

Chapter 9

VIBRATOR POWER UNIT, TYPE 596

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LEADING PARTICULARS

| | |
|---|--|
| Vibrator power unit, Type 596 | Stores Ref. 5UB/6488 |
| Input volts | 25 to 29 volt, d.c. |
| Maximum output volts at 29 volt d.c. input | 300 volts |
| Rating | Intermittent |
| Temperature range | { —40 deg. C. at 60,000 ft. with Type X354 vibrators { —65 deg. C. at 60,000 ft. with Type 20 vibrators |
| Weight of unit | 9 lb. 12 oz. |

Introduction

1. The Vibrator Power Unit, Type 596, is designed for use in aircraft fitted with Aden guns. With this type of gun, the round is fired by an electric cap fitted in the base of the shell case, the electrical energy necessary to fire the cap being provided by a capacitor in the Power Unit. This capacitor is charged to approximately 300 volts by means of a vibrator circuit energized from the aircraft's 28-volt d.c. supply.

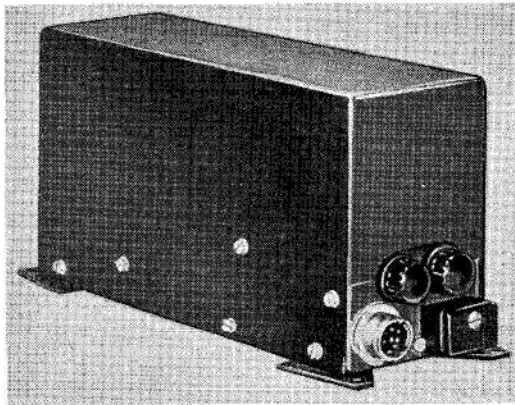


Fig. 1. General view of vibrator power unit

2. Each unit has four capacitors (one per gun), fed from two identical vibrator circuits, so that failure of one circuit will not affect the operation of the guns.

3. Information on the Aden Gun will be found in A.P.1641S and A.P.4483A.

DESCRIPTION

4. The common four gun output circuit comprising resistors R6, R7, R8, R9 and capacitors C11, C12, C13, C14, is fed from the two identical circuits, No. 1 and No. 2 (fig. 3). Since the two circuits are identical a description of No. 1 circuit only will be given.

5. From the 28 volt d.c. positive input terminal a supply is taken, via a 3 amp. fuse, to the operating coil of the vibrator unit, also to the centre tapping of the primary winding of the 1 : 10 step-up transformer T1. The outer tappings of the primary winding are connected to contacts 5 and 7, of the vibrator and a 1 μ F. buffering capacitor is connected across them. The operation of the vibrator reeds alternately connects the top and bottom ends of the primary winding to the d.c. terminal, so that current flows alternately

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from the centre to the top and bottom ends of the winding, thus inducing an alternating flux into the transformer iron.

charged condition, thus preventing the possibility of inadvertent firing of the guns.

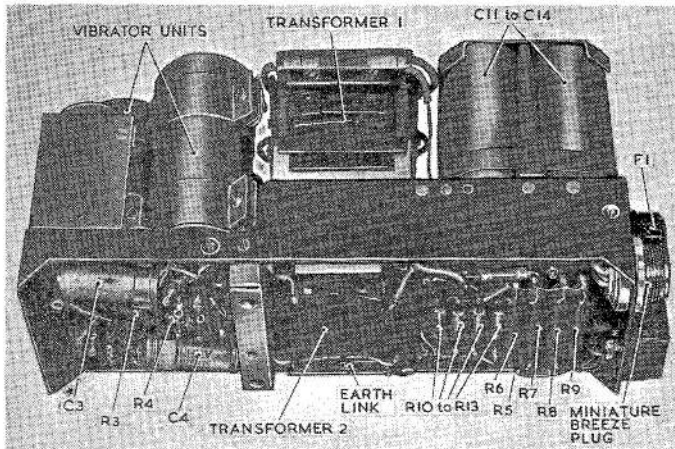


Fig. 2. Interior view of unit

6. The top and bottom ends of the secondary winding of T1 are connected to contacts 2 and 4 of the vibrator; the centre tapping is connected via two silicon diodes (D1, D3) to the output resistor, capacitor network. The buffering circuit C5, C6, R3 is connected across the secondary winding. An alternating voltage will be induced in the secondary winding by the primary alternating flux; the function of the vibrator will ensure that the top and bottom ends of the secondary winding are connected alternately to the earthed side of the output network when they are negative, with respect to the second tapping. A d.c. voltage will therefore appear across the output resistor, capacitor, network; this voltage is smoothed by the 2 μ F. reservoir capacitor C9, under normal operating conditions it will be in the order of 300 volts.

7. A spark quenching circuit R1, C3 is connected across the vibrator contacts. The silicon diodes (D1, D3) are fitted to ensure that under fault conditions in Circuit No. 1 current will not be fed into the fault from circuit No. 2. The blowing of the 3 amp. fuse F1 will isolate the faulty circuit from the d.c. input, leaving No. 2 circuit to supply the power to the guns on its own.

8. Two resistors (R5), each of 510,000 ohms are connected in parallel across the output resistor, capacitor, network (fig. 3), to ensure that the output capacitors are *not* left in a

OPERATION

9. When the firing button in the aircraft is pressed, a relay in the aircraft gun control circuit is energized, which applies the 28-volt d.c. supply to the input terminals. After a period of approximately 40 milli-seconds, the output capacitors will be fully charged. A second relay energized by the first is slugged to operate with a delay of approximately 70 milli-seconds; this second relay, on closing, allows the output capacitors to discharge across the caps of the rounds in the guns.

10. The output voltage is dependent on the input voltage, the external load, and whether

one, or both of the circuits in the power unit are operative.

11. Under normal conditions, with all guns working, the output voltage will be approximately 260 volts with an input of 25 volts and 290 volts with an input of 29 volts.

INSTALLATION

12. The vibrator power unit will operate in any attitude. Two mounting feet, each drilled with four 2 B.A. clearance holes, are provided for installation in the aircraft, but only four screws are necessary for adequate fixing. The unit should be fitted in such a position that the fuses are easily accessible.

13. Dimensions of the power unit are shown on installation drawing (fig. 3).

SERVICING

14. Examine the unit for signs of corrosion and cracks in the chassis; the latter defect may be caused by metal fatigue. If cracks are found in the chassis the unit must be renewed.

15. Inspect all soldered connections for signs of breaking, or deterioration; check also for broken leads and chafing. It is important to ensure that leads passing around sharp metal edges of the chassis are adequately insulated.

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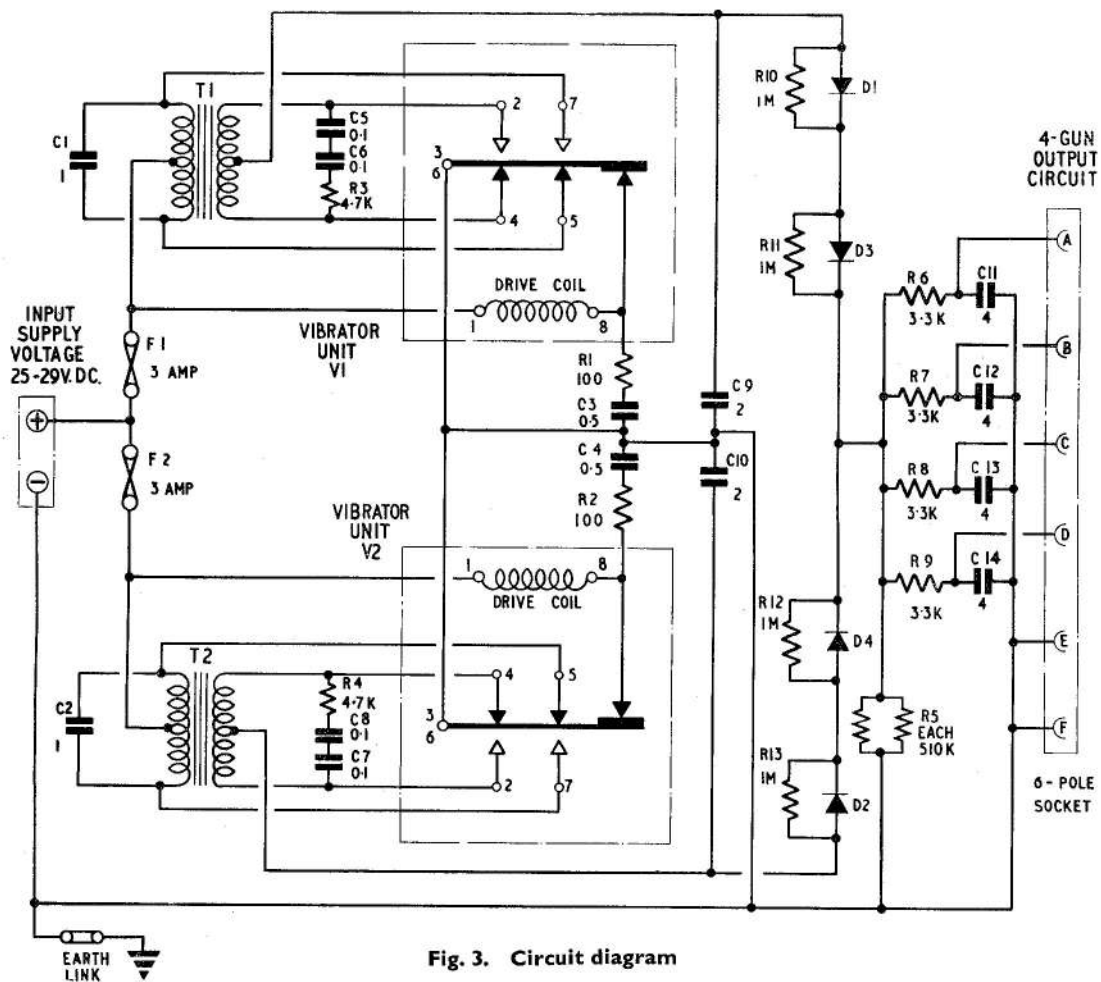


Fig. 3. Circuit diagram

Testing

16. With reference to a continuity test during first line servicing, an "Aden Gun Aircraft Test Unit" Stores Ref. 7R/544 has been provided; this unit is described in A.P.4483A, Vol. 1, Part 1, Sect. 1, Chap. 13.

17. This gun test unit can be used to check the servability of the vibrator power unit in the following manner. Initially, connect the gun test unit to the aircraft control circuit at the gun breaks. On pressing the firing button, the four 50 volt, 2.5 watt lamps in the test unit should flash brilliantly and then continue to glow at a lower intensity. Failure of any of the lamps to flash, indicates an open circuit gun firing capacitor. Failure of all, or some of the lamps to glow at all, could be due, either, to a fault in the aircraft gun control circuit, or, to an unservicable vibrator power unit. In this event the test

unit may be connected to the output of the power unit and the location of the fault determined. Suitable connecting test leads will be required to suit the output connections of the power unit.

18. When testing the voltage output of the unit, each input fuse should be removed in turn, to ensure that each of the two circuits in the unit is working. Information on the testing of the unit and associated armament circuits in the aircraft will be found in the relevant Aircraft Publication.

19. During bay servicing the performance of the unit may be assessed by observing the wave form of the oscillatory component of the output voltage with the aid of an oscilloscope and a switch box adapter. Details of these tests will be found in Vol. 4, Part 6 of this publication.

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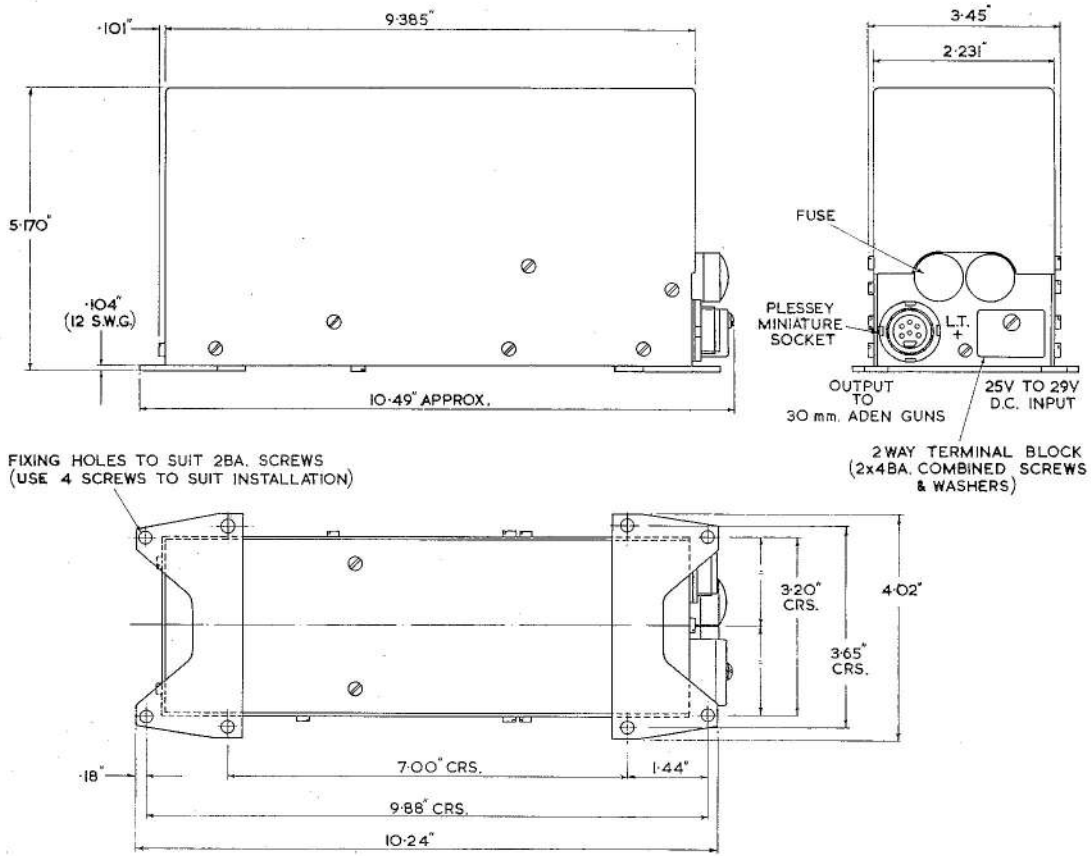


Fig. 4. Installation drawing of unit

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LIGHTNING MK. 1
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