

Chapter 4

TEST PANEL—SEQUENCE TIMER

LIST OF CONTENTS

	Para.		Para.
<i>Introduction</i>	1	Operation	
Description		<i>General</i>	12
<i>General</i>	6	<i>Test procedure</i>	13
<i>Container</i>	7		
<i>Panel wiring</i>	10	Servicing	
<i>Extension looms</i>	11	<i>General</i>	14

LIST OF TABLES

	Table
<i>Cable looms and assemblies</i>	1
<i>Extension cable looms</i>	2
<i>Schedule of parts</i>	3

LIST OF ILLUSTRATIONS

	Fig.		Fig.
<i>General view</i>	1	<i>Test circuit diagram</i>	2

LEADING PARTICULARS

<i>Type</i>	Avro Part No. 1Z9114
<i>Ref. No.</i>	26DC/95250

Dimensions

<i>Length</i>	11.625 in.
<i>Width</i>	3.5 in.
<i>Height</i>	5.625 in.
<i>Weight</i>	5.5 lb.
<i>Operating voltage</i>	28 volt d.c.

Introduction

1. The fuel demand from each of the Vulcan aircraft's 14 fuel tanks is controlled in such a manner that, over a 5-minute period, each tank delivers a volume of fuel proportional to the capacity of that tank. In this way the tendency for the centre of gravity to shift as fuel tanks are emptied, is reduced to a minimum.

2. To enable this control over fuel delivery to be maintained, two sequence timers are used, one controlling the port fuel installation, and the other the starboard.

3. A sequence timer is a cam-operated switching device, the cam-shaft being geared to a constant-speed motor. Each sequence

timer embodies seven cam-operated switches, which are divided into two groups, one of three and the other of four switches. Each group of switches is supplied independently from the aircraft 28-volt d.c. system.

4. Each switch will be opened and closed at certain fixed periods during the revolution of the cam shaft, as determined by the profile of the cam. The cam profile is calibrated in terms of degrees in relation to one complete revolution (360°) and to the other cams in the group, so that in every revolution of the cam shaft each switch will have been closed for a period directly related to the capacity of the fuel tank whose pump it controls. A detailed description of the sequence timer

is given in A.P.4343D, Vol. 1, Book 4, and of the Vulcan fuel system in A.P.4505A, Vol. 1, Book 2 (Vulcan 1) or A.P.4505B, Vol. 1, Book 2 (Vulcan 2).

5. The object of the Sequence Timer Test Panel is to enable the sequence timers to be checked for correct operation of the cam switches, whilst permitting normal functioning of the aircraft installation.

DESCRIPTION

General

6. The test panel (*fig. 1*) comprises a container, which houses the warning lamps and control switches, and the two extension looms whereby the container is connected to the sequence timer and the aircraft electrical system.

Container

7. The container consists of a box frame of aluminium angle covered on all sides by 16 S.W.G. aluminium alloy plate. The rear plate is detachable, being secured by round headed screws and anchor nuts, and the remaining plates are riveted to the frame.

8. Seven warning lamps and two switches are mounted on the front plate. The lamps are disposed in two groups, the L.H. group consisting of three lamps labelled 2, 3 and 6 respectively, and the R.H. group, four lamps labelled 1, 4, 5 and 7 respectively. Fitted centrally below each group is a control switch associated with that group.

9. The R.H. end plate accommodates two plugs which are the couplings for the extension cables. The larger plug is for inter-connection between the test panel and the aircraft electrical system, and the smaller plug for interconnection of the test panel to the sequence timer to be tested.

Panel wiring

10. Two cable looms are employed to connect the two plugs to the lamps and switches. Individual cable assemblies are employed for other internal connections. Details of the looms and cable assemblies are shown in Table 1.

Extension looms

11. Two extension looms are provided to connect the test panel to the aircraft system

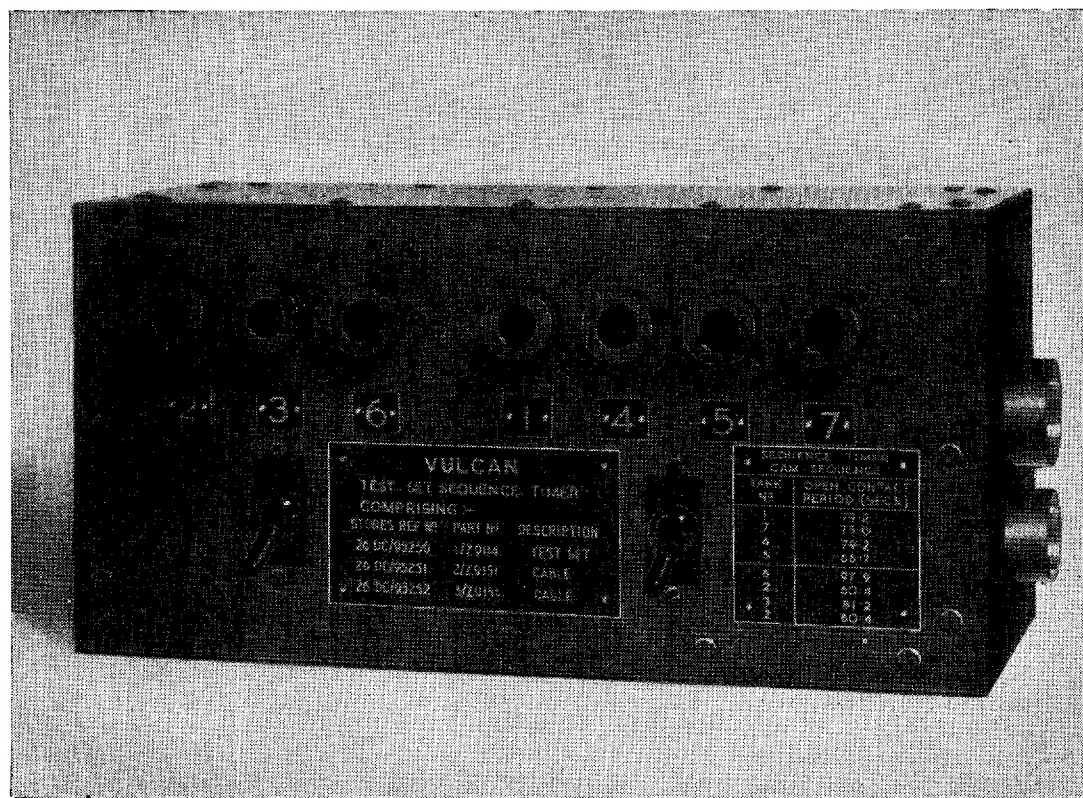


Fig. 1. General view

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and the sequence timer under test. These looms are made up from sheathground cable. Details of the two looms are shown in Table 2.

OPERATION

General

12. The test panel can be used for 'in-situ' testing of the sequence timer and its associated equipment, and also during bay servicing of the unit. In the former function, it is interposed between the sequence timer and the aircraft control circuit, and uses the aircraft power source. In the latter function, external current supplies are required.

Test procedure

13. To conduct a test on the sequence timer, proceed as follows:—

- (1) Connect the two extension cables to the appropriate connections of the test panel.
- (2) Disconnect the sequence timer from the aircraft system by uncoupling the socket from the sequence timer plug.
- (3) Connect the extension cables to the aircraft system and the sequence timer; the plug to the socket which was previously connected to the sequence timer, and the socket to the sequence timer. The single cable which forms part of the aircraft system extension loom is provided with a 2 B.A. lug for connecting to the aircraft earth system.
- (4) Switch on the aircraft 28-volt d.c. and 115-volt, 3-phase, 400 c/s, a.c. supplies on Mk. 1 aircraft, and 28-volt d.c. and 200-volt, 3-phase, 400 c/s, a.c. on Mk. 2 aircraft.

(5) Set the fuel system auto-manual switch to AUTO.

(6) Set the test panel group selector switches to ON. The indicator lamps will light, and each lamp will be extinguished in turn for a period equivalent to the operating time of the cam operated switches.

(7) Using a stop-watch, check that the times of the cam sequences are in accordance with those quoted on the test panel, or for later sequence timers type D.10705 and D.10706, as follows:

Tank No.	Open contact period ± 1.6 (secs.)
1	77.5
7	67.5
4	77.5
5	63.5
6	91.5
2	57.5
3	77.5
2	59.5

Note . . .

The cam sequence times will be affected by any variation in the supply frequency. It is essential that throughout the tests a frequency of 400 c/s is maintained.

- (8) Switch OFF all supplies.
- (9) Disconnect the extension cables from the aircraft, sequence timer and test set.
- (10) Reconnect the aircraft system.

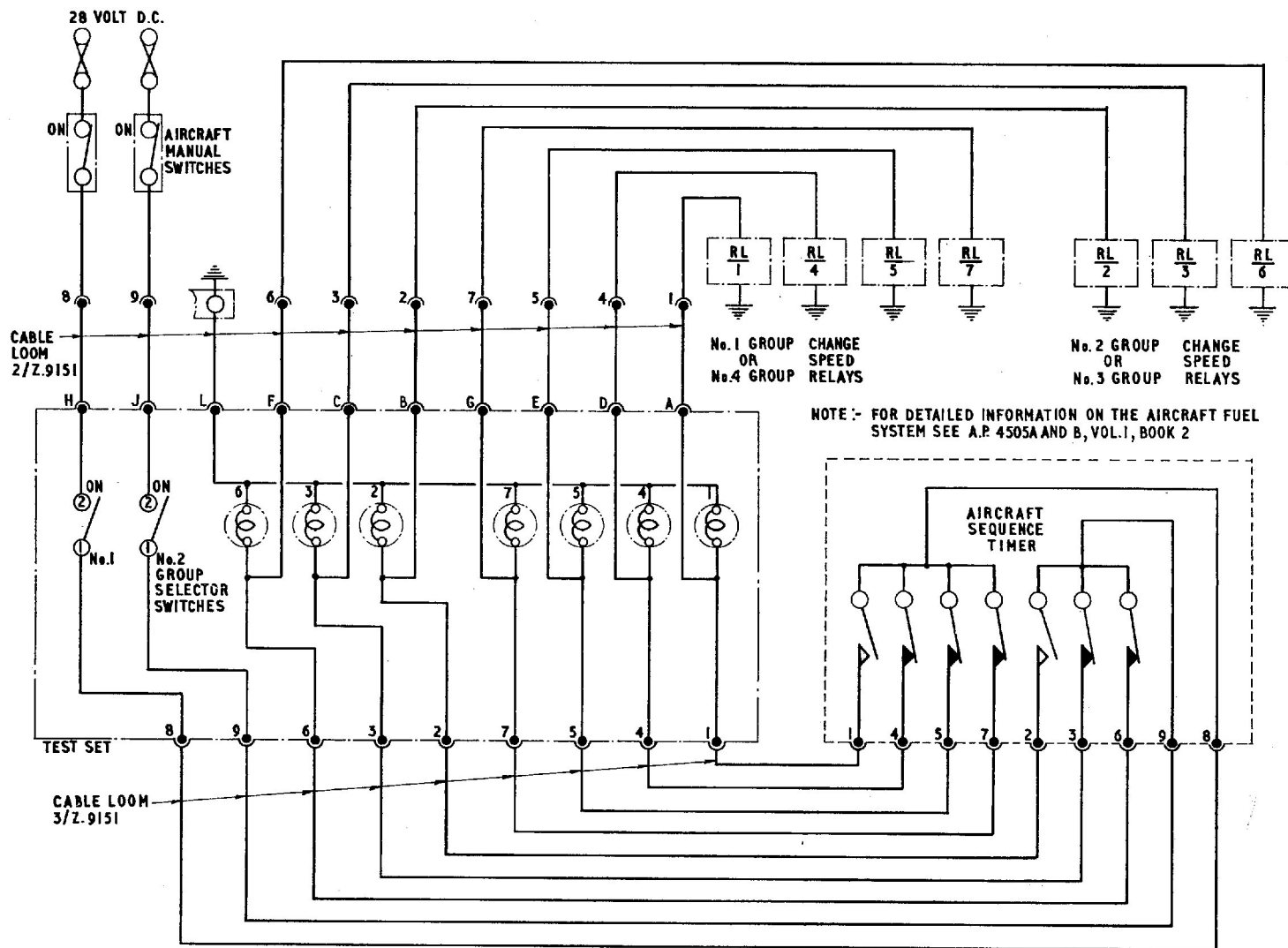
SERVICING

General

14. The test panel will require little servicing other than periodic checking of the lamp filaments. The extension cables should be examined periodically for damage to the outer cover and end connections, and should be wiped free of grease and oil after use.

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Fig. 2. Test circuit diagram



and the sequence timer under test. These looms are made up from sheathground cable. Details of the two looms are shown in Table 2.

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