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# OPERATING INSTRUCTIONS



**ALTEC**<sup>®</sup>  
LANSING CORPORATION

260A  
AMPLIFIER

## SPECIFICATIONS

Type:	Power Amplifier	Output Impedance:	Less than 12% of nominal load impedance
Gain:	50 dB; 30 dB, bridging 600Ω line	Noise level:	-16 dBm, 70 dB below rated output
Input Sensitivity:	1.2 v rms/600Ω	Controls:	Meter switch and plate current balance potentiometers
Power Output:	260 watts @ less than 2% THD, 45 cps-15 kc	Power Supply:	105/117/125 volts, 60 cps, 740 watts
Frequency Response:	± 0.5 dB, 20-20,000 cps; ± 3 dB, 5-70,000 cps @ 10 watts output	Tubes:	2 - 6AU6, 2 - 813, 2 - 3B28, 1 - 5R4GYA
Source Impedance:	500/600Ω and 5KΩ bridging	Dimensions:	17½" H x 19" W x 14¼" D
Load Impedance:	9Ω, 19Ω (70V line), 65Ω (130V line)	Color:	Green
		Weight:	186 lbs.

## DESCRIPTION

The 260A Amplifier is a rack mounted, medium gain power amplifier designed for sound reinforcement and for industrial applications where 260 watts of continuous power having extremely low distortion is required. It is well suited for shake-table operation and motor-running service at any frequency from 50 to 15,000 cps.

The amplifier consists of two stages of push-pull amplification, the output stage being a pair of 813 tubes operating in Class AB<sub>1</sub>. Negative feedback is carried around all stages from a tertiary winding on the extra heavy output transformer. This allows the output to operate above ground where such a condition is required. The output taps accommodate loads of 9Ω, 19Ω (70V Line) and 65Ω (130V Line).

Gas-filled rectifiers (3B28) and choke input filters provide hash-free and well regulated high voltage to the 813 tubes. All high voltage capacitors are oil-filled units. The 260A Amplifier is completely stable under all output load conditions, with no tendency toward oscillation whether the output is open circuited or connected to any combination of resistive, capacitive or inductive load.

## CONTROLS

The 260A Amplifier is turned on by means of a 10 ampere thermal-cutout switch, Thirty seconds of filament warm-up time is afforded by a time delay relay which then connects the AC line to the primary of the high voltage transformer. This relay is actuated by the 120 volt bias supply, which insures complete safety for the tubes in case of bias failure. Thus, the 260A Amplifier can be operated from a remote location by simply turning on the AC supply at the operating position. For applications of the 260A Amplifier where it is desired to operate with the filaments on but with high voltage applied only during limited periods, provision has been made for mounting an accessory relay. Mounting holes for a Potter Brumfield type MR1 are located in the right side wall of the chassis directly above the time delay relay. One of the white wires attached to the contacts of this relay has sufficient extra length that it can be cut and the ends connected to the contacts of the new relay. An external source of relay actuating current must be provided for this operation. The MR series relays may be had with solenoids suitable for 6-12-24 volts AC or DC operation. The choice is dictated by the conditions under which the device is being used.

If the "push to talk" type operation is not required, but it is desired to switch the 260A Amplifier on from a remote point over a control circuit at low voltage rather than 117 VAC the Potter-Brumfield relay may be used for this purpose. It is mounted as above, and the gray wire loop laced into the cable form-is to be cut and the severed loop ends are to be connected to the contacts of the relay. In this type of operation, the starting circuit breaker of the 260A Amplifier must be left "on." Operation of the Potter-Brumfield relay from the remote point closes the main AC circuit of the 260A Amplifier and after thirty seconds warmup, the amplifier is ready for use.

A meter and selector switch are provided for the purpose of checking tube condition-and to allow proper balancing of the 813 tubes. With the selector switch in the "V1" or "V2" position, the meter pointer should rest within the block marked "V1-V2 Normal" on the meter scale if the 6AU6 tubes are in good condition.

With the selector switch in "V3" or "V4" position and with no signal, the meter pointer should rest on the portion of the scale marked "ZERO SIGNAL." Normal small variations in 813 tube characteristics may require adjustment of the bias. Screw driver adjustment of the bias potentiometers is provided through holes located in the meter panel on either side of the trademark.

With signal applied and the tubes delivering power into the load, the meter pointer will swing over the portion of the scale marked "V3-V4 OPERATING RANGE." When delivering full power, the pointer will hover over the right end of this portion of the scale. Intermediate levels will cause the meter to read between the quiescent and full power limits. Rapid variations in speech and music will cause deflections over this range.



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## POWER CONNECTIONS

The two power transformers of the 260A Amplifier have primary taps for 105, 117 and 125 volts. The tap which most nearly approximates the average line voltage should be used. It is desirable that the wire from the AC line be of such size that no appreciable voltage drop will occur at a current of 8 amperes, which is the drain on the line when the amplifier is delivering full power.

## INPUT CONNECTIONS

As shipped, the input transformer is connected for operation from a 500 ohm line. A line level of +4.5 dBm (1.2 volts) will drive the 260A Amplifier to full power. Where higher levels are available, a bridging connection will reduce the gain by 20 dB. If required, line impedances of 30/50, 125/150, or 250/300 can be matched by strapping the input transformer terminals in accordance with the schedule shown on the schematic.

In some instances, the 260A Amplifier may replace a power amplifier such as the Altec 287W in an existing system where an amplifier of moderate power is used as a driver. In this case, it is necessary to terminate the driver amplifier with a load resistor to match the rated output and impedance of the driver. The 5,000 ohm input connection on the 2c,0A Amplifier should be connected across this load resistor.

## OUTPUT CONNECTIONS

For sound reinforcement, loudspeakers with voice coil impedances from 8 to 16 ohms may be directly connected to the 9 ohm output tap.

For multiple loudspeaker operation, the 70 volt distribution line should be used. At this tap, the amplifier delivers rated audio output at 70 volts. Using loudspeakers equipped with 70 volt line transformers, it is only necessary to connect the chosen wattage tap on the transformer to the speaker distribution line. The amplifier will operate correctly providing the sum of the power drawn by all the speakers does not exceed the power rating of the amplifier. Total power can be divided among speakers as desired. Due to the excellent output voltage regulation of the 260A, speakers or groups of speakers can be switched on and off without the necessity of providing dummy loads, and as speakers are connected or disconnected, there will be no apparent change in volume level.

When losses in a 70 volt distribution system tend to be large, the use of a 130 volt line may offer very attractive economies. Loudspeaker 70 volt line transformers may be used on a 130 volt line by connecting the line to a tap rated at one quarter of the desired power. For example, if the speaker is to draw 1 watt, connect it to the appropriate impedance terminal of the transformer and connect the 130 volt line to a ¼ watt terminal.

The 130 volt output tap also provides a suitable source of power to operate motors and other electrical apparatus normally supplied from 117 volt AC lines. In this service, the amplifier is capable of continuously delivering 260 volt amperes to the load at any frequency from 50 cycles to 15,000 cycles.

If the full power capabilities of the amplifier are to be utilized when the load is a motor or other induction apparatus having a low power factor, it is essential that corrective capacitors be added to the circuit.

## MOUNTING

The 260A Amplifier is designed for mounting in a standard relay rack.

Wall mounting can be accomplished by the use of the 12156 assembly. Assemble the two side members to the two channel iron rails as indicated in the exploded view of Figure 1. Attach this assembly to the wall by means of toggle bolts or lag screws through the holes in the rails. Mount the 260A between the side members by means of 12-24 screws in the tapped holes located on the front edges of the side members. Attach the necessary conduits in the knockouts provided in the side members. Wire amplifier through the holes which line up with the knockouts in the chassis. Install the side covers to conceal all wiring. Installation of these covers also conceals the mounting screws of the amplifier. When assembled completely, this unit is extremely rigid.

## SAFETY PRECAUTIONS

All practical safety precautions have been incorporated in the design of the 260A Amplifier, including an interlock switch which interrupts the AC line to the high voltage transformer, when the cover is removed. A potential of 1,800 volts occurs at several points in this amplifier. Therefore, do not defeat the interlock switch, and do not attempt tube replacement or service work with the power turned on.

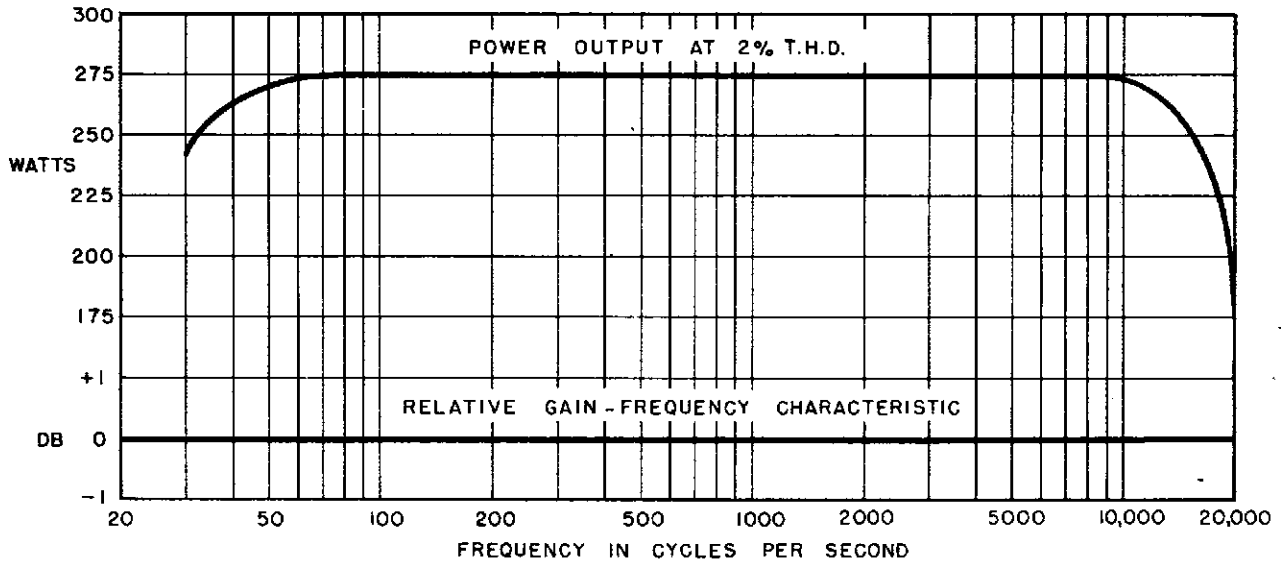
The high voltage condensers are equipped with bleeders which will normally dissipate any charge within a few seconds after the power is turned off. However, an unsuspected open bleeder could leave a dangerous charge on a condenser, and it is good practice to discharge all filter condensers with a short circuit before any work is done.

In view of the above, trouble shooting on the amplifier should be done by means of resistance and continuity checks, with the power turned off. The schematic diagram shows all pertinent resistance values to aid in servicing the amplifier.

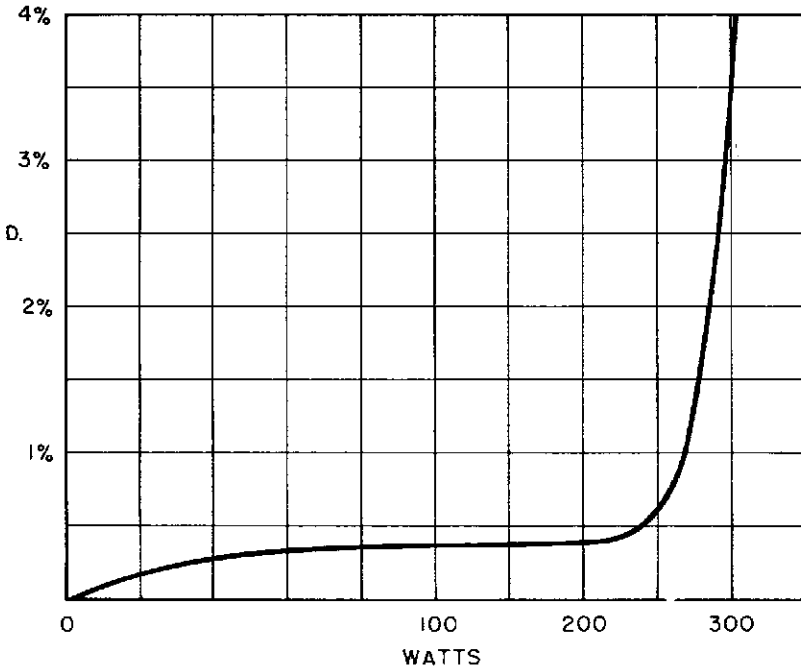
## Note!

Modification of wiring or components within the amplifier enclosure will void Underwriter Laboratories listing and make equipment subject to local inspection at time of installation.

**260A AMPLIFIER**  
**TYPICAL RESPONSE WITH RANDOM TUBE SELECTION.**  
**70 VOLT LINE CONNECTION**

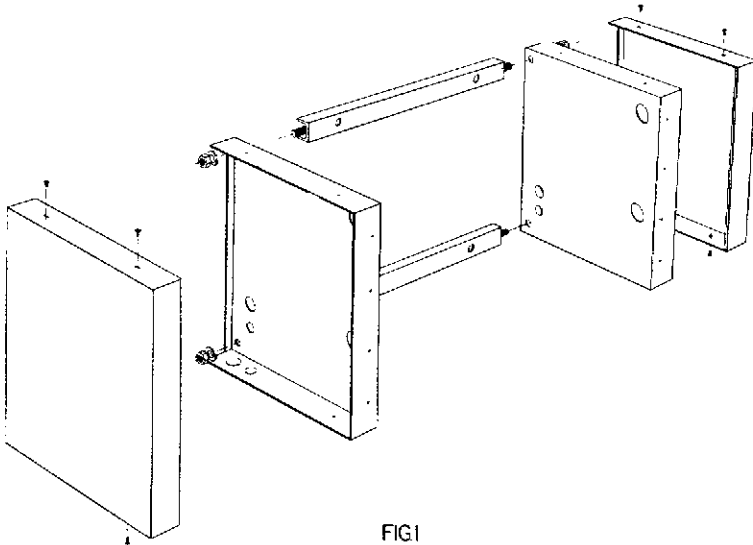


**260A AMPLIFIER**  
**DISTORTION VS POWER OUTPUT AT 1000 C.P.S.**



**PARTS LIST**

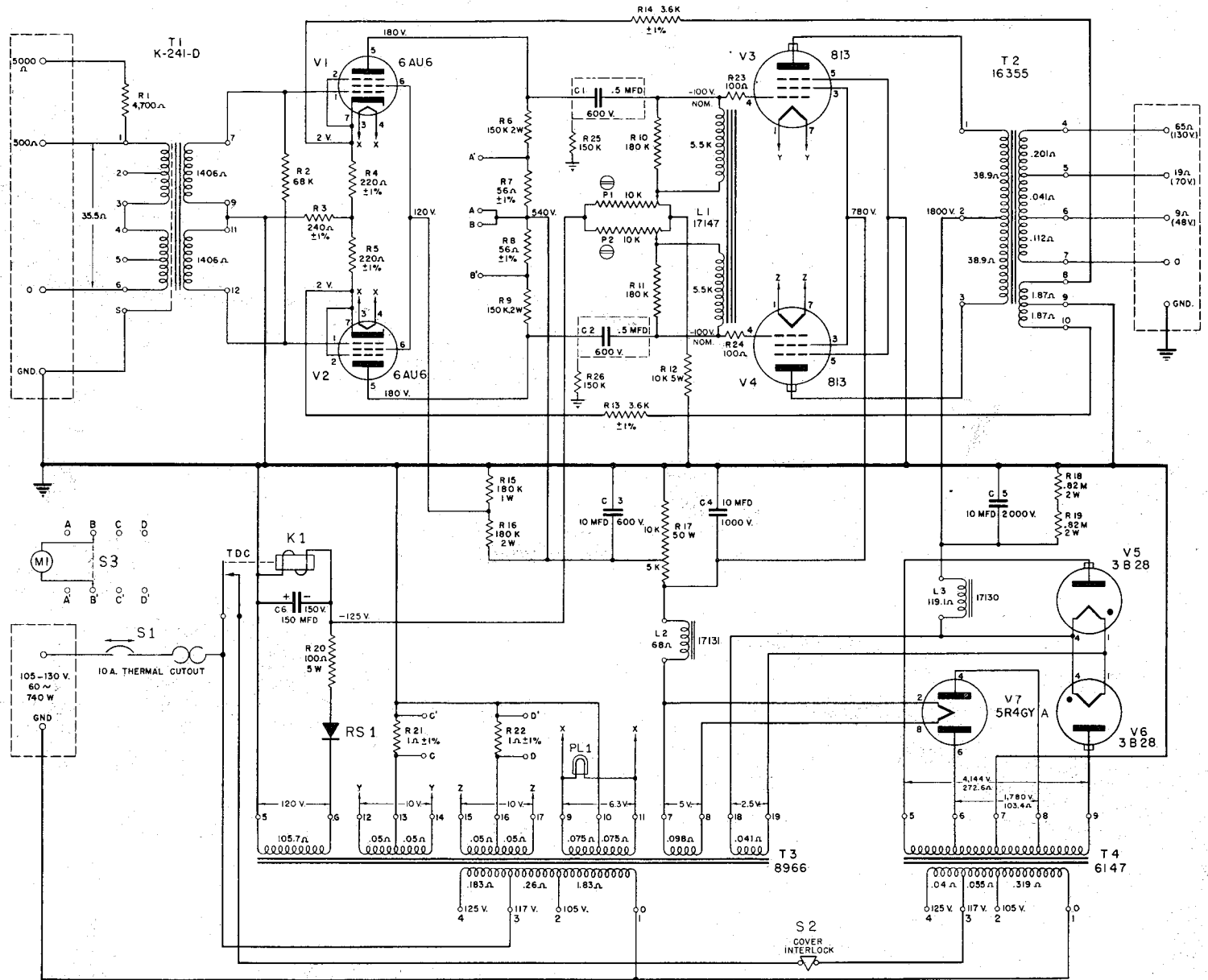
C1, 2	.5 mfd, 600 V., C.D. WAB-6050
C3	10 mfd, 600 V., G.E. 23F878-G102
C4	10 mfd, 1,000 V., G.E. 23F451-G102
C5	10 mfd, 2,000 V., G.E. 23F386-G102
C6	150 mfd, 150 V., Mallory FP 117
R1	4,700 ohms, $\pm 10\%$ , 1/2 watt
R2	68,000 ohms, $\pm 10\%$ , 1/2 watt
R3	240 ohms, $\pm 1\%$ , 1/2 watt, Deposited Carbon
R4, 5	220 ohms, $\pm 1\%$ , 1/2 watt, Deposited Carbon
R6, 9	150,000 ohms $\pm 10\%$ , 2 watt
R7, 8	56 ohms, $\pm 10\%$ , 1/2 watt, Deposited Carbon
R10, 11, 15	180,000 ohms, $\pm 10\%$ , 1 watt
R12	10,000 ohms, 5 watt, Tru-ohm FR-5
R13, 14	3,600 ohms, $\pm 1\%$ , 2 watt, Dalohm RS-2
R16	180,000 ohms $\pm 10\%$ , 2 watt
R17	10,000 ohms, 50 watt, Altec Lansing 12189
R18, 19	820,000 ohms, $\pm 10\%$ , 2 watt
R20	100 ohms, 5 watt, Tru-ohm FR-5
R21, 22	1 ohm, $\pm 1\%$ , 1/2 watt, Wire Wound
R23, 24	100 ohms, $\pm 10\%$ , 1 watt
R25, 26	150,000 ohms, $\pm 10\%$ , 1/2 watt
P1, 2	10,000 ohms, Clarostat A43-10K
L1	Peerless 17147
L2	Peerless 17131
L3	Peerless 17130
T1	Peerless K-241-D
T2	Peerless 16355
T3	Peerless 8966
T4	Peerless 6147
S1	G.E. Manual Starter, CR1061-H1A, 10 amp., 12.0 Heater
S2	V3-1 Microswitch
S3	Meter Switch, Altec Lansing 12192
PL1	G.E. Mazda #44
M1	0-200 Microamp Meter, Altec 5958
K1	Relay, Altec Lansing 12191
RS1	Selenium Rectifier, Sarkes-Tarzian #75
V1, 2	6AU6 Vacuum Tube
V3, 4	813 Vacuum Tube
V5, 6	3B28 Vacuum Tube
V7	5R4GYA Vacuum Tube



**FIG1**

INPUT CONNECTIONS ARE STANDARD AS SHOWN AND SHOULD SATISFY MOST REQUIREMENTS. ADDITIONAL IMPEDANCES ARE AVAILABLE HOWEVER BY RECONNECTING T1 AS INDICATED BELOW.

T1 PRIMARY CONNECTIONS		
INPUT	CONNECT TO	STRAP
500/600	1-6	3-4
250/300	1-6	2-4 & 3-5
150	1-6	1-4 & 3-6
30/50	1-6	1-5 & 2-6



**LEGEND**  
 Ω = OHMS  
 K = 1,000Ω  
 M = 1,000,000Ω  
 ALL CAPACITANCE VALUES IN MFD. UNLESS OTHERWISE INDICATED.

# ALTEC LANSING 260A AMPLIFIER

ISSUE	APPROV	DATE	CHANGE	BY	APP'D
1		12-21-56			
2		9-28-56	ADDED R23 AND R24		
3		1-30-58	R15 WAS R13 & R16 WAS R24		
4		9-28-58	ADDED T3 TERM NOS. 740 WAS 600		

ALTEC LANSING CORPORATION  
 SEVERY HILLS, CALIF.

SCHMATIC  
 260A AMPLIFIER

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