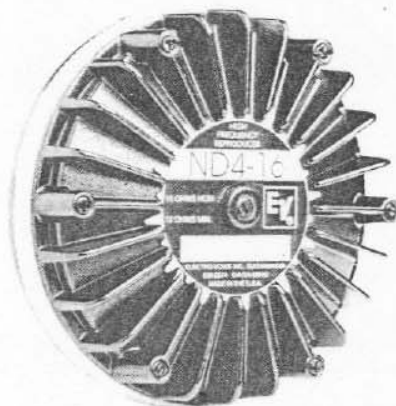
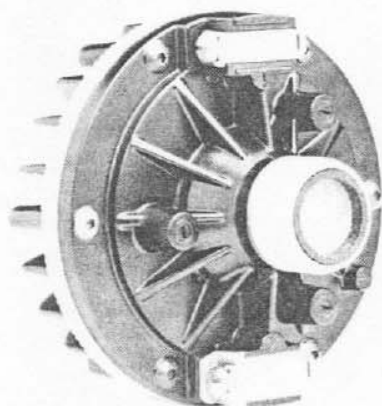




ND4-8 ND4-16

High-Frequency Drivers

- N/DYM® high-energy magnet structure cuts the weight to half that of comparable conventional drivers —only 1.6 kg (3.6 lb.)
- Small overall dimensions fit in tight places
- Pure titanium dome provides extended high-frequency response
- Lightweight aluminum voice-coil for maximum efficiency
- Double screw-down terminal blocks allow daisy chaining and accept 10-gauge wire

SPECIFICATIONS

The following specifications are in accordance with or exceed the "AES Recommended Practice for Specification of Components Used in Professional Audio and Sound Reinforcement" (AES2-1984; ANSI S4.26-1984).

Power Frequency Response:

1 kHz to 20 kHz (essentially flat 1 kHz to 3 kHz with 6-dB-per-octave roll-off to 20 kHz, rapid roll-off beyond.)

Nominal Impedance:

ND4-8:

8 ohms

ND4-16:

16 ohms

Minimum Impedance on HP Series Horns above 800 Hz:

ND4-8 (see Figure 6):

6.2 ohms

ND4-16 (see Figure 8):

11.8 ohms

Minimum dc Resistance:

ND4-8:

4.5 ohms

ND4-16:

10.9 ohms

Long-Term Average Power Capacity on HP Horn, Indicated Bands of Pink Noise, 8 ohms impedance assumed,

24 Hours, 10-dB crest factor:

40 Watts (800-20,000 Hz)

2 Hours, 6-dB crest factor:

50 Watts (800-8,000 Hz)

60 Watts (1,500-15,000 Hz)

Nominal Efficiency:

25%

Maximum Long-Term Acoustic Power Output (24 hours):

10 Watts

Recommended Minimum Crossover

Frequency:

800 Hz

Sound Pressure Level at 1 Meter 1 Watt

Input, HT94 horn:

111 dB

Throat Diameter:

2.54 cm (1.00 in.)

Voice-Coil Diameter:

5.08 cm (2.00 in.)

Voice-Coil Construction:

Pure aluminum wire wound on high-temperature polyimide form.

Diaphragm Construction

Integral all-titanium construction consisting of spherical diaphragm dome and geometrically optimized suspension; high-temperature, long-duration-cure adhesive bonds the coil form to the diaphragm.

Electrical Connection

Double screw-down terminal blocks with color-coded insulators accept #10 AWG or smaller conductors; double terminals permit daisy chaining multiple drivers

Polarity:

A positive voltage applied to the positive (brass-colored) terminal produces a positive acoustic pressure in the throat.

Mechanical Connection:

1 3/8 in.-18 thread, 15.9 mm (5/8 in.) long, for any standard screw mount.

Dimensions,

Overall Diameter (see Figure 2):

125.2 mm (4.93 in.)

Overall Depth:

85.1 mm (3.35 in.)

Net Weight:

1.6 kg (3.6 lb)

Shipping Weight:

2.0 kg (4.5 lb)

DESCRIPTION

The Electro-Voice ND4 is a high-performance high-frequency driver capable of unprecedented acoustic power output over a wide frequency range. This performance results from expert engineering and design, involving careful selection of materials and advanced driver architecture which are ideally suited for efficient presentation of high quality musical and communication program material. Features of the ND4 include:

1. A unique, geometrically optimized diaphragm consisting of a one-piece dome and suspension fabricated from pure titanium. Advanced metal-forming and processing technology developed by EV engineers allows this design to be formed from stock a mere 0.03 mm (0.0012 in.) thick. The combination of diaphragm geometry and material choice gives the ND4 diaphragm an ideal combination of superb high-frequency response and resistance to fatigue from stress.
2. A precision, lightweight voice coil made from pure aluminum wire, which gives the ND4 high magnetic motor strength and maximum efficiency. Proprietary high-temperature winding and electrical bonding technologies assure excellent coil reliability and performance.
3. Optimized aluminum diecast construction which reduces weight. A highly-ribbed, front casting resists stress while a finned back plate improves heat dissipation, increasing reliability under long-term, high-power use. The ND4 is constructed with a water-resistant gasket making it suitable for outdoor use.

ND4-8, ND4-16 SPECIFICATION GRAPHICS

FIGURE 1 — Axial Frequency Response on HP9040 Horn
(anechoic environment, 1 watt at 1 meter)

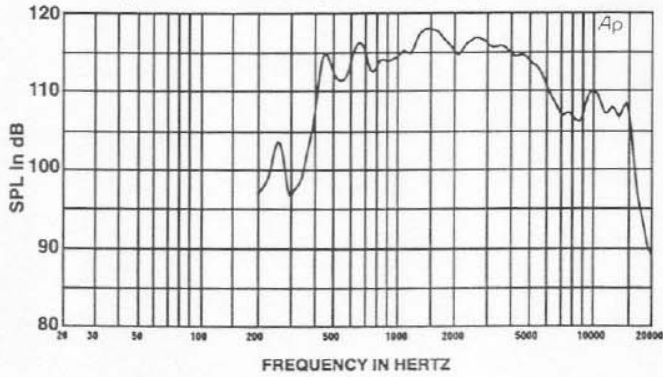


FIGURE 2 — Dimensions

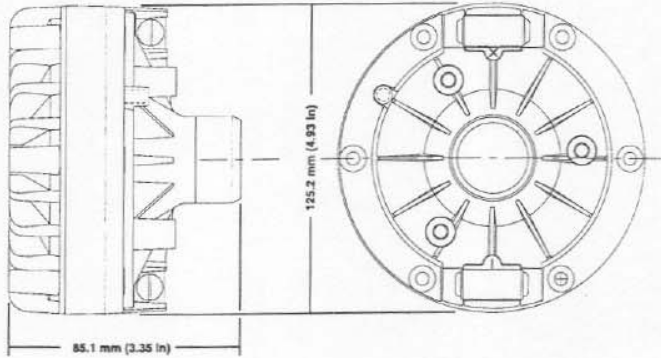


FIGURE 3 — Distortion Response at 3 watts, on 1-Inch Plane-Wave Tube

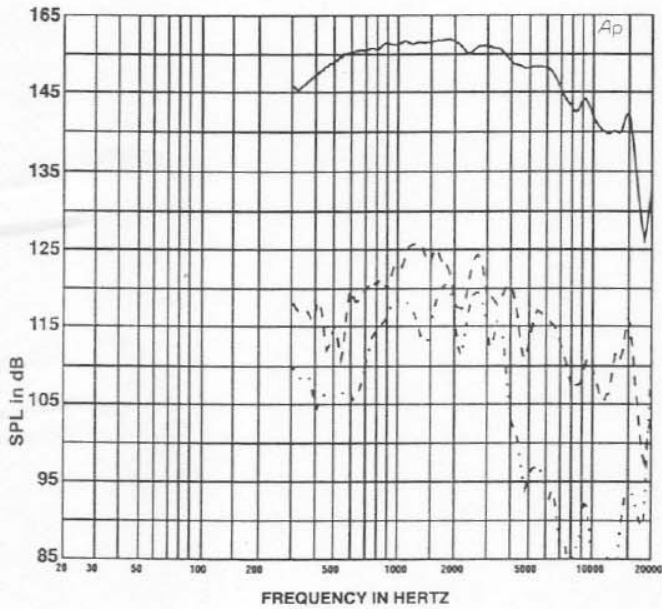


FIGURE 4 — Distortion Response on HP9040 Horn
(anechoic environment, 3 watt at 1 meter)

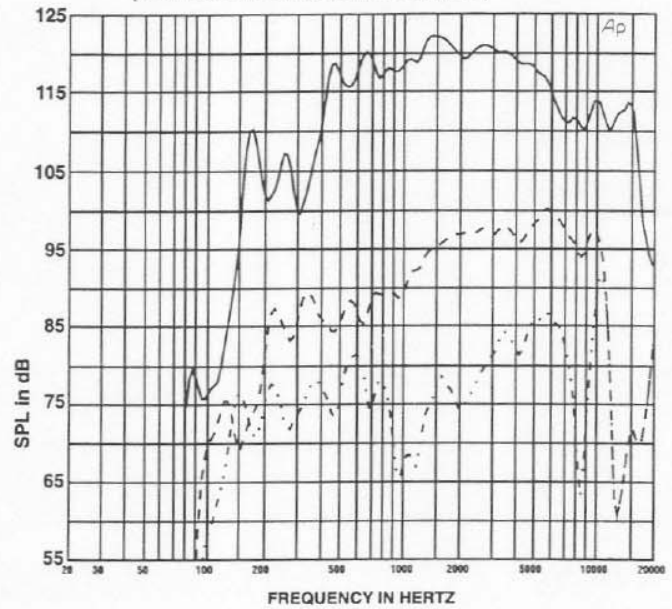


FIGURE 5 — Impedance Response, 1-Inch Plane-Wave Tube, 8-Ohm Driver

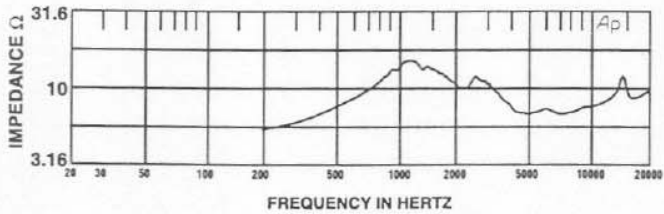


FIGURE 6 — Impedance Response, On HP9040, 8-Ohm Driver

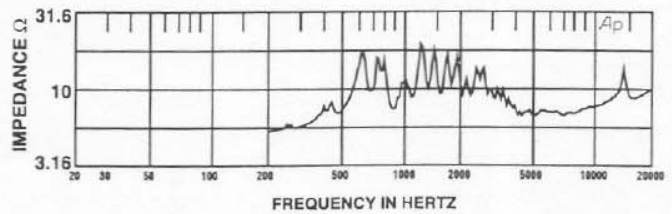


FIGURE 7 — Impedance Response, 1-Inch Plane-Wave Tube, 16-Ohm Driver

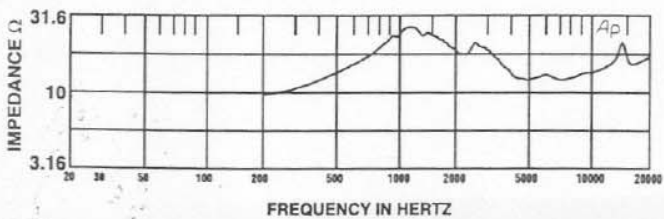
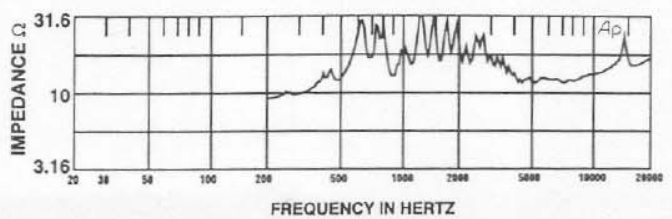


FIGURE 8 — Impedance Response, On HP9040, 16-Ohm Driver



4. An improved magnet structure that employs high-energy neodymium. A smaller magnet structure that cuts the weight in half compared to the DH2Amt and other drivers of equivalent performance.
5. Smaller size, which allows more effective use in Manifold Technology® systems or any other application where space is limited. A black zinc coating on the magnet and cover-plate surfaces improves heat dissipation away from the coil gap.

Figure 1 shows the free-field 1-watt/1-meter on-axis sensitivity versus frequency of the ND4 on an HP9040 large-format constant-directivity horn. Figures 3 and 4 show ND4 distortion response on a plane-wave tube and HP9040 horn, respectively. Note that the fundamental (upper) curve in Figure 3 (plane-wave tube) is the power response of the ND4, showing total acoustic output versus frequency, unaffected by horn directivity changes. Figures 5 through 8 show impedance responses with both tube and horn loads.

RECOMMENDED HORNS

Electro-Voice HP series horns with suitable 1 3/8-18 screw-in to "2-inch" adapter, or 1 3/8-18 screw-in horns without adapter (such as the Electro-Voice HP94.) Note that required cross-over will vary with the application and specific horn used.

IMPEDANCE

See representative curves on Figures 5 through 8. Note that actual impedance figures are dependent on the specific horn used.

CROSSOVER AND EQUALIZATION

As with all horn/driver combinations that combine high overall efficiency with constant directivity, the ND4 and HP series horns provide "raw" or unequaled frequency response that rolls off above 3,000 Hz at 6 dB per octave. Such equalization can be provided by a number of commercially available crossover/equalizer products.

DISTORTION

Note distortion curves on Figures 3 and 4.

FIELD REPLACEMENT

In case of voice-coil or diaphragm failure, the diaphragm cover subassembly can be replaced by simply removing the driver from the front housing, then replacing the cover subassembly itself by the removal of six cover screws. A replacement kit with instructions may be ordered under Electro-Voice Part No. 81161XX (8 ohm) and 82816XX (16 ohm) from the Electro-Voice Service Department in Buchanan, Michigan. If desired, the complete driver may be returned for service. Note that these diaphragm subassemblies are identical with those

used in the DH2 family of drivers.

AES RECOMMENDED PRACTICE

The ND4 specifications conform to the AES Recommended Practice for Specification of Components Used in Professional Audio and Sound Reinforcement (AES2-1984/ANSI S4.26-1984). This recommended practice was developed over a number of years by consultants, manufacturers and government agencies from around the world, so that the detailed performance information required in professional applications could be provided in a unified format. The recommended practice has been published in the October, 1984, issue of the Journal of the Audio Engineering Society (vol. 26, pp. 771-780). Individual copies of the recommended practice are available from the Audio Engineering Society, 60 East 42nd Street, New York, New York 10165, USA. Also appearing in this issue is an article which comments on the recommended practice from an engineering point of view (C.A. Henricksen, "Engineering Justifications for Selected Portions of the AES Recommended Practice for Specification of Loudspeaker Components," pp. 763-769). The comments in this article will be particularly of interest to those not involved in the day-to-day design and testing of loudspeakers.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The loudspeaker shall be of the compression-driver type consisting of a 0.031-mm (0.0012-in.) thick titanium diaphragm joined to an edge-wound aluminum ribbon voice coil on a polyimide form.

The nominal impedance shall be 8 ohms (ND4-8) or 16 ohms (ND4-16). The loudspeaker shall exhibit essentially flat power response from 1,000 to 3,000 Hz, with a smoothly rolled-off response from 3,000 to 20,000 Hz. Its mid-band efficiency shall not be less than 25%.

The loudspeaker shall be capable of handling a 40-watt, 800- to 20,000-Hz pink-noise signal with a 10-dB crest factor (300 watts peak) for a period of 24 hours. In addition, it shall be capable of handling a 50-watt, 1,000- to 8,000-Hz pink-noise signal and a 60-watt, 1,500- to 15,000-Hz pink-noise signal, both with 6-dB crest factors for a period of two hours.

The loudspeaker shall have a diameter of 125 mm (3.9 in.) and a depth of 85 mm (3.35 in.). It shall have a 1 3/8-18 thread mount with a 1-inch throat opening.

The unit shall weigh no more than 1.6 kg (3.5 lb).

The loudspeaker shall be the Electro-Voice

model ND4-8 (ND4-16) compression driver.

WARRANTY (Limited)

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). **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.

Specifications subject to change without notice.

Electro-Voice®

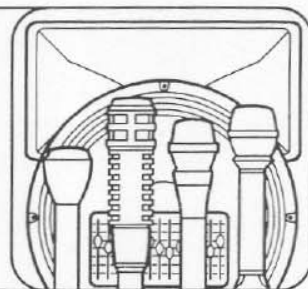
a MARK IV company

600 Cecil Street
Buchanan, Michigan 49107

Phone: 616-695-6831

FAX: 616-695-1304

Pro Sound Performance Comparisons



No. 6—March 1996

Compression Driver Comparison: EV ND4 versus JBL 2426

The JBL 2426H is a "small format" compression driver with a 44.5-mm (1.75-in.) diameter diaphragm, a 25.4-mm (1.0-in.) screw- or bolt-on exit and a conventional magnetic structure. The Electro-Voice ND4-8 is a small-format driver with a 50.8-mm (2.0-in.) diaphragm, a 25.4-mm (1.0-in.) screw-on exit and a high-energy, N/DYM® neodymium magnetic structure. (The optional ADH-2 adapter allows mounting to 25.4-mm (1.0-in.) bolt-on horns.) Both drivers have titanium diaphragms and a nominal 8-ohm impedance (see additional comments below).

While the neodymium magnetic structure adds cost to the ND4, it provides, relative to the JBL 2426, significant savings in size and weight, plus (with the same voltage applied) 3- to 5-dB more output above 3 kHz. Corrected for the unusually low actual (versus nominal) impedance of the JBL 2426, the output difference for equal actual power into the devices increases to the range of 4.8 to 6.8 dB (see below). For many applications—those with crossovers of, say, 1,500 Hz and above—this means that a single ND4 can replace two JBL 2426's, without the destructive interference of two separate horn/driver systems operating in the same pass band.

The physical comparisons are shown in Table 1; the acoustic and impedance comparisons are shown in Figure 1.

Notes on EV/JBL Impedance Differences

While both the ND4-8 and 2426H carry the same 8-ohm *nominal* impedance rating, Figure 1 shows that the *actual* impedance of the 2426H is considerably lower than that of the ND4-8. The median value of the ND4-8 over the 1- to 20-kHz range is about 8.4 ohms; that of the 2426H is about 5.6 ohms. This means that for 1 volt applied, as in the tube measurements of Figure 1, the 2426H is drawing about 1.8 dB more power than the ND4-8. ***This overstates the sensitivity of the 2426H by a like amount.***

1. $P_{EV} = 1^2/8.4 = 0.12$ watts; $P_{JBL} = 1^2/5.6 = 0.18$ watts. $P_{EV}/P_{JBL} = 0.12$ watts/0.18 watts = 0.6667. $10\log_{10} 0.6667 = -1.8$ dB. This means that with the same power input instead of the same voltage input, the EV ND4 will produce about 1.8 dB more output than the equal-voltage-applied tube curves indicate.

FIGURE 1 — Total Acoustic Power Output versus Frequency and Impedance versus Frequency,
EV ND4-8 vs. JBL 2426H (25.4-mm (1-in.) plane-wave tube, 1 volt applied)

