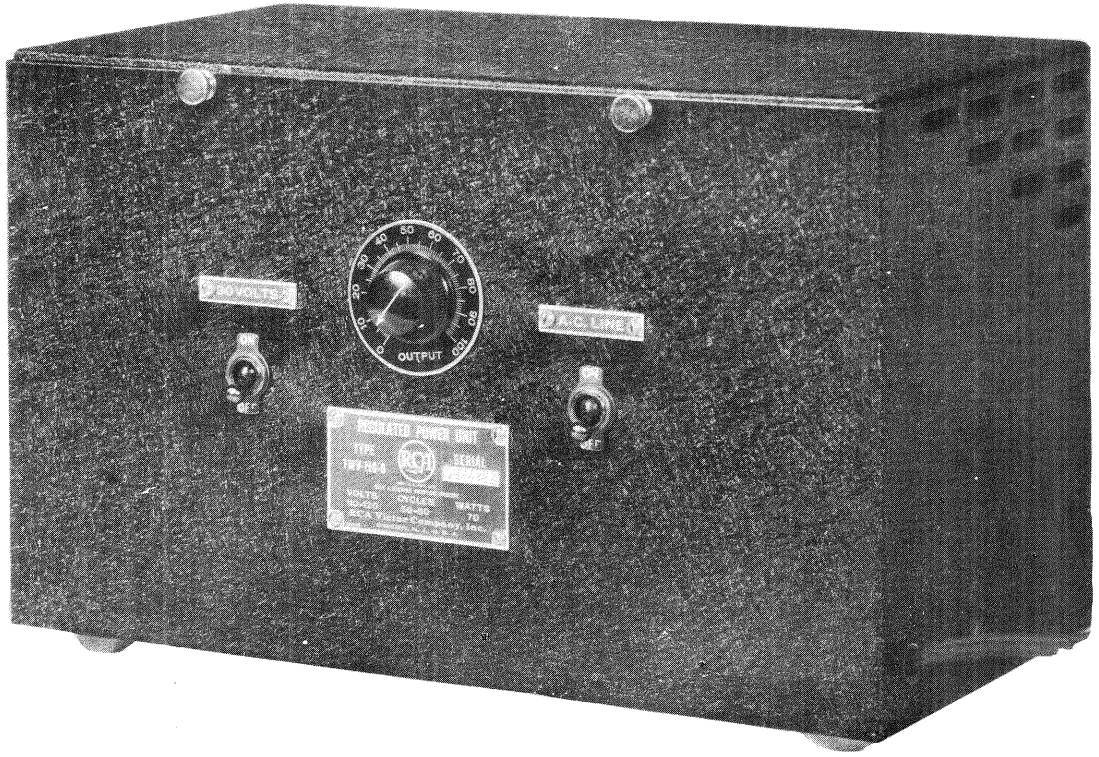


Figure 1—External view of Type TMV-118-B Regulated Power Unit

RCA REGULATED POWER UNIT
TYPE TMV-118-B
SERVICE NOTES

ELECTRICAL SPECIFICATIONS

A. C. Input Voltage Rating	90–130 Volts
Frequency Rating	50–60 Cycles
Power Consumption	70 Watts
Maximum Output Voltage	See Curves
Maximum Output Current	See Curves
Type and Number of Radiotrons	1 RCA-80, 1 RCA-2A3, 2 RCA-874, 1 RCA-57—Total, 5

PHYSICAL SPECIFICATIONS

Height	7¼ Inches
Width	12 Inches
Depth	7 Inches
Weight	25 Pounds
Weight Packed for Shipment	28 Pounds

The RCA Regulated Power Unit, Type TMV-118-B, is a device for converting the usual alternating current line power into direct current suitable for use with devices normally requiring "B" batteries. The voltage regulation is better than that obtained from a set of heavy-duty batteries while the hum is negligible. A special regulating circuit maintains constant output voltages independently of line or load variations over a wide range. A general view of the external appearance of the TMV-118-B Power Unit is shown in Figure 1.

DESCRIPTION OF ELECTRICAL CIRCUIT

Figure 2 shows the schematic circuit diagram of the complete unit, while Figure 3 shows a sketch of the current-carrying section of the circuit. All by-pass capacitors and filter circuits are omitted.

Before examining the circuit, it is well to understand the action of the voltage regulating tube, RCA-874. The RCA-874 is a gaseous tube of two elements The tube functions to maintain a fairly constant voltage (90 volts) across a circuit, independently of load due to the fact that its resistance varies with the voltage across its terminals. The tube requires 125 volts for starting and maintains an approximately constant D. C. voltage across its terminal for any current from 10 to 50 milliamperes. A link circuit is provided by having two of the tube prongs tied together so that the power circuit may be wired through this link. This prevents power from being applied to the unit without the RCA-874 in place. Excessive voltage might otherwise occur if such a condition existed due to absence of the load of the regulator tube.

The rectifier and filter circuit of the TMV-118-B functions in the usual manner, a full-wave rectifier and a tapped choke being used. The voltage regulating feature consists of four tubes which function as follows:

Referring to Figure 3, the general purpose of each tube is as follows:

RCA-874 is a voltage regulator, maintaining a fairly constant voltage across resistors R-5 and R-6. This voltage is known as the reference voltage and a portion of it comprises the grid voltage of the RCA-57.

RCA-57 is a control tube for changing the grid voltage of Radiotron RCA-2A3 in accordance with voltage variations.

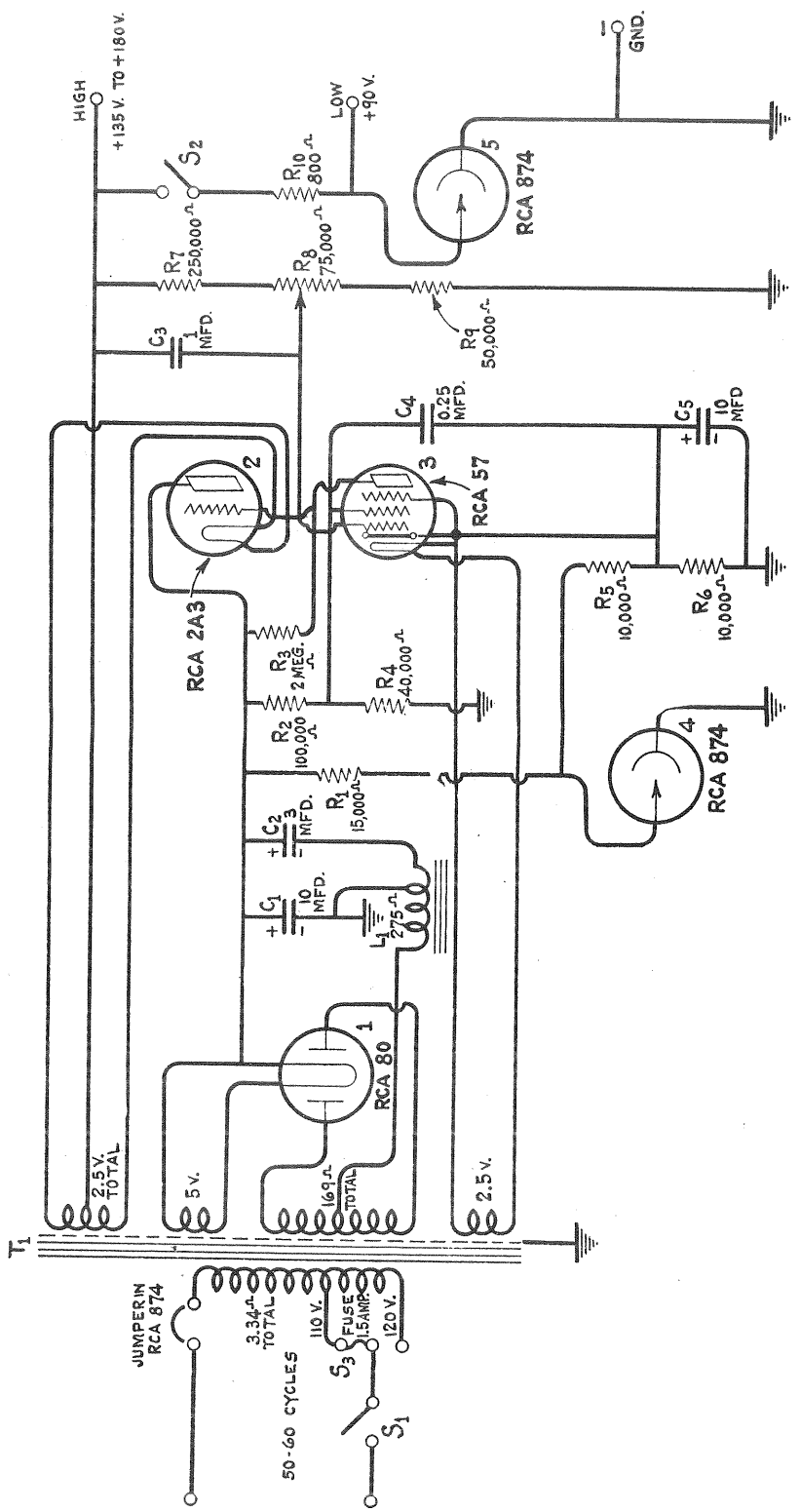


Figure 2—Schematic Circuit Diagram

RCA-2A3 is a voltage regulating tube which functions as a series resistor in the output line. Its resistance is governed by the value of its grid voltage.

RCA-874 (2) is a voltage regulating tube that is used only when the 90-volt tap is used.

The functioning of the circuit may best be explained by considering its action when a variation in line voltage or load occurs.

Assume that the voltage at a particular instant is reduced across the — and +B taps, either by reason of high load current or low A. C. line voltage. This would cause a reduced voltage from ground to the arm of the voltage adjusting potentiometer, which is connected to the grid of RCA-57. Inasmuch as the voltage across resistors R-5 and R-6 is normally higher between cathode and ground than that from the potentiometer arm to ground, reducing this voltage will cause an increased negative voltage to be applied between the cathode and grid of the RCA-57.

Increasing the negative potential on the grid of the RCA-57 reduces its plate current and consequently the voltage drop across resistor R-3. This causes the grid of the RCA-2A3 to become less negative and its resistance less. This reduces the voltage drop across the RCA-2A3, which gives an increased voltage at the output, thereby compensating for the reduction caused by load or low-line voltage.

As this action occurs very rapidly, the effect is a constant voltage output at all times. While only a portion of the D. C. output is applied to the grid of the RCA-57, the full ripple voltage is applied through capacitor C-3. The regulating action of the circuit also functions on this ripple voltage which causes a

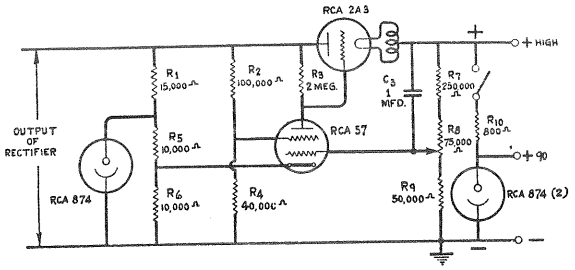
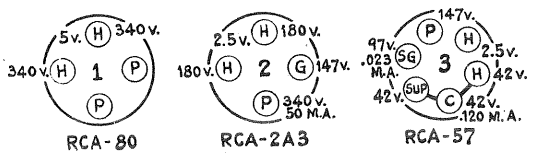
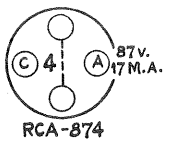


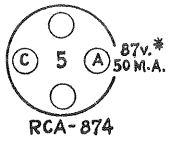
Figure 3—Voltage Regulating Circuits

further hum reduction. The final result is D. C. almost entirely free from ripple voltage.

A switch is provided for the 90-volt output which has the additional regulation of the UX-874 (2) when it is connected.







* Set output volts to 135—no load with 90-volt switch "on"

All D. C. voltages are to ground except heaters—Voltages are with 180-volt, 50 M. A. load, 90-volt switch "off"—Input voltage 115 volts, 60 cycles—transformer on 110-volt tap.

Figure 4—Voltages at Radiotron Sockets

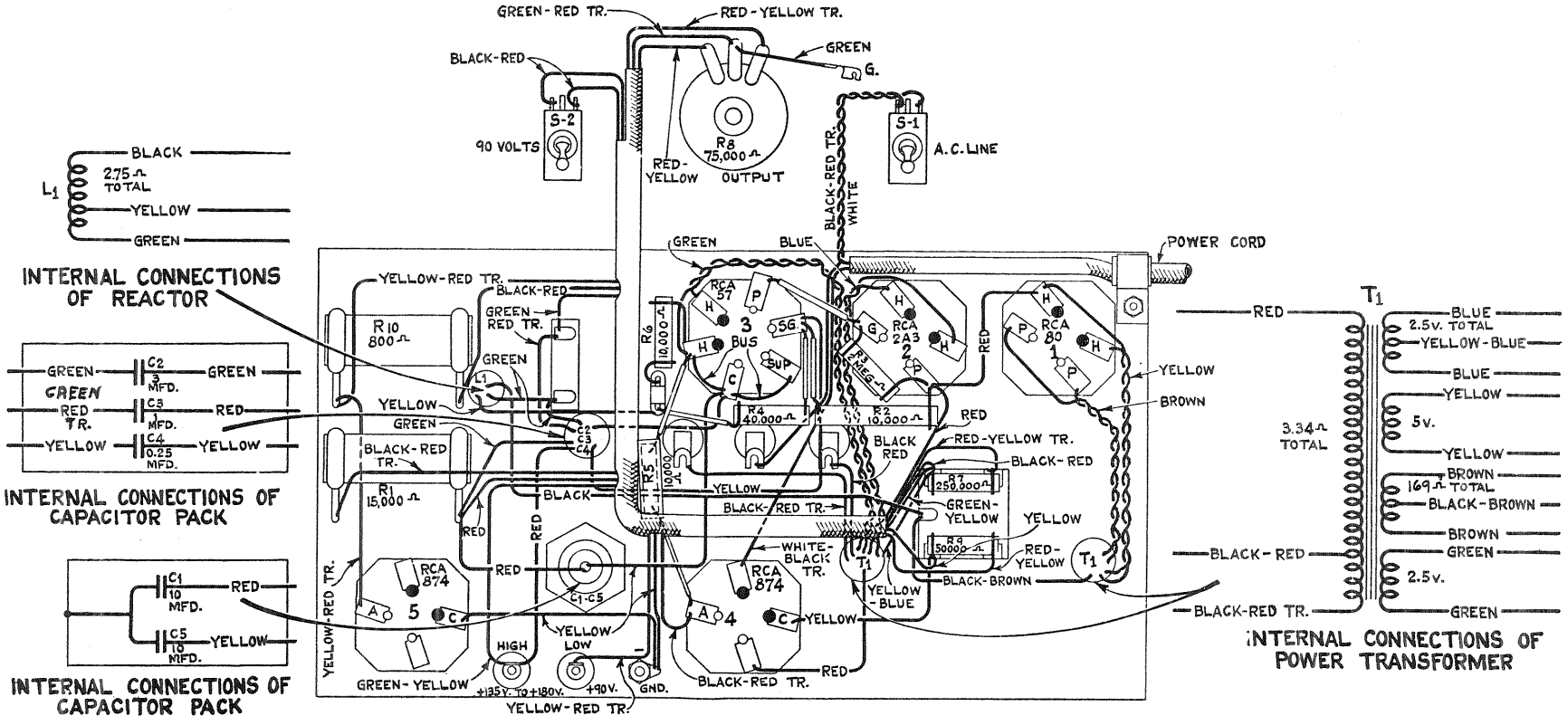


Figure 5—Wiring Diagram

SERVICE DATA

CAUTION

When using the TMV-118-B power unit with devices having filter capacitors, it is desirable to have a switch between the power unit and the device to open the circuit during a 30-second warming-up period. During this warming-up period, the output voltages may be high and unless the filter or by-pass capacitors are conservatively rated, premature failure may result.

(1) EXCESSIVE HUM

Excessive hum may be caused by operating the TMV-118-B beyond the limits of its capacity. A reference to the curves shown in Figure 4 shows the safe limits and regulation to be expected for such operation. A good test for maximum load is maximum permissible hum. Excessive hum with the equipment in normal condition is an indication of excessive load.

Excessive hum accompanied by high voltage is caused by a defective Radiotron RCA-57.

Excessive hum accompanied by normal voltage is an indication of a defective capacitor C-3.

(2) LOW VOLTAGE

Low voltage may be caused by a low emission Radiotron RCA-80 or RCA-2A3.

(3) HIGH VOLTAGE

High voltage may be caused by a defective Radiotron UX-874 or, if accompanied by hum, a defective RCA-57.

(4) VOLTAGE READINGS

The voltages shown on Figure 4 are those at which the various tubes operate. When taking readings, suitable allowance must be made for the load of the meter.

(5) VOLTAGE REGULATION

Figures 6 to 11, inclusive, show the voltage regulation of the TMV-118-B over a wide range of line voltages, load current and output voltage conditions. A reference to the charts should be made to ascertain the regulation for any given condition, prior to placing the unit in operation.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price	Stock No.	Description	List Price
4782	Cable—Wiring cable—6-conductor—Tapped	$0.85	3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5 (R9)	$1.00
2747	Cap—Grid contact cap—Package of 5	.50	3058	Resistor—100,000 ohms—Carbon type—1 watt—Package of 5 (R2)	1.10
4770	Capacitor pack—Comprising one 3.0 mfd., one 0.25 mfd. and one 1.0 mfd. capacitors (C2, C3, C4)	1.35	3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5 (R7)	1.00
4776	Capacitor pack—Comprising two 10.0 mfd. capacitors (C1, C5)	1.80	3079	Resistor—40,000 ohms—Carbon type—½ watt—Package of 5 (R4)	1.00
3883	Fuse—2 amperes—Package of 5	.40	4046	Resistor — 2 megohms — Carbon type — ½ watt—Package of 5 (R3)	1.00
4336	Knob—Potentiometer knob—Package of 5	.40	3986	Scale—Dial scale—0 to 100	.66
4774	Mount—Fuse mount	.42	4780	Screw—Thumb screw—Package of 2	.34
4777	Post—Binding post assembly—3 posts	.85	6300	Socket—4-contact Radiotron socket	.35
4779	Potentiometer (R8)	1.48	7485	Socket—6-contact Radiotron socket	.40
4773	Reactor—Filter reactor (L1)	4.75	21131	Switch—Toggle switch	1.75
4771	Resistor—800 ohms (R10)	.85	4775	Transformer—Power transformer (T1)	11.82
4772	Resistor—15,000 ohms (R-1)	.85			
4781	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5 (R5, R6)	1.00			

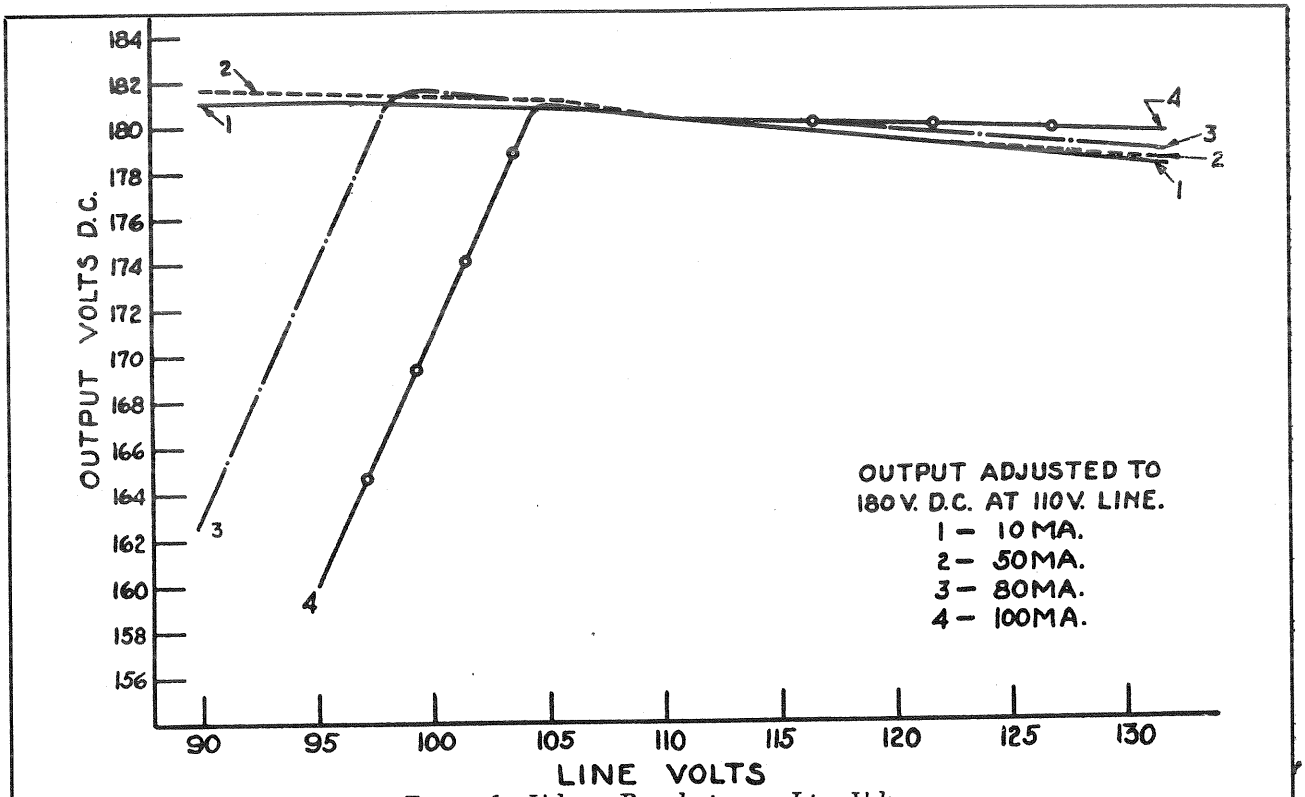


Figure 6—Voltage Regulation vs. Line Volts

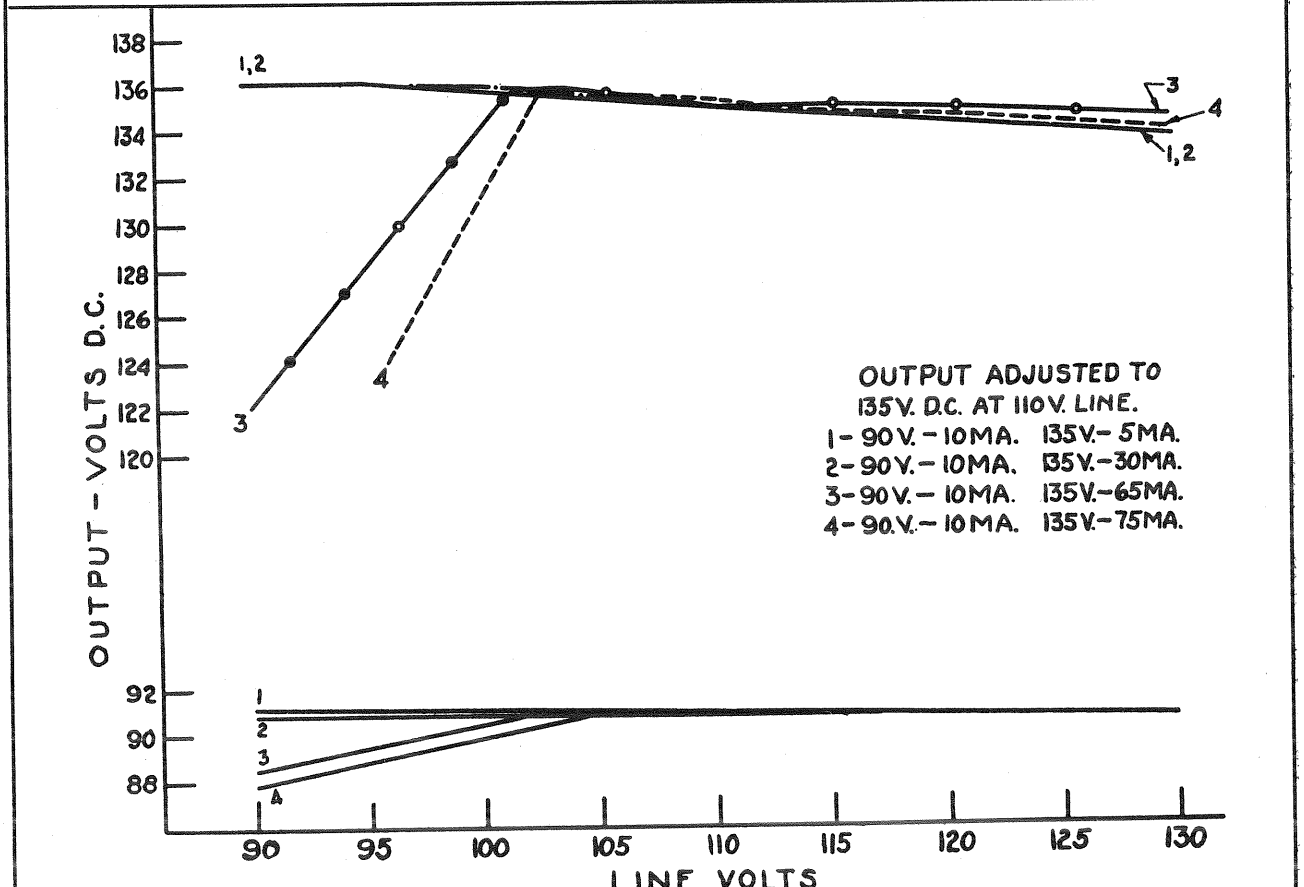


Figure 7—Voltage Regulation vs. Line Volts

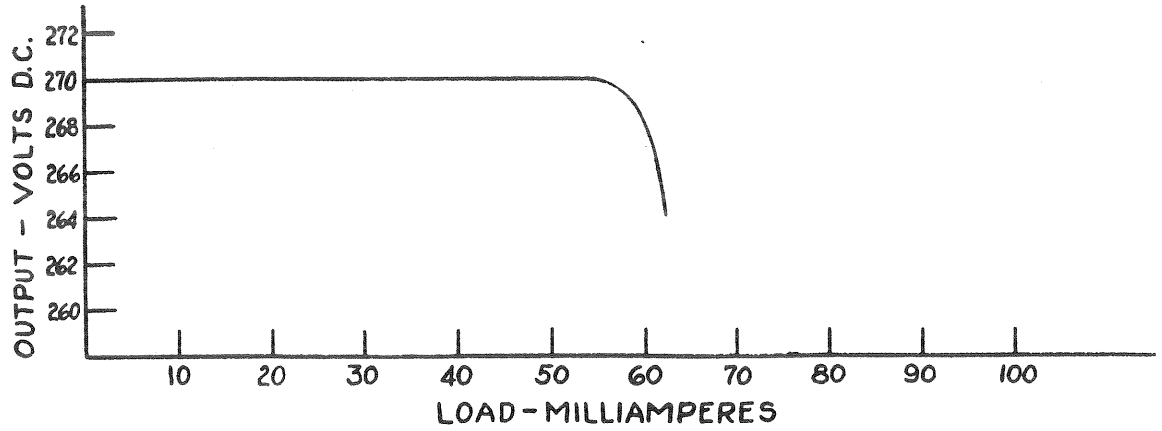


Figure 8—Voltage Regulation vs. Load with Constant Line Voltage (110 Volt-60 Cycle)

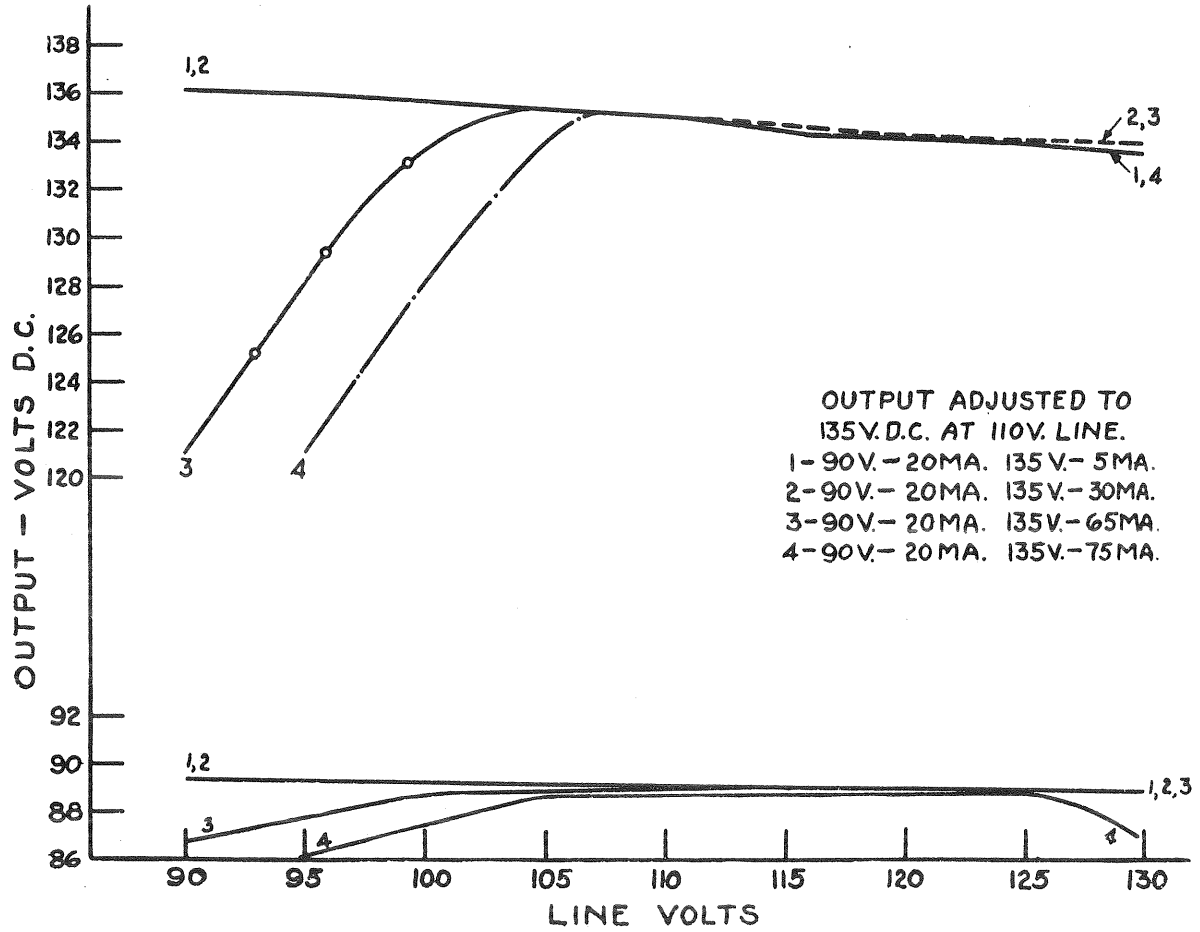


Figure 9—Voltage Regulation vs. Line Volts

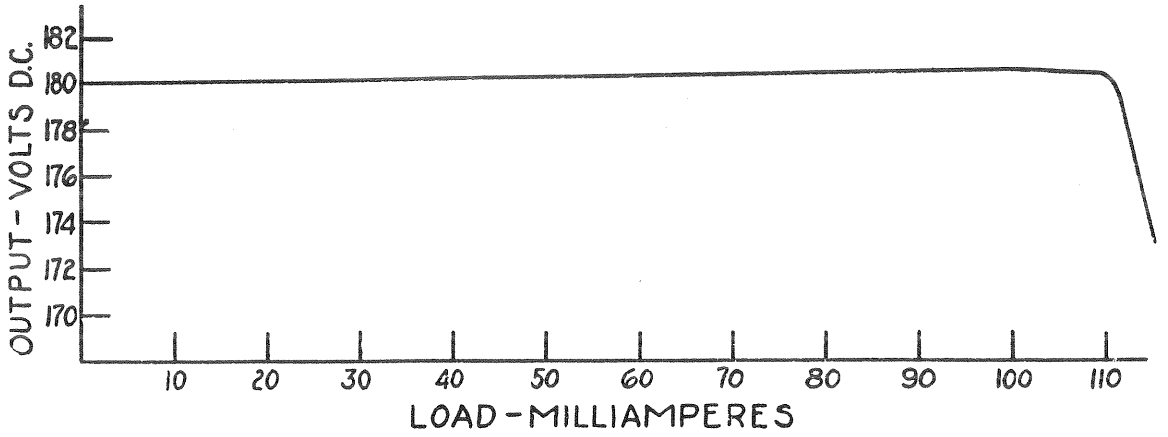


Figure 10—Voltage Regulation vs. Load with Constant Line Voltage (110 Volt-60 Cycle)

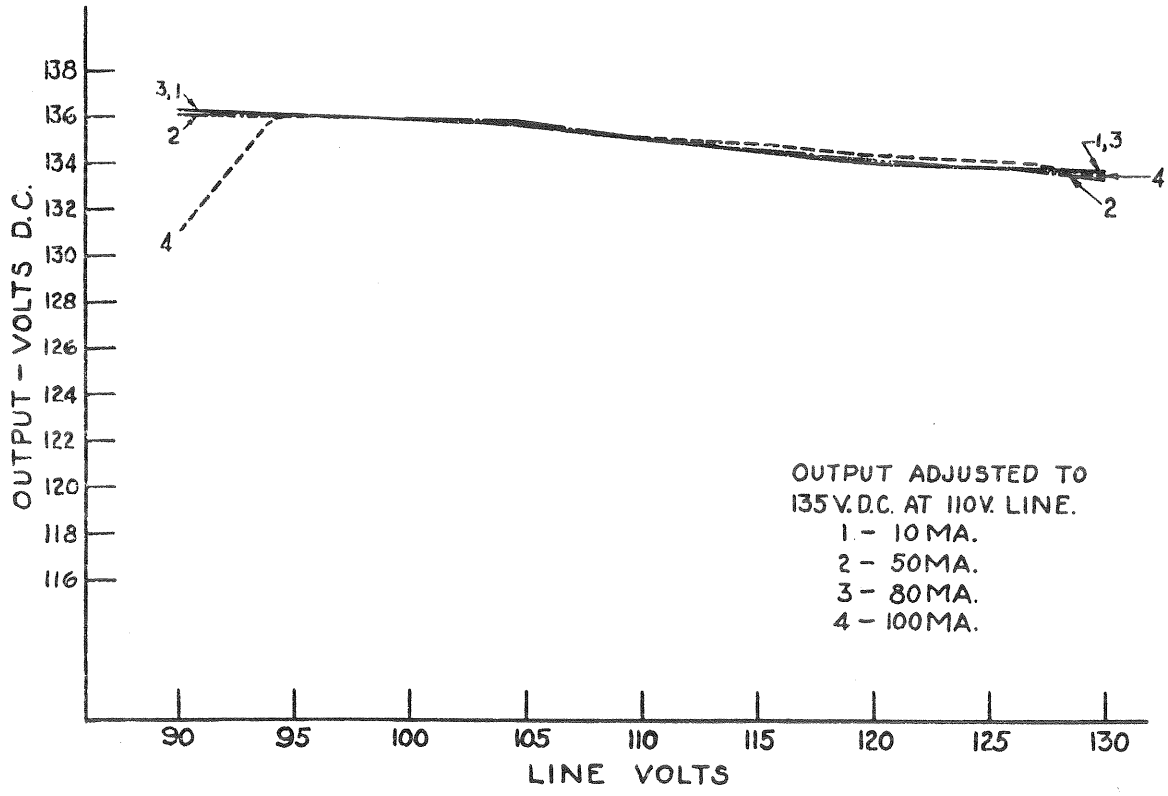


Figure 11—Voltage Regulation vs. Line Volts