



209 SERIES

8-Inch Full-Range Ceiling Loudspeakers

- **209-8A**, 8 ohm, 10 watts (EIA RS 426-A)
- **209-4T**, with 4 watt multi-tap transformer
- **209-4TWB**, with 4 watt multi-tap transformer and grille
- High efficiency: 94 dB for 1W @ 1M
- Maximum SPL: 104 dB for 10W @ 1M
- Frequency response: 80 Hz - 15 kHz
- Wide dispersion
- Dual magnet construction

Description

The Altec Lansing 209 is a high-quality 8-inch, full-range loudspeaker for distributed sound systems.

An acoustically transparent dome encloses a small, centrally mounted free-edge cone which is used to improve high-frequency dispersion.

The 209 is suitable for use in applications requiring highly intelligible speech or smooth musical reproduction.

To ensure long-term reliability in installations, the 209-8A is designed to handle 10 watts continuous power (40 watts peak) of shaped white noise signal for eight hours per EIA RS-426-A 1980.

The 209-4T includes a transformer, allowing connection to 25/70/100-volt line, with taps of 0.5 to 4 watts. The 209-4TWB offers the same performance as the 209-4T and includes a premounted ceiling grille.

Directional Performance

The directional characteristics of the 209 in a 1.8 cubic-foot vented enclosure were measured by running a set of polar responses in Altec Lansing's large anechoic chamber. The test signal was 1/3-octave-band-limited

pseudo-random pink noise centered at the ISO standard frequencies indicated in Figure 3.

Additional typical data is provided in Figures 4 and 5, which indicate 6-dB-down beamwidth versus frequency and directivity factor, respectively, for a 209 in the test enclosure.

Power Handling Test

The 209 is designed to withstand the power test described in EIA RS-426-A 1980. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with usual constant-percentage-bandwidth analyzer (one-third-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz, with a 3-dB-per-octave slope above 1,200 Hz. This shaped signal is sent to the power amplifier with the continuous power set at 10 watts into the EIA equivalent impedance (8.6 volts true RMS). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power,

or 40 watts peak (17.2 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

Recommended Connections

The 209 is a nominal 8-ohm impedance loudspeaker with a 10-watt input capability. However, it is also available with transformer, the 209-4T, and with transformer and grille, the 209-4TWB.

The 209-4T utilizes a 4-watt, 25/70.7/100-volt universal line matching transformer with power taps ranging from 0.5 to 4 watts as indicated in Table 1. The transformer is mounted to the frame and the primary winding is accessible for the user to select any of the power taps indicated in Table 1.

All wattages marked for the various taps refer to the load on the amplifier, with the insertion loss of the transformer being less than 2 dB.

Recommended Enclosures and Baffles

209-8A and 209-4T are designed to fit on standard 8-inch ceiling speaker baffles. Additionally, the 209 series loudspeakers will accommodate the use of any standard back enclosure with a diameter of 8.6 inches or greater and a depth of at least 3.5 inches.

209 Series 8-Inch Full-Range Loudspeakers

Larger back volumes will increase the low-frequency output. The frequency response of a 209 in a typical 0.25-cubic-foot and 1.8-cubic-foot back enclosure are shown in Figure 1.

Mounting

The 209 may be front- or rear-mounted against either surface of its mounting flange and requires a 18.4 cm (7.25 in.) diameter cutout and a 19.5 cm (7.68 in.) bolt circle. Normal fasteners up to 5 mm (0.20 in.) will fit through the eight holes in the frame. The 209 is designed for mounting on standard ceiling speaker baffles.

Architects' and Engineers' Specifications

The loudspeaker shall be a dual-cone loudspeaker with a nominal diameter of 20.6 cm (8.1 in.), an overall depth of 7.0 cm (2.75 in.), and shall weigh no more than 1.0 kg (2.2 lb). The voice coil shall have a nominal diameter of 2.54 cm (1.0 in.) and depth of 7.6 mm (0.3 in.) and shall operate in a gap of not less than 1.0 T (10,000 Gauss). High frequencies shall be reproduced by 5.7 cm (2.2 in.) free-edge cone attached to the apex of the low-frequency device and protected from dust by a dust dome fastened to the low-frequency cone.

The loudspeaker shall exhibit a sensitivity (SPL, 1 W at 1 m (3.28 ft) averaged 200-4,000 Hz) of no less than 94 dB on axis maintaining an essentially flat frequency response with 3-dB-down points at 115 Hz and 12,000 Hz in a 12-cubic-foot sealed box in a free field. The half-space reference efficiency shall be 1.9%. The nominal impedance shall be 8 ohms and the dc resistance shall be 6.5 ohms. The loudspeaker shall be capable of handling a continuous 10-watt (8.6 volts true RMS) shaped white-noise sig-

nal (as per EIA RS-426A 1980) with a 6-dB crest factor for eight hours.

The loudspeaker shall be the Altec Lansing model 209-8A. When fitted with a transformer that allows connection to 25/70.7/100-volt systems of 0.5 to 4 watts, the loudspeaker shall be referred to as the Altec Lansing model 209-4T and the 209-4TWB with transformer and grille.

Limited Warranty

Altec Lansing products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than EVI Audio Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to EVI Audio Service or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of au-

thorized service representatives is available from EVI Audio Service at 600 Cecil Street, Buchanan, MI 49107 (800/234-6831 or FAX 616/695-4743). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Altec Lansing shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Altec Lansing Speakers and Speaker Systems are guaranteed against malfunction due to defects in materials or workmanship for a period of five (5) years from the date of original purchase. The Limited Warranty does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from improperly designed enclosures. Altec Lansing active electronics associated with the speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

For warranty repair or service information, contact the service repair department at: 616/695-6831 or 800/685-2606.

For technical assistance, contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard Time.

Specifications subject to change without notice.

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Figure 1—Axial Frequency Response, 1 Watt/ 1 Meter

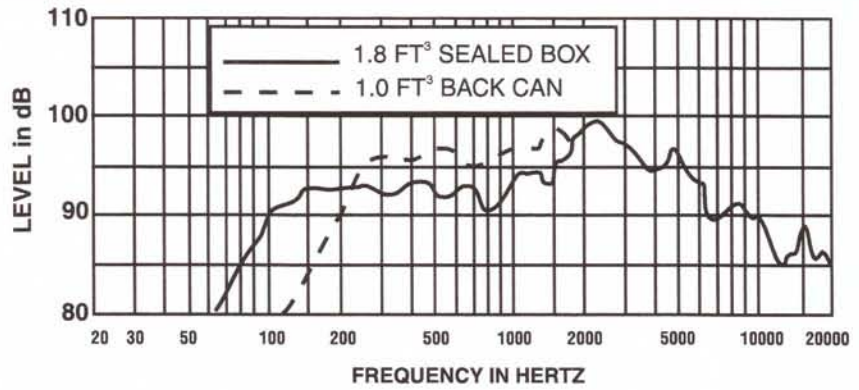


Figure 2—Input Impedance vs. Frequency

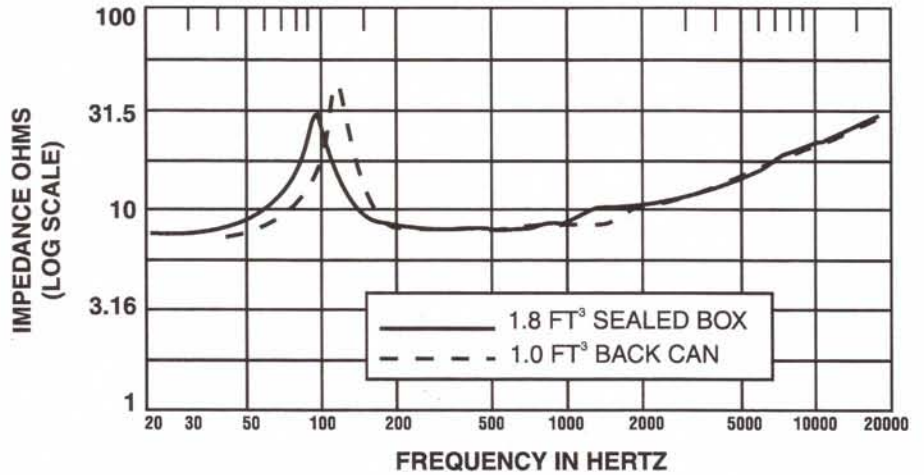
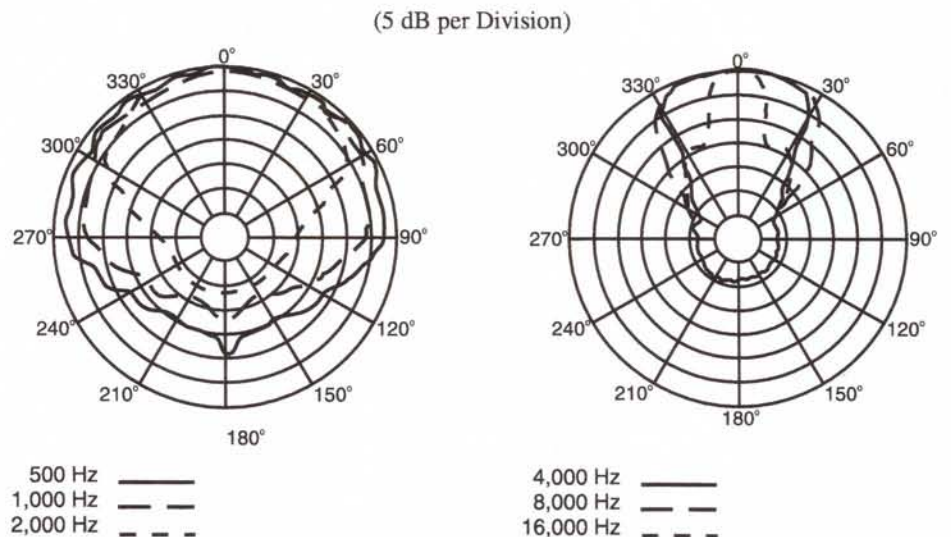


Figure 3—Polar Response in 1.8 ft³ Sealed Box 4-Volt RMS of 1/3-octave-Band Limited Noise in Anechoic Environment, 20 Feet on Axis



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Figure 4—Beamwidth vs. Frequency in 1.8 ft³ Sealed Box

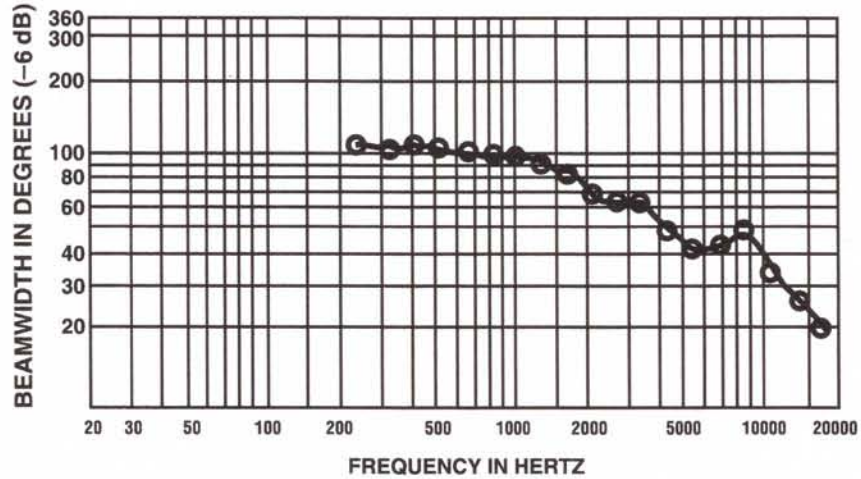


Figure 5—Directivity Factor and Directivity Index vs. Frequency in a 1.8 ft³ Sealed Box

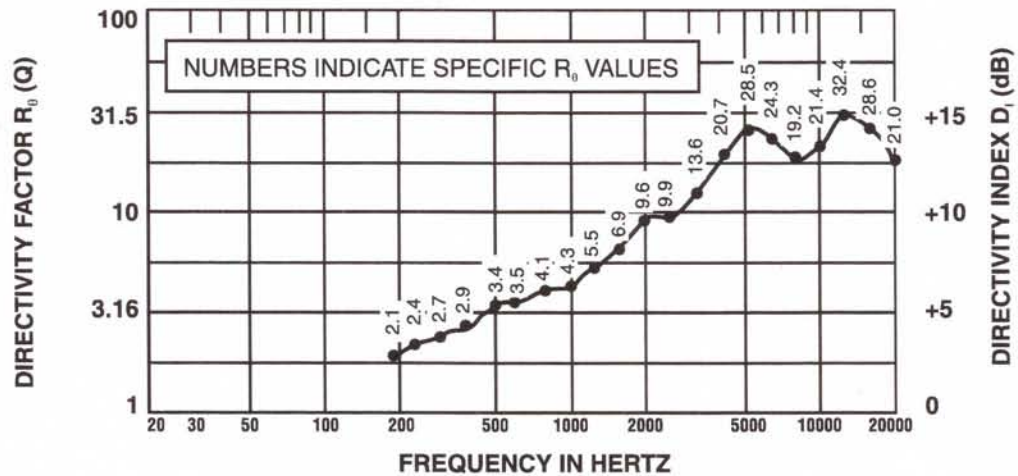
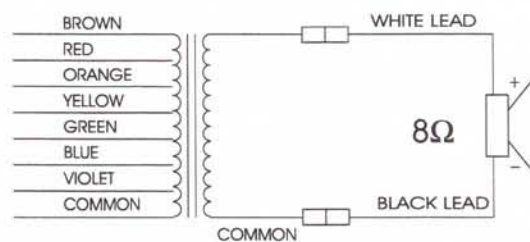


Figure 6—Wiring

209-4T

Table 1	25 V	70 V	100 V
4.0 W	BROWN	YELLOW	GREEN
2.0 W	RED	GREEN	BLUE
1.0 W	ORANGE	BLUE	VIOLET
0.5 W	YELLOW	VIOLET	N/A
COMMON	BLACK	BLACK	BLACK
8 ohms	White	White	White
Common	Black	Black	Black



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Figure 7—Dimensions

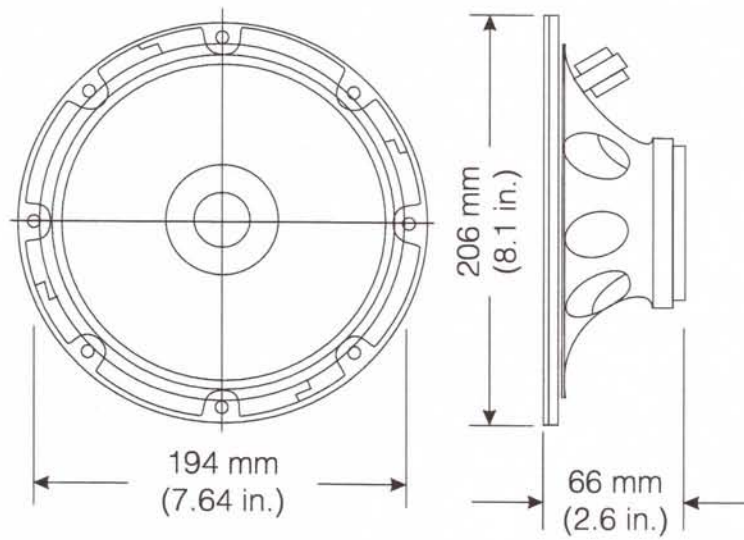
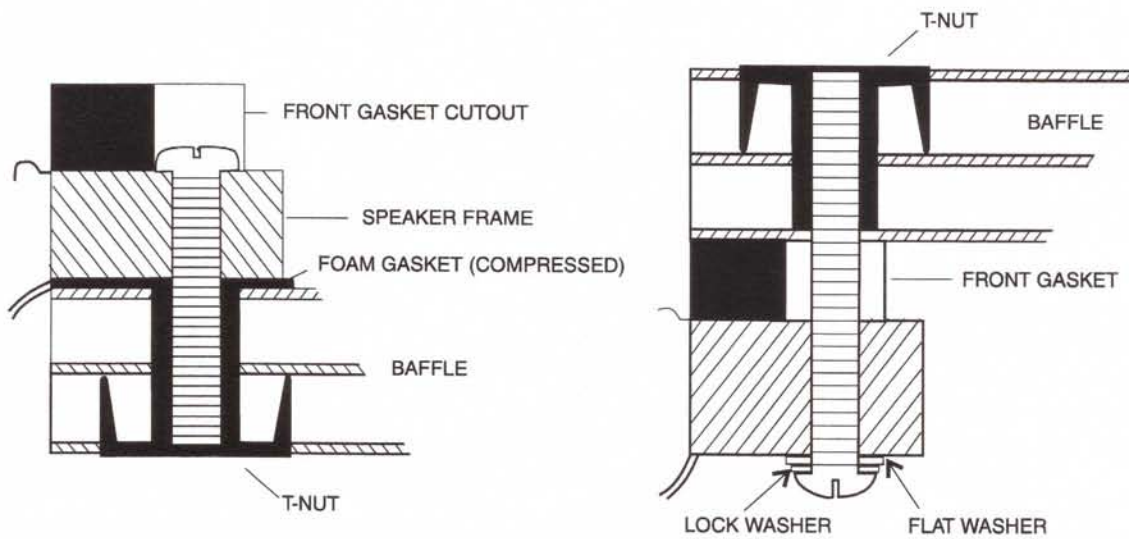


Figure 8—Diagram



209 Series 8-Inch Full-Range Loudspeakers

SPECIFICATIONS

Frequency Response:

80-15,000 Hz, ± 5 dB (see Figure 1)

Power-Handling Capacity per EIA

RS-426-A 1980 (80-15,000 Hz band-limited pink noise, 6-dB crest

factor):

10 watts

Impedance,

Nominal:

8 ohms

Minimum:

7 ohms (230 Hz)

Sound Pressure Level at 1 Meter, 1

Watt Input, 200-4,000 Hz Average:

94 dB

Maximum SPL:

104 dB for 10W @ 1M

Voice-Coil Diameter:

2.54 cm (1.0 in.)

Magnet Weight:

0.32 kg (0.72 lb)

Magnet Material:

Barium Ferrite

Flux Density:

1.0 Tesla

Speaker Frame:

22-gauge stamped steel

Frame Color:

Black

Dimensions,

209-8A/209-4T,

Diameter:

20.6 cm (8.1 in.)

Height:

7.0 cm (2.75 in.)

209-4TWB,

Diameter:

33.0 cm (13.0 in.)

Height:

7.6 cm (3.0 in.)

Net Weight,

209-8A: 1.0 kg (2.2 lb)

209-4T: 1.4 kg (3.0 lb)

209-4TWB: 1.6 kg (3.59 lb)

Shipping Weight,

209-8A: 1.3 kg (2.9 lb)

209-4T: 1.7 kg (3.7 lb)

209-4TWB: 1.9 kg (4.1 lb)

Transformer Input,

(209-4T):

25/70.7 (100-volt option)

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**ALTEC
LANSING®**

600 Cecil Street, Buchanan, MI 49107

616/695-6831, 616/695-1304 Fax

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