

Chapter 9

ELECTRIC URN, 2 GALLON

(Completely revised)

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LEADING PARTICULARS

<i>Electric urn, G.E.C. Type HE 37855/M26</i>	Ref. No. 5V/91
<i>Element, 28V, 500 watt</i>	Ref. No. 5V/106
<i>Control fuse, Bulgin F.129</i>	Ref. No. 5V/114
<i>Relay (4-relay type) Type P</i>	Ref. No. 5CW/1722
<i>Relay (3-relay type) Type S.7</i>	Ref. No. 5CW/6717
<i>Indicator lamp (28V, 3.5 watt)</i>	Ref. No. 5L/9951273
<i>Voltage</i>	28 volt
<i>Rating</i>	2000 watt
<i>Capacity</i>	2 gallon
<i>Heating up time</i>	30 min.
<i>Weight</i>	18.5 lb.

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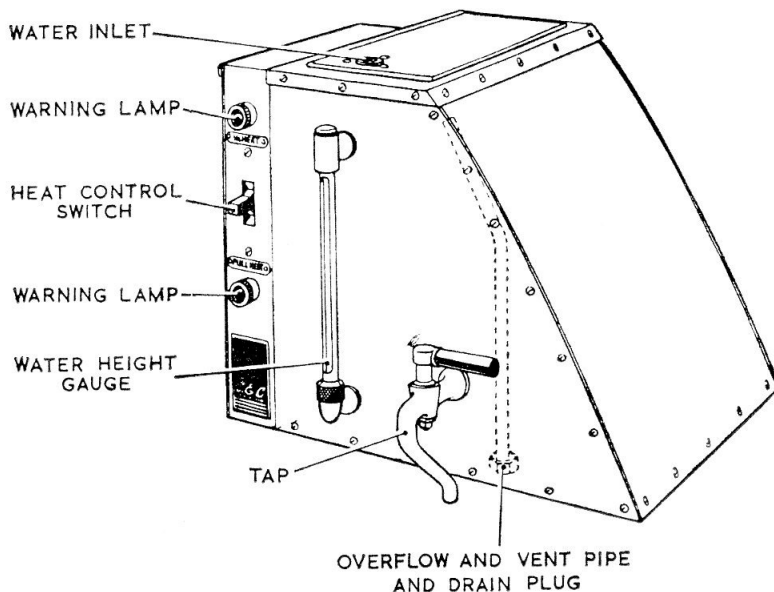


Fig. 1. Electric urn, 2 gallon

Introduction

1. The G.E.C. Type HE37855/M26 urn is used in the galley of transport aircraft to provide boiling water for the making of beverages. The urn, which is shown in fig. 1, has provision for 2-heat selection, FULL-HEAT to bring the contents to boiling point and $\frac{1}{2}$ -HEAT to maintain them at boiling point. Two warning lamps situated one above and one below the switch indicate the selection made.

DESCRIPTION

General

2. The urn consists of an inner container and an outer casing which are of aluminium plate with the space between these filled with glass fibre lagging. A double cased lid on the top of the urn provides access into the inner container and has a water inlet through which the urn is filled. A water-contents gauge is fitted on the front of the urn together with the tap which has a curved extension. A stainless steel overflow and vent pipe is fitted into the inner container and the urn can be drained by removing the coupling which holds this pipe in position. Protection against overheating due to the urn boiling dry is provided by a bi-metal cut-out, when the cut-out operates it may be reset by a button provided at the rear of the urn; the urn must be allowed to cool

before the cut-out resetting button is pressed.

Electrical connections

3. The heater elements which are of the wound-wire sheathed type are mounted on a plate and inserted into the urn at the rear. The element terminals and the cut-out are enclosed in a terminal box through the lid of which the cut-out reset button protrudes. The external supply is connected to two terminal blocks which are housed with the control switch, warning lamps, protective fuse and the relays, in a control box at the side of the urn. The cable entry is through two rubber bushed holes at the rear of the control box, the side of which may be removed to give access to the control circuit fuse and to the other components.

4. The three-position heat control switch controls the relays in the heater element circuit, in early production models there were four Type P.1 relays which were later replaced by Type S.1 relays of larger contact rating, these were subsequently superseded by Type S.7 relays. The larger current carrying capacity of the contacts of the relays enabled the number of relays fitted to the urn to be reduced from four to three, the circuit diagram in fig. 3 shows that required for early production models and that in fig. 4 for the later production models.

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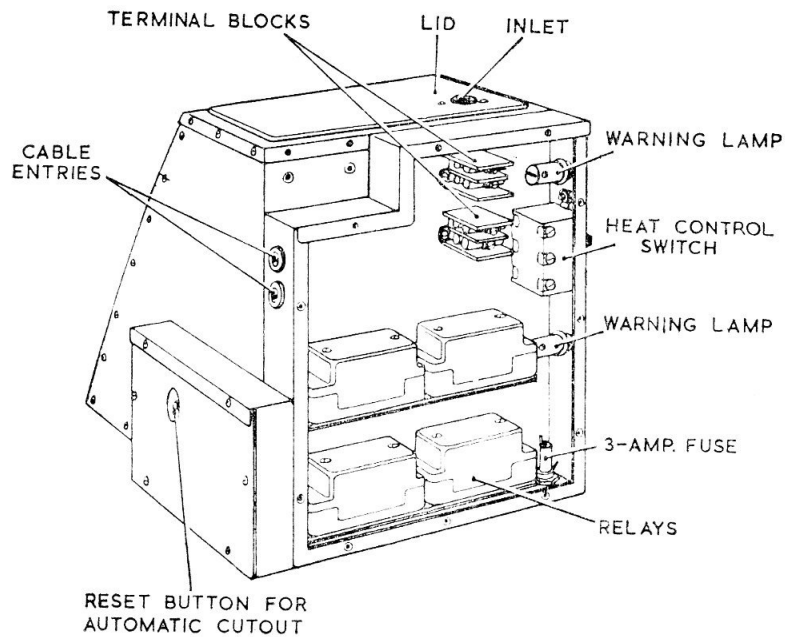


Fig. 2. Side view with cover removed

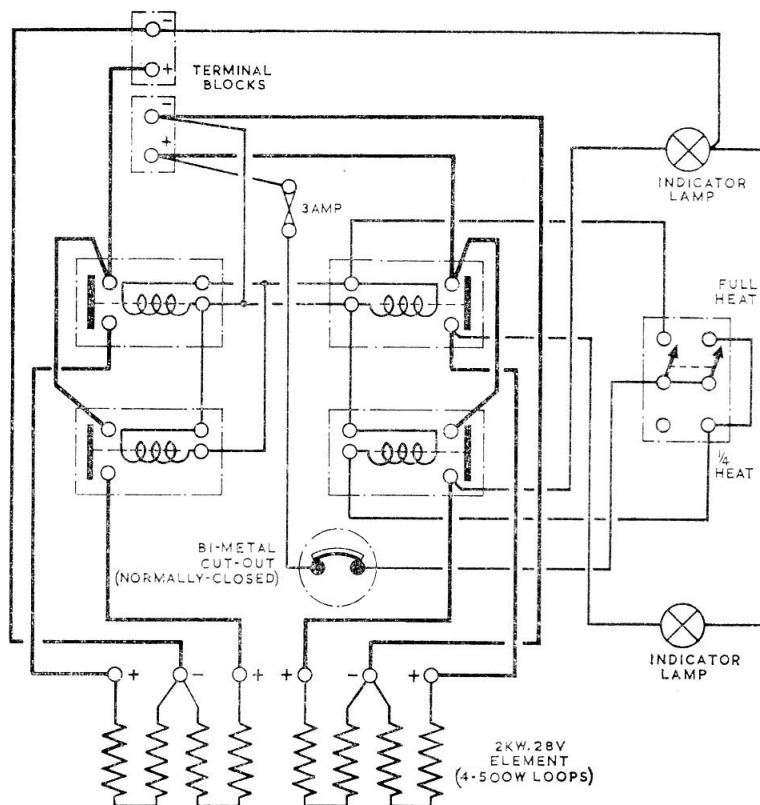


Fig. 3. Circuit diagram, 4-relay types

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OPERATION

General

5. All models of the urn have a thermostatically operated cut-out and a 3 amp fuse in the supply to the control switch, should the urn overheat or develop a fault these will protect the elements and the other circuit components. The indicator lamps are connected to the contacts of the $\frac{1}{4}$ -HEAT relay or to the contacts of one of the FULL-HEAT relays as appropriate, and indicate the selection made. It should be noted that they only indicate that the control circuit is energized and do not necessarily show that the elements are operating, in the case of FULL-HEAT the indicators show only that two of the relays are energized.

4-relay types

6. When the control switch is placed in the FULL-HEAT position all four relays are energized. These relays are each connected in series with a 500 watt heater element as shown in fig. 3, and the total loading is thus 2000 watt. When the switch is placed in the $\frac{1}{4}$ -HEAT position only one of the relays is energized giving a loading of 500 watt.

3-relay types

7. In the 3-relay type of urn one relay is used to control two of the 500 watt elements, each of the other relays controls one 500 watt element as shown in fig. 4. When the control switch is placed in the FULL-HEAT position all three relays are energized and the total loading is 2000 watt, in the $\frac{1}{4}$ -HEAT position only one relay is energized and the loading is 500 watt.

SERVICING

8. Inspect the tap and all gasket joints for signs of leaking, and remove the lid and examine for the deposit of scale or fur on the interior and on the elements. Scale or fur can be removed by using a solution of glacial acetic acid, mixed in the proportion of one part acid to 16 parts of water (i.e. half pint of glacial acetic acid to one gallon of water). The required amount of this solution should be boiled in the urn and then allowed to stand for a number of hours, after which the solution should be drawn off and the loose scale and fur brushed out by hand. NO SHARP METAL OR HARSH ABRASIVES SHOULD BE USED.

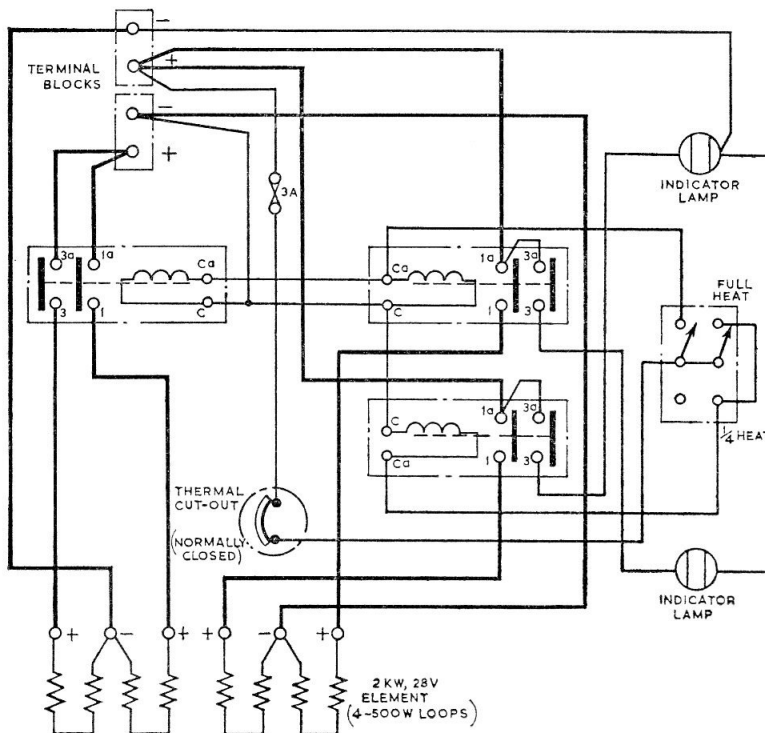


Fig. 4. Circuit diagram, 3-relay types

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9. The covers of the control box and of the heater compartment should be removed and the electrical connections and terminals checked for corrosion and security. The covers of the relays should be removed and they should be inspected for signs of overheating and the contacts checked for signs of pitting or burning. Further servicing of the relays should be carried out in accordance with the relevant chapter in A.P.4343C, Vol. 1, Book 2, Sect. 3.

Element renewal

10. (1) Remove the element compartment cover and disconnect the connections from the element terminal studs.
- (2) Disconnect the connections to the cut-out and remove the terminal block

securing screws.

- (3) Remove the thermal cut-out from the element plate.
- (4) Remove the twelve 2 B.A. nuts and washers securing the element mounting plate and withdraw the element from the urn.
- (5) Clean any trace of the old sealing washer from the mounting hole, and then smear Bosswhite sealing compound on both surfaces of the new washer supplied with the new element and fit the new washer to the mounting hole.
- (6) Insert the new element after testing and reassemble in the reverse order.

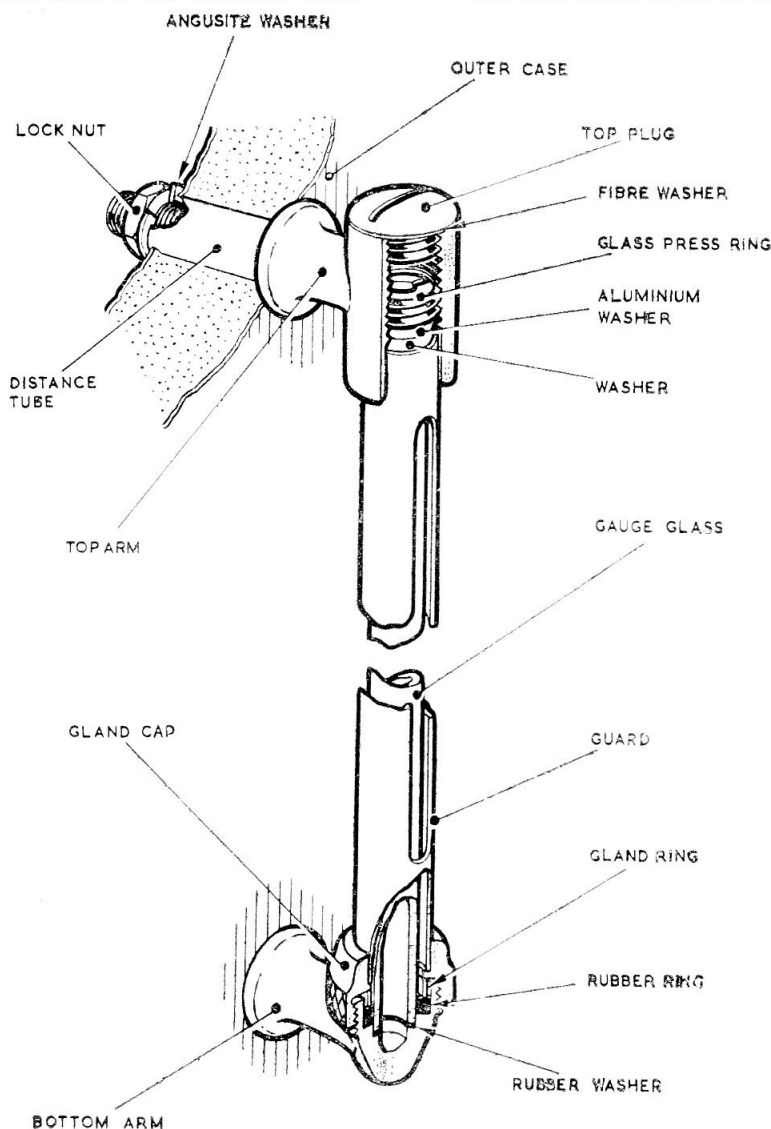


Fig. 5. Water contents gauge

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Thermal cut-out renewal

11. (1) Disconnect the leads and remove the two nuts securing the plastic cover. The cover and the terminal plate assembly may now be withdrawn.

(2) The main bridge assembly holding the cut-out plunger should then be removed by unscrewing the two securing screws. The bi-metal jaw is secured to the element plate by a screw and is also soft soldered to the plate, it should be inspected and if renewal is required it will normally be accomplished by the renewal of the element.

(3) A new bridge assembly, terminal plate assembly and cover may be fitted in the reverse order.

Water contents gauge renewal

12. The water contents gauge, which is shown partially sectioned in fig. 5, may be renewed by removing the inner locknuts from the top and the bottom arms and then withdrawing the assembly. The gland cap on the new contents gauge should be slackened off before attempting to fit the gauge to the urn, when fitting the gauge ensure that the screwed shanks of the top and the bottom arms pass through the distance tubes inside the inter-compartment space. Bosswhite jointing com-

pound should be smeared on the new Angusite washers and on the threads of the top and the bottom arms before the locknuts are secured. After fitting the gauge to the urn tighten down the gland cap on the bottom arm and then adjust the glass press ring in the top arm if necessary. A new gauge glass may be fitted by gaining access through the top plug and removing the glass press ring, the glass can then be removed by passing it through the top arm.

Testing

13. After all servicing the urn should be filled with water which should then be boiled, after which the urn should be allowed to stand for one hour and all joints and seals examined for signs of leaking. The thermal cut-out may be checked for operation by timing the time taken for the cut-out to operate when the urn is switched to FULL-HEAT whilst empty. The time taken for the cut-out to operate should be between 1 minute 50 seconds and 2 minutes 10 seconds. If after 2 minutes 10 seconds the cut-out does not operate switch off and adjust the gap in the bi-metal jaw of the cut-out. The gap in the jaw is nominally $\triangleleft \frac{1\frac{1}{4}}{64} \text{ in.} \triangleright$

Insulation resistance test

14. The insulation resistance of the urn should be tested using a 250 volt insulation resistance tester and should be not less than 5 megohms.

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