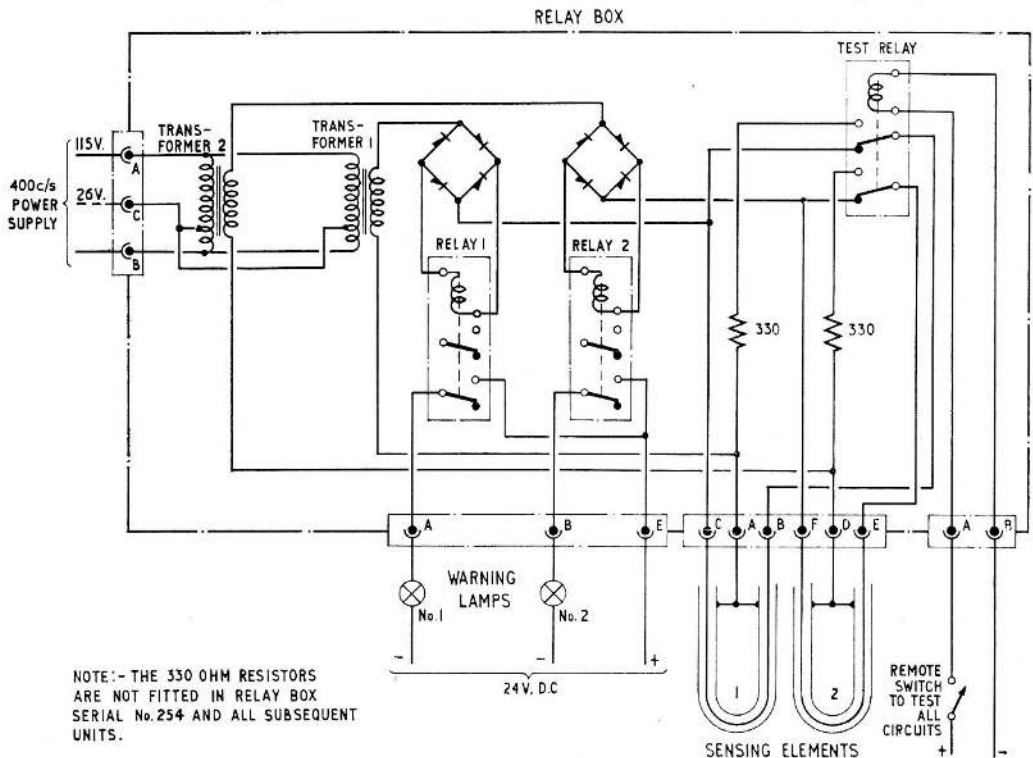


Fig. 3. Circuit diagram

RESTRICTED

Test relay energized

8. When the remote test switch is depressed, 24-volts d.c. is applied to the coil of the test relay which will then operate. The operation of this relay causes the transformers secondary circuits to be completed through the central electrodes of their elements instead of through the filling material. In early boxes this change over also inserts a 330-ohm resistor in series in each of the element circuits to compensate for their reduced impedance. Provided that there is continuity in the central electrodes the current under these conditions will be sufficient to operate the warning relays. The warning lamps will then light giving a visual indication

of continuity throughout the element circuits.

SERVICING

General

9. The servicing of the relay box should be restricted to an examination to ensure that it is mechanically sound and undamaged. As it is hermetically sealed no dismantling of the box is permissible.

Testing

10. The relay box may be functionally tested using the procedure and test circuit given in the Standard Serviceability Test, Appendix A.

RESTRICTED

Appendix A

STANDARD SERVICEABILITY TEST

for

FIRE DETECTION RELAY BOX, TYPE D1250 (R.N.)

Introduction

1. The following tests may be applied to ascertain the serviceability of the relay box, or prior to its installation in an aircraft.

TEST EQUIPMENT

2. The following test equipment, or suitable equivalents, will be required:—

(1) Two single-pole ON/OFF switches, Ref. No. 5CW/6430, and one single-pole changeover switch with centre-off position, Ref. No. 5CW/6431.

(2) A decade resistance box 0-11110 ohms, Ref. No. 10S/16239.

(3) Two Type B warning lamps, Ref. No. 5CX/1553, fitted with 24V 3.5 watt filament lamps.

(4) A 28V d.c. supply and a 115/26V 400 c/s a.c. supply.

(5) A 250V insulation resistance tester, Ref. No. 0557/AP.5047.

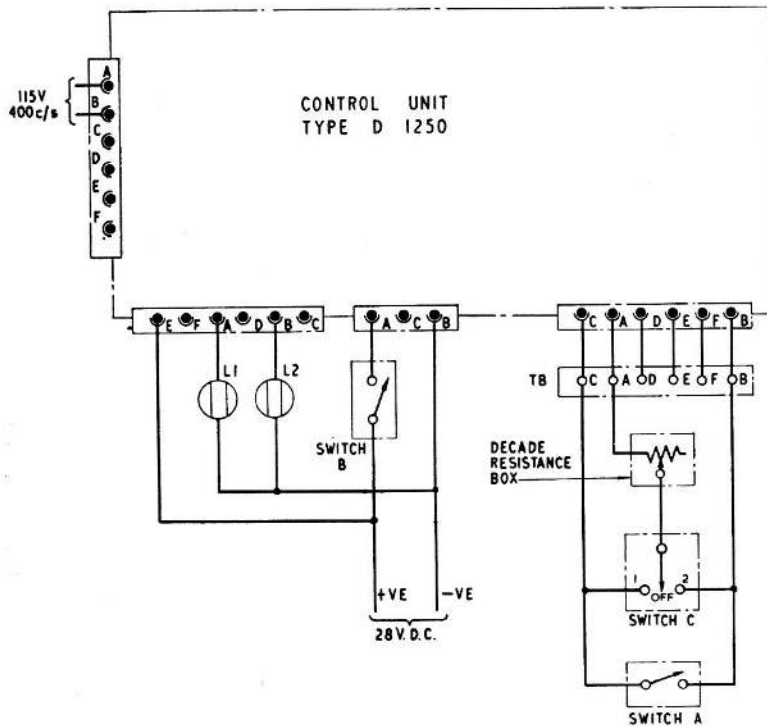


Fig. 1. Test circuit diagram

RESTRICTED

TEST PROCEDURE

Note . . .

Differences in test figures for relay boxes fitted with a 330 ohm resistor are shown in brackets.

3. (1) Connect the relay box to a test circuit, as shown in fig. 1, using suitable 6-pole and 3-pole sockets and a 6-way terminal block.
- (2) Ensure all switches are off and set the decade resistance box to 2350 (2000) ohms for units fitted with Type GD relays, or to 1250 (900) ohms for those fitted with Type JD relays.
- (3) Close switch C to position 1 and ensure that both warning lamps remain out.
- (4) Return switch C to the OFF position and set the decade resistance to 500 (200) ohms.
- (5) Close switch C to position 1 and ensure that the warning lamp L1 is illuminated.
- (6) Slowly increase the resistance of the decade resistance box until warning lamp

L1 goes out. The decade resistance at this point must be between 3000 (2700) and 12350 (12000) ohms for units fitted with Type GD relays and between 1300 (1000) and 5350 (5000) ohms for those fitted with Type JD relays.

- (7) Repeat the tests in (2)-(6) with switch C in position 2.
- (8) With switch C in position OFF close switches A and B and ensure that warning lamp L1 is illuminated.
- (9) With all switches off and the supplies switched off disconnect the connections to terminals A, B and C of the 6-way terminal block and reconnect to terminals D, E and F respectively.
- (10) Switch on the supplies and repeat the tests outlined in (2)-(8) checking the indications of lamp L2.

Insulation resistance test

4. Using a 250V insulation resistance tester the insulation resistance measured between each pin of the plugs: and the case must be not less than 20 megohms.

Appendix B

STANDARD SERVICEABILITY TEST

for

FIRE DETECTION RELAY BOX, TYPE D1200 (R.A.F.)

1. The Standard Serviceability Test will be issued as soon as information is available.

RESTRICTED

This file was downloaded
from the RTFM Library.

Link: www.scottbouch.com/rtfm

Please see site for usage terms,
and more aircraft documents.

