Chapter 36

COMPOUNDING, MERZ-PRICE AND CONTACTOR UNIT, ROTAX, TYPE U 6402

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LEADING PARTICULARS

Compounding unit, Type U 6402	*Ref. No.* 5UC/7380
Operating voltage	208 *V, 3-phase,* 400 *c/s*
Rating	*continuous,* 50 *kVA*
Cooling	*natural convection*
Altitude	36,000 *ft. maximum*
Ambient temperature range	—70 *deg. C. to* +55 *deg. C.*
Dimensions—	
Overall length	15·687 *in.*
Overall width	8·625 *in.*
Overall height	7·812 *in.*
Weight	16 *lb. approx.*

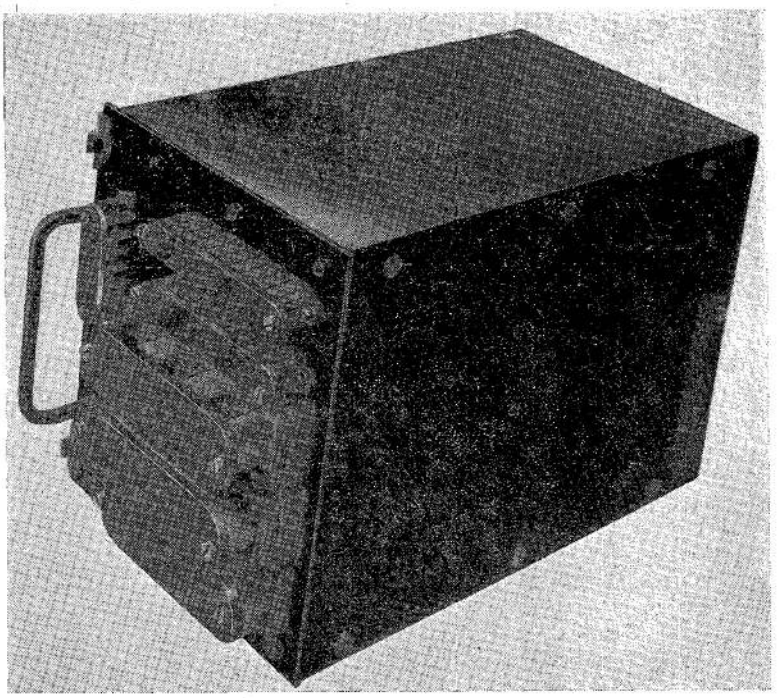

Fig. 1. General view of unit

Introduction

1. The U 6402 is a compounding, Merz-Price and contactor unit for use in conjunction with Rotax alternator, Type BA2003 and voltage control and protection unit, Type U 6401 on 208V, 400 c/s, 3-phase supplies.

DESCRIPTION

2. The unit is designed for mounting in a rack assembly system already fitted in an aircraft for which this, and associated equipment, has been specifically designed. Its main electrical components are as follows: a Merz-Price transformer consisting of three separate delta-connected current transformers, TR1, TR2, TR3, mounted one above the other on moulded supports backing the three main terminals A1, B1, C1 on the front end-plate; a single-phase current transformer TR4, forming a common assembly with TR3; a compounding transformer TR5 mounted on the opposite end-plate; and a 3-phase contactor (D13101) bolted to the chassis base.

3. Internal connections are shown in the circuit diagram (fig. 2). All the external connections numbered thereon are taken to moulded Ward Brooke multi-way terminal blocks or heavy-current terminal posts in Rotax moulded 3-way terminal blocks, protected by covers and mounted on the front end plate. Access to internal components is via light aluminium covers to top and sides secured by quick-release fasteners.

Operation

4. The contactor has two sets of heavy-current contacts and two sets of auxiliary contacts (micro-switches). The solenoid windings are centre-tapped and cross connected through each winding's own set of auxiliary contacts so that only one solenoid and set of contacts is in operation at one time.

5. The path from main terminals A2, B2, C2 is used only for ground operation in conjunction with the aircraft auxiliary power unit, while the other path from main terminals A1, B1, C1 is used only for flight in

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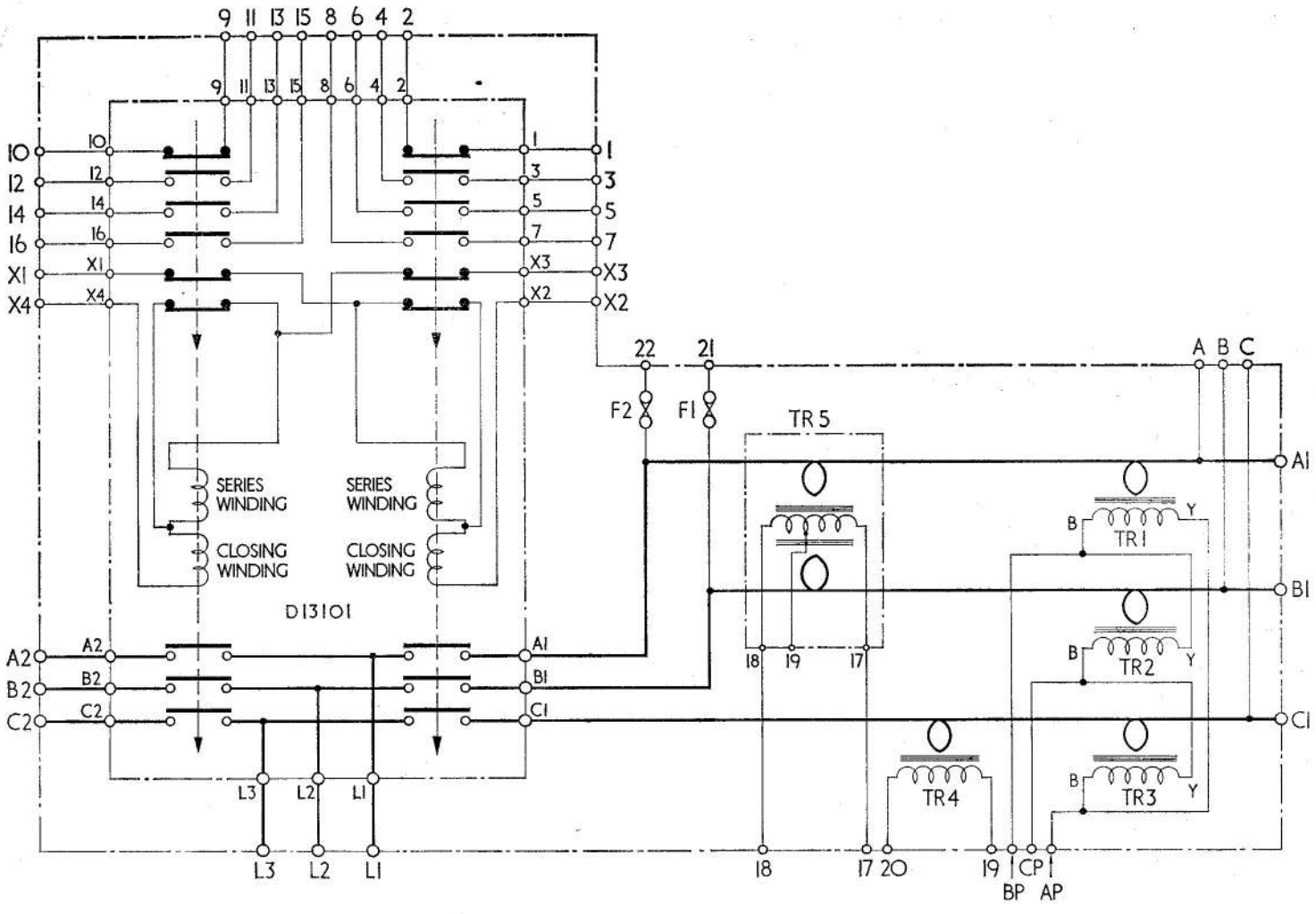

Fig. 2. Circuit diagram

conjunction with the respective alternator. The Merz-Price protection transformers are used with the flight-operated solenoid; on the occurrence of a line-to-line or line-to-neutral fault, a relay in the voltage control and protection unit, Type U6401, cuts off the supply to the solenoid and thus breaks the bus-bar contacts. The compounding transformer on line B is used to sense the line current and to send a signal, varying in proportion to the load, to a rectifier in the U6401 which supplies a share of the alternator excitation current via a field compounding winding.

Electrical connections

6. Auxiliary connections are made via 6-UNC-type studs on three 10-way and one 5-way Ward Brooke terminal blocks. Main connections are made via 0·3125 in. UNF terminals mounted on three 3-way Rotax terminal blocks. Earthing is provided for by a 10–32 UNF stud on the same end-plate.

INSTALLATION

7. The unit slides along channels on two runners and is located in the rack by two pins at the rear and two brackets secured upon anchor plates at the front. The unit may be operated in any attitude.

SERVICING

8. Servicing is normally confined to ensuring that the unit is clean and free from damage. Check that all terminals and external screws are tight, that all connections are secure and examine connecting leads for signs of fraying, corrosion or other deterioration.

Testing

9. If at any time the serviceability of the unit should be suspect, it may be subjected to the standard serviceability test as laid down in Appendix A.

Appendix A

STANDARD SERVICEABILITY TEST FOR COMPOUNDING, MERZ-PRICE AND CONTACTOR UNIT, ROTAX, TYPE U 6402

Introduction

1. The following tests may be applied to the unit before it is put into service, or at any time when its serviceability is suspect.

Test equipment

2. The following test equipment will be required:—

(1) Continuity tests: Testmeter, Type F (Ref. No. 5QP/1).

(2) Insulation resistance: insulation resistance tester, Type A (Ref. No. 5G/1621).

(3) Electrical tests:
ammeter, a.c., range 0–500 mA.
ammeter, a.c., range 0–100 mA.

Testing

Continuity tests

3. (1) With a 28V d.c. supply connected to terminals X1, X2, test for continuity between the following terminals. The results should be as follows:

L1–A1	Short circuit
L2–B1	Short circuit
L3–C1	Short circuit
3–4	Short circuit
5–6	Short circuit
7–8	Short circuit
9–10	Short circuit
A–A1	Short circuit
B–B1	Short circuit
C–C1	Short circuit
L1–A2	Open circuit
L2–B2	Open circuit
L3–C2	Open circuit
1–2	Open circuit
11–12	Open circuit
13–14	Open circuit
15–16	Open circuit

(2) Transfer the 28V d.c. supply from terminals X1, X2 to terminals X3, X4, and test for continuity between the following terminals. The results should be as follows:

L1–A1	Open circuit
L2–B1	Open circuit
L3–C1	Open circuit
3–4	Open circuit
5–6	Open circuit
7–8	Open circuit
9–10	Open circuit
L1–A2	Short circuit
L2–B2	Short circuit
L3–C2	Short circuit
1–2	Short circuit
11–12	Short circuit
13–14	Short circuit
15–16	Short circuit
A1–22	Short circuit
B1–21	Short circuit

Insulation tests

4. (1) (a) Common together terminals A, A1, A2, L1 and 22 and bring off connection as a common lead.

(b) Common together terminals B, B1, B2, L2 and 21 and bring off connection as a second commoning lead.

(c) Common together terminals C, C1, C2, L3 and bring off connection as a third commoning lead.

(d) Common together terminals 1 and 2 and bring off connection as a fourth commoning lead.

(e) Common together terminals 3 and 4 and bring off connection as fifth commoning lead.

(f) Common together terminals 5 and 6 and bring off connection as sixth commoning lead.

(g) Common together terminals 7 and 8 and bring off connection as seventh commoning lead.

(h) Common together terminals 9 and 10 and bring off connection as eighth commoning lead.

(j) Common together terminals 11 and 12 and bring off connection as ninth commoning lead.

(k) Common together terminals 13 and 14 and bring off connection as tenth commoning lead.

(l) Common together terminals 15 and 16 and bring off connection as eleventh commoning lead.

(m) Common together terminals 17 and 18 and bring off connection as twelfth commoning lead.

(n) Common together terminals 19 and 20 and bring off connection as thirteenth commoning lead.

(p) Common together terminals X1 and X2 and bring off connection as fourteenth commoning lead.

(q) Common together terminals X3 and X4 and bring off connection as fifteenth commoning lead.

(r) Common together terminals Ap, Bp, and Cp and bring off connection as sixteenth commoning lead.

(2) Connect all but the first commoning lead to a suitable point on the chassis, and check the insulation between the first commoning lead and the chassis with a 500 volt Megger. The reading obtained should not be less than 5 megohms.

(3) Repeat the insulation resistance test, between chassis and each of the remaining commoning leads in turn, with the other fifteen commoning leads connected to the chassis. In each case, the insulation resistance must not be less than 5 megohms.

Electrical tests

5. (1) Connect a 28 volt d.c. supply to terminals X1 and X2 and pass a three phase current of 50 amp., 400 c/s, between terminals L1, L2, L3 and terminals A1, B1, C1. The outputs obtained from the current transformer secondaries under these conditions should be as follows:—

Compounding transformer:—Output 170 to 228 mA a.c. between terminals 17 and 18.

Meter transformer:—Output 230 to 280 mA a.c. between terminals 19 and 20.

Merz-Price transformer:—

(a) Output 76 to 95 mA a.c. between terminals Ap and Bp, with Cp connected to Bp.

(b) Output 76 to 95 mA a.c. between terminals Bp and Cp, with Ap connected to Cp.

(c) Output 76 to 95 mA a.c. between terminals Cp and Ap, with Bp connected to Ap.

Note . . .

The current transformer secondary windings must not be left on open circuit with current flowing in the primaries, i.e., if the secondaries are not connected to loads, they must be short-circuited.

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