

309 Series

8-inch Duplex® Ceiling Loudspeakers



COMMERCIAL

General Product Description

The Electro-Voice® 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 3,000 Hz, which provides 6 dB of attenuation for the tweeter outside its operating range. The 309-4T is provided with a 25/70.7/100-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 features a 70.7/100-V line transformer that offers <1 dB insertion loss and a selection of 1-, 2-, 4- and 8-W taps.

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

WB versions come complete with a pre-mounted ceiling grille.

Architects' and Engineers' Specifications

The loudspeaker shall be a Duplex type with an 8-inch low-frequency cone radiator and a coaxially mounted, wide-dispersion cone tweeter. The Duplex® 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 be 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 mPa). Minimum impedance, 6.0 ohms.



The loudspeaker shall be 206.5 mm (8.13 in.) in diameter and 82.5 mm (3.25 in.) deep. Weight shall be 1.3 kg (2.8 lb) [309-8A], 1.4 kg (3.1 lb) [309-4T] and 1.45 kg (3.2 lb) [309-8T]. The 309-4T shall have a 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 < 1.0 dB. The Duplex® loudspeakers shall be the EV (Electro-Voice®) 309SA; and 309-4T and 3098T with transformer.

Specifications:

Pressure Sensitivity: 96 dB SPL
(1 W, 500 Hz - 3 kHz) re: 20 µPa

Frequency Response: 85 Hz - 18 kHz (see Fig. 1)

Power-Handling Capacity: 16 watts
85 - 18 kHz, bandlimited pink noise, 6 dB crest factor

Impedance:

Nominal: 8 ohms

Minimum: 6 ohms (11 kHz)

Maximum Long-Term Output: 108 dB SPL
(16 W/1 m) re: 20 mPa)

Crossover Network: 3,000 Hz
with 6 dB-per-octave tweeter protection

Input Terminals:212-in. push terminals

309-8A - Theile-Small Parameters

Free Air Resonance, f_s : 110 Hz

Equivalent Volume Compliance, V_{AS} : 0.92 ft³

Total Q, Q_{TS} : 0.94

Electrical Q, Q_{ES} : 1.16

Mechanical Q, Q_{MS} : 5.03

Volume Displacement V_D : 1.61 in.³

Reference Efficiency: 2.87%

Speaker Frame: 22-gauge stamped steel

Finish: Black

Dimensions:

309-8A / 309-4T

Loudspeaker Diameter: 206.5 mm (8.13 in.)

Height: 82.6 mm (3.25 in.)

Net Weight:

 309-8A: 1.3 kg (2.8 lb)

 309-4T: 1.9 kg (4.1 lb)

 309-8TWB: 2.3 kg (5.0 lb)

Shipping Weight:

 309-8A: 1.5 kg (3.3 lb)

 309-4T: 2.1 kg (4.6 lb)

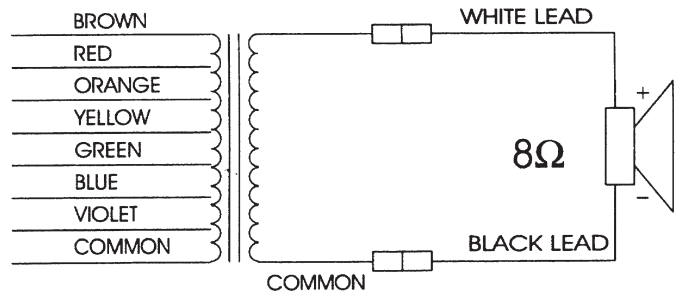
 309-8TWB: 2.5 kg (5.5 lb)

Transformer Input:

 309-4T 25/70.7 (100 volt operation)

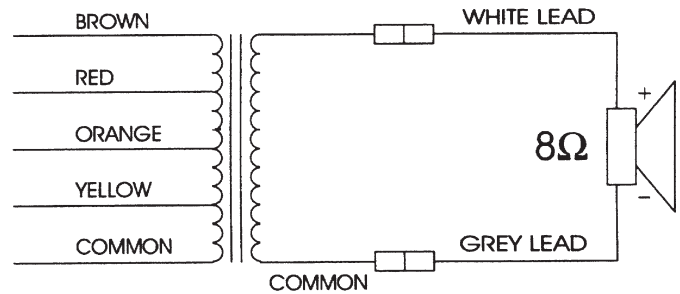
309-4T

	25V	70V	100V
4.0W	Brown	Yellow	Green
2.0W	Red	Green	Blue
1.0W	Orange	Blue	Violet
.05W	Yellow	Violet	N/A
Common	Black	Black	Black
8 Ohms	White	White	White
Common	Black	Black	Black

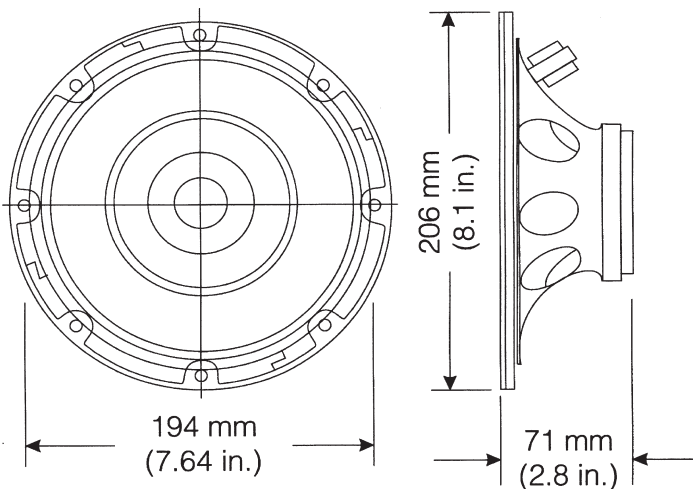


309-8T

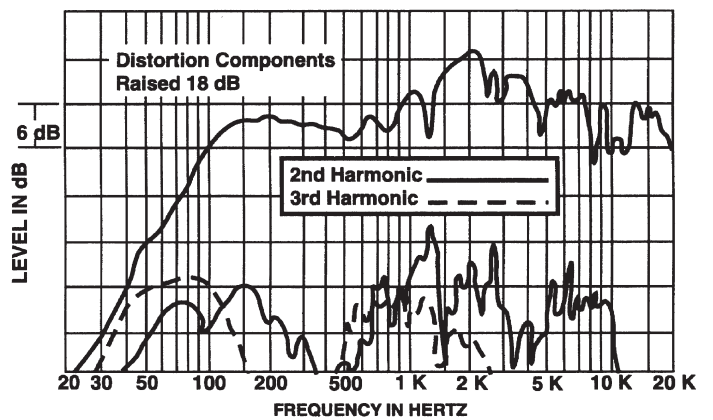
	70V	100V
8.0W	Brown	Red
4.0W	Red	Orange
2.0W	Orange	Yellow
1.0W	Yellow	N/A
Common	Black	Black
8 Ohms	White	White
Common	Grey	Grey



Wiring Diagram



Dimensions



Distortion

Recommended Connections

The 309 is a nominal 8-ohm impedance loudspeaker with a 10-watt input capability. However, it is also available with transformer, the 309-4T, and with transformer and grille, the 309-4TWB.

The 309-4T 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 the table for the 309-4T. 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 the table for the 309-4T.

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

309-8A and 309-4T 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.

Larger back volumes will increase the lowfrequency 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 309 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 309 is designed for mounting on standard ceiling speaker baffles.

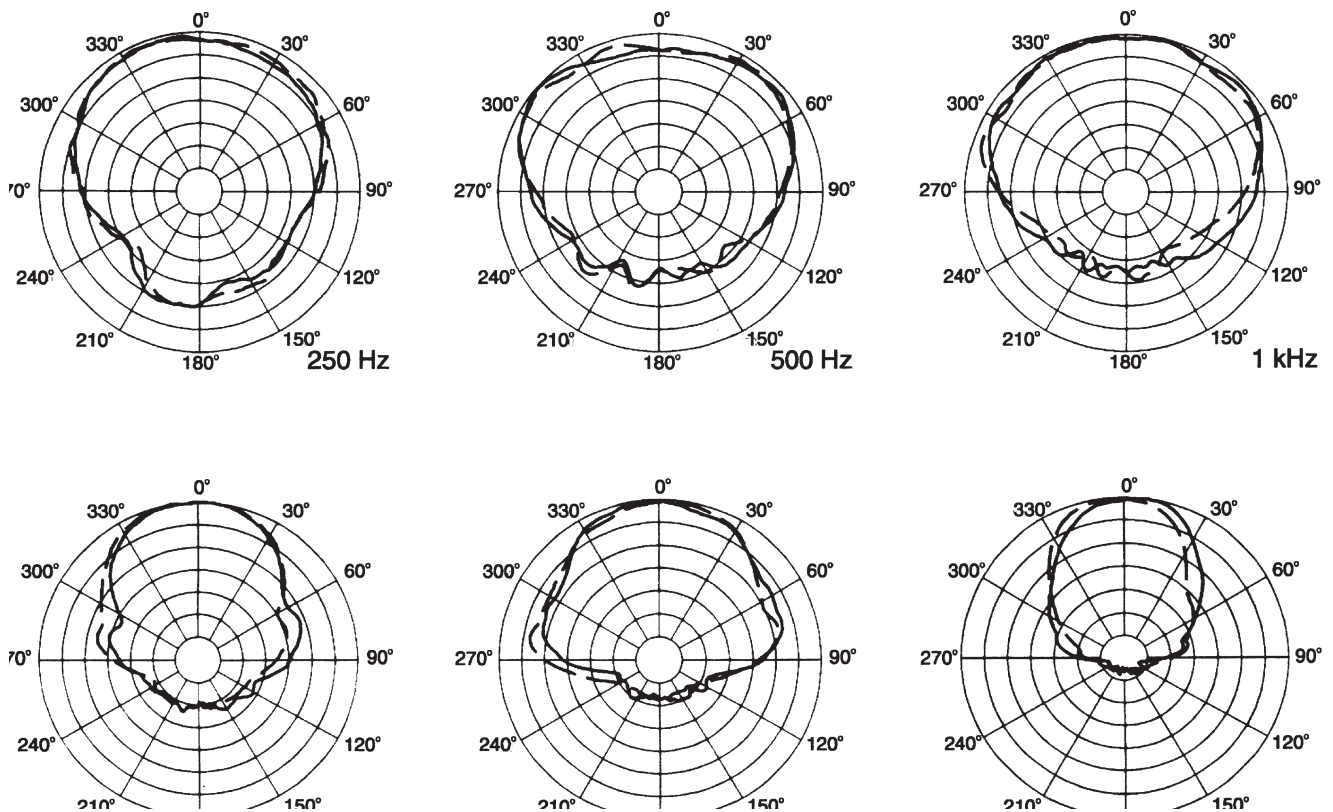
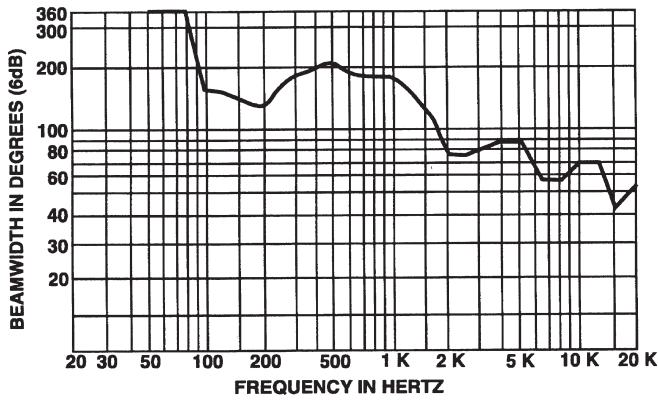
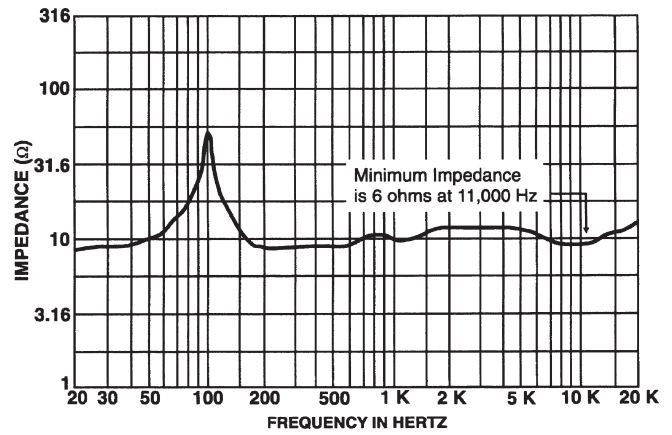


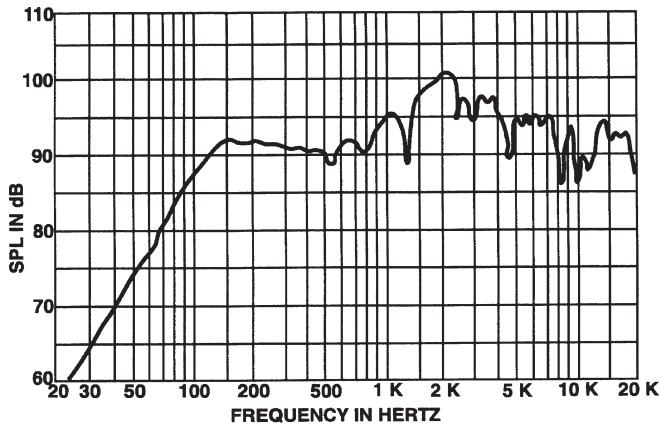
Figure 1, One-Third-Octave Polar Response Charts
Measurements were made in a 1.5 ft³ closed enclosure.



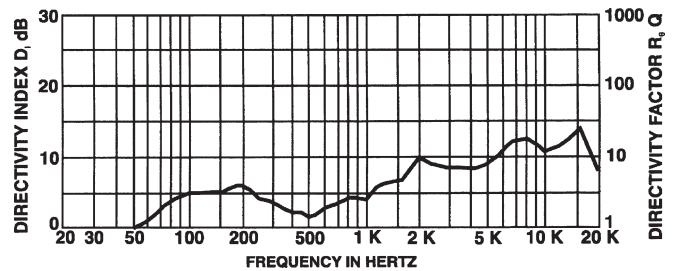
Beamwidth vs Frequency



Impedance Response



Amplitude Response



Directivity and Q

	309-4T, 309-4TWB				309-8T, 309-8TWB	
Power	70V		100V		70V	
0.5W	10,000 ohms	Yellow	20,000 ohms	Green	N/A	N/A
1.0W	5,000 ohms	Orange	10,000 ohms	Yellow	5,000 ohms	Yellow
2.0W	2,500 ohms	Red	5,000 ohms	Orange	2,500 ohms	Orange
4.0W	1,250 ohms	Brown	2,500 ohms	Red	1,250 ohms	Red
8.0W	N/A	N/A	N/A	N/A	625 ohms	Brown

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