314 SIGNALS SQUADRON

WIRELESS SENDER C11

TECHNICAL HANDBOOK - UNIT REPAIRS

General

1. This regulation details the procedure to be followed in carrying out unit repairs. The extent of repair at unit level will normally be restricted to replacing items held in the First Aid Technical Stores Outfit (FATSO).

2. In the cases of components in the sealed master oscillator compartment or in the Aerial tuning unit No 7 replacements should be made only:-

(a) On the initiative of the technician, when absolutely necessary to restore essential communications.

(b) On the authority of the Officer Commanding.

3. Where action as in para 2 has been taken the following points must be observed:-

(a) The seal should be broken only in the driest and most dust free conditions and should not, in any case, remain open for more than one hour.

(b) A new desiccator should be fitted immediately before resealing.

(c) The equipment should be returned to workshops for drying and seal testing as soon as possible after the repair.

4. It is imperative that C69, the trimmer capacitor adjacent to the calibrator crystal is not disturbed, since the frequency setting accuracy is dependent on the correct adjustment of this trimmer. If it is accidentally moved the set should be returned to a REME unit which is equipped with a Calibrator, crystal, precision. This action is also desirable as soon as possible after the crystal oscillator valve V12 has been replaced.

Air filters

5. The set will operate at the correct temperature only if there is free air flow through the filters fitted to the sender and power supply unit. The filters should, therefore, be removed frequently and cleaned of dust.

6. To clean the filters proceed as follows:-

(a) Slacken the screw holding the turn-button catch sufficiently to allow the cover to be fully opened.

(b) Lift the spring clip holding the filter in position, clear of its grooves.

(c) Depress and draw the filter forward out of its holder.

(d) Gently tap the filter (as withdrawn) to remove dust collected on the underside.

(e) Replace in reverse order, ensuring that the filter is held firmly upwards by the spring clip.

7. If the filter cannot be satisfactorily cleaned fit a new one from the FATSO.

Removal and replacement of collet type knobs

8. To remove the knob:-

(a) Hold the knob and unscrew the central dome headed cap using the special tools provided. Do not unscrew against the mechanical end stops of the control.

(b) Remove the damaged part or parts of the knob.

(c) Fit the new bakelite part of the knob on the hexagon and tighten the dome headed cap ensuring that orientation of the pointer is correct.

9. If it is necessary to change either the complete knob assembly or the component secured by it:-

(a) Loosen the dome headed cap approximately eight turns and tap sharply on the cap or, preferably, on a screwdriver engaged in the slot. This will release the collet.

(b) Remove the dome headed cap and the bakelite part of the knob.

(c) Unscrew the upper large nut to remove the knob assembly.

(d) Unscrew the lower large thin nut to remove the component.

10. To replace the assembly:-

(a) Refit the collet and body over the spindle.

(b) Fit and tighten the large thin nut assembly and the large upper lock nut.

(c) Fit the knob over the body and engage the hexagon.

(d) Refit the dome headed cap and tighten until the collet begins to grip pulling the knob away from the panel to prevent binding.

(e) Orient the knob pointer correctly and tighten fully.

Access to internal components

11. To remove the sender from its case:-

(a) Stand the equipment on its face.

(b) Unscrew the four large knurled screws on the rear of the case.

(c) Lift the case from the set.

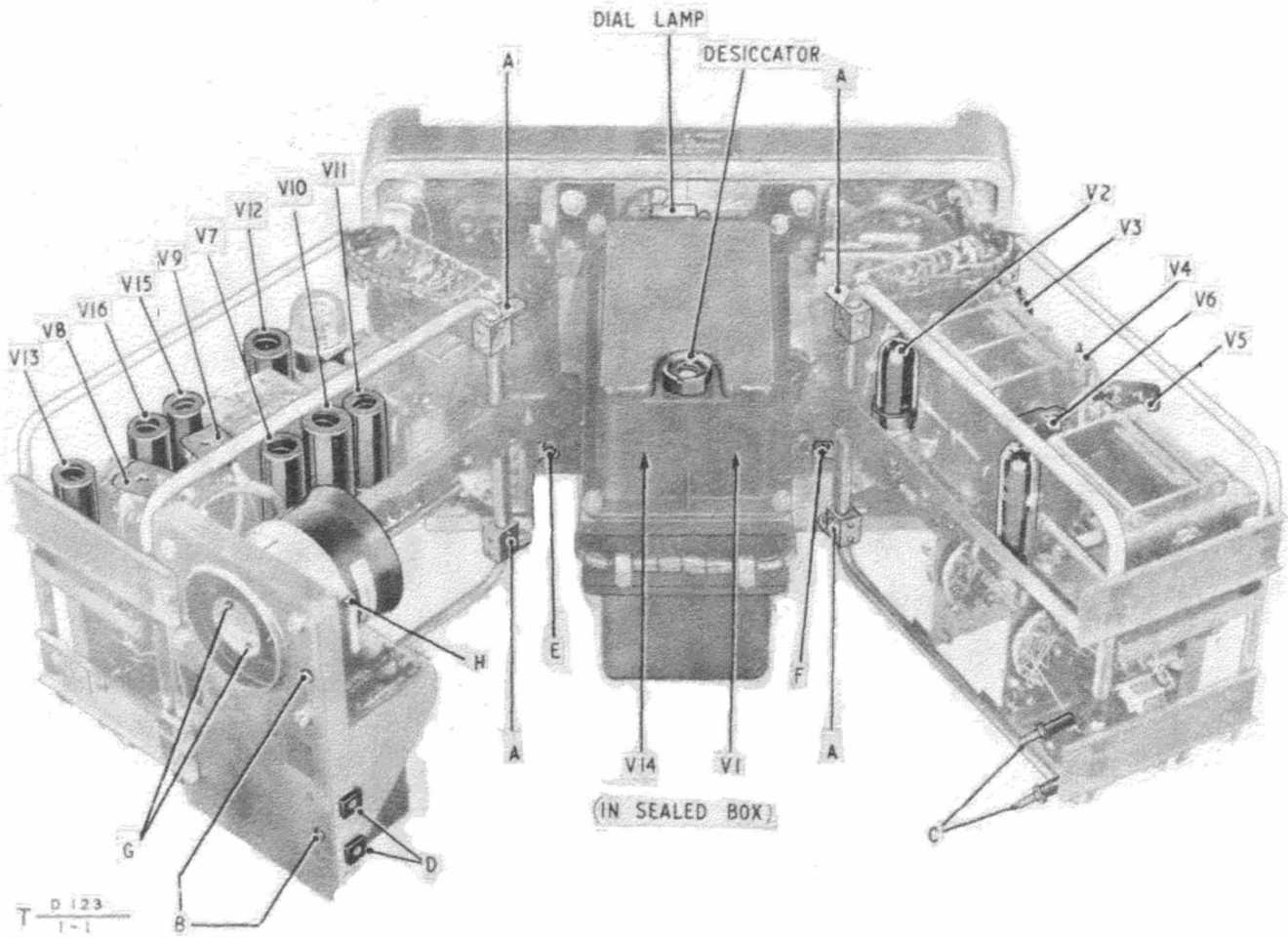

Fig 1 - General layout of sender assembly

12. (a) If it is necessary to unhinge the chassis eg to replace a blower motor, refer to Fig 1 and proceed as follows:-

(i) Remove the four No 4 BA screws A.

(ii) Remove the two No 2 BA screws B.

(iii) Remove plugs C from sockets D.

(b) The chassis will now hinge open to approximately the extent shown in Fig 1. If it is necessary to open further, loosen the four No 4 BA nuts E and F securing the filter holders until they can be depressed sufficiently to allow the chassis to be swung fully open.

13. Do <u>not</u> move any control or disturb the positioning of the amplifier capacitors when the set is unhinged. Ensure that this has not occurred by checking that all couplings engage <u>correctly</u> on reassembly.

Replacement of blower motor

14. To replace the motor assembly (see Fig 1):-

(a) Open and unhinge the chassis as detailed in paras 11 and 12.

(b) Undo the two No 8 BA screws G and remove end cover plate.

(c) Undo two No 6 BA nuts and remove leads complete with capacitor and ferrite beads. Take care not to damage the beads.

(d) Loosen clamping screw H and slide motor assembly forward out of its clamp.

(e) Replace by new assembly in reverse order noting the lead polarity:- the brown/white lead is fitted to the terminal marked + with anti-clockwise arrow above it.

(f) Verify that air is expelled from rear of unit.

(g) Return unserviceable motor assembly for repair.

Desiccators

15. Humidity indicators are fitted to the desiccators on the master oscillator unit and aerial tuning unit. While these indicators are blue the desiccant remains effective. When the indicator is pink the desiccant can absorb no more moisture and the following action should be taken:-

(a) Fit a new desiccator from the FATSO. Do not remove the replacement from its sealed pack until ready to fit. Make the change in as dry and dust free an atmosphere as possible.

(b) Notify REME so that the unit can be dried and seal tested as soon as possible.

Elementary fault finding and valve replacement

16. Table 3001 (location of faults) attempts to give a logical diagnosis of faults assuming that the p.s.u. sender and a.t.u. are connected normally. The first check, therefore, should always be on simple things such as microphones, headsets, connectors and controls. The table gives symptoms based on a switching on sequence using the sender panel meter and aerial current meter as monitors. Table 1 gives typical readings for a good set.

17. Valves may normally be replaced without need of readjustment other than the usual setting up procedure. If V1 or V14 are changed action as in para 3 must be taken and if V12 is replaced, action as in para 4. Fig 1 gives the layout of the valves and Table 2 lists the functions and type numbers. Note that some valves are connected in series, therefore the fact that a valve does not light up does not indicate that that particular valve is faulty.

Meter	Switch position	Measures	Expected reading
Panel	LT x 5	24V d.c. supply	4.5 - 5.0
Panel	HT x 100	500V h.t.	4.5 - 5.0
Panel	GRID PA x 1	Grid volts V5, V6	Low power 1 - 4 High power 5 - 8
	CATH PA x 30	Cathode volts V5, V6	Low power 1.5 - 3 High power 5 - 9
Aerial		Aerial current	High power 5 - 10

Table 1 - Typical meter readings

Circuit Reference	Function of stage	Valve type
V1	Master oscillator	CV4010
V2	Buffer amplifier	CV4039
V3	Doubler (Bands 2 and 3) only	CV4039
V4	Doubler/amplifier	CV4039
V5	Power amplifier (parallel connected)	CV2347
V6		CV2347
V7	Automatic modulator control rectifier	CV4007
V8	Push-pull modulator	CV2347
V9		CV2347
V10	Two-stage audio amplifier	CV4003
V11	Microphone amplifier	CV4015
V12	Calibrator oscillator and mixer	CV4003
V13	C.W. sidetone oscillator	CV4010
V14	Voltage stabiliser for V1	CV287
V15	Intercommunication two-stage amplifier	CV4010
V16		CV4010

Table 2 - Valve functions and types

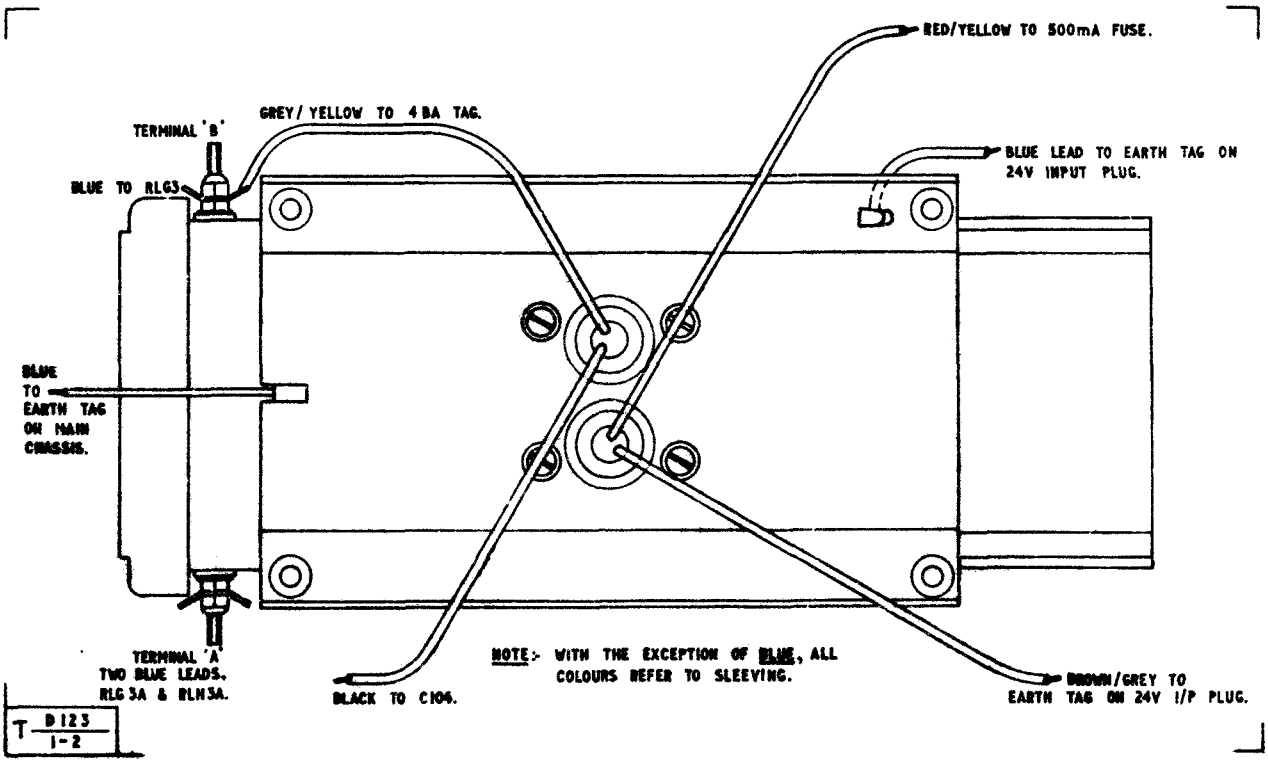

Fig 2 - Wiring to rotary transformer

Replacement of rotary transformer in power supply unit

18. Do not assume that the rotary transformer is faulty until checks have been made on switch positions, batteries, connectors, fuses and brushes. If it is necessary to replace the rotary transformer and the item is available in FATSO remove the unit from its case as follows:-

(a) Stand the unit on its front panel.

(b) Unscrew the four knurled nuts at rear and lift the case from the unit.

19. To remove the rotary transformer. (Refer to Fig 2):-

(a) Unsolder the grey/yellow sleeved lead from Terminal B.

(b) Undo the two No 4 BA nuts and remove the tags and remaining leads from Terminals A and B.

(c) Unsolder the two blue earth links from the rotary base mounting to chassis.

(d) Unsolder the black lead from large capacitor C106.

(e) Unscrew the four No 2 BA screws securing the rotary transformer and ease backwards.

(f) Unsolder the red/yellow sleeved lead from the 500mA fuseholder.

(g) Unsolder the brown/grey sleeved lead from the earth tag on the input plug.

(h) Remove the rotary transformer and fit the new item in reverse order.

Note: The next page is Page 1001

Table 3001 - Elementary

Check No	Switch positions	Symptoms
1	Power ON	No dial lights on set, p.s.u. or a.t
2	Power ON Meter switch at LT x 5	No meter reading
3	Power ON System switch to C.W.	Rotary transformer does not run
4	Power ON Set at C.W. Meter switch HT x 100	Rotary transformer runs but no meter reading
5	Power ON Set at C.W. Meter at GRID PA x 1	Low or no meter reading
6	Power ON Set at INT CAL Check at calibration points	(a) No whistle in headset (b) Whistle in headset
7	Power ON C.W. high power Meter at CATH PA x 30	(a) High reading on all frequency b (b) High readings Bands 2 and 3 Normal Band 1
8	Power ON C.W. high power Meter at CATH PA x 30 Tune for maximum current on aerial tuning unit	Low or no reading on set meter and Low or no reading on aerial meter
9	Power ON Voice/CFS Send and whistle into microphone	No change in aerial current (set previously checked on C.W.)
10	As in 9 listen in headset	No change in aerial current - but (a) No sidetone (b) Sidetone
11	Power ON Set INT CAL	No whistle in headset near calibrati points
12	Power ON C.W. high power	Transmitter functions correctly but no sidetone on keying

mentary fault finding table

	Possible faults	Action to be taken
. or a.t.u.	(a) Faulty battery (b) 5A fuse blown (c) Faulty lamp or lamps (d) Wiring fault	(a)) (b)) Replace faulty item (c)) (d) Report
	5A fuse blown	Replace
run	(a) Faulty brushes (b) Faulty rotary transformer (c) Relay or switching fault	(a) Replace (b) Replace (if in FATSO) (c) Report
no meter	500mA fuse blown	Replace
	Faulty valves V1, V2, V3 or V4	Proceed to check 6 to eliminate
	(a) V1 or V2 faulty (b) Fault is in V3 or V4	(a) Replace (b) Proceed to check 7 to further eliminate
quency bands nd 3	(a) V4 faulty (b) V3 faulty	(a) Replace (b) Replace
er meter	(a) V5 or V6 faulty (b) Internal fault	(a) Replace (b) If valve replacement action does not eliminate the fault, report
.W.)	(a) Faulty microphone (b) V8, V9, V10, or V11 faulty	(a) Replace or fit new insert (b) To eliminate proceed as in 10
- but	(a) V10 or V11 faulty (b) V8 or V9 faulty	(a) Replace (b) Replace
alibration	(a) Faulty V12 (b) Internal fault	(a) Replace V12 and report change to workshops (b) Report
ly but	Faulty V13	Replace

END

R E S T R I C T E D

Table 3001 - Elementary fault finding table

Table 3001 - Elementary fault finding table

Check No	Switch positions	Symptoms	Possible faults	Action to be taken
1	Power ON	No dial lights on set, p.s.u. or a.t.u.	(a) Faulty battery (b) 5A fuse blown (c) Faulty lamp or lamps (d) Wiring fault	(a)) (b)) Replace faulty item (c)) (d) Report
2	Power ON Meter switch at LT x 5	No meter reading	5A fuse blown	Replace
3	Power ON System switch to C.W.	Rotary transformer does not run	(a) Faulty brushes (b) Faulty rotary transformer (c) Relay or switching fault	(a) Replace (b) Replace (if in FATSO) (c) Report
4	Power ON Set at C.W. Meter switch HT x 100	Rotary transformer runs but no meter reading	500mA fuse blown	Replace
5	Power ON Set at C.W. Meter at GRID PA x 1	Low or no meter reading	Faulty valves V1, V2, V3 or V4	Proceed to check 6 to eliminate
6	Power ON Set at INT CAL Check at calibration points	(a) No whistle in headset (b) Whistle in headset	(a) V1 or V2 faulty (b) Fault is in V3 or V4	(a) Replace (b) Proceed to check 7 to further eliminate
7	Power ON C.W. high power Meter at CATH PA x 30	(a) High reading on all frequency bands (b) High readings Bands 2 and 3 Normal Band 1	(a) V4 faulty (b) V3 faulty	(a) Replace (b) Replace
8	Power ON C.W. high power Meter at CATH PA x 30 Tune for maximum current on aerial tuning unit	Low or no reading on set meter and Low or no reading on aerial meter	(a) V5 or V6 faulty (b) Internal fault	(a) Replace (b) If valve replacement action does not eliminate the fault, report
9	Power ON Voice/CFS Send and whistle into microphone	No change in aerial current (set previously checked on C.W.)	(a) Faulty microphone (b) V8, V9, V10, or V11 faulty	(a) Replace or fit new insert (b) To eliminate proceed as in 10
10	As in 9 listen in headset	No change in aerial current - but (a) No sidetone (b) Sidetone	(a) V10 or V11 faulty (b) V8 or V9 faulty	(a) Replace (b) Replace
11	Power ON Set INT CAL	No whistle in headset near calibration points	(a) Faulty V12 (b) Internal fault	(a) Replace V12 and report change to workshops (b) Report
12	Power ON C.W. high power	Transmitter functions correctly but no sidetone on keying	Faulty V13	Replace

EME8/832

END