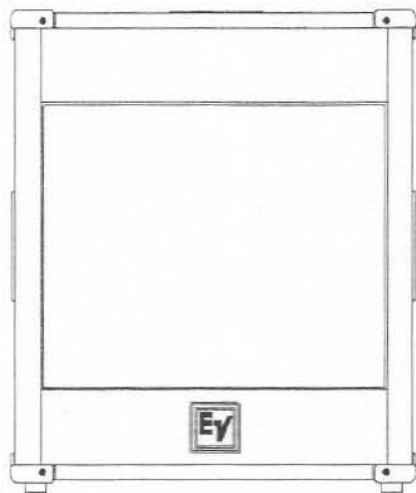


Force® Sub



- High-output dual 15 inch slot-loaded woofer system designed to complement the FORCE® stage system
- Integral passive-crossover filter combined with unique acoustic design allows for parallel operation with full-range systems for added bass response
- 300 watts continuous power-handling capability
- Top-mounted 1-3/8-inch stand adapter
- 30 inch pole included for elevating EV FORCE® full-range system
- Durable industrial-grade carpet covering

Description

The Electro-Voice Force® Sub is an 8-ohm, dual-15-inch subwoofer system designed to reproduce high impact bass program material from a small, compact, easily portable enclosure. The Force® Sub is intended for use with the Electro-Voice Force® full-range stage system, and incorporates a built-in low-pass filter to allow parallel operation of both systems from a single amplifier channel. When connected in parallel, the combined impedance is 4 ohms. Conventional biamp operation is also possible using an active electronic crossover of 12, 18 or 24 dB per octave and a crossover frequency between 80 and 125Hz. No internal wiring change is required for biamp operation because the built-in first-order low-pass filter is only effective above 125Hz. In either mode of operation an active low-frequency protection filter is strongly recommended to reduce unwanted program content below 40Hz. (Bass guitar open low "E" is approx. 41.2Hz) These very low frequencies are not only potentially damaging to the woofers, they also waste massive amounts of amplifier power and cause needless distortion of the upper frequencies.

As seen in the response curve (fig. 1), the frequency response of the Force® Sub is not "flat" nor was it intended to be. The requirements of a subwoofer for live performance are radically different from those of a typical living room. Most popular music is inherently bass-heavy, with most of that energy concentrated in the kick drum "thump" region between 60 and 80Hz. Force® Sub has been designed for maximum output efficiency in exactly that range. The use of two specially designed 15 inch woofers results in 36% more cone area than a single 18 inch, and the dual slot-load enclosure design is derived from technology developed for the Electro-Voice X-Array™ touring systems. It should be noted that the frequency response graph (fig.1) was measured in an anechoic (whole space) environment. From a practical standpoint, this is a sort of "worst case" measurement of low-frequency capability. In actual use, sitting on the floor, the long bass wavelengths will be reinforced by the floor and the room boundaries and will result in more low bass output than the graph implies, depending on the room and the Force® Sub's position in it.

The Force® Sub includes a top-mounted stand adapter and a 30 inch pole mount for

use with the Force® full-range system. Safety concerns limit the use of a pole greater than 30 inches in length, but **under no circumstances should the total height of all components exceed 80 inches.**

Force® Sub will handle a long term *average* power input of 300 watts RMS and real-world *peaks* of over 600 watts. The input connections are ¼ inch phone, but may also be ordered with Neutrik NL4MP connectors (Force® Sub-E), which are recommended for sustained high power operation.

Power handling.

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 pro-

Figure 1—Frequency Response, 1 watt at 1 meter anechoic environment (SPL is 3dB higher for half space)

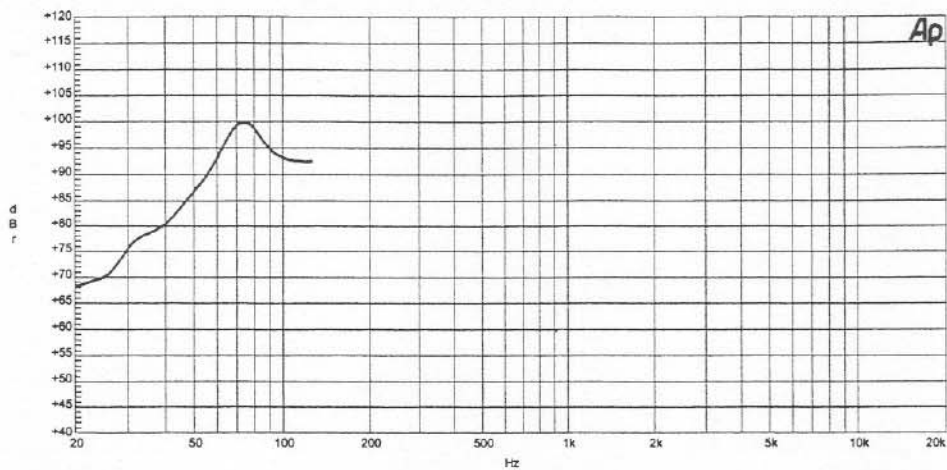
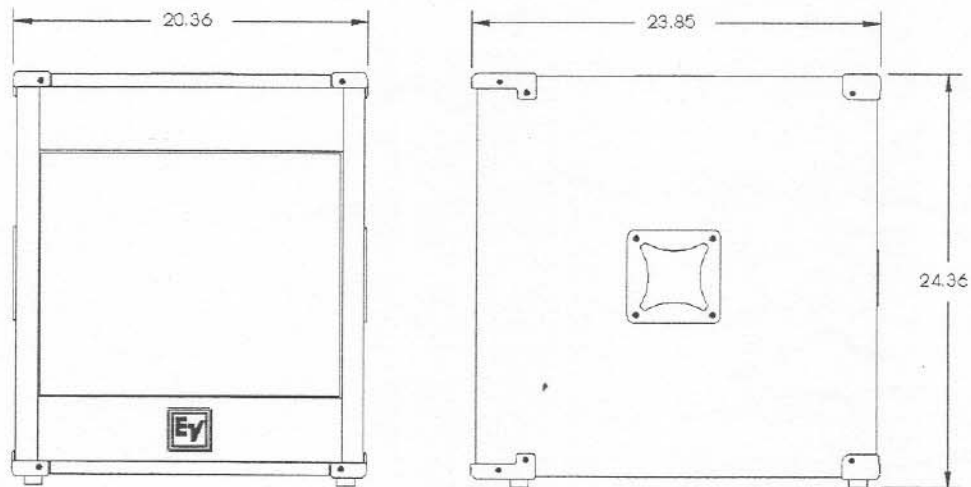


Figure 2—Line Drawing



gram. 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 Force® Sub 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.

Amplifier Recommendations.

The power-handling capacity of the Force® Sub is 300 watts EIA (350 watts AES). For biamp operation choose an amplifier of approximately 300 watts RMS per channel, full 20-20,000 Hz bandwidth *at 8 ohms*. For passive operation (Force® Sub and Force® full-range connected in parallel) the power capacity of the full-range system must be taken into consideration. Remember that the Force full-range has a lower power-handling capacity than the Force Sub, so above the Force® Sub's 125 Hz low-pass filter frequency *all of the amplifier power is directed to the full-range system*. Only below 125 Hz is the power shared between the two systems, with the Force® Sub getting the majority only on the very lowest notes. Therefore, for passive operation select an amplifier whose continuous *8 ohm* rating, full 20-20,000 Hz bandwidth, is appropriately sized to the full-range system (a nice size for the Force® is approximately 200 to 300 watts

RMS @ 8 ohms continuous power per channel) *and whose 4 ohm rating per channel is near the total for both systems*. This class of amplifier, especially if it also incorporates good on-board limiters, provides plenty of power *where you need it* down in the bass region where both systems are drawing power in short duration pulses, but not so much as to seriously endanger the more delicate high-frequency components. An amplifier that matches this description very well is the Electro-Voice Q44, which is ideally suited to powering a Force® or a passively crossed (parallel connected) Force® and Force® Sub system in stereo. Using an active (electronic) crossover, the Electro-Voice Q66 is an ideal choice for powering up to four Force® Subs. **WARNING: Under NO Circumstances should ANY amplifier be used in Bridge Mode.** Bridging an amplifier results in abnormally high peak voltage levels that can *destroy your speakers*.

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 Service or any of its authorized ser-

vice 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 600 Cecil Street, Buchanan, MI 49107 (800/234-6831 or FAX 616/695-4743). **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.

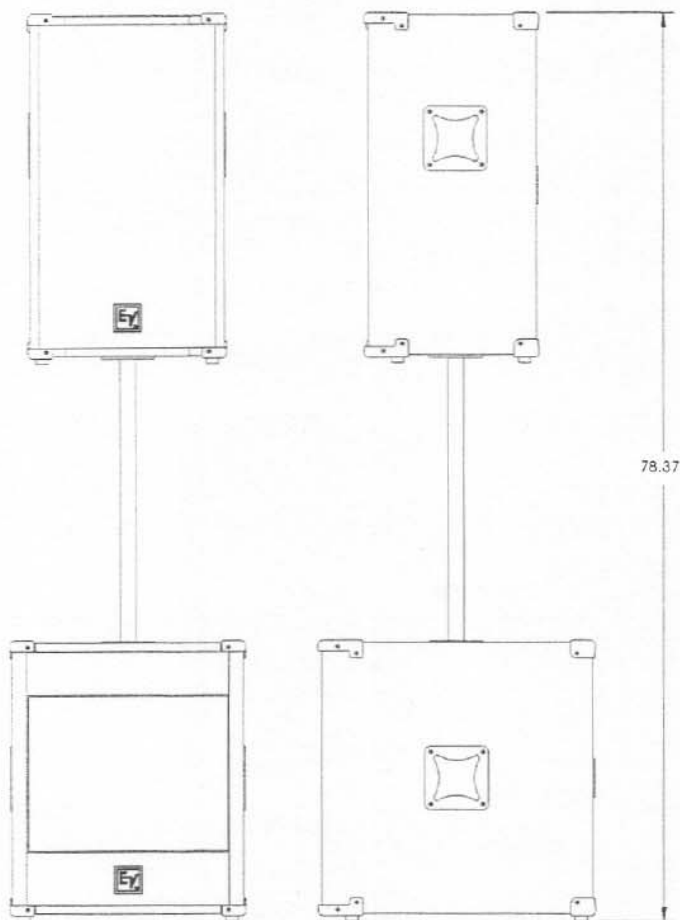
For warranty repair, service information, or a listing of the repair facilities nearest you, contact the service repair department at: 616/695-6831 or 800/685-2606.

For technical assistance, contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard time.

Specifications subject to change without notice.

Figure 3a—Force® with Force® Sub

Force® Sub



Specifications

Frequency Response:

47 – 125 Hz

Long-Term Average Power Handling,

EIA RS-426A:

300 watts

AES(1984):

350 watts

*900 WATT
SHORT TERM
PEAK*

Sound Pressure Level, 1w/1m:

97 dB, full space, anechoic

100 dB, half space

Crossover:

Acoustic/first order electrical

Impedance:

Nominal: 8 ohms

Minimum: 6.8 ohms

When used with Force full-range

in parallel: Nominal 4 ohms,

Minimum 3.8 ohms

Input connectors:

¼ inch phone input

¼ inch phone output to Force full-range

(Neutrik NL4MP input/output

on E versions)

Enclosure material/construction:

Black carpeted MDF

Dimensions, overall,

Height:

24.3 in. (61.7 cm)

Width:

20.3 in. (51.6 cm)

Depth:

23.8 in. (60.5 cm)

Net Weight:

89.5 lb (40.6 kg)

Shipping Weight:

97.5 lb (44.3 kg)

Electro-Voice®

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