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STATION, RADIO, C42

TECHNICAL HANDBOOK - UNIT REPAIRS

This EMER must be read in conjunction with Tels H 442 Part 2 which contains figures and tables to which reference is made

Note: This Issue 2 supersedes Issue 1, Pages 1-6 and 1001 dated 6 Jul 56.

General

1. This equipment is sealed and should not normally be opened for unit repairs. The only occasions when unit repairs may be carried out is when it is absolutely necessary, to attempt to restore essential communications. Internal repairs to the equipment will then be confined to replacement of certain valves detailed in the Action column of Table 3001.

2. If, in an emergency, the unit is opened the following provisions must be observed:-

(a) It must be opened under the driest possible conditions and in any case should not remain open for more than three hours.

(b) Two recently re-activated silica gel (green canister) desiccators must be fitted before resealing (see para 14).

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

Precautions

3. In no circumstances should any of the following repairs or adjustments be undertaken with the limited resources of a unit repair mechanic.

(a) The 100kc/s crystal trimmer C22 must not be touched.

(b) Neither the 100kc/s crystal nor its oscillator valve V3 should be exchanged or replaced.

(c) Neither the receiver local oscillator unit nor its drive mechanism should be removed or adjusted. The local oscillator valve V31 should not normally be changed, but if the set appears to be excessively microphonic or noisy, a replacement V31 may effect a cure. No other adjustment to this unit or its drive mechanism should be attempted.

(d) The power amplifier V8 is neutralised and should not therefore be exchanged. In the event of failure, the set should be returned to Workshop.

(e) The position of wiring on the r.f. unit is critical and should not therefore be altered or moved.

(f) The tray containing the r.f. unit should not be opened unless the r.f. tuning dial is set to DATUM (60Mc/s end).

INSTRUCTIONS FOR OPENING

4. Remove the 10 socket headed No 2 BA steel screws using a Wrench, set screw, 5/32 in. The anti-tamper cap which will be found on one screw can most easily be removed by piercing with a sharp instrument, and then withdrawing. Care should be taken to ensure that the wrench is fully home in the socket heads before unscrewing, otherwise the screw and wrench may be damaged.

5. If the seal between the case and front panel does not break easily, place the set face down on its front panel, and sharply tap the case alternately on opposite sides using the hand or fist, until the seal breaks. The case can then be lifted clear.

6. When replacing the case, make sure that the rubber gasket is correctly seated in its channel in the front panel flange and check that new desiccators have been fitted.

MECHANICAL REPAIRS AND ADJUSTMENTS

Removal and replacement of collet type knobs

7. Using the special tool provided, unscrew the central dome headed cap. The knob itself should be held by the special tool so that the unscrewing torque is not taken by the mechanical stops of the controls. If the knob is badly damaged, the remaining pieces should be broken away, and if necessary the spindle held by a suitable spanner. If further dismantling is required, the dome headed cap should be replaced and given approximately six turns. A sharp tap on this cap or preferably a screwdriver engaged in its slot, will release the collet. Remove the dome headed cap, unscrew the upper large thin nut, and the whole assembly can be removed.

8. To replace, refit the collet and body over the spindle, and fit and tighten the large thin nut. Fit the new knob over the body and engage the hexagon. Refit the dome headed cap and tighten. To avoid binding, pressure must be exerted to pull the knob away from the panel while tightening. When the collet grips, check the orientation of the knob before tightening fully. Do not apply pressure with the screwdriver until the collet is gripping firmly.

ELECTRICAL TESTS

9. To test whether a C42 is serviceable the following action should be taken:-

(a) Connect the C42, a known good p.s.u. (S.U.V. No 12, 12 or 24V), an M box, an Avo 8 and a Microphone and receiver headgear assembly, No 1 or 1A to the test socket of the M box.

(b) Set the Avo 8 to the 1mA d.c. range, switch on and allow time to warm up.

(c) Carry out a complete tuning procedure at any frequency except 36Mc/s, as detailed in Chapter 2, Section 12 of the User Handbook. Make the following observations during tuning.

(i) CURSOR ADJ. - Rock the CHANNEL tuning knob to swing the tuning meter pointer through the correct centre zero, and observe the extent of the maximum excursion on either side of zero.

(ii) CURSOR ADJ. - Note the maximum limiter grid current on the Avo 8, which should occur at or near the correct centre zero on the tuning meter.

(iii) CHANNEL ADJ. - Repeat observations for (i).

(iv) CHANNEL ADJ. - Repeat observations for (ii) and leave correctly tuned.

(v) TUNE RF - Rock the TUNE RF tuning knob to swing the tuning meter pointer through the correct centre zero, and observe the extent of maximum excursion of the tuning meter on either side of centre zero.

(vi) TUNE RF - Note the maximum limiter grid current on the Avo 8 which should occur at or near the correct centre zero on the tuning meter. Leave correctly tuned.

(vii) OPERATE - Observe limiter grid current. It will be necessary to turn the Avo 8 to the 250µA range. Having made the reading, reset to the 1mA range.

(viii) SQUELCH - Rotate the squelch control from end to end in both directions. Depending upon the direction of rotation, the Signal lamp should light or extinguish approximately in the mid position.

(ix) PHONES - Listen to the set noise on the phones and note its level. Ensure that the signal lamp is out and the NOISE switch is at ON for this test.

(x) MICROPHONE - Operate the pressel switch, speak into the microphone, and listen for sidetone (S/T) in the phones.

(d) If the above tests do not give the correct result shown in Table 3001, determine the likely fault, and make the necessary exchange or replacement it it is necessary to restore essential communication.

10. If no fault is revealed in the above tests check the r.f. power using a Functional tester, No 1 as detailed in the User Handbook, Chapter 3, Section 21, Test Chart No 6.

11. Check the i.c. amplifier by connecting the headset to the i.c. socket on the M Box, and listen for sidetone whilst speaking into the microphone with the pressel switch operated.

12. Check the operation of the a.f.c. circuit as follows:-

(a) Switch on and tune the set correctly to any frequency.

(b) Switch the sender to low power and the NOISE switch to ON.

(c) Operate the microphone pressel switch and listen to the phones.

(d) Detune the CHANNEL knob on either side of the correct frequency and note the point at which noise comes up in the phones.

(e) If the a.f.c. is working correctly, this should be not less than 250kc/s from the correct frequency.

13. If during tuning, an asymmetrical indication on the tuning meter is observed, it indicates that one of the discriminator diodes is faulty. The set should be sent to Field Workshop for repair.

Resealing

14. The set should be fitted with two recently re-activated 2 in. silica gel (green canister) desiccators and replaced in its case immediately on completion of the repair. If no unit repair is possible and the set is to be sent to a workshop for further repair, then re-activated desiccators should not be fitted.

15. The following procedures are included for the guidance of units already in possession of suitable facilities. This regulation is not an authority for the issue of stores or equipment.

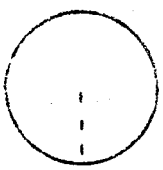
(a) The gasket should be smeared with Silicone grease (H1/6850-99-942-3548).

(b) Silica gel desiccators may be re-activated by drying in an oven at 140°C for 2 hours.

16. At the first available opportunity, a set which has undergone emergency repair must be sent to a Field workshop for inspection and specification tests. Brief details of emergency repairs carried out will be noted in the AF G1045.

Note: The next page is Page 1001

Table 3001 - Fau

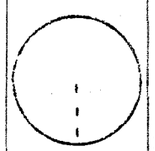
The ten observations to be taken (see para 9(c))							
CURSOR ADJ.		CHANNEL ADJ.		TUNE R.F.		OPERATE	SQUEL
Tune meter indication	Lim grid µA	Tune meter indication	Lim grid µA	Tune meter indication	Lim grid µA	Lim grid µA	Operati
Normal	600-900	Normal	500-800	Normal	600-900	30-70	Norma
							Not oper
				No indication	20-50	30-70	Norma
Meter swing		No indication	20-50	Normal	600-900	30-70	Norma
	10-20	No indication	2-5	Very slight or None	20-70 Tune for Max	2-5	Norma
Reduced indication	100-500	No indication	20-40	Normal	600-900	20-40	Norma
 Meter swing							
Slight indication	50-150	No indication	10-20	No indication	300-600 Tune for Max	10-15	Norma
 Meter swing	2-5	No indication	2-5	Normal	2-5	2-5	Not oper
No indication	600-900	No indication	500-800	No indication	600-900	30-70	Normal
				Normal	600-900	30-70	Not oper
	40-70	Normal	500-800	Normal	600-900	30-70	Normal
	20-40	No indication	2-10	No indication	10-30 Tune for Max	2-8	Normal
	less than 20	No indication	2-5	Normal	2-5	2-5	Not oper
	No reading	No indication	No reading	Normal	No reading	No reading	Not oper

01 - Fault finding table

SQUELCH Operation	HEADSET Phones	HEADSET Mic	Probable fault	Action (*Return to REME Workshops if valve change does not effect a cure)
Normal	Normal	Normal S/T	No fault. Set operating OK	NIL
		S/T very load	A.M.C. not working	Change V28*
		No S/T	Mic amp or mod not working	Check a.f.c.; if OK, change V27 or V30*
	No noise	No S/T	A.F. amplifier not working	Change V20 or V21*
Not operating	Normal	Normal S/T	Squelch unit faulty	Return to workshop
Normal	Normal	No S/T, Noise	M.O. not working	Change V6, V7*
Normal	Normal	Normal	100kc/s cal not working	Change V3*
Normal	Normal	Noise or possibly S/T	1st i.f. amplifier not working	Change V9*
Normal	Normal	Normal S/T	R.F. stage not working	Change V1*
Normal	Normal	Noise	Local oscillator not working	Change V31*
Not operating	Low Noise or Hum	Possibly S/T	2nd i.f. amplifier not working	Change V14, V15*
Normal	Normal	Normal	Meter faulty	Return to Workshops
Not operating	Hum	Hum, no S/T	2nd limiter not working	Change V17*
Normal	Normal	Normal S/T	2Mc/s cal not working	Return to Workshops
Normal	Normal	Noise	Mixer not working	Change V2*
Not operating	Low Noise	No S/T	2nd mixer or 8.4Mc/s osc not working	Change V13*
Not operating	Hum	Hum, no S/T	1st limiter (V16) o/c heater	Change V16*

END

Table 3001 - Fault finding table

The ten observations to be taken (see para 9(c))										Probable fault	Action (*Return to REME Workshops if valve change does not effect a cure)
CURSOR ADJ.		CHANNEL ADJ.		TUNE R.F.		OPERATE	SQUELCH	HEADSET			
Tune meter indication	Lim grid µA	Tune meter indication	Lim grid µA	Tune meter indication	Lim grid µA	Lim grid µA	Operation	Phones	Mic		
Normal	600-900	Normal	500-800	Normal	600-900	30-70	Normal	Normal	Normal S/T	No fault. Set operating OK	NIL
 Meter swing									S/T very load	A.M.C. not working	Change V28*
									No S/T	Mic amp or mod not working	Check a.f.c.; if OK, change V27 or V30*
								No noise	No S/T	A.F. amplifier not working	Change V20 or V21*
							Not operating	Normal	Normal S/T	Squelch unit faulty	Return to workshop
				No indication	20-50	30-70	Normal	Normal	No S/T, Noise	M.O. not working	Change V6, V7*
		No indication	20-50	Normal	600-900	30-70	Normal	Normal	Normal	100kc/s cal not working	Change V3*
	10-20	No indication	2-5	Very slight or None	20-70 Tune for Max	2-5	Normal	Normal	Noise or possibly S/T	1st i.f. amplifier not working	Change V9*
Reduced indication  Meter swing	100-500	No indication	20-40	Normal	600-900	20-40	Normal	Normal	Normal S/T	R.F. stage not working	Change V1*
Slight indication  Meter swing	50-150	No indication	10-20	No indication	300-600 Tune for Max	10-15	Normal	Normal	Noise	Local oscillator not working	Change V31*
	2-5	No indication	2-5	Normal	2-5	2-5	Not operating	Low Noise or Hum	Possibly S/T	2nd i.r. amplifier not working	Change V14, V15*
No indication 	600-900	No indication	500-800	No indication	600-900	30-70	Normal	Normal	Normal	Meter faulty	Return to Workshops
				Normal	600-900	30-70	Not operating	Hum	Hum, no S/T	2nd limiter not working	Change V17*
	40-70	Normal	500-800	Normal	600-900	30-70	Normal	Normal	Normal S/T	2Mc/s cal not working	Return to Workshops
	20-40	No indication	2-10	No indication	10-30 Tune for Max	2-8	Normal	Normal	Noise	Mixer not working	Change V2*
	less than 20	No indication	2-5	Normal	2-5	2-5	Not operating	Low Noise	No S/T	2nd mixer or 8.4Mc/s osc not working	Change V13*
	No reading	No indication	No reading	Normal	No reading	No reading	Not operating	Hum	Hum, no S/T	1st limiter (V16) o/c heater	Change V16*

END