Chapter 5

DE-ICING, OVERHEAT CONTROLLER, PLESSEY, TYPE 11

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Controller, Type 11	*Part No.* 7CZ/107914
Sensing unit (*Plessey* 7CZ/143151)	*Ref. No.* 5CZ/6346
Amplifier and time delay unit (*Plessey* 7CZ/143244)	*Ref. No.* 5CZ/6345
Supply to amplifier	115*V*, 400 *c/s* (*nominal*) 21-29*V d.c.* (*nominal*)
*Used on heater mats D.*8	7·425 *ohms* ± 3·5%
Setting range	7·66 *ohms to* 8·3 *ohms*
Hold off cycle	5-7 *secs.*

Introduction

1. The type 11 controller is an overheat protective device and consists of two separate units namely a sensing unit and an amplifier and time delay unit (*fig.* 1).

2. The unit is employed in the aircraft de-icing system and its purpose is to discontinue the power to a set of engine de-icing mats when their temperature reaches a given maximum value and to resume the power after a given time interval.

Note . . .

Details of the apparatus required to test the controller and sensing unit, together with the test procedure wil be issued later.

DESCRIPTION

General

3. Both units are housed in an hermetically sealed cans with glass seals shrouded by moulded terminal blocks for external screw connections. The sensing unit potentiometer is externally adjustable and all internal components are mounted on printed circuit boards.

Sensing unit

4. This unit consists of a combination voltage and current transformer coupled to which is a phase sensitive rectifier system, the output of which is fed into the amplifier and time delay unit.

Amplifier and time delay unit

5. This unit consists of a two-stage magnetic amplifier driving a small internal relay which in turn switches the main de-icing contactor. A time delay circuit is incorporated which holds the relay off for a fixed time interval after a overheat operation.

OPERATION

6. No sensing elements are used with this system. The temperature is measured using

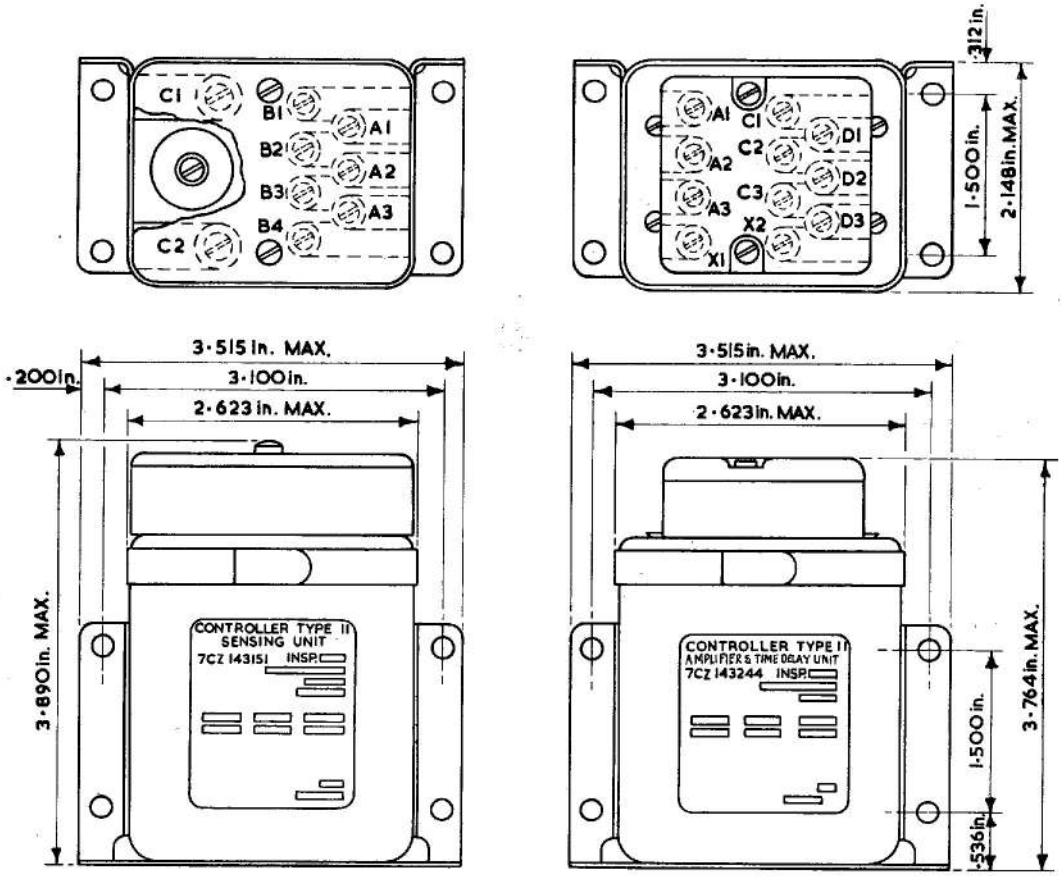

Fig. 1 External view of sensing unit and amplifier and time delay unit.

the resistance temperature coefficient of the heater mats.

7. The total mat current is fed to a three turn winding on the combined current and voltage transformer (*fig.* 3). The total mat voltage is fed to a high resistance winding on the transformer, but in such a direction that at the overheat temperature, the fluxes due to the two windings exactly cancel each other out. The resistance of the second winding is adjustable by means of a potentiometer (R2), mounted in the sensing unit. Thus, by varying the level of the flux, due to the mat voltage, the point at which the fluxes will cancel out can be varied.

8. Any out-of-balance of fluxes will produce an output from the phase sensitive rectifier (P.S.R.) system, the polarity of which will depend on whether there is a predominance of current ampere turns (mat cold) or voltage ampere turns (mat hot). The output from the P.S.R. is fed to the amplifier and time delay unit.

9. The relay in the amplifier and delay unit is normally de-energised for zero signal for mat cold signal inputs and is energised through the two stage magnetic amplifier when " hot " signals are received. When the relay RL/2 is energised the main contactor is open circuited and discontinues the power to the mat. This has the effect of removing the " hot " signal and normally the relay would immediately allow power to be resumed to the mats and heating would result. This is overcome by the introduction of a time delay circuit (capacitor resistance) which is incorporated to hold the internal relay energised by means of the magnetic amplifier, for a period of 6 secs.±1 sec. during which time the mat will probably have cooled sufficiently to provide a cooled signal.

SERVICING

10. Since both of these units are sealed very little servicing can be done other than external inspection for damage, security of attachments and the condition of connecting leads.

11. Using a 500 V insulation resistance tester measure the insulation resistance between all terminals collectively and frame ; the resistance should not be less than 20 megohms.

12. Further information on testing will be issued as soon as it becomes available.

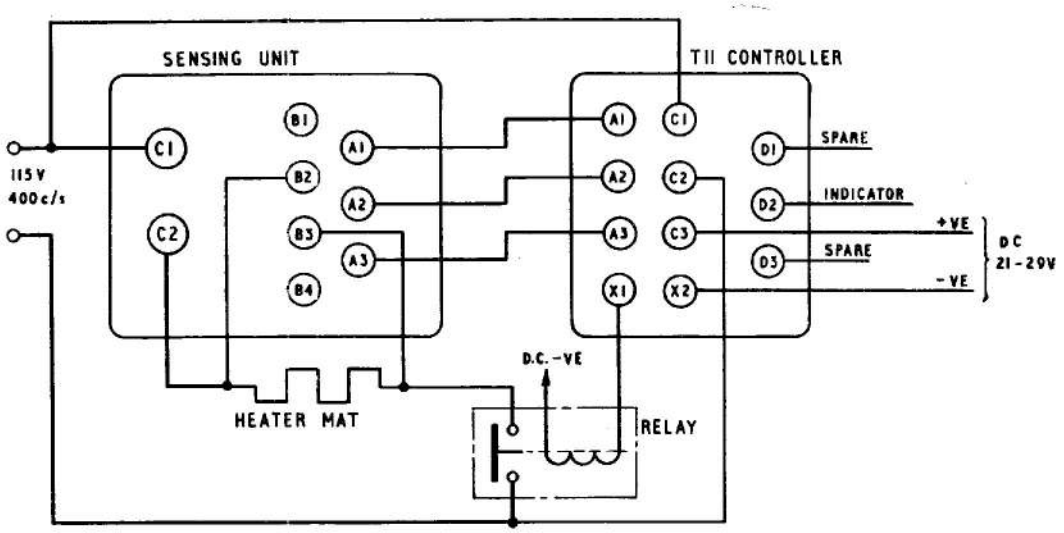

Fig. 2 Terminal arrangement.

(42) Wt. 54487—3617 2625 12/61 St.S.

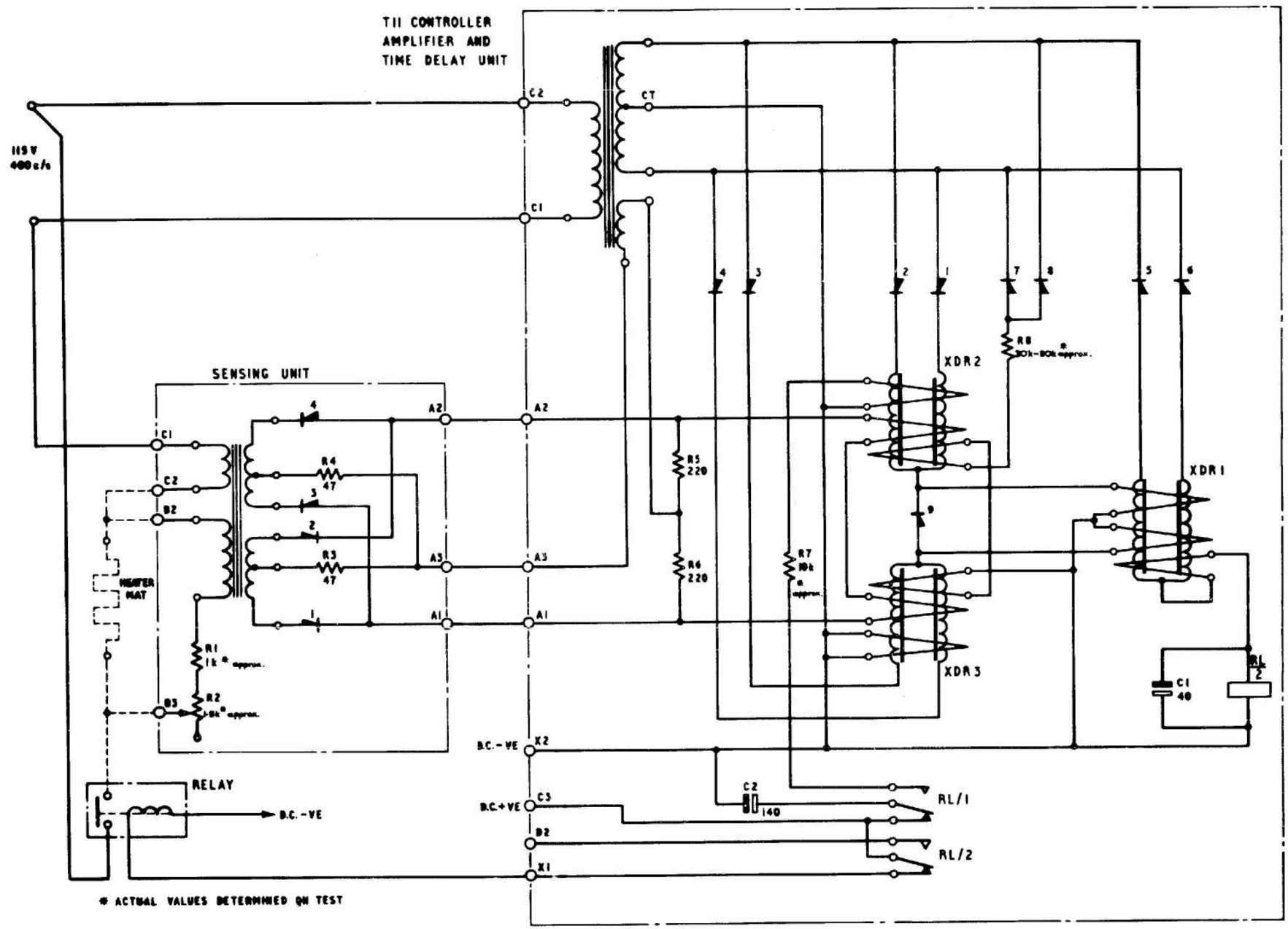

Fig. 3 Circuit diagram Fig. 3