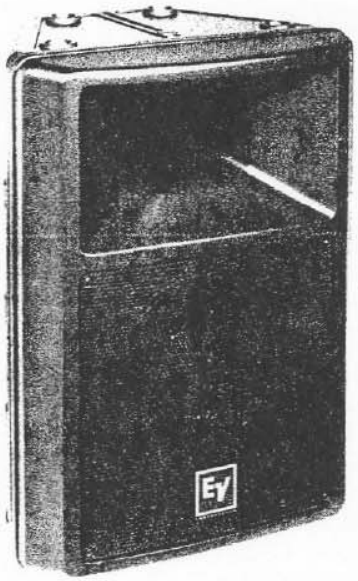
Electro-Voice®





# Sx200

## 300-Watt Two-Way Portable Speaker System

- Lightweight (39 lb) and compact
- Very durable structural-foam enclosure with integral handle
- Stand mountable and arrayable
- High efficiency (101.5 dB, 1 W/1 m)
- High power handling (300 watts continuous, 1,200 watts short term)
- Concert-proven components—12-inch high-performance woofer and DH2010A compression driver with a titanium diaphragm
- Molded-in HF horn, with 65° x 65° constant-directivity coverage, increases intelligibility in noisy, reverberant rooms
- Four molded-in attachment points (metric M8 x 1.25) for secure suspension
- Neutrik Speakon® high-current connectors (Sx200-E) or 1/4-in. phone jacks (Sx200)
- F200 monitor feet provided
- Also available in white (Sx200W or Sx200W-E)

SPECIFICATIONS

**Versions Available:**
**Sx200**—two-way, full-range speaker system with ¼-inch jack
**Sx200-E**—two-way, full-range speaker system with Speakon® connector*
**Sx200W**—two way, full-range speaker system with ¼-inch jack, white
**Sx200W-E**—two-way, full-range speaker system with Speakon® connector, white*

**Axial Frequency Response (swept sine-wave input, 4 volts at 10 feet on axis, anechoic environment, normalized for 1 watt/1 meter; see Figure 1):**
80-25,000 Hz

**Low-Frequency 3-dB-Down Point:**
80 Hz

**Usable Low-Frequency Limit with Xp200A Controller (10-dB-down point):**
55 Hz

**Half-Space Reference Efficiency:**
5.9%

**Long-Term Average Power-Handling Capacity per ANSI/EIA RS-426-A 1980 (see Power-Handling Capacity section):**
300 watts

**Maximum Woofer Acoustic Output:**
17.7 watts

**Sensitivity (SPL at 1 meter, 1 watt input, anechoic environment, band-limited pink-noise signal, 300-2,000 Hz):**
101.5 dB

**Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise (see Figure 3),**
**2,000-20,000 Hz, Horizontal:**
65° ±15°
**2,000-20,000 Hz, Vertical:**
65° ±15°

**Directivity Factor $R_\theta$ (Q), 800- to 16,000-Hz Median (see Figure 4):**
14.3 (+7.9, −9.3)

**Directivity Index $D_I$, 800- to 16,000-Hz Median (see Figure 4):**
11.1 dB (+2.4 dB, −4.1 dB)

**Distortion, 0.1 Full Power Input,**
**Second Harmonic,**
**100 Hz:** 1.2%
**1,000 Hz:** 1.4%
**10,000 Hz:** 10%
**Third Harmonic,**
**100 Hz:** 0.1%
**1,000 Hz:** 1.4%
**10,000 Hz:** 2.5%

**Distortion, 0.01 Full Power Input,**
**Second Harmonic,**
**100 Hz:** 0.2%
**1,000 Hz:** 1.1%
**10,000 Hz:** 1.0%
**Third Harmonic,**
**100 Hz:** 0.1%
**1,000 Hz:** 0.4%
**10,000 Hz:** 0.2%

**Transducer Complement,**
**High Frequency:**
DH2010A driver
**Low Frequency:**
12-inch woofer

**Box Tuning Frequency:** 65 Hz

**Crossover Frequency:** 1,500 Hz

**Crossover Slope,**
**Low Pass:**
18 dB per octave
**High Pass:**
6 dB per octave

**Impedance,**
**Nominal:**
8 ohms
**Minimum:**
6 ohms

**Input Connections:**
Paralleled Neutrik Speakon® NL4MP connectors (Sx200-E) or 1/4-in. phone jacks (Sx200) (allows paralleling of multiple speakers)

**Enclosure Materials and Colors:**
Polypropylene structural foam; choice of black or white

**Supplied Accessories:**
F200 monitor feet; *Suspending System200™ Loudspeakers* instruction manual

**Optional Accessories:**
100BK mounting stand
Mb100 eyebolt attachment kit
Mb200 installation kit
Mb300 horizontal array kit
OmniMount® Series 100 mounting hardware**
VPCSx protective cover
PDCSx padded protective cover

**Other Products Available for Enhancement of Sx200 Performance:**
Xp200A system controller
Sb120 nonpowered bass module
Sb120a 400-watt powered bass module

**Attachment Points:**
Four metric inserts (M8 x 1.25) (see Figure 5 and Suspending Sx200 Enclosures section)

**Dimensions (see Figure 5),**
**Height:**
58.6 cm (23.1 in.)
**Width:**
42.9 cm (16.9 in.)
**Depth:**
31.2 cm (12.3 in.)

**Net Weight:**
17.7 kg (39 lb)

**Shipping Weight:**
19.1 kg (42 lb)

* Speakon® is a registered trademark of Neutrik, Inc.

** Available through OmniMount Systems, Inc. OmniMount® is a registered trademark of OmniMount Systems, Inc.

## DESCRIPTION

The Electro-Voice Sx200 is a 300-watt, 12-inch two-way, high-efficiency, constant-directivity portable speaker system. Through the extensive use of computer-aided design and modeling, Electro-Voice engineers have developed a state-of-the-art professional loudspeaker system.

The high-frequency section of the Sx200 ultilizes a molded-in, 65° x 65°constant-directivity horn. This unique pattern contributes to high intelligibility. Vocals sound natural yet "cut through" in reverberant, noisy rooms. In addition, the coverage pattern is unusually uniform over its range of operation. Sound quality off axis is very well maintained, even at 45° off axis (a 90° total coverage angle), well beyond the rated coverage angle. The horn's unique, Varipath™ throat geometry* helps direct driver output to the corners of the room, points of coverage not described in the usual specifications of horizontal and vertical coverage angles, and parts of the audience that typically do not receive the strongest coverage.

One of the many other unique features of the Sx200 is the cabinet. Constructed of high-impact polypropylene structural foam, it provides a stiff and extremely durable enclosure. Molded into the cabinet are an integral carrying handle and a stand socket for mounting on $1^3/_8$-inch stands such as the Electro-Voice model 100BK. Rubber feet that are attached to the bottom of the cabinet and mating sockets that are molded into the top provide a means of stacking systems. The trapezoidal-shaped cabinet, in combination with the uniform, 65° x 65° directivity characteristics, make the Sx200 ideal for use alone or in arrays.

Two feet are supplied with the Sx200 which allow the system to be used horizontally as a stage monitor. The feet are used by inserting them into the holes at the rear of the cabinet. The "O" rings on the feet allow the feet to be removed many times without wear. Two screws are provided to position the feet permanently, if desired.

In situations requiring additional bass output, the Sx200 can be used in combination with the Electro-Voice Xp200A system controller. The Xp200A includes a low-frequency enhancement circuit that is tailored to match the low-frequency characteristics of the Sx200. Up to 12 dB of additional bass output can be obtained from the system when used with the Xp200A system controller. The amount of low-frequency enhancement can be adjusted to suit the user's personal preference.

For the most demanding situations, two bass-module models are available to complement the Sx200: the Electro-Voice Sb120 nonpowered bass module and the Electro-Voice Sb120a powered bass module. Both bass modules were designed to be used with the Sx200 and are constructed in similar structural foam enclosures. The Sb120a includes a 400-watt power amplifier that is built into the speaker cabinet. The Xp200A system controller provides a sub-woofer output that is a crossed-over sum of the left and right channels.

The Sx200's high-frequency horn is driven by the DH2010A one-inch-throat, wide-bandwidth, titanium-diaphragm driver. The DH2010A uses a unique, convex-drive Time Path™ phasing plug structure (U.S. Patent #4,525,604) for smooth and extended high-frequency performance. The voice coil is coupled to the diaphragm with EV's exclusive Resonant Drive™ technology. This increases and smooths the high-frequency response and reduces the amount of internal equalization required for flat frequency response. Driver output extends to 25,000 Hz.

A self-resetting high-frequency protection circuit, EV's PRO™ circuit, is included with the Sx200 to prevent against accidental overdrive and improve system reliability. If the input power to the high-frequency driver exceeds the nominal rating, the protection circuit is activated and reduces the power delivered to the driver by 6 dB. The system will remain in this mode of operation until the input power is reduced to a safe level.

The bass section of the Sx200 is designed using Thiele-Small parameters for efficient performance to below 80 Hz. The woofer is a 12-inch Pro-Line unit featuring beryllium copper lead wires, a low-mass, edge-wound voice coil and high-temperature materials. The part of the magnetic structure adjacent to the coil is insulated using the exclusive EV PROTEF™ process (U.S. Patent #4,547,632). The coil is driven by a 16-lb magnetic structure. The system combines professional-quality components, arranged in a time-coherent vertical array, with an unusually durable Thiele-Small-aligned vented enclosure. The result is clear and articulate, high-quality sound.

## FREQUENCY RESPONSE

The combination of a 12-inch woofer, wide-bandwidth high-frequency driver and an equalized crossover results in the wide and smooth overall response shown in Figure 1. This response was measured at 10 feet, using a 4-volt input in an anechoic chamber, and was measured using a swept sine-wave input. No external equalization was used. Figure 1 has been averaged and corrected for 1 watt at 1 meter.

## CONSTANT-DIRECTIVITY SPEAKER SYSTEM

The crossover frequency and speaker component geometries have been selected so that the directional characteristics of the woofer and constant-directivity horn match at the crossover frequency to create a special system type—the constant-directivity system. Response within the 65° rated coverage angle is uniform, which means dependable audience coverage without "hot spots" or dead zones at certain frequencies. The 65° dispersion characteristic also helps avoid early reflections from nearby floor or side-wall surfaces which could degrade performance. The controlled directivity of the high- and low-frequency transducers also eliminates response irregularities caused by diffraction off nearby enclosure edges and, in combination with an essentially flat on-axis frequency response, produces a total acoustic power output that is uniform with frequency.

## DIRECTIVITY

A unique feature of the Sx200 is the constant-directivity dispersion provided by the 65° x 65° horn. The polar response of the system at selected one-third-octave bandwidths is shown in Figure 2. These polar responses were measured in an anechoic environment at 10 feet using one-third-octave pink-noise inputs. The frequencies selected are fully representative of the polar response of the system. Beamwidth of the system utilizing the complete one-third-octave polar data is shown in Figure 3. $R_\theta$ and directivity index ($D_i$) are plotted in Figure 4.

## SUSPENDING Sx200 ENCLOSURES

***WARNING: Suspending any object is potentially dangerous and should only be attempted by individuals who have a thorough knowledge of the techniques and regulations of rigging objects overhead. Electro-Voice strongly recommends that the Sx200 be suspended taking into account all current national, federal, state and local regulations. It is the responsibility of the installer to ensure the Sx200 is safely installed in accordance with all such regulations. If the Sx200 is suspended, Electro-Voice strongly recommends that the system be inspected at least once a year. If any sign of weakness or damage is detected, remedial action should be taken immediately.***

A manual entitled *Suspending System 200™ Loudspeakers* is included with every Sx200 system. It gives a summary of the suspension kits available and an idea of how each kit is used. A brief overview, which illustrates some approaches for single and multiple suspension, is given here for the benefit of the system designer. Please refer to individual suspension kit engineering data sheets for full details and safety information.

The first approach is to suspend an **individual** Sx200 enclosure. The four metric M8 x 1.25 inserts (see Figure 5) which are built into the enclosure allow the system to be suspended using eyebolts (Mb100 Accessory Kit). Typically it will be necessary to attach two cables to the top eyebolt and "pull up" on the rear. The Mb200 bracket (see Figure 7) encompasses the top and bottom of the enclosure and has additional features to make suspending the Sx200 easier and more flexible.Electro-Voice recommends the use of the Mb200 in all but the simplest situations. The Mb200 has supplementary holes to allow the Sx200 to be attached to a wall or ceiling and aimed at an audience.

The Mb200 Installation Kit also allows the use of OmniMount® Series 100 mounting hardware by providing three-hole-pattern groups compatible with these support systems. When OmniMount® Series 100 mounting hardware is specified, the Mb200 Installation Kit must first be attached to the speaker enclosure.

The second approach is to suspend **multiple** Sx200 enclosures. The Sx200 enclosure is not designed to suspend multiple enclosures from itself. If an "array" is required, then multiple Mb200's must be used. Arrays may be constructed vertically by "daisy chaining" two Mb200's from each other. The Mb300 array bracket allows the easy and secure construction of horizontal arrays, using Mb200's to support the enclosure.

## POWER-HANDLING CAPACITY

To our knowledge, Electro-Voice was the first U.S. manufacturer to develop and publish a power test closely related to real-life conditions. First, we use a random-noise input signal because it contains many frequencies simultaneously, just like real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than typical actual program, adding an extra measure of reliability. Third, the test signal includes not only the overall "long-term average" or "continuous" level—which our ears interpret as loudness—but also short-duration peaks which are many times higher than the average, just like actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone and diaphragm excursion). Note that the sine-wave test sig-

* Patent applied for.

Sx200 SPECIFICATION GRAPHICS

FIGURE 1 — Sx200 Frequency Response
(1 watt/1 meter, anechoic environment)

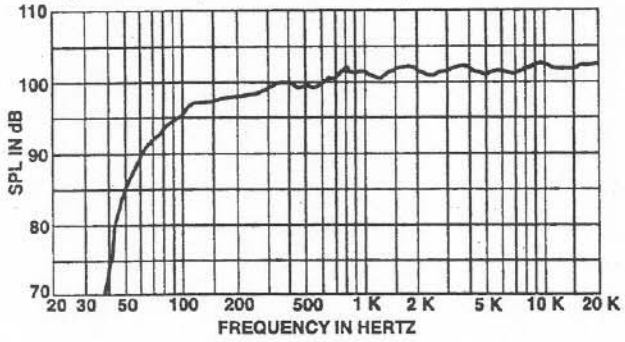



FIGURE 2 — Sx200 Polar Response (anechoic environment)

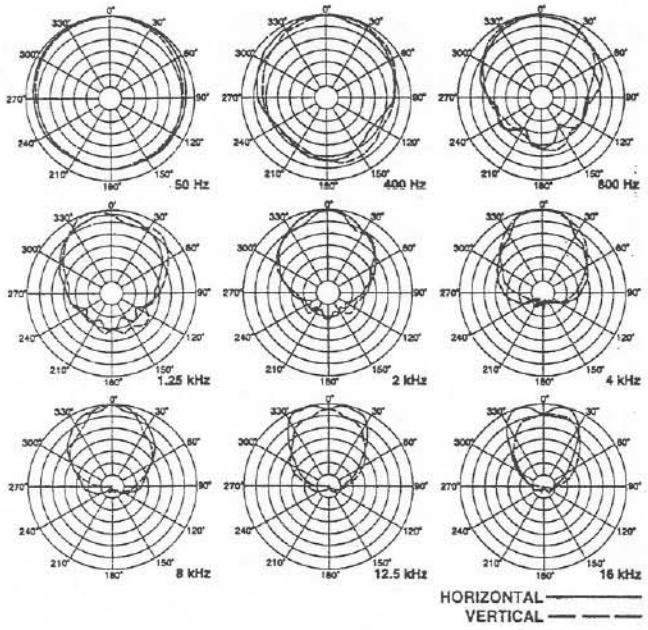



FIGURE 3 — Sx200 Beamwidth Response (anechoic environment)

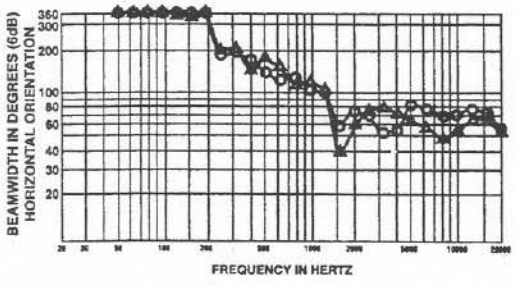



FIGURE 4 — Sx200 Directivity Response (anechoic environment)

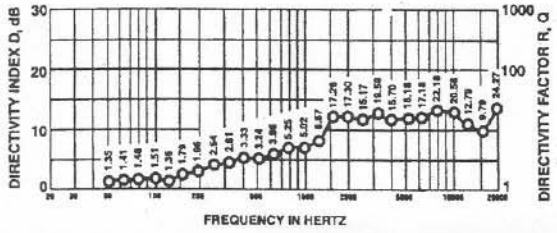



FIGURE 5 — Sx200 Dimensions

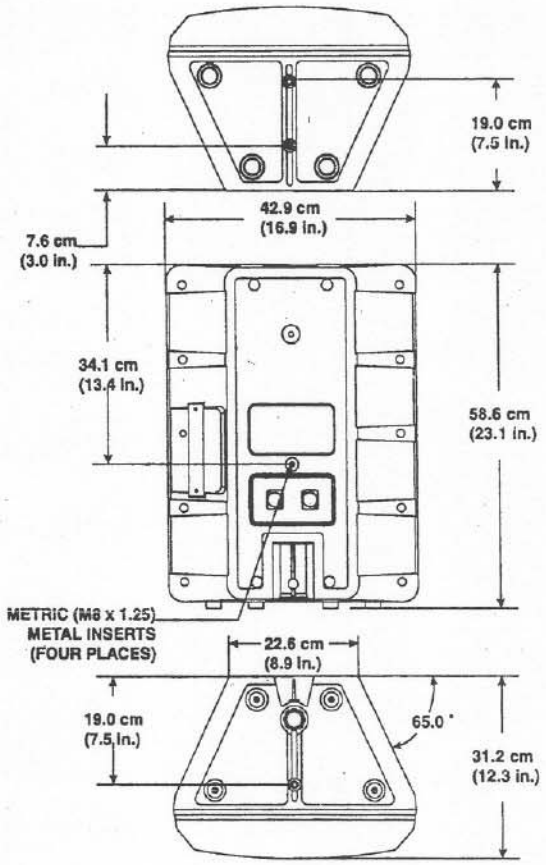



FIGURE 6 — Two-Conductor Cable Configurations for Sx200 Speaker System Using Neutrik Speakon® NL4FC Four-Pin Connector

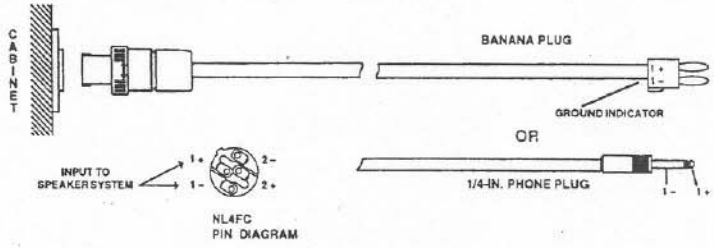
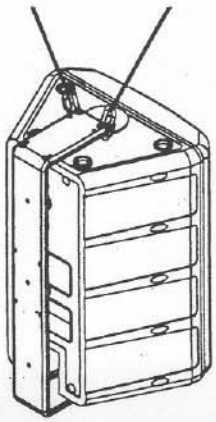



FIGURE 7 — Suspending the Sx200 Using Mb200 Installation Kit



nals sometimes used have a much less demanding peak value relative to their average level. In actual use, long-term average levels exist from several seconds on up, but we apply the long-term average for several hours, adding another extra measure of reliability.

Specifically, the Sx200 is designed to withstand the power test described in the ANSI/EIA RS-426-A 1980. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white-noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage bandwidth analyzer (one-third-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz with a 3-dB-per-octave slope above 1,200 Hz. This shaped signal is sent to the power amplifier with the continuous power set at 300 watts into the 7.1-ohm EIA equivalent impedance (46.2 volts true rms). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 1,200 watts peak (92.5 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

## AMPLIFIER POWER RECOMMENDATIONS

As noted in the Power-Handling Capacity section, above, the Sx200 has a random-noise power capacity of 300 watts long term (1,200 watts peak) per ANSI/EIA RS-426-A 1980. The following guidelines will help relate this number to an appropriate power amplifier output rating.

1. To use the Sx200 to full capacity, skilled experts in sound system installation and operation will obtain the best results if the power amplifier is 2.0 to 4.0 times the long-term average noise power rating of the speaker system. For the Sx200 this is 600 to 1,200 watts.

   The **caution** cannot be made strongly enough, however, that **this arrangement is only for experts** or for those who can discipline themselves against "pushing" the system for ever-higher sound levels and who can avoid "accidents" such as catastrophic feedback or dropped microphones.

2. A more conservative, "normal" amplifier size, which will produce audible results nearly equal to those of the "expert" recommendation, is 1.0 to 1.4 times the long-term average noise power rating of the speaker. For the Sx200 this is 300 to 420 watts.

3. To be very conservative, one can use an amplifier rated at 0.5 to 0.7 times the long-term average noise power rating of the loudspeaker. For the Sx200 this is 150 to 210 watts.

Request P.A. Bible Addition No. Two ("Power Handling Capacity") for more background on these recommendations.

## Sx200 CONNECTIONS

The Sx200 is equipped with two Neutrik Speakon® NL4MP or two 1/4-in. phone jacks connected in parallel, a configuration which allows for daisy-chaining of speaker systems.

In continued high-power applications, Electro-Voice recommends the use of the Speakon connector. The Speakon NL4MP will mate to a NL4FC Speakon connector, which is a 4-pin connector. Figure 6 shows typical wiring configurations using banana plugs or 1/4-in. phone jacks (the banana plug provides the more reliable connection). Cable connections should be made to the 1+ and 1– terminals only. Cables utilizing the Speakon NL4FC are available from your local dealer or from the companies listed below:

**Pro Co Sound, Inc.**
135 E. Kalamazoo Ave.
Kalamazoo, MI 49007
616/388-9675

**Whirlwind Music Distributors, Inc.**
P.O. Box 1075
Rochester, NY 14603
716/663-8820

**Neutrik USA, Inc.**
195-S3 Lehigh Ave.
Lakewood, NJ 08701
908/901-9488

## ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker shall consist of a 30.5-cm (12-inch) low-frequency transducer in a vented, trapezoidal-shaped enclosure; a high-frequency compression driver with a pure titanium diaphragm coupled to a 65° x 65° constant-directivity horn molded into the front baffle of the enclosure; and a passive crossover-equalizer network with protection for the high-frequency driver. Up to 12 dB additional bass output can be obtained with the Electro-Voice Xp200A speaker-system controller. The loudspeaker shall meet the following performance criteria: frequency response of 80 to 25,000 Hz, –3 dB; power handling of 300 watts long term and 1,200 watts short term, with a shaped random-noise input per ANSI/EIA RS-426-A 1980; sensitivity of 101.5 dB SPL at 1 meter with a 1-watt, 300- to 2,000-Hz pink-noise input; 6-dB-down horizontal coverage angle of 65° ±15° in the 2,000- to 20,000-Hz range; 6-dB-down vertical coverage angle of 65° ±15° in the 2,000- to 20,000-Hz range; crossover frequency of 1,500 Hz; nominal impedance of 8 ohms and minimum impedance of 6 ohms. Paralleled input and output connectors shall be present, consisting of Neutrik Speakon® NL4MP or 1/4-in. phone jacks. The enclosure shall be constructed of polypropylene structural foam and fitted with a steel grille, an integral handle, a stand socket for mounting on 1 3/8-inch stands, rubber feet and mating sockets to facilitate stacking. Dimensions shall be 58.6 cm (23.1 in.) high x 42.9 cm (16.9 in.) wide x 31.2 cm (12.3 in.) deep. Net weight shall be 17.7 kg (39 lb).

The loudspeaker system shall be the Electro-Voice Sx200, Sx200-E, Sx200W or Sx200W-E.

## 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

**ELECTRO-VOICE** **600 Cecil Street, Buchanan, Michigan 49107**
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Part Number 533876 — 9633