

General Product Description

The DL10X low/mid-frequency reproducer is a 10-inch, 8-ohm driver designed for professional high-level, high-fidelity monitoring and sound reinforcement. At the heart of this speaker is a carefully engineered drive system. Its design assures linear, low-distortion output, high power capability and efficient heat transfer.

Incorporated into the design are three exclusive Electro-Voice® innovations. PROTEF™ coating (U.S. patent #4,547,632), a Teflon®-based coating, is applied to the inside diameter of the top plate. Occasional violent power peaks of several seconds may expand a transducer's voice coil into contact with the top plate, causing failure. PROTEF™ provides protection against such failure. The coating lubricates any rubbing contact and provides electrical insulation between the coil and the steel top plate. The Thermo Inductive Ring (TIR™) and Flux Demodulation Device (FDD™), also included in the DL10X design, are aluminum castings fastened to the pole of the magnet. They provide a shorted turn to control inductance and provide a major heat transfer path from the voice coil, which improves power handling and reduces thermal dynamic-range compression.

The voice coil itself is constructed of edge-wound rectangular aluminum wire, mounted on a rugged, laminated polyimide former. The complete assembly is low in mass and is fabricated using the most advanced epoxies, insulations and materials available.

Great care was taken in the selection of diaphragm materials and construction to ensure smooth, musical upper-bass reproduction. The cone has a moisture-repellent treatment, allowing it to be used in harsh and humid conditions. (Do not expose the cone to direct water or sunlight.)

The DL10X is a true high-fidelity woofer in every sense, being capable of high output, low distortion, and solid bass response.

Architects' and Engineers' Specifications

The low/mid-frequency woofer shall have a nominal diameter of 25.4 mm (10 in.), an overall depth of 120 mm (4.7 in.) and weigh less than 8.6 kg (19.0 lb). The frame shall be constructed of strong, deformation-resistant die-cast aluminum. The magnet assembly shall incorporate PROTEF™ protection, a TIR™ (Thermo Inductive Ring) and FDD™ (Flux Demodulation Device) to reduce inductive coupling and increase power handling. The cone and dust dome should withstand use in damp and humid conditions. The voice coil shall have a diameter of 63.5 mm (2.5 in.), a winding depth of 15.2 mm (0.6 in.) and be made of edge-wound aluminum ribbon. The voice-coil former shall be made of aerospace-grade polyimide laminate and bonded with high-temperature epoxy adhesives. The performance specification of a representative production unit shall be as follows: measured sensitivity (SPL at 1 m (3.3 ft) with 1 watt input, 100- to 800-Hz pink noise) shall be in excess of 98 dB. The reference efficiency shall be at least 5.92%. The usable response shall be 100 to 5,000 Hz, and the nominal impedance shall be 8 ohms. The EIA rated power shall be 300 watts. The low/mid-frequency transducer shall be the Electro-Voice® DL10X.

Directional Characteristics

The directional characteristics of the DL10X in a 2.0-cubic-foot vented enclosure were measured in Electro-Voice's large anechoic chamber. The test signal was one-third-octave filtered pink noise centered at the frequencies indicated. All directional information was measured at 20 feet. Beamwidth is the angle at which the horizontal and vertical polar responses have decreased in level by 6 dB when compared to the axial frequency response (Figure 1). Figure 2 illustrates the total directivity of the DL10X. The directivity factor R_0 (Q) is the relative value, at a point, of the DL10X when compared to an ideal spherical response. The directivity index, D_i , is calculated by the formula: $D_i = 10 \log_{10} R_0$.

DL10X

Low/Mid-Frequency Reproducer



Electrical Connections

The DL10X is fitted with a pair of plated, frame mounted connectors with color-coded ends. Electrical connection is made by pushing down, inserting wire completely through the rectangular slot and releasing pressure. One conductor of #9 stranded, #8 AWG solid, a pair of twisted #15 AWG stranded or a pair of #14 AWG solid conductors will fit.

Typical Amplifier Size

300-600 watts per woofer is the optimal amplifier size. Amplifiers of this size will allow maximum output with minimal risk of speaker damage when properly used. Smaller amplifiers can also be used with excellent results.

Typical Enclosures

The most extended bass, lowest distortion and best control is usually realized in properly designed vented enclosures. In such designs, the vent, or port, actually provides the lowest octave of output. The vent is driven to full acoustic output by a relatively small motion of the speaker cone itself, acting through the air contained within the enclosure. The excursion of the DL10X at these frequencies is much reduced compared to sealed or open-back enclosures, directly reducing harmonic distortion and the possibility of speaker bottoming. Used as a midbass speaker, horn loading may be desirable for the DL10X. Usable frequency response in a horn-type enclosure can extend from 100 to 4,000 Hz. Please note, however, that in a horn-loaded system, the actual performance greatly depends on the design of the horn enclosure. Factors such as flair rate, mouth size, and rear chamber volume play critical roles in the performance of any horn-loaded system.

Normally Tuned Enclosures

The DL10X in a 1.0-cubic-foot enclosure tuned to 75 Hz has essentially flat response to 90 Hz.

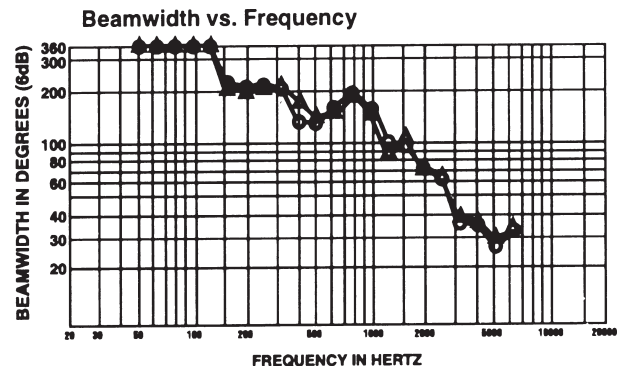


Figure 1

Specifications:

Usable Axial Frequency Response in Typical Enclosure (4.0 ft³ tuned to 40 Hz), Swept One Third-Octave Pink Noise, 4 Volts at 10 Feet, Anechoic Environment, Normalized for 1 Watt/1 Meter:

..... 100-5,000 Hz

Power Handling Per ANSI/EIA RS-426-A 1980: 300 watts

Per AES2-1984/ANSI S4.26-1984,

50-500 Hz: 300 watts

100-1,000 Hz: 350 watts

Sensitivity (SPL at 1 m, 1 watt input power, nominal impedance),

200- to 4,000-Hz Average: 100 dB

100-to 800-Hz Average: 98 dB

Impedance Response:

Minimum (Zmin): 6.0 ohms at 350 Hz

Nominal: 8 ohms

Distortion Response

Second Harmonic:

100 Hz: -23 dB (7.1%)

1,000 Hz: -45 dB (0.6%),

Third Harmonic:

100 Hz: -36 dB (1.6%)

1,000 Hz: -33 dB (2.2%)

Beamwidth (angle included by 6-dB-down points on polar responses for octave bands of pink noise):

500 Hz: 1300

1,000 Hz: 130°

2,000 Hz: 70

Physical Constants,

Effective Piston Diameter: 216 mm (8.5 in.)

Moving Mass (MMo): 0.025 kg (0.055 lb)

Voice-Coil Winding Depth: 15.2 mm (0.6 in.)

Voice-Coil Diameter: 63.5 mm (2.5 in.)

Voice-Coil Winding Length: 18.1 m (59.4 ft)

Top Plate Thickness at Voice Coil: 10.9 mm (0.43 in.)

BL Factor: 20.4 tesla meter

Thiele-Small Parameters (broken in),

f_s : 60 Hz

V_{AS} : 44 liters (1.57 ft³)

Q_{ES} : 0.16

Q_{MS} : 3.21

Q_{TS} : 0.15

R_E : 6.0 ohms

η_0 : 5.92%

S_D : 0.037 m² (57 in.²)

M_{MD} : 0.025kg (0.055 lb)

L_E : 1.1 mH

C_{MS} : .0236 mm/N

R_{MS} : 3.46 mechanical ohms

$P_E(\text{max})$ (per ANSI/EIA RS-426-A 1980): 300 watts

X_{MAX}^1 : 4.1 mm (0.16 in.)

X_{lim}^2 : 12.7 mm (0.50 in.)

$V_D (S_D \times X_{MAX})$ 0.15 liters (0.0019 ft³)

Additional Descriptive Information,

Magnet Weight: 2.2 kg (4.9 lb)

Magnet Material: Barium ferrite

Frame: Cast aluminum

Frame Finish: Textured black epoxy

Plating of Steel Parts: Bright Cadmium

Voice-Coil Material: Aluminum

Voice-Coil Insulation: Polyimide 220 °C rating

Voice-Coil Form: Polyimide

Back Cover: Black, advanced synthetic elastomer

Optional Accessories:

SMH-1 mounting hardware kit

1. X_{max} is the one-way peak excursion which produces 10% THD of the current waveform when driven at f_s .
2. Displacement limit is the one-way peak excursion which, when exceeded, will cause physical damage to the drive mechanism.

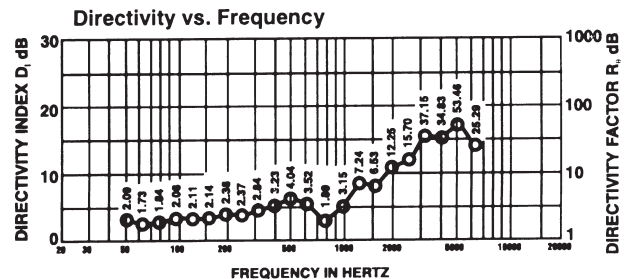
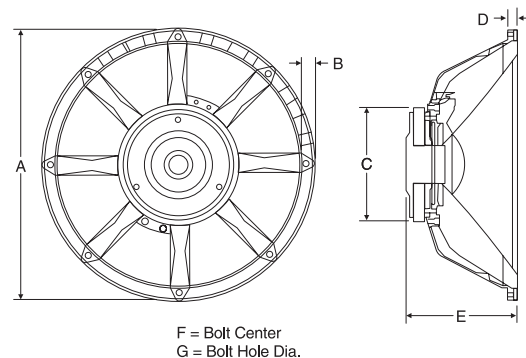


Figure 2

Dimensions: (in)	
A	10.23
B	0.68
C	7.70
D	0.45
E	4.7
F	9.62
G	0.28 x 8



Dimensions

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Electro-Voice®

U.S.A. and Canada only.

For customer orders, contact the Customer Service department at
800/392-3497 Fax: 800/955-6831

For warranty repair or service information, contact the Service
Repair department at 800/685-2606

For technical assistance, contact Technical Support at 866/78AUDIO

Please refer to the Engineering Data Sheet for warranty information.

Specifications subject to change without notice.