

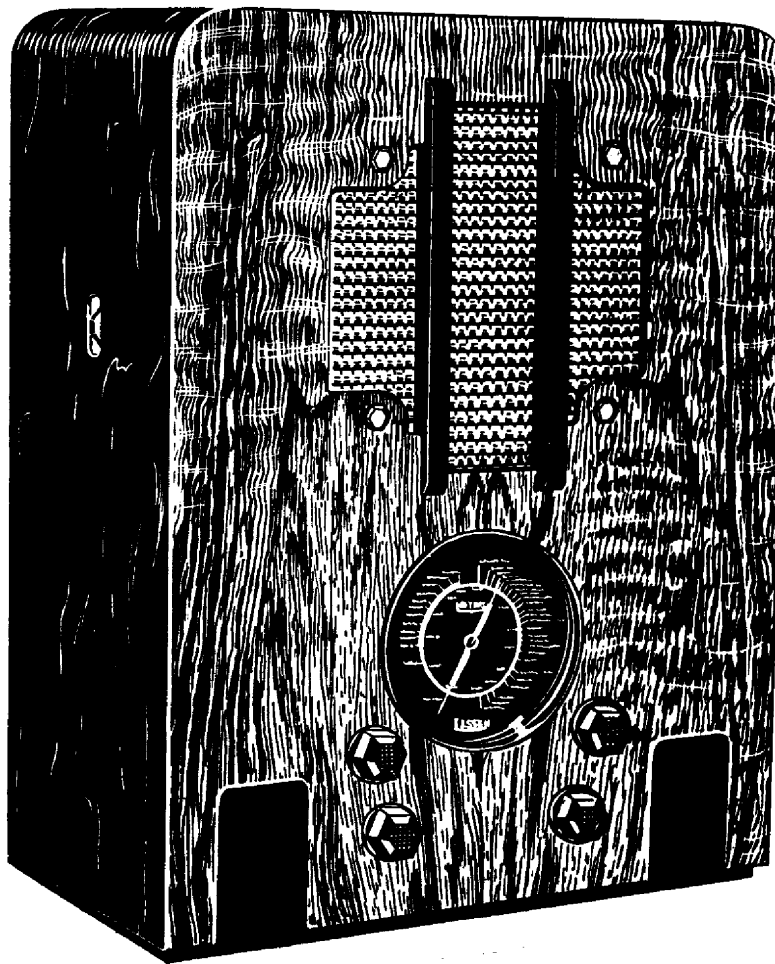
LISSEN

SERVICE MANUAL FOR A.C. OR D.C. MAINS OPERATED RECEIVER MODEL 8113

TECHNICAL SPECIFICATION

THE Lissen model "8113" is a universal A.C. or D.C. mains operated receiver, for operation with an external aerial.

The aerial is coupled to the tuned grid circuit of the R.F. amplifying valve, a variable-mu R.F. pentode (V1). Volume is controlled by the potentiometer, R4, which varies the bias on this valve.



The coupling to the detector valve a triode (V2) is another tuned circuit. Reaction is obtained by the feed back from the coil, L7, to the tuned grid circuit of the detector, and is controlled by the reaction condenser, C5.

The detector is coupled to the output stage by a shunt fed A.F. transformer.

The output valve is an audio frequency pentode (V3). A tone correcting network is employed which prevents over emphasis of the higher frequencies. This valve is transformer coupled to the low impedance voice coil of the energised moving coil speaker.

GENERAL REMARKS

In the event of trouble, check the following details:—

1. Power supply; if the pilot lamps light it is certain that the power supply is not at fault, otherwise check:—

- (a) Tuning scale lights and fuses.
- (b) Mains leads, plugs and sockets.
- (c) Mains switch.
- (d) Receiver correctly adjusted for power supply.

In the case of a D.C. supply, if the pilot lamps light, but no signal is received, reverse the mains plug in its socket.

2. Valves:—

- (a) Check characteristics, or
- (b) Substitute known good valves.

3. Locate trouble to a particular stage:—

- (a) Check valve operating conditions, or
- (b) Test the A.F. detector and R.F. stages with an oscillator and check the alignment of the tuned circuits.

4. Locate faulty component by testing with a suitable measuring instrument, or if necessary, by substitution.

5. Check trimming, with the help of an oscillator, if not attended to under 3(b).

The charts are given in the order they will usually be required.

Voltage and current readings are given for A.C. and D.C. supplies. Higher or Lower input voltages will give proportionately higher or lower voltage and current readings.

VALVE HEATER CIRCUIT

The four valve heaters, the tuning scale lights and the resistance R11 are all wired in series, and take a current of 0.2 amps.

It should be remembered that this circuit will be broken if either of the tuning scale lights should fail or be removed.

They should be replaced by bulbs of the 3.5 volt 0.3 amp. type.

OPERATING CONDITIONS OF THE VALVES

Valve	Circuit.	Input : 230 volts D.C.	Input : 250 volts A.C.
R.F. valve, Mazda VP/1321 (V1)	Anode voltage Anode current Screen voltage Screen current	175 volts 0 m.a. 177 volts 2 m.a.	208 volts 6.5 m.a. 217 volts 2.2 m.a.
Detector valve Mazda HL/1320 (V2)	Anode voltage Anode current	78 volts 1.0 m.a.	90 volts 2.2 m.a.
Output valve Mazda PEN/3520 (V3)	Anode voltage Anode current Aux. grid volt. Aux. grid cur.	148 volts 88 m.a. 174 volts 5.5 m.a.	180 volts 46 m.a. 215 volts 8 m.a.
Rectifier valve Mazda (V4) U4020			
Power consumption	..	63 watts	79 watts
Undistorted output	..	1.25 watts	2.5 watts

If a particular reading should vary considerably from the above table, a systematic check of the circuits associated with the particular valve should be made.

The following tables will facilitate the testing of the components concerned.

CIRCUIT ANALYSIS

Valve	Circuit	Associated components.
R.F. valve (V1)	Anode circuit	L4, C8.
	Screen circuit	R1 and R2, C10.
	Grid circuit	L2 and L3, C1 and C3, S1.
	Cathode circuit	R8 and R4, C11.
Detector valve (V2)	Anode circuit	L7, L8, R6, R7, C5, C12, C13, C14.
	Grid circuit	L5, L4, R5, C2, C4, C8, C9, S2.
Output valve (V3)	Anode and aux. grid circuit	T2 primary, R10, C16.
	Grid circuit	Transformer T1, R8.
	Cathode circuit	R9, C15.

SWITCH POSITIONS

Circuit Indication	Medium waves	Long waves
S1	Closed	Open
S2	Closed	Open
S3	Closed	Closed

COMPONENT SPECIFICATION

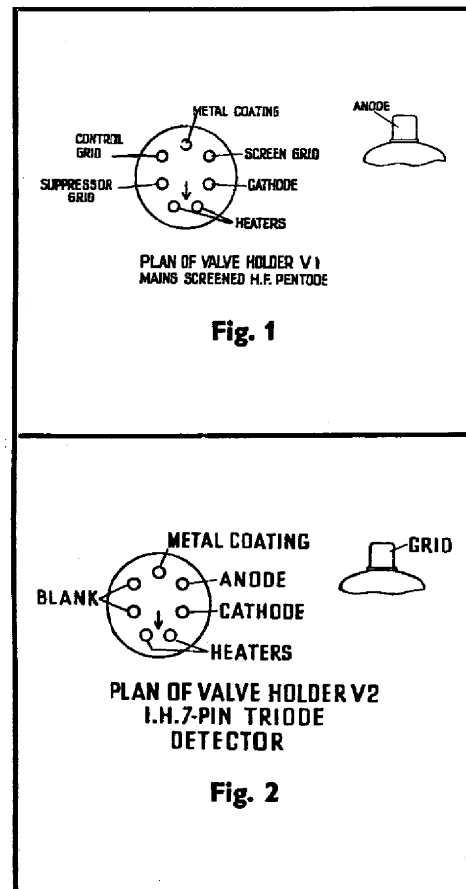
Circuit Indication	Inductances and Transformers	Location	Component number
L1 ..	Aerial coupling coil, 24 ohms	Fig. 5	78,010
L2 ..	Medium wave aerial coil, 2.6 ohms	Fig. 5	78,010
L2, L3	Long wave aerial coil, 18 ohms	Fig. 5	78,010
L4 ..	R.F. choke, 460 ohms	Fig. 6	79,008
L5 ..	Medium wave grid coil, 2.2 ohms	Fig. 5	78,011
L5, L6	Long wave grid coil, 19 ohms	Fig. 5	78,011
L7 ..	Reaction coil, 1.6 ohms	Fig. 5	78,011
L8 ..	R.F. choke, 310 ohms	Fig. 6	79,010
L9 ..	Speaker voice coil, and		
L10	Speaker hum balancing coil, 1.8 ohms	Fig. 7	85,009
L11	Speaker field coil, 600 ohms	Fig. 5	85,009
L12	Filter choke, 1 ohm	Fig. 6	79,004
L13	Filter choke, 1 ohm	Fig. 6	79,004
T1 ..	A.F. transformer, primary, 770 ohms; secondary, 1,900 ohms	Fig. 5	77,026
T2 ..	Output transformer, primary, 750 ohms; secondary, 0.36 ohms	Fig. 6	77,081

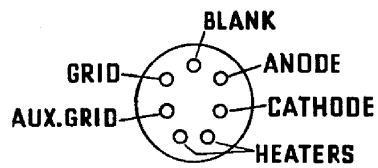
CONDENSERS

Circuit Indication	Specification	Location	Component number
C1	Aerial tuning condenser ..	Fig. 5	80,014
C2	Grid tuning condenser ..	Fig. 5	80,014
C3	Aerial tuning condenser trimmer	Fig. 5	80,014
C4	Grid tuning condenser trimmer	Fig. 5	80,014
C5	Reaction condenser ..	Fig. 6	80,013
C6	.0008 mfd. mica, 350 volts. D.C. working	Fig. 6	66,968
C7	.000005 mfd. ceramic (disc type)	Fig. 5	71,261
C8	.00005 mfd. ceramic (hood type)	Fig. 5	71,250
C9	.00005 mfd. ceramic (hood type)	Fig. 5	71,250
C10	0.1 mfd. tubular, 350 volts D.C. working	Fig. 6	68,020
C11	0.1 mfd. tubular, 350 volts D.C. working	Fig. 6	68,020
C12	0.1 mfd. tubular, 350 volts D.C. working	Fig. 6	68,020
C13	.0005 mfd. mica, 350 volts D.C. working	Fig. 6	66,969
C14	2 mfd. dry elect., 300 volts D.C. working	Fig. 6	67,009
C15	50 mfd. dry elect., 12 volts D.C. working	Fig. 6	67,005
C16	.01 mfd. tubular, 450 volts D.C. working	Fig. 6	68,005
C17	16 mfd. dry elect., 300 volts D.C. working	Fig. 6	67,001
C18	8 mfd. dry elect., 300 volts D.C. working	Fig. 6	67,001
C19	0.1 mfd. tubular, 350 volts D.C. working	Fig. 6	68,020
C20	0.1 mfd. tubular, 350 volts D.C. working	Fig. 6	68,020
C21	0.1 mfd. tubular, 350 volts D.C. working	Fig. 6	68,020
C22	.01 mfd. tubular, 450 volts D.C. working	Fig. 6	68,005

RESISTANCES

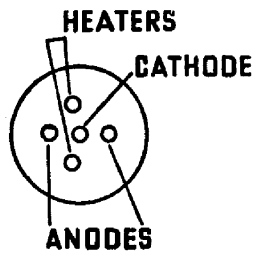
Circuit Indication	Resistance Value	Colour Code			Location	Component number
		Body	Tip	Dot		
R1	31,000 ohms (2 watts)	Org.	Brn.	Org.	Fig. 6	71,980
R2	31,000 ohms (2 watts)	Org.	Brn.	Org.	Fig. 6	71,980
R3	300 ohms (1/2 watt)	Org.	Blk.	Brn.	Fig. 6	71,942
R4	Volume control, 10,000 ohms	—	—	—	Fig. 5	81,010
R5	510,000 ohms (1/2 watt)	Grn.	Brn.	Yel.	Fig. 5	71,944
R6	11,000 ohms (1/2 watt)	Brn.	Brn.	Org.	Fig. 6	71,963
R7	50,000 ohms (1/2 watt)	Grn.	Blk.	Org.	Fig. 6	71,971
R8	26,000 ohms (1/2 watt)	Red	Blu	Org.	Fig. 6	71,974
R9	150 ohms (1/2 watt)	Brn.	Grn.	Brn.	Fig. 6	71,976
R10	11,000 ohms (1/2 watt)	Brn.	Brn.	Org.	Fig. 6	71,963
R11	Tapped power resistor (725 ohms)	—	—	—	Fig. 5	71,228





PLAN OF VALVE HOLDER V3
I.H. PENTODE
OUTPUT VALVE

Fig. 3



PLAN OF VALVE HOLDER V4
RECTIFIER VALVE.

Fig. 4

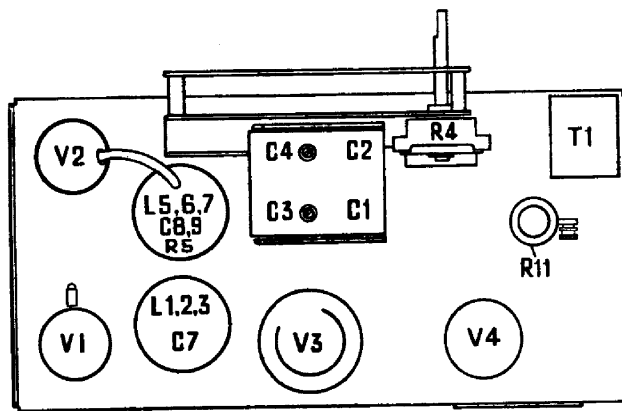


Fig. 5

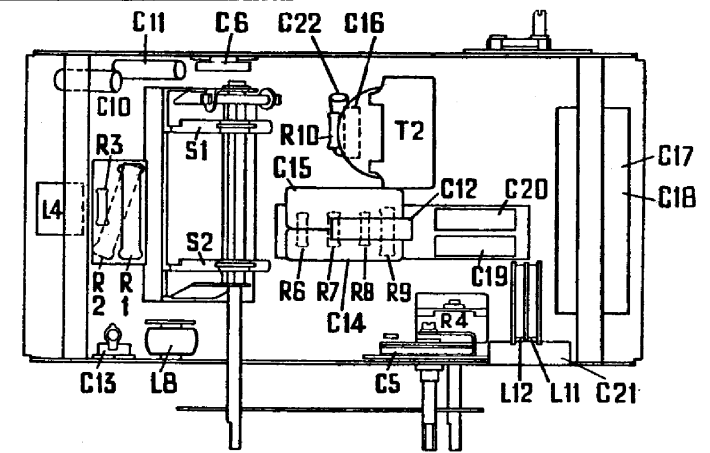


Fig. 6

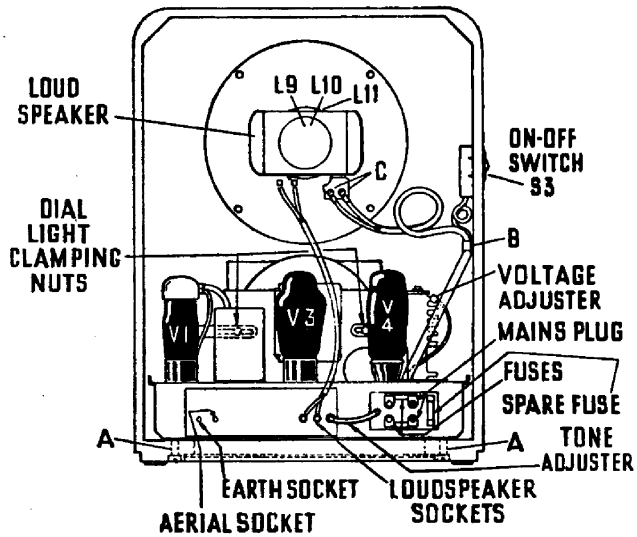
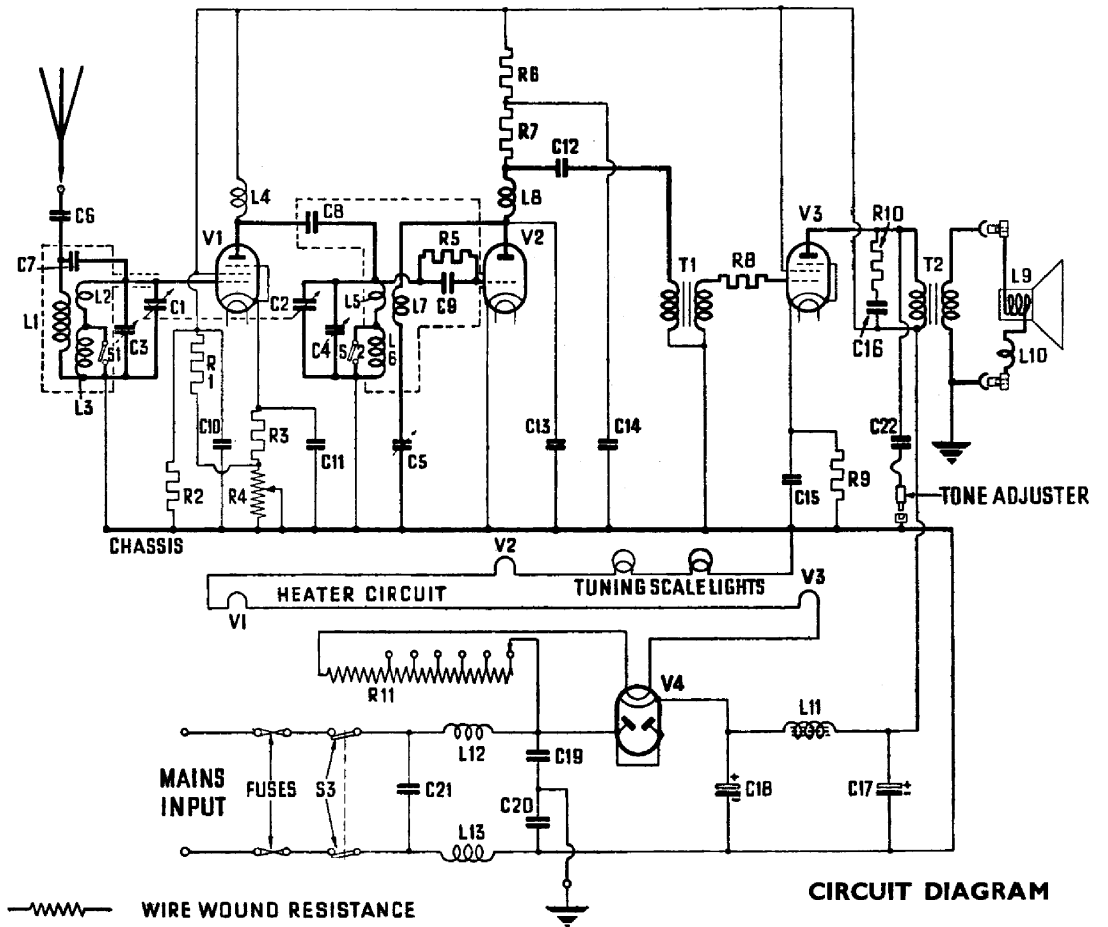


Fig. 7



CIRCUIT DIAGRAM

- WIRE WOUND RESISTANCE
- COMPOSITE RESISTANCE
- SCREENED LEAD

REMOVING THE CHASSIS FROM THE CABINET

The knobs must first be removed by a direct forward pull. Next the speaker plugs are pulled from their sockets and the field leads disconnected at the speaker end by loosening the screws (C, in Fig. 7).

The "on-off" switch must be unscrewed from the cabinet, and the fixing B (Fig. 7) removed.

The four fixing bolts (A, in Fig. 7), accessible from the underside of the cabinet, should now be removed, and the chassis withdrawn from the cabinet.

It should be noted that to get access to the underside of the chassis it is only necessary to remove the metal base plate of the cabinet, which is held in place by 4 wood screws.

This plate forms part of the electrical screening, and care should be taken when replacing it, that good electrical contact is made, through the copper strip at one corner of the cabinet base.

To ensure this, the base plate is slightly "warped" so that when screwed home the corner will be tightly pressed against the copper strip. Care must be taken that the side with the bare metal corners is uppermost.

REPLACING THE DIAL LIGHTS

To replace the dial lights, remove valves V₁, V₂, and V₄, and undo the clamping nuts, shown in Fig. 7. The brackets holding the bulbs may now be withdrawn sufficiently to replace the bulbs.

The chassis need not be removed from the cabinet to do this.

ADJUSTING THE GANG CONDENSER AND DIAL POINTER

Rotate the gang till the pointer is at the higher wavelength end of the scale. Push a flat ended rod through the hole in the side of

the gang cover and against the vanes. Now rock the vanes by means of the rotor drive until it is felt that the rotors are fully in mesh. If the pointer does not coincide with the two index marks at the top and bottom of the scale, release the centre fixing screw and move the pointer into this position.

ADJUSTING THE RADIO FREQUENCY CIRCUITS

Rotate the gang till the pointer is at the lower wavelength end of the dial and switch the receiver to the medium waves. Apply a modulated signal of 202 metres to the aerial terminal and adjust the trimming condensers C₃ and C₄ in turn for maximum output.

Finally check this adjustment to make sure that no error has been made.

TESTING ELECTROLYTIC CONDENSERS

The leakage of an electrolytic condenser should be tested with an H.T. battery, a milliammeter and a safety resistance of 10,000 ohms. The milliammeter, safety resistance, H.T. battery and the condenser to be connected in series. The polarity of the condenser must be observed, by connecting the positive and negative condenser terminals in the circuit to the corresponding battery terminals.

The table below gives the H.T. voltage and the maximum steady leakage currents for the various electrolytic condensers. The current is measured after the condenser is fully charged and the safety resistance is short-circuited with a switch. Condensers with a larger leakage current should be replaced.

Condenser	H.T. Voltage	Maximum leakage when fully charged
C14, 2 mfd.	300	0.2 m.a.
C15, 50 mfd.	12	5.5 m.a.
C17, 16 mfd.	300	1.8 m.a.
C18, 8 mfd.	300	0.9 m.a.

NOTES

This space is reserved for recording any further information you may find useful. If advice is required at any time the Lissen Service Dept. will be pleased to help you.