

TRADER SERVICE SHEETS

RECEIVER SERIES (NUMBER TWENTY-THREE)

G.E.C. A.C./D.C. THREE

THIS 1934-5 G.E.C. receiver is of the universal type for A.C. or D.C. mains, and it can be used with voltages from 200 to 250 without adjustment. A straight detector-pentode circuit is employed, and a rectifier valve supplies H.T. current when A.C. mains are in use. The tuning arrangements are quite simple, but they include a "tuning compensator" which enables the volume and selectivity control to be operated without alteration in tuning.

CIRCUIT DESCRIPTION

One aerial connection by way of series condenser **C10** (volume and selectivity control) to either of two sockets. No. 1 goes to top end of tuned grid coils, **L3, L4** tuned by **C11**, and No. 2 is connected to coupling coils **L1, L2** to give greater selectivity. "Tuning compensator" consists of an additional set of fixed plates in aerial condenser which functions on the differential principle when the plug provided is connected to earth by way of socket **Y**.

Grid leak triode detector (**V1, Osram metallised H30**) with reaction applied by anode coil **L5** and controlled by differential condenser **C12**.

Series fed transformer coupling by **T1** to output pentode (**V2, Osram N30/K**), which is of the "Catkin" type. Tone compensation by condenser **C3** in anode circuit.

When the receiver is used with A.C. mains H.T. current is supplied by a low-resistance half-wave rectifier which takes the form of a full-wave valve (**V3, Osram U30**) with its anodes and cathodes in parallel. With a D.C. supply the valve functions as a resistance.

Smoothing by choke **L6** and dry electrolytic condensers **C8, C9**. In 25 c.p.s. receiver extra smoothing is effected by **R6** and **C14** in **V1** anode circuit. Speaker field **L7** across main H.T. supply.

Heaters of valves connected in series with dial lamp and automatic voltage regulating barretter lamp (**Osram 30L1**) across mains supply.

DISMANTLING THE SET

Removing Chassis.—Remove on-off switch knob at rear of cabinet (pull off). Remove back of cabinet (four screws and washers). Remove the moulded bakelite hexagonal nuts securing the three control knobs, and pull off these knobs. Unscrew wave-change switch knob. Remove the brown wax concealing the four chassis-fixing screws at underside of base. Remove these screws. The chassis may now be withdrawn sufficiently for most testing requirements. *When replacing*, reverse the above procedure, but first of all pull wave-change switch into the M.W. position. It is essential to refill with wax the holes into which the chassis fixing screws are sunk, since these screws will not necessarily be at earth potential. The hexagonal control knob nuts must also be screwed up hard so that they cannot be removed by hand.

To remove chassis entirely it will be necessary to unsolder the six loud-speaker leads from the top row of tags on the loud-speaker input transformer. These leads are in three twisted pairs. There are seven tags on the transformer panel. Suppose these are numbered 1 to 7, from the left. Then the black and pink pair of leads are connected to tag 1 (black) and tag 7 (pink). The orange and red pair go to tag 2 (orange) and tag 6 (red). The black pair go to tags 3 and 5. Tag 4, the central one, is free.

Removing Speaker.—The speaker unit is held to the front of cabinet by three nuts and bolts. The hexagonal bolt heads are insulated, and appear at the front of the cabinet. *When replacing*, the speaker transformer should be at the top of the chassis.

COMPONENTS AND VALUES

Condensers		Values (μF)
C1	V1 grid condenser	0.0002
C2	Earth blocking condenser ..	0.1
C3	V2 anode tone compensator ..	0.0075
C4	Mains H.F. by-pass	0.04
C5	V2 cathode by-pass, electrolytic	20.0
C6	V1 anode decoupling	1.0
C7	V2 aux. grid by-pass	1.0
C8	H.T. smoothing, electrolytics	6.0
C9		6.0
C10	Aerial series condenser, differential	—
C11	Aerial tuning condenser	—
C12	Reaction condenser, differential	—
C13*	Additional V1 anode decoupling	6.0
C14*	Additional V1 H.T. smoothing..	6.0

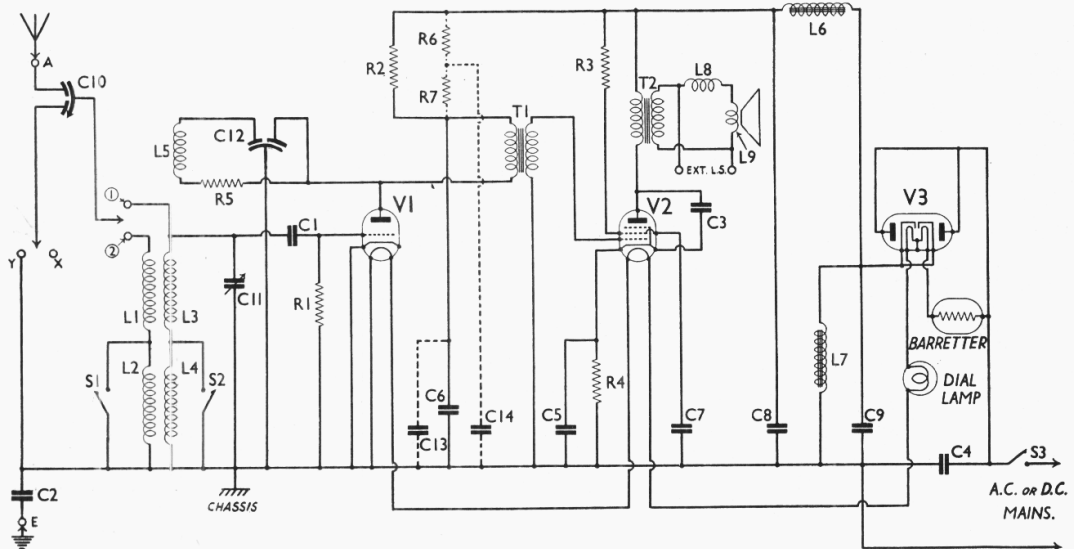
* In 25 c.p.s. model only.

Resistances		Values (ohms)
R1	V1 grid leak	2,000,000
R2†	V1 anode decoupling	77,000
R3	V2 aux. grid H.T. feed	5,500
R4	V2 G.B. resistance	250
R5	Reaction circuit stabiliser ..	300
R6*	V1 H.T. smoothing	33,000
R7*	V1 anode decoupling	33,000

† Omitted in 25 c.p.s. model. *In 25 c.p.s. model only.

Other Components		Values (ohms)
L1	Aerial coupling coils ..	1.7
L2		22.0
L3		4.7
L4		17.0
L5	Reaction coil	2.3
L6	H.T. smoothing choke	400
L7	Speaker field	6,750
L8	Speaker hum coil	total 3.1
L9	Speaker speech coil	
T1	Intervalve trans.	Pri. 1,150 Sec. 7,500
T2	Speaker input trans.	Pri. 400 Sec. 0.8
S1-S2	Waveband switches	—
S3	Mains switch	—

(Continued overleaf)



The circuit of the G.E.C. "A.C./D.C. Three." C10 and C12 are variable differential condensers. The sockets X and Y are shown in the plan view of the chassis. Sockets 1 and 2 are at the rear of the chassis. R6 and R7 replace R2 in the 25 cycle model. C13 and C14 are only fitted in the 25 cycle model.

G.E.C. A.C./D.C. THREE
(contd.)

VALVE ANALYSIS

The voltages and currents given in the table below are approximate only and were obtained from a representative receiver working with the mains supplies indicated. No aerial or earth was connected, and the reaction control was at minimum. All voltages were measured with a high-resistance voltmeter, cathode in each case being negative.

The values do not necessarily apply to the 25 c.p.s. receiver.

Valve	Mains Input Volts	Anode Volts	Anode Curr. (mA)	Screen Volts	Screen Curr. (mA)
V1 H30	200 D.C.	74	1.4	—	—
V2 N30	200 D.C.	160	24.0	140	5.0
V1 H30	250 D.C.	82	1.8	—	—
V2 N30	250 D.C.	200	32.0	180	6.5
V1 H30	200 A.C.	78	1.5	—	—
V2 N30	200 A.C.	170	25.0	150	5.0
V1 H30	250 A.C.	85	2.0	—	—
V2 N30	250 A.C.	215	33.0	190	7.0

GENERAL NOTES

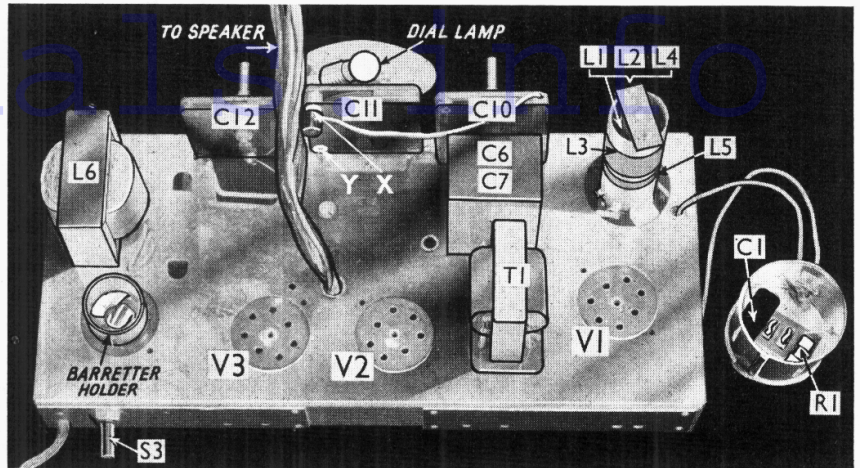
IMPORTANT.—In this receiver the chassis is not directly earthed, and in many cases a potential equal to the mains voltage will exist between chassis and earth. Care should therefore be taken when testing to avoid risk of shocks.

Switches.—S1 and S2 are combined in a single push-pull switch with one common contact, and perform the wave-changing operations. They are closed on the M.W. band and open on the L.W. band.

S3 is the rotary Q.M.B. mains switch situated at the rear of the receiver.

Coils.—These are in a single unit, seen in the plan view of the chassis. L3 and L5 are single layer coils on the outside of the cylindrical paxolin former. The remainder are wound on a cylindrical wooden former inside the paxolin one, and are concentric with it.

The whole coil unit can be removed, after unsoldering the wiring, since it is



Plan view of the chassis. Note C1 and R1 inside the screening cap of V1, and the sockets X and Y on C11, into one of which the flexible lead from C10 is plugged.

held to the chassis by a bracket and a single screw.

Alternative Aerial Couplings.—Note the two sockets, marked X and Y in the circuit diagram and plan view of the chassis, which allow C10 to be used as an ordinary or differential type respectively. In the latter case this condenser has very little effect on the tuning, but the receiver may not tune down as low as when the plug is in X.

Note also the two sockets 1 and 2, seen in the under chassis view. In conjunction with the loose plug provided, these really form a single pole change-over switch connecting the moving vanes of C10 to the top of the tuned grid coil (1) or to the aerial coupling coils (2). If the plug is withdrawn, the aerial is not coupled at all.

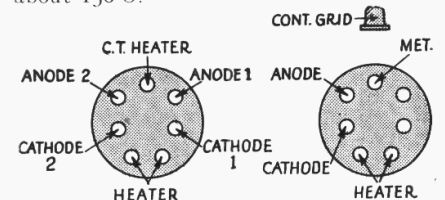
Condenser C2.—This is used to isolate the earth socket from direct connection to the chassis, and is of the 500 V working type.

Condensers C6, C7.—These two 1µF decoupling condensers are in a single casing mounted on top of the chassis. One end of each is connected to the case and chassis, the other end of C6 being an

orange lead, and that of C7 a blue and white lead.

Condensers C8, C9.—These are of the dry electrolytic type, mounted together in a carton seen in our under-chassis view. The negative side of each is connected to chassis, while the two positive leads are brought out in red-covered wire. That belonging to C8 is nearest the front of the chassis.

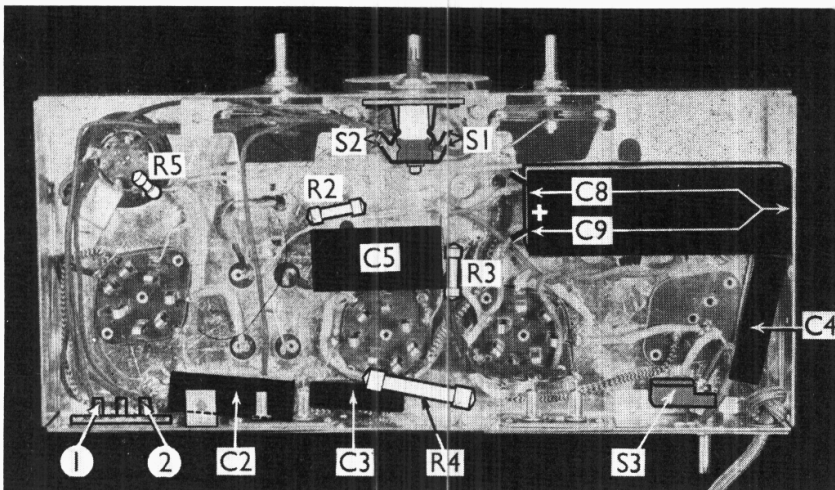
Barretter Lamp.—This has an E.S. screw type base, fitting into a special holder on the chassis. The barretter is designed so that even with widely varying voltages across it, the current flowing remains fairly constant. The Type 301 used in this receiver passes a mean current of 0.3 A. Its resistance when cold is about 150 Ω.



Connections of the rectifier V3 (left) and the triode V1 (right), looking at the underside of the valve bases. In the case of V3, the centre-tap of the heater is not used in this receiver.

Valves.—All the valves are of the Osram universal A.C./D.C. type. V1 is a triode with 7-pin base, the connections being given in the right-hand diagram above. V2 is an output pentode of the Catkin type, the connections being as for an ordinary 7-pin I.H. output pentode. (See Service Sheet 13, page 35, col. 2, left-hand diagram.) V3 is a full-wave rectifier used in half-wave form, the anodes and cathodes being in parallel. As shown in the left-hand diagram above, one pin connects to the centre of the heater. This is not used in the present set, the valve having a heater voltage of 26 V. The other heaters are of the 13 V 0.3 A type.

Dial Lamp.—This is of the Osram M.E.S. type rated at 6.5 V, 0.3 A. If this fails the heater circuit is broken. A spare is provided on the inside of the back of the receiver.



Under-chassis view. C8 and C9 are dry electrolytics in a single carton, the negative connections being common. Sockets 1 and 2 are shown in the circuit diagram.