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Chapter 13

CONTROL PANEL, E.E. TYPE AE7003

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LEADING PARTICULARS

Control Panel Type AE7003	*Ref. No.* 5UC/6182
Input d.c.	$28 \pm 2V$
Input a.c.	100 *V*
Line frequency	400 *c/s*
Number of phases	3 *phase*
Output	67 ± 2 *V d.c.*
Overall dimensions	$9\frac{3}{64} \times 7\frac{27}{32} \times 4\frac{15}{64}$ *in.*
Weight	$6\frac{1}{2}$ *lb*

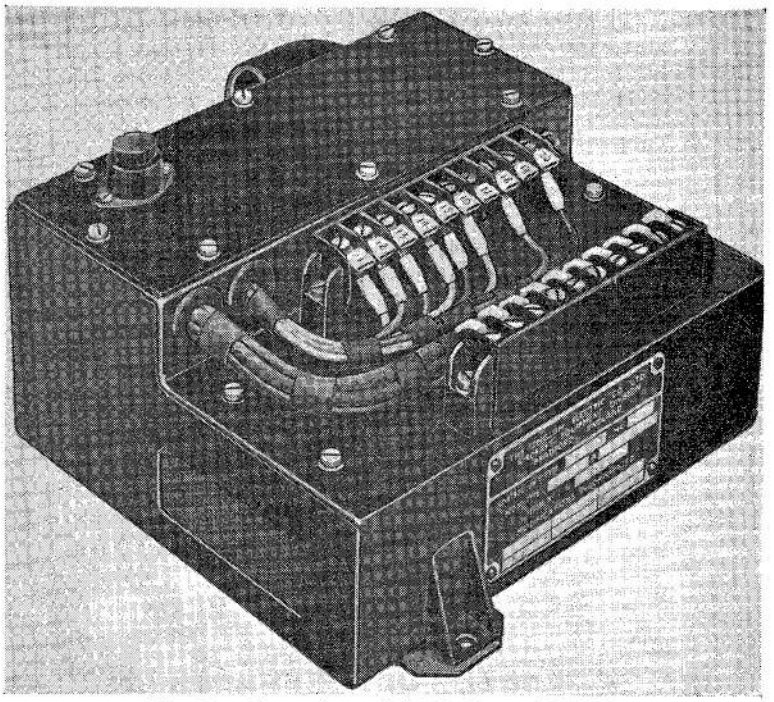

Fig. 1. Control panel, E.E. Type AE7003

Introduction

1. The auxiliary control panel, Type AE7003, transfers the control of the a.c. generator from the magnetic amplifier regulator Type AE7511 to the carbon pile regulator, and vice versa in conjunction with the Type AE7002 control panel.

DESCRIPTION

2. The components are housed within a light alloy case. Two terminal blocks and a push-button are attached to the top of the case. Two 1-ohm resistors are mounted inside the lower section and the remaining components, comprising a 3-phase transformer, two relays and six rectifiers, are mounted below the higher section. An air inlet connection is provided on one face, the air outlet being through a perforated grid. Access to the unit is through detachable panels on the bottom and top faces.

INSTALLATION

3. The panel may be mounted at any angle or in any position convenient for wiring and accessible for inspection. It is fixed at one end by two angle brackets drilled to take 2 B.A. round-head screws, the 2 B.A. holes in the brackets align with holes drilled in a strap on the bottom of the unit. At the other end the unit is located by two dowel pins.

OPERATION

4. Relay TR1 in fig. 3 is energized by a signal from the Type AE7002 control panel. It has four pairs of contacts. Contacts TRI-2 and TRI-3 (normally open), when closed these switch the Type AE7511 magnetic amplifier regulator on to the a.c. generator exciter field terminals, and also on to resistors R1 and R2. Contact TR1-1 (normally open), when closed, energizes the operating coil of relay TR2. Contact TR1-4 (normally closed), when open inserts a resistance in series with the carbon pile operating coil in order to reduce the carbon pile resistance to a minimum, as it remains in circuit during generator control by the magnetic amplifier regulator.

5. Relay TR2 in fig. 3 operates three pairs of contacts, TR2-1 contact (normally open), when closed maintains the operating voltage (under normal generator line voltage conditions) on the TR1 coil. Contact TR2-2 is normally closed, in this position it provides a signal to disconnect the radar from the generator by means of the radar master control. TR2-3, contact normally open, when closed increases the generator exciter bias field current, during operation on the magnetic amplifier regulator.

6. The transformer rectifier unit in fig. 3 consists of 3-phase transformer and full-wave

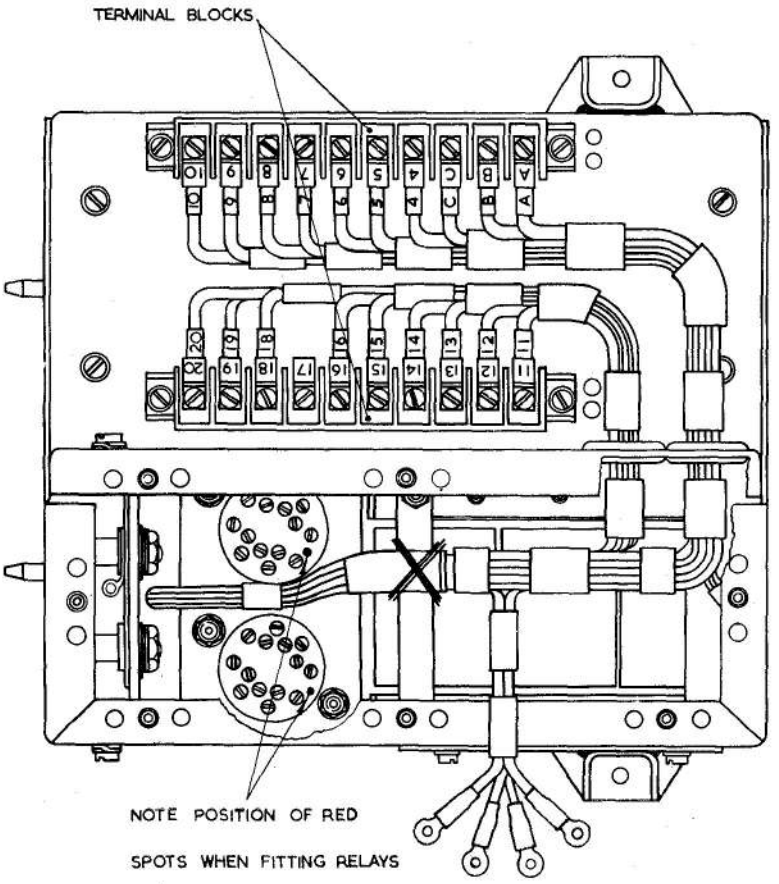

Fig. 2. View with top cover and air inlet removed

rectifier bridge. The transformer is fed from the Type AE7701 resistor box with a 100-V, 3-phase supply. The output from the rectifiers supply the operating coil of the carbon pile.

SERVICING

7. Ensure that the mounting screws are secure, and all exterior screws on the unit are tight. Examine leads for chafing and deterioration of insulation. Inspect the case for signs of corrosion and damage.

TESTING

Continuity tests

8. With the control panel disconnected from the associated circuit, the internal wiring should be tested for continuity using a testmeter Type D. The sequence of operations for this test, and the meter readings which should be obtained are given in Table 1.

9. For tests 10 and 11 the testmeter should be set to read 100 V d.c. Apply a d.c. voltage, as shown in column 1 of the correct polarity to the terminals indicated in column 2. Connect the meter to the terminals shown in column 3 and check the resistance or voltage readings with those given in column 4, before carrying out the procedure shown in column 6. The circuit under test is shown in column 5 and additional instructions in column 6.

10. Using a bridge megger connected to 9 and 10 for resistor R1 (*fig.* 4), and 7 and 8 for resistor R2, check the resistance of each, the value in both instances should be 1 ohm $\pm$ 0·1 ohm.

Table 1

Continuity tests

Test	(1) D.C. test voltage	(2) (1) Applied to terminals + ve	— ve	(3) Meter connected to terminals		Meter Readings: Before applying (6)	Meter Readings: After applying (6)	(5) Circuit under test	(6) Procedure
1	0	—	—	15	10	—	140 ± 10 ohms	TR1—Coil	
2	28	15	10	13	10	O CCT	140 ± 10 ohms	TR2—Coil	Apply volts
				DO NOT PROCEED FURTHER IF UNIT FAILS THESE TESTS					
3	28	15	10	13	10	140 ± 10 ohms	O CCT	Button switch	Press button switch
4	0	—	—	15	10	140 ± 10 ohms	O CCT	,, ,,	,, ,, ,,
5	0	—	—	A	B	—	2·4 ± 0·4 ohms	Transformer primary windings	
6	0	—	—	B	C	—	2·4 ± 0·4 ohms		
7	0	—	—	C	A		2·4 ± 0·4 ohms		
8	28	15	10	20	14	O CCT	O CCT	TR2 N.O. contact	Apply voltage
9	28	15	10	18	19	S CCT	S CCT	,, N.C. ,,	,, ,,
10	28	15	10	16	10	0 volts	0 volts	,, N.O. ,,	,, ,,
11	28	13.15	10	16	10	0 volts	28 volts	,, N.O. ,,	,, ,,
12	28	13.15	10	18	19	S CCT	O CCT	,, N.C. ,,	,, ,,
13	28	13.15	10	20	14	O CCT	S CCT	,, N.O. ,,	,, ,,
14	28	15	10	11	8	O CCT	S CCT	TR1 N.O. ,,	,, ,,
15	28	15	10	12	9	O CCT	S CCT	TR1 ,, ,,	,, ,,
16	28	15	10	6	4	S CCT	O CCT	,, N.C. ,,	,, ,,
17*	28	13.15.16	10	18	19	S CCT	O CCT	TR1 TR2-Coils	,, ,,
18*	28	13.16	10	18	19	O CCT	S CCT	Button switch	Press button switch

**Note.*—Do not disconnect the supply to terminals 13 and 16, between tests 17 and 18.

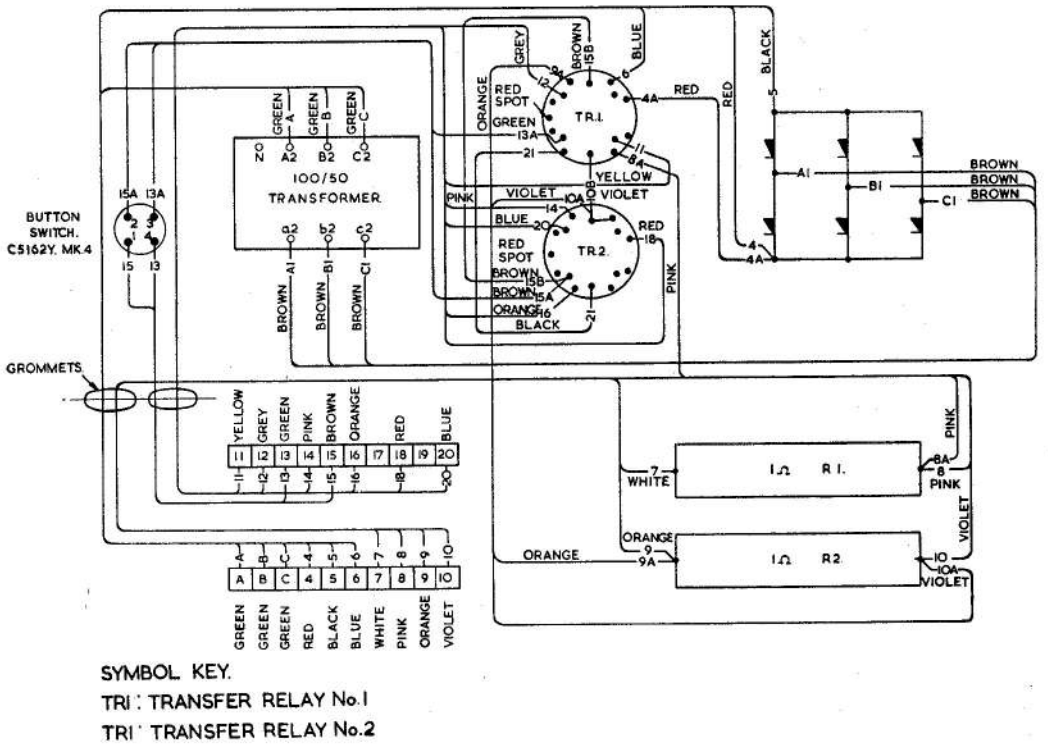

Fig. 3. Schematic wiring diagram

Functioning test

11. Connect a 100-V, 3-phase, 400 c/s supply to terminals 1, 2 and 3, a d.c. voltage of 67 $\pm$ 2 V should appear across terminals 4 and 5, terminal 4 being positive.

12. Connect the unit into the test circuit (*fig.* 4), set the potentiometer for zero volts. Lamp 1 only should light.

13. Increase the voltage slowly until lamp 1 goes out and lamp 2 lights. This is to occur at less than 14 V.

14. Reduce the voltage slowly. Lamp 1 should light and lamp 2 go out when the voltage is less than 7 V.

Insulation test

15. Measured with a 500-V d.c. insulation resistance tester, the insulation resistance between the terminals and the case should not be less than 5 megohms.

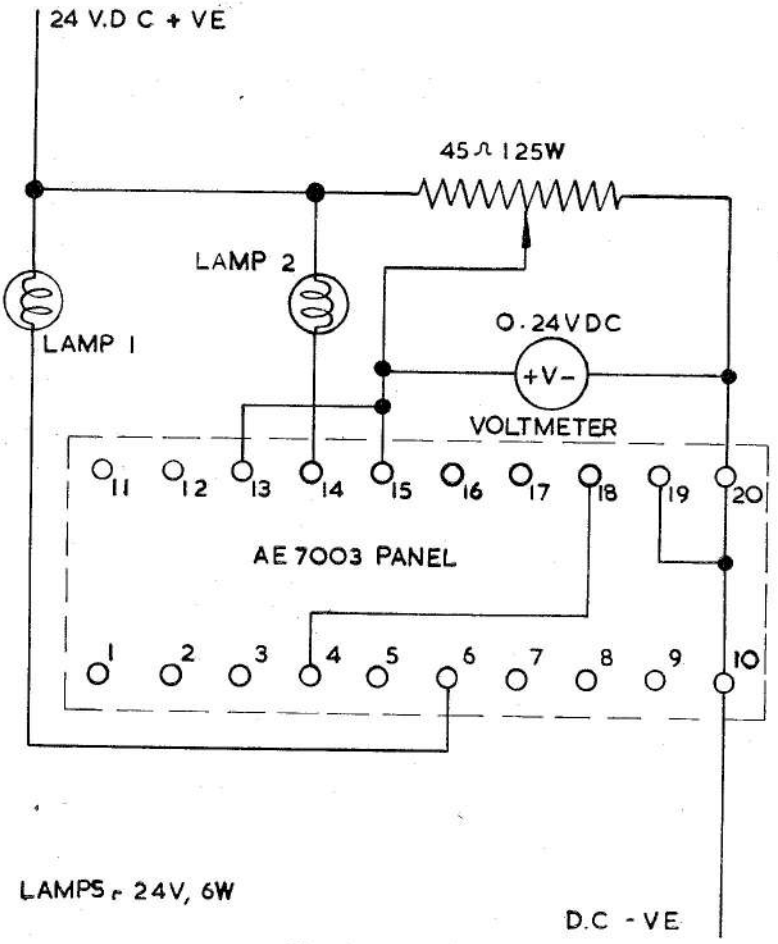

Fig. 4. Test circuit

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