

Service Bulletin for Model 110

Make all voltage tests with volume control on full and line voltage adjuster on proper tap.

CONNECTOR UNIT				
To R. F. AMPLIFIER	1	Det. Plate	1	226 Plates (Red)
	2	Det. Cathode	2	" " "
	3	Heaters	3	R. F. Plate (Green & Black
	4	"	4	484 Heaters (Black out of cable)
	5	R. F. Cathode	5	" " " " "
	6	R. F. Plate	6	226 Fil. Black (in cable)
	7	Vol. Control Wire	7	" " " " "
	8	Det. Grid return	8	Det. Plate (Yellow & Black)
	9	Vol. cont. & Ground	9	Ground (Green)
B Phone pickup		A		

Tests of strip B are identical with those of 931 and 301 amplifier terminal strip. The failure to obtain these values indicates trouble either in the intermediate audio connector or the power converter.

The Audio connector unit is tested by testing the voltages on strip A.

They are as follows: (Volume maximum).

Terminal		Read
1 - 9	2 - 9	200 - 240 V. D. C. (High resistance meter)
3 - 9		130 - 145 V. D. C. " " "
4 - 5		2.6 - 2.95 V. A. C.
6 - 7		1.3 - 1.5 V. A. C.
8 - 9		110 - 130 D. C.
Speaker Blue - Blue		230 - 260 V.

Test of Converter

250 plate to filament	380 - 430 V. D. C.
250 filament to ground	80 - 95 volts D. C.
250 plate current	45 - 55 M. A. D. C.

If Test of Strip A Between Terminals	Results In	Follow Test No.	Look for
1 - 9 2 - 9	Voltage far in excess of 240 volts	2	Defective 20,000 ohm resistor.
1 - 9 2 - 9	Voltage found lower than 200 volts	2	Ground or High resistance.
1 - 9 2 - 9	No voltage	1 first 2	Open interstage transformers. Primary or output transformer or open 20,000 226 tube plate resistor.
3 - 9	Excessively High Voltage	5	Open 7000 ohm resistor.
3 - 9	No voltage	1	Open or short filter resistor circuit.
8 - 9	High voltage	5	Open 7000 ohm resistor.
3 - 9	No voltage	5	Shorted 7000 ohm resistor.
8 - 9	No voltage	1	Rectifier circuit open or shorted, or filter circuit. Short or open circuit.
8 - 9	Low or no voltage	10	Open or high resistance 20,000 ohm detector plate resistor or shorted filter condenser across it to ground or shorted 7000 ohm re- sistance.

Test of speaker voltage	High voltage	4	Open 20,000 ohm resistor or open field coil.
Test of speaker voltage	No voltage	1	Rectifier default
Test of speaker voltage	Low voltage	1 or 4	Low resistance load or rectifier or low resistance of 20,000 ohm resistance due to faulty resistor.
250 plate to filament	No voltage	1	Probably defect in rectifier circuit.. If there is voltage between 281 filament and ground follow next test.
250 plate to filament	No voltage	6	Open output transformer primary.
250 filament to ground	High voltage	12	Open input transformer grid circuit.
250 filament to ground	No voltage	12	Shorted 900 ohm resistor.
250 plate current	No plate current	1	Rectifier defective. If high voltage okey at resistor, follow next test.
250 plate current	No plate current	9	Open 900 resistor.

A failure to obtain these values may be due to faulty converter. These possible faults may be checked by a continuity tester as follows. If the previous tests shows absence of D. C. high voltage (Test with converter off).

TEST BETWEEN	NO READING	READING
1. 281 filament and ground (output side of last choke disconnected).	Okey	Shows short curcuit, Bad order rectifier on high volt D. C. due to broken down condenser or choke or grounded lead.
2. Each red lead and each 250 plate.	Open 20,000 ohm resistor in 226 plate supply, or open interstage primary or open output transformer primary.	Okey
3. Test speaker field by disconnected blue leads and testing continuity across their terminals on baffle board strip.	Open field	Okey
4. Blue leads (disconnected from speaker).	Open 20,000 ohm resistor across field supply.	Okey
5. 281 filament & ground. (Output side of last choke connected after first test on this position has been made). (Speaker disconnected).	Open resistor divider circuit. Either 20,000 ohm speaker field resistor; 2,000 ohm resistor or 7,000 ohm resistor.	Probably okey. If small compared to short circuit reading.
6. Each 250 plate and 281 filament.	Open choke coil or open 250 output transformer primary.	Okey
7. Terminals at speaker of yellow leads. (Leads disconnected).	Open speaker moving coil.	Okey
8. Yellow speaker leads disconnected.	Open output transformer secondary.	Okey

9. 250 filaments and ground.	Open 900 ohm resistor.	Okey if reading is less than short circuit read.
10. Green-black and the yellow-black lead.	Open 20,000 - detector filter resistance.	Okey if small compared to short circuit test.

If rectifier tubes become excessively hot, it may be due to high voltage ground caused by:

11.
 1. Broken down choke.
 2. Broken down condenser.
 3. Short circuited resistor line (especially 7000 ohm resistor) or to excessive tube load of 250 or 226 caused by:
12.
 1. Short circuited 900 (250 bias) resistor or 1000 ohm resistor (226 bias).
 2. Open grid lead in either audio transformer secondary.

This latter case of excessive plate current due to open grid leads may be noticed by excessive heating of either the 900 ohm 250 tube bias or 1000 ohm 226 tube bias.

The plate voltage of the 281 tubes is approximately 650 to 690 volts R. M. S., measured between 281 plate and ground. The total voltage D. C. measured between a 281 filament connection and ground is approximately 490-525 volts D. C.