409 "E" Series
8" Duplex®
Premium Ceiling Loudspeakers

PRIMARY SPECIFICATIONS

System Type: Two-way, full range, Duplex®
        loudspeaker system.
Pressure sensitivity: 97 dB SPL
        (1W,500Hz - 3kHz,
        re: 20μPa, see note 1).
Frequency Response: 85 Hz - 18 kHz
        (see Figure 1,Note 2)
Power Handling: 32 watts, 85 Hz - 18 kHz,
        AES method (see note 3).
Maximum Long Term
       Output: 110.8 dB SPL
       (32 watts input, 1m,
       re:20μPa, 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.

KEY FEATURES

★ Offers Wide Dispersion, High Efficiency
★ Dual Magnet Construction

DESCRIPTION

The Altec Lansing 409 "E" 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 409 "E" series utilize a single section crossover
network, centered at 2500Hz and providing 6dB of
attenuation for each element outside it's operating
range.

The 409-ST (with 15700 transformer) and
the 409-4T (with 15704 transformer) both offer a
selection of 0.5,1,2 and 4W. The 409-8T (with
15708 transformer) offers a selection of 1,2,4 and
8W. The 409-16T (with 15716 transformer) offers
2,4,8 and 16W and the 409-32T (with 15732
transformer) offers a 4,8,16,32W selection.

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

Five sealed, metal ceiling-type enclosures are of-
fered with the 409 "E" series. Each is made of heavy-
gauge, rugged cold rolled steel, under-coated to pre-
vant panel resonance, and finished with rust-inhibiting
paint. The enclosures are classified as Utility or De-
luxe. 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.
Crossover Network: Two-way at 2500 Hz with 6dB per octave tweeter protection.

Input Terminals: 0.212 inch push-on type connectors.

Enclosures: 5183-X, 5184-X, 5184-E, 5184-N

Dimensions, Diameter: 8.13in (20.65cm)
Depth:
409-8E: 3.25in (8.3cm)
409-ST: 3.86in (9.8cm)
409-4T: 4.13in (10.5cm)
409-8T: 4.50in (11.4cm)

Net Weight:
409-8E: 4.86in (12.4cm)
409-32T: 5.38in (13.7cm)

Shipping Weight:
409-8E: 2.8 lbs (1.3 kg)
409-ST: 3.1 lbs (1.4 kg)
409-4T: 3.3 lbs (1.5 kg)
409-8T: 4.0 lbs (1.8 kg)
409-16T: 4.5 lbs (2.0 kg)
409-32T: 5.0 lbs (2.3 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

409-8E - THEILE-SMALL PARAMETERS
Free Air Resonance, $f_r$: 90 Hz
Equivalent Volume Compliance, $V_{eq}$: 0.61 ft$^3$
Total Q, $Q_t$: 1.54
Electrical Q, $Q_e$: 1.78
Mechanical Q, $Q_m$: 11.53
Volume Displacement, $V_o$: 1.95 in$^3$
Reference Efficiency: 0.71%
Figure 6. One-third Octave Polar Response Charts

NOTE: Measurements were made in a 1.5 ft³ closed enclosure
NOTES ON MEASUREMENT CONDITIONS

1. Pink noise signal, one Watt calculated using $E^2/Z_{\text{min}}$, 3.16 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 A.E.S method for individual driver, where the test signal is pink noise with a 6dB 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 10kHz. The distortion at any given frequency may be found by graphically taking the difference between the fundamental and harmonic, and adding the number of Decibels which the harmonic has been raised on the graph and apply the formula:

$$\text{percent distortion} = 100 \times \frac{1}{10} - \left(\text{difference in dB}\right)$$

SPECIFICATIONS - TRANSFORMERS

<table>
<thead>
<tr>
<th>Frequency Response:</th>
<th>Primary Impedances and Power Drawn, nominal 70v:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>15700</strong>: 100 Hz to 10 kHz, +/-1 dB</td>
<td>15700  15708  15716  15732</td>
</tr>
<tr>
<td>15704, 15708</td>
<td>10000Ω  5000Ω  2500Ω  1250Ω</td>
</tr>
<tr>
<td>15716, 15732: 50 Hz to 15kHz, +/-1 dB</td>
<td>0.5 W   1.0 W   2.0 W   4.0 W</td>
</tr>
<tr>
<td>Insertion Loss:</td>
<td>15700: 1.0 dB</td>
</tr>
<tr>
<td>15704, 15708</td>
<td>5000Ω  2500Ω  1250Ω  625Ω</td>
</tr>
<tr>
<td>15716, 15732: 0.5 dB</td>
<td>1.0 W   2.0 W   4.0 W   8.0 W</td>
</tr>
<tr>
<td>Secondary Impedance: 8 ohms (all)</td>
<td>2500Ω  1250Ω  625Ω  312Ω</td>
</tr>
<tr>
<td></td>
<td>2.0 W   4.0 W   8.0 W   16 W</td>
</tr>
<tr>
<td></td>
<td>1250Ω  625Ω  312Ω  156Ω</td>
</tr>
<tr>
<td></td>
<td>4.0 W   8.0 W   16 W   32 W</td>
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<tr>
<td>Connection Type: Bunch tinned wires for soldering or crimping.</td>
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</tbody>
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ARCHITECT’S AND ENGINEER’S SPECIFICATIONS

409 “E” SERIES
DUPLEX LOUDSPEAKERS

The loudspeaker shall be a Duplex® type with a 8-inch low-frequency cone and a high-temperature voice coil assembly coaxially mounted with a wide dispersion cone tweeter. The Duplex® loudspeaker shall meet the following criteria. AES power rating shall be 32 watts of band limited pink noise (85 Hz to 18 kHz, 6 dB crest factor). Frequency response, uniform from 85 Hz to 18 kHz. Pressure sensitivity, 97 dB SPL at 1 meter (95 dB at 4 feet) on axis with one watt of band-limited pink noise from 500 Hz to 3 kHz (ref. 20 µPa). Minimum impedance, 6.0 ohms. The loudspeaker shall be 8.13 in (20.65 cm) in diameter and ___ in (____ cm) deep and shall weigh ___ lbs (___ kg).

The Duplex® loudspeakers shall be the Altec Lansing models 409-8E, 409-ST (with 15700 transformer), 409-4T (with 15704 transformer), 409-8T (with 15708 transformer), 409-16T (with 15716 transformer) and the 409-32T (with 15732 transformer).

ALTEC LANSING®
a MARK IV company

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