

260A Amplifier

260A



Features:

- 260 watts continuous
- Efficient, circuitry
- Low cost per watt
- Only 7 tubes
- Automatic warm-up
- High voltage safety protection
- Remote or local control
- 117 v output for motor operation
- Utmost reliability

HIGH POWER FOR: MILITARY COMPLEXES — SCHOOLS — FACTORIES SOUND REINFORCEMENT — RAIL, BUS & AIR TERMINALS HOTELS — LABORATORIES MOTOR CONTROL — RESEARCH

This amplifier will deliver 260 watts of low distortion power over a wide frequency range. This high specified power is available CONTINUOUSLY at 2% or lower distortion over the entire spectrum. Every care has been taken in its design to meet the safety, quality and reliability requirements of large public address and industrial sound systems and the specialized needs of industrial control and laboratory applications.

Output voltage regulation is held to less than 1 db. Output connections will accommodate conventional low impedance speaker loads, 70 volt distribution lines, and will provide 140 volts or 117-125 volts for the operation of motors at controlled frequencies.

An automatic delay relay in the power circuit assures an adequate warm-up period for the main tube complement without operator supervision and also makes it possible to install fully remote on-off control. Complete safety from high voltages is assured the operator by an interlock switch on the front cover which automatically turns off the amplifier when the cover is removed, and by bleeders on the high voltage condensers.

The carefully engineered circuit is exceptional in its simplicity using only seven high capacity broadcast type tubes instead of a large quantity of small receiver tubes. This circuit simplicity is important from the standpoint of reliability, maintenance and the cost of spares and replacements.

For high powered public address, music and industrial sound systems the 260A will be found far more reliable and economical than a number of smaller amplifiers. In industrial control use its extreme stability and high continuous rating make it the obvious choice for the operation of motors and shake tables at selected frequencies. The 260A is designed for standard relay rack mounting and there is an accessory cabinet available for wall mounting.



A Division of  Ling Altec, Inc.

1515 S. Manchester Ave., Anaheim, Calif.
New York

ALTEC 260A

SPECIFICATIONS

Gain:	50 db; 30 db, bridging 600 ohm line
Input Sensitivity:	1.2 v rms/600 ohms
Power Output:	260 watts @ less than 2% thd, 45 cycles—15 KC
Frequency Response:	@ 10 watts, ± 0.5 db, 20-20,000 cps; ± 3 db, 5-70,000 cps
Source Impedance:	500/600 ohms and 5,000 ohms bridging
Load Impedance:	9, 19 (70 v line), 65 (130 v line) ohms
Output Impedance:	Less than 12% of nominal load impedance
Noise Level:	-16 dbm; 70 db below rated output
Controls:	Meter switch—Plate current balance
Power Supply:	105/117/125 volts, 60 cycles, 740 watts
Tubes:	Two 6AU6, two 813, two 3B28, one 5R4GYA
Dimensions:	18" H x 19" W x 14 $\frac{1}{4}$ " D
Color:	Green
Weight:	186 lbs.

ACCESSORIES

12156 wall mounting assembly

ARCHITECTS AND ENGINEERS SPECIFICATIONS

The amplifier shall be of the rack mounting type measuring not more than 18" H, 19" W, and 14 $\frac{1}{2}$ " D. Provisions shall also be available for wall mounting. It shall be equipped with interlock switch to disconnect the high voltage supply whenever it becomes necessary to expose any of the components. This safety feature shall be augmented by automatic filament warm-up delay relay enabling remote on and off control of the amplifier. Instantaneous on-off control of tube plates shall be available by installing proper external relays. The amplifier shall include a meter and necessary switching for checking plate current balance. The meter and switch shall be mounted on the control panel attached to the amplifier and located in the center of the front safety cover. This panel shall also include a pilot light and an on-off switch. Any amplifier not including these features or utilizing a separate tube condition meter shall not be acceptable under these specifications.

Power output shall be 260 watts with less than 2% total harmonic distortion over the frequency range of 45 to 15,000 cycles. The frequency response at 10 watts shall be $\pm .5$ db from 20 to 20,000 cycles and ± 3 db in the range from 5 to 70,000 cycles. The noise level shall be -16 dbm; 70 db below rated output. The overall gain of the amplifier shall be 50 db; 30 db bridging 600 ohm line. The output impedance shall be 9, 19 (70 v line), 65 (130 v line) ohms. The output impedance shall be less than 12% of nominal load impedance. Output connections shall provide for low impedance speaker loads, 70 v line, and a 65 ohm tap for 140 v line or 117-125 v to operate motors at various frequencies. The source impedance shall be 500/600 ohms and 5,000 ohm bridging. The power amplifier shall have selectable primary voltage taps of 105/117/125 v, 60 cycles, and shall not draw more than 740 W from the primary source. The tube complement shall consist of two 6AU6, two 813, two 2B28, one 5R4GYA. The unit shall be finished in green and shall weigh in the order of 186 pounds.

Any power amplifier which does not have a tertiary winding in the output transformer to free the load circuit from the amplifier ground shall not be deemed acceptable under these specifications.

The amplifier shall be Altec Lansing Model 260A.

NOTICE
We recommend that you obtain your Altec products from factory trained authorized Altec Sound Contractors and Distributors. This will assure you of proper installation, a continuing source of knowledgeable advice, service, and quick warranty protection.




ALTEC LANSING

260A AMPLIFIER

OPERATING INSTRUCTIONS

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.

SPECIFICATIONS

Type:	Power Amplifier.
Gain:	50 db; 30 db, bridging 600 ohm line.
Input Sensitivity:	1.2 volts rms/600 ohms.
Power Output:	260 watts @ less than 2% thd, 45 to 15,000 cps.
Frequency Response:	10 watts output; ± 0.5 db, 20-20,000 cps, ± 3.0 db, 5-70,000 cps.
Source Impedance:	500/600 ohms and 5,000 ohms bridging.
Load Impedance:	9, 19 (70 v line), 65 (130 v line) ohms.
Output Impedance:	Less than 12% of nominal load impedance.
Noise Level:	-16 dbm, 70 db below rated output.
Controls:	Meter switch — Plate current balance.
Power Supply:	105/117/125 volts, 60 cycles, 740 watts.
Tubes:	2-6AU6, 2-813, 2-3B28, 1-5R4 GYA
Dimensions:	17-1/2" H x 19" W x 14-1/4" D.
Color:	Green.
Weight:	186 pounds.

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 AB₁. Negative feedback is carried around all stages from a tertiary winding on the extra-heavy duty output transformer. This allows the output to operate above ground if such a condition is required. The output taps accommodate loads of 9 ohms, 19 ohms (70-volt line) and 65 (130-volt line) ohms.

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 obtained with solenoids suitable for 6-12-24 volt, AC or DC operation. The choice is dictated by the conditions under which the device is being used.

If the "push-to-talk" 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 cut and the severed loop ends are 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 warm-up, the amplifier is ready for use.

A meter and a selector switch are provided for the purpose of checking tube conditions 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 the 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. Screwdriver



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1515 S. Manchester Ave., Anaheim, Calif.

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Price \$.14

C/P

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adjustment of the bias potentiometers is provided through holes located in the meter panel on either side of the trade-mark.

With signal applied and the tubes delivering power into the load, the meter pointer will swing over the portion of the scale marked "V3-4 OPERATING RANGE". When delivering full power, the pointer will hover over the right hand 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.

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.

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 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 one watt, connect it to the proper impedance terminal of the transformer and connect the 130-volt line to a 1/4 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 VAC 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.

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 chart illustrated 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 260A Amplifier should be connected across this load resistor.

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 in the front edges of the side members. Attach the necessary conduits in the knockouts provided in the side members. Wire the 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.

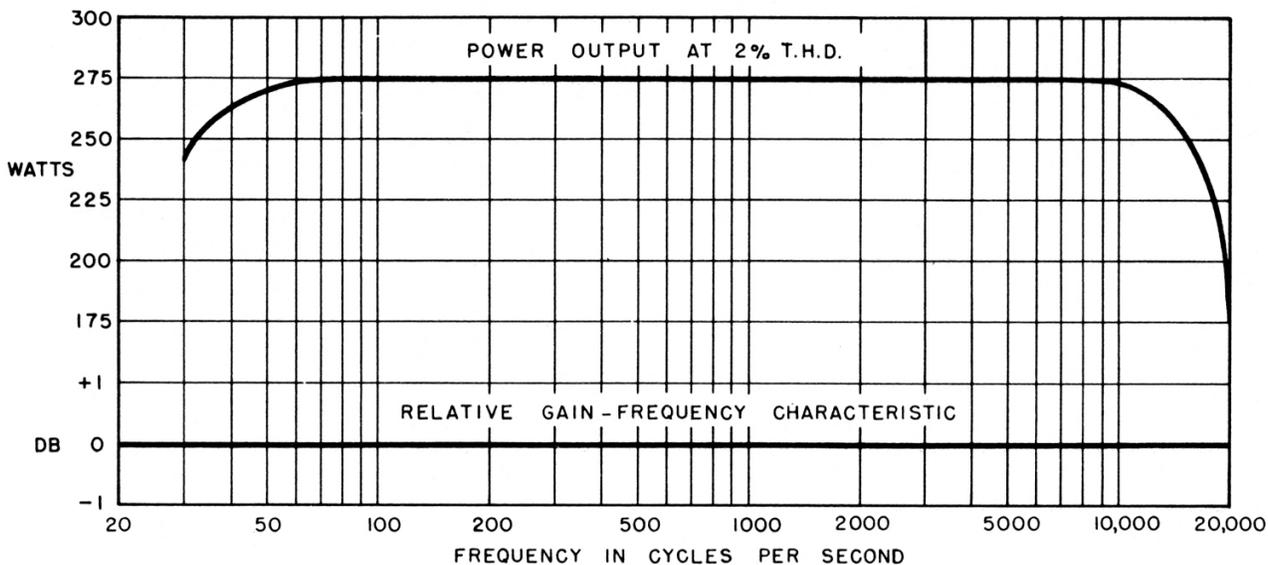
The high voltage condensers are equipped with bleeders which will normally dissipate any charge within a few seconds after the power is turned off. However, an unsuspected open bleeder could leave a dangerous charge on a condenser, and it is good practice to discharge all filter condensers with a short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

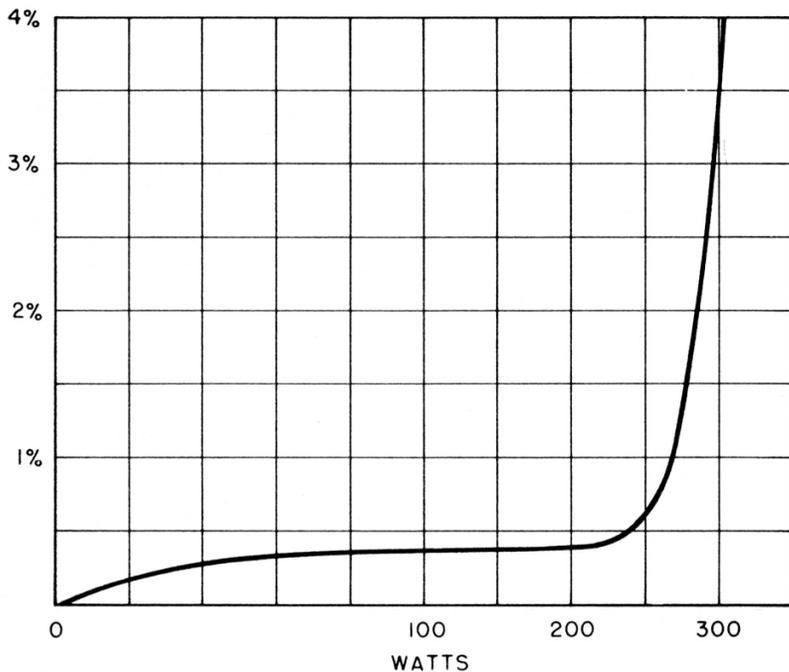
NOTE!

Modification of wiring or components within the amplifier will void the 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

Reference Designator	Name and Description
C1, C2	Capacitor, 0.5 mfd, 600 v (CD WAB-6050)
C3	Capacitor, 10 mfd, 600 v (G.E. 23F895-G102)
C4	Capacitor, 10 mfd, 1000 v (G.E. 23F451-G102)
C5	Capacitor, 10 mfd, 2000 v (G.E. 23F907-G102)
C6	Capacitor, 150 mfd, 150 v (Mallory FP 117)
K1	Relay (Altec 13510-3)
L1	Coil, grid (Altec 17147)
L2	Coil, filter (Altec 17131)
L3	Coil, filter (Altec 17130)
M1	Meter, 0-200 microamp (Altec 5958)
P1, P2	Potentiometer, 10,000 Ω (Clarostat A43-10K)
PL1	Pilot lamp (G.E. Mazda #44)
R1	Resistor, 4700 Ω \pm 10%, 1/2 w
R2	Resistor, 68,000 Ω \pm 10%, 1/2 w
R3	Resistor, 240 Ω \pm 1%, 1/2 w (Welwyn C-12)
R4, R5	Resistor, 220 Ω \pm 1%, 1/2 w (Welwyn C-12)
R6, R9	Resistor, 150,000 Ω \pm 10%, 2 w
R7, R8	Resistor, 56 Ω \pm 10%, 1/2 w (IRC MDC)
R10, R11, R15	Resistor, 180,000 Ω \pm 10%, 1 w
R12	Resistor, 10,000 Ω , 5 w (TruOhm FR-5)
R13, R14	Resistor, 3600 Ω \pm 1%, 2 w (Dalohm RS-2)
R16	Resistor, 180,000 Ω \pm 10%, 2 w
R17	Resistor, 10,000 Ω , 50 w (Altec 12189-2)
R18, R19	Resistor, 820,000 Ω \pm 10%, 2 w
R20	Resistor, 100 Ω , 5 w (TruOhm FR-5)
R21, R22	Resistor, 1 Ω \pm 1%, 1 w (TruOhm S-AL-1)
R23, R24	Resistor, 100 Ω \pm 10%, 1 w
R25, R26	Resistor, 150,000 Ω \pm 10%, 1/2 w
RS1	Rectifier, selenium (Sarkes-Tarzian 100-150)
S1	Switch, manual starter, 10 amp, CR 101 Y (G.E.)
S2	Microswitch, V3-1
S3	Switch, meter (Altec 12192-2)
T1	Transformer, input (Altec K-241-D)
T2	Transformer, output (Altec 16355)
T3	Transformer, filter (Altec 8966)
T4	Transformer, power (Altec 6147)
V1, V2	Vacuum tube, 6AU6
V3, V4	Vacuum tube, 813
V5, V6	Vacuum tube, 3B28
V7	Vacuum tube, 5R4-GYA

