



SH-1810ER

Three-Way, Full-Range, All-Horn-Loaded Speaker System

- High output/high efficiency for live performance
- Controlled dispersion for difficult acoustic conditions
- 60° x 40° coverage pattern
- Professional-grade components for years of trouble-free use on the road
- PRO™ circuit protection on the high-frequency driver
- Constructed on 3/4-inch void free plywood with dado cut joints
- Metal grille to protect components
- Carpet covered
- Wheels for easy transportation

SPECIFICATIONS

Axial Frequency Response (swept sine wave, anechoic environment, 4 volts at 10 feet on axis, normalized for 1 watt, 1 meter into midbass driver; see Figure 1):

45-20,000 Hz

Low-Frequency 3-dB-Down Point:

45 Hz

Usable Low-Frequency Limit (10-dB-down point):

33 Hz

Half-Space Reference Efficiency:

6.0%

Long-Term Average Power-Handling Capacity (per ANSI/EIA 426-A 1980; see Power-Handling Test section),

Normal:

300 watts

Biamp High:

300 watts

Biamp Low:

400 watts

Maximum Woofer Acoustic Output:

24 watts

Sensitivity (SPL at 1 meter, 1 watt into nominal impedance, anechoic environment, band-limited pink-noise signal, 300-2,000 Hz):

105 dB

Beamwidth (angle included by 6-dB-down points on polar responses, indicated one-third-octave bands of pink noise; see Figure 3),

600 to 16,000 Hz Horizontal:

60° (+15°, -10°)

800 to 16,000 Hz Vertical:

45° (+35°, -15°)

10,000-18,000 Hz:

60° ±12°

Directivity Factor $R_s(Q)$, 800- to 16,000-Hz Median (see Figure 4):

17.3 (+11.7, -10.1)

Directivity Index D_s , 800- to 16,000-Hz Median (see Figure 4):

12.1 dB (+2.5 dB, -3.5 dB)

Distortion, 0.1 Full Power Input (see Figure 5),

Second Harmonic,

100 Hz: 1%

1,000 Hz: 0.6%

10,000 Hz: 6%

Third Harmonic,

100 Hz: 0.6%

1,000 Hz: 0.6%

10,000 Hz: 2%

Transducer Complement,

High Frequency:

DH3 titanium diaphragm driver

Mid Frequency:

DL10X

Low Frequency:

DL18MT

Crossover Frequencies:

250 Hz and 2,500 Hz

Impedance,

Nominal:

8 ohms

Minimum:

6 ohms

Input Connections:

Parallel 1/4-in. phone jacks

(allows paralleling of multiple speakers)

Mid Bass:

Enclosure Materials and Colors:

Black carpet-covered, 3/4-in. void-free plywood

Grille:

Perforated metal

Enclosure Dimensions,

Height:

121 cm (47.6 in.)

Width:

63 cm (24.8 in.)

Depth:

61 cm (24.0 in.)

Net Weight:

75 kg (163 lb)

Shipping Weight:

81 kg (176 lb)

DESCRIPTION

The Electro-Voice SH-1810ER is a three-way Extended Range™ main speaker system. Professional quality components, arrayed vertically in a rugged, road-ready cabinet are protected by an acoustically transparent metal grille. Each section of the SH-1810ER incorporates concepts and features drawn from the MT-4 Manifold Technology® concert system, resulting in high-output, high-fidelity sound reproduction from a compact main speaker system.

The low frequencies (33-250 Hz) are reproduced by a DL18MT woofer in a new reverse version of the SubScoop™ geometry. The SubScoop enclosure combines the best attributes of horn-loaded and vented-box designs.

High-efficiency horn principles dominate most of the frequency range, while vented box principles contribute the very lowest octave. The reverse-geometry woofer gives additional performance advantages; the rear volume and associated flare-rate contraction are optimized for low-end extension.

The midbass/midrange section consists of the DL10X professional driver, combines with a proprietary aperiodic phase plug (U.S. patent no. 4,718,517)—identical to the combination used in the MT-4 concert system. Its range extends from 250 to 2,500 Hz, encompassing the entire vocal range within a single driver/phase plug.

SH-1810ER SPECIFICATION GRAPHICS

FIGURE 1 — Axial Frequency Response
(anechoic environment, 1 watt at 1 meter)

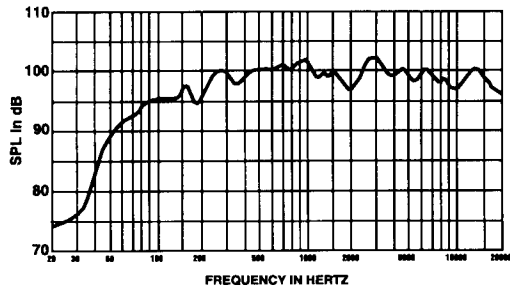


FIGURE 3 — Beamwidth vs. Frequency

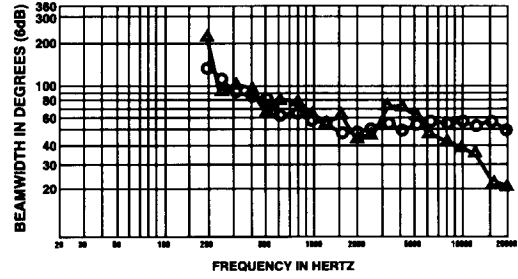


FIGURE 2 — Polar Response

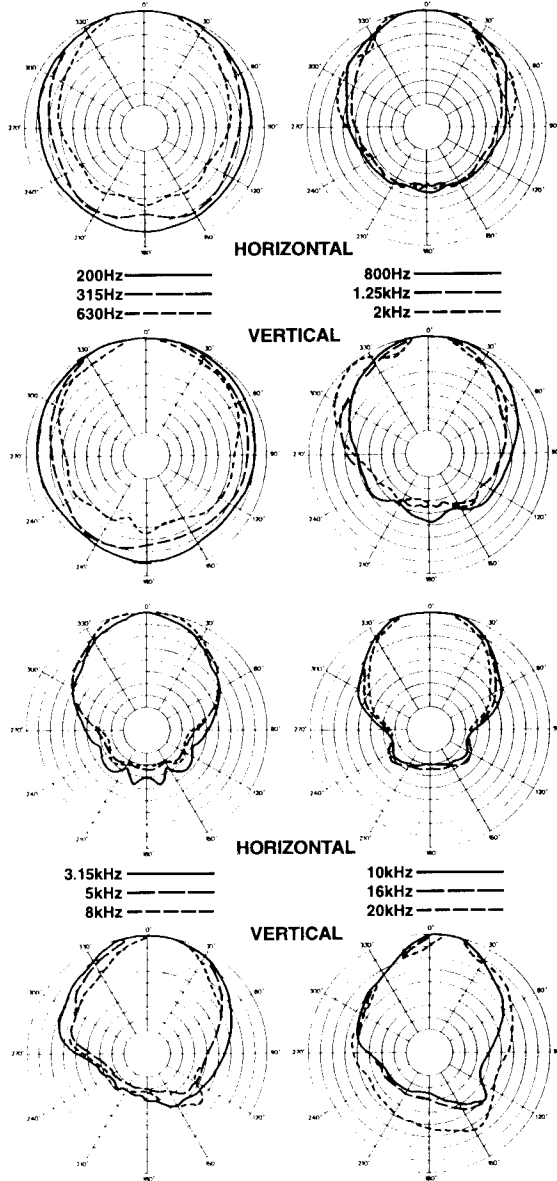
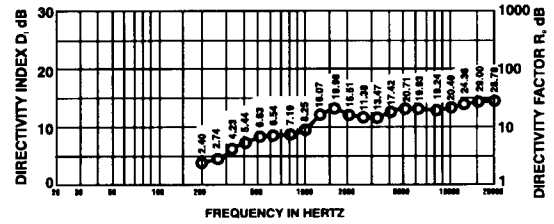


FIGURE 4 — Directivity Factor and Directivity Index vs. Frequency



The phase plug automatically compensates for loudspeaker "beaming"—the tendency for higher frequencies to radiate from the center of the cone area at a constantly narrowing coverage angle. The integral 60° x 40° horn is therefore fed a consistent acoustic input, resulting in a wide, uniform sound field.

The DH3 high-frequency driver, which is also used in the MT-4 concert system, provides the SH-1810ER with smooth, extended response. The DH3 consists of a 1.25-inch titanium diaphragm with a Time Path™ convex phase plus (U.S. patent no. 4,525,604).

The driver's output exits through a one-inch throat into a 60° x 40° constant-directivity horn, which is centrally counted within the mouth plane of the midrange horn. This mounting position encourages stable sound projection and horizontal pattern control through the critical crossover region.

BIAMPING

Biamping is an option that may be used when full use of the extra power handling of the bass section is required. It may also be used when additional bass units (such as the T18 sub-woofer) are used in large venues or outdoors. Biamping is activated by a switch located at the rear of the system. Set this switch to "Biamp" mode and use an external active crossover (please refer to manufacturer's instructions for exact details). The crossover frequency should be 250 Hz and have a slope of at least 12 dB per octave. The woofer can be accessed in this mode by using the 1/4-inch phone jacks marked "Low in Biamp."

RECOMMENDED POWER AMPLIFIERS

Due to the high efficiency of the SH-1810ER, less amplifier input is needed to achieve a given sound output level. In the passive mode, amplifiers with a rating of up to 600 watts rms into 8 ohms may be used.

When the SH-1810ER is used in the biamp mode, the recommended amplifier rating for the mid/high section remains unchanged from that of the passive mode (600 watts rms into 8 ohms). However, the optimal performance of the low end can be achieved by using an amplifier of up to 800 watts rms into 8 ohms.

MULTIPLE USE

More than one SH-1810ER may be used from one amplifier by the use of the parallel 1/4-inch phone jacks provided on all the inputs. Care must be taken not to "abuse" the amplifier by connecting impedances that are too low (see amplifier specifications). The feature is of interest when used in the "Biamp" mode with additional bass units such as the Electro-Voice T18.

TWEETER PROTECTION

The SH-1810ER is built with professional-grade components of outstanding power handling and durability. To provide additional performance, a solid-state, self-resetting protection device for the DH3 is incorporated into the crossover. The PRO™ circuit device permits short-term transients to pass. It gently attenuates long-term signals exceeding the thermal limits of the DH3. This means none of the musical highs disappear, and the long-term power handling is not compromised.

ENCLOSURE CONSTRUCTION

Intended to be used as a portable speaker system, the SH-1810ER is ruggedly constructed of 3/4-inch void-free plywood. All joints are dado cut and the cabinet is finished with a densely woven, abuse-resistant carpet that is both attractive and highly durable. A metal grille protects and enhances the visual appeal of the SH-1810ER. The system is easily transported by one person tilting the cabinet back on the attached wheels. Large, heavy-duty metal corner protectors, firmly secured by rubber feet, and recessed handles complete the picture and ensure that the SH-1810ER speaker system is ideally suited to a long and reliable life on the road.

FREQUENCY RESPONSE

The SH-1810ER's axial frequency response was measured in Electro-Voice's large anechoic chamber at a distance of 3.0 meters (10 feet) with a swept sine-wave input (see Figure 1). It has been normalized for 1 watt/1 meter into the midbass section. Minimal level adjustment and equalization have been used.

DIRECTIVITY

The directional characteristics of the SH-1810ER were measured in Electro-Voice's large anechoic chamber, with a test signal of one-third-octave filtered pink noise at the frequencies indicated. A full spherical measurement system, which is fully compatible with Mark IV Audio's AcoustaCADD™ computer-aided design program, was used. All directional information was measured at 6.1 meters (20 feet).

Figure 2 illustrates the nominal horizontal and vertical polar responses.

Figure 3 illustrates the horizontal and vertical beamwidths. Beamwidth is the angle at which the horizontal and vertical polar responses have decreased in level by 6 dB when compared to the on-axis frequency response.

Figure 4 represents the total directivity of the SH-1810ER. The directivity factor R_0 (Q) is the relative value, at a point, when compared to an ideal spherical response. The directivity index (DI) is calculated by $DI = 10 \log_{10} R_0$.

POWER-HANDLING TEST

Electro-Voice components and systems are manufactured to exacting standards, ensuring they will hold up, not only through the most rigorous of power tests, but also through continued use in arduous, real-life conditions. Two main test specifications are used: the AES Recommended Practice for Specification of Loudspeaker Components Used in Professional Audio and Sound Reinforcement (AES2-1984/ANSI S4.26-1984) and the EIA Loudspeaker Power Rating Full Range (ANSI/EIA 426-A 1980). Both of these specifications use random-noise spectrums which mimic typical music and test the thermal and mechanical capabilities of the components. Electro-Voice will support relevant additional standards as and when they become available. Extreme, in-house power tests, which push the performance boundaries of the components, are also performed and passed to ensure years of trouble-free service.

Specifically, the SH-1810ER in "normal" mode and mid/high-frequency section in "biamp" mode pass ANSI/EIA 426-A 1980 with the following values:

$R_{SR} = 6.9$ ohms ($1.15 \times R_E$)
 $P_{E(MAX)} = 300$ watts
Test voltage = 45.5 volts rms,
91.0 volts peak (+6 dB)

The low-frequency section in "biamp" mode passes ANSI/EIA 426-A 1980 with the following values:

$R_{SR} = 6.9$ ohms ($1.15 \times R_E$)
 $P_{E(MAX)} = 400$ watts
Test voltage = 52.4 volts rms,
104.8 volts peak (+6 dB)

The "peak" power-handling capacity of a woofer is determined by the peak test voltage amount. For the SH-1810ER low-frequency section, a 104.8-volt peak test voltage translates into 1,600-watt short-term peak power-handling capacity. This is the equivalent of four times the "average" power-handling capacity, and is a peak that can be sustained for only a few milliseconds. However, this sort of short-duration peak is very typical in speech and music. Provided the amplifier can reproduce the signal accurately, without clipping, the woofer will also perform accurately and reliably, even at these levels.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker module shall be a three-way, all-horn-loaded type with switch-selectable biamp option. The low frequencies (33 to 250 Hz) shall be reproduced with a 400-watt (ANSI/EIA 426-A 1980) DL18MT 460-mm (18-in.) woofer capable of producing average sound levels in excess of 125 dB in the long term and short-term peaks of 132 dB.

The midbass frequencies (250 to 2,500 Hz) will be reproduced by a DL10X 254-mm (10-in.) coupled to a 60° x 40° constant-directivity horn system. The high frequencies (above 2,500 Hz) will be reproduced by a DH3 compression driver coupled to a 60° x 40° horn. The midbass and high-frequency drivers have a combined power handling of 300 watts (ANSI/EIA 426-A 1980) and are capable of producing average sound levels in excess of 129 dB in the long term and short-term peaks of 135 dB. The high-frequency driver will be protected with the self-resetting PRO™ circuit.

The enclosure will be constructed of 3/4-in. multilayer plywood with dado joints and covered in black, abuse-resistant carpet. The front will be covered with a black metal grille. The enclosure dimensions will be 1210 mm (47.6 in.) tall, 630 mm (24.8 in.) wide, and 610 mm (25.8 in.) deep. The system will weigh 75 kg (163 lb). Wheels and handles will be provided. 1/4-in. jack connectors will be provided for both passive and biamp inputs.

The system will be the Electro-Voice SH-1810ER speaker system.

UNIFORM LIMITED WARRANTY

Electro-Voice 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 Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice 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 authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831 or 800/234-6831). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice 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.

Electro-Voice 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. Electro-Voice 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.

Service and repair address for this product: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107 (616/695-6831 or 800/234-6831).

Specifications subject to change without notice.



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