Chapter 9

3-PHASE CONDENSER UNIT, ROTAX, TYPE ZA 7801

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Condenser unit, Type ZA 7801	*Ref. No.* 5CZ/5891
Voltage	208*V*, 400 *c/s*, 3-*phase a.c.*
Temperature	—65 *deg. C to* + 70 *deg. C*
Altitude	60,000 *ft.* (*max*)
Nominal line current	3.6 *amp.*
Nominal reactive kVA	1.3 *kVA*
Overall dimensions—	
Length	4.312 *in.*
Width	3.375 *in.*
Height	5.200 *in.*
Weight	4 *lb.*

Introduction

1. The 3-phase condenser unit is suitable for use in aircraft, and is designed to correct the power factor of individual 3-phase induction motors. Correction is particularly desirable in the case of induction motors which may run light or on no load, for the power factor of induction motors is inherently low at these loads.

2. The unit is designed to give satisfactory operation in air temperatures between +70 deg. C and —65 deg. C at altitudes up to 60,000 ft; at temperatures below +15 deg. C the capacitance may fall progressively with reduction in temperature down to a minimum of 75% of the nominal value at —65 deg. C. The amount of power factor correction will be accordingly reduced, while the low temperature prevails.

DESCRIPTION

3. The unit (*fig.* 1) consists of three banks of four 1 μF capacitors suitably interconnected to give a capacity of 4 μF per phase as shown in fig. 2. These are mounted within a plated brass case, arranged with four fixing holes. A moulded terminal cover is provided and secured to the enclosing cover. The capacitors are cylindrically wound from Kraft paper and aluminium foil, the end connections being ultrasonically soldered and the whole filled with solventless varnish.

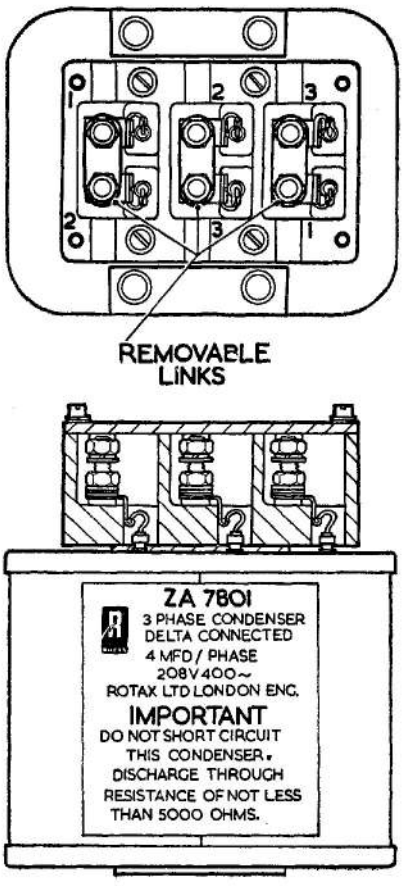

Fig. 1. 3-phase condenser unit, Type ZA 7801

4. The unit provides four 1 μF capacitors in parallel per phase, the phases connected in delta. Each of the four parallel circuits of each phase is protected by an internal fuse, so that in event of a short-circuit developing in a capacitor it will be disconnected without shut-down and the unit will continue to function with reduced capacity in one phase. These fuses are contained within the sealed case.

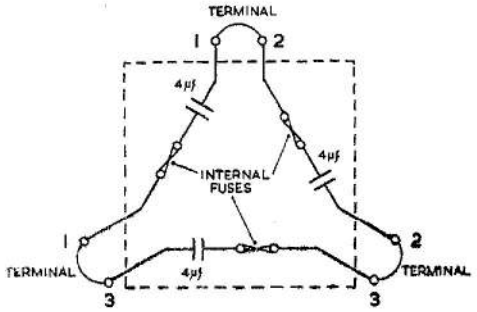

Fig. 2. Circuit diagram

Rating

5. The unit is continuously rated for connection to a 208 volt, 400 c/s 3-phase supply and at that voltage and frequency the normal line current is 3·6 amp. and the nominal total reactive kVA is 1·3 kVAr.

Electrical connections

6. There are six 2B.A. terminals provided, i.e., two per phase, each pair joined by a removable link. These are suitable for receiving up to three lugs per phase.

OPERATION

7. The unit is for permanent connection to the stator terminals of the 3-phase induction motor whose power factor is to be corrected. The capacitor currents are approximately 180 degrees ahead, in time phase of the Wattless currents taken by the induction motor. The wattless or idle currents in the line conductors, and supply alternator, are accordingly reduced by cancellation, i.e., the power factor is improved.

INSTALLATION

8. The unit may be mounted in any attitude. Four 0·215 in. diameter fixing holes are provided at 2·843 in. and 1·375 centres.

SERVICING

9. The unit should be given a visual inspection for freedom from damage and security of electrical connections.

Testing

10. The following tests may be made for satisfactory performance; a faulty unit must be rejected, as no renewal of component parts is possible.

WARNING . . .

It is essential that the capacitors should not be short-circuited during testing. Discharge should be conducted through a resistance of not less than 5,000 ohms.

Individual phases

11. Capacitors in each separate phase should meet the following requirements (at room temperature, 20 deg. C approx.)—

(1) Capacity, at 1kc/s 2·7—4·4 μF

(2) Percentage power factor — less than 1·75

(3) Insulation resistance (300V d.c. for 60 sec.) not less than 20 megohms

Insulation resistance (between phases) (at room temperature 20 deg. C)

12. The insulation resistance, measured by connecting the two terminals of each phase winding together and testing between each phase in turn, by applying 300V d.c. for 60 sec. should be not less than 1,000 megohms at room temperature.

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