

Electro-Voice®

a MARK IV company

FORCE®
10/12/15

**Musical
Instrument
Loudspeakers**

SPECIFICATIONS

Nominal Diameter,

FORCE 10: 254 mm (10 in.)
FORCE 12: 305 mm (12 in.)
FORCE 15: 381 mm (15 in.)

Nominal Impedance,

FORCE 10: 8 ohms
FORCE 12: 8 ohms
FORCE 15: 8 ohms

**Long Term Average Power Handling
Capacity (per EIA Standard RS-426A),**

FORCE 10: 150 watts
FORCE 12: 150 watts
FORCE 15: 150 watts

**Sound Pressure Level at 1 Meter, 1 Watt into
Nominal Impedance (using spectrum specified
in EIA Standard SE103 Section SE3),**

FORCE 10: 98 dB
FORCE 12: 99 dB
FORCE 15: 100 dB

Usable Frequency Response,

FORCE 10: 75-7000 Hz
FORCE 12: 60-7000 Hz
FORCE 15: 45-6000 Hz

Voice Coil Diameter,

FORCE 10: 63.5 mm (2.5 in.)
FORCE 12: 63.5 mm (2.5 in.)
FORCE 15: 63.5 mm (2.5 in.)

Magnetic Assembly Weight,

FORCE 10: 4.54 kg (10 lb)
FORCE 12: 4.54 kg (10 lb)
FORCE 15: 4.54 kg (10 lb)

**Baffle Opening Diameter
(front or rear mounting),**

FORCE 10: 229 mm (9 in.)
FORCE 12: 279 mm (11 in.)
FORCE 15: 353 mm (13.88 in.)

Overall Diameter,

FORCE 10: 259 mm (10.2 in.)
FORCE 12: 310 mm (12.2 in.)
FORCE 15: 384 mm (15.1 in.)

Overall Depth,

FORCE 10: 122 mm (4.8 in.)
FORCE 12: 130 mm (5.1 in.)
FORCE 15: 163 mm (6.4 in.)

Net Weight,

FORCE 10: 5.44 kg (12.0 lb)
FORCE 12: 5.8 kg (12.8 lb)
FORCE 15: 5.8 kg (12.8 lb)

Frame Composition,

FORCE 10: diecast aluminum
FORCE 12: diecast aluminum
FORCE 15: diecast aluminum

THIELE-SMALL PARAMETERS

**f_s
Free-Air Resonance Frequency,**

FORCE 10: 65 Hz
FORCE 12: 55 Hz
FORCE 15: 40 Hz

Q_{ts}

Total Q at f_s ,
FORCE 10: .38
FORCE 12: .44
FORCE 15: .51

V_{as}

Volume of Air Having Same Acoustic
Compliance as Driver Suspension,
FORCE 10: .0425 m³ (1.5 ft³)
FORCE 12: .0878 m³ (3.1 ft³)
FORCE 15: .2974 m³ (10.5 ft³)

η_0

Half-Space Reference Efficiency,
FORCE 10: 2.6%
FORCE 12: 2.9%
FORCE 15: 3.3%

V_d

Peak Displacement Volume of Diaphragm,
FORCE 10: 104.4 cm³ (6.4 in.³)
FORCE 12: 166.2 cm³ (10.1 in.³)
FORCE 15: 282.2 cm³ (17.2 in.³)

S_d

Effective Diaphragm Area,
FORCE 10: 316.1 cm² (49 in.²)
FORCE 12: 503.3 cm² (78 in.²)
FORCE 15: 855.3 cm² (132.6 in.²)

X_{max}

Peak Linear Displacement of Diaphragm,
FORCE 10: 3.3 mm (.13 in.)
FORCE 12: 3.3 mm (.13 in.)
FORCE 15: 3.3 mm (.13 in.)

R_e

DC Resistance of Voice Coil,
FORCE 10: 5.2 ohms \pm 10%
FORCE 12: 5.2 ohms \pm 10%
FORCE 15: 5.2 ohms \pm 10%

DESCRIPTION

The FORCE 10-, 12-, and 15-inch loudspeakers are designed for professional high level, high quality musical instrument and sound reinforcement systems. Power capabilities are 150 watts per EIA Standard RS-426A.

The construction of FORCE loudspeakers features a low mass voice coil on a rugged laminated Polyimide coil form, driven by a 10-lb magnetic structure. Also featured are a heavy duty curvilinear cone and a fatigue-resistant cone suspension. Both the coil and magnetic structure are vented. All of this is packaged in a husky eight-spoke diecast aluminum frame with a heat radiating finned back cover.

FORCE speakers may be front or rear mounted without an adapter. The optional SMH-1 speaker mounting kit, including T-nuts and complete instructions facilitates front mounting.

POWER HANDLING TEST

The FORCE 10, 12, and 15 are designed to withstand the power test described in EIA Standard RS-426A. 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 1200 Hz with a 3-dB-per-octave slope above 1200 Hz. This shaped signal is sent to the power amplifier with the continuous power set at 150 watts into the 5.6 ohms EIA equivalent impedance (29 volts true RMS). Amplifier clipping sets instantaneous peaks at 6 dB above the continuous power, or 600 watts peak (58 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

RECOMMENDED ENCLOSURES

Replacement use in existing enclosures

FORCE loudspeakers will often be used to replace inferior speakers in existing enclosures. Mechanical and electrical characteristics are such that the superior efficiency, sound quality, and reliability of FORCE loudspeakers will be realized in virtually any sealed, vented (bass reflex), horn, or open-backed enclosure.

VENTED ENCLOSURES

The most extended, lowest distortion, and best controlled bass performance is usually realized in properly designed vented enclosures. In such designs, the vent, or port, actually reproduces the lowest octave or so of bass response. The vent is driven to full acoustic output by a relatively small motion of the speaker cone itself, acting through the air contained within the enclosure. The excursion of the speaker at these frequencies is much reduced compared to sealed or open-backed enclosures, directly reducing harmonic distortion and the possibility of speaker "bottoming."

INSTALLATION

FORCE speakers may be front or rear mounted, although front mounting is preferred because of convenience. For simple front mounting, the convenient SMH-1 mounting accessory is recommended. Complete mounting instructions are included with the SMH-1. Instructions for standard front mounting are given below. It is important that recommended baffle openings and mounting hole locations be followed as stated in the specifications table.

For front mounting, mark baffle opening and screw locations on the blank panel first. Drill the screw holes before cutting the large baffle opening. If 1/4-20 screws are used, four screws are sufficient for secure mounting of

the speaker. T-nuts are recommended for simple, secure mounting. If T-nuts are used, the holes should be .28" diameter (letter L drill). Apply glue to the flanges of 1/4-20 long shank T-nuts before driving into the rear of the holes.

Sealing of the front-mounted speaker is accomplished with the adhesive-backed foam gasket segments. Strip off protective paper and apply gasket to the rear mounting surface of the speaker rim, making certain that holes in the gasket line up with the mounting holes in the speaker frame.

Length of the 1/4-20 screws should be 1/2" plus the panel thickness when using T-nuts. The screws must have fillister heads to seat down in the recess of the speaker frame. Screws should be tightened evenly and securely. Maximum torque possible with a proper size screwdriver should be sufficient.

IMPORTANT! When front mounting, the screw head must fit down into the front gasket cutout.

Rear mounting requires the same diameter cutout and screw circle as front mounting. Other comments regarding the use of T-nuts apply to rear mounting as well.

Screw length should be 3/4" plus panel thickness if using T-nuts — longer for standard hex nuts. If hex nuts are used, a second nut should be tightened against the first nut to prevent loosening during operation. A lock washer and flat washer are recommended between the screw head and frame.

Screws should be tightened evenly, but not excessively. Maximum torque possible with a proper size screwdriver should be sufficient. Do not use adhesive-back gasket segments for rear mounting.

If a cabinet is to be constructed from scratch, 1/4-inch solid and jointed or marine plywood is recommended. After construction, be certain interior is completely free of metal filings, wood chips, etc.

CONNECTIONS

Use No. 18 or larger stranded wire to connect the two terminals on the loudspeaker to the amplifier output. If a choice of amplifier output impedance is available (4, 8, 16 ohms), a single FORCE speaker should be connected to the 8-ohm tap. Two FORCE speakers may be connected in parallel as shown in Figure 1. Be sure to connect the red terminals together. If series wiring is desired, wiring and polarity should follow Figure 2.

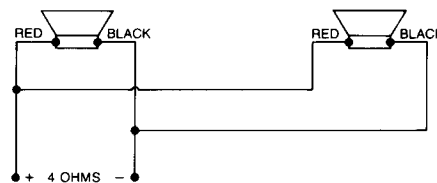


FIGURE 1
Connection of 2 FORCE
Speakers in Parallel

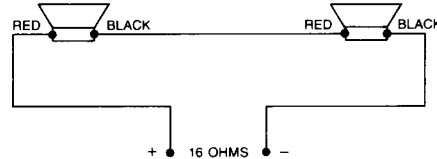


FIGURE 2
Connection of 2 FORCE
Speakers in Series

WARRANTY (Limited)

Electro-Voice Speakers and Speaker Systems (excluding active electronics) are guaranteed for five years from date of 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 the proper Electro-Voice service facility. 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 Electro-Voice or its authorized service agencies will void this guarantee. A list of authorized warranty service agencies is available from Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107 (AC/616-695-6831); or Electro-Voice West, 8234 Doe Avenue, Visalia, CA 93291 (AC/209-651-7777). 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: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.

Specifications subject to change without notice.



ELECTRO-VOICE, INC., 600 Cecil Street, Buchanan, Michigan 49107

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