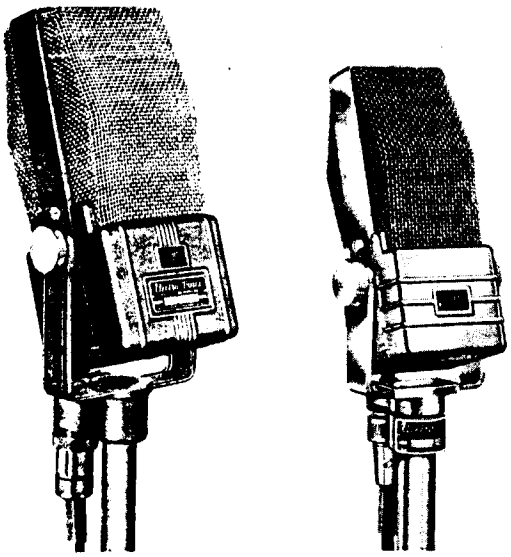
Electro-Voice
MICROPHONES
ELECTRO VOICE, INC.
Buchanan, Michigan

TECHNICAL DATA SHEET No. 36
MODELS V-1A, V-2A, V-3
TYPE .....VELOCITY

The velocity microphone, also known as the "pressure gradient" type, responds to the difference in instantaneous sound pressure on the front and back of the moving element.

The velocity microphone has a bidirectional pick-up pattern and an inherently flat frequencey response. It is a type of microphone widely used in studio broadcasting and recording.



Models V-3, V-2A Model V-1A
FIG. 1 — E-V VELOCITIES

PHYSICAL

ELECTRO-VOICE velocity microphones are based on proven design and are extremely durable. The frame and internal mounting structure is a single piece, high pressure die-casting. Jars and mechanical shock cannot cause shifting of parts. This is an exclusive feature of all ELECTRO-VOICE velocity microphones. The microphone cradle is steel reinforced. Knurled knobs at the sides permit locking the microphone firmly in any position.

Models V-3 and V-2A utilize Alnico V and Armco magnetic iron combined in a non-welded magnetic circuit. The transformer core is made of nickle alloy iron, hydrogen annealed. The coils have low distributed capacity for reproduction of high frequencies. E-V's exclusive Acoustalloy diaphragm employed with the dynamic circuit gives these pressure gradient microphones a unique ruggedness found in no other velocity.

The pole pieces and magnetic assembly of Model V-1A are secured directly to the frame. The ribbon is of specially rolled material to provide high sensitivity and long life. The magnetic structure is so located as to provide most efficient utilization of the magnetic flux.

ACOUSTICAL

The open housing virtually eliminates internal reflection and diffraction. This assures full utilization of the velocity microphone's high fidelity characteristic. True reproduction without imposed peaks and dips is the result of an efficient magnetic circuit and the Acoustalloy diaphragm which provides a smoother response over a wider frequency range, in Models V-3 and V-2A. In Model V-1A proper coordination of ribbon fabrication, pole piece design, magnetic circuit placement and correct transformer coupling provides a high fidelity response characteristic. The frequency response curve is ideally adapted to voice and music reproduction. Bidirectional polar pattern is shown in Figure 2.

ELECTRICAL

It is an inherent characteristic of the ribbon velocity microphone (Model V-1A) that the output level is somewhat lower than that of a pressure microphone, consequently it is usually

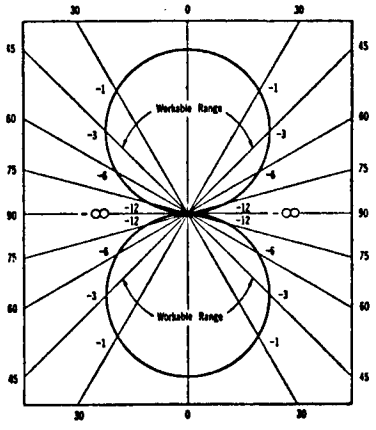


FIG. 2. — BIDIRECTIONAL POLAR PATTERN
Indicates the output in decibels versus angle of pick-up.

advisable to use the gain control on the amplifier in a correspondingly higher position. The gain of the V-2A and V-3 is sufficiently high so that the microphones can be used with any amplifier interchangeably with crystal or dynamic microphones.

The velocity microphone retains its excellent frequency characteristic when used at distance of more than six inches from the sound source. When used at less than this distance, the microphone has a tendency to accentuate the low frequencies. This, however, may be desirable in certain instances . . . to compensate for associated equipment deficient in low frequencies or a voice that lacks depth, for example.

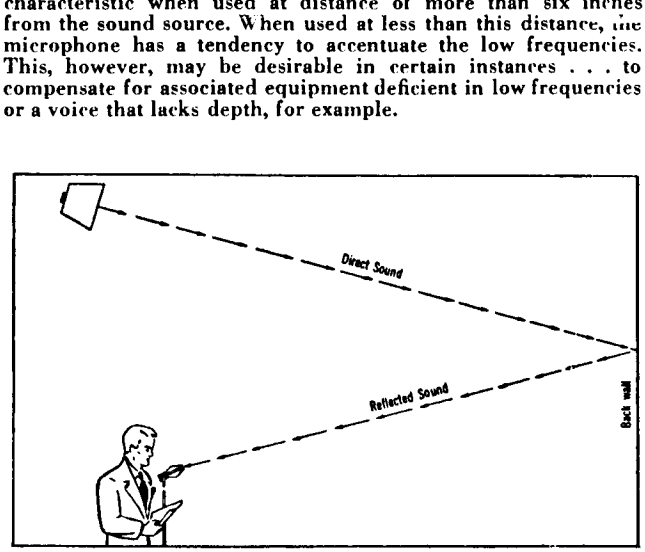


FIG. 3. — TILTING MICROPHONE
REDUCES ACOUSTIC FEEDBACK

The bidirectional characteristic of the velocity gives equal pick-up at the front and back of the microphone and zero pick-up at the sides, top and bottom. Figure 2 indicates the output in decibels versus angle of pick-up. For all practical purposes the frequency response remains constant at all angles. The null or zero pick-up at the sides gives the velocity microphone the following advantages:

1. Pick-up is increased 1.7 times over that of the conventional pressure microphone for average conditions of reverberation, acoustic feedback and room noise. For public address applications this pick-up range may be increased considerably through proper placement of speakers so that direct and reflected sounds strike the microphone at the null points (sides, top or bottom.)

2. Random room noise and reverberation are reduced 5 db.

3. The microphone may be placed so as to almost completely eliminate unwanted sounds.

4. Acoustic feedback can be further reduced by tilting the microphone to place the null sides in the direction of the interfering sounds. See Figure 3.

5. The microphone can be worked from both front and back simultaneously.

APPLICATIONS

E-V velocity microphones are recommended for all types of music and voice reproduction . . . in public address, broadcasting and recording. Wide frequency response, high fidelity characteristics, wide-range front pick-up and pick-up range make these microphones ideal for solo or orchestra — for individual or chorus — for single speaker or groups. Very popular with singers and band leaders. Mounted in footlights or on overhead booms, they are used in reinforcing stage plays.

MECHANICAL

"ON-OFF" Switch: Sliding contact type switch is an integral part of all models. Switch short circuits the transformer secondary in "OFF" position.

Shock Absorber: V-2A and V-3: Built into head.
V-1A: Built into stand coupler.

Cradle: Steel reinforced. Permits tilting and locking of microphone in any position.

Stand Coupler: Standard ⅝"-27 thread.

Cable Connector: Models V-3 and V-2A — Locking three contact, wiping type built into microphone cradle. Permits tilting microphone without strain on connector or cable.

Model V-1A — Locking single run contact, pressure type, built into microphone cradle. Permits tilting microphone without strain on connector.

Cable Connections: Model V-3 — Terminal No. 1, shield (ground); No. 2 and 3, line. When switch is in Hi-Z position, Terminals No. 1 and 2 are ground, No. 3 is line.

Model V-2A—High impedance: Terminal No. 1 shield (ground); Terminal No. 2 blank; No. 3, line. Low impedance: Terminal No. 1 shield (ground); No. 2 and 3 line.

Cable: Standard high impedance models equipped with 20 feet of well shielded cable. (Total capacity .0007 mfd.). As the high impedance output of velocity type microphones is approximately 25,000 or 35,000 ohms, long cables should be avoided. When cable lengths of more than 40 or 50 feet are required, it is recommended that low impedance models with suitable coupling transformer (such as ELECTRO-VOICE Model 502) be used. The attenuation effect of extra cable length on high impedance types is shown in Figure 4.

Case: Microphone case is of highest purity (99.99%) pressure-cast metal.

Finish: Models V-3 and V-2A. Gray baked enamel.
Model V-1A. Satin chromium.

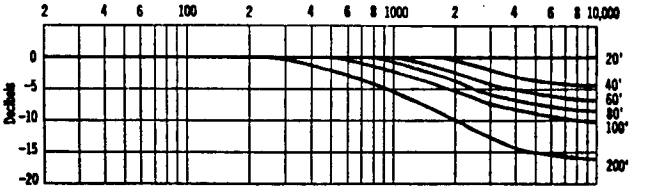


Fig. 4. Attenuation Effect of Extra Cable Length when Installed on 35,000 ohm (Hi-Z) Microphones. Based on cable capacity of .0007 Mfd./20 ft. (DB loss = $20 \log_{10}\sqrt{(RC\omega)^2 + 1}$).

Output Level: Models V-3 and V-2A. Voltage: Hi-Z (25,000 ohms) (O db = 1 volt/dyne/cm²) -53 db. RMA Sensitivity Rating -149 db. Voltage developed by normal speech .022 volt across Hi-Z output.

Model V-1A. Voltage: Hi-Z (35,000 ohms) (O db = 1 volt/dyne/cm²) -63 db. RMA Sensitivity Rating -159 db. Voltage developed by normal speech .007 volt across Hi-Z output.

Internal Impedance: Model V-3: Vari-Z Selector mounted on rear of case. Permits selection of 50, 250, 500 or Hi-Z (25,000 ohms) output impedances. Low impedances are balanced to ground. High impedance tap provides single input lead and ground.

Model V-2A. Single impedance only. Hi-Z (direct to grid, 25,000 ohms) or 50, 250 or 500 ohms. Low impedances balanced to ground.

Model V-1A. Single impedance only. Hi-Z (direct to grid, 35,000 ohms) 50, 250 or 500 ohms. Low impedances not balanced to ground.

Frequency Response: Models V-3 and V-2A. 40-10,000 c.p.s., substantially flat.

Model V-1A. 40-9,000 c.p.s., substantially flat.

Polar Pattern: Bidirectional voltage output proportional to cosine of angle of pick-up. For all practical purposes, the frequency response remains constant at all angles of pick-up. See Figure 2.

Dimensions: See Figure 5. Models V-3 and V-2A. Dimension A: 2½", Dimension B: 3½", Dimension X: 8", Dimension Y: 2¾".

Model V-1A. Dimension A: 2", Dimension B: 2¾", Dimension X: 6½", Dimension Y: 2⅛".

Net Weight: Models V-3 and V-2A: 2½ pounds.
Model V-1A: 2 pounds.

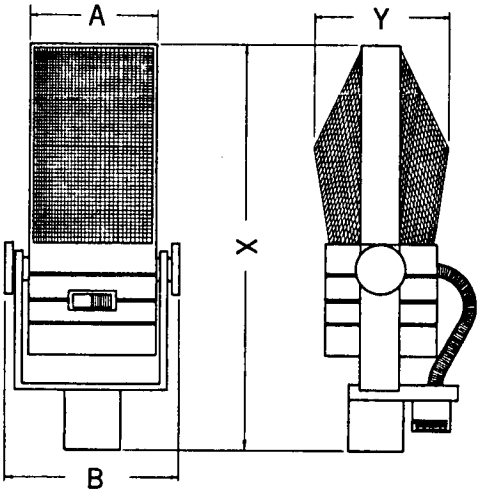


FIG. 5. — DIMENSION DRAWING
See proper dimensions for each model in paragraph above.

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