309 Series 8" Duplex® Ceiling Loudspeakers

KEY FEATURES

★ Offers Wide Dispersion, High Efficiency
★ Dual Magnet Construction

DESCRIPTION

The Altec Lansing 309 series Duplex® loudspeaker systems are two-way loudspeakers with 8-inch low-frequency cones and high-temperature voice-coil assemblies coaxially mounted with wide-dispersion cone tweeters. The dual magnet construction allows each speaker to be structurally, magnetically, electrically and mechanically independent of the other. The 309-8A/309-4T/309-8T utilize a single section crossover network, centered at 3000 Hz and providing 6 dB of attenuation for the tweeter outside its operating range.

The 309-4T is provided with a 25/70 V line transformer that offers <1 dB insertion loss and a selection of 0.5, 1, 2 and 4 W taps.

The 309-8T is provided with a 70 V line transformer that offers <1 dB insertion loss and a selection of 1, 2, 4 and 8 W taps.

The 5281-W grille is available as an accessory, and provides an attractive means to conceal the loudspeaker in ceiling or wall installations. The perforated grille is finished in semigloss white enamel. Other grilles available include the 5281-S (satin aluminum), 5282-W and 5284-WM (both are square grilles).

Five sealed, metal ceiling-type enclosures are offered with the 309-8A/309-4T/309-8T. Each is made of heavy-gauge, rugged, cold-rolled steel, undercoated to prevent panel resonance, and finished with rust-inhibiting paint. The enclosures are classified as Utility or Deluxe. Utility model numbers are as follows: 5183-X, 5184-E and 5184-N. Deluxe enclosures are lined with glass wool blankets. Deluxe model numbers are as follows: 5181-XM, 5182-XM, 5184-X and 5189-X.

These components are designed to work together as a complete system of in-ceiling loudspeakers and accessories. They give wide dispersion, high-efficiency, high-maximum output, ease of installation, and wide-range reproduction of music or voice.

PRIMARY SPECIFICATIONS

- **System Type:** Two-way, full range, Duplex® loudspeaker system.
- **Pressure Sensitivity:** 96 dB SPL (1 W, 500 Hz - 3 kHz) re: 20 μPa, see Note 1).
- **Frequency Response:** 85 Hz - 18 kHz (see Figure 1, Note 2).
- **Power Handling:** 16 watts, 85 Hz - 18 kHz, AES method (see Note 3).
- **Maximum Long Term Output:** 107.6 dB SPL (16 W/1 m) re: 20 μPa, see Note 4).
- **Impedance:** 6.0 ohms minimum at 11 kHz.
  8.0 ohms nominal.
- **Components:** 8-inch, high-efficiency, low-frequency driver with a coaxially mounted, 2.5-inch cone tweeter.
- **Crossover Network:** 3000 Hz with 6-dB-per-octave tweeter protection.
- **Input Terminals:** .212-inch push terminals.
Accessories,
Grilles: 5281-W, 5281-S, 5282-W and 5284-WM
Enclosures: 5183-X, 5184-E, 5184-N
Deluxe Enclosures: 5181-XM, 5182-XM, 5184-X and 5189-X
Tee-bar Support: 5487-X
Dimensions,
Loudspeaker Diameter: 8.13 in. (20.65 cm)

Depth: 3.25 in. (8.26 cm)

Net Weight,
309-8A: 2.8 lbs (1.3 kg)
309-4T: 3.1 lbs (1.4 kg)
309-8T: 4.0 lbs (1.8 kg)

Shipping Weight,
309-8A: 3.3 lbs (1.5 kg)
309-4T: 3.6 lbs (1.6 kg)
309-8T: 4.5 lbs (2.0 kg)

Finish: Black

Figure 1. Amplitude Response

Figure 2. Beamwidth vs. Frequency

Figure 3. Impedance Response

Figure 4. Directivity and Q

Figure 5. Distortion Response

309-8A - THEILE-SMALL PARAMETERS
Free Air Resonance, f_r: 110 Hz
Equivalent Volume Compliance, V_e: 0.92 ft³
Total Q, Q_Total: 0.94
Electrical Q, Q_e: 1.16
Mechanical Q, Q_m: 5.03
Volume Displacement, V_d: 1.61 in.³
Reference Efficiency: 2.87%
Figure 6. One-third Octave Polar Response Charts

HORIZONTAL

VERTICAL

NOTE: MEASUREMENTS WERE MADE IN A 1.5 FT' CLOSED ENCLOSURE
NOTES ON MEASUREMENT CONDITIONS

1. Pink-noise signal, one watt calculated using \( E^2/Z_{\text{min}} \), 3.16-meter measurement distance referred to one meter.
2. On-axis, one watt calculated using \( E^2/Z_{\text{min}} \), 3.16-meter measurement distance referred to one meter, low frequencies corrected for anechoic chamber error.
3. This system rating patterned after the AES method for individual driver, where the test signal is pink noise with a 6-dB crest factor over the bandwidth of the system, with power calculated using the \( E^2/Z_{\text{min}} \), for two hours.
4. This measurement made under the same conditions as Pressure Sensitivity, but at rated power, and takes into account any power compression effects due to non-linearities in the system.
5. Distortion components invalid above 10 kHz. The distortion at any given frequency may be found by graphically taking the difference between the fundamental and harmonic, adding the number of decibels which the harmonic has been raised on the graph, and applying the formula: percent distortion = \( 100 \times \frac{\text{difference in dB}}{20} \)

SPECIFICATIONS - TRANSFORMER

<table>
<thead>
<tr>
<th>Frequency Response:</th>
<th>100 Hz to 15 kHz, ( \pm 1 ) dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Impedance:</td>
<td>8 ohms</td>
</tr>
<tr>
<td>Connection Type:</td>
<td>Bunch tinned wires for soldering or crimping.</td>
</tr>
<tr>
<td>Maximum Insertion Loss:</td>
<td>1.0 dB</td>
</tr>
</tbody>
</table>

Primary Impedances and Power Drawn:

<table>
<thead>
<tr>
<th>309-4T:</th>
<th>309-8T:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>25 V</td>
</tr>
<tr>
<td>0.5 W</td>
<td>1250 ( \Omega )</td>
</tr>
<tr>
<td>1.0 W</td>
<td>625 ( \Omega )</td>
</tr>
<tr>
<td>2.0 W</td>
<td>312 ( \Omega )</td>
</tr>
<tr>
<td>4.0 W</td>
<td>156 ( \Omega )</td>
</tr>
<tr>
<td>8.0 W</td>
<td>N/A</td>
</tr>
</tbody>
</table>

ARCHITECT’S AND ENGINEER’S SPECIFICATIONS

309-8A/309-4T/309-8T
DUPLEX LOUDSPEAKERS

The loudspeaker shall be a Duplex\textsuperscript{®} type with an 8-inch low-frequency cone radiator and a coaxially mounted, wide-dispersion cone tweeter. The Duplex\textsuperscript{®} loudspeaker shall meet the following criteria. AES power rating shall be 16 watts of band-limited pink noise (85 Hz to 18 kHz, 6 dB crest factor). Frequency response will uniform from 85 Hz to 18 kHz on both the transformer and non-transformer versions. Pressure sensitivity, 96 dB SPL at 1 meter (94 dB at 4 feet) on axis with one watt of band-limited pink noise from 500 Hz to 3 kHz (ref. 20 \( \mu \)Pa). Minimum impedance, 6.0 ohms.

The loudspeaker shall be 8.13 in. (20.65 cm) in diameter and 3.25 in. (8.25 cm) deep. Weight shall be 2.8 lbs (1.3 kg) [309-8A], 3.1 lbs (1.4 kg) [309-4T] and 3.2 lbs (1.45 kg) [309-8T]. The 309-4T shall have a 25/70 V transformer with taps at 0.5, 1, 2 and 4 watts. The 309-8T shall have a 70 V transformer with taps at 1, 2, 4 and 8 watts. The maximum insertion loss shall be less than 1.0 dB. The Duplex\textsuperscript{®} loudspeakers shall be the Altec Lansing models 309-8A; and 309-4T and 309-8T with transformer.