

## Chapter 1

### CONTROL BOX, TYPE A.W.E. 143/6

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#### LEADING PARTICULARS

|                                              |                             |
|----------------------------------------------|-----------------------------|
| <b>Control box, Type A.W.E. 143/6</b> ... .. | Ref. No. 5CZ/6962           |
| <i>Input voltage</i> ... ..                  | 200V — 115V 400c/s 3-phase  |
| <i>Input power (total)</i> ... ..            | ... 22V.A.                  |
| <i>Input power (per phase)</i> ... ..        | ... 12V.A.                  |
| <i>Control winding voltage</i> ... ..        | 28V d.c.                    |
| <i>Control winding current</i> ... ..        | ... 30mA                    |
| <i>Output voltage (per circuit)</i> ... ..   | ... 4V a.c.                 |
| <i>Output current (per circuit)</i> ... ..   | ... 3 amp.                  |
| <i>Ambient temperature range</i> ... ..      | —40 deg. C. to +120 deg. C. |
| <i>Overall dimensions</i>                    |                             |
| <i>Length (max.)</i> ... ..                  | ... 5.7 in.                 |
| <i>Width (max.)</i> ... ..                   | ... 3.1 in.                 |
| <i>Depth (max.)</i> ... ..                   | ... 2.25 in.                |
| <i>Weight (max.)</i> ... ..                  | 1 lb. 10 oz.                |

#### Introduction

1. The control box, Type A.W.E. 143/6 (formerly known as T.D.D. 143/6), is used with a pilot's control unit Type A.W.E.

149 (formerly T.D.D. 149), to control the power supply to each of two lamp circuits in an instrument illumination system. The pilot's control unit is described in A.P.4343E, Vol. 1, Book 1, Sect. 7, Chap. 64.

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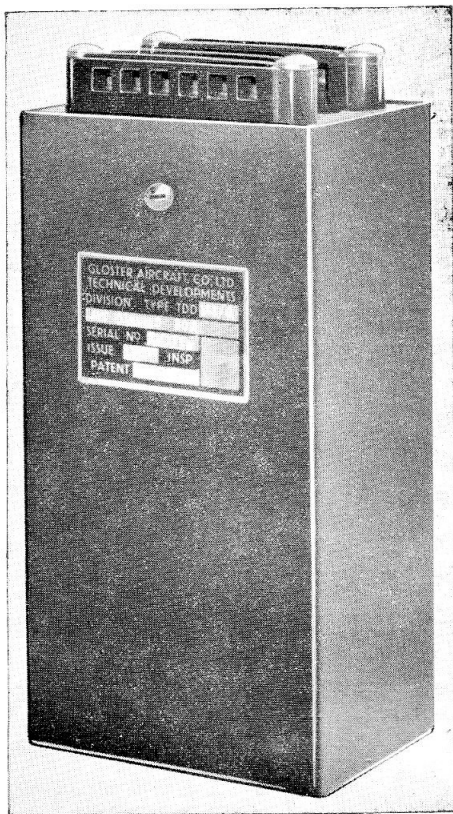


Fig. 1. General view of control box, Type A.W.E. 143/6

## DESCRIPTION

2. The control box consists of two magnetic reactor units with d.c. control windings, and two Scott connected transformers, enclosed in an outer casing.

3. The control windings control the output current through the reactor by varying the degree of saturation in the reactor core, and are connected to an appropriate control potentiometer which regulates the d.c. voltage applied. At maximum saturation (full d.c. voltage on the control winding), the impedance of the reactor is minimum, thus giving maximum output current for maximum brilliance of the lamps.

4. The unit is designed to allow selection of illumination from full lamp brilliance to zero, and is such that should a fault develop in one circuit, it will not prevent the satisfactory functioning of the other circuit.

5. Electrical connection is made via two 6-way terminal blocks marked ST1 and ST2, situated externally at one end of the unit, each block having an insulated cover. Terminal block ST1 is for connection to the 115V or 200V 400 c/s 3-phase a.c. supply, and terminal block ST2 is for connection to the control potentiometer and lamp load.

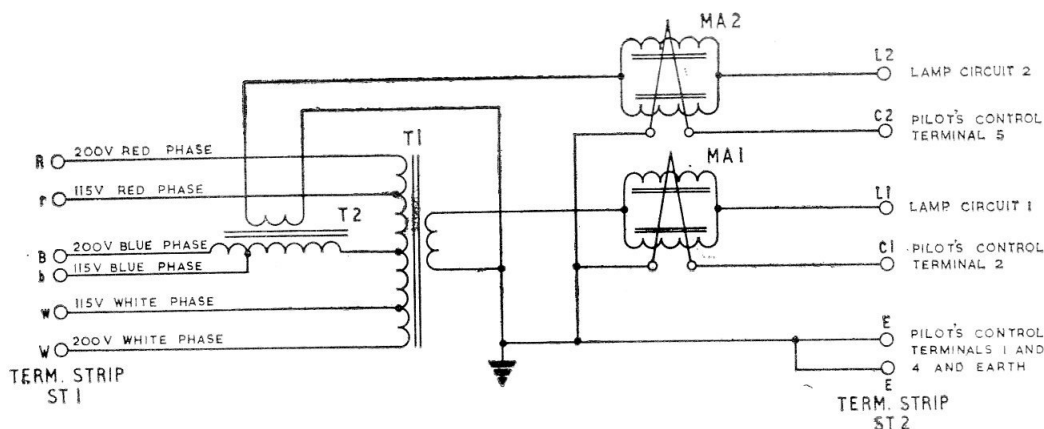


Fig. 2. Circuit diagram

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### **INSTALLATION**

6. The unit is secured in position by four 4 B.A. bolts via two straps, which are bolted to the main body by four 4 B.A. screws. The two straps are removable should the unit be required to be directly mounted.

### **SERVICING**

7. Little dismantling is possible and servicing is limited to checking for security of mounting, security of connections, and examination for freedom from damage.

8. With the control box removed to the bench, remove the two metal straps, case, and top cover board. Examine all soldered connections for sound joints, and examine the windings for damaged insulation. Replace top cover board, case, and metal straps.

### **TESTING**

9. The control box may be functionally tested using the procedure given in the Standard Serviceability Test, Appendix A to this chapter.

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## Appendix A

### STANDARD SERVICEABILITY TEST for CONTROL BOX, TYPE A.W.E. 143/6

#### Introduction

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

#### TEST EQUIPMENT

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

- (1) Four testmeters, Type 12889, Ref. No. 5QP/17447.
- (2) Pilot's control unit, Type A.W.E. 149/3 Ref. No. 5CZ/5963 or Type A.W.E. 149/4 Ref. No. 5CZ/7285.
- (3) Two loads each comprising 12 lamps Ref. No. 5L/995-9125 or 5L/995-9126.
- (4) A 28V d.c. variable supply.
- (5) A 115V and 200V, 400 c/s, 3-phase a.c. variable supply.

#### TEST PROCEDURE

##### Functional test (115V)

3. (1) Connect the control box to the test circuit as shown in fig. 1, with the testmeters in the (control unit) potentiometer circuit set to 0.01A, and in the load circuit set to 0-10A.
- (2) Set the a.c. and d.c. inputs to 115V 400 c/s and 28V respectively.
- (3) Adjust the potentiometer (pilot's control unit, Type A.W.E. 149) to give zero control current. The load current shown on the load ammeters should be within the limits shown in Table 1.

(4) Adjust the potentiometer to give a control current of 17mA. The load current shown on the load ammeters should be within the limits shown in Table 1.

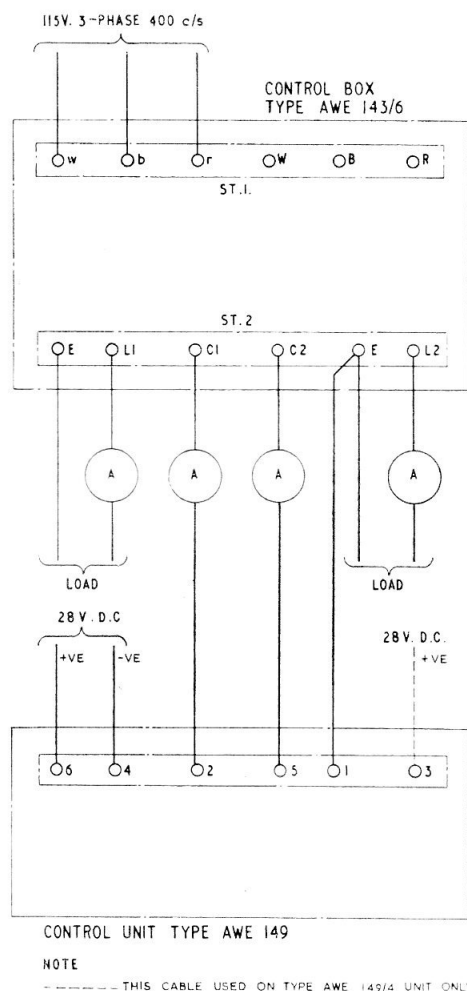


Fig. 1. Test circuit

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(5) Adjust the potentiometer to give a control current of 30mA. The load current shown on the load ammeters should be within the limits given in Table 1.

(6) Adjust the potentiometer to give 28 volts across the control winding. The load currents shown on the load ammeters should be within the limits given in Table 1.

#### Functional test (200V)

4. Repeat the tests as detailed in para. 3. The load currents shown on the load ammeters should be within the limits given in Table 1.

**TABLE 1**

| Input to<br>Control Winding | Load Current<br>(Both channels) |
|-----------------------------|---------------------------------|
| 0mA                         | Less than 0.6A                  |
| 17mA                        | $2.2 \pm 0.2A$                  |
| 30mA                        | $3.0 \pm 0.3A$                  |
| 28 volts                    | $3.0 \pm 0.3A$                  |

#### Input variation, functional test

5. With the a.c. supply set at 110V 392 c/s and the d.c. supply set at 25V and 28.5V alternatively, repeat the test as given at para. 3. The load currents should lie within the limits given in Table 2.

**TABLE 2**

| Input to<br>Control Winding | Load Current<br>(Both Channels) |
|-----------------------------|---------------------------------|
| 0mA                         | Less than 0.6mA                 |
| 17mA                        | $2.1 \pm 0.2mA$                 |
| 30mA                        | $2.8 \pm 0.3mA$                 |
| 25 volts                    | $2.8 \pm 0.3mA$                 |
| 28.5 volts                  | $2.8 \pm 0.3mA$                 |

#### Insulation resistance test

6. With the external circuits disconnected and the earth lead removed, measure the resistance between each terminal and frame using a 500V insulation resistance tester. The reading obtained in each instance should be not less than 5 megohms.

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