# AC100 ROUND CONCENTRATING HORN

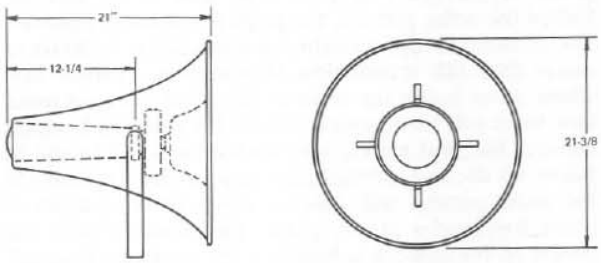


Figure 1 – Dimensions

## DESCRIPTION

The development of the model AC100 was based on the exclusive CDP principle, designed by Electro-Voice to reduce distortion in public address projectors. Although similar to the CDP, the AC100 is highly directional, throwing an intense "beam" of sound over a relatively narrow angle. By utilizing the E-V compound horn design, high-frequency losses normally associated with concentrating horns are avoided, and intelligibility is greatly improved. Where penetration is required without strident or poorly balanced sound, the AC100 solves the problem uniquely. The AC100 horn with an 1828/1829 series, E-V convertible driver is particularly suited to installations at athletic fields, fairs, race tracks, factories, arenas, or wherever intensity or high efficiency for "long throw" applications is needed.

The high efficiency and low distortion of the AC100 are achieved by its compound horn design. The compound horn is actually two horns in one. A large horn, designed to reproduce tones below 1000 Hz, is coupled to the rear of the driver diaphragm. This horn reproduces these low tones with high efficiency but will not reproduce tones above 1000 Hz. A small horn coupled to the front of the diaphragm is designed to reproduce the tones above 1000 Hz only. This combination of two horns means that each horn can be designed to reproduce its own range of frequencies without compromise. The result is extraordinarily smooth, peak-free response throughout the entire useful voice and music range. Another benefit of the compound horn design is in reduction of distortion – particularly at high frequencies. When very high tones are reproduced through a horn designed for low frequencies, distortion is the inevitable result, particularly at high power levels. By dividing the range and using two horns, a significant reduction in distortion is insured with improved voice clarity and more pleasant musical reproduction as results. For instance, at 2000 Hz a typical reentrant horn may measure 13% harmonic distortion at 30 watts but the AC100 measures only 1% distortion under the same test conditions.

The concentration of sound results from the design which allows relatively large horn sizes for each band of frequencies. This is particularly true of the high frequencies which need not travel long reentrant paths as would be the case with conventional horns. The resultant improved efficiency, plus optimum overall horn size for balanced response without excessive bass, provides a new high in intelligibility. The horn remains a reasonable size for ease in mounting.

## SPECIFICATIONS

| | |
|---|---|
| **Low Frequency Horn Taper:** | 100 Hz |
| **Low Frequency Horn Cutoff:** | 100 Hz |
| **Low Frequency Horn Air Column Length:** | 56 inches |
| **Dispersion,** | |
| **Low Frequency:** | 80° |
| **High Frequency:** | 30° |
| **Acoustical Crossover:** | 1000 Hz |
| **Mounting:** | Steel "U" bracket |
| **Size:** | 21-3/8" dia. x 21" deep |
| **Net Weight:** | 14¾ lbs., less driver |

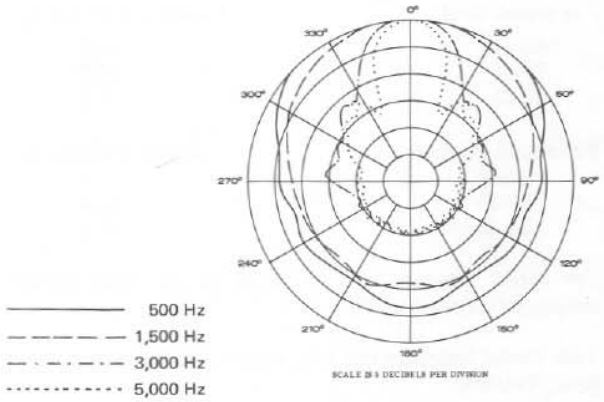


Figure 2 – Polar Pattern

## POLAR DISPERSION CHARACTERISTICS

Figure 2 shows the distribution of sound at various frequencies. Note that the radial scale is measured in decibels, so that the shape of the pattern indicates relative loudness at all angles at a constant distance from the speaker. Each frequency has been adjusted to the same loudness on axis for this test.

## CONSTANT LOUDNESS CONTOUR

Figure 3 indicates the distance you can stand from the AC100 when an E-V driver is operated at half rated power to achieve a typical sound level of 90 decibels. Unlike the polar pattern, the graph is plotted in distance. The constant loudness contour is measured at 3000 Hz to assure that full articulation of speech is achieved anywhere on or inside the contour line. This does not mean that there will be no sound outside the constant loudness contour line, but merely that the loudness at 3 kc will be below 90 db, and intelligibility may suffer. Reference to the polar pattern will indicate the relative loudness of other frequencies at any point. The nominal rated disperion of the speaker is based on the loudness "balance" of all frequencies at various angles. This is a subjective measurement and may vary with individual applications.

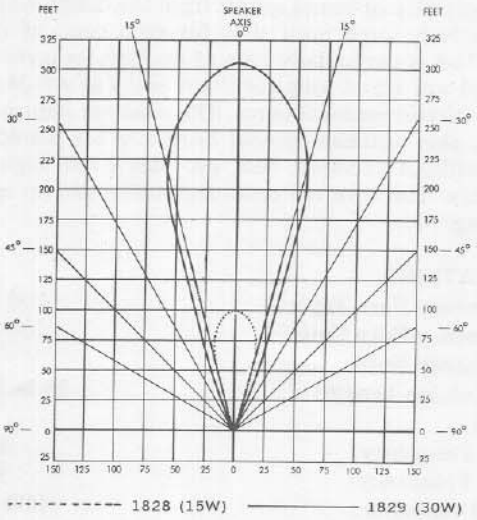


Figure 3 – Constant Loudness Contour at 3.0 kc

Although a 90 db reference level has been selected, some other sound levels may be required. The following table gives the conversion factor for several other levels:

| For sound level of: | Multiply distance by: |
|---|---|
| 60 db | 32.0 |
| 70 db | 10.0 |
| 80 db | 3.2 |

| For sound level of: | Divide distance by: |
|---|---|
| 100 db | 3.2 |
| 110 db | 10.0 |
| 120 db | 32.0 |

For sound pressure level of 90 db at full rated power, multiply distance shown by 1.4.

Two useful formulas can help you to use these charts and specifications:

(1) Every time you double amplifier power into a driver, the sound pressure level at any point will be increased 3 decibels. Conversely, if amplifier power into the speaker is cut in half (from 30 watts to 15 watts, for instance) the sound pressure level will be reduced by 3 db.

(2) Every time you double the distance from the listener to the speaker, the sound pressure level at the listener will be reduced by 6 decibels. This is equivalent to having only ¼ the amount of power available at the more distant position.

NOTE: The above statements refer to outdoor systems where no sound reinforcing reverberation affects the efficiency of the system. On indoor sound systems, reflections from walls will tend to reinforce the sound level, thus reducing the effects noted above. The smaller the room, the less effect distance will have on loudness. Highly reflective wall surfaces (tile, glass, stone, etc.) will further reduce the loudness difference. These reflections, however, may reduce intelligibility by creating a "garbled" or echo effect.

## INSTALLATION

The AC100 is shipped with a sturdy "U" bracket installed. It may prove more convenient to install only the bracket and then assemble the horn in place, so that the weight of the horn need not be supported during installation. Once the horn is in place, the appropriate E-V Convertible Driver should be installed. **The protective plastic front cap, the threaded back cap, and the plastic damping plug in the rear port of the driver should be removed.** Do not discard these parts as they may be needed if the driver is to be subsequently used for any other type of horn. Mount the driver by screwing the threaded rear port into the large horn cross-bracket. **The terminals should face the front of the horn.** Now screw the round concentrating horn, packed with the AC100, onto the threaded front port of the driver. Both connections should be snug.

The cable from the amplifier should be threaded through the grommet in the side of the horn. A knot should be tied about 10" from the end of the cable to provide a strain relief. The cable can be threaded through the hole in the cross-bracket and connected to the terminals of the driver.

Since the AC100 is a relatively narrow-angle horn, the orientation of the horn is most important for proper coverage. Avoid pointing the speaker at "hard," highly reflective surfaces that may reflect the sound back into a microphone, since this will increase the possibility of feedback.

Best understanding of speech and best musical balance will occur up to 40° off the axis of the speaker.

## ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The horn shall be of the compound concentrating type and shall be of spun aluminum and die cast construction. The diameter shall be 21 inches, and the depth (less driver) shall be 21 inches. The acoustical crossover shall be 1000 Hz. The low frequency horn shall have a rated 100 Hz taper and cutoff and an air path length of 56 inches. Dispersion shall be 80° at 1000 Hz and 30° at 3000 Hz. The horn shall accept any Electro-Voice Convertible Driver. The finish shall be Mesa Tan baked enamel. The net weight shall be 14¾ pounds (less driver). A steel "U" bracket shall be provided for mounting.

The Electro-Voice Model AC100 is specified.