™University Sound®

a MARK IV company

SPECIFICATIONS

Frequency Response:
500-4,000 Hz ± 5 dB
(see Figure 2)

Power Handling:
8 Hours, 6-dB Crest Factor
30 watts (500-5,000 Hz pink noise)

Impedance,
7110XC Nominal: 8 ohms
7110XC-16 Nominal: 16 ohms
7110XC Minimum: 6.5 ohms
(Cobreflex III horn)
7110XC-16 Minimum: 14 ohms
(Cobreflex III horn)

Sound Pressure Level at 1 Meter,
1 Watt Input Averaged, Pink Noise
Band-Limited from 500 to 5,000 Hz:
100 Hz

Voice Coil Diameter:
3.8 cm (1.5 in.)

Magnet Weight:
0.28 kg (0.63 lb)

Magnet Material:
Strontium ferrite

Flux Density:
1.1 Tesla

Construction:
Integral sintered bronze acoustic screen and heavy diecast aluminum case. Acrylic gun metal gray finish

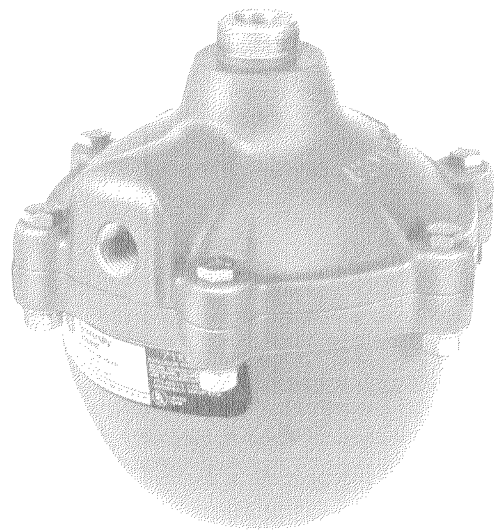
Mechanical Construction of Driver:
1 3/8"-18 x ½" long thread allows the 7110XC to be mounted on any University Sound horn

Dimensions,
Diameter:
2.0 cm (7.9 in.)
Length:
18.7 cm (7.4 in.)

Net Weight:
5.4 kg (12.0 lb)

Shipping Weight:
5.6 kg (12.8 lb)

Recommended Horns:
PH
SMH
Cobreflex IIB
Cobreflex III
SM120A



7110XC 7110XC-16

Explosion-Proof Driver

DESCRIPTION

The University Sound Model 7110XC and 7110XC-16 are explosion-proof drivers for use in potentially hazardous areas. A variety of horn attachments can be made to suit installation requirements.

A specially designed integral sintered bronze acoustic screen and heavy diecast aluminum cast meet the UL standards for explosion-proof classification (see Table 1).

The 711X0C and 7110XC-16 are designed to meet and surpass UL standards for use in hazardous areas classified as Class I- Groups B, C and D, ~~plus Class II- Groups E,F, and G.~~ *

The driver is ideal for use in such locations as gasoline storage and loading facilities, coal pulverizing plants, grain mills, paint shops, and other areas with potentially volatile atmospheres containing alcohol, acetone, natural gas, and other explosive gases such as a hydrogen/air mix.

For optimum flexibility, the 711OXC is supplied without a line matching transformer. If one is required, the University Model 5030 is recommended.

U.L. has recently changed their standards for Class II (dust borne) explosive environments. As a result, the 7110XC explosion proof driver is no longer certified as a Class II device. THIS CHANGE DOES NOT EFFECT CLASS I. The 7110XC is still fully certified for sales into Class I (explosive gases) environments.

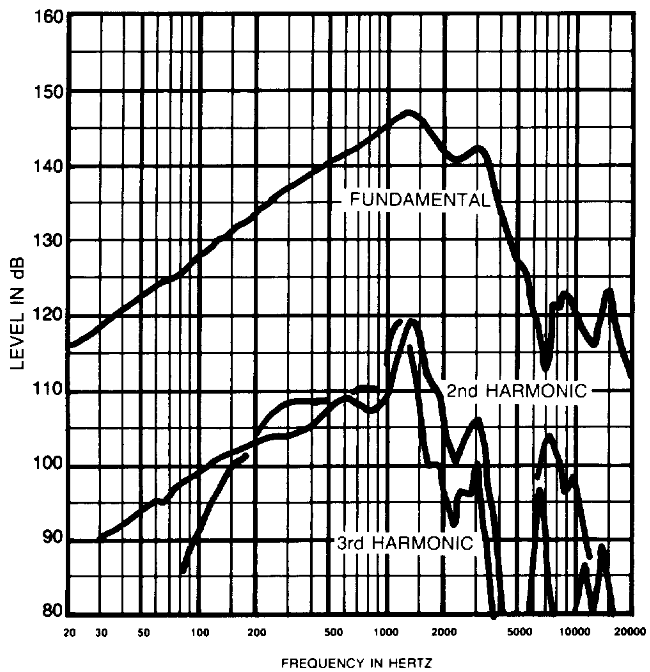


FIGURE 1
Distortion Response — Plane Wave Tube (1 inch)
(6-watt input)

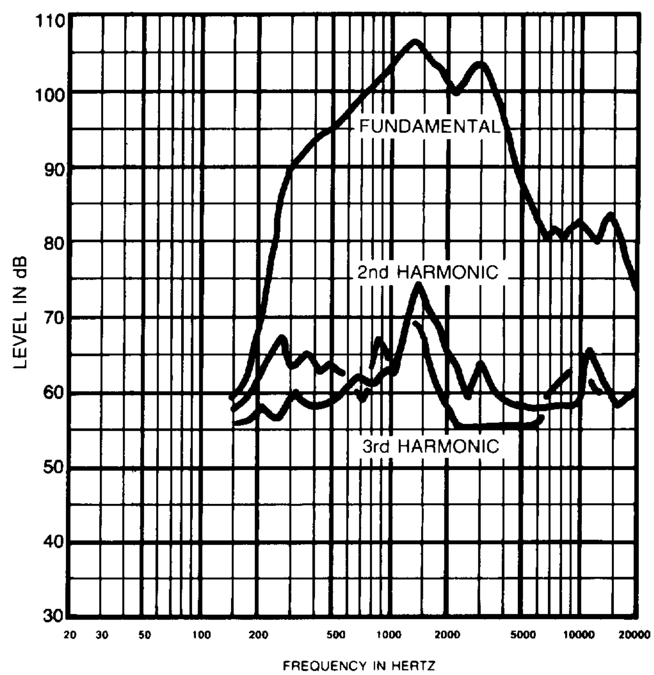


FIGURE 2
Distortion Response — Cobreflex III Horn
(1 watt/1 meter)

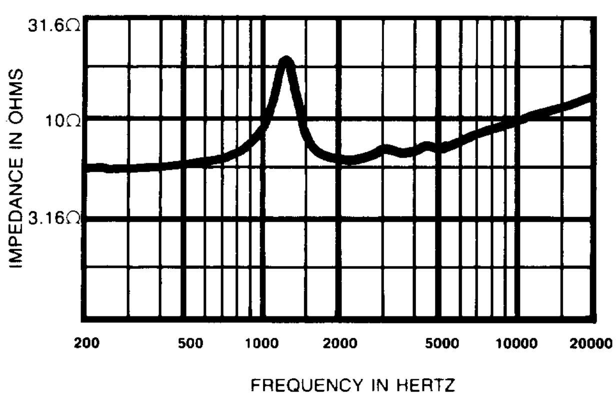


FIGURE 3
Impedance Response — Plane Wave Tube
(1 inch)

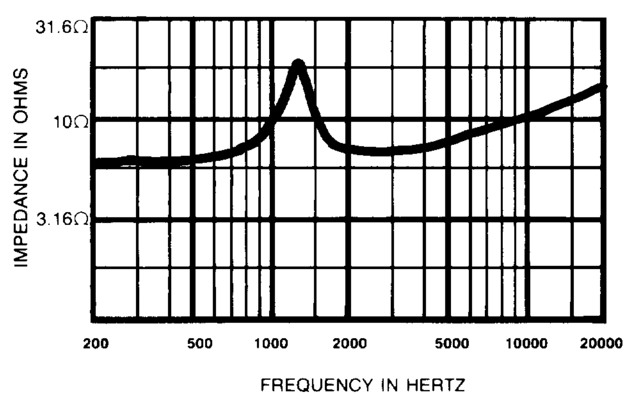


FIGURE 4
Impedance Response — Cobreflex III Horn

INSTALLATION

Installation of explosion-proof speakers must conform with governing electrical equipment hazardous locations and with provisions of the National Electrical Code. NO ALTERATIONS CAN BE MAKE TO THESE DRIVER UNITS!

No holes can be made, or holding devices screwed into the case to possibly weaken or otherwise endanger the structure after installation.

All main bolts on the case housing of the driver must be tightened. Wiring may be run in threaded rigid, or approved standard electrical flexible conduit and engage five full threads. Explosion-proof conduit boxes, junctions, and fittings are approved type and usually contain screw-in covers. Unions, elbows, and bends are also of special design.

Class I Environmental characteristics as follows:		
	Group B:	Hydrogen-air.
	Group C:	Atmosphere containing ethyl-ether, ethylene,cyclopropane.
	Group D:	Atmosphere containing gasoline, petroleum, naphtha, alcohol, acetone, lacquer solvent and natural gas, benzine, butane, propane, benzol.
Class II Environmental characteristics as follows:		
	Group E:	Atmosphere containing metallic dust such as aluminumand magnesium.
	Group F:	Atmosphere containing carbon, coal, coke dust.
	Group G:	Atmosphere containing grain, starch and flour dust.

TABLE 1
Underwriter's Laboratories Approved Explosion-Proof Classifications

ELECTRICAL CONNECTIONS

Access to the driver unit for electrical connections or installation of the Model 5030 transformer is made by removal of the six bolts holding the case halves together. In the event of a short run of conduit line, up to 100 feet, the 8-ohm voice coil of the driver may be connected directly to the line. Use the 8-ohm tap on the amplifier, a high-impedance or constant line voltage distribution system is recommended. The Model 5030 (70V/25V) matching transformer (optional) is coded for easy connection.

REASSEMBLY PROCEDURE

Tighten the six case bolts using torque of 25-ft-lbs. Check between the case halves with a 0.00015-inch feeler gauge enters more than 1/8-in. at any point, tighten bolts to 35-ft-lbs. Recheck with feeler gauge.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The explosion-proof drivers shall be University Sound Model 7110XC and 7110XC-16 and approved by Underwriter's Laboratory for use in hazardous areas specifically designated as Class I Groups B, C, and D, and Class II Groups E, F, and G.

The loudspeaker shall exhibit essentially flat power response from 500 to 4,000 Hz with a smoothly rolled-off response beyond. The sensitivity, when mounted on a University Sound Cobreflex III horn, will be 100 dB (1W/1m) with a 500-to-5,000-Hz pink noise applied. The case shall be heavy cast aluminum with dimensions not exceeding 20.0 cm (7.87 in.) in diameter, and 18.7 cm (7.37 in.) in length.

The rear case shall be removable to facilitate wiring by incorporation of six 3/8-inch diameter bolts, and provisions made for connection of standard ½-inch pipe conduit.

The driver voice coil impedance shall be eight ohms (16 ohms on the 7110XC-16). The internal driver will employ a linen-based, molded phenolic diaphragm, 1½-inch diameter voice coil and "rim-centered" ferrite magnet structure. Replacement part 353 (439 for the 7110XC-16) voice.coil and diaphragm assembly shall be available.

The coupling diameter shall be standard 13/8--18-inch threads for screw-in attachment to horn. Weight of unit shall not exceed 5.4 kg (12.0 lb). Finish shall be baked-on acrylic gun metal gray. The University Sound Model 7110XC or 7110XC-16 is specified.

WARRANTY (Limited) — University Sound Speakers and Speaker Systems (excluding active electronics) are guaranteed for five years from date original purchase against malfunction due to defects in workmanship and materials. If such malfunction occurs, unit will be repaired or replaced (at our option) without charge for materials or labor if delivered prepaid to University Sound. Unit will be returned prepaid. Warranty does not extend to finish, appearance items, burned coils, or malfunction due to abuse or operation under other than specified conditions, including cone and/or coil damage resulting from improperly designed enclosures, nor does it extend to incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. Repair by other than University Sound will void this guarantee. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Service and repair address for this product:
University Sound, Inc., 600 Cecil Street
Buchanan, MI 49107 (AC/6160695-6831)

Applications and technical information for University Sound products:
University Sound, Inc., Technical Coordinator, Phone 818/362-9516, FAX 818/367-5292.

Specifications subject to change without notice.

BASIC GUIDELINES FOR THE USE OF HORNS AND DRIVERS WITHIN A SOUND SYSTEM.

DESIGNING FOR INTELLIGIBILITY AND ADEQUATE SPL

The Basic Idea

Many sound systems would have better performance if the following basic principles are kept in mind. Speakers with the appropriate coverage patterns should be chosen, aimed and powered to achieve a uniform direct field in the highly absorbtive audience, with no sound aimed at the reflective wall and ceiling surfaces. Where multiple speakers are required in order to achieve a uniform direct field, their coverage patterns should be only slightly overlapped, so that each section of the audience is covered by a single speaker. To the extent this ideal is achieved, reverberation is minimized and intelligibility is maximized.

The following material explains these concepts in more detail and illustrates two design approaches.

What is Reverberation?

Reverberation is the persistence of sound within an enclosure, such as a room, after the original sound has ceased. Reverberation may also be considered as a series of multiple echoes so closely spaced in time that they merge into a single continuous sound. These echoes decrease in level with successive reflections, and eventually are completely absorbed by the room.

Non-Reverberant Environments

An open, outdoor space is considered to be a non-reverberant environment, as virtually all sound escapes the area without reflection.

Variations in Level Due to Distance for Non-Reverberant Environments

In non-reverberant environments, such as outdoors, sound pressure level will be reduced by half (6 dB) every time the distance form the speaker is doubled (this is called the inverse-square law). Figure A shows the dB losses to be expected as distance from the speaker is increased from the one-meter (3.28-foot) measuring distance typically used in SPL specifications.

Reverberant Environments

Where sound is reflected from walls and other surfaces, there is a point beyond which the "reverberant field" dominates and the sound pressure level is higher and more constant than predicted by using the inverse-square law alone.

Variations in Level Due to Distance for Reverberant Environments

The reverberant field will begin to dominate typically at distances of 10 to 30 feet. This distance is greatest for the least reverberant rooms and speakers with narrow beamwidth angles. The frequency and beamwidth specifications provided by the data sheet are still required to obtain satisfactory distribution of the direct sound (or direct field) from the loudspeaker(s), which still follows the inverse-square law. It is the direct signal that contributes to speech intelligibility. This is why the sound system designer should seek a uniform direct field, with as little reverberant field as possible. For example, consider a single speaker with a wide beamwidth angle used to cover a long, narrow, reverberant room. The direct field will be so far below the reverberant field at the back of the room that speech will probably be unintelligible.

Calculating Variations in Level Due to Changes in Electrical Power

Each time the power delivered to the speaker is reduced by one-half, a level drop of 3 dB occurs. The nomograph of Figure B shows the the change in dB to be expected as the power varies from the one-watt input typically used in SPL specifications.

Power Handling

The power rating of a speaker must be known to determine whether a design is capable of meeting the sound pressure level requirements of the system. The power rating combined with the sensitivity will enable a system designer to calculate the maximum sound pressure level attainable at a given distance.

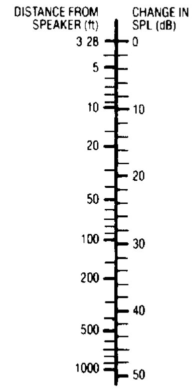


FIGURE A
Level Variation With Distance

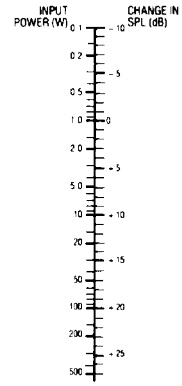


FIGURE B
Level Variation With Power

Powering to Achieve Both Average and Peak SPL

The average power that must be delivered to the speaker(s) to achieve the desired average SPL can be determined from the previously presented material on speaker sensitivity, level variation with distance and level variation with power. Enough additional power must be available to reproduce without distortion the short-term peaks that exist in voice and music program. This difference between the peak and average capability of a sound system, when expressed in dB, is often called "peak-to-average ratio," "crest factor" or "headroom." The peaks can be large, as noted earlier: at least 10 times the average (10 dB).

The better sound systems are designed for peaks that are 10 dB above the average, although 6 dB of headroom is sufficient for most general-purpose voice paging systems. The 10-dB peaks require amplifier power ten times that required for the average sound levels. The 6-dB peaks require four times the power.

Utilizing Speaker Beamwidth Information for Maximum Intelligibility

Knowing the beamwidth angle of a loudspeaker can aid in providing a uniform direct field in the listening area. After selecting a desired speaker location, the beamwidth angle needed to adequately cover the listeners without spilling over to the walls or ceilings must be determined. Once these angles are known, the correct speaker can be found by using catalog specifications.

Using Easy-VAMP™ and Floor-Plan Isobars

In some circumstances, it is desirable to use an approach that is more detailed than using the basic horizontal and vertical beamwidth angles. Environments which have excessive reverberation or high ambient noise levels make it especially difficult to achieve the desired SPL and intelligibility.

In recent years, a number of computer-based techniques have been developed to help sound system designers. Some of the more complex systems use personal computers, with relatively sophisticated graphics. Simpler systems, such as Electro-Voice's VAMP™ (Very Accurate Mapping Program), utilize clear overlays and require programmable scientific calculators. However, the hardware/software and training investment required to utilize even the simpler systems are not attractive to some sound systems designers. Because of this, University Sound has developed a special adaptation of VAMP, called Easy-VAMP™, which provides a similar design aid without the complexity and cost of the VAMP programs.

More information on both the Easy-VAMP™ and floor-plan isobars can be found in the University Sound Guide.

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