

## S<sub>x</sub> 300PI S<sub>x</sub> 300PIX 300-Watt Two-Way Weather-Resistant Speaker Systems

- Ring-Mode Decoupling (RMD™) for increased intelligibility
- Lightweight Structural-foam enclosure
- Stand mountable and arrayable
- High efficiency (99 dB, 1 W/1 m)
- High power handling (Sx300PI: 300-watts continuous, 1,200-watts short term)
- Powder-coated, full-face stainless-steel grill with foam backing
- Four molded-in attachment points (metric M8 x 1.25) for secure suspension
- 100-watt transformer option (Sx300PIX)
- Available in white

### Description

The Sx300PI and Sx300PIX are continuations of the popular the Sx-series offering the added value of weather-resistant cabinets. The Electro-Voice Sx300PI is a 300-watt, 12-inch, two-way, high-efficiency, constant-directivity speaker system for permanent installation. Through the extensive use of computer-aided design and modeling, Electro-Voice engineers have developed a state-of-the-art professional loudspeaker system for permanent installation where weather resistance is needed. The Sx300PIX is the same as the Sx300PI with the addition of an AT100 transformer.

The high-frequency section of the Sx300PI utilizes 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 consistent, 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 Sx300PI 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 $\frac{3}{8}$ -inch stands such as the Electro-Voice 100BK. Rubber feet attached to the bottom of the cabinet and mating sockets 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 Sx300PI ideal for use alone or in arrays.

The Sx300PI’s high-frequency horn is driven by the Electro-Voice 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 Sx300PI to prevent 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 Sx300PI is designed using Thiele-Small parameters for efficient performance to below 80 Hz. The woofer is a DL12Sx 12-inch 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 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.

### Ring-Mode Decoupling (RMD™)

The Sx300PI controls both acoustical and mechanical ring modes to provide dramatically increased intelligibility, using techniques learned from the development of the Electro-Voice X-array™ concert speakers. There is much less coloration of the sound from resonating sources, leaving only the intended sound to be heard by the audience.

\* Patent pending

## 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.

## Port Covers

The four ports surrounding the woofer may be "sealed" in order to add further weather protection to the system. Optional port covers may be used in situations where increased weather resistance is needed. This will aid in the prevention of any moisture that may protrude through the foam-backed grill under extreme weather conditions to accumulate inside the enclosure. The optional port cover "kit" is supplied along with instructions with each system. However, once the aid of the port covers are installed, a difference of frequency response will change as shown in Figure 2.

## 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 Sx300PI is the constant-directivity dispersion provided by the 65° x 65° horn. The polar response of the system at selected one-third-octave band-

widths 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 4.  $R_q$  and directivity index (D<sub>i</sub>) are plotted in Figure 5.

## Suspending Sx300PI 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 Sx300PI be suspended taking into account all current national, federal, state and local regulations. It is the responsibility of the installer to ensure the Sx300PI is safely installed in accordance with all such regulations. If the Sx300PI 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.**

When mounting the Sx300PI in a location where a weather-resistant system is required, a minimum of a five-degree down angle is recommended. (See Figure 9.) This will aid in the prevention of any moisture protruding through the foam-backed grille. A manual entitled *Suspending System 200™ Loudspeakers* is included with every Sx300PI 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** Sx300PI enclosure. The four metric M8 x 1.25 inserts (see Figure 6) 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 8) encompasses the top and bottom of the enclosure and has additional features to make suspending the Sx300PI 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 Sx300PI 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** Sx300PI enclosures. The Sx300PI 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 signals 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 Sx300PI 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

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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 Sx300PI has a random-noise power capacity of 300-watts long term (1,200-watts peak) (nontransformer) 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 Sx300PI 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 Sx300PI this is 600 to 1,200 watts (nontransformer).

**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 Sx300PI, this is 300 to 420 watts (nontransformer).
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 Sx300PI this is 150 to 210 watts (nontransformer).

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

### Sx300PI Connections

The Sx300PI is equipped with two Neutrik Speakon® NL4MP connectors.

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 7 shows typical wiring configurations using banana plugs. Cable connections for the Sx300PI should be made to the 1+ and 1– terminals only. Cable connections for the Sx300PIX should be made as shown in Figure 9, depending on the given input voltage and the desired output wattage. 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

It is recommended that after making the proper connection with the Speakon connector to the input on the enclosure, a bead of sealant should be applied around the connection to assure a watertight seal.

### Weather-Resistant Mounting

When mounting the Sx300 PI in a location where a weather-resistant system is required a minimum of a five-degree down angle is recommended. (See figure 9.) This will help prevent any moisture from wicking through the foam and mesh-backed grille and accumulating inside the enclosure under extreme weather conditions.

### Architects' and Engineers' Specifications

The loudspeaker shall consist of a 305-mm

(12-inch) low-frequency transducer in a 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. 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 (nontransformer), with a shaped random-noise input per ANSI/EIA RS-426-A 1980; sensitivity of 99 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 connectors. The enclosure shall be constructed of polypropylene structural foam and fitted with a full-face, foam-backed, stainless-steel grille, an integral handle, a stand socket for mounting on 1<sup>3</sup>/<sub>8</sub>-inch stands, rubber feet and mating sockets to facilitate stacking. Dimensions shall be 586 mm (23.1 in.) high x 429 mm (16.9 in.) wide x 312 mm (12.3 in.) deep. Net weight shall be 17.7 kg (39 lb) nontransformer; 21.7 kg (48 lb) transformer. The loudspeaker systems shall be the Electro-Voice Sx300PI, Sx300PIX, Sx300PI-W, Sx300PIX-W.

### 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 indi-

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vidual 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 Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice Service 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 Service at: 1 Telex Drive, Morrilton, AR 72110 (800/685-2606 or at 501/354-0111). **Incidental and Conse-**

**quential 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

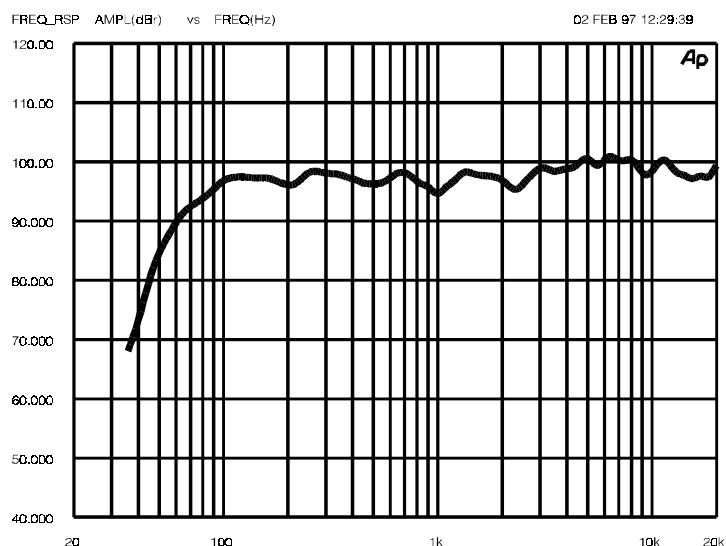
does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from improperly designed enclosures. Electro-Voice active electronics associated with the speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

For warranty repair, service information, or a listing of the repair facilities nearest you, contact the service repair department at: 800/685-2606 or 501/354-0111.

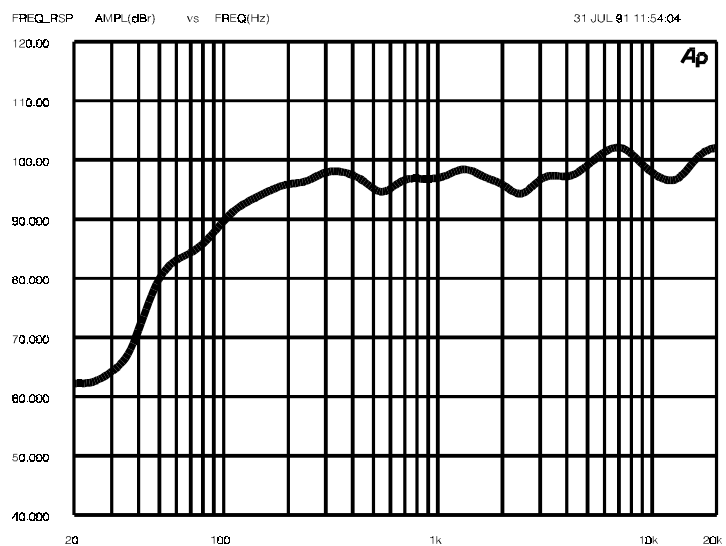
**For technical assistance,** contact Technical Support at 800/392-3497 (ext. 4656) or 952/736-4656, M-F, 8:00 a.m. to 5:00 p.m., Central Standard time.

Specifications subject to change without notice.

**Figure 1 — Sx300PI Frequency Response (1watt/1 meter, anechoic environment) (open ports)**



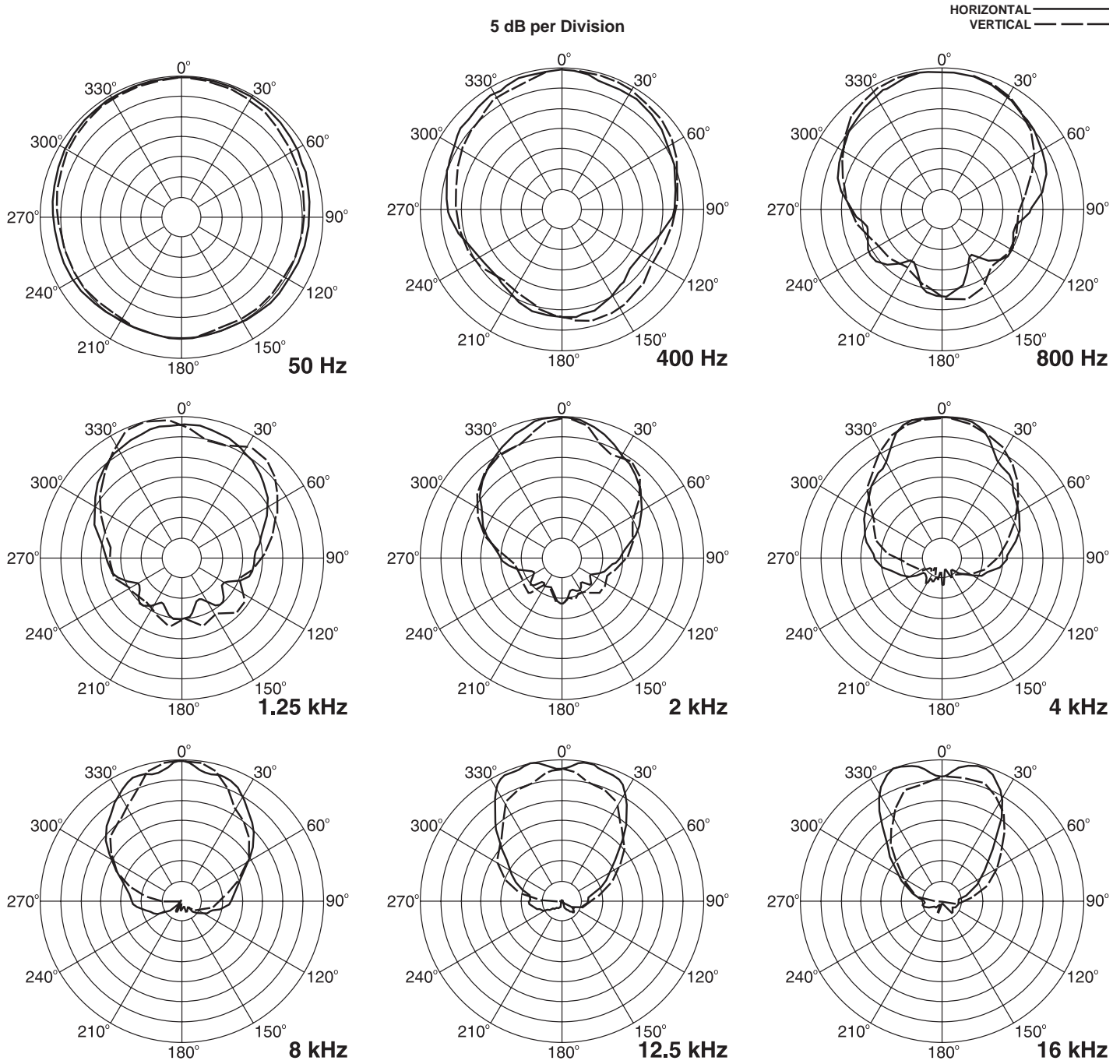
**Figure 2 — Sx300PI Frequency Response (1 watt / 1 meter, anechoic environment) (closed ports)**





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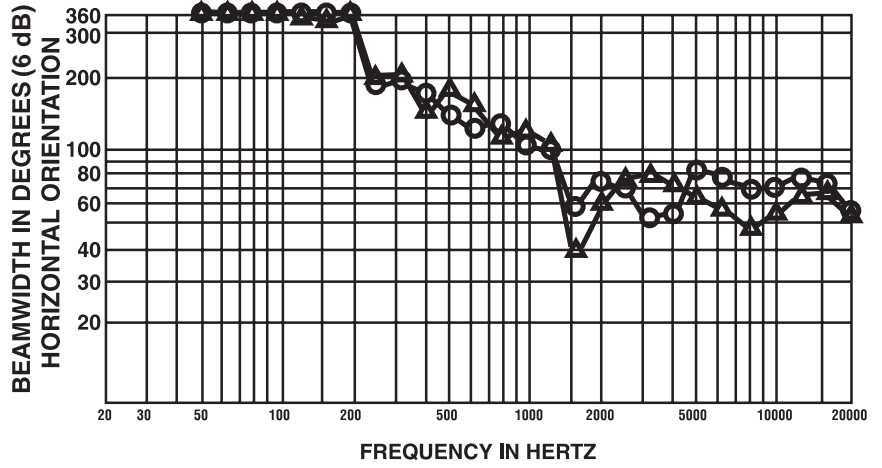
Figure 3 — Polar Response (anechoic environment) (open ports)



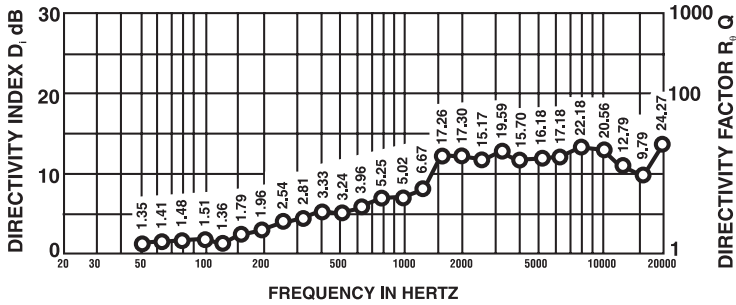
Sx300PI and Sx300PIX 300-Watt Two-Way Weather-Resistant Speaker Systems

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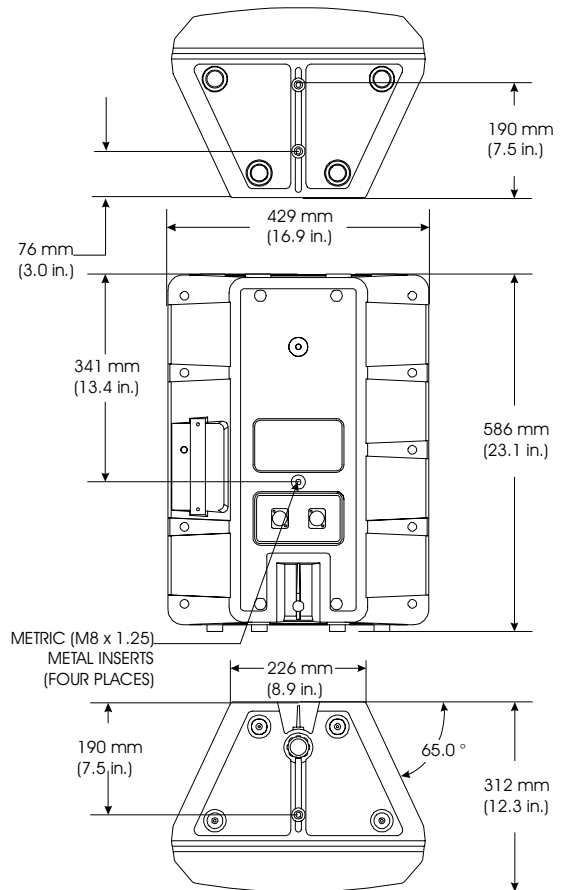
**Figure 4 — Beamwidth Response**  
(anechoic environment) (open ports)



**Figure 5 — Directivity Response** (anechoic environment) (open ports)

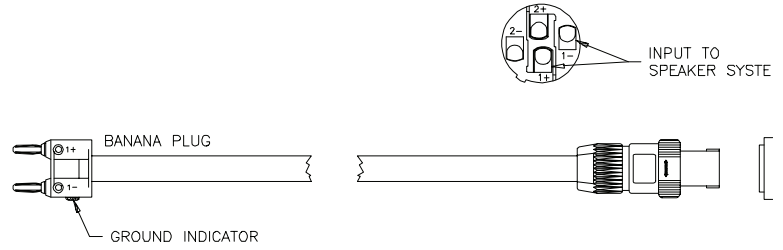


**Figure 6 — Sx300PI/ Sx300PIX Dimensions**

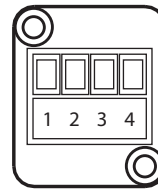


# Sx300PI and Sx300PIX 300-Watt Two-Way Weather-Resistant Speaker Systems

Figure 7 — Cable Configurations for Sx300PI and Sx300PIX



**Sx300PI Connection**



	70.7 VOLT	100 VOLT
PIN 4	50W	100W
PIN 3	70W	140W
PIN 2	100W	200W
PIN 1	COMMON	COMMON

CONNECTIONS TO  
TRANSFORMER TAPS

**Sx300PIX Connection**

Figure 8 — Suspending the Sx300PI Using Mb200 Installation Kit

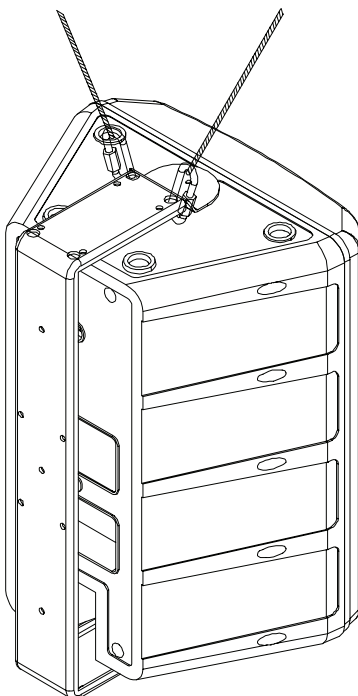
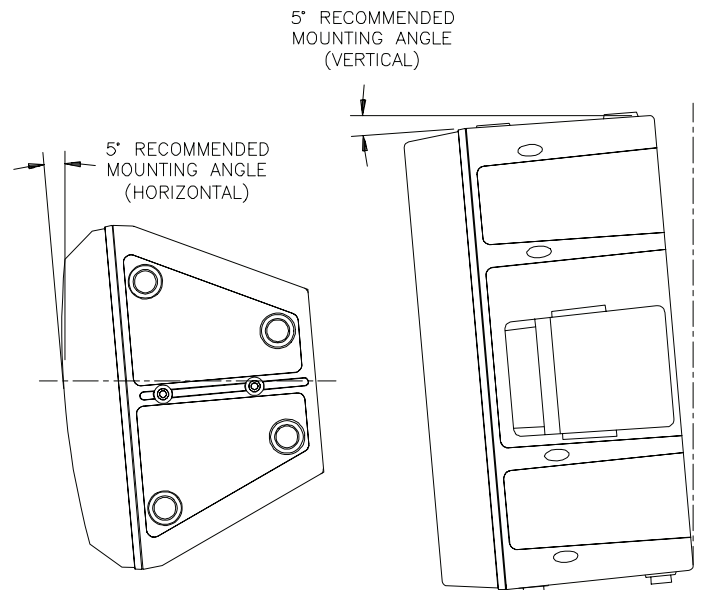


Figure 9 — Recommended Mounting of the Sx300PI and Sx300PIX



Sx300PI and Sx300PIX 300-Watt Two-Way Weather-Resistant Speaker Systems

# Sx300PI and Sx300PIX 300-Watt Two-Way Weather-Resistant Speaker Systems

## Specifications

### Versions Available:

**Sx300PI**—two-way, full-range speaker system (300 watt)

**Sx300PIX**—two-way, full-range speaker system with 100-watt transformer

**Sx300PI-W**—two-way, full-range speaker system (300 watt), white

**Sx300PIX-W**—two-way, full-range speaker system with 100-watt transformer, 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

**(Open Port) Low-Frequency 3-dB-Down Point:**  
90 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 (nontransformer)

200 watts - 100-V line (transformer)

100 watts - 70.7-V line (transformer)

**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):**  
99 dB

**Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise (see Figure ),**

**2,000-20,000 Hz, Horizontal:**  
65° -15°

**2,000-20,000 Hz, Vertical:**  
65° -15°

**Directivity Factor  $R_q(Q)$ , 800-16,000 Hz Median (see Figure 5):**  
14.3 (+7.9, -9.3)

**Directivity Index  $D_p$ , 800-16,000 Hz Median (see Figure 5):**  
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 EV woofer

**Box-Tuning Frequency:**

63 Hz

**Crossover Frequency:**

1,500 Hz

**Crossover Slope,**

**Low Pass:**

12 dB per octave

**High Pass:**

12 dB per octave

**Impedance, Sx300PI**

**Nominal:**

8 ohms

**Minimum:**

6 ohms

**Impedance, Sx300PIX at**

**Highest Wattage Tap,**

**Nominal:**

50 ohms

**at 1 kHz:**

111 ohms

**Input Connections, Sx300PI:**

Paralleled Neutrik Speakon® NL4MP connectors (allow paralleling of multiple speakers)

**Input Connections, Sx300PIX:**

Paralleled Phoenix-Style connectors (for wattage selection and paralleling of multiple speakers)

**Enclosure Materials and Colors:**

Polypropylene structural foam; choice of black or white

Supplied Accessories:

*Suspending Sx100/Sx300 Series*

*Loudspeakers* instruction manual

**Optional Accessories:**

100BK mounting stand

Mb100 forged eyebolt attachment kit

Mb200 wall/ceiling mounting bracket

Mb300 horizontal array kit

OmniMount® Series 100 mounting hardware\*\*

VPCSx vinyl case

PDSx padded case

MBS200 Stainless Steel Bracket Kit

**Attachment Points:**

Four metric inserts (M8 x 1.25) (see Figure 5 and Suspending Sx300PI

Enclosures section)

**Dimensions (see Figure 5),**

**Height:**

586 mm (23.1 in.)

**Width:**

429 mm (16.9 in.)

**Depth:**

312 mm (12.3 in.)

**Net Weight:**

17.7 kg (40 lb) – nontransformer

21.7 kg (49 lb) – transformer

**Shipping Weight:**

19.1 kg (43 lb) – nontransformer

23.1 kg (52 lb) – transformer

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

# Electro-Voice®

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